TAYLOR ENGINEERING, INC.

ADDENDUM NO. 2

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

MANDATORY PRE-BID MEETING

A copy of the agenda and attendance sheet is provided in **ATTACHMENT 1**.

SUMMARY OF QUESTIONS AND RESPONSES

1. **QUESTION:** Is this a state funded project or Federally funded. My understanding of FIND is that they are state funded.

   RESPONSE: State-funded. Please refer to the FIND website: http://aicw.org/mission.jsp.

2. **QUESTION:** What is the Engineers or (F.I.N.D.) estimate for the Dredged Material Management Area DU-9 Expansion project?

   RESPONSE: The Engineers estimate is between $1 and $5 million.

3. **QUESTION:** What is the weight limit of the bridge on the entrance road?

   RESPONSE: Unfortunately, Dee Dot was unable to locate a copy of their bridge report with the weight limit; however, they did note that their timber trucks weigh around 80,000 lb.

4. **QUESTION:** Please clarify timber walkway repair.

   RESPONSE: The timber walkway repair is limited to the decking. For cost estimating, assume 50% board replacement as stated in SECTION 06 11 00.

5. **QUESTION:** Where is the discharge point for dewatering?

   RESPONSE: The Contractor is responsible for acquisition of the NDPES permit. Given the site history, the discharge point for dewatering will likely need to occur within the property boundaries of the project. The attached April 2015 Golder Associates report (**ATTACHMENT 2**) was provided during permitting portion of the project.

6. **QUESTION:** Is there additional geotechnical information available?

   RESPONSE: Appendix D of the original Bid Advertisement contains the bulk of the information; however, we did locate and attach (**ATTACHMENT 3**) a 2004 geotechnical report by the U.S. Army Corps of the Engineers.

7. **QUESTION:** Does the slurry wall comprise of bentonite? Does the material need to be hauled off-site?

   RESPONSE: Addendum No. 1 issued on January 11, 2017 contained additional details (As-Built Drawings and original specifications) concerning the bentonite slurry wall.

8. **QUESTION:** Timber designated for clearing and grubbing. Can we burn? Is the material considered the Contractors? Can we visit again to assess timber?

RESPONSE: Per SECTION 31 00 00, burning is not allowed. However, after Award, the selected Contractor may negotiate with Dee Dot Ranch about potential burning activities. Necessary permits will need to be acquired at no additional cost to the Owner. The timber material is considered to be the Contractor's to dispose of as they wish. A site visit, routed to the attendees of the mandatory pre-bid meeting, occurred at 9 AM on Thursday, January 26 to allow for additional site access. An additional site visit may be scheduled if there is enough interest. For cost estimating purposes, the Contractor shall assume that burning is not allowed. If burning is requested and approved, an appropriate Work Order modification will be negotiated.

9. **QUESTION:** Are there any identified eagles or indigo snakes?

RESPONSE: An Environmental Scientist did walk the site on June 3, 2016 and did not identify any eagles during the site visit. The area is prime habitat for indigo snakes; however, none were identified during the site visit.

10. **QUESTION:** Cut/Fill Balance and unsuitable material.

RESPONSE: Adjusted for an assumed 18% shrinkage due to compaction, the cut/fill earthwork with the interior elevation of 12.4 feet NAVD 88 leaves a remaining balance of 16,495 CY of material. With no shrinkage adjustment, the cut/fill earthwork with the interior elevation of 12.4 feet NAVD leaves a remaining balance of 37,646 CY. The interior elevation range (12.4 feet to 9.9 feet NAVD 88) provides the Contractor a readily available source of borrow material should the material above 12.4 feet be unsuitable as defined by the Project Specifications. Borrow material remaining above the 12.4 feet NAVD elevation shall not be hauled off-site; however, the Contractor shall spread the material out evenly across the bottom of the finished elevation OR deposit the material in the existing DMMA cell for FIND to offload in the future.

11. **QUESTION:** Where is the nearest source for shell rock? Would we consider a variance of crush-crete?

RESPONSE: Southern Florida to our knowledge. A variance would be considered; however, we strongly prefer that the material match that of the existing DMMA access road. For cost estimating purposes, the Contractor shall assume shell rock.

12. **QUESTION:** Sheet C-9 shows a 6-ft grass strip between the two roads; however, Sheet C-10 does not. Which is correct?

RESPONSE: Sheet C-9 provides the cross-section detail showing the required grass strip. The scale provided on Sheet C-10 does not lend itself to showing the 6-ft grass strip.

13. **QUESTION:** Where is the outfall located? Is it off-site?

RESPONSE: See Sheet C-2 of the Project Drawings for the location of the outfall. The outfall is located within a FIND easement west of the Intracoastal Waterway.

14. **QUESTION:** Can you provide a Specification for the Erosion Control Mat?

RESPONSE: Please refer to Paragraph 2.03 of SECTION 01 35 43 and Paragraph 2.8 of SECTION 32 92 19.

15. **QUESTION:** Is there a better soils report than what was given for the plans on iSqFt? What is shown, deepening on the KIPS, we could go 15' or as deep as 70'.

RESPONSE: All information for this project needs to be acquired from the FIND website. Furthermore, the project **does not** include any work for the existing buried pipeline and associated components (helical anchors, straps, pipe, etc.). Addendum No. 1, Attachment 3 provided a copy of the As-Built of the DU-9 Permanent Discharge Pipe strictly to show the design elevations of the rip rap outfall.
http://www.aicw.org/studies_and_information/bids_files_plans_logos/bids.php#revize_document_center_rz1008 .

16. **QUESTION:** What are the helical pier installation torque loads for ultimate and working capacities (we are assuming a 2:1 safety factor).

RESPONSE: See response to Question No. 15.

17. **QUESTION:** Is there an average bid depth that you would like us to bid to?

RESPONSE: See response to Question No. 15.

18. **QUESTION:** We are a dealer/installer of A.B. CHANCE products, do we need to contact our supplier and get the engineer involved?

RESPONSE: See response to Question No. 15.

19. **QUESTION:** Do we need to hire a separate engineer for the details for the straps that go around the pipe OR will our product cut sheets be sufficient for the helical pier information and let some else worry about the straps? We are happy to make the straps...We know that it is a 24" pipe, I do not know the loads and are we dealing with uplift and compression? If necessary, we can have someone design the details for the helical piers and straps? We just need answers and the soil report if possible.

RESPONSE: See response to Question No. 15.

20. **QUESTION:** If the excavation quantity to elevation 12.4 exceeds the fill quantity, what do we do with the excess?

RESPONSE: See response to Question No. 10.

21. **QUESTION:** What is the thickness of the topsoil requirement by the grassing spec 32-32-19 & earthwork spec 31-23-00?

RESPONSE: Topsoil shall be 3-6 inches.

22. **QUESTION:** Can the outer portion of the slopes (the area outside of a 2/1 be strippings)?

RESPONSE: Yes.

23. **QUESTION:** Can the requirement of "No Burning" be eliminated?

RESPONSE: See response to Question No. 8.

24. **QUESTION:** Why are there north-south oriented ditches in the DMMA DU-9 expansion area?

RESPONSE: The north-south oriented ditches — that do not show up in the existing topography survey — are remnant features of the Dee Dot Sludge Disposal Area No. 2.

25. **QUESTION:** Can the requirement of 24-hr security be eliminated – D Dot has Security?

RESPONSE: Concur. However, the Contractor will be responsible for securing each of the Florida Inland Navigation District gates surrounding the Dredged Material Management Area DU-9 site before daily site departure.

26. **QUESTION:** There seems to be a foot difference in existing ground elevations in the Northwest corner of the expansion. Plan Sheet C-3 shows existing ground at elevation 16, 15, 14, 13, 12 going west to east at station 54 to 2. Cross sections at stations 54 & 2 agree with Sheet C-3. But the Cad file shows elevations 17, 16, 15, 14, 13, 12. Which prevails?

RESPONSE: See revised CAD drawing (c2014-075-M-EG Composite for Design UPDATED.DWG) posted on the FIND website. The previous file was correct; however, four surfaces were contained in the file and a different surface was displaying by default. The updated file posted omits the extra surfaces.

27. **QUESTION:** Can the bid due date be extended?

RESPONSE: No. The bid due date coincides with the FIND Board Meeting schedule; therefore, bids are due two weeks before the February 17 scheduled board meeting.

SPECIFICATIONS

Updates to Specifications are contained in **ATTACHMENT 4**.

SECTION 00 01 00 BID SOLICITATION

UPDATE: Corrected **FROM** "The Contractor will have **180 calendar days** from the Notice to Proceed to complete the project" **TO** "The Contractor will have **450 calendar days** (inclusive of the 180-day Grassing Establishment Period) from the date established in the "Notice to Proceed" to complete the project."

SECTION 31 23 00 DIKE AND EARTHWORK CONSTRUCTION

Paragraph 1.1.A:

The Work covered by this section includes furnishing all labor, equipment, and materials required to perform all necessary excavation, filling, and grading to construct the dredged material management area including dike, ditches, and roads described herein and in the Project Drawings. Completion of this work includes the removal of the existing 3-ft wide x 30-ft deep bentonite slurry wall ~~to the bottom elevation of the DMMA expansion~~ to elevation 9.9 ft NAVD 88.

SECTION 31 23 00 DIKE AND EARTHWORK CONSTRUCTION
Paragraph 3.7B:
The expected work sequence for earthwork is as follows:

1. Clear and grub
2. Strip and stockpile topsoil
3. Prepare dike foundation
4. Construct dike and other earthwork features
5. Place unsuitable material in specified final location and cover with sand fill
6. Place and spread 3-6 inches topsoil over dike and other areas designated for grassing

APPENDIX A, PROJECT DRAWINGS

Updates to Project Drawings are contained in **ATTACHMENT 5**.

SHEET C-5 AND C-6. Modified note **FROM** "EXISTING 3′ WIDE X 30′ DEEP BENTONITE SLURRY WALL (TO BE EXCAVATED TO MATCH ELEVATION OF BOTTOM DMMA EXPANSION" **TO** "EXISTING 3′ WIDE X 30′ DEEP BENTONITE SLURRY WALL (TO BE EXCAVATED TO ELEVATION 9.9 FT NAVD 88."

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

ADDENDUM NO. 2
ATTACHMENT 1
Mandatory Pre-Bid Meeting Agenda
and Attendance Sheet

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

MANDATORY PRE-BID MEETING AGENDA
JANUARY 19, 2017 AT 11 A.M.

1. OWNER'S REPRESENTATIVES

Florida Inland Navigation District (FIND)
1314 Marcinski Road
Jupiter, FL 33477
(561) 627-3386

Mark Crosley – Executive Director
Mark Tamblyn – Field Projects Coordinator

2. ENGINEER'S REPRESENTATIVES

Taylor Engineering, Inc.
10151 Deerwood Park Blvd.
Bldg. 300, Suite 300
Jacksonville, FL 32256
(904) 731-7040

Jerry Scarborough, P.E. – Senior Advisor
Lori Brownell, P.E. – Engineer of Record, Project Manager

3. PROJECT SCOPE

The major categories of work include, but are not limited to the following

1. Clearing and grubbing the work and access areas
2. Removing a bentonite slurry wall
3. Constructing the earthen dike and associated underdrain system
4. Constructing perimeter road adjacent to the dike
5. Establishing grass
6. Renovating the timber walkway and discharge pipeline outfall

The selected Contractor must perform all work in accordance with the construction drawings and specifications, all subsequent project addendums, the provided Florida Department of Environmental Protection (FDEP) Permit No. 55-129250-006-EI and any applicable local laws or regulations concerning the work.

4. SITE HISTORY

The ±180-acre Dredged Material Management Area (DMMA) DU-9 site is located ±0.5-mile west of the ICWW, approximately 1.5 miles south of the Duval/St Johns County line, and lies within an extensive private landholding known as Dee Dot Ranch. The FIND acquired the DMMA DU-9 site in 1995 and obtained construction permits in 2000. Due to contamination[1] found within the center of the site during preliminary construction activities in 2001, the FIND modified the permit in 2004 and redesigned and constructed a smaller (±34-acre) basin north of the contaminated area in 2006. In 2008, the FIND acquired another modification of this permit (FDEP Permit No. 0129250-003-EG) to allow for permanent installation of approximately 3,800 ft of 36-in diameter buried discharge line from the DMMA weir outlet to just west of the ICWW. Installation was successfully completed in 2011. The USACE used the site in 2009 to maintenance dredge the ICWW and deposited approximately 285,000 cy of material. This

[1] Since the contamination area (approximately 450-ft wide by 1,300-ft long) was first identified, the owner of the Dee Dot Ranch and its engineering consultant, CH2MHILL, have worked to successfully remediate the area. In May 2016 FDEP issued a Conditional Site Rehabilitation Completion Order (SRCO) (Appendix G) indicating that the criteria of Chapter 62-70 *F.A.C.* had been met.

construction will restore the original, 2000 site footprint to meet the required needs of the ICWW maintenance dredging requirements for the next 50 years.

5. BID DOCUMENTS REQUIREMENTS

Each bidder must submit the following items to the Florida Inland Navigation District by **2:00 p.m**. Eastern Standard Time on **Friday, February 3, 2017**:

1. 00 41 63 BID FORM
    a. Copy of Contractor's State or County (as applicable) Contracting License
    b. Reference Form
    c. Similar Project Form
2. 00 41 63A BID SCHEDULE (inclusive of Receipt of Addendum)
3. 00 43 13 BID BOND
4. 00 45 01 PUBLIC ENTITY CRIME STATEMENT
5. 00 45 02 AFFIDAVIT FOR SURETY COMPANY

6. PROJECT SCHEDULE

1. Bid Due Date: Friday, February 3, 2017
2. FIND Board Meeting: Saturday, February 18, 2017 in St. Lucie County
3. Contract period: 450 days (inclusive of the 180-day Grassing Establishment Period) from Notice to Proceed
4. Liquidated damages: $1,500 per day

7. CONSTRUCTION COORDINATION

The Contractor will coordinate all shop drawings, submittals, requests for information, and applications for payment through Taylor Engineering through the life of the contract. Taylor Engineering will schedule biweekly construction progress meetings throughout the project.

8. COORDINATION WITH ADJACENT LANDOWNERS

The site is located within an extensive private landholding known as Dee Dot Ranch. The selected Contractor will be provided with its own unique access code for the entrance gate for the duration of the Contract. Contractors are not allowed to deviate from the site access road to the FIND property.

9. WRITTEN ADDENDUM

Taylor Engineering will receive written questions from bidders until 5 p.m. Friday, January 27, 2017. The FIND will respond to these questions with a written addendum issued by 5:00 p.m. Monday, January 30, 2017.

10. BIDDER'S QUESTIONS

Taylor Engineering and the Owner's representatives will entertain questions at this time; however, we will provide written responses to the questions with the addendum, which will govern over any response given at this time.

--END OF AGENDA--

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

MANDATORY PRE- BID MEETING ATTENDANCE SHEET
JANUARY 19, 2017 AT 11 A.M.

PLEASE PRINT AND LEAVE BUSINESS CARD, IF AVAILABLE

#	NAME	COMPANY	PHONE	EMAIL
1	LORI BROWNELL	TAYLOR ENGINEERING	904.731.7040	LBROWNELL@ TAYLORENGINEERING.COM
2	mike Riley	Kemron Environ	404 886 1472	mriley @ kemron.com
3	LARRY SHOTWELL	PHILLIPS & JORDAN, INC	813.783.1132	FLESTIMATE @ PANDJ.COM
4	Steven Nadler	Carter's Contracting Services	850-420-8033	snadler@ carters-contracting.com
5	Joe Frederickson	Blue Goose	(771) 332-3796	jfrederickson@ bluegoose construction.com
6	Tommy GASKIN	Herve Cody Contr.	386-336-1149	jgaskin1@ comcast.net
7	JACK Adams	Herve Cody Cont.	828-506-3450	wjackadams@ gmail.com
8	MARK TAMBLYN	FIND	561-262-1101	mtamblyn@ aicw.org
9	DAVID TAYLOR	FERREIRA	772-631-1945	dtaylor@ FERREIRACONSTUCTION.COM
10	CHUCK HENNESSEY	HPA	904-721-3300	CHENNESSEY@ HTEPPER.COM

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

MANDATORY PRE- BID MEETING ATTENDANCE SHEET
JANUARY 19, 2017 AT 11 A.M.

PLEASE PRINT AND LEAVE BUSINESS CARD, IF AVAILABLE

#	NAME	COMPANY	PHONE	EMAIL
11	Will English	HPA	721-3300	Wenglish@hpepper.com
12	Bob Rousseau	Douglas N Higgins	305-215-6099	BOB2@DNHIGGINS.com
13	Matt DeLuca	Douglas N Higgins	941-921-5000	MATTD@DNHIGGINS.com
14	Peter B. Kirby	Kirby Development, Inc	904-821-5010	pbk@kirbydevelopment.com
15	Barry Barco	Barco-Duval Inc.	904-772-1313	bbarco@barcoduval.com
16	Roger Campbell	" " "	" " "	ronprice@barcoduval.com
17	GREG BONN	BONN ENVIRONMENTAL SERVICES+TECH	904-504-7192	GNBONN@COMCAST.NET
18	MATT KIRK	Cross Environmental	904-235-5998	KIMATTandTINA@Aol.com
19	Ricardo Villet	Continental Heavy Civil	305-833-6828	rvillet@chcivil.com
20	Tim Morgan	Great Lakes E&I	678-343-0091	timmorgan@glris.com

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

MANDATORY PRE- BID MEETING ATTENDANCE SHEET
JANUARY 19, 2017 AT 11 A.M.

PLEASE PRINT AND LEAVE BUSINESS CARD, IF AVAILABLE

#	NAME	COMPANY	PHONE	EMAIL
21	Michael Bell	R.B. Baker Construction	904 903 6271	Estimator Brian Pate bpate@rbbaker.com
22	Bruce Smith	Loren Jack trucking	772-209-9870	Brucecq Smith 58 @ gmail. com
23	Cannon Gaston	CGC, Inc.	(904)783-4119	cgcestimating@gmail.com
24	Jeremy Rowell	Rowell Contracting, Inc	904-349-5338	jeremyrowell@live.com
25	Susi M. Mendez	PAC Comm Inc.	(305)381-5157	jmendez@paccommine.com
26	Keith Keller	D-Dot Timberlands	(904) 591-9695	ddtimber@bellsouth.net
27	JERRY ~~SCARBOROUGH~~ SCARborough	TAYLOR ENGINEERING	9047317040	JSCARBOROUGH@ TAYLORENGINEERING.com
28				
29				
30				

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

ADDENDUM NO. 2
ATTACHMENT 2
2015 Golder Associates Report

April 27, 2015 15-23484

Mr. Mike Petrovich, Esquire
Hopping Green & Sams, PA
119 South Monroe Street
Suite 300
Tallahassee, FL 32301

RE: TECHNICAL ANALYSIS
DMMA DU-9: FORMER SLUDGE DISPOSAL AREA NUMBER 2
ST. JOHNS COUNTY, FLORIDA

Dear Mike:

Golder Associates Inc. (Golder) is pleased to provide this technical analysis of data related to Former Sludge Disposal Area Number 2 (Site), which is part of a larger dredged material management area (referred to as DMMA DU-9) owned by the Florida Inland Navigation District (FIND). After recent meetings with representatives of the Florida Department of Environmental Protection (FDEP) and with FIND's engineering consultant, Taylor Engineering, Inc. (Taylor), three primary concerns have been raised related to residual groundwater contamination at the Site:

1. the potential for contaminants in groundwater generated during construction dewatering to be present at concentrations requiring treatment or special handling of the produced groundwater;
2. the potential for contaminant concentrations to accumulate in surface water within the DMMA DU-9 to concentrations that would cause concern over discharges through the weir outfall structure, and
3. the potential for contaminants to migrate beyond the boundaries of the DMMA DU-9 footprint at concentrations that would be of regulatory concern as a result of operation of DMMA DU-9.

We have evaluated available data related to assessment and remediation of chlorinated solvent contamination at the Site, current hydrologic conditions, design information for the DMMA DU-9 impoundment provided by Taylor, and the anticipated hydraulic conditions that will exist during operation of the impoundment. Our analysis is directed specifically at the three concerns listed above and we have been asked by you to render an opinion as to the effects that the existing groundwater contamination could have on construction and operation of the proposed expanded DMMA DU-9. A summary of our findings and associated conclusions is provided below.

CURRENT SITE CONDITIONS

Based on information presented in the technical report prepared by CH2M HILL (CH2MH), titled "Supplemental Groundwater Sampling Results and Evaluation" dated November 25, 2013, two contaminants have been detected in groundwater samples collected from site monitoring wells at levels above the groundwater cleanup target levels (GCTLs) in Table I, Chapter 62-777 Florida Administrative Code (FAC), but well below the natural attenuation default concentrations (NADCs) in Table V of the same rule chapter. These contaminants include vinyl chloride (VC) and cis-1,2-dichloroethene (DCE). Based on our review of available Site data, localized areas of residual groundwater impacts remain in the shallow surficial aquifer at one monitoring well location (TPOC-1), and in the underlying intermediate groundwater zone at five monitoring well locations (DD-02I, DD-3B, DD-6C, DD-8C, and DD-14B).

Additionally, comparison of recent analytical results with historical data indicate that contaminant concentrations are either decreasing or stable at the above-referenced monitoring well locations, and it is our understanding that no source materials are known to remain on-site.

Both VC and DCE are breakdown products of commercially used chlorinated solvents such as tetrachloroethene (PCE) and trichloroethene (TCE). PCE has been widely used as a dry-cleaning solvent and both PCE and TCE have been used as degreasing solvents in various commercial and industrial applications. PCE and TCE break down in the environment due to naturally-occurring chemical conditions and from the action of bacteria adapted to metabolize the compounds. The breakdown chain involves the loss of a chlorine ion from the molecule taking the compound, in the case of PCE, from PCE (four chlorine ions), to TCE (three chlorine ions), to several different DCE compounds having two chlorine ions, to VC (one chlorine ion) and ultimately to ethane (a non-toxic gas compound). Ethane ultimately breaks down further to water and carbon dioxide. The chlorinated compounds are considered contaminants of concern with regard to human health and the environment. Therefore, very conservative, stringent maximum concentrations for these compounds are regulated in drinking water.

The State of Florida considers all groundwater that is not saline (less than 10,000 parts per million total dissolved solids) as potential drinking water. Therefore, the State regulates groundwater as though it might be used for potable purposes. In practice, there are many naturally-occurring conditions that would prevent the use of groundwater, particularly in the shallow surficial aquifer, from being used for potable purposes without treatment. These include the presence of iron, chloride, sulfate and other dissolved constituents; high or low pH; bacterial contamination; and other physical characteristics, such as color or taste, that are considered nuisance criteria. If groundwater at a given site will not be used for potable purposes, the State allows for exceedances of maximum contaminant levels if there are institutional or engineering controls put into place that will prevent the future use of groundwater. This is central to the remaining groundwater contamination at the Site as we understand that FDEP has expressly concurred that the Site qualifies for No Further Action with Institutional Controls in accordance with Rule 62-780.680 (2), FAC. A copy of FDEP's March 17, 2014, written correspondence in this regard is attached.

ISSUES OF POTENTIAL CONCERN

Quality of Water Generated During Dewatering and Construction

Based on review of Figure A-1 prepared by Taylor, dated December 2014, the floor of the planned DMMA DU-9 build-out area will be at elevation 11 feet (above National Geodetic Vertical Datum of 1929 (NGVD29)), which will require that groundwater be managed during earthwork activities as the depth to the top of the water table is anticipated to be above this elevation. The degree to which the elevation is below the water table varies based on seasonal fluctuations; therefore, this will depend upon when the work will be conducted. There is also a perimeter road and ditch system that is partially outside the DMMA footprint. It is expected that the system will largely follow the same pattern/design as the constructed northern basin.

Depth to groundwater information from Remedial Progress Report No. 3 (prepared by CH2MH, dated May 2013) indicates that groundwater elevations in the shallow surficial aquifer range from approximately 11.5 to 14.3 feet above mean sea level (ft msl) across the site. (Note: We assume that the reported groundwater elevations in ft msl from the CH2MH report are roughly equivalent to elevations in ft NGVD, and that the conversion factor between the two datums would be less than 12 inches.) Therefore, assuming that the water table would need to be lowered to at least 2 feet below the floor of the DMMA DU-9 build-out area, the target elevation for dewatering would be 9 ft msl, (approximately 5 feet below ambient water table conditions). Dewatering to this approximate elevation could be conducted using conventional well points screened in the upper surficial aquifer from 4 to 9 ft msl. In consideration of this type of dewatering approach, the possibility of introducing contaminants into the produced groundwater at concentrations above GCTLs is negligible for the following reasons:

- Groundwater extraction would be limited to the uppermost 5 feet of the surficial aquifer, which essentially negates the possibility of introducing, or influencing, contaminants in the intermediate groundwater zone. Under this scenario, a 20-foot vertical "buffer" would be present between the top of the intermediate zone and the bottom(s) of the well points. Typically, vertical hydraulic conductivity values for unconsolidated aquifer material such as sand and silt are an order of magnitude lower than the horizontal hydraulic conductivity. Therefore, horizontal flow of groundwater toward dewatering well points would be the predominant induced movement of groundwater during construction. This further supports our conclusions regarding effects of dewatering on contaminants in the intermediate groundwater zone.

- Impacted groundwater in the shallow surficial aquifer is limited to a localized area around TPOC-1; which is located roughly 240 feet west of the DMMA DU-9 build-out area. Given this distance, along with the amount by which the water table would be lowered, and the estimated hydraulic conductivity of the shallow surficial aquifer, the average linear groundwater velocity can be estimated to determine the amount of time necessary for a particle to travel from the TPOC-1 location to a well point installed at the DMMA DU-9 build-out area. Neglecting the effects of adsorption, Golder estimated this timeframe to be approximately six months. In other words, dewatering operations would have to be ongoing, continuously, for six months before the first arrival of contaminants would be expected to appear at the nearest well point location. Calculations in this regard are provided as an attachment to this letter.

- The above-described evaluation does not take into account the effects of contaminant adsorption, dilution, and volatilization during groundwater extraction. For these reasons, even if contaminant molecules reach the dewatering system, the concentrations are expected to be significantly reduced, to levels below applicable drinking water criteria. Based on our experience, this conclusion is both reasonable and probable due to the fact that contaminants will adsorb to organic particulates within the surficial aquifer as they migrate, and that concentrations will be diluted along the groundwater flow path. Furthermore, VC and DCE are highly volatile and unstable in a surface water environment and the heavy aeration of groundwater as it is pumped from the well points will further volatilize contaminants from the water by evaporation. This is similar to air stripping of VC and DCE, which is a proven method for remediating contaminated groundwater. Lastly, should protection against this perceived concern be desirable, VC and DCE are amenable to treatment using conventional air stripping and/or filtration equipment. However, based on our understanding of Site conditions, it is our opinion that this should be unnecessary.

- In addition to evaluating potential transport mechanisms, we calculated the approximate mass of VC and DCE and examined the potential impacts to produced water quality in the unlikely event that all the contaminated shallow surficial aquifer water was pulled into the dewatering system. Based on sampling data, the maximum area of the contaminated shallow surficial aquifer was estimated conservatively at 10,000 square feet (100 feet by 100 feet). The saturated thickness of potentially contaminated shallow surficial groundwater was estimated at 5 feet. Dewatering the entire footprint of the DMMA DU-9 by 5 feet would yield between two and three orders of magnitude more water than the maximum volume of contaminated shallow groundwater present. Using the maximum concentrations of VC and DCE from the most recent sampling event as representing the concentrations present within the entire remaining volume of contaminated shallow surficial groundwater (another conservative assumption), we calculated the maximum concentrations that could be seen in produced water from dewatering. The inflow of groundwater to the dewatering system would reach equilibrium with the pumping rate necessary to maintain the dewatered area such that the total volume of produced water will be many times the static dewatered volume. However, even if the calculated mass of VC and DCE was distributed in one static dewatered volume, the overall concentrations would be less than 0.1 and 0.3 micrograms per liter, respectively, which are well below

the drinking water criteria of 1 and 70 micrograms per liter, respectively. Thus, the likelihood that produced water would exceed drinking water criteria for VC and DCE is extremely remote.

Potential for Contaminants in DU-9 Discharge Water

Since construction of the DMMA DU-9 build-out will result in the bottom of the DMMA intersecting the top of the water table, some mixing of accumulated groundwater in the DMMA with return water from dredging operations would be anticipated. However, similar to the dewatering scenario described above, the possibility of introducing contaminants into return water from dredging operations at concentrations above surface water criteria is negligible for the following reasons:

- Groundwater seepage into DMMA DU-9 would be limited to the uppermost 3 feet of the surficial aquifer, which essentially negates the possibility of contaminants from the intermediate zone from entering the DMMA. A vertical "buffer" of approximately 25 feet is present between the top of the intermediate zone and the floor of the planned DMMA DU-9 build-out. Furthermore, groundwater would have to migrate both vertically and horizontally against the pressure gradient created by the water level in DMMA DU-9. It is impossible for water to travel against a pressure gradient in the subsurface.
- Impacted groundwater in the shallow surficial aquifer is limited to a localized area around TPOC-1 (located roughly 240 feet west of the DMMA DU-9 build-out area), where VC and DCE concentrations are well below the NADCs. Given this information, and considering the effects of soil adsorption coupled with ongoing natural attenuation, it is highly unlikely that VC or DCE would appear in seepage entering the DMMA at concentrations above applicable regulatory standards. Also as indicated above, shallow groundwater in the vicinity of TPOC-1 is outside the footprint of the DMMA DU-9 build-out; therefore, there would be a significant horizontal pressure gradient that would prevent migration of contaminants into DMMA DU-9 during operation.
- Golder completed calculations to estimate theoretical concentrations of VC and DCE in return water that would overflow the weir(s) during DMMA operating conditions. The results indicate that the concentrations would be well below applicable regulatory standards, even when highly conservative assumptions are included in the analysis. Calculations in this regard are provided as an attachment to this letter.

Potential of Contaminant Migration during DMMA DU-9 Operation

We understand that the DMMA DU-9 will be operated approximately once every 10 years over 50 years. This will result in cycles of surficial groundwater mounding in the immediate vicinity of DMMA DU-9, followed by periods where the groundwater levels will return to pre-operational levels. Although operation of the DMMA DU-9 will result in temporary mounding of groundwater in the surficial aquifer, the likelihood that this would significantly influence or alter the distribution of VC or DCE concentrations in either the shallow or intermediate zones is considered negligible. When in operation, shallow groundwater flow characteristics around DMMA DU-9 would be temporarily influenced by a local change in gradient near the top of the water table. Groundwater flow from a mound-type feature is radial, and therefore a temporary reversal in gradient would be expected to the west of DMMA DU-9. This would effectively create a temporary hydraulic barrier that would preclude migration of contaminants from the TPOC-1 shallow plume area toward the Intracoastal Waterway (ICWW). Additionally, due to frictional losses with increasing depth below the mounded area, it is not anticipated that contaminant distribution in the intermediate aquifer would be affected. As mentioned previously, a 20 to 25-foot vertical buffer will exist between the bottom of DMMA DU-9 and the intermediate zone.

The contaminant source material was apparently placed on the site decades ago. Based on our experience with similar sites, we have found that over time the rate of contaminant migration reaches a state of equilibrium with natural attenuation influences that result in biochemical breakdown of the chlorinated solvent source compounds. Additionally, if the source is removed, as was done at the Site, the downgradient extent of groundwater contamination will typically retract, concentrations will decrease,

and more breakdown compounds will be present than parent compounds. These are the conditions observed at the Site since source removal activities were completed by CH2MH, and these conditions provide the basis for the Site's eligibility for closure with conditions. Thus, even though periodic filling of the basin will cause fluctuations in the local groundwater flow regime, this will not result in further downgradient migration of contaminants.

CONCLUSIONS

Based on our review of documents provided, and as discussed above, we conclude the following:

1. Dewatering using conventional methods can be completed successfully without introducing contaminants into produced groundwater from dewatering operations at concentrations above GCTLs. More specifically, based on the results of our evaluation, if groundwater extraction is limited to the uppermost 5 feet of the surficial aquifer, it is highly unlikely that VC or DCE from the impacted areas of the shallow and intermediate zones of the surficial aquifer will appear in effluent at concentrations above GCTLs. Conventional air stripping and/or filtration equipment could be made available for treatment of produced groundwater if VC or DCE are determined to be present in at concentrations above GCTLs.

2. Based on the attached calculations, we do not believe that seepage into the DMMA will result in an accumulation of VC- or DCE-impacted groundwater that would result in an exceedance of discharge criteria for these constituents in return water from DMMA DU-9 operations.

3. Although operation of DMMA DU-9 will result in temporary mounding of groundwater in the surficial aquifer in the immediate vicinity of the DMMA, the likelihood that this would significantly influence or alter the distribution of VC or DCE concentrations in either the shallow or intermediate zones is considered negligible. The changed hydraulic conditions present when the DMMA is filled will maintain the shallow groundwater impacts in the vicinity of TPOC-1 on the western, up-gradient side of the impoundment. The impoundment will thus act as a temporary hydraulic barrier that would prevent the eastward migration of groundwater toward the ICWW.

4. Based on conservative assumptions, the maximum potential concentrations of VC and DCE in produced water from dewatering operations would be more than an order of magnitude below drinking water criteria for those constituents.

5. The current downgradient extent of contaminants should be the maximum distance travelled by groundwater contaminants at the Site. Given the amount of time that has elapsed since the source material was placed, it is probable that conditions for equilibrium were established between contaminant migration rates and contaminant mass destruction by natural attenuation mechanisms. Additionally, the subsequent removal of the source material will have had the long-term effect of decreasing contaminant mass, contaminant concentrations, and the downgradient extent of contamination in groundwater at the Site.

Therefore, we believe that the current groundwater contamination present in Sludge Disposal Area Number 2 does not present an impediment to construction and operation of DMMA DU-9. We do not believe that the groundwater contamination, as indicated from the most recent monitoring data, presents a material threat to human health or the environment, and we do not believe that construction or operation of DMMA DU-9 would alter current conditions so as to create such a threat.

We appreciate being given the opportunity to work with you and your client on this project. Please feel free to contact us with any questions or comments concerning this proposal.

Sincerely,

GOLDER ASSOCIATES INC.

Michael J. Dickey, PE
Senior Engineer

James P. Oliveros, PG
Senior Consultant and Principal

Attachments

JPO/MJD/ams

FN: G:\Projects\15-\15-23484\Estuary Corporation DU-9 Techical Analysis.docx

ATTACHMENTS

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

NORTHEAST DISTRICT
8800 BAYMEADOWS WAY WEST, SUITE 100
JACKSONVILLE, FLORIDA 32256

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

March 17, 2014

Mr. Michael B. Dykes, P.E. Mike.Dykes@CH2M.com
CH2M Hill
9428 Baymeadows Road, Suite 200
Jacksonville, Florida 32256

Re: **Correspondence Dated March 3, 2014**
Florida Inland Navigation District (FIND) Site DU-9
Consent Order No. 01-0219
Site # COM_179673 / Project # 245268
St. Johns County - Waste Cleanup

Dear Mr. Dykes:

The Florida Department of Environmental Protection (DEP) has reviewed the Correspondence dated March 3, 2014 (received March 10, 2014), for the above-referenced site. After reviewing the correspondence, DEP concurs that conditional closure is appropriate for the site. Specifically, the site qualifies for a Risk Management Option II (RMO II) – No Further action with institutional controls in accordance with Chapter 62-780.680(2), Florida Administrative Code. In order to obtain an RMO II closure, the following is needed:

1. Written confirmation that the property owner agrees to institutional controls on the property including, but may not be limited to, restrictions that would prohibit the withdrawal and use of surficial groundwater (i.e. less than or equal to 60 feet below land surface).

Please note that placing the institutional controls on the property would not restrict the property owner from developing and operating the site as a dredge soil disposal area.

If you have any questions, please contact Merrilee Palcic, P.E. at the letterhead address, by e-mail at Merrilee.l.palcic@dep.state.fl.us or at 904.256.1544.

Sincerely,

Richard S. Rachal III. P.G.
Program Administrator
Waste & Air Resource Management

ec: Harry Francis, Estuary Corporation hfrancis@davisfamilyoffice.com
Mike Petrovich, Hopping Green and Sams - mikep@hgslaw.com
Mike Crosley, FIND, mcrosley@aicw.org

TITLE: ANALYSIS OF POTENTIAL FOR CONTAMINANTS IN DU-9 DISCHARGE WATER

Objective: Estimate concentrations of VC and Cis 1,2 DCE overflowing weir(s) and into return water line during DMMA operating conditions, and compare to surface water standards.

Assumptions/Understanding of Conditions:

1.) Concentration if VC in groundwater sample collected at TPOC-1 was 34 µg/L from October 2013 sampling event. (Technical Report Prepared by CH2M HILL dated November 25, 2013)

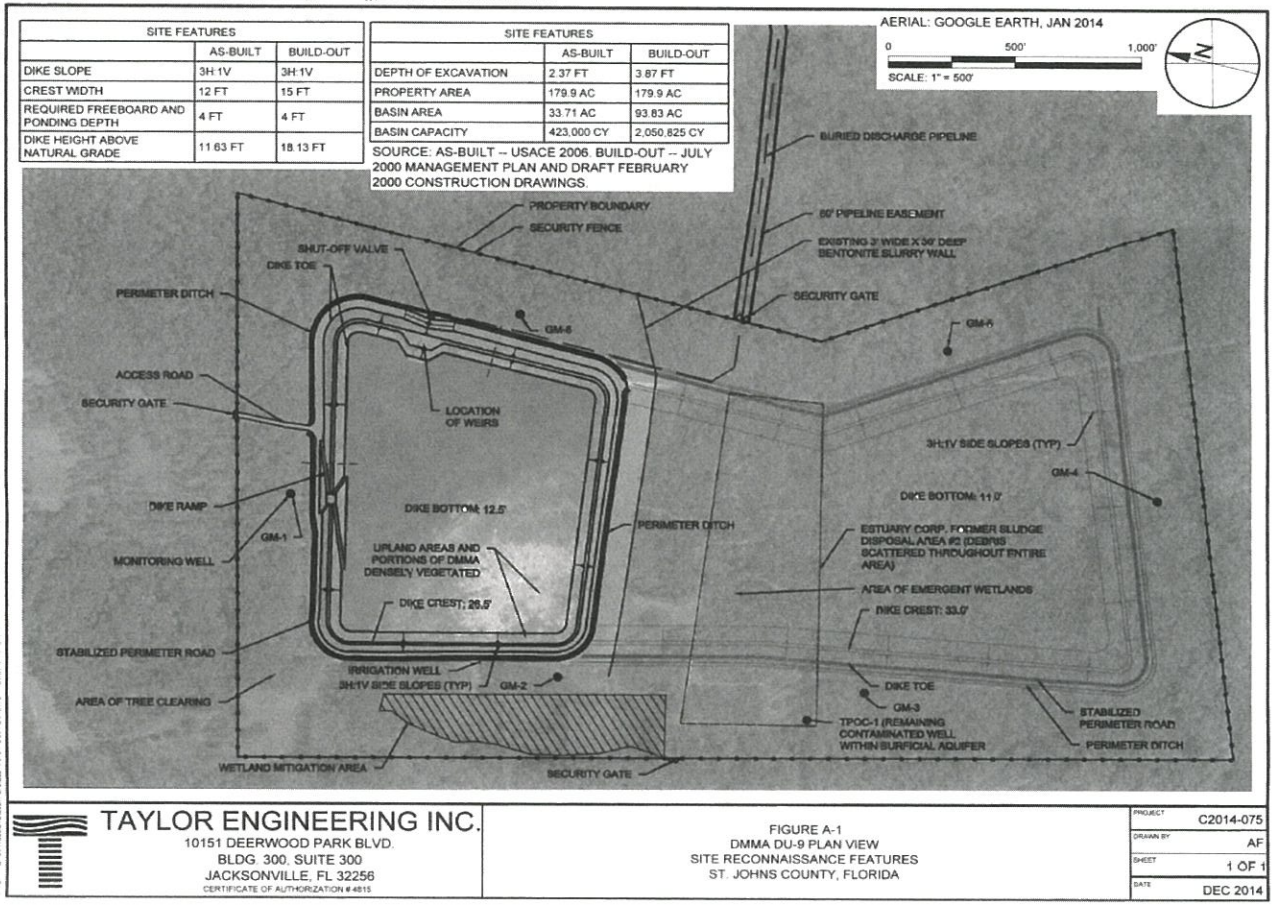
2.) Concentration if 1,2 DCE in groundwater sample collected at TPOC-1 was 100 µg/L from October 2013 sampling event. (Technical Report Prepared by CH2M HILL dated November 25, 2013)

3.) The extent of groundwater impacts in the surficial aquifer is limited to localized plumes of VC and 1,2 DCE around TPOC-1.

4.) Groundwater elevations across the area range from approximately 12 to 14 feet above mean sea level. (2010 Remedial Action Plan Prepared by CH2M HILL dated December 2010)

5.) DMMA DU-9 elevations and basin capacity information obtained from Figure A-1 prepared by Taylor Engineering, dated December 2014.

Item	Unit	Value
Floor of DMMA	Elevation (ft msl)	**11**
Dike Crest	Elevation (ft msl)	**33**
Freeboard	Feet	**4**
DMMA Total Capacity	Cubic Yards	**2,050,825**
Operational Height	Feet	**18**
DMMA Capacity per Foot of Height Across Footprint	Cubic Yards	113,935
Groundwater Elevation	Elevation (ft msl)	**14**
Height of Accumulated Groundwater in DMMA	Feet	3
Quantity of Accumulated Groundwater in DMMA	Liters	261,281,463
Groundwater Contribution from Plume Area	Percent	**15**
VC Concentration	µg/L	**34**
1,2 DCE Concentration	µg/L	**100**
Mass VC	grams	1333
Mass 1,2 DCE	grams	3919
Estimated VC Concentration in Effluent	µg/L	0.85
Estimated 1,2 DCE Conc. In Effluent	µg/L	2.50
Estimated VC Concentration in Effluent Below GCTL?	Yes/No	YES
Estimated DCE Conc. In Effluent Below GCTL?	Yes/No	YES
Estimated VC Conc. Below Surface Water Standard?	Yes/No	YES
Estimated DCE Conc. Below Surface Water Standard?	No Surface Water Standard Available	N/A



TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD.
BLDG. 300, SUITE 300
JACKSONVILLE, FL 32256
CERTIFICATE OF AUTHORIZATION # 4815

FIGURE A-1
DMMA DU-9 PLAN VIEW
SITE RECONNAISSANCE FEATURES
ST. JOHNS COUNTY, FLORIDA

PROJECT	C2014-075
DRAWN BY	AF
SHEET	1 OF 1
DATE	DEC 2014

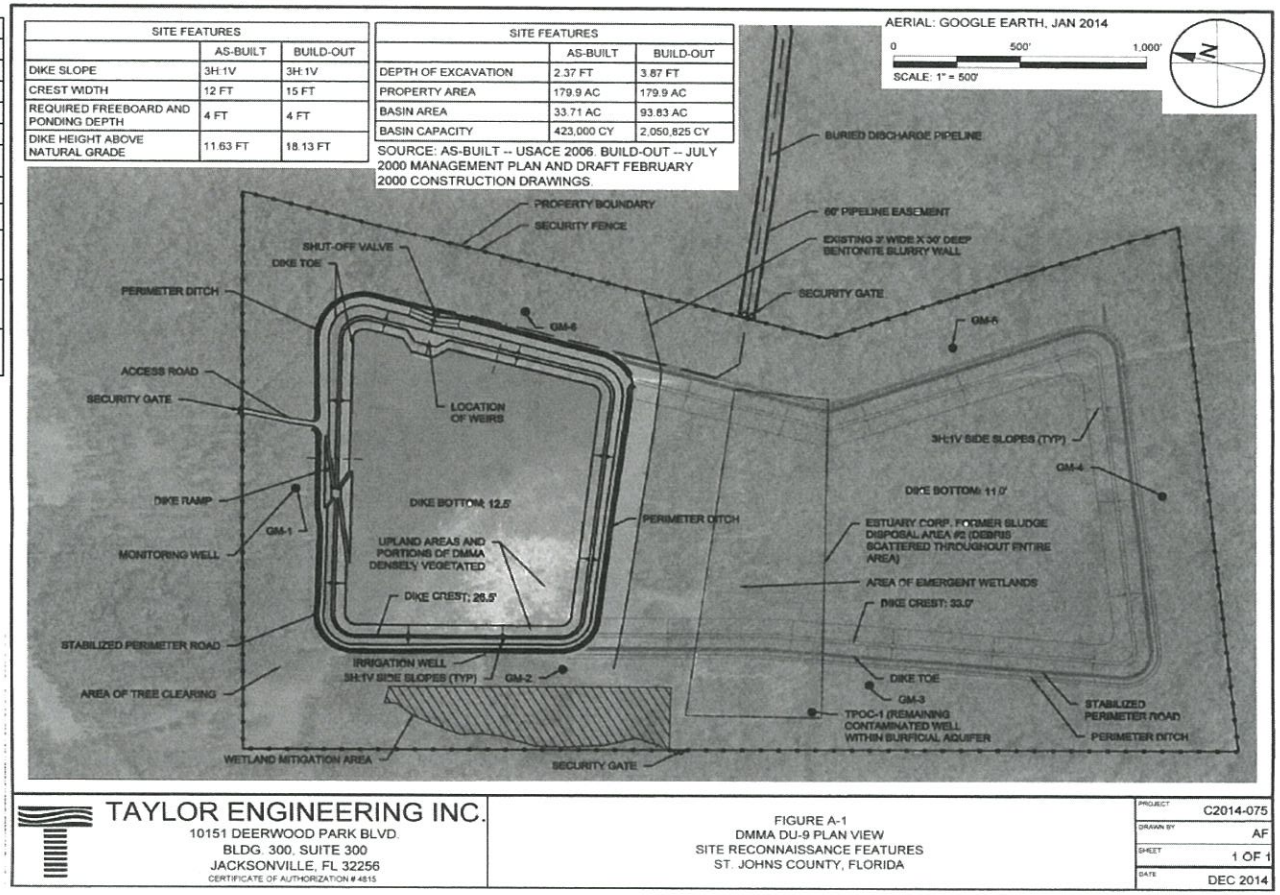
TITLE: CONSIDERATIONS RELATING TO WATER QUALITY DURING DE-WATERING AND CONSTRUCTION

Objective: Estimate the groundwater velocity and the amount of time for a particle to travel from the TPOC-1 location to a well point along the DU-9 build-out area during dewatering activities.

Assumptions/Understanding of Conditions:

1.) The shallow surficial aquifer has a hydraulic conductivity of approximately 21 feet/day in the west and southwest portions of the site. (Remedial Action Plan Prepared by CH2M HILL dated December 2010)
2.) Concentration if 1,2 DCE in groundwater sample collected at TPOC-1 was 100 µg/L from October 2013 sampling event. (Technical Report Prepared by CH2M HILL dated November 25, 2013)
3.) The extent of groundwater impacts in the surficial aquifer is limited to a localized plume of VC/1,2 DCE around TPOC-1.
4.) Groundwater elevations across the area range from approximately 12 to 14 feet above mean sea level. (2010 Remedial Action Plan Prepared by CH2M HILL dated December 2010)
5.) It is assumed that the water table within the DU-9 build-out area would be lowered by approximately 5 feet.

Item	Unit	Value
Floor of DMMA	Elevation (ft msl)	**11**
Target Groundwater Elev.	Elevation (ft msl)	**9**
Elev. At TPOC-1	Elevation (ft msl)	**14**
Delta H	Feet	5
Horizontal Distance	Feet	**240**
Gradient (i)	Dimensionless	0.021
Hydraulic Conductivity (K)	Feet/Day	**21**
Effective Porosity	Dimensionless	**0.3**
Average Linear Velocity (v = (K * i)/n)	Feet/Day	1.46
Particle Travel Time (No Adsorption)	Days	165
Particle Travel Time (No Adsorption)	Years	0.5



TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD.
BLDG. 300, SUITE 300
JACKSONVILLE, FL 32256
CERTIFICATE OF AUTHORIZATION # 4815

FIGURE A-1
DMMA DU-9 PLAN VIEW
SITE RECONNAISSANCE FEATURES
ST. JOHNS COUNTY, FLORIDA

PROJECT	C2014-075
DRAWN BY	AF
SHEET	1 OF 1
DATE	DEC 2014

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

ADDENDUM NO. 2
ATTACHMENT 3
2004 USACE Geotechnical Report

Section 00320

Geotechnical Data Report

for

DU-9 Dredged Material Management Plan

Duval County, Florida

Prepared by

Geotechnical Branch

Engineering Division

Jacksonville District Corps of Engineers

July 1, 2004

SECTION 00320

GEOTECHNICAL DATA

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LIST OF PLATES

SECTION 00320

GEOTECHNICAL DATA

1.1 SCOPE

The information provided in this section encompasses the geotechnical field investigations relevant to this project. The investigations consist of borings with the associated boring logs and laboratory data presented in paragraphs 1.4.6 and 1.4.7, respectively. A character of materials paragraph is included to provide a comprehensive description of the materials utilizing both recent and historical knowledge of the project area. Also included in this section are definitions of terms and boring log notes, which provide additional explanation of the boring logs and drilling techniques. After Contract award, any questions that pertain to the information provided in this section should be addressed to Chief, Geotechnical Branch at (904) 232-1616. Prior to Contract award, refer to Paragraph 999.214-4000 in Section 00100.

Items discussed in the character of materials paragraph may not appear explicitly on the core boring logs. Based on historic knowledge of the project area, the character of materials paragraph includes items that supplement the data documented by the core boring logs. When reviewing core boring logs, use all data on the logs, including the materials description, legend, and blow counts. When evaluating the subsurface conditions, use all data, including the character of materials paragraph and core boring logs.

1.2 CHARACTER OF MATERIALS

The data presented in Table 2, Table 3, and Table 4 under paragraph 1.4.1 were provided by the project sponsor.

1.2.1 Regional Geology

The State of Florida occupies part of a larger geographic unit known as the Florida Plateau. The deep water of the Gulf of Mexico is separated from the deep water of the Atlantic Ocean by the partially submerged Florida Plateau. The plateau is 500 miles long and varies in width from 250 to 450 miles wide. The Florida Plateau has been alternately dry land or covered by shallow seas for millions of years.

The east coast of Florida from the Georgia line to Miami Beach (350 miles) consists of a series of sandy barrier islands broken occasionally by inlets. The barrier islands are characterized by dunes and shore parallel beach ridges. Many of the islands display relic beach ridges formed during higher stands of sea level. Lagoons and marshes are typically located between the barrier islands and the mainland.

1.2.2 Local Geology

The St. Johns County shore is a barrier beach with a low tidal marsh and lagoon behind it. For the northern 6 miles, the beach ridge is about 3 miles wide, with dune elevations ranging from 15 to 25 feet, mean low water. For the next 12 miles, the ocean is separated from the mainland by two ridges and two low marshes. The easterly ridge is about 500 to 1500 feet wide, with a nearly continuous dune line ranging in elevation from 15 to 44 feet. The eastern marsh, which contains the Guano River, is generally 2,000 feet wide. The land ridge west of the Guano River is generally 10 feet high and about 4,000 feet wide. The main marsh ranges in width from 3,000 feet to 9,000 feet wide and contains the Tolomato River at a point about 18 miles south of the Duval-St Johns County line.

The formations exposed at the surface are undifferentiated deposits of Pleistocene and Recent age. These deposits consist of fine to medium quartz sand and lenses of shell and clay of varying thickness. Thick shell beds near the coast have been firmly cemented to form coquina. This formation is underlain by Upper Miocene or Pliocene deposits of interbedded lenses of marine, fine to medium sand, shell and green, calcareous, silty clay. This is underlain by the Hawthorne Formation of early and middle Miocene age, of which the surface is approximately 130 feet below sea level. The Hawthorne Formation consists of gray to green, plastic, phosphatic, sandy clay and marl: interbedded with lenses of phosphatic sand, pebbles and sandy limestone. The Hawthorne Formation is underlain by limestone formations of Eocene age.

1.2.3 Materials Encountered

The near surface strata within the upper 25 feet of the soil profile generally consists of slightly silty fine to medium-grained quartz sand (SP-SM). A weakly cemented, organically stained, slightly silty, fine to medium-grained quartz sand

(SP-SM) encountered in several borings approximately 5 feet below ground surface (bgs) correlates with a probable hardpan horizon frequently encountered in the area. This medium to very dense fine sand (Hardpan) extends to a depth of about 13.5 feet bgs. Predominantly loose to medium dense fine-grained quartz sand with varying amounts of silt and clay was encountered extending to the termination depths of the core borings. A sandy clay was encountered in boring B-4 from 47 to 57 feet bgs. At the time of drilling, the groundwater level was approximately 3 feet bgs.

1.3 DEFINITIONS

Terms commonly used in the boring logs shall be defined as:

Banded - Rock from 0.02 to 0.1-foot thick.
Carbonate - Soil component that reacts with HCl of an indeterminate origin (shell, rock, etc.).
Cavity - Voids greater than the diameter of the core.
Decomposed - Saprolite; rock is essentially reduced to a soil with a relic rock texture; can be molded or crumbled by hand.
Dense - Equivalent to SPT N-value of 30 to 50.
Fill - Material that has been placed by man, described with all soil characteristics.
Firm - Thumb will indent soil about ¼ inch (6 mm).
Hard - Soil that can be indented with difficulty by thumbnail or rock that is difficult to scratch with knife (cannot be pitted with a geology hammer but can be chipped with moderate blows of the hammer).
Highly Weathered - Entire rock section is discolored; alteration is greater than 50%; some areas of slightly weathered rock are present; some minerals are leached away; retains only a fraction of its original strength (wet strength usually lower than dry strength).
Incompetent - Rock that disintegrates while coring; weak.
Indurated - Rock or soil hardened or consolidated by pressure or cementation. Very difficult to break by hand.
Layer - Rock or soil with thickness of 6 inches or less.
Laminated - Alternating layers of varying material or color with layers less than 6 mm thick.
Lens - A geologic deposit of variable thickness, which disappears laterally in all directions and cannot be correlated to adjacent borings.
Massive Bedded - Rock over 3-foot thick.

Moderately Hard - Rock that can be scratched easily with a knife; cannot be scratched with fingernail (can be pitted with moderate blows of geology hammer).
Moderately Weathered - Discoloration is evident; rock surface is pitted and altered, with alterations penetrating well below rock surfaces; 10% to 50% of the rock is altered; strength is noticeably less than unweathered rock.
Pitted - Rock with voids 0.03 (1 mm) to 0.02-foot (6 mm) diameter.
Poorly-Indurated - See semi-indurated.
Rock - A naturally occurring substance composed of one or more minerals bound together. This geologic term includes a range of engineering properties: strength, hardness, permeability, weathering, and discontinuity. These properties are noted or can be inferred from the boring logs as blow counts, penetration rate, RQD, hardness, etc.
Seam - Rock or soil with average thickness of 2 to 3 inches.
Semi-Indurated - Rock or soil with a lesser degree of hardening or consolidation by pressure or cementation. Crumbles with little effort by hand.
Shell - Material composed of predominantly (>75%) coarse-grained sand to gravel-sized whole or broken shell.
Slightly Weathered - Rock with superficial discoloration, alteration and/or discoloration along discontinuities; less than 10 % of the rock volume is altered; strength is essentially unaffected.
Soft - Thumb will penetrate soil about 1 inch (25 mm).
Thick Bedded - Rock from 1 to 3-foot thick.
Thin Bedded - Rock from 0.1 to 0.3-foot thick.
Unweathered - Rock with no evidence of any mechanical or chemical alteration.
Very Hard - Rock that cannot be scratched with a knife (chips can be broken off only with heavy blows of the geology hammer).
Vuggy - Rock with voids 0.02 foot (6 mm) to the diameter of the core.

1.4 GEOMECHANICAL DATA

1.4.1 Summary of Field Investigations

The table below summarizes the field investigations conducted for this project. The data presented in Table 2, Table 3, and Table 4 were supplied by the project sponsor and do not conform to Corps of Engineers standards. Prospective offerors are cautioned to use great care in the evaluation of these borings.

Table 1. Borings drilled for this project

Designation	State Plane, FL-East, NAD27		Project Location
	X	Y	
CB-DU-9-1	365036	2143121	DU-9
CB-DU-9-2	365452	2141873	
CB-DU-9-3	365934	2140804	
CB-DU-9-4	365895	2140417	
CB-DU-9-5	364857	2141820	
CB-DU-9-6	364435	2141090	
CB-DU-9-7	364249	2141742	

Table 2. Borings supplied by the project sponsor

Designation	State Plane, FL-East, NAD27		Project Location
	X	Y	
B1*	364490	2143440	DU-9
B-1	364509	2143394	
B-2	365113	2142981	
B-3	364661	2142380	
B-4	364170	2142474	
B-5*	364352	2142202	
B-6*	364935	2142157	
B-7*	364631	2142489	
* Coordinates presented were obtained directly from the contractor and are not presented elsewhere in this report			

Table 3. Test pits supplied by the project sponsor

Designation	State Plane, FL-East, NAD27		Project Location
	X	Y	
OP-4	364190	2143229	DU-9
OP-5	364576	2143456	
OP-6	364793	2143175	
OP-7	365077	2143427	
OP-9	364180	2142915	
OP-11	364810	2143003	
OP-12	365110	2143003	
OP-14	364179	2142602	
OP-15	364565	2142651	
OP-16	364881	2142670	
OP-17	365030	2142660	
OP-19	364236	2142305	
OP-20	364538	2142300	
OP-21	364832	2142305	
OP-22	365129	2142298	

Table 4. Bulk samples supplied by the project sponsor

Designation	State Plane, FL-East, NAD27		Project Location
	X	Y	
BS-1*	364250	2142270	DU-9
BS-2*	364640	2143490	
* Coordinates presented were obtained directly from the contractor and are not presented elsewhere in this report			

Falling head recharge tests for determination of hydraulic conductivity were conducted for this project. For testing results, see paragraph 1.4.7.

1.4.2 Summary of Index Testing Data

The table below summarizes the index testing conducted for this project.

Table 5. Index testing conducted for this project

Boring Designation	Sample Designation	USCS	LL	PL	w_n	G_s
CB-DU-9-1	6	SP				
CB-DU-9-4	3	SP				
CB-DU-9-5	8	SP-SM			24.9	2.64
CB-DU-9-6	9	SP				
B1	1	SP			13.8	
	2	SP			22.9	
	3	SP			24.2	
	4	SP				
	5	SP-SM			19	
	6	SP			30	
	7	SP				
	8	SP-SM			30	
	9	SP-SM			29	
B-1	2	SP				
	11	SC	60	19	45	
B-2	9	SM				
	13	SP-SM			33	
B-3	5	SP-SM				
B-4	2	SP				
	7	SP				
	9	SM			56	
	13	CH	111	35	73	
	14	CH			74	
BS-1		SP				

Boring Designation	Sample Designation	USCS	LL	PL	w_n	G_s
BS-2		SP				

1.4.3 Summary of Additional Laboratory Testing Data

Triaxial testing results were obtained for this project. For testing results, see paragraph 1.4.7.

Modified compaction testing results were obtained for this project. For testing results, see paragraph 1.4.7.

1.4.4 Boring Log Notes

Borings CB-DU-9-1 through CB-DU-9-7 were driven using the Standard Penetration Test (SPT) procedure with a 140 lb. hammer with a 30-inch drop using a 2.0-foot split spoon (1 3/8-inch I.D. and 2-inch O.D.) until refusal was encountered. Refusal is defined as a total of 50 blows of the hammer within any 6-inch increment, a total of 100 blows of the hammer within any 1-foot increment, or no observed advance of the sampler after 10 successive blows of the hammer. When refusal was encountered, the borings were continued with a 4-inch x 5 1/2-inch diameter core barrel until the rate of penetration indicated softer material, at which point the SPT procedure was resumed.

1.4.5 Recovered Materials

The material recovered from the borings B1, B-1 through B-7, OP-4 through OP-7, OP-9, OP-11 through OP-12, OP-14 through OP-17, OP-19 through OP-22, and BS-1 through BS-2 is not available.

The material recovered from the borings CB-DU-9-1 through CB-DU-9-7 is available for inspection by prospective offerors at the Corps of Engineers District Warehouse listed under 1a below:

1. Florida

   a) Jacksonville
      Address: 3077 Talleyrand Avenue
               Jacksonville, FL
      Hours: 07:00 am to 2:30 pm

b) Clewiston

Address: 525 Ridgelawn Road
Clewiston, FL

2. Puerto Rico and the US Virgin Islands

a) San Juan

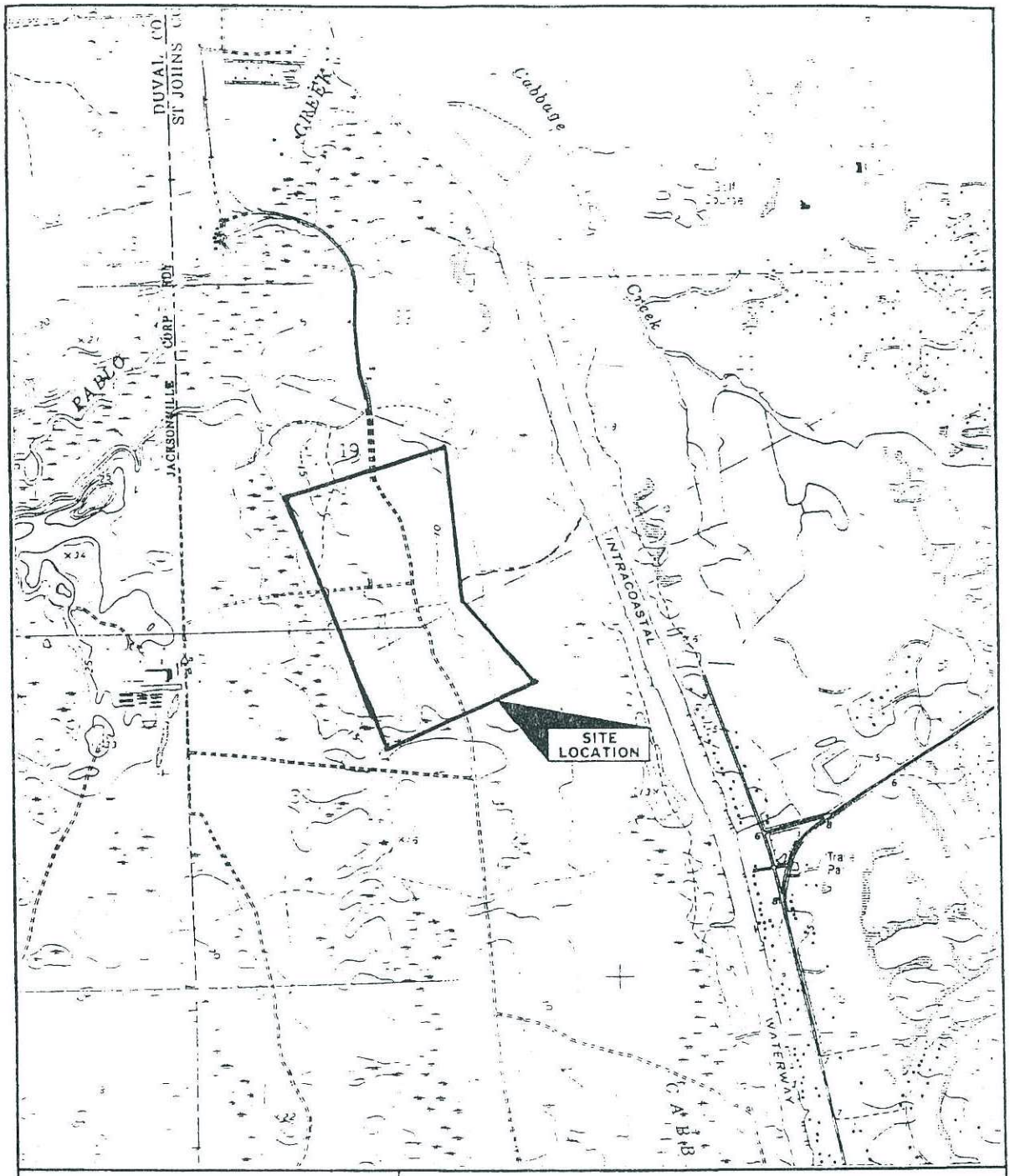
Address: 400 Fernandez Juncos
Parada 7.5
Puerta de Tierra, PR

b) Ponce

Address: PR 139, Km 6.1
Ponce, PR

The recovered materials will be available for inspection during normal business hours as noted above, except Federal holidays, during the entire bid period. Prospective offerors shall notify the Jacksonville District Explorations Manager at 904-232-3295; Chief, Geology Section at 904-232-1620; or Chief, Geotechnical Branch at 904-232-1616 at least four (4) working days before the visit. The following information will be required to schedule the visit: (1) the project title; (2) the specific borings or entire set which are to be viewed; (3) the date, time, and duration of the visit; (4) the name of the person(s) and company to view the borings; and (5) a point of contact and phone number regarding the visit. Offerors shall record their material examination visit in a record book maintained at the inspection site.

It is strongly suggested that all contractors view the samples before submitting their bid.



Project No. 99-1018	**Site Vicinity/Topographic Map**
Revision Date: 3/10/99	DMMA DU-9
Scale: 1"=2,000'	U.S. Geological Survey 7.5 Minute – Topographic Map
Ellis & Associates, Inc.	Palm Valley, Florida Quadrangle
GEOTECHNICAL ENGINEERING & ENVIRONMENTAL SERVICES CONSTRUCTION MATERIALS ENGINEERING AND TESTING	Revised 1992
991018t	Site boundaries depicted are approximate
	Figure No. 1

Plate 1 DU-9

1.4.6 Boring Logs

Applicable boring logs are presented on the following pages. Boring logs for B1, B-1 through B-7, OP-4 through OP-7, OP-9, OP-11 through OP-12, OP-14 through OP-17, and OP-19 through OP-22 are presented in paragraph 1.4.8.

While the Government's borings are representative of subsurface conditions at their respective locations and vertical reaches, local variations characteristic of the rocks and subsurface materials of this region are to be expected. Accordingly, offerors shall form their own conclusions from the examination of the recovered materials prior to submission of their offer.

Hole No.CB-DU-9-1

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Jacksonville District

SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.
2. LOCATION (Coordinates or Station): X=365,036 Y=2143,121
3. DRILLING AGENCY: Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-1
5. NAME OF DRILLER: R. Gordon
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.
10. SIZE AND TYPE OF BIT: See Remarks
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 15 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 1
15. ELEVATION GROUND WATER: 1.7'
16. DATE HOLE STARTED: 12/08/92 COMPLETED: 12/08/92
17. ELEVATION TOP OF HOLE: 13.86 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 71% %
19. SIGNATURE OF GEOLOGIST: M. Goff

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5	
14.0	0.0					14.0		0
			SAND, fine to medium grain, quartz, tan-gray trace gravel, trace organics. (SP)	67	1	SPLIT SPOON	4 8 12	
						12.5		
11.5	2.5			100	2	SPLIT SPOON	7 7	2.5
			SAND, with trace to little silt, predominantly fine grain, quartz, black-dark brown, trace organics, trace shell. (SP-SM)		3		14	
						11.0		
				67	4	SPLIT SPOON	6 6 7	
						9.5		
				67	5	SPLIT SPOON	2 3 8	5
						8.0		
				80	6	SPLIT SPOON	11 16 23	
						6.5		7.5
				60	7	SPLIT SPOON	20 56 75	
						5.0		
				67	8	SPLIT SPOON	36 49 100/.1'	10
						3.5		
				73	9	SPLIT SPOON	28 22 31	
2.0	12.0		trace silt			2.0		
			SAND, fine to medium grain, quartz, brown, trace silt, trace shell, wet. (SP)	67	10	SPLIT SPOON	6 9 27	12.5
						.5		
				73	11	SPLIT SPOON	6 10 16	
						-1.0		15
				93	12	SPLIT SPOON	4 6 9	
-2.5	16.5		color change from brown to tan			-2.5		
				80	13	SPLIT SPOON	3 3 7	17.5
						-4.0		
				73	14	SPLIT SPOON	3 3 7	
						-5.5		
				27	15	SPLIT SPOON	1 2 4	20
-7.0	21.0					-7.0		
			NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD)		22.5

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT: Disposal Area - Duval Co.

HOLE NUMBER: CB-DU-9-1

Hole No.CB-DU-9-2

DRILLING LOG

DIVISION: South Atlantic

INSTALLATION: Jacksonville District

SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.
2. LOCATION (Coordinates or Station): X=365,452 Y=2141,873
3. DRILLING AGENCY: Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-2
5. NAME OF DRILLER: R. Gordon
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.
10. SIZE AND TYPE OF BIT: See Remarks
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 15 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 1
15. ELEVATION GROUND WATER: 2.3'
16. DATE HOLE STARTED: 12/04/92 COMPLETED: 12/04/92
17. ELEVATION TOP OF HOLE: 13.25 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 81% %
19. SIGNATURE OF GEOLOGIST: M. Gott

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5"
13.2	0.0					13.2	
			SAND, fine to medium grain,quartz, gray, damp, trace gravel, trace shell. (SP)	73	1	SPLIT SPOON	3 7 10
10.9	2.3					11.7	
			SAND, little silt, fine grain, quartz, damp to moist, medium dense, dark brown, trace organics. (SP-SM)	100	2	SPLIT SPOON	7 7
9.4	3.9				3	10.2	14
			SAND, predominantly fine grain, quartz, wet, trace organics. black, medium density. (Gray from (3.0-3.9) Black below 3.9). (SP)	80	4	SPLIT SPOON	4 7
7.2	6.0					8.7	11
			SAND, little silt, fine grain, quartz, damp to moist dense, black, trace organics. (SP-SM)	87	5	SPLIT SPOON	4 7
						7.2	18
				93	6	SPLIT SPOON	12 21
						5.7	58
				67	7	SPLIT SPOON	44 93
			Color change - from black to dark brown.			4.2	*WASH
				80	8	SPLIT SPOON	42 97
						2.7	99
				100	9	SPLIT SPOON	23 52
						1.2	92
				73	10	SPLIT SPOON	13 56
						-.2	52
				53	11	SPLIT SPOON	18 25
			Silt to trace, wet, low density, trace shells.			-1.7	44
				73	12	SPLIT SPOON	5 10
						-3.2	13
				80	13	SPLIT SPOON	4 8
						-4.7	12
				87	14	SPLIT SPOON	4 6
			Silt becoming less dense-loose.			-6.2	9
				80	15	SPLIT SPOON	2 4
-7.7	21.0					-7.7	5

NOTE:
Soils are field visually classified in accordance with unified soils classification system

140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD)

*washed due to reaching refusal at 93 blows.

0 | 2.5 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 | 22.5

> 17 | > 21 | > 18 | > 25 | > 79 | > 93 | > 196 | > 144 | > 110

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PROJECT: Disposal Area - Duval Co.

HOLE NUMBER: CB-DU-9-2

Hole No.CB-DU-9-3

DRILLING LOG | DIVISION: South Atlantic | INSTALLATION: Jacksonville District | SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.	10. SIZE AND TYPE OF BIT: See Remarks
2. LOCATION (Coordinates or Station): X=365,934 Y=2140,804	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Corps of Engineers	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 15 undisturbed: 0
5. NAME OF DRILLER: R. Gordon	14. TOTAL NUMBER OF CORE BOXES: 1
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED	15. ELEVATION GROUND WATER: 2.4'
7. THICKNESS OF BURDEN: Ft.	16. DATE HOLE STARTED: 12/07/92 COMPLETED: 12/07/92
8. DEPTH DRILLED INTO ROCK: 0 Ft.	17. ELEVATION TOP OF HOLE: 11.51 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.	18. TOTAL CORE RECOVERY FOR BORING: 75% %
	19. SIGNATURE OF GEOLOGIST: M. Goff

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5'
11.5	0.0				11.5	
		SAND, fine to medium grain, quartz, gray. trace organics. (SP)	53	1	SPLIT SPOON	1 2 3
9.0	2.5				10.0	
		SAND, little silt, dark brown, predominantly fine grain, quartz, trace organics, dense. (SP-SM)	100	2	SPLIT SPOON	3 4 7
				3	8.5	
			73	4	SPLIT SPOON	7 10 12
					7.0	
			80	5	SPLIT SPOON	12 28 43
					5.5	
			100	6	SPLIT SPOON	41 52 58
					4.0	
			100	7	SPLIT SPOON	36 60 76
					2.5	
			100	8	SPLIT SPOON	* * *
					1.0	
		trace to little silt, fine to medium grain.	73	9	SPLIT SPOON	6 6 8
					-.5	
-2.0	13.5		0	10	SPLIT SPOON	** ** **
					-2.0	
		SAND, fine to medium grain, quartz, brown, wet, trace silt, trace shell. (SP)	67	11	SPLIT SPOON	1 3 4
					-3.5	
			93	12	SPLIT SPOON	3 4 8
					-5.0	
			67	13	SPLIT SPOON	2 3 6
					-6.5	
			67	14	SPLIT SPOON	3 4 5
					-8.0	
			80	15	SPLIT SPOON	3 4 6
-9.5	21.0				-9.5	
		NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD) *No blows recorded. **Overwashed run.	

0 | 2.5 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 | 22.5

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PROJECT: Disposal Area - Duval Co. | HOLE NUMBER: CB-DU-9-3

Hole No.CB-DU-9-4

DRILLING LOG | DIVISION: South Atlantic | INSTALLATION: Jacksonville District | SHEET 1 OF 1

1. PROJECT: Disposal Area – Duval Co.	10. SIZE AND TYPE OF BIT: See Remarks
2. LOCATION (Coordinates or Station): X=365,895 Y=2140,417	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Corps of Engineers	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 14 undisturbed: 0
5. NAME OF DRILLER: R. Gordon	14. TOTAL NUMBER OF CORE BOXES: 1
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED	15. ELEVATION GROUND WATER: 2.4'
7. THICKNESS OF BURDEN: Ft.	16. DATE HOLE STARTED: 12/07/92 COMPLETED: 12/07/92
8. DEPTH DRILLED INTO ROCK: 0 Ft.	17. ELEVATION TOP OF HOLE: 11.67 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.	18. TOTAL CORE RECOVERY FOR BORING: 76.% %
	19. SIGNATURE OF GEOLOGIST: M. Goff

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5'
11.7	0.0					11.7	
			SAND, fine to medium grain, quartz, gray, damp, trace gravel. (SP)	87	1	SPLIT SPOON	3, 4, 8
						10.2	
			Color change to brown with dark brown layers with total organics and trace organics, moist.	67	2	SPLIT SPOON	7, 7, 11
						8.7	
				73	3	SPLIT SPOON	2, 3, 5
7.2	4.5					7.2	
			SAND, fine grain, quartz, with little silt, dark brown to black, moist wet, dense, trace organics. (SP-SM)	100	4	SPLIT SPOON	2, 6, 14
						5.7	
				67	5	SPLIT SPOON	12, 32, 40+ for
						4.2	
				27	6	SPLIT SPOON	46, 45, 48
2.7	9.0					2.7	
			SAND, fine to medium grain, quartz, wet, low dense, brown, trace silt. (SP)	60	7	SPLIT SPOON	12, 16, 18
						1.2	
				80	8	SPLIT SPOON	4, 7, 7
			trace shell fragments. brown to tan.			-.3	
				93	9	SPLIT SPOON	3, 5, 6
						-1.8	
				100	10	SPLIT SPOON	2, 2, 3
						-3.3	
			trace silt. tan.	87	11	SPLIT SPOON	1, 2, 2
						-4.8	
				80	12	SPLIT SPOON	2, 6, 7
						-6.3	
				67	13	SPLIT SPOON	3, 5, 7
						-7.8	
				80	14	SPLIT SPOON	2, 3, 5
-9.3	21.0					-9.3	
			NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0" STANDARD SPLIT SPOON (1 3/8" ID X 2" OD)	

0 | 2.5 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 | 22.5

Hole No.CB-DU-9-5

DRILLING LOG

DIVISION: South Atlantic
INSTALLATION: Jacksonville District
SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.
2. LOCATION (Coordinates or Station): X=364,857 Y=2141,820
3. DRILLING AGENCY: Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-5
5. NAME OF DRILLER: R. Gordon
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.
10. SIZE AND TYPE OF BIT: See Remarks
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 15 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 1
16. ELEVATION GROUND WATER: 2.4'
16. DATE HOLE STARTED: 12/04/92 COMPLETED: 12/04/92
17. ELEVATION TOP OF HOLE: 16.31 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 76% %
19. SIGNATURE OF GEOLOGIST: M. Goff

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5'
16.3	0.0					16.3	
			SAND, fine to medium grain, quartz, gray to white, damp, trace organics. (SP)	80	1	SPLIT SPOON	3 3 5
14.4	1.9					14.8	
			SAND, little silt, fine grain (predominantly), quartz, dense, dark brown, wet. trace organics. (from 3.0 - 4.0 trace silt) (SP-SM)	73	2	SPLIT SPOON	7 11 12
					3	13.3	
				53	4	SPLIT SPOON	1 1 3
						11.8	
				100	5	SPLIT SPOON	2 2 5
						10.3	
				87	6	SPLIT SPOON	3 10 18
						8.8	
				80	7	SPLIT SPOON	12 25 40
						7.3	
				80	8	SPLIT SPOON	28 68 79
						5.8	
				80	9	SPLIT SPOON	28 48 63
						4.3	
				73	10	SPLIT SPOON	31 46 67
						2.8	
				47	11	SPLIT SPOON	9 11 16
						1.3	
			decrease in silt to trace - less dense.	73	12	SPLIT SPOON	3 5 12
-.2	16.5					-.2	
			SAND, fine to medium grain, quartz, wet, very loose, brown, trace silt. (SP)	67	13	SPLIT SPOON	*2 6 11
						-1.7	
				100	14	SPLIT SPOON	2 3 4
						-3.2	
				73	15	SPLIT SPOON	3 4 6
-4.7	21.0					-4.7	
			NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD) *overwash of .3'	

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

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PROJECT: Disposal Area - Duval Co.
HOLE NUMBER: CB-DU-9-5

Hole No.CB-DU-9-6

DRILLING LOG | DIVISION: South Atlantic | INSTALLATION: Jacksonville District | SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.
2. LOCATION (Coordinates or Station): X=364,435 Y=2141,090
3. DRILLING AGENCY: Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-6
5. NAME OF DRILLER: Gordon/Gregory
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.
10. SIZE AND TYPE OF BIT: See Remarks
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 14 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 1
15. ELEVATION GROUND WATER: .5'
16. DATE HOLE STARTED: 12/02/92 COMPLETED: 12/03/92
17. ELEVATION TOP OF HOLE: 15.75 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 76.% %
19. SIGNATURE OF GEOLOGIST: J. Gentile

ELEV.	DEPTH	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5'
15.7	0.0				15.7	
15.4	.4	SAND, fine to medium grain, quartz, little silt, some organic, dark brown, black. (SM)	66	1 1A	SPLIT SPOON	1 2 3
		SAND, fine to medium, quartz, trace to little silt, organic stain, dark brown. (SP-SM)			14.2	
			93	2	SPLIT SPOON	2 3 8
					12.7	
			80	3	SPLIT SPOON	7 7 8
					11.2	
			66	4	SPLIT SPOON	8 11 15
					9.7	
8.2	7.5		60	5	SPLIT SPOON	8 21 32
					8.2	
		SAND, fine to medium, quartz, trace silt, brown. (SP)	54	6	SPLIT SPOON	16 32 35
					6.7	
			66	7	SPLIT SPOON	9 20 25
					5.2	
			73	8	SPLIT SPOON	10 13 15
					3.7	
			66	9	SPLIT SPOON	10 10 11
					2.2	
			73	10	SPLIT SPOON	3 5 11
		tan, clean, from 15.0' to 18.0'			.7	
			60	11	SPLIT SPOON	2 3 4
		clean to trace silt, trace shell, tan to gray from 18.0' to 21.0'.			-.7	
			100	12	SPLIT SPOON	2 2 4
					-2.2	
			100	13	SPLIT SPOON	2 2 4
					-3.7	
			100	14	SPLIT SPOON	2 3 5
-5.2	21.0				-5.2	
		NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD)	

0 | 2.5 | 5 | 7.5 | 10 | 12.5 | 15 | 17.5 | 20 | 22.5

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PROJECT: Disposal Area - Duval Co. | HOLE NUMBER: CB-DU-9-6

Hole No.CB-DU-9-7

DRILLING LOG

DIVISION: South Atlantic
INSTALLATION: Jacksonville District
SHEET 1 OF 1

1. PROJECT: Disposal Area - Duval Co.
2. LOCATION (Coordinates or Station): X=364,249 Y=2141,742
3. DRILLING AGENCY: Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-DU-9-7
5. NAME OF DRILLER: R. Gordon
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED
7. THICKNESS OF BURDEN: Ft.
8. DEPTH DRILLED INTO ROCK: 0 Ft.
9. TOTAL DEPTH OF HOLE: 21.0 Ft.
10. SIZE AND TYPE OF BIT: See Remarks
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: disturbed: 15 undisturbed: 0
14. TOTAL NUMBER OF CORE BOXES: 1
15. ELEVATION GROUND WATER: 3.0'
16. DATE HOLE STARTED: 12/03/92 COMPLETED: 12/03/92
17. ELEVATION TOP OF HOLE: 17.61 Ft.
18. TOTAL CORE RECOVERY FOR BORING: 78.6% %
19. SIGNATURE OF GEOLOGIST: M. Goff

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE REC %	SAMPLE NUMBER	REMARKS Bit or Barrel	BLOWS/.5'
17.6	0.0					17.6	
			SAND, fine to medium grain, predominantly fine grain, quartz, damp, trace gravel. (SP)	73	1	SPLIT SPOON	2, 7, 11
						16.1	
			trace organics, trace silt.	87	2	SPLIT SPOON	7, 7, 10
						14.6	
			damp to slightly wet, trace organics. below 4.0' - clean sand.	93	3	SPLIT SPOON	6, 6, 9
						13.1	
			no organics below 5.0'.	87	4	SPLIT SPOON	2, 5, 5
						11.6	
11.2	6.4						
			SAND, little silt, dark brown, wet, trace organics. (SP-SM)	100	5	SPLIT SPOON	2, 2, 2
					6	10.1	
				100	7	SPLIT SPOON	5, 10, 25
						8.6	
				60	8	SPLIT SPOON	30, 35, 34
						7.1	
				57	9	SPLIT SPOON	8, 8, 12
						5.6	
			trace to little silt.	60	10	SPLIT SPOON	3, 7, 11
						4.1	
				60	11	SPLIT SPOON	4, 6, 6
						2.6	
				73	12	SPLIT SPOON	2, 3, 5
						1.1	
				73	13	SPLIT SPOON	2, 2, 4
						-.4	
				100	14	SPLIT SPOON	7, 5, 3
						-1.9	
				67	15	SPLIT SPOON	2, 2, 4
-3.4	21.0					-3.4	
			NOTE: Soils are field visually classified in accordance with unified soils classification system			140# HAMMER WITH 30" DROP USED IN 2.0' STANDARD SPLIT SPOON (1 3/8" ID X 2" OD)	

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5

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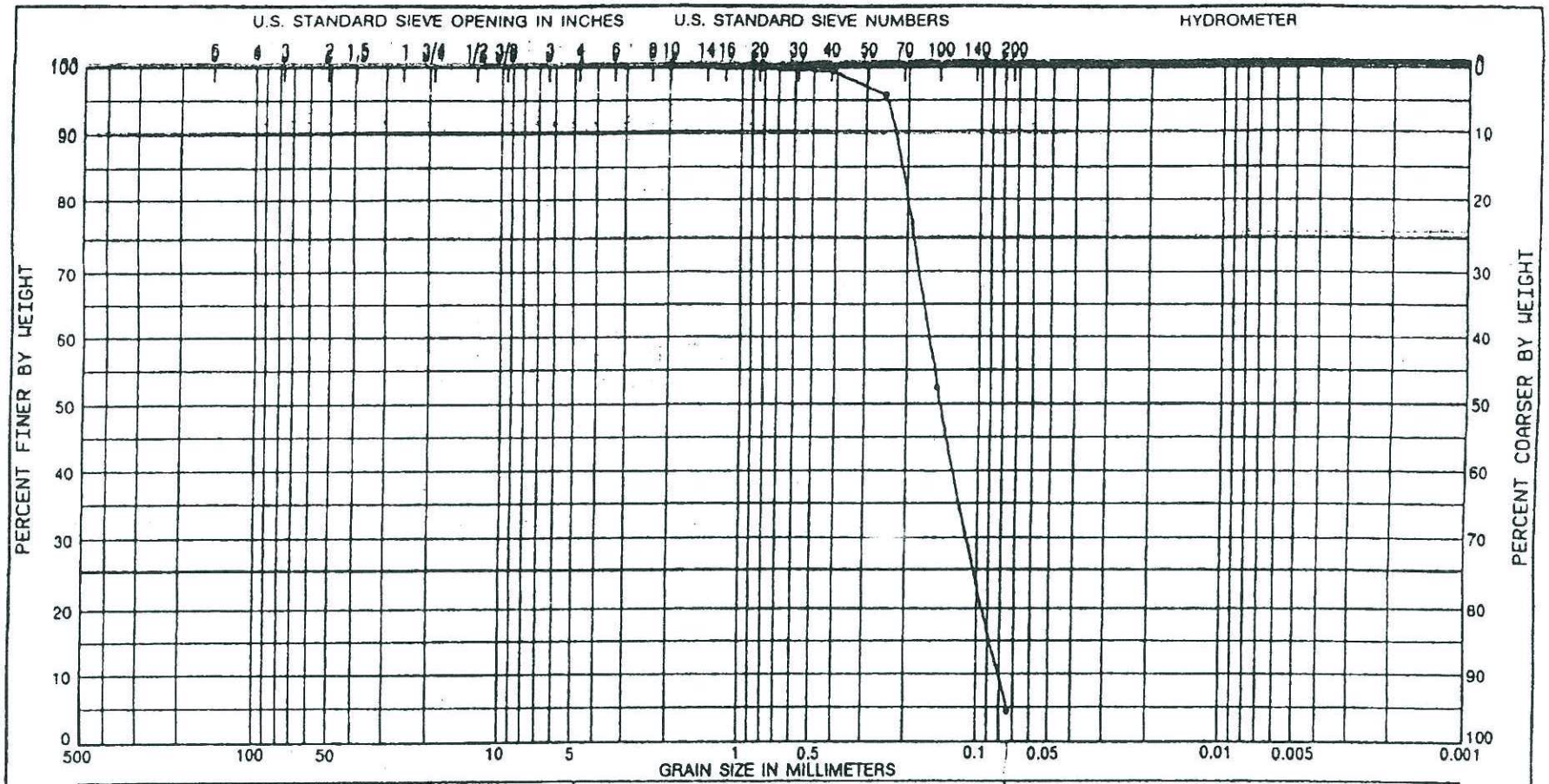
PROJECT: Disposal Area - Duval Co.
HOLE NUMBER: CB-DU-9-7

1.4.7 Field and Laboratory Testing Data

Applicable laboratory data are presented on the following pages. Field and laboratory data for B1 and B-1 through B-4 are presented in paragraph 1.4.8.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 6877
REQUISITION: RM-CW-93-0169



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth/Elev	Visual Classification	Nat w%	LL	PL	PI
6	N/A	Dark brown poorly graded sand (SP), with a trace of mica, organic matter and shell fragments.	-	-	-	-

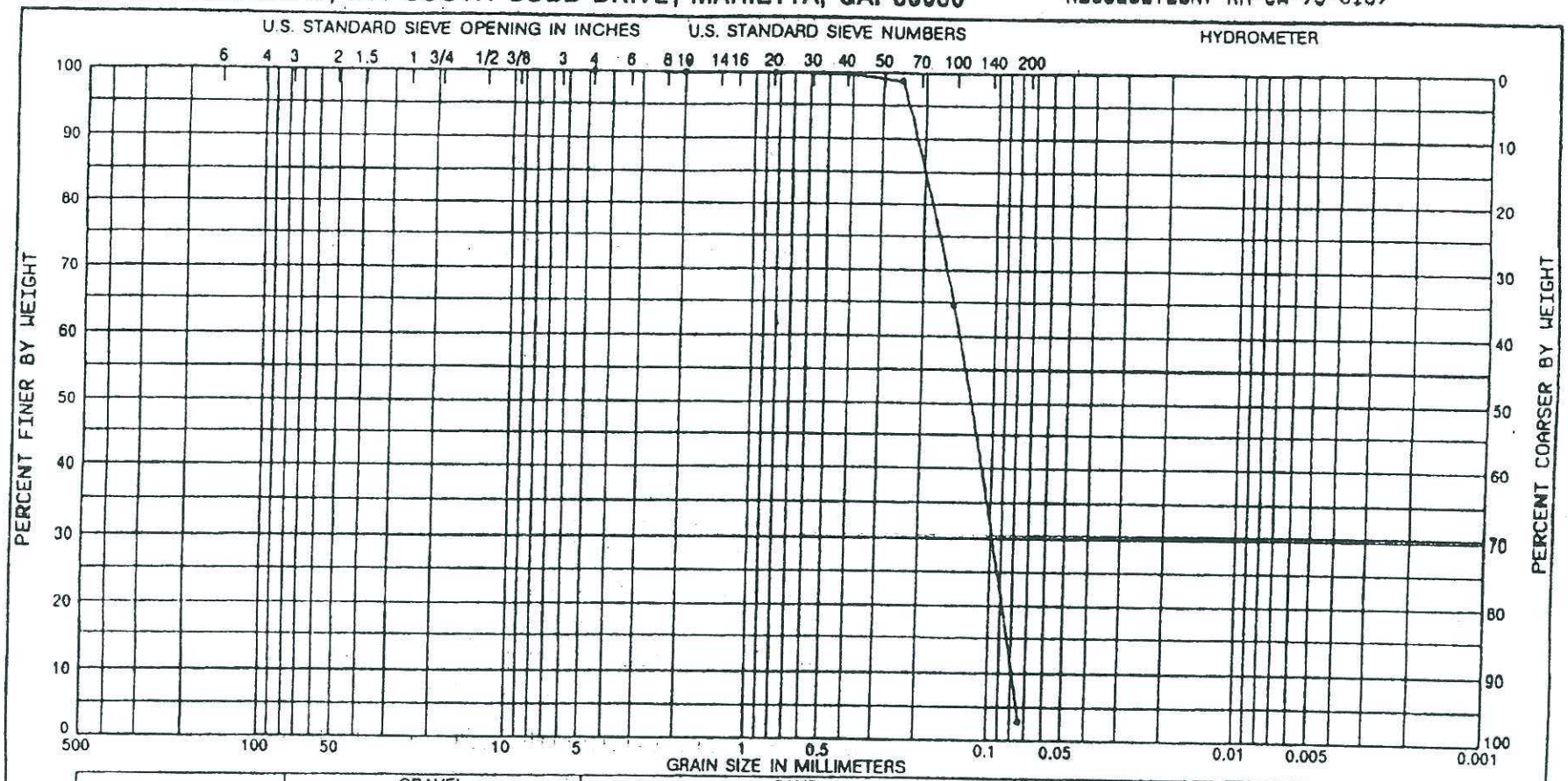
Project Jacksonville District
Find Disposal Areas
Lab No. 73/5481
Boring No. CB-DU9-A
Date 02/02/93

GRADATION CURVES

00320-24

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8877
REQUISITION: RM-CW-93-0169



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth/Elev	Visual Classification	Nat w%	LL	PL	PI
3	N/A	Light broun poorly graded sand (SP), with a trace of mica, organic matter and shell fragments.	-	-	-	-

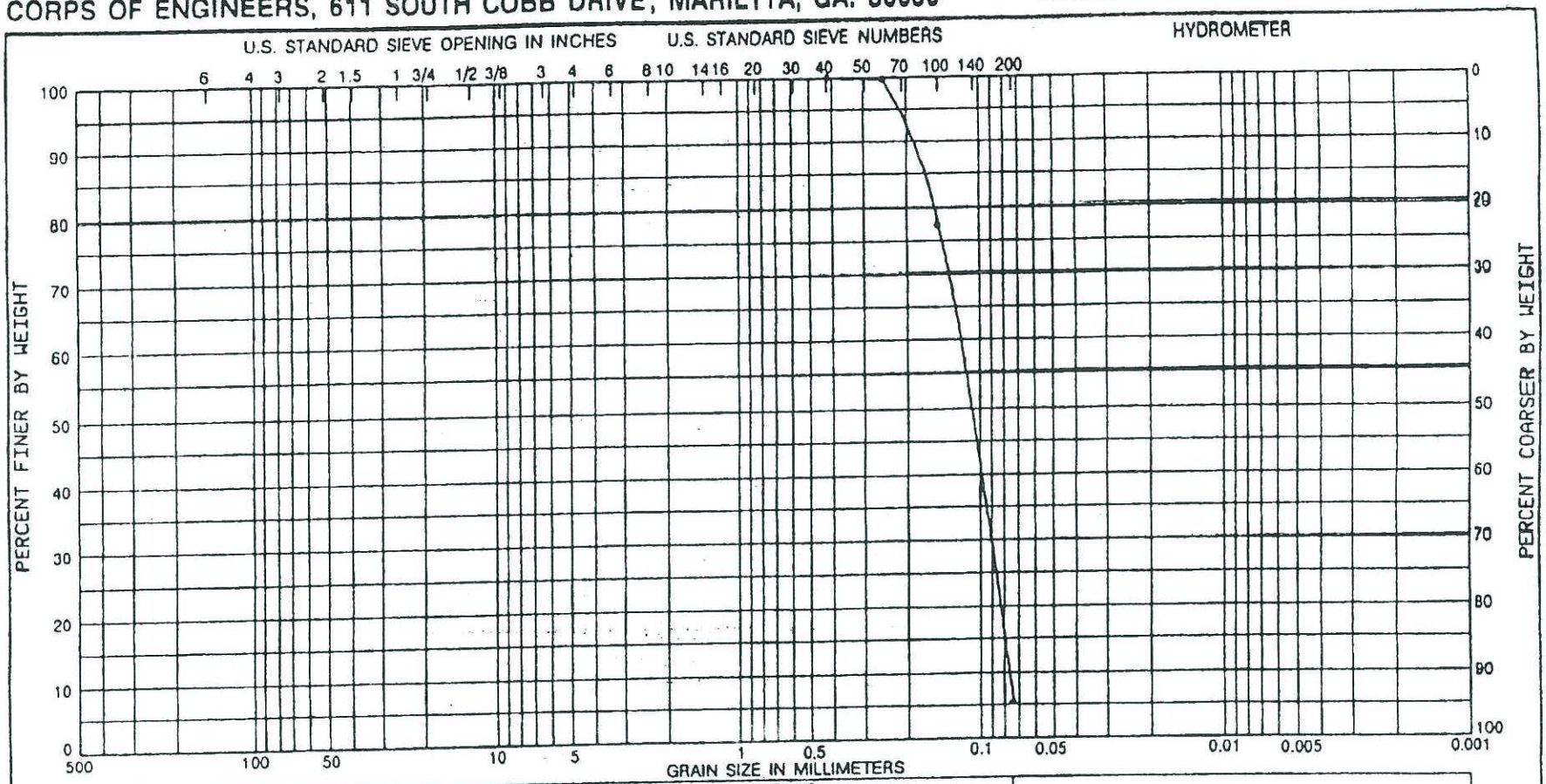
GRADATION CURVES

Project Jacksonville District
Find Disposal Areas
Lab No. 73/5480
Boring No. CB-DU9-4
Date 02/02/93

00320-25

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIV ON LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 6877
REQUISITION: RM-CW-93-0169



Sample No	Depth/Elev	Visual Classification	Nat w%	LL	PL	PI
B	N/A	Dark brown poorly graded silty sand (SP-SM), with a trace of mica and organic matter.	24.8	-	-	-
		Specific Gravity = 2.64				

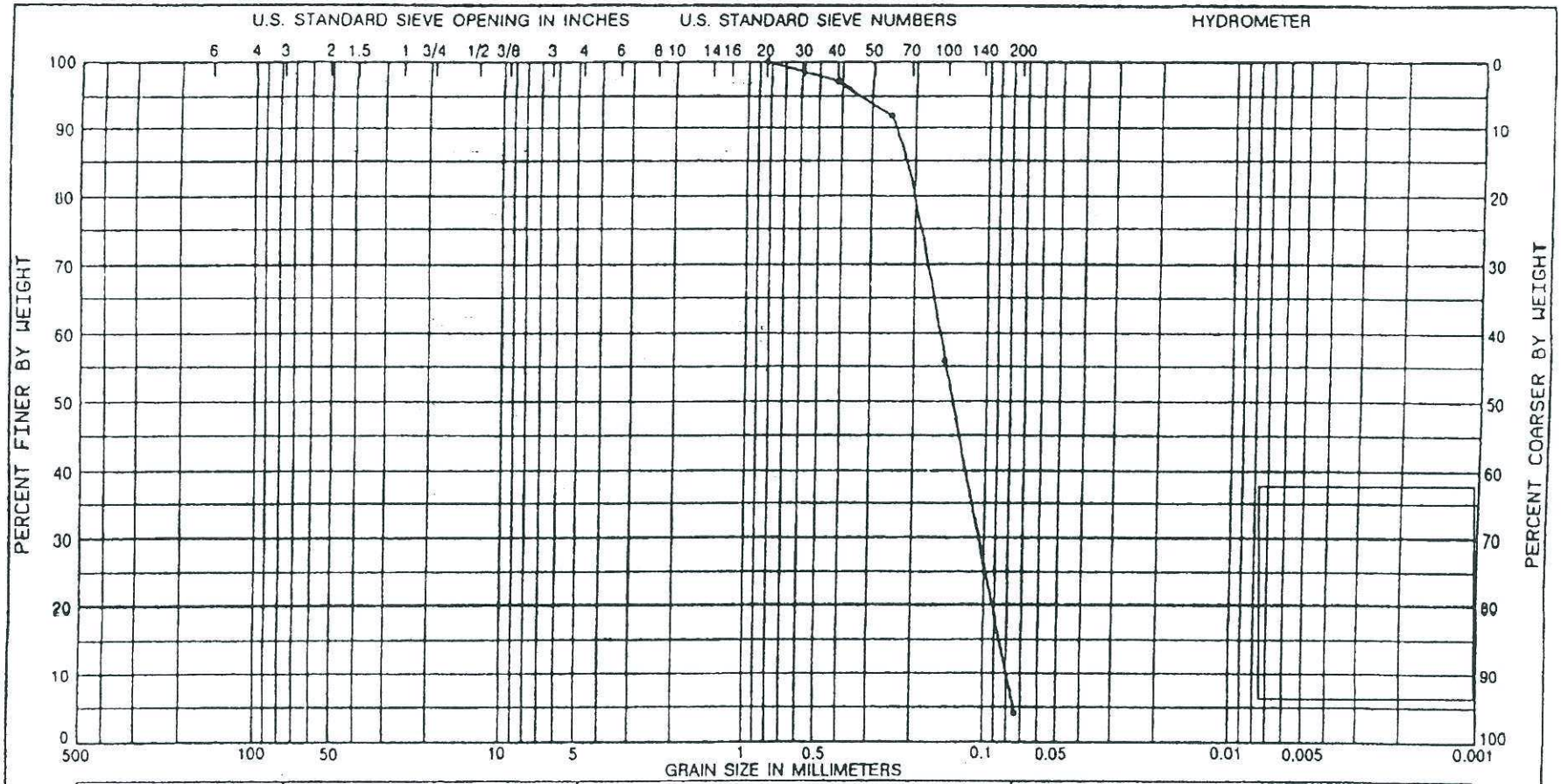
Project Jacksonville District
Find Disposal Areas
Lab No. 73/5482
Boring No. CB-DU9-5
Date 02/02/93

GRADATION CURVES

00320-26

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 6877
REQUISITION: RM-CW-93-0169



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth/Elev	Visual Classification	Nat w%	LL	PL	PI
9	N/A	Dark brown poorly graded sand (SP),	-	-	-	-
		with a trace of mica and organic matter.				

Project Jacksonville District
Find Disposal Areas
Lab No. 73/5483
Boring No. CB-DU9-A
Date 02/02/93

GRADATION CURVES

00320-27

1.4.8 Supplemental Information

Attached is "Report of Geotechnical Exploration DMMA DU-9, Dee Dot Ranch Property, St. Johns County, Florida, E&A Project No. 99-1018" prepared by Ellis & Associates, Inc.

Attached is "Groundwater Mounding Evaluation, Proposed DU-9 Dredge Material Management Area, St. Johns County, Florida" prepared by MACTEC Engineering and Consulting, Inc.

Attached is "Preliminary Report of Geotechnical Exploration, DU-9 Dredged Material Management Area, Florida Inland Navigation District, St. Johns County, Florida" prepared by MACTEC Engineering and Consulting, Inc.

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

ADDENDUM NO. 2
ATTACHMENT 4
Updated Specifications
Section 00 01 00 Bid Solicitation
Section 31 23 00 Dike and Earthwork Construction

SECTION 00 10 00

BID SOLICITATION

Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477
(561) 627-3386

FLORIDA INLAND NAVIGATION DISTRICT DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION; ST. JOHNS COUNTY, FLORIDA

The Florida Inland Navigation District (District) will receive sealed bids for the construction of the District's Dredged Material Management Area DU-9 Build Out Construction Project at its offices at 1314 Marcinski Road, Jupiter, Florida 33477 until **2 PM, local time, February 3, 2017** and then, at said office, will be awarded to the qualified, responsible, and responsive Bidder presenting the lowest Bid. Bids will be opened at a public meeting and read aloud.

The project (**APPENDIX A)** generally entails the construction of a build out (expansion) to an existing dredged material management area (DMMA), permanent perimeter road, site clearing and grubbing, installation of various piping and culverts, landscaping, and other associated work. The major categories of work include, but are not limited to the following:

a. Clearing and grubbing the work and access areas
b. Removing a bentonite slurry wall
c. Constructing the earthen dike and associated underdrain system
d. Constructing perimeter road adjacent to dike
e. Establishing grass
f. Renovating the timber walkway and discharge pipeline outfall

The DU-9 project area, located in St. Johns County, Florida, lies south of the terminus of San Pablo Road S on the Dee-Dot Ranch property near the St. Johns County line. The Contractor will have **450 calendar days** (inclusive of the 180-day Grassing Establishment Period) from the date established in the "Notice to Proceed" to complete the project. ~~The Contractor will have **180 calendar days** from the Notice to Proceed to complete the entire project.~~

The District will hold a **mandatory** pre-bid meeting and site visit at **11:00 AM** on **January 19, 2017** at the project site. Bidders shall meet at the north property entrance gate of the Dee-Dot Ranch property.

A Bid Bond will be required for bids that exceed $200,000.00. Offers providing less than 90 days for District acceptance after the date offers are due will not be considered and will be rejected. Contractors may obtain the Contract Documents, Project Drawings, and Specifications from the offices of the District or the District's website (http://www.aicw.org) at no charge.

--End of Section--

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SECTION 31 23 00

DIKE AND EARTHWORK CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work covered by this section includes furnishing all labor, equipment, and materials required to perform all necessary excavation, filling, and grading to construct the dredged material management area including dike, ditches, and roads described herein and in the Project Drawings. Completion of this work includes the removal of the existing 3-ft wide x 30-ft deep bentonite slurry wall to ~~the bottom elevation of the DMMA expansion~~ elevation 9.9 ft NAVD 88.

B. NOTE: A portion of the site was previously used as a Sludge Disposal Area. Estuary Corp. As of May 2016, the site has been successfully remediated and was issued a Conditional Site Rehabilitation Completion Order (SRCO) by the Florida Department of Environmental Protection (**APPENDIX G**). Due to the site's history, the Contractor shall visually pre-screen the material in the area of the former Dee Dee Dot Sludge Disposal Area No. 2 for the unlikely finding of any remaining contaminated materials. Should any suspect material be identified, the Contractor shall immediately notify the Engineer and place the material into the designated "Temporary Disposal Area for Suspect Material" stockpile area for further inspection. Should any monitoring wells associated with the clean-up of the former Dee Dot Sludge Disposal Area No, 2 be identified, the Contractor shall immediately notify the Engineer. The Engineer will notify the Florida Department of Environmental Protection and Dee Dot's consultant, Golder Associates, for formal abandonment of the identified well(s).

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. All publications are "Latest Edition" unless specified otherwise.

A. American Society of Testing Materials (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM D1140	Standard Test Methods for Amount of Material in Soils Finer than the No. 200 Sieve
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D2216	Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3740	Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction
ASTM D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

B. American Association of State Highway and Traffic Officials (AASHTO)
AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe

C. Florida Department of Transportation (FDOT)
FDOT Standard Specifications for Road and Bridge Construction

1.3 DEFINITIONS

A. Dike Embankment: The term “dike embankment” as used in these specifications is defined as the earth fill portion of the dike and includes all types of earth fill for the dike, stability berms, roads, ditches, and all other specified or directed earth fill within the limits of the project, excepting those stone and filter material used for the dike toe drain system.

B. Dike Embankment Template: The dike embankment template is defined as follows: The bottom vertical limit of the template shall be the surveyed foundation grade. The top vertical limit of the template shall be the finished elevation of the top of dike as defined on the Project Drawings. The horizontal limits of the template shall be from the outside toe of placed/compacted fill necessary to construct the dike, perimeter road, ditch, and ditch berm to the interior toe of placed fill necessary to construct the dike.

C. FDOT Specifications: Latest edition of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

D. Fine Material: Fine material shall be defined as the amount of material by dry weight passing the U.S. standard No. 200 sieve (ASTM D1140 or ASTM D6913).

E. Maximum Density: Maximum density shall be defined as the maximum dry density obtained from modified proctor compaction curves (ASTM D1557) and approved by the Engineer.

F. Toe Drain: The toe drain is defined as the material making up the dike interior drain system and primarily includes a gravel trench wrapped in filter fabric. The system also includes the perforated and non-perforated collector pipes, filter fabric, concrete inlets, and outlet pipes.

G. Structure: Footings, foundations, retaining walls, slabs, piles or other man-made stationary features constructed above or below the ground surface.

1.4 SUBMITTALS

The following submittals shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES.

A. Geotechnical Engineer and Testing Laboratory Credentials

1. The Contractor shall submit the name and credentials of the geotechnical engineering consultant and personnel who will be performing the quality control tests for soil compaction, soil sieve analysis, concrete testing, etc. The company and personnel shall show experience in this type of work and the work shall be overseen by a registered professional engineer.

2. The Contractor shall submit the name and credentials of the testing laboratory which will be performing the material testing for Engineer’s approval.

B. Foundation Preparation Grading Plan

1. Submit a foundation preparation grading plan to the Engineer for approval. The foundation preparation grading plan shall show the proposed grades and elevations of the foundation in section view and profile view. This may be done by marking the drawing cross sections with red pen (and sketching a profile view) or this may be performed digitally in AutoCAD.

C. Dewatering Plan

1. Submit a written dewatering plan describing the equipment required and the means and methods required to dewater the site for excavation. Provide sketches as necessary.

2. Submit a copy of any necessary dewatering permits

D. Toe Drain Material Information

1. Submit manufacturer's information on perforated and non-perforated HDPE collector pipes.

2. Submit test data and gradation curves for toe drain gravel.

3. Submit manufacturer's information on filter fabric for toe drain.

E. Water Source for Dike Compaction

1. Submit the source of the water to be used to achieve optimum moisture content during compaction operations.

2. Submit a copy of any necessary permits for temporary groundwater well if used.

F. Drainage Inlets and HDPE Drain Pipes

1. Submit shop drawings and information on pre-cast concrete inlets. Shop drawings shall also show how proposed inlets will be hydraulically connected to the existing toe drain system.

2. Submit manufacturer's data on all sizes of HDPE drain pipe used for the toe drains or culvert crossings.

G. Dike Construction Quality Control Tests and Measurements

The Contractor shall submit quality control tests to the engineer for approval. These include:

1. Soil density and moisture tests

2. Soil gradation and classification tests

3. Toe drain material thickness measurements

4. Gravel gradation tests

H. Pipe Bedding Compaction Tests

1. The contractor shall submit a modified proctor (ASTM D1557) per each soil type and in place density testing results for every 200 linear ft of pipe installed but not less than one test per pipe or culvert location.

I. Foundation Survey

1. After foundation preparation is completed, submit topographic survey of the dike foundation footprint for Engineer approval.

J. Pipe Invert Surveys

1. Before backfilling, the contractor shall submit surveys of pipe elevations to the Engineer for approval.

K. Payment Surveys

1. Surveys for payment of dike construction shall be submitted at 30-day intervals in accordance with SECTION 01 29 00 MEASUREMENT AND PAYMENT. The Engineer shall have seven (7) working days to examine surveys and make recommendations for payment or non-payment.

L. Toe Drain TV Pipe Inspection Video/Report

1. Following dike construction, submit inspection video and a letter report for the existing and newly constructed toe drain system including any pipes passing beneath the perimeter road for Engineer approval. The Contractor shall repair any broken or non-functioning pipes in the newly constructed toe drain system at no charge to the District.

M. Aerial Photographs

1. The contractor shall submit aerial photographs of the site after initial site preparation but before shaping of the dike. An additional aerial site photograph shall be submitted after the completion of the containment basin.

1.5 GEOTECHNICAL ENGINEERING CONSULTANT AND TESTING LAB QUALIFICATIONS

A. Geotechnical Engineer Consultant Testing and Inspection Services: Contractor shall retain a qualified independent geotechnical engineering/testing consultant to perform soil testing and provide quality control testing services during earthwork operations.

B. Testing Laboratory Qualifications: The geotechnical testing laboratory shall demonstrate to the Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM D3740, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the work. AASHTO or FDOT certification may be substituted as approved by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS FOR DIKE EMBANKMENT

A. General

1. Materials for the dike embankment fills shall be acquired from excavation areas as shown on the Construction Drawings. The intention is to use the most suitable material obtainable from these sources. Materials containing brush, roots, sod, or other perishable materials, and stones larger than one (1) inch will not be considered suitable.
2. The suitability of the materials shall be subject to quality control tests. Mixing of the borrow materials during the excavating process may be required. The contractor shall not excavate below the finished interior basin elevation shown on the Project Drawings. Any soils excavated from below the water table will require dewatering prior to placement and compaction.
3. The Contractor shall examine the Geotechnical Report(s) before bidding to review the embankment fill material available at the project site.

B. Suitable Material

1. Material considered suitable for dike, road, and general earthwork construction shall consist of an inorganic, granular soil containing between 0 and 12 percent material passing the No. 200 mesh sieve (sand having a Unified Soil Classification of SP or SP-SM.

C. Unsuitable Material

1. Materials which do not comply with the requirements for “Suitable Material” are unsuitable. Additionally, materials unsuitable for use as dike embankment construction fill are defined as follows:

    a. Material containing more than 4% organic matter (by dry weight)

    b. Materials classified by the Unified Soil Classification System as PT, OH, OL, CH, SC, MH, SM, GM, GC, GW and GP.

    c. Materials containing roots greater than one (1) inch in diameter, logs, scrap lumber, metal objects, plastic and fiberglass objects, concrete construction refuse, and other objectionable debris.

    d. Materials containing brush, sod, organic, and other perishable materials.

    e. Material containing rocks greater than one (1) inch in diameter.

D. Topsoil Material

1. Material suitable for topsoil shall be natural in-situ topsoil taken from onsite areas within the clearing limits but outside the existing dike. Unless otherwise approved by the Engineer, suitable topsoil shall be dark colored soils discolored by the organic content of the soil and having at least 1.0 percent organic content by dry weight.

2.2 MATERIALS FOR TOE DRAIN SYSTEM

A. Toe Drain Gravel: Gravel for the dike drains shall be the size aggregate specified on the Project Drawings. Gravel shall be natural limestone or granite stone having a minimum unit weight of 140 pcf and meeting FDOT specifications for coarse aggregate.

B. Filter Fabric: Filter fabric shall be Mirafi 1100N non-woven filter fabric or engineer approved equivalent.

C. 6-inch Diameter Perforated HDPE Drain Pipe: 6-inch diameter perforated drain pipe shall be single wall HDPE corrugated pipe having a manning's n of 0.015 or less and capable of withstanding the cover requirements and construction loads. Pipe and fittings shall meet AASHTO specification M252, type CP, with class 2 perforations. Joints, tees, elbows, and other connections shall interlock so as to withstand a minimum of 40 lbs of tensile force and shall be soil-tight. If the manufacturer provides no test results on the tensile capacity of the joints, the Contractor shall place a minimum of two ½ inch wide beads of 3M Marine 5200 fast-cure adhesive around the inside perimeter of the joints and shall test 3 typical joints to see if the joints can hold a 40 lb tensile force for a minimum of 12 hours.

D. 6-inch Diameter Non-Perforated HDPE Drain Pipe: 6-inch diameter non-perforated drain pipe shall be single wall HDPE corrugated pipe having a manning's n of 0.015 or less and capable of withstanding the cover requirements and construction loading. Pipe shall meet AASHTO specification M252, type C. Joints, tees, elbows, and other connections shall interlock via mechanical means and shall withstand a minimum of 40 lbs of tensile force and shall be soil-tight.

2.3 DRAIN PIPE AND INLET MATERIALS

A. HDPE Double Wall Drain Pipe: Pipe greater than 6 inches in diameter, pipe specified as culverts or pipe specified as double-wall shall be of the diameter listed on the Drawings and shall be HDPE drain pipe with double wall corrugations. Pipe shall have a smooth-wall interior with a manning's n of 0.012 or less. Pipe shall be double wall meeting AASHTO specification M252 or M294, type S. Fittings shall be bell-and-spigot type and shall be water tight to a pressure rating of 10 psi per ASTM D3212. Fittings shall be a minimum of 8 ft apart. Pipe lengths less than 8 ft shall not be used unless all remaining pieces are the full ordered length.

B. Concrete Inlets and Grates: Concrete inlets shall be pre-cast concrete inlets meeting the requirements and dimensions outlined in the Project Drawings. Grates shall fit the inlets and meet requirements as outlined in the Project Drawings.

2.4 ACCEPTABLE SOILS FOR PIPE BEDDING

Where pipe bedding consists of soil material, soil shall be classified as SP or SP-SM per ASTM D2487 and have a fine material content less than 12% per ASTM D6913.

PART 3 - EXECUTION

3.1 DEWATERING

A. The Contractor shall dewater the site as necessary to construct the DMMA. The Contractor shall abide by all state and local laws regarding dewatering of construction sites. The Contractor shall monitor any discharge as necessary to ensure that the discharged water does not violate state water quality standards. The Contractor shall not discharge dewatered effluent

to any location onsite except for the DMMA basin area unless approved by the Engineer. The Contractor shall submit a dewatering plan to the Engineer for approval.

3.2 FOUNDATION PREPARATION

A. Foundation Preparation

1. Excavate to a point so that the prepared foundation is level when measured perpendicular to the proposed dike centerline. The proposed dike footprint shall be defined as 15 ft (measured perpendicular to the dike centerline) beyond where any proposed cut or fill is required to construct the dike, interior shelf, perimeter road, and perimeter ditch. The intent is to have a roadway like preparation where compaction equipment can work effectively. The Engineer recognizes that the prepared foundation surface will vary in elevation.

2. Where the foundation intercepts existing dikes or grades having a slope in excess of 15 percent, bench cut the slope as described in the section herein entitled “Fill Placement and Compaction”.

3. Following the establishment of groundwater control, the foundation should be compacted by surface rolling with a self-propelled vibratory compactor. During compaction efforts, groundwater levels shall be maintained a minimum of two (2) ft below the stripped (cleared) ground surface. The compactor should impart a dynamic drum force of not less than 44,000 pounds. Each section of the subgrade shall be subjected to multiple, overlapping (20% overlap) coverages of the compactor as it operates at its full vibrational frequency and at a travel speed of not more than 1.5 miles per hour. Compaction shall continue until no further settlement is visibly discernible at the subgrade surface. In no case, however, should any section of the subgrade receive less than ten (10) coverages with the compactor. Soil in the top twelve (12) inches shall be compacted to 95% maximum density at a moisture content within 2% of optimum as determined by Modified Proctor (in accordance with ASTM D1557).

4. If during compaction efforts, the soil displays any signs of instability such as pumping, weaving, or shoving, the Contractor shall notify the Engineer. Should weak or instable soil conditions exist the Contractor shall, under direction of the Engineer, excavate the weak soils and store the material onsite. Upon completion of the dike, this material shall be buried in the interior basin unless otherwise directed by the Engineer.

5. After compaction, thoroughly scarify the ground surface within the entire dike base footprint to a depth of six (6) inches. Run scarifying parallel to the centerline of the dike. All earthwork operations, including excavation, handling, hauling, drying, and compacting of material shall account for variable groundwater conditions and surface ponding from any recent heavy rains.

B. Foundation Preparation Finished Grade Elevation:

1. The elevation of the prepared foundation surface shall match the existing grade to the greatest extent practical. Unless otherwise approved by the Engineer, excavation (cut) shall be no greater than necessary to provide a reasonable level and gently sloping surface with grades less than 5% measured parallel to the dike centerline and elevation differences less than 6 inches when measured along a line perpendicular to the dike centerline (unless benching is utilized). Excavation (cut) during construction of the foundation shall not be greater than 1 foot below the existing grade except to level humps or high spots less than 500 feet in length as measured parallel to the dike centerline.

2. The Contractor shall submit a foundation preparation plan to the Engineer for approval showing the cross sections and profiles of the proposed foundation grades. The final surveyed foundation elevations shall be within plus or minus 3 inches of the approved foundation grade elevations, unless otherwise directed by the Engineer

C. Foundation Survey

1. Upon completion of clearing/grubbing and dike foundation preparation, the contractor shall perform a topographic baseline survey that will used to determine future earthwork payment quantities. The survey shall encompass the entire area within the limits of clearing including the dike/roadway footprints and the interior basin area. The survey shall also include an area 25 ft outside the perimeter of the limits of clearing. Transects shall be taken perpendicular to the dike centerline at intervals not to exceed 100 ft with individual survey points taken at all breaks in grade or slope and at intervals not exceeding 50 ft on center. The survey shall be submitted to the Engineer for approval in electronic paper version (24x36) and in AutoCAD 2013 or later version containing point elevation data. Horizontal and vertical coordinate systems shall match those used on the Construction Drawings. The survey shall be signed and sealed by a licensed professional surveyor registered in the State of Florida.

3.3 HANDLING OF UNSUITABLE MATERIAL

A. The Contractor shall separate unsuitable material (as defined in Paragraph 2.1.C) from suitable material during excavation and shall place the material within the basin at the depth and location shown on the Drawings or as directed by the Engineer. Unsuitable material may be temporarily stockpiled in areas within the construction boundary where no construction activities are taking place. Disposal of unsuitable material under or within the dike and other constructed features is expressly forbidden. Dress all areas where unsuitable materials are placed smoothly and evenly. Place a minimum of one foot of sand cover over unsuitable material unless specified otherwise on the Drawings. Unless otherwise approved by the Engineer, the Contractor shall dewater the unsuitable material to the extent necessary to operate heavy tracked equipment over the material and evenly spread and grade any sand cover.

B. If the placement area for the unsuitable material is temporary, the Contractor shall survey the stockpile area after all material is stockpiled and again after all unsuitable material is removed from the stockpile area. If the placement area is permanent, the Contractor shall survey the unsuitable material placement area before and again after placement of the unsuitable material.

C. To get an accurate estimate of the quantity of unsuitable material, the Contractor shall survey the placement area (either temporary or permanent) with transects taken every 50 ft. Surveys shall clearly delineate the horizontal and vertical extent of the unsuitable material. Surveys shall conform to the same requirements designated in these specifications for dike payment surveys.

3.4 BASIN EXCAVATION AND DEWATERING

A. Fill material for DMMA construction shall be taken from the basin area. The Contractor shall excavate the basin to the lines and grades shown on the Drawings and shall dewater the basin area as necessary to maintain moisture control of fill material. The Contractor shall dewater the basin area for final grading.

3.5 FILL PLACEMENT AND COMPACTION

A. General

1. No fill shall be placed on any part of the embankment foundation until such areas have been inspected and approved by the Engineer. The gradation and distribution of material throughout the compacted earth fill section of the dike shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. Successive loads of material shall be dumped at locations on the dike as directed or approved.

B. Dike Embankment

1. Scarify the prepared foundation grade to a depth of six (6) inches prior to placing fill. After the first lift is placed, scarify the surface of the previously compacted lift to a depth of three (3) inches and moisten as required for bonding to overlying material. After dumping, the materials shall be spread by approved means in approximately horizontal layers over the entire fill areas. Thoroughly mix embankment materials by disking or harrowing. When succeeding lifts display differences in color or fines content material shall be uniformly mixed to a depth of two (2) ft.

2. Each lift placed adjacent to the existing dike shall overlap the existing dike at that elevation by ten (10) ft. Excavation of the existing dike shall be completed as necessary to place each new lift. The existing dike section that is overlapped by the new lift shall be scarified and moistened as described above.

3. Fill shall be placed at a moisture content within plus or minus 2% of the soils optimum moisture content as determined by ASTM D1557. Place fill in lifts 12 inches or less and compact using a vibratory compactor similar to the one used to prepare the foundation. Compact material to a minimum of 95% of the maximum density determined by the Modified Proctor Test (ASTM D1557). If the overlapping tracks of a bulldozer or lightweight vibratory compaction equipment are utilized as the only compaction means, then the fill loose lift thickness shall be reduced to six (6) inches. Construct the dike embankment to the lines, grades, and cross sections indicated on the Project Drawings.

4. Where the prepared foundation grade is too steep or too uneven, material shall be placed by benching.

5. The Contractor shall record field density tests as soon as practically possible after compacting the dike embankment fill.

C. Benching

1. Where benching is required, place and compact the material in horizontal layers. The horizontal face cut into the existing slope shall be a minimum of 6 feet. The vertical face cut into the existing dike resulting from benching shall not be greater than 3 feet in height unless otherwise approved by the Engineer.

D. Backfill for Pipes

1. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected.

   Place and compact material in lifts. Space between the pipe and sides of the trench shall be packed by hand tamper, up to a level of one foot above the top of the pipe. Contractor shall compact backfill to 90% of maximum density as determined by the Modified Proctor Test (ASTM D1557) in layers not to exceed 4 inches in depth up to the centerline of the

pipe from the trench bottom. The backfill shall be carried up evenly on both sides of the pipe.

2. Place remaining material within trench in 6 inch lifts and compact with hand tamper or walk-behind equipment.

3.6 TOE DRAIN SYSTEM INSTALLATION

A. Toe Drain General: Install the toe drain to the lines and grades shown on the Project Drawings. Place adequate soil or gravel cover over piping to prevent damage before allowing machinery over the buried pipe material.

B. Quality Control Testing Gravel: The Contractor shall provide gradation tests per ASTM for the first 10 cubic yards delivered to the project site and every 4,000 cubic yards thereafter. If any discrepancies are noted, additional tests shall be required.

C. Quality Control Toe Drain Dimensions: The geotechnical consultant shall measure and record the width and thickness of the gravel layer at every 300 linear ft (as measured along the dike centerline) and records shall include written documentation of the measured thickness. The geotechnical consultant shall keep written records of the field measurements and submit these in a brief weekly report to the Engineer. If the geotechnical consultant discovers any locations where the gravel thickness is not within specified tolerances described herein, the consultant shall bring it to the Contractor's and Engineer's attention for corrective action. The consultant shall note locations where tolerances were not met, the date corrective action was taken, and shall record the new thickness measurement demonstrating that the material thickness is now within specified tolerances.

D. Toe Drain Tolerances: The dimensions and tolerances of the gravel toe drain shall be plus or minus 6 inches unless otherwise specified on the Drawings. For perforated pipe placed within gravel backfill, the minimum thickness of gravel cover in any direction as measured from the outside edge of pipe shall be 12 inches.

E. Pipe Installation and Inspection: Place and compact soil bedding material to 95% maximum density per ASTM D1557. Where gravel or aggregate is specified as bedding material, compact to the requirements specified by the Engineer. Assemble pipes for the full lengths along bedding material and establish the final invert elevations. The slope of the pipe between specified invert elevations shall be straight and true and shall be within the tolerances specified herein. The Contractor and the Contractor's construction surveyor shall install wooden stakes at 25-50 ft on center and shall install a string line along the top of pipe run (as specified on the Drawings) to assist the Engineer in evaluation of the assembled pipe. Notify the Engineer that the pipe is ready for inspection giving at least 48 hours advanced notice.

F. Survey of Pipe Installation: After the bedding is graded, the pipe is assembled and the final pipe inverts are set, the Contractor shall survey the horizontal and vertical locations of the pipe before backfilling. Record the pipe elevations on the top of pipe at pipe ends and every 25-35 ft along the pipe run. Where the open end of the pipe is accessible, survey the pipe invert elevation in addition to the top of pipe elevation. For each type/size of pipe, measure the distance from the top of the pipe to the invert and include this information in the survey. Submit the survey results to the Engineer for approval before backfilling. Include the surveyor's data in the as-built survey with the pipe elevations marked invert or top of pipe.

G. Pipe Installation Tolerances: Pipe shall be installed to within plus or minus 0.1 ft vertically of the specified invert elevation. Between specified invert elevations, pipe shall be placed within plus or minus 0.1 ft vertically of a theoretical straight line drawn between the specified invert elevations. Pipe shall be placed horizontally to within plus or minus 3 inches of the specified

horizontal location. Minimum soil cover over the top of pipes shall be 12 inches unless otherwise noted.

H. Filter Fabric: Install filter fabric of the type specified on the Project Drawings. Stake fabric as necessary to hold in place during backfilling. Lap joints a minimum of 18 inches.

I. Pipe Inspection: Following completed dike construction, the Contractor shall inspect the toe-drain collector pipes for blockage and crushing by running a remotely controlled television camera through the entire length of each pipe run. The Contractor shall video record the inspection for submittal. The Contractor shall note any locations where damage or excessive settlement has occurred and submit this information along with an inspection report to the Engineer for approval. The Contractor shall repair damaged or settled pipe at no additional cost to the Owner.

3.7 EARTHWORK WORK SEQUENCE

A. Fill placement for dike construction shall proceed on the lower end first until the partially constructed dike is approximately the same top elevation at any location. Dike construction can then proceed with the requirement that the dike shall be constructed so that the maximum elevation difference is 3 ft at any location along the top of the dike.

B. The expected work sequence for earthwork is as follows:

1. Clear and grub
2. Strip and stockpile topsoil
3. Prepare dike foundation
4. Construct dike and other earthwork features
5. Place unsuitable material in specified final location and cover with sand fill
6. Place and spread 3-6 inches topsoil over dike and other areas designated for grassing

C. The Engineer may approve other work sequences proposed by the Contractor with consideration given for environmental impacts, site access, soil erosion, groundwater control, settlement, etc.

3.8 DIKE EMBANKMENT SOIL QUALITY CONTROL TESTING

A. Determination of Maximum Density

1. The compaction curves provided in the geotechnical report supplied with the specifications are considered preliminary.

2. The Contractor shall collect a minimum of five (5) bulk samples from the excavation area to perform Modified Proctor Test before dike embankment construction begins. All Contractor-supplied tests shall be performed by the approved geotechnical testing firm, and resulting test data shall be signed and sealed by a licensed professional engineer registered in the State of Florida. The Engineer will select the sampling locations and depths for Contractor-supplied testing.

3. The Engineer will determine if these tests may be averaged into previous test results or are suitable to be used to provide a new maximum dry density.

B. Quality-Control Testing: Dike, Perimeter Road, Ditch, Entrance Roads and Other Earthwork

1. In-Place Density (Compaction) Testing: The contractor's geotechnical engineering consultant shall perform a minimum of one soil density and moisture test for every 1,000

cubic yards of fill placed and compacted but not less three times per week during dike construction. Soil density and moisture testing shall conform to ASTM D6938. The tests shall be distributed over the dike, stability berms, and roadways as determined by the geotechnical consultant unless otherwise directed by the Engineer. The consultant shall record the elevation, dike station and approximate offset location of each test.

2. Soil Particle-Size (Gradation) Testing and Soil Classification: The contractor's geotechnical engineering consultant shall perform a minimum of one soil gradation test (ASTM D6913) and one soil classification test (ASTM D2487) for every 4000 cubic yards of material placed and compacted but less than once per week during dike construction. The Contractor shall test for organic content as a percent per dry weight every 8000 cubic yards of material, but not less than once every 2 weeks during dike construction. Sampling for gradation testing should occur at locations determined by the geotechnical consultant unless otherwise directed by the Engineer. The consultant shall record the elevation, dike station and approximate offset of the sample location.

3. The Contractor shall obtain test results in a timely manner and take corrective action to repair any part of the project not meeting the requirements of the Specifications.

3.9 DIKE AND EARTHWORK GRADE TOLERANCES

A. At all points along the dike crest a six (6) inch tolerance above indicated grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown drains freely and that there are no abrupt humps or depressions in surfaces or bulges in the width of the crown. No points along the dike crest shall be below the indicated grade. No payment shall be made for material more than six (6) inches above the design template as measured perpendicular to and above the design template.

B. The final surveyed foundation elevations shall be within plus or minus 3 inches of elevations indicated on the approved foundation preparation grading plan, unless otherwise directed by the Engineer.

C. All other earthwork grades including roadways, ditches, shelves and other features shall be within plus or minus 3 inches of the specified grade elevation.

3.10 SLIDES

A. In the event of slides in any part of the embankment prior to final acceptance of the work, the Contractor shall remove material from the slide area, as directed, and shall rebuild such portion of the embankment. The removal and disposal of material and the rebuilding of the embankment shall be performed without cost to the Owner.

3.11 DIKE AND EARTHWORK FINAL GRADING

A. Bring the dike to the required grade and cross section at all points. Redress the dike surface as necessary to remove ruts and irregularities to the satisfaction of the Engineer. The Contractor is advised that this may require hand raking to achieve a suitable smooth surface.

B. The Contractor may utilize fill within the basin area as necessary but the final basin elevation shall be finish graded to within the elevation range shown on the drawings. All ruts and holes greater than 8 inches in depth shall be smoothed. Changes in elevation less than 2 ft shall be accomplished by slopes 10% or shallower and changes in elevation greater than 2 ft shall be accomplished with slopes of 4H:1V or shallower.

3.12 PERIMETER ROADS, ENTRANCE ROADS AND PERIMETER DITCHES

A. Perimeter roads, entrance roads, and perimeter ditches shall be constructed to the lines and grades shown in the Project Drawings. Final surveys of the perimeter roads, entrance roads, and perimeter ditches shall be included in the as-built survey for the dike construction.

3.13 GRASSING

A. Apply grassing in accordance with SECTION 32 92 19 GRASSING ESTABLISHMENT.

3.14 DIKE PROTECTION AND MAINTENANCE

A. Repair and reestablish grades to the specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact. Where settling occurs before project completion, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

B. After completion of the dike, maintain and repair the dike crest as necessary to eliminate any ruts or depressions caused by settlement or by the operation of vehicles or equipment for the remainder of the contract period. Leave the dike crest surfaces in such condition that they drain freely at all points. The Contractor shall take special care to protect the completed dike and adjoining areas affected by his operations from erosion with the use of erosion fencing, hay bales, temporary swales, or whatever other means necessary. If erosion occurs, make the necessary repairs immediately.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Place and grade surplus suitable and unsuitable soil in dike interior following construction. Remove trash and debris, and legally dispose of it offsite.

3.16 PAYMENT SURVEYS

A. The Contractor shall provide a topographic survey of the dike/roadway every 30 days or as needed for payment quantities. The Contractor’s foundation survey will serve as the base topographic survey to determine pay quantities. The signed and sealed survey shall be submitted to the Engineer for approval in electronic PDF paper version (24-in. x 36-in.) and in a digital AutoCAD file containing point elevation data. Horizontal and vertical coordinate systems shall match those used on the Construction Drawings. When measuring volumes for payment of dike embankment construction, the surveyor shall take survey points on cross sections perpendicular to the dike centerline at approximately every 200 ft.

B. The as-built survey shall serve as the final payment survey, but the surveyor shall take survey points on cross sections perpendicular to the dike centerline at approximately every 100 ft.

C. The Contractor’s payment survey drawings shall contain the following information:

1. Plan view of the site showing the proposed dike embankment, perimeter road, and perimeter ditch.

2. Plan view shall include 1-ft contour lines for the constructed dike embankment, perimeter road, perimeter ditch, and roads.

3. Plan view shall contain a table indicating the volume of dike embankment fill placed per each payment survey and a running total of the volume placed.

4. Cross section views at 200-ft intervals showing the dike embankment template and the most recent payment survey.

5. Payment survey drawings shall be signed and sealed by a licensed Professional Surveyor registered in the State of Florida.

D. The Contractor shall submit the electronic AutoCAD files containing point data with each payment survey.

E. The District may, at its' own expense, retain a qualified survey firm to observe and/or review any and all surveying methods and techniques used by the Contractor. Should the Contractor's methods or techniques not be in accordance with the Specifications, the Engineer will notify the Contractor regarding any discrepancies. The District may also elect to conduct independent quality control surveys at any time without any notice to the Contractor.

3.17 AS-BUILT SURVEY

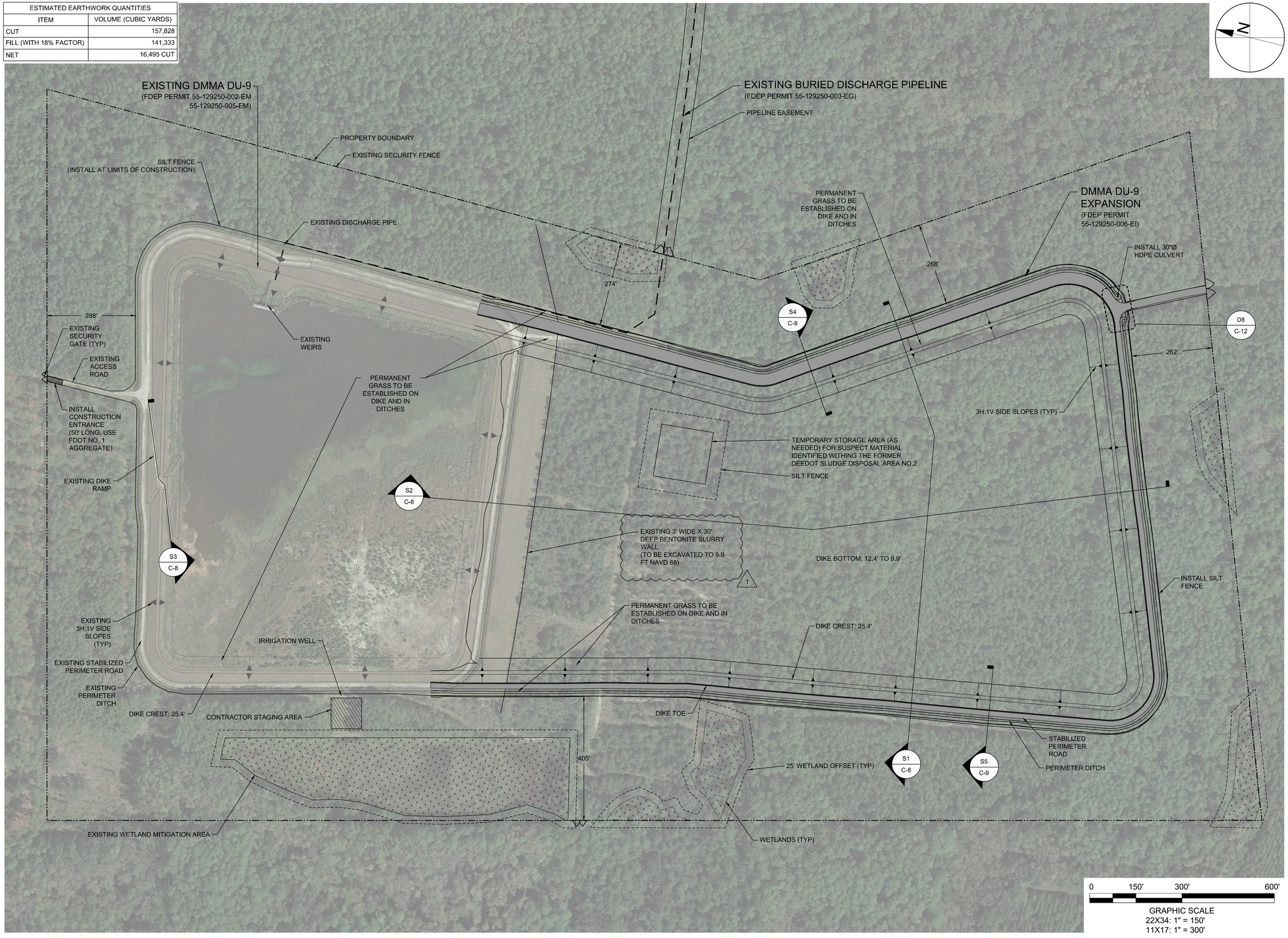
A. The Contractor shall complete an as-built survey (see SECTION 01 78 00 PROJECT CLOSEOUT) of the completed dike, roads, ditches, and outfall. The survey shall display the constructed dike in plan and section view superimposed on the Drawings. The survey shall display elevations, inverts, and horizontal location of the dike, timber walkway, installed weirs, weir pipes, drainage pipe inverts, rip-rap splash pads, vegetation lines, drainage inlets, ditches, roads, and instrumentation.

-- End of Section --

FLORIDA INLAND NAVIGATION DISTRICT
DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

ADDENDUM NO. 2
ATTACHMENT 5
Updated Project Drawings
Sheet C-5 and C-6

ESTIMATED EARTHWORK QUANTITIES	
ITEM	VOLUME (CUBIC YARDS)
CUT	157,828
FILL (WITH 18% FACTOR)	141,333
NET	16,495 CUT



TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD
BLDG 300, SUITE 300
JACKSONVILLE, FLORIDA 32256
(904)-731-7040
1655 PALM BEACH LAKES BLVD
SUITE 1012
WEST PALM BEACH, FL 33401
(561)-640-7310
CERTIFICATE OF AUTHORIZATION # 4815

SEAL

LORI S. BROWNELL P.E.# 60025

PROJECT TITLE

FLORIDA INLAND NAVIGATION DISTRICT DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION

ST. JOHNS COUNTY, FLORIDA

NO	ZONE	REVISIONS / SUBMISSIONS	DATE
1	D5	UPDATED NOTE	1/26/17

PROJECT NO	C2014-075
DATE	JAN 2017
DESIGNED	LSB
DRAWN	AF
CHECKED	KAK
REVIEWED	JS
SCALE	AS SHOWN

DRAWING TITLE

SITE PLAN WITH AERIAL

C-5

SHEET 5 OF 15

ANTON FLEWELLING, 1/26/2017 3:10:31 PM, X:\sys\Projects\2014-075_DU9_Permit\Construction\c2014-075-C-Proposed.dwg

ESTIMATED EARTHWORK QUANTITIES	
ITEM	VOLUME (CUBIC YARDS)
CUT	157,828
FILL (WITH 18% FACTOR)	141,333
NET	16,495 CUT

EXISTING DMMA DU-9
(FDEP PERMIT 55-129250-002-EM
55-129250-005-EM)

EXISTING BURIED DISCHARGE PIPELINE
(FDEP PERMIT 55-129250-003-EG)

PIPELINE EASEMENT

PROPERTY BOUNDARY

EXISTING SECURITY FENCE

SILT FENCE
(INSTALL AT LIMITS OF CONSTRUCTION)

EXISTING DISCHARGE PIPE

PERMANENT GRASS TO BE ESTABLISHED ON DIKE AND IN DITCHES

DMMA DU-9 EXPANSION
(FDEP PERMIT 55-129250-006-EI)

INSTALL 30"Ø HDPE CULVERT

274'

268'

288'

262'

EXISTING SECURITY GATE (TYP)

EXISTING ACCESS ROAD

EXISTING WEIRS

S4 / C-9

D8 / C-12

INSTALL CONSTRUCTION ENTRANCE (50' LONG, USE FDOT NO. 1 AGGREGATE)

3H:1V SIDE SLOPES (TYP)

TEMPORARY STORAGE AREA (AS NEEDED) FOR SUSPECT MATERIAL IDENTIFIED WITHING THE FORMER DEEDOT SLUDGE DISPOSAL AREA NO.2

SILT FENCE

EXISTING DIKE RAMP

S2 / C-8

EXISTING 3' WIDE X 30' DEEP BENTONITE SLURRY WALL (TO BE EXCAVATED TO 9.9 FT NAVD 88)

1

DIKE BOTTOM: 12.4' TO 9.9'

S3 / C-8

INSTALL SILT FENCE

EXISTING 3H:1V SIDE SLOPES (TYP)

PERMANENT GRASS TO BE ESTABLISHED ON DIKE AND IN DITCHES

DIKE CREST: 25.4'

IRRIGATION WELL

EXISTING STABILIZED PERIMETER ROAD

EXISTING PERIMETER DITCH

DIKE CREST: 25.4'

CONTRACTOR STAGING AREA

DIKE TOE

405'

STABILIZED PERIMETER ROAD

PERIMETER DITCH

25' WETLAND OFFSET (TYP)

S1 / C-8

S5 / C-9

EXISTING WETLAND MITIGATION AREA

WETLANDS (TYP)

0 150' 300' 600'

GRAPHIC SCALE
22X34: 1" = 150'
11X17: 1" = 300'

TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD
BLDG 300, SUITE 300
JACKSONVILLE, FLORIDA 32256
(904)-731-7040
1655 PALM BEACH LAKES BLVD
SUITE 1012
WEST PALM BEACH, FL 33401
(561)-640-7310
CERTIFICATE OF AUTHORIZATION # 4815

SEAL

LORI S. BROWNELL P.E.# 60025

PROJECT TITLE

FLORIDA INLAND NAVIGATION DISTRICT DREDGED MATERIAL MANAGEMENT AREA DU-9 EXPANSION
ST. JOHNS COUNTY, FLORIDA

NO	ZONE	REVISIONS / SUBMISSIONS	DATE
1	D5	UPDATED NOTE	1/26/17

PROJECT NO	C2014-075
DATE	JAN 2017
DESIGNED	LSB
DRAWN	AF
CHECKED	KAK
REVIEWED	JS
SCALE	AS SHOWN

DRAWING TITLE

SITE PLAN WITHOUT AERIAL

C-6

SHEET 6 OF 15