DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

SPECIFICATIONS
AND
CONTRACT DOCUMENTS

PREPARED FOR THE
FLORIDA INLAND NAVIGATION DISTRICT

By

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K.A. KNIGHT #58084

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SECTION 00 10 00

BID SOLICITATION

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

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION; BREVARD COUNTY, FLORIDA

The Florida Inland Navigation District (District) will receive sealed bids for the construction of the District's Dredged Material Management Area BV-4B Construction Project at its offices at 1314 Marcinski Road, Jupiter, Florida 33477 until **2 PM, local time, November 10, 2022,** and then, at said office, the bids will be publicly opened or read aloud.

This project generally entails clearing approximately 65 acres of land, construction of an approximately 165,000 cubic yard earthen dike, installation of a gravel blanket drain within the dike, construction of a stabilized earth perimeter road, fabrication and installation of three steel box weirs and accompanying aluminum access walkway structure; installation of various piping, manholes and culverts, grassing establishment, and other associated work.

The Contractor must include a written description of his/her experience and technical capabilities with such construction. At a minimum, this written description should include a description of at least 3 similar projects in the past 10 years on which the contractor was the general or primary contractor.

All bids not containing written information demonstrating the Contractor's experience and technical capabilities will be disqualified. If in the opinion of the District and its Engineer, the Contractor's experience and technical capabilities do not indicate similar experience, the bid will be disqualified. The Contractor may be asked to provide additional information to assist the District and its Engineer in making this determination. The District will award the bid to the qualified and responsive Contractor with the lowest bid price.

The BV-4B project area, located in Brevard County, Florida, just west of the Indian River between Mims and Titusville, and lies South of Cuyler Street and West of Hammock Road. The Contractor will have a period of **425** calendar days from the Notice to Proceed to Substantial Completion to construct the entire project. The District will hold a **non-mandatory pre-bid meeting and site visit at 11:00 AM** on **October 19, 2022** at the BV-4B Dredged Material Management Site. Bidders shall meet at the property entrance gate of the BV-4B DMMA site.

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 00 21 13

INSTRUCTIONS TO BIDDERS

RECEIPT AND OPENING OF BIDS

The Florida Inland Navigation District (herein called the "District") will receive bids at the location and date referenced in the **Bid Solicitation** section, and then at said office all bids shall be opened and the name of each bidder and the price submitted in the bid shall be read aloud. Any Bid received after the time and date specified will not be considered, but will be returned unopened. All bid information will be available at the District office three business days after the bid opening. Bidders or their authorized representatives are welcome to request all bid information at that time.

Each Bid must be submitted in an opaque sealed envelope, addressed to:

Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477

Each sealed envelope containing a Bid must be plainly marked on the outside as **"Bid for Dredged Material Management Area BV-4B Construction Project,"** and the envelope should bear on the outside the name and address of the Bidder, and their Contractor's License Number and classification for the State of Florida. If the Bid is sent through the mail or other delivery system, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the District at the address above with the notation "BID ENCLOSED" on the face of it.

The District may waive any informalities or minor defects or reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. No Bidder may withdraw a Bid within 90 days after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the District and Bidder.

MANDATORY PRE-BID MEETING

The District will hold a **non-mandatory** pre-bid meeting and site visit at the date, time, and placed reference in the Bid Solicitation section.

Representatives of the District and Engineer will be present at the pre-bid meeting to discuss the project. All Bidders are required to attend and participate in the meeting. Failure on the part of any Bidder to attend the pre-bid meeting will render their Bid unresponsive. The Engineer will transmit to all prospective Bidders of record such Addenda as the Engineer considers necessary in response to questions arising at the pre-bid meeting. Oral statements may not be relied upon and will not be binding or legally effective.

PREPARATION OF BIDS

All Bids shall be submitted on reproduced copies of the forms furnished in the following Sections of the Contract Documents.

1. 00 41 63 BID FORM
2. 00 41 63A BID SCHEDULE
3. 00 43 13 BID BOND (if bid exceeds $200,000.00)
4. 00 45 01 PUBLIC ENTITY CRIME STATEMENT
5. 00 45 02 AFFIDAVIT FOR SURETY COMPANY

These forms, completed in their entirety, together with all other required documents, including but not limited to copies of licenses, credentials, reference lists, and project descriptions, constitute the "Bid," also called the "Bid Package."

All blank spaces on the BID FORM for Bid prices must be filled in, in ink or typewritten, and the BID FORM must be fully completed and executed when submitted. The total bid price must be written in both words and numbers. In the event of a conflict, the words shall govern. Amounts are products of the Bid Unit Prices multiplied by the estimated quantities. In the event of a conflict between the amounts and the Unit Prices, the Unit Prices shall govern.

CREDENTIALS OF BIDDERS TO BE SUBMITTED WITH BID

Each Bidder shall submit the documentation listed below with the bid package. Failure on the part of the Bidder to submit these items will render the Bid/Bidder unresponsive.

1. Copies of the Bidder's State or County (as applicable) Contracting licenses.

2. The names, addresses, and telephone numbers of three (3) references. Bidders shall use the REFERENCES form provided in SECTION 00410 – BID FORM.

3. Descriptions of at least three (3) projects of a similar nature that the Bidder has completed in the last three (3) years or currently has under way. Bidders shall use the SIMILAR PROJECTS form provided in SECTION 00410 – BID FORM.

Other information, including, but not limited to, additional references, financial data, and evidence of qualification to conduct business in the jurisdiction where the project is located, and construction methods and equipment to be utilized in the completion of any portion of the work shall be provided upon specific request by the District. The District reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the District that such Bidder is properly qualified and licensed to carry out the obligations of the Contract Documents and to complete the Work contemplated therein.

INQUIRIES/ADDENDA

Verbal interpretations of the meaning of the Project Drawings, Specifications, or other Contract Documents will not be valid. Every request for interpretations shall be in writing and addressed to **Keith Knight, P.E. via e-mail at (kknight@taylorengineering.com** or regular mail at Taylor Engineering, Inc. (herein after called the "Engineer"), 10199 Southside Blvd, Suite 310, Jacksonville, Florida 32256 and to be given consideration must be received at least ten (10) calendar days prior to the date fixed for the opening of Bids. The Engineer will record the responses to inquiries and any supplemental instructions in the form of written Addenda. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Specifications, which, if issued, will be e-mailed to all parties to whom attended the mandatory Pre-Bid Meeting (at the respective e-mail addresses provided for such purposes) not later than seven (7) calendar days prior to the Bid opening date. Bidders must acknowledge receipt of the Addenda in their Bid. Failure of any Bidder to receive, or to acknowledge receipt of any such Addenda shall not relieve such Bidder from any obligation under its Bid as submitted, provided, however, that failure to so acknowledge receipt of any such Addenda might render a Bid unresponsive and result in its rejection. Bidders are advised to contact the Engineer and check the FIND's website (www.aicw.org) prior to submitting Bids to satisfy themselves as to the existence and number of all such Addenda. All Addenda so issued shall become part of the Contract Documents.

PERFORMANCE OF WORK BY THE CONTRACTOR

The Contractor shall perform Work equivalent to at least forty percent (40%) of the total amount of the Work, based on percentage of Contract value, to be performed under the Contractor with his own organization.

JOINT VENTURE

If the Bid involves a joint venture, a copy of the joint venture agreement shall be included with the Bid along with the attached "Statement of Business Organization."

PUBLIC ENTITY CRIMES

Any Bidder, or any of his Suppliers, Subcontractors, or Consultants who shall perform Work which is intended to benefit the District, shall not be a convicted vendor. Each Bidder shall submit a completed Public Entity Crime Statement with the Bid Form. The Bidder shall use the form provided in SECTION 00 45 01 PUBLIC ENTITY CRIME STATEMENT for this purpose. The Bidder further understands and accepts that any Contract

issued as a result of this solicitation shall be either voidable by the District or subject to immediate termination by the District, in the event there is any misrepresentation or lack of compliance with the mandates of Section 287.133 F.S. The District, in the event of such termination, shall not incur any liability to the Contractor for any work or materials furnished.

BID GUARANTY

Bidders are not required to provide a Bid Bond if the Bid amount is less than or equal to $200,000.00 unless specified in the Supplemental conditions. Each Bid greater than $200,000.00 must be accompanied by the District's Bid Bond form meeting the standards specified in the General Conditions, including those applicable to the Sureties for the Payment Bond and Performance Bond specified in the General Conditions. The Bond shall be written on the Bid Guaranty form provided by the District, with Affidavit for Surety Company attached, in an amount not less than ten percent (10%) of the amount of the Bid. The successful Bidder is required to use the District's forms provided in the Contract Documents. Alternate Bond forms will not be accepted. Failure to use the District's Bond forms shall render the Bid unresponsive.

In lieu of the Bid Bond, the Bid may be accompanied by a certified check of any national or state bank made payable to the District in an amount not less than ten percent (10%) of the amount of the Bid. The Bid Bond or certified check shall be conditioned upon the Bidder's:

A. not withdrawing said Bid within ninety (90) days after date of opening of the same, and

B. within fifteen (15) calendar days after the prescribed forms are presented to the Bidder:

    1. entering into a written Contract with the District, in accordance with the Bid as accepted;

    2. providing evidence of insurance in the manner specified by the District; and

    3. if the Bid exceeds $200,000.00, providing a Payment Bond and a Performance Bond as specified in the General Conditions (or, in lieu of the Payment Bond and Performance Bond, having provided an alternate form of security as specified in the General Conditions).

Any securities that may be received will be returned to all Bidders, with the exception of the two (2) highest ranked Bidders, within ninety (90) calendar days after the opening of the Bids. Bid bonds will not be returned to the Bidders, unless specifically requested by the Bidder. Any certified check of the two (2) highest ranked Bidders will be returned to them promptly after the District and the successful Bidder have (i) executed the Contract for the work, and (ii) the Contractor (successful Bidder) has secured and tendered to the District a valid and acceptable Payment Bond and Performance Bond as specified in the General Conditions (or, in lieu of the Payment Bond and Performance Bond, having provided an alternate form of security as specified in the General Conditions). Failure of the District to execute the Contract within ninety (90) days after the date of the Bid opening shall initiate release of the Bid Bond, certified check, cashier's check, treasurer's check or bank draft of the highest ranked and second highest ranked Bidders unless mutually agreed otherwise. If a single Bidder is the highest ranked responsible and responsive Bidder on both contracts, and is awarded only one contract, he will be released from his Bid Bond for the contract not awarded to him.

Attorneys-In-Fact who sign Bonds must file with such Bond a certified copy of their power of attorney to sign said Bonds.

WITHDRAWAL OF BIDS

Any Bid may be withdrawn prior to the scheduled time for the opening of Bids or authorized postponement thereof provided that the Bidder submits a written request signed by an authorized representative of the firm that submitted the Bid. No Bidder may withdraw a Bid within ninety (90) days after the actual date of the opening thereof.

NOTICE OF INTENDED AWARD

Tentative Bid tabulations will be posted to the District's web page, www.aicw.org, under the bid file folder within three (3) working days of the Bid opening. After completion of the review of the Bids, a final Bid tabulation and Notice of Award will be posted to the District's webpage. Failure to file a protest within the time

prescribed in Section 120.57(3), Florida Statutes, shall constitute a waiver of proceedings under Chapter 120, Florida Statutes.

ACCEPTANCE OR REJECTION OF BIDS

The District reserves the right to reject any and all Bids when (i) such rejection is in the interest of the District; (ii) such Bid is void per se; or (iii) the Bid contains any irregularities, PROVIDED, however, that the District reserves the right to waive any minor irregularities and to accept the most responsive and qualified Bid determined by the District. Bids will be considered irregular if there are omissions, unauthorized alterations of any forms, additions not called for, conditional or unauthorized alternate Bids, or other irregularities of any kind. The District reserves the right to request a written confirmation of the Bid and the responsibility of the Bidder prior to the awarding of the Contract. Failure of the Bidder to confirm the Bid within seven (7) working days from the date of the District's request shall render the Bid unresponsive and will entitle the District to award to the next lowest Bidder and shall require forfeiture of the Bid Bond.

CONTRACT

The Bidder understands that the Bid form does not constitute a Contract with the Bidder. A binding Contract does not exist until the Contract has been executed by both parties. The Bidder to whom the award is made shall, within fifteen (15) calendar days after receipt of the Contract, execute the Contract in the form attached, entering into a Contract with the District. The executed Contract must be returned to the District accompanied by the required Payment Bond and Performance Bond as set forth herein. If the Bidder fails to execute the Contract or provide the insurance and Bonds within fifteen (15) calendar days after receipt of the Contract, there shall be just cause for the annulment of the award and forfeiture of the Bid Guaranty to the District. Award may then be made to the next lowest qualified, responsible, and responsive Bidder or the work may be re-advertised at the District's sole discretion.

NOTICE TO PROCEED

The Notice to Proceed will be issued within fifteen days (15) of receipt and acceptance of the pre-construction submittals by the District and completion of the Pre-Construction Meeting. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the District and Contractor. If the Notice to Proceed has not been issued within the allowed time or within the period mutually agreed upon, the Contractor may terminate the Contract without further liability on the part of either party.

PROJECT DRAWINGS AND SPECIFICATIONS

Up to four (4) sets of the Project Drawings and Specifications will be provided free of charge to the successful Bidder upon award.

SUBSTITUTE MATERIAL AND EQUIPMENT

A Contract, if awarded, will be on the basis of material and equipment described in the Project Drawings and Technical Specifications without consideration of possible substitute or an "equivalent" or "equal" item. Whenever it is indicated that a substitute or an "equivalent" or "equal" item of material or equipment may be furnished or used by the Contractor if acceptable to the Engineer, application for such acceptance will not be considered by the Engineer until after the date of execution of the Contract. In all cases, the low Bidder shall be determined on the basis of the base Bid which shall reflect the costs for the materials and equipment specified. Bidders unable to provide the specified materials and equipment shall be determined unresponsive.

CONDITIONS OF WORK

The Contract Documents contain the provisions required for the construction of the Work. Information obtained from an officer, agent, or employee of the District, Engineer, or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the Contract. Each Bidder is responsible for inspecting the site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any Bidder to so familiarize themselves shall in no way relieve any Bidder from any obligation in respect to their Bid.

All applicable federal, state, and local laws and regulations shall apply to the Work throughout the Contract.

EQUAL OPPORTUNITY

The Florida Inland Navigation District recognizes fair and open competition as a basic tenet of public procurement. Contractors doing business with the District are prohibited from discriminating on the basis of race, color, creed, national origin, handicap, age, or sex. In addition, The District encourages contractors doing business with the District to solicit and utilize minority business enterprises (as defined in Section 288.703, Florida Statutes) as subcontractors and suppliers to the greatest extent possible.

--End of Section--

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SECTION 00 41 63

BID FORM

FLORIDA INLAND NAVIGATION DISTRICT

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

Submitted on _____(Date)

Bidder (Firm Name)	Address
Signature of Authorized Representative	Name & Title

1. The above signed, as Bidder, hereby declares that the only person or persons interested in the Bid as Principal or Principals is or are named herein and that no other person than herein mentioned that has any interest in this Bid or in the Contract to be entered into; that this Bid is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud.

2. The Bidder further declares that he has examined the site and has informed himself fully in regard to all conditions pertaining to that place where the Work is to be done; that he has examined the Project Drawings and Specifications for the Work and Contractual Documents relative thereto. The Bidder also acknowledges that he has read all of the provisions furnished prior to the opening of Bids; and that he has satisfied himself relative to all Work to be performed.

3. If this Bid is accepted, the undersigned Bidder agrees to complete all Work included under the Contract within **425** calendar days from the date established in the "Notice to Proceed" to the date the Contractor is issued "Substantial Completion". If the Contractor fails to complete the work within this time, the District may obtain the services of another Contractor to complete the Work. Such monies required for the District to complete the Work shall be chargeable to the Contractor.

4. In case of failure on the part of the Contractor to complete the Work within the time fixed in the Contract, or any extension thereof granted, then the Contractor shall be liable to pay the District: (i) not as a penalty but as liquidated damages, $1,500.00 per day for each calendar day the Work remains incomplete after the expiration of the time limit specified or any extension(s) thereof for the total contract plus (ii) any monies which are paid by the District to any other person, firm or corporation for services rendered for the preservation or completion of the Work. These monies shall include, but are not limited to, all Engineering and Inspection fees required to oversee the completion of the Work. Such monies shall be chargeable to the Contractor and shall be deducted from any monies due said Contractor, or if no money is due or the amount due is insufficient to cover the amount charged, then the Contractor and his Surety shall be liable for said amount. Bidder agrees to perform all the Work described in the Contract Documents for the unit and lump sum prices identified on the following Bid Schedule (located at the end of this section).

5. If this Bid is accepted, it is understood that the terms and conditions of the bid provisions and documents relative thereto, shall be binding upon the parties; however, the undersigned Bidder agrees, upon acceptance and prior to commencement of any Work, to:

   a. Execute the aforementioned Contract with Florida Inland Navigation District as a written memorial and formalization of said Bid provisions and matters relative.

b. Provide the necessary Certificates of Insurance, a Payment Bond and a Performance Bond (each equal to one hundred percent (100%) of the total Contract Bid Amount), of which this Bid, Instructions to Bidders, General Conditions, Technical Specifications, and Project Drawings shall be made a part for the performance of Work described therein.

c. Furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, supervision, labor and all means necessary to construct and complete the Work specified in this Bid and Contract and called for in the Project Drawings, upon "Notice to Proceed with Contract Work."

d. Complete all Contract Work within the time specified in the Bid Form or pay for liquidated damages and cost of supervision for each calendar day in excess thereof according to the terms set forth in the Contract and Specifications.

6. The Bidder understands this Bid does not constitute a Contract with the Bidder, and there is no official Contract binding the parties until:

   a. bids are reviewed and accepted by the District; and

   b. applicable Bonds and certificate of insurance are reviewed and accepted by the District; and

   c. the Contract has been approved by the District; and

   d. the Contract has been executed by both parties.

7. The undersigned agrees that, in case of failure on his part to execute and deliver the said Contract and the Bonds within fifteen (15) days after receipt of the Contract, the Bid Bond, or securities accompanying his Bid, shall be paid into the funds of Florida Inland Navigation District, otherwise, any Bid Bond or securities accompanying this Bid shall be returned to the undersigned.

8. The Corporation, Partnership or Business name and signature of authorized Corporate Officer, Partner, or Individual making this Bid, together with the signature of the licensee qualifying Bidder, must appear on the signature page of this Bid.

9. The Bidder understands and agrees that he must perform all Work necessary to complete the Work as described in the Project Drawings and Specifications. Payment to the Contractor will be made only for the actual quantities of Work performed and accepted or materials furnished in accordance with the Contract. All Work and materials not specified under "Item" in the Bid shall be considered incidental to the Contract

10. The Bidder has attached to this Bid an approved Bid Bond or a certified check as described in Section 00 21 13, for the sum of ten percent (10%) of the Bid Amount according to the conditions under the Instructions to Bidders and provisions herein.

11. The Bidder, if apparent low Bidder, agrees to provide the following after the bid opening within the time specified herein:

    a. evidence of the appropriate insurance coverage,

    b. approved Payment Bond and Performance Bond, each for one hundred (100%) of the Contract Bid Amount, according to the conditions under the General Conditions and provisions therein.

    c. requested credentials, past Work information, and other evidence as requested by the Engineer to verify the ability of the Contractor to perform the Work, if not previously furnished.

12. In accordance with §287.135, Florida Statutes, Bidder hereby certifies that Bidder is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, and that it does not have business operations in Cuba or Syria. "Business operations" means, for purposes specifically related to Cuba or Syria, engaging in commerce in any form in Cuba or

Syria, including, but not limited to, acquiring, developing, maintaining, owning, selling, possessing, leasing, or operating equipment, facilities, personnel, products, services, personal property, real property, military equipment, or any other apparatus of business or commerce.

13. Both the Bidder and the licensee shall fill in the information below, pursuant to Chapter 489, Florida Statutes. Licensee is defined as the person who is the licensed Contractor who qualifies the bidding Company, Corporation or Partnership. If the Bidder is an individual, he must be licensed.

(Please print or type)

BIDDER'S NAME:_____

BIDDER'S E-MAIL:_____

ADDRESS:_____

PHONE NUMBER:_____

FEID OR SOCIAL SECURITY NUMBER:_____

BIDDER'S SIGNATURE, BY:_____

LICENSE NUMBER:_____

LICENSE TYPE:_____
(Attach copy of license)

STATE OR COUNTY:_____

LICENSE LIMITATIONS, IF ANY_____
(Attach a separate sheet, if necessary)

LICENSE SIGNATURE, BY:_____

(If an INDIVIDUAL OR SOLE PROPRIETOR is Bidder, sign on this line.)

By: _____
Signature

_____
Type or Print Name

_____
Address

(If an OPERATING UNDER A TRADE OR FICTITIOUS NAME* is Bidder, fill in the trade name followed by signature)

**Attach copy of Florida fictitious name registration from www.sunbiz.org.*

_____
Trade Name or Fictitious Name

By: _____
Signature

_____
Type or Print Name

(If a LIMITED LIABILITY COMPANY is Bidder, fill in the trade name followed by signature)

_____
LLC Name and State of Organization

By: _____
Signature of Managing Member

_____
Type or Print Name

(If a GENERAL OR LIMITED PARTNERSHIP is Bidder, fill in name of joint venture, followed by signature of the partners signing)

_____
Partnership Name

By: _____
Signature of General Partner

_____
Business Address of Partnership

(Names and Addresses of all Partners - attach a separate sheet if necessary)

(**If a CORPORATION is Bidder, fill in the name of the Corporation, followed by the signature of the President or Vice President)**

_____
Corporation Name and State of Incorporation

(Corporate Seal)

By: _____
Signature of Officer or Authorized Agent

_____
Address of Corporation

REFERENCES

Provide the names, addresses, and telephone numbers of three (3) clients (former or current) who can attest to your company's experience in work similar in nature to the Work required to construct this project in the spaces provided below.

FIRM NAME: _____

ADDRESS: _____

CONTACT PERSON: _____

TELEPHONE NUMBER: _____

FIRM NAME: _____

ADDRESS: _____

CONTACT PERSON: _____

TELEPHONE NUMBER: _____

FIRM NAME: _____

ADDRESS: _____

CONTACT PERSON: _____

TELEPHONE NUMBER: _____

SIMILAR PROJECTS

Provide descriptions of at least three (3) projects of a similar nature that the Bidder has completed as general contractor or primary contractor in the last ten (10) years or currently has under way in the spaces provided below. For each project, explain why it is relevant, problems encountered, actions taken to correct problems, and any environmental impacts that were encountered. If additional spaces are needed, make copies of this form.

PROJECT NAME: _____

OWNER'S NAME: _____

CONTACT PERSON: _____ TELEPHONE: _____

START DATE: _____ COMPLETION DATE: _____

DESCRIPTION: _____

_____

_____

_____

_____

_____

_____

_____

PROJECT NAME: _____

OWNER'S NAME: _____

CONTACT PERSON: _____ TELEPHONE: _____

START DATE: _____ COMPLETION DATE: _____

DESCRIPTION: _____

_____

_____

_____

_____

_____

_____

_____

PROJECT NAME: _____

OWNER'S NAME: _____

CONTACT PERSON: _____ TELEPHONE: _____

START DATE: _____ COMPLETION DATE: _____

DESCRIPTION: _____

_____

_____

_____

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_____

_____

--End of Section--

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SECTION 00 41 63A

BV-4B DMMA BID SCHEDULE

ALL BID ITEMS SHALL INCLUDE ALL COSTS FOR FURNISHING TO THE OWNER ALL MATERIALS, EQUIPMENT AND SUPPLIES, PERMITS, AND FOR ALL COSTS INCURRED IN PROVIDING ALL WORK SHOWN ON THE BV-4B DREDGED MATERIAL MANAGEMENT AREA PROJECT DRAWINGS AND OUTLINED IN THE CONTRACT SPECIFICATIONS FOR THE CONSTRUCTION.

ITEM	DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL COST
01	Insurance	LS	1		
02	Mobilization and Demobilization	LS	1		
03	Environmental Protection and Erosion Control	LS	1		
04	Construction, Payment, and As-Built Surveys	LS	1		
05	Construction Materials Testing	LS	1		
06	Settlement Plates	EA	6		
07	Geokon Piezometer	EA	6		
08	Settlement Plates and Piezometer Installation and Monitoring by Geotechnical Consultant	LS	1		
09	Monitoring Wells Nested (3 wells per Nested Well, 27 wells total)	EA	9		
10	Clearing and Grubbing	AC	64.4		
11	Topsoil Stripping, Stockpiling, and Placement	CY	30,000		
12	Demolition	LS	1		
13	Site Dewatering	LS	1		
14	Dike Foundation Grading and Compaction (Engineer's quantity estimate 12,600 cy scraped and temporarily stockpiled see note 6)	LS	1		
15	Earthwork Compacted Fill: Dike, Perimeter Road, Access Roads, and Perimeter Ditch Construction (see note 7)	CY	165,000		
16	Blanket Toe Drain Gravel #7 Aggregate (Engineer's quantity estimate 10,400 CY see note 6)	LS	1		
17	Blanket Toe Drain Concrete Sand (Engineer's quantity estimate 8,800 CY see note 6)	LS	1		
18	Blanket Drain 6 inch dia HDPE Piping	LF	6,670		
19	Blanket Drain Filter Fabric (Engineer's quantity estimate 8,850 SY see note 6)	LS	1		
20	Steel Box Weirs	EA	3		
21	Steel Box Weirs Concrete Foundation	CY	72		
22	Steel Box Weirs Composite Weir Boards	LS	1		
23	Aluminum Walkway	LS	1		
24	Aluminum Walkway Concrete Footings	CY	7.1		
25	HDPE Solid Wall Pipe 30 in dia	LS	55		
26	HDPE Solid Wall Pipe 36 in dia	LF	126		
27	HDPE Solid Wall Pipe 48 in dia	LF	577		
28	30 in dia HDPE Corrugated Drain Pipe	LF	61		
29	36 in dia HDPE Corrugated Drain Pipe (Culvert)	LF	142		
30	Concrete Hold Downs for Pipe	CY	21.3		
31	Pipeline Leak Test	LS	1		
32	Roadway Shellrock (or Crushed Concrete) Stabilization	CY	1,700		

33	Pre-Cast Concrete Drainage Inlets Type H (3 grates)	EA	1		
34	Pre-Cast Concrete Drainage Inlets Type E	EA	2		
35	Pre-Cast Concrete Pressure-Rated Manholes	EA	3		
36	Blanket Drain Outlet Pipe Splash Pads Erosion Protection Stone	LS	1		
37	Ditch Drainage Inlet Splash Pad and Retention Swale Outlet Erosion Protection Stone	LS	1		
38	Perimeter Ditch Erosion Protection Stone	LS	1		
39	Perimeter Dike Toe Swale Erosion Protection Stone	LS	1		
40	Resilient Wedge Gate Valve	EA	1		
41	Blanket Drain Piping TV Inspection	LS	1		
42	Mobile Storage Container	LS	1		
43	Grassing	AC	30.6		

TOTAL BASE BID $ _____

TOTAL BASE BID (WRITTEN)

_____ **Dollars**

AMOUNTS SHALL BE SHOWN IN BOTH WORDS AND NUMBERS. IN CASE OF DISCREPANCIES, THE AMOUNT SHOWN IN WORDS SHALL GOVERN FOR EACH BID ITEM AND TOTAL BID.

Signature of Bidder: _____ Date: _____

Notes:

(1) Quantities are estimated. Actual quantities may vary.

(2) Contractor shall verify all quantities before bidding.

(3) All bids must be for the entire work and must have each blank space completed.

(4) All costs are installed cost

(5) Bid quantities do not include waste or overages

(6) Due to the difficulty of measuring or verifying quantities during construciton, this bid item will be paid for as lump sum. The Engineer has provided an estimated quantity. The Contractor shall make their own quantity estimate and base their bid on their estimate. The bid pricie should include any excess quantitiy due to waste, tolerances, and construction methods.

(7) Compacted fill quantity includes total estimated earthwork fill over entire site after foundation scraping and preparation EXCEPT for topsoil and gravel-concrete sand quantity used in blanket drain.

Bidder has to sign below that they have read and understood all addendums related to this project. Failure to acknowledge any addendum issued *may* disqualify the Bidder.

Addendum No.1	Date of Receipt:
Addendum No.2	Date of Receipt:
Addendum No.3	Date of Receipt:

NOTICE TO ALL BIDDERS

1	The District reserves the right to waive any informality in any bid, to reject any and all bids, and to delete any part of any of the above items.
2	Changes in the Contract Price and Contract Time require prior authorization in writing from the District and the Engineer, in the form of a Change Order. The Contractor is responsible for verification of all bid quantities and to report to the Engineer any discrepancies found prior to ordering materials and or equipment for construction.

3	Bid prices for the various work items are intended to establish a total price for completing the project in its entirety. The Contractor shall include in the Bid, any item for which a separate pay item has not been established in the Bid Form (under any related pay item), to reflect the total price for completing the project in its entirety.
4	Contractor shall meet requirements of all applicable permits and codes (in their current edition).
5	Bid items for rip-rap and erosion protection stone include any required filter fabric.
6	The District will award the bid to the lowest qualified bidder.

Bidder: _____

By: _____

Title: _____

_____ _____

Name of Bidder Signature of Bidder

Date: _____

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SECTION 00 43 13

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal and _____, as Surety, are held and firmly bound unto Florida Inland Navigation District, in the penal sum of _____ dollars ($_____) lawful money of the United States, not less than 10% of the amount of the bid amount, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THE OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying bid, dated _____, 20___ for the Contract and Specifications for the **Dredged Material Management Area BV-4B Construction Project.**

NOW, THEREFORE, if the Principal:

1. Does not withdraw said Bid within ninety (90) calendar days after date of opening of the same, and

2. Within fifteen (15) calendar days after the prescribed Contract forms are presented to the Contractor:

    a. Enters into a written Contract with Florida Inland Navigation District, in accordance with the Bid, as accepted; and

    b. Provides evidence of insurance in the manner specified by the Florida Inland Navigation District;

    c. Gives a Payment Bond and Performance Bond as specified in the General Conditions (or, in lieu of the Payment Bond and Performance Bond, provides an alternate form of security as specified in the General Conditions).

3. Or in the event of the failure to fully comply with all of the foregoing, if the Principal pays the District the difference between the amount specified in said Bid and the amount for which the District may procure the required Work and/or supplies if the latter amount be in excess of the former, then the above obligations shall be void, and of no effect, otherwise to remain in full force and effect.

DATED ON _____, 20___.

WHEN THE PRINCIPAL IS AN INDIVIDUAL OR SOLE PROPRIETOR:

By: _____
Signature

_____
Business Address

WHEN THE PRINCIPAL OPERATES UNDER A TRADE NAME OR FICTITIOUS NAME*:

By: _____
Signature

_____
Business Name and Address

**Attach copy of Florida fictitious name registration from www.sunbiz.org.*

WHEN THE CONTRACTOR IS A LIMITED LIABILITY COMPANY:

By: _____
LLC Name and State of Organization

_____
Signature of Manager or Managing Member

_____
Type or Print Name/Title

WHEN THE PRINCIPAL IS A GENERAL OR LIMITED PARTNERSHIP:

By: _____
Name and Address of Partnership

_____
Signature of General Partner

WHEN THE PRINCIPAL IS A CORPORATION:
ATTEST:

_____
Corporate Name and State of Incorporation

(Corporate Seal)

_____
Signature of President

ATTEST:

_____
(Corporate Surety)
(Surety Seal)

_____
Business Address

_____ By: _____
(Secretary) (Surety)

_____
Florida Resident Agent (Typed or Written Name)

(Surety shall provide evidence of signature authority, i.e., a certified copy of Power of Attorney.)

NOTE: If both the Principal and Surety are Corporations, the respective Corporate Seals should be affixed and attached.

--End of Section--

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SECTION 00 45 01

PUBLIC ENTITY CRIME STATEMENT

SWORN STATEMENT PURSUANT TO SECTION 287.133(3) (a), FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____
[print name of the public entity]

by _____
[print individual's name and title]

for _____
[print name of entity submitting sworn statement]

whose business address is: _____
_____
_____
_____

and (if applicable) its Federal Employer Identification Number (FEIN) is: _____
(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement:_____.)

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1) (b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287-133(1) (a), Florida Statutes, means:

   i. A predecessor or successor of a person convicted of a public entity crime, or

   ii. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a “person” as defined in Paragraph 287.133(1) (e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

6. Based on information and belief, the statement that I have marked below is true in relation to the entity submitting this sworn statement. [Indicate which statement applies.]

_____ Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. [Attach a copy of the final order]

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1(ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

_____
[Signature]

_____
[Date]

STATE OF _____

COUNTY OF _____

Before me this day personally appeared _____, who being duly sworn, executed this Affidavit and acknowledged to and before me the truthfulness and accuracy of the statements in the Affidavit.

SWORN TO AND SUBSCRIBED before me this _____ day of _____, 20____, by AFFIANT, who is personally known to me

Name: _____
NOTARY PUBLIC

Commission Expiration Date: _____

--End of Section--

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SECTION 00 45 02

AFFIDAVIT FOR SURETY COMPANY

TO: Florida Inland Navigation District

RE: Contract Name: Dredged Material Management Area BV-4B Construction

BIDDER: _____

Name: _____

Address: _____

Phone: _____

AMOUNT OF BOND: _____

SURETY COMPANY: _____

Name: _____

Address: _____

Phone: _____

BEFORE ME, the undersigned authority, personally appeared the AFFIANT, who being duly sworn and says:

(1) He/She is _____ of the Surety Company;

(2) In accordance with Section 287.0935, Florida Statutes, the Surety Company fulfills each of the following provisions:

(a) The Surety Company is licensed to do business in the State of Florida;

(b) The Surety Company holds a certificate of authority authorizing it to write surety bonds in Florida;

(c) The Surety Company has twice the minimum surplus and capital required by the Florida Insurance Code at the time the invitation to bid is issued;

(d) The Surety Company is otherwise in compliance with the provisions of the Florida Insurance Code; and

(e) The Surety Company holds a currently valid certificate of authority issued by the United States Department of Treasury under 31 U.S.C. ss. 9304 to 9308.

FURTHER AFFIANT SAYETH NOT.

Signature of AFFIANT: _____ Date: _____
(Officer of Surety Company)

Title of AFFIANT: _____

STATE OF _____

COUNTY OF _____

Before me this day personally appeared _____, who, being duly sworn, executed this Affidavit and acknowledged to and before me the truthfulness and accuracy of the statements in the Affidavit.

SWORN TO AND SUBSCRIBED before me this _____ day of _____, 20____, by AFFIANT, who is personally known to me.

Name: _____
NOTARY PUBLIC

Commission Expiration Date: _____

--End of Section--

SECTION 00 51 00

NOTICE OF AWARD

Dated: _____

To: _____

_____

_____

Project: _____

The District has considered the Bid submitted by you for the above-described Work in response to its Bid Solicitation dated _____, 20__ and Instructions for Bidders (SECTION 00 21 13).

You are hereby notified that your Bid has been accepted for items in the amount of:

$_____.

You are required by the Instructions for Bidders (SECTION 00 21 13) to execute the Contract and furnish the required Payment Bond (SECTION 00 61 13.16), Performance Bond (SECTION 00 61 13.13), and certificates of insurance in accordance with General Conditions (SECTION 00 72 00) and Supplementary Conditions (SECTION 00 73 00) within fifteen (15) calendar days from the date of receipt of this Notice by you. The required number of document copies accompanies this Notice together with a checklist of execution action. Return all document copies to the Engineer for further processing, review and distribution to the parties to the Contract.

If you fail to execute said Contract and to furnish said Bonds within fifteen (15) days from the date of receipt of this Notice, the District will be entitled to consider all your rights arising out of the District's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The District will be entitled to such other rights as may be granted by law. You are required to return acknowledged copies of this Notice of Award to the District and the Engineer.

Owner: Florida Inland Navigation District By: _____
(Authorized Signature)

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the Notice of Award is hereby acknowledged by _____.

Authorized Signature: _____ Date: _____

Title: _____

--End of Section--

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SECTION 00 52 00

CONTRACT

CONTRACT
BETWEEN
FLORIDA INLAND NAVIGATION DISTRICT
AND

_____
CONTRACTOR

THIS Contract, made this _____ day of _____, 20___, by and between the Florida Inland Navigation District, an independent special district of the State of Florida, hereinafter designated as the "DISTRICT," and _____, at _____, a _____ Corporation, FEID Number _____, hereinafter designated as the "CONTRACTOR."

WITNESS THAT:

WHEREAS, the District is an independent special district created by the Florida Legislature and given those powers and responsibilities enumerated in Chapter 374, Florida Statues; and

WHEREAS, the District desires the services of a qualified and experienced Contractor to provide construction services; and

WHEREAS, the District received Bids on _____for the project called "**Dredged Material Management Area BV-4B Construction."**

WHEREAS, the Contractor has responded to the District's solicitation and the Contractor is qualified and willing to provide said services; and

WHEREAS, the District has found the Contractor's response to be acceptable and wishes to enter into a Contract; and

WHEREAS, the District has funds in its current fiscal year budget which are available for the funding of the Contract;

NOW THEREFORE, the District and the Contractor in consideration of the benefits flowing from each to the other do hereby agree as follows:

ARTICLE 1 - STATEMENT OF WORK

1.1 The Contractor shall furnish all equipment, tools, materials, labor, and everything necessary and shall perform the required Work in accordance with the Contract Documents for the contract entitled "Dredged Material Management Area BV-4B Construction."

ARTICLE 2 - TERM OF THE CONTRACT

2.1 Unless extended or terminated, the period of performance of the Contract shall commence upon the effective date of the Notice to Proceed and continue for a period of calendar days stated in the bid form. The Contractor shall not proceed with Work under this Contract until a Notice to Proceed is received from the District.

ARTICLE 3 - COMPENSATION/CONSIDERATION

3.1 The consideration, for the full and complete performance under this Contract, shall be in the amount of $_____, subject only to any additions and/or deduction as provided in the Contract Documents and formally approved by the District.

The consideration stated above is based upon the aggregate Contract price submitted to the District, in which the aggregate amount is obtained from the summation of the total prices for each of the Bid items shown in the Bid.

ARTICLE 4 - INVOICING AND PAYMENT

4.1 If acceptable progress is being made, the Contractor may request partial payments on monthly estimates, based on the actual value of Work done or completed, which request may be approved and paid by the District. All pay requests shall reference the District's Contract Number, shall follow the same format as AIA Document G702-1992, and shall be in accordance with the terms specified in the General Conditions.

4.2 The Executive Director of the District has been authorized to approve and execute change orders, with the concurrent approval of the District's Chair, totaling up to ten (10) per cent of the initially executed contact value. When change orders in total exceed ten (10) percent of the initially executed construct value, they will be presented to the District's Board of Commissioners for approval at one of their regularly scheduled meetings. However, if there is a finding by the Engineer, the District's Executive Director and the District's Chair that a delay in approving the change order will result in an unnecessary delay causing negative financial, environmental, or health safety and welfare impacts, a change order up to 20% of the executed contract value can be executed by the District's Executive Director.

ARTICLE 5 - REMEDIES

5.1 If either party initiates legal action, including appeals, to enforce this Contract, the prevailing party shall be entitled to recover a reasonable attorney's fee.

5.2 It is acknowledged that the Contractor's failure to complete the Work within the Contract Time provided by the Contract Documents, or any extension thereof granted, will cause the District to incur substantial economic damages and losses of types and in amounts which are impossible to compute and ascertain with certainty as a basis for recovery by the District of actual damages, and that liquidated damages represent a fair, reasonable and appropriate estimate thereof. Accordingly, in lieu of actual damages for such delay, the Contractor agrees that liquidated damages may be assessed and recovered by the District as against Contractor and its Surety, in the event of delayed completion and without the District being required to present any evidence of the amount or character of actual damages sustained by reason thereof; therefore Contractor shall be liable to the District for payment of liquidated damages in the amount of One Thousand Five Hundred Dollars ($1,500) for each day that Substantial Completion is delayed beyond the Contract Time as adjusted for time extensions provided by the Contract Documents. Such liquidated damages are intended to represent estimated actual damages and are not intended as a penalty, and Contractor shall pay them to District without limiting District's right to terminate this agreement for default as provided elsewhere herein.

5.3 In case of any other failure to perform the Contract, the Contractor shall be liable to pay the District any monies which are paid by the District to any other person, firm or corporation for services rendered for the preservation or completion of the Work. These monies shall include, but are not limited to, all Engineering and Inspection fees required to oversee the completion of the Work.

5.4 Such liquidated damages and monies shall be chargeable to the Contractor and shall be deducted from any monies due said Contractor, of if no money is due or the amount due is insufficient to cover the amount charged, then the Contract and his Surety shall be liable for said amount.

ARTICLE 6 - STANDARDS OF COMPLIANCE

6.1 The Contractor, its employees, Subcontractors, or assigns, shall comply with all applicable federal, state, and local laws and regulations relating to the performance of this Contract. The District undertakes no duty to ensure such compliance, but will attempt to advise the Contractor, upon request, as to any such laws of which it has present knowledge.

6.2 The Contractor hereby assures that no person shall be excluded on the grounds of race, color, creed, national origin, handicap, age, or sex, from participation in, denied the benefits of, or be otherwise subjected to discrimination in any activity under this Contract. The Contractor shall take all measures necessary to effectuate these assurances.

6.3 The laws of the State of Florida shall govern all aspects of this Contract. In the event it is necessary for either party to initiate legal action regarding this Contract, venue shall be in the Fifteenth Judicial Circuit or claims under state law and in the Southern District of Florida for any claims which are justifiable in federal court.

6.4 The Contractor hereby warrants that he has not, during the bidding process, nor shall he, during the term of this Contract, offer to pay any officer, employee or agent of the District, anything of value including, but not limited to gifts, loans, rewards, promises of future employment, favors or services, based on the understanding that the actions, decision or judgments of such officer, employee, or agent would be influenced thereby. For breach of this provision, the District may terminate this Contract without liability and, at its discretion, deduct or otherwise recover the full amount of such fee, commission, percentage, gift, or other consideration.

6.5 The Contractor, by its execution of this Contract, acknowledges and attests neither he, nor any of his suppliers, subcontractors, or consultants who shall perform Work which is intended to benefit the District, is a convicted vendor or, if the Contractor or any affiliate of the Contractor has been convicted of a public entity crime, a period longer than thirty-six (36) months has passed since that person was placed on the convicted vendor list. The Contractor further understands and accepts that this Contract shall be either voidable by the District or subject to immediate termination by the District, in the event there is any misrepresentation or lack of compliance with the mandates of Section 287.133, Florida Statutes. The District, in the event of such termination, shall not incur any liability to the Contractor for any Work or materials furnished. The Contractor is required to submit a completed Public Entity Crime Statement with the Bid Form.

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in s. 287.017 for CATEGORY TWO for a period of 36 months following the date of being placed on the convicted vendor list.

6.6 While this package cites Florida Department of Transportation (FDOT) specifications and references, the Contractor does not have to be FDOT certified.

ARTICLE 7 - RELATIONSHIP BETWEEN THE PARTIES

7.1 The Contractor is an independent Contractor and is not an employee or agent of the District. Nothing in this Contract shall be interpreted to establish any relationship, other than that of an independent Contractor, between the District and the Contractor, its employees, agents, subcontractors, or

assigns, during or after the performance of this Contract. The Contractor is free to provide similar services to others.

7.2 The Contractor shall not assign, delegate, or otherwise transfer its rights and obligations as set forth in this Contract without the prior written consent of the District.

ARTICLE 8 - GENERAL PROVISIONS

8.1 The Contract Documents listed below, by this reference, shall become a part of this Contract as though physically attached as a part hereof and all documents in this Contract shall be interpreted together to yield the most consistent results to achieve the purpose of the project:

a. General Conditions
b. Supplementary Conditions
c. General Requirements
d. Technical Specifications
e. Project Drawings
f. Such addenda supplementing the documents forming this Contract as are referenced to it and attached as a part of it.
g. Bid Solicitation, Bid Form, Instructions to Bidders, Addenda, provided however, that no exceptions to the District's specifications, whether stated or implied in the Contractor's Bid, shall be allowed **EXCEPT** as shall be itemized, listed, approved by the District and recorded as written Addenda with the District as a supplement to this Contract.

8.2 This Contract states the entire understanding between the parties and supersedes any written or oral representations, statements, negotiations, or agreements to the contrary. The Contractor recognizes that any representations, statements, or negotiations made by District staff do not suffice to legally bind the District in a Contractual relationship unless they have been reduced to writing, approved, and signed by an authorized District representative. This Contract, once properly executed, shall bind the parties, their assigns, and successors in interest.

8.3 This Contract may be amended only with the prior written approval of the parties.

IN WITNESS WHEREOF, the parties or their duly authorized representatives hereby execute this Contract on the date first written above.

Legal Form Approved
District Counsel

By: _____

Date: _____

FLORIDA INLAND NAVIGATION DISTRICT

By: _____
Executive Director

WHEN THE CONTRACTOR IS AN INDIVIDUAL OR SOLE PROPRIETOR:

Signed, sealed, and delivered in the presence of:

_____
Witness

By: _____
Signature

_____
Witness

_____
Type or Print Name

WHEN THE CONTRACTOR OPERATES UNDER A TRADE NAME OR FICTITIOUS NAME:

Signed, sealed, and delivered in the presence of:

Witness	Trade Name or Fictitious Name
Witness	Signature
	Type or Print Name

WHEN THE CONTRACTOR IS A GENERAL OR LIMITED PARTNERSHIP:

Signed, sealed, and delivered in the presence of:

Witness	Partnership Name
Witness	Signature of General Partner
	Type or Print Name of General Partner

WHEN THE CONTRACTOR IS A CORPORATION:

ATTEST:

Secretary	Corporation Name
(Corporate Seal)	By:
	Signature of Officer or Authorized Agent
	Type or Print Name/Title

WHEN THE CONTRACTOR IS A LIMITED LIABILITY COMPANY:

Signed, sealed, and delivered in the presence of:

Witness	LLC Name and State of Organization
Witness	Signature of Manager or Managing Member
	Type or Print Name/Title

--End of Section--

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SECTION 00 55 00

NOTICE TO PROCEED

Dated: _____

To:

Project: _____

In accordance with the Contract, for the above referenced project dated _____, you are hereby notified to commence Work on _____, and you are to complete the Work within _____ consecutive days. The alternative bid item, if awarded, is not authorized under this Notice to Proceed.

Owner: Florida Inland Navigation District

Authorized Signature: _____ Date: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the Notice of Award is hereby acknowledged by:

Authorized Signature: _____ Date: _____

Title: _____

--End of Section--

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SECTION 00 61 13.13

PERFORMANCE BOND

District's Contract No. _____ **Surety Bond No.** _____

BY THIS BOND, know that _____ as Principal, herewith called Contractor, and _____, as Surety, hereinafter called Surety, are bound to the Florida Inland Navigation District, as Obligee, herein called District, in the amount of: _____Dollars ($_____) for payment of which Contractor and Surety bind themselves, their heirs, personal representatives, executors, administrators, successors and assigns, jointly and severally, with reference to a written agreement entered into by Contractor and District, the construction of:

_____(project name).

THE CONDITION OF THIS BOND is that if the Contractor:

1. Performs said Contract in accordance with its terms and conditions; and

2. Pays District all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that District sustains because of a default by Contractor under the Contract; and

3. Pays District any and all other amounts due District by Contractor because of a default by Contractor under the Contract; and

4. Perform the guarantee of all Work and materials furnished under the Contract for the time specified in the Contract:

THEN THIS BOND IS VOID, OTHERWISE, IT REMAINS IN FULL FORCE.

Any changes in or under the Contract documents and compliance or noncompliance with formalities connected with the Contract or with the changes, do not affect the Surety's obligation under this bond. Surety hereby waives notice of any alteration or extension of time made by the District.

Dated on _____, 20___.

Contractor's Principal Business Address Telephone No.:	Surety's Principal Business Address and and Telephone No.:
_____	_____
_____	_____
_____	_____
Phone: (_____) _____ -_____	Phone: (_____) _____ - _____

District's Principal Business Address and Telephone No.:
1314 Marcinski Road
Jupiter, Florida 33477
Phone: (561) 627-3386

WHEN THE PRINCIPAL IS AN INDIVIDUAL OR SOLE PROPRIETOR:
Signed, sealed, and delivered in the presence of:

_____ By: _____
(Witness) Signature

_____ _____
(Witness) Business Address

WHEN THE PRINCIPAL OPERATES UNDER A TRADE NAME OR FICTITIOUS NAME:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) Business Name and Address

_____ By: _____
(Witness) Signature

WHEN THE CONTRACTOR IS A LIMITED LIABILITY COMPANY:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) LLC Name and State of Organization

_____ _____
(Witness) Signature of Manager or Managing Member

_____
Type or Print Name/Title

WHEN THE PRINCIPAL IS A GENERAL OR LIMITED PARTNERSHIP:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) (Name and Address of Partnership)

_____ By: _____
(Witness) (Signature of General Partner)

WHEN THE PRINCIPAL IS A CORPORATION:
ATTEST:

_____ _____
(Corporate Principal) Business Address

(Corporate Seal)

_____ By: _____ (Secretary)
(President)

ATTEST:

(Corporate Surety)
(Surety Seal)

Business Address

(Secretary) By: (Surety)

Florida Resident Agent

(Surety shall provide evidence of signature authority, i.e., a certified copy of Power of Attorney.)

NOTE: If both the Principal and Surety are Corporations, the respective Corporate Seals should be affixed and attached.

--End of Section--

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SECTION 00 61 13.16

PAYMENT BOND

District's Contract No. _____ **Surety Bond No. _____**

BY THIS BOND, know that _____ as Principal, herewith called

Contractor, and _____, as Surety, hereinafter called Surety, are bound to Florida Inland Navigation District, as Obligee, herein called District, in the amount of:

_____ Dollars ($_____) for payment of which Contractor and Surety bind themselves, their heirs, personal representatives, executors, administrators, successors and assigns, jointly and severally, with reference to a written agreement entered into by Contractor and District, the construction of:

_____(project name)

THE CONDITION OF THIS BOND is that if the Contractor:

Promptly makes payments to all claimants as defined in Section 255.05(1), Florida Statutes, supplying Contractor with labor, material, or supplies, used directly or indirectly by Contractor in the prosecution of the Work provided for in the Contract;

THEN THIS BOND IS VOID, OTHERWISE, IT REMAINS IN FULL FORCE.

Any changes in or under the Contract documents and compliance or noncompliance with formalities, connected with the Contract or with the changes, do not affect Surety's obligation under this bond. Surety hereby waives notice of any alteration or extension of time made by the District.

Any action instituted by a Claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2) and (10), Florida Statutes.

DATED on _____, 20___.

Contractor's Principal Business Address
Telephone No.:

_____

_____

_____

Phone: (_____) _____ -_____

Surety's Principal Business Address and
and Telephone No.:

_____

_____

_____

Phone: (_____) _____ - _____

District's Principal Business Address and Telephone No.:
1314 Marcinski Road
Jupiter, Florida 33477
Phone: (561) 627-3386

WHEN THE PRINCIPAL IS AN INDIVIDUAL OR SOLE PROPRIETOR:
Signed, sealed, and delivered in the presence of:

_____ By: _____
(Witness) Signature

_____ _____
(Witness) Business Address

WHEN THE PRINCIPAL OPERATES UNDER A TRADE NAME OR FICTITIOUS NAME:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) Business Name and Address

_____ By: _____
(Witness) Signature

WHEN THE CONTRACTOR IS A LIMITED LIABILITY COMPANY:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) LLC Name and State of Organization

_____ _____
(Witness) Signature of Manager or Managing Member

_____
Type or Print Name/Title

WHEN THE PRINCIPAL IS A GENERAL OR LIMITED PARTNERSHIP:
Signed, sealed, and delivered in the presence of:

_____ _____
(Witness) (Name and Address of Partnership)

_____ By: _____
(Witness) (Signature of General Partner)

WHEN THE PRINCIPAL IS A CORPORATION:
ATTEST:

_____ _____
(Corporate Principal) Business Address

(Corporate Seal)

_____ By: _____ (Secretary)
(President)

ATTEST:

(Corporate Surety)
(Surety Seal)

Business Address

(Secretary) By: (Surety)

Florida Resident Agent

(Surety shall provide evidence of signature authority, i.e., a certified copy of Power of Attorney.)

NOTE: If both the Principal and Surety are Corporations, the respective Corporate Seals should be affixed and attached.

--End of Section--

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SECTION 00 65 16
CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE: _____

PROJECT NAME: Dredged Material Management Area BV-4B Construction

OWNER: Florida Inland Navigation District

CONTRACTOR: _____

CONTRACT DATE: _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To: Florida Inland Navigation District
OWNER

And to: _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and that part of the Work is hereby declared to be substantially complete in accordance with the Contract Documents on:

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected, prepared by Contractor and verified and amended by the Engineer is attached hereto. This list may not be all-inclusive, and failure to include any items in the tentative list does not alter the responsibility of Contractor to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by Contractor within _____ days of the above Date of Substantial Completion.

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer on: _____
DATE

SECTION 00 65 16
CERTIFICATE OF SUBSTANTIAL COMPLETION

Taylor Engineering, Inc. By: _____

ENGINEER (Authorized Signature)

Contractor accepts this Certificate of Substantial Completion on: _____
Date

_____ By: _____

CONTRACTOR (Authorized Signature)

Owner accepts the Work or designated portion thereof as substantially complete and will assume full possession thereof on: _____
Date

Florida Inland Navigation District By: _____

OWNER (Authorized Signature)

--End of Section--

SECTION 00 65 19
CERTIFICATE OF FINAL COMPLETION

DATE OF ISSUANCE: _____

PROJECT NAME: Dredged Material Management Area BV-4B Construction

OWNER: Florida Inland Navigation District

CONTRACTOR: _____

ENGINEER: _____

This Certificate of Final Completion applies to all Work under the Contract Documents. The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and the Work is hereby declared to be complete in accordance with the Contract Documents on:

_____
DATE OF FINAL COMPLETION

This Certificate does not constitute an acceptance of any Work not in accordance with the Contract Documents nor is it a release of the Contractor's obligation to complete the Work in accordance with the Contract Documents. The warranty for all Work completed under this Contract expires (1) year from the date of Final Completion.

The following documents are attached to and made part of this Certificate:

Executed by Engineer on: _____
DATE

Taylor Engineering, Inc. By: _____
ENGINEER (Authorized Signature)

Contractor accepts this Certificate of Substantial Completion on: _____
Date

_____ By: _____
CONTRACTOR (Authorized Signature)

Owner accepts the Work as complete and will assume full possession thereof on: _____
Date

Florida Inland Navigation District By: _____
OWNER (Authorized Signature)

--End of Section--

SECTION 00 65 19
CERTIFICATE OF FINAL COMPLETION

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SECTION 00 72 00

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in the Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Addenda: Written or graphic instruments issued prior to the opening of Bids that modify or interpret the Contract Documents by additions, deletions, clarifications, or corrections.

Application for Payment: The form furnished or approved by the District which is to be used by the Contractor in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid: The offer or proposal of the bidder submitted on the prescribed form setting forth the price(s) for the Work to be performed.

Bidder: Any person, firm, partnership, or corporation submitting a Bid for the Work.

Bonds: Bid, Payment, and Performance Bonds and other instruments of security, furnished by the Contractor and the Contractor's Surety in accordance with the Contract Documents.

Change Order: A written order to the Contractor, signed by the District, authorizing an addition, deletion, or revision in the Work or an adjustment in the Contract Price or Contract Time issued on or after the effective date of the Contract.

Claim: A demand or assertion by one of the parties seeking, as a matter of right, an adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract.

Construction Change Directive: A written order to the Contractor, prepared by the Engineer and signed by the District, directing a change to the Work prior to agreement on adjustment, if any, in the Contract Price or Contract Time, or both.

Contract: The written agreement between the District and the Contractor covering the Work to be performed and other Contract Documents are made a part of the Contract.

Contract Documents: The Contract, including the Bid Solicitation, Instructions for Bidders, Contractor's Bid, Bid Bond, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Change Order(s), General Conditions, Project Drawings, Specifications, Addenda, and all Modifications issued after the effective date of the Agreement.

Contract Price: The total monies payable by the District to the Contractor under the Contract Documents.

Contract Time: The number of calendar days or the date stated in the Contract Documents for the completion of the Work.

Contractor: The person, firm, or corporation with whom the District has entered into the Contract.

Day: A calendar day of twenty-four (24) hours measured from midnight to the next midnight.

Defective: Term used to describe Work that is unsatisfactory, faulty or deficient, in that it does not conform to the requirements of the Contract Documents or does not meet the requirements of any inspection, referenced standard, test or approval or has been damaged prior to final acceptance.

District: The Florida Inland Navigation District is an independent special District created under the laws of the State of Florida.

District Observer: The Engineer, Engineer's representative, or Resident Authorized Representative.

Engineer: The person, firm, or corporation named as such in the Contract Documents.

Engineer's Consultants: A person, firm, or corporation having a Contract with the District or the Engineer to furnish services as the District's or Engineer's independent professional associate or consultant with respect to the Work or Project.

Effective Date of the Contract: The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Contract is signed and delivered by the last of the two parties to sign and deliver.

Executive Director: The person employed as the District's Executive Director or his or her designee.

Field Order: A written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.

Furnish: to provide or install complete in place.

General Requirements: Sections of Division 01 of the Specifications.

Governing Board: The Board of Commissioners of the Florida Inland Navigation District.

Laws and Regulations: Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

Liens: Liens, changes, security interest or encumbrances upon real property or personal property.

Milestone: A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

Modification: (a) A Written Amendment of the Contract Documents signed by the District and the Contractor, (b) a Change Order or (c) a Field Order. A Modification may only be issued after Effective Date of the Contract.

Notice of Award: The written notice of the acceptance of the Bid from the District to the successful Bidder.

Notice to Proceed: Written notice given by the District to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contractor shall start to perform the Contractor's obligations under the Contract Documents.

Partial Utilization: Use by the District of a substantially completed part of the Work for the purpose for which it is intended prior to substantial completion of all the Work.

Project: The total construction of which the Work to be provided under the Contract Documents may be the whole or a part as indicated elsewhere in the Contract Documents.

Project Drawings: The part of the Contract Documents which show largely through graphical presentation the character, extent and scope of the Work to be furnished and performed by the Contractor and which have been prepared or approved by the Engineer. Shop drawings are not Project Drawings as so defined.

Resident Project Representative: An authorized representative of the District who is assigned to perform construction observation.

Samples: Physical examples of materials, equipment, or Workmanship that are representative of some portion of the Work and establish standards by which some portion of Work will be judged.

Shop Drawings: All drawings, diagrams, illustrations, brochures, schedules, and other data or information that are specifically prepared or assembled by the Contractor and submitted by the Contractor to illustrate some portion of the Work.

Specifications: Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and Workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor: An individual, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion: The date determined by the Engineer when the construction of the Work or an expressly stipulated part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Work or stipulated part can be fully utilized for the purposes for which it is intended.

Supplier: A manufacturer, fabricator, supplier, distributor, materialman, vendor, firm, corporation or organization having a direct contract with the Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by the Contractor or any Subcontractor.

Surety: The corporate body which is bound with the Contractor and which engages to be responsible for the Contractor and the acceptable performance of the Work.

Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, handholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, natural gas, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work: Work to be paid for on the basis of unit prices.

Work: The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

Written Amendment: A written amendment of the Contract Documents, signed by the District and the Contractor on or after the effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

Written Notice: Any written notice to any party to the Contract relative to any part of this Contract. Such notice shall be considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at the party's last given address, or as to the Contractor, delivered in person to said party or said party's authorized representative at the Project site. Email to the last given email address, and delivery by a recognized overnight delivery service shall constitute written notice. However, written notice by any means other than certified or registered mail shall not be deemed complete until actually received by the addressee. If email is used, it is up to the party sending the email to verify receipt by asking for a verification reply or electronic read notice.

ARTICLE 2 - CONDITIONS AFFECTING WORK

The Contractor acknowledges that he has investigated and correlated his observations with the requirements of the Contract and satisfied himself as to the conditions affecting the Work. These conditions include, but are not restricted to, those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electrical power, roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, and the character of equipment and facilities needed preliminary to and during prosecution of the Work. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as

this information is reasonably ascertainable from an inspection of the site, including all exploratory Work done by the District, as well as from information presented by the Project Drawings and Specifications made a part of this Contract. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The District assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the District, its officers or employees prior to the execution of the Contract, unless such information has been stated expressly in the Contract.

ARTICLE 3 - CONTRACT DOCUMENTS

The Contract Documents comprise the entire agreement between the District and the Contractor concerning the Work. The Contract Documents are complementary; what is called for by one is binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project. It is the intent of the Contract Documents to describe the functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials, equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as to be required to produce the intended result shall be furnished and performed whether or not specifically called for. When words and phrases that have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment such words or phrases shall be interpreted in accordance with that meaning. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations, of any governmental authority, whether such reference be specific or be implied, shall mean the latest standard, specification, manual, code, Laws or Regulations in effect on the date of the Bid Solicitation except as may otherwise be specifically stated. However, no provision of any referenced standard, specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the District, the Contractor or the Engineer, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to the District, the Engineer, or any of the Engineer's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents. Clarifications and interpretations of the Contract Documents shall be issued by the Engineer.

Brand names where used in the Contract Documents, are intended to denote the standard of quality required for the particular material or product. The term "equal" or "equivalent," when used in connection with brand names, shall be interpreted to mean a material or product that is similar and equal in type, quality, size, capacity, composition, finish, color and other applicable characteristics to the material or product specified by trade name, and that is suitable for the same use and capable of performing the same function, in the opinion of the Engineer, as the material or product so specified. Proposed equivalent items must be approved by the Engineer before they are purchased or incorporated in the Work. When a brand name, catalog number, or other identification, is used without the phrase "or equal," the Contractor shall use the item specified. "Equivalent" or "equal" items will only be approved after the Contractor has been furnished with the Notice to Proceed.

If, during the performance of the Work, the Contractor discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or any such standard, specification, manual or code, the Contractor shall report all errors to the Engineer in writing at once and the Contractor shall not proceed with the Work affected thereby (exception in an emergency as provided for in the Contract Documents) until an amendment or supplement to the Contract Documents has been issued.

ARTICLE 4 - SPECIFICATIONS AND PROJECT DRAWINGS

The Contractor shall check all Project Drawings furnished to him immediately upon their receipt and shall promptly notify the Engineer of all errors, inconsistencies, omissions, and discrepancies. Dimensions marked on Project Drawings shall, in general, be followed in preference to scaled measurements. Anything mentioned in the Specifications and not shown on the Project Drawings, or shown on the Project Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. In the case of an inconsistency between Drawings and Specifications or within either document not clarified by addendum, the

better quality or greater quantity of Work shall be provided in accordance with the Engineer's interpretation. In case of a discrepancy either in the dimensions, in the Project Drawings, or in the Specifications, the matter shall be submitted to the District who shall make a determination in writing. Any adjustment by the Contractor without such a determination by the District shall be at his own risk and expense. All deviations made by the Contractor from the Specifications and Project Drawings will be compiled and provided to the District in the form of Record Drawings (see SECTION 01 78 00 PROJECT CLOSEOUT). The District may furnish from time to time such detail Project Drawings and other information considered necessary to clarify the Contract.

Omissions from the Project Drawings or Specifications or the misdescription of details of Work which are manifestly necessary to carry out the intent of the Project Drawings and Specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the Work as if fully and correctly described in the Project Drawings and Specifications. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency, or omission in the Contract without providing written notice to the District, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction. Standard references used in the Specifications shall be the latest revision or edition of that reference, any such referenced paragraph, or section revised shall apply to the Work as indicated.

ARTICLE 5 - CONSTRUCTION BONDS

5.1 BONDS REQUIRED

If the Contract price is in excess of two-hundred thousand dollars ($200,000.00), the Contractor shall, within fifteen (15) calendar days after receipt of the Contract for execution, provide the District with a payment bond and a performance bond in accordance with Florida Statutes § 255.05(1) in an amount not less than the Contract Price. The form of the payment and performance bonds shall be as provided IN SECTION 00 61 13.13 PERFORMANCE BOND and 00 61 13.16 PAYMENT BOND, with a Power of Attorney Affidavit attached. Contractor, at Contractor's Expense, shall record the Performance Bond and the Payment Bond in the Public Records of the county where the improvement is located and deliver a certified copy of each recorded bond to the District. Contractor shall perform no work, and the District shall not make any payment to Contractor until Contractor has delivered certified copies of the recorded bond to the District. Failure to provide the Bond(s) with the fifteen (15) day period shall be sufficient cause for the District to deem the Bidder non-responsive and nullify the Contract Award.

5.2 SURETIES QUALIFICATIONS

All bonds required under this Contract, including, but not by way of limitation, any Bid Bond, Payment Bond or Performance Bond, shall be written through a reputable and responsible Surety Bond agency licensed to do business in the State of Florida and with a Surety which holds a certificate of authority authorizing it to write Surety Bonds in Florida meeting the following requirements:

BOND REQUIREMENTS FOR CONSTRUCTION CONTRACTS

CONTRACT SUM	A.M. BEST'S RATING CLASSIFICATION / OTHER REQUIREMENTS	BEST'S FINANCIAL SIZE CATEGORY
From: $ 0.00 To: $200,000.00	Bid or Payment Bond or Performance Bond Not Required (unless specified in Supplemental Conditions)	Not Applicable
From: $200,000.01 To: $500,000.00	All Bonds Required: B+ or better (See requirements under paragraph 1 below)	No Minimum Required
From: $500,000.01 To: $2,500,000.00	A - or better Circular 570 requirements (paragraph 2 below)	IV or larger
From: $2,500,000.01 or more	A - or better Circular 570 requirements (paragraph 2 below)	V or larger

(1) Contract Price of five-hundred thousand dollars ($500,000.00) or Less:

If the Contract price is five-hundred thousand dollars ($500,000.00) or less, Bonds with a Surety company in compliance with the following requirements shall be acceptable:

(a) The surety company is licensed to do business in the State of Florida;
(b) The surety company holds a certificate of authority authorizing it to write Surety Bonds in the State Florida;
(c) The surety company has twice the minimum surplus and capital required by the Florida Insurance code at the time the Bid Solicitation is issued;
(d) The surety company is otherwise in compliance with the provisions of the Florida Insurance Code; and,
(e) The surety company holds a currently valid certificate of authority issued by the U.S. Department of the Treasury under 31 U.S.C. ss.9304 to 9308.

In order to qualify as an acceptable Surety company under this paragraph (1), an Affidavit for Surety Company shall be executed by an Officer of the Surety Bond insurer as evidence that a Surety company complies with the foregoing requirements.

(2) Circular 570, Contract Price of $500,000.01 or more:

If the Contract price is $500,000.01 or greater, the Surety shall also comply with the Circular 570 requirements as set forth in this paragraph (2). The Surety shall maintain a current certificate of authority as an acceptable Surety on Federal Bonds in accordance with U.S. Department of Treasury Circular 570, current revision. If the amount of the Bond exceeds the underwriting limitations set forth in the Circular, in order to qualify, the net retention of the Surety company shall not exceed the underwriting limitation in the Circular and the excess risk must be protected by coinsurance, reinsurance, or other methods in accordance with Treasury Circular 297, revised September 1, 1978 (3) CFR Section 223.10 - Section 223.111. Further, the surety company shall provide the District with evidence satisfactory to the District, that such excess risk has been protected in an acceptable manner.

5.3 ADDITIONAL OR REPLACEMENT BOND

It is further mutually agreed between the parties hereto that if, at any time, the District shall deem the Surety or Sureties upon any Bond to be unsatisfactory, or if, for any reason, such Bond ceases to be adequate, the Contractor shall, at his expense within five (5) business days after the receipt of notice from the District to do so, furnish an additional or replacement Bond or Bonds on the District's standard form, amount, and with such Surety or Sureties as shall be satisfactory to the District. In such event, no further payments to the Contractor shall be deemed due under this Contract until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the District.

In addition, the Contractor shall for any increases in the Contract amount automatically increase the amount of the Payment Bond and the Performance Bond to equal the revised amount of the Contract and shall provide the District with evidence of the same.

5.4 FLORIDA RESIDENT AGENT

The Surety Company shall have a Florida resident agent whose name shall be listed in the prescribed space on the forms provided by the District for all Bonds required by the District.

5.5 ALTERNATIVE FORM OF SECURITY

In lieu of the Payment Bond and the Performance Bond, the Contractor may, pursuant to Section 255.05, Florida Statutes, provide an alternate form of security in the form of cash, a money order, a certified check, or an irrevocable letter of credit. Any such alternative form of security shall be for the same purpose and be subject to the same conditions as those applicable to the Bond for which the alternative form of security is being substituted. The determination of the value of an alternative form of security shall be made by the District.

ARTICLE 6 - INSURANCE REQUIREMENTS

Without limiting any of the other obligations or liabilities of Contractor, Contractor shall provide, pay for, and maintain in force until all of its work to be performed under this Contract has been completed and accepted by the District (or for such duration as is otherwise specified hereinafter), the insurance coverages set forth herein.

6.1 WORKERS' COMPENSATION/EMPLOYER'S LIABILITY INSURANCE

Such insurance to apply for all employees in compliance with the "Workers' Compensation Law" of the State of Florida and all applicable federal laws. Such insurance shall be no more restrictive than that provided by the latest edition of the standard Workers' Compensation Policy, as filed for use in Florida by the National Council on Compensation Insurance (NCCI), without any restrictive endorsements other than any endorsements required by NCCI or the State of Florida. In addition to coverage for the Florida Workers' Compensation Act, where appropriate, coverage is to be included for the Federal Employer's Liability Act and any other applicable Federal or State law. In addition, the policy(ies) must include:

The minimum amount of coverage (inclusive of any amount provided by an umbrella or excess policy) shall be:

Part One: "Statutory"
Part Two: $1,000,000 Each Accident
$1,000,000 Disease – Policy Limit
$1,000,000 Disease – Each Employee

In addition to coverage for the Florida Workers' Compensation Act, where appropriate, coverage is to be included for:

a. If any of Contractor's employees or subcontractors' (of any tier) employees will be involved in loading, unloading, building or repairing vessels, coverage shall be included for the U.S Longshoremen & Harbor Workers Act. Such coverage shall be provided on a form no more restrictive than NCCI Form WC 00 01 06A Longshore and Harbor Workers' Compensation Act Coverage Endorsement.

b. If any of Contractor's employees or subcontractors' (of any tier) employees will be working as the masters or crew members of any vessel, coverage shall be included for losses arising out of injuries to such employees. Such coverage is to be provided on a form no more restrictive than the latest edition of the NCCI Form WC 00 02 01B Maritime Coverage Endorsement.

In the event that Contractor provides all or a portion of the Workers' Compensation/Employers Liability insurance required herein via a professional employer organization ("PEO") or employee leasing company, any such Workers' Compensation/Employers Liability insurance provided will only be deemed acceptable solely for the purposes of insuring Contractor's enrolled employees. In addition, and notwithstanding the foregoing, in order to adequately protect the District against injuries to uninsured employees of Subcontractors and non-enrolled employees of Contractor, Contractor must still procure, maintain, and furnish District with evidence of a stand-alone separate Workers' Compensation/Employers Liability insurance policy issued with Contractor as the named insured, and complying with all requirements for Contractor provided Workers' Compensation contained in the Agreement. It is permissible for Contractor to exclude payroll of leased employees from such separate Workers' Compensation/Employers Liability insurance policy.

The Workers' Compensation policy must be endorsed to waive the insurers right to subrogate against the District and District's Commissioners, officers, employees and agents in the manner which would result from the attachment of the NCCI Waiver Of Our Right To Recover From Others Endorsement (Advisory Form WC 00 03 13) with the District and the District's Commissioners, officers, employees and agents scheduled thereon.

6.2 COMMERCIAL GENERAL LIABILITY INSURANCE

Such insurance shall be on a form no more restrictive than that provided by the latest edition of the standard Commercial General Liability Form (Form CG 00 01) as filed for use in the State of Florida by the Insurance Services Office (ISO), without any restrictive endorsements other than any endorsements specifically required by ISO or the State of Florida. The coverage may include restrictive endorsements which exclude coverage for liability arising out of:

Mold, fungus, or bacteria

Terrorism

Silica, asbestos or lead

Sexual molestation

The minimum limits (inclusive of amounts provided by an umbrella or excess policy) shall be:

$5,000,000 General Aggregate

$2,000,000 Products/Completed Operations Aggregate

$2,000,000 Personal and Advertising Injury

$5,000,000 Each Occurrence

Contractor shall continue to maintain products/completed operations coverage in the amount stated above for a period of three (3) years after the final completion of the Work. The insurance shall be on a form no more restrictive than, and shall cover those sources of liability which would be covered by Coverage A of, the latest occurrence form edition of the Commercial General Liability Coverage Form (ISO Form CG 00 01), or of the occurrence Products/Completed Operations Liability Coverage Form (ISO Form CG 00 37), as filed for use in the State of Florida by ISO, without any restrictive endorsements other than those than those which, under an ISO filing, must be attached to the policy (i.e., mandatory endorsements).

District and District's Commissioners, officers, employees and agents shall be included as an "Additional Insured" on a form no more restrictive than ISO form CG 20 10 (Additional Insured – Owners, Lessees, or Contractor) combined with ISO form CG 20 37 (Additional Insured – Owners, Lessees or Contractors – Completed Operations).

Contractor shall cause its subcontractors to purchase and maintain commercial general liability insurance in the minimum amount of $1,000,000, covering District and Contractor.

6.3 BUSINESS AUTOMOBILE LIABILITY INSURANCE

Such insurance shall be provided on a form no more restrictive than that provided by Section II (Liability Coverage) of the most recent version of the standard Business Auto Policy (ISO Form CA 00 01) without any restrictive endorsements, including coverage for liability contractually assumed. The policy shall cover all owned, non-owned, and hired autos used in connection with the performance of work under this Contract.

The minimum limits (inclusive of any amounts provided by an umbrella or excess policy) shall be:

$1,000,000 Each Occurrence – Bodily Injury and Property Damage Combined

6.4 WATERCRAFT/VESSEL LIABILITY INSURANCE

To the extent watercraft are utilized, Contractor shall purchase and maintain, or cause its subcontractors to purchase and maintain, insurance which shall, at a minimum, cover Contractor and subcontractors for injuries or damage arising out of the use of all owned, non-owned and hired watercraft. The insurance shall include the District and District's Commissioners, officers, employees and agents "Additional Insureds".

The limits applicable to watercraft liability (inclusive of any amounts provided by an umbrella or excess policy) shall be:

Each Occurrence/Annual Aggregate	$5,000,000

6.5 POLLUTION/ENVIRONMENTAL IMPAIRMENT LIABILITY INSURANCE

Such insurance shall include clean-up costs and cover Contractor for liability resulting from pollution or other environmental impairment arising out of, or in connection with, work performed under this Contract, or which arises out of, or in connection with this Contract, including coverage for clean-up of pollution conditions and third-party bodily injury and property damage claims arising from pollution conditions. Such insurance shall also include transportation coverage and non-owned disposal site coverage. Such insurance shall be on a form acceptable to District.

District and District's Commissioners, officers, employees and agents shall be included as "Additional Insureds" on the policy.

Coverage must either be on an occurrence basis; or, if on a claims-made basis, the coverage must respond to all claims reported within three years following the period for which coverage is required and which would have been covered had the coverage been on an occurrence basis.

The minimum limits (inclusive of any amounts provided by an umbrella or excess policy) shall be:

$5,000,000	Each Claim/Occurrence
$5,000,000	Annual Aggregate

6.6 PROPERTY/BUILDER'S RISK

Contractor shall be responsible to maintain Builder's Risk and/or and Installation policy for all construction projects. The coverage limit shall be equal to 100% of the completed value of the project. Such coverage shall be written on "all-risk" including coverage for the perils of windstorm and flood. Such coverage shall be written on an "agreed value" basis and shall not be subject to a coinsurance clause. The maximum deductible for other than windstorm and flood shall be $25,000. The maximum deductible for windstorm and/or flood shall be 2% of the value of the project at the time of the loss. District shall be included on the policy as a Named Insured and a loss payee.

6.7 PROVISIONS APPLICABLE TO ALL POLICIES

Until such insurance is no longer required by this Contract, Contractor shall provide District with renewal or replacement evidence of insurance at least fifteen (15) days prior to the expiration or termination of such insurance.

All policies required by this Contract shall be endorsed to provide that the insurer will provide District thirty (30) days' advance notice of any cancellation of the policy, except in cases of cancellation for non-payment of premium for which District shall be given ten (10) days' advance notice.

Insurers providing the insurance required by this Contract must either be: (1) authorized by a subsisting certificate of authority issued by the State of Florida to transact insurance in the State of Florida, or (2) except with respect to coverage for the liability imposed by the Florida Workers' Compensation Act, an

eligible surplus lines insurer under Florida Statutes.

In addition, each such insurer shall have and maintain throughout the period for which coverage is required, a Best's Rating of "A-" or better and a Financial Size Category of "VII" or better according to A. M. Best Company.

Contractor shall provide to District satisfactory evidence of the insurance required in the Contract within fifteen (15) calendar days after notification of award of the Contract. As evidence of compliance with the insurance required herein, Contractor shall furnish District with one of the following forms of acceptable evidence of insurance:

a. 1. an appropriate Certificate of Insurance (which identifies the project) and is signed by an authorized representative of the insurer evidencing all coverage required; and

2. a copy of the actual additional insured endorsement as issued on the policy(ies), signed by an authorized representative of the insurer(s) verifying inclusion of the District and the District's Commissioners, officers, employees and agents as additional insureds;

b. the original of the policy(ies); or

c. other evidence satisfactory to the District.

The official title of the certificate holder is Florida Inland Navigation District. This official title shall be used in all insurance documentation.

Notwithstanding the prior submission of a Certificate of Insurance, copies of endorsements, or other evidence initially acceptable to the District, if requested by the District, Contractor shall, within thirty (30) days after receipt of a written request from District, provide the District with a certified copy or certified copies of the policy or policies providing the coverage required herein. Contractor may redact or omit, or cause to be redacted or omitted, those provisions of the policy or policies which are not relevant to the insurance required herein.

The insurance provided by the Contractor shall apply on a primary basis to and shall not require contribution from any other insurance or self-insurance maintained by the District or the District's Commissioners, members, officers, employees or agents. Any insurance, or self-insurance, maintained by the District shall be in excess of, and shall not contribute with, the insurance provided by Contractor.

District and Contractor, each for itself and on behalf of its insurers, to the fullest extent permitted by law without voiding the insurance required hereunder, waive all rights against each other and any of their other contractors, subcontractors, agents and employees, each of the other, for damages or loss to the extent covered and paid for by any insurance maintained by the other party.

Except where prior written approval has been obtained hereunder, the insurance maintained by Contractor shall apply on a first dollar basis without application of a deductible or self-insured retention. Contractor shall pay on behalf of the District or the District's Commissioners, officers, employees and agents any deductible or self-insured retention applicable to a claim against the District or the District's Commissioners, officers, and employees.

District reserves the right, but not the obligation, to review and revise any insurance requirements at the time of contract renewal and/or any amendments, not limited to deductibles, limits, coverages and endorsements based on insurance market conditions affecting the availability or affordability of coverage;

or changes in the scope of work/specifications affecting the applicability of coverage.

Compliance with these insurance requirements shall not limit the liability of Contractor, its subcontractors, sub-subcontractors, employees or agents. Any remedy provided to the District or the District's Commissioners, officers or employees by the insurance provided by Contractor or the District shall be in addition to and not in lieu of any other remedy (including, but not limited to, as an indemnitee of Contractor) available to District under this Contract or otherwise.

Neither approval nor failure to disapprove insurance furnished by Contractor shall relieve Contractor from the responsibility to provide insurance as required by this Contract.

The Contractor's insurance shall be primary insurance as respects the District, its Commissioners, officers, employees and agents, and any insurance or self insurance maintained by the District, its Commissioners, officers, employees and agents shall be excess of the Contractor's insurance and shall not contribute to it.

The policies shall contain a waiver of subrogation against the District, its Commissioners, officers, employees and agents for any claims arising out of the work of the Contractor.

The policies shall contain no exclusionary language or limitations that are applicable to any additional insured that are not applicable to the named insured.

Each policy shall contain a provision that defense costs are paid in addition to and do not deplete any policy limits.

If used to satisfy the minimum coverage, Umbrella Liability or Excess Liability insurance must be maintained with coverage at least as broad as the underlying policies. This insurance shall be in addition to and in excess of any other insurance coverages required hereunder. The applicable policies of insurance shall indicate which policies the Umbrella Liability or Excess Liability includes as underlying, and a deductible or self-insured retention of not more than $25,000 as to Contractor (unless approved in writing by the District) and no deductible or self-insured retention as to any additional insured.

The insurance requirements set forth in this Exhibit will in no way limit Contractor's liability arising out of the Work. The inclusions, coverage and limits set forth in this Exhibit are minimum inclusions, coverage and limits. The required minimum policy limits set forth in this Exhibit will not be construed as a limitation of the District's rights under any policy with higher limits, and no policy maintained by Contractor will be endorsed to include such a limitation. Nothing contained in this Section will be construed as limiting the type, quality or quantity of insurance coverage that Contractor should maintain. Contractor will be responsible for determining appropriate inclusions, coverage and limits which may be in excess of the minimum requirements set forth in this Exhibit.

ARTICLE 7 - INDEMNIFICATION

The Contractor shall indemnify and hold harmless the District, its officers, agents, guests, invitees and employees, from all liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the Contractor and persons employed or utilized by the Contractor in the performance of the Contract. The Contractor shall include substantially the same indemnification provisions in all contracts with Subcontractors.

The Contractor acknowledges that it is solely responsible for ensuring the safety of the premises to protect its employees, Subcontractors, invitees, licensees and all other persons during the course of the Work.

ARTICLE 8 - SCHEDULES

Within ten (10) days after the Effective Date of Contract, the Contractor shall submit to the Engineer for review a preliminary progress schedule (See SECTION 01 29 00 MEASUREMENT AND PAYMENT) indicating the

starting and completion dates of the various stages of the Work, including any Milestones specified in the Contract Documents.

Prior to the submission of the first Application for Payment, the Contractor shall submit a finalized progress schedule. No progress payment shall be made to the Contractor until the schedule is submitted to and acceptable to the Engineer as provided herein. The progress schedule will be acceptable to the Engineer as providing an orderly progression of the Work to completion within any specified Milestones and Contract Time, but such acceptance will neither impose on the Engineer responsibility for the sequencing, progress or scheduling of the Work nor interfere with or relieve the Contractor from full responsibility thereof. The Contractor's schedule of values will be acceptable to the Engineer as to form and substance.

ARTICLE 9 - SUPERINTENDENCE BY CONTRACTOR

The Contractor, at all times during performance and until the Work is completed and accepted, shall give his personal superintendence to the Work or have a competent superintendent at the project site, satisfactory to the District and with authority to act for the Contractor.

9.1 PERFORMANCE OF WORK BY THE CONTRACTOR

The Contractor shall, with his own organization, perform Work equivalent to at least forty percent (40%) of the total amount of the Work, based on percentage of Contract value, to be performed under the Contract.

9.2 SUBCONTRACTORS

The Contractor is as fully responsible to the District for the acts, coordination, and omissions of his Subcontractors and of persons, either directly employed by said Subcontractor, as he is for the acts and omissions of persons directly employed by him. The Contractor shall submit the names of the Subcontractors proposed for the Work for District acceptance at the pre-construction meeting. The Contractor shall not substitute any Subcontractor without the prior consent of the District. Nothing contained in the Contract shall create any Contractual relationship between any Subcontractor and the District. All Subcontractors shall complete and submit to the Engineer a Public Entity Crime Statement.

9.3 PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES

In accordance with §287.135, Florida Statutes, Contractor certifies that Bidder is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, and that it does not have business operations in Cuba or Syria. "Business operations" means, for purposes specifically related to Cuba or Syria, engaging in commerce in any form in Cuba or Syria, including, but not limited to, acquiring, developing, maintaining, owning, selling, possessing, leasing, or operating equipment, facilities, personnel, products, services, personal property, real property, military equipment, or any other apparatus of business or commerce. District may terminate the contract if Contractor is found to have submitted a false certification, been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or been engaged in business operations in Cuba or Syria.

ARTICLE 10 - PERMITS

The Contractor shall, without additional expense to the District, be responsible for obtaining licenses and permits and for complying with any applicable federal, state, and municipal laws, codes, and regulations in connection with the prosecution of the Work. The District will obtain the environmental permits indicated in SECTION 01 35 43 ENVIRONMENTAL PROTECTION; the Contractor will obtain any other environmental permits.

ARTICLE 11 - PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS

The Contractor will preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site of Work which is not to be removed. Care will be taken in removing trees authorized for removal to avoid damage to vegetation to remain in place. Any limbs or branches of trees broken during such operations or by the careless operation of equipment, or by Workmen, shall be trimmed with a clean cut and painted with an approved tree-pruning compound as directed by the District. The Contractor will protect from damage all existing improvements, District easements, or utilities at or near the site of the Work, the location of which is made known to him, or the existence of which may be reasonably inferred from a site inspection, and will repair or restore any damage to such facilities, and shall be responsible for any interruption of utility services, resulting from failure to comply with the requirements of this Contract or the failure to exercise reasonable care in the performance of the Work. If the Contractor fails or refuses to repair any such damage promptly, the District may have the necessary Work performed and charge the cost thereof to the Contractor. The Contractor shall follow all requirements set forth in SECTION 01 35 43 ENVIRONMENTAL PROTECTION.

ARTICLE 12 - SAFETY

The Contractor shall be responsible for providing safe and healthful working conditions for employees of the Contractor, Subcontractors, the District, or its invitees. The Contractor shall initiate and maintain an accident prevention program that should include, but is not limited to, the following: Establish and supervise programs for the education and training of employees in the recognition, avoidance, and prevention of unsafe conditions and acts.

The Contractor shall be responsible for providing first-aid services and medical care to all his employees. The Contractor shall establish and maintain good housekeeping practices throughout all phases. The Contractor shall be responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions.

The District's Observer may, but is not required to, order that the Work be stopped if a condition of immediate danger exists. Nothing contained herein shall be construed to shift responsibility or risk of loss for injuries or damage sustained as a result of a violation of this section from the Contractor to the District and the Contractor shall remain solely and exclusively responsible for compliance with all safety requirements and for the safety of all persons and property at the project site. Employees required to handle or use toxins, caustics and other harmful substances shall be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required. All Work shall meet and be in compliance with standards and regulations set forth by Occupational Safety and Health Administration (OSHA), Florida Department of Labor and Employment Security and any and all other appropriate federal, state, local or District safety and health standards including but not limited to OSHA Excavation Safety Standards as enumerated in the "Trench Safety Act" Section 553.60, Florida Statutes.

12.1 EMERGENCIES

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the District, is obligated to act to prevent threatened damage, injury or loss. If the Contractor believes that any significant change in the Work or Contract Document have been caused thereby, prompt written notice shall be given to the Engineer. If the Engineer determines that a change in the Contract Documents is necessary due to the action taken by the Contractor in the event of the emergency, a Field Order or Change Order will be issued.

ARTICLE 13 - DIFFERING SITE CONDITIONS

During the progress of the Work should the Contractor encounter differing site conditions, the Contractor shall within 48 hours, and before such conditions are disturbed, deliver to the District written notice of:

a. Subsurface, submerged or latent physical conditions at the site differing materially from those

indicated in this Contract, or;

b. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in this Contract.

The Engineer shall promptly investigate the conditions, and shall render a non-binding opinion as to whether such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the Work under this Contract, whether or not changed as a result of such conditions, and shall make a non-binding recommendation for an adjustment to the Contract Price, the Contract Time, or both. Contractor and the Executive Director shall meet and discuss the Engineer's recommendation and shall attempt to negotiate a mutually acceptable adjustment. If the Contractor and the Executive Director reach agreement, the terms of the adjustment shall be documented by a Change Order. If the Executive Director finds that a change to the work is warranted by differing site conditions but the Contractor does not agree with the proposed adjustment to the Contract Price, Contract Time, or both, the Executive Director may issue a Construction Change Directive. During the Engineer's investigation, the Contractor shall proceed with those portions of the Work which do not disturb such conditions. Engineer shall notify Contractor in writing when Work may resume in the area of the differing site conditions. If the Contractor disagrees with the Executive Director's findings regarding the non-existence of differing site conditions or the Executive Director's proposed adjustment, if any, the Contractor may file a Claim in accordance with Section 14.6 of these General Conditions within 30 days of receipt of the Executive Director's determination.

No Claim by the Contractor for an adjustment hereunder shall be allowed if asserted after final payment under this Contract.

ARTICLE 14 – CHANGES TO THE WORK; CLAIMS

The District may, without invalidation of the Contract, at any time, without notice to the Sureties, by Change Order or Construction Change Directive, make any change in the Work within the general scope of the Contract. The Engineer may, without invalidation of the Contract, at any time, without notice to the Sureties, by Field Order, make any change in the Work, not involving an adjustment in the Contract Price or an extension of the Contract Time, within the general scope of the Contract.

Upon receiving a Change Order, Construction Change Directive or a Field Order the Contractor will promptly proceed with the Work involved. All such Work shall be executed under the applicable conditions of the Contract Documents.

14.1 FIELD ORDERS

The Engineer may authorize minor variations in the Work from the requirements of the Contract Documents that do not involve extra cost or extension of time and are compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. These shall be accomplished by a Field Order and will be binding on the District and the Contractor who shall perform the Work involved promptly. If the District or the Contractor believes that a Field Order justifies an adjustment in the Contract Price or the Contract Time, the District or the Contractor may make a written Claim for such an adjustment as provided in Section 14.6.

14.2 CHANGE ORDERS

The District and the Contractor shall execute appropriate Change Orders covering:

a) Changes in the Work where the District and the Contractor are in agreement with:

   1. the change in the Work;
   2. the amount of the adjustment, if any, in the Contract Price; and
   3. the amount of the adjustment, if any, in the Contract Time.

b) Changes in the Work which are required because of acceptance of defective Work or correcting defective Work;

c) Changes in the Contract Price or Contract Time, or both, which are agreed to by the parties; and

d) Changes in the Contract Price or Contract Time, or both, which embody the substance of any written decision rendered by the Governing Board pursuant to the paragraph entitled "Claims" of these General Conditions provided that, in lieu of executing any such Change Order, an appeal may be taken from any decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, the Contractor shall carry on the Work and adhere to the progress schedule.

The District and the Contractor will execute appropriate Change Orders prepared by the Engineer covering changes in the Work to be performed as provided in the paragraph entitled "Differing Site Conditions," and Work performed in an emergency as provided in the paragraph entitled "Emergencies" and any other Claim for a change in the Contract Time or the Contract Price which is approved by the parties.

14.3 CONSTRUCTION CHANGE DIRECTIVES

The District may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Price and Contract Time being adjusted accordingly.

A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

If the Construction Change Directive provides for an adjustment to the Contract Price, the adjustment shall be based on one or more of the methods provided in Section 14.5.

Upon receipt of a Construction Change Directive, the Contractor shall promptly, but in no event more than ten (10) days after receipt, proceed with the change in the Work involved and advise the Engineer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Price or Contract Time.

A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Price and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be deemed as a Change Order.

Pending final determination of the total cost of a Construction Change Directive to the District, amounts not in dispute for such changes in the Work shall be included in applications for payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Engineer will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Price on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Section 14.6.

When the District and Contractor agree with the determination made by the Engineer concerning the adjustments in the Contract Price and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

14.4 SURETY NOTIFICATION

It is the Contractor's responsibility to notify the Surety of any changes affecting the general scope of the Work or change in the Contract Price and the amount of the applicable bonds shall be adjusted accordingly. The Contractor will furnish proof of such adjustment to the District.

14.5 CHANGE OF CONTRACT PRICE

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to the Contractor for performing the Work. All duties, responsibilities, and obligations assigned to or undertaken by the Contractor shall be at the Contractor's expense without change in the Contract Price.

If the Contractor wishes to make a Claim for an increase in the Contract Price, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 12.1.

If the Contractor believes that additional cost is involved for reasons including but not limited to (1) a written interpretation by the Engineer, (2) an order by the District to stop the Work where the Contractor was not at fault, (3) a Field Order (4) failure of payment by the District, (5) termination of the Contract by the District, (6) District's suspension, or (7) other reasonable grounds, a Claim shall be filed in accordance with Section 14.6.

The Contract Price may only be changed by a Change Order, Construction Change Directive or Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the Claim to the other party and to the Engineer promptly (but in no event later than ten (10) days) after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered within thirty (30) days after the start of such occurrence or event (unless the Engineer allows additional time for Claimant to submit additional or more accurate data in support of the Claim) and shall be accompanied by Claimant's written statement that the adjustment Claimed covers all known amounts to which the Claimant is entitled as a result of said occurrence or event. All Claims for adjustment in the Contract Price shall be initially reviewed by the Engineer in accordance with the paragraphs entitled "Claims" of these General Conditions. No Claim for an adjustment in Contract Price will be valid unless submitted in accordance with this paragraph.

The value of any Work covered by a Change Order, Construction Change Directive or of any Claim for an adjustment in the Contract Price shall be determined in one of the following ways:

a. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved;

b. By a mutually agreed lump sum; or

c. The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the Work plus a fixed amount (Contractor's fee) to be agreed upon but not to exceed fifteen (15%) percent of the actual cost of such Work to cover the cost of general overhead and profit.

Whenever the cost of any Work is to be determined pursuant to subparagraphs b. or c. above, the Contractor will submit in form prescribed by the Engineer an itemized cost breakdown together with supporting data.

The term Cost of the Work means the sum of all costs necessarily incurred and paid by the Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by the District, such costs shall be in amounts no higher than those prevailing at the locality of the Project.

The Contractor, in connection with any proposal he makes for a Contract modification, shall furnish a price breakdown, itemized as required by the District. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all materials, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all Work involved in the modification, whether such Work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification therefore, shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the District.

14.6 CLAIMS AND CLAIMS DISPUTES

Claims must be initiated by written notice to the other party with a copy to the Engineer. The responsibility to substantiate the Claim shall rest with the party making the Claim.

Claims shall be referred initially to the Engineer for analysis and a non-binding recommendation. The Engineer shall provide his analysis and non-binding recommendation to both parties within a reasonable amount of time, not to exceed thirty (30) days, unless otherwise agreed by the parties. Upon receipt of the Engineer's analysis and non-binding recommendation, the Contractor and the Executive Director shall meet and attempt in good faith to negotiate a mutually acceptable resolution of the Claim. If the parties successfully negotiate a mutually acceptable resolution, the terms shall be documented by a Change Order or Written Amendment, as appropriate, and signed by both parties.

If the parties fail to reach a mutually acceptable resolution of the Claim, the Claimant shall have the right to have the Claim reviewed by the Governing Board. The Claimant shall file a written request for Governing Board review within thirty (30) days of the termination of negotiations. The Governing Board shall review the Claim at the next available regularly scheduled Governing Board meeting. The decision of the Governing Board shall be final and binding on the parties.

Pending final resolution of a Claim, except as otherwise agreed in writing or as otherwise provided in the General Conditions, the Contractor shall proceed diligently with performance of the Contract and the District shall continue to make payments in accordance with the Contract Documents.

14.7 TIME EXTENSION

The Contract Time or milestones may only be changed by a Change Order, Construction Change Directive or Written Amendment. The Contractor's right to proceed shall not be terminated nor the Contractor charged with liquidated damages and associated District expenses if the delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the District, acts of another Contractor in performance of a contract with the District, fires, floods, epidemics, quarantine restrictions, strikes, embargoes, unusually severe weather, or delays of Subcontractors or suppliers arising from unforeseeable causes beyond the control and without fault or negligence of both the Contractor and such Subcontractor or suppliers.

Any request by the Contractor for an extension of the Contract Time shall be based on a written notice delivered by the Contractor to the Executive Director with a copy to the Engineer promptly (but in no event later than ten (10) days) after the start of the occurrence or event giving rise to the request. The notice shall state the number of calendar days being requested and the reason (or reasons) for the need for the additional time. The Engineer shall promptly investigate the stated reasons for the time extension, and shall render a non-binding opinion as to whether such reasons cause an increase in the time required for, performance of any part of the Work under this Contract and shall make a non-binding recommendation for an adjustment to the Contract Time. Contractor and the Executive Director shall meet and discuss the Engineer's recommendation and shall attempt to negotiate a mutually acceptable adjustment. If the Contractor and the Executive Director reach agreement, the terms of the adjustment shall be documented by a Change Order If the Executive Director finds that a change to the Contract Time is warranted but the Contractor does not agree with the proposed adjustment to the Contract Time, the Executive Director may issue a Construction Change Directive. If the Contractor disagrees with the Executive Director's findings regarding the non-existence of grounds for a time extension or the Executive Director's proposed adjustment of the Contract Time, if any, the Contractor may file a Claim in accordance with Section 14.6 of these General Conditions within 30 days of receipt of the Executive Director's determination.

No Claim for an extension of the Contract Time will be valid if not submitted in accordance with this paragraph.

ARTICLE 15 - TERMINATION AND SUSPENSION

15.1 TERMINATION FOR CAUSE

The District may terminate the Contract if the Contractor:

a. Persistently or repeatedly refuses or fails to supply enough skilled Workers or proper materials;

b. Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

c. Disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;

d. Is adjudged bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency;

e. Repeatedly or consistently fails to meet project schedules;

f. Otherwise is guilty of substantial breach of a provision of the Contract.

When any of the above reasons exist, the District may, without prejudice to any other rights or remedies of the District and after giving the Contractor and the Contractor's Surety seven (7) days written notice, terminate employment of the Contractor and may, subject to any prior rights of the Surety:

a. Take possession of the site and all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

b. Accept assignment of subcontracts; and

c. Finish the Work by whatever reasonable method the District may deem expedient.

When the District terminates the Contract for one of the reasons stated in this paragraph, the Contractor shall not be entitled to receive further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds costs of finishing the Work as determined by the District, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the District. This obligation for payment shall survive termination of the Contract. Upon a final determination that the termination was improper, it will be deemed converted to a termination for convenience and the Contractor's remedy for a wrongful termination will be limited to recovery of profit for the completed Work and reasonable termination costs.

15.2 TERMINATION FOR CONVENIENCE

The performance of Work under this Contract may be terminated by the District in accordance with this clause in whole, or from time to time in part, whenever the Engineer shall determine that such termination is in the best interest of the District. Any such termination shall be affected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination become effective. After receipt of a Notice of Termination, and except as otherwise directed by the District, the Contractor shall:

a. Stop Work under the Contract on the date and to the extent specified in the Notice of Termination;

b. Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;

c. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;

d. Assign to the District, in the manner, at the times, and to the extent directed by the District, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the District shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the District, to the extent required, which approval or ratification shall be final for all the purposes of this clause;

f. Transfer title and deliver to the District, in the manner, at the times, and to the extent, if any, directed by the District: The fabricated or unfabricated parts, Work in process, completed Work, supplies, and other material produced as a part of, or acquired in connection with, the performance of the Work terminated by the Notice of Termination, and the completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the District;

g. Use best efforts to sell, in the manner, at the times, to the extent, and at the price directed or authorized by the District, any property of the types referred to in (f) above; provided , however, the Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at a price or prices approved by the District; and provided further, the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the District to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the District may direct;

h. Complete performance of such part of the Work as shall not have been terminated by the Notice of Termination; and;

i. Take such action as may be necessary, or as the District may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the District has or may acquire an interest.

After receipt of a Notice of Termination, the Contractor shall submit to the District his termination Claim, in the form and with certification, prescribed by the District. The Contractor and the District may agree upon the whole or any part of the amount to be paid to the Contractor by reason of the total or partial termination of Work pursuant to this clause. This amount may include a reasonable allowance for profit on Work not performed, provided that such agreed amount, exclusive of settlement costs, shall not exceed the total Contract price as reduced by the amount of payments otherwise made and as reduced by the estimated cost of the Contractor's overhead and administrative expenses for Work not performed, and as further reduced by the Contract price of Work not terminated. The Contract shall be amended accordingly, and the Contractor shall be paid the agreed amount in accordance with the Section entitled "Payment to Contractor."

15.3 SUSPENSION OF WORK

The District may, with or without cause, order the Contractor in writing to suspend, delay, or interrupt the Work, in whole or in part, for such period of time as the District may determine. An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance caused by suspension, delay, or interruption.
No adjustment shall be made to the extent:

a. That performance is, was, or would have been so suspended, delayed, or interrupted by another cause for which the Contractor is responsible; or

b. That an equitable adjustment is made or denied under another provision of this Contract.

Adjustments made in the cost of performance may have a mutually agreed, fixed, or percentage fee.

ARTICLE 16 – PAYMENT AND COMPLETION

16.1 INSPECTION AND ACCEPTANCE

All Work shall be subject to inspection and test by the District at all reasonable times and at all places prior to

acceptance. Any such inspection and test is for the sole benefit of the District and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the Work strictly complies with the Contact requirements. No inspection or test by the District shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material or Work in place prior to acceptance and shall not in any way affect the continuing rights of the District after acceptance of the completed Work.

The presence or absence of a District Observer does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the Specifications without the District's written authorization.

The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the Work performed under the Contract conforms to Contract requirements. The Contractor shall maintain complete inspection records and make them available to the District (within fifteen [15] days upon request). All Work shall be conducted under the general direction of the Engineer and is subject to District inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract.

The Contract shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Engineer. The District may charge to the Contractor any additional cost of inspection or test when Work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The District shall perform all inspections and tests in a manner that will not unnecessarily delay the Work. Special, full size, and performance tests shall be performed as described in the Contract.

The Contractor shall, without charge, replace any material or correct any workmanship found by the District not to conform to the Contract requirements, unless the District consents to accept such material or workmanship with an appropriate adjustment in Contract price. The Contractor shall promptly segregate and remove rejected material from the premises. If the Contractor does not promptly replace rejected material or correct rejected workmanship, the District:

a. May, by Contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or

b. May terminate the Contractor's right to proceed in accordance with the paragraph of this section entitled "Termination for Default."

The Contractor shall furnish promptly, without additional charge, all facilities, labor and material reasonable need for performing such safe and convenient inspections and tests as may be required by the District. All inspections and tests by the District shall be performed in such manner as not to unnecessarily delay the Work. The District reserves the right to charge to the Contractor any additional cost of inspection or test when material or Workmanship is not ready at the time specified by the Contractor for inspection or test, or when reinspection or retest is necessitated by Work not complying with the Contract and/or any applicable federal, state or municipal laws, codes and regulations in connection with the prosecution of the Work.

Should it be considered necessary or advisable by the District at any time before acceptance of the entire Work to make an examination of Work already completed, by removing or tearing out the same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material. If such Work is found to be defective or not conforming in any material respect, due to the fault of the Contractor or his Subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such Work is found to meet the requirements of the Contract, an equitable adjustment shall be made in the Contract price to compensate the Contractor for the additional services involved in such examination and reconstruction and, if completion of the Work has been delayed thereby, he shall, in addition, be granted a suitable extension of time.

Unless otherwise provided in this Contract, acceptance by the District shall be made as promptly as practicable after completion and inspection of all Work required by this Contract, or that portion of the Work, that the District determines can be accepted separately. Acceptance shall be final and conclusive, except as regards latent defects, fraud, or such gross mistakes as may amount to fraud or as regards the District's rights under any warranty or guarantee. The District shall evidence acceptance of the Work in writing by approved request for "Final Payment" and by issuance of the Certificate of Final Completion.

16.2 SCHEDULE OF VALUES

The accepted schedule of values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to or provided by the Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

16.3 PAYMENT TO CONTRACTOR

At least ten (10) days before each progress payment is scheduled (but not more often than once a month), the Contractor will submit to the Engineer for review an Application for Payment filled out and signed by the Contractor covering the Work completed during the period covered by the Application for Payment and supported by such documentation as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing by both parties, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation, satisfactory to the District, as will establish the District's title to the material and equipment and protect the District's interest therein, including applicable insurance. The Engineer will, within fifteen (15) days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application for Payment to the District or return the Application for Payment to the Contractor indicating in writing reasons for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application for Payment. The District will, within fifteen (15) days of presentation of an approved Application for Payment, pay the Contractor a progress payment on the basis of the approved Application for Payment less the retainage. The retainage shall be an amount equal to 10 percent of said estimate until 50 percent of the Work has been completed. At 50 percent completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Engineer certifies that the Work is not proceeding satisfactorily but amounts previously retained shall not be paid to the Contractor. At 50 percent completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 10 percent of the value of the Work completed. Upon substantial completion of the Work, any amount retained may be paid to the Contractor. When the Work has been

substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the District are valid reasons for noncompletion, the District may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed or corrected.

16.4 CONTRACTOR'S WARRANTY OF TITLE

The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to the District upon Contractor's receipt of the Payment, free and clear of all Liens; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor or by any other person performing the Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

16.5 APPLICATION FOR PAYMENT REVIEW

The Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by the Engineer to the District based on the Engineer's on-site observations of the executed Work as an experienced and qualified design professional and on the Engineer's review of the Application for Payment and the accompanying data and schedules, that, to the best of the Engineer's knowledge, information and belief, that the Work has progressed to the point indicated; the quality of the Work is generally in accordance with the Contractor Documents (subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent test called for in the Contract Documents and any qualifications stated in the recommendation); and that the Contractor is entitled to payment of the amount recommended. However, by recommending any such payment the Engineer will not thereby be deemed to have represented that exhaustive or continuous on-site observations to check the quality or the quantity of the Work, were made or that the means, methods, techniques, sequences, and procedures of construction were reviewed or that any examination to ascertain how or for what purpose the Contractor has used the moneys paid or to be paid to the Contractor on account of the Contract Price were made, or that title to any Work, materials, or equipment has passed to the District free and clear of any Liens. The Contractor shall make the following certification on each request for payment:

I certify that to the best of my knowledge and belief that all items and amounts herein are correct; that all Work has been performed and/or material supplied in conformance with the Contract Documents, and that the balance due is appropriate for payment.

The Engineer may refuse to recommend the whole or any part of any payment if, in the Engineer's opinion, it would be incorrect to make such representations to the District. The Engineer may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspection or tests, nullify any such payment previously recommended, to such extent as may be necessary in the Engineer's opinion to protect the District from loss because:

a. The Work is defective, or completed Work has been damaged requiring correction or replacement,

b. The Work for which payment is requested cannot be verified,

c. Claims or Liens have been filed or there is reasonable evidence indicating the probable filing thereof,

d. The Contract Price has been reduced because of Modification,

e. The District has been required to correct defective Work or complete the Work.

f. Of unsatisfactory prosecution of the Work, including failure to clean up.

g. Of persistent failure to cooperate with other contractors on the Project and persistent failure

to carry out the Work in accordance with the Contract Documents.

h. Of any other violation of, or failure to comply with, the provisions of the Contract Documents.

Upon completion and acceptance of the Work, the Engineer will issue a Certificate of Final Completion attached to the final Application for Payment that the Work has been accepted by the Engineer under the conditions of the Contract Documents. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the District, will be paid to the Contractor within thirty (30) days of completion and acceptance of the Work.

16.6 SUBSTANTIAL COMPLETION

When the Contractor considers the entire Work ready for its intended use the Contractor shall notify the District and the Engineer in writing the entire Work is substantially complete, except for items specifically listed by the Contractor as incomplete, and request the Engineer issue a Certificate of Substantial Completion. Within a reasonable time thereafter, the District, the Contractor, and the Engineer shall observe the Work to determine the status of completion. If the Engineer does not consider the Work substantially complete, the Engineer will notify the Contractor in writing giving the reasons therefore. If the Engineer considers the Work substantially complete, the Engineer will prepare and deliver to the District a tentative Certificate of Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. The District shall have seven (7) days after receipt of the tentative certificate during which to make written objection to the Engineer as to any provisions of the certificate or attached list. If, after considering such objections, the Engineer concludes that the Work is not substantially complete, the Engineer will within fourteen (14) days after submission of the tentative certificate to the District notify the Contractor in writing, stating the reasons therefore. If, after consideration of the District's objections, the Engineer considers the Work substantially complete, the Engineer will within said fourteen (14) days execute and deliver to the District and the Contractor a definitive Certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as the Engineer believes justified after consideration of any objections from the District. At the time of delivery of the tentative Certificate of Substantial Completion, the Engineer will deliver to the District and the Contractor a written recommendation as to division of responsibilities pending final payment between the District and the Contractor with respect to security, operation, safety, maintenance, heat, utilities, insurance, and warranties. Unless the District and the Contractor agree otherwise in writing and so inform the Engineer in writing prior to the Engineer's issuing the definitive Certificate of Substantial Completion, the Engineers aforesaid recommendation will be binding on the District and the Contractor until final payment. The District shall have the right to exclude the Contractor from the Work after the date of Substantial Completion, but the District shall allow the Contractor reasonable access to complete or correct items on the tentative list.

16.7 FINAL APPLICATION FOR PAYMENT

After the Contractor has completed all remaining work and corrections as stated on the punch list to the satisfaction of the Engineer and delivered all maintenance and operating instruction, schedules, guarantees, bonds, certificates of inspection, as-built Project Drawings, marked-up record documents and other documents — all as required by the Contract Documents, and after the Engineer has indicated the Work is acceptable — the Contractor may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the District) of all liens arising out of or filed in connection with the Work. In lieu thereof and as approved by the District, the Contractor may furnish receipts or releases in full; an affidavit of the Contractor that the releases and receipts include all labor, services, material and equipment for which the District or the District's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the Surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, the Contractor may furnish a bond or other collateral satisfactory to the District to indemnify the District against any lien. The Contractor shall not be required to provide any releases or waivers from claimants provided that the Payment Bond has been recorded and delivered in accordance with Section 5.1 and the Surety has provided the District with a written consent regarding the Project in accordance with Section 255.05(11), Florida Statues and such written consent has not been revoked.

16.8 USE AND POSSESSION PRIOR TO COMPLETION

The District shall have the right to take possession of or use any completed or partially completed part of the Work. Such possession or use shall not be deemed an acceptance of any Work under the Contract. If such prior possession or use by the District delays the progress of the Work or causes additional expense to the Contractor, an equitable adjustment in the Contract price or the time of completion will be made, and the Contract shall be modified in writing accordingly.

16.9 OTHER CONTRACTS

The District may undertake or award other contracts for additional Work, and the Contractor shall fully cooperate with such other contractors and District employees and carefully coordinate his own Work to such additional Work as may be directed by the District. The Contractor shall not commit or permit any act that will interfere with the performance of Work by any other contractor or by District employees.

16.10 MATERIAL AND WORKMANSHIP

Unless otherwise specifically provided in this Contract, all equipment, material and articles incorporated in the Work covered by this Contract are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this Contract, reference to any equipment, material, article or patented process, by trade name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article or process which, in the judgment of the District, is equal to that named. The Contractor shall furnish to the District, for his approval, the name of the manufacturer, the model number and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment that the Contractor contemplates incorporating in the Work. The Contractor shall furnish the District, for approval, full information concerning the material or articles that he contemplates incorporating in the Work. When so directed, samples shall be submitted for approval at the Contractor's expense. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection. All Work under this Contract shall be performed in a skillful and workmanlike manner. The District may, in writing, require the Contractor to remove from the Work any employee the District deems incompetent, careless, or otherwise objectionable.

16.11 WARRANTY

The Contractor warrants to the District that all materials and equipment furnished under this Contract will be new and that all Work will be of good quality free from faults and defects and is in conformance with the Contract. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the District, the Contractor shall furnish satisfactory evidence as to the kind and quality of the materials and equipment. Any Work, equipment or materials that, within one (1) year from the date of substantial completion as determined by the District, is not in conformance with the Contract or is otherwise found to be defective, must be corrected or replaced, at Contractor's expense.

16.12 WORK AND STORAGE AREAS

All operations of the Contractor, including storage of materials upon District premises, shall be confined to areas authorized or approved by the District. Temporary buildings, storage sheds, shops, offices, etc., may be erected by the Contractor only with the approval of the District and shall be built with labor and materials furnished by the Contractor without expense to the District. Such temporary buildings and utilities shall remain the property of the Contractor and shall be removed by him at his expense upon the completion of the Work. With the written consent of the District, such buildings and utilities may be abandoned and need not be removed.

The Contractor shall, under regulations prescribed by the District, use only established roadways or construct and use such temporary roadways as may be authorized by the District. Where materials are transported in the prosecution of the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by a federal, state, or local law or regulations. When it is necessary to cross curbing or sidewalks, protection against damage shall be provided by the Contractor and any damaged roads, curbing or sidewalks shall be repaired by, or at the expense of the Contractor.

The Contractor shall not store materials, except those to be incorporated in the Work, on the Project site. Portions of completed Work and materials incorporated in the Work shall be deemed to have become the property of the District, but if any such materials or parts of the Work become lost, damaged, or destroyed by any means whatsoever, the Contractor shall satisfactorily repair and replace the same at his own cost. The Contractor shall be responsible for any materials of construction stored on the site, and shall replace, in kind, any such materials lost, damaged, or destroyed at his own expense.

The Contractor shall maintain, where and when needed, suitable and sufficient guard signs and barriers, and at night, suitable and sufficient lights for the prevention of accidents. Guard signs and lights shall comply with OSHA, FDOT, and Coast Guard regulations. Lights shall be shielded or directed to minimize unwanted light pollution.

The Contractor shall clear from within the limits of the District's Work area all objectionable debris necessary to conduct the Work operations. The Work area shall, at all times, be kept free from accumulation of waste material or rubbish, and prior to completion of the Work, all rubbish, tools, equipment and materials shall be removed from, on or about the site.

Upon completion of the Work specified herein and before acceptance and final payment shall be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish and temporary structures. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily. Any salvaged material not specified to be disposed of otherwise, shall become the property of the Contractor and shall be removed from the site.

16.13 TAX EXEMPTION

The District is exempted from payment of Florida State Sales and Use taxes and Federal Excise tax. The Contractor, however, shall not be exempted from paying Florida State Sales and Use taxes to the appropriate governmental agencies or for payment by the Contractor to supplier for taxes on materials used to fulfill its Contractual obligations with the District.

The Contractor shall be responsible and liable for the payment of all of its FICA/Social Security and other taxes resulting from this Contract.

16.14 RECORDS

The Contractor shall maintain records and the District shall have inspection and audit rights as follows:

a. Maintenance of records: The Contractor shall maintain all financial and non-financial records and reports directly or indirectly related to the negotiation or performance of this Contract including supporting documentation for any service rates, expenses, research or reports. Such records shall be maintained and made available for inspection for a period of five (5) years from completing performance and receiving final payment under this Contract.

b. Examination of records: The District or its designated agent shall have the right to examine in accordance with generally accepted governmental auditing standards all records directly or indirectly related to this Contract. Such examination may be made only within five (5) years from the date of final payment under this Contract and upon reasonable notice, time, and place.

   Records that relate to any litigation, appeals, or settlements of Claims arising from performance under this Contract shall be made available until a final disposition has been made of such litigation, appeals, or Claims.

c. Cost and pricing data: The Contractor, by executing this Contract, certifies to truth-in-negotiation, specifically that wage rates and other factual unit costs supporting the consideration are accurate, complete, and current at the time of Contracting. The Contractor agrees that the District may adjust the consideration for this Contract to exclude any significant sums by which the consideration was increased due to inaccurate, incomplete, or non-current wage rates and other actual unit costs. The District shall make any such

adjustment within one (1) year following the termination of this Contract.

16.15 PUBLIC ACCESS

The Contractor shall allow public access to all project documents and materials in accordance with the provisions of Chapter 119, Florida Statutes. Should the Contractor assert any exemptions to the requirements of Chapter 119 F.S. and related statutes, the burden of establishing such exemption, by way of injunctive or other relief as provided by law, shall be upon the Contractor.

16.16 NONDISCRIMINATION

The Contractor hereby assures that no person shall be excluded on the grounds of race, color, creed, national origin, disability, age or sex from participation in, denied the benefits of, or otherwise be subjected to discrimination in any activity under this Contract. The Contractor shall take all measures necessary to effectuate these assurances.

16.17 FORCE MAJEURE

Notwithstanding any provisions of this Contract to the contrary, the parties shall not be held liable if performance of this Contract is prevented by fires, floods, strikes, embargoes, acts of the public enemy, unusually severe weather, outbreak of war, restraint of Government, riots, civil commotion, or acts of God, to the extent that the same are unforeseeable, unavoidable through the exercise of due care, not in existence or effect at Date of Contract, and beyond the control of the party seeking relief under this section. The existence of the Covid-19 pandemic shall not be deemed a force majeure event except in the event that the Federal, State or local government issues an order prohibiting construction in the nature of the Work. Increased cost of compliance with Federal, State or local government statutes, regulations or orders intended to prevent or limit transmission of Covid-19 shall not be deemed a force majeure event.

ARTICLE 17 – VALUE ENGINEERING

17.1 GENERAL

The Contractor is encouraged to develop, prepare, and submit Value Engineering Proposals (VEP's) voluntarily. The Contractor shall share in any Contract savings realized from accepted VEP's in accordance with the paragraph below.

17.2 VEP PREPARATION

As a minimum, the Contractor shall include in each VEP the information described in subparagraphs 1 through 8 below:

1. A description of the difference between the existing Contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

2. A list and analysis of the Contract requirements that must be changed if the VEP is accepted, including any suggested specification revisions.

3. A separate, detailed cost estimate for: 1) the affected portions of the existing contact requirement, and 2) the VEP. The cost reduction associated with the VEP shall take into account the Contractor's costs. including any amount attributable to subcontracts under the paragraph below.

4. A description and estimate of costs that District may incur in implementing the VEP, such as test and evaluation, operating, maintenance and support costs.

5. A prediction of any effects the proposed change would have on the operating costs of the District.

6. A statement of the time by which a Contract amendment accepting the VEP must be issued in order to achieve the maximum cost reduction, noting any effect on the Contract completion time.

7. Identification of any previous submissions of the VEP, including the dates submitted, the Contract numbers involved, and previous District actions.

8. Any design change to the plans and specifications must be prepared under the supervision of a Professional Engineer in the State of Florida at the Contractor's expense. Such changes shall adhere to Florida law and the Florida Board of Professional Engineer's rules for taking over or modifying another Engineer's work. The Contractor will submit signed and sealed drawings and calculations to the District's Engineer (and if applicable, the project's Engineer of Record) for approval. Drawings and calculations will be signed and sealed by a professional Florida Engineer.

17.3 SUBMISSION

The Contractor shall submit VEP's to the Engineer.

17.4 EXECUTION

The Engineer shall notify the Contractor of the status of the VEP within fourteen (14) calendar days after Engineer receives it. If additional time is required, the Engineer shall provide the reason for the delay and the expected date of the decision. The District will process VEP's expeditiously; however, it shall not be liable for any delay in acting upon a VEP.

If the VEP is not accepted, the Engineer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VEP, in whole or in part, at any time before it is accepted by the District. The Engineer may require that the Contractor provide written notification before undertaking significant expenditures for VEP effort.

Any VEP may be accepted, in whole or in part, by the District's execution of an amendment to this Contract citing this clause: the District may accept the VEP, even though an agreement on price reduction has not been reached, by issuing the Contractor a Construction Change Directive to proceed with the change. Until a Construction Change Directive is issued, or a Contract amendment applies a VEP to this Contract, the Contractor shall perform in accordance with the existing Contract. The District's decision to accept or reject, all or part of any VEP, shall be final and not subject to the Disputes clause or otherwise subject to litigation.

17.5 SHARING

The Contractor's share of savings is determined by subtracting District's costs (i.e. test and evaluation, operating, maintenance and support costs, etc.) from Contract savings and multiplying the result by fifty percent (50%).

Payment of any share due the Contractor for use of a VEP on this Contract shall be authorized by an amendment to this Contract to accept the VEP and reduce the Contract price by the amount of the Contract savings. This amendment will also add the Contractors share of savings to the Contract Price.

The Contractor is encouraged to include an appropriate Value Engineering clause in any subcontract and to share any cost savings with its Subcontractors.

Substitution of materials and/or equipment in lieu of that specified shall not necessarily be considered a VEP. To be considered as a VEP, the substitution must involve cost savings other than a simple reduction in price of the equipment or materials.

ARTICLE 18 – RESPONSIBILITIES

18.1 DISTRICT'S RESPONSIBILITIES

Except as otherwise provided in these General Conditions, the District will issue all communications to the Contractor through the Engineer.

The District will furnish the data required of the District under the Contract Documents promptly and shall make payments to the Contractor promptly when they are due as provided in these General Conditions.

Unless otherwise indicated, the District's duties in respect of providing lands and easements are set forth elsewhere in these General Conditions.

In addition to the District's rights to request changes in the Work in accordance with the section entitled "CHANGES IN THE WORK" of the General Conditions, the District will be obligated to execute necessary Change Orders.

The District will not supervise, direct or have control or authority over, nor be responsible for, the Contractor's means, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with Laws and Regulations applicable to the performance of the Work. The District will not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

18.2 ENGINEER'S RESPONSIBILITIES

a. District's Representative

The Engineer will be the District's representative during the construction period. The duties and responsibilities and the limitations of the authority of the Engineer as the District's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of the District and the Engineer.

b. Visits to the Site

The Engineer will make visits to the site on a regular basis at intervals appropriate to the various stages of construction as the Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and quality of the various aspects of the Contractor's executed Work. Based on information obtained during such visits and observations, the Engineer will endeavor for the benefit of the District to determine, in general, if the Work is proceeding in accordance with the Contract Documents. The Engineer's efforts will be directed toward providing the District a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, the Engineer will keep the District informed of the progress of the Work and will endeavor to guard the District against defects and deficiencies in the Work.

The Engineer's visits and on-site observations are subject to all the limitations on the Engineer's authority and responsibility set forth in these General Conditions, and particularly, but without limitation, during or as a result of the Engineer's on-site visits or observations of the Contractor's Work the Engineer will not supervise, direct, control or have authority over or be responsible for the Contractor's techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work.

c. Clarifications and Interpretations

The Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the Engineer may determine necessary, which shall be consistent with the intent or reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on the District and the Contractor. If the District or the Contractor believes that a written clarification or interpretation justifies an adjustment in the Contact Price or the Contract Time, the District or Contractor may make

a written Claim therefore as provided in these General Conditions. The Engineer and the District shall not be held responsible for all ambiguities (latent and patent) found in the Contract Documents.

ARTICLE 19 - SUPPLEMENTARY CONDITIONS

19.1 CONSTRUCTION DRAWINGS AND SPECIFICATIONS DISTRIBUTION

The Contractor will be supplied with four (4) copies of the Project Drawings and Specifications. Additional copies can be obtained by the Contractor at reproduction cost. The Contractor shall have one (1) set of the Project Drawings and Specifications at the job site at all times.

19.2 “AS-BUILT” CONTRACT DRAWINGS

The Contractor shall maintain a separate set of full-size Contract Drawings, marked up in red, to indicate as-built conditions. These Drawings shall be maintained in a current condition at all times until completion of the Work and shall be available for review by the Engineer at all times. All variations from the Contract Drawings, for whatever reasons, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail utilized in the Contract Drawings. Upon completion of the Work, the marked-up Drawings shall be furnished to the Engineer prior to acceptance of the Work. The Engineer reserves the right to withhold final payment until acceptable as-built Contract Drawings have been submitted.

19.3 RETAINAGE INVESTMENT

The retainage amount withheld in the Contractor’s Application for Payments shall be invested by the District at the current rate provided by the State Board of Administration for the duration of the Project. If the Project is completed within the time limits specified and at the Contract Price specified, subject to any authorized modification thereto, the interest earned on the retainage shall be paid to the Contractor. Any expenses charged by the financial institution for the retainage investment account will be deducted from the interest earned on the account. Payment of the interest to the Contractor shall be made with the final payment, after the Engineer certifies the Work, including incomplete minor items remaining after substantial completion, has been completed within the time specified and within the current Contract Price. If the Contractor does not satisfy the time and/or price conditions, the District will retain the interest earned on retainage.

--End of Section--

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

THERE ARE NO SUPPLEMENTARY CONDITONS FOR THIS PROJECT.

--End of Section--

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SECTION 00 73 19

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This specification covers the requirements for safety and occupational health requirements for the protection of the Contractor, Engineer personnel, property and other resources.

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 National Standards Institute (ANSI)

ANSI A10.32	Personal Fall Protection - Safety Requirements for Construction and Demolition Operations
ANSI Z359.1	Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ANSI/ASSE A10.34	(2001) Protection of the Public on or Adjacent to Construction Sites

B. American Society of Mechanical Engineers (ASME)

ASME B30.22	(2000) Articulating Boom Cranes
ASME B30.3	(1996) Construction Tower Cranes
ASME B30.5	(2004) Mobile and Locomotive Cranes
ASME B30.8	(2004) Floating Cranes and Floating Derricks

C. National Fire Protection Association (NFPA)

NFPA 10	(2002) Portable Fire Extinguishers
NFPA 241	(2000) Safeguarding Construction, Alteration, and Demolition Operations
NFPA 70	(2005) National Electrical Code
NFPA 70E	(2004) Electrical Safety in the Workplace

D. U.S. Army Corps Of Engineers (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements

E. U.S. National Archives and Records Administration (NARA)

29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

A. Accident Prevention Plan (APP)

1. Submit the APP to the Engineer for information only 15 calendar days prior to the date of the preconstruction conference for acceptance.

B. Accident Reports

1. Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

1.4 SITE QUALIFICATIONS, DUTIES AND MEETINGS

A. The Contractor is solely responsible for ensuring the safety of the premises and to protect its employees, Subcontractors, invitees, and all other persons during the course of the Work. The District or Engineer will not supervise, direct or have control or authority over, nor be responsible for, the Contractor's means, sequences or procedures to implement safe working conditions, or for any failure of the Contractor to comply with Laws and Regulations applicable to safety.

B. Personnel Qualifications

1. Site Safety and Health Officer (SSHO)

a. Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person can be the SSHO on this project. The SSHO shall meet the following requirements:

1) A minimum of 5 years safety work on similar projects.
2) 30-hour OSHA construction safety class or equivalent within the last 5 years.

2. Crane Operators

a. Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacitates of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane operators (i.e., union, a government agency, or and organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

3. Site Safety and Health Officer (SSHO)/Superintendent Personnel Duties

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

C. Meetings

1. Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract.

2. Safety Meetings

a. Safety meetings shall be conducted and documented as required by EM 385-1-1. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractor's daily report.

1.5 ACCIDENT PREVENTION PLAN (APP)

A. The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Engineer considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing

the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

B. Submit the APP to the Engineer 15 calendar days prior to the date of the preconstruction conference.

C. The APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Engineer, until the matter has been rectified.

D. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Engineer, project superintendent, SSHO and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Eliminate/remove the hazard. In the interim, all necessary action shall be taken to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ANSI/ASSE A10.34,) and the environment.

E. Copies of the accepted plan will be maintained at the Contractor's field office and at the job site.

F. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.6 ACTIVITY HAZARD ANALYSIS (AHA)

A. Contractor shall conduct Activity Hazard Analysis (AHA) in a format and in accordance with USACE EM 385-1-1. The analysis should be used during daily Contractor inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

B. The AHAs will be developed by the Contractor, supplier or subcontractor and provided to the prime contractor.

1.7 SITE SAFETY REFERENCE MATERIALS

A. Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.8 EMERGENCY MEDICAL TREATMENT

A. Contractors will arrange for their own emergency medical treatment. Engineer has no responsibility to provide emergency medical treatment.

1.9 REPORTS

A. Accident Reports

1. For recordable injuries and illnesses, and property damage accidents resulting in at least $2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Engineer within 5 calendar day(s) of the accident. The Engineer will provide copies of any required or special forms.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

A. The Contractor shall comply with USACE EM 385-1-1, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard shall prevail.

B. Fall Protection Equipment and Systems

1. The Contractor shall enforce use of the fall protection equipment and systems designated for each specific work activity when an employee is exposed to a fall hazard. Employees shall be protected from fall hazards as specified in EM 385-1-1, Section 21. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ANSI A10.32.

C. Personal Fall Arrest Equipment

1. Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

D. Existing Anchorage

1. Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ANSI Z359.1. Exiting horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

E. Horizontal Lifelines

1. Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

F. Guardrails and Safety Nets

1. Guardrails and safety nets shall be designed, installed and used in accordance with EM 385-1-1 and 29 CFR 1926 Subpart M.

G. Rescue and Evacuation Procedures

1. When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.2 EQUIPMENT

A. Material Handling Equipment

1. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

B. Weight Handling Equipment

1. Cranes and derricks shall be equipped as specified in EM 385-1-1, Section 16.

2. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.

3. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

4. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.

5. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 Section 11 and ASME B30.5 or ASME B30.22 as applicable.

6. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.

7. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

8. All employees shall be kept clear of loads about to be lifted and of suspended loads.

9. The Contractor shall use cribbing when performing lifts on outriggers.

10. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

11. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

12. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Engineer personnel.

13. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Engineer personnel.

14. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

3.3 WORK IN CONFINED SPACES

A. The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b) (6). Any potential for a hazard in the confined space requires a permit system to be used.

1. Entry procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 06.I.06 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

2. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.

-End of Section-

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SECTION 00 73 19A

DRUG-FREE WORKPLACE FORM

The undersigned vendor in accordance with Florida Statute 287.087 hereby certifies

That _____ does:
(Name of Business)

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation programs, employee assistance programs and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).

4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, plea of guilty or nolo contendere to, any violation of Chapter 1893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

5. Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program, if such is available in the employee's community, by any employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

_____
Contractor's Signature

_____
Date

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SECTION 00 94 63

CHANGE ORDER

Change Order No. _____

Date: _____

Agreement Date: _____

Project Name: _____

Owner: _____

Contractor: _____

The following changes are hereby made to the Contract Documents:

_____

_____

_____

_____

_____

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_____

Justification:

_____

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_____

Change in Contract Price:

Original Contract Price:	$_____
Current Contract Price adjusted by previous Change Order	$_____
The Contract Price due to this Change Order will be (Increased) (Decreased) by:	$_____
The new Contract Price including this Change Order will be:	$_____

Change in Contract Time:

Original Completion Date:	_____
Current completion date adjusted by previous Change Order:	_____
The Contract time due to this Change Order will be (Increased or Decreased) by the indicated number of calendar days:	_____
The new Contract Time including this Change Order will be:	_____

Recommended By: _____

ENGINEER

Authorized Signature: _____ Date: _____

Title: _____

Ordered By: _____

DISTRICT EXECUTIVE DIRECTOR

Authorized Signature: _____ Date: _____

Title: _____

Approved By: _____

DISTRICT EXECUTIVE CHAIR

Authorized Signature: _____ Date: _____

Title: _____

Accepted By: _____

CONTRACTOR

Authorized Signature: _____ Date: _____

Title: _____

--End of Section--

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Description

1. This project generally entails the construction of a dredged material management area (DMMA) for the Florida Inland Navigation District.

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

   a. Clearing and grubbing
   b. Constructing stabilized roads
   c. Constructing the earthen dike and associated gravel blanket-drain system
   d. Constructing toe swale, perimeter ditches and associated retention pond
   e. Fabricating and installing three steel box weirs and mass concrete foundation, and furnishing and installing a mobile weir board storage container
   f. Fabricating and installing an aluminum access walkway and associated concrete footers to service the weirs
   g. Installing HDPE solid wall pipe and HDPE corrugated drain pipe
   h. Installing drainage pipeline and associated concrete manholes
   i. Installing various instrumentation/monitoring equipment including nested monitoring wells, piezometers, settlement plates and associated components.
   j. Establishing grass

3. The Florida Inland Navigation District and their Engineering representative, Taylor Engineering, Inc., will administer the entirety of this project.

B. Location

1. The BV-4B project area, located in Brevard County, Florida (Township 21S; Sections 16,20, & 21; Range 35E), lies South of Cuyler Street and West of Hammock Road.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

--End of Section--

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SECTION 01 29 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes requirements to be used for the basis of measurement and payment. The Contractor shall receive and accept the compensation provided in the Bid Schedule as full payment for furnishing all materials, labor, tools and equipment for performing all operations necessary to complete the Work under the Contract. Payment for all loss or damages arising from the nature of the Work, or from the action of the elements or any unforeseen difficulties, encountered during the Work until final acceptance by the Owner is also included in the compensation provided in the SECTION 00 41 63A BID SCHEDULE.

B. Bid prices for the various work items are to establish a total price for completing the project in its entirety. The Contractor shall include in the Bid, any item for which a separate pay item has not been established in the Bid Schedule, to reflect the total price for completing the project in its entirety, as depicted on the Project Drawings and specified herein. Unless there is a specific line item for administrative costs, such as Project Management, Quality Control and Safety, allocate such costs proportionally across all line items. The Contractor must include all costs for this project to complete all work, in total, designated in the project drawings, specifications, and bid schedule.

1.2 SUBMITTALS

The following submittals shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES. Bring the following administrative submittal items to the Preconstruction Meeting:

A. Schedule of Values

1. The Contractor will submit a printed schedule on Contractor's standard form in electronic printout for review and approval prior to the first Payment Application by the Engineer. List payment items sequentially in the same order as they appear in the Bid Form.

2. Lump sum items are to have adequate breakdown of components to facilitate evaluating completeness for payment. Breakdown components shall appear directly under the payment item heading to which they apply.

3. The Contractor will revise the schedule to list approved Change Orders, with each Application for Payment. The Contractor will submit revised Schedule of Values in accordance with this specification.

B. Construction Schedule:

1. Prepare draft Construction Schedule for Preconstruction Meeting. Within 10 days after effective date of contract prepare and submit to the Engineer for approval a construction schedule in the form of a progress chart. The Contractor shall indicate on the progress chart, the bid items contained in the contract, showing the amount of the item and its relative weighted percentage of the total contract. The Contractor may separate features of work under each item to show salient work elements such as procurement of materials, plants, and equipments, and supplemental work elements such as excavation,

reinforcing steel, backfill, etc. These salient features shall total to the cost and weighted percentages shown for the major bid item. When quantity variations impact the weighted percentages of a separate item by five percent or more, the Contractor shall revise the contract progress charts to accurately reflect the impact of such variations.

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

A. Construction Submittals

1. Revised Construction Schedule:

a. Submit copies of the updated construction schedule to the Engineer for each Payment Application. Changes that have occurred since the last update shall be clearly marked.

1.3 MEASUREMENT

A. Measurement for Payment for this Project is based upon completion of the Work in accordance with Project Drawings and Specifications for each of the items. Field measurements will determine the percent complete of work components when listed on the approved Schedule of Values. Measurements will be made using linear, area, volumetric units, or by units quantity counts, as listed on the SECTION 00 41 63A BID SCHEDULE for unit quantity items and at the Engineer's sole discretion for lump sum items.

B. The Contractor will take all measurements and compute quantities. The Engineer will verify measurements and quantities as appropriate.

C. The Contractor will assist the Owner by providing necessary equipment, workers, and survey personnel as required.

D. Measurement Devices:

1. Weigh Scales: Inspected, tested, and certified by the applicable State Weights and Measures department within the past year.
2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
3. Metering Devices: Inspected, tested, and certified by the applicable State department within the past year.

E. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord, in feet and hundredths of a foot.

F. Measurement by Area: Measured by square dimension using mean length and width or radius, in feet and hundredths of a foot.

G. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness, in feet and hundredths of a foot.

H. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.4 UNIT PRICE CONTRACT

A. Unless indicated on the Contract Documents, all work indicated on the Project Drawings and specified in the Bid Documents and Contract shall be included in the Contract Sum indicated on the Bid Form.

B. Prices stated in the Bid Schedule shall include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the Work as depicted on the Project Drawings and specified herein. The basis of payment for an item in the amount shown in the Bid Schedule shall be in accordance with the description of that item provided in this Section.

C. The Contractor's attention is again called to the fact that the quotations for the various items of work are intended to establish a total price for completing the Work in its entirety. Should the Contractor feel that the cost for any item of work has not been established by the Bid Form or Payment Items, the Contractor shall include the cost for that work in another applicable bid item, in order that the Proposal for the project reflects the total price to be paid by the Owner for completing the Work in its entirety.

D. Changes in the Contract Price and Contract Time require prior authorization in writing from the Owner and the Engineer, in the form of a Change Order or Work Change Directive. The Contractor is responsible for verification of all bid quantities and to report to the Engineer any discrepancies found prior to ordering materials and/or equipment for construction. Refer to SECTION 00 72 00 GENERAL CONDITIONS.

1.5 BASIS FOR PAYMENTS

A. The various major items of Work will be paid for either by 1) the quantity of the actual Work complete by the Contractor and accepted by the Engineer multiplied by the unit price or 2) the lump sum amount indicated for each Bid Schedule Item. The Work shall include all miscellaneous and ancillary items necessary to construct a complete and functional Project.

1.6 SCHEDULE OF VALUES

A. The below descriptions generally outline the scope of work required for those elements of the Work to be paid for under each item listed in the Schedule of Bid Items. The Contractor shall submit a Schedule of Values per SECTION 00 72 00 GENERAL CONDITIONS and shall be consistent with SECTION 01 33 00 SUBMITTAL PROCEDURES.

1.7 PAYMENT ITEMS

A. Basis of Payment for Unit Price Items

1. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer determine payment.

2. If the actual Work requires more or fewer quantities than those quantities indicated, the Contractor will provide the required quantities at the unit prices contracted.

3. If the actual Work requires a fifty percent (50%) or greater change in quantity than those quantities indicated, the Owner or Contractor may claim for a Contract Price adjustment for that item.

B. Basis of Payment for Lump Sum Items

1. Payment for lump sum items for this Project will be made at the lump sum price named in the Contract. The contract price shall constitute full compensation for each item, including all required labor, products, tools, equipment, plant, transportation, services and incidentals, erection, application or installation of an item of the Work, overhead and profit as required to complete the item as indicated in the Project Drawings and Specifications.

C. Progress Payments

1. One progress payment will be made upon completion of mobilization to the site.

2. Subsequent progress payments will be made upon receipt and acceptance of surveys used for progress payments. Surveys will be evaluated based on the volumetric change. The Contractor is required to have all surveys performed by a Florida licensed professional surveyor.

3. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by a unit price of the item. Final payment for unit price Work will be accomplished by reconciliation Change Orders to adjust quantities at the end of the Project.

4. No payment, partial or complete, will be made for defective or rejected Work.

5. No separate payment will be made for additional labor and materials required for accomplishing the Project in its entirety. All labor, materials, and incidental costs shall be included for payment as part of the Proposal and the Contract, under the several scheduled items of the Project.

1.8 DESCRIPTION OF WORK ITEMS AND SCHEDULE OF VALUES

A. The following Work items are described in order to assist the Contractor in the preparation of the Proposal and to assist the Engineer in the evaluation of Bids and evaluation of progress payments during construction. The Contractor shall submit a Schedule of Values containing the work components of each Bid Item of the Proposal for approval prior to the first Payment Application for Payment for work in progress.

B. No separate payment will be made for any testing and/or surveying performed to complete the Work; costs for testing and/or surveying (as applicable), are included in the cost to complete the work item.

C. Submittals are considered part of the Contractor’s administrative and overhead costs. The Contactor will not be compensated separately for submittals required by these specifications or those listed on the Project Drawings.

D. Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated there with shall be included in the applicable unit prices or lump-sum prices contained in the Bid Schedule.

E. For the purpose of the work items listed below, complete installation will mean the inclusion of demolition work, site restoration to existing or better conditions, and testing, all included in the cost to complete the work item (as applicable).

F. All work shall be completed in accordance with all applicable permits and owner requirements.

G. In general, payment for lump sum bid items will be paid based on the percentage of work complete as estimated by the Engineer and will include all cost associated with and incidental to the work.

H. In general, payment for unit price items will be paid based on the measured quantity of work complete as approved by the Engineer and will include all cost associated with and incidental to the work. Where it is not practical to measure quantities, the quantity shall be estimated by the Engineer.

I. All earthwork volume quantities determined by the Contractor's surveyor shall be subject to review by the Engineer. The Contractor shall provide the Engineer with the AutoCAD files including all digital terrain surfaces, point files, and other information as necessary to review and verify the quantities determined by survey. In case of a discrepancy between the Contractor supplied quantities and the quantities determined by the Engineer, the Engineer shall make the final determination of which quantity to use for final payment.

J. Attached is a list of **selected** work items that the opinion of the Engineer, require clarification on the exact method of partial and/or final payment. This list is not intended to be a complete and all-inclusive record of the required work items. Items include:

1. Insurance – Payment will be as a lump sum (LS) for costs associated with and incidental to acquiring and maintaining the appropriate insurance requirements for this project as listed in SECTION 00 73 00 SUPPLEMENTARY CONDITIONS. Sixty percent (60%) of the lump sum payment will be payable to the Contractor upon completion of the mobilization at the work site with the remaining forty percent (40%) payable upon the completion of demobilization.

2. Mobilization and Demobilization - Payment for this item will be made as a lump sum (LS) for costs associated with or incidental to mobilization, demobilization, and establishment of initial project management and coordination. Sixty percent (60%) of the lump sum payment will be payable to the Contractor upon completion of the mobilization at the work site with the remaining forty percent (40%) payable upon the completion of demobilization.

3. Environmental Protection and Erosion Control – Payment will be as a lump sum (LS) for full compensation for furnishing and installing all materials, labor, and equipment required for compliance with all permits and specifications related to environmental protection and erosion control. Forty percent (40%) of the lump sum payment will be payable to the Contractor upon completion of the erosion control measures at the work site with the remaining sixty percent (60%) payable in equal sums for each remaining payment application.

4. Earthwork Compacted Fill - Dike, Perimeter Road, Access Roads, and Perimeter Ditch Construction – Payment will be made as a unit price (Cubic Yards) for all costs associated with or incidental to earthwork as shown on the Project Drawings. These prices shall include all excavation, transportation, placement and compaction of on-site materials, and providing and maintaining access to the work site. Payment for dike construction will be full compensation for the complete installation of the Work, including dewatering, excavation, placement, grading, compaction, and all other operations necessary to properly install and compact the dike, perimeter road, perimeter ditches, access ramps and other earthwork fill as defined in the Drawings and Specifications.

   The Contractor is advised that this bid quantity reflects the Engineer's estimate of the proposed on-site fill volume compacted to the density required in the Specifications. The unit price payment will be payable as the earthwork fill volume surveyed and calculated by the Contractor and verified by the Engineer. **The Contractor's approved dike foundation and site payment survey will serve as the base surface for earthwork fill calculations.**

The final as-built survey shall be performed after all earthwork is complete and all topsoil has been placed. This final as-built survey will serve as the final payment survey and final determination of earthwork quantities.

The volume of topsoil and blanket drain material will NOT be included in the cubic yardage calculated for payment for earthwork compacted fill. Or put differently, the Engineer WILL DEDUCT the volume of topsoil and blanket drain material from the calculated earth fill amount for payment under this line item.

The Engineer's volume estimate of blanket toe drain gravel and blanket toe drain concrete sand as shown in the description column of the bid schedule will be used as the volume of blanket drain material deducted from the final earthwork payment.

5. Topsoil Stripping, Stockpiling and Placement – Payment will be made as a unit price (Cubic Yards) for all costs associated with or incidental to stripping, stockpiling, and installation of topsoil as described in the Specifications and Project Drawings. These prices shall include all surveying and testing of topsoil material. Quantities shall be determined by surveying the stockpile of the topsoil before installation.

6. Grassing - Payment will be made as a unit cost (Acres) for the costs associated with and incidental to the grassing. Payment will be full compensation for all labor, material, and other work required to establish the grassing. The District will pay seventy percent (70%) of the total compensation due for grassing establishment upon approval of the completed work after the preliminary inspection. The remaining thirty percent (30%) will be paid at the conclusion of the Grassing Establishment Period. The unit price payment will be payable as the area of grassing surveyed by the Contractor and field verified and approved by the Engineer.

1.9 DEFECTIVE WORK

A. The Contractor shall replace the Work, or portions of the Work, not conforming to specified requirements as directed by the Engineer.

B. If, in the opinion of the Engineer or of the Owner, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the unit or lump sum price for the item will be adjusted to a new price. The adjustment will be performed at the sole discretion of the Owner. The determination for the adjustment will be done by the Engineer, whose determination will be final.

2. The defective Work will be partially repaired to the instructions of the Engineer, and the unit or lump sum price will be adjusted to a new price at the sole discretion of the Owner. The determination for the adjustment will be done by the Engineer, whose determination will be final.

C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the Engineer to assess the defect and identify payment adjustment is final.

E. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.

3. Products damaged in transit, during handling, or due to improper storage.
4. Products not completely unloaded from the transporting vehicle.
5. Products placed beyond the lines and levels of the required Work.
6. Products remaining on hand after completion of the Work.
7. Removing, demolishing, and disposing of rejected Work.
8. Loading, hauling, and disposing of rejected Products.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PAYMENT PROCEDURES

A. Requesting Progress Payment

1. Provide hard copies of supporting invoices and quantity measurements to support all requested earnings. Ensure that sum of payment activities do not exceed contract award funding amounts.

B. Options and Modification

1. When additional work is added by modification, existing funding amounts must be updated, or new line items for modification will be created. If contract has option line item not yet awarded, option line item will appear as zero dollars until option is awarded by modification. No payment may be requested for Options or Modification until contract modification has been funded and signed.

--End of Section--

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SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall manage the project and coordinate all activities of own employees, subcontractors, suppliers and offsite fabricators. The Contractor shall use computers, e-mail, and internet resources for administrative work and notify Engineer of important meetings, schedule events, and activities. The Contractor shall furnish labor, materials, and equipment required to plan and execute project management functions.

B. The Contractor shall coordinate activities and manage resources to construct the project conforming to the contract, on time and within budget.

1.2 SUBMITTALS

The following submittals shall be submitted in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES. Bring the following administrative submittal items to Preconstruction Meeting:

A. List of Subcontractors

1. Submit a list of proposed subcontractors with company name, person to contact, street address, mail address, email address, phone number, type of specialty and estimated subcontract quote.

B. Signature of Authority

1. Furnish a power of attorney or a notarized letter of authority from Contractor identifying local representatives authorized to sign contract documents.

1.3 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and Work to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner’s partial occupancy.

C. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

D. Work by Others

1. During construction period, others may perform construction or maintenance work within construction limits. The Contractor shall coordinate work by others with Engineer and the District and schedule activities to avoid problems at no additional cost.

1.4 PROJECT MEETINGS

A. The Engineer and the District require the following types of project meetings, all of which are described below:

1. Preconstruction Meeting
2. Construction Progress Meetings

B. Preconstruction Meeting

1. The Engineer will conduct a Preconstruction Meeting for this project. The Preconstruction Meeting will be after Notice of Award (NOA) but prior to Notice to Proceed (NTP). (Refer to subparagraph "Preconstruction Meeting Submittals" below.) The Engineer will notify Contractor of time, place, and agenda. Contractor shall notify key subcontractors and suppliers to attend. The Engineer will discuss contract "ground rules" and general issues including:

    a. Lines of Engineer authority
    b. Lines of Contractor authority
    c. Contract General Conditions
    d. Contract Supplementary Conditions
    e. Contract Administration
    f. Progress Payment
    g. Correspondence Procedures
    h. Project Schedule
    i. Submittal Register
    j. Labor Requirements
    k. General Site Safety

2. Preconstruction Meeting Attendees

    a. Permit Authority Representatives
    b. District Engineer
    c. District Representative
    d. Contractor Representatives

3. Preconstruction Meeting Minutes

4. The Contractor will take detailed minutes of Preconstruction Meeting and may use an audio or video tape. Copies of typed minutes will be provided to the Engineer to review within three working days after the meeting. Audio or video tapes if used will be made available for the Engineer to review.

5. Preconstruction Meeting Submittals

    a. The timing of submission of submittals and completion of the Preconstruction Meeting is intended to allow the Contractor, Engineer, and the District adequate time to prepare for commencement of work. However, should the Contractor fail to submit required items within the times stated, the District may issue NTP prior to receipt of submittals and prior to the Preconstruction Meeting. If the NTP is issued prior to the Contractor's compliance with submittal requirements and prior to the Preconstruction Meeting, the Contractor will not be permitted to commence work until these requirements have been satisfied. Any delays attributable to the Contractor's failure to comply with these pre-work requirements shall be at the Contractor's expense and may be cause for remedial action by the Engineer/the District. Submittals required by this Section are described in paragraph SUBMITTALS above.

6. Other Division 01 Submittals to bring in draft form to Preconstruction Meeting:

    a. Accident Prevention Plan – See SECTION 00 73 19 SAFETY AND OCCUPATION HEALTH REQUIREMENTS
    b. Construction Schedule - See SECTION 01 29 00 MEASUREMENT AND PAYMENT
    c. List of Subcontractors - See SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION
    d. Signature of Authority – See SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION
    e. Submittal Register - See SECTION 01 33 00 SUBMITTAL PROCEDURES
    f. Environmental Protection Plan – See SECTION 01 35 43 ENVIRONMENTAL PROTECTION
    g. Contractor Quality Control Plan - See SECTION 01 40 00 CONTRACTOR QUALITY CONTROL (must be submitted before Preconstruction Meeting)

7. Divisions 02 through 34 Submittals

    a. In addition to the above, bring submittal items for materials, workmanship, plans, or events required early in project schedule that are ready for transmittal to Engineer. Prepare transmittal of submittal items in accordance with SECTION 01 33 00 SUBMITTAL PROCEDURES.
    b. Geotechnical Engineer's Credentials – See SECTION 31 23 00 EXCAVATION, GRADING, AND DIKE CONSTRUCTION.

8. Notice To Proceed (NTP)

    a. NTP will be issued according to the Contract Documents. If the Contractor has failed to submit specified plans, including, but not limited to, Accident Prevention Plan – SECTION 00 73 19 SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS, Environmental Protection Plan and the Turbidity and Water Quality Management and Monitoring Plan - SECTION 01 35 43 ENVIRONMENTAL PROTECTION, and Quality Control Plan – SECTION 01 40 00 CONTRACTOR'S QUALITY CONTROL or has not yet received the Engineer's conditional approval to work under an interim plan, the Contractor shall not proceed with the work and shall consider the work to be suspended in accordance with the SECTION 00 72 00 GENERAL CONDITIONS. While the Contractor is working under a conditionally accepted interim plan, funds may be retained from progress payments in accordance with the SECTION 00 72 00 GENERAL CONDITIONS until the Contractor submits an acceptable plan. If the Contractor does not submit an acceptable plan within a reasonable time, as determined by the Engineer, the Engineer may order the Contractor to suspend work. Any suspension order issued for the Contractor's failure to submit an acceptable plan will not constitute unreasonable delay under the SECTION 00 72 00 GENERAL CONDITIONS and the Contractor will not be entitled to an equitable adjustment of either performance period or contract price.

C. Construction Progress Meetings

1. Construction progress meetings will occur on-site in the job-trailer provided by the Contractor or another near-site location agreed to by all parties. The Engineer will schedule the day of the week and time of the meetings. Meetings will generally occur once every two weeks. As project activities increase ("ramp up"), a minimum of one construction progress meeting per week is typical of a project of this scope. The Engineer will notify the Contractor when and if construction progress meetings will convene weekly.

The Contractor will attend additional meetings as required, or when requested by Engineer.

2. The Contractor will preside over construction progress meetings and will notify any persons who need to be present to discuss agenda issues. Engineer may direct attendance by key Contractor suppliers, or fabricators as needed. A sample meeting agenda is provided in paragraph “GENERAL MEETING REQUIREMENTS” below.

3. The Contractor will take detailed minutes of each Construction Project Meeting and may use an audio or video tape. Copies of typed minutes will be provided to the Engineer to review within three working days of each meeting. Audio or video tapes if used will be made available for the Engineer to review

4. Progress Meeting Participants typically include:

    a. Engineer
    b. Owner Representatives
    c. Contractor's Site Superintendent
    d. Contractor's Quality Control Manager
    e. Contractor's Safety Coordinator
    f. Subcontractors, as appropriate to the agenda
    g. Suppliers, as appropriate to the agenda
    h. Others as appropriate to the agenda

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 GENERAL MEETING REQUIREMENTS

A. Contractor is responsible for phase and construction progress meetings to include:

1. Meeting notification to participants
2. Prepare agenda for meetings
3. Physical arrangements for meetings
4. Preside at meetings
5. Record minutes recording proceedings and decisions
6. Copy and send minutes to:

    a. Meeting participants
    b. Project parties affected by decisions
    c. Engineer (No later than 3 working days)

B. PROGRESS MEETING AGENDA

Modify agenda as needed for on-going work.

1. Review key issues from previous progress meetings
2. Review work progress since previous meeting
3. Review current definable features of work:

    a. Identify phases of current features of work
    b. Identify pending phase changes
    c. Identify features for discussion in next scheduled meeting

4. Discuss problem prevention:

    a. Field observations
    b. Deficiencies and tracking
    c. Procedures working well
    d. Problems, conflicts
    e. Methods to improve

5. Review construction schedule:

    a. Identify delays
    b. Discuss proposed corrective actions to regain schedule

6. Submittals and Requests for Information (design interpretation):

    a. Review submittal register
    b. Identify submittals to expedite as required

7. Review off-site activities:

    a. Fabrications
    b. Material and equipment delivery schedule

8. Review Testing:

    a. Type, Schedule
    b. Received Results

9. Review changes to construction schedule:

    a. Planned progress during succeeding work period
    b. Coordination of various schedules
    c. Effect of changes on construction and completion date

10. Review site safety
11. Discuss maintaining contract quality for materials and workmanship
12. Discuss pending modifications, changes and substitutions
13. Discuss other business, as appropriate

-- End of Section --

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes requirements and procedures for submittals including shop drawings, product data, samples, or other submittals relating to products, and as specified in individual sections.

B. The Contractor shall submit all items listed in this and other Sections of these Specifications. The Engineer may request submittals in addition to those listed when deemed necessary to adequately describe the Work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the Drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with Contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the Contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; Operation and Maintenance manuals including parts list; certifications; warranties and other such required submittals. Submittals requiring Engineer approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

1.2 DEFINITIONS

A. Manufacturer's Instructions: Instructions, stipulations, directions, and recommendations issued in printed form by the manufacturer of a product addressing handling, installation, erection, and application of the product; Manufacturer’s Instructions are not prepared especially for the Work.

B. Shop Drawings: Custom prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects. Shop drawings should provide the appropriate level of detail for the Contractor’s field or fabrication shop personnel to use as the sole reference in building the referenced piece of the Work.

C. Product Data: Standard printed information on materials, products and systems; Illustrations, standard schedules, performance charts, brochures, diagrams and other information to illustrate materials or equipment for some portion of the Work.

D. Samples: Physical examples, which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged. Included are both fabricated and unfabricated physical examples as complete units or as smaller portions of units available for either limited visual inspection or (where indicated) for more detailed testing and analysis.

E. Special Samples: Physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged, and will be incorporated in the Work.

F. Miscellaneous Submittals: Technical reports, administrative submittals, certificates, and guarantees not defined as shop drawings, product data, or samples.

1. Technical reports include laboratory reports, tests, technical procedures, technical records, Contractor's design analysis and Contractor's survey field notes for construction staking, before cross-sections and after cross-sections.

2. Administrative Submittals are those nontechnical submittals required by the Contract Documents or deemed necessary for administrative records. These Submittals include statements of applicability, copies of industry standards, as-constructed data, security/protection/safety data, and similar type Submittals.

3. Certificates and guarantees are those Submittals on Equipment and Materials where a written certificate or guarantee from the manufacturer or Supplier is called for in the Specifications.

4. Reports as required by Contractor describing Contractor's means and methods for items such as dewatering, earth and water retaining, erosion control, and safety plans.

1.3 SUBMITTALS

A. Final Submittal Register

1. Submit final submittal register in accordance with this specification for Engineer approval.

1.4 PROCEDURES

A. Before commencing work, the Contractor will review the Draft Submittal Register attached to this specification as an APPENDIX. The Contractor will review the Submittal Register and note any discrepancies or required additions. The reviewed Submittal Register will serve only as guidance document for submission as the project proceeds. Optional submittals or other submittal requirements not listed on the Submittal Register but described in the test of the Specifications may be required, and the Contractor shall provide these upon request of the Engineer.

B. Unless specifically required to deliver hard copies, Contractor shall deliver all submittals to the Engineer in electronic format via email at the email address listed in Instructions to Bidders.

C. For submittal files too large to send via email, the Engineer will provide the Contractor with an ftp site to upload the electronic submittal to.

D. For submittals that require the seal of a Professional Engineer or Professional Surveyor, the seal and signature shall be clearly visible.

E. When immediate contact is required herein, the Contractor shall contact the Engineer by telephone, unless otherwise instructed.

F. Submit submittals in ample time for review and response.

G. Submit submittals specified or reasonably required for construction, operation, and maintenance of the Work.

H. Deliver submittals under acceptable transmittal form which identifies:

1. Submittal date.
2. Project and Contractor.
3. Subcontractor and major supplier, when appropriate.

4. Reference submittal to Contract Documents by Drawing, detail, and/or Specification section numbers, as appropriate.
5. Variations from Contract Documents when variations are included in submittal.
6. Whether submittal requires approval or is for information only.

1.5 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Submit Shop Drawings, Product Data, Samples, and other pertinent information in sufficient detail to show compliance with specified requirements.

B. Check, verify, and revise submittals as necessary to bring them into conformance with Contract Documents and actual field conditions.

1. Determine and verify quantities, dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.

2. Coordinate submittal with other submittals and with the requirements of the Contract Documents.

C. After completion of checking, verification, and revising, sign and date submittals indicating review and approval; and submit to Engineer.

1. Signature indicates Contractor has satisfied shop drawing review responsibilities and constitutes Contractor's written approval of shop drawing.

2. Shop drawings without Contractor's written approval will be returned for resubmission.

D. Shop Drawings: Engineer will return one (1) electronic copy with reviewer's comments and stamp.

E. Product Data and Manufacturer's Instructions: Excise or cross out non-applicable information and clearly mark applicable information with citations to and terminology consistent with Contract Documents. Engineer will return one (1) electronic copy with reviewer's comments and stamp.

F. Samples: Submit one (1) physical sample (unless otherwise directed) labeled with reference to applicable Contract Documents. Samples will not be returned unless return is requested in writing and an additional sample is submitted.

G. Special Samples: Submit one (1) sample labeled with reference to applicable Contract Documents. Sample will be returned for installation in the Work.

H. The Contractor shall assume all risks of additional expenses and delays when proceeding with work related to required submittals that have not been reviewed and approved.

1.6 MANUFACTURER’S INSTRUCTIONS

A. Submit manufacturer's instructions whenever available and when installation, erection, or application in accordance with manufacturer’s instructions is required by the Specifications.

B. Submit manufacturer's instructions prior to installation, erection, or application of equipment and other project components. Submit manufacturer's instructions in accordance with requirements for Product Data.

1.7 ENGINEER'S REVIEW

A. Engineer's review of submittals shall not release Contractor from Contractor's responsibility for performance of requirements of Contract Documents. Neither shall Engineer's review release the Contractor from fulfilling purpose of installation nor from Contractor's liability to replace defective work.

B. Do not consider submittals as Contract Documents. Purpose of submittals is to demonstrate how Contractor intends to conform to the design concepts.

C. Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents.

1. Engineer's review does not extend to:

a. Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.

b. Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.

c. Safety precautions or programs related to safety, which shall remain the sole responsibility of the Contractor.

D. Except as may be provided in these specifications, a submittal will be returned within 10 business days. When a submittal cannot be returned within that period, Engineer will, within a reasonable time after receipt of the submittal, give notice of the date by which that submittal will be returned.

E. For submittals returned Approved – No further action is required by the Contractor for this submittal; Contractor shall pursue with the Work described by this submittal.

F. For submittals returned Rejected – See All Comments, Contractor shall develop a new submittal package with materials, equipment, methods, etc. that meet the requirements of the Contract Documents.

G. For submittals returned Revise and Resubmit – Make Corrections Noted / See All Comments, Contractor shall incorporate the review comments into a complete revised package, and resubmit it for review.

H. For submittals returned Approved as Noted – No further action is required by the Contractor for this submittal; however, Contractor shall incorporate comments into the Work described by this submittal.

I. For submittals returned Resubmittal Not Required – Make Corrections Noted / See all Comments, Contractor shall incorporate all review comments into the work, but resubmittal of an amended submittal package is not required.

J. For submittals returned Submittal Not Required – Returned without Review, File for Record, no further action is required by the Contractor for this submittal.

K. For submittals returned Submittal Received, for Information Only – File for Record, no further action is required by the Contractor for this submittal.

L. For submittals returned Submit Specified Item – Contractor shall develop a new submittal package with the specified item.

M. Engineer will be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.

N. For submittals returned Rejected or Revise and Resubmit, the Contractor shall submit the subsequent submittal in its entirety so as to ultimately create one accepted submittal document. Submitting partial submittal data as a response to specific questions/comments will not be acceptable and the Engineer reserves the right to reject such partial submittals.

O. Subsequent submittals shall contain the same submittal number as the original submittal; however, the Contractor shall append a suffix number or letter to the subsequent submittal number to identify it as subsequent to the original submittal.

P. Costs incurred by Owner as a result of additional reviews of a particular submittal after the fourth time it has been reviewed shall be borne by Contractor at a rate of $500.00 per subsequent submittal review or the Engineer's actual time spent reviewing the submittal whichever is greater. Reimbursement to Owner will be made by deducting such costs from Contractor's subsequent partial payments.

1.8 MINOR OR INCIDENTAL PRODUCTS AND EQUIPMENT SCHEDULES

A. Shop Drawings of minor or incidental fabricated products will not be required, unless requested.

B. If requested by the Engineer, submit tabulated lists of minor or incidental products showing the names of the manufacturers and catalog numbers, with Product Data and Samples as required to determine acceptability.

1.9 SCHEDULING

A. Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent Drawings shall be so scheduled. Adequate time, a minimum of ten (10) calendar days exclusive of mailing time, shall be allowed on the Submittal Register for review and approval. No delays, damages, or time extensions will be allowed for time lost in late submittals.

1.10 DEVIATIONS

A. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Engineer reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SUBMITTAL REGISTER

A. A draft submittal register has been provided in the appendixes listing each item of material or equipment for which submittals are required by the Specifications. The list may not be all-inclusive and additional submittals may be required. The Contractor shall complete and return

an electronic copy of the Submittal Register to the Engineer for approval within ten (10) business days after the Notice to Proceed has been issued. The approved Submittal Register will become the scheduling document and will be used to control submittals throughout the life of the Contract. The register and the progress schedules shall be coordinated. After initial approval of the Contractors' Submittal Register, the Contractor shall submit an electronic copy of the revised and/or updated Submittal Register, as part of the monthly payment application to the Engineer. The appended Submittal Register is an Excel-based spreadsheet. The Engineer will provide an electronic version of this document to the Contractor upon request.

3.2 SUBMITTALS KNOWN TO BE UNACCEPTABLE

A. The Contractor shall contact the Engineer immediately regarding construction-testing submittals that have failed tests criteria or are otherwise unacceptable.

-- End of Section --

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* RJ- *REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 00 73 19 SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS												
01	00 73 19	Accident Prevention Plan	X		X							
02	00 73 19	Accident Reports			X							
SECTION 01 29 00 MEASUREMENT AND PAYMENT												
03	01 29 00	Schedule of Values	X	X								
04	01 29 00	Construction Schedule	X	X								
05	01 29 00	Revised Construction Schedules		X								
SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION												
06	01 31 00	List of Subcontractors	X		X							
07	01 31 00	Signature of Authority	X		X							
SECTION 01 33 00 SUBMITTAL PROCEDURES												
08	01 33 00	Final Submittal Register	X	X								
SECTION 01 35 43 ENVIRONMENTAL PROTECTION												
09	01 35 43	Environmental Protection Plan and Certification Form	X	X								
10	01 35 43	Erosion and Sediment Control Plan	X		X							
11	01 35 43	Listed Species Requirements	X	X								
12	01 35 43	Copy of Project Permits and Inspection Logs			X							
SECTION 01 40 00 CONTRACTOR QUALITY CONTROL												
13	01 40 00	Quality Control Plan	X	X								
SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS												
14	01 50 00	Mobilization/Demobilization Plan	X		X							
15	01 50 00	Hurricane and Severe Storm Plan	X		X							
16	01 50 00	Temporary Site Facility Drawings	X		X							
SECTION 01 78 00 PROJECT CLOSEOUT												
17	01 77 00	Record Drawings		X								
18	01 77 00	As-Built Drawings		X								
19	01 77 00	Request for Inspection			X							
20	01 77 00	Aerial Photos (if required by permit conditions)			X							

Dredged Material Management Area BV-4B Construction

TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	TYPE: PRECONSTRUCTION SUBMITTAL	TYPE: ENGINEER APPROV	TYPE: INFORMATION ONLY	CONTRACTOR ACTION/SCHEDULE DATES: REVIEWER	CONTRACTOR ACTION/SCHEDULE DATES: SUBMISSION DATE	CONTRACTOR ACTION/SCHEDULE DATES: APPRV NEEDED BY	CONTRACTOR ACTION/SCHEDULE DATES: MATL NEEDED BY	ENGINEER ACTION: DATE	ENGINEER ACTION: APPROVAL CODE	REMARKS
SECTION 03 30 00 CAST-IN-PLACE CONCRETE												
21	03 30 00	Cast-in-Place Concrete Mixture Design	X	X								
22	03 30 00	Concrete Mix Materials	X	X								
23	03 30 00	Concrete Curing Materials and Methods	X	X								
24	03 30 00	Mass Concrete Temperature Monitoring Plan and Concrete Temperature Modeling (if required)	X	X								
25	03 30 00	Steel Reinforcement Shop Drawings	X	X								
26	03 30 00	Ancillary Materials	X	X								
27	03 30 00	Concrete Testing Reports		X								
28	03 30 00	Notice Ready for Inspection			X							
SECTION 31 10 00 SITE CLEARING AND GRUBBING												
29	31 10 00	Vegetative and Rubbish Disposal Verification			X							
SECTION 31 23 00 DIKE AND EARTHWORK CONSTRUCTION												
30	31 23 00	Geotechnical Engineer and Testing Laboratory Credentials	X	X								
31	31 23 00	Manufacturer's Information on Settlement and Pore Water Pressure Instrumentation	X	X								
32	31 23 00	Foundation Preparation Grading Plan	X	X								
33	31 23 00	Dewatering Plan	X	X								
34	31 23 00	Toe/Blanket Drain Material Information	X	X								
35	31 23 00	Water Source for Dike Compaction	X	X								
36	31 23 00	Topsoil Handling and Temporary Storage Plan	X	X								
37	31 23 00	Dike Construction Quality Control Tests and Measurements		X								
38	31 23 00	Pipe Bedding Compaction Tests		X								
39	31 23 00	Dike Foundation and Pre-Payment Site Survey		X								
40	31 23 00	Settlement and Pore Water Pressure Construction Monitoring Data with Operating Manual and Report		X								
41	31 23 00	Pipe Invert Surveys		X								
42	31 23 00	Payment Surveys		X								

APPROVAL CODES:
AP- *APPROVED AS SUBMITTED*
AC- *APPROVED AS CORRECTED*
RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED*
RJ- *REJECTED, DEVELOP REPLACEMENT*
NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW
IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY
SI - SUBMIT SPECIFIED ITEM

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* RJ- *REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
43	31 23 00	Pipe Inspection Video/Report		X								
44	31 23 00	Instrumentation Monitoring Report		X								
SECTION 31 23 33 TRENCHING AND SHORING FOR PIPE INSTALLATION												
45	31 23 33	Trench Shoring Shop Drawings (if required)	X	X								
46	31 23 33	Backfill Compaction Testing		X								
SECTION 32 92 19 GRASSING ESTABLISHMENT												
47	32 92 19	Grass Establishment Plan	X	X								
48	32 92 19	Grassing Material Certificates		X								
49	32 92 19	Grass Watering and Maintenance Records		X								
SECTION 33 05 61 PRECAST CONCRETE MANHOLES AND INLETS												
50	33 05 61	Precast Plant Certification	X	X								
51	33 05 61	Product Information	X	X								
52	33 05 61	Drainage Structures Shop Drawings	X	X								
SECTION 33 40 00 STEEL BOX WEIRS AND ALUMINUM WALKWAY												
53	33 40 00	Mobile Storage Container Information	X	X								
54	33 40 00	Epoxy Anchor Product Data	X	X								
55	33 40 00	Neoprene Bearing Pad Data	X	X								
56	33 40 00	Weir Shop Drawings	X	X								
57	33 40 00	Walkway Shop Drawing	X	X								
58	33 40 00	Weir Coating System	X	X								
59	33 40 00	Welding Certification	X		X							
60	33 40 00	Hardware Product Data	X	X								
61	33 40 00	Aluminum Grating Product Data	X	X								
62	33 40 00	Weir Fabricated Flap Valve Shop Drawings and Material Data	X	X								
63	33 40 00	Weir Flap Gate Mechanical Winch System	X	X								
64	33 40 00	Fabricated Weir Lift Plan	X	X								
65	33 40 00	Weir Board Product Data	X	X								
66	33 40 00	Weir Neoprene Gasket Material and Adhesive	X	X								
67	33 40 00	Weir Shop Inspection Notice			X							
68	33 40 00	Walkway Shop Inspection Notice			X							
69	33 40 00	Weir Coating Inspection Report		X								
70	33 40 00	Certified Steel Mill Reports			X							
71	33 40 00	Certified Aluminum Mill Reports			X							
SECTION 33 46 00 HDPE PIPE												
72	33 46 00	HDPE Solid Wall Pipe Product Information	X	X								
73	33 46 00	HDPE Corrugated Double Wall Pipe Product Information	X	X								
74	33 46 00	HDPE Pipe Shop Drawings	X	X								
75	33 46 00	Leak Testing Plan	X	X								
76	33 46 00	Results of Leak Test		X								
77	33 46 00	Pipe Backfill Compaction Testing		X								

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* *RJ- REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 34 71 00 ROADWAY STABLIZATION												
78	34 71 00	Stabilization Material Supplier	X	X								
79	34 71 00	Compaction Control and Quality Control Tests		X								
SECTION 35 42 37 RIP-RAP AND EROSION PROTECTION STONE												
80	35 42 37	Riprap Product Data	X	X								
81	35 42 37	Stone Test Results	X	X								
82	35 42 37	Filter Fabric Product Data	X	X								
SECTION 40 05 61 RESILIENT WEDGE GATE VALVE												
83	40 05 61	Valve General Information		X								

SECTION 01 35 43

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other Technical Requirements of these specifications. For the purpose of this specification, environmental pollution and damage are defined as the presence of chemical, physical, or biological elements or agents, which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

B. Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. Contractor shall record on daily quality control reports or attachments thereto, any problems in complying with laws, regulations and ordinances, and corrective action taken.

C. Contractor shall comply with all requirements under terms and conditions set forth in the following environmental permits and authorizations for this project:

- **Florida Department of Environmental Protection permit ERP 0344990-001-EI (and Modification)**
- **Army Corps of Engineer's permit SAJ-2016-01811 (IP-JLC) (and Modification)**

Copies of these environmental permits are appended to these Contract Documents. **The Contractor shall familiarize himself and his personnel with these and any other permits required for this project and shall comply with all requirements under the terms and conditions set forth therein. The contractor shall be responsible for any fines resulting from violations of construction conditions set forth in the environmental permits. The Contractor shall include all costs for preparation and submittal of required reporting within each relative bid item.**

It is the Contractor's responsibility to obtain all other relevant Federal, State and local permits (e.g., NPDES permit, dewatering permits, building permits, utility crossing permits, etc.) <u>at no cost to the Owner.</u> The Contractor shall be responsible for any delays and costs resulting from failure to comply with these and all federal, state and local environmental protection laws and regulations.

1.2 SUBMITTALS

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

A. <u>Environmental Protection Plan</u>

Within ten (10) calendar days after Notice to Proceed, the Contractor shall submit in writing an Environmental Protection Plan. The Engineer may, at its discretion, consider an interim plan for

the first 30 days of operations. However, the Contractor shall furnish an acceptable final plan no later than 30 calendar days after receipt of Notice to Proceed. Acceptance of the Contractor's plan shall not relieve the Contractor of its responsibility for adequate and continuing control of pollutants and other environmental protection measures. Acceptance of the plan is conditional and predicated on satisfactory performance during construction. The Engineer reserves the right to require the Contractor to make changes to the Environmental Protection Plan or operations if the Engineer determines that environmental protection requirements are not being met. No physical work at the site shall begin prior to acceptance of the Contractor's Plan or an interim plan covering the work to be performed. The Environmental Protection Plan shall include but not be limited to the following:

1. Methods for protection of features and resources to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., landscape features, surface and groundwater quality, air quality, historical, archeological, and cultural resources.

2. Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall provide written assurance that immediate corrective action will be taken to correct pollution of the environment due to accident, natural causes, or failure to follow the procedure set out in accordance with the environmental protection plan.

3. Methods for protection of Endangered Species (if applicable).

4. Methods for protecting during construction activities.

5. Spill Prevention Plan. The Contractor shall specify all potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, ground, water, wetlands, or drainage areas. The plan shall specify the Contractor's provisions to be taken to meet Federal, State, and local laws and regulations regarding labeling, storage, removal, transport, and disposal of potentially hazardous substances.

6. A statement identifying the Contractor's personnel who shall be responsible for implementation of the Environmental Protection Plan.

7. A Certification Letter must be signed acknowledging the Contractor has a copy of all environmental permits applicable to the project and understand the conditions in the permits. The Certification Letter (see General Forms in APPENDIX) shall be attached to the Environmental Protection Plan.

B. Erosion and Sediment Control Plan

1. The Contractor shall submit an erosion control plan a minimum of ten (10) days prior to start of construction of the DMMA area.

2. The Erosion control plan and installed erosion control measures shall be in accordance with all permit conditions and requirements.

3. If it has been determined that any environmental resources have been damaged due to the lack of proper erosion control measures, the Contractor shall repair any damage and pay any fines at no additional cost to the Owner.

C. Listed Species Requirements

1. Submit work plan for complying with any listed species requirements as outlined in the permit conditions for the Eastern Indigo Snake, Salt Marsh Snake, and if working by barge/boat, the Florida Manatee.

D. Copy of Project Permits and Inspection Logs

1. Submit a copy of each of the permits sought and received by the Contractor.

2. Submit copies of any required inspection logs (e.g., NPDES inspection logs) to the Engineer throughout the Work.

1.3 SUBCONTRACTORS

A. Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

1.4 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

A. Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to insure adequate and continuous environmental pollution control. Quality Control and supervisory personnel shall be thoroughly trained in the proper use of monitoring devices and abatement equipment, and shall be thoroughly knowledgeable of federal, state, and local laws, regulations, and permits as listed in the Environmental Protection Plan submitted by Contractor. Quality Control personnel will be identified in the Quality Control Plan submitted in accordance with SECTION 01 40 00 Contractor Quality Control.

1.5 NOTIFICATION

A. The Engineer will notify the Contractor in writing of any observed noncompliance with the aforementioned federal, state, or local laws or regulations, permits and other elements of the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Engineer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

B. The Contractor shall notify the Engineer, in writing, of the occurrence of environmental incidents.

PART 2 - PRODUCTS

2.1 GENERAL

A. All erosion/turbidity control devises shall be installed pursuant to Chapter 6 of The Florida land Development Manual, A Guide to Sound Land and Water Management, prior to the commencement of the construction activities. The devices shall remain functional at all times.

2.2 SILTATION FENCES

A. The siltation fences shall be geotechnical woven or non-woven fabric conforming to the applicable application requirement of Section 985 of the Florida Department of Transportation "Standards Specifications for Road and Bridge Construction." The type and size of posts and wire mesh reinforcement will be at the option of the Contractor as applicable to the installation conditions.

2.3 EROSION CONTROL MATTING

A. Erosion control matting shall be woven, biodegradable geotechnical fabric. It shall be used to temporarily stabilize channels or steep slopes until vegetation is established. The type selected shall be comparable to the vegetation cover applied for the particular installation. The material shall be stapled in place at 18 inches on center with a minimum matting lap of 4 inches.

2.4 HAY OR STRAW BALES

A. Hay or straw bales shall be individual bales each entrenched 4 inches into the soil. The bales shall be clean, fresh hay or straw. Bales shall be replaced when they become clogged with silt, deteriorate, or after a period of 3 weeks, whichever occurs first. The particular application may require that bales be staked into the ground with rebar.

PART 3 - EXECUTION

3.1 LISTED SPECIES REQUIREMENTS

A. Contractor shall comply with all permit requirements for listed species. Requirements for the Eastern Indigo Snake and Atlantic Salt Marsh Snake are repeated here for the Contractor's convenience. See permit conditions for all requirements. Samples of posters and notifications required for listed species is attached in Appendix G Listed Species Information.

B. Eastern Indigo Snake

1. At least 30 days prior to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov)
2. The Plan materials should consist of: 1) a combination of posters and pamphlets (see Poster Information section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated
3. Posters shall be placed at strategic locations on the construction site and along any proposed access roads (Poster should be printed on 11" x 17" or larger paper and laminated)
4. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss the snake
5. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office
6. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan

7. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting
8. If an eastern indigo snake is discovered during gopher tortoise relocation activities, the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.
9. Periodically during construction activities, the applicant's designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed.
10. Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion

C. Atlantic Salt Marsh Snake

1. Provide educational materials include a combination of posters, videos, pamphlets, and lectures (e.g., an observer trained to identify Atlantic salt marsh snakes could instruct construction personnel before any clearing activities occur).
2. Post informational signs throughout the construction site and along any proposed access road containing a description of Atlantic salt marsh snakes, their habits, and protection under Federal Law.
3. Post instructions not to injure, harass, or kill this species;
4. Give directions to cease activities, and to contact the U.S. Fish and Wildlife Service if an Atlantic salt marsh snake is encountered; and,
5. Provide telephone numbers of pertinent agencies to be contacted if a dead Atlantic salt marsh snake is encountered.
6. Informational posters should be submitted for review as part of the consultation package.
7. An Atlantic salt marsh snake monitoring report must be submitted to the South Florida Ecological Services Office within 60 days of the conclusion of activities. The report should be submitted whether or not Atlantic salt marsh snakes are observed.

D. Caracara

1. Contractor to thoroughly review and adhere to all permit conditions related to the Caracara.

3.2 PROTECTION OF ENVIRONMENTAL RESOURCES

A. General

1. For contract work, the Contractor shall comply with all applicable federal, state, and local laws and regulations. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following paragraphs. Failure to meet the requirements of these Specifications for environmental protection may result in Work stoppages or termination for default. No part of the time lost due to any such Work stoppages shall be made the subject of claims for extensions of time or for excess costs or damages by Contractor. If Contractor fails or refuses to promptly repair any damage caused by violation of provisions of these Specifications, the Owner may have the necessary Work performed and charge the cost thereof to Contractor.

B. Protection of Land Resources

1. Before beginning any construction, Contractor shall identify all land resources to be preserved within Contractor's work area. Contractor shall not remove, cut, deface, injure,

or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without special permission from Engineer. Contractor shall engage a qualified tree surgeon to perform all tree surgery, and shall repair injuries to bark, trunk, branches, and roots of protected trees by dressing, cutting, and painting as specified for Class I Fine Pruning, of the National Arborist Association Pruning Standards for Shade Tree or as per State's Agricultural Extension Agency Guidelines, immediately as occurrences arise. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

2. Work Area Limits

    a. The Contractor’s field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas determined by the Engineer. Temporary movement or relocation of the Contractor facilities shall be made only upon approval by the Engineer.

    b. Prior to any construction, the Contractor shall mark the areas that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area that are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

3. Protection of Landscape

    a. Trees and their roots, shrubs, vines, grasses, land forms, and other landscape features (indicated, defined, and delineated on the Drawings to be preserved, such as wetlands) shall be clearly identified and protected by fencing or any other approved techniques. Place tree protection fencing before excavation or grading is begun and maintain in place until construction is complete.

4. Disturbed Areas

    a. The Contractor shall effectively prevent erosion and control sedimentation through approved methods include, but are not limited to, the following:

        1) Retardation and Control of Runoff: Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, and by any other erosion control measures necessary.

        2) The Contractor shall select, implement, and maintain erosion and sediment control measures as required by local, state, and federal laws and regulations.

5. Location of Field Offices, Storage, and Other Contractor Facilities

    a. Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas approved by Engineer. Temporary movement or relocation of Contractor’s facilities shall be made only on approval by Engineer.

    b. Disposal of Solid Wastes

1) Solid wastes (excluding clearing debris) shall be placed in containers that are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination. The Contractor shall transport all solid waste off the properties within the project limits and dispose of it in compliance with federal, state, and local requirements for solid waste disposal. Discarded materials other than those that can be handled in the solid waste category will be handled as directed by the Engineer.

c. Dispensing of Fuel

Fuel dispensers shall have a 4-foot square, 16-gauge metal pan with borders banded up and welded at corners right below the bib. Edges of the pans shall be 8-inch minimum in depth to ascertain that no contamination of the ground takes place. Pans shall be cleaned by an approved method immediately after every dispensing of fuel and wastes disposed of offsite in an approved area. Should any spilling of fuel occur the CONTRACTOR shall immediately recover the contaminated ground and dispose of it offsite in an approved area.

d. Disposal of Chemical Waste

1) Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local regulations.

e. Disposal of Discarded Materials

1) Discarded materials other than those that can be included in the solid waste category shall be handled as directed.

C. Protection of Water Resources

1. General:

a. The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. The Contractor shall conduct his operations in a manner to minimize and erosion, and shall conform to all water quality standards as prescribed by Chapter 63-302 of the Florida Administrative Code. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities that are included in this contract.

2. Washing and Curing Water

a. Wastewaters directly derived from construction activities shall not be allowed to enter surface water areas. These wastewaters shall be collected and placed in retention ponds where suspended materials can be settled out or the water evaporates so that pollutants are separated from the water.

3. Intertidal Areas and Crossings

a. Intertidal areas and crossings shall be controlled and protected from turbidity runoff during construction. Crossings, to allow for upstream discharge, shall provide movement of water without violating water pollution control standards of the Federal, State, and local government.

4. Monitoring of Water Areas

a. Monitoring of water areas affected by construction activities shall be the responsibility of the Contractor. The Contractor shall monitor all water areas affected by construction activities.

5. Oil, Fuel, and Hazardous Substance Spill Prevention and Mitigation

a. Prevent oil or other hazardous substances from entering the ground, drainage, or local bodies of water. Provide containment, diversionary structures, or equipment to prevent discharged oil from reaching a watercourse. Take immediate action to contain and clean up any spill of oily substances, petroleum products, and hazardous substances. Immediately report such spills to the Engineer. Provide on or more of the following preventive systems at each oil storage site. The provision of such preventive systems shall be approved by the Engineer prior to tank installation and use.

1) Dikes, berms, retaining walls, culverting, curbing, guttering, or other similar structures shall be capable of containing the contents of the largest single tank.

2) Spill diversion ponds shall be capable of containing the contents of the largest single tank.

3) Absorbent materials shall be capable of absorbing the contents of the largest single tank.

b. Oil Storage Tank Installation: All oil storage tank installation shall be constructed so that a secondary means of containment is provided for the entire contents of the largest single tank. Dikes and other structures shall be positioned or located so as to provide a secondary containment identical to that required for non-mobile storage tanks. Storage tanks shall be located where they will not be subject to flooding or washout. When it is determined that the installation of containment structures or equipment to prevent discharged oil from reaching a watercourse is not practicable, a clear demonstration of such impracticability shall be submitted to the Engineer for approval prior to installation or use of the storage tank. The following shall also be provided to the Engineer for approval prior to installation use of the storage tank.

1) An oil spill contingency plan.

2) A written certification of commitment of manpower, equipment, and materials required to expeditiously control and remove the discharge oil.

c. Liabilities: Contractor shall be liable for the damage caused by oil spills when it can be shown that oil was discharged as a result of willful negligence or willful misconduct. The penalty for failure to report the discharge of oil shall be in accordance with state and federal laws.

6. Wetlands Protection

a. The Contractor shall determine the location of wetlands within the project area and adjacent to the project areas from the information contained in the contract documents. The Contractor shall instruct all personnel associated with the project of the presence of wetlands within 1,000 feet of staging areas, access roads or any other areas used during construction activities.

b. All construction personnel shall be advised that there are civil and criminal penalties for harming or destroying wetlands beyond actions specifically identified, anticipated, and authorized in these specifications and associated plans and environmental documents. The Contractor shall erect suitable erosion control barriers at least 30 feet upland and along the entire length of all wetland delineation lines/agricultural canals adjacent to the work site and staging areas, prohibit all access into the wetland, and ensure compliance with the paragraph “Protection of Water Resources” above.

c. The Contractor shall not anchor, place pipelines, or stage equipment in a manner that will cause any damage to wetlands beyond those specifically identified, anticipated, authorized in these specifications and associated drawings and environmental documents. Anchoring, placing pipeline, or staging equipment shall be avoided in wetland areas. If such activities cannot be done without affecting sensitive areas outside the construction area identified in the contract documents, the activities shall cease, and the Engineer shall be immediately notified. Any actual incident involving damage to, or disturbance of, wetlands shall be reported immediately to the Engineer.

d. The Contractor shall provide turbidity curtains, siltation fences, hay bales, and other means and materials to prevent the pollution of any offsite streams, intertidal areas and crossings, lakes, ditches, rivers, and other water improvements including on-site retention areas from siltation from erosion, run off, concrete truck wash, mortar mixer cleanout, and other construction activities. Under no circumstances will material delivery trucks be cleaned out or washed out on FIND property. The Contractor is responsible for arranging for proper clean out facilities.

D. Protection of Wildlife Resources

1. Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of wildlife. Species that require specific attention along with measures for their protection will be listed in the Contractor’s Environmental Protection Plan prior to the beginning of construction operation.

2. In the event that a threatened or endangered species is harmed because of construction activities, the Contractor shall cease all work and notify the Engineer. The Engineer will provide emergency contact information at the Pre-Construction Meeting.

E. Protection of Air Resources

1. The Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the applicable air pollution standards of the State of Florida (Florida Statue, Chapter 403 and others) and all Federal emission and performance laws and standards.

2. Particulates, such as dust, shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and work areas within or outside the project boundaries free from particulates that would cause air pollution standards to be exceeded or that would cause a hazard or nuisance. The Contractor shall have the necessary equipment and approved methods to control particulates as the work proceeds and before a problem develops.

F. Preservation and Recovery of Historic, Archeological, and Cultural Resources

1. Inadvertent Discoveries

    a. If, during construction activities, Contractor observes items that may have historic or archeological value, such observations shall be reported immediately to Engineer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on, removing, or otherwise damaging such resources.

2. Claims for Downtime due to Inadvertent Discoveries

    a. Upon discovery and subsequent reporting of a possible inadvertent discovery of cultural resources, the Contractor shall seek to continue work well away from, or otherwise protectively avoiding, the area of interest, or in some other manner that strives to continue productive activities in keeping with the contract. Should an inadvertent discovery be of the nature that substantial impact(s) to the work schedule are evident; such delays shall be coordinated with the Engineer. Contract adjustments resulting from compliance with this paragraph shall be determined in accordance with the General Conditions.

G. Protection from Sound Intrusions

1. The Contractor shall keep construction activities under surveillance and control to minimize damage to the environment by noise and to comply with all federal, state, and local noise ordinances. The use of horns, bells or the use of whistle signals shall be held to a minimum necessary in order to ensure as safe and as quiet an operation as possible.

3.3 EROSION AND SEDIMENT CONTROL

A. General

1. The Contractor shall install and maintain, for the full period of the construction, silt fence and straw bales at the locations shown on Sheet E-17 of the Permit Drawings. These features shall be coordinated with all applicable construction features to assure the continuous and effective control of erosion and degradation of surface water quality on and adjoining the site. In the event of unforeseen conditions, the Engineer may require the use of control features or methods other than those indicated or proposed by the Contractor.

2. The Contractor may remove the silt fence surrounding the perimeter of the DMMA site upon final grading and grassing of the perimeter ditch and associated berm.

3. The Contractor may remove the silt fence along the bypass road corridor upon final grading and grassing of the bypass road shoulders and ditches.

4. Any adjacent/off-site wetland areas around the perimeter of the DMMA shall be protected from construction activities and construction-related runoff through the use of siltation screening and straw bales. The erosion protection devises shall be placed before the initiation of any ground-disturbing activities and shall remain in place until all ground disturbing activities within the project have concluded, and the site has stabilized, at which time the screening or hay bales shall be removed completely from the site.

B. Maintenance of Erosion Control Features

1. The Contractor shall, at his expense, provide routine maintenance of permanent and temporary erosion control features until the project is completed and accepted. If such erosion control features must be reconstructed due to the Contractor's negligence, carelessness, or in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, such replacement shall be on the Contractor's expense.

2. If the Contractor through any construction activity degrades, destroys, or impacts the ground cover on any adjoining property including rights-of-way, effected area shall be fully repaired and re-vegetated at the Contractor's expense. Where the area affected is undeveloped with no maintained stand of grass, the area shall be sodded with Bahia, and where affected areas are grassed, the sod shall match the applicable vegetative cover.

3.4 POST CONSTRUCTION CLEANUP

A. The Contractor shall clean up any area(s) used for construction.

3.5 DELAYS IN WORK

A. Delays in work due to the fault or negligence of the Contractor or the Contractor's failure to comply with this specification shall not be compensable. Any adjustments to the contract performance period or price that are required as a result of compliance with this section shall be made in accordance with the provisions of the Contract Clause entitled "SUSPENSION OF WORK."

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SECTION 01 45 00

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers the establishment and operation of the Contractor's Quality Control (CQC) system as specified by the General Conditions of the Contract.

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 For Testing and Materials (ASTM)

ASTM D 3740	Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
ASTM E 329	Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.3 SUBMITTALS

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

A. Quality Control Plan

1. Within twenty (20) calendar days of Notice of Award, the Contractor shall submit the Contractor Quality Control (CQC) Plan for review and acceptance by the Engineer prior to the coordination meeting. The District will consider an interim plan for the first twenty (20) days of operation. However, the Contractor shall furnish, no later than twenty (20) calendar days after receipt of the Notice to Proceed, an acceptable final CQC Plan to implement the requirement of paragraph entitled "INSPECTION AND ACCEPTANCE" of SECTION 00 72 00 GENERAL CONDITIONS. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used.

2. If the Contractor fails to submit an acceptable CQC Plan with the time prescribed, construction shall not start unless an acceptable interim plan is submitted and approved. While the Contractor is operating an acceptable interim plan, the Engineer shall retain funds from progress payments until such time as the Contractor submits an acceptable final plan. If an acceptable final plan is not submitted within a reasonable time, and determined by the Engineer, the Engineer may order the Contractor to stop work until such time as an acceptable plan has been submitted and approved. Any such stop work order shall both be considered a suspension of Work for an unreasonable period of time under SECTION 00 72 00 GENERAL CONDITIONS (Article 15) in the paragraph "SUSPENSION OF WORK" and the Contractor shall not be entitled to pay adjustments as a result of the stop work order.

3. Failure to comply with the above requirements within the time prescribed will be considered a condition endangering the performance of the Contract and may be considered grounds for termination of the Contract in accordance with paragraph "TERMINATION FOR DEFAULT", Section 00 72 00 GENERAL CONDITIONS (Article 15, et. al.)

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in accordance with these specifications. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Engineer and/or Owner for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

A. Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

1. A description of the quality control organization. The staff shall include a CQC System Manager who shall perform his duties in tandem with those of the Project Superintendent and with direct reporting responsibility to an officer of the prime Contractor and/or an individual not directly responsible for production. The Project Manager/Superintendent may have dual roles as CQC System Manager or Safety Officer, but may not fulfill all three duties Additionally, a qualified Florida Licensed Professional Land Surveyor is required for all surveys;

2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

3. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

4. A sample of the proposed Quality Control Log.

B. Acceptance of CQC Plan

1. Acceptance of the Contractor's CQC plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the

construction. Engineer reserves the right to require the Contractor to make changes to his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

C. Failure to Submit Acceptable CQC Plan

1. If the Contractor fails to submit an acceptable CQC plan within the time prescribed, construction SHALL NOT start unless an acceptable interim plan is submitted. If an acceptable final plan is not submitted within a reasonable time, as determined by the Engineer, the Engineer may order the Contractor to stop work until such time as an acceptable plan has been submitted. Any such stop work order shall not be considered a suspension of work for an unreasonable period of time as stated in the General Conditions and the Contractor shall not be entitled to pay adjustments as a result of the stop work order. Failure to comply with the above requirements within the time prescribed will be considered a condition endangering the performance of the Contract and may be considered grounds for termination of the Contract in accordance with paragraph "TERMINATION FOR DEFAULT" of SECTION 00 72 00 GENERAL CONDITIONS.

D. Notification of Changes

1. After acceptance of the CQC Plan, the Contractor shall notify the Engineer in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Engineer.

3.3 COORDINATION MEETING

A. After award of the contract, but before physical work starts and before the acceptance by the Engineer of the CQC Plan, the Contractor shall meet with the Engineer or Authorized Representative and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with Owner's Quality Assurance. There may also be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONROL ORGANIZATION

A. General

1. The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Engineer. The organization shall designate a Safety Officer who will serve as a member of the CQC staff and designate a qualified surveyor for quantity measurement.

B. CQC System Manager

1. The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of eight (8) years of experience in related work.

This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager, containing a minimum of three (3) years of experience, shall be identified in the plan to serve in the event of the System Manager's absence.

C. CQC Personnel

1. A staff shall be maintained under the direction of the CQC System Manager to perform all CQC activities. The staff must be of sufficient size to ensure adequate CQC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned CQC responsibilities and must be allowed sufficient time to carry out these responsibilities. The CQC plan will clearly state the duties and responsibilities of each staff member.

D. Registered Land Surveyor

1. A licensed Professional Land Surveyor registered in the State of Florida shall perform all layouts of the work and quantity surveys required to carry out the project work. The Professional Land Surveyor shall certify all drawings, computations, and all other records relating to surveys or layouts of the work.

E. Organizational Changes

1. The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Engineer for acceptance.

3.5 CONTROL

A. The Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

1. Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the Project Drawings

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. Reviews of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for the feature of work.

i. Review requirements under permits, environmental protection, and protection of environmental species.

j. Discussion of the initial control phase (workmanship).

k. This phase shall include a meeting conducted by the CQC System Manager and attended by superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

2. Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of monitoring and survey controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish a level of workmanship and verify that it meets minimum acceptable workmanship standards and review allowable tolerances. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3. Follow-up Phase

a. Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

4. Additional Preparatory and Initial Phases

a. Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable; there are changes in the applicable CQC staff, onsite production supervision or work crew; work on the definable feature is resumed after a substantial period of inactivity; when other problems develop.

3.6 TESTS

A. Testing Procedure

1. The Contractor shall perform specified tests to verify that control measures are adequate to provide an end product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Engineer duplicate samples of test specimens for possible testing by the Owner. Testing includes operations and/or acceptance tests when specified. The Contractor shall procure the services of an Engineer-approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing standard or procedures comply with contract requirements

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instruments calibration data against certified standards

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of tests and monitoring instruments, both passing and failing, shall be recorded for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by Engineer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of test performed by an offsite or commercial test facility shall be provided directly to the Engineer. Failure to submit timely test reports as stated or maintain adequate monitoring testing may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7 TESTING LABORATORIES

A. Capability Check

1. The Owner reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician’s testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329 or shall be FDOT certified.

B. Capability Recheck

1. If the selected laboratory fails the capability check, the Contractor will be assessed a charge to reimburse the Owner for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

C. Onsite Laboratory

1. The Owner reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check Contractor's testing procedures, techniques, and test results at no additional cost to the Owner.

D. Furnishing or Transportation of Samples for Testing

1. Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Owner shall be delivered to Engineer-approved laboratory. Coordination for each specific test, exact delivery location, and dates will be made with the Engineer.

3.8 DOCUMENTATION AND REPORTS

A. The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the following information:

1. Contractor or subcontractor or testing agency performing quality control work.

2. Description of quality control test or work performed that day.

3. If lab testing required submit documentation that lab test are forth coming. Once lab test are available, append lab results to that days quality control work.

4. List deficiencies noted along with corrective action.

5. Instructions give/received and any conflicts in plans and/or specifications.

6. Contractor's verification statement.

B. Submit weekly (or daily if requested by Engineer) a continuous running log (in Excel Spreadsheet format) of quality control testing and quality control actions taken by Contractor and the results of those tests or actions. Quality control log should document subsequent corrective actions taken for failing tests.

3.9 NOTIFICATION OF NONCOMPLIANCE

A. The Engineer will notify the contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. In addition to temporary construction facilities, this section covers temporary utilities, vehicular access and parking, and project identification. The Contractor is responsible for adherence to and reporting requirements for all applicable permit conditions.

B. See SECTION 01 35 43 ENVIRONMENTAL PROTECTION for requirements including silt control, trailer placement, fueling restrictions, dust control, solid waste, and clean-up. Upon completion of project, clean-up and restore area in accordance with SECTION 00 72 00 GENERAL CONDITIONS and SECTION 01 77 00 PROJECT CLOSEOUT.

1. Construction facilities include, but are not limited to, the following:

    a. Contractor's Field Offices
    b. Information Bulletin Board
    c. Material and Equipment Storage Area
    d. Fueling Area
    e. Secured Storage Area
    f. Employee Parking Area
    g. Debris Container (Dumpster)
    h. Construction Signage to include Project Sign; Safety Sign; and Construction Warning Signs

2. Temporary utilities include, but are not limited to, the following:

    a. Water
    b. Electric
    c. Sewage
    d. Communications
    e. Lighting

1.2 REFERENCES

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

A. American National Standards Institute (ANSI)

ANSI C2	(1997) National Electrical Safety Code

B. National Fire Protection Association (NFPA)

NFPA 70	(1999) National Electrical Code

C. U.S. Army Corps of Engineers (USACE)

USACE CESAJR 385-1-1	(1998) Safety and Occupational Health Program

USACE EM 385-1-1 (2003) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.3 SUBMITTALS

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

A. Mobilization/Demobilization Plan

1. Prior to construction, the Contractor shall submit a Mobilization/Demobilization Plan. This plan shall be submitted within 10 calendar days of Notice to Proceed. The Mobilization/Demobilization Plan shall include, but not be limited to, the following:

   a. Mobilization Requirements:

      1) Methods, equipment and materials;
      2) Connection of utilities;
      3) Placement of site facilities and temporary controls; and
      4) Construction of facilities

   b. Demobilization Requirements (methods, equipment, and materials required to clean-up and restore site at project conclusion):

      1) Collection, recycle and disposal of solid waste
      2) Contract-generated material
      3) Utility disconnection
      4) Removal of Contractor facilities
      5) Repair and restoration of site (i.e., fences, roads, or permanent facilities)

B. Hurricane and Severe Storm Plan

1. The Contractor shall prepare a Hurricane and Severe Storm Plan for the Engineer describing the following:

   a. A description of the contractor’s chain of command for implementing the Hurricane and Severe Storm Plan
   b. Methods for securing construction equipment, temporary facilities, construction materials, and constructed items
   c. A description of the contractor’s insurance coverage for damage due to severe weather

C. Temporary Facility Drawings

1. Within 10 calendar days after date of receipt of Notice to Proceed, the Contractor shall submit a general layout sketch of the Contractor's temporary site facilities shall include, but not be limited to, the following:

   a. Traffic control plan (with adjacent landowner at site access point)
   b. Parking areas
   c. Material storage
   d. Equipment lay down area
   e. Fuel areas
   f. Supplemental or other staging areas
   g. Temporary well, water supply

h. Septic field or holding tanks, port-a-lets
i. Fences -- location and dimensions, entrance and exit points, and details of installation

1.4 EXISTING UTILITIES

A. The Contractor is responsible for furnishing all necessary utilities at the project site.

PART 2 - PRODUCTS

2.1 STORAGE CONTAINERS

A. Welded steel construction, locking, shipping containers or equal.

B. Fuel sled - ensure double containment for fuel tank, and electrically grounded and have fire extinguisher station.

2.2 FIELD OFFICE

A. This project requires the Contractor to provide a field office with available space for the District/engineer to work. The field office shall contain continuous wireless internet access throughout the project.

B. The Contractor shall mobilize the field office to the site within (20) twenty days after the NTP and the field office shall remain at the project site until Substantial Completion.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Identification of Employees

1. Contractor and Subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

B. Employee Parking

1. Park employee's vehicles in areas designated by the Owner away from construction traffic, within reasonable walking distance of site. Maintain area free of ruts, mud holes, and puddles. Place gravel where required by deteriorated conditions.

2. Contractor should protect unattended equipment as it may be subject to vandalism.

3. Storage trailers and storage area with the Owner’s material should be locking type with lighting.

C. Onsite Information

1. Keep copy of Project Drawings, specifications, and other contract documents at Contractor's Field Office, available for use at all times.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

A. Install temporary facilities and utilities in accordance with ANSI C2, USACE CESAJR 385-1-1, USACE EM 385-1-1, and NFPA 70. Obtain necessary construction, building, zoning, or soil erosion and sediment control approvals required by local authorities, and utility companies. Equip trailer(s) with wind tie downs in accordance with local wind and building code requirements.

B. Fire Extinguisher

1. Refer to USACE EM 385-1-1. Non-toxic, dry chemical, fire extinguisher meeting Underwriters Laboratories, Inc., approval for Class A, Class B, and Class C fires with a minimum rating of 2A; 10B; and 10C.

C. Utility Lines

1. Install, connect, and modify temporary lines as coordinated with the ~~owning~~ owner. Conform to requirements in accordance with ANSI C2 and NFPA 70 for Temporary Electric Lines. Remove temporary line at completion of project.

3.3 PROJECT SIGN

A. Project Signs

1. A project sign approved by the Owner shall be erected within 15 days after receipt of the Notice to Proceed. Upon completion of the project, the sign shall be removed from the site.

3.4 PROTECTION AND MAINTENANCE OF TRAFFIC

A. During construction, the Contractor shall provide access and temporary roads, as necessary, to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic, on roads selected for hauling material to and from the site, shall interfere as little as possible with the adjacent landowner. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

B. Barricades

1. The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

A. Waste Storage

1. Provide dumpsters or suitable debris containers. Prevent wind blown trash; cover as needed. Dispose of offsite when needed. Refer to SECTION 01 35 43 ENVIRONMENTAL PROTECTION.

B. Fuel Storage and Fueling Operations

1. Refer to SECTION 01 35 43 ENVIRONMENTAL PROTECTION. Provide light when fueling at night.

3.6 SECURITY PERSONNEL

A. When no on-site construction activities are taking place, Contractor shall provide locked gates across all access roads leading onto the property.

B. When on-site construction activities are taking place, Contractor shall:

1. Limit vehicular access to authorized vehicles and personnel only.

2. Check fenced areas, equipment, trailers on a daily basis. If damage is observed or vandalism is found report to the Engineer.

3. Not allow visitors without knowledge of Contractor and permission of the Owner. Direct visitors to report upon arrival to Contractor's Field Office for site safety and accident prevention briefing. Provide visitors appropriate protective equipment (i.e., earplugs, safety glasses, etc.).

3.7 CLEANUP

A. Construction debris, waste materials, packaging material, and the like shall be removed from the work site daily. Any dirt or mud that is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities that are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored. Refer to SECTION 01 35 43 ENVIRONMENTAL PROTECTION for solid waste and post construction clean-up.

3.8 RESTORATION OF STAGING AREA

A. Upon completion of the project and after removal of trailers, materials, and equipment from within the staging area. Areas used by the Contractor for the storage of equipment or material, or other use, shall be landscaped in accordance with SECTION 32 92 19 GRASSING ESTABLISHMENT. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including topsoil and seeding as necessary.

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SECTION 01 77 00

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 SUBMITTALS

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

A. Record Drawings

1. Submit digital scan of record drawings prior to requesting inspection for Substantial Completion.

B. As-Built Drawings

1. Submit PDF of digitally signed and sealed as-built drawings.

2. Submit two (2) CDs containing the electronic AutoCAD drawing files and a PDF printout of the As-Built Drawings.

C. Request for Inspection

1. The Contractor shall notify the Engineer in writing when ready for the substantial completion inspection and the final acceptance inspection. The Owner and Engineer will then set up an appropriate time for inspection.

D. Aerial Photographs

1. If required by permit conditions, submit site aerial photographs on CD or DVD.

1.2 PROJECT RECORD DOCUMENTS

A. Record Drawings:

1. Throughout the project, maintain at least one clean, undamaged full-size hard copy set of Project Drawings for submittal as Record Drawings for Engineer review. Do not use Record Drawings for construction purposes.

2. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.

3. Where Shop Drawings are used, record a cross-reference of the Shop Drawings submittal number at the corresponding location on the Record Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

4. Mark new information that is important to the Engineer and District but was not shown on the Project Drawings or Shop Drawings.

5. Note related Change-Order numbers where applicable.

6. All changes due to field Request for Information (RFI) process, shop drawings reflecting modified data due to submittal and approval process, and contract field and design modifications shall be incorporated in the Record Drawings.

7. Record Drawings shall be kept current on a weekly basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans that are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes.

8. The Engineer and the Contractor will jointly review the Record Drawings for accuracy and completeness prior to submission of each monthly pay estimate.

B. As-Built Drawings:

1. Within fifteen (15) days of Substantial Completion, the Contractor shall complete an as-built survey and submit an As-Built Drawing set of the completed dike, drain pipes, weirs, weir pipes, walkway, roads, ditches, inlets, culverts, fence line, fence gates, edge of clearing, and other construction items as deemed necessary by the Engineer. The as-built survey shall show plan location and elevation of all constructed features including the dike, roadways, weirs, drainage features, and other items. Approval and acceptance of final As-Built Drawings shall be accomplished before final payment is made to the Contractor.

2. The survey shall encompass the entire area within the limits of clearing including the dike/roadway footprints, the interior basin area, and pipeline easement. Transects of the dike footprint and perimeter ditch/road 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 20 ft on center. Transects of the general site or basin area shall be taken at intervals not exceeding 100 ft with individual points taken at all breaks in grade or slope at intervals not exceeding 50 ft. The survey shall be submitted to the Engineer for approval in digital PDF format and in AutoCAD digital format 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. The As-Built Drawing set shall display the constructed dike cross sections superimposed on the Project Drawing sheets displaying the planned dike cross sections. Linework for the constructed features should be bold and easily distinguishable from linework for the designed features. Linework for the designed features shown in the Project Drawings shall be made to plot faded and in the background of the constructed features.

4. On a separate drawing sheet, the Contractor shall overlay the as-built survey over the original drawings plan view showing the location of the dike, weirs, and roadways so that the actual constructed location can be compared with the proposed location shown on the Drawings. The Engineer will provide electronic copies of the Project Drawings in AutoCAD.

5. Each sheet of the As-Built Drawing set shall be clearly marked “As-Built Drawings” and shall be signed and sealed by a licensed Land Surveyor Registered in the State of Florida.

6. As-built survey drawings shall be in AutoCAD 2015 or later format. Survey data shall be in the same horizontal coordinate system and vertical datum used in the project drawings.

7. For unit price bid items determined by survey, the As-Built Survey Drawing set shall show a table with the final construction quantities of each unit price item using the same unit as indicated on the Bid Schedule.

8. The District and Engineer reserves the right to reject any drawing files it deems incompatible with the Engineer's AutoCAD system. Paper prints, drawing files and storage media submitted will become the property of the District upon final approval. Failure to submit final As-Built Drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this contract.

C. Request for Inspection

1. Submit request for inspection to the Engineer.

D. Aerial Photographs

1. If required by FDEP permit conditions, the Contractor shall submit to the Engineer aerial photographs as defined in the permit conditions.

1.3 SUBSTANTIAL COMPLETION

A. The District will consider the project substantially complete upon completion and acceptance of all major construction items and initial placement and growth of the grass. Substantial completion does not need to coincide with the end of the Grassing Establishment Period.

B. Before requesting inspection for Certification of Substantial Completion, complete the following (list exceptions in the request):

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, the Contractor shall demonstrate 100 percent completion for the portion of the Work claimed as substantially complete.

   a. Include supporting documentation required for completion as indicated in these Specifications and a statement showing an accounting of changes to the Contract Sum.

   b. If 100 percent completion cannot be shown (besides grassing establishment), include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

2. Submit partial release of lien for all work performed to date.

3. Submit specific warranties, maintenance agreements, final certifications, and similar documents.

4. Submit Record Drawings, as-built surveys, and similar final record information.

C. Inspection Procedures

1. On receipt of a written request for inspection from the Contractor, the Engineer will schedule the inspection within 21 days or advise the Contractor that the work is not substantially complete. Upon inspection, if the Engineer is of the opinion that any items are not complete, the Engineer will advise the Contractor of construction that must be completed or corrected before the certificate of substantial completion will be issued. If in the opinion of the Engineer, all the major items are complete, the Engineer will issue the notice of substantial completion accompanied by a punch list of minor items that need completion.

2. The Engineer will repeat inspection when requested and assured that the Work is substantially complete.

1.4 FINAL ACCEPTANCE

A. The District will consider the project complete upon completion of the Grassing Establishment Period and with final acceptance of grassing.

B. Before requesting inspection for Certification of Final Acceptance, complete the following:

1. Submit all outstanding submittals.
2. Submit final pay application reflecting all changes in the contract price.
3. Submit final release of liens

C. Inspection Procedures

1. On receipt of a written request for inspection from the Contractor, the Engineer will proceed with inspection within 10 days. After inspection, the Engineer will prepare a punch list of any remaining items that require completion. When the Contractor has completed all items on the punch list to the satisfaction of the Engineer, the Engineer will issue the Certificate of Final Acceptance.

PART 2 - PRODUCTS

2.1 AUTOCAD DRAWINGS

A. The Contractor will be furnished AutoCAD design files. The Contractor shall use the electronic design files provided by the District to prepare changes and additions to the electronic As-Built Drawings.

PART 3 - EXECUTION

3.1 FINAL SITE CLEANUP

A. Perform cleanup to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from Construction work.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris, and rubbish from the site and dispose of at legal disposal areas away from the site.

D. Prior to final completion, or District occupancy, Contractor shall conduct an inspection of the site, and all work areas, to verify that the entire work area is clean.

E. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

F. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the District's

property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

G. Where extra materials of value remain after completion of associated Work, they become the District's property. Store or dispose of these materials as directed by the District.

-- End of Section --

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SECTION 02 41 00

DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes requirements for furnishing the labor, materials, and equipment necessary to complete the demolition and off-site disposal of the items shown in the Drawings.

1.2 DEFINITIONS

A. Engineer: The owner's designated representative for construction oversight.

B. Engineer of Record: The Engineer whose signature and seal is affixed to the Drawings and Specifications; hereafter referred to as Engineer.

1.3 RESPONSIBILITIES AND GENERAL DESCRIPTION OF THE WORK

A. The Contractor shall demolish or relocate/restore items as necessary to accomplish the work.

B. The Engineer assumes no responsibility for actual conditions or dimensions of structures to be demolished. The items and plan extent of features to be demolished are shown in the Drawings. Should the Contractor identify additional features which require demolition or need further clarification to the extent of demolition required, the Contractor will contact the Engineer prior to commencing said demolition.

C. The Contractor shall be responsible for acquiring appropriate necessary permits for demolition work and disposal of demolition debris.

D. The Contractor shall ensure the safe passage of persons around the area of demolition. The Contractor shall conduct operations to prevent damage or injury to adjacent structures, other facilities, and persons. The Contractor shall protect existing finished work that is to remain in place from damage during the demolition phase.

E. The Contractor shall promptly repair damages caused to adjacent facilities by demolition operations at no cost to the Owner.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION (GENERAL)

A. The Contractor shall demolish and dispose of all items slated for demolition or obviously requiring removal before new work can be installed. Dispose of all material offsite at a licensed landfill in accordance with local, state, and federal laws and regulations.

B. If hazardous materials are found, the Contractor shall notify the Owner and Engineer immediately. If hazardous materials are encountered during demolition operations, the Contractor shall comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution

C. The Contractor shall completely backfill below-grade areas and voids resulting from demolition work. The Contractor shall provide fill consisting of approved soil, gravel or sand (free of trash and debris) and shall compact the fill to the approximate density of in-situ soil.

3.2 HISTORICAL ARTIFACTS

A. The Contractor shall immediately notify the Engineer if any artifact, or other objects of antiquity that have scientific or historical value, or are of interest to the public, are discovered, located, and/or recovered. The Contractor acknowledges that the site(s), articles, or other materials are the property of the State of Florida, with title vested in the Department of State, Division of Historical Resource.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. The Contractor shall remove and dispose of offsite all debris, rubbish, and other materials resulting from demolition operations. Material may be stored in designated areas as approved by the Engineer until removal from the site.

B. The Contractor shall transport demolished materials and properly dispose of them at an approved site according to state, federal and local laws and regulations.

C. The Contractor may not burn combustible products of the demolition operations onsite.

D. The Contractor shall not bury material onsite unless approved in writing by the Engineer.

3.4 CLEANUP AND REPAIR

A. The Contractor shall remove tools, materials, equipment, trash and any demolished materials from the site.

-- End of Section --

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this section includes furnishing all labor, equipment and materials required for the cast-in-place concrete weir foundation, walkway footers, and all ancillary concrete items. This Work shall be accomplished in complete and strict accordance with the Specifications and the applicable Drawings and shall be subject to the terms and conditions of the Contract.

1.2 GENERAL

A. The Contractor is responsible for the mix design and shall proportion the concrete mix for specific project requirements such as travel time, workability, curing methods, pumpability, weather conditions, expected field strength, etc. The Contractor shall notify the Engineer in writing if any of the concrete requirements herein inhibit or prevent the satisfactory installation or strength requirements of the concrete.

B. All concrete work shall comply with ACI 318 Building Code Requirements for Structural Concrete.

C. Concrete work shall comply with ACI 301 Specifications for Structural Concrete including the following, except as modified herein and in the contract documents.

1. General requirements including quality assurance, acceptance of structure, and protection of in-place concrete.

2. Formwork and form accessories.

3. Steel reinforcement and supports.

4. Concrete mixtures.

1.3 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 Concrete Institute (ACI)

ACI 117	Specifications for Tolerances for Concrete Construction and Materials Commentary
ACI 301	Specifications for Structural Concrete
ACI 305R	Hot Weather Concreting
ACI 304.2R	Placing Concrete by Pumping Methods
ACI 304R	Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 306.1	Standard Specifications for Cold Weather Concreting
ACI 308.1	Standard Specifications for Curing Concrete
ACI 309R	Guide for Consolidation of Concrete

ACI 318	Building Code Requirements for Structural Concrete and Commentary
ACI 347R	Guide to Formwork for Concrete

B. American Society for Testing and Materials (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C143	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
ASTM C1107	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)
ASTM C1240	Standard Specification for Silica Fume Used in Cementitious Mixtures

1.4 DEFINITIONS

A. Cementitious Material: As used herein shall include portland cement, pozzolan, fly ash, ground granulated blast-furnace slag, and silica fume.

B. Engineer: The Engineer as designated by the owner in charge of construction oversight.

C. Engineer of Record: The Engineer whose signature and seal is affixed to the Drawings and Specifications; hereafter referred to as Engineer.

D. Pozzolan: A silicious or aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

E. Compressive Strength: Compressive strength of concrete at 28 days per ASTM C39 using standard cylinders.

F. Mass Concrete: For purposes of this project, the Engineer has defined the weir concrete foundation as mass concrete. The weir foundation will comply with all requirements herein for mass concrete.

1.5 PRECONSTRUCTION SUBMITTALS

The Contractor shall provide the following submittals for Engineer approval at least 14 days (unless otherwise noted) prior to ordering materials or casting concrete:

A. Cast-in-Place Concrete Mixture Design

1. Submit a detailed design of all concrete mixtures showing the amounts and types of cement, water, fly ash, pozzolans, corrosion inhibitor, slag, aggregates, admixtures, and other components of the mix for each mix required.

B. Concrete Mix Materials

1. Submit manufacturer's information or test reports demonstrating that materials meet referenced ASTM specifications and that the mix design will be suitable for the job conditions. Submittals shall include the following where applicable:

   a. Fly Ash: Submit manufacturer's data or certification demonstrating that fly ash and pozzolans comply with ASTM C618 type F.

   b. Silica Fume: Submit manufacturer's data or certification demonstrating that silica fume complies with ASTM C1240.

   c. Blast Furnace Slag: Submit manufacturer's data or certification demonstrating that blast furnace slag complies with ASTM C989.

   d. Aggregates: Submit manufacturer's data or certification that aggregates comply with ASTM C33.

   e. Admixtures, Air-Entraining Agents, and Corrosion Inhibitors: Submit manufacturer's data or certification that concrete admixtures comply with ASTM C494 and that the air-entraining agents comply with ASTM C260. Submit manufacturer's literature and test reports for corrosion inhibitors and anti-washout admixtures.

   f. Cement: Submit manufacturer's data or certification that Portland cement complies with ASTM C150.

C. Concrete Curing Materials and Methods

1. Submit proposed materials and methods for curing concrete member types including the water source. If silica fume is required in the mix design, specify the methods that will be used to ensure proper curing and prevent plastic shrinkage cracking. Also describe how finishing methods will be adjusted or modified for silica fume concrete. If a curing compound will be used, submit manufacturer's information for approval.

D. Mass Concrete Temperature Monitoring Plan and Concrete Temperature Modeling (if required)

1. If the Contractor proposes a concrete mix design or curing method different from the one listed in this specification for mass concrete, the Contractor shall submit:

   a. Results of concrete curing temperature modeling demonstrating the concrete will not exceed the specified temperature limits.

   b. Submit proposed plan for monitoring the concrete curing temperatures for the weir foundation.

E. Steel Reinforcement and Shop Drawings

1. Submit manufacturer's certification and mill test reports that reinforcement meets ASTM A615 Grade 60 requirements. Provide reinforcement shop drawings showing bending details, lap lengths, bar sizes, and other details of reinforcement placement.

F. Ancillary Materials

1. Submit manufacturer's information on joint material, joint sealant, backer rods, bearing pads, shims, mechanical connections, form ties, chairs, spacers, sealers, epoxy anchors, epoxy adhesive for dowels, grout, patching material, crack repair material, and other items used for concrete and installation of concrete.

1.6 CONCRETE CONSTRUCTION SUBMITTALS

A. Concrete Testing Reports

1. Sample and test the fresh concrete for slump, temperature, air content, and compressive strength. Collect samples of fresh concrete to perform tests specified in accordance with ASTM C31 for making test specimens. Sample and test concrete a minimum of once each day and at least once every 40 cubic yards thereafter. Sample and test any concrete where field or plant personnel add more than 2 gallons of water or add water in excess of the allowable water quantity shown on the batch ticket. The following testing results shall be submitted within 3 business days of test results:

a. Delivery Certification: The Contractor shall ensure that an electronic delivery ticket is furnished with each batch (truckload) of concrete before unloading. The delivery ticket shall include the mix number.

b. Slump Test Results: Perform slump tests in accordance with ASTM C143.

c. Temperature Test Results: Perform temperature tests in accordance with ASTM C1064. The temperature of concrete at time of placement shall not exceed 90 degrees F.

d. Air Entrainment Test Results: Test Concrete for air content in accordance with ASTM C231 or ASTM C173.

e. Compressive Strength Test Results: Sample and conduct strength tests in accordance with ASTM C39.

B. Notice of Ready for Inspection

1. Submit notice to the Engineer at least 48 hours in advance of concrete placement that formwork and reinforcement is ready for inspection.

PART 2 - PRODUCTS

2.1 CONCRETE MIX

A. Cement: Cement shall comply with ASTM C150, Type II

B. Fly Ash: Fly Ash shall be a by-product produced from the combustion of coal or powdered coal (not petroleum coke) and shall comply with ASTM C618, Type F.

C. Slag: Slag material shall comply with ASTM C989, Grade 120.

D. Silica Fume: Silica fume material shall comply with ASTM C1240.

E. Water: Water shall comply with the requirements of ASTM C94.

F. Aggregates: Material shall comply with ASTM C33

G. General Admixtures: Air entraining admixtures shall conform to ASTM C260.

H. Water reducing/retarding admixtures shall comply with ASTM C494, Type D.

I. Water reducing admixtures shall comply with ASTM C494, Type A.

J. High range water reducer (HRWR) material shall comply with ASTM C494, Type I,II, F, or G. The use of a high range water reducer is mandatory if silica fume is specified.

2.2 CONCRETE MATERIALS

A. Reinforcement: Reinforcing Bars shall be deformed bars and shall comply with ASTM A615 Grade 60.

B. Chairs and supports shall be constructed of non-corrosive material such as plastic or stainless steel.

C. Form ties or wall ties shall be non-metallic.

D. Grout shall be non-shrink grout conforming to ASTM C1107. Unless otherwise specified, grout shall have a minimum compressive strength of 5000 psi at 28 days.

E. Joint filler shall be closed cell neoprene rubber conforming to AASHTO M153 type I.

F. Joint Sealants: Joint sealants shall be a single or multipart polysulfide or polyurethane sealant recommended by the manufacturer for concrete expansion joints ¾ of an inch wide or wider and meeting the specifications below. Submit manufacturer's information to the Engineer for approval.

1. Horizontal surfaces, 3 Percent Slope, Maximum. Material shall comply with ASTM C920, Type S or M, Class 35 or greater.

2. Vertical Surfaces or horizontal surfaces with greater than 3 Percent Slope. Material shall comply with ASTM C920, Type S or M, Grade NS, Class 35 or greater.

3. Examples of suitable sealants for vertical or sloping joints (non-sag sealant) are Vulkem 921 and Sikaflex 15LM.

G. Backing rods shall be the closed cell polyethylene type complying with ASTM C1330.

H. Bearing pads shall be closed cell neoprene AASHTO grade with a shore durometer hardness of 60. Thickness shall be 1/2 inch unless specified otherwise on the drawings.

I. Steel shims for shimming beam bearing locations and other structural members shall be 316 stainless steel. Shimming shall be limited to 3/8 of an inch in total height unless otherwise approved by the Engineer.

2.3 CONCRETE MIX DESIGN 5500 PSI SILICA FUME FOR WEIR FOUNDATION (MASS CONCRETE)

A. Concrete Mix Design for the Weir Foundation shall be as follows:

Minimum Compressive Strength:	5,500 psi
Minimum Cementitious Materials Content:	650 lb/cy
Maximum Cementitious Materials Content:	810 lb/cy
Maximum Water-to-Cement Ratio:	0.36
Minimum Cement Content:	40%
Fly Ash Content:	45-50%
Silica Fume Content:	7-10%
Corrosion Inhibiting Admixture:	None Required
Max Aggregate Size:	1 inch (#57 stone acceptable)
Air Content:	2-6%
Target Slump:	7-8 inches
High Range Water Reducer Required Yes/No	Yes, Brand and Amount per Contractor
Max Temperature at Time of Placement	90 degrees (add ice if necessary)

2.4 CONCRETE MIX DESIGN 5000 PSI CONCRETE

A. Concrete Mix Design for the walkway footers, drainage inlets and concrete manholes and other items where 5000 psi concrete is specified shall be as follows:

Minimum Compressive Strength:	5,000 psi
Minimum Cementitious Materials Content:	600 lb/cy
Maximum Water-to-Cement Ratio:	0.38
Fly Ash Content:	18-25%
Silica Fume Content:	None Required
Corrosion Inhibiting Admixture:	None Required
Max Aggregate Size:	1 inch (#57 stone acceptable)
Air Content:	2-6%
Target Slump:	3 inches if high range water reducer not used
High Range Water Reducer Required Yes/No	None required by Engineer
Max Temperature at Time of Placement	95 degrees

PART 3 EXECUTION

3.1 CONCRETE FOUNDATION

A. The Contractor shall compact the subgrade beneath concrete structures to 95% maximum density per Modified Proctor unless noted otherwise. The Contractor shall provide a minimum of 2 soil density tests beneath the weir foundation.

3.2 GENERAL CONCRETE NOTES

A. Concrete work shall comply with ACI 318 and local municipal and state building codes. The Contractor shall be responsible for coordinating with local code officials regarding inspection and other requirements including special inspection requirements. The Engineer shall observe and approve all formwork and reinforcement before concrete placement unless otherwise approved by the Engineer in written correspondence (e-mail is acceptable). The Contractor shall coordinate with

the Engineer regarding expected evaluation times and shall give at least 2 full days notice when “ready for evaluation”.

B. Formwork for concrete shall be designed by the Contractor and shall comply with ACI 347R.

C. Reinforcement bending, placement, and detailing shall conform to ACI 318 and CRSI's “Manual of Standard Practice”.

D. Reinforcement Bar Splicing

1. Unless noted otherwise, minimum lap splices for reinforcing bars shall be:

<u>#3 to #6 bars</u>	
Bottom bars:	34 bar diameters
Top, side, and all other bars:	44 bar diameters
<u>#7 and Larger Bars</u>	
Bottom bars:	55 bar diameters
Top, side, and all other bars:	72 bar diameters

E. Cover: Concrete cover for reinforcement shall be 3 inches clear from the outer most piece of reinforcement (including stirrups) unless noted otherwise.

F. Chamfer all exposed concrete edges 1 inch unless otherwise shown on the Drawings.

G. All concrete shall be placed monolithically unless an expansion or construction joint is clearly shown on the drawings.

3.3 PLACING CONCRETE

A. General

1. Concrete shall be placed within 90 minutes of batching or before the truck mounted mixer drum has revolved 300 revolutions unless otherwise approved by the Engineer. Placing of concrete shall be in accordance with the applicable requirements of Chapter 5 of ACI 304R, ACI 304.2R and the requirements of this section.

B. Jobsite Addition of Water

1. Jobsite addition of water to the concrete mix is strictly forbidden unless agreed upon by the Engineer in writing prior to placement. Approval by the Engineer (for adding water) does not guarantee or imply final acceptance of the concrete.

2. Unauthorized jobsite additions of water may result in the concrete being rejected and may require demolition of the concrete at no expense to the Owner or Engineer.

3. If agreed upon by the Engineer, the Contractor shall ensure the following:

a. The Contractor shall hold a pre-concreting conference to establish proper procedures for jobsite addition of water as well as to determine who is authorized to request a jobsite water addition.

b. Jobsite addition of water shall comply with ASTM C94.

c. A minimum of 4 concrete sample cylinders shall be taken and tested after the addition of water to the concrete. The amount of water added and the estimated remaining cubic

yardage of concrete in the truck shall be recorded. This information and the sample (cylinder) numbers shall be supplied to the Engineer within 48 hrs.

d. The addition of water shall not result in exceedance of the maximum w/c ratio or maximum slump.

e. The suppliers batch ticket shall indicate the w/c ratio as batched and clearly indicate the volume of water withheld at the batch plant

f. The ready-mix truck shall contain a visible water meter to accurately quantify the volume of water added at the jobsite

g. The ready-mix truck shall provide an additional 30 revolutions of the mixer drum after the addition of water.

h. When water is added to the concrete at the jobsite, the Contractor's geotechnical/material testing technician in charge of overseeing concrete testing (or the Contractor's geotechnical/material testing engineer) shall be present on the job site and shall record all data as required herein.

C. Transfer from Truck to Forms

1. Transfer concrete from the mixer to the forms as rapidly as practical. Prevent segregation or loss of ingredients. Clean concrete transfer equipment thoroughly before each batch. Do not use aluminum pipe or aluminum chutes. Remove concrete which has segregated during transfer and dispose of as directed.

D. Vibration

1. Comply with the requirements of ACI 309R using vibrators with a minimum frequency of 9,000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used. Provide a spare vibrator at the casting site whenever concrete is placed. Place concrete in 18 inch maximum vertical lifts. Insert and withdraw vibrators approximately 18 inches apart. Penetrate at least 8 inches into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms.

E. Cold Weather

1. Do not mix concrete when the air temperature is below 45 degrees and falling. Comply with ACI 306.1 for cold weather placement. Do not allow concrete temperature to decrease below 50 degrees F.

F. Hot Weather

1. Hot weather concreting shall be defined as placement of concrete when the forecasted high temperatures are predicted to reach 90 degrees F or above within 72 hours of concrete placement. Placement of concrete in hot weather shall comply with the following and with ACI 305R.except as modified herein:

a. The Contractor shall place concrete within 60 minutes of batching for hot weather concreting.

b. The Contractor shall cool the concrete so that the concrete is below 95 degrees F at time of placement. Concrete exceeding 95 degrees F at time of offloading from the truck shall be rejected. Cool concrete by the addition of ice, by cooling aggregates before

mixing or other suitable means. Start continuous moisture curing as soon as the surface of the fresh concrete is sufficiently hard to permit curing without damage. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. For silica fume concrete, the use of high-pressure pressure washers capable of providing an even spray of atomized water over the entire concrete surface during the time from initial set to final set is mandatory. For vertical surfaces, protect forms from direct sunlight, keep forms wet and add water to top of structure once concrete is set.

c. The Contractor shall cure the concrete in accordance with Method 1 or Method 2 in the CURING AND PROTECTION section of this specification.

3.4 MASS CONCRETE TEMPERATURE CONTROL

A. Dimensions for the weir foundation are large enough to qualify as mass concrete and may experience temperature control problems during curing if precautions are not taken. For this member, the Contractor should:

1. Use the concrete mix design requirements for the Weir Foundation (Mass Concrete).

2. Use curing methods for silica fume concrete given in this specification.

3. Apply a curing blanket with and R value of 4 to 5 covering the top and sides of the foundation for 21 days.

B. If the Contractor desires to utilize another mix design or other methods for temperature control of the mass concrete, the Contractor shall:

1. Engage a professional engineer and submit signed and sealed calculations or computer model results demonstrating that the proposed concrete mix design will not exceed 165 degrees during curing nor exceed a 35 degree temperature difference (45 degrees if limestone aggregate is used).

2. Submit a temperature monitoring plan to the Engineer for approval. The temperature monitoring plan shall include a minimum of 7 thermocouples and continuous temperature data collection at 15 minute maximum intervals for a total monitoring period of not less than 12 days and not less than 2 days after the any curing blankets are removed. No temperature monitoring plan is required if the Contractor uses concrete materials, curing blankets and curing methods in accordance with the requirements for mass concrete as specified herein.

3.5 CONCRETE FINISHING

A. Unless noted otherwise, concrete finishes shall be form finished, hand troweled, or in the case of walking surfaces, hand troweled with broom finish. Patch tie-holes and defects. Finishes shall be class 3.

3.6 CURING AND PROTECTION

A. General

1. Concrete shall be cured in accordance with the methods listed below. Concrete shall be cured in accordance with ACI 308.1 except as modified herein. The materials and methods of curing shall be subject to approval by the Engineer. The Contractor is advised that concrete containing silica fume is subject to plastic shrinkage cracking. The Contractor shall take

whatever precautions are necessary to prevent plastic shrinkage cracking. The presence of plastic shrinkage cracking shall constitute a sole reason for rejection of the concrete and non-acceptance.

B. Silica Fume Concrete

1. Fog spraying in accordance with ACI 308.1 shall be utilized between concrete placement and initial set. If wind speeds exceed 10 mph, install wind breaks before fogging and leave in place until fogging has ceased. As soon as concrete has set sufficiently, begin continuous moist curing.

2. Apply continuous moist curing for 72 hours (3 days) followed by 4 days of additional moist curing. Continuous moist curing shall consist of flooding/submersion or continuous sprinkling (sprinklers or soaker hoses) combined with continuous covering using wet burlap. After 72 hours, continue with moist curing methods as described below.

3. Apply moist curing methods for an additional 4 days. Moist curing shall consist of covering with periodic wetting. Periodic covering and wetting shall meet the following requirements. Keep surface of concrete wet. Covering may consist of burlap or clear plastic. Inspect the coverings a minimum of 3 times daily and apply moisture at each inspection as needed.

4. Keep forms wet for entire 7 day curing process or until removal. Surfaces exposed upon removal of forms shall be cured as previously described. Forms covering the bottom surfaces of members shall stay in place for a minimum of 7 days or Contractor shall provide an engineer approved acceptable curing method for bottom surfaces.

C. Mass Concrete Weir Foundation

1. Mass concrete shall be covered with a curing blanket on all sides not in direct contact with the earth. The curing blanket shall be waterproof with an R-value of 4-5 and shall remain in place for 21 days. Formwork shall remain in place until the curing blanket is removed.

D. Concrete Not Containing Silica Fume

1. Concrete shall be moist cured for 7 days. Moist curing shall consist of either continuous moist curing methods (such as flooding/submersion or continuous sprinkling combined with continuous covering using wet burlap) OR shall consist of moist curing by periodic wetting and covering.

2. Periodic covering and wetting shall meet the following requirements. Keep surface of concrete wet. Covering may consist of burlap or clear plastic. Inspect the coverings a minimum of 3 times each day during daylight hours and apply moisture at each inspection as needed.

3. Keep forms wet for entire 7 day curing process or until removal. Surfaces exposed upon removal of forms shall be cured as previously described. Forms covering the bottom surfaces of members shall stay in place for a minimum of 7 days or Contractor shall provide an engineer approved acceptable curing method for bottom surfaces.

E. Liquid Membrane-Forming Curing Compounds (for concrete slabs less than 12 inches in thickness with a surface area exceeding 5000 square feet).

1. Note: Do not use this method of curing if the predicted high temperature during the first 3 days of use is greater than 85 degrees.

2. Apply chlorinated-rubber based curing compound meeting the requirements of ASTM C309 immediately after finishing. Use a power sprayer for fast application and apply curing compound in accordance with the manufacturer's instructions. Forms shall be kept wet until removal. Apply curing compound to all areas where formwork is removed before 7 days. Curing compound shall be removed from all visible surfaces or as instructed by the Engineer. Do not remove curing compound for seven days unless otherwise approved by the Engineer.

3.7 FORMWORK REMOVAL

A. The Contractor shall remove formwork according to the following schedule:

1. For mass concrete, formwork shall remain in place until the curing blanket is allowed to be removed as defined in the MASS CONCRETE TEMPERATURE section.

2. If hot weather concreting as defined in the PLACING CONCRETE section of this specification applies, remove formwork 7 days following placement.

3. If hot weather concreting as defined in the PLACING CONCRETE section does not apply, remove formwork a minimum of 72 hours following placement, or when the compressive strength of the concrete test cylinders meets 70% of the specified compressive strength.

3.8 CONCRETE ACCEPTANCE

A. Acceptance of the concrete shall be determined solely by the Engineer and shall be based on the following criteria:

1. Concrete meeting the specified minimum strength criteria.

2. The absence of structural cracking and/or plastic shrinkage cracks.

3. Good workmanship, lack of honeycombing and concrete meeting placement tolerances.

4. Proper finishing including the grouting of formwork mounting holes, form-tie holes, etc.

5. Proper curing and formwork removal.

6. Proper installation of expansion and construction joints.

7. Installation in accordance with these specifications.

B. Reasons for Rejection of Concrete: Concrete may be rejected based on inadequacies related to the acceptance criteria listed above as determined by the Engineer.

C. Acceptance of concrete strength tests shall be in accordance with section 5.6 of ACI 318.

D. Rejected concrete shall be demolished in accordance with the Engineer's instructions and disposed of offsite at no cost to the Owner.

3.9 CONCRETE REPAIR

A. Form tie holes shall be patched with Non-Shrink Grout complying with ASTM C1107 or other Engineer approved concrete repair material.

B. Damaged or cracked concrete not rejected by the Engineer shall be repaired as specified herein and in general accordance with ACI 546R.

C. If approved by the Engineer, small repairs less than 2 inches deep and less than 12 inches in length shall be repaired using Fivestar EZ-Cure Repair Mortar or Engineer approved equivalent. This product requires no wet curing or curing membranes.

D. For other repairs, the Engineer shall specify or approve all repair methods and repair materials. Repair grouts/mortars shall be non-shrink and shall be wet-cured in accordance with the manufacturer's instructions or shall be epoxy based requiring no wet curing.

3.10 CONCRETE CONSTRUCTION TOLERANCES

A. The surface of the concrete weir foundation shall be installed to within plus or minus 1 inch of the specified elevation.

B. Tolerances shall comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials" unless otherwise noted herein. Unless noted otherwise, concrete surfaces shall adhere to a Class C finish. Walking surfaces shall be assigned a floor classification of "conventional".

-- END OF SECTION --

SECTION 31 10 00

SITE CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. The work in this section includes furnishing all labor, materials, and equipment necessary to complete any clearing and grubbing of vegetation and debris removal within the construction boundary and as indicated in the Drawings. All work shall be done in accordance with all local, State and Federal regulations and requirements.

1.2 DEFINITIONS

A. Clearing - the felling, trimming, and cutting of trees into sections and the satisfactory offsite disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, etc., occurring in the area of the DMMA basin, dike embankment, drainage ditches, entrance roads, and other areas within the clearing limit boundary shown on the Project Drawings.

B. Grubbing - the excavation, removal, and disposal of stumps, roots, and buried debris occurring in the area of the ditch reclamation, DMMA basin, dike embankment, laydown yard, drainage ditches, entrance roads, fence lines, and other areas within the clearing limits boundary as shown on the Project Drawings.

C. Debris Removal - Debris removal shall consist of the removal and disposal of all on site rubbish including miscellaneous metallic and plastic objects, containers, tires, and all other non-burnable materials, which are not covered by other Bid Items.

1.3 SUBMITTALS

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

A. Vegetative and Rubbish Disposal Verification

1. Verification of proper disposal operations shall be provided to the Engineer for information only within five (5) working days of the commencement of disposal operations and will state where those materials are being disposed.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PROTECTION

A. Entrance and Access Roads

1. Keep the site entrance and access roads free of cut timber and debris at all times.

B. Trees, Shrubs, and Existing Facilities

1. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

C. Utility Lines

1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the owner of such piping or utility immediately for directions.

3. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

3.2 CLEARING

A. Trees, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface. Resulting vegetation shall be disposed of by hauling off-site and properly disposed.

3.3 GRUBBING

A. All stumps, roots, snags, and other buried organic or non-organic debris not suitable for foundation purposes shall be excavated and removed. Grubbing shall remove all roots, stumps, limbs and organic or non-organic debris to a depth of not less than 18 inches below the original ground surface. In general, organic stumps or limbs greater than 6 inches in dimension shall be removed. Roots longer than 12 inches and greater than 1 inch in diameter shall be removed. Depressions made by grubbing shall be filled with suitable material and compacted with passes of a tracked or wheeled vehicle as needed to make the surface conform to the surface of adjacent ground. The resulting ground should be smooth, free of ruts, holes, roots, limbs, stumps or debris that would interfere with subsequent grassing, mowing and maintenance operations.

3.4 DISPOSAL OF MATERIALS

A. Vegetative and Woody Materials

1. Logs, stumps, roots, brush, fallen trees and other clearing debris from clearing and grubbing operations shall be disposed offsite. All vegetative and woody materials shall become the property of the Contractor, and shall be disposed in accordance with all local, State and Federal laws, regulations, and requirements.

B. Burning

1. Burning will not be permitted.

C. Rubbish, Metals, and Other Non-wood Debris

1. All rubbish, metals, and other non-wood debris shall be removed from the site and disposed of in an approved disposal site. The material shall be separated from soils by shaking or vibration so that excessive soil is removed. The material should include no more than 10% soil by weight when weighed at the disposal site. This material shall become the property of the Contractor, and shall be disposed in accordance with all local, State, and Federal requirements. Verification of proper disposal and disposal site for subject materials shall be provided to the Engineer within five (5) working days of the materials being removed from the site. No burning of material described in this section will be allowed onsite.

3.5 SITE CLEANUP

A. The Contractor shall remove all trash, debris, tools, and equipment from the site after completion of the work.

-- 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 Construction Drawings.

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/blanket 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 and interior shelf.

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/Blanket Drain: The toe/blanket drain is defined as the material making up the dike interior drain system and primarily includes gravel surrounded by concrete sand. The system also includes the perforated and non-perforated collector pipes, filter fabric, and outlet pipes. Within these specifications, it may be referred to as simply the toe drain, the blanket drain, or the toe/blanket drain

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 overseeing the installation and monitoring of the settlement and pore water pressure instrumentation, and 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. Settlement and Pore Water Pressure Instrumentation

1. Submit manufacturer’s information and/or shop drawings to the Engineer for approval of all settlement and pore water pressure instrumentation including instrumentation panel.

C. 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.

D. 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.

E. Toe/Blanket Drain Material Information

1. Submit manufacturer's information on perforated and non-perforated HDPE single wall corrugated collector pipes and discharge pipes used with the toe/blanket drain demonstrating that the product meets specifications.

2. Submit information and gradation curves for toe/blanket drain concrete sand demonstrating that the sand meets specifications.

3. Submit test data and gradation curves for toe/blanket drain gravel demonstrating that the material meets specifications.

4. Submit manufacturer's information on filter fabric for the toe/blanket drain demonstrating that the product meets specifications.

F. 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.

G. Topsoil Handling and Temporary Storage Plan

1. The Contractor shall submit a plan showing topsoil removal areas and temporary stockpile areas.

H. 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

I. Pipe Bedding Compaction Tests

1. The contractor shall submit in place density testing results for every 200 linear ft of pipe installed but not less than one test per pipe or culvert location.

J. Dike Foundation and Pre-Payment Site 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.

K. Settlement and Pore Water Pressure Construction Monitoring Data with Operating Manual and Report

1. The Contractor shall submit to the Engineer recorded data and reports of settlement and pore water pressure monitoring as described herein.

2. The Contractor shall submit to the Engineer an instrumentation operation manual and monitoring report as outlined herein.

L. Pipe Invert Surveys

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

M. Payment Surveys

1. Surveys for payment of dike construction shall be submitted at 30-60 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.

N. Pipe Inspection Video/Report

1. Following dike construction, submit inspection video and an inspection letter report for the toe drain system including any pipes passing beneath the perimeter road for Engineer approval.

O. Instrumentation Monitoring Report

1. Submit instrumentation monitoring report 10-15 days before final completion.

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 the geotechnical investigation of the borrow area, perform soil testing, observe installation of settlement/pore water pressure instrumentation, record data from settlement/pore water pressure instrumentation, provide reports on recorded data, 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 onsite excavation areas as shown on the 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 Drawings unless approved by the Engineer in writing. 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 2.0 percent organic content by dry weight.

2.2 MATERIALS FOR TOE DRAIN SYSTEM

A. Toe/Blanket 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. Concrete Sand: Sand for the toe and blanket drain shall meet ASTM C33 and shall have a D15 grain size of 0.40 mm or greater.

C. Filter Fabric: Filter fabric shall be Mirafi FW404 woven filter fabric or engineer approved equivalent.

D. 6-inch Diameter 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. Perforated pipe shall be type CP, with class 2 perforations. Non-perforated pipe shall be type C. 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.

2.3 WEIR SOLID WALL HDPE PIPING AND CORRUGATED HDPE DRAIN PIPE

A. See section entitled "HDPE Pipe".

2.4 ACCEPTABLE SOILS FOR PIPE BEDDING

A. 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.

2.5 MATERIALS FOR SETTLEMENT AND PORE WATER PRESSURE INSTRUMENTATION

A. Settlement and pore water pressure instrumentation, including panel shall be of the type and/or manufacturer as specified on Drawings.

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. Dike Foundation and Pre-Payment Site 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 area including the dike/roadway footprints and the interior basin area. The survey shall also include an area 20 ft outside the perimeter of the limits of clearing. Transects of the dike footprint and perimeter ditch/road 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 20 ft on center. Transects of the general site or basin area shall be taken at intervals not exceeding 100 ft with individual points taken at all breaks in grade or slope at intervals not exceeding 50 ft. The survey shall be submitted to the Engineer for approval in electronic paper version (24x36) and in AutoCAD containing point elevation data. Horizontal and vertical coordinate systems shall match those used on the Drawings. The survey shall be signed and sealed by a licensed professional surveyor registered in the State of Florida.

3.3 SETTLEMENT AND PORE WATER PRESSURE INSTRUMENTATION

A. Settlement and pore water pressure instrumentation shall be of the type and/or manufacturer as specified on the Drawings. Instrumentation shall be installed to the elevations and locations shown on the Drawings. The Contractor's geotechnical consultant shall oversee and approve installation and surveying of all such instrumentation and shall provide a written letter report stating that the instrumentation was installed according to their instructions and to the depths indicated on the Drawings. Once instrumentation is installed, the Contractor's geotechnical consultant shall take all data readings and shall oversee any necessary vertical extension of instrumentation as the dike is constructed. During construction and before taking data readings, the consultant shall inspect the instrumentation for damage to ensure that the instrumentation is in good working order.

B. Pore water instrumentation wiring shall be run underground at a minimum depth of 12 inches below grade and shall be contained within plastic underground electrical conduit. Run all instrumentation wiring to a single stainless steel electrical box. The electrical box shall be mounted on (2) 4 inch diameter schedule 40 galvanized steel pipes embedded a minimum of 4 ft underground unless otherwise approved by the Engineer. Wiring for each instrument shall be plainly labeled and instrumentation identified by dike station number and depth. The geotechnical consultant shall oversee the wiring AND labeling of the panel to ensure that pore water pressure instrumentation is properly identified, labeled and ready to monitor.

C. After installation of instrumentation, the Contractor's geotechnical consultant shall monitor instrumentation and take readings weekly from the time the instrumentation is installed to 3 months after substantial completion is issued.

D. At the end of the project, the geotechnical consultant shall provide an operating manual and report. The report shall include the results of all readings for settlement plates and pore water pressure monitors. The manual shall include a wiring diagram showing the locations of instruments, wiring, and instrument panel. The operating manual shall include manufacturer's information, calibrating information, and any and all other information needed by another party to continue instrumentation monitoring.

3.4 HANDLING OF UNSUITABLE MATERIAL

A. If unsuitable material is encountered, the Contractor shall separate unsuitable material from suitable material during excavation and shall bury the unsuitable material within the basin area at the depth and location 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. After burial of unsuitable material, 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.

3.5 TOPSOIL

A. After clearing and grubbing is complete, the Contractor shall remove the topsoil from cleared areas and temporarily store it either in the construction laydown area or in another area approved by the Engineer.

B. Before use, the Contractor shall prepare this material for use as topsoil cover by sorting and removing the existing grasses, roots and vegetation to the greatest extent possible. This may require spreading, raking, shakers, or other means to remove roots and vegetation from the soil. Vegetation removed from the topsoil shall be disposed of offsite.

C. Once the topsoil has been sorted and temporarily stockpiled by stacking in an approved area, the Contractor shall survey the stack of topsoil material. To get an accurate estimate of the quantity of topsoil, the Contractor shall survey the pile with transects taken every 50 ft. Surveys shall conform to the same requirements designated in these specifications for dike payment surveys. The Contractor's surveyor shall submit a signed/sealed survey of the stockpile with a material volume estimate shown on the survey. The Contractor's surveyor shall provide the AutoCAD digital files including a digital XYZ or AutoCAD point file to the Engineer for quality control checks.

D. After dike, road and other earthwork construction is complete, **the Contractor shall place the topsoil on the dike slopes to a depth of 4-6 inches**. The remaining topsoil material shall be placed and spread over the surface of the perimeter ditches and other areas designated for permanent grassing as directed by the Engineer.

3.6 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 compacted fill. The Contractor shall dewater the basin area for final grading.

3.7 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 spreads 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 six (6) inches.

2. 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 by surface rolling with a self-propelled vibratory compactor. During compaction efforts, groundwater levels shall be maintained a minimum of two (2) ft below 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 surface. In no case, however, should any section receive less than ten (10) coverages with the compactor. Compact soil within the lift thickness to 95% maximum density at a moisture content within 2% of optimum as determined by Modified Proctor (in accordance with ASTM D1557).

3. If approved by the Engineer, areas not suitable for heavy vibratory compaction equipment may be compacted using lightweight vibratory compaction equipment or overlapping tracks of a bulldozer. In this case, place fill in 6-inch lifts before compacting. Compact material to a minimum of 95% of the maximum density determined by the Modified Proctor Test (ASTM D1557).

4. Construct the dike embankment to the lines, grades, and cross sections indicated on the Drawings.

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

6. 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.

3.8 TOE DRAIN SYSTEM INSTALLATION

A. Toe Drain General: Install the toe drain to the lines and grades shown on the 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 portion of the toe drain shall be plus or minus 6 inches from the dimensions shown on the Drawings but in no case shall the gravel layer be less than 12 inches in thickness. 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. The concrete sand layer shall be a minimum of 5 inches thick at any location.

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 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. Pipe showing excessive settlement, damage, joint dislocation or having a ring deflection of greater than 5% shall be excavated and replaced. The Contractor shall repair damaged or settled pipe at no additional cost to the Owner.

3.9 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. Install instrumentation (settlement plates, etc.)
4. Prepare dike foundation
5. Construct dike and other earthwork features
6. Place unsuitable material (if encountered) in specified final location and cover with sand fill
7. Place and spread 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.

3.10 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.

3.11 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 top of the perimeter ditch berm shall be plus 6 inches to minus zero inches.

C. 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.

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

3.12 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.

3.13 TOPSOIL PLACEMENT

A. The Contractor shall place topsoil on the dike area designated for permanent grassing as shown in the Drawings. Remaining topsoil shall be placed on other areas designated for permanent grassing as directed by the Engineer. Apply topsoil before final grading and grassing operations.

3.14 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.

3.15 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 Drawings. Final surveys of the perimeter roads, entrance roads, and perimeter ditches shall be included in the as-built survey for the dike construction.

3.16 GRASSING

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

3.17 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.

3.18 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.

3.19 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 dike foundation survey will serve as the base topographic survey to determine pay quantities. The survey shall be submitted to the Engineer for approval in electronic PDF version (24x36) and in a digital AutoCAD file containing point elevation data. Horizontal and vertical coordinate systems shall match those used on the 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.

3.20 AS-BUILT SURVEY

A. The Contractor shall complete an as-built survey in accordance with SECTION 01 78 00 PROJECT CLOSEOUT. The Contractor's surveyor shall provide digital AutoCAD drawings, surfaces and point files to the Engineer for quality control checks.

3.21 DETERMINATION OF FINAL PAYMENT VOLUME FOR EARTHWORK FILL AND TOPSOIL MATERIAL

A. Final Payment Volume of Compacted Fill: After placement of all earthwork fill and topsoil material, the Contractor shall perform a topographic as-built survey as described herein. Since the final surveyed surface includes the topsoil material and the blanket drain material, the final payment volume for earthwork fill shall be determined by subtracting the surveyed volume of topsoil and the toe/blanket drain BID VOLUME listed on the bid schedule from the total volume of earth fill as determined by survey. The total volume of earth fill shall be determined in AutoCAD by comparing the digital terrain surfaces of the dike foundation/prepayment survey and the final as-built survey. The final payment volume for topsoil shall be determined by surveying the temporary stockpile of topsoil as described previously within this specification.

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SECTION 31 23 33

TRENCHING AND SHORING FOR PIPE INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. This specification addresses the work necessary to perform trenching for pipe installation.

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. Florida Trench Safety Act (90-96, Laws of Florida)

B. OSHA Excavation Safety Standards 29, CFR part 1926.650 Subpart P

C. American Society of Testing Materials (ASTM)

ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.3 SUBMITTALS

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

A. Trench Shoring Shop Drawings

1. When shoring is required to be structurally designed, the Contractor shall submit shop drawings, signed and sealed by a licensed engineer registered in the State of Florida describing the trench shoring required to install the pipes.

B. Backfill Compaction Testing

1. Submit results of soil density testing to the Engineer for approval. Perform soil density tests per ASTM D2922 for each pipe or every 200 linear ft of pipe installed, whichever is greater. Perform tests at two vertical levels, at mid-level of pipe and 1 ft above the top of the pipe or as directed by the Engineer.

1.4 GENERAL REQUIREMENTS

A. The Engineer shall observe the pipe after placement in the trench and before backfilling. The Contractor shall notify the Engineer 48 hours in advance when the pipe is ready for inspection.

B. Contractor shall not leave open trenches unattended outside of working hours. Contractor shall place temporary fencing around the open trenches at the end of each workday.

C. All excavation operations shall be in accordance with the Florida Trench Safety Act, which establishes the safety standards of 29 CFR, Part 1926, Subpart P.

D. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the District of such piping or utility immediately for directions.

2. Cooperate with District and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

1.5 DEWATERING PERMITS

A. If dewatering is necessary, contractor shall apply and pay for all required dewatering permits.

1.6 TRENCH PROTECTION

A. Contractor shall construct and maintain sheeting and bracing as required to support the sides of excavations, protect workman and to protect adjacent structures, existing piping and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, and if voids are formed, they shall be immediately filled and rammed.

B. All sheeting and bracing not specified to be left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering, or otherwise as may be directed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The Contractor is responsible for selecting the structural system required for trench shoring and bracing.

B. Backfill: Backfill shall be clean sand having less than 12% fine material passing the 200 sieve.

PART 3 - EXECUTION

3.1 GENERAL

A. All trenching and shoring necessary to complete the Work shall be made by the Contractor and the cost thereof shall be included in the contract price.

3.2 TRENCH EXCAVATION

A. Excavation for all trenches required for the installation of pipes shall be made to at least 6 inches greater than the bottom of the pipe unless shown otherwise on the Project Drawings. Excavate trench to provide the minimum clear cover over the pipe bell as specified on the Project Drawings. Excavate in such manner and to such widths as will give suitable room for laying the pipe and compacting the backfill.

B. The bottom of the trench should consist of in-situ soil of clean sand or stiff clay. Unsuitable soils such as muck, silt, or soft clay shall be excavated to a depth at least 2 ft below the bottom of the pipe and replaced with clean compacted sand backfill.

C. Unless otherwise approved by the Engineer, dewater the trench area so that the groundwater level is below the bottom of the trench and no seepage can be seen on the sides of the trench.

D. Provide shoring and bracing as needed to protect workmen and comply with OSHA regulations and Florida law.

E. Place and compact backfill so that pipe has a rounded bed that will evenly and uniformly support the pipe along its entire length and cross section. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.

F. Install pipe to the lines and elevations shown on the Drawings. Install pipe joints in accordance with the Drawings and Specifications. Where no instructions are given for joining pipe, install pipe joints in accordance with the manufacturer’s instructions or FDOT specifications as directed by the Engineer.

G. Compact all trench backfill to at least 90% max density as determined by modified proctor unless specified otherwise in the Drawings and Specifications.

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SECTION 32 92 19

GRASSING ESTABLISHMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This section consists of requirements for all labor, equipment, and materials required where grassing is specified in the Drawings and Specifications.

B. This section covers materials and execution for seeding, hydroseeding, and sodding. However, the Contractor shall select the appropriate means and methods among seeding, hydroseeding sodding for establishing grass to meet the Satisfactory Stand of Grass as described in this specification. The Contractor may select multiple means methods of meeting these requirements at different grassing areas if desired.

C. Grass seed listed under Part 2 and seed mixture listed under Part 3 is intended for general guidelines for bidding purposes for seeding and hydroseeding. The Contractor shall submit their site-specific proposed mixture based on topsoil pH tests, grassing season, and local experience for Engineer Approval before ordering grassing materials.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the test by the basic designation only.

A. American Society for Testing and Materials (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials
ASTM D4972	Standard Test Method for pH of Soils
ASTM F1647	Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes Method A (Loss on Ignition)

B. U.S. Department of Agriculture (USDA)

AMS Seed Act	Federal Seed Act

1.3 SUBMITTALS

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

A. Grassing Establishment Plan

Prior to grassing, the Contractor shall submit a Grass Establishment Plan including the following information:

1. An outline explaining general procedure, listing of equipment to be used, order of application, and method of application to be used.

2. Results of topsoil pH and organic content tests on five (5) different soil samples taken as directed by the Engineer. Submit test results, prepared by an independent testing agency.

3. Submit the seed mixture, tackifiers, mulch, soil amendments, fertilizer, weed control, insect/pest control, and times and rates of application of each.

4. The name and location of the source, and pH and chloride content, of the water used for grass watering for the Engineer's approval.

B. Grassing Material Certificates

1. Prior the delivery of materials, certificates of compliance demonstrating that the proposed materials meet the specified requirements.

C. Grass Watering and Maintenance Records

1. Submit to the Engineer a written record of all grass watering and maintenance including, type of action taken, dates, amounts (in pounds or gallons) of material applied (including water), weather conditions, and rainfall amounts as recorded in the nearest local newspaper.

PART 2 - PRODUCTS

2.1 SEED

A. Provide State-Certified seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, hard seed, weed seed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Damaged seed will be rejected.

B. Temporary seeding species shall be selected based on season. Seed species and mixtures shall be proportioned by weight as follows:

Seed	Minimum Pure Seed Content	Minimum Active Germination	Total Germination	Additional Requirements
Pensacola Bahia	95%	40%	80% Including firm seed	N/A
Bermuda	95%	N/A	85%	Shall be the common variety
Annual Rye Grass	95%	N/A	90%	N/A
Millet	90%	N/A	85%	Shall be of the brown top variety

C. Weed seed shall be a maximum 1 percent by weight of the total mixture.

D. The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.

2.2 SOD

A. Sod shall be Pensacola Bahia. Sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Broadleaf weeds and patches of foreign grasses shall be a maximum of 2 percent of the sod section.

B. Sod shall be machine cut to a minimum 1 - 3/8-inch thickness. Measurement for thickness shall exclude top growth and thatch.

C. Sod shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted.

2.3 FERTILIZER

A. Fertilizers shall comply with the State fertilizer laws. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid, and (3) water-soluble potash, contained in the fertilizer.

B. The chemical composition of the fertilizer for each application shall be chosen by the Contractor.

2.4 SOIL AMENDMENTS

A. Soil amendments shall consist of pH adjuster, fertilizer, organic material, and soil conditioners meeting the following requirements. Vermiculite shall not be used. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

B. These materials may be burnt lime, hydrated lime, ground limestone, sulfur, or shells. Agricultural liming material shall conform with ASTM C602.

C. Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

D. Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singularly or in combination to meet the requirements of the soil test.

2.5 MULCH

A. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. The following provides types of mulch that the Contractor may use:

1. Seeded Areas: Straw

    a. Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2. Seeded Areas: Hay

    a. Native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition and of proper consistency for placing with

commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

3. Hydroseeded Areas: Wood Cellulose Fiber

   a. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0. Use with hydraulic application of grass seed and fertilizer.

4. Hydroseeded Areas: Paper Fiber

   a. Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.6 TOPSOIL

A. 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.

2.7 WATER

A. Water shall be the responsibility of the Contractor, unless otherwise noted. The water used in the described grassing operations may be obtained from any approved spring, pond, lake, stream, or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalies, or any other substance that might be harmful to plant growth. Salt water or brackish water shall not be used.

2.8 SURFACE EROSION CONTROL MATERIAL

A. The Contractor is advised that additional erosion control measures may be beneficial for the dike side slopes or other areas of grassing. The Contractor should submit any proposed additional erosion control measures under the Grassing Establishment Plan for Engineer approval.

PART 3 - EXECUTION

3.1 GENERAL

A. The intent is to provide a permanent stand of grass over all disturbed areas <u>except</u> the basin interior. Proposed stabilized road surfaces need not receive grassing.

B. The Contractor shall be responsible for observing and documenting that the seed, mulch, fertilizer, tackifiers, and other materials are applied according to the specifications. The Contractor shall personally observe that all material was delivered to the site unopened and shall collect all bags and containers used to hold these products which will be submitted to the Engineer for inspection. The Contractor shall maintain and submit to the Engineer a written record of all watering and maintenance including, dates, amount (in pounds or gallons) of material applied (including water), weather conditions, and rainfall amounts as recorded in the nearest local newspaper.

C. Perform grassing operations only during periods when beneficial results can be obtained. When drought, excessive moisture, excessive wind, or other unsatisfactory conditions prevail, the work shall be stopped until conditions again become favorable.

3.2 DELIVERY, INSPECTION, STORAGE, AND HANDLING

A. All materials shall be delivered to the site in original, unopened containers bearing the manufacturer's information. Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

B. The Contractor shall inspect all materials upon arrival for conformity to approved submittal materials. Seed that is wet, moldy, or bears a test date five months or older shall be rejected. Other materials shall be inspected for compliance with specified requirements. Open soil amendment containers or wet soil amendments will be rejected. Unacceptable materials shall be removed from the job site.

C. Materials shall be stored in designated cool, dry locations away from contaminants.

D. Material packaging for all seed, fertilizer, mulch, and other grassing materials shall be stored on-site for Engineer/District review until the end of the Grassing Establishment Period. At the end of the Grassing Establishment Period, and upon approval by the Engineer, the Contractor shall remove the packaging from the site.

3.3 TOPSOIL

A. Test five (5) samples of topsoil and test for pH and organic content in accordance with ASTM D4972 and ASTM F1647. Take samples at different levels in the stockpile at locations directed by the Engineer. Tests shall determine the quantities and type of soil amendments required to meet local growing conditions for the specified seed species.

B. Topsoil shall be raked or sieved as necessary to remove debris, roots, branches, rocks, and other non-desirable materials.

C. After submitting test to the Engineer for approval, apply topsoil in accordance with SECTION 31 23 00 DIKE AND EARTHWORK CONSTRUCTION.

3.4 SITE PREPARATION

A. Application of Soil Amendments

1. The pH adjuster shall be applied as recommended by the soil test. The pH adjuster shall be incorporated into the soil to a maximum 4-inch depth or may be incorporated as part of the tillage operation.

2. The soil conditioner shall be applied as recommended by the soil test. Soil conditioner shall be spread uniformly over the soil minimum 1 inch depth and thoroughly incorporated by tillage into the soil to a maximum 4-inch depth.

3. Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 4-inch depth.

B. Tillage for Seeding Installation

1. Soil on slopes up to a maximum of 3 horizontal to 1 vertical shall be tilled to a minimum 4-inch depth. On slopes between 3 horizontal to 1 vertical and 1 to 1, the soil shall be tilled to a minimum 2-inch depth by scarifying with heavy rakes or other method. Rototillers shall be used where soil conditions and length of slope permit. Drainage patterns shall be maintained as indicated on the drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure. Debris and stones larger than 3 inches in any direction shall be removed from the surface.

C. Prepared Surface

1. The prepared surface shall be a maximum of 1 inch below the adjoining grade of any surface area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris. Debris and stones over a minimum 3 inches in any dimension shall be removed from the surface. Areas with the prepared surface shall be protected from compaction, damage by vehicular and pedestrian traffic, and surface erosion.

3.5 pH TESTING AND SEED MIXTURE ADJUSTMENT

A. Prior to planting operations, perform pH test on a minimum of five samples of topsoil material in the areas to be grassed. Adjust seed mixture components to match the existing pH conditions. Seed shall be applied at the following rates for the soil pH listed:

B. Soil with pH greater than 6.5

Apply seed at the following minimum rates:

1.	Pensacola Bahia Grass (Paspalum Notatum)	80 lb/ac
2.	Common Bermuda Grass (Cynodon Dactylon)	50 lb/ac
3.	Rye or Millet (depending on the season)	50 lb/ac
		180 lb/ac total

C. Soil with pH less than or equal to 6.5

Apply seed at the following minimum rates:

1.	Pensacola Bahia Grass (Paspalum Notatum)	100 lb/ac
2.	Common Bermuda Grass (Cynodon Dactylon)	30 lb/ac
3.	Rye or Millet (depending on the season)	50 lb/ac
		180 lb/ac total

3.6 INSTALLING SEED TIME AND CONDITIONS

A. Check with local Agriculture Extension Service for recommended restrictions on seeding time to meet local growing conditions.

B. Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the

work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

C. Immediately prior to commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

3.7 SEED, AND SOD APPLICATIONS

A. Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of the paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

B. Installing Seed

1. Seeding method shall be broadcast seeding, or hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used, unless otherwise approved, because of the difficulty in achieving even coverage. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

C. Broadcast Seeding

1. Seed shall be uniformly broadcast at the minimum rate specified by the grassing supplier using broadcast seeders. The Contractor shall be responsible for calculating and applying the actual pure live seed poundage based on the label attached to each bag of seed and to achieve the stand of grass required in these specifications. Also, the Contractor shall determine the application rate of temporary seed required. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing. Cover seed uniformly to a maximum depth of 1/4 inch by disk harrow, steel mat drag, cultipacker, or other approved device.

D. Rolling for Broadcast Seeding

1. The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3 horizontal to 1 vertical shall not be rolled.

E. Hydroseeding

1. Seed shall be broadcast at the minimum rate specified by the seed supplier. Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The Contractor shall be responsible for calculating and applying the actual pure live seed poundage based on the label attached to each bag of seed and to achieve the stand of grass required below. Also, the Contractor shall determine the application rate of temporary seed required. The time period for the seed to be held in the slurry shall not exceed 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

F. Sodding Operation

1. Sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail,

the work shall be stopped until conditions improve. Rows of sod sections shall be placed parallel to and tightly against each other. Joints shall be staggered laterally. The sod sections shall not be stretched or overlapped. All joints shall be butted tight. Voids and air drying of roots shall be prevented. Sod sections shall be laid across the slope on long slopes. Sod sections shall be laid at right angles to the flow of water in ditches. Displacement of the sod shall be prevented by tamping or rolling the sod in place and knitting the sod to the soil. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed, and holes or missing corners shall be patched with sod. Excess and waste material shall be removed from the sodded areas and shall be disposed of offsite.

2. The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be rolled and completed with a light raking to remove from the surface debris and stones over 1 inch in any dimension. Areas within the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3. Sod shall be stored in designated areas and kept in a moist condition by watering with a fine mist, and covered with moist burlap, straw, or other covering. Covering shall allow air to circulate, preventing internal heat from building up. Sod shall be protected from exposure to wind and direct sunlight until installed. Sod shall not be damaged during handling. Except for bulk deliveries, materials shall not be dropped or dumped from vehicles. Time limitation between harvesting and installing sod shall be a maximum of 36 hours.

3.8 FERTILIZER AND MULCH

A. Fertilizer

1. Seeded/Hydroseeded Areas: Apply initial application of fertilizer at 500 lb/ac.

2. Seeded/Hydroseeded Areas: Apply a second application of fertilizer 45-60 days after seeding at 500 lb/ac.

3. Sodded Areas: Apply one application of fertilizer at 500 lb/ac when conditions appear favorable.

B. Mulching

1. Seeded Areas: Hay or Straw Mulch

a. Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

b. Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

c. Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

2. Hyrdroseeded Areas: Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

   a. Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.9 WATERING

A. Do not water newly seeded areas to force the seed germination. Water these areas only to sustain grass growth.

B. Once seed germination begins water every day at a rate required to keep the grassed areas moist throughout the day. Apply water at a rate that will not cause erosion of the soil, seed, or mulch. If natural rainfall of ¼ in or greater occurs water 3 days after the rainfall event if no further rainfall of sufficient quantity occurs. Continue this watering schedule for 30 days from germination.

C. After this initial 30-day period, water as described above every 7 days for the remainder of the Grassing Establishment Period. The above watering schedule is the required minimum. If the emerging grass appears stressed, or the soil conditions appear excessively dry, the contractor shall apply additional amounts of water as necessary to establish a satisfactory stand of grass.

3.10 SURFACE EROSION CONTROL

A. Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

B. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded with a temporary seed mix. The application rate shall be determined by the Contractor as a temporary erosion control measure.

3.11 QUANTITY CHECK

A. For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.12 RESTORATION AND CLEAN UP

A. Restore to original condition existing turf areas, pavements, and facilities which have been damaged during seeding operations at the Contractor's expense. Remove excess and waste material and dispose of offsite.

3.13 PROTECTION OF SEEDED AREAS

A. Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required or directed.

3.14 GRASS ESTABLISHMENT PERIOD

A. The grass establishment period to obtain a healthy stand of permanent grass plants will begin on the first day of seeding work required under this contract, shall continue through the remaining life of the contract, and end when a satisfactory stand of grass plants is obtained, or **180 days** after the first day of seeding work whichever comes first.

B. If the Engineer or District deems the grass unsatisfactory at the conclusion of the establishment period, the District may either:

1. Extend the Grassing Establishment Period by a mutually agreed upon time period and require/allow the Contractor to remedy the grassing deficiencies.

2. Terminate the Contract and withhold sufficient funds to remedy the grassing deficiencies through other means.

C. Because initial grassing operations would likely begin near the end of the project, the Contractor should understand that this work will likely continue beyond the date of Substantial Completion. Written calendar time period shall be furnished for the grass establishment period. When there is more than 1 grass establishment period, the boundaries of the seeded area covered for each period shall be described. The grass establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

D. Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from damage due to traffic; mowing; watering; and post-fertilization.

E. The Contractor shall mow as frequently as necessary to control the growth of weeds. Weeds shall not be allowed to seed.

F. Unsatisfactory stand of grass plants and mulch shall be repaired or reapplied, and eroded areas shall be repaired.

G. A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reapplied; and diagnosis for unsatisfactory stands of grass plants.

3.15 SATISFACTORY STAND OF GRASS

A. Permanent grass plants shall be evaluated for species and health when the grass plants are a minimum of 1 inch high. A satisfactory stand of permanent grass plants from the seeding operation shall be a minimum of 20 grass plants per square foot with a least 50% of the grass plants consisting of permanent grass such as Bahia or Bermuda. Bare spots shall be a maximum of 9 inches square. The total bare spots shall not exceed 2 percent of the total seeded area.

– End of Section –

SECTION 33 05 61

PRECAST CONCRETE MANHOLES AND DRAINAGE INLETS

PART 1 - GENERAL

1.1 SUMMARY

A. The Work covered by this section includes furnishing all labor, equipment, and materials required for the installation of precast drainage structures, including manholes and drainage inlets.

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 C478 Specifications for Reinforced Concrete Manhole Sections
ASTM C443 Specifications for Joints and Concrete Pipe and Manholes using Rubber Gaskets
ASTM C1107 Standard specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

B. Florida Department of Transportation (FDOT)

FDOT Standard Specification for Road and Bridge Construction
FDOT Standard Details

1.3 SUBMITTALS

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

A. Pre-cast Plant Certification

1. If using pre-cast structures, provide certification showing that the pre-casting plant has been certified by the pre-cast concrete institute or the Florida Department of Transportation.

B. Product Information

C. Provide manufacturer's information and specifications demonstrating that the material or product meets specifications.

D. Drainage Structures Shop Drawings

1. Shop Drawings showing complete details and reinforcement schedules for fabrication and assembly. Submit details of pipe to concrete manhole connection capable of withstanding and passing the specified internal pressure test.

1.4 QUALITY ASSURANCE

A. Use a pre-casting plant that has been certified by the pre-cast concrete institute or the FDOT and has been engaged for more than five (5) years in the manufacturing of precast concrete drainage structures.

1.5 DELIVERY, STORAGE AND HANDLING

A. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representatives of the Owner. Such inspection may be made at the places, and the sections shall be subject to rejection at any time because failure to meet any of the Specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All sections that have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

B. At the time of inspection, the section will be carefully examined for compliance with the ASTM designation specified below and these Specifications, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimensions, "scratch-strength", blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.

C. Imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval.

PART 2 PRODUCTS

2.1 GENERAL

A. **The pipe and drain system including solid wall HDPE piping, pipe connections to manholes, concrete manholes, and manhole covers shall be pressure rated to 13 psi and shall be field pressure tested after installation and shall withstand 13 psi hydrostatic test loads to the pass/fail criteria described in ASTM F2164. See specification SECTION 33 40 00 HDPE PIPE for additional information on pipeline leak testing.**

2.2 CONCRETE MANHOLE SECTIONS

A. **All manholes and manhole covers shall be capable of sustaining an internal minimum hydrostatic pressure of 13 psi for the duration of the leak test without any earthen backfill installed.**

B. Manholes shall be designed by the precast manufacturer to withstand soil and groundwater pressure and uplift forces for the soil depth specified on the Drawings.

C. Precast concrete manholes shall conform to Specifications for Precast Reinforced Concrete Manhole Sections, ASTM C478, except as otherwise specified below. The method of constructions shall conform to the detailed Construction Drawings and the following additional requirements:

1. The minimum wall thickness for the various size barrel sections shall be 6 inches, unless otherwise specified herein and approved by the Engineer.

2. Barrel sections shall have tongue and groove joints. Joints shall have round rubber gaskets performed and set in specially provided indentations. The round rubber gasket shall conform to ASTM C443 standard specifications or approved equal.

3. Joints shall be capable of sustaining an internal minimum hydrostatic pressure of 13 psi and passing the specified leak test. The Contractor and precast manufacturer are cautioned that internal pressure test requirements as required herein can lift the top off of the precast manhole. If necessary, manholes shall be cast monolithically without joints in order to meet the internal pressure requirements and successfully pass the leak test.

4. Concrete and concrete curing shall conform to the requirements for concrete as described in SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

5. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section. Each precast section of the structure must be inspected and stamped by an accredited testing laboratory.

6. Top sections shall be concentric cone type unless otherwise specified.

7. The tops of base sections shall be suitable shaped to mate with the precast barrel sections.

D. Precast leveling rings for setting manhole frames over manholes shall be 2-inch thick and have one No. 2 continuous reinforcing steel bar. Leveling rings shall not hinder or inhibit successful pressure testing.

2.3 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be designed to attach to precast concrete manholes and prevent the infiltration or escape of air and water to a 13-psi positive or negative pressure rating.

B. Unless otherwise approved by the Engineer, manhole covers shall be fastened to the frame by a minimum of four steel bolts.

C. Covers shall be one-man operable using standard tools.

2.4 MANHOLE TO PIPE CONNECTIONS

A. Manhole to pipe connections shall withstand 13 psi hydrostatic pressure. Connections may be grouted connections. If grouted connections are used, grout shall be non-shrink complying with ASTM C1107 and having a minimum 28 day compressive strength of 8000 psi.

2.5 CONCRETE DRAINAGE INLETS

A. Concrete drainage inlets shall conform to Florida Department of Transportation specifications for the type and size inlet specified on the Drawings.

B. Drainage inlets shall be designed by the precast manufacturer to withstand soil and groundwater pressure and uplift forces for the soil depth specified on the Drawings.

C. Concrete and concrete curing shall conform to the requirements for concrete as described in SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

2.6 DRAINAGE INLET TO PIPE CONNECTIONS

A. Inlet to pipe connections shall be grouted connections and shall be soil tight. Grout shall be non-shrink complying with ASTM C1107 and having a minimum 28 day compressive strength of 8000 psi.

PART 3 EXECUTION

3.1 CONCRETE INLET INSTALLATION

A. Place drainage inlets to elevations and locations as shown in the Drawings.

B. Backfill in lifts not exceeding 8 inches, bringing the fill up evenly on all sides.

3.2 MANHOLE INSTALLATION

A. Manhole structure sections shall be set so as to be straight and vertical and with section in true alignment.

B. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting them in place to prevent any subsequent jarring which may loosen the mortar joints. All cutting is to be performed only by power driven abrasive wheels or saws.

C. Hydrostatic leak testing on manholes and pipe system shall be performed as described herein and in SECTION 33 40 00 HDPE PIPE.

D. After a successful hydrostatic leak test approved by the Engineer, backfill in lifts not exceeding 12 inches, bringing the fill up evenly on all sides.

--END OF SECTION—

SECTION 33 40 00

STEEL BOX WEIRS AND ALUMINUM WALKWAY

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this section includes furnishing all labor, equipment and materials required for the fabricated steel frame box weirs and aluminum walkway. This work includes but is not limited to the structural steel weir components, structural aluminum components, emergency flap gate, and composite lumber weir boards. This Work shall be accomplished in complete and strict accordance with the Specifications and the applicable Project Drawings and shall be subject to the terms and conditions of the Contract.

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 Association of State Transpiration and Highway Officials (AASHTO)

AASHTO M251	Standard Specification for Plain and Laminated Elastomeric Bridge Bearings

B. American Society for Testing and Materials (ASTM)

ASTM A36	Standard Specification for Carbon Structural Steel
ASTM A193	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A194	Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength
ASTM A572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM B209	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM D2000	Standard Classification System for Rubber Products in Automotive Applications
ASTM D2240	Standard Test Method for Rubber Property—Durometer Hardness
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

C. American Welding Society (AWS)

AWS D1.1	Structural Welding Code Steel
AWS D1.2	Structural Welding Code Aluminum

D. Society for Protective Coatings (SSPC)

SSPC SP-10	Near White Metal Blast Cleaning

E. United States Army Corps of Engineers

C-200 Formula for Coal Tar Epoxy Paint

1.3 DEFINITION

A. Engineer: The Engineer as designated by the owner in charge of construction oversight.

B. Engineer of Record: The Engineer whose signature and seal is affixed to the Project Drawings and Specifications; hereafter referred to as Engineer.

1.4 PRECONSTRUCTION SUBMITTALS

The Contractor shall provide the following submittals for Engineer approval at least 14 days (unless otherwise noted) prior to ordering materials:

A. Mobile Storage Container:

1. Submit product information and photos of mobile storage container for approval.

B. Epoxy Anchor Product Data

1. Submit manufacturer's information demonstrating that epoxy and anchor bolts for epoxy anchors meet specifications.

C. Neoprene Bearing Pad Data

1. Submit manufacturer's data demonstrating that neoprene bearing pads meets specifications and the adhesive for attaching the neoprene to the aluminum members meets specifications.

D. Weir Shop Drawings

1. Submit detailed Shop Drawings for the fabricated weir system for approval prior to commencing fabrication.

E. Walkway Shop Drawings

1. Submit detailed Shop Drawings for the fabricated weir system (including railing) for approval prior to commencing fabrication.

F. Weir Coating System

1. Submit paint product information demonstrating that the proposed paint coating system meets specifications.

G. Welding Certification

1. Submit certified reports for steel and aluminum welding qualification tests for shop welding and field welding personnel prior approval to commencing welding.

H. Hardware Product Data

1. Submit manufacturer's information for approval demonstrating that the hardware meets the specifications before fabrication. Hardware includes nuts, bolts, snaps, rings, and other such miscellaneous metals.

I. Aluminum Grating Product Data

1. Submit manufacturer's information for approval demonstrating that the aluminum grating for the walkway meets the specifications before ordering. Submit proposed method of attaching the walkway grating to the walkway.

J. Weir Fabricated Flap Valve Shop Drawings and Material Data

1. Submit detailed Shop Drawings showing the flap valve and the connection to the weir for approval prior to ordering the flap valve material. Submit documentation showing the aluminum alloy and strength to be used and the weld filler and strength to be used. Submit manufacturer's data showing neoprene gasket material meets specifications.

K. Weir Flap Gate Mechanical Winch System (crank winch style)

1. Submit manufacturers information on type of winch and cable with allowable working capacities.

L. Fabricated Weir Lift Plan

1. Submit detailed Construction Drawings for approval showing the Contractor's planned method of lifting the fabricated weir into position before fabrication.

M. Weir Board Product Data

1. Submit manufacturer's information for approval demonstrating the composite lumber weir boards meet specifications.

N. Weir Neoprene Gasket Material and Adhesive

1. Submit manufacturer's data demonstrating that neoprene gasket material (where weir boards bear on) meets specifications and the adhesive for attaching the neoprene to the steel members meets specifications.

1.5 CONSTRUCTION SUBMITTALS

A. Weir Shop Inspection Notice

1. Submit notice to Engineer to inspect fabricated weirs at fabrication shop (before coating).

B. Walkway Shop Inspection Notice

1. Submit notice to Engineer to inspect fabricated walkway at fabrication shop (before coating)

C. Weir Coating Inspection Report

1. Submit the certified coating inspector's report demonstrating that the surface preparation and coating application was in conformance with the specifications.

D. Certified Steel Mill Reports

1. Submit certified reports from the steel mill demonstrating that the structural steel meets the specifications prior to fabrication.

E. Certified Aluminum Mill Reports

1. Submit reports from the aluminum mill demonstrating that the structural aluminum meets the specifications prior to fabrication.

PART 2 - PRODUCTS

2.1 EPOXY ANCHORS

A. Bolts or all-thread fasteners labeled as adhesive anchors or epoxy-set shall be installed with Hilti adhesive HIT RE 500 V3 or equivalent as approved by the Engineer. Connections shall be installed in accordance to the manufacturer's instructions and shall be installed to the minimum embedment shown on the Project Drawings.

B. Anchors bolts shall be high strength 316 stainless steel all-thread rod meeting ASTM A193, Grade B8M, Class 2.

C. Nuts for anchor bolts shall be 316 stainless steel meeting ASTM A194, Grade 8M.

D. Washers shall be 316 stainless steel.

2.2 STRUCTURAL STEEL AND STEEL WELD MATERIAL

A. All structural steel shall meet the requirements of ASTM A36 with a minimum yield strength of 36 ksi. Alternately ASTM A572 grade 50 may be substituted for A36 steel.

B. Weld filler for structural steel shall conform to table 3.1 in AWS D1.1 for the material specification and grade used. Tensile strength of filler metal shall be between 70 and 80 ksi unless otherwise approved by the Engineer in writing.

2.3 ALUMINUM AND ALUMINUM WELD MATERIAL

A. Aluminum plate and walkway structural sections shall be alloy 6061-T6 conforming to ASTM B209 and having a minimum tensile yield stress of 35 ksi.

B. Aluminum walkway grating shall be alloy 6063-T6 conforming to ASTM B209.

C. Weld filler for aluminum shall be 4043 unless otherwise approved by the Engineer. Tensile strength of filler metal shall be between 27 and 40 ksi unless otherwise approved by the Engineer in writing.

D. Aluminum members shall be anodized with a clear class 3 coating.

2.4 NEOPRENE BEARING PAD MATERIAL

A. Neoprene for the walkway bearing pads shall be high grade neoprene conforming to AASHTO M251 and shall have a Shore A Durometer hardness of 50 per ASTM D2240.

2.5 STRUCTURAL STEEL COATING

A. All exposed carbon steel shall be coated with a coal-tar epoxy system as follows:

1. Surface preparation: SSPC SP-10 Near White Metal Blast Cleaning

2. Primer coat: Zinc-rich (organic) epoxy primer conforming to SSPC Paint Specification No. 20. Apply one coat at 3-6 mils dry film thickness.

3. Top coats: Coal tar epoxy meeting Army Corps of Engineers specification C-200. Apply (2) two coats at 8-16 mils dry film thickness each coat. Color shall be black.

2.6 NEOPRENE GASKET MATERIAL

A. Neoprene for the weir board and flap gate gasket material shall be high grade neoprene conforming to ASTM D2000 type BC and MIL-R-3065 and shall have a Shore A Durometer hardness of 40 per ASTM D2240. Attach to steel member with ¼ inch 316 stainless steel bolts at 12 inches on center having a Phillips countersunk head. In addition to the bolts, apply 3M Neoprene High Performance Rubber and Gasket Adhesive 2141 to the full length of the gasket.

2.7 HARDWARE

A. Unless specified otherwise, all hardware, including but not limited to bolts, nuts, and washers shall be 316 stainless steel. Where galvanizing is specified, bolts and associated hardware shall be hot-dipped galvanized per ASTM A153. Unless high strength stainless steel is specified, stainless steel bolts shall meet the requirements of ASTM F593, alloy group 2, condition A, marked F593F and shall have a minimum tensile yield strength of 30 ksi.

B. Fasteners:

1. Bolts: ASTM A307 (Grade A), and ASME B18.2.6

2. Nuts: ASTM A563A, and ASME B18.2.2

3. Plain Washers: ASTM F844, and ASME B18.21.1, Type B

2.8 SAFETY CHAINS

A. Construct safety chains of stainless steel, straight link type, 3/16-inch diameter, with at least twelve links per foot, and with snap hooks on each end. Provide stainless steel snap hooks of boat type. Provide stainless steel eye bolt for attachment of chain, anchored as indicated on the Project Drawings.

2.9 COMPOSITE LUMBER WEIR BOARDS

A. The Contractor will supply enough weir boards to fill all four sides of each weir to the top of the weir. If requested, the contractor shall ship the weir boards or a portion of the weir boards to a location designated by the Owner for storage.

B. The composite lumber weir boards shall be Everlast Synthetic Products, LLC or engineer approved equivalent. The rectangular nominal size shall be 4-in. x 6-in. hollow composite members with a minimal wall thickness of 0.18-in. and shall be able to easily fit into the channels of the weir with

adequate clearance for raising or lowering the boards. The weir board corners shall be chamfered to the smallest degree acceptable by the manufacturer.

C. The Contractor shall verify the length of the weir board on the fabricated weir structure before ordering weir boards. The length shall meet the tolerances shown in the Project Drawings.

D. All outer sides of the weir boards shall have a smooth glossy finish with a light neutral color.

E. The weir board manufacturer shall add UV inhibitors to the resin mixture and the outside surface of the structural tube shall have adequate coverage to prevent fiber bloom. The weir boards shall have a minimum design life of 25 years in a UV environment.

F. The weir boards shall have a minimum specific gravity of 1.8 as determined by ASTM D 792.

G. The weir boards shall be formulated and reinforced to meet the following minimum specific mechanical properties in the weak (bending) axis: modulus of elasticity - $3.5x10^6$ psi, modulus of rupture – 19,100 psi, section modulus – 7.16 in^3, and moment of inertia – 14.31 in^4.

2.10 MOBILE STORAGE CONTAINER

A. The Contractor shall furnish and place an 8-ft wide x 20-ft long Mobile Mini brand (or approved equivalent) storage container and shall store the weir boards in the container as directed by the District.

B. The container may be used; however, shall be in sound condition without the presence of visible deterioration. A representative of the District shall inspect and approve the condition and integrity of the storage container prior to Contractor purchase.

C. Submit product information and photos of new or used mobile storage container for approval. Arrange to have District personal and Engineer inspect mobile storage container before shipping to the project site.

D. Mobile storage container shall be painted olive green.

2.11 FLAP GATE MECHANICAL WINCH SYSTEM

A. Winch system shall consist of a crank style winch with a break system to allow Contractor to safely raise and lower the gate in a controlled manner under heavy load. The winch shall be HDG. Cable shall be 316 stainless steel. Cable shall be rating to minimum breaking strength of 8,000 lbs.

PART 3 - EXECUTION

3.1 WEIR AND WALKWAY FABRICATION

A. The Contractor shall notify the Engineer after fabrication and a minimum of three (3) days before the fabricator intends to coat the fabricated weirs. The Engineer will perform an inspection of the fabricated weir before the coating process.

B. All fabrication where possible shall occur in a controlled environment. Material must be straight before being laid off or worked. If straightening is necessary, it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with

welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detailed Shop Drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints.

C. Bolts, nuts and screws shall be securely tightened unless otherwise indicated. Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the Project Drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/16 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall deviate from the dimensions shown by not more than 1/8 inch.

D. Specific Tolerances: The dimension between the inside webs of the MC8 channels where the weir boards will fit shall not vary more than plus or minus 1/8 inch from the distance specified on the Project Drawings (Note: This distance is indirectly specified by the out-to-out dimension indicated for the MC8 channels).

E. All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in an approved manner.

F. Welding: Welding shall conform to the AWS D1.1 for steel members and AWS D1.2 for aluminum members.

3.2 STEEL COATING

A. The Contractor shall prepare the steel surface and coat the steel box weirs and other steel items with the coating system described in the products section of this specification.

B. The Contractor shall have a certified coating specialist inspect and approve the surface preparation and the coating system after each coat of primer and top coat. Submit the certified coating specialist’s inspection report to the Engineer for approval.

C. Neoprene gaskets shall be roughened on adhesive side and installed after steel coating so as not to coat the gasket material.

3.3 FABRICATED WEIR AND WALKWAY SYSTEM ERECTION

A. The Contractor shall inform the Engineer of its intended schedule to erect the fabricated weir system at least three business days before receiving the fabricated weir system at the project site.

B. The Contractor shall lift the fabricated weir section in a manner that will not overstress the structural steel or compromise any of the weir system’s connections.

C. The Engineer will observe erection of the fabricated weir system and reserves the right to halt progress if the lift appears to be overstressing the structural steel or compromising any of the weir system's connections.

D. The Contractor shall install the epoxy adhesive anchors per the manufacturer's instructions.

3.4 TOUCH-UP COATING

A. The Contractor shall touch-up any damaged or removed coating with coal tar epoxy to the satisfaction of the Engineer and the District.

-- END OF SECTION --

SECTION 33 46 00

HDPE PIPE

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this section includes all labor, equipment, materials, and testing requirements to install High Density Polyethylene (HDPE) Piping Systems as described on Project Drawings.

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 for Testing and Materials (ASTM)

ASTM D1248	Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))
ASTM D1603	Standard Test Method for Carbon Black Content in Olefin Plastics
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM F2164	Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
ASTM F2620	Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

1.3 SUBMITTALS

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

A. HDPE Solid Wall Pipe Product Information

1. Prior to installation submit manufacturer's information demonstrating conformance to the required pipe specifications to the Engineer for approval.

B. HDPE Corrugated Double Wall Pipe Product Information

1. Submit to the Engineer for approval manufacturer's product information on the pipe and fittings demonstrating that the product meets specifications.

C. HDPE Pipe Shop Drawings

1. Prior to installation submit to Engineer for approval manufacturer's design layout showing dimensions, pipe size, joints, flanges, back-up rings, flange bolts size and type, heat fusion welds, and other information as applicable.

D. Leak Testing Plan

1. Submit a written plan summarizing the leak testing plan. Specify if the testing will be performed for the entire length of the pipeline or in segments.

E. Results of Leak Test

1. Submit a written statement summarizing the results of pipe system leak test to the Engineer for approval.

F. Pipe Backfill Compaction Testing

1. Submit pipe backfill compaction tests as described in Section 31 23 00 Dike and Earthwork Construction.

1.4 DELIVERY AND STORAGE

A. Inspect all materials for damage when delivered to the site. Cover and protect materials from direct sunlight. Keep the inside of pipes and fittings free of dirt and debris.

PART 2 - PRODUCTS

2.1 HDPE SOLID WALL PIPE AND FITTINGS

A. Polyethylene for solid wall HDPE pipe shall be PE4710. Materials used for the manufacturing of polyethylene pipe and fittings shall meet or exceed ASTM D3350 cell classification of PE445574C/E, Type III, Grade PE47 and ASTM F714, Class D, Category 5, Grade E10 or E11.

B. Pipe shall be IPS with a DR as specified on the Drawings. Pipe shall have a minimum working pressure rating as specified by the Plastic Pipe Institute for the DR specified and shall have a smooth interior with a Manning's n of 0.012 or less. Joints shall be of the same type, grade, material and minimum wall thickness as the pipe. Joints (elbows, wyes, etc.) may need to have a greater wall thickness to meet the same pressure rating as the pipe.

C. Fittings shall be IPS with a working pressure rating equal to or greater than that of the pipe and joints. <u>This may require the fittings and joints to have a smaller DR (greater wall thickness) than the straight pipe.</u>

D. Reducers shall be the concentric type.

E. Back up rings shall be polypropylene coated ductile iron. Bolts shall be ASTM A307, Grade A galvanized in accordance with ASTM A153. The number and size of the bolts shall match those shown on the Project Drawings. Where no flanged connection detail is shown, flanges shall be AWWA class B unless otherwise instructed by the Engineer.

F. Pipe and fittings must be capable of withstanding the cover requirements specified in the Project Drawings.

2.2 HDPE CORRUGATED PIPE AND FITTINGS (GREATER THAN 8 INCH DIAMETER)

A. HDPE pipe greater than 8 inches in diameter specified as corrugated or double wall shall be corrugated double wall HDPE pipe meeting the requirements of ASTM F2648 with the interior wall being smooth (not corrugated) and having a mannings n of 0.012 or less.

B. HDPE pipe shall also meet the requirements of AASHTO M294, type S.

C. Fittings shall be bell and spigot type and shall be watertight per ASTM D3212 and pressure rated to 10 psi. Submit fitting type to Engineer for approval. Fittings shall be a minimum of 8 ft apart.

2.3 BACKFILL MATERIAL

A. Suitable backfill material shall be in accordance to SECTION 31 23 33 TRENCHING AND SHORING FOR PIPE INSTALLATION. Contractor will be responsible for all pipe damaged during installation and construction of the project. All damaged pipe will be replaced in accordance with the Project Drawings and Specifications at contractor's expense.

PART 3 - EXECUTION

3.1 HDPE SOLID WALL PIPE AND FITTINGS

A. Install pipe and fittings according to the manufacturer's recommendations and ASTM D2321. If the manufacturer's recommendation conflicts with ASTM D2321 the manufacturer's recommendation shall govern. Compact bedding and backfill according to manufacturer's instruction in lifts not exceeding 6 inches. Backfill shall be compacted to not less than 90 percent max density using Modified Proctor Test (ASTM D1557) regardless of manufacturer's instructions.

B. Unless flanged joints are clearly shown on the drawings, all pipes shall be joined using heat fusion. Perform heat-fusion joining in accordance with ASTM F2620. Where possible joints shall be butt fusion welded. Extrusion welding shall not be allowed unless approved by the Engineer.

C. Lay pipelines to the grades (vertical) and alignment (horizontal) indicated on the Project Drawings. Do not install pipe when trench conditions are unstable. All excavation and shoring operations shall be accordance with SECTION 31 23 33 TRENCHING AND SHORING FOR PIPE INSTALLATION.

3.2 HDPE CORRUGATED PIPE AND FITTINGS

A. HDPE Double Wall Drain Pipe: Corrugated pipe greater than 8 inches in diameter, pipe specified as culverts or pipe specified as corrugated or double-wall shall be of the diameter listed on the Project Drawings and shall be HDPE corrugated drain pipe with double wall construction. 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 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. Install pipe and fittings according to the manufacturer's recommendations and ASTM D2321. If the manufacturer's recommendation conflicts with ASTM D2321 the manufacturer's recommendation shall govern. Compact bedding and backfill in lifts not exceeding 6 inches. Backfill shall be clean sand compacted to not less than 90 percent max density using Modified Proctor Test (ASTM D1557) regardless of manufacturer's instructions. Where pipe is beneath the dike or earthen embankment, compact bedding and backfill to 95% maximum density per Modified Proctor.

C. Fittings for pipe greater than 8 inches in diameter shall be bell-and-spigot type and watertight to 10 psi. Fittings for pipe 8 inches in diameter or less shall be soil tight. Install fitting in accordance with

the manufacturer's instructions. For fittings 8 inches in diameter or less (toe drain or underdrain pipe), the Contractor shall apply a ½ diameter bead of 3M Marine Adhesive Sealant Fast Cure around the inside perimeter of the joint fitting.

D. Lay pipelines to the grades (vertical) and alignment (horizontal) indicated on the Project Drawings. Do not install pipe when trench conditions are unstable. All excavation and shoring operations shall be accordance with SECTION 31 23 33 TRENCHING AND SHORING FOR PIPE INSTALLATION.

3.3 HDPE SOLID WALL PIPE HYDROSTATIC LEAK TESTING

A. Place pipeline in final position. **Do not backfill over pipe until the system has passed the hydrostatic leak test and is approved by the Engineer.** Any backfill placed prior to testing, inspection and acceptance shall be removed at the Contractors expense.

B. The entire pipeline shall be leak tested. It may be tested in its entirety or in segments to allow backfilling of previously tested pipeline segments. If the contractor elects to test individual segments, the Contractor shall provide a flanged connection with a solid steel blind flange capable of safely withstanding the hydrostatic test loads.

C. Notify the Engineer 72 hours in advance of pipe testing.

D. Close off pipe with blind flanges. Blind flanges shall be capable of resisting the hydrostatic test pressures.

E. Pressure testing of the gravity-flow return line should be conducted in accordance with ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.

F. Hydrostatic pressure testing is required. The preferred testing medium is clean water. The test section should be completely filled with the test medium, taking care to bleed off any trapped air. Venting at high points may be required to purge air pockets while the test section is filling. Venting may be provided by loosening flanges/drainage structures, or by using equipment vents. Re-tighten any loosened flanges/drainage structures before applying test pressure.

G. Pressure gauge shall read a maximum pressure of 20-30 psi and shall have marked increments of 1 psi.

H. The test procedure consists of initial expansion, and test phases:

1. During the initial expansion phase, the test section is pressurized to 15 psi, and sufficient make-up water is added each hour for three hours to return to test pressure. The goal of the initial phase is to observe any visible leaks and to stabilize the pressure. If any visible leaks are evident, the Contractor shall stop the test and repair the leaks as required by the Engineer. A new test will begin after the Contractor has made sufficient repairs.

2. After the initial expansion phase, about four hours after pressurization, the test phase begins. At the start of the test phase reduce the pressure to 10 psi and hold for one hour. During the test phase, the pressure shall remain within the allowance indicated in ASTM F2164.

3. If no visible leakage is observed, and pressure during the test phase remains within the allowance for the 1-hour test period, a passing test is indicated.

4. If a failing test occurs, the Contractor shall examine the pipe and fittings to determine the location of the leak and repair the leak. The Contractor shall conduct subsequent leak tests until a passing test occurs.

I. Do not lift, drag or otherwise move pipe after testing. If for any reason pipe has to be moved or lifted, repeat leak test.

J. Upon approval by the Engineer, backfill pipe in accordance with the Project Drawings and Specifications.

–END OF SECTION--

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SECTION 34 71 00

ROADWAY STABILIZATION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this section consists of the application of a shell-rock **(or crushed concrete)** stabilized road base material to the surfaces of specified portions of the dike perimeter road, access roads, and dike ramps to provide a firm surface capable of supporting vehicular traffic.

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 D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

B. Florida Department of Transportation (FDOT)

FDOT Standard Specifications for Road and Bridge Construction

1.3 SUBMITTALS

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

A. Stabilization Material Supplier

1. Submit information from the stabilization material supplier providing date demonstrating the material meets specifications. Include the FDOT source number of the supplier with this information.
2. After approval of supplier's information, Contractor shall have one truck load of shell rock (or crushed concrete) material delivered to the site for inspection by the Engineer. Upon approval by the Engineer, the Contractor may then order material on an as-needed basis.

B. Compaction Control and Quality Control Tests

1. Submit Compaction Control and Quality Control test results to the Engineer for review. Test results should be submitted within two (2) calendar days after the completion of each test.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Crushed concrete may be substituted for shellrock base material. Crushed concrete shall meet FDOT specifications and shall be clean of debris and reinforcing steel with no individual concrete pieces greater than 2 inches in diameter.**

B. Stabilized Shell-Rock Road Base Material Data

Stabilization material shall meet the requirements of one of the following **except the maximum fine material passing the 200 sieve shall be 7%:**

1. FDOT Standard Specification Section 913 Shell Material
2. FDOT Standard Specifications Section 913A for Shell-Rock Material
3. FDOT Standard Specification Section 915 Cemented Coquina Shell Material

C. Subgrade

1. The material for the subgrade shall consist of suitable soil as specified in Section 31 23 00 – DIKE AND EARTHWORK CONSTRUCTION.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. General

1. Before stabilizing operations begin, construct the area to be stabilized to the subgrade elevation and cross slope indicated in the Drawings. Bring the surface of the subgrade to a plane approximately parallel to the plane of the proposed finished surface.

2. The grade to be stabilized may be processed in one course, unless the equipment and methods being used do not provide the required uniformity, particle size limitation, compaction, and other desired results, in which case, the Engineer will direct that the processing be done in more than one course.

B. Subgrade Construction

1. Construct the subgrade as specified in Section 31 23 00 – DIKE AND EARTHWORK CONSTRUCTION.

C. Application of Stabilizing Material

1. Spread the stabilizing materials uniformly over the area to be stabilized.

D. Compaction

1. Compact the stabilization material to 95% max density (Modified Proctor ASTM D 1557) within the entire limits of the width and depth of the area to be stabilized. Compact the materials at a moisture content required to achieve the specified compaction. If the moisture content of the material is improper for attaining the specified density, moisten the material or permit it to dry until the proper moisture content for the specified compaction is reached.

E. Finish Grading

1. Shape the completed stabilized grade to conform with the finished grades indicated in the Project Drawings. Check the grade by the use of elevations taken, or other means approved by the Engineer.

F. Tolerances

1. The thickness of the stabilized road base shall be within +2 inches or -1 inch of the thickness indicated on the Project Drawings.

3.2 QUALITY CONTROL TESTING

A. Perform 4-point Modified Proctor Test using ASTM D 1557 on a sample of stabilization material. The sample shall be approved by the Engineer or the Engineer's representative. Use the maximum density from the compaction curve (moisture density relationship curve) to determine the maximum dry density of the stabilization material. Perform in-place field density testing in accordance with ASTM D2922 for every 1,000 square yards of stabilization material installed.

3.3 MAINTENANCE OF COMPLETED GRADE

A. After the grade has been completed as specified above, maintain it free from ruts, depressions and any damage resulting from erosion, the hauling or handling of materials, equipment, tools, etc. Such responsibility shall include any repairs or replacement necessary to reconstruct the grade in the event of erosion or other damage occurring to the previously compacted grade. Any such work required for repair or re-installation shall be at the Contractor's expense.

-- End of Section --

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SECTION 35 42 37

RIP-RAP AND EROSION PROTECTION STONE

PART 1 - GENERAL

1.1 SUMMARY

A. The Work covered by this section consists of furnishing all labor, materials, and equipment to construct riprap splash pads and other erosion protection stone as shown on the Project Drawings.

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 for Testing and Materials

ASTM C88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D6473	Specific Gravity and Absorption of Rock for Erosion Control

B. Florida Department of Transportation (FDOT)

FDOT Standard Specifications for Road and Bridge Construction

1.3 SUBMITTALS

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

A. Riprap Product Data

1. Submit a description of the source material, the quarry location, and FDOT source number.

B. Stone Test Results

1. The Contractor shall submit copies of stone gradation and material quality testing results demonstrating that the stone meets all the requirements of the Specifications prior to ordering material.

A. Filter Fabric Product Data

1. The Contractor shall submit manufacturer's information verifying the material meets the specification prior to installation. Contractor's submittal shall include a 6" x 6" physical sample of the filter fabric.

1.4 STONE SOURCES

A. All stone shall be durable natural stone. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its

deterioration from natural cases. The stone shall be clean and reasonable free from soil , quarry fines, and shall contain no refuse.

PART 2 - PRODUCTS

2.1 RIPRAP AND EROSION PROTECTION STONE

A. Riprap and Erosion Protection Stone shall consist of hard durable natural stone meeting the requirements herein. Crushed concrete will not be allowed.

B. Where bank and shore stone is specified, stone shall meet the physical property requirements outlined in FDOT Standard Specifications for Road and Bridge Construction section 530-2.1.3.1 Rubble (Bank and Shore Protection).

C. Where ditch rubble is specified, stone shall conform to FDOT Standard Specifications for Road and Bridge Construction section 530-2.1.3.2 Rubble (ditch lining) except the minimum weight of stone shall be 140 pounds per cubic foot.

D. All rip-rap stone and erosion protection stone including bank and shore stone and ditch rubble shall meet the physical requirements for absorption, los angeles abrasion, soundness, flat and elongated pieces, dirt and fines, and drop test as specified in the FDOT Standard Specifications for Road and Bridge Construction Section 530-2.1.3.3.

E. Where smaller coarse-aggregate size stone is specified, stone shall comply with FDOT Standard Specifications for Road and Bridge Construction Section 901 Coarse Aggregates in addition to the requirements herein. Size of the stone shall be indicated on the drawings. Where a gradation of stone is specified, gradation shall conform to the applicable FDOT specification sections in section 901. Minimum unit weight of any coarse-aggregate size stone used shall be 140 pounds per cubic foot. Coarse aggregate shall be natural stone consisting of quartz, granite, limestone, dolomite, or sandstone complying with FDOT section 901-2.1, 901-2.2, or 901-2.3. Cemented coquina rock will not be allowed.

2.2 FILTER FABRIC

A. Filter fabric used in conjunction with rip-rap or erosion protection stone shall be Mirafi FW404 woven filter fabric or engineer approved equivalent.

PART 3 - EXECUTION

3.1 MATERIAL HANDLING AND STORAGE

A. Stone shall be transported and handled in a manner that minimizes stone breakdown and contamination with dirt, organic matter, or other objectionable material and debris. The filter fabric shall be stored in a clean, dry area where it will not be damaged. Fabric rolls shall remain in their original packaging until needed.

3.2 SITE PREPARATION

A. Areas to be covered by stone shall be free of all stumps, logs, and other objectionable debris. Filter fabric shall be placed on all areas to be covered by stone in a manner recommended by the geotextile manufacturer. The fabric shall be laid flat along the slopes, pulled tight, and pinned where necessary to hold it in place until the stone is placed. A one (1) foot minimum overlay shall be required at all seems. Under no condition shall any stones be placed without

filter fabric. Torn, punctured, or over-elongated sections of filter fabric shall be removed and replaced with new, undamaged fabric.

3.3 STONE PLACEMENT

A. Stone shall be placed in a manner that prevents damage to the filter fabric and minimizes stone breakage. Stone shall be handled in a manner that minimizes the introduction of dirt, organic matter, or other objectionable materials into the riprap splash pad and minimizes the creation of turbidity in the surrounding waters. Turbidity barriers and/or other measures shall be used to ensure compliance with permit requirements and state water quality standards.

--End of Section--

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SECTION 40 05 61

RESILIENT WEDGE GATE VALVE

PART 1 - GENERAL

1.1 SUBMITTALS

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

A. General Information:

1. Provide literature that includes information on performance and operation of the valve and floorstand, materials of construction, gearing, size, flanges, seals, pressure rating, and other features demonstrating that the valve meets the specifications outlined herein.

PART 2 - PRODUCTS

2.1 RESILIENT WEDGE GATE VALVES

A. General

1. Valves shall be resilient wedge gate valves of the size shown on the drawings and shall conform to AWWA C515, having a working pressure rating of 250 psi.

2. Valves shall be designed for buried service and shall include a stem extension and floorstand. Floorstand shall have an indicator showing the valve position.

3. Valve closures shall be a geared manual wheel type requiring at least 450 revolutions to open/close the valve.

4. Valves shall have flanged ends matching the flanged ends of the proposed HDPE pipe connecting to the valve.

5. Valve shall have a position indicator and shall have the word “OPEN’ cast into the metal to indicate direction to open.

6. Valves shall be supplied with O-Ring seals at all joints.

7. Contractor shall install a 5 ft x 5 ft x 6 inch thick 5000 psi concrete pad on grade to install the floorstand on. Reinforce concrete pad with #3 bars at 6 inch on center in both directions placed at mid-depth.

B. Materials

1. Valve Body: Ductile iron per ASTM A536 minimum tensile strength 70,000 psi.

2. Stem and Nut: Cast bronze minimum yield strength 32,000 psi.

3. Handwheel: Cast iron or ductile iron.

4. Disc: Ductile iron per ASTM A536.

5. Coating: Coat all cast iron surfaces with epoxy paint system per AWWA C550.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valve in accordance with manufacturer's instruction. Coordinate flange types and connections to match HDPE pipe.

B. Contractor shall install a schedule 40 PVC or other Engineer approved casing around the buried extension stem.

C. Close valve during piping system and manhole pressurized leak test (13-15 psi test pressure). Valve shall remain leak-free during piping system testing.

-- END OF SECTION --

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDICES

PREPARED FOR THE
FLORIDA INLAND NAVIGATION DISTRICT

By

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Certificate of Authorization #4815
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(Taylor Engineering Contract No. C2014-026)

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DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX A

Environmental Permits

FLORIDA DEPARTMENT OF Environmental Protection

CENTRAL DISTRICT OFFICE
3319 MAGUIRE BLVD., SUITE 232
ORLANDO, FLORIDA 32803

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

Permittee/Authorized Entity:
Florida Inland Navigation District (FIND)
Mark Crosley, Executive Director
MCrosley@aicw.org
1314 Marcinski Road
Jupiter, Florida 33477

FIND BV-4B Dredge Material Management Area (DMMA)
Temporary Stormwater Management Discharge Structure

Authorized Agent:
Taylor Engineering, Inc.
Jonathan T. Armbruster, P.E.
JArmbruster@TaylorEngineering.com
10199 Southside Boulevard, Suite 310
Jacksonville, Florida 32256

Environmental Resource Permit – Modification
State-Owned Submerged Lands Authorization – Not on State Lands
Army Corps of Engineers – Separate Authorization May Be Required

Permit No.: 344990-002-EM
Oculus Facility-Site ID Search: ERP 344990

Modification of Permit No.: 344990-001-EI
344990-001-EI Permit Issuance Date: September 22, 2017
344990-001-EI Modification Issuance Date: November 5, 2021
344990-001-EI Construction Phase Expiration Date: September 22, 2022
344990-001-EI Construction Phase Extended To: September 22, 2027

FLORIDA DEPARTMENT OF
Environmental Protection

CENTRAL DISTRICT OFFICE
3319 MAGUIRE BLVD., SUITE 232
ORLANDO, FLORIDA 32803

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

NOTICE OF PERMIT MODIFICATION

Florida Inland Navigation District (FIND)
Mark Crosley, Executive Director
MCrosley@aicw.org
1314 Marcinski Road
Jupiter, Florida 33477

Permit Modification No.: 344990-002-EM
Permittee: FIND
Project: FIND DMMA BV-4B – Temporary Stormwater Management Discharge Structure

Dear Mr. Crosley:

The request to modify the above referenced permit has been received and reviewed by Department staff. This permit modification authorizes the construction of a temporary stormwater management discharge structure while constructing the authorized activities within 344990-001-EI. The temporary structure will be anticipated to discharge during extreme storm events.

The FIND DMMA BV-4B is located southwest of Cuyler Street and Hammock Road, in Sections 20 and 21, Township 21 South and 35 East, Eustis, Brevard County.

Permitting History

- 344990-001-EI is individual permit that authorized the construction of FIND DMMA BV-4B (BV-4B) to dewater and store the material dredged from the northern half of Reach II of the Intracoastal Waterway. BV-4B proposed unavoidable wetland impacts. 2.51 freshwater forested and 1.54 freshwater herbaceous UMAM bank credits from Farmton Mitigation Bank were proposed to be purchased by the applicant, to offset the direct and secondary wetlands impacts with a total functional loss of 4.095 acres. The permit was issued on September 22, 2017, with an expiration date of September 22, 2022.

Since the proposed modification is not expected to result in any adverse environmental impact or water quality degradation, the permit is hereby modified as requested. By copy of this letter and the attached exhibits, we are notifying all necessary parties of the modification.

This permit modification changes the 344990-001-EI permit construction expiration date from September 22, 2022 to September 22, 2027. This permit modification does not alter the Specific or General Conditions or monitoring requirements of the permit(s) and permit modifications, unless stated herein. This letter must be attached to the original permit(s), permit modifications and any future permit documents.

NOTICE OF RIGHTS

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency action, the hearing process may result in a modification of the agency action or even denial of the application.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rules 28-106.201 and 28-106.301, F.A.C., a petition for an administrative hearing must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, any e-mail address, any facsimile number, and telephone number of the petitioner, if the petitioner is not represented by an attorney or a qualified representative; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;

(f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and

(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, or via electronic correspondence at Agency_Clerk@dep.state.fl.us. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant and persons entitled to written notice under Section 120.60(3), F.S., must be filed within 21days of receipt of this written notice. Petitions filed by any persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 21 days of publication of the notice or within 21 days of receipt of the written notice, whichever occurs first. You cannot justifiably rely on the finality of this decision unless notice of this decision and the right of substantially affected persons to challenge this decision has been duly published or otherwise provided to all persons substantially affected by the decision. While

you are not required to publish notice of this action, you may elect to do so pursuant Rule 62-110.106(10)(a).

The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C. If you do not publish notice of this action, this waiver will not apply to persons who have not received written notice of this action.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, or via electronic correspondence at Agency_Clerk@dep.state.fl.us, before the deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation

Mediation is not available in this proceeding.

FLAWAC Review

The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when this order is filed with the Clerk of the Department.

Judicial Review

Once this decision becomes final, any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Florida Rules of Appellate Procedure 9.110 and 9.190 with the Clerk of the Department in the Office of General Counsel (Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000) and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice must be filed within 30 days from the date this action is filed with the Clerk of the Department.

EXECUTION AND CLERKING

Executed in Orlando, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



Reggie Phillips
Program Administrator
Permitting and Waste Cleanup Program

Attachments:
Exhibit 1: Oculus Link to 344990-002-EM Engineering Drawings, 23 Pages
Exhibit 2: Oculus Link to DEP ERP_344990 Permitting Files
Exhibit 3: See the links below for Chapter 62-330, F.A.C., Forms,
Link to the Construction Commencement Notice/Form 62-330.350(1)
Link to the As-built Certification and Request for Conversion to Operational Phase/Form 62-330.310(1)
Link to the Operation and Maintenance Inspection Certification/Form 62-330.311(1)
Link to the Request to Transfer Permit/Form 62-330.340(1)

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this permit and all copies were sent on the filing date below to the following listed persons:

David Stites, Taylor Engineering, DStites@TaylorEngineering.com
Keith Knight, Taylor Engineering, KKnight@TaylorEngineering.com
Jerry Scarborough, Taylor Engineering, JScarborough@TaylorEngineering.com
Kierstin Masse, Taylor Engineering, KMasse@taylorengineering.com
Brevard County, LeeAnn.McCullough-Wham@brevardfl.gov
Mary J. Duncan, FDEP, Mary.J.Duncan@FloridaDEP.gov
Kelly L. Chase, FDEP, Kelly.L.Chase@FloridaDEP.gov
Cameron Dewey, SJRWMD, CDewey@sjrwmd.com
Marjorie Cook, SJRWMD, MCook@sjrwmd.com
ConservationPlanningServices@MyFWC.com
CompliancePermits@DOS.MyFlorida.com
MarineTurtle@MyFWC.com
ImperiledSpecies@MyFWC.com
Reggie Phillips, FDEP, Reggie.Phillips@FloridaDEP.gov
Teayann Duclos, FDEP, Teayann.Duclos@FloridaDEP.gov
Leo Angleró, FDEP, Leo.Anglero@FloridaDEP.gov

FILING AND ACKNOWLEDGMENT

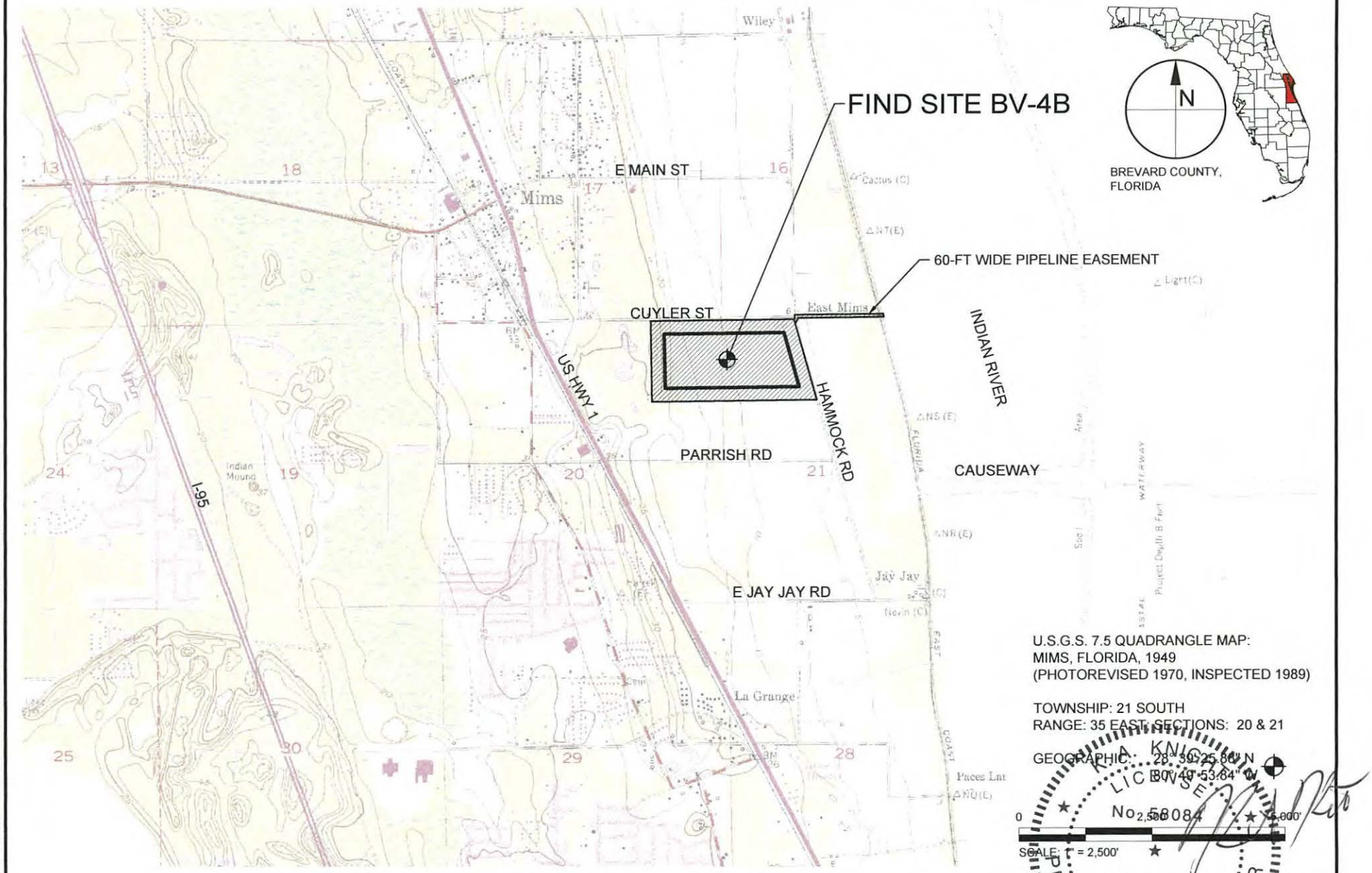
FILED, on this date, pursuant to Section 120.52, F.S., with the designated Department Clerk, receipt of which is hereby acknowledged.

Dawn M. Festa

Clerk

November 5, 2021

Date



KEITH A. KNIGHT LICENSED No. 58084 PROFESSIONAL ENGINEER STATE OF FLORIDA

10-12-21

PROJECT	C2014-026
DRAWN BY	RE
SHEET	1 of 23
DATE	SEPT 2021

SEAL
KEITH A. KNIGHT P.E.# 58084
DATE

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

FIGURE 1
LOCATION MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 PLOCATION MAP.DWG 9/13/2021 12:12:34 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ADJACENT PROPERTIES DATA OBTAINED FROM BREVARD COUNTY PROPERTY APPRAISER, APRIL 2016.
3. REFER TO ADJACENT PROPERTY OWNERSHIP TABLE IN ERP APPLICATION SECTION C, PART 1, ITEM 13

N

0 500' 1,000'

SCALE: 1" = 500'

K. A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER

10-12-21

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

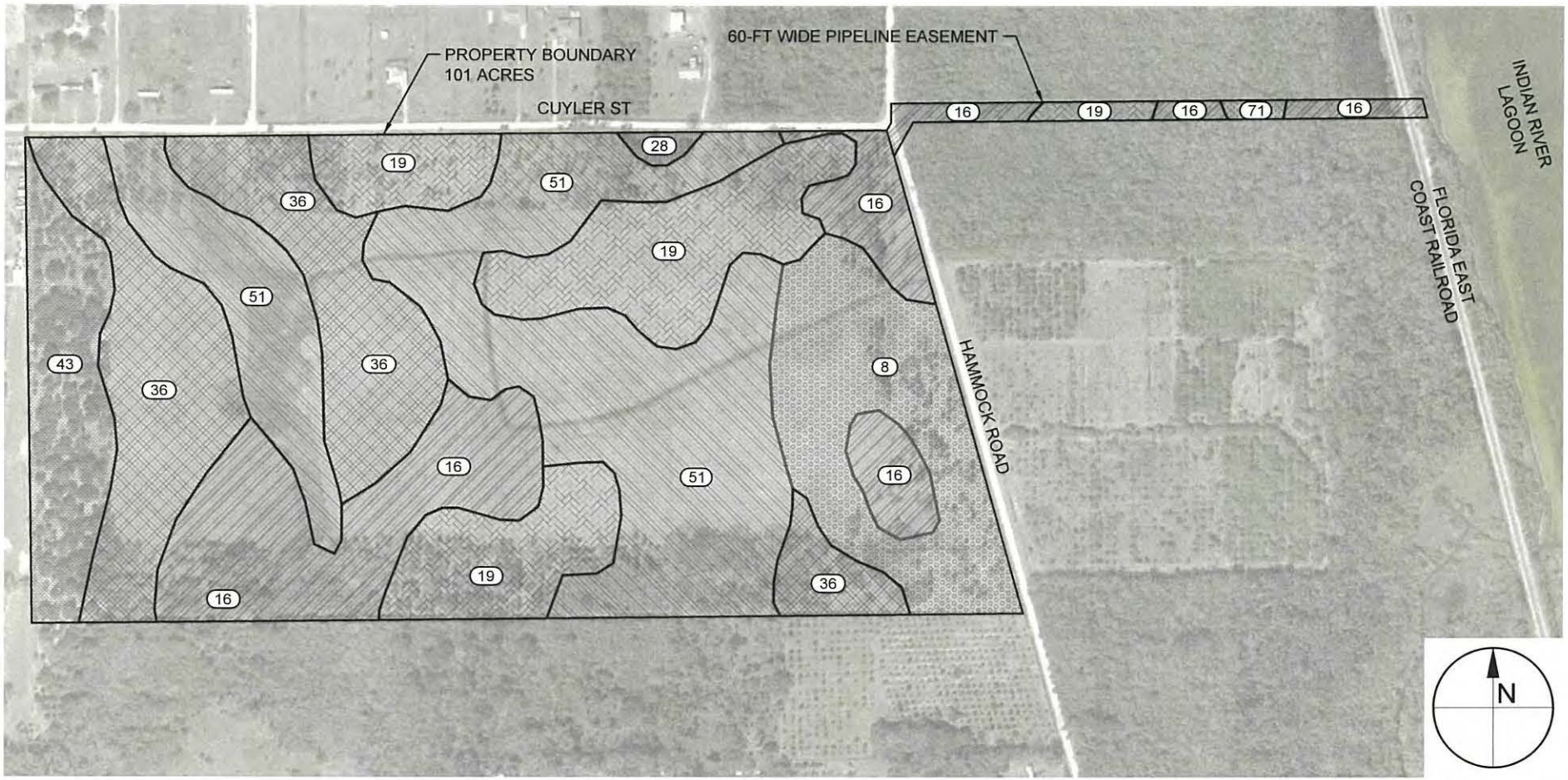
FIGURE 2
ADJACENT PROPERTIES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	2 of 23
DATE	SEPT 2021

KEITH A. KNIGHT P.E.# 58084 DATE

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITC2014-026 P-ADJACENTS.DWG 9/13/2021 12:12:50 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



SOILS CLASSIFICATIONS

ID	NAME
8	BRADENTON FINE SAND, LIMESTONE SUBSTRATUM
16	COPELAND-BRADENTON-WABASSO COMPLEX, LIMESTONE SUBSTRATUM
19	RIVIERA SAND
28	IMMOKALEE SAND
36	MYAKKA SAND, 0 TO 2 PERCENT SLOPES
43	PAOLA FINE SAND, 0 TO 5 PERCENT SLOPES
51	POMPANO SAND
71	WABASSO SAND

0 500' 1,000'
SCALE: 1" = 500'

K. A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
10-12-21

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

FIGURE 3
USDA/NRCS SOILS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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DATE	SEPT 2021

KEITH A. KNIGHT P.E.# 58084 DATE

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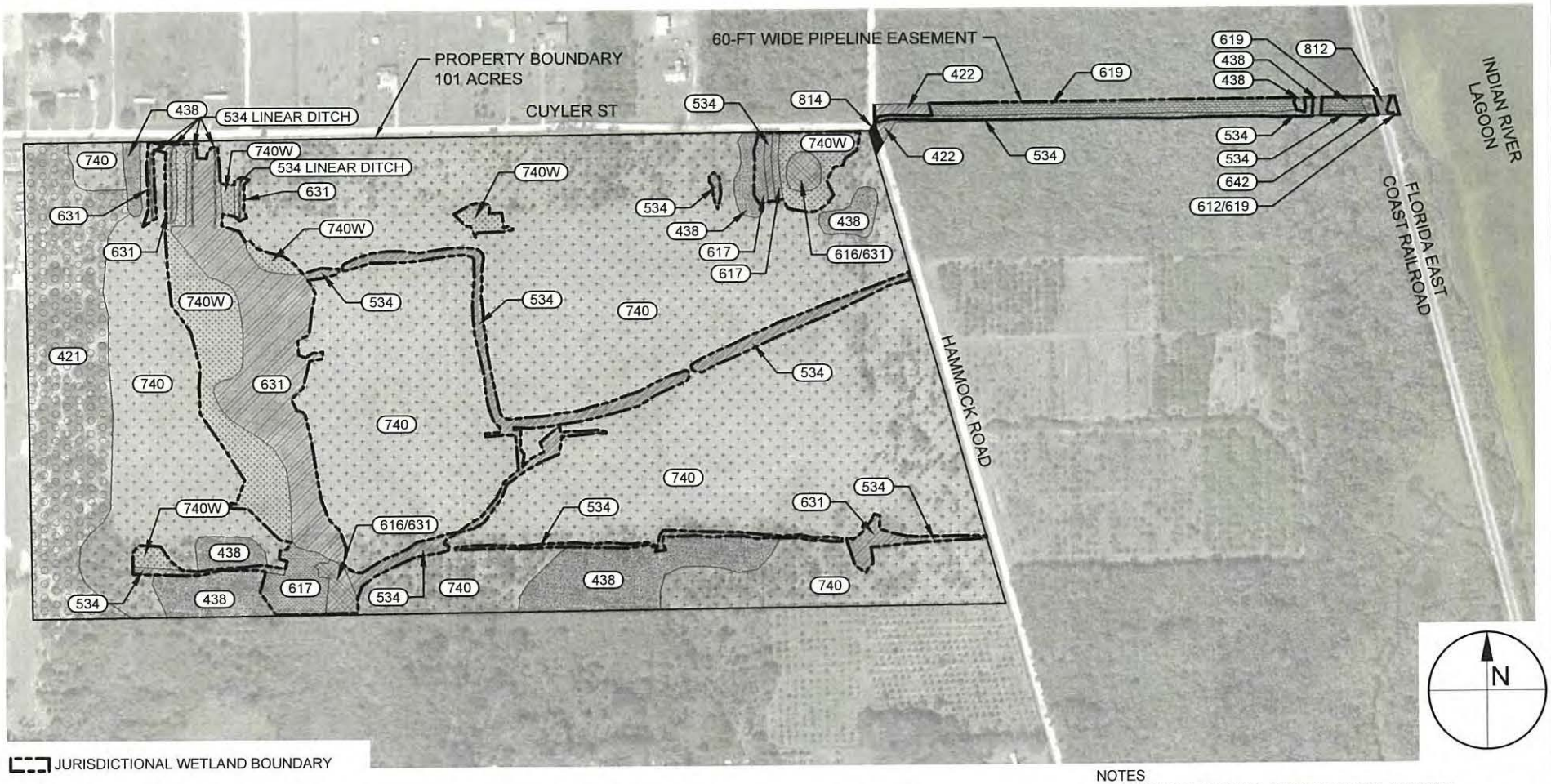
PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



JURISDICTIONAL WETLAND BOUNDARY

BV-4B PROPERTY FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
421	8.33	XERIC OAK
438	5.30	MIXED HARDWOODS
534	3.37	DRAINAGE / IRRIGATION DITCHES
616 / 631	0.60	INLAND PONDS AND SLOUGHS / WETLAND SCRUB
617	1.09	MIXED WETLAND HARDWOODS
631	5.74	WETLAND SCRUB
740	71.92	DISTURBED LAND
740W	4.65	DISTURBED LAND - WET

BV-4B PIPELINE EASEMENT FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
422	0.32	BRAZILIAN PEPPER
438	0.07	MIXED HARDWOODS
534	0.54	DRAINAGE / IRRIGATION DITCHES
612/619	0.03	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS
619	1.25	EXOTIC WETLAND HARDWOODS
642	0.05	SALTWATER MARSH
812	0.06	RAILROADS
814	0.07	ROADS

NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 20-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC., FIELD-VERIFIED BY FDEP & USACE (JULY 2014); SURVEYED BY BRADY SURVEYING, INC.
4. COMMUNITIES CLASSIFIED ACCORDING TO FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM (FLUCCS)

0 500' 1,000'
SCALE: 1" = 500'

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

FIGURE 4
EXISTING CONDITIONS FLUCCS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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SHEET	4 of 23
DATE	SEPT 2021

KEITH A. KNIGHT P.E.# 58084 DATE

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITC2014-026 P-EXISTFLUCCS.DWG 9/13/2021 12:13:25 PM

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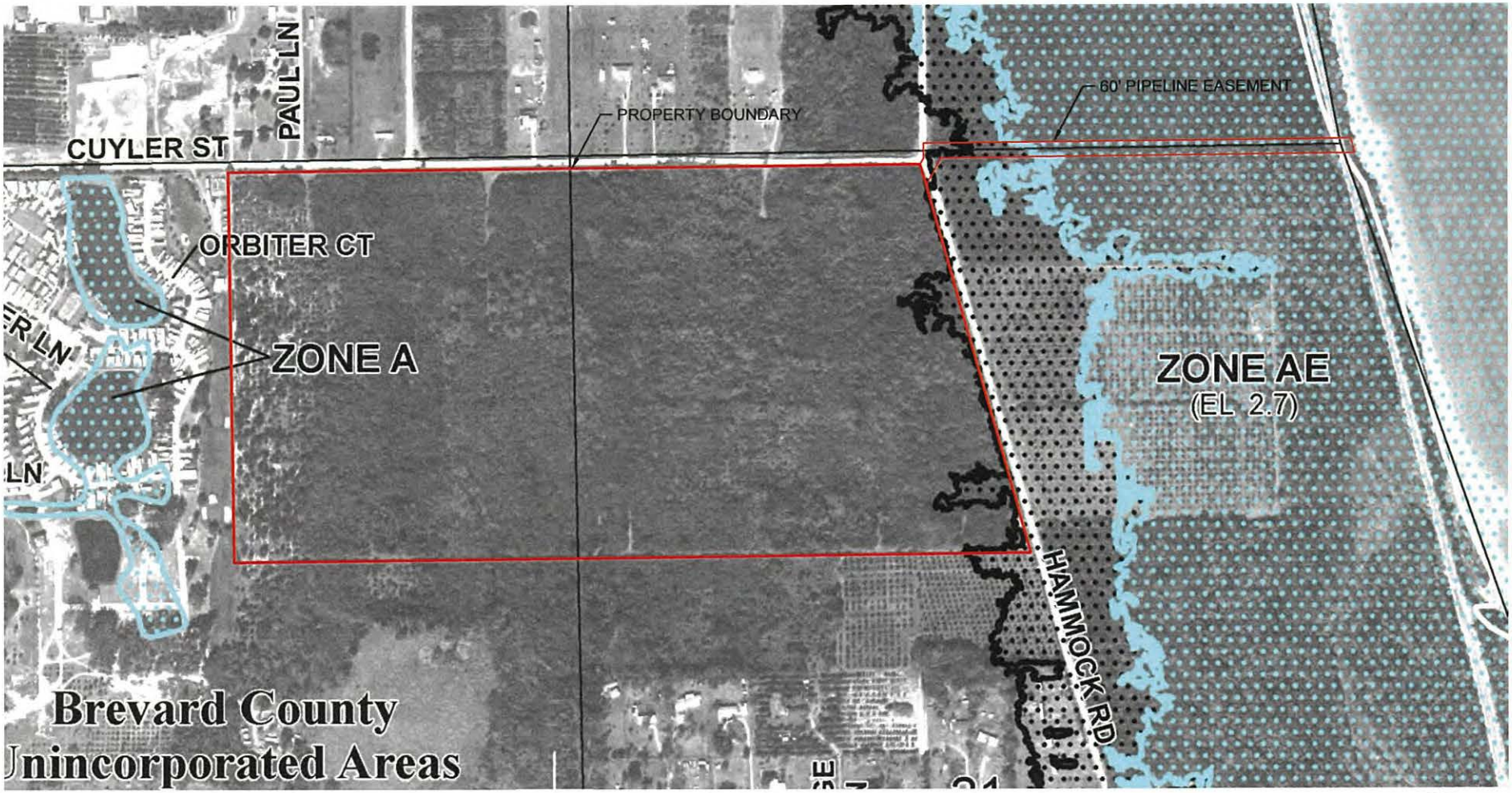

N

0 600 1,200'

SCALE: 1" = 600'

K. A. KNIGHT LICENSE NO 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER

10-12-21

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

FIGURE 5
FEMA FLOOD ZONE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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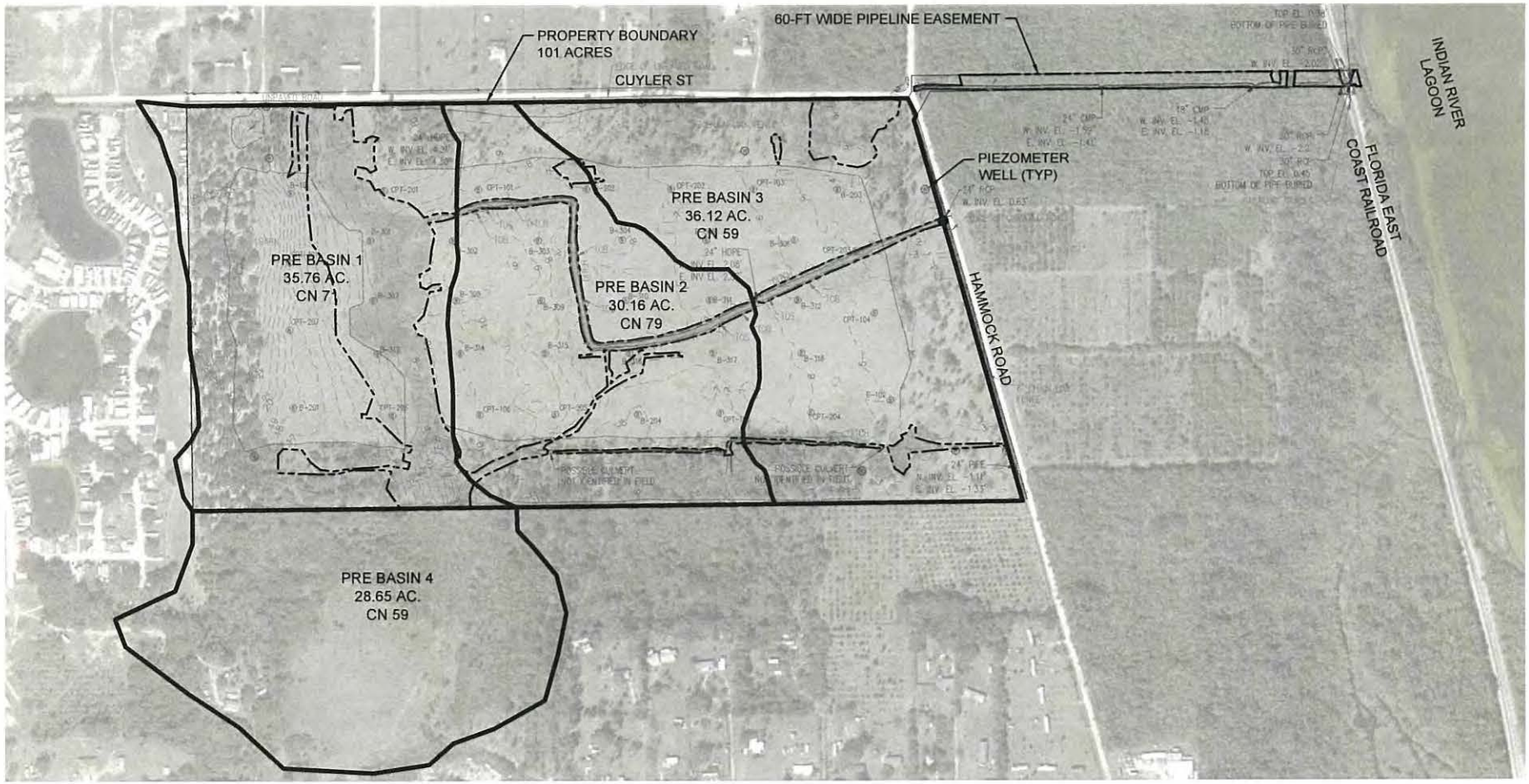
DRAWN BY	AF
SHEET	5 of 23
DATE	SEPT 2021

SEAL

KEITH A. KNIGHT P.E.# 58084 DATE

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITS\C2014-026 P-FEMA.DWG 9/13/2021 12:13:42 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY
OUTFALL

0 600' 1,200
SCALE: 1" = 600'

K. A. KNIGHT LICENSE No. 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
12-12-21

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

FIGURE 6
PRE-DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
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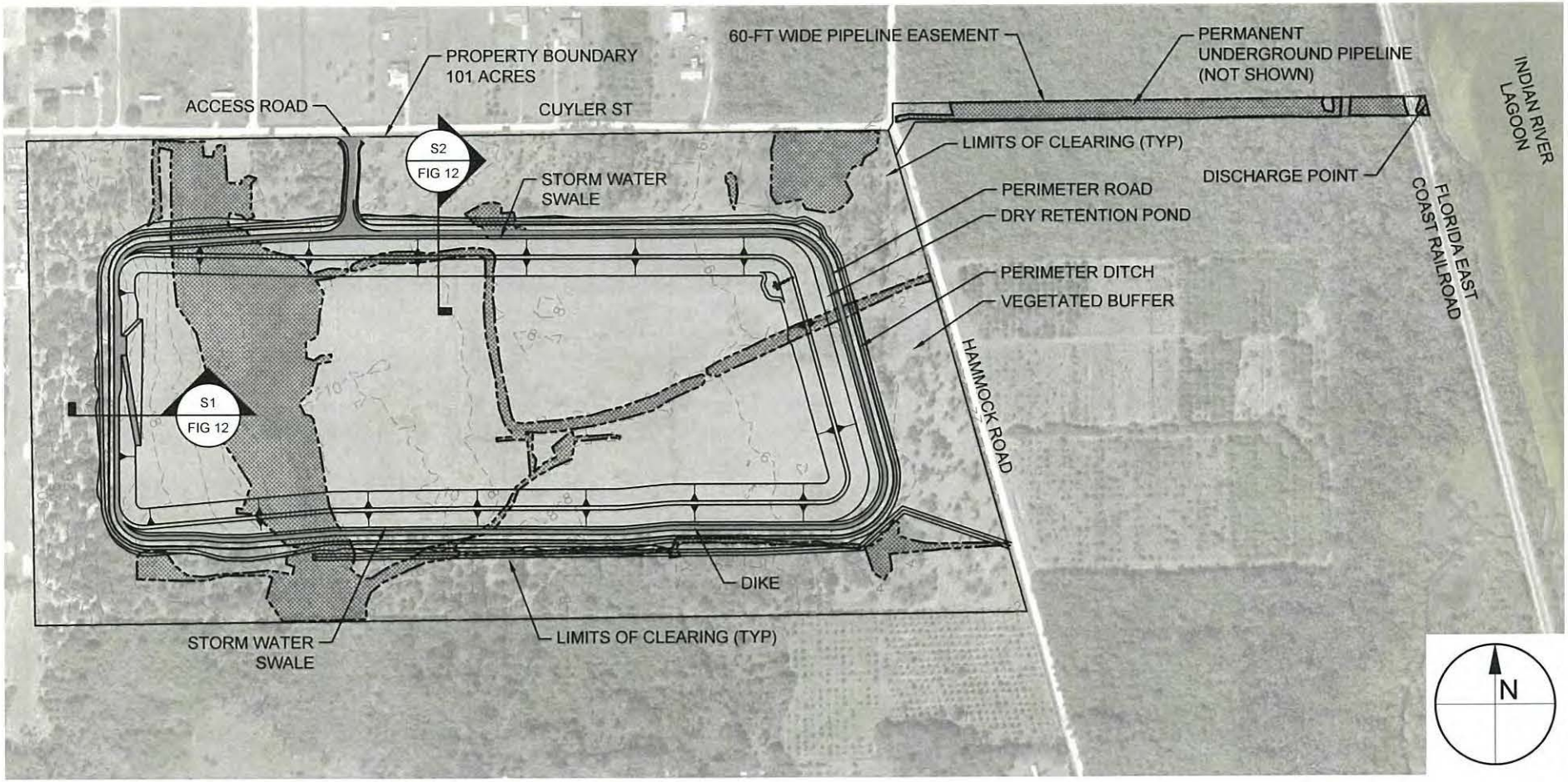
SEAL
KEITH A. KNIGHT P.E.# 58084 DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITTING\C2014-026 P-PREDEVBASIN.DWG 9/13/2021 12:14:00 PM



NOTES

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4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
7. SITE ACREAGE WITHIN PROPERTY BOUNDARY IS 101 AC.
8. CLEARED AREA IS 63 AC INCLUDING PIPELINE EASEMENT.
9. DMMA CAPACITY IS ESTIMATED AT 710,710 CY

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000'
SCALE: 1" = 500'

K.A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
10-12-21

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

FIGURE 7
SITE PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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KEITH A. KNIGHT P.E.# 58084 DATE

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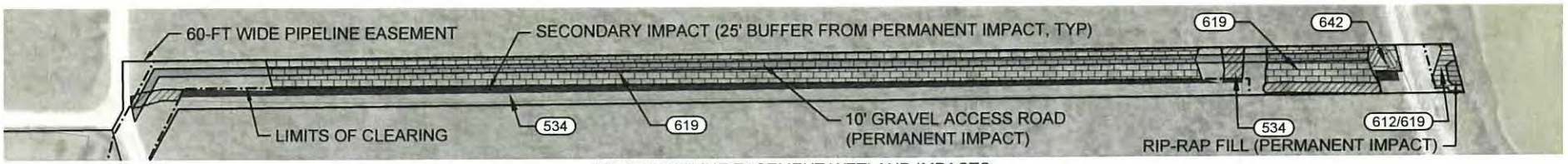
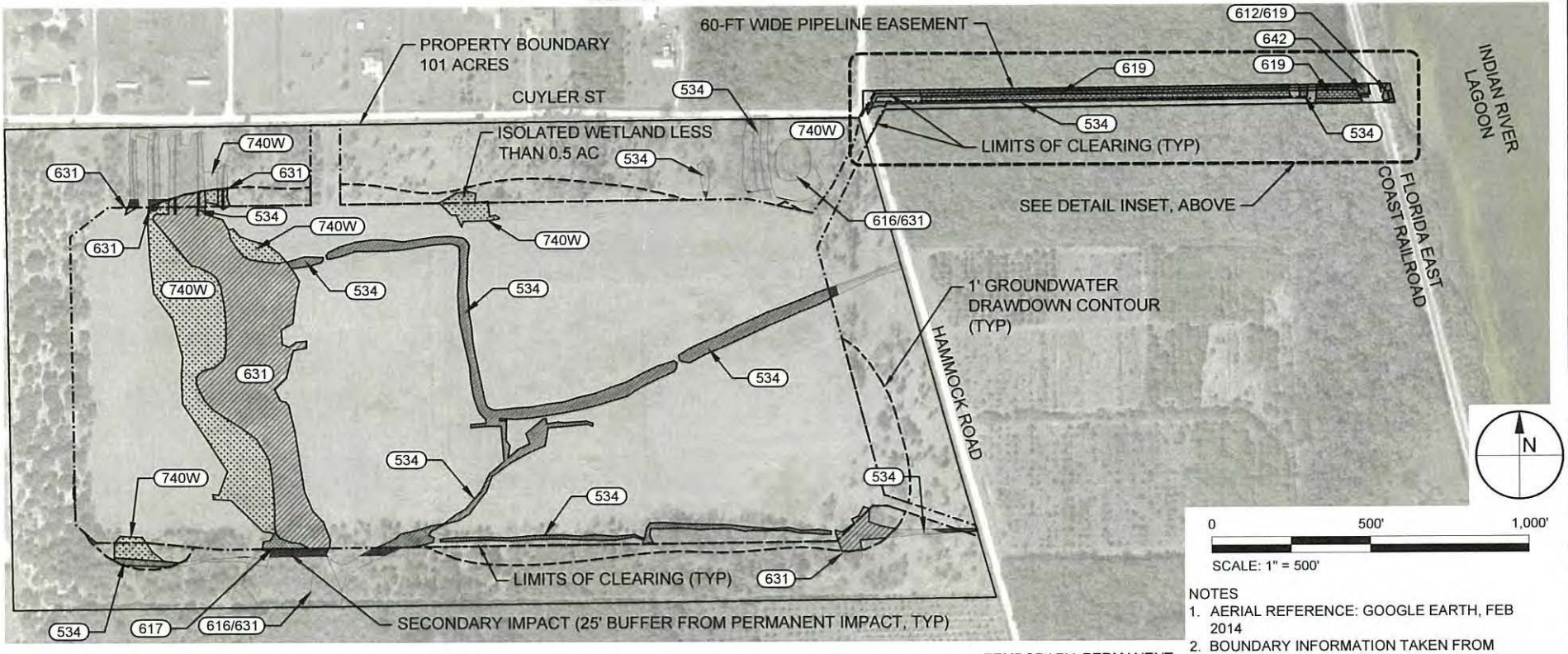
PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



INSET: PIPELINE EASEMENT WETLAND IMPACTS
SCALE: 1" = 200'



NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 27, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
4. PERMANENT IMPACTS WITHIN BV-4B PROPERTY DETERMINED BY EITHER CLEARING LIMITS OR 1-FT GROUNDWATER DRAWDOWN CONTOUR, WHICHEVER RESULTS IN GREATEST IMPACT.

BV-4B PROPERTY WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	PERM. IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	2.64
617	MIXED WETLAND HARDWOODS	0.08
631	WETLAND SCRUB	4.97
740W	DISTURBED LAND - WET	3.55
	TOTAL:	11.24

BV-4B PIPELINE EASEMENT WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	TEMPORARY IMPACT ACREAGE	PERMANENT IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	0.08	0.01
619	EXOTIC WETLAND HARDWOODS	0.83	0.30
642	SALTWATER MARSH	0.03	N/A
612/619	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS	0.03	0.01
	TOTAL:	0.97	0.32

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

FIGURE 8
WETLAND IMPACTS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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SHEET	8 of 23
DATE	SEPT 2021

SEAL
KEITH A. KNIGHT P.E.# 58084
DATE 10-12-21

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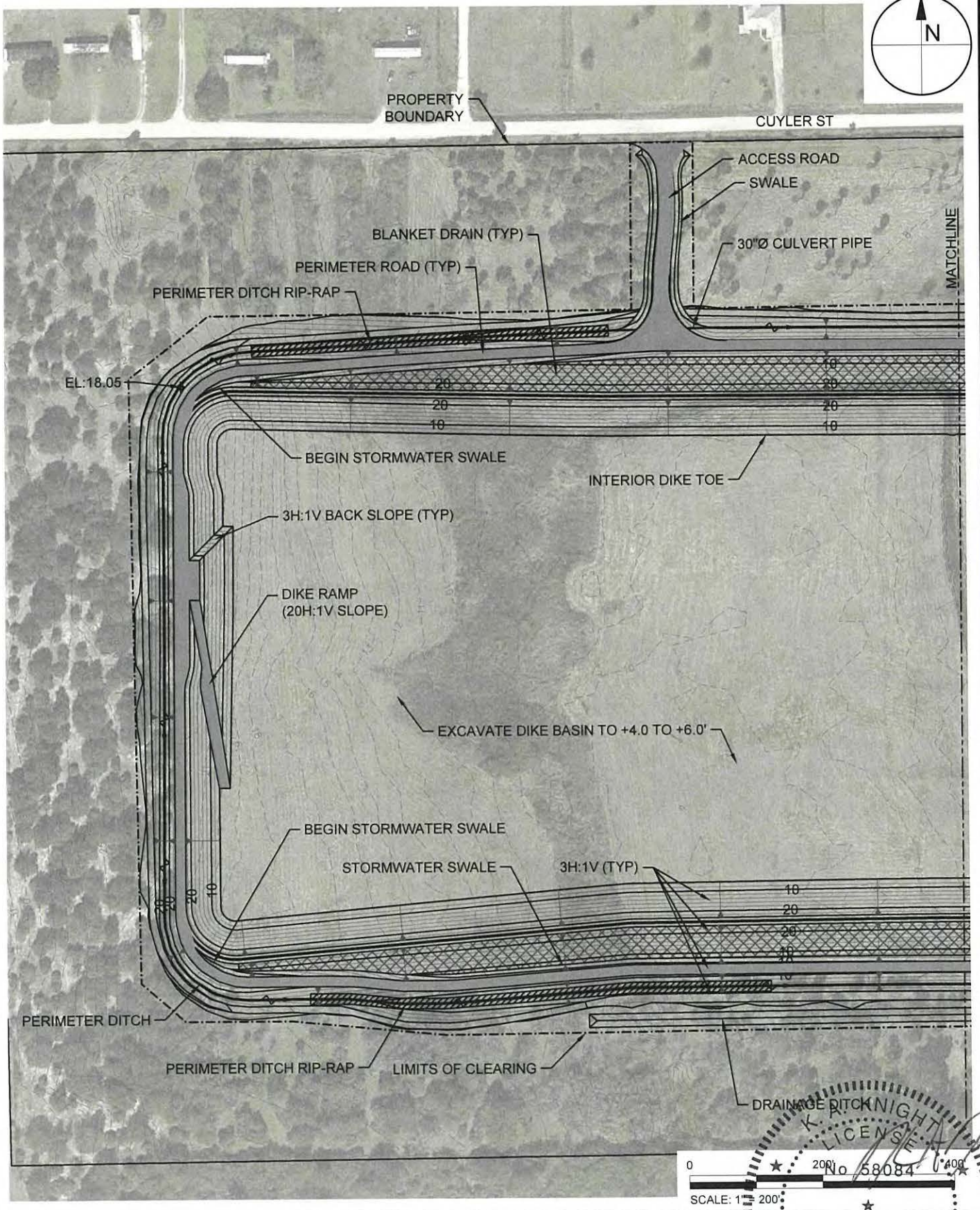
PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



K. A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER 10-11-21

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

FIGURE 9
GRADING PLAN - WEST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	9 of 23	SEPT 2021

KEITH A. KNIGHT P.E. #58084 DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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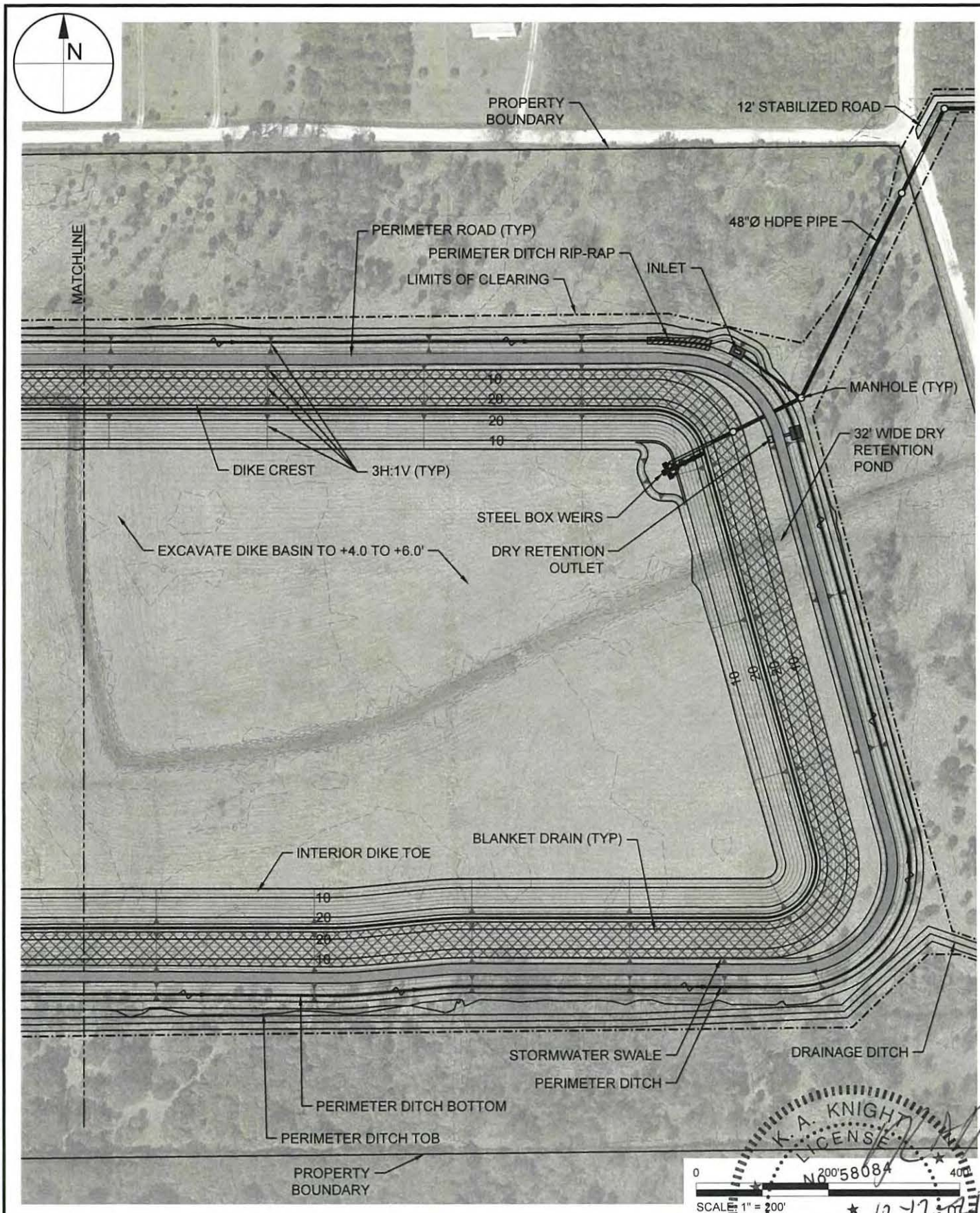

K. A. KNIGHT LICENSE 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER SEAL 12-12-21

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

FIGURE 10
GRADING PLAN - EAST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	10 of 23	SEPT 2021

KEITH A. KNIGHT P.E. # 58084 DATE

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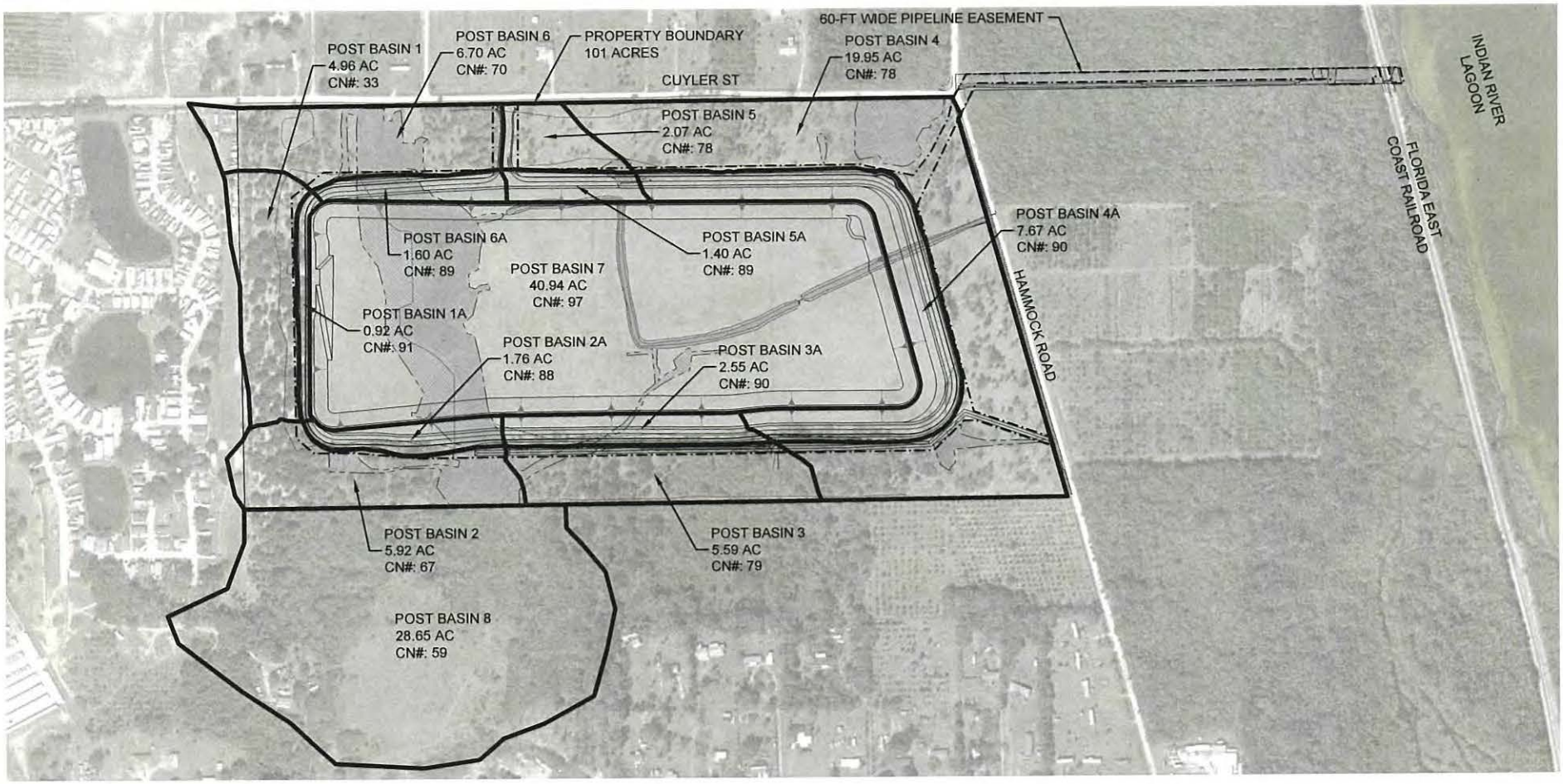
PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

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3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
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5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000'
SCALE: 1" = 500'

K. A. KNIGHT LICENSED No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
12-22-21
SEAL
KEITH A. KNIGHT P.E. # 58084
DATE

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

FIGURE 11
POST DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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DATE	SEPT 2021

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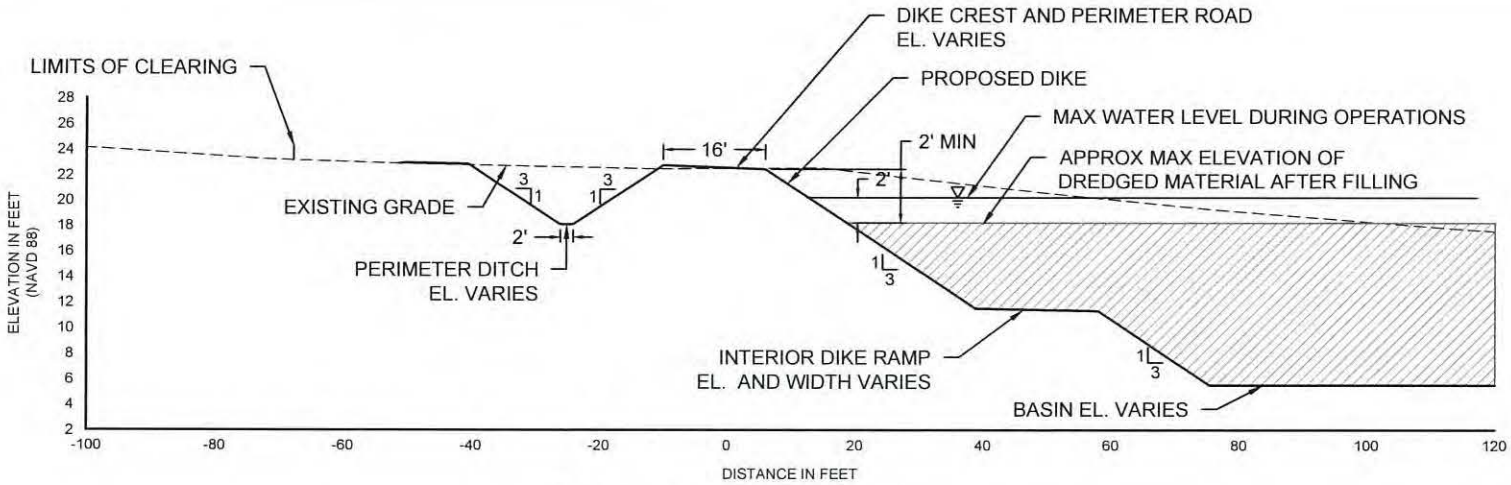
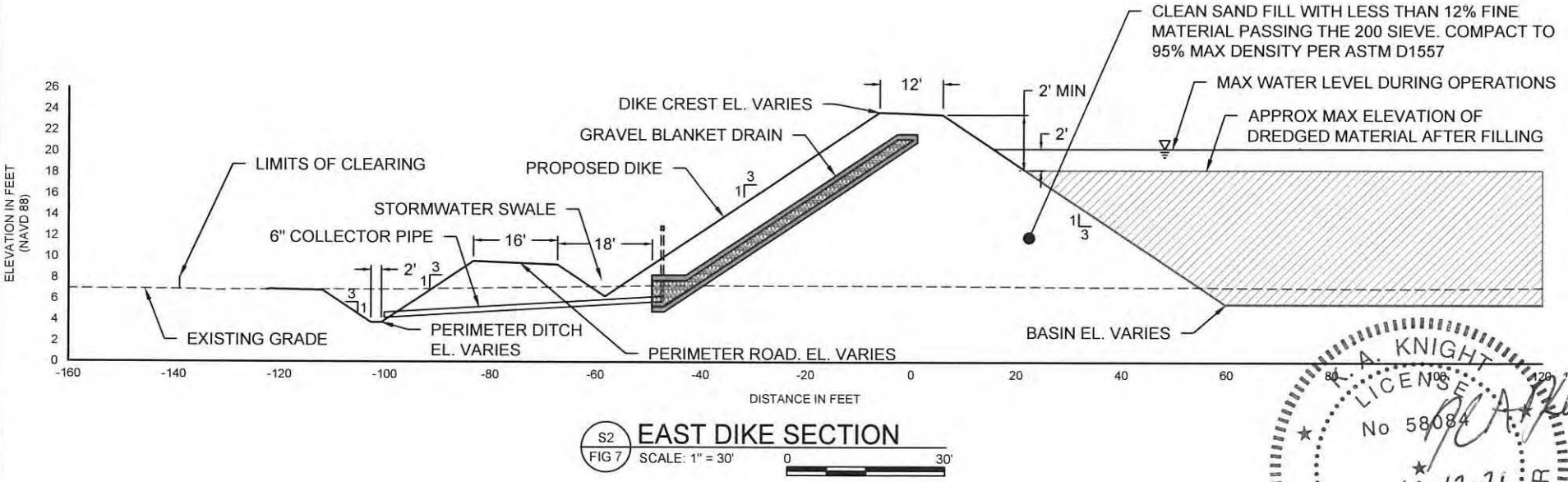


S1 FIG 7 **WEST DIKE SECTION**
SCALE: 1" = 30' 0 30'



S2 FIG 7 **EAST DIKE SECTION**
SCALE: 1" = 30' 0 30'

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12-12-21
KEITH A. KNIGHT P.E.# 58084 DATE

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JACKSONVILLE, FL 32256
CERTIFICATE OF AUTHORIZATION # 4815

FIGURE 12
DIKE SECTIONS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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SHEET	12 of 23
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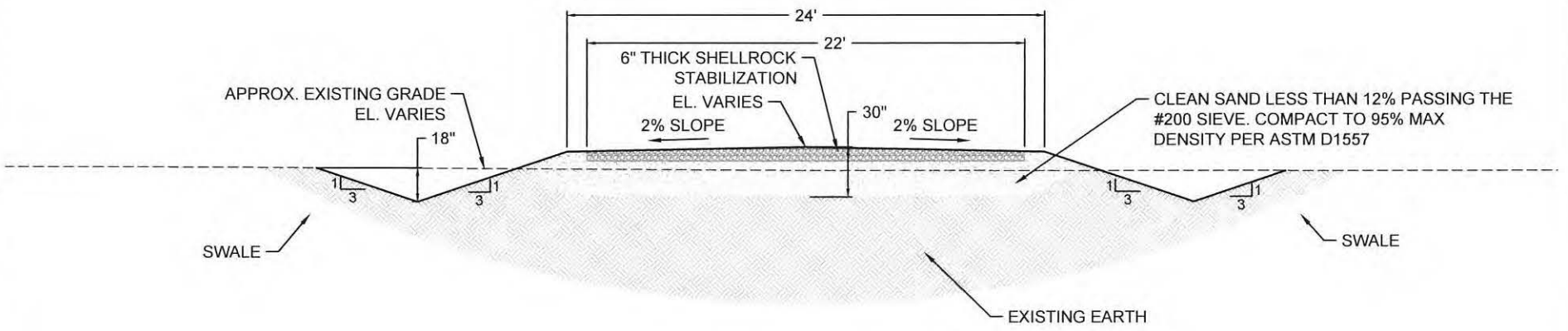

S4 / ### ACCESS ROAD SECTION
SCALE: 1" = 8' 0 8'

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FIGURE 13
ACCESS ROAD SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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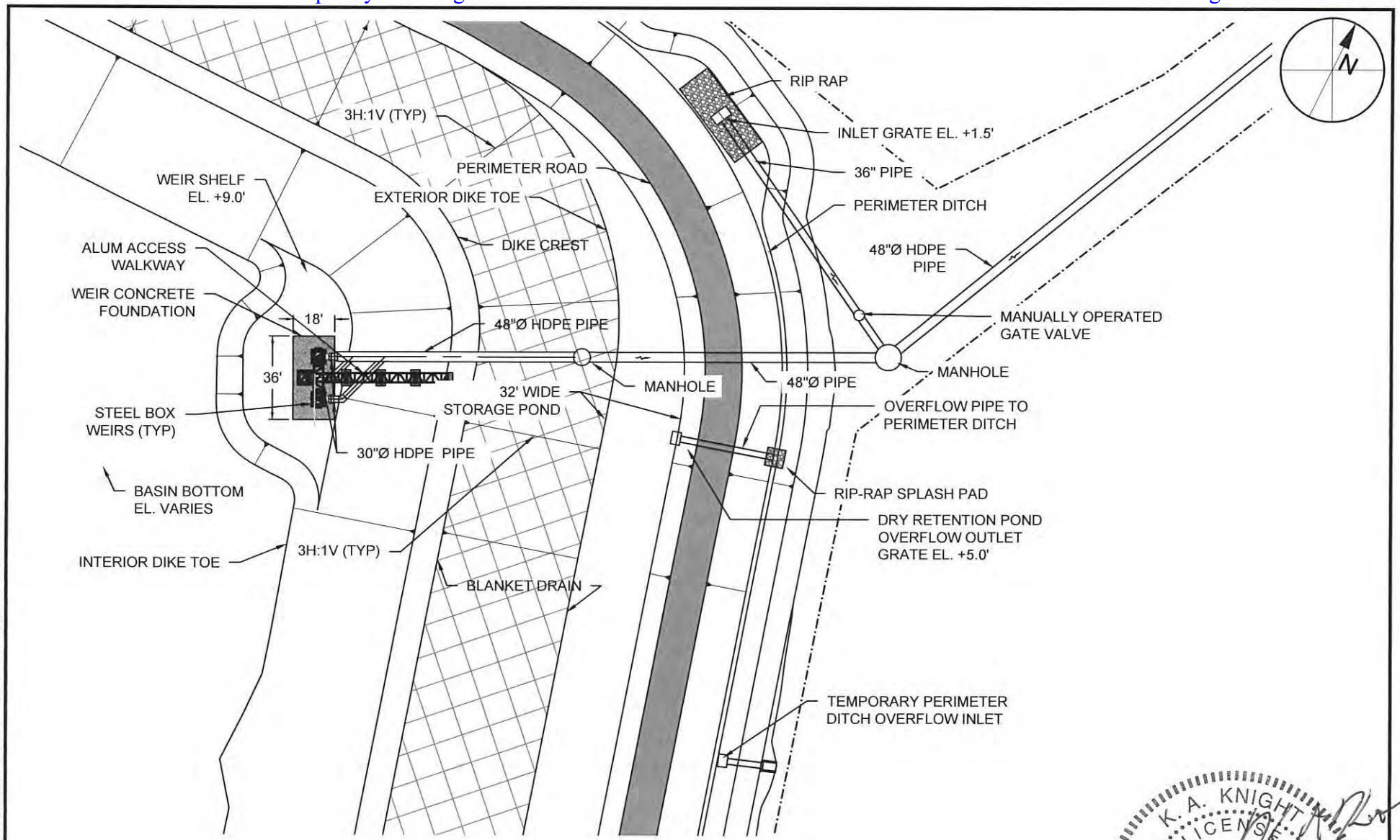

P1 / ### WEIR PLAN
SCALE: 1" = 60' 0 60'

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FIGURE 14
WEIR PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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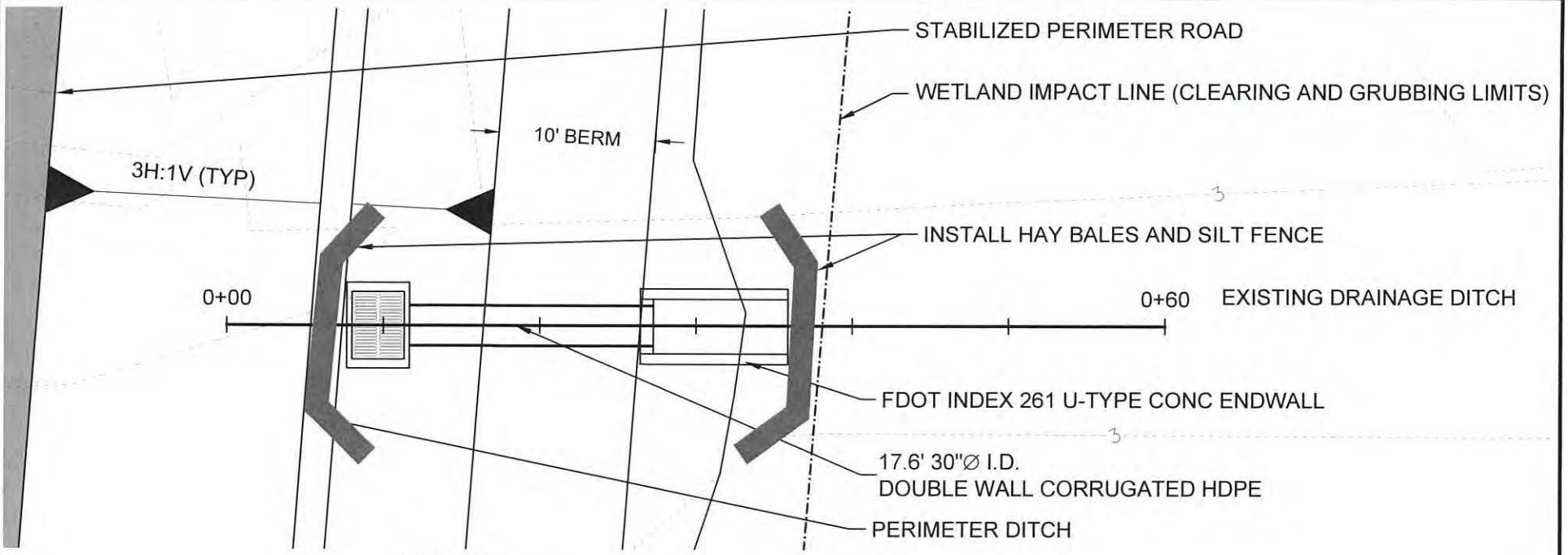

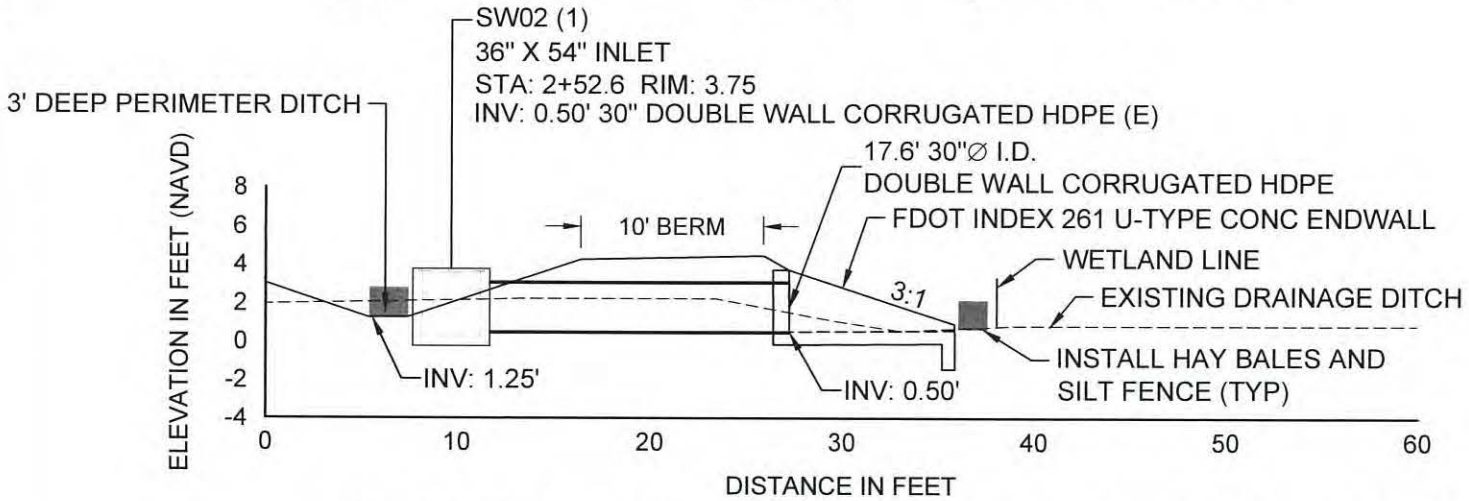

NOTE: THE TEMPORARY PERIMETER DITCH OVERFLOW INLET WILL BE PLUGGED OR REMOVED ONCE THE CONSTRUCTION OF THE PERMANENT UNDERGROUND PIPELINE IS COMPLETED AND FUNCTIONING.

A TEMPORARY PERIMETER DITCH OVERFLOW INLET PLAN AND PROFILE

0 10' 20'

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FIGURE 15
TEMPORARY PERIMETER DITCH OVERFLOW INLET PLAN AND PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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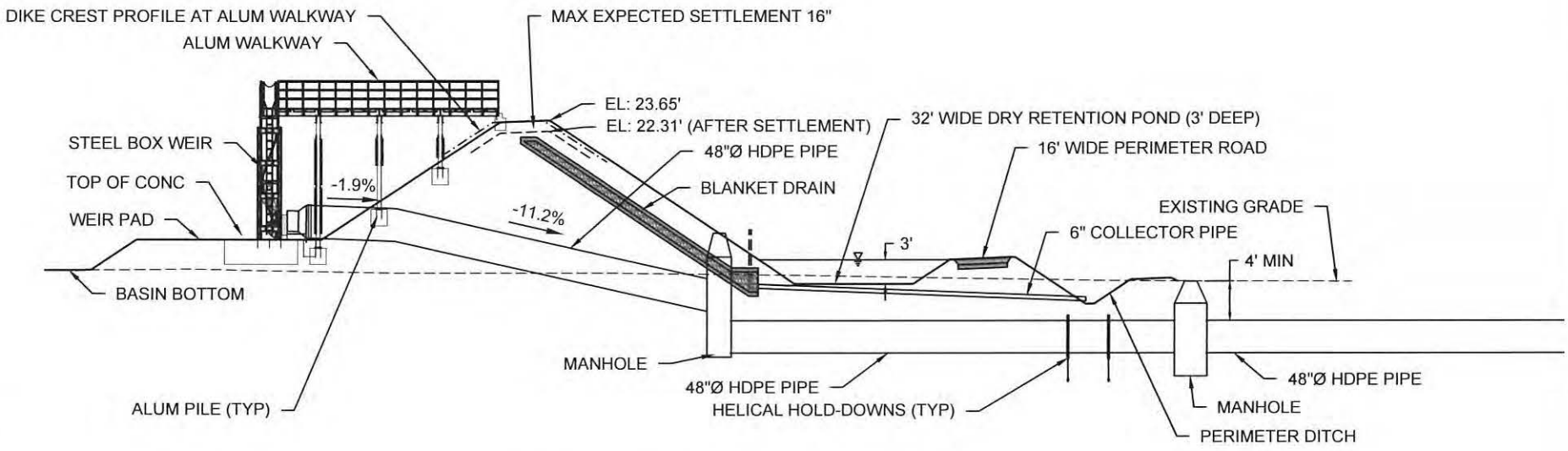

S5
FIG 14

DIKE OUTFALL PIPE PROFILE

SCALE: 1" = 30'
V-SCALE: 1" = 15'

0 30'

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FIGURE 16
WEIR PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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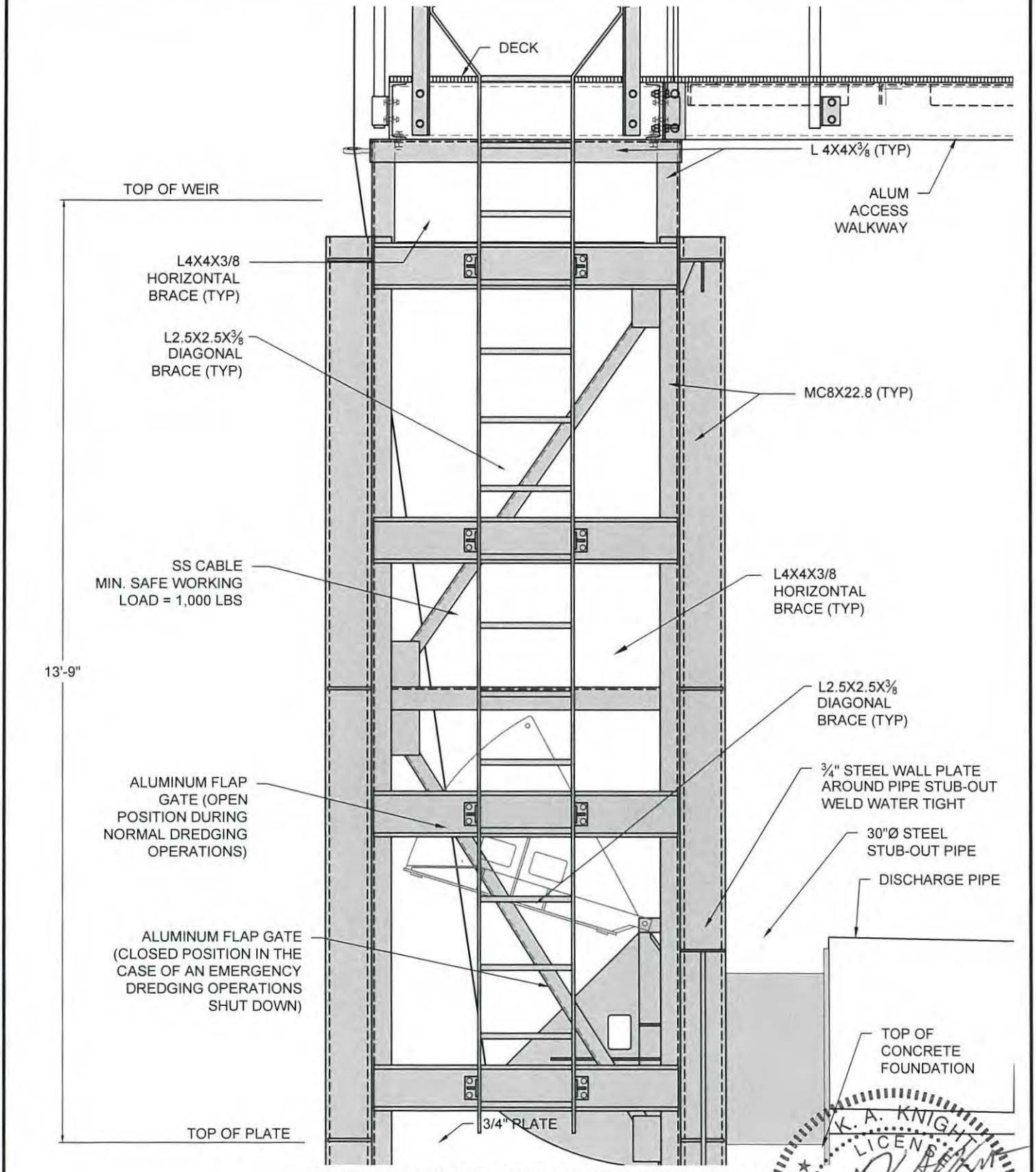

STEEL BOX WIER SIDE ELEVATION DETAIL

SCALE: 1" = 2'

0 2'

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FIGURE 17
WEIR DETAIL
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	17 of 23	SEPT 2021

KEITH A. KNIGHT P.E.# 58084 DATE

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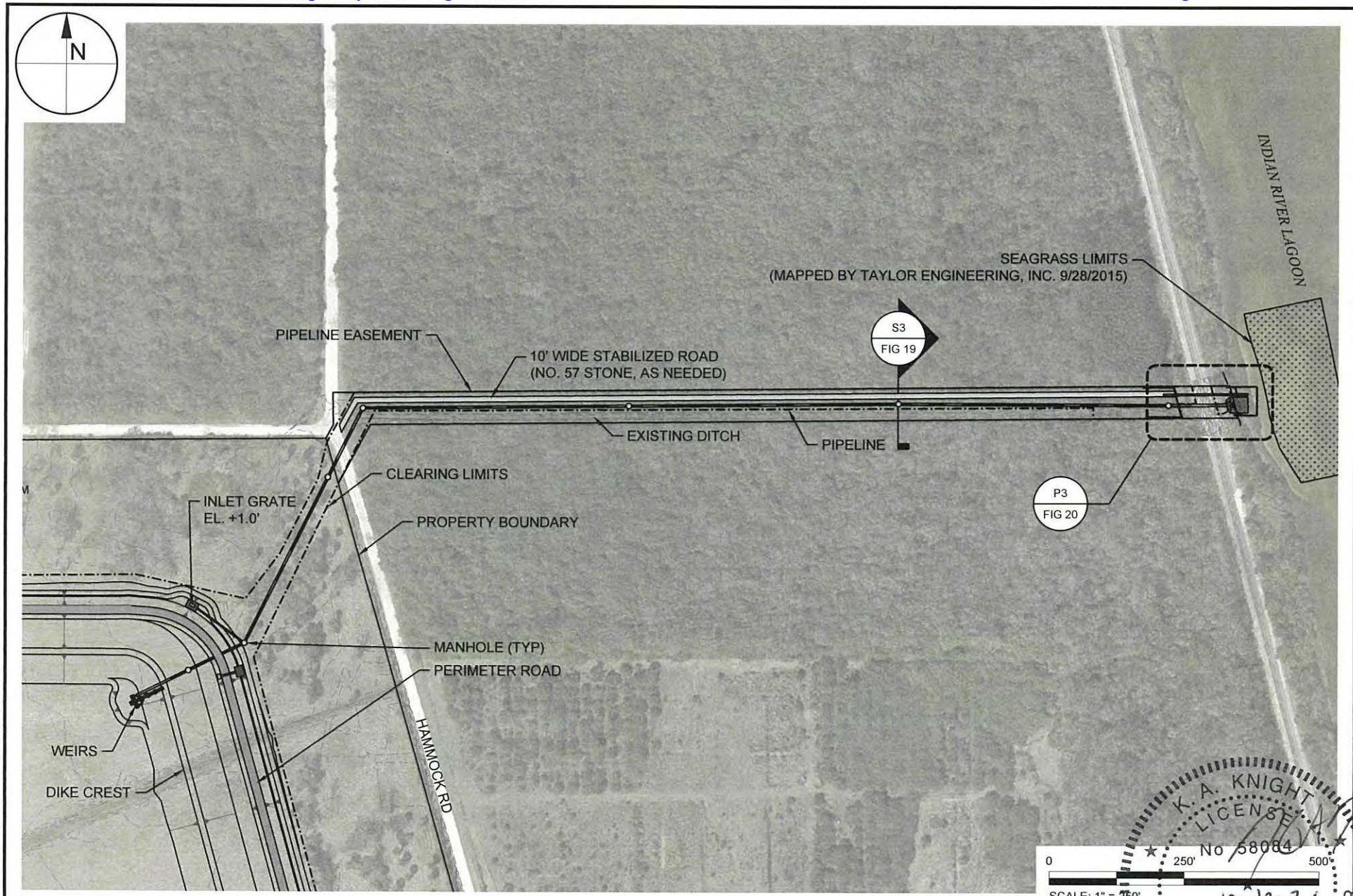

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KEITH A. KNIGHT P.E.# 58084
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FIGURE 18
PIPELINE OVERVIEW
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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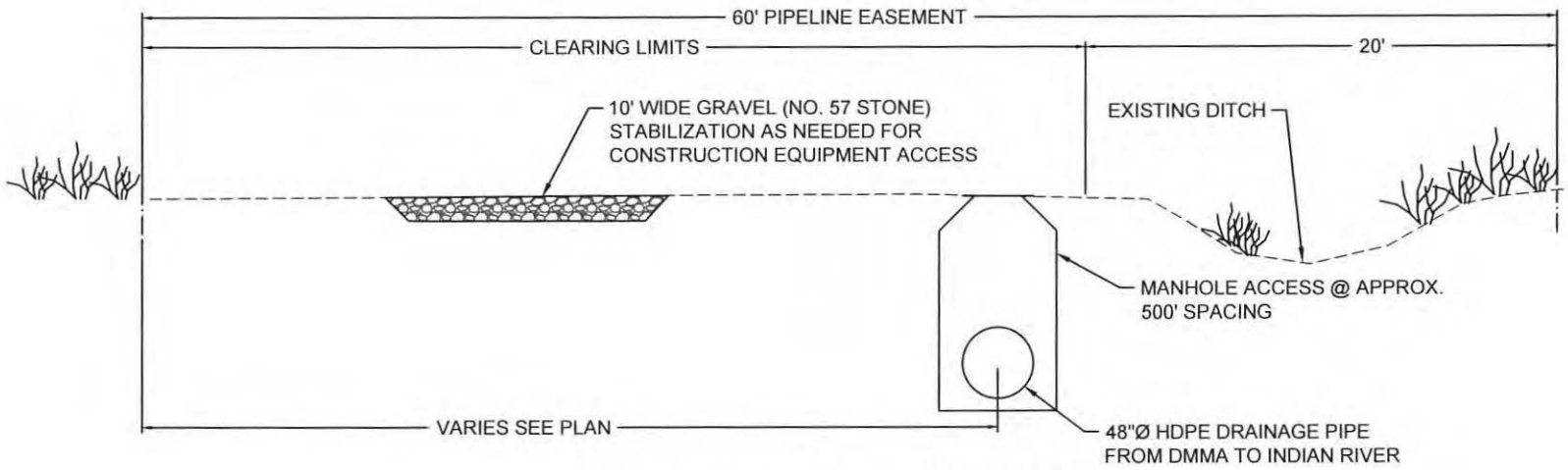

S3 / FIG 18 TYPICAL PIPELINE SECTION
SCALE: 1" = 8'
V-SCALE: 1" = 1'
0 8'

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FIGURE 19
PIPELINE TYPICAL SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
10-12-21
KEITH A. KNIGHT P.E.# 58084 DATE

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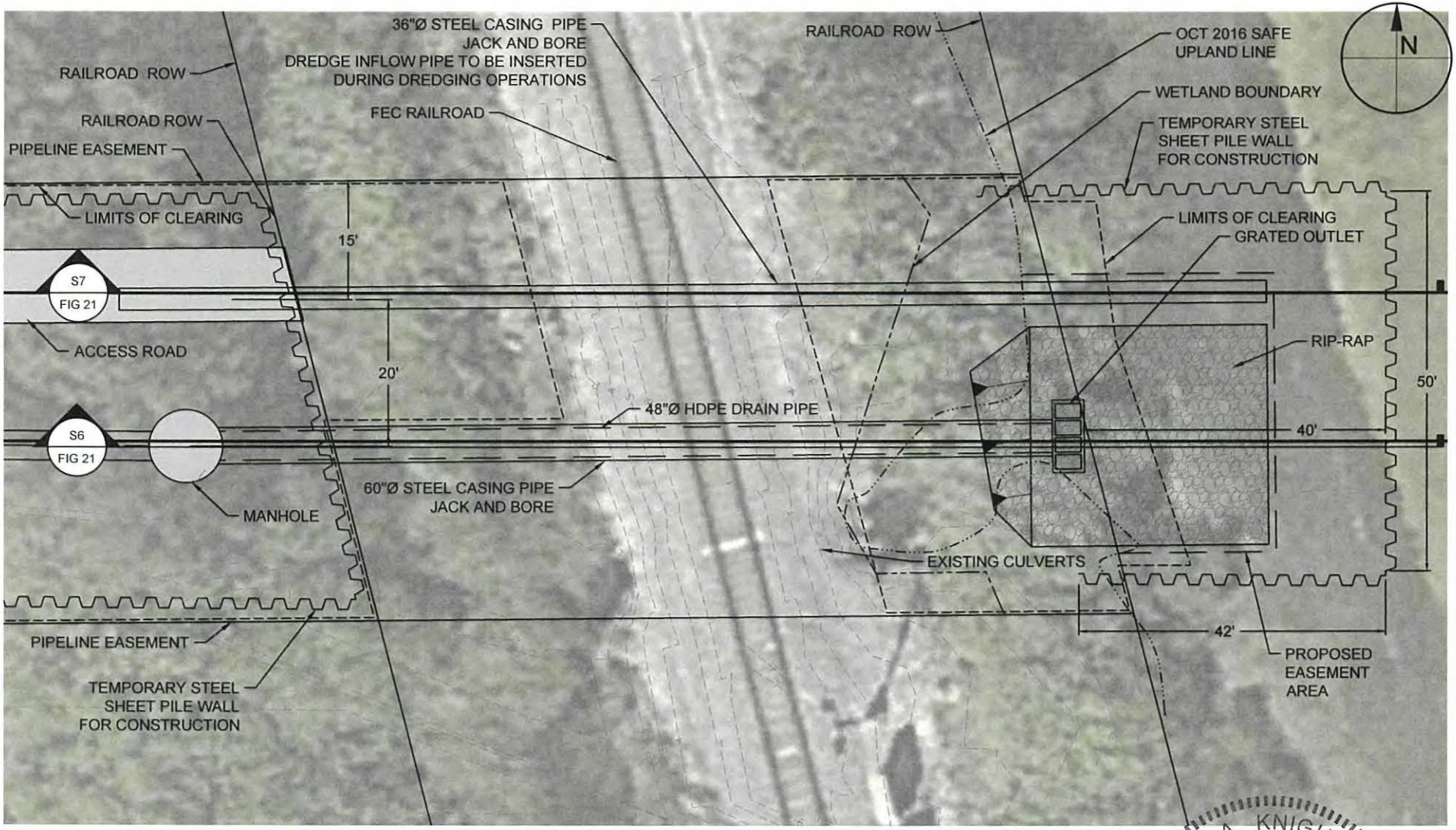

P3
FIG 18 FEC RAILROAD CROSSING PLAN
SCALE: 1" = 20' 0 20'

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STATE OF
FLORIDA
PROFESSIONAL ENGINEER

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REGISTRY # 4815

FIGURE 20
RAILROAD CROSSING PLAN AND PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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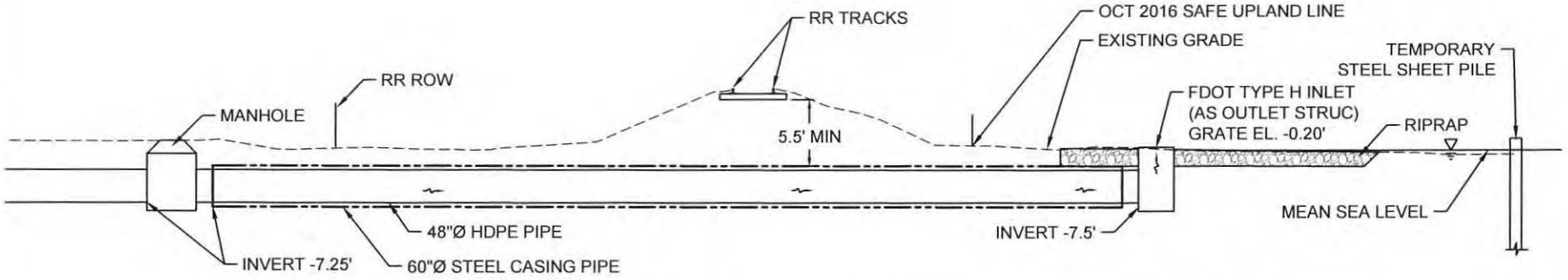
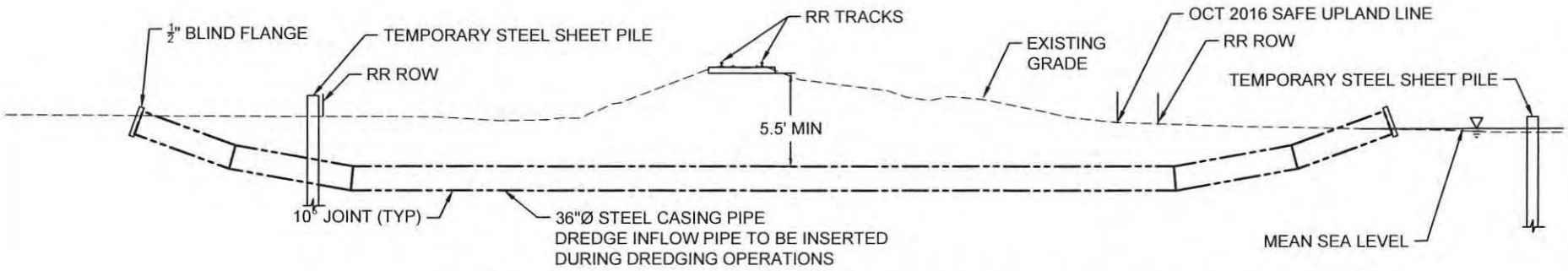


S6 FIG 20 FEC RAILROAD CROSSING SECTION - 60IN STEEL CASING
SCALE: 1" = 20'



S7 FIG 20 FEC RAILRAOD CROSSING SECTION - 36 IN STEEL CASING
SCALE: 1" = 20'

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TAYLOR ENGINEERING INC.	FIGURE 21
10151 DEERWOOD PARK BLVD.	RAILROAD CROSSING SECTIONS
BLDG. 300, SUITE 300	FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
JACKSONVILLE, FL 32256	BREVARD COUNTY, FLORIDA
REGISTRY # 4815	

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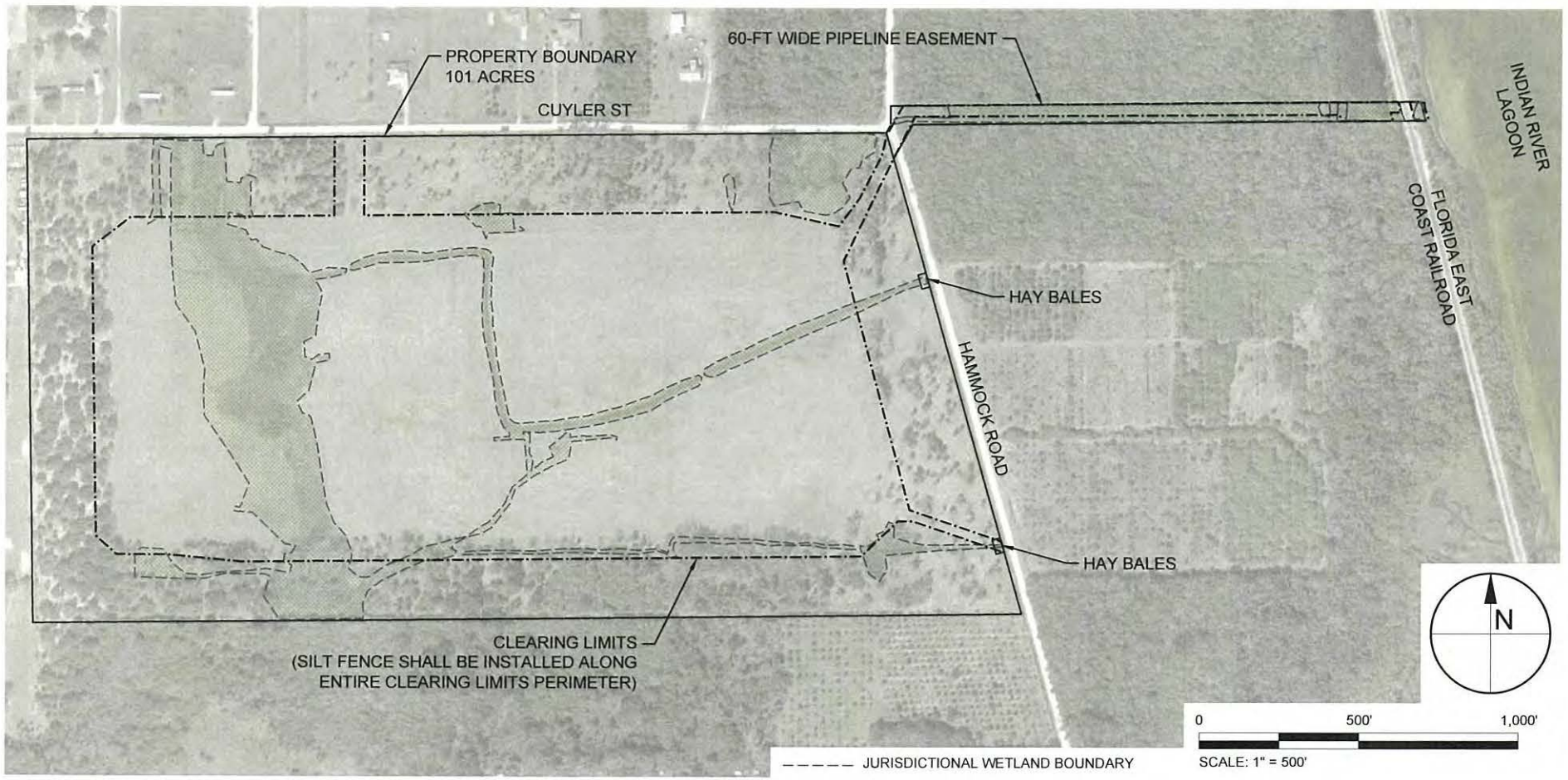

EROSION CONTROL AND GRASSING/SODDING NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN EROSION CONTROL MEASURES AS NECESSARY TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND COMPLY WITH STATE WATER QUALITY CRITERIA FOR STORMWATER DISCHARGE. EROSION CONTROL MEASURES INCLUDE BUT ARE NOT LIMITED TO TURBIDITY SCREENS, MULCHING, HAY BALES, AND SILT FENCE. IF A WATER QUALITY VIOLATION OCCURS, THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ALL DAMAGE AND ALL COSTS WHICH MAY RESULT INCLUDING LEGAL FEES, CONSTRUCTION COSTS, AND FINES.
2. DISTURBED AREAS SHALL BE MAINTAINED IN ACCORDANCE WITH CITY, COUNTY, STATE, AND FEDERAL REQUIREMENTS UNTIL A PERMANENT VEGETATIVE COVER IS ESTABLISHED.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING PERMANENT VEGETATION AT ALL DISTURBED AREAS PER DRAWINGS AND MEETING THE NPDES FINAL STABILIZATION REQUIREMENTS.
4. EROSION CONTROL MEASURES SHALL BE MAINTAINED FOR THE ENTIRE DURATION OF THE PROJECT OR UNTIL VEGETATION IS ESTABLISHED.
5. EROSION CONTROL MEASURES SHALL BE PLACED TO CONTAIN ALL POINTS OF DISCHARGE TO SURFACE WATERS OR WETLANDS INCLUDING SURFACE RUNOFF, CURB INLETS, DITCH BOTTOM INLETS, DITCHES, AND DOWNSTREAM PORTIONS OF STREAMS, CANALS, AND TIDAL WATERS ADJACENT TO CONSTRUCTION.
6. 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR WILL SUBMIT A "NOTICE OF INTENT" TO THE EPA IN ACCORDANCE WITH NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM RULES AND REGULATIONS.
7. THE CONTRACTOR SHALL WRAP STORM GRATES IN FILTER FABRIC TO PREVENT SEDIMENTATION OF THE STORM SEWER SYSTEM. CONTRACTOR SHALL MAINTAIN THE FILTER FABRIC UNTIL PROJECT COMPLETION.
8. THE SITE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES AFTER COMPLETION OF CONSTRUCTION AND ONLY WHEN AREAS HAVE BEEN STABILIZED.
9. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

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FIGURE 22
EROSION CONTROL PLAN AND NOTES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
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10-12-21
KEITH A. KNIGHT P.E.# 58084 DATE

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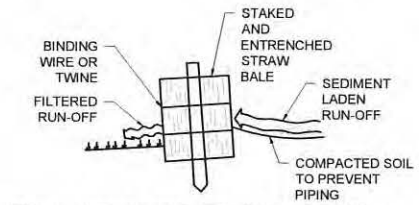
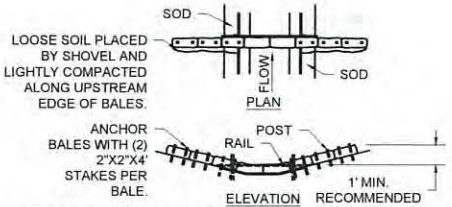
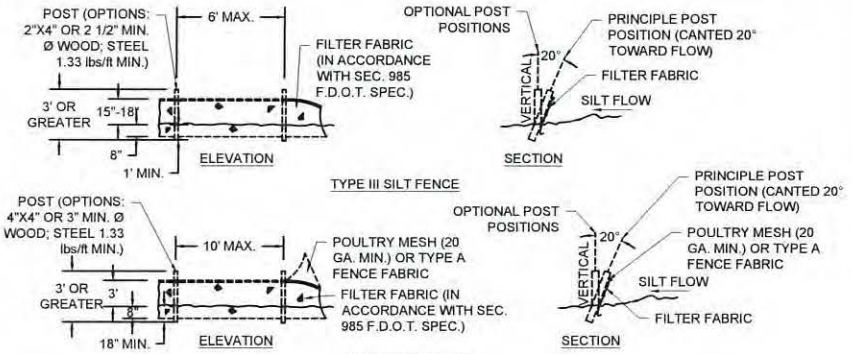


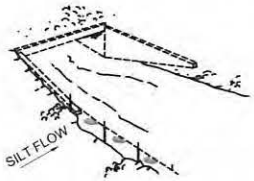
CROSS SECTION OF A PROPERLY INSTALLED STRAW BALE



SPACING: BALE BARRIERS FOR PAVED DITCHES SHOULD BE SPACED IN ACCORDANCE WITH CHART I, SHEET 1 OF 3, INDEX NO. 102 OF THE F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS.

STRAW BALE BARRIER FOR PAVED DITCH





TYPE III OR TYPE IV SILT FENCE PROTECTION AROUND DITCH BOTTOM INLETS.

TYPE III OR TYPE IV SILT FENCE



TYPE III AND IV SILT FENCE

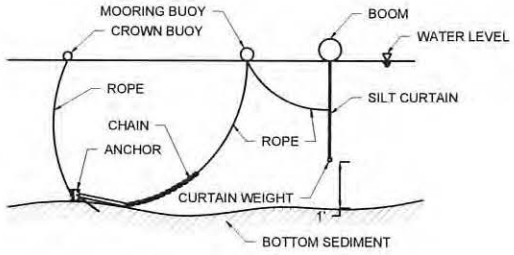
DITCH INSTALLATION AND SPACING FOR TYPE III & TYPE IV FENCE TO BE IN ACCORDANCE WITH SHEET 1 OF 3, OF THE F.D.O.T. INDEX NO. 102



APPLICATION AND SPACING OF TYPES I & TYPES II HAY BALE BARRIERS SALL BE IN ACCORDANCE WITH SHEET 1 OF 3, F.D.O.T. INDEX NO. 102

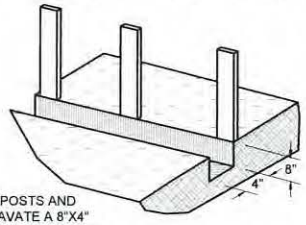
TYPE II TYPE I

TYPICAL STRAW BALE DETAIL

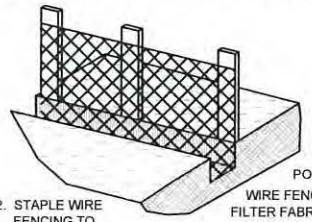


TURBIDITY CURTAIN DETAIL

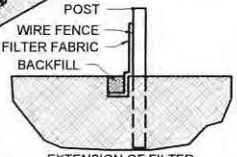
DO NOT DEPLOY IN A MANNER THAT SILT FENCES WILL ACT AS A DAM ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE USED AT UPLAND LOCATIONS AND TURBIDITY BARRIERS USED AT PERMANENT BODIES OF WATER.



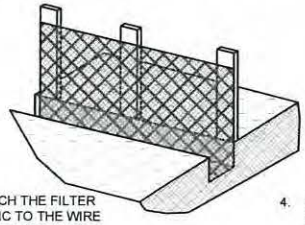
1. SET POSTS AND EXCAVATE A 8"X4" TRENCH UP SLOPE ALONG THE LINE OF POSTS.



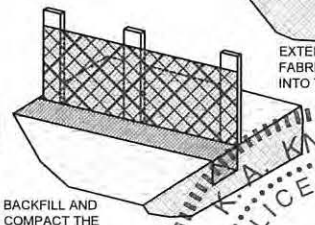
2. STAPLE WIRE FENCING TO THE POSTS.



EXTENSION OF FILTER FABRIC AND WIRE FENCE INTO THE TRENCH.



3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND FILTER FABRIC AND WIRE FENCE INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.

SILT FENCE INSTALLATION DETAILS

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

FIGURE 23
EROSION CONTROL DETAILS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	23 of 23
DATE	SEPT 2021

SEAL
KEITH A. KNIGHT LICENSE No 58084
STATE OF FLORIDA PROFESSIONAL ENGINEER
10-12-21
KEITH A. KNIGHT P.E. # 58084 DATE

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITC2014-026 P-EROSION.DWG 9/13/2021 12:20:50 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Permittee:
Mark Crosley, Executive Director
Florida Inland Navigation District (FIND)
1314 Marcinski Road
Jupiter, FL 33477
mcrosley@aicw.org

Agent:
Chris Ellis
Taylor Engineering, Inc.
10151 Deerwood Park Blvd., Bldg. 300, Suite 300
Jacksonville, FL 32256
cellis@taylorengineering.com

and

Johnathan Armbruster
Taylor Engineering, Inc.
10151 Deerwood Park Blvd., Bldg. 300, Suite 300
Jacksonville, FL 32256
jarmbruster@taylorengineering.com

F.I.N.D. – Dredge Material Management Area BV-4B

Environmental Resource Permit

State-owned Submerged Lands Authorization –Pending

U.S. Army Corps of Engineers Authorization – Pending

Permit No.: ERP 0344990-001-EI

Permit Issuance Date: September 22, 2017
Permit Construction Phase Expiration Date: September 22, 2022

Consolidated Environmental Resource Permit and Recommended Intent to Grant Sovereignty Submerged Lands Authorization

Permittee: Florida Inland Navigation District (FIND)
Permit No: ERP 0344990-001-EI

PROJECT LOCATION

The activities authorized by this Permit are located at the southwest corner of Cuyler Street and Hammock Road in Mims, Florida, 32754, Brevard County, Sections 20 and 21, Township 21 South, Range 35 East.

PROJECT DESCRIPTION

The permittee is authorized to construct and operate a permanent 101-acre Dredge Material Management Area (DMMA) to dewater and store material dredged from the northern half of Reach II of the Intracoastal Waterway (ICWW).

The permittee is also authorized to construct a stormwater swale and a dry retention pond as depicted on the attached exhibits.

Mitigation: To offset direct secondary impacts with a total functional loss of 4.095, the applicant has reserved 2.51 freshwater frosted and 1.54 freshwater herbaceous UMAM bank credits from Farmton Mitigation Bank. Additionally, the applicant has reserved 0.1 credits from CGW Mitigation Bank to offset estuarine impacts associated with the DMMA pipeline. **Prior to any construction or impacts authorized by this permit, the permittee shall provide the Department with documentation that all mitigation credits have been purchased and deducted from the official credit ledger for Farmton Mitigation Bank and CGW Mitigation Bank in the name of Florida Inland Navigation District for permit number 0327292-002 EI.**

Authorized activities are depicted on the attached exhibits.

AUTHORIZATIONS

F.I.N.D. – Dredge Material Management Area BV-4B

Environmental Resource Permit

The Department has determined that the activity qualifies for an Environmental Resource Permit. Therefore, the Environmental Resource Permit is hereby granted, pursuant to Part IV of Chapter 373, Florida Statutes (F.S.), and Chapter 62-330, Florida Administrative Code (F.A.C.).

Sovereignty Submerged Lands Authorization

The activity is located on sovereignty submerged lands owned by the State of Florida. It therefore also requires authorization from the Board of Trustees of the Internal Improvement Trust Fund (Board of

Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Section 253.77, F.S. As staff to the Board of Trustees under Sections 253.002, F.S., the Department has determined that the activity qualifies for and requires a public easement, as long as the work performed is located within the boundaries as described and is consistent with the terms and conditions herein.

The final documents required to execute the public easement will be sent to the grantee by the Department's Division of State Lands for execution. The Department intends to issue the public easement, upon satisfactory execution of those documents, including payment of required fees and compliance with the conditions in the attached permit. **You may not begin construction of the activities described until you receive a copy of the executed public easement from the Department.**

Federal Authorization

Your proposed activity as outlined on your application and attached drawings **does not qualify** for Federal authorization pursuant to the State Programmatic General Permit and a **SEPARATE permit** or authorization **shall be required** from the Corps. A copy of your permit application has been forwarded to the Corps for their review. The Corps will issue their authorization directly to you or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date your application was received at the local FDEP Office, contact the Irene Sadowski at the USACE, Region 4, Cocoa Office at (321) 504-3771, ext. 12 for status and further information. **Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.**

Coastal Zone Management

Issuance of this authorization also constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

Water Quality Certification

This permit also constitutes a water quality certification under Section 401 of the Clean Water Act, 33 U.S.C. 1341.

Other Authorizations

You are advised that authorizations or permits for this activity may be required by other federal, state, regional, or local entities including but not limited to local governments or municipalities. This permit does not relieve you from the requirements to obtain all other required permits or authorizations.

The activity described may be conducted only in accordance with the terms, conditions and attachments contained in this document. Issuance and granting of the permit and authorizations herein do not infer, nor guarantee, nor imply that future permits, authorizations, or modifications will be granted by the Department.

PERMIT/SOVEREIGNTY SUBMERGED LANDS CONDITIONS

The activities described must be conducted in accordance with:

- **The Specific Conditions**
- **The General Conditions**
- **The limits, conditions and locations of work shown in the attached drawings**
- **The term limits of this authorization**

You are advised to read and understand these conditions and drawings prior to beginning the authorized activities, and to ensure the work is conducted in conformance with all the terms, conditions, and drawings herein. If you are using a contractor, the contractor also should read

and understand these conditions and drawings prior to beginning any activity. Failure to comply with these conditions, including any mitigation requirements, shall be grounds for the Department to revoke the permit and authorization and to take appropriate enforcement action. Operation of the facility is not authorized except when determined to be in conformance with all applicable rules and this permit and sovereignty submerged lands authorization, as described.

SPECIFIC CONDITIONS – PRIOR TO CONSTRUCTION

1. To offset direct secondary impacts with a total functional loss of 4.095, the applicant has reserved 2.51 freshwater frosted and 1.54 freshwater herbaceous UMAM bank credits from Farmton Mitigation Bank. Additionally, the applicant has reserved 0.1 credits from CGW Mitigation Bank to offset estuarine impacts associated with the DMMA pipeline. **Prior to any construction or impacts authorized by this permit, the permittee shall provide the Department with documentation that all mitigation credits have been purchased and deducted from the official credit ledger for Farmton Mitigation Bank and CGW Mitigation Bank in the amounts specified above in the name of Florida Inland Navigation District for permit number 0327292-002 EI.**

SPECIFIC CONDITIONS – GENERAL CONSTRUCTION ACTIVITIES

2. Turbidity must be controlled to prevent violations of water quality pursuant to Rule 62-302.530(69), Florida Administrative Code. Turbidity shall not exceed 29 Nephelometric Turbidity Units (NTU) above natural background conditions. Also, turbidity of the effluent from DMMA discharged back in to the Indian River Lagoon shall not exceed 29 NTU above natural back ground of the receiving surface waters. **There is no mixing zone for DMMA effluent**.
3. Best management practices (primarily turbidity screens and floating turbidity barriers) for erosion and turbidity control shall be implemented and maintained at all times during construction and operation of the permitted activity to prevent siltation and turbid discharges in excess of State water standards pursuant to Chapter 62-302, F.A.C. The permittee shall be responsible for ensuring that erosion and turbidity control devices and procedures are inspected and maintained daily during all phases of construction authorized by this permit until all areas that were disturbed during construction are sufficiently stabilized to prevent erosion, siltation, and turbid discharges.
4. Upon final completion of the project and upon reasonable assurance that the project is no longer a potential turbidity source, the permittee will be responsible for the removal of the turbidity barriers. The turbidity control devices shall be removed no later than one year from completion of the project. All turbidity control devices shall be disposed of in an upland disposal area.
5. The limits of construction shall be delineated by silt fencing or a floating turbidity barrier. The permittee shall bear the responsibility of notifying all construction workers that silt fencing or turbidity barrier represents the limits of all construction activities. The permittee shall bear the responsibility of keeping all construction workers and equipment out of the adjacent wetlands and surface waters where work has not been permitted for impacts.
6. There shall be no stock piling of tools, materials (i.e., lumber, pilings, riprap, and debris) within wetlands, along the shoreline within the littoral zone, or elsewhere within wetlands/waters of the state unless specifically approved in this permit. Any and all

construction debris shall be removed from wetlands/ waters of the state within 14 days of completion of the work authorized by this permit.

7. Watercraft associated with the construction shall operate within waters of sufficient depth to preclude bottom scouring/prop dredging.

8. This permit does not authorize impacts, either direct or secondary, to submerged aquatic vegetation.

9. The riprap material shall consist of clean rocks ranging from six inches to two feet in diameter.

10. Construction equipment shall not be repaired or refueled in wetlands or elsewhere within waters of the state.

11. The permittee shall report any damage to the Department within 24 hours that occurs to the wetlands/littoral zone area as a result of the dock or riprap construction. If any damage occurs to wetlands or surface waters as a result of any construction activities, the permittee shall be required to restore the wetland area by regrading the damaged areas back to the natural reconstruction elevations and planting vegetation of the size, densities and species that exist in the adjacent areas pursuant to a consent order. The restoration shall be completed within 30 days of completion of the construction and shall be done to the satisfaction of the Department.

12. Any disturbed areas of the shoreline shall be stabilized immediately (within 48 hours) following completion the project.

SPECIFIC CONDTIONS – DMMA & STORMWATER MANAGEMENT (SWM)

13. Submit Form 62-330.350(1), "Construction Commencement Notice," at least 48 hours prior to commencement of the DMMA construction authorized by this permit.

14. In accordance with Section 373.416(2), F.S., unless revoked or abandoned, all DMMA's, stormwater management systems, dams, impoundments, reservoirs, appurtenant works, or works permitted under Part IV of Chapter 373, F.S., must be operated and maintained in perpetuity.

15. The DMMA operation, management and maintenance shall be in accordance with Chapter 7 of the U.S. Army Corp of Engineers Engineer Manual 1110-2-5027 (EM 1110-2-5027), the designs, plans, calculations, and other specifications that are submitted with an application, approved by the Agency, and incorporated as a condition within this permit.

16. If the DMMA is not functioning as designed and permitted, operational maintenance must be performed immediately to restore the system. Within 30 days of any failure of the DMMA or deviation from the permit, a report shall be submitted electronically or in writing to the Department using the enclosed "Operation and Maintenance Inspection Certification" [Form 62-330.311(1)] describing the remedial actions taken to resolve the failure or deviation. If operational maintenance measures are insufficient to enable the system to meet the design and performance standards of Chapter 62-330, F.A.C. and EM 1110-2-5027, the permittee must either replace the system or construct an alternative design. A permit modification must be obtained from the Department prior to constructing such an alternate design pursuant to Rule 62-330.315, F.A.C.

17. Upon completion of the permitted systems, dams, reservoirs, impoundments, appurtenant work, or works, the Agency shall have periodic inspections made to ensure the project

was constructed and is being operated in compliance with the terms and conditions of the permit, and in a manner that protects the public health and safety and the natural resources of the state. No person shall refuse immediate entry or access to any authorized representative of the District or DEP who requests entry for purposes of such inspection and presents appropriate credentials pursuant to Section 12.4 (b) of the Environmental Resource Permit Applicant's Handbook Volume I (AH Vol. I).

18. Inspections may be performed by Agency staff during and after construction. When needed to ensure a project is being operated and maintained in perpetuity, the permit may require the operation and maintenance entity to conduct the periodic inspections. The required inspection schedule for a specific project will be specified in the permit pursuant to Section 12.4 (c) of the AH Vol. I.

19. The efficiency of DMMAs, stormwater management systems, dams, impoundments, and most other projects normally decreases over time without periodic maintenance. For example, a significant reduction in the flow capacity of a stormwater management system often can be attributed to partial blockages of its conveyance system. Once flow capacity is compromised, flooding may result. Therefore, operation and maintenance entities must perform periodic inspections to identify if there are any deficiencies in structural integrity, degradation due to insufficient maintenance, or improper operation of projects that may endanger public health, safety, or welfare, or the water resources. If deficiencies are found, the operation and maintenance entity will be responsible for correcting the deficiencies so that the project is returned to the operational functions required in the permit and contemplated by the design of the project as permitted. The corrections must be done a timely manner to prevent compromises to flood protection and water quality pursuant to Section 12.4 (e) of AH Vol. I.

20. The operation and maintenance entity must maintain a record of each inspection, including the date of inspection, the name and contact information of the inspector, whether the system was functioning as designed and permitted, and make such record available upon request of the Agency pursuant to Section 12.4 (h) of AH Vol. 1.

SPECIFIC CONDITIONS – DMMA & SWM POST–ISSUANCE SUBMITTALS

21. Submit Form 62-330.310(1) "As-Built Certification and Request for Conversion to Operation Phase," when the DMMA and SWM are constructed and prior to be placed in operation.

22. Submittal of Form 62-330.310(1) "As-Built Certification and Request for Conversion to Operation Phase," in accordance with subparagraph 62-330.350(1)(f)2., F.A.C., shall serve to notify the Agency that the project, or independent portion of the project, is completed and ready for inspection by the Agency.

23. All submittals required by the Specific or General Conditions of this permit shall be provided to the Department in a digital format (via electronic mail, CD or DVD, or through a file transfer site) when practicable. The mailing address for the appropriate Department office is 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767 and the electronic mail address is DEP_CD@dep.state.fl.us. All submittals shall include the project name and indicated permit number when referring to this project.

SPECIFIC CONDITIONS – MANATEES

24. The Standard Manatee Construction Conditions for In-water Work (2011) must be followed for all in-water activity. The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

    a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

    b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

    c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

    d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

    e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

    f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

25. In-water work must not be performed after dusk or before dawn, when the possibility of spotting manatees is negligible.

GENERAL CONDITIONS FOR INDIVIDUAL PERMITS

The following general conditions are binding on all individual permits issued under Chapter 62-330, F.A.C., except where the conditions are not applicable to the authorized activity, or where the conditions must be modified to accommodate project-specific conditions.

1. All activities shall be implemented following the plans, specifications and performance criteria approved by this permit. Any deviations must be authorized in a permit modification in accordance with Rule 62-330.315, F.A.C. Any deviations that are not so authorized may subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S.

2. A complete copy of this permit shall be kept at the work site of the permitted activity during the construction phase, and shall be available for review at the work site upon request by the Agency staff. The permittee shall require the contractor to review the complete permit prior to beginning construction.

3. Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be installed immediately prior to, and be maintained during and after construction as needed, to prevent adverse impacts to the water resources and adjacent lands. Such practices shall be in accordance with the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual (Florida Department of Environmental Protection and Florida Department of Transportation June 2007),* and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008),* which are both incorporated by reference in subparagraph 62-330.050(9)(b)5., F.A.C., unless a project-specific erosion and sediment control plan is approved or other water quality control measures are required as part of the permit.

4. At least 48 hours prior to beginning the authorized activities, the permittee shall submit to the Agency a fully executed Form 62-330.350(1), "Construction Commencement Notice," [October 1, 2013], which is incorporated by reference in paragraph 62-330.350(1)(d), F.A.C., indicating the expected start and completion dates. A copy of this form may be obtained from the Agency, as described in subsection 62-330.010(5), F.A.C. If available, an Agency website that fulfills this notification requirement may be used in lieu of the form.

5. Unless the permit is transferred under Rule 62-330.340, F.A.C., or transferred to an operating entity under Rule 62-330.310, F.A.C., the permittee is liable to comply with the plans, terms and conditions of the permit for the life of the project or activity.

6. Within 30 days after completing construction of the entire project, or any independent portion of the project, the permittee shall provide the following to the Agency, as applicable:
    a. For an individual, private single-family residential dwelling unit, duplex, triplex, or quadruplex – "Construction Completion and Inspection Certification for Activities Associated With a Private Single-Family Dwelling Unit" [Form 62-330.310(3)]; or
    b. For all other activities – "As-Built Certification and Request for Conversion to Operational Phase" [Form 62-330.310(1)].
    c. If available, an Agency website that fulfills this certification requirement may be used in lieu of the form.

7. If the final operation and maintenance entity is a third party:
   a. Prior to sales of any lot or unit served by the activity and within one year of permit issuance, or within 30 days of as- built certification, whichever comes first, the permittee shall submit, as applicable, a copy of the operation and maintenance documents (see sections 12.3 thru 12.3.3 of Volume I) as filed with the Department of State, Division of Corporations and a copy of any easement, plat, or deed restriction needed to operate or maintain the project, as recorded with the Clerk of the Court in the County in which the activity is located.
   b. Within 30 days of submittal of the as- built certification, the permittee shall submit "Request for Transfer of Environmental Resource Permit to the Perpetual Operation Entity" [Form 62-330.310(2)] to transfer the permit to the operation and maintenance entity, along with the documentation requested in the form. If available, an Agency website that fulfills this transfer requirement may be used in lieu of the form.

8. The permittee shall notify the Agency in writing of changes required by any other regulatory agency that require changes to the permitted activity, and any required modification of this permit must be obtained prior to implementing the changes.

9. This permit does not:
   a. Convey to the permittee any property rights or privileges, or any other rights or privileges other than those specified herein or in Chapter 62-330, F.A.C.;
   b. Convey to the permittee or create in the permittee any interest in real property;
   c. Relieve the permittee from the need to obtain and comply with any other required federal, state, and local authorization, law, rule, or ordinance; or
   d. Authorize any entrance upon or work on property that is not owned, held in easement, or controlled by the permittee.

10. Prior to conducting any activities on state-owned submerged lands or other lands of the state, title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund, the permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees of the Internal Improvement Trust Fund shall not be considered received until it has been fully executed.

11. The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities that may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any project authorized by the permit.

12. The permittee shall notify the Agency in writing:
   a. Immediately if any previously submitted information is discovered to be inaccurate; and
   b. Within 30 days of any conveyance or division of ownership or control of the property or the system, other than conveyance via a long-term lease, and the new owner shall request transfer of the permit in accordance with Rule 62-330.340, F.A.C. This does not apply to the sale of lots or units in residential or commercial subdivisions or condominiums where the stormwater management system has been completed and converted to the operation phase.

13. Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the project or activities to ensure conformity with the plans and specifications authorized in the permit.

14. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered binding unless a specific condition of this permit or a formal determination under Rule 62-330.201, F.A.C., provides otherwise.

16. The permittee shall provide routine maintenance of all components of the stormwater management system to remove trapped sediments and debris. Removed materials shall be disposed of in a landfill or other uplands in a manner that does not require a permit under Chapter 62-330, F.A.C., or cause violations of state water quality standards.

17. This permit is issued based on the applicant's submitted information that reasonably demonstrates that adverse water resource-related impacts will not be caused by the completed permit activity. If any adverse impacts result, the Agency will require the permittee to eliminate the cause, obtain any necessary permit modification, and take any necessary corrective actions to resolve the adverse impacts.

18. A Recorded Notice of Environmental Resource Permit may be recorded in the county public records in accordance with subsection 62-330.090(7), F.A.C. Such notice is not an encumbrance upon the property.

NOTICE OF RIGHTS

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency action, the hearing process may result in a modification of the agency action or even denial of the application.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rule

28-106.201, F.A.C., a petition for an administrative hearing must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;
(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;
(c) A statement of when and how the petitioner received notice of the agency decision;
(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
(e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;
(f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant must be filed within 14 days of receipt of this written notice. Petitions filed by any persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S. must be filed within 14 days of publication of the notice or within 14 days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who has asked the Department for notice of agency action may file a petition within 14 days of receipt of such notice, regardless of the date of publication. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation
Mediation is not available in this proceeding.

Judicial Review
Any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

EXECUTION AND CLERKING

Executed in Orlando, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Kimberly Rush, P.E.
Permitting and Waste Cleanup
Program Administrator
Florida Department of Environmental Protection

CERTIFICATE OF SERVICE
The undersigned duly designated deputy clerk hereby certifies that this permit and all copies were sent on the filing date below to the following listed persons:

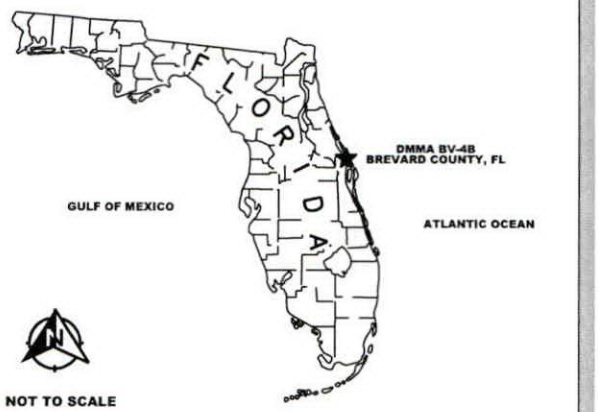
Attachments:
Exhibit 1: Project Drawings, 25 pages
Exhibit 2: U.S. Army Corp of Engineers Engineer Manual 1110-2-5027, 243 pages
Exhibit 3: As-built Certification and Request for Conversion to Operational Phase/Form 62-330.310(1)
Request for Transfer to the Perpetual Operation Entity/Form 62-330.310(2)
Request to Transfer Permit/Form 62-330.340(1)

Copies furnished to:
Leo Angleró, FDEP, Leo.anglero@dep.state.fl.us
Kimberly Eisele, FDEP, Kim.Eisele@dep.state.fl.us
Brevard County Natural Resources-LeeAnn McCullough-Wham LeeAnn.McCullough-Wham@brevardcounty.us

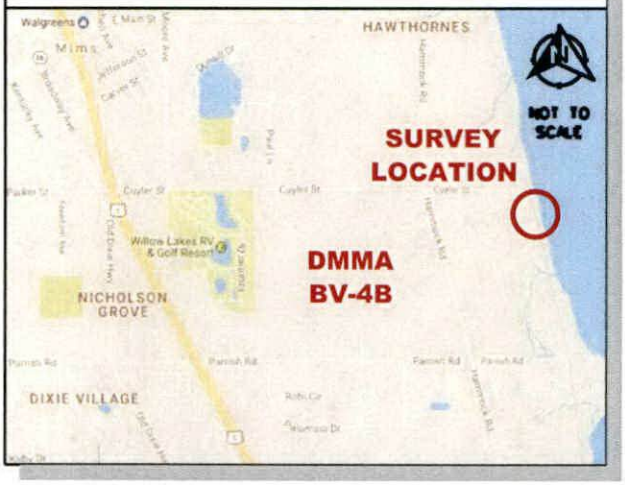
FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to Section 120.52, F. S., with the designated Department Clerk, receipt of which is hereby acknowledged.

Mandakini Patel — September 22, 2017
Clerk **Date**

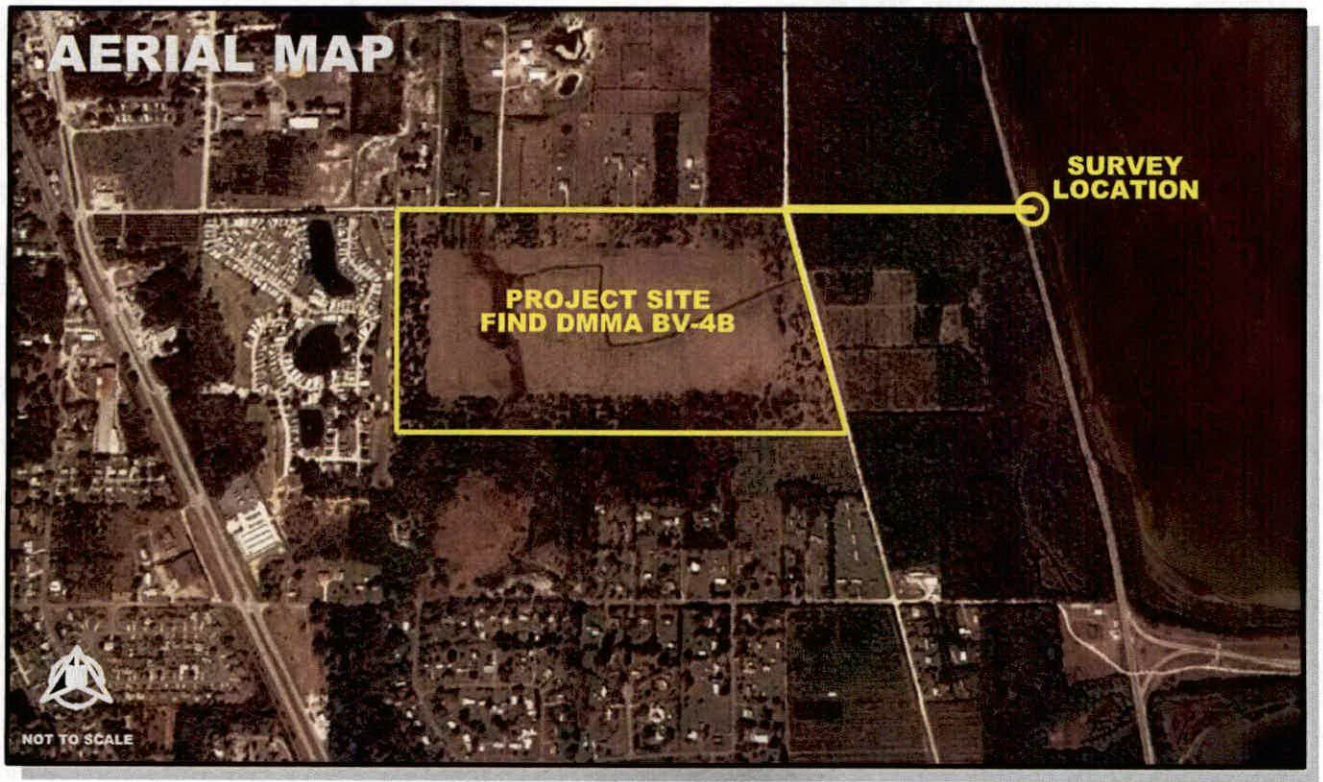
LOCATION MAP



VICINITY MAP



AERIAL MAP



LEASE/EASEMENT NO.: BOT NO. 050240443
EASEMENT NO. 41966

REFER TO SHEET 2 FOR LEGAL DESCRIPTION AND SURVEY NOTES
REFER TO SHEET 3 FOR SKETCH OF DESCRIPTION

SPECIFIC PURPOSE SURVEY SKETCH AND DESCRIPTION PIPELINE EASEMENT

PROJECT LOCATION

FIND DREDGED MATERIAL MANAGEMENT AREA (DMMA) BV-4B BREVARD COUNTY, FLORIDA

Revisions:
6.8.17. rev. Sketch & Description

STATE OF FLORIDA
7-19-17
WILLIAM T. SADLER JR., P.E., P.S.M.
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER NUMBER 5869
FLORIDA AUTHORIZATION NUMBER LB 7342

SEA DIVERSIFIED, INC.
Surveying and Engineering Applications
21 NW 2nd Street
Delray Beach, Florida 33444

Date:	01-16-17	Sheet: 1 OF 3
Drawn by:	W.T.S.	
Checked by:	W.T.S.	
Scale:	NTS	CADD ID: 17-2514.COVER

17-2514.sh1.cover.BV-4B.dgn 6/8/2017 5:52:02 PM SEA DIVERSIFIED INC.

RECEIVED
JUL 26 2017
DEP Central Dist

SUBMERGED LANDS EASEMENT

LEGAL DESCRIPTION

ALL OF THE SOVEREIGNTY SUBMERGED LANDS LYING BELOW THE SAFE UPLAND LINE OF THE INDIAN RIVER LAGOON IN SECTION 16, TOWNSHIP 21 SOUTH, RANGE 35 EAST, BREVARD COUNTY, FLORIDA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING FROM SOUTHWEST CORNER OF SECTION 16, THENCE NORTH 89°27'41" EAST ALONG THE SOUTH LINE OF SECTION 16 A DISTANCE OF 3,047.94 FEET TO THE EASTERLY RIGHT-OF-WAY LINE OF THE EAST COAST RAILWAY COMPANY AND THE POINT OF BEGINNNING; THENCE CONTINUE NORTH 89°27'41" EAST ALONG THE EASTERLY PROJECTION OF THE SOUTH LINE OF SECTION 16 A DISTANCE OF 37.09 FEET; THENCE NORTH 00°32'19" WEST A DISTANCE OF 60.00 FEET; THENCE SOUTH 89°27'41" WEST A DISTANCE OF 52.00 FEET TO THE EASTERLY RIGHT-OF-WAY LINE OF THE EAST COAST RAILWAY COMPANY; THENCE CONTINUE SOUTH 89°27'41" WEST A DISTANCE OF 2.3 FEET, MORE OR LESS, TO A POINT AT THE INTERSECTION WITH THE SAFE UPLAND LINE, SAID LINE HAVING AN ELEVATION OF 1.1 FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD) AS PRESCRIBED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF STATE LANDS; THENCE SOUTHERLY ALONG THE SAFE UPLAND LINE TO A POINT OF INTERSECTION WITH THE SOUTH LINE OF SECTION 16; THENCE NORTH 89°27'41" EAST ALONG THE SOUTH LINE OF SECTION 16 A DISTANCE OF 0.5 FEET, MORE OR LESS, TO THE EASTERLY RIGHT-OF-WAY LINE OF THE EAST COAST RAILWAY COMPANY AND THE POINT OF BEGINNNING.

SAID SUBMERGED LANDS SITUATED AND LYING IN BREVARD COUNTY, FLORIDA AND CONTAINING 3,204 SQUARE FEET OR 0.0736 ACRES MORE OR LESS.

SURVEY NOTES:

1. THIS SPECIFIC PURPOSE SURVEY WAS PREPARED JANUARY 16, 2017 FOR TAYLOR ENGINEERING, INC. THE SKETCH AND DESCRIPTION CONTAINED, HEREIN DOES NOT REPRESENT A FIELD BOUNDARY SURVEY.
2. THE PURPOSE OF THE SURVEY WAS TO PREPARE A SKETCH AND DESCRIPTION OF A PROPOSED PUBLIC EASEMENT ON SOVEREIGNTY SUBMERGED LANDS ASSOCIATED WITH FLORIDA INLAND NAVIGATION DISTRICT (FIND) DREDGED MATERIAL MANAGEMENT AREA BV-4B.
3. LANDS DESCRIBED, HEREON, WERE NOT ABSTRACTED FOR OWNSERSHIP, EASEMENTS, RIGHTS-OF-WAY OR OTHER INSTRUMENTS OF RECORD.
4. THIS SKECTH OF DESCRIPTION WAS PREPARED IN ACCORDANCE WITH SLER 0960 AND IS IN COMPLIANCE WITH THE STANDARDS OF PRACTICE PURSUANT TO RULES 5J-17.050 THROUGH 5J-17.052, FLORIDA ADMINISTRATIVE CODE.
4. THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED PROFESSIONAL SURVEYOR AND MAPPER .
5. THE COORDINATES SHOWN HEREON ARE IN FEET AND BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83/90).
6. THE BEARINGS SHOWN HEREON ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83/90). BEARINGS AND OTHER BOUNDARY INFORMATION DEPICTED, HEREON, WERE OBTAINED FROM A BOUNDARY SURVEY ENTITLED BOUNDARY AND 60' RIGHT-OF-WAY SURVEY PREPARED BY ST. JOHNS SURVEY COMPANY DATED AUGUST 19, 1991, UNDER FILE NO. 250-022C. BOUNDARY INFORMATION WAS NOT VERIFIED AS PART OF THIS SPECIFIC PURPOSE SURVEY.
7. SECTION CORNER COORDINATES ARE BASED ON THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION CERTIFIED CORNER RECORDS, DOC. NO. 092351, OBTAINED FROM THE LAND BOUNDARY INFORMATION SYSTEM (LABINS) WEBSITE. SECTION CORNER COORDINATES WERE NOT VERIFIED AS PART OF THIS SPECIFIC PURPOSE SURVEY.

LEGEND AND ABBREVIATIONS:

P.O.B.	POINT OF BEGINNING
P.O.C.	POINT OF COMMENCEMENT
R/W	RIGHT-OF-WAY
SEC	SECTION
N	NORTHING
E	EASTING

CERTIFIED TO THE BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA

LEASE/EASEMENT NO.: BOT NO. 050240443
EASEMENT NO. 41966

REFER TO SHEET 3 FOR SKETCH OF DESCRIPTION

SPECIFIC PURPOSE SURVEY
SKETCH AND DESCRIPTION
PIPELINE EASEMENT

LEGAL DESCRIPTION
SURVEY NOTES

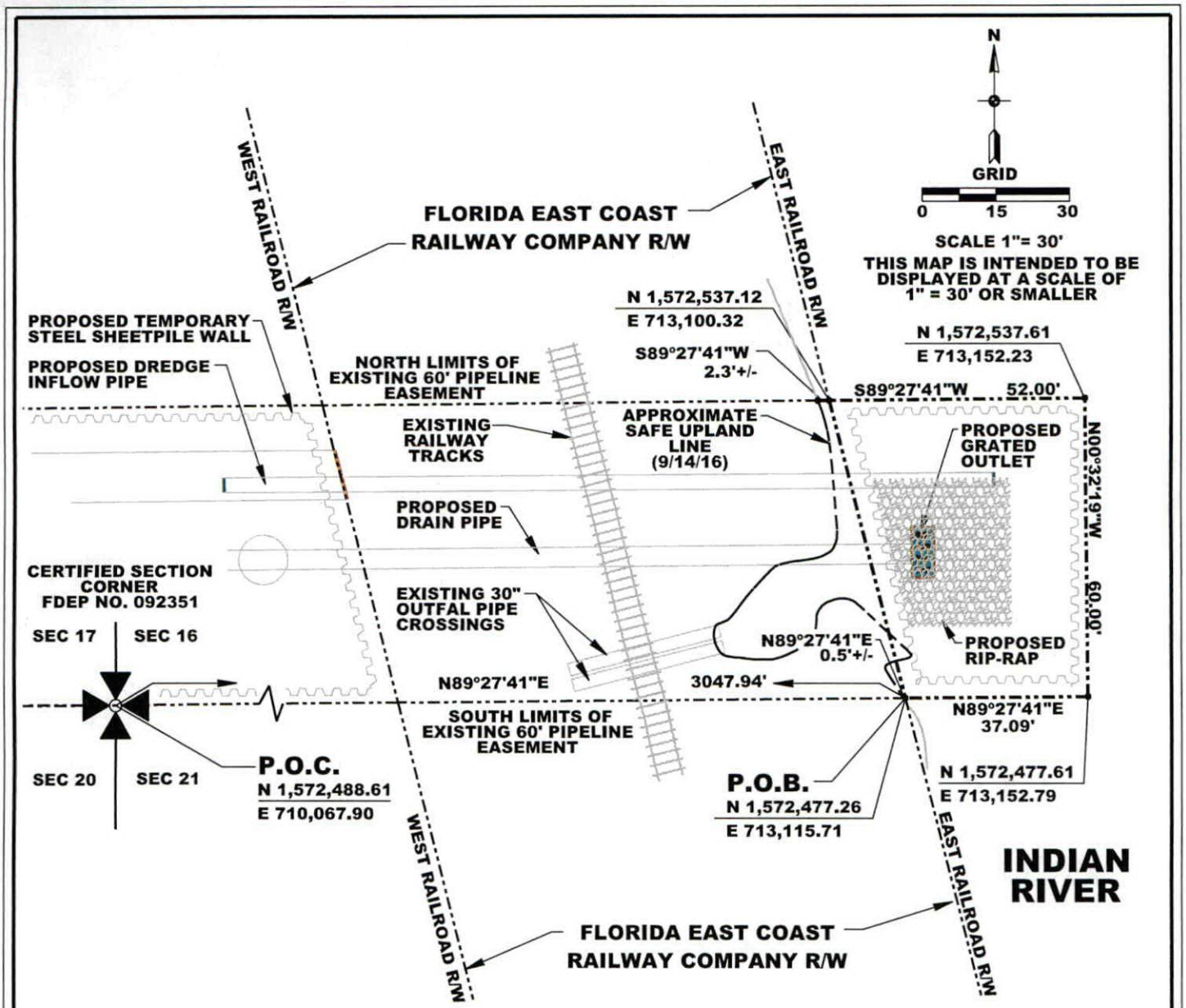
FIND DREDGED MATERIAL MANAGEMENT AREA (DMMA) BV-4B
BREVARD COUNTY, FLORIDA

Revisions:
6.8.17. rev. Sketch & Description

SEA DIVERSIFIED, INC.
Surveying and Engineering Applications
21 NW 2nd Street
Delray Beach, Florida 33444

Date:	01-16-17	Sheet: 2 of 3
Drawn by:	W.T.S.	
Checked by:	W.T.S.	
Scale:	N.T.S.	CADD ID: 17-2514.SH2.LEGAL

DEP Central Dist.
JUL 26 2017
RECEIVED



THIS IS NOT A FIELD BOUNDARY SURVEY

PROPOSED IMPROVEMENTS DEPICTED ARE BASED ON PLANS PROVIDED BY TAYLOR ENGINEERING, INC. DATED NOVEMBER 2016 (TAYLOR PROJECT NUMBER C2014-026)

SAFE UPLAND LINE, AS DEPICTED HEREON, IS A LINE DESCRIBING THE APPROXIMATE 1.1-FOOT NGVD CONTOUR AS FIELD LOCATED ON 9.14.16. THE SAFE UPLAND LINE ELEVATION WAS PROVIDED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF STATE LANDS.

LEASE/EASEMENT NO.: BOT NO. 050240443
EASEMENT NO. 41966

REFER TO SHEET 2 FOR LEGAL DESCRIPTION AND SURVEY NOTES

SPECIFIC PURPOSE SURVEY SKETCH AND DESCRIPTION PIPELINE EASEMENT

SKETCH OF DESCRIPTION

FIND DREDGED MATERIAL MANAGEMENT AREA (DMMA) BV-4B
BREVARD COUNTY, FLORIDA

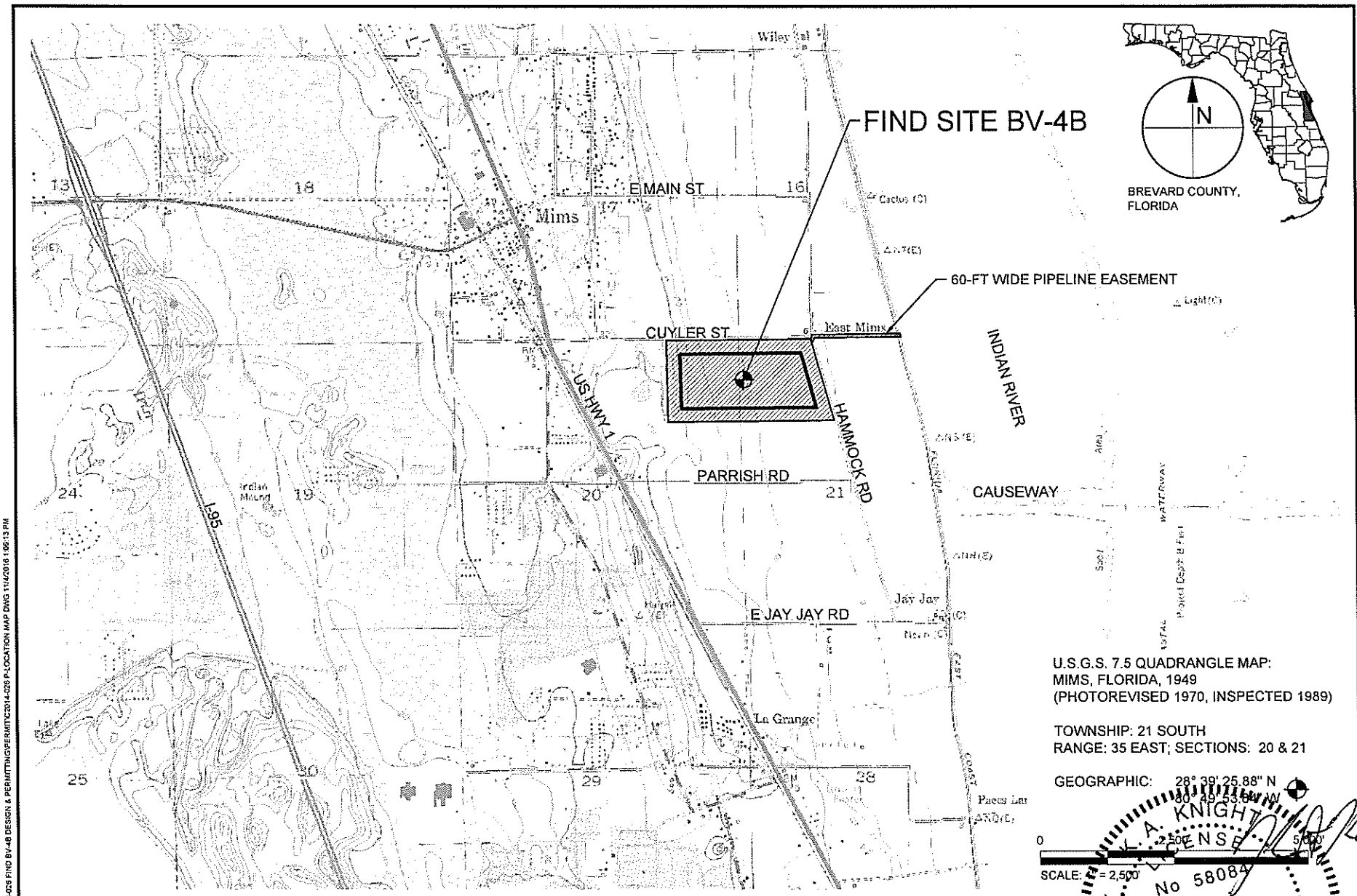
Revisions:
6.8.17. rev. Sketch & Description

SEA DIVERSIFIED, INC.
Surveying and Engineering Applications
21 NW 2nd Street
Delray Beach, Florida 33444

Date:	01-16-17	Sheet: 3 of 3
Drawn by:	W.T.S.	
Checked by:	W.T.S.	
Scale:	AS SHOWN	CADD ID: 17-2514.SH3.SKETCH

17-2514.sh3.Sketch of Description.RR R-W.BV-4B.rev.6.8.17.2D.OPTION 1.dgn 6/9/2017 10:56:48 AM SEA DIVERSIFIED INC.

DEP Central Dist
JUL 26 2017



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

FIGURE 1
LOCATION MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	1 of 22
DATE	NOV 2016

SEAL
K. A. KNIGHT
LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-4-16

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-LOCATION MAP DWG 11/4/2016 1:06:13 PM



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ADJACENT PROPERTIES DATA OBTAINED FROM BREVARD COUNTY PROPERTY APPRAISER, APRIL 2016.
3. REFER TO ADJACENT PROPERTY OWNERSHIP TABLE IN ERP APPLICATION SECTION C, PART 1, ITEM 13

N

0 500' 1,000'

SCALE: 1" = 500'

K. A. KNIGHT
GENSE
No 58069
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-4-16
SEAL
KEVIN KNIGHT LICENSE NUMBER
DATE

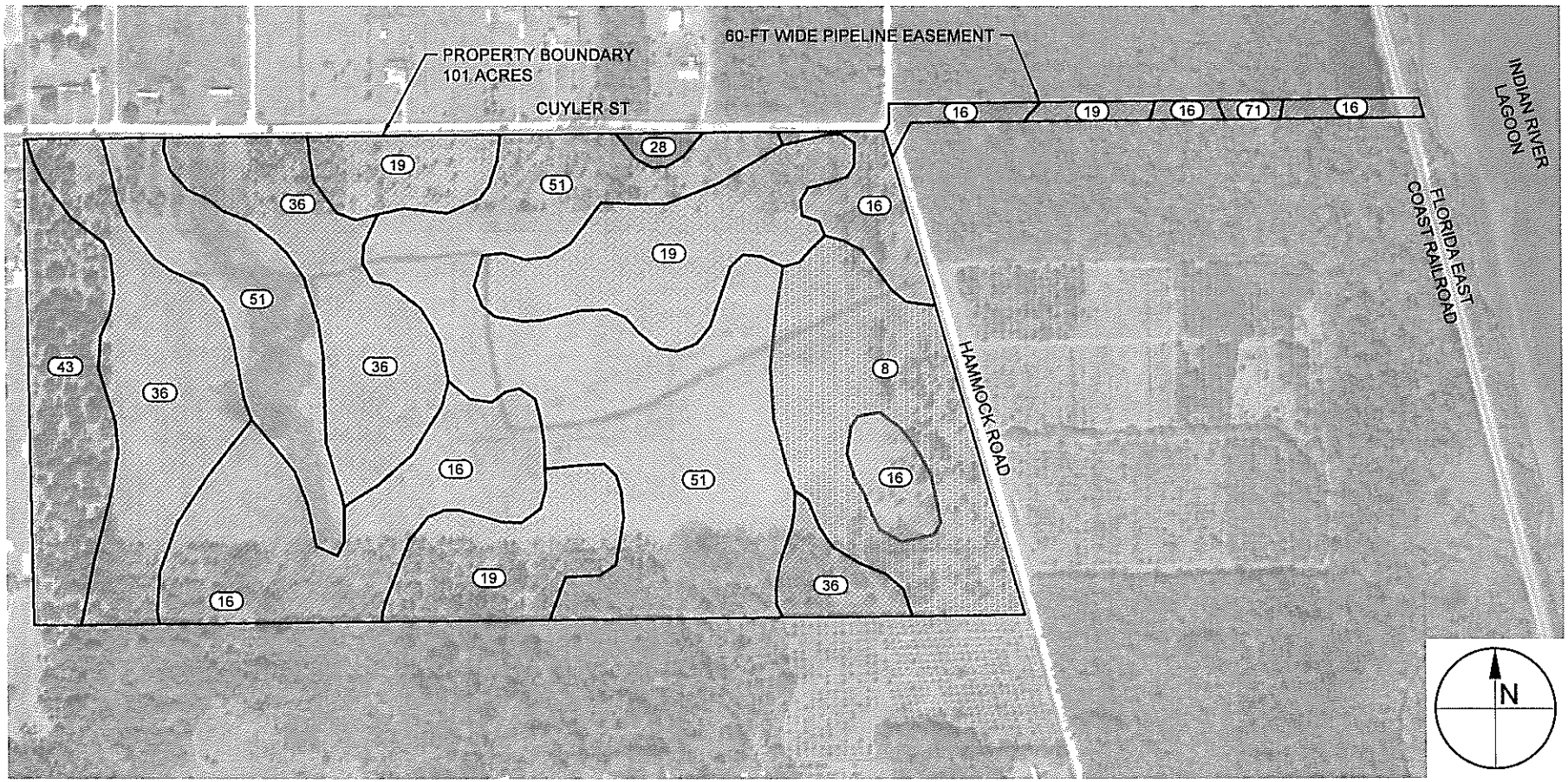
TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD.
BLDG. 300, SUITE 300
JACKSONVILLE, FL 32256
CERTIFICATE OF AUTHORIZATION # 4615

FIGURE 2
ADJACENT PROPERTIES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C20140126
DRAWN BY	AF
SHEET	2 of 2
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITS\C2014-026 P-ADJACENTS.DWG 11/4/2016 1:06:37 PM



SOILS CLASSIFICATIONS

ID	NAME
8	BRADENTON FINE SAND, LIMESTONE SUBSTRATUM
16	COPELAND-BRADENTON-WABASSO COMPLEX, LIMESTONE SUBSTRATUM
19	RIVIERA SAND
28	IMMOKALEE SAND
36	MYAKKA SAND, 0 TO 2 PERCENT SLOPES
43	PAOLA FINE SAND, 0 TO 5 PERCENT SLOPES
51	POMPANO SAND
71	WABASSO SAND

0 500' 1,000'
SCALE: 1" = 500'

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

FIGURE 3
USDA/NRCS SOILS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

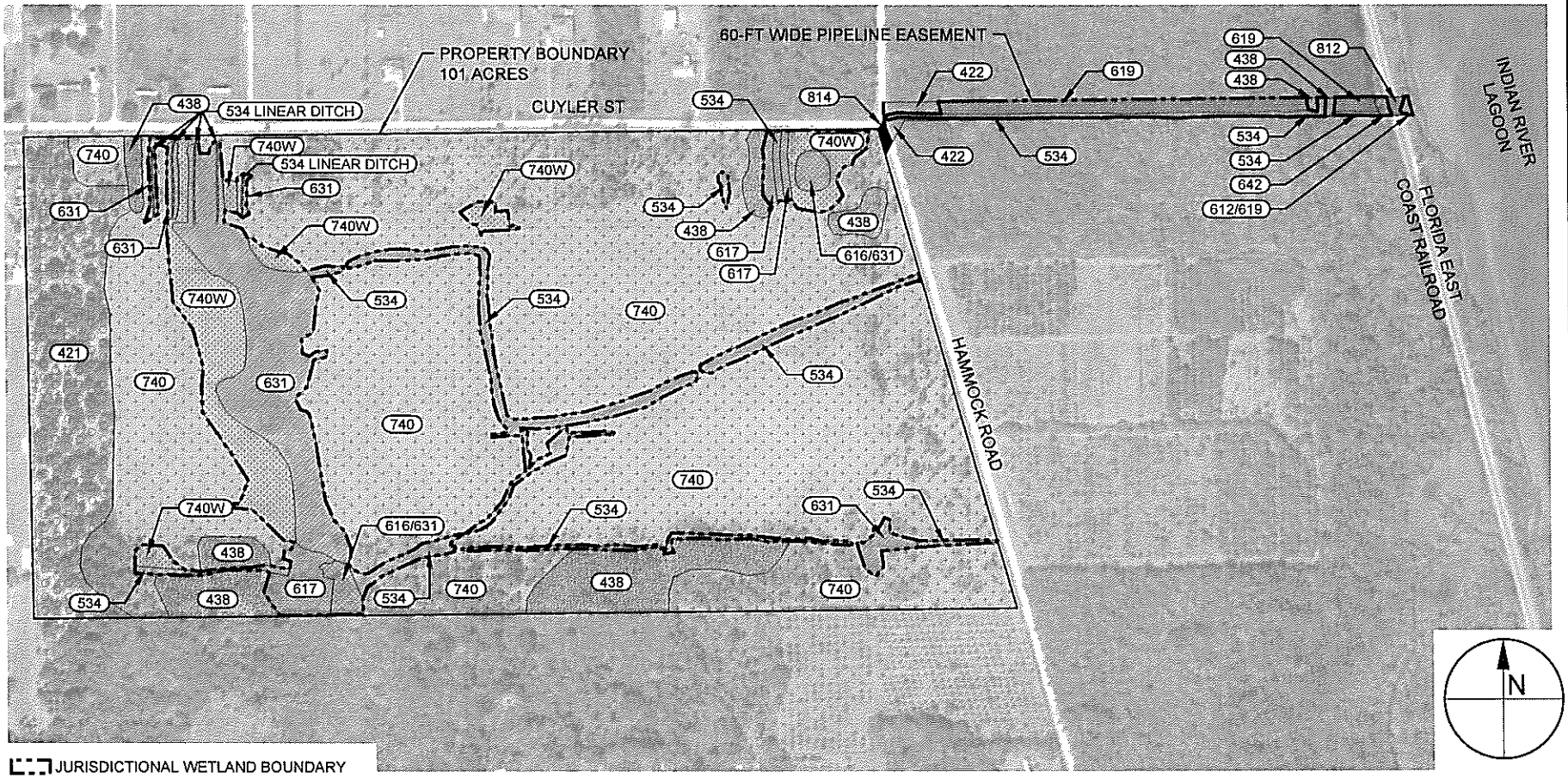
PROJECT	C2014-026
DRAWN BY	AF
SHEET	3 of 22
DATE	NOV 2016

SEAL
KEITH A. KNIGHT P.E. # 58084
DATE

A. KNIGHT
LICENSE
No 58084
11-4-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-SOILS.DWG 11/4/2016 1:07:01 PM



BV-4B PROPERTY FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
421	8.33	XERIC OAK
438	5.30	MIXED HARDWOODS
534	3.37	DRAINAGE / IRRIGATION DITCHES
616 / 631	0.60	INLAND PONDS AND SLOUGHS / WETLAND SCRUB
617	1.09	MIXED WETLAND HARDWOODS
631	5.74	WETLAND SCRUB
740	71.92	DISTURBED LAND
740W	4.65	DISTURBED LAND - WET

BV-4B PIPELINE EASEMENT FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
422	0.32	BRAZILIAN PEPPER
438	0.07	MIXED HARDWOODS
534	0.54	DRAINAGE / IRRIGATION DITCHES
612/619	0.03	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS
619	1.25	EXOTIC WETLAND HARDWOODS
642	0.05	SALTWATER MARSH
812	0.06	RAILROADS
814	0.07	ROADS

NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE (JULY 2014); SURVEYED BY SEA DIVERSIFIED, INC.
4. COMMUNITIES CLASSIFIED ACCORDING TO FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM (FLUCCS)

0 500' 1,000'
SCALE: 1" = 500'

K.A. KNIGHT
LICENSE
No. 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-7-16
SEAL
DATE

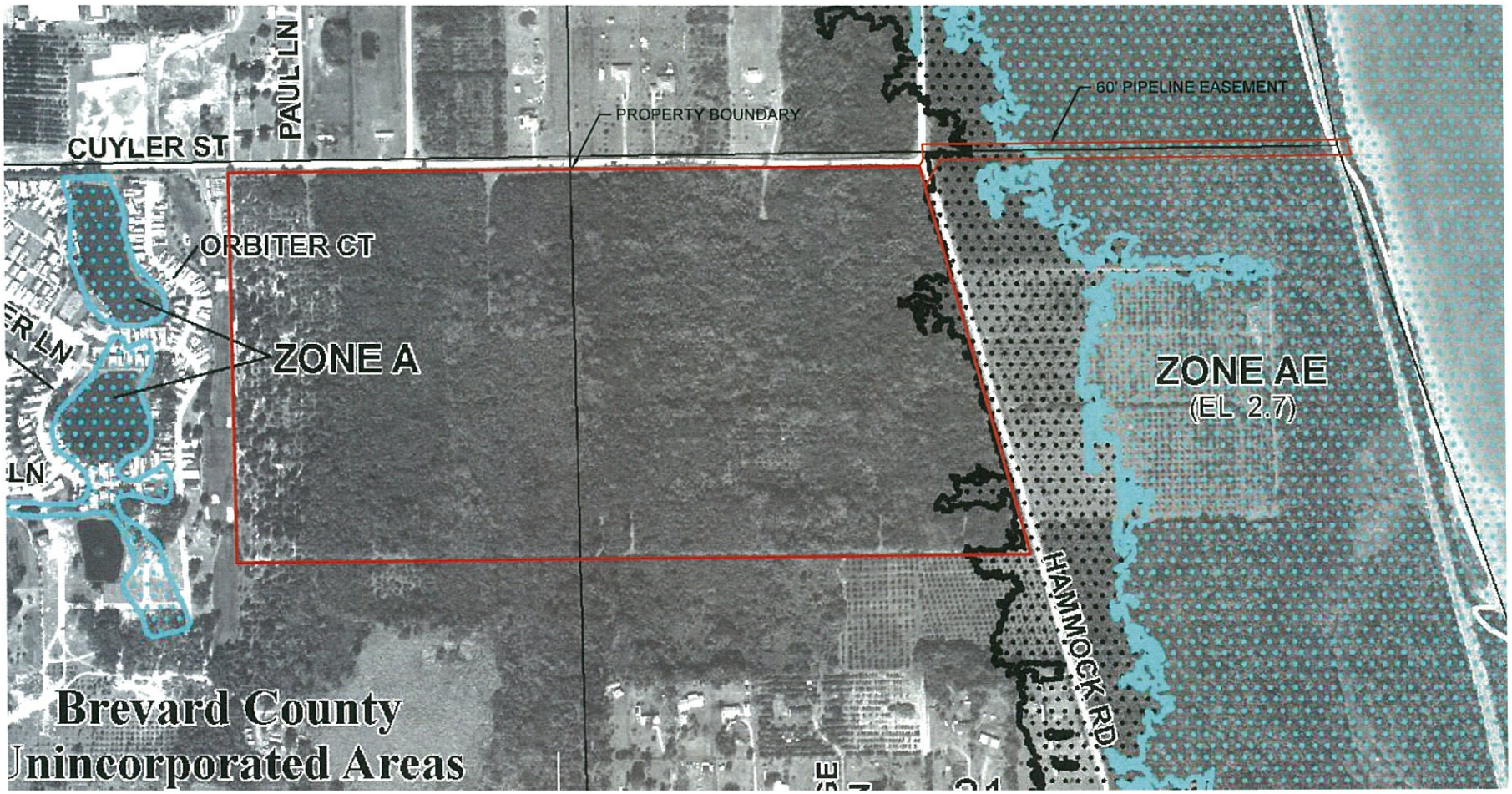
TAYLOR ENGINEERING INC.
10151 DEERWOOD PARK BLVD.
BLDG. 300, SUITE 300
JACKSONVILLE, FL 32256
CERTIFICATE OF AUTHORIZATION # 4815

FIGURE 4
EXISTING CONDITIONS FLUCCS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AP
SHEET	4 of 22
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITC2014-026 P-EXISTFLUCCS.DWG 11/4/2016 1:07:36 PM



N

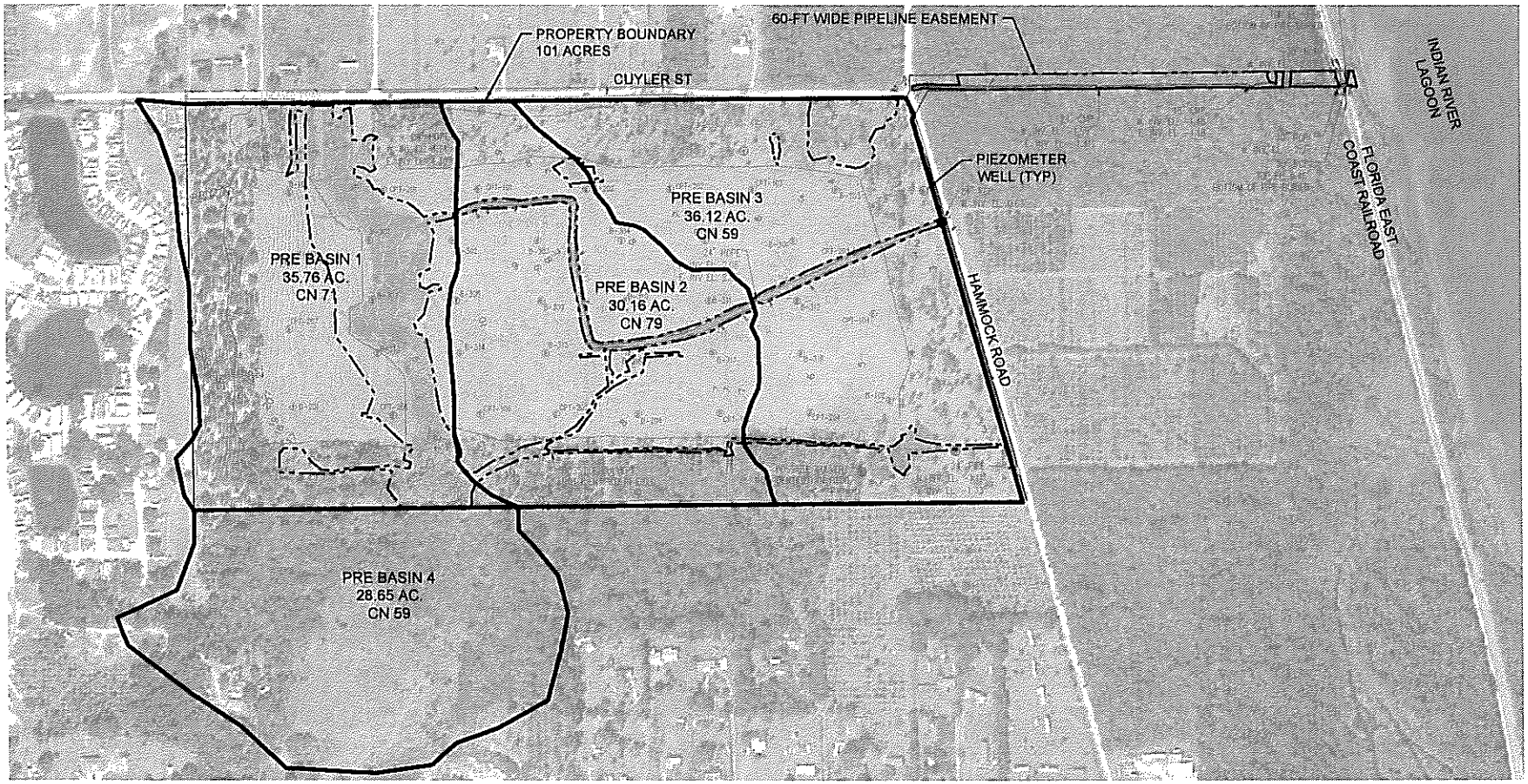
0 600' 1,200'
SCALE: 1" = 600'

K. A. KNIGHT
LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-4-16

TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4815	FIGURE 5 FEMA FLOOD ZONE MAP FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT C2014-026 DRAWN BY AF SHEET 5 of 22 DATE NOV 2016	SEAL KEITH A. KNIGHT P.E.# 58084 DATE

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-FEMA.DWG 11/4/2016 1:07:59 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY
OUTFALL

0 600' 1,200'
SCALE: 1" = 600'

K. A. KNIGHT
LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-8-16
DATE

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

FIGURE 6
PRE-DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AE
SHEET	6 of 25
DATE	NOV 2016

SEAL
KEITH A. KNIGHT # 58084
DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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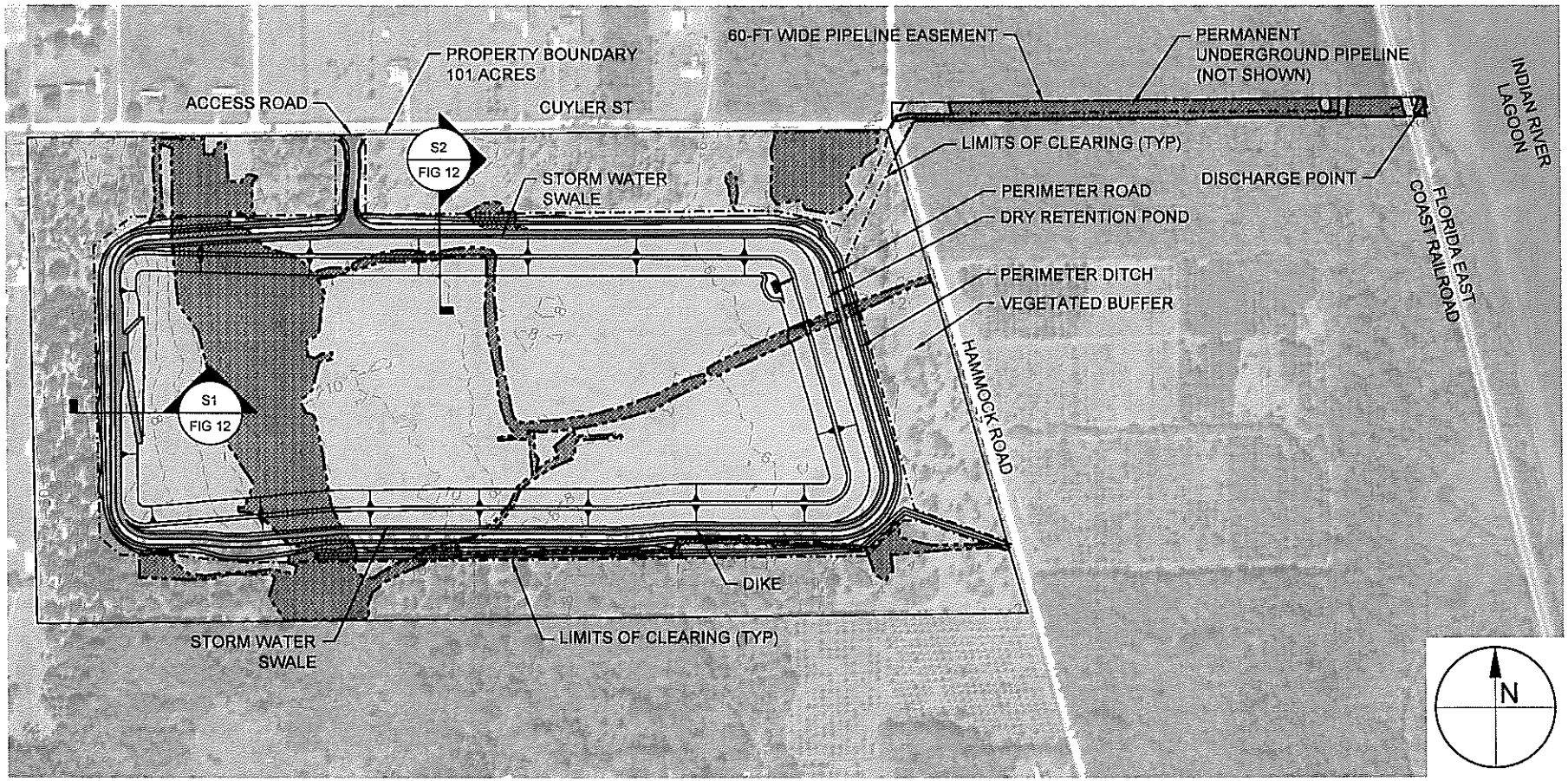

NOTES

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2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
7. SITE ACREAGE WITHIN PROPERTY BOUNDARY IS 101 AC.
8. CLEARED AREA IS 63 AC INCLUDING PIPELINE EASEMENT.
9. DMMA CAPACITY IS ESTIMATED AT 710,710 CY

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000'
SCALE: 1" = 500'

K. A. KNIGHT LICENSED No. 66084 STATE OF FLORIDA PROFESSIONAL ENGINEER
11-4-16

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

FIGURE 7
SITE PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	7 of 22
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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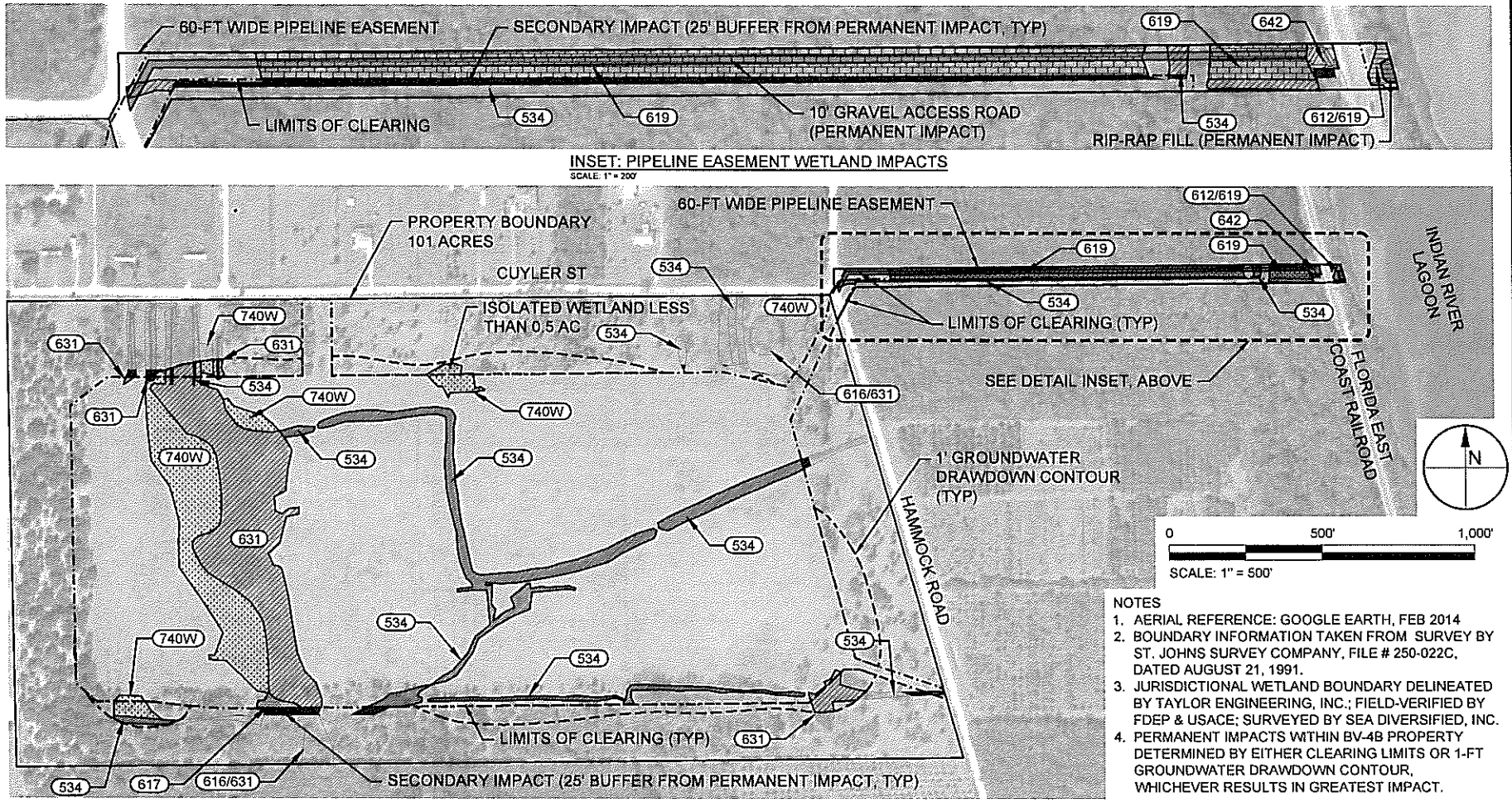

NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
4. PERMANENT IMPACTS WITHIN BV-4B PROPERTY DETERMINED BY EITHER CLEARING LIMITS OR 1-FT GROUNDWATER DRAWDOWN CONTOUR, WHICHEVER RESULTS IN GREATEST IMPACT.

BV-4B PROPERTY WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	PERM. IMPACT ACREAGE	SECONDARY IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	2.64	0.1
616/631	INLAND PONDS & SLOUGH/WETLAND SCRUB	N/A	0.02
617	MIXED WETLAND HARDWOODS	0.08	0.08
631	WETLAND SCRUB	4.97	0.05
740W	DISTURBED LAND - WET	3.55	0.01
	TOTAL:	11.24	0.26

BV-4B PIPELINE EASEMENT WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	TEMPORARY IMPACT ACREAGE	PERMANENT IMPACT ACREAGE	SECONDARY IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	0.08	0.01	0.12
619	EXOTIC WETLAND HARDWOODS	0.83	0.30	0.95
642	SALTWATER MARSH	0.03	N/A	0.03
612/619	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS	0.03	0.01	0.03
	TOTAL:	0.97	0.32	1.13

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

FIGURE 8
WETLAND IMPACTS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	8 of 22
DATE	NOV 2016

SEAL
K. A. KNIGHT
LICENSE
No 58084
11-4-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER
KEITH A. KNIGHT P.E.# 58084
DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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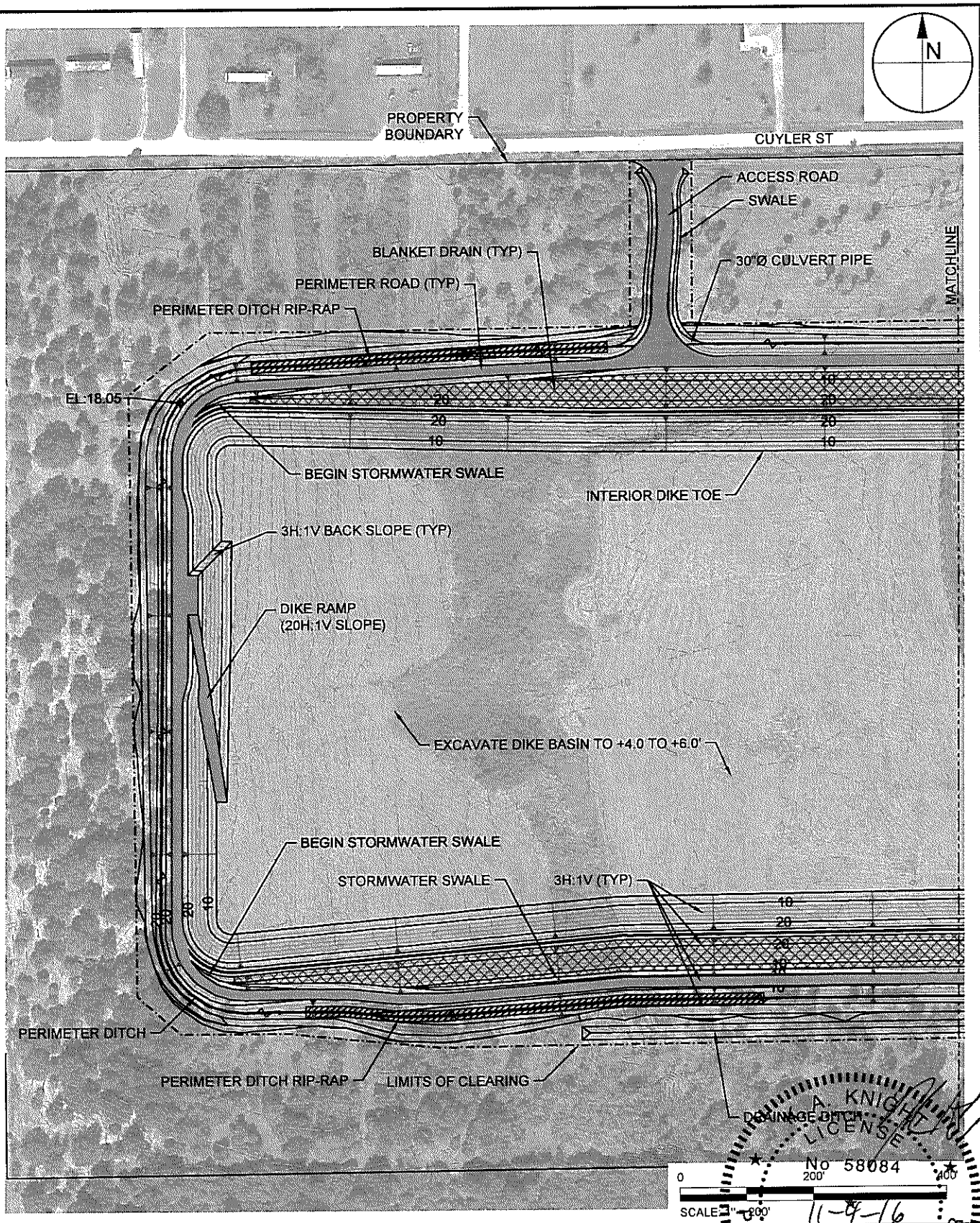

KEITH A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
11-9-16

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FIGURE 9
GRADING PLAN - WEST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	9 of 22	NOV 2016

KEITH A. KNIGHT — 58084 — DATE

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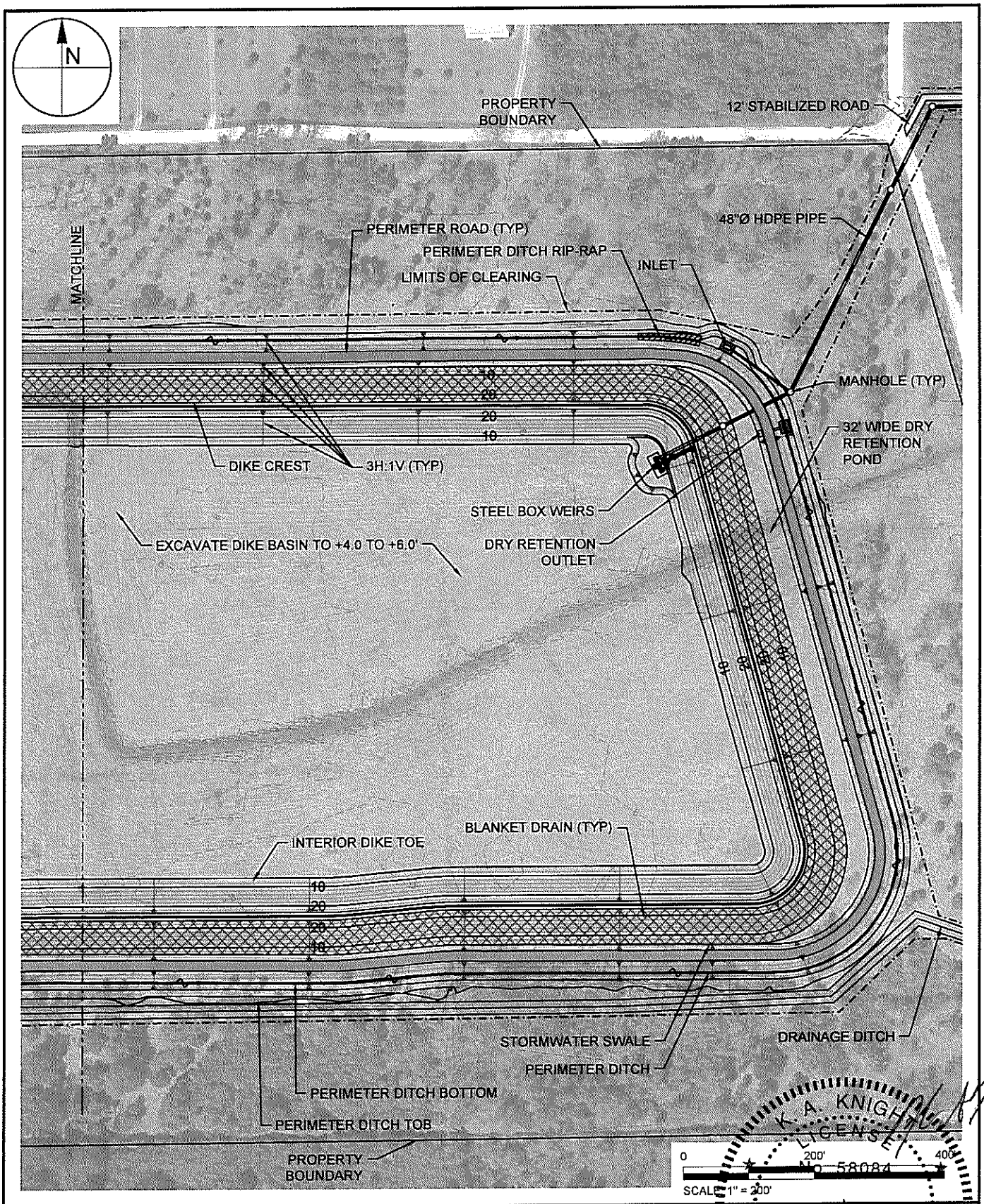

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FIGURE 10
GRADING PLAN - EAST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	10 of 22	NOV 2016

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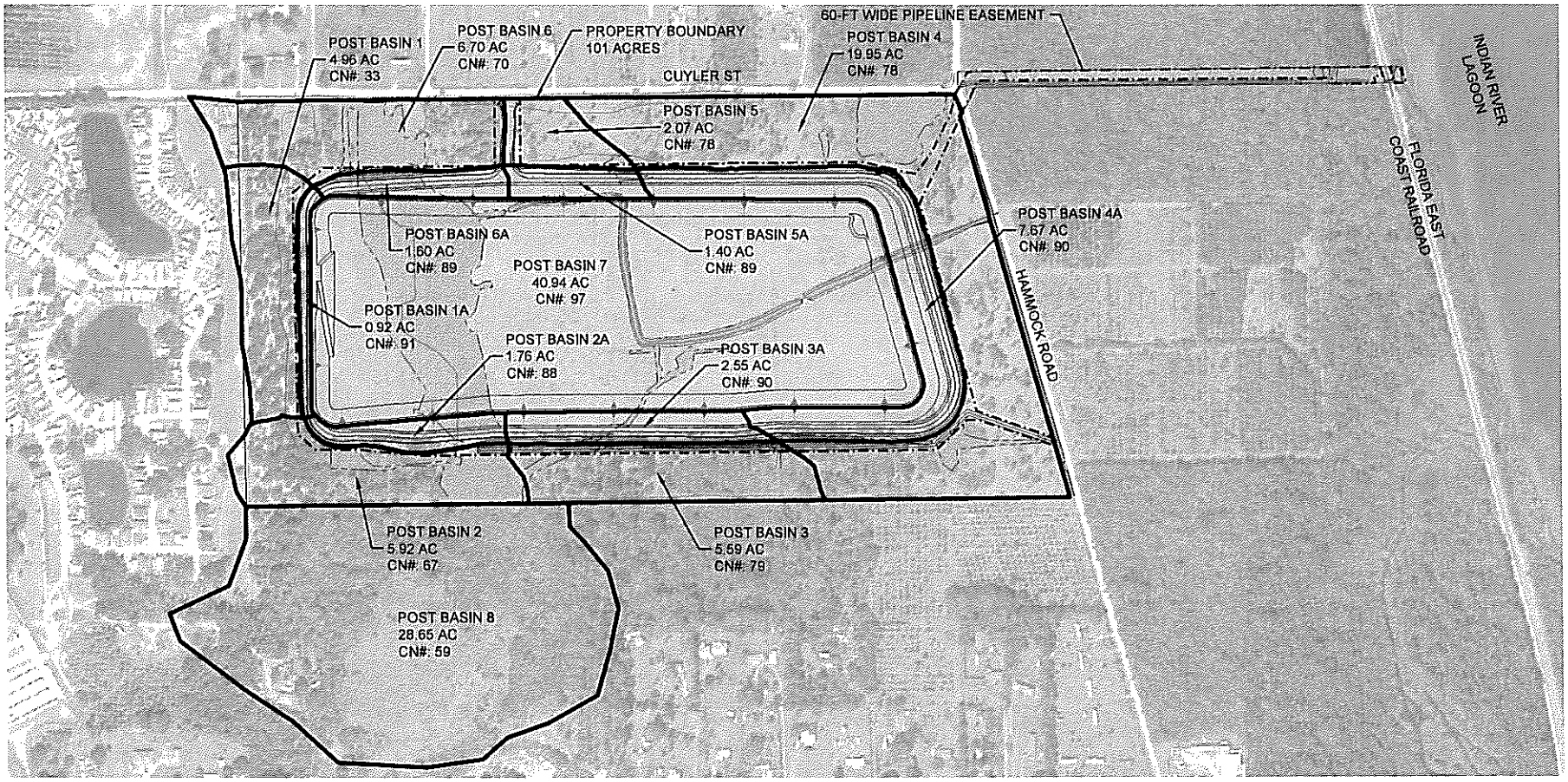

NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000

SCALE: 1" = 500'

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FIGURE 11
POST DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
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DATE	NOV 2016

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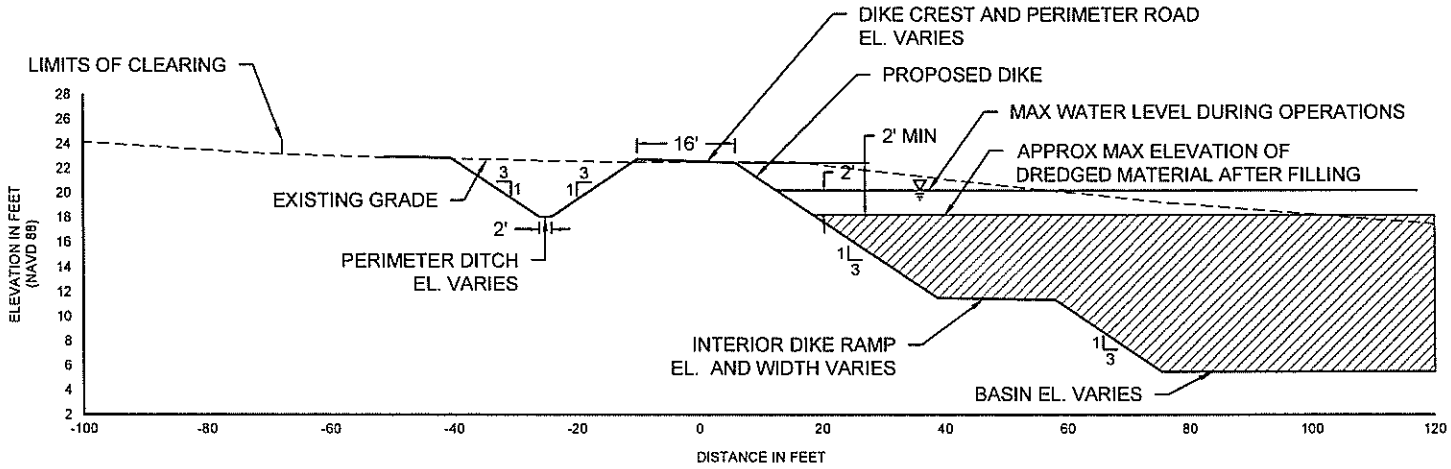
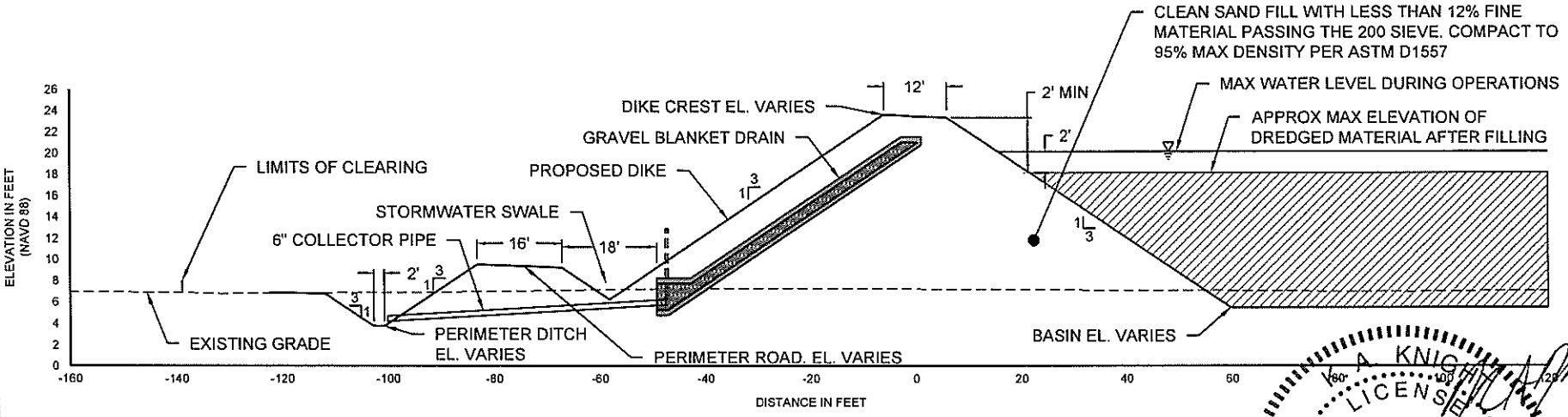


S1 FIG 7 **WEST DIKE SECTION**
SCALE: 1" = 30' 0 30'



S2 FIG 7 **EAST DIKE SECTION**
SCALE: 1" = 30' 0 30'

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FIGURE 12
DIKE SECTIONS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	
SHEET	12 of 22
DATE	NOV 2016

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KEITH A. KNIGHT DATE

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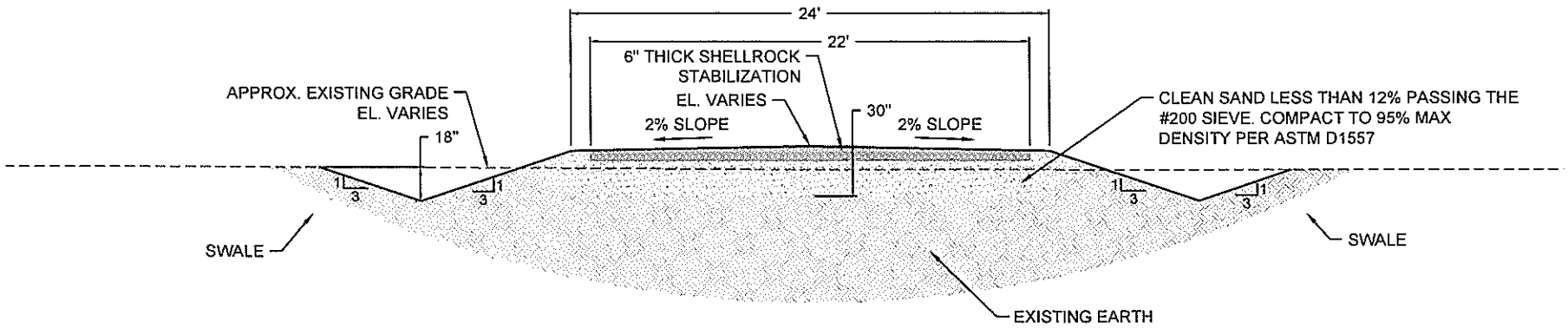

S4 / ### ACCESS ROAD SECTION
SCALE: 1" = 8' 0 8'

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11-4-16
STATE OF FLORIDA
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FIGURE 13
ACCESS ROAD SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	13 of 22
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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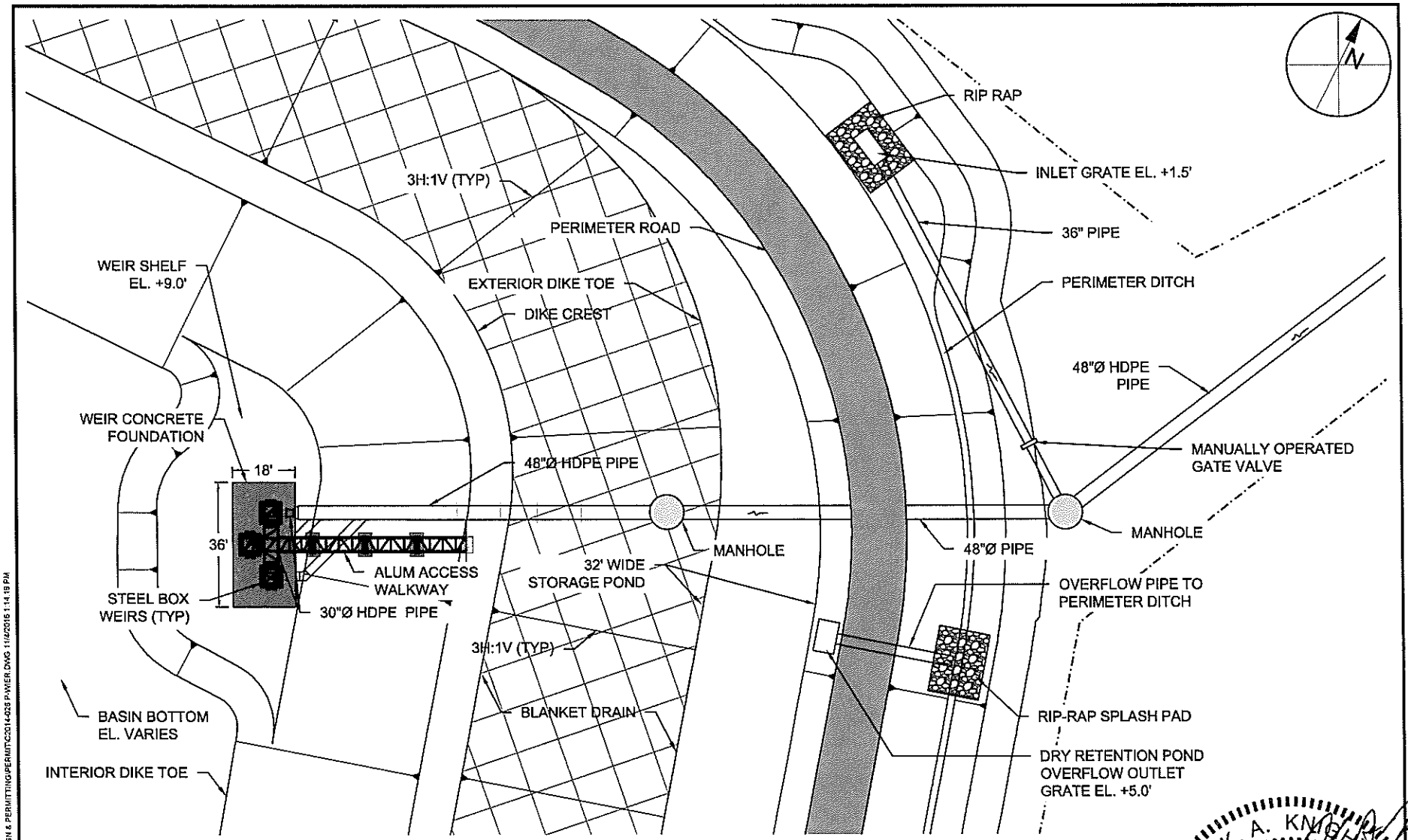

P1 ### WEIR PLAN
SCALE: 1" = 10' 0 10'

K. A. KNOPH
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11-4-16
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FIGURE 14
WEIR PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
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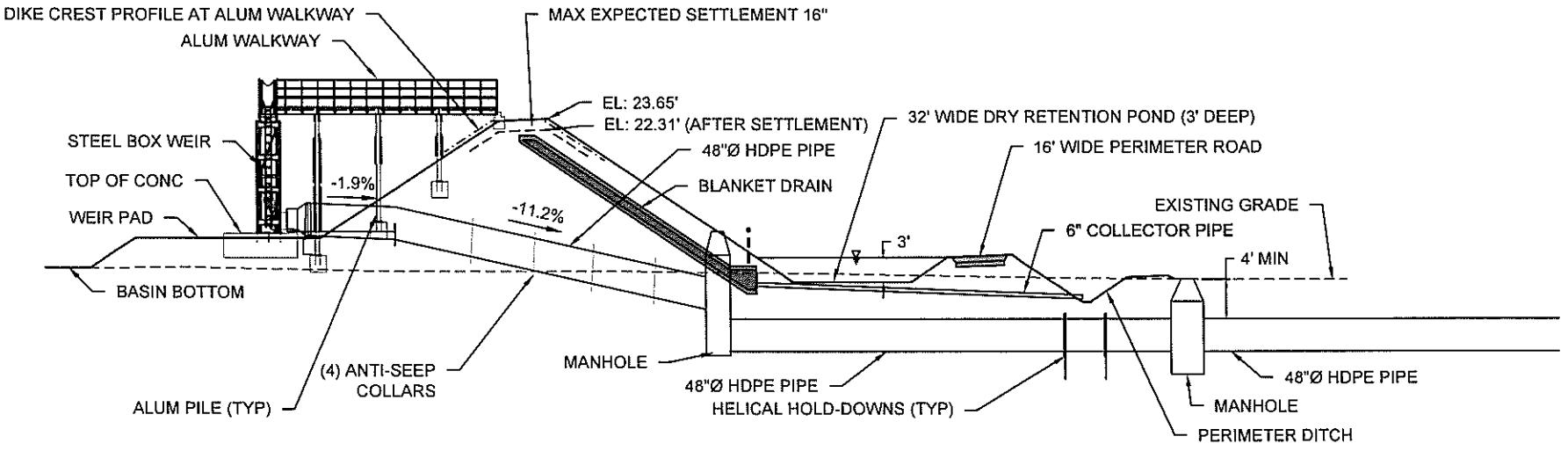

S5 / FIG 14 **DIKE OUTFALL PIPE PROFILE**
SCALE: 1" = 30'
V-SCALE: 1" = 15'
0 30'

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No 58084
11-4-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER
KEITH A. KNIGHT P.E. #58084

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FIGURE 15
WEIR PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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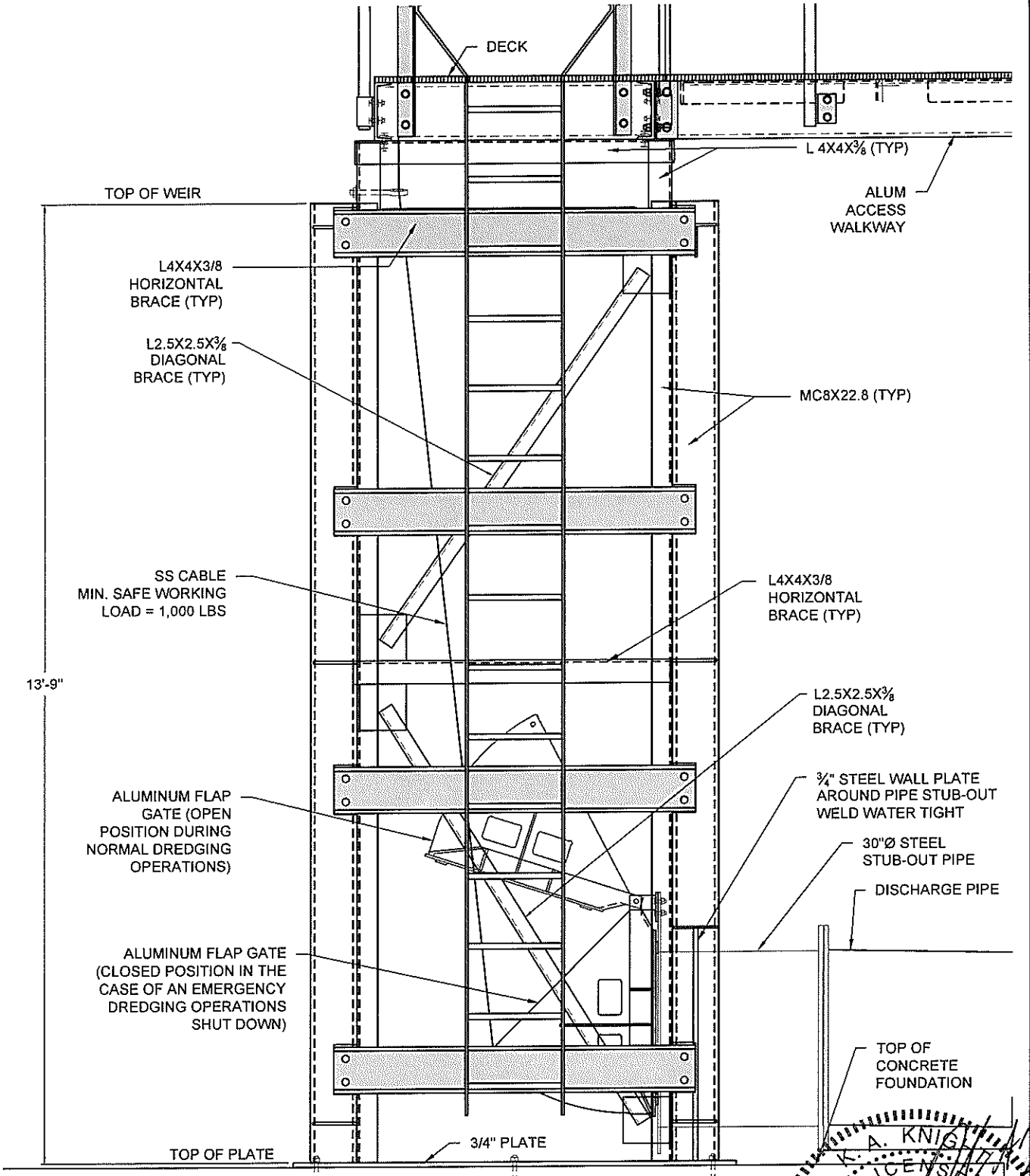

STEEL BOX WIER SIDE ELEVATION DETAIL

SCALE: 1" = 2'

0 2

K. A. KNIGHT
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FIGURE 16
WEIR DETAIL
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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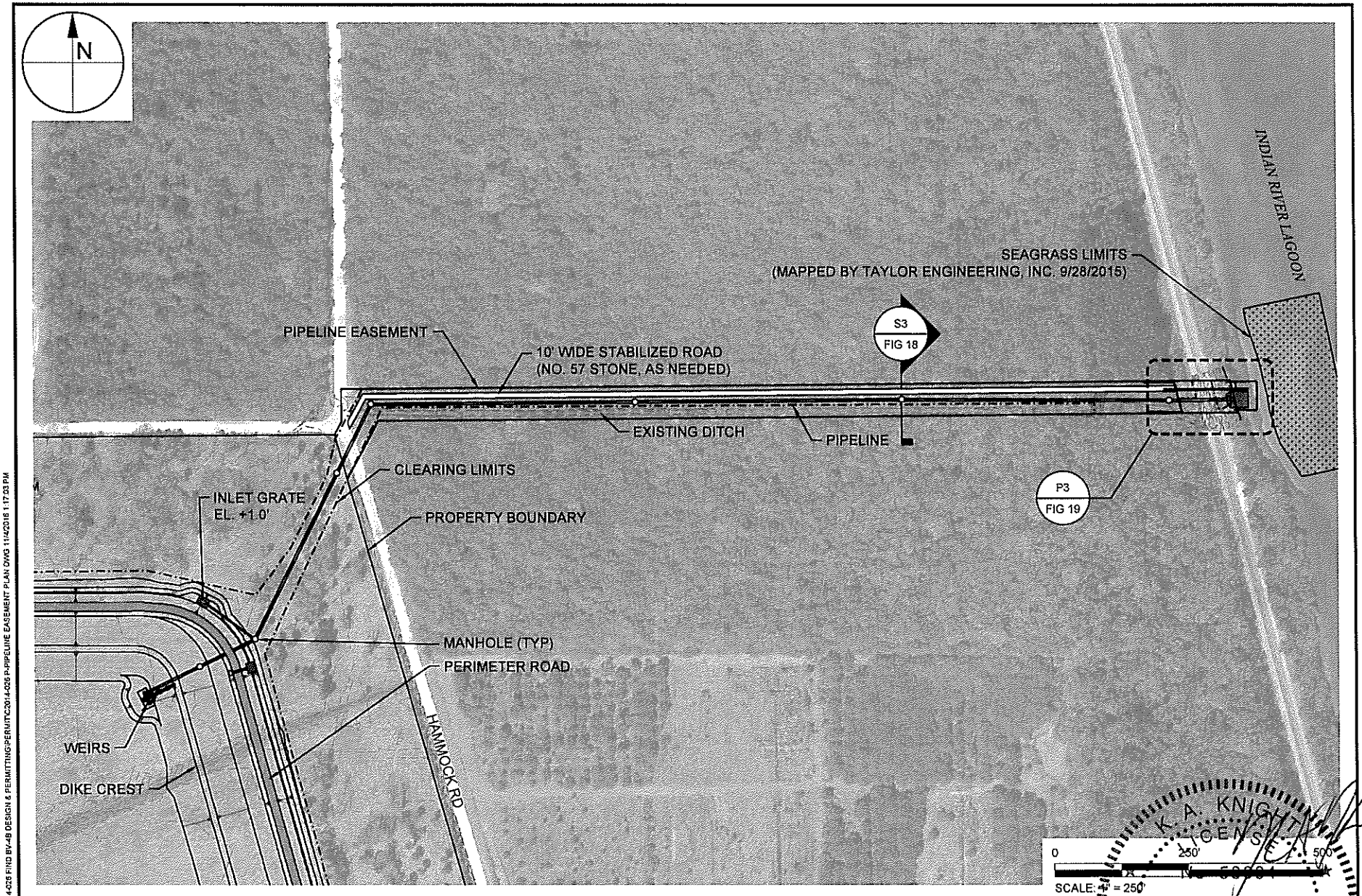

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LICENSE
No. 50904
11-4-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER

TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4815	FIGURE 17 PIPELINE OVERVIEW FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT C2014-026 DRAWN BY AF SHEET 17 of 22 DATE NOV 2016	SEAL KEITH A. KNIGHT P.E. 50904 DATE

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-PIPELINE EASEMENT PLAN.DWG 11/4/2016 1:17:03 PM

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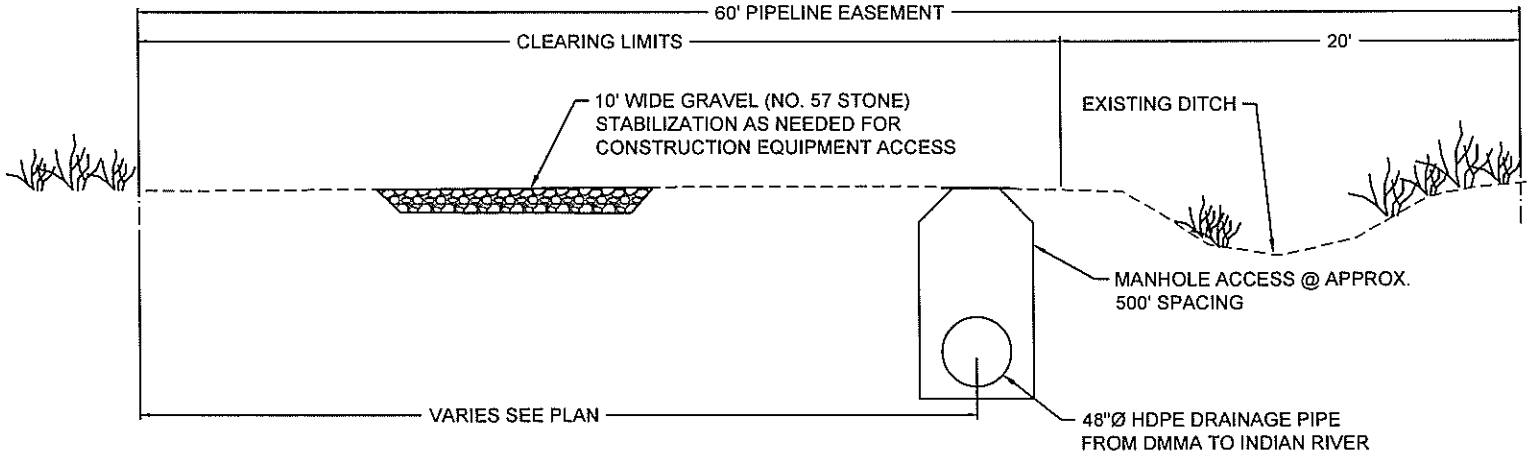

S3 / FIG 17 TYPICAL PIPELINE SECTION
SCALE: 1" = 8'
V-SCALE: 1" = 1'
0 8'

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FIGURE 18
PIPELINE TYPICAL SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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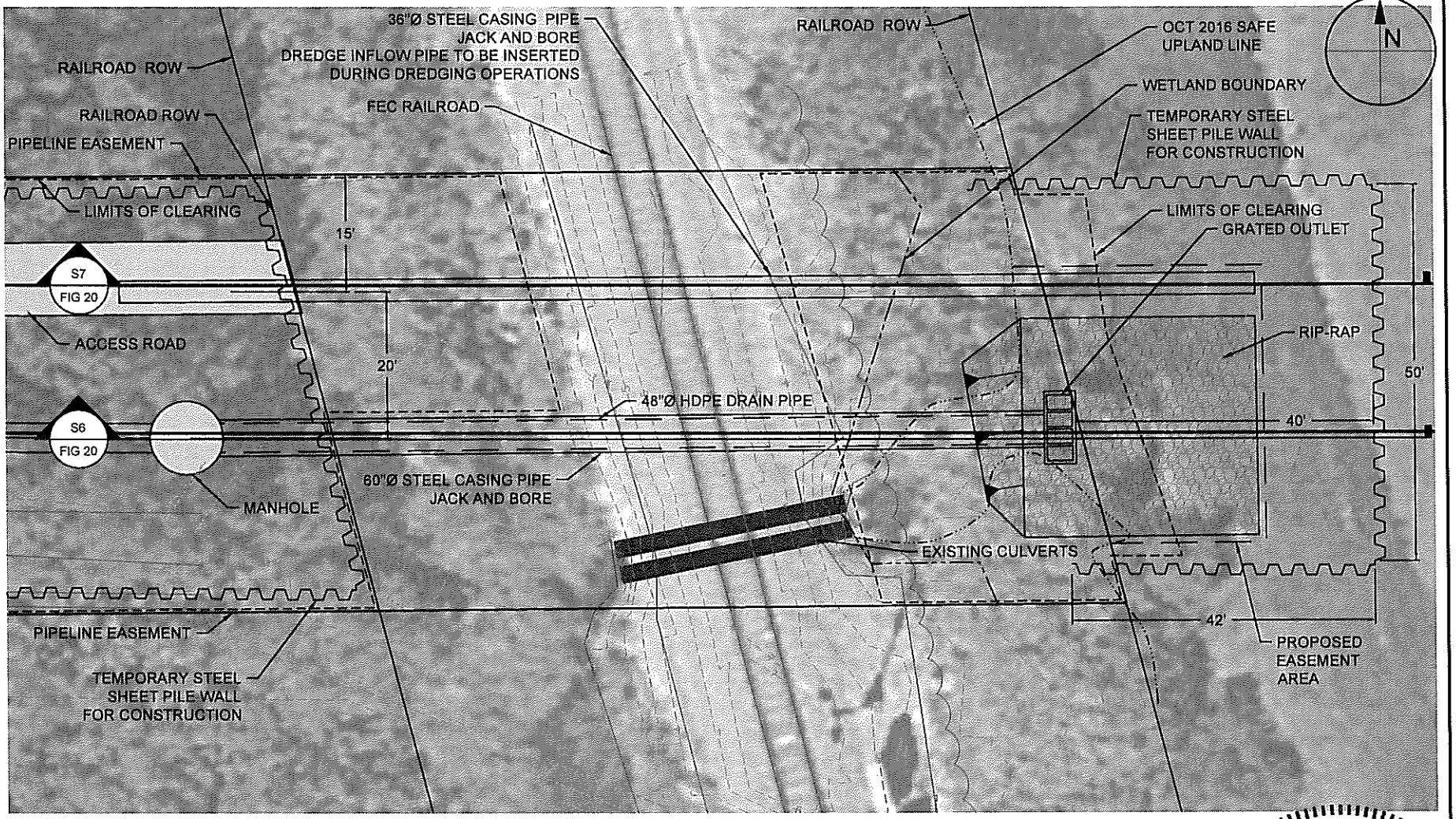

P3 / FIG 17 FEC RAILROAD CROSSING PLAN
SCALE: 1" = 20'
0 20'

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FIGURE 19
RAILROAD CROSSING PLAN AND PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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KEITH A. KNIGHT P.E. 58084 DATE

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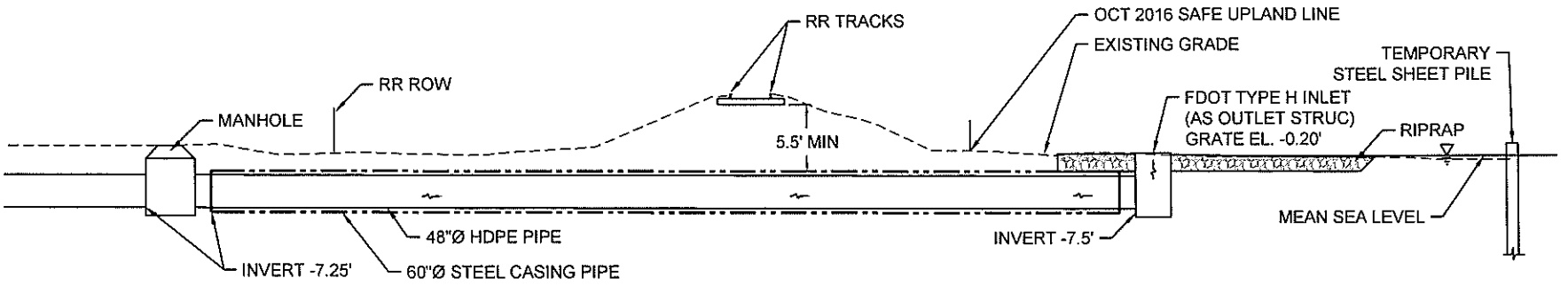
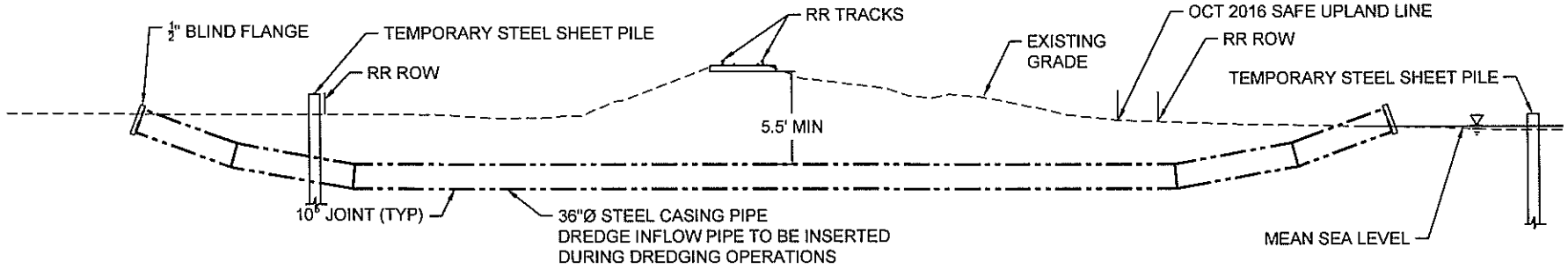


S6 / FIG 19 FEC RAILROAD CROSSING SECTION - 60IN STEEL CASING
SCALE: 1" = 20' 0 20'



S7 / FIG 19 FEC RAILRAOD CROSSING SECTION - 36 IN STEEL CASING
SCALE: 1" = 20' 0 20'

K. A. KNIGHT LICENSE No 58084 11-4-16 STATE OF FLORIDA PROFESSIONAL ENGINEER
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TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4815	FIGURE 20 RAILROAD CROSSING SECTIONS FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT C2014-026 DRAWN BY AF SHEET 20 of 22 DATE NOV 2016

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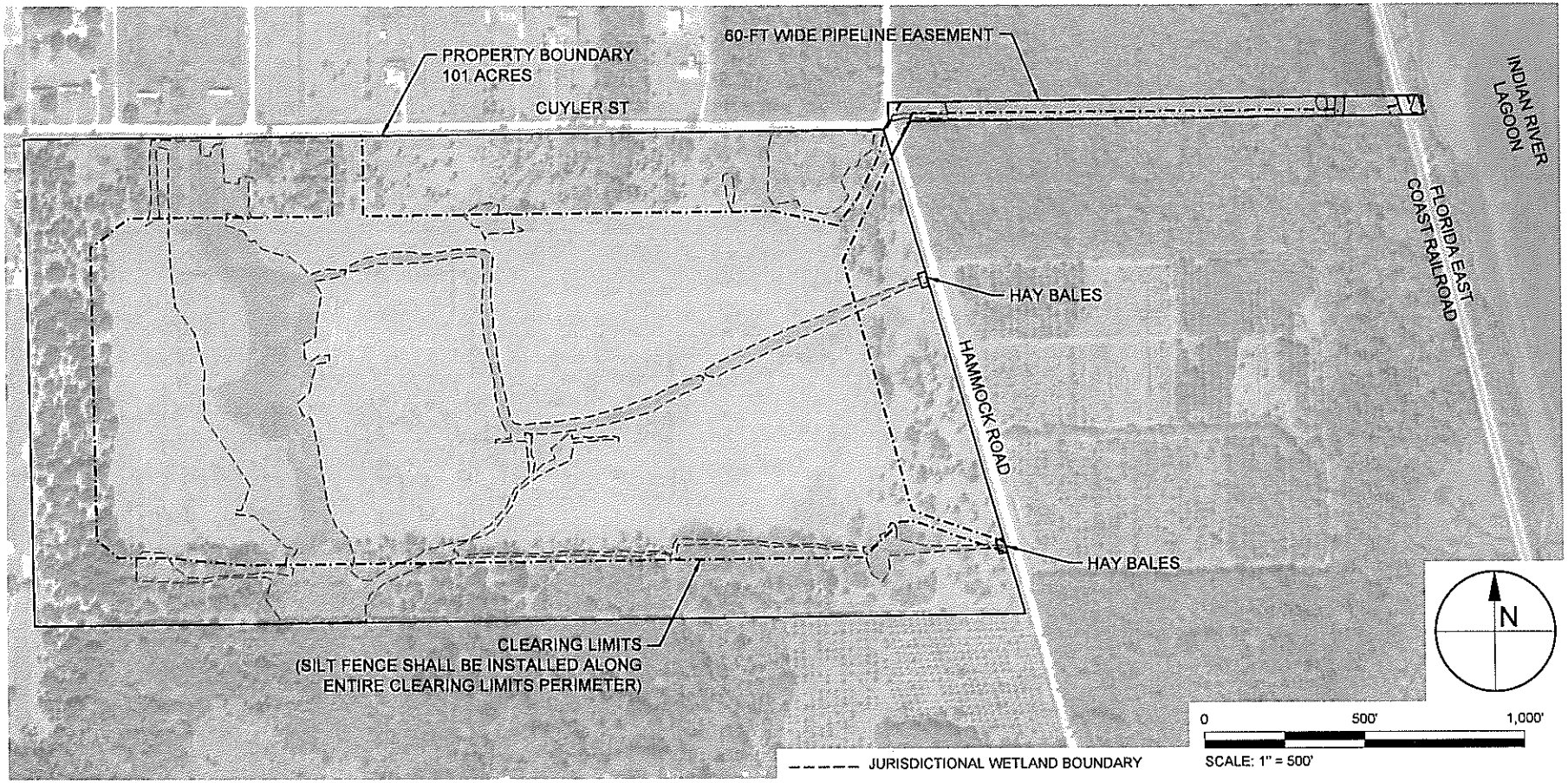

EROSION CONTROL AND GRASSING/SODDING NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN EROSION CONTROL MEASURES AS NECESSARY TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND COMPLY WITH STATE WATER QUALITY CRITERIA FOR STORMWATER DISCHARGE. EROSION CONTROL MEASURES INCLUDE BUT ARE NOT LIMITED TO TURBIDITY SCREENS, MULCHING, HAY BALES, AND SILT FENCE. IF A WATER QUALITY VIOLATION OCCURS, THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ALL DAMAGE AND ALL COSTS WHICH MAY RESULT INCLUDING LEGAL FEES, CONSTRUCTION COSTS, AND FINES.
2. DISTURBED AREAS SHALL BE MAINTAINED IN ACCORDANCE WITH CITY, COUNTY, STATE, AND FEDERAL REQUIREMENTS UNTIL A PERMANENT VEGETATIVE COVER IS ESTABLISHED.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING PERMANENT VEGETATION AT ALL DISTURBED AREAS PER DRAWINGS AND MEETING THE NPDES FINAL STABILIZATION REQUIREMENTS.
4. EROSION CONTROL MEASURES SHALL BE MAINTAINED FOR THE ENTIRE DURATION OF THE PROJECT OR UNTIL VEGETATION IS ESTABLISHED.
5. EROSION CONTROL MEASURES SHALL BE PLACED TO CONTAIN ALL POINTS OF DISCHARGE TO SURFACE WATERS OR WETLANDS INCLUDING SURFACE RUNOFF, CURB INLETS, DITCH BOTTOM INLETS, DITCHES, AND DOWNSTREAM PORTIONS OF STREAMS, CANALS, AND TIDAL WATERS ADJACENT TO CONSTRUCTION.
6. 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR WILL SUBMIT A "NOTICE OF INTENT" TO THE EPA IN ACCORDANCE WITH NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM RULES AND REGULATIONS.
7. THE CONTRACTOR SHALL WRAP STORM GRATES IN FILTER FABRIC TO PREVENT SEDIMENTATION OF THE STORM SEWER SYSTEM. CONTRACTOR SHALL MAINTAIN THE FILTER FABRIC UNTIL PROJECT COMPLETION.
8. THE SITE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES AFTER COMPLETION OF CONSTRUCTION AND ONLY WHEN AREAS HAVE BEEN STABILIZED.
9. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

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FIGURE 21
EROSION CONTROL PLAN AND NOTES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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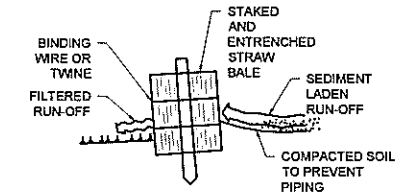
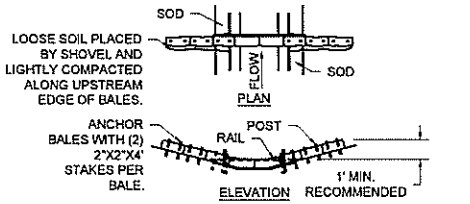
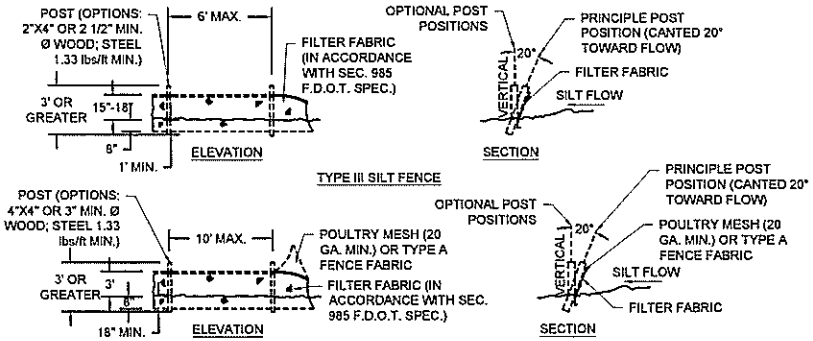


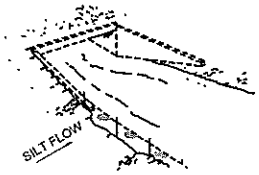
CROSS SECTION OF A PROPERLY INSTALLED STRAW BALE

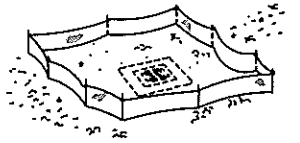


SPACING: BALE BARRIERS FOR PAVED DITCHES SHOULD BE SPACED IN ACCORDANCE WITH CHART I, SHEET 1 OF 3, INDEX NO. 102 OF THE F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS.

STRAW BALE BARRIER FOR PAVED DITCH

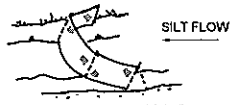






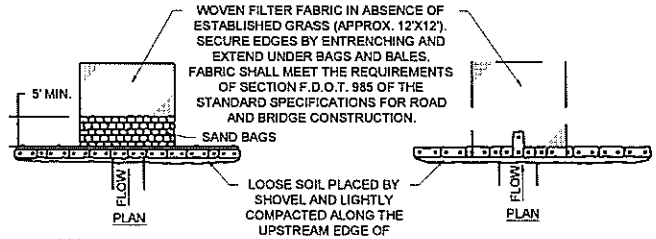
TYPE III OR TYPE IV SILT FENCE PROTECTION AROUND DITCH BOTTOM INLETS.

TYPE III OR TYPE IV SILT FENCE



TYPE III AND IV SILT FENCE

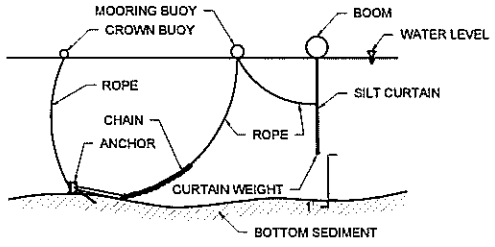
DITCH INSTALLATION AND SPACING FOR TYPE III & TYPE IV FENCE TO BE IN ACCORDANCE WITH SHEET 1 OF 3, OF THE F.D.O.T. INDEX NO. 102



APPLICATION AND SPACING OF TYPES I & TYPES II HAY BALE BARRIERS SALL BE IN ACCORDANCE WITH SHEET 1 OF 3, F.D.O.T. INDEX NO. 102

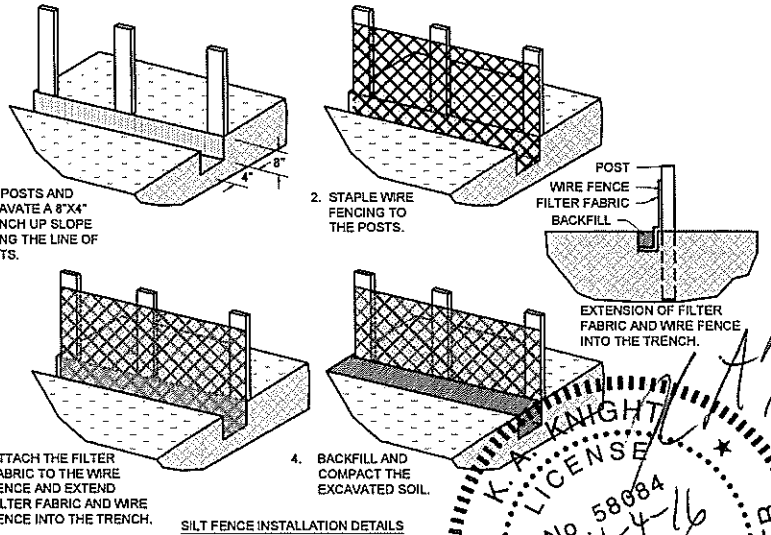
TYPE II TYPE I

TYPICAL STRAW BALE DETAIL



TURBIDITY CURTAIN DETAIL

DO NOT DEPLOY IN A MANNER THAT SILT FENCES WILL ACT AS A DAM ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE USED AT UPLAND LOCATIONS AND TURBIDITY BARRIERS USED AT PERMANENT BODIES OF WATER.



SILT FENCE INSTALLATION DETAILS

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

FIGURE 22
EROSION CONTROL DETAILS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AP
SHEET	22 of 22
DATE	NOV 2016

SEAL
K. A. KNIGHT LICENSE No 58084 11-4-16 STATE OF FLORIDA PROFESSIONAL ENGINEER
KEITH A. KNIGHT P.E. 58084 DATE

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMITC2014-026 P-EROSION.DWG 11/4/2016 1:20:29 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

CONSTRUCTION COMMENCEMENT NOTICE

Instructions: In accordance with Chapter 62-330.350(1)(d), F.A.C., complete and submit this form at least 48 hours prior to commencement of activity authorized by permit.

Permit No. _____ Application No. _____

Project Name _____ Phase _____

Construction of the system authorized by the above referenced Environmental Resource Permit and Application, is expected to commence on _____ , 20 _____ and will have an estimated completion date of _____ , 20 _____

PLEASE NOTE: If the actual construction commencement date is not known within 30 days of issuance of the permit, District staff should be so notified in writing. As soon as a construction commencement date is known, the permittee shall submit a completed construction commencement notice form.

Permittee's or Authorized Agent's Signature _____ Company _____

Print Name _____ Title _____ Date _____

E-mail _____ Phone Number _____

Reset Form Save & Print

AS-BUILT CERTIFICATION AND REQUEST FOR CONVERSION TO OPERATION PHASE

Instructions: Complete and submit this page within 30 days of completion of the permitted activities, as required by the permit conditions. **Any components of the permitted activities that are not in substantial conformance with the permit must be corrected or a modification of the permit will be required in accordance with Rule 62-330.315, Florida Administrative Code (F.A.C.).** The operation phase of the permit is effective when the construction certification for the entire permit/application is approved by the Agency. If the final operation and maintenance entity is not the permittee, the permittee shall operate the system, works or other activities temporarily until such time as the transfer to the operation entity is finalized (use Form 62-330.310(2)).

Permit No.:	Application No(s).	Permittee:
Project Name:		Phase (if applicable):

I HEREBY CERTIFY THAT (please choose accurately and check only one box):

☐ I hereby notify the Agency of the completion of construction of all the components of the system, works or other activities for the above referenced project and certify that it has been constructed in substantial conformance with the plans specifications and conditions permitted by the Agency. Any minor deviations will not prevent the system from functioning in compliance with the requirements of Chapter 62-330, F.A.C. Attached is documentary evidence of satisfaction of any outstanding permit conditions, other than long term monitoring and inspection requirements.

☐ At the time of final inspection, the works or activities were NOT completed in substantial conformance with the plans and specifications permitted by the Agency. (The registered professional shall describe the substantial deviation(s) in writing, and provide confirming depiction on the as-built drawings and information.)

If there were substantial deviations, plans must be submitted clearly labeled as “as-built” or “record” drawings reflecting the substantial deviations. If there are no substantial deviations, do not submit “as built” drawings.

For activities that require certification by a registered professional:

By: _____

Signature | Print Name | Fla. Lic. or Reg. No

! AFFIX SEAL ! | Company Name

Company Address | Date

For activities that do not require certification by a registered professional:

By: _____

Signature | Print Name

Company Name

Company Address | Date

DRAWINGS AND INFORMATION CHECKLIST

Following is a list of information that is to be verified and/or submitted by the Registered Professional or Permittee:

1. All surveyed dimensions and elevations shall be certified by a registered Surveyor or Mapper under Chapter 472, F.S.

2. The registered professional's certification shall be based upon on-site observation of construction (scheduled and conducted by the registered professional of record or by a project representative under direct supervision) and review of as-built drawings, with field measurements and verification as needed, for the purpose of determining if the work was completed in accordance with original permitted construction plans, specifications and conditions.

3. If submitted, the as-built drawings are to be based on the permitted construction drawings revised to reflect any substantial deviations made during construction. Both the original design and constructed condition must be clearly shown. The plans need to be clearly labeled as "as-built" or "record" drawings that clearly highlight (such as through "red lines" or "clouds") any substantial deviations made during construction. As required by law, all surveyed dimensions and elevations required shall be verified and signed, dated and sealed by an appropriate registered professional. The following information, at a minimum, shall be verified on the as-built drawings, and supplemental documents if needed:

    a. Discharge structures - Locations, dimensions and elevations of all, including weirs, orifices, gates, pumps, pipes, and oil and grease skimmers;
    b. Detention/Retention Area(s) – Identification number, size in acres, side slopes (h:v), dimensions, elevations, contours or cross-sections of all, sufficient to determine stage-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems,
    c. Side bank and underdrain filters, or exfiltration trenches - locations, dimensions and elevations of all, including clean-outs, pipes, connections to control structures and points of discharge to receiving waters;
    d. System grading - dimensions, elevations, contours, final grades or cross-sections to determine contributing drainage areas, flow directions and conveyance of runoff to the system discharge point(s);
    e. Conveyance - dimensions, elevations, contours, final grades or cross-sections of systems utilized to divert off-site runoff around or through the new system;
    f. Benchmark(s) - location and description (minimum of one per major water control structure);
    g. Datum- All elevations should be referenced to a vertical datum clearly identified on the plans, preferably the same datum used in the permit plans.

4. Wetland mitigation or restoration areas - Show the plan view of all areas, depicting a spatial distribution of plantings conducted by zone (if plantings are required by permit), with a list showing all species planted in each zone, numbers of each species, sizes, date(s) planted and identification of source of material; also provide the dimensions, elevations, contours and representative cross-sections depicting the construction.

5. Any additional information or outstanding submittals required by permit conditions or to document permit compliance, other than long-term monitoring or inspection requirements.

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REQUEST FOR TRANSFER OF ENVIRONMENTAL RESOURCE PERMIT TO THE PERPETUAL OPERATION ENTITY

Instructions: Complete this form to transfer to the permit to the operation and maintenance entity. This form can be completed concurrently with, or within 30 days of approval of the As-Built Certification and Request for Conversion to Operation Phase (Form 62-330.310(1)). Please include all documentation required under Section 12.2.1(b) of Applicant's Handbook Volume 1. (see checklist below). **Failure to submit the appropriate final documents will result in the permittee remaining liable for operation and maintenance of the permitted activities.**

Permit No.:	Application No(s).
Project Name:	Phase (if applicable):

A. REQUEST TO TRANSFER: The permittee requests that the permit be transferred to the legal entity responsible for operation and maintenance (O&M).

By: _____

Signature of Permittee	Name and Title
Company	Company Address
Phone	City, State, Zip

B. AGREEMENT FOR SYSTEM OPERATION AND MAINTENANCE RESPONSIBILITY: The below-named legal entity agrees to operate and maintain the works or activities in compliance with all permit conditions and provisions of Chapter 62-330, Florida Administrative Code (F.A.C.) and Applicant's Handbook Volumes I and II in perpetuity. Authorization for any proposed modification to the permitted activities shall be applied for and obtained prior to conducting such modification.

By: _____

Signature of Representative of O&M Entity	Name of Entity for O&M
Name and Title	Address
Email Address	City, State, Zip
Phone	Date

Enclosed are the following documents, as applicable:

- ☐ Copy of recorded transfer of title to the operating entity for the common areas on which the stormwater management system is located (unless dedicated by plat)
- ☐ Copy of all recorded plats
- ☐ Copy of recorded declaration of covenants and restrictions, amendments, and associated exhibits
- ☐ Copy of filed articles of incorporation and documentary evidence of active corporate status with the Department of State, Division of Corporations (for corporations)
- ☐ A completed, signed, and notarized affidavit attesting that the operating entity meets the requirements of Section 12.3 of Environmental Resource Permit Applicant's Handbook Volume I.(Note- this is optional, but aids in processing of this request)

Reset Form Save & Print

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
701 SAN MARCO BOULEVARD
JACKSONVILLE, FLORIDA 32207-8175

REPLY TO
ATTENTION OF

December 17, 2021

Regulatory Division
North Branch
Cocoa Section
SAJ-2016-01811(IP-JLC)
Modification-#1

Mark Crosley
Executive Director
Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477
submitted via electronic mail: mcrosley@aicw.org

Dear Applicant:

The U.S. Army Corps of Engineers (Corps) has completed the review and evaluation of your modification request, received on December 14, 2021, in which you asked to modify Department of the Army permit number SAJ-2016-01811, issued to Florida Inland Navigation District, dated November 14, 2017. The project is located east of United States Highway 1, at the southwest corner of Hammock Road and Cuyler Street, in Sections 20 and 21, Township 21S, Range 35E, Mims, Brevard County, Florida.

The proposed modification is to extend the expiration date to complete your proposed project. This authorization is hereby extended. The time limit for completing the work authorized ends on **November 14, 2027**.

The impact of your proposal on navigation and the environment has been reviewed and found to be insignificant. The permit is hereby modified in accordance with your request. You should attach this letter to the permit. All other conditions of the permit remain in full force and effect.

If you have any questions concerning this permit modification, please contact the project manager Jason D. Perryman at the letterhead address, by telephone at 321-504-3771 or by electronic mail at jason.d.perryman@usace.army.mil.

Thank you for your cooperation with our permit program. The Corps' Jacksonville District Regulatory Division is committed to improving service to our customers. We strive to perform our duty in a friendly and timely manner while working to preserve our environment. We invite you to complete our automated Customer Service Survey at https://regulatory.ops.usace.army.mil/customer-service-survey/. Please be aware this

Internet address is case sensitive; and, you will need to enter it exactly as it appears above. Your input is appreciated – favorable or otherwise.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

FOR
James L. Booth
Colonel, U.S. Army
District Commander

Enclosures

cc:
Agent – M. Noah Adams, Taylor Engineering Inc., nadams@taylorengineering.com
CESAJ-RD-PE

DEPARTMENT OF THE ARMY PERMIT

Permittee: Mark Crosley
Executive Director
Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477

Permit No: SAJ-2016-01811(IP-JLC)

Issuing Office: U.S. Army Engineer District, Jacksonville

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The project involves the construction the BV-4B Dredged Material Management Area by permanently filling 11.63 acres of waters of the U.S. (8.98 of wetlands and 2.65 acres of other waters) and temporarily impacting 0.91 acres of waters of the U.S along the pipeline easement.

Project Location: The project is situated east of United States Highway 1 at the southwest corner of Hammock Road and Cuyler Street in Sections 20 and 21 Township 21S, Range 35E, Mims, Brevard County, Florida.

Directions to site: From Jacksonville take I-95 south and exit onto State Road 46 and go east to Hammock Road and then go south to the project site at the southwest corner of Cuyler Street and Hammock Road.

Approximate Central Coordinates: Latitude 28.65702 North
Longitude -80.83232 West

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on **November 14, 2022**. If you find that you need more time to complete the authorized activity, submit your

request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature and the mailing address of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **Reporting Address:** The Permittee shall submit all reports, notifications, documentation and correspondence required by the general and special conditions of this permit to the following address:

a. For standard mail: U.S. Army Corps of Engineers, Regulatory Division, Special Projects and Enforcement Branch, P.O. Box 4970, Jacksonville, Florida 32232-0019.

b. For electronic mail: SAJ-RD-Enforcement@usace.army.mil (not to exceed 10 MB).

The Permittee shall reference this permit number, SAJ-2016-01811 (SP-JLC), on all submittals.

2. Commencement Notification: Within 10 days from the date of initiating the authorized work, the Permittee shall provide to the Corps a written notification of the date of commencement of work authorized by this permit.

3. **Erosion Control:** Prior to the initiation of any work authorized by this permit, the Permittee shall install erosion control measures along the perimeter of all work areas to prevent the displacement of fill material outside the work area. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas shall be stabilized using sod, degradable mats, barriers, or a combination of similar stabilizing materials to prevent erosion. The erosion control measures shall remain in place and be maintained until all authorized work has been completed and the site has been stabilized.

4. Turbidity controls:

a. Shall be used throughout construction to control erosion and siltation and ensure that turbidity levels within the project area do not exceed background conditions.
b. Shall be made of material in which listed species cannot become entangled (i.e., reinforced impermeable polycarbonate vinyl fabric [PVC]), and shall be monitored to ensure listed species are not entangled or trapped in the project area.
c. Shall be removed promptly when the work is complete and the water quality in the project area has returned to background conditions.
d. Shall not block entry to or exit from designated critical habitat.

5. Water Quality Certification: The permitee and all contractors and sub-contractors shall comply with the special conditions listed in the water quality certification (FDEP) as a special condition to this permit. For your convenience, a copy of the certification is included as ***Attachment 2*.**

6. **Cultural Resources:**

a. No structure or work shall adversely affect impact or disturb properties listed in the *National Register of Historic Places* (NRHP) or those eligible for inclusion in the NRHP.

b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey (and which shall include,

but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work and ground-disturbing activities within a 100-meter diameter of the discovery and notify the Corps within the same business day (8 hours). The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

c. Additional cultural resources assessments may be required of the permit area in the case of unanticipated discoveries as referenced in accordance with the above Special Condition ; and if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO for finds under his or her jurisdiction, and from the Corps.

d. **In** the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05 Florida Statutes. All work and ground disturbing activities within a 100-meter diameter of the unmarked human remains shall immediately cease and the Permittee shall immediately notify the medical examiner, Corps, and State Archeologist within the same business day (8-hours). The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume without written authorization from the State Archeologist and from the Corps.

e. If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*.

7. **Mitigation:** Within 30 days from the date of initiating the authorized work, the permittee shall provide verification to the Corps that 4.20 Palustrine WRAP credits have been purchased from the Farmton Mitigation Bank (SAJ 1995-01836).

8. Wetland Impacts Temporary and Permanent: All temporary wetland impact areas shall be restored to their original contours and elevations within 30 days of the approved plans. In accordance with Executive Order 13112 all temporary impacts to wetlands and streams shall be allowed to naturally revegetate so as to no cause or promote the introduction or spread of invasive species in the United States. It shall be the responsibility of the Florida Inland Navigation District to monitor and maintain the areas disturbed by this project to prevent the colonization of these areas by invasive nuisance exotic plant species such as but not limited to Cogon Grass, Brazilian Pepper, Melaleuca Tree, Japanese or Old World climbing fern and any other nuisance/invasive plant species identified by Florida's Exotic Pest Plant Council that pose a threat the natural Florida habitats in and adjacent to the FIND project site.

9. Sheetpile Wall and Outfall:

a. The temporary sheet pile wall, outfall pipe and associated construction shall avoid all seagrass areas.
b. The metal sheet piles shall only be installed via vibratory hammer or water jet. The use of an Impact hammer is not authorized by this permit.
c. Removal of temporary sheet pile wall: Within 30 days of completion of the outfall structure and rip rap area, all temporary structures must be removed and, to the maximum extent practical, the site must be restored to pre-construction elevations.

10. Assurance of Navigation and Maintenance: The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

11. Endangered Species: The permittee agrees to comply with all of the activity specific Project Design Criteria (PDCs) listed in the National Marine Fisheries Service's (NMFS) Statewide Programmatic Biological Opinion (SWPBO), dated December 4, 2015. Failure to comply with these conditions could result in enforcement action by the

Corps and/or NMFS. The SWPBO document can be viewed/downloaded from the following link: http://www.saj.usace.army.mil/Missions?regulatory/Source-Book/

12. **Eastern Indigo Snake Protection Measures**: The Permittee shall comply with U.S. Fish and Wildlife Service (USFWS) "Standard Protection Measures for the Eastern Indigo Snake" (dated August 12, 2013) during project site preparation and construction included as **Attachment 3**.

13. **Manatee Conditions:** The permittee shall comply with the "***Standard Manatee Conditions for In-Water Work – 2011***" designed to protect the endangered West Indian Manatee provided in **Attachment 4** of this permit.

14. **Sea Turtle and Smalltooth Sawfish Conditions:** The permittee shall comply with National Marine Fisheries Service's **"*Sea Turtle and Smalltooth Sawfish Construction Conditions"*** dated March 23, 2006 and provided in **Attachment 5** of this permit.

15. Caracara Survey: Prior to any work authorized by this permit the permittee shall conduct a site specific Crested Caracara (*Caracara cheriway*) survey of the property in accordance with the Survey Protocol outlined in the South Florida Ecological Services Office, DRAFT April 20, 2004, Species Conservation Guidelines, for Audubon's Crested Caracara. The finding and final report shall be submitted to the Corps and the USFWS, Jacksonville (U.S. Fish and Wildlife Service, North Florida Field Office, 7915 Baymeadows Way, Suite 200, Jacksonville, Florida 32256-7517or by email to: jaxregs@fws.gov within 30 days of completion. In the event nest are discovered on the site the permittee shall implement the conservation measures outlined in the Caracara Conservation Guidelines **(Attachment 6)**. The USFWS is the responsible agency for ensuring compliance with the Caracara Conservation Guidelines and all coordination for compliance in regards to the Caracara shall be coordinated with the USFWS.

16. Species reporting: Any collision(s) with and/or injuries to any sea turtle, sawfish, whale, or sturgeon occurring during the construction of a project, shall be reported immediately to NMFS's Protected Resources Division (PRD) at (727-824-5312) or by email to takereport.nmfsser@noaa.gov and CESAJ-ComplyDocs@usace.army.mil. Sea turtle and marine mammal stranding/rescue organizations' contact information is available by region at http://www.nmfs.noaa.gov/pr/health/networks.htm. Smalltooth sawfish encounters shall be reported to http://www.flmnh.ufl.edu/fish/sharks/sawfish/sawfishencounters.html.

17. Marine Life Entrapment: Neither structure nor material or the method of construction shall pose more than minimal risk of entrapping fish, marine turtles, or

marine mammals. In-water lines must be industrial grade metal or heavy cables that do not readily loop and tangle. All in-water lines (rope and cable) must be rigid and cannot have excess line in the water. Lines may be enclosed in a plastic or rubber sleeve/tube to add rigidity.

18. Noise Effects BMPs: All projects shall comply with the requirements of the attached "Noise Best Management Practices (BMPs) for Piling Installation" included as **Attachment 7.**

19. Atlantic salt marsh Snake: The Permittee shall comply with U.S. Fish and Wildlife Service (USFWS) Draft "Standard Protection Measures for the Atlantic Salt Marsh Snake" (dated February12, 2014) during project site preparation and construction included as **Attachment 8**.

20. **Fill Material**: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, debris, automotive parts, asphalt, construction materials, concrete block with exposed reinforcement bars, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act.

21. **Regulatory Agency Changes**: Should any other regulatory agency require changes to the work authorized or obligated by this permit, the Permittee is advised that a modification to this permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification of this permit from the Cocoa Regulatory Office.

22. Posting of Permit: The Permittee shall have available and maintained for review a copy this permit and approved plans at the construction site.

23. **As-Builts**: Within 60 days of completion of the authorized work or any specific phased improvement of the authorized work or at the expiration of the construction window of this permit, whichever occurs first, the Permittee shall submit as-built drawings of the authorized work and a completed As-Built Certification Form (**Attachment 9**) to the Corps. The drawings shall be signed and sealed by a registered professional engineer and include the following:

a. A plan view drawing of the location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed in the same scale as the attached permit drawings (8 1/2-inch by II-inch). The drawing should show all "earth disturbance," including wetland impacts, water management structures, and any on-site mitigation areas.

b. List any deviations between the work authorized by this permit and the work as constructed. In the event that the completed work deviates, in any manner, from the authorized work, describe on the As-Built Certification Form the deviations between the work authorized by this permit and the work as constructed. Clearly indicate on the as-built drawings any deviations that have been listed. Please note that the depiction and/or description of any deviations on the drawings and/or As-Built Certification Form does not constitute approval of any deviations by the U.S. Army Corps of Engineers.

c. The Department of the Army Permit number.

d. Include pre-and post-construction aerial photographs of the project site, if available.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344)

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413)

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



(PERMITTEE) (DATE)

01-24-18

Mark Crosley
(PERMITTEE NAME-PRINTED)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

21 January 2018

(DISTRICT ENGINEER) (DATE)
Jason Kirk, P.E.
Colonel, U.S. Army
District Commander

DEPARTMENT OF THE ARMY PERMIT TRANSFER REQUEST

PERMIT NUMBER: SAJ-2016-01811(SP-JLC)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. Although the construction period for works authorized by Department of the Army permits is finite, the permit itself, with its limitations, does not expire.

To validate the transfer of this permit and the associated responsibilities associated with compliance with its terms and conditions, have the transferee sign and date below and mail to the U.S. Army Corps of Engineers, Enforcement Section, Post Office Box 4970, Jacksonville, FL 32232-0019.

_____ _____
(TRANSFEREE-SIGNATURE) (DATE)

_____
(NAME-PRINTED)

_____
(ADDRESS)

_____
(CITY, STATE, AND ZIP CODE)

Attachments to Department of the Army Permit Number SAJ-2016-01811

1. PERMIT DRAWINGS: 20 pages, dated November 2017

2. WATER QUALITY CERTIFICATION: Specific Conditions of the water quality permit/certification File # ERP 0344990-001-EI, issued by the Florida Department of Environmental Protection on 22 September 2017, in accordance with General Condition number 5 on page 2 of this DA permit. 12 Pages.

3. EASTERN INDIGO SNAKE CONDITIONS: 3 Pages

4. MANATEE CONSTRUCTION CONDITIONS: 2 Pages

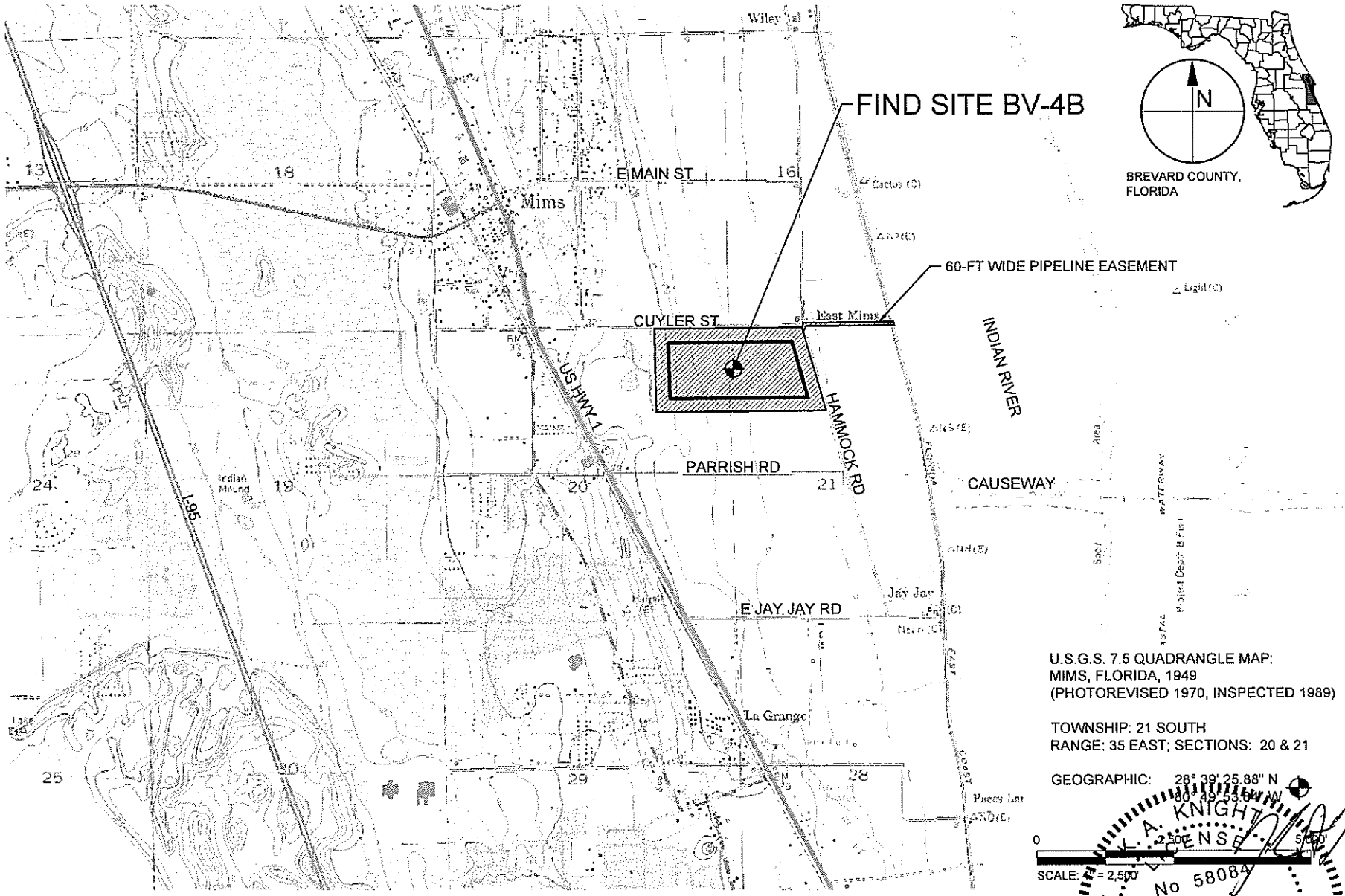
5. SEATURTLE SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS: 1 Page

6. CARACARA SURVEY REQUIRENTS: 40 Pages

7. NOISE BMP's: 5 Pages

8. SALT MARSH SNAKE CONDITIONS: 1 Page

9. AS-BUILT CERTIFICATION FORM: 2 Pages



U.S.G.S. 7.5 QUADRANGLE MAP:
MIMS, FLORIDA, 1949
(PHOTOREVISED 1970, INSPECTED 1989)

TOWNSHIP: 21 SOUTH
RANGE: 35 EAST; SECTIONS: 20 & 21

GEOGRAPHIC: 28° 39' 25.88" N
80° 49' 53.84" W

K. A. KNIGHT
LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-4-16

TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4815	FIGURE 1 LOCATION MAP FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT: C2014-026 DRAWN BY: AF SHEET: 1 of 22 DATE: NOV 2016	SEAL KEITH A. KNIGHT P.E. #58084 DATE

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-LOCATION MAP DWG 11/4/2016 1:06:13 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ADJACENT PROPERTIES DATA OBTAINED FROM BREVARD COUNTY PROPERTY APPRAISER, APRIL 2016.
3. REFER TO ADJACENT PROPERTY OWNERSHIP TABLE IN ERP APPLICATION SECTION C, PART 1, ITEM 13

N

0 500 1,000'

SCALE: 1" = 500'

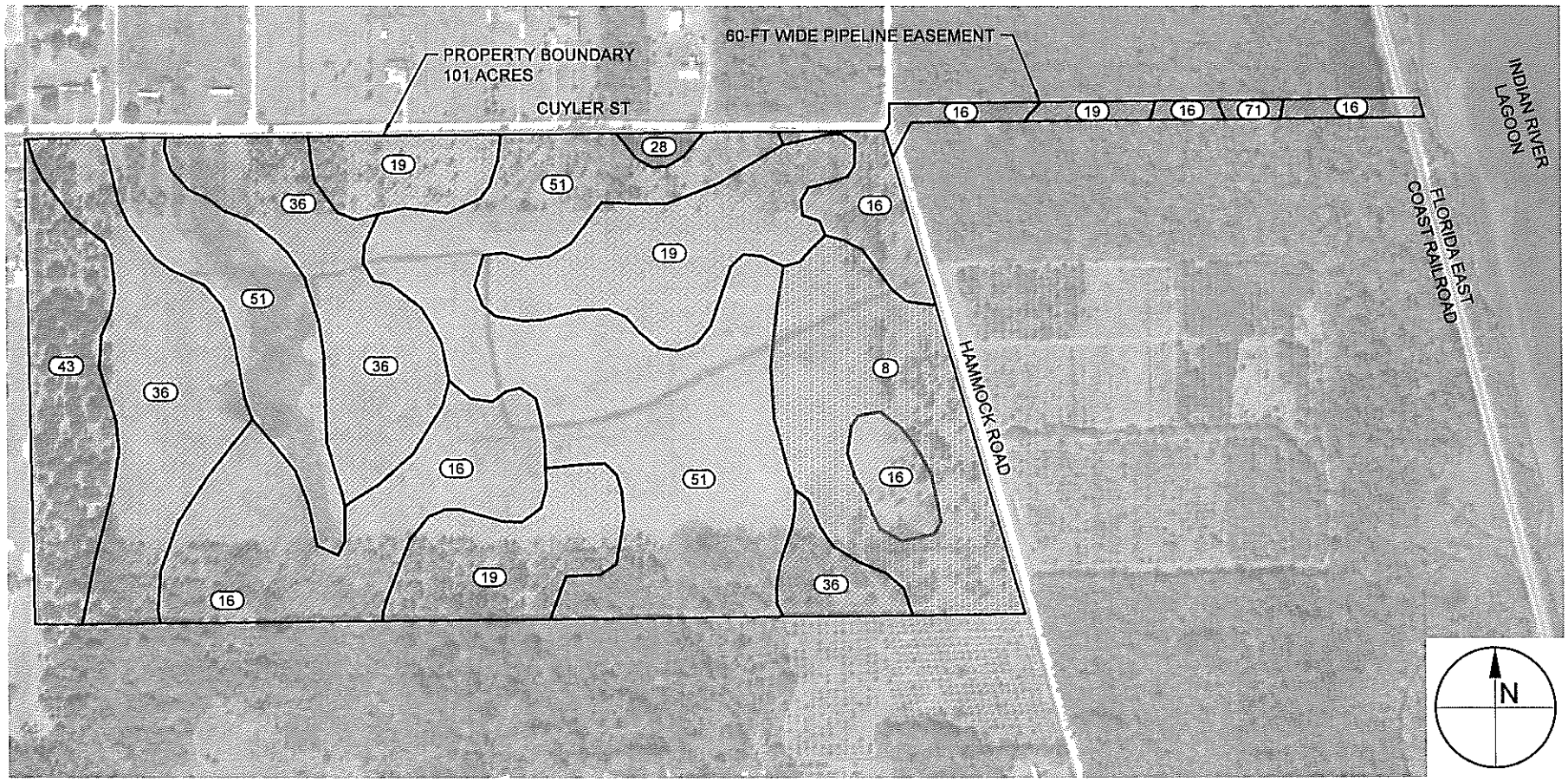
K. A. KNIGHT LICENSE No 58064 STATE OF FLORIDA PROFESSIONAL ENGINEER

11-4-16

TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4615	FIGURE 2 ADJACENT PROPERTIES FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT C2014-026 DRAWN BY AF SHEET 2 of 22 DATE NOV 2016	SEAL DATE

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-ADJACENTS.DWG 11/4/2016 1:06:37 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



SOILS CLASSIFICATIONS

ID	NAME
8	BRADENTON FINE SAND, LIMESTONE SUBSTRATUM
16	COPELAND-BRADENTON-WABASSO COMPLEX, LIMESTONE SUBSTRATUM
19	RIVIERA SAND
28	IMMOKALEE SAND
36	MYAKKA SAND, 0 TO 2 PERCENT SLOPES
43	PAOLA FINE SAND, 0 TO 5 PERCENT SLOPES
51	POMPANO SAND
71	WABASSO SAND

0 500' 1,000'
SCALE: 1" = 500'

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

FIGURE 3
USDA/NRCS SOILS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	DF
SHEET	3 of 22
DATE	NOV 2016

KEITH R. KNIGHT P.E. # 58084 — DATE

STATE OF FLORIDA PROFESSIONAL ENGINEER
KEITH A. KNIGHT LICENSE No 58084 11-4-16

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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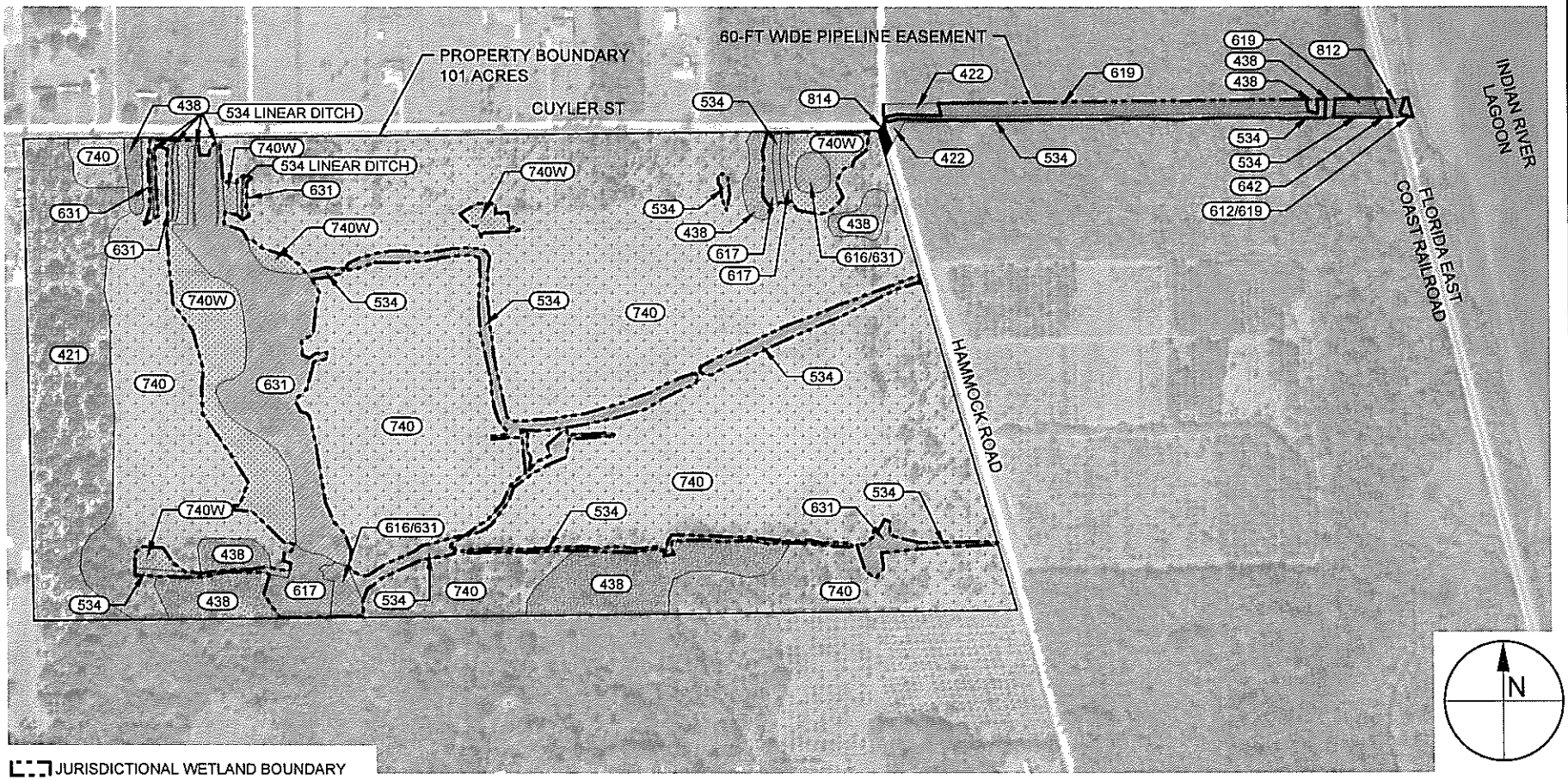


BV-4B PROPERTY FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
421	8.33	XERIC OAK
438	5.30	MIXED HARDWOODS
534	3.37	DRAINAGE / IRRIGATION DITCHES
616 / 631	0.60	INLAND PONDS AND SLOUGHS / WETLAND SCRUB
617	1.09	MIXED WETLAND HARDWOODS
631	5.74	WETLAND SCRUB
740	71.92	DISTURBED LAND
740W	4.65	DISTURBED LAND - WET

BV-4B PIPELINE EASEMENT FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
422	0.32	BRAZILIAN PEPPER
438	0.07	MIXED HARDWOODS
534	0.54	DRAINAGE / IRRIGATION DITCHES
612/619	0.03	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS
619	1.25	EXOTIC WETLAND HARDWOODS
642	0.05	SALTWATER MARSH
812	0.06	RAILROADS
814	0.07	ROADS

NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE (JULY 2014); SURVEYED BY SEA DIVERSIFIED, INC.
4. COMMUNITIES CLASSIFIED ACCORDING TO FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM (FLUCCS)

0 500' 1,000'
SCALE: 1" = 500'

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

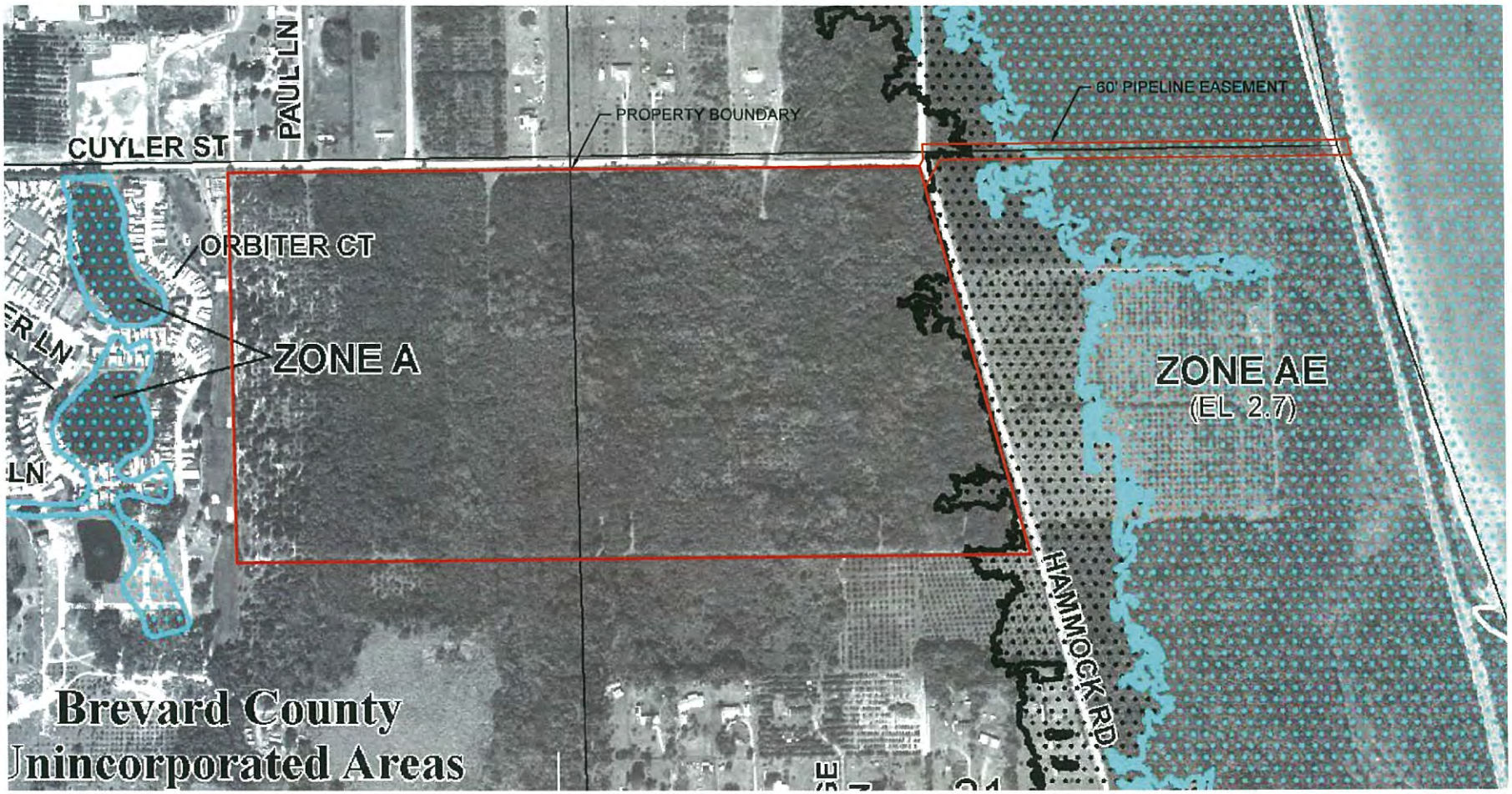
FIGURE 4
EXISTING CONDITIONS FLUCCS MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	4 of 22
DATE	NOV 2016

K. A. KNIGHT
LICENSE
No. 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER
11-7-16

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-EXISTFLUCCS.DWG 11/4/2016 1:07:36 PM



K. A. KNIGHT
LICENSE
No 58084
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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

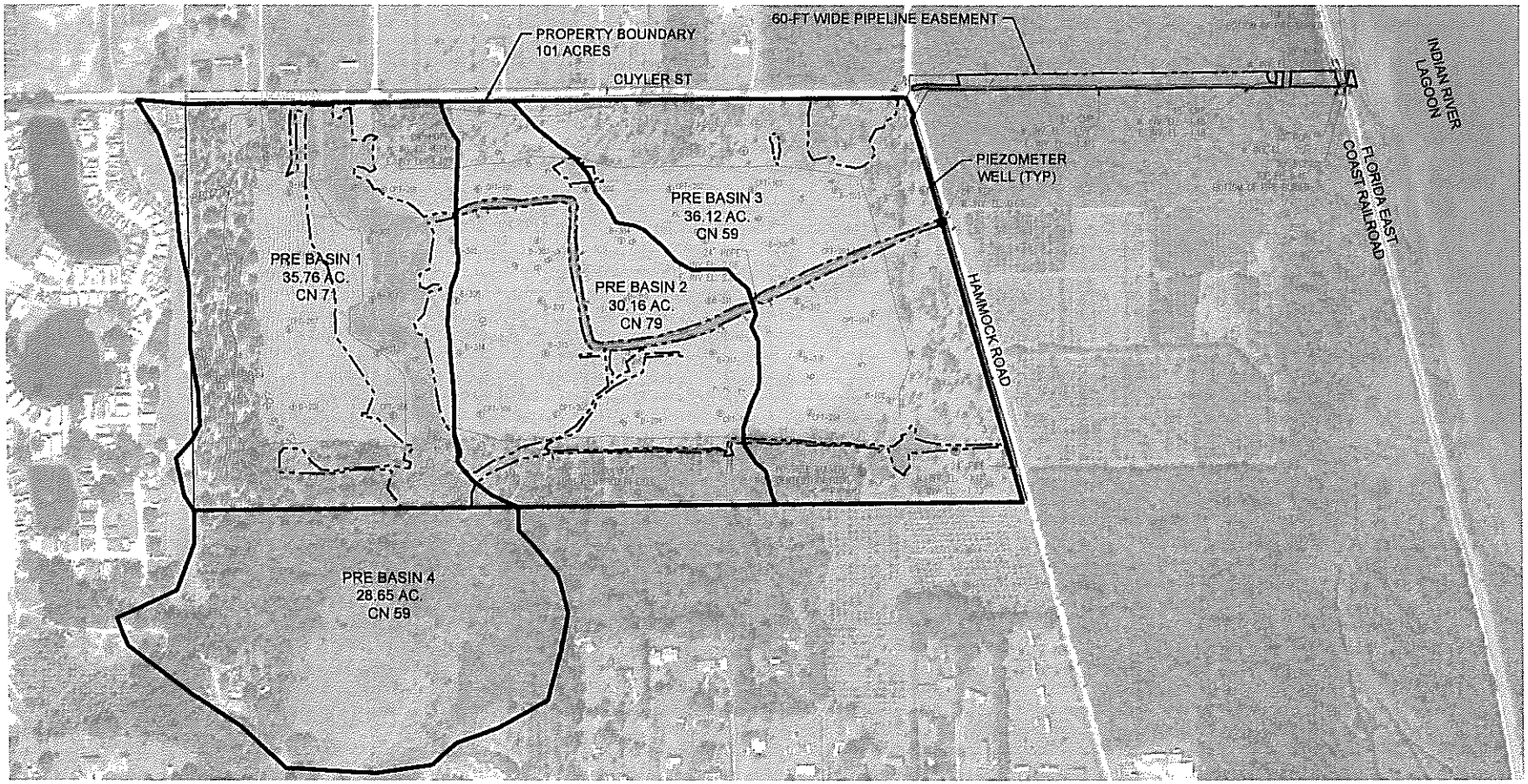
FIGURE 5
FEMA FLOOD ZONE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	JF
SHEET	5 of 22
DATE	NOV 2016

SEAL
KEITH A. KNIGHT PE # 58084
DATE 11-4-16

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-FEMA.DWG 11/4/2016 1:07:59 PM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
4. TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY BY SEA DIVERSIFIED, INC., FILE SDI P.N. 13-2155.B, DATED OCTOBER 14, 2014.
5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY
OUTFALL

0 600' 1,200'
SCALE: 1" = 600'

K. A. KNIGHT
LICENSE
No 58084
11-8-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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

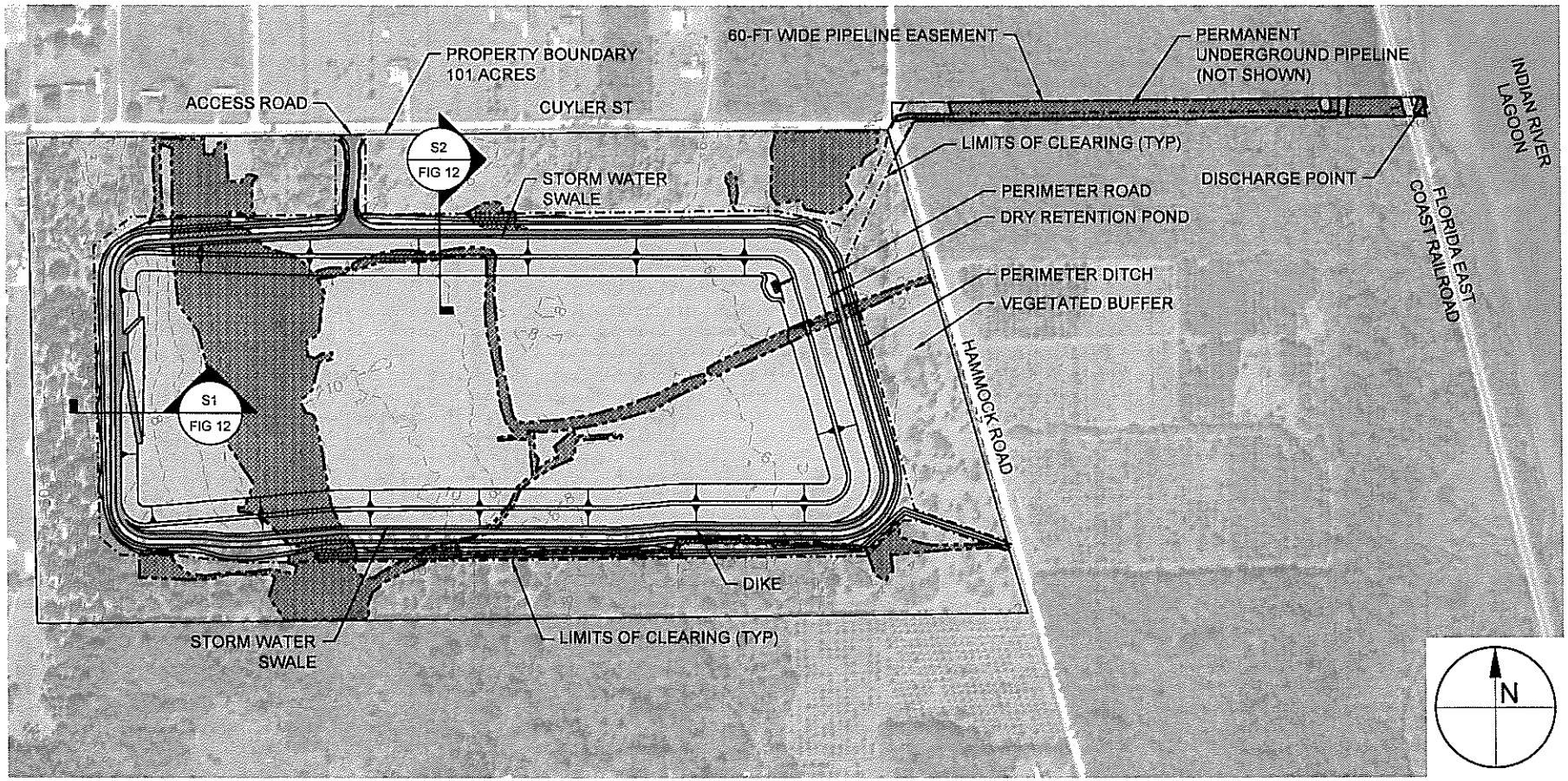
FIGURE 6
PRE-DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AE
SHEET	6 of 22
DATE	NOV 2016

SEAL
KEITH A. KNIGHT P.E. 58084
DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-PREDEVBASIN.DWG 11/4/2016 1:08:28 PM



NOTES

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5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
7. SITE ACREAGE WITHIN PROPERTY BOUNDARY IS 101 AC.
8. CLEARED AREA IS 63 AC INCLUDING PIPELINE EASEMENT.
9. DMMA CAPACITY IS ESTIMATED AT 710,710 CY

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000'
SCALE: 1" = 500'

K. A. KNIGHT LICENSED No. 66084 STATE OF FLORIDA PROFESSIONAL ENGINEER
11-4-16

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

FIGURE 7
SITE PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	7 of 22
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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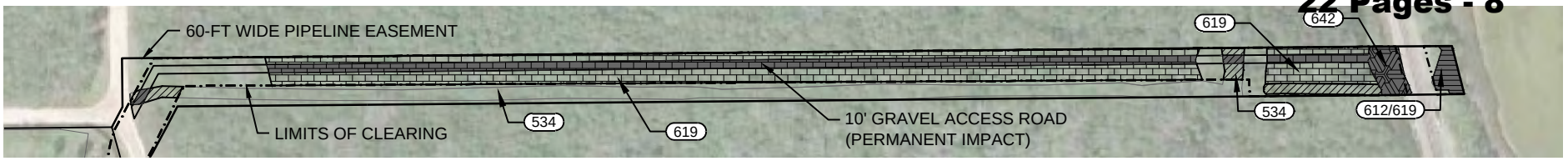
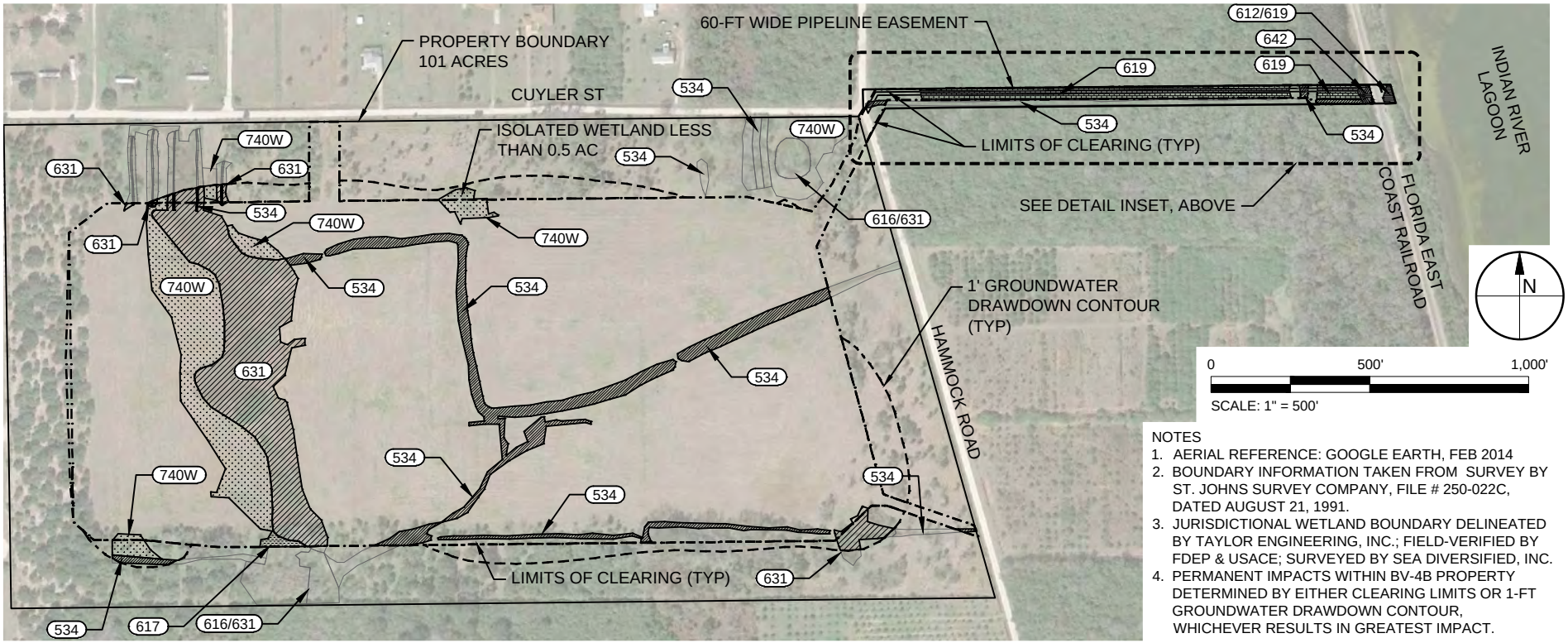


PERMANENT PIPELINE EASEMENT IMPACTS

INSET: PIPELINE EASEMENT WETLAND IMPACTS
SCALE: 1" = 200'
0 100' 200'



N

0 500' 1,000'
SCALE: 1" = 500'

NOTES
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2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.
4. PERMANENT IMPACTS WITHIN BV-4B PROPERTY DETERMINED BY EITHER CLEARING LIMITS OR 1-FT GROUNDWATER DRAWDOWN CONTOUR, WHICHEVER RESULTS IN GREATEST IMPACT.

BV-4B PROPERTY WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	PERM. IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	2.64
617	MIXED WETLAND HARDWOODS	0.08
631	WETLAND SCRUB	4.97
740W	DISTURBED LAND - WET	3.55
	TOTAL:	**11.24**

BV-4B PIPELINE EASEMENT WETLAND IMPACT LEGEND

FLUCCS CODE	DESCRIPTION	TEMPORARY IMPACT ACREAGE	PERMANENT IMPACT ACREAGE
534	DRAINAGE / IRRIGATION DITCHES	0.08	0.01
619	EXOTIC WETLAND HARDWOODS	0.83	0.30
642	SALTWATER MARSH	N/A	0.05
612/619	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS	N/A	0.03
	TOTAL:	**0.91**	**0.39**

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

FIGURE 8
WETLAND IMPACTS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	8 of 22
DATE	APRIL 2017

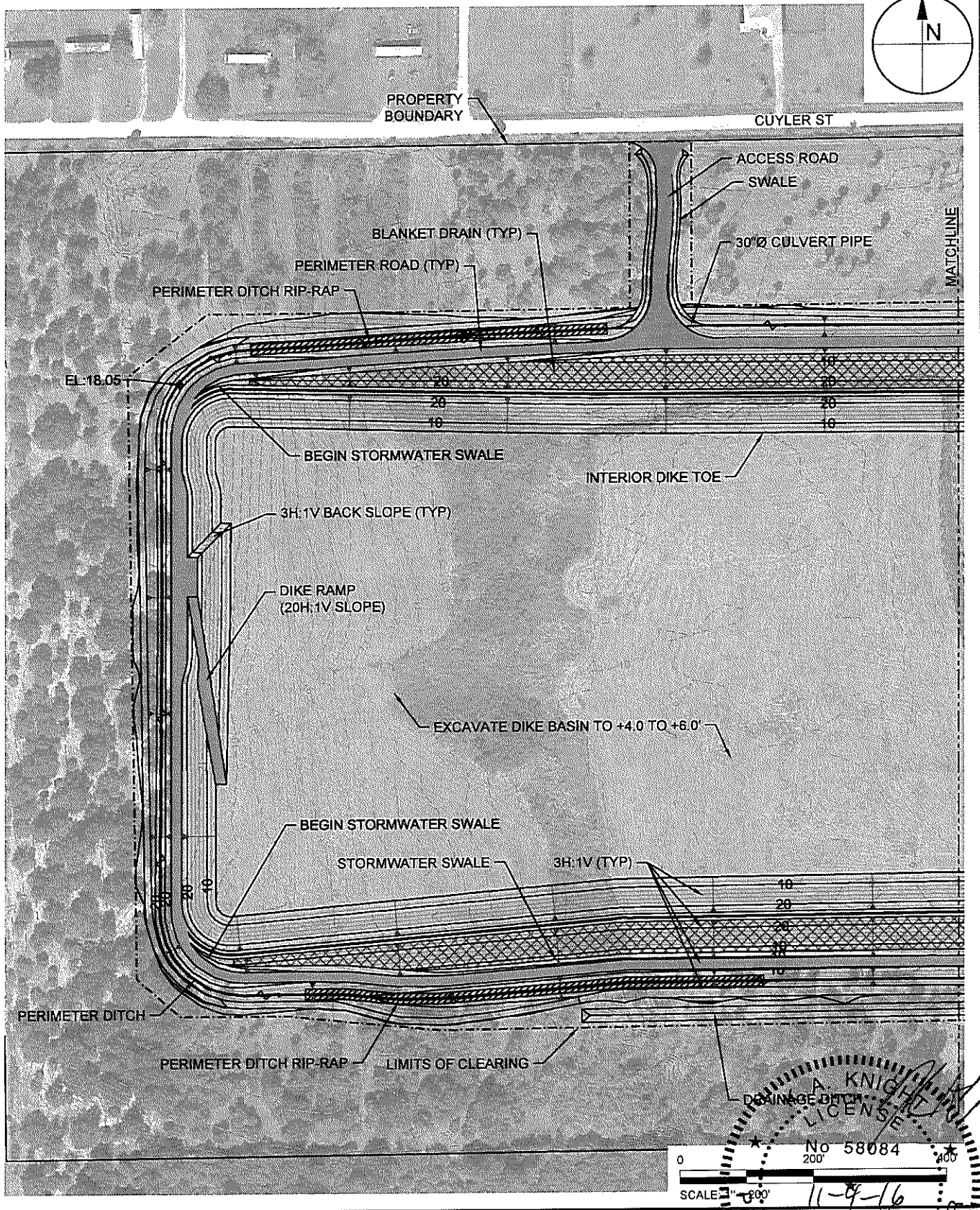
SEAL

KEITH A. KNIGHT P.E.# 58084 DATE

ANTON X:\SYSPROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-WETLANDS IMPACT USACE.DWG 4/20/2017 10:42:06 AM

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

SAJ 2016-01811 - Attachment 1
Permit Drawings - Nov 2017
22 Pages - 9



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

FIGURE 9
GRADING PLAN - WEST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	9 of 22	NOV 2016

SEAL
KEITH A. KNIGHT # 58084 DATE

L. A. KNIGHT LICENSE No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER
11-9-16

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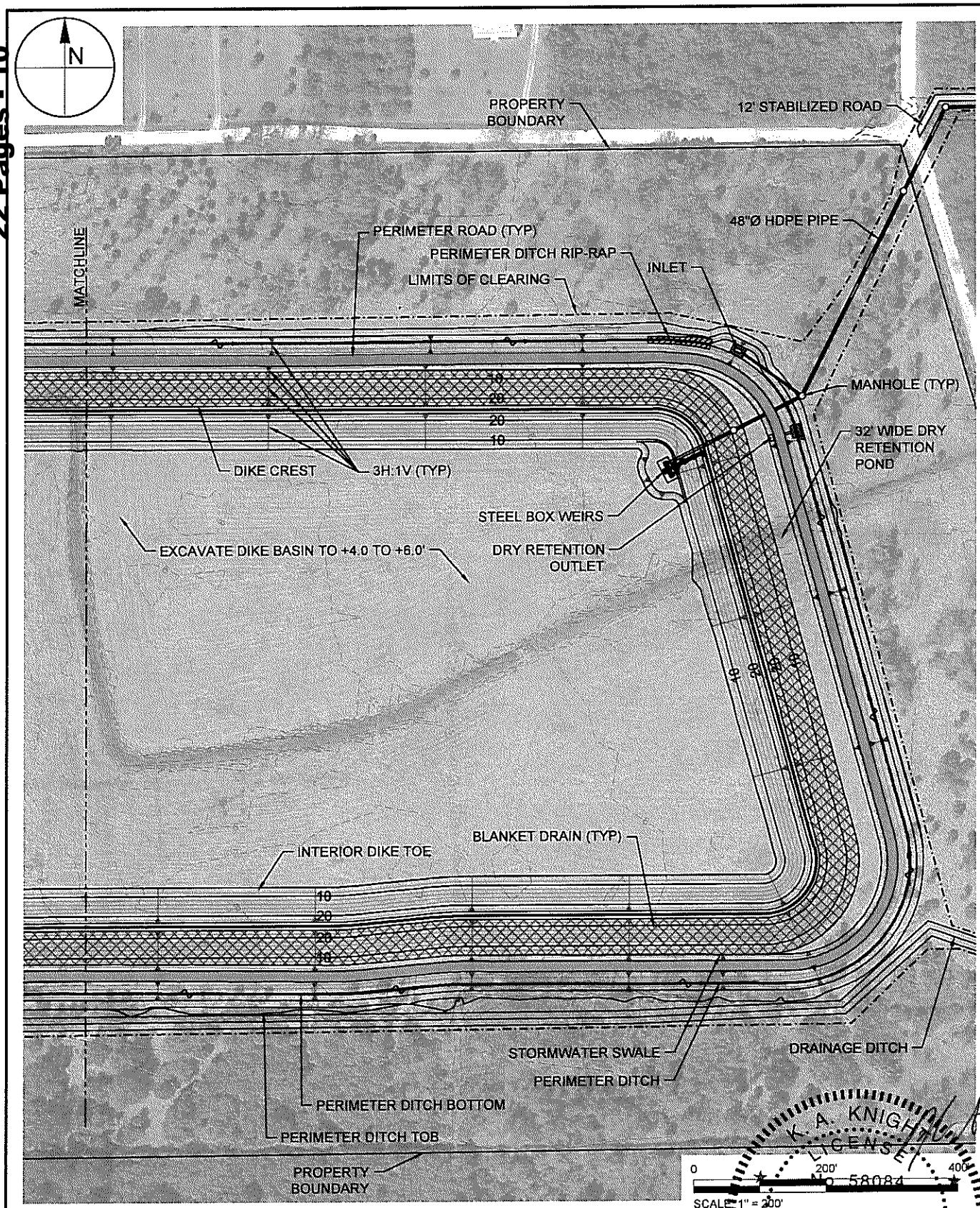
PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



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

FIGURE 10
GRADING PLAN - EAST
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	10 of 22	NOV 2016

K. A. KNIGHT LICENSE 58084
SEAL
11-4-16
STATE OF FLORIDA PROFESSIONAL ENGINEER
KEITH A. KNIGHT P.E. # 58084
DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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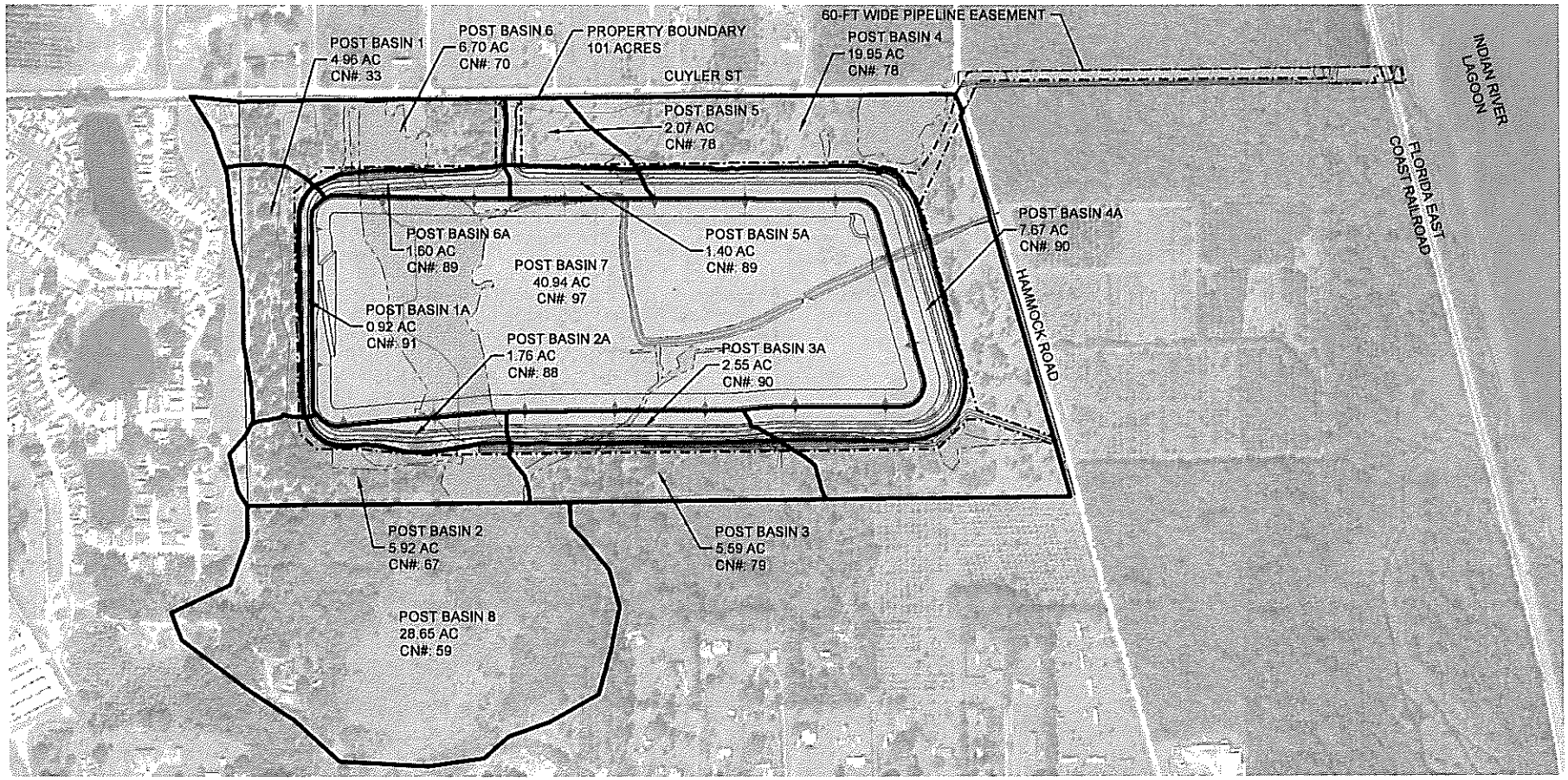

NOTES

1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014.
2. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
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5. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
6. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY

0 500' 1,000

SCALE: 1" = 500'

K. A. KNIGHT LICENSED No 58084 STATE OF FLORIDA PROFESSIONAL ENGINEER

11-4-16

KEITH A. KNIGHT P.E. # 58084 DATE

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

FIGURE 11
POST DEVELOPMENT DRAINAGE MAP
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	11 of 22
DATE	NOV 2016

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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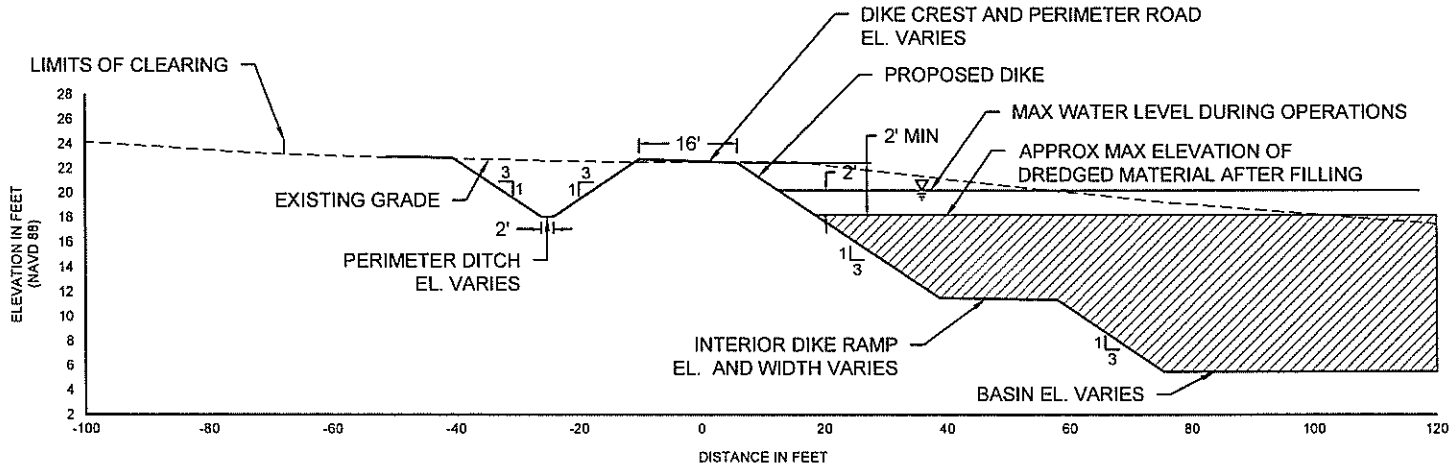
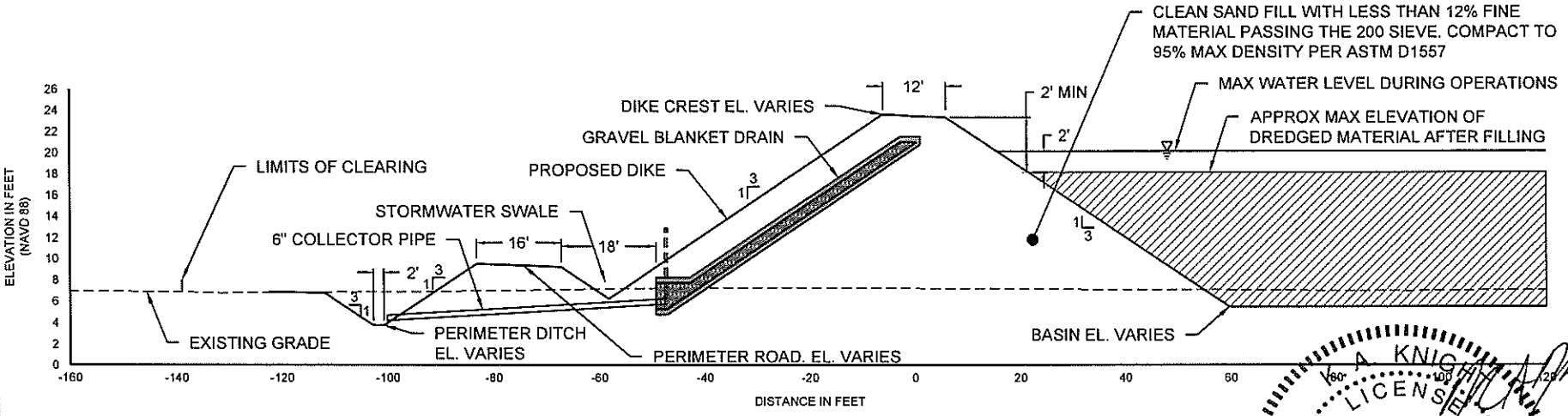


S1 FIG 7 **WEST DIKE SECTION**
SCALE: 1" = 30' 0 30'



S2 FIG 7 **EAST DIKE SECTION**
SCALE: 1" = 30' 0 30'

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

FIGURE 12
DIKE SECTIONS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	
SHEET	12 of 22
DATE	NOV 2016

KEITH A. KNIGHT LICENSE No 58084 11-4-16 STATE OF FLORIDA PROFESSIONAL ENGINEER SEAL DATE

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

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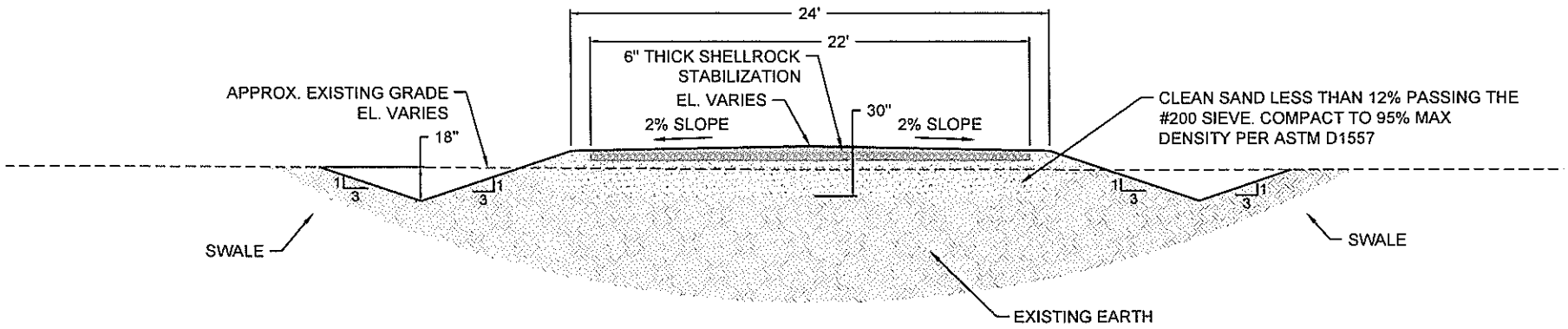

S4 / ### ACCESS ROAD SECTION
SCALE: 1" = 8' 0 8'

K. A. KNIGHT
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PROFESSIONAL ENGINEER

KEITH A. KNIGHT P.E.# 58084 DATE

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FIGURE 13
ACCESS ROAD SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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SHEET	13 of 22
DATE	NOV 2016

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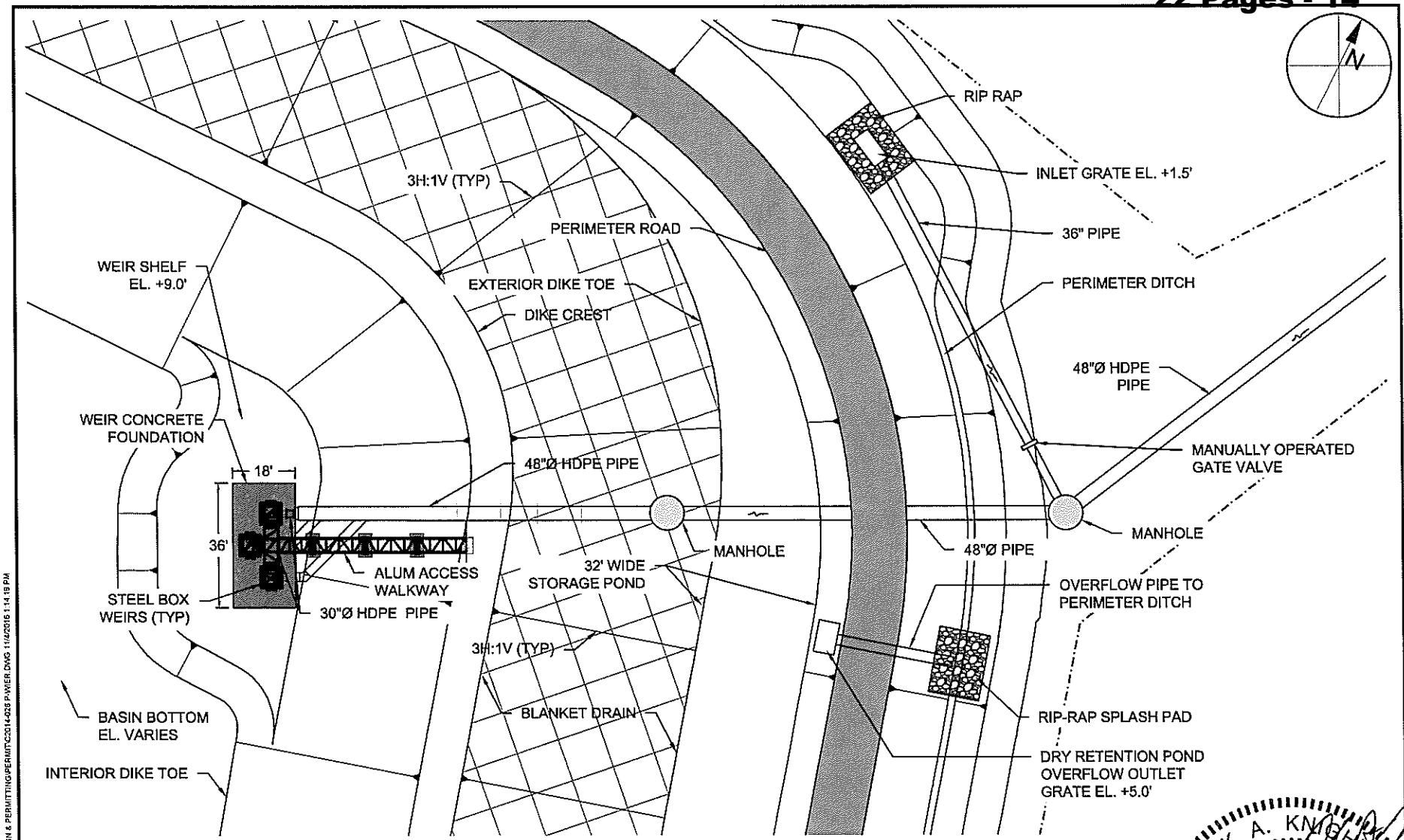

P1 ### WEIR PLAN
SCALE: 1" = 10' 0 10'

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FIGURE 14
WEIR PLAN
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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DATE	NOV 2016

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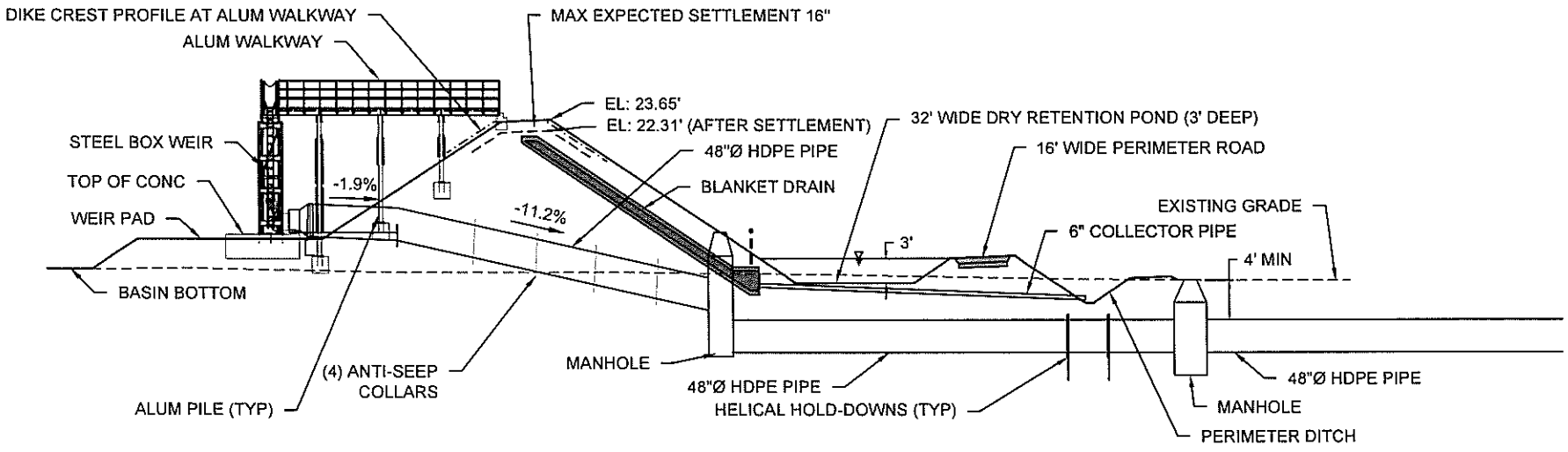

S5 / FIG 14 **DIKE OUTFALL PIPE PROFILE**
SCALE: 1" = 30'
V-SCALE: 1" = 15'
0 30'

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FIGURE 15
WEIR PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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11-4-16
KEITH A. KNIGHT P.E. #58084

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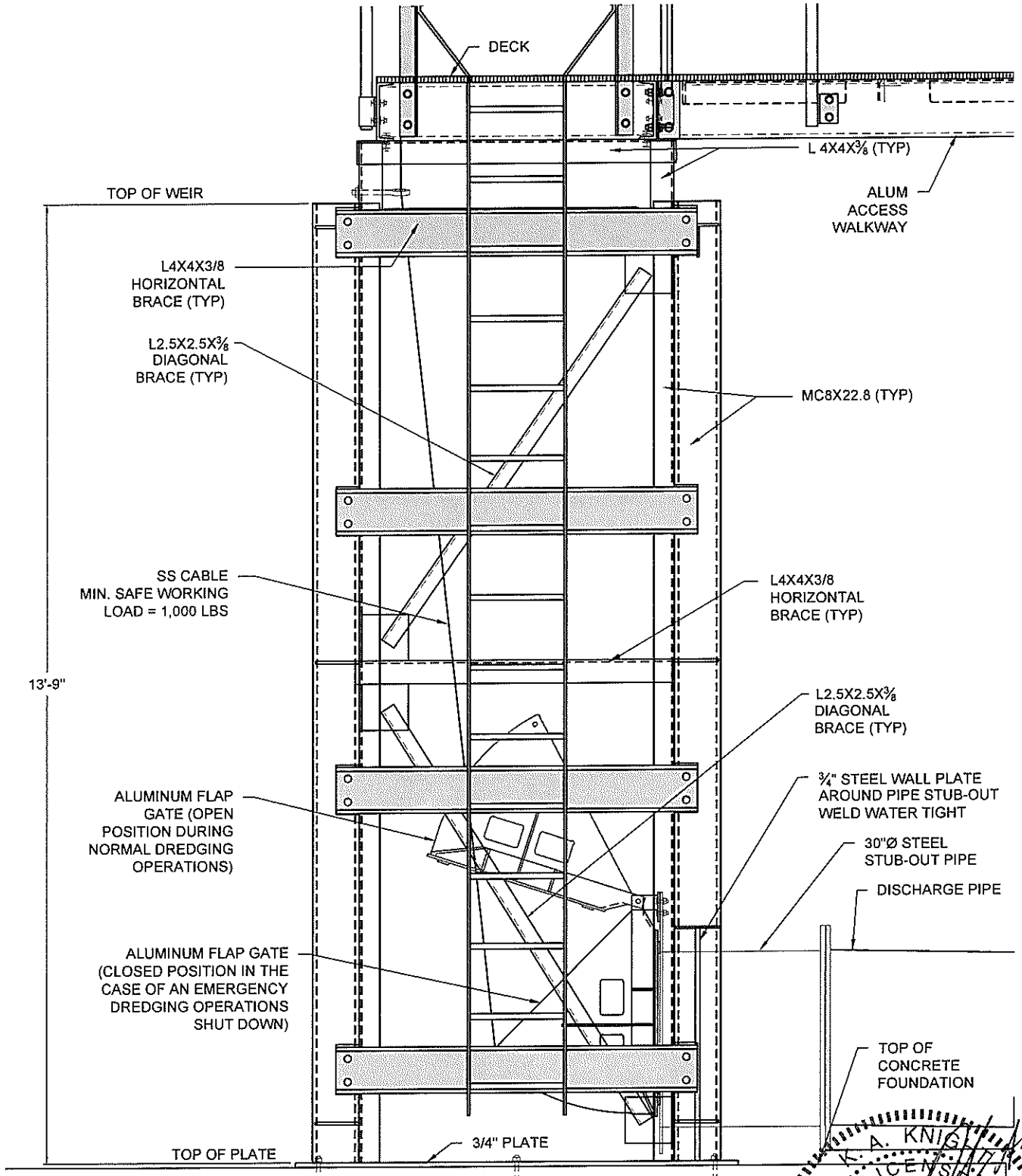
SAJ 2016-01811 - Attachment 1
Permit Drawings - Nov 2017
22 Pages - 16



STEEL BOX WIER SIDE ELEVATION DETAIL

SCALE: 1" = 2'

0 2

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FIGURE 16
WEIR DETAIL
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	DRAWN BY	SHEET	DATE
C2014-026	AF	16 of 22	NOV 2016

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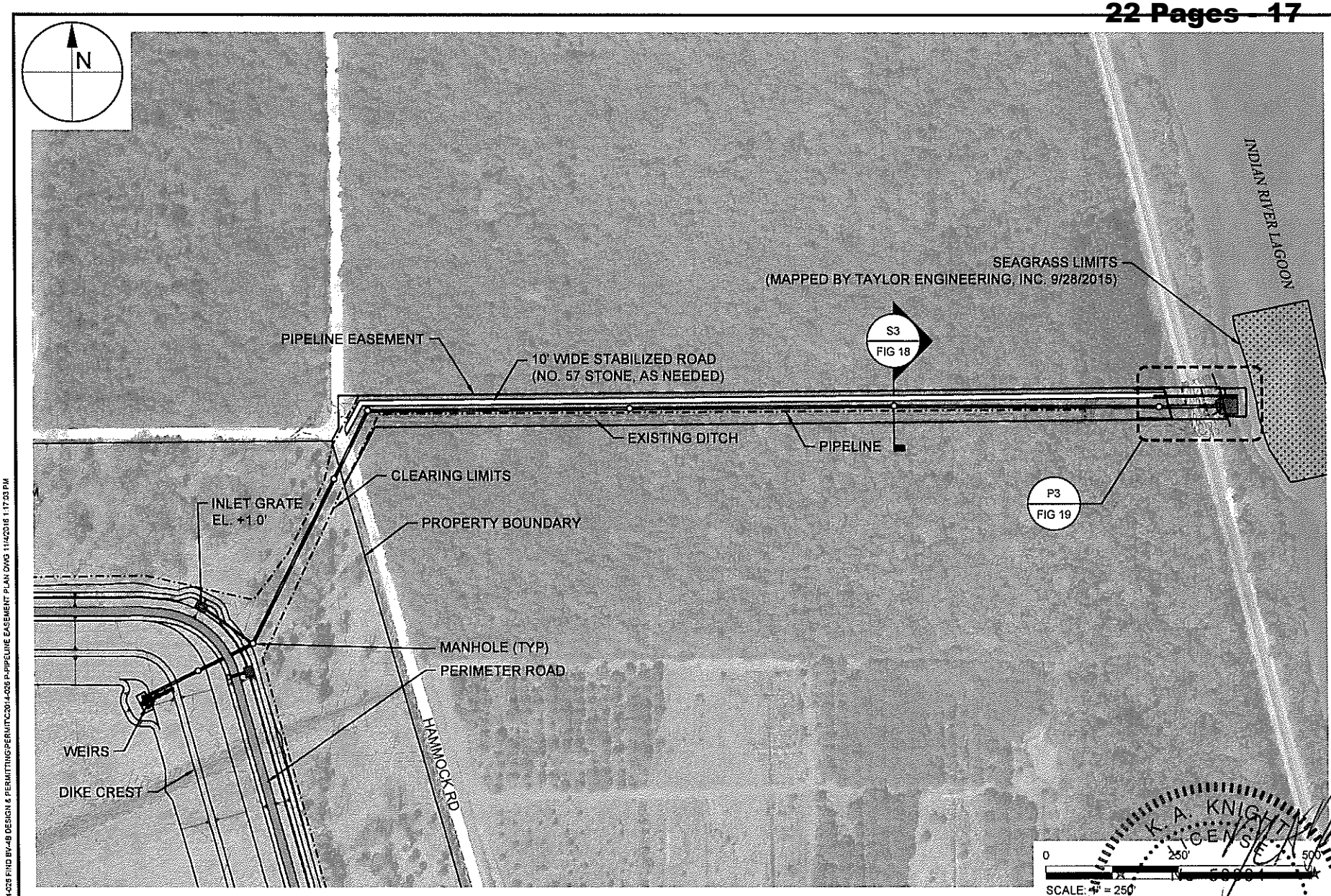

K. A. KNIGHT
LICENSE
No. 50004
11-4-16
STATE OF FLORIDA
PROFESSIONAL ENGINEER

TAYLOR ENGINEERING INC. 10151 DEERWOOD PARK BLVD. BLDG. 300, SUITE 300 JACKSONVILLE, FL 32256 CERTIFICATE OF AUTHORIZATION # 4815	FIGURE 17 PIPELINE OVERVIEW FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA BREVARD COUNTY, FLORIDA	PROJECT C2014-026 DRAWN BY AF SHEET 17 of 22 DATE NOV 2016	SEAL KEITH A. KNIGHT P.E. 50004 DATE

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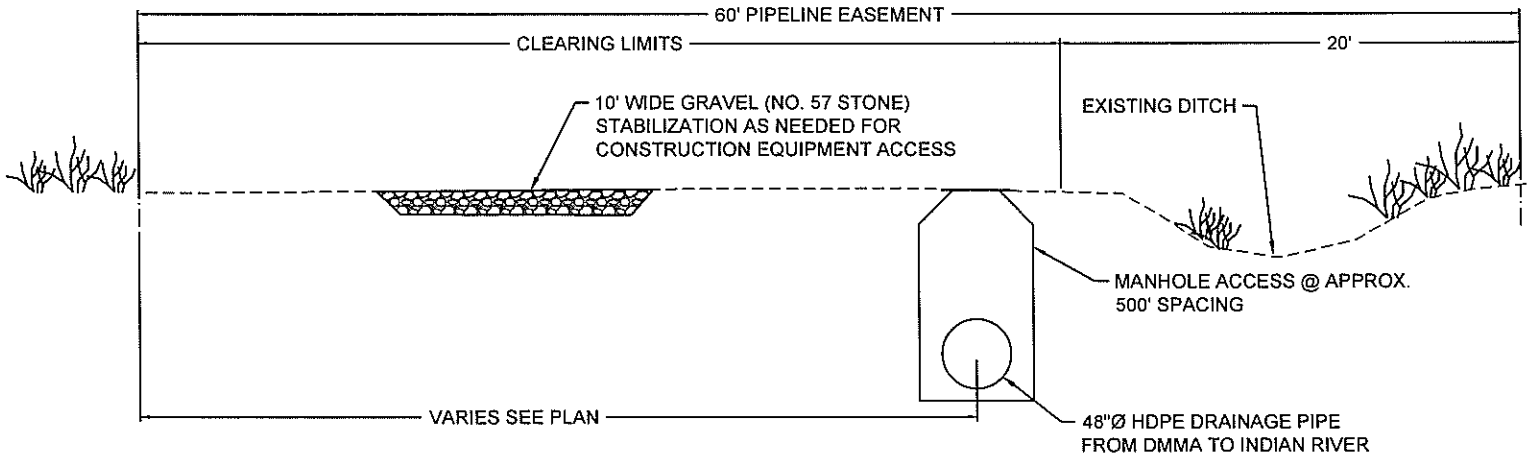

S3 / FIG 17 TYPICAL PIPELINE SECTION
SCALE: 1" = 8'
V-SCALE: 1" = 1'
0 8'

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FIGURE 18
PIPELINE TYPICAL SECTION
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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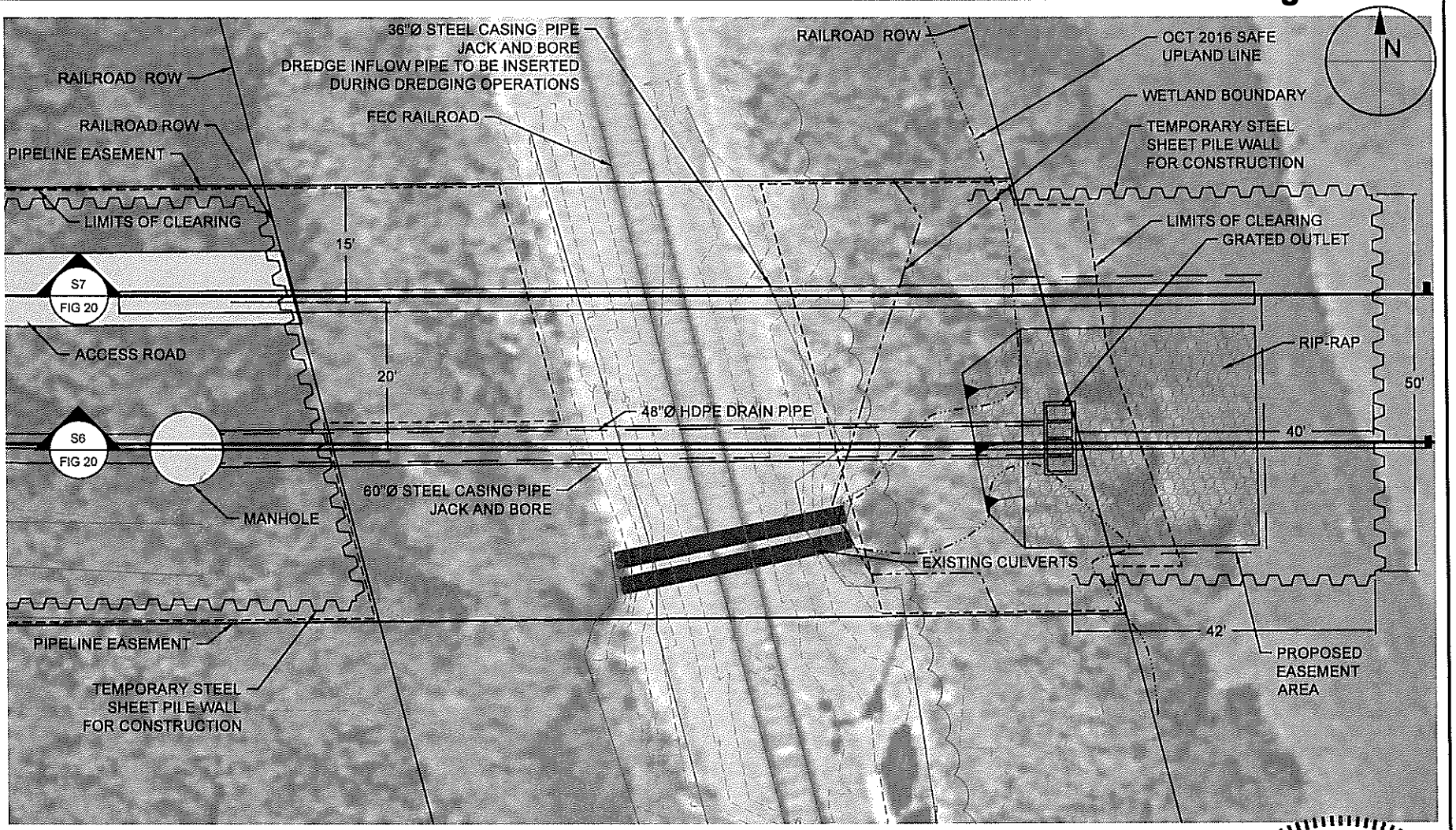

P3 / FIG 17 FEC RAILROAD CROSSING PLAN
SCALE: 1" = 20'
0 20'

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FIGURE 19
RAILROAD CROSSING PLAN AND PROFILE
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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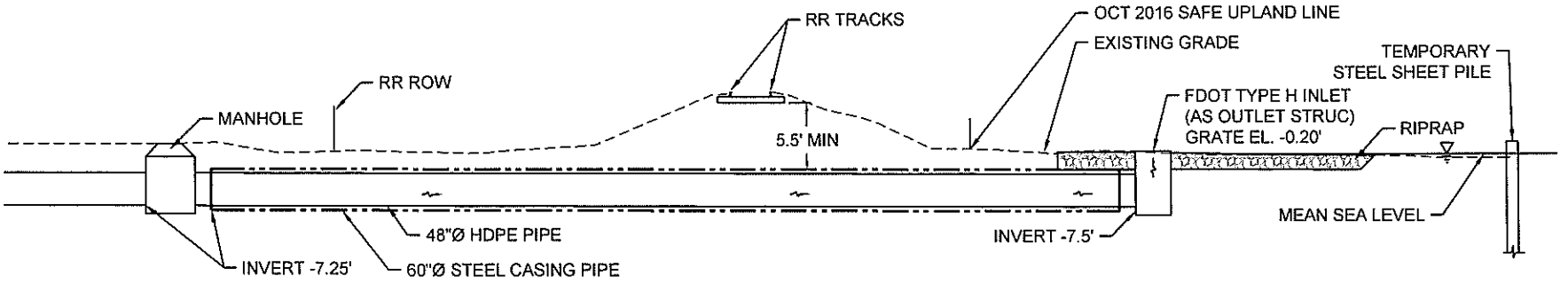
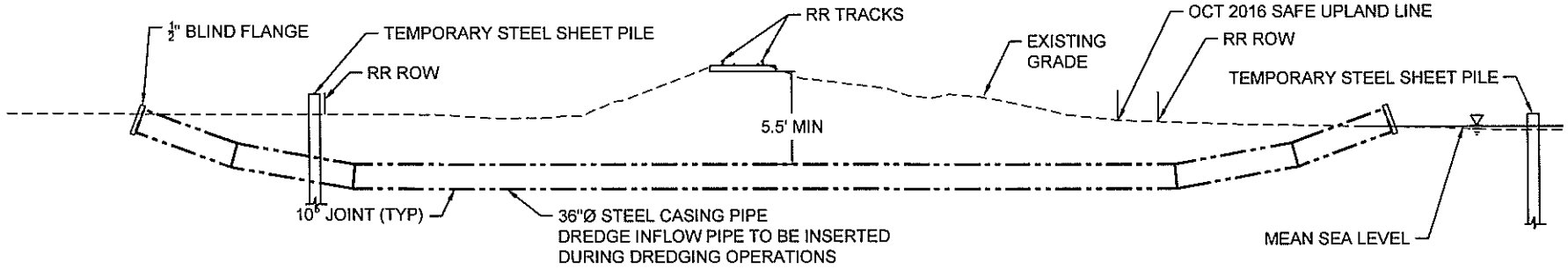


S6 / FIG 19 FEC RAILROAD CROSSING SECTION - 60IN STEEL CASING
SCALE: 1" = 20'



S7 / FIG 19 FEC RAILRAOD CROSSING SECTION - 36 IN STEEL CASING
SCALE: 1" = 20'

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FIGURE 20
RAILROAD CROSSING SECTIONS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
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DATE	NOV 2016

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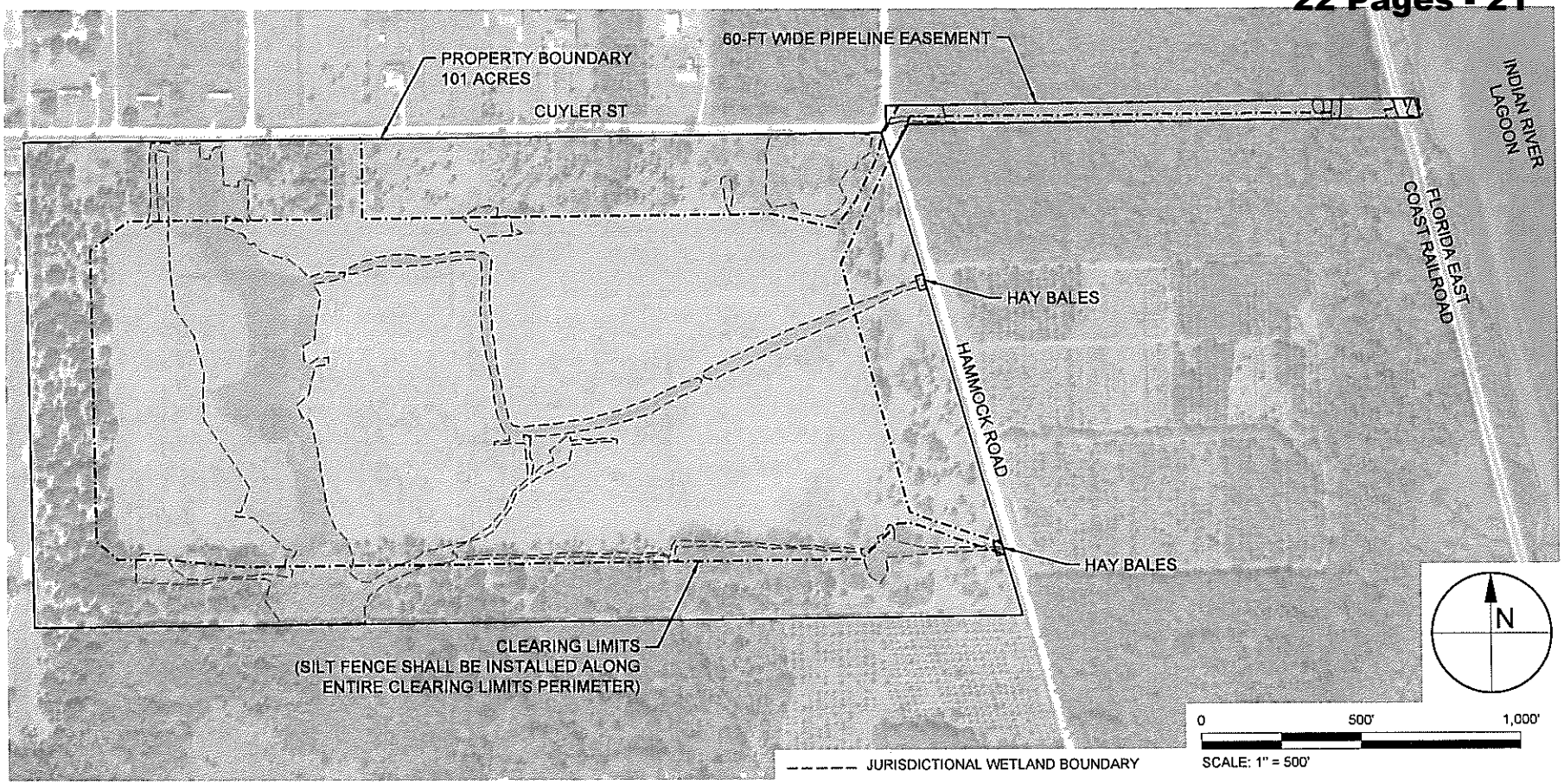

EROSION CONTROL AND GRASSING/SODDING NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN EROSION CONTROL MEASURES AS NECESSARY TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND COMPLY WITH STATE WATER QUALITY CRITERIA FOR STORMWATER DISCHARGE. EROSION CONTROL MEASURES INCLUDE BUT ARE NOT LIMITED TO TURBIDITY SCREENS, MULCHING, HAY BALES, AND SILT FENCE. IF A WATER QUALITY VIOLATION OCCURS, THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ALL DAMAGE AND ALL COSTS WHICH MAY RESULT INCLUDING LEGAL FEES, CONSTRUCTION COSTS, AND FINES.
2. DISTURBED AREAS SHALL BE MAINTAINED IN ACCORDANCE WITH CITY, COUNTY, STATE, AND FEDERAL REQUIREMENTS UNTIL A PERMANENT VEGETATIVE COVER IS ESTABLISHED.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING PERMANENT VEGETATION AT ALL DISTURBED AREAS PER DRAWINGS AND MEETING THE NPDES FINAL STABILIZATION REQUIREMENTS.
4. EROSION CONTROL MEASURES SHALL BE MAINTAINED FOR THE ENTIRE DURATION OF THE PROJECT OR UNTIL VEGETATION IS ESTABLISHED.
5. EROSION CONTROL MEASURES SHALL BE PLACED TO CONTAIN ALL POINTS OF DISCHARGE TO SURFACE WATERS OR WETLANDS INCLUDING SURFACE RUNOFF, CURB INLETS, DITCH BOTTOM INLETS, DITCHES, AND DOWNSTREAM PORTIONS OF STREAMS, CANALS, AND TIDAL WATERS ADJACENT TO CONSTRUCTION.
6. 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR WILL SUBMIT A "NOTICE OF INTENT" TO THE EPA IN ACCORDANCE WITH NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM RULES AND REGULATIONS.
7. THE CONTRACTOR SHALL WRAP STORM GRATES IN FILTER FABRIC TO PREVENT SEDIMENTATION OF THE STORM SEWER SYSTEM. CONTRACTOR SHALL MAINTAIN THE FILTER FABRIC UNTIL PROJECT COMPLETION.
8. THE SITE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES AFTER COMPLETION OF CONSTRUCTION AND ONLY WHEN AREAS HAVE BEEN STABILIZED.
9. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

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FIGURE 21
EROSION CONTROL PLAN AND NOTES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
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DATE	NOV 2016

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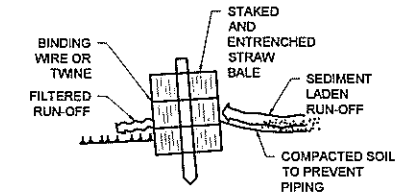
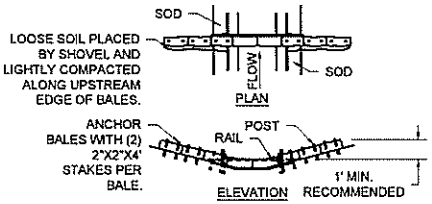
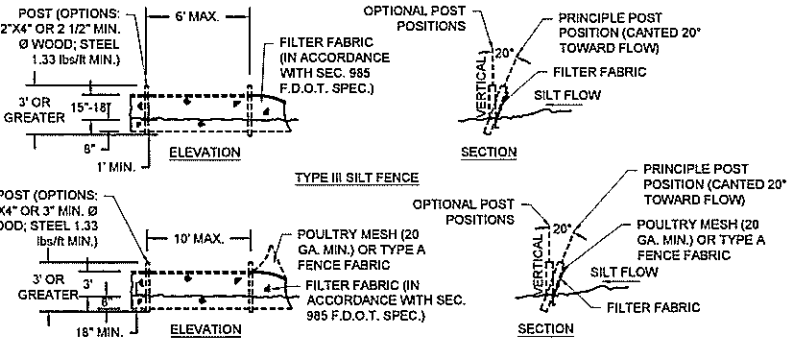


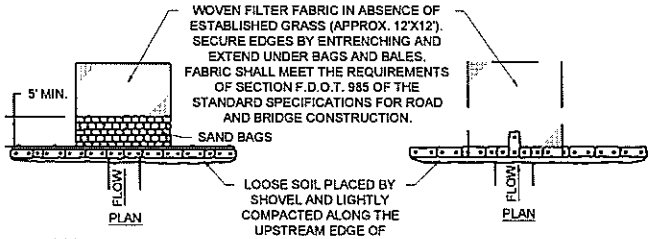
CROSS SECTION OF A PROPERLY INSTALLED STRAW BALE

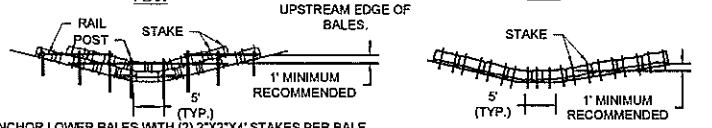


SPACING: BALE BARRIERS FOR PAVED DITCHES SHOULD BE SPACED IN ACCORDANCE WITH CHART I, SHEET 1 OF 3, INDEX NO. 102 OF THE F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS.

STRAW BALE BARRIER FOR PAVED DITCH



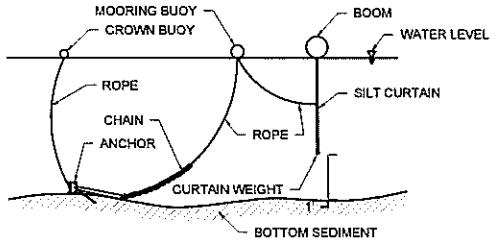




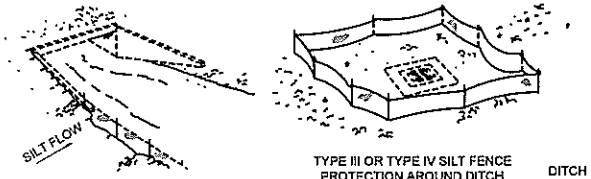
APPLICATION AND SPACING OF TYPES I & TYPES II HAY BALE BARRIERS SALL BE IN ACCORDANCE WITH SHEET 1 OF 3, F.D.O.T. INDEX NO. 102

TYPE II TYPE I

TYPICAL STRAW BALE DETAIL

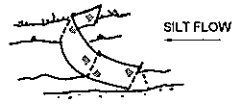


TURBIDITY CURTAIN DETAIL



TYPE III OR TYPE IV SILT FENCE PROTECTION AROUND DITCH BOTTOM INLETS.

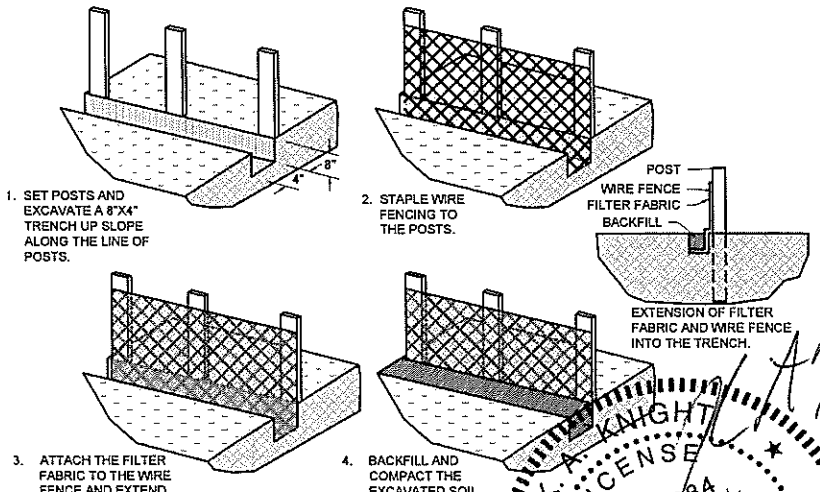
TYPE III OR TYPE IV SILT FENCE



TYPE III AND IV SILT FENCE

DITCH INSTALLATION AND SPACING FOR TYPE III & TYPE IV FENCE TO BE IN ACCORDANCE WITH SHEET 1 OF 3, OF THE F.D.O.T. INDEX NO. 102

DO NOT DEPLOY IN A MANNER THAT SILT FENCES WILL ACT AS A DAM ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE USED AT UPLAND LOCATIONS AND TURBIDITY BARRIERS USED AT PERMANENT BODIES OF WATER.



SILT FENCE INSTALLATION DETAILS

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FIGURE 22
EROSION CONTROL DETAILS
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AP
SHEET	22 of 22
DATE	NOV 2016

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KEITH A. KNIGHT P.E. 58084 DATE

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Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Permittee:
Mark Crosley, Executive Director
Florida Inland Navigation District (FIND)
1314 Marcinski Road
Jupiter, FL 33477
mcrosley@aicw.org

Agent:
Chris Ellis
Taylor Engineering, Inc.
10151 Deerwood Park Blvd., Bldg. 300, Suite 300
Jacksonville, FL 32256
cellis@taylorengineering.com

and

Johnathan Armbruster
Taylor Engineering, Inc.
10151 Deerwood Park Blvd., Bldg. 300, Suite 300
Jacksonville, FL 32256
jarmbruster@taylorengineering.com

F.I.N.D. – Dredge Material Management Area BV-4B

Environmental Resource Permit

State-owned Submerged Lands Authorization –Pending

U.S. Army Corps of Engineers Authorization – Pending

Permit No.: ERP 0344990-001-EI

Permit Issuance Date: September 22, 2017
Permit Construction Phase Expiration Date: September 22, 2022

Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Consolidated Environmental Resource Permit and Recommended Intent to Grant Sovereignty Submerged Lands Authorization

Permittee: Florida Inland Navigation District (FIND)
Permit No: ERP 0344990-001-EI

PROJECT LOCATION

The activities authorized by this Permit are located at the southwest corner of Cuyler Street and Hammock Road in Mims, Florida, 32754, Brevard County, Sections 20 and 21, Township 21 South, Range 35 East.

PROJECT DESCRIPTION

The permittee is authorized to construct and operate a permanent 101-acre Dredge Material Management Area (DMMA) to dewater and store material dredged from the northern half of Reach II of the Intracoastal Waterway (ICWW).

The permittee is also authorized to construct a stormwater swale and a dry retention pond as depicted on the attached exhibits.

Mitigation: To offset direct secondary impacts with a total functional loss of 4.095, the applicant has reserved 2.51 freshwater frosted and 1.54 freshwater herbaceous UMAM bank credits from Farmton Mitigation Bank. Additionally, the applicant has reserved 0.1 credits from CGW Mitigation Bank to offset estuarine impacts associated with the DMMA pipeline. **Prior to any construction or impacts authorized by this permit, the permittee shall provide the Department with documentation that all mitigation credits have been purchased and deducted from the official credit ledger for Farmton Mitigation Bank and CGW Mitigation Bank in the name of Florida Inland Navigation District for permit number 0327292-002 EI.**

Authorized activities are depicted on the attached exhibits.

AUTHORIZATIONS

F.I.N.D. – Dredge Material Management Area BV-4B

Environmental Resource Permit

The Department has determined that the activity qualifies for an Environmental Resource Permit. Therefore, the Environmental Resource Permit is hereby granted, pursuant to Part IV of Chapter 373, Florida Statutes (F.S.), and Chapter 62-330, Florida Administrative Code (F.A.C.).

Sovereignty Submerged Lands Authorization

The activity is located on sovereignty submerged lands owned by the State of Florida. It therefore also requires authorization from the Board of Trustees of the Internal Improvement Trust Fund (Board of

Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Section 253.77, F.S. As staff to the Board of Trustees under Sections 253.002, F.S., the Department has determined that the activity qualifies for and requires a public easement, as long as the work performed is located within the boundaries as described and is consistent with the terms and conditions herein.

The final documents required to execute the public easement will be sent to the grantee by the Department's Division of State Lands for execution. The Department intends to issue the public easement, upon satisfactory execution of those documents, including payment of required fees and compliance with the conditions in the attached permit. **You may not begin construction of the activities described until you receive a copy of the executed public easement from the Department.**

Federal Authorization

Your proposed activity as outlined on your application and attached drawings **does not qualify** for Federal authorization pursuant to the State Programmatic General Permit and a **SEPARATE permit** or authorization **shall be required** from the Corps. A copy of your permit application has been forwarded to the Corps for their review. The Corps will issue their authorization directly to you or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date your application was received at the local FDEP Office, contact the Irene Sadowski at the USACE, Region 4, Cocoa Office at (321) 504-3771, ext. 12 for status and further information. **Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.**

Coastal Zone Management

Issuance of this authorization also constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

Water Quality Certification

This permit also constitutes a water quality certification under Section 401 of the Clean Water Act, 33 U.S.C. 1341.

Other Authorizations

You are advised that authorizations or permits for this activity may be required by other federal, state, regional, or local entities including but not limited to local governments or municipalities. This permit does not relieve you from the requirements to obtain all other required permits or authorizations.

The activity described may be conducted only in accordance with the terms, conditions and attachments contained in this document. Issuance and granting of the permit and authorizations herein do not infer, nor guarantee, nor imply that future permits, authorizations, or modifications will be granted by the Department.

PERMIT/SOVEREIGNTY SUBMERGED LANDS CONDITIONS

The activities described must be conducted in accordance with:

- **The Specific Conditions**
- **The General Conditions**
- **The limits, conditions and locations of work shown in the attached drawings**
- **The term limits of this authorization**

You are advised to read and understand these conditions and drawings prior to beginning the authorized activities, and to ensure the work is conducted in conformance with all the terms, conditions, and drawings herein. If you are using a contractor, the contractor also should read

and understand these conditions and drawings prior to beginning any activity. Failure to comply with these conditions, including any mitigation requirements, shall be grounds for the Department to revoke the permit and authorization and to take appropriate enforcement action. Operation of the facility is not authorized except when determined to be in conformance with all applicable rules and this permit and sovereignty submerged lands authorization, as described.

SPECIFIC CONDITIONS – PRIOR TO CONSTRUCTION

1. To offset direct secondary impacts with a total functional loss of 4.095, the applicant has reserved 2.51 freshwater frosted and 1.54 freshwater herbaceous UMAM bank credits from Farmton Mitigation Bank. Additionally, the applicant has reserved 0.1 credits from CGW Mitigation Bank to offset estuarine impacts associated with the DMMA pipeline. **Prior to any construction or impacts authorized by this permit, the permittee shall provide the Department with documentation that all mitigation credits have been purchased and deducted from the official credit ledger for Farmton Mitigation Bank and CGW Mitigation Bank in the amounts specified above in the name of Florida Inland Navigation District for permit number 0327292-002 EI.**

SPECIFIC CONDITIONS – GENERAL CONSTRUCTION ACTIVITIES

2. Turbidity must be controlled to prevent violations of water quality pursuant to Rule 62-302.530(69), Florida Administrative Code. Turbidity shall not exceed 29 Nephelometric Turbidity Units (NTU) above natural background conditions. Also, turbidity of the effluent from DMMA discharged back in to the Indian River Lagoon shall not exceed 29 NTU above natural back ground of the receiving surface waters. **There is no mixing zone for DMMA effluent**.
3. Best management practices (primarily turbidity screens and floating turbidity barriers) for erosion and turbidity control shall be implemented and maintained at all times during construction and operation of the permitted activity to prevent siltation and turbid discharges in excess of State water standards pursuant to Chapter 62-302, F.A.C. The permittee shall be responsible for ensuring that erosion and turbidity control devices and procedures are inspected and maintained daily during all phases of construction authorized by this permit until all areas that were disturbed during construction are sufficiently stabilized to prevent erosion, siltation, and turbid discharges.
4. Upon final completion of the project and upon reasonable assurance that the project is no longer a potential turbidity source, the permittee will be responsible for the removal of the turbidity barriers. The turbidity control devices shall be removed no later than one year from completion of the project. All turbidity control devices shall be disposed of in an upland disposal area.
5. The limits of construction shall be delineated by silt fencing or a floating turbidity barrier. The permittee shall bear the responsibility of notifying all construction workers that silt fencing or turbidity barrier represents the limits of all construction activities. The permittee shall bear the responsibility of keeping all construction workers and equipment out of the adjacent wetlands and surface waters where work has not been permitted for impacts.
6. There shall be no stock piling of tools, materials (i.e., lumber, pilings, riprap, and debris) within wetlands, along the shoreline within the littoral zone, or elsewhere within wetlands/waters of the state unless specifically approved in this permit. Any and all

construction debris shall be removed from wetlands/ waters of the state within 14 days of completion of the work authorized by this permit.

7. Watercraft associated with the construction shall operate within waters of sufficient depth to preclude bottom scouring/prop dredging.

8. This permit does not authorize impacts, either direct or secondary, to submerged aquatic vegetation.

9. The riprap material shall consist of clean rocks ranging from six inches to two feet in diameter.

10. Construction equipment shall not be repaired or refueled in wetlands or elsewhere within waters of the state.

11. The permittee shall report any damage to the Department within 24 hours that occurs to the wetlands/littoral zone area as a result of the dock or riprap construction. If any damage occurs to wetlands or surface waters as a result of any construction activities, the permittee shall be required to restore the wetland area by regrading the damaged areas back to the natural reconstruction elevations and planting vegetation of the size, densities and species that exist in the adjacent areas pursuant to a consent order. The restoration shall be completed within 30 days of completion of the construction and shall be done to the satisfaction of the Department.

12. Any disturbed areas of the shoreline shall be stabilized immediately (within 48 hours) following completion the project.

SPECIFIC CONDTIONS – DMMA & STORMWATER MANAGEMENT (SWM)

13. Submit Form 62-330.350(1), "Construction Commencement Notice," at least 48 hours prior to commencement of the DMMA construction authorized by this permit.

14. In accordance with Section 373.416(2), F.S., unless revoked or abandoned, all DMMA's, stormwater management systems, dams, impoundments, reservoirs, appurtenant works, or works permitted under Part IV of Chapter 373, F.S., must be operated and maintained in perpetuity.

15. The DMMA operation, management and maintenance shall be in accordance with Chapter 7 of the U.S. Army Corp of Engineers Engineer Manual 1110-2-5027 (EM 1110-2-5027), the designs, plans, calculations, and other specifications that are submitted with an application, approved by the Agency, and incorporated as a condition within this permit.

16. If the DMMA is not functioning as designed and permitted, operational maintenance must be performed immediately to restore the system. Within 30 days of any failure of the DMMA or deviation from the permit, a report shall be submitted electronically or in writing to the Department using the enclosed "Operation and Maintenance Inspection Certification" [Form 62-330.311(1)] describing the remedial actions taken to resolve the failure or deviation. If operational maintenance measures are insufficient to enable the system to meet the design and performance standards of Chapter 62-330, F.A.C. and EM 1110-2-5027, the permittee must either replace the system or construct an alternative design. A permit modification must be obtained from the Department prior to constructing such an alternate design pursuant to Rule 62-330.315, F.A.C.

17. Upon completion of the permitted systems, dams, reservoirs, impoundments, appurtenant work, or works, the Agency shall have periodic inspections made to ensure the project

was constructed and is being operated in compliance with the terms and conditions of the permit, and in a manner that protects the public health and safety and the natural resources of the state. No person shall refuse immediate entry or access to any authorized representative of the District or DEP who requests entry for purposes of such inspection and presents appropriate credentials pursuant to Section 12.4 (b) of the Environmental Resource Permit Applicant's Handbook Volume I (AH Vol. I).

18. Inspections may be performed by Agency staff during and after construction. When needed to ensure a project is being operated and maintained in perpetuity, the permit may require the operation and maintenance entity to conduct the periodic inspections. The required inspection schedule for a specific project will be specified in the permit pursuant to Section 12.4 (c) of the AH Vol. I.

19. The efficiency of DMMAs, stormwater management systems, dams, impoundments, and most other projects normally decreases over time without periodic maintenance. For example, a significant reduction in the flow capacity of a stormwater management system often can be attributed to partial blockages of its conveyance system. Once flow capacity is compromised, flooding may result. Therefore, operation and maintenance entities must perform periodic inspections to identify if there are any deficiencies in structural integrity, degradation due to insufficient maintenance, or improper operation of projects that may endanger public health, safety, or welfare, or the water resources. If deficiencies are found, the operation and maintenance entity will be responsible for correcting the deficiencies so that the project is returned to the operational functions required in the permit and contemplated by the design of the project as permitted. The corrections must be done a timely manner to prevent compromises to flood protection and water quality pursuant to Section 12.4 (e) of AH Vol. I.

20. The operation and maintenance entity must maintain a record of each inspection, including the date of inspection, the name and contact information of the inspector, whether the system was functioning as designed and permitted, and make such record available upon request of the Agency pursuant to Section 12.4 (h) of AH Vol. 1.

SPECIFIC CONDITIONS – DMMA & SWM POST–ISSUANCE SUBMITTALS

21. Submit Form 62-330.310(1) "As-Built Certification and Request for Conversion to Operation Phase," when the DMMA and SWM are constructed and prior to be placed in operation.

22. Submittal of Form 62-330.310(1) "As-Built Certification and Request for Conversion to Operation Phase," in accordance with subparagraph 62-330.350(1)(f)2., F.A.C., shall serve to notify the Agency that the project, or independent portion of the project, is completed and ready for inspection by the Agency.

23. All submittals required by the Specific or General Conditions of this permit shall be provided to the Department in a digital format (via electronic mail, CD or DVD, or through a file transfer site) when practicable. The mailing address for the appropriate Department office is 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767 and the electronic mail address is DEP_CD@dep.state.fl.us. All submittals shall include the project name and indicated permit number when referring to this project.

SPECIFIC CONDITIONS – MANATEES

24. The Standard Manatee Construction Conditions for In-water Work (2011) must be followed for all in-water activity. The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

    a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

    b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

    c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

    d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

    e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

    f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

25. In-water work must not be performed after dusk or before dawn, when the possibility of spotting manatees is negligible.

GENERAL CONDITIONS FOR INDIVIDUAL PERMITS

The following general conditions are binding on all individual permits issued under Chapter 62-330, F.A.C., except where the conditions are not applicable to the authorized activity, or where the conditions must be modified to accommodate project-specific conditions.

1. All activities shall be implemented following the plans, specifications and performance criteria approved by this permit. Any deviations must be authorized in a permit modification in accordance with Rule 62-330.315, F.A.C. Any deviations that are not so authorized may subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S.

2. A complete copy of this permit shall be kept at the work site of the permitted activity during the construction phase, and shall be available for review at the work site upon request by the Agency staff. The permittee shall require the contractor to review the complete permit prior to beginning construction.

3. Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be installed immediately prior to, and be maintained during and after construction as needed, to prevent adverse impacts to the water resources and adjacent lands. Such practices shall be in accordance with the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual (Florida Department of Environmental Protection and Florida Department of Transportation June 2007)*, and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008)*, which are both incorporated by reference in subparagraph 62-330.050(9)(b)5., F.A.C., unless a project-specific erosion and sediment control plan is approved or other water quality control measures are required as part of the permit.

4. At least 48 hours prior to beginning the authorized activities, the permittee shall submit to the Agency a fully executed Form 62-330.350(1), "Construction Commencement Notice," [October 1, 2013], which is incorporated by reference in paragraph 62-330.350(1)(d), F.A.C., indicating the expected start and completion dates. A copy of this form may be obtained from the Agency, as described in subsection 62-330.010(5), F.A.C. If available, an Agency website that fulfills this notification requirement may be used in lieu of the form.

5. Unless the permit is transferred under Rule 62-330.340, F.A.C., or transferred to an operating entity under Rule 62-330.310, F.A.C., the permittee is liable to comply with the plans, terms and conditions of the permit for the life of the project or activity.

6. Within 30 days after completing construction of the entire project, or any independent portion of the project, the permittee shall provide the following to the Agency, as applicable:
    a. For an individual, private single-family residential dwelling unit, duplex, triplex, or quadruplex – "Construction Completion and Inspection Certification for Activities Associated With a Private Single-Family Dwelling Unit" [Form 62-330.310(3)]; or
    b. For all other activities – "As-Built Certification and Request for Conversion to Operational Phase" [Form 62-330.310(1)].
    c. If available, an Agency website that fulfills this certification requirement may be used in lieu of the form.

7. If the final operation and maintenance entity is a third party:
   a. Prior to sales of any lot or unit served by the activity and within one year of permit issuance, or within 30 days of as- built certification, whichever comes first, the permittee shall submit, as applicable, a copy of the operation and maintenance documents (see sections 12.3 thru 12.3.3 of Volume I) as filed with the Department of State, Division of Corporations and a copy of any easement, plat, or deed restriction needed to operate or maintain the project, as recorded with the Clerk of the Court in the County in which the activity is located.
   b. Within 30 days of submittal of the as- built certification, the permittee shall submit "Request for Transfer of Environmental Resource Permit to the Perpetual Operation Entity" [Form 62-330.310(2)] to transfer the permit to the operation and maintenance entity, along with the documentation requested in the form. If available, an Agency website that fulfills this transfer requirement may be used in lieu of the form.

8. The permittee shall notify the Agency in writing of changes required by any other regulatory agency that require changes to the permitted activity, and any required modification of this permit must be obtained prior to implementing the changes.

9. This permit does not:
   a. Convey to the permittee any property rights or privileges, or any other rights or privileges other than those specified herein or in Chapter 62-330, F.A.C.;
   b. Convey to the permittee or create in the permittee any interest in real property;
   c. Relieve the permittee from the need to obtain and comply with any other required federal, state, and local authorization, law, rule, or ordinance; or
   d. Authorize any entrance upon or work on property that is not owned, held in easement, or controlled by the permittee.

10. Prior to conducting any activities on state-owned submerged lands or other lands of the state, title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund, the permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees of the Internal Improvement Trust Fund shall not be considered received until it has been fully executed.

11. The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities that may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any project authorized by the permit.

12. The permittee shall notify the Agency in writing:
   a. Immediately if any previously submitted information is discovered to be inaccurate; and
   b. Within 30 days of any conveyance or division of ownership or control of the property or the system, other than conveyance via a long-term lease, and the new owner shall request transfer of the permit in accordance with Rule 62-330.340, F.A.C. This does not apply to the sale of lots or units in residential or commercial subdivisions or condominiums where the stormwater management system has been completed and converted to the operation phase.

13. Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the project or activities to ensure conformity with the plans and specifications authorized in the permit.

14. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

15. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered binding unless a specific condition of this permit or a formal determination under Rule 62-330.201, F.A.C., provides otherwise.

16. The permittee shall provide routine maintenance of all components of the stormwater management system to remove trapped sediments and debris. Removed materials shall be disposed of in a landfill or other uplands in a manner that does not require a permit under Chapter 62-330, F.A.C., or cause violations of state water quality standards.

17. This permit is issued based on the applicant's submitted information that reasonably demonstrates that adverse water resource-related impacts will not be caused by the completed permit activity. If any adverse impacts result, the Agency will require the permittee to eliminate the cause, obtain any necessary permit modification, and take any necessary corrective actions to resolve the adverse impacts.

18. A Recorded Notice of Environmental Resource Permit may be recorded in the county public records in accordance with subsection 62-330.090(7), F.A.C. Such notice is not an encumbrance upon the property.

NOTICE OF RIGHTS

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency action, the hearing process may result in a modification of the agency action or even denial of the application.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rule

28-106.201, F.A.C., a petition for an administrative hearing must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;
(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;
(c) A statement of when and how the petitioner received notice of the agency decision;
(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
(e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;
(f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant must be filed within 14 days of receipt of this written notice. Petitions filed by any persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S. must be filed within 14 days of publication of the notice or within 14 days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who has asked the Department for notice of agency action may file a petition within 14 days of receipt of such notice, regardless of the date of publication. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation
Mediation is not available in this proceeding.

Judicial Review
Any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

EXECUTION AND CLERKING

Executed in Orlando, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Kimberly Rush, P.E.
Permitting and Waste Cleanup
Program Administrator
Florida Department of Environmental Protection

CERTIFICATE OF SERVICE
The undersigned duly designated deputy clerk hereby certifies that this permit and all copies were sent on the filing date below to the following listed persons:

Attachments:
Exhibit 1: Project Drawings, 25 pages
Exhibit 2: U.S. Army Corp of Engineers Engineer Manual 1110-2-5027, 243 pages
Exhibit 3: As-built Certification and Request for Conversion to Operational Phase/Form 62-330.310(1)
Request for Transfer to the Perpetual Operation Entity/Form 62-330.310(2)
Request to Transfer Permit/Form 62-330.340(1)

Copies furnished to:
Leo Angleró, FDEP, Leo.anglero@dep.state.fl.us
Kimberly Eisele, FDEP, Kim.Eisele@dep.state.fl.us
Brevard County Natural Resources-LeeAnn McCullough-Wham LeeAnn.McCullough-Wham@brevardcounty.us

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to Section 120.52, F. S., with the designated Department Clerk, receipt of which is hereby acknowledged.

Mandakini Patel — September 22, 2017
Clerk **Date**

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service
August 12, 2013

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida for use by applicants and their construction personnel. At least **30 days prior** to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov; South Florida Field Office: verobeach@fws.gov; Panama City Field Office: panamacity@fws.gov). As long as the signatory of the e-mail certifies compliance with the below Plan (including use of the attached poster and brochure), no further written confirmation or "approval" from the USFWS is needed and the applicant may move forward with the project.

If the applicant decides to use an eastern indigo snake protection/education plan other than the approved Plan below, written confirmation or "approval" from the USFWS that the plan is adequate must be obtained. At least 30 days prior to any clearing/land alteration activities, the applicant shall submit their unique plan for review and approval. The USFWS will respond via e-mail, typically within 30 days of receiving the plan, either concurring that the plan is adequate or requesting additional information. A concurrence e-mail from the appropriate USFWS Field Office will fulfill approval requirements.

The Plan materials should consist of: 1) a combination of posters and pamphlets (see **Poster Information** section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated (see **Pre-Construction Activities** and **During Construction Activities** sections below).

POSTER INFORMATION

Posters with the following information shall be placed at strategic locations on the construction site and along any proposed access roads (a final poster for Plan compliance, to be printed on 11" x 17" or larger paper and laminated, is attached):

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands

and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION UNDER FEDERAL AND STATE LAW: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

IF YOU SEE A <u>LIVE</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the live eastern indigo snake sufficient time to move away from the site without interference;
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A <u>DEAD</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

Telephone numbers of USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office – (904) 731-3336
Panama City Field Office – (850) 769-0552
South Florida Field Office – (772) 562-3909

PRE-CONSTRUCTION ACTIVITIES

1. The applicant or designated agent will post educational posters in the construction office and throughout the construction site, including any access roads. The posters must be clearly visible to all construction staff. A sample poster is attached.

2. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss identification of the snake, its protected status, what to do if a snake is observed within the project area, and applicable penalties that may be imposed if state and/or federal regulations are violated. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office (a final brochure for Plan compliance, to be printed double-sided on 8.5" x 11" paper and then properly folded, is attached). Photos of eastern indigo snakes may be accessed on USFWS and/or FWC websites.

3. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan, which includes notification of the appropriate USFWS Field Office. The contact information for the USFWS is provided on the referenced posters and brochures.

DURING CONSTRUCTION ACTIVITIES

1. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting (example: discovery of snake sheds, tracks, lots of refugia and cavities present in the area of clearing activities, and presence of gopher tortoises and burrows).

2. If an eastern indigo snake is discovered during gopher tortoise relocation activities (i.e. burrow excavation), the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.

3. Periodically during construction activities, the applicant's designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed. Construction personnel should be reminded of the instructions (above) as to what is expected if any eastern indigo snakes are seen.

POST CONSTRUCTION ACTIVITIES

Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion. The report can be sent electronically to the appropriate USFWS e-mail address listed on page one of this Plan.



ATTENTION:

THREATENED EASTERN INDIGO SNAKES MAY BE PRESENT ON THIS SITE!!!

IF YOU SEE A LIVE EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the eastern indigo snake sufficient time to move away from the site without interference.
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate U.S. Fish and Wildlife Service (USFWS) office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office – (904) 731-3336
Panama City Field Office – (850) 769-0552
South Florida Field Office – (772) 562-3909

Killing, harming, or harassing indigo snakes is strictly prohibited and punishable under State and Federal Law.

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK
2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:



Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

DRAFT
April 20, 2004

Species Conservation Guidelines
South Florida

Audubon's Crested Caracara

The Species Conservation Guidelines (Guidelines) for Audubon's crested caracara (*Polyborus plancus audubonii* (=*Caracara cheriway audubonii*)) (caracara) provides a tool to assist the user in determining if their project may adversely affect caracaras. Here we describe actions which might have a detrimental impact on the caracara and how these effects can be avoided or minimized.

The Fish and Wildlife Service (Service) suggests review of the following papers for synopses of caracara ecology: *South Florida Multi-Species Recovery Plan* (Service 1999) and the *Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara (Caracara cheriway audubonii)* (Morrison 2001). Below is a summary of some life history aspects of this species which are pertinent to the Guidelines process.

Life History

The caracara is a resident, diurnal, and non-migratory species that occurs in Florida as well as the southwestern U.S. and Central America. Only the Florida population, which is isolated from the remainder of the species, is listed as threatened under the Endangered Species Act. This large long-lived raptor breeds from September through June with the primary season being November through April (Morrison 1999). Morrison and Humphrey (2001) found that caracaras prefer to nest in cabbage palms *(Sabal palmetto*) surrounded by open habitats with low ground cover and low density of tall or shrubby vegetation in Florida. Peak egg laying takes place from late December through early February (Morrison 1999). Incubation lasts for about 32-33 days and young fledge at 43-56 days after hatching (Layne 1996, Morrison 1996). Juveniles leave the natal area and can be found roosting in large groups (50 or more) in large palm and oak trees (Morrison 2001).

Habitat

The Florida population commonly occurs in dry or wet prairie areas with scattered cabbage palms (*Sabal palmetto*). It may also be found in lightly wooded areas. Scattered saw palmetto (*Serenoa repens*), scrub oaks (*Quercus geminata, Q. minima, Q. pumila*), and cypress *(Taxodium* spp.) may also be present. Widespread changes in land use may have caused a change in habitat use in this subspecies. Morrison and Humphrey (2001) found a strong association of caracara home ranges with improved pasture. The presence of seasonal wetlands may be an important factor in the attractiveness of these pastures to caracaras (Service 1999). There is no critical

habitat designated for this species.

Distribution

Historically, this subspecies was a common resident in Florida from northern Brevard County, south to Lake Okeechobee. It has been reported as far north as Nassau County, and as far south as Collier County and the lower Florida Keys in Monroe County. Caracara may be found in Charlotte, Collier, Hardee, Hendry, Martin, Monroe, Palm Beach, Polk, and St. Lucie Counties, but the region of greatest abundance for this subspecies is a five-county area north and west of Lake Okeechobee, including Desoto, Glades, Highlands, Okeechobee, and Osceola Counties. Figure 1 shows the consultation area where we primarily expect projects to impact the caracara.

Telemetry data (Morrison, unpubl. data) show several communal gathering areas for juvenile caracaras in south-central Florida. These gathering areas are not always at the same location, but are known to occur in a several general areas marked on Figure 1. The largest gathering area includes the floodplains and adjacent pasture lands on both sides of the Kissimmee River. Other smaller areas were identified in Highlands and Glades Counties (Fig. 1). Both the consultation and gathering areas are important in determining whether a project may affect caracaras.

Determination

A flowchart is provided to guide you in determining your project's impacts on the caracara (Fig. 2). You should have a project description and a habitat maps. The map should have the project boundaries and a 1,500-m (4,920 ft) buffer surrounding the property. This buffer will help identify any off-site caracara territories that may overlap onto the property. Compare your project location with the consultation area map (Fig. 1). If the project is not in the caracara consultation area then the project should have no effect on the caracara and the Federal action can proceed.

Within the consultation area, there are special gathering areas used by juvenile caracara (Fig. 1). If the project is within a gathering area, then activities may affect the caracara and conservation measures may be needed (see below). Major habitat modification in these areas may require formal consultation.

It is important to determine whether a project site has suitable habitat. Suitable habitat for the caracara includes wet and dry prairies with scattered saw palmetto, scrub oak, or cypress. In addition, improved and semi-improved pastures and range lands may be considered suitable habitat. Heavily forested areas are not considered a suitable habitat. If the project is within the consultation area, and no suitable habitat is present, then no effect is anticipated to the caracara and Federal action can proceed.

If the project occurs within the consultation area, and suitable habitat is present, the Service presumes the habitat is occupied and activities in this area may affect the caracara. In this case a caracara nest survey will confirm whether or not caracaras nest on the property. Guidelines on how to survey for caracara nests can be found in Appendix B. If the survey does not detect caracara nests, then no effect from the project is anticipated on the caracara.

If the surveys detected a caracara nest or available information indicates the presence of a nest at the project site, then the project may affect the caracara and further consultation with the Service is warranted. If appropriate conservation measures are implemented by the project then the project is not likely to adversely affect the caracara. If conservation measures can not be implemented or take of a caracara may occur then the project is likely to adversely affect the caracara and formal consultation should be initiated.

Conservation Measures

When a nest is present a series of conservation measures for activities in primary and secondary zones are provided below. These Guidelines can be used to modify project activities to avoid or minimize impacts and result in the project not likely adversely affecting the caracara.

Management Zones

In evaluating project impacts to the caracara in south Florida, the Service defines a primary zone as 300 m (985 ft), and a secondary zone as 1,500 m (4,920 ft) outward from the nest tree. Protection of the primary zone is very important particularly during the nesting season, and must be maintained in order to provide conditions for successful reproduction. Impacts during the active nesting period can be avoided by timing of activities near the nest site. Conservation measures that help reduce the impact of a project on the caracara and that are compatible with caracara survival are as follows:

Non-nesting Season (May to October)

- Maintain nest tree and other trees in the zone. This should include dead trees that are often used for perching and roosting. The nest and the nest tree are protected year-round by both Federal and State law and removal or other means of physical damage is prohibited.

- Maintain ground vegetation to provide cover for fledgings as they learn to fly.

- Maintain pasture, grassland, and wetlands that are necessary for caracara foraging. Typical land management practices, such as, cattle grazing, burning, and mowing are allowed during the non-nesting season. Man-made wetlands, such as, ditches and canals, are important feeding sites and also should be maintained. New construction that will increase the level of

disturbance may adversely affect caracaras.

- Avoid use of chemicals toxic to wildlife, including pesticides, fertilizers, or herbicides.

Nesting Season (November to April)

Caracaras are most sensitive to disturbance during nest building, incubation, and early nestling stages (first 3 to 4 weeks). There are additional conservation measures during this time to minimize impacts to the caracara.

- Normal agricultural activities should be limited during this season. Once the nestlings fledge normal activities can resume.

- In general, human activities in this zone should be limited including low flyovers by aircraft.

Secondary Zone - The secondary zone encompasses an area extending outward from the end of the primary zone (300 m (984 ft) from the nest) to 1,500 m (4,920 ft). This zone is generally defined as the foraging territory in which the nest site is located. This secondary zone is used by caracaras for the collection of nest material, roosting, and feeding. The average caracara home range is 1250 ha (Humphrey and Morrison 1997). This amount of suitable habitat contiguous to the nest site may be required to maintain the ecologic function of the nesting territory. Conservation measures for this zone are directed at maintaining the foraging capacity of the area.

- Maintain pasture, grassland, and wetlands that are necessary for caracara foraging. Typical land management practices, such as, cattle grazing, burning, and mowing can be done throughout the year. Man-made wetlands, such as, ditches and canals, are important feeding sites and also should be maintained. Conversion of pasture and wetland habitats in this zone to row crops, sugarcane, citrus groves, pine plantations, or hardwood forest may adversely affect caracaras. Normal ranching and agricultural operations (including sod farming), hiking, bird watching, fishing, camping, picnicking, hunting, and recreational off-road vehicle use are allowed in the secondary zone.

- Limit use of chemicals toxic to wildlife, including pesticides, fertilizers, or herbicides, as they may impact the caracara through it's food supply.

Habitat Enhancements

If potential nest trees are lacking in an otherwise suitable habitat, planting of cabbage palms can improve the habitat for caracaras. Caracaras prefer open grasslands or unimproved pasture. Tall, thick, or scrubby ground cover can be improved through prescribed burning or mechanical vegetation removal.

Gathering Areas

Though no specific locations within these gathering areas are used continuously, they are important staging areas for caracaras during the first year after leaving their natal territory. The following are recommended guidelines for activities within these areas:

- habitat conversion other than traditional agricultural and ranching activities should be limited within the gathering area;
- large trees, both living and dead, should be retained as roost and perch trees;
- incorporate land management practices that keep ground cover vegetation short, which may include cattle grazing, burning, mowing, or roller chopping; and
- plant cabbage palm tree clusters (minimum of three trees spaced close together) in areas lacking potential nest and perch trees.

Examples of how conservation measures may be implemented are as follows:

Non-nesting Season

The project avoids habitat modification in the primary and secondary zones, with any acceptable land uses in these zones occurring outside the nesting season. These zones were formulated to protect the caracara from excessive human disturbance. Ideally the project footprint can be modified not to impact the conservation zones. If the primary zone can be set aside by conservation easement, or other protective covenant as an environmentally sensitive area then we can assure the use of the site by the caracara throughout its life. Within the primary zone, it is important to retain suitable trees for nesting, such as cabbage palms, and other large trees for perching and roosting. Also, maintain natural ground cover that can be used by fledglings as cover.

In both zones, suitable habitat such as grasslands, pasture, and man-made wetlands (ditches and ponds) within pastures, should be maintained. New buildings, roads, power lines or canals, in the zones may adversely affect caracaras. As the secondary zone is important to foraging, conversion of pasture and wetland habitats to row crops, sugarcane, citrus groves, pine plantations, or hardwood forest may adversely affect caracaras. Chemicals harmful to wildlife should be avoided in the conservation zones. During the non-nesting season, normal agricultural operations, exotic species control, and other wildlife enhancement activities can occur in both zones. If the above conservation measures are incorporated into a caracara management plan the project is not likely to adversely affect the caracara.

Nesting Season

Caracaras are most sensitive to human disturbance during the nesting season between November and April (Morrison 2001). As such, unnecessary human entry and aircraft flyovers should be avoided within the primary zone and flyovers should be prohibited during this period. If necessary, project activities can occur during the nesting season, after the hatchlings have fledged. It can take as little as 11 weeks from egg laying to fledging. A site monitor should be used to determine when fledging occurs and project activities can begin. During the nesting season, normal agricultural operations, exotic species control, and other wildlife enhancement activities can occur in the secondary zone. If the above conservation measures are incorporated into a caracara management plan the project is not likely to adversely affect the caracara.

Modifications to Conservation Measures

The Service believes that there are very few circumstances that biologically justify modification of the conservation measures. However, some caracaras are very tolerant of human activity. In these cases, biological data, such as habitat use, flight patterns, and foraging areas can be used to justify modifications to conservation measures. This data must include a biological evaluation of the monitoring data and why the proposed modifications would not adversely affect the nesting caracaras. This information should be incorporated as a component of the caracara management plan. If the data in the caracara management plan biologically support the request to modify the conservation measures, then the project is not likely to adversely affect the caracara and concurrence of this determination may be requested from the Service.

On-site Habitat Enhancement

For projects that propose modification to habitat in the primary or secondary zones, the Service would normally require formal consultation. But if surveys indicate that the habitat quality has degraded as a result of exotic species invasion, lack of fire, or other anthropogenic actions, then on-site habitat enhancement may be possible to offset loss of function that would result from project impacts.

If the habitat modification is small, and on-site habitat enhancements are proposed to improve habitat quality in the remainder of the zones, then a determination could be made that the project is not likely to adversely affect the caracara. Proposed modifications and enhancements should be incorporated in a caracara management plan. This plan also needs a monitoring program to document the success of the enhancement actions.

Nest Abandoned or Blown Down

Caracara nests are protected both by Federal and State laws. In situations where nests are blown down, or damaged during storm events, the caracara will usually rebuild the nest during the next

nesting season in the same tree or in an adjacent tree. In certain circumstances, several years may pass before a new nest is constructed. A nest should not be considered abandoned until it is not used for three consecutive breeding seasons or no other active nests are found within 0.5 km (0.31 mi) of the nest. The nest site should be protected as per the non-nesting season conservation measures. These should be documented in a caracara management plan. If a nest is found to be abandoned by the above criteria, then the project is not likely to adversely affect the caracara.

Nest off-site, but secondary zone overlaps onto the project

Caracaras may nest off-site but within 1,500 m (4,920 ft) of the project boundary. The secondary zone area that overlaps onto the site should be protected by measures listed above. If possible, the off-site management zone area should be protected through conservation easements. A survey of activity patterns could be completed to determine if the birds make use of resources on the property. If the birds do not make use of the project area or if conservation measures for the area of overlap were included in a caracara management plan, then the project is not likely to adversely affect the caracara.

Habitat Protection in Gathering Areas

Within gathering areas, if the conservation measures listed above are incorporated into a caracara management plan then the project is not likely to adversely affect the caracara. Major habitat modification such as conversion of pasture and wetland habitats to row crops, sugarcane, citrus groves, pine plantations, or hardwood forest may be harmful and therefore warrant formal consultation. Prudent modification of the project with the aforementioned conservation measures will reduce the potential for harm to the point that formal consultation will not be necessary. The Service recommends early consultation to identify issues and options available to reduce the project's impact on the caracara.

Habitat Modification in the Conservation Zones

If the project:

- modifies substantial habitat within the conservation zones;
- requires intrusion into the primary zone; or
- could result in loss of eggs in the nest, nestlings, or nest tree, then formal consultation is required.

During construction, an on-site monitor will be required to determine if project activities are disturbing the caracara. There are many options to minimize adverse effects and reduce incidental take. Actions that may be appropriate to minimize harmful effects could include habitat enhancement, muffling of equipment, less intrusive construction methods, and other project-specific recommendations. Prudent modification of the project with these

recommendations can avoid formal consultation and expedite the project's completion. The Service recommends early consultation to identify issues and options available to reduce the project's impact on the caracara.

Reports

Survey Report

Survey protocols for caracara can be found in Appendix B and Morrison (2001). The goal of the survey is to provide a complete count of all caracara nesting pairs within the project area and develop an approximate territory or home range map for each nesting pair. The survey report should include the following, as applicable:

A. Field data sheets with:
   1. dates with starting and ending times of all surveys conducted;
   2. weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation; and
   3. total number of caracara nests found and number of caracaras observed in each location.

B. An aerial photograph or vegetation map depicting:
   1. the entire area of interest;
   2. nest locations, primary and secondary zones;
   3. habitat descriptions; and
   4. locations of all caracaras seen or heard while conducting the survey or at any other time, including flight direction.

Biological Evaluation Report

If the project may affect the caracara, a biological evaluation will be helpful for determining whether formal consultation is necessary. Guidelines for this report can be found in Service (2004).

Caracara Management Plan

If a project may adversely affect the caracara, a management plan can identify conservation measures, habitat enhancements, and monitoring that will help minimize adverse effects to caracaras. The following should be considered when assessing project effects to the caracara:

- What is the level of use of the project area by the caracara? You may need to conduct surveys.

- How is the area used? Why is the caracara there? Are they transient, foraging, perching, roosting, or nesting, etc?

- What effect will the project have on the caracara's foraging areas in all areas influenced by the project?

- What actions are proposed to minimize potential effects to the caracara? This should include monitoring and enhancement actions, if any.

The management plan should be a component of the initiation package (Service 2004).

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GIS Layers

Consultation Area	Caracara_ca	shape file
Gathering Areas	Caracara_ga	shape file

South Florida Ecological Services
DRAFT
April 20, 2004

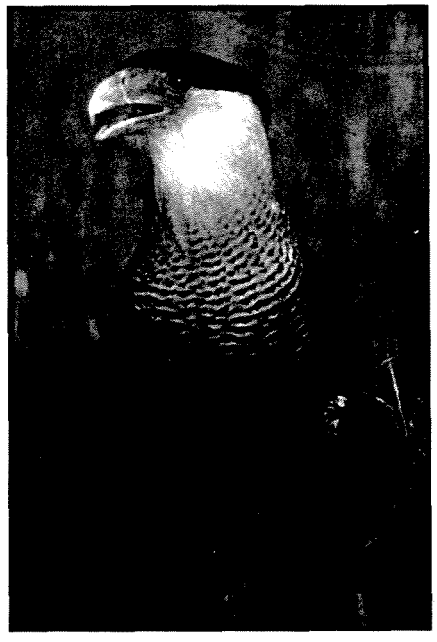
APPENDIX A

Recommended Management Practices and Survey Protocols for Audubon's Crested Caracaras (*Caracara cheriway audubonii*) in Florida

Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara (*Caracara cheriway audubonii*) in Florida

TECHNICAL REPORT NO. 18

Joan L. Morrison



September 2001

Bureau of Wildlife Diversity Conservation
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

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Suggested citation:

Morrison, J. L. 2001. Recommended management practices and survey protocols for Audubon's crested caracara (*Caracara cheriway audubonii*) in Florida. Technical Report No. 18. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida, USA.

Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara (*Caracara cheriway audubonii*) in Florida

TECHNICAL REPORT NO. 18

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Florida Fish and Wildlife Conservation Commission
Project NG96-021
Contract Number 96115

September 2001

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INTRODUCTION

This document was published and issued by the Florida Fish and Wildlife Conservation Commission (FFWCC) but was prepared in consultation with experts on the crested caracara and with biologists from both the FFWCC and the U.S. Fish and Wildlife Service. The purpose of this document is to provide recommendations for management practices that would benefit the caracara in Florida by developing, maintaining, and/or enhancing environmental conditions required for the species' survival and well being. The management practices recommended here are advisory in nature, to be used by a variety of constituents including private landowners and land managers who may have an interest in managing their lands in ways compatible with the caracara's survival. These management practices, if carried out, should avoid or minimize detrimental human-related impacts on crested caracaras and should foster persistence of the species in Florida. This document also provides general biological information about the species and protocols for surveying for nests and for monitoring known nest sites.

BIOLOGICAL INFORMATION ABOUT THE SPECIES

The crested caracara (*Caracara cheriway*; hereafter, caracara), is a unique raptor/scavenger from the family Falconidae that reaches the northern limit of its geographic range in the southern U.S. (Fig. 1). The subspecies occurring in the U.S. is Audubon's crested caracara (*C. c. audubonii*) (Brown and Amadon 1968, American Ornithologists' Union 1983). In Florida, this raptor occurs as an isolated population in the south-central region of the state.

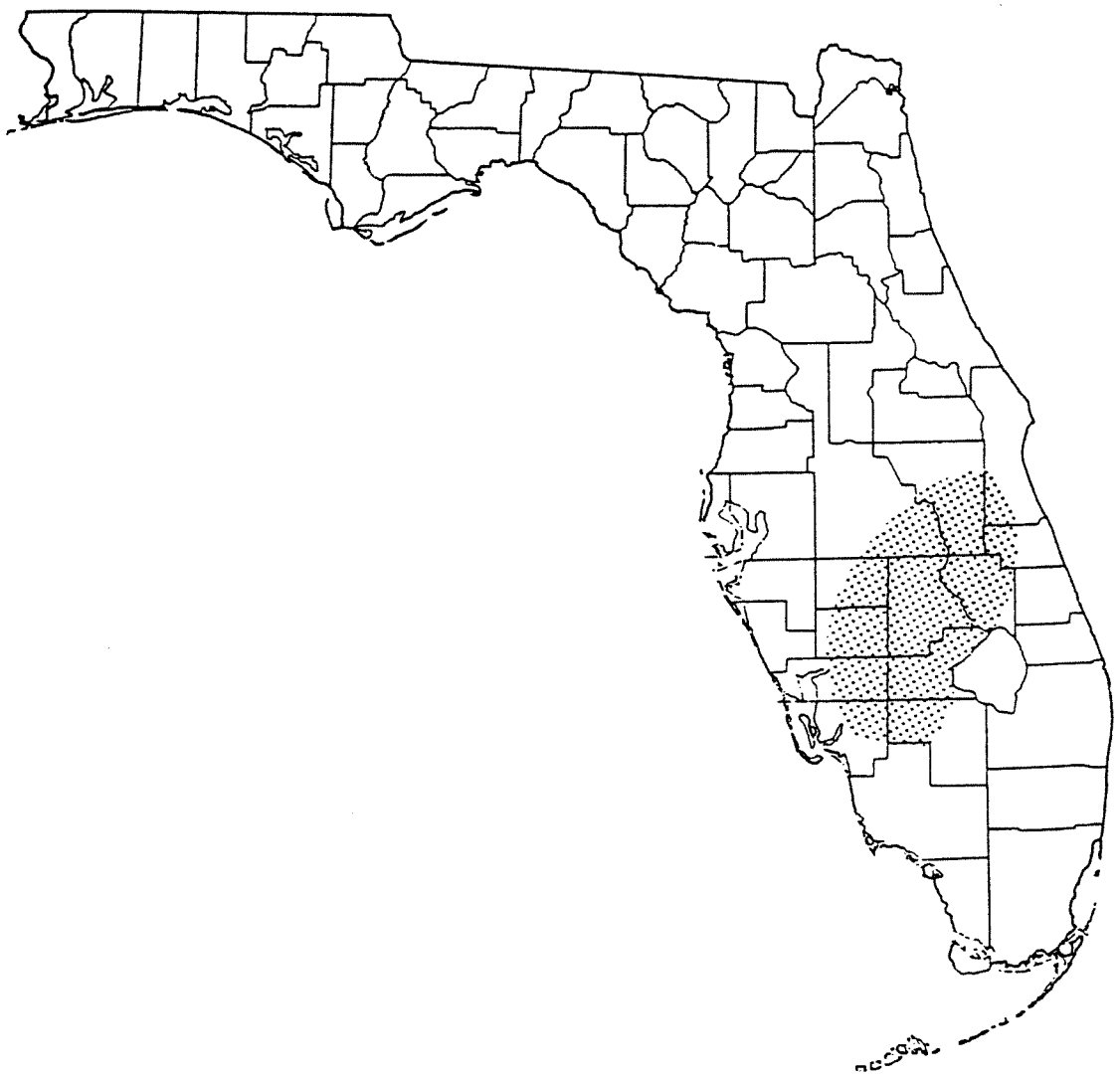

Fig. 1. Currently known breeding range of the crested caracara in Florida.

Caracaras in Florida were formerly documented to inhabit native prairie in Florida's central region. The species has been reported from the Kissimmee, Caloosahatchee, and upper St. Johns river basins, and the Kissimmee prairie (Bryant 1859, Scott 1892, Phelps 1912, Bailey 1925, Nicholson 1929, Howell 1932, Bent 1938, Sprunt 1954). Few historic nesting records are available, however. Notable changes in land use patterns have occurred throughout central Florida in recent years and, as a result, the status of this population has become a subject of concern. The caracara's range in Florida is now considerably smaller than was historically reported (Stevenson and Anderson 1994, Layne 1996), and this raptor apparently now occurs almost exclusively on privately owned cattle ranches in the south-central part of the state (Morrison and Humphrey 2001). The size of this population is unknown but is probably at least 500 (Layne 1996) or greater (J. Morrison, unpublished data). Populations comprised of 500 or fewer individuals may be more susceptible to extinction due to stochastic demographic or environmental events (Shaffer 1981).

All available evidence suggests that the most serious threat to Florida's caracara population is loss or degradation of nesting and feeding habitat. Such loss is most commonly due to conversion of pasture and other grassland habitats and wetlands to citrus, sugar cane, other agriculture, and urban development. Adult caracaras exhibit high site- and mate-fidelity; therefore, extensive loss of habitat within the home range, particularly of the nesting site itself, may cause the pair to abandon that home range, or at least the nesting site. Caracaras use some agricultural lands for foraging (J. Morrison, unpublished data); however, these habitats will not support resident, breeding caracaras if nesting habitat is not available. It is currently not known what degree of nesting or foraging habitat loss within a home range will cause permanent movement of a pair out of their home range.

Home Range

Florida's caracaras are resident, remaining year-round on home ranges that consist of the nesting territory and feeding habitat. Home ranges of caracaras in Florida average approximately 1,200 ha (3,000 acres) in size (Morrison 1997*a*) and represent an area within a radius of approximately 2–3 km (1.2–1.9 miles) from the nest. Adult caracaras typically forage throughout their home range during both nesting and non-nesting seasons. The nesting territory itself may be considered to be approximately the 25% core area of the home range, within an average radius of 1.0 km (0.6 mile) from the nest. This core area is where the resident pair spends most of its time during the nesting season (Morrison 1997*a*). The nesting territory is strongly defended by the pair during the nesting season. Adult caracaras spend more time farther from the nest and are rarely defensive around the nesting site during the non-nesting

season (Morrison 1997*a*). Other areas within the home range that are not near the nest itself are regularly used by the caracaras for collecting nesting material, roosting, loafing, and feeding.

Nesting

The crested caracara has a nesting ecology similar to that of bald eagles (*Haliaeetus leucocephalus*). Caracara pairs are generally monogamous and highly territorial, and exhibit strong fidelity to their breeding site, even nesting in the same tree year after year. Long-term observational data on occupancy of home ranges by caracaras in Florida indicate that as long as the nesting site and surrounding feeding habitat are not substantially altered, the home range will remain continuously occupied (J. Layne, unpublished data) and the pair will make an annual breeding attempt (Morrison 1999). Adult caracaras are highly intolerant of other adult caracaras within the nesting territory and particularly near the nest site, although caracaras of the juvenile age classes (fledgling to 3 years of age) may be tolerated at feeding areas that are not near the nest tree.

Timing.—Breeding activity can occur from September through June in Florida, with the primary season being November through April. Peak egg laying occurs from late December through early February, and incubation ranges from 31 to 33 days (Morrison 1999). The total breeding cycle (nest building, egg laying, incubation, nestling, and post-fledging dependency periods) is approximately 25 weeks in length, although sometimes up to 2 months elapse between completion of nest building and commencement of egg laying. The nestling period covers approximately 7–8 weeks, and the post-fledging dependency period is approximately 8 weeks (Morrison 1999).

Crested caracaras are capable of making more than 1 nesting attempt during a single breeding season. Pairs frequently produce a replacement clutch following nest failure in the incubation or early nestling stages (Morrison 1999). Early-season nesting pairs (those that lay their first clutch before March 1) may raise a second brood, but this occurs in less than 10% of the population, annually (Morrison 1998). Second-brood clutches may be laid as late as March and April. Second-brood young fledge as late as July and may remain with their parents through the rest of the summer and into the fall.

Nesting Habitat.—The crested caracara is primarily a bird of open habitats. Its nesting habitat in Florida consists of large expanses of pastures, grasslands, or prairies dotted with numerous shallow ponds and sloughs and single or small clumps of live oaks (*Quercus virginiana*), cabbage palms (*Sabal palmetto*), and cypress (*Taxodium* spp.). Cabbage palms are favored as

nest trees; equally chosen are single, isolated trees or trees within a group of 3–10. Caracaras nest only occasionally in oak and cypress trees. Most striking about caracara nesting habitat is the physical structure of the landscape—low, short, ground vegetation; scattered trees; and minimal or absent understory or shrub layer. Caracaras in Florida historically nested in native wet prairie habitat, particularly adjacent to marshes associated with the Kissimmee and St. Johns rivers (Nicholson 1929, Bent 1938). Caracaras are now found regularly in "improved" pastures, grasslands heavily managed for forage production for cattle (Morrison 1997*a*). Exotic forage grasses dominate these improved pastures, and regular mowing, burning, and high-density grazing maintain the low vegetative structure.

The Nest.—Caracara nests can generally be seen by looking up directly into the nest tree from alongside the trunk. Nests are bulky, loosely woven structures typically composed of long, slender, dried pieces of vines, weed stalks, briars, twigs, and fruiting clusters of palm. Nests are round or oval in shape and are about 2 feet in diameter. Nests typically face south to southeast within the nest tree.

Number of Nest Trees Used.—The nest site that originally attracts the pair of breeding caracaras is of critical importance. Pairs may use the same tree year after year, even if the old nest is lost. It is not uncommon for nests to be blown from trees by storms, after which the resident pair typically rebuilds a new structure in the same tree. If an old structure remains, the pair typically builds a new structure on top of it. Caracara pairs sometimes have 2 or 3 alternate nest trees that may be used in different years or for a second nesting effort within the same year. All nest trees used by a given pair are typically situated in the same general vicinity (usually within 0.5 km [0.3 mile] of each other). A new pair will often use one of the originally used nest trees when a member of a pair dies or is replaced (J. Morrison, unpublished data).

Feeding

Crested caracaras obtain their food from a variety of habitats, including improved pastures, newly plowed or burned fields, dairies, and around dwellings and farm buildings. They scavenge along roads and at slaughterhouses, poultry houses, and urban dumps. Caracaras also forage regularly in a variety of wetland habitats. The types of wetlands that provide good feeding conditions for caracaras include the extensive networks of drainage ditches and small ponds and wetlands found within improved pastures, drying marshes or stock ponds, shallow roadside or agricultural ditches, and marshes associated with river oxbows. Caracaras occasionally forage in agricultural lands including sod and cane fields and citrus groves but

do not spend most of their foraging time in these habitats (J. Morrison, unpublished data). Groups of up to 20 juvenile caracaras are often seen feeding in citrus groves during the fall, although the seasonality of this behavior is not understood.

The crested caracara is considered a scavenger because it is most easily observed feeding on carrion along roadsides. However, this raptor actually exhibits a broad diet, feeding on insects associated with carrion and dung in pastures as well as on a wide variety of vertebrate and invertebrate prey, much of which it captures live. Prey includes rats, mice, skunks, rabbits, squirrels, piglets, snakes, frogs, lizards, sirens, nestling birds, birds' eggs, turtles, fish, crayfish, beetles, grasshoppers, and worms.

Roosting

Adult caracaras frequently perch on the tallest trees or snags or on telephone poles within their home range. Breeding adult caracaras typically roost in trees near or within the nest stand. Groups of up to 50 or more juvenile caracaras roost in groups of palm and oak trees. These roosts occur on ranches or they may be near gathering areas (see below), particularly along the Kissimmee River floodplain. During the non-breeding season, roosts containing up to 30 juveniles may even be found within the home range of a nesting pair, although not generally within the nesting territory itself.

The Juvenile Period

Young caracaras fledge from January through July with the peak of fledging occurring in March and April. Juvenile caracaras have a long fledgling dependency period, remaining dependent on their parents for the first 2–3 months after fledging from the nest (Morrison 1996). Beginning about 3 months post-fledging, juveniles begin to explore locations outside the natal home range but continue to return to that home range. Following the exploratory phase, juveniles become nutritionally independent but are tolerated by the adults and may remain on their natal home range until the adults begin another breeding effort the following year. The home range used by juvenile caracaras until permanent departure mirrors that of their parents. Permanent departure from the natal home range can occur from 11 to 45 weeks post-fledging.

Age at first reproduction for Florida's crested caracaras is 3 years, although probably not all 3-year-olds attain a territory and begin breeding. Juvenile caracaras are characterized by a medium to dark brown and buffy white plumage (Wheeler and Clark 1995). They do not attain the black and

white adult plumage until about 4 years of age. Juvenile caracaras primarily use improved pasture and grassland habitats and associated wetlands for foraging.

Gathering Areas

After departing from their natal home ranges, young caracaras are nomadic throughout the population's range in south-central Florida, but they regularly use temporary settling areas called gathering areas. Juvenile caracaras typically travel between gathering areas and may remain for days to weeks at any one site (J. Morrison, unpublished data). Juvenile caracaras explore throughout the population's range, then return to spend varying lengths of time in the gathering areas. Even individuals from home ranges on the periphery of the population's range eventually find their way to these gathering areas. Because individuals move between areas it is difficult to monitor numbers at the gathering areas; therefore, the numbers of juveniles and floaters (adult non-breeders) in this population are not known.

Tolerance of Human Activity and Disturbance

Caracaras exhibit a wide range of tolerance of human activities. Some may be quite tolerant of buildings and of the occasional presence of people, livestock, machinery, and vehicles in their home range. Particular pairs may endure a wide range of potential impacts to their habitat resulting from altered patterns of human activity. The nature and extent of impacts on nesting and feeding habitat or on the birds themselves will depend largely on the current situation within each home range and on previous exposure of the resident pair to human activity. Whether or not a caracara pair will be affected by an activity generally depends on the patterns of activity. Some human influence may already be present in any particular home range. If the caracaras have been nesting successfully at these sites, it would be mainly altered patterns of activity that might impact their nesting behaviors and success.

Caracaras are most sensitive to human disturbance during the nesting season, particularly during the late incubation and early nestling stages, although pairs may abandon a nest if disturbed frequently during the nest-building stage. More nests fail during the last week of incubation and the first 2 weeks of the nestling stage than at any other time during the nesting cycle, at least prior to fledging (Morrison 1999). Nests may be abandoned if disturbed during hatching. Increased activity around the nest at hatching may also attract predators such as American crows (*Corvus brachyrhynchos)*, which can take small chicks.

Nesting occurs during the winter months; therefore, eggs and small chicks may die quickly from exposure if adults are frequently forced off the nest or are kept off for long periods. Adults are more tolerant of human activity occurring near the nest after the chicks have hatched and become partially feathered than during the period between nest construction and the third or fourth week of the nestling stage. Adult caracaras are particularly sensitive to human disturbance when attempting to deliver food to nestlings. They will not approach the nest if human activity is occurring nearby. Prevention of food deliveries has the most potential for serious consequences when nestlings are very young and must be fed frequently.

Caracaras generally flush from nests during incubation or early nestling stages when the disturbance source is within 300 m (1,000 feet) of the nest (J. Morrison, unpublished data). Flushing occurs at greater distances as the amount and frequency of disturbance increases, for example with subsequent visits to the nest area. If certain activities occur within approximately 300 m of the nest during the nesting season (November through April), they may have detrimental impacts on caracara nesting activities and success. Significant changes in activity levels or in habitat near the nest could result in the breeding pair leaving that nest site and moving to another site, even if these activities occur during the non-breeding season. If habitat changes occur over a wide area within the overall home range, the breeding pair might abandon the home range altogether.

RECOMMENDED MANAGEMENT PRACTICES FOR CRESTED CARACARA HABITAT IN FLORIDA

Following are recommendations for management practices that would benefit the crested caracara in Florida. These practices could be used by landowners and land managers interested in developing, maintaining, and enhancing habitat suitable for caracaras, and they pertain to habitat both near the nest site and throughout the home range. Objectives of these management practices are to (1) protect the nest site itself, (2) minimize disturbance around the nest that might compromise the nest site, (3) conserve important feeding areas nearby and away from the nest site, (4) protect important areas of cover for the fledglings during the post-fledging dependency period, and (5) improve and enhance habitat, when possible.

1) Retain pasture and grassland habitats and natural and man-made wetlands (i.e., ditches and ponds) within pastures.
2) Do not remove nest trees or other live trees within 300 m (1,000 feet) of a nest tree. Harvest of palm trees for human consumption should occur farther than 300 m from a known nest tree.
3) Retain dead trees, which are often used for perching and roosting, within 300 m (1,000 feet) of a nest tree.
4) Planting palm trees in areas lacking potential nest trees might attract new caracara pairs into an area. Potential nest trees should be at least 5 m (16 feet) in height and have full, closed crowns. At least 3 trees should be planted close together in a group.
5) Retain ground vegetation within 300 m (1,000 feet) of a nest tree. Clumps of taller grasses and small shrubs are regularly used as cover by chicks after they fledge from the nest. Chicks are vulnerable for the first few weeks after fledging because they do not fly well. They spend most of their time on the ground hiding under vegetation and perching on low branches in trees. Limiting disturbance to ground vegetation near a nest tree will ensure adequate cover for fledglings.
6) Cattle grazing, burning, mowing, and roller chopping are land management activities that are compatible with caracara survival. These activities keep ground cover vegetation short, which allows the caracaras to easily walk through grassland habitats when foraging. Caracaras are quite terrestrial compared to other raptors and frequently walk in grassland and along wetland habitats in search of food. Caracaras frequently walk behind tractors during plowing and feed on insects disturbed by the activity. They follow the front of grass fires and remain at burned sites for several days, feeding on animals killed by the fire. Continuing the above

management activities will enhance foraging habitat by limiting growth of tall, thick, or shrubby ground vegetation that is not used as frequently by foraging caracaras. Reductions in these management activities may cause widespread growth of thick, tall, or shrubby ground vegetation.

7) Wetland maintenance and ditch cleaning are management activities compatible with caracara survival. Caracaras are attracted by ditch-cleaning operations and feed on fish, turtles, sirens, and other animals exposed by these activities. They also steal food from wading birds that feed along these ditches.
8) In a known home range, particularly near a nest site, care should be taken to avoid use of chemicals toxic to wildlife, including pesticides, fertilizers, or herbicides. Care should also be taken to keep these chemicals from being introduced into wetlands and waterways.
9) Construction activities (including increased vehicle traffic other than normal agricultural operations; earth stockpiling; vehicle parking; equipment or materials storage; or development of new agricultural, commercial, industrial, or residential sites) typically cause changes in human activity levels and in habitat that may affect nesting caracaras. Although roads, canals, and some agricultural lands may provide seasonal food resources, their construction near the nest, particularly during the early phases of the nesting cycle (nest building, egg laying, incubation, early nestling), could disturb the pair and cause them to abandon the nesting territory.
10) Some activities such as fence-building, moving cattle, and normal vehicle and agricultural operations can occur in the home range year-round. Careful timing of these activities within 300 m (1,000 feet) of the nest can minimize the impacts of such activities during the nesting season. These activities should be limited near the nest, particularly during nest building, incubation, and early nestling (first 2–3 weeks) stages.
11) Mortality of juvenile caracaras is particularly high along roads, which they frequent in search of carrion. Increasing the number of roads within a home range increases risk of collision with vehicles. Care should be taken along all roads to minimize mortality of caracaras by posting signs, lowering speeds, and watching for birds.

SURVEY PROTOCOL FOR FINDING CARACARA NESTS

As land use changes continue in south-central Florida, the need increases for a standardized and effective protocol for assessing the presence of nesting caracaras or of gathering areas at targeted project sites. Survey techniques for caracaras must provide accurate information on territorial occupancy and breeding. This protocol is intended for use by individuals required to survey new habitat for breeding pairs.

Caracaras are not often visible to a casual observer even in known occupied, active, nesting territories, particularly during certain times of the day and of the year. Casual roadside surveys can grossly underestimate occupancy rates for caracara territories. The probability of seeing a caracara on a roadside survey in a known occupied territory can be as low as 30%, even during the breeding season (Morrison 1995). This protocol is intended to assist individuals in maximizing opportunities for finding nesting pairs and determining breeding status. If possible, surveys should be conducted by a qualified biologist, hereby defined as one who has had previous experience with caracaras, including observations and, preferably, radio tracking. Ideally, this person will have been trained by a qualified caracara researcher in monitoring, observation, and data collection techniques for caracaras, so that surveys will be carried out in a standardize manner.

Timing of Surveys

The timing of nesting activity can vary greatly from year to year; nesting can occur any time during September through June. Surveys for territory occupancy or to find new breeding pairs are best conducted during the months of January, February, and March, when nesting within the overall population is at its peak and adults are most likely to be feeding nestlings. Surveys made earlier than January could unduly disturb the birds and result in nest abandonment. Caracaras are most sensitive during the nest building, incubation, and early nestling stages of the nesting cycle. Caracaras can also be easily observed in the territory after the chicks fledge from the nest. The peak of fledging for this population occurs during March and April.

Surveys are best conducted early in the morning or late in the afternoon. Caracaras are most actively nest building, foraging, and feeding young between sunrise and about 1100 hours, and again, between about 1600 hours and sunset. Caracaras are rarely active during the heat of midday, especially in the summer months. They roost in trees that are often far from the nest site; thus they are rarely visible. Surveys conducted from May through October, particularly in new habitat for the purpose of finding new breeding pairs, are

not likely to be productive because of the caracaras' reduced activity levels during these months. Nests from even the most recent nesting season may be hard to find because they may have blown out of the nest tree. Any rain that occurred after nesting season would likely destroy most signs of activity around the nest tree. Also, after the chicks fledge, the family spends less time near the nest site, making them more difficult to find and observe. Surveys conducted during November and December may be productive, but probably will be more so in known territories. Pairs are most likely to be building nests during these months, but do not spend as much time near the nest as they do after egg laying. Additionally, pairs are quite sensitive to disturbance during the nest building and incubation stages, so surveys conducted early in the breeding season have the potential to excessively disturb nesting pairs.

Duration of Surveys

When surveying for caracaras in areas where the nest site is not known, observers should remain in each area for 2–4 hours during each visit. Observers should remain in the vehicle and watch for caracaras over a wide area of suspected habitat. Observations may be made on consecutive days, but ideally should be conducted at least 2 weeks apart and during the months of January through March. Observations made in this manner will usually yield information on territorial occupancy and even the nest site after only 3 visits, if the site is active. If the entire territory cannot be surveyed from a road, areas containing palm trees should be searched by foot if access is feasible. Observations should be conducted in an area at least twice a month for at least 3 consecutive months before it is considered to be unoccupied by caracaras.

Searching for Nests

Caracaras are very site faithful, even to particular nest trees. Most caracaras nest in cabbage palms (Morrison 1997*b*). The nest structure can easily be seen by looking up directly into the palm from alongside the trunk. Signs that a suspected nest is active are feces and prey remains below the nest, chicks calling from the nest, or defensive behavior by the adults when the observer is near the tree. Nests will most likely be facing south to southeast within the nest tree. Nest trees are generally over 5 m (16 feet) in height; have large, full, closed crowns; and are typically on the southeastern to southwestern edge of a group of trees. Nests may also be in lone, free-standing palm trees, in groups of 2–10 palms, or (rarely) in tall, emergent palms in the middle of a large hammock. Oaks and cypress should be checked also, but these are likely to be used as nest trees only if few palms are available within a large area of otherwise suitable pasture and wetland habitat.

When searching for new breeding pairs, efforts should first concentrate on areas of large contiguous pasture habitat containing scattered palms and oaks and numerous wetlands. Observations should be conducted from a position where a large area of suitable habitat can be viewed. If possible, observations should also be made from cover, such as a vehicle, so that disturbance to the pair can be minimized. Searching should focus on observing adult behavior (e.g., carrying sticks or food) that would suggest nesting activity. Caracaras exhibit little size and no plumage dimorphism (Morrison and Maltbie 1999), and these behaviors are not gender specific.

Other behaviors of adults can be used to find nests. During incubation, the adult not currently incubating often will perch high and visibly in a tall tree within 300 m (1,000 feet) of the nest. Adult caracaras exhibit little defense behavior near their nest, but if the chicks are large (5–8 weeks), adults may remain close to the nest and exhibit rattle and cackle vocalizations and the head-throwback display (Morrison 1996). Nest searching using playback tapes, a technique used successfully for surveys of other raptors, is not likely to be effective for caracaras because they do not respond to such tapes. Their vocalizations do not carry far in open habitats. Most vocalizations are used in situations of immediate contact or proximity of individuals, such as copulation, aggression towards a nest predator, or when feeding alongside other caracaras or vultures.

When a nest is found, the contents can be checked using an extendible pole with a mirror attached or by direct observation. If a nest is not found immediately in an area where adult caracaras are known to occur, another visit should be made to that territory within 1 month after the first visit. Use of carrion as bait can also facilitate nest finding, determining territory occupancy, and determining the breeding status of a known pair. A carcass or other large piece of carrion can be set in a suspected area the night before a planned observation period. If caracaras are in the area, they will usually find and begin feeding upon the carcass just after sunrise the following morning. Individuals can then be observed when they return to the nest site.

Nest Monitoring

Subsequent to finding a caracara nest in a new area, monitoring of the nest may be required to obtain information on breeding chronology and reproductive success. If a monitoring program is initiated in conjunction with a land development program, refer to the monitoring protocol which follows.

MONITORING PROTOCOL FOR KNOWN CARACARA TERRITORIES

Because a major management goal is to monitor the status of Florida's caracara population, it is important to monitor known caracara territories as well as attempt to find new ones. Objectives of monitoring known territories are (1) determining whether territories remain occupied year after year, (2) determining whether the same individuals occupy and breed in the same territories year after year, (3) determining whether pairs successfully fledge young year after year, (4) determining how many young are fledged per pair per year, and (5) for long-term monitoring programs, evaluating any changes in habitat use by resident caracaras in conjunction with habitat changes in their home range. Procedures for monitoring in known territories are similar to those for surveying for nesting pairs in new habitat, but the difference is that monitoring occurs in areas where nest and foraging locations may already be known.

For any monitoring program for crested caracaras in Florida, a qualified biologist should visit the territory on a regular basis (i.e., at least once per month). A qualified biologist is one who has had previous experience with caracaras, including observations and, preferably, radio tracking. Ideally, this person would be trained by a qualified caracara researcher in monitoring, observation, and data collection techniques for caracaras, so that any monitoring program initiated in conjunction with a land development project would be standardized with respect to other ongoing long-term monitoring of crested caracaras in south-central Florida.

Nest Finding and Monitoring Reproductive Success

Timing of Monitoring to Determine Territorial Occupancy and Breeding Status.—Monitoring at known caracara territories is best conducted during January, February, and March, when nesting within the overall population is at its peak and adults are most likely to be feeding nestlings. Caracaras can also be easily observed in the territory after chicks fledge from the nest, which peaks for this population during March and April.

Monitoring is best conducted early in the morning or late in the afternoon. Caracaras are most actively nest building, foraging, and feeding young between sunrise and about 1100 hours and again between about 1600 hours and sunset. Caracaras are rarely active during the heat of midday, especially during the summer months. They roost in trees and often far from the nest site, thus they are rarely visible. Monitoring conducted from May through October may be more difficult because of the caracaras' reduced activity levels during

these months. After the chicks fledge, the family spends less time near the nest site so the observer may have to visit more areas within the home range to find and observe the caracaras. Whereas surveying for new nests is not likely to be as productive in November and December, monitoring during these times may be productive in territories with known nest locations. Pairs are most likely to be building nests during these months.

Duration of Monitoring Sessions.—To find active nests in known territories, all known nest trees should be checked first. If a nest is not immediately found, observers should position themselves where known nest trees can be observed and then remain in the vehicle while watching for caracaras over a wide area of suspected habitat. Observations made in this manner will usually yield information on territorial occupancy and even the nest site after only 3 visits, if the site is active. When a nest is found, nest contents can be checked using an extendible pole with a mirror attached or by direct observation.

Additional monitoring sessions may be needed if the nest is not found during the first monitoring session. Each session should span approximately 2–4 hours and ideally should be conducted at least 2 weeks apart from December through March. During the second visit, the search area for the nest should be broadened to include all potential nest sites within 0.5 km (0.3 mile) of the traditional site. Sometimes a pair moves its nest site, particularly if habitat degradation has occurred within the nesting territory or near the traditional nest site, or if one member of the pair dies. Usually, however, if the home range remains occupied, adults will be seen within 3 visits to the nesting territory. A third visit should be made, if necessary, within 2 weeks of the second visit. If no adults are seen or no nest is found after 3 visits, with at least 1 visit made in each of 3 consecutive months from November through April, the home range may be considered temporarily unoccupied. However, if both members of a pair die, the site would likely be taken over by another pair if no habitat degradation occurs, so an apparently unoccupied site should be monitored the following breeding season.

Monitoring for Habitat Use

To evaluate habitat use by caracaras in known territories, monitoring sessions should occur at least monthly year-round for a minimum of 3 years when associated with habitat conversion or a land development project. Because caracaras are site faithful, responses to habitat changes or noticeable changes in nesting behaviors or success may not become apparent within only 1, 2, or even 3 years of observation. During each visit the biologist should remain in the territory for at least 4 hours beginning at sunrise, or beginning in

late afternoon and extending into early evening, but before dark. Any radio-tagged individuals should be tracked during this period and foraging activity, habitats used, and locations recorded. If no individuals are radio tagged, the observer should search for caracaras within the project area. These individuals should be followed and observed during the monitoring period and their foraging activity, habitats used, and locations recorded.

Other Monitoring Considerations

The major limitation to finding new nesting territories and monitoring known nests is the fact that most caracaras in Florida now occur on privately owned land. Permission must always be obtained from the landowner before entering the property of interest. Private lands and the requests of landowners, such as not driving in certain areas and observing gate closures, must always be respected. Less restricted access facilitates nest searching on public lands, but searching may be more difficult because of habitat differences such as smaller areas of short-grass pasture habitats and larger areas of thick, tall, or shrubby ground vegetation, which caracaras typically do not use.

Reporting Banded Individuals

Sightings of banded caracaras made during any survey or monitoring period provide valuable information regarding individual survival and habitat use. Sightings, along with supporting information, may be reported to the Florida Fish and Wildlife Conservation Commission or the U.S. Fish and Wildlife Service. If a banded caracara is found dead, the band number and color combination should be reported to the U.S. Fish and Wildlife Service.

CURRENT STATUS OF THE CRESTED CARACARA IN FLORIDA

Currently, Florida's population of Audubon's crested caracaras is listed as Threatened both federally (U.S. Fish and Wildlife Service 1987) and by the state of Florida (Logan 1997). This listing was afforded primarily because this population is believed to be isolated from any other caracara populations and of small size, therefore is of evolutionary and conservation concern, and because suitable caracara habitat in Florida has been declining rapidly in recent years. Under this listing, the caracara is protected from activities that would directly harm an individual or its habitat.

Persons with further interest in the legal statutes that afford protection for Florida's crested caracaras should review the federal Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.); the federal Migratory Bird Treaty Act (16 U.S.C. 703-711); and Rules 68A-4.001 and 68A-27.011of the state of Florida Wildlife Code.

Attachment 6 - Caracara Requirements
40 Pages

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South Florida Ecological Services
DRAFT
April 20, 2004

APPENDIX B

Survey Protocol for Finding Caracara Nests

South Florida Ecological Services
DRAFT
April 20, 2004

SURVEY PROTOCOL FOR FINDING CARACARA NESTS

This supplemental information is provided for further guidance on surveying for caracara nest based on the protocol in Morrison (2001). There is the highest probability of success in finding caracara nests during the period January to April. This period covers the time when most birds are feeding the nestlings and become more visible to observers. Surveys should start in January and continue through April to provide adequate data to conclude that a caracara nest does not occur on site. Once all nests on the site are found the survey can be terminated. Surveys should be conducted by a biologist with caracara experience as the birds can be hard to find and identify at long distances. The protective area for the caracara is 1,500 m (4,920 ft) around the nest. The area surveyed should include the project area and a 1,500-m buffer to account for off-site territories that might overlap onto the project area. All areas of suitable habitat within the project area and buffer should be initially surveyed for 1 day. If the area is large or the view obstructed more than 1 day or multiple observers may be needed to completely survey the area.

The observer should position themselves in a location where the largest open area (unobstructed by trees) can be viewed. The survey area should be no more than about 500 ha, which is the largest area easily observable from one point. An aerial photograph of the property and buffer zone can be used to identify areas of suitable habitat and map observation blocks to facilitate surveying the whole area. Use the map and a site visit to select strategic points where caracaras are more likely to be seen going to and from potential nesting sites. From a stationary position search for caracara activity, especially birds moving to the nest tree carrying sticks or food. Watch for other birds, such as American crows (*Corvus brachyrhynchos*), red-tailed hawks (*Buteo jamaicensis*), and turkey vultures (*Cathertes aura*), that might elicit an aggressive response from caracaras present. Nesting caracaras will often chase potential predators away from the nest; thus, revealing their presence. Also circling vultures can indicate the presence of naturally occurring carrion that may attract caracaras. If a potential nesting tree is detected then the observer can reposition to improve observing the bird's behavior. Weather condition should

be adequate to clearly view the whole area. The area should be viewed from sunrise to 11AM and again 3 hours before sunset. During midday potential nest trees can be examined close up for evidence of nests (Morrison 2001). The area viewed during each survey should be marked on a site map. All caracara activity observed should be recorded by time of day and distinguished between juvenile and adult birds. Record flight direction to identify foraging areas and the nesting tree. Mark any nesting tree locations on a map and obtain GPS coordinates. Weather conditions including temperature, wind speed and direction, cloud cover, visibility, and precipitation, should be recorded at the start and end of each survey period.

If no nests are found during the initial survey then return and repeat the survey in 2 weeks. Continue to repeat the survey at a 2-week interval through the end of April or until a nest is found. If the survey starts after January and no nests are found the earlier part of the survey should be completed during the next nesting season to insure that early nesting birds are not missed.

The opportunity for caracara observation can be enhanced by placing fresh meat (or road kills) along the property border overnight and observing the bait site during the morning survey. These birds can be followed back to their nest trees. For more details on caracara activities and habits see Morrison (2001).

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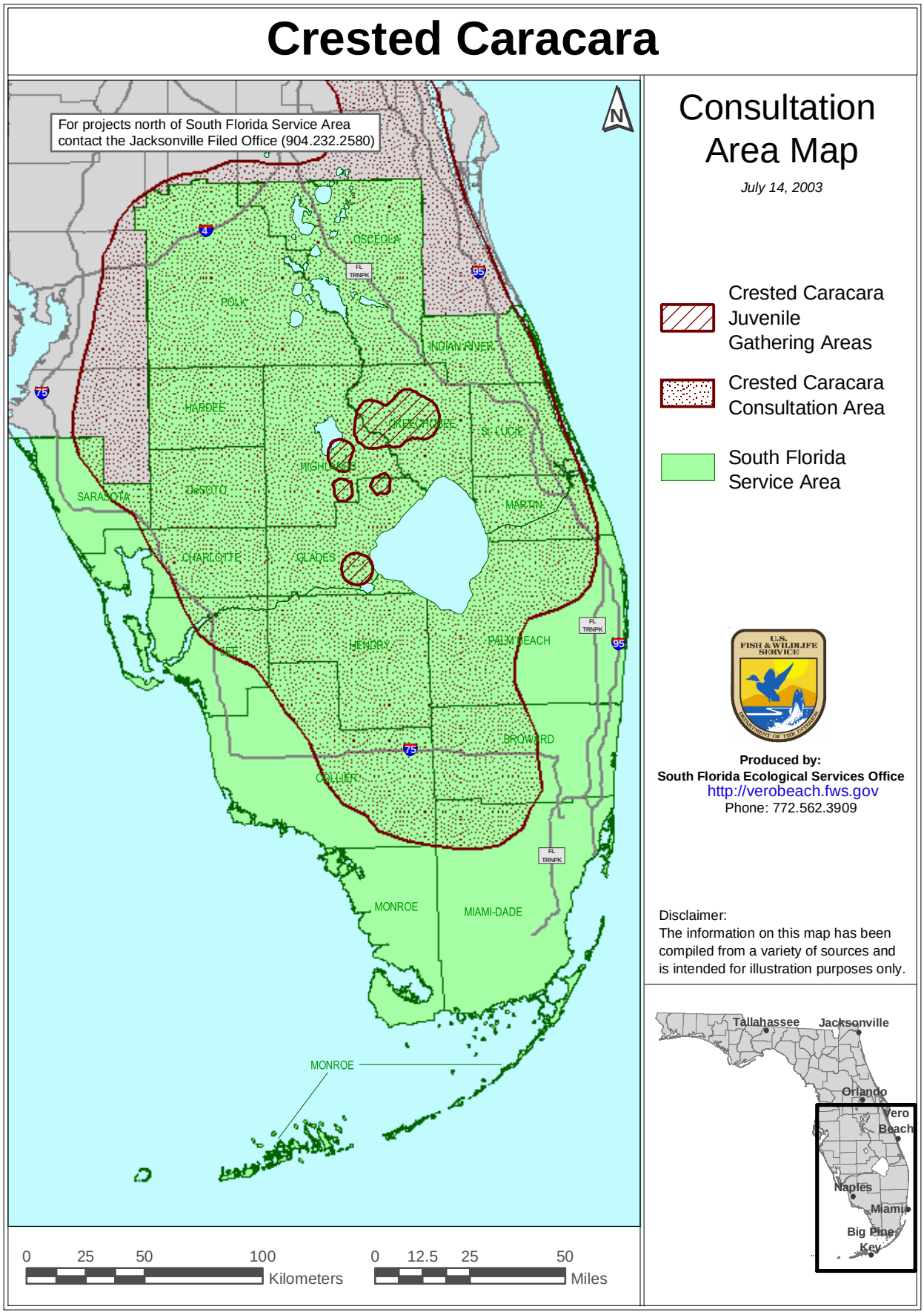

Figure 1.

Crested Caracara Monitoring
Field Data Form

Date:_____ Start Time_____Stop Time _____Monitor_____

Site Name and Location: **Include latitude and longitude**, section, township, and range, and county.

_____

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start					
Finish					

Flight Data

#	Age A/Im	Time	Description

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description

General Observations
(crested caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description



Standard Local Operating Procedures for Endangered Species
Audubon's Crested Caracara

Start Here

STEP 1
- Project Description
- Habitat Description
- Checked County List?

STEP 2
- ✓Check Consultation Area Map
- ✓Check Suitable Habitat

STEP 3

Inside Consultation Area?
- No → **STEP 4** → **No Effect** → **Proceed with Action**
- Yes → Suitable Habitat?
  - No → **No Effect** → **Proceed with Action**
  - Yes → Survey Habitat For Nests and aggregations.
    - Nest within 1,500 m / 4,920 ft or Aggregation Present?
      - No → **No Effect** → **Proceed with Action**
      - Yes → Recommended Management Practices for Caracaras (Morrison 2001)
        - Can not avoid or implement Conservation Measures → **Likely to Adversely Affect** → **Formal Consultation**
        - **Conservation Measures**
          - Conservation measures implemented.
            - Actions proposed outside nesting season.
          - Conservation measures implemented.
            - During nesting season.
            - Site monitor.
          - Conservation measures modified with supporting data
          - Minimal habitat modification in primary or secondary zones.
            - On-site enhancement and restoration.

→ **Not Likely to Adversely Affect**
Request Concurrence

→ **Service Response**
- Yes → **Proceed with Action**
- No → **Likely to Adversely Affect** → **Formal Consultation**

November 4, 2003

Figure 2.

Noise Best Management Practices (BMPs) for Piling Installation

The following best management practices are designed to reduce the exposure to sea turtles, smalltooth sawfish, and sturgeon to potential harmful daily noise exposure levels associated with pile driving during dock and seawall construction activities.

Noise BMP Plan A (For all projects): Sea Turtle, Smalltooth Sawfish, and Sturgeon Construction Conditions

The permittee shall comply with the following protected species construction conditions:

a. All construction personnel are responsible for observing water-related activities to detect the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing species protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which protected species cannot become entangled, be properly secured, and be regularly monitored to avoid protected species' entrapment. Barriers may not block protected species entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. If a protected species is seen within 100 yd of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 ft of a protected species. Operation of any mechanical construction equipment shall cease immediately if a protected species is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

e. Any injury to a protected species shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

f. All work must occur during daylight hours.

Noise BMP Plan B (for Impact Pile-Driving Installation of 6 or More Concrete Piles per Day)

The permittee shall follow all conditions defined in the Noise BMP Plan A above plus the conditions provided below:

1. It must be determined if the project occurs in open water or a confined space. This differentiation is important because if a project occurs in a confined space, an animal may not move through or past a noise source to escape it. A *confined space* is defined as any area that has a solid object (e.g., shoreline, seawall, jetty) or structure within 150 feet (ft) of the pile installation site that would effectively serve as a barrier or otherwise prevent animals from moving past it to exit the area. This does not include objects such as docks or other pile-supported structures that would not stop animal movement or significantly reflect noise.

2. If the project is located in open water, up to 10 concrete piles measuring up to 24-in diameter may be installed per day.

3. If the project is located in a confined space, up to 5 concrete piles measuring up to 24-in diameter may be installed per day.

4. If more than 5 piles will be installed per day in a confined space, noise abatement measures (below) are required for all of the concrete piles installed that day with a maximum of 10 piles installed per day.

Noise Abatement Measures: Approved noise abatement measures include noise attenuation piles (TNAP) and/or bubble curtains.

TNAP design must be constructed of a double-walled tubular casing (a casing within a larger casing), with at least a 5-inwide hollow space completely filled with closed-cell foam or other noise dampening material between the walls. The TNAP must be long enough to be seated firmly on the sea bottom, fit over the pile being driven, and extend at least 3 ft above the surface of the water.

Bubble curtain design must adhere to the guidelines for unconfined and confined bubble curtains defined below, and be followed as detailed in the USACE permit application. The use of *any* other alternative noise control method must receive prior approval by NMFS and the USACE.

If the required noise abatement measure discussed above cannot be used, then the pile must be installed by a different method using the appropriate noise BMPs defined in this document. (e.g., concrete piles may be installed by vibratory hammer instead, following BMP Plan A).

Bubble Curtain Specifications for Pile Driving
When using an impact hammer to drive or proof concrete piles, use one of the following sound attenuation methods:

1. If water velocity is equal to or less than 1.6 ft per second (1.1 miles per hour) for the entire installation period, surround the pile being driven by a confined or

unconfined bubble curtain that will distribute small air bubbles around 100% of the pile perimeter for the full depth of the water column.

a. General - An unconfined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe, and a frame. The frame facilitates transport and placement of the system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation.

b. The aeration pipe system shall consist of multiple layers of perforated pipe rings, stacked vertically in accordance with the following:

Water Depth (m)	No. of Layers
0 to less than 5	2
5 to less than 10	4
10 to less than 15	7
15 to less than 20	10
20 to less than 25	13

c. The pipes in all layers shall be arranged in a geometric pattern which shall allow for the pile being driven to be completely enclosed by bubbles for the full depth of the water column and with a radial dimension such that the rings are no more than 0.5 m from the outside surface of the pile.

i. The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without burial and shall accommodate sloped conditions.

ii. Air holes shall be 1.6 millimeter (mm) (1/16-in) in diameter and shall be spaced approximately 20 mm (3/4 in) apart. Air holes with this size and spacing shall be placed in 4 adjacent rows along the pipe to provide uniform bubble flux.

iii. The system shall provide a bubble flux 3.0 m^3 per minute per linear meter of pipe in each layer (32.91 ft^3 per minute per lin ft of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

V_t = 3.0 m^3/min/m * Circumference of the aeration ring in m

or

V_t = 32.91 ft^3/min/ft * Circumference of the aeration ring in ft

iv. Meters shall be provided as follows:

• Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

• Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated.

Flow meters shall be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

2. If water velocity is greater than 1.6 ft per second (1.1 miles per hour) at any point during installation or if constructing a seawall, surround the pile or area being driven by a confined bubble curtain (e.g., a bubble ring surrounded by a fabric or non-metallic sleeve). The confined bubble curtain will distribute air bubbles around 100% of the pile perimeter for the full depth of the water column, according to specifications below.

    a. General - A confined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe(s), and a means of confining the bubbles.

    b. The confinement shall extend from the substrate to a sufficient elevation above the maximum water level expected during pile installation such that when the air delivery system is adjusted properly, the bubble curtain does not act as a water pump (i.e., little or no water should be pumped out of the top of the confinement system).

    c. The confinement shall contain resilient pile guides that prevent the pile and the confinement from coming into contact with each other and do not transmit vibrations to the confinement sleeve and into the water column (e.g., rubber spacers, air-filled cushions).

    d. In-water less than 15 m deep, the system shall have a single aeration ring at the substrate level. In-waters greater than 15 m deep, the system shall have at least 2 rings: 1 at the substrate level and the other at mid-depth.

    e. The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without sinking into the substrate and shall accommodate for sloped conditions.

f. Air holes shall be 1.6 mm (1/16-in) in diameter and shall be spaced approximately 20 mm (3/4 in) apart. Air holes with this size and spacing shall be placed in 4 adjacent rows along the pipe to provide uniform bubble flux.

g. The system shall provide a bubble flux of 2.0 m^3 per minute per linear meter of pipe in each layer (21.53 ft^3 per minute per lin ft of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

Vt = 2.0 m3/min/m * Circumference of the aeration ring in m

or

Vt = 21.53 ft3/min/ft * Circumference of the aeration ring in ft

h. Flow meters shall be provided as follows:

Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

ii. Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated.

iii. Flow meters shall be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

South Florida Ecological Services Office

DRAFT

February 12, 2004

STANDARD PROTECTION MEASURES FOR THE ATLANTIC SALT MARSH SNAKE

1. Develop educational materials on Atlantic salt marsh snakes and on the ecological communities and hydrological functions of coastal saltwort flats and salt grass-bordered tidal creeks in Indian River County. Educational materials could include a combination of posters, videos, pamphlets, and lectures (*e.g.*, an observer trained to identify Atlantic salt marsh snakes could instruct construction personnel before any clearing activities occur). You may also fund development of educational materials by a local environmental organization or institution.

2. Post informational signs throughout the construction site and along any proposed access road containing the following information:

   a. a description of Atlantic salt marsh snakes, their habits, and protection under Federal Law;

   b. instructions not to injure, harass, or kill this species;

   c. directions to cease activities, and to contact the U.S. Fish and Wildlife Service if an Atlantic salt marsh snake is encountered; and,

   d. telephone numbers of pertinent agencies to be contacted if a dead Atlantic salt marsh snake is encountered.

   Informational posters should be submitted for review as part of the consultation package.

3. An Atlantic salt marsh snake monitoring report must be submitted to the South Florida Ecological Services Office within 60 days of the conclusion of activities. The report should be submitted whether or not Atlantic salt marsh snakes are observed. the report should contain the following information:

   a. any sightings of Atlantic salt marsh snakes and

   b. other obligations required by the Florida Fish and Wildlife Conservation Commission, as stipulated in the permit.

ATLANTIC SALT MARSH SNAKE

Nerodia clarkii taeniata



Photo of Atlantic salt march snake. Photo courtesy of USFWS/Photo by Robert S. Simmons.

FAMILY: Colubridae

STATUS: Threatened throughout its range (*Federal Register*, November 29, 1977)

DESCRIPTION: The Atlantic salt marsh snake is a slender, heavily keeled water snake about 2 feet in total length, with a pattern of stripes that are variously broken into blotches. The dorsal ground color is pale olive, patterned with a pair of dark brown stripes running down the back and enclosing a pale mid-dorsal stripe. These dark stripes usually become fragmented posteriorly into a series of elongate blotches. There is also a row of dark blotches along the lower sides of the body, which merge to form stripes in the neck region. The ventral surface is black with a median series of yellowish spots. This snake feeds on small fish in shallow water. It is most active at night, during periods of low tide.

REPRODUCTION AND DEVELOPMENT: Little is known about the life history of this snake, but it is probably similar to the Gulf salt marsh snake. Females of the Gulf Coast race produce from 2 to 14 live young, usually in mid-summer.

RANGE AND POPULATION LEVEL: Although historically reported from coastal areas of Volusia, Brevard, and Indian River counties, Florida, it now appears to be restricted to a limited coastal strip in Volusia County. Its population level is currently unknown.

HABITAT: The Atlantic salt marsh snake inhabits coastal salt marshes and mangrove swamps. Specifically, it occurs along shallow tidal creeks and pools, in a saline environment ranging from brackish to full strength. It is often associated with fiddler crab burrows.

REASONS FOR CURRENT STATUS: Extensive drainage and development within the coastal zone has reduced the available habitat of this species. Continued filling of coastal wetlands will further limit the range of this already restricted reptile. Additionally, creating impoundments in marshlands for mosquito control may eliminate habitat by changing water salinity. There is also a concern that habitat disturbance within these regions may have broken down natural isolating mechanisms between the Atlantic salt marsh snake and the adjacent freshwater snake (*Nerodia fasciata pictiventris*). This breakdown may be responsible for hybridization between these species.

MANAGEMENT AND PROTECTION: Along with efforts to discourage further loss of habitat, there is also a need for extensive studies on the life history and status of this species.

REFERENCES:

Kochman, H.I. 1992. Atlantic Salt Marsh Snake. Pages 111-116 in Paul E. Mohler, ed., Rare and Endangered Biota of Florida, Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville. Page 291.

U.S. Fish and Wildlife Service. 1993. Atlantic Salt Marsh Snake Recovery Plan. Atlanta, Georgia. 19 pages.

U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan for the threatened and endangered species. Vero Beach, Florida.

For more information please contact:

Bill Brooks
U.S. Fish and Wildlife Service
6620 Southpoint Drive South, Suite 310
Jacksonville, Florida 32216
904/232-2580
billy_brooks@fws.gov

Last Updated: 4/2001
Last Reviewed 9/2005

AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Submit this form and one set of as-built engineering drawings to the U.S. Army Corps of Engineers, Enforcement Section, P. O. Box 4970, Jacksonville, FL 32232.. *If you have questions regarding this requirement, please contact the Enforcement Branch at 904- 232-3131.*

1. Department of the Army Permit Number: SAJ-_____

2. Permittee Information:

Name: _____

Address: _____

_____

3. Project Site Identification (physical location/address):

_____

_____

_____

4. As-Built Certification: I hereby certify that the authorized work, including any mitigation required by Special Conditions to the permit, has been accomplished in accordance with the Department of the Army permit with any deviations noted below. This determination is based upon on-site observation, scheduled, and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

_____ _____
Signature of Engineer Name (*Please type*)

_____ _____
(FL, PR, or VI) Reg. Number Company Name

_____ _____ _____
City State ZIP

(Affix Seal)

_____ _____
Date Telephone Number

Identify any deviations from the approved permit drawings and/or special conditions (attach additional pages if necessary):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX B

Geotechnical Report

Geotechnical Engineering Report

Phase III
BV-4B Dredged Material Management Area (DMMA)
Brevard County, Florida
March 18, 2015
Terracon Project No. HB145006

Prepared for:
Taylor Engineering, Inc.
Jacksonville, Florida

Prepared by:
Dunkelberger Engineering & Testing,
A Terracon Company
Port St. Lucie, Florida

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

March 18, 2015

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Taylor Engineering, Inc.
10151 Deerwood Park Blvd.
Jacksonville, Florida 32256

Attn: Lori Brownell, P.E. … via e-mail (lbrownell@taylorengineering.com)

Re: Draft Geotechnical Engineering Report
BV-4B Dredged Material Management Area (DMMA)
Brevard County, Florida
Dunkelberger Project Number: HB145006

Dear Ms. Brownell:

Dunkelberger Engineering and Testing, A Terracon Company (DUNKELBERGER) has substantially completed the Geotechnical Analysis (Phase III services) for the above referenced project. This study was carried out in general accordance with our subcontract agreement (Taylor Engineering Contract No. C2014-026) dated March 25, 2014. The findings from the geotechnical analysis are presented in the following report.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, please contact us.

Sincerely,
Dunkelberger Engineering and Testing, Inc.
A Terracon Company

Brent M. Langlois, E.I.
Project Geotechnical Engineer

Douglas S. Dunkelberger, P.E.
Principal
FL Registration No. 33317

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DRAFT GEOTECHNICAL ENGINEERING REPORT
BV-4B DREDGED MATERIAL MANAGEMENT AREA (DMMA)
BREVARD COUNTY, FLORIDA

DUNKELBERGER Project No. HB145006
March 18, 2015

1.0 PROJECT & SITE DESCRIPTION

The proposed BV-4B Dredged Material Management Area (DMMA) is located southeast of Mims, Florida in Brevard County. The BV-4B DMMA is one of two sites selected to provide long-term dredged material containment capacity for the Intracoastal Waterway (ICWW). It is intended to serve the northern half of Reach II located between Mims and NASA Parkway. The site is situated about ½ mile west of the ICWW. A *Site Vicinity Map* is provided as Sheet 1. The overall site boundaries surround approximately 101 acres of generally cleared land that was formerly used as citrus grove. A band of vegetated wetlands are aligned north to south near the west end of the site. A narrow ditch extends from the wetlands to the east site boundary along an irregular alignment. A large rural residential area lies to the south and a motor home park is located just west of the site.

2.0 PROPOSED CONSTRUCTION

Background information concerning the design, construction and operation of the DMMA was provided by Taylor Engineering within the following three documents:

1) *BV-4B Management Plan (1992)*- summary of preliminary design, site preparation, and site management features
2) *BV-4B Engineering Narrative (1992)*- abbreviated summary of the site's key proposed engineering parameters
3) *BV-4B Groundwater Assessment Report (2002)*- description of groundwater assessment, model development, and preliminary evaluation of potential engineering controls to limit potential off-site saline contamination

From the document review, we understand that the proposed DMMA footprint is expected to cover 48 acres of the site with a design capacity of approximately 771,031 cubic yards of dredged materials. To provide that storage capacity perimeter earthen dikes will be constructed to a final crest elevation of +25.5 feet (15 feet above the existing mean site grade) with respect to the National Geodetic Vertical Datum of 1929 (NGVD). Preliminary design of the dikes indicates 3:1 (horizontal: vertical) side slopes with a 12-foot wide crest. The interior area of the containment embankment will be excavated as a borrow source. The excavation will generally be about 3 to 5 feet deep but will extend to as much as 10 feet deep towards the western side of

the site where a high sand ridge exists. The majority of the borrow fill, an estimated 194,070 cubic yards, will be used to construct the dike and access ramps. Additional fill will be obtained from the proposed perimeter ditches.

We recently learned in e-mail correspondence that the DMMA will include a triple steel box weir structure at its northeast corner. The weirs will be supported on a concrete slab foundation with a maximum bearing pressure of about 1,000 pounds per square foot (psf). A timber walkway structure with pile supports will span from the dike crest to the top of the weirs. A 24-inch diameter high density polyethylene (HDPE) discharge pipe will run from the base of the weirs through the bottom of the dike to outfall in the perimeter ditch.

3.0 SCOPE OF WORK

The overall geotechnical work scope for the project consists of: (1) geotechnical field investigation and laboratory analysis; (2) engineering analyses, recommendations, and design; (3) summary report and recommendations; and (4) construction drawings and specifications. That scope was divided into four separate phases (Phases I through IV).

A preliminary geotechnical engineering report was issued on December 8, 2014 encompassing the results of services under Phases I and II. The initial phase involved collection of field and laboratory data as required input to detailed geotechnical engineering analyses and groundwater models. The groundwater modeling, representing the Phase II services, evaluated groundwater impacts (i.e. elevated chloride concentrations) from operation of the DMMA both with and without saline control features (ditches, under drains and wells). The first four report sections below (**Sections 4.0 through 8.0**) are a re-cap of the Phase I/II data relevant to the Phase III services. The latter sections of this report (**Sections 9.0 and 10.0**) present the results of the detailed geotechnical engineering analyses pertaining to the design and the construction of the DMMA dike and its associated features.

4.0 REVIEW OF AVAILABLE DATA

4.1 USGS Topographic Map

A copy of the USGS Topographic Map is provided as Sheet 2 of this report. Reference to the map shows the site area with a west to east downward slope ranging in elevation from approximately +30 feet to +5 feet with respect to the National Geodetic Vertical Datum of 1929 (NGVD ’29). The elevation at the central area of the site is about +10 (ft.-NGVD). Based on a topographic survey at the locations of the borings completed for this study, the average site elevation is + 9 feet NAVD.

4.2 Brevard County Soil Conservation Survey

The Soil Survey of Brevard County, Florida as prepared by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS; later renamed the Natural Resource Conservation Service – NRCS) identifies the soil types in the proposed DMMA footprint area of the site as Bradenton Fine Sand (Map Unit 8), Copeland-Bradenton-Wabasso Complex, Limestone Stratum (Map Unit 16), Riviera Sand (Map Unit 19), Myakka Sand (Map Unit 36), and Pompano Sand (Map Unit 51).

The above listed soil types are generally sandy and devoid of organic (muck) soils at shallow depths. More detailed descriptions of the primary soil classifications are provided below.

Bradenton Fine Sand is typically described as 0 to 2 percent slope, poorly drained sandy soils that are typically slightly acidic fine sands from 0 to 12 inches followed by moderately alkaline sand clay loam soil from 12 to 34 inches. Below this there is unweathered bedrock from 34 to 38 inches. Under natural (pre-development) conditions, the Seasonal High Groundwater Table (SHGWT) is reported to exist within 12 to 18 inches of the surface.

Copeland-Bradenton-Wabasso Complex, Limestone Stratum is typically described as 0 to 2 percent slope, very poorly drained sandy soils that are typically slightly to moderately alkaline loamy fine sands to sandy clay loam from 0 to 22 inches followed by moderately alkaline silt loam, marl from 22 to 30 inches. Below this there is unweathered bedrock from 30 to 34 inches. Under natural (pre-development) conditions, the Seasonal High Groundwater Table (SHGWT) is reported to exist within 0 to 6 inches of the surface.

Riviera Sand is typically described as 0 to 2 percent slope, poorly drained sandy soils that are typically slightly acidic sands from 0 to 30 inches followed by slightly alkaline sandy loam soil. Under natural (pre-development) conditions, the Seasonal High Groundwater Table (SHGWT) is reported to exist within 0 to 12 inches of the surface.

Myakka Sand is typically described as 0 to 2 percent slope, poorly drained sandy soils that are typically strongly to very strongly acidic sand soils from 0 to 63 inches. Under natural (pre-development) conditions, the Seasonal High Groundwater Table (SHGWT) is reported to exist within 6 to 18 inches of the surface.

Pompano Sand is typically described as 0 to 2 percent slope, poorly drained sandy soils that are typically slightly acidic sand soils from 0 to 80 inches. Under natural (pre-development) conditions, the Seasonal High Groundwater Table (SHGWT) is reported to exist within 0 to 12 inches of the surface.

The Soil Survey is not intended as a substitute for site-specific geotechnical exploration; rather it is a useful tool in planning a project scope in that it provides information on soil types likely to be

encountered. Boundaries between adjacent soils types on the Soil Survey maps are approximate. The Soil Survey is included as Sheet 3.

4.3 Historical Aerial Review

Historical aerial photographs from Years 1943, 1951, 1979, 1994, 1999, 2002, 2005, 2009, 2010, 2012, and 2014 were reviewed for features of geotechnical significance. The noted items are listed below in chronological order.

- 1943: the site is vacant, wooded (vegetated) land
- 1994: the site is a citrus grove
- 2002: the site is grown over with vegetation (citrus grove abandoned)
- 2010: the site interior is cleared of vegetation and a narrow ditch runs through the site
- 2012: a vegetated wetland type area appears near the west end of the site
- 2014: the site appears similar to its current condition

5.0 FIELD EXPLORATION PROGRAM AND METHODS

The layout of the field exploration program (i.e. test hole locations) is shown in Sheet 5. Prior to our field exploration, a site survey was conducted by Morgan & Eklund to locate and stake the test locations and also provide existing ground elevations at each test hole location. Additionally, water surface elevations of the nearby lakes/ponds were surveyed on April 4, 2014 to provide hydrological data for the groundwater modeling. Ground elevations at each boring location are included in Sheet 5. Water surface elevations measured at the nearby surrounding lakes/ponds ranged from +3.5 to +19.9 feet (NAVD88) as shown on Sheet 4. Descriptions of the exploratory program are provided in the following report sections.

5.1 Hand Auger Borings

Three (3) hand auger borings were located on the west side of the vegetated wetland area and drilled to a maximum depth of 6 feet below the existing land surface (bls). These borings were performed in lieu of SPT borings due to difficult drill rig access caused by wet ground. The borings were drilled using hand turned auguring equipment. Samples of the soils were collected from the auger bucket, placed in plastic bags, labeled, and transported to our laboratory for visual-manual classification by a geotechnical engineer.

5.2 Standard Penetration Test (SPT) Borings

Deeper subsurface conditions within the DMMA footprint were explored with twenty three (23) Standard Penetration Test (SPT) borings. The borings were drilled 15 feet deep in the proposed interior borrow area and 45 to 100 feet in depth below the existing land surface (bls) along the proposed perimeter dike alignment. The SPT borings were drilled with a track-mounted mini-rig employing mud-rotary procedures. Samples of the in-place materials were recovered continuously to a depth of 10 feet, and then taken at 5-foot vertical intervals to the termination depth of the borehole. The sampling involved use of a standard split-barrel driven with a 140-pound drop hammer freely falling 30 inches (the Standard Penetration Test per ASTM D 1586). SPT "N-values" were recorded approximately at 2-foot vertical intervals within the first 10 feet of the boring and at 5-foot vertical intervals thereafter. Samples recovered from the borings were placed in moisture-proof containers, labeled, and returned to our laboratory for visual-manual classification by a geotechnical engineer. The deep boreholes were subsequently sealed with neat cement grout and the shallow boreholes were sealed with bentonite chips. Detailed graphical boring profiles are presented as Sheets 6 through 11.

5.3 Cone Penetration Test (CPT) Soundings

Cone Penetrometer Test (CPT) soundings were advanced at nine (9) locations in lieu of SPT borings as a cost effective means to complete the field exploration. The CPT soundings were completed to depths of 45 to 70 feet along the proposed perimeter dike alignment. The CPT method provides continuous readings of soil resistance by use of a truck-mounted, mechanical cone penetrometer equipped with a friction mantle (ASTM D 3441). CPT cone bearing resistances and friction sleeve readings were recorded as the penetrometer was pushed into the ground with a hydraulic ram. Detailed graphical logs and correlative parameters are presented in *Appendix A* as Exhibits A-1 through A-18.

5.4 Bulk Samples

Bulk samples were obtained at eighteen (18) locations from the interior borrow area. The samples were obtained from auger borings drilled to depths of 10 feet using a continuous flight auger (CFA). During the drilling, soil cuttings were raised and expelled at the surface where they were recovered, placed in large bags, labeled, and transported to our laboratory for testing.

5.5 Deep Ground Piezometer (PZ-1)

One (1) location was selected for the installation of a deep piezometer to measure groundwater levels. The piezometer, denoted PZ-1 for the purposes of this report, was constructed near Boring B-310. The piezometer consisted of a 10-foot length by 2-inch diameter machine slotted PVC pipe (0.010-inch slot width) that was coupled to 65 feet of solid riser pipe of similar composition. The sand pack surrounding the well screen consisted of clean 6/20 silica sand. A

layer of bentonite chips was placed above the piezometer screen and the remainder of the hole was grouted with neat cement. The screened interval for PZ-1 is approximately between 60 and 70 feet bls.

5.6 Intracoastal Waterway (ICWW) Vibracores

Dredged sediment samples were recovered by our subcontractor, Athena Technologies, Inc., from the north half of Reach II of the Intracoastal Waterway (ICWW) using the Vibracore method. In general, this method consisted of vibrating a thin walled 6-inch diameter steel casing 5 feet below the ICWW mud line at multiple locations. The casing was then extracted and the sample emptied into containers. The process was repeated until approximately 5 gallons of sediment was recovered at each test location. Dredged sediment sampling was obtained at eleven (11) locations from the proposed dredge areas. The bulk samples, placed in large containers, were labeled by location with GPS coordinates and transported back to our laboratory where they were laid out for visual-manual classification by a geotechnical engineer. A layout of the Vibracore locations is shown on Sheet 12.

6.0 GENERAL SUBSURFACE CONDITIONS

6.1 Subsoil Conditions

The soil samples collected from the SPT and auger borings were classified in accordance with the Unified Soil Classification System (USCS). Detailed graphical boring profiles are presented in Sheets 7 through 12. The generalized soil stratification is presented below.

Table 6.1 Generalized Soil Stratification

Stratum Number	Material Description	Unified Soil Classification System (USCS)
1	Gray to brown fine SAND, trace to slightly silty	SP, SP-SM
2	Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation	SP, SP-SM
3	Green to gray CLAY with traces of silt	CL
4	Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell	SP, SP-SM
5	Green clayey fine SAND with varying amounts of broken shell	SC
6	Light gray cemented SAND with little broken shell	SP
7	White LIMESTONE	-

In general, the borings found about 10 to 20 feet of relatively clean fine sands (SP, SP-SM; Strata 1,2) followed typically by about 25 feet of more clean fine sands with broken shell (Stratum 4). Seven of the eight deep SPT borings showed soft clay layers (Stratum 3) beginning at depths of about 30 to 40 feet bls. The clay occurs in two to three discrete layers between elevations of about -26 feet and -69 feet NAVD. Maximum aggregate clay layer thicknesses are 11 feet, 14 feet, and 23 ½ feet beneath the west, middle and east sections, respectively, of the DMMA.

Below the clay, the shelly sands continued to depth and varied from clean to clayey (Stratum 5) in texture with a localized zone of cementation (Stratum 6). Limestone was found at the bottom (93 to 100 feet, bls) in one of the two 100-foot depth SPT borings.

The SPT N-values, and CPT cone tip readings, indicate that the predominately sandy subsoils beneath the DMMA footprint are medium dense in terms of relative density. As exceptions to that characterization, the surficial sands are loose and the clay layer is soft in terms of relative consistency.

6.2 Groundwater Conditions

At the time of our field exploration, groundwater was encountered in each drilled test hole. At these locations, the groundwater level was measured during drilling at elevations between about +1.5 and +16 (feet-NAVD). Additionally, groundwater level readings were taken periodically in the existing monitoring wells and in the piezometer installed as part of this study.

Well and piezometer readings were made on six days between mid-April and early-July 2014. A summary of those groundwater measurements are shown on the following table

Table 6.2 Groundwater Monitoring Data

Groundwater Monitoring Data								
Monitoring Well ID	Approximate Elevation (feet-NAVD88)							
	Existing Ground	04/14/14	04/22/14	05/05/14	05/20/14	06/03/14	07/07/14	Bottom of Well
PZ-1	7.90	nm	5.23	5.73	6.03	5.45	(1)	-69.30
MW-1M	18.63	nm	nm	14.31	14.95	14.30	17.11	-9.97
MW-2M	19.29	15.13	15.13	15.76	15.74	15.06	17.66	-8.71
MW-3M	31.90	18.44	19.44	18.39	18.95	18.34	20.29	3.00
MW-4M	22.89	17.22	17.22	16.72	17.48	16.80	19.12	-5.71
MW-5M	21.30	16.72	16.97	16.75	17.57	16.90	19.15	-7.30
MW-6M	9.03	5.85	6.14	5.58	6.43	5.43	7.98	-17.72
MW-8M	9.98	6.88	6.88	6.53	6.33	6.03	6.78	-68.02
MW-10M	3.93	0.93	1.22	0.96	1.53	0.95	(1)	-25.07
MW-11M	3.96	1.00	1.21	1.04	1.77	1.14	(1)	-24.24

MW-12M	3.45	0.45	0.54	0.48	0.93	0.57	(1)	-24.15
MW-13M	6.15	3.78	4.03	4.16	4.60	3.96	(1)	-22.30

(1) Monitoring well location not accessible due to standing (surface) water.
nm - not measured this date

Similar to the trend of topographic relief across the site, the groundwater flow gradient is relatively steep from west to east dropping from about +20 to +1 in elevation (feet- NAVD). Depths to groundwater ranged from about 1 ½ to 13 ½ feet below the existing ground surface at the time of our study.

7.0 LABORATORY TESTING PROGRAM: ON-SITE SOILS

Samples from the borings were reviewed by a geotechnical engineer and classified in accordance with the Unified Soil Classification System (ASTM D 2487) and appropriate geologic nomenclature. Representative samples of the subsurface strata were tested for soil properties as follows.

- Moisture Content (125 Tests)
- Organic Content (25)
- Fines Content (81)
- Gradation (38)
- Modified Proctor Compaction (6)
- Limerock Bearing Ratio (LBR) (3)
- Hydraulic Conductivity (8)
- Triaxial Shear Strength (3)
- Consolidation (2)

Complete laboratory test results are summarized in the attached tables.

7.1 Index Properties

Representative samples of the soils recovered from the borings were tested for index properties including moisture content (ASTM D 2216), organic content (ASTM D 2974), Atterberg Limits (ASTM D 4318), fines content (ASTM D 1140), and grain size distribution (ASTM D 422). A complete summary of the index properties and grain size distribution results are presented in Tables 1.1, 1.2, 2.1, 2.2, and 2.3. Grain size distribution curves are provided in *Appendix B* as Exhibits B-1 through B-27. Average values of the test results are summarized in the following table.

Table 7.1 Laboratory Testing Results - Index Properties

Stratum No.	Soil Type	MC (%)	Atterberg Limits		OC (%)	Amount Passing Sieve Size (%)					
			LL	PI		#4	#10	#40	#60	#100	#200
1	SP, SP-SM	23.1	-	-	4.1	99.9	99.8	98.5	97.9	77.4	6.5
2	SP, SP-SM	23.9	-	-	-	99.9	99.4	98.7	98.5	81.4	8.7
3	CL	69.0	45.8	27.9	-						76.5
4	SP, SP-SM	24.5	-	-	-	99.0	95.4	87.3	84.1	67.6	7.2
5	SC	31.8	40.8	20.4	-	98.4	90.0	77.8	75.3	71.8	30.9
6	SP	21.5	-	-	-	-	-	-	-	-	-
7	LIMESTONE	-	-	-	-	-	-	-	-	-	-

Notes: 1. Soil Type refers to the Unified Soil Classification System Group Symbol (ASTM D 2487).
2. MC, LL, PI, and OC indicates moisture content, Liquid Limit, Plasticity Index and Organic Content, respectively.

7.2 Modified Proctor Compaction

Bulk soil samples obtained from the proposed interior borrow area at six (6) locations, from depths of 0 to 10 feet bls, were tested for their compacted moisture/dry density relationship in accordance with the Modified Proctor Compaction Test (ASTM D 1557). The optimum moisture content of the compacted soils ranged between 12.1 and 14.7 percent, and the maximum dry density ranged from 100.6 to 107.3 pounds per cubic foot (pcf). A summary of the test data are provided in Table 3.

7.3 Limerock Bearing Ratio (LBR)

Bulk soil samples at three (3) selected locations within the interior borrow area were tested for Limerock Bearing Ratio (LBR). The optimum moisture content of the compacted soils ranged between 11.1 and 12.9 percent, and the maximum dry density ranged from 89.5 to 104.0 pounds per cubic foot (pcf). The LBR values ranged from 10.3 to 61.3. A summary of the test data are provided in Table 4.

7.4 Hydraulic Conductivity

Two (2) undisturbed (Shelby tube) samples of the soft clay (Stratum 3) were extruded and tested for hydraulic conductivity in a triaxial flexible wall permeameter (ASTM D 5084). The hydraulic conductivity of the clay ranged from 3.93×10^{-8} to 9.75×10^{-8} cm/sec.

Additionally, six (6) bulk samples of near-surface soils in the proposed interior borrow area were remolded to specific moisture-dry density conditions and tested in the laboratory for hydraulic conductivity. The samples were remolded to approximately 95 percent of their maximum dry density and ±1 percent dry of their optimum moisture content as determined by the Modified

Proctor Compaction Test. The hydraulic conductivity of the samples was determined in a rigid-walled permeameter using the constant head method (ASTM D 2434). The hydraulic conductivity of the material obtained from the proposed interior borrow area ranged from 2.21 x 10^{-3} cm/sec to 4.44 x 10^{-3} cm/sec (6.25 to 12.58 feet per day).

Results of the hydraulic conductivity testing are summarized in Tables 5.1 and 5.2. Detailed test reports are provided in *Appendix B* as Exhibits B-28 to B-41.

7.5 Triaxial Shear Strength

Consolidated undrained (CU) triaxial shear strength tests with pore pressure measurements were completed on three (3) remolded bulk samples of near-surface soils (depths of 1 to 10 feet bls) representative of those that will be a source of borrow for the dike embankment fill. The soil specimens were prepared at approximately 95 percent of their maximum dry density and ±1 percent of their optimum moisture content as determined by the Modified Proctor Compaction Test. The specimens were run at consolidation pressures of 5, 10 and 20 psi, respectively. The effective strength values for cohesion (c) from the triaxial shear strength tests ranged from 0.08 to 0.47 kilo pounds per square foot (ksf). The effective angle of internal soil friction (ϕ) ranged from 33.1 to 35.5 degrees

A summary of the triaxial shear strength test results are summarized in Table 6. Detailed reports of the test results are provided in *Appendix B* as Exhibits B-42 to B-47.

7.6 Consolidation

Two (2) undisturbed (Shelby tube) samples of the soft clay (Stratum 3) were extruded and tested for one-dimensional consolidation. The tests were conducted at multiple load increments to a maximum load of 16 tons per square foot (tsf). Sample compression was measured using a ½ inch stroke dial gage. Borings B-203 and B-204 had compression index (C_c) values of 0.52 and 0.78, respectively. The pre-consolidation pressure for B-203 and B-204 was 4.8 ksf and 2.0 ksf, respectively. This data, as well as the correlative CPT data, suggests that the clay is normally consolidated to slightly over consolidated.

A summary of the consolidation test results are summarized in Table 7. Detailed reports of the test results are provided in *Appendix B* as Exhibits B-48 to B-49.

8.0 LABORATORY TESTING PROGRAM: DREDGED MATERIALS

Dredged sediment samples from the eleven (11) vibracores were reviewed by a geotechnical engineer and classified in accordance with the Unified Soil Classification System (ASTM D 2487) and appropriate geologic nomenclature. Each vibracore sample was tested for the following properties:

- Organic Content
- Gradation
- Leachability

8.1 Index Properties

Representative samples of the soils recovered from the vibracores were tested for organic content (ASTM D 2974) and grain size distribution (ASTM D 422). A summary of the index properties are presented in the following table. Grain size distribution curves are provided in *Appendix C* as Exhibits C-1 through C-11. Average values of the test results are summarized in the following table.

Table 8.1 Vibracore Laboratory Testing Results - Index Properties

ID	Soil Type	OC (%)	Amount Passing Sieve Size (%)							
			1/2 "	#4	#10	#20	#40	#60	#100	#200
V1	SP-SM	1.5	100.0	99.6	97.9	94.3	92.6	91.5	76.5	9.9
V2	SM	2.6	98.1	95.6	92.3	88.1	84.9	80.9	64.3	19.1
V3	SP	0.8	100.0	97.1	92.8	86.9	84.0	81.1	68.6	3.1
V4	SP	1.2	98.8	92.2	81.9	65.9	59.7	57.1	48.7	3.1
V5	SP	1.2	98.5	95.6	92.4	89.0	86.6	83.4	65.0	5.3
V6	SP-SM	0.9	100.0	99.4	97.1	93.8	92.4	91.7	74.7	8.0
V7	SP-SM	2.0	100.0	97.9	93.3	88.1	85.9	84.6	48.2	5.6
V8	SP-SM	1.6	100.0	99.1	95.7	91.7	90.0	88.5	78.6	9.5
V9	SM	9.2	100.0	99.2	94.8	87.1	83.2	80.8	72.0	14.8
V10	SP-SM	17.2	100.0	97.2	86.9	76.9	71.6	68.1	54.1	8.1
V11	SC	2.3	100.0	91.0	75.3	57.6	48.3	43.0	33.8	24.8

Notes: 1. Soil Type refers to the Unified Soil Classification System Group Symbol (ASTM D 2487).
2. OC indicates Organic Content

8.2 Chloride Leachability Testing

Representative soil samples from each of the eleven (11) vibracore locations were used for our in-house chloride leachability tests. The purpose of the laboratory testing was to simulate an operational condition of the DMMA to evaluate the leaching potential of a 2-foot thick layer (column) of dredged material when subjected to 54 inches of influent. The procedure generally consisted of a PVC pipe setup including two 3-inch diameter pipes, one at 2 feet in length to hold the soil specimen, and the second at 5 feet to hold 54 inches of water. A PVC pipe reducer and ball valve were fastened to the bottom of the pipes to allow pausing of the test. A filter stone was placed in the bottom of each pipe. Containers were placed under each ball valve to capture the leached extract. Two feet of sample was loaded into the tubes and water was subsequently

added to saturate the sample. Once the samples were saturated, 54 inches of water (modeling annual rainfall) was loaded onto each sample and the ball valves were opened to begin the test. chloride and pH tests were run on the liquid extract on an incremental basis after 9 inches of water had passed through the sample. After the complete 54 inches of water had fully passed through, a final set of chloride and pH tests were run for the entire 54 inches of liquid extract.

In addition to our in-house testing, other portions of the eleven (11) vibracore samples were sent to Palm Beach Environmental Labs (PBEL) to test for pH, total chloride of soil, and Toxicity Characteristic Leaching Procedure (TCLP) testing.

Results of the in-house soil column leaching tests showed relatively high concentrations of chlorides in the extract liquid. For 11 column tests, the average chloride content of the first 9 inches of percolated liquid extract was 9,775 mg/L. The commercial laboratory TCLP test results, for the same 11 samples, averaged 275 mg/L. It is noted as a point of reference that seawater has a chloride concentration of 19,400 mg/L.

Referencing the State's Secondary Drinking Water Standard at 250 mg/L, the test results indicate significant leaching potential particularly during first flushing of newly placed dredge materials. It is noted that the State's Secondary Drinking Water Standard and the FDEP Groundwater Cleanup Target Level are equivalent.

Detailed results of the leachability testing is presented in *Appendix C* as Exhibits C-12 through C-17.

9.0 ENGINEERING ANALYSIS

9.1 Design Sections

Three typical dike sections were each analyzed for stability, settlement, and seepage. The sections represent low, medium and high embankment heights for the west, middle, and east parts, respectively, of the dike. The following text provides details regarding the existing topography, foundation soil stratigraphy, and typical dike features followed by discussion of the results of the analyses.

9.1.1 Common Features

We have assumed that the following design features, typical of previous DMMA projects, will be incorporated into the dike and are included on the design cross-sections used in our analyses.

Crest
The final design elevation of the dike crest is to be at +25.5 feet NAVD. The dike will have a 12-foot wide crest for ease of construction and to provide suitable access for post-construction vehicle traffic.

Dike Slopes
The dike cross sections will have inside (upstream) slopes and outside (downstream) slopes of 3 horizontal to 1 vertical (3H:1V).

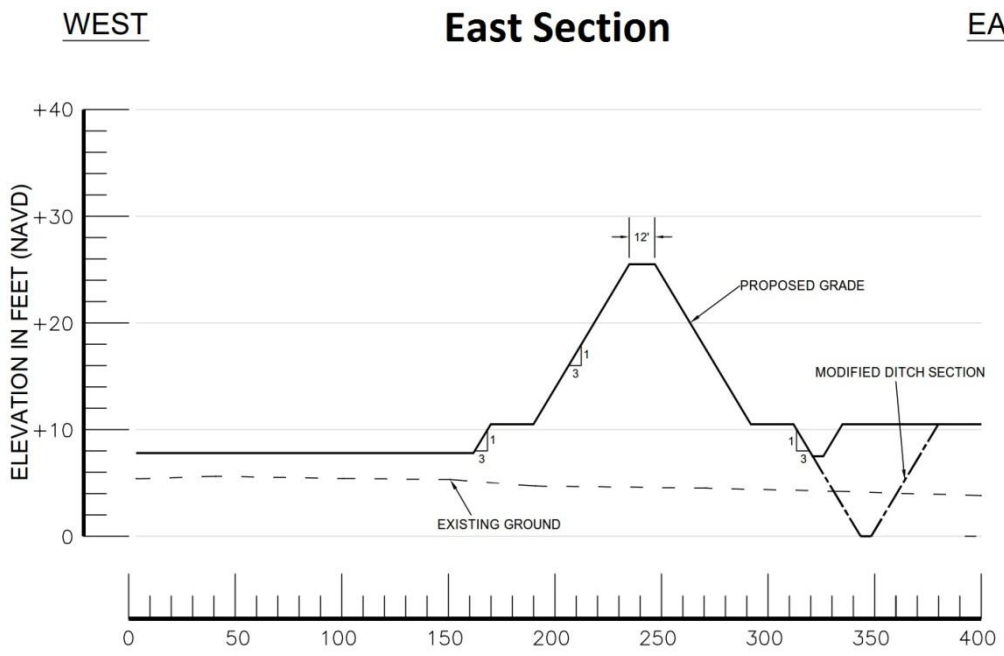
Perimeter Ditch
The dike cross sections each have an outside perimeter ditch for the collection of storm water runoff and seepage from the impoundment. The ditch bottom width is 5 feet and at elevations ranging from about +7.5 feet NAVD to +0 feet NAVD. The side slopes of the perimeter ditch are 3H:1V.

Toe Drain
Each design cross-section includes a blanket-toe drain feature beneath the outboard slope. The drain will outfall to the perimeter ditch.

Weir Structure
The outlet structure will be located at the east end of the dike and will consist of three weir-controlled drop inlets with 24-inch diameter high density polyethylene (HDPE) discharge pipes penetrating through the dike to outfall in the perimeter ditch. The steel weir box structure will be supported on a concrete foundation slab and a timber walkway will span from the top of the structure to the dike crest. The elevated walkway will be supported by timber piling driven through the inboard slope of the dike.

9.1.2 East Section

The design “Cross-Section : East” represents a high embankment fill reaching about 21 feet above the topographical low area of the site. This typical section is shown below.

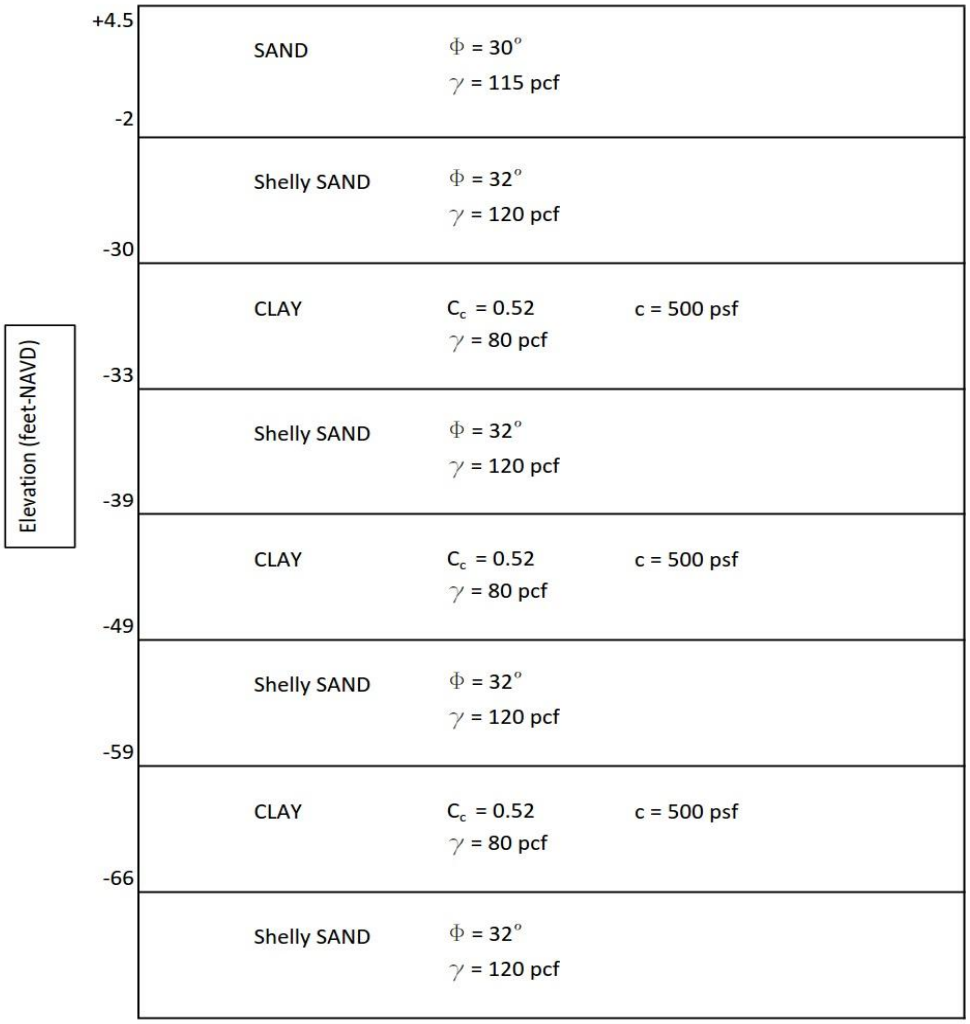


The stratigraphy beneath the east section is represented by the conditions found in SPT Borings B-102 and B-203 as well as CPT soundings CPT-104 and CPT-203. In general, the subsurface profile consists of loose to medium dense fine sands and slightly silty fine sands (SP, SP-SM) that extend to elevations ranging from -25 to -30 feet NAVD. These sands are followed by about 3 to 7 feet of soft clay (CL). The clay layer is underlain by very loose to medium dense fine sands and slightly silty fine sands (SP, SP-SM) that extend to the top of a hard limestone layer at an elevation of about -90 feet NAVD.

Boring CPT-104 encountered a second layer of soft clay (CL) from an elevation of about -63 to -66 feet NAVD.

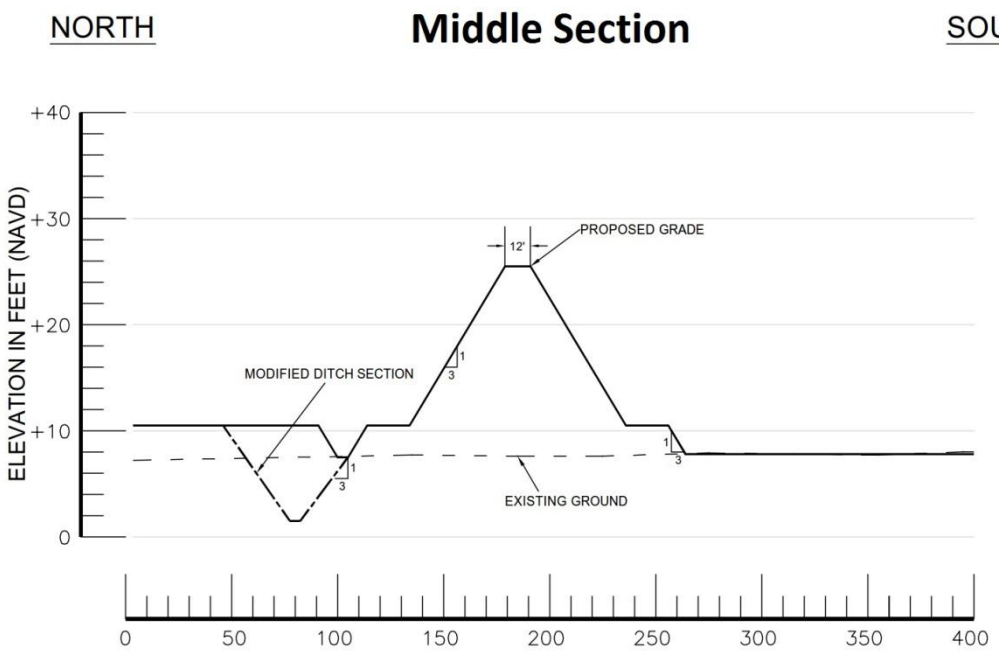
Boring B-203 encountered a second and third layer of soft clay (CL) between elevations of about -38 to -48 feet NAVD and -59 to -65 feet NAVD, respectively.

The typical foundation soil profile, including engineering properties, adopted for analysis of the east section is presented below.



9.1.3 Middle Section

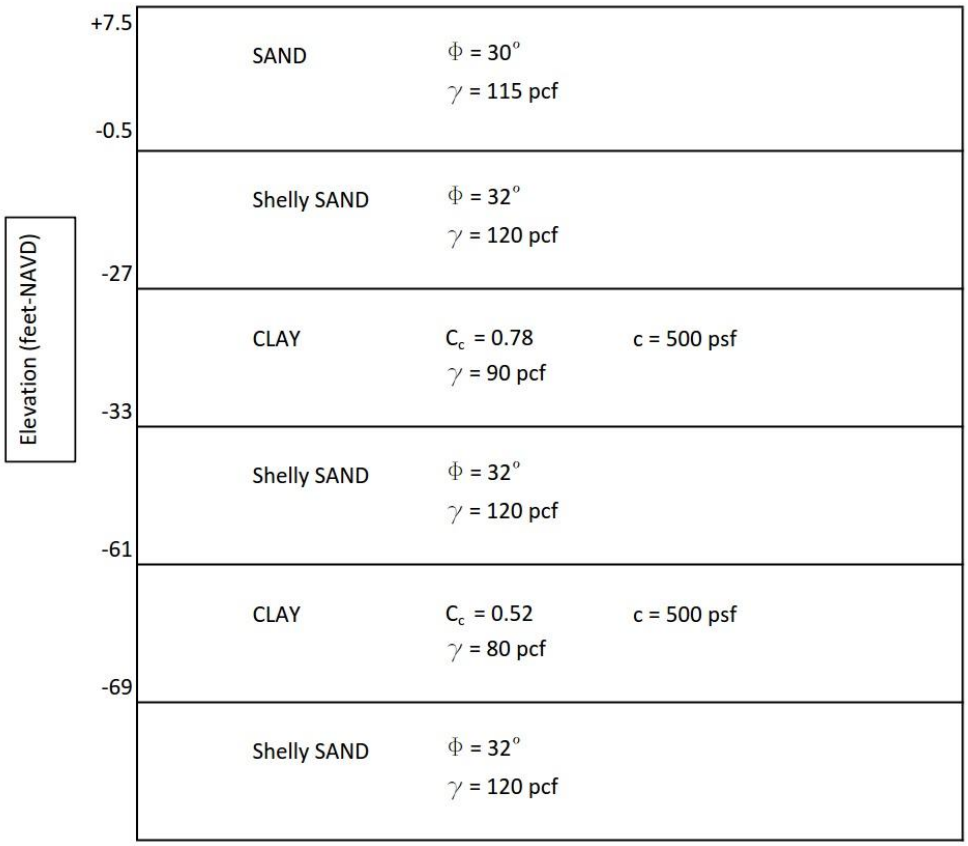
The design "Cross-Section: Middle" represents medium embankment fill heights for the north and south sides of the dike. With existing ground surface elevations at about +9 feet NAVD in the central part of the site, a maximum fill height of about 17 ½ feet was used for the middle section. This typical section is shown below.



The stratigraphy beneath middle section is represented by the conditions found in SPT Borings B-202 and B-204 as well as CPT soundings CPT-102, CPT-106, CPT-202, and CPT-205. In general, the subsurface profile consists of loose to medium dense fine sands and slightly silty fine sands (SP, SP-SM) that extend to elevations ranging from -26 to -30 feet NAVD. The upper sands are followed by about 2 to 7 feet of soft clay (CL) and then more very loose to medium dense fine sands and slightly silty fine sands (SP, SP-SM) to the maximum borehole depth at about Elevation -68 feet NAVD.

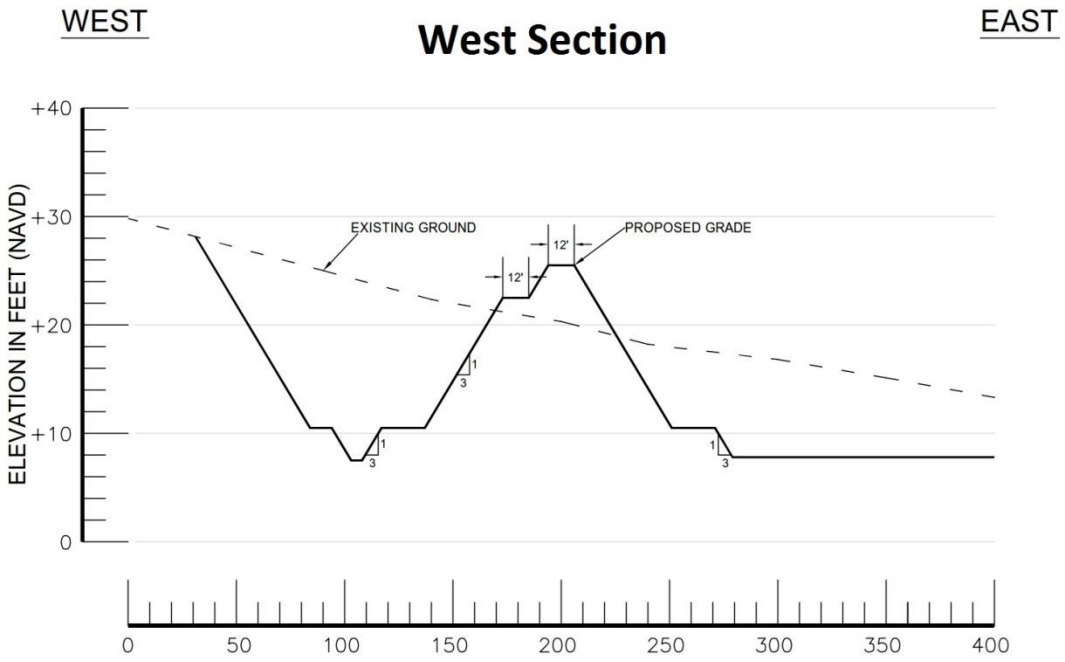
Boring B-202 found two layers of soft clay (CL) at elevations of about -27 to -32 feet NAVD and -61 to -68 feet NAVD.

The typical foundation soil profile, including engineering properties, adopted for analysis of the middle section is presented below.



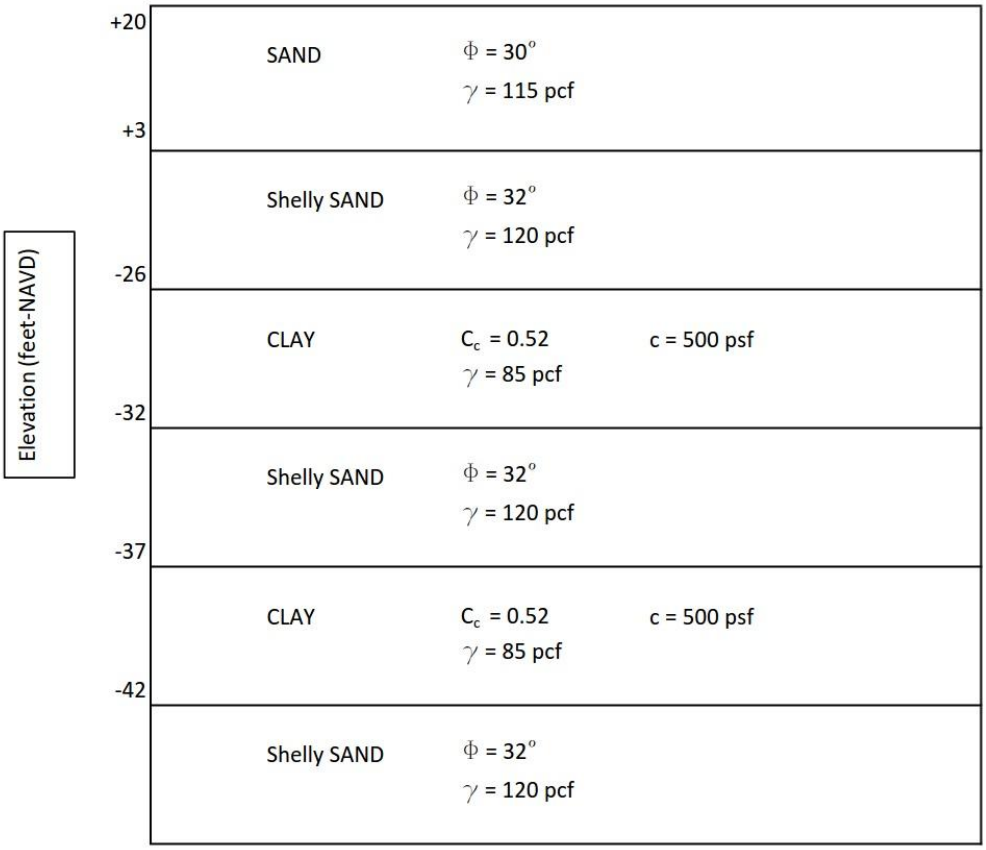
9.1.4 West Section

The high ground in the area of the west dike could involve grading options ranging from minimal cut, only to form a shallow drainage ditch, to a deep cut on the outboard slope to set its toe at the same elevation as the East and Middle dike design sections. The design “Cross-Section: West” represents the latter option as a worst case scenario involving a deep cut section in the topographically high western part of the site. Fill heights are minimal being a maximum of about 5 1/2 feet. This typical section is shown below.



The stratigraphy beneath west section is represented by the conditions found in SPT Borings B-101, B-201, and B-207. In general, the subsurface profile consists of loose to very dense fine sands and slightly silty fine sands (SP, SP-SM) that extend to the maximum borehole termination elevation of -81 feet NAVD, with a few intermittent layers of clay (CL). Two of the three borings showed clays of soft consistency ranging in thickness from about 3 to 9 feet and between elevations of about -23 and -42 feet NAVD. No clay was found in Boring B-201.

The typical foundation soil profile, including engineering properties, adopted for analysis of the west section is presented below.



9.2 Dike Settlement Analysis

9.2.1 Settlement Analysis Design Assumptions

The immediate (elastic) and long-term (consolidation) settlement was evaluated at thirteen different locations distributed along the three dike design sections. Each design section was represented by a trapezoidal stress diagram with a top (crest) width of 12 feet and a base width equal to that of each typical section. Each diagram was tapered from the crest to the base on a 3H:1V slope. Design Section “East” was modeled with a 160-foot base width having a pressure of 1,350 psf/foot of dike. Design Section “Middle” was modeled with a 150-foot base width having a pressure of 1,040 psf/foot of dike. Design Section “West” was modeled with a 55-foot base width having a pressure of 360 psf/foot of dike. The differences in load geometry and intensity are due to the variable embankment fill heights from west (low embankment) to east (high embankment) across the site.

9.2.2 Initial Settlement

Settlement within the sand layers (identified as Strata Numbers 1, 2, 4, 5, and 6 on the subsurface profiles provided in Appendix A) is expected to occur almost immediately as the weight of the embankment fill is applied (i.e. during construction). The elastic settlement of these soils under dike loading was estimated using the Schmertmann analysis procedures and calculation spreadsheets (Coduto 2001). The elastic modulus was calculated from empirical equations based on SPT blow counts (N-values) and CPT cone tip resistance values. Settlement within soils at depths greater than 100 feet below the base of the embankment was assumed to be negligible.

A summary of the estimated immediate settlement for each design section is summarized in the table below.

Table 9.2.2 Estimated Immediate Settlement

Design Section	Estimated Range of Sand Settlement (inches)	Estimated Average Sand Settlement (inches)
East	½ to 2 ½	2
Middle	½ to 2 ½	1 ½
West	½ to 1	1

These settlements are expected to occur during placement of the dike fill and post-construction settlement associated with the sand layers should be minimal.

9.2.3 Consolidation Settlement

The consolidation settlement within the clay soils (identified as Stratum Number 3 on the *Subsurface Profiles* provided in Appendix A) was calculated based upon the following design parameters:

Table 9.2.3-1 Clay Soil Index Properties

U.S.C.S. Classification	Void Ratio (e_0)	C_c strain
CL	1.52	0.52
CL/CH	2.58	0.78

The compressibility parameters for the clay soils were derived from laboratory consolidation tests (refer to **Section 7.6** of this report). The clays were assumed to be normally consolidated within the range of anticipated embankment loads based on those test results.

We calculated the approximate increase in vertical effective stress ($\Delta\sigma'_v$) below the center of the embankment section based on U.S. Army Corps of Engineers (USACE) methodology.

A summary of consolidation settlement estimates for each of the three dike sections is provided in the table below.

Table 9.2.3-2 Estimated Consolidation Settlement

Design Section	Estimated Range of Consolidation Settlement (inches)	Estimated Average Consolidation Settlement (inches)
East	4 ½ to 14	9
Middle	2 ½ to 5 ½	4
West	½ to 2	1 ½

The values reflect settlements beneath the dike crest due to consolidation of the clay layers. Consolidation settlement occurs over the long-term, in contrast to the immediate settlement of the sand layers, and therefore will continue after dike construction is complete as described in the following section. If it is critical to maintain the design crest elevation of the dike, it should be over-built with a camber to account for the estimated magnitude of consolidation settlement.

9.2.4 Time Rate of Settlement

The time rate of consolidation settlement will vary across the site due to differences in both clay layer and embankment fill thicknesses. The estimated time to reach various percentages of consolidation are summarized in the following table. The coefficient of compressibility (C_v) was based on the laboratory consolidation tests and calculated increases in vertical effective stress in the clay layer due to embankment fill loads.

Table 9.2.4 Estimated Rate of Consolidation

Cross Section	Coefficient of Compressibility (C_v) (ft^2/day)	Consolidation (%)	Time
East	0.056 to 0.063	30	6 months
		80	4 years
		90	6 years
Middle	0.021 to 0.049	30	6 months
		80	4 years
		90	5 ½ years
West	0.035	30	4 months
		80	2 ½ years
		90	3 1/2 years

The time required for 90% consolidation is estimated to be approximately 6 years for the middle and east dikes where the clay layer is the thickest. The clay is much thinner in the west section and therefore 90% consolidation in that area will be reached in about 3 1/2 years.

The time rate of consolidation could be accelerated by placement of wick drains beneath the dike. The table below indicates the estimated time required for 30, 80 and 90% consolidation at the east, middle, and west dike sections. The calculations are based on a wick spacing of five feet on center.

Cross Section	Consolidation (%)	Time (days)	Time (months)	Time (years)
East	30	58	2	0
	80	290	10	1
	90	435	15	1
Middle	30	152	5	0
	80	760	25	2
	90	1,140	38	3
West	30	91	3	0
	80	455	15	1
	90	682	23	2
Barron Hansbo Method Only horizontal/radial drainage (no vertical) 5-foot spacing Square spacing pattern $k_v/k_h = 1$ $d_w = 0.2$ feet (well diameter)				

As indicated, the time required for 90% consolidation beneath all dike sections is reduced by the wick drains to less than three years. The area-specific reduction is 42, 45 and 80% for the middle, west and east dike sections. The wick drains exhibit the most benefit to the east dike section. If wick drains are used for the east dike, we recommend that they be extended westward beneath the middle dike section a minimum distance of 600 feet. The drain spacing should be increased to 10 feet on center for the last 200 feet of the westward extension. That will allow for a gradual transition to the dike section without wick drains and reduce the potential for abrupt differential embankment settlement.

The actual magnitude and time rate of settlement of the dike should be monitored during construction through the use of settlement plates and pore water pressure transducers as discussed in **Section 10** of this report. If actual settlements vary significantly from our estimated settlements, then the dike overbuild should be adjusted accordingly.

9.3 Dike Seepage and Stability Analysis

9.3.1 Analysis Methodology

Field and laboratory test data were utilized to assign engineering properties for each of the subsoil layers in the east, west, and middle typical sections. Geotechnical computer software was then used to determine the slope stability factors of safety at each cross-section location under four different operational scenarios: End-of-Construction, Steady State Seepage, Transient Seepage, and Rapid Draw Down (of ditch water).

The pore water pressure in the soil layers must be defined within the computer software for each slope stability analysis. A steady-state seepage analysis was used to determine the pore water pressure for the end-of-construction and steady state scenarios. The phreatic surface was manually defined for the rapid draw down scenario. The transient seepage analysis incorporates the time required for the pool (impounded water) to rise and recede in calculating the phreatic surface and pore water pressures.

The seepage and stability analyses were run using the computer programs SEEP/W and SLOPE/W, respectively. These programs are part of the GeoStudio two-dimensional finite element software suite developed by GEO-SLOPE International Ltd. SEEP/W uses a hydrogeologic model to determine seepage paths, seepage flow rates, phreatic surfaces, pore water pressures and exit gradients for steady state and transient seepage problems. SLOPE/W runs limit-equilibrium slope stability analyses using a method-of-slices search routine to determine a safety factor for multiple potential failure surfaces. SLOPE/W can use pore water pressures calculated from a phreatic surface that is manually defined by the user or it can use pore water pressures generated by SEEP/W.

The seepage exit gradients obtained from SEEP/W were compared with the exit gradients considered to be safe for major impoundments. For sandy soils, the factor of safety against piping (i.e. seepage induced soil erosion) is simply expressed as the reciprocal of the exit gradient. The recommended factor of safety for piping is considered to be a minimum of 3.0 as indicated in the U.S. Army Corps of Engineers (USACE) Engineering Manual EM 1110-2-1901 – Seepage Analysis and Control for Dams.

For the stability analyses, the circular failure surface search routine using Morgenstern-Price's Method of Slices was used to find the minimum factor of safety failure surface. The Engineering Manual for Slope Stability published by the USACE, EM 1110-2-1902, Table 3-1 indicates that the required minimum factor of safety is 1.5 for slopes under long-term conditions with steady-state seepage and 1.3 for upstream slopes during rapid drawdown from the Maximum Storage Pool. The embankment stability analysis results were compared to these minimum factors of safety.

9.4 Slope Stability Analysis

9.4.1 Geotechnical Design Parameters

The slope stability geotechnical design parameters utilized in the evaluation included moist and saturated unit weights, angles of internal friction and cohesion. The soil unit weight and strength parameters were based on standard correlations with SPT N-values. The strength parameters (cohesion and friction angle) were based on correlations with SPT and CPT data and generally less than (i.e. more conservative) than values reflected by the laboratory triaxial tests. The ranges of the soil parameters used for the three design sections are provided in the following table.

Table 9.4.1 Geotechnical Design Parameters

Material Description	Saturated Unit Weight (pcf)	Angle of Internal Friction (degrees)	Cohesion (psf)	Permeability (k_h) (feet/day)
Dredged Material	100	25	-	6
Embankment	120	32	-	6
Sand	115	30	-	5
Shelly Sand	120	32	-	10
Clay	80 - 90	0	500	0.01

Notes: 1. k_h/k_v was assumed to be 1 for all soil types.

The following sections of the report summarize the results of the long-term seepage and slope stability analyses for the three design cross-sections (east, middle, and west). The results are also shown graphically on the attached Exhibits E-1 through E-22 and F-1 through F-8 in Appendices E and F. For each cross-section separate figures are provided to show each of the seepage and stability scenarios: end-of-construction, steady-state seepage, transient seepage and rapid drawdown scenarios.

The failure planes and corresponding factors of safety for the stability analyses presented herein represent the worst case scenario for each condition and section. Deeper failure planes from the dike crest to the ditch toe were also analyzed but are not shown because they do not represent the worst case scenario (i.e. lowest factor of safety).

9.4.2 Dike Stability Analysis Results

The results of the slope stability analyses of the three dike design cross-sections are summarized in the following table.

Table 9.4.2 Dike Slope Stability Analysis Results

Cross Section	Analysis Condition	Minimum Factor of Safety, F.S. (USACE)	Calculated Factor of Safety, F.S.	
			Upstream Slope	Downstream Slope
East	End-of-Construction	1.3	-	1.9
	Steady State	1.5	-	1.7
	Transient	1.5	2.0 to 2.1	-
Middle	End-of-Construction	1.3	-	1.9
	Steady State	1.5	-	1.7
	Transient	1.5	2.0 to 2.1	-
West	End-of-Construction	1.3	-	1.7
	Steady State	1.5	-	1.6
	Transient	1.5	2.0	-

The calculated safety factors are all above the USACE minimum values.

9.4.3 Ditch Stability Analysis

The results of the slope stability analyses for the three perimeter ditch cross-sections are summarized in the table below.

Table 9.4.3 Ditch Slope Stability Analysis Results

Cross Section	Analysis Condition	Minimum Factor of Safety, F.S. (USACE)	Calculated Factor of Safety, F.S.			
			Inside (Sand)	Outside (Sand)	Inside (rip-rap)	Outside (rip-rap)
East	End-of-Construction	1.3	1.5	1.6	1.9	1.9
	Steady State	1.5	**1.1**	1.5	1.7	1.9
	Rapid Draw Down	1.3	**1.1**	1.3	1.7	1.9
Middle	End-of-Construction	1.3	1.5	1.6	1.9	1.9
	Steady State	1.5	**1.0**	1.6	1.9	1.9
	Rapid Draw Down	1.3	**1.0**	1.4	1.6	1.9
West	End-of-Construction	1.3	1.6	1.5	1.9	1.9
	Steady State	1.5	**1.3**	**1.3**	1.9	1.9
	Rapid Draw Down	-	-	-	-	-

The calculated factors of safety fell slightly below the USACE minimum values in all three design cross-sections under either steady-state seepage (Year 40 maximum impoundment operating level) or rapid draw down conditions as indicated above.

Ditch slope stability is significantly less critical than dike stability and may warrant a risk-based approach by dealing with ditch slope issues, should they occur, through routine post-construction inspection and maintenance. However, the inside slopes are of greater importance since they support the outfall piping from the weir and toe drain.

The stability analyses were re-run with a rip-rap lining on the slopes. The height of the rip-rap section in our analyses was 6 feet, 4 ½ feet, and 1 ½ feet for the east, middle, and west sections, respectively. Those heights correspond to top of rip-rap elevations of +6 feet for the east and middle ditch sections and +9 feet for the west section. The assumed rip-rap section was an 18-inch thick layer of limestone boulders over 6 inches of gravel bedding material. As indicate in Table 9.4.3 the rip-rap increased the factors of safety above the minimum required values.

9.4.4 Cut Slope Stability Analysis

Site grading along the west side of the dike will be largely in cut. Current (pre-construction) groundwater elevations are relatively high in this area. The planned perimeter ditch will draw seepage from both the impoundment and the higher ground to the west. Cut slopes at 3H:1V will be stable (F.S.>1.5) under dry conditions. However, seepage exiting the face of the backside cut above its toe could cause a slope stability issue. Similar to the dike downstream slope, installation of a drain feature may be necessary to keep the slope face dry.

9.5 Dike Seepage Analysis

9.5.1 Seepage Analysis Soil Properties

The principal soil property required for seepage analysis is hydraulic conductivity. Hydraulic conductivity values for the various soil layers were estimated using the laboratory permeability test results and our experience with similar soil types.

The hydraulic conductivity values used in the seepage analyses are provided in Table 9.4.1 in **Section 9.4.1**.

9.5.2 Boundary Conditions

All seepage analyses used constant head boundary conditions to represent the inside pool (impounded water) and outside water features (i.e. perimeter ditch). Exit-face boundary conditions were used on all outside slopes to allow the SEEP/W model to identify locations where the phreatic surface would exit the slope.

Constant head and no-flow boundary conditions were utilized on the vertical faces at the inside and outside limits of the model. The horizontal distances ranged from approximately 150 to 240 feet between the dike and the inside vertical face for the three design sections. The horizontal distances from the ditch to the outside limits of our model ranged from approximately 21 to 50 feet for the east and middle design sections and 195 feet for the west design section due to the specific cut slope stability evaluation needed in this area. The constant head boundary conditions for the water features in each design section are summarized in the following tables:

Table 9.5.1-1 East Cross-Section Boundary Conditions

Analyses	Pool Elevation (feet-NAVD)	Toe Drain Elevation (feet-NAVD)	Ditch Water Elevation (feet-NAVD)	Groundwater Elevation (feet-NAVD)
End-of-Construction	+9.8	+8.5	+4.5	+4.5
Steady State	+23.5	+8.5	+3.0	+4.5
Rapid Draw Down	+23.5	+8.5	+4.5 to +1.5	+4.5

Table 9.5.1-2 Middle Cross-Section Boundary Conditions

Analyses	Pool Elevation (feet-NAVD)	Toe Drain Elevation (feet-NAVD)	Ditch Water Elevation (feet-NAVD)	Groundwater Elevation (feet-NAVD)
End-of-Construction	+9.8	+8.5	+4.5	+4.5
Steady State	+23.5	+8.5	+3.0	+4.5
Rapid Draw Down	+23.5	+8.5	+4.5 to +1.5	+4.5

Table 9.5.1-3 West Cross-Section Boundary Conditions

Analyses	Pool Elevation (feet-NAVD)	Toe Drain Elevation (feet-NAVD)	Ditch Water Elevation (feet-NAVD)	Groundwater Elevation (feet-NAVD)
End-of-Construction	+9.8	+8.5	+7.5	+16.3
Steady State	+23.5	+8.5	+7.5	+16.3
Rapid Draw Down	N/A	N/A	N/A	N/A

9.5.3 Seepage Flow Rates

The seepage analysis indicated that the dike's downstream slope will be wet at its toe under steady-state seepage conditions. To avoid a wet toe, we recommend that a toe drain be installed beneath the entire length of the dike's downstream slope. The toe drain was modeled by inserting a node into the finite element mesh with a "sink" type boundary condition (i.e. the pressure equals 0 at the drain). The node (i.e. drain) was set at two feet below the downstream slope toe. The following table presents the seepage flow rates into the drain under steady-state seepage conditions for the three cross-sections.

Table 9.5.3-1 Seepage Flow Rate Into Toe-Drain

Cross Section	Seepage Flow Rates per foot of dike (ft^3/day)	Seepage Flow Rates per foot of dike (gpm)
East	15.1	0.078
Middle	14.6	0.076
West	23.5	0.122

The water flowing to the drain will need to be routed to the perimeter ditch via an outfall pipe with positive gravity flow. The following table presents the total seepage flow rate into the perimeter ditch under steady-state seepage conditions for the three cross-sections.

Table 9.5.3-2 Seepage Flow Rate Into Perimeter Ditch

Cross Section	Seepage Flow Rates per foot of dike (ft^3/day)	Seepage Flow Rates per foot of dike (gpm)
East	56.6	0.294
Middle	53.5	0.278
West	51.6	0.206

9.5.4 Seepage Exit Gradients

The quantitative results of the seepage analyses for the end-of-construction and steady-state seepage scenarios are provided on Exhibits F-1 through F-8 in Appendix F. The seepage results indicate that most seepage lost from the DMMA will flow through the dike and within the upper sands above the clay strata. The SEEP/W results also show that the phreatic surface does not exit on the face of the downstream slope, but instead passes through the toe drain.

The exit gradients into the perimeter ditch under steady-state seepage conditions were determined for each design section. The phreatic surface exit gradient into the perimeter ditch for each dike section is presented in the following table.

Table 9.5.4 Seepage Exit Gradients

Cross Section	Perimeter Ditch Surface Exit Gradient	Corresponding Piping Safety Factor
East	0.254	3.9
Middle	0.188	5.3
West	0.333	3.0
West (outside ditch slope)	0.234	4.3

9.6 Weir Structure Foundations

The weir structure base slab will require deep foundation support due to excessive settlements from consolidation of the underlying clay layers caused by the weight of the adjacent dike. Driven pre-stressed concrete (PSC) piles may be used for support of the weir structure. Our evaluation considered 14-inch and 18-inch square PSC piles driven through the three clay layers found in Boring B-203. Deeper soil data from B-102 was used to evaluate the capacity below these layers. Additionally, excessive down drag on the pile from placement of the embankment fill should be avoided by pre-drilling to 70 feet below existing grade. The upper 70 feet of soil is neglected from the capacity estimate.

Axial compressive capacities for the piles were calculated using the FB Deep. The program uses a methodology based on empirical correlations between Cone Penetrometer Tests and Standard Penetration Tests for typical Florida soils. The capacity curves for the piles are presented on Exhibits G-1 and G-2 in Appendix G.

The elevated walkway will be supported by driven timber piles. Driven timber piles will derive their compressive capacity through a combination of end bearing and side friction. Axial compressive capacities for the piles were calculated using the Nordlund (1963) design method as laid out in the FHWA Manual: Design and Construction of Driven Pile Foundations (FHWA-HA-97-013). The Nordlund method uses a semi-empirical approach considering the pile type and the soil-pile interaction. The calculated pile capacity is a function of the subsurface soil properties, friction angle at the soil-pile interface, taper of the pile, pile length, and soil volume displaced. Soil properties used in our calculations were based on correlations from SPT N-values and laboratory testing.

The lumber type assumed for our analyses was Southern Pine. Timber piles are subject to decay, insect attack, and fire, depending on the environment. To avoid these potential problems, we recommend that all timber piling be pressure treated with an environmentally acceptable preserving chemical.

The analyses were performed for a 14-inch butt diameter and 10-inch tip diameter timber pile driven (embedded) to 20 feet bls for the subsurface profile conditions at the locations of Borings B-203. Side shear capacity developed in the dike fill was neglected from the pile capacity

estimate. Additionally, due to the light loads associated with the weir access walkway, end bearing capacity was neglected from the pile capacity estimate. Therefore, the allowable pile compressive capacity is equal to the pile's ultimate side friction, minus the shaft resistance from the dike fill, divided by a factor of safety of 2. The results of the analysis for the piles are presented in the table below.

Table 9.6-1 Weir Pile Capacity

Boring	Pile Butt Diameter (inches)	Pile Butt Diameter (inches)	(1) Embedment Depth (bls)	(2) Pile Capacity (kips)	
				Ultimate	Allowable
B-203	14	10	20	34	17

(1) Pile capacity estimate based on pile driven 20 feet below existing grade.
(2) Pile capacity estimates neglect end bearing resistance and shaft resistance developed in the dike fill.

The results of the SPT borings and laboratory test data were used to estimate geotechnical parameters applicable to the lateral analysis of both the PSC piles used for support of the weir structure and timber piles used for support of the elevated walkway. A summary of the geotechnical design parameters for the generalized subsurface profile condition is presented in the following table.

Table 9.6-2 Geotechnical Soil Parameters for Lateral Analysis

Boring	Soil Type	Depth (feet)	Range of SPT N-Values	Soil Unit Weight (pcf)		Angle of Internal Friction (degrees)	Effective Cohesion (psf)	Lateral Earth Pressure Coefficients	
				Moist	Saturated			Ka (Active)	Kp (Passive)
Fill		-	-	115	120	32	0	0.31	3.25
B-203	Sand	0 to 5	5 to 8	110	115	30	0	0.33	3.00
	Shelly Sand	5 to 30	6 to 22	115	120	32	0	0.31	3.25
	Clay	30 to 37	4	75	80	0	500	0	0
	Shelly Sand	37 to 43	26	115	120	32	0	0.31	3.25
	Clay	43 to 53	5 to 6	75	80	0	500	0	0
	Shelly Sand	53 to 63	12 to 28	115	120	32	0	0.31	3.25
	Clay	63 to 70	2 to 8	75	80	0	500	0	0

With an embedment depth of 20 feet, the pile tips will bear above the clay layers and therefore will experience total settlements comparable to the consolidation settlements of the east dike. Piles near the crest could settle up to about 14 inches over a period of 6 years while piles at the toe of the dike should experience about 7 inches of settlement. If that magnitude of differential settlement is not acceptable for the weir access walkway, then its construction should be delayed. Should the construction need to commence sooner, consolidation settlement may be accelerated by placement of wick drains beneath the dike at the location of the weir structure.

Deeper embedment of the timber piles to reduce settlement was considered impractical due to the excessive pile lengths required to bypass the clay strata and overcome down drag forces of the overburden soils.

10.0 CONSTRUCTION RECOMMENDATIONS

10.1 Dikes

10.1.1 Foundation Preparation

Earthwork operations should begin with the stripping of any surficial organic soil (topsoil) from the planned limits of the DMMA. The stripped topsoil should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and re-compacted. After stripping, the exposed surface should be proof-rolled to aid in locating loose or soft areas. Proof-rolling should be performed with a vibratory roller with a minimum static weight of 20,000 pounds. The roller should make a minimum of eight overlapping passes over all areas of the site, the latter four passes at right angles to previous passes. The soils should be compacted sufficiently to obtain a minimum compaction of 95 percent of the maximum density at moisture content within 2 percent of the optimum moisture content as determined by ASTM D 1557 to a minimum depth of 12 inches prior to fill placement.

10.1.2 Wick Drain Installation

Procurement and installation of the wick drains and their associated monitoring equipment should be in accordance with applicable sections of the Florida Department of Transportation (FDOT) Technical Special Provision for Wick Drains, Geotechnical Monitoring Equipment, and Installation. The wick drains should consist of a band-shaped plastic core enclosed in an appropriate geotextile. The wick drains should be placed in a square grid pattern at 5-foot spacing within the dike embankment footprint. A spacing of 10 feet should be used for the 200-foot long transitions to embankment sections without drains. Wick drains should be installed from the prepared foundation grade to the bottom of the deepest clay layer (approximately Elevation -70 feet NAVD).

10.1.3 Settlement Monitoring

Settlement platforms and vibrating wire pore pressure piezometer transducers should be installed prior to fill placement. We recommend placing settlement platforms along the east dike centerline at a 300-foot maximum spacing. The settlement platforms should be installed at the ground surface after it has been cleared, grubbed, and proof-rolled prior to dike fill placement. We also recommend the installation of four direct push vibrating wire pressure transducers along the dike centerline on the east side of the project. These transducers should be placed in the center of the soft clay layer (Stratum No. 3) as determined from SPT borings sampled at 2.5-foot intervals.

10.1.4 Fill Placement

The fill borrow soil is anticipated to be near-surface clean sand to slightly silty sand (SP and SP-SM). Silty to clayey sand (SM to SC) with fines contents up to 25 percent may be used on the inside portion (not within 5 feet measured normal to the slope face) of the dike section. The fill should be free of roots, vegetation, and other deleterious materials. It should have an organic content no greater than 2 percent by weight.

Fill should be placed parallel to centerline of the dikes. Each lift of fill should extend across the entire dike section. The compacted surface of each lift should be scarified by light disking, or by any other approved method, before the succeeding layer is placed. After dumping the succeeding lift, materials should be spread by bulldozers or other approved means in approximately horizontal layers over the entire fill area. The fill should be placed in maximum 12-inch thick loose lifts.

The gradation and distribution of materials throughout the compacted earth fill section of the dike shall be such that the dike will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material. The fill should be disked or harrowed to blend.

The materials in each layer of the fill should be within ±2 percent of the soil's optimum moisture content, as determined by ASTM D 1557. The moisture content after compaction should be as uniform as practical throughout any one layer. Harrowing, disking, or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained.

The materials in each layer of the fill should be compacted as required to obtain a minimum of 95 percent of the soil's maximum dry density determined by ASTM D 1557.

10.1.5 Seepage Toe Drains

The seepage toe drain should be constructed with an invert elevation at a minimum of two feet below the toe of the outboard dike slope. The drain should outfall to the perimeter ditch via gravity flow through an outlet pipe.

The toe drain should consist of a perforated, corrugated high density polyethylene (HDPE) pipe embedded in inert fine gravel and wrapped with a non-woven polypropylene geotextile. Given the estimated magnitude of dike settlement and associated potential for embankment cracking, we recommend extending the horizontal geotextile-wrapped gravel layer upward on a 3H:1V incline as a blanket (i.e. sloping chimney type) drain beneath the outboard slope.

10.1.6 Site Saline Controls

Based on the groundwater modeling results, presented in our Preliminary Geotechnical Report dated December 8, 2014, a perimeter ditch system will be used to control the lateral movement of seepage from the impoundment. Water impounded during dredging events will be high in chloride content and seep into the subsurface . The seepage will flow predominately in the shallow sand strata, above the first layer of clay, with strong influence from a west to east hydraulic down gradient in the shallow aquifer. The perimeter ditch along the north, south and east sides of the dikes will be deepened , and widened, as compared to the typical DMMA drainage ditch. The ditch bottom will be extended to elevations between +3 and 0 feet NAVD to allow control of ditch water between elevations of +4.5 and +1.5 feet NAVD. The target operational control of the ditch is +3 feet NAVD, but that level may need to adjusted up or down during wet (high groundwater) and dry (low groundwater) seasons, respectively, to increase seepage capture.

The ditch water should flow to a permanent closed outfall with ultimate discharge into the ICWW.

The west ditch will be the typical drainage type and flow through box structures necessary for the vertical transfer of water into the deeper north and south ditch sections.

10.2 Groundwater Control

Where groundwater is expected to be encountered during excavation, a dewatering system should be installed to prevent softening and disturbance of subgrade below foundations and fill material, to allow foundations and fill material to be placed in the dry, and to maintain stable excavation side slopes. Groundwater should be maintained at least 3 feet below the bottom of any excavation.

Dewatering systems for structures should be kept in operation until the dead load of the structure exceeds possible buoyant uplift force on structure. Dewatering systems should be shut off at such a rate as to prevent a quick upsurge of water that might weaken the subgrade, or cause instability in excavation side slopes.

10.3 Structures

Subgrade to receive fill or backfill should be free of organic material, roots, stumps or other undesirable material. It should be scarified to a depth of 6 inches and compacted to a minimum of 95 percent of the soil's maximum dry density as determined by ASTM D 1557.

Fill and backfill adjacent to structures should be placed in 12-inch maximum loose lifts and compacted as necessary to obtain a minimum of 95 percent of the soil's maximum dry density determined by ASTM D 1557. Fill material should be compacted with equipment of proper type and size to obtain the density specified. Hand-operated equipment should be used for filling and backfilling within 3 feet of walls and retaining walls. When hand-held equipment is used, fill should be placed in 6-inch maximum loose lifts. Fill or backfill material should not be placed when the air temperature is less than 40 degrees Fahrenheit and when the subgrade to receive the material is wet, loose, or soft.

Backfill should not be placed around any part of concrete structures until each part has reached its specified 28-day compressive strength. Backfilling should not commence until stripping of concrete forms, trash removal from excavations, concrete finishing, damp-proofing and waterproofing have been completed.

Fill should not be placed against walls until slabs at the top, bottom and intermediate levels of walls are in place and have reached 28-day required compressive strength to prevent wall movement.

Fill and backfill should be brought up uniformly around the structures and individual walls, piers, or columns.

10.4 Weir Discharge Pipe

Significant consolidation settlement is anticipated beneath the dike in the vicinity of the weir's discharge pipe. To reduce post-construction settlement of the pipe, we recommend constructing the full dike section in this area early in the construction schedule. When consolidation settlement is nearly complete, a portion of the dike would then be removed to expose a minimum 15-foot wide work area along the pipe alignment. After the pipe is installed, the dike fill should be replaced. The excavation slopes should be no steeper than 4H:1V, and each lift of the new fill should be bench-cut into the existing fill a minimum horizontal distance of 2 feet.

Seepage control should be placed along the pipe where it penetrates the dike to avoid the potential for piping of soils along the outside of the pipe. The seepage control would involve: installing a pipe cradle consisting of flowable fill or low strength concrete around the lower half of the pipe; and placing a minimum 1-foot thick envelope of permeable sand around the pipe and cradle passing beneath the downstream slope of the dike.

11.0 SUMMARY AND RECOMMENDATIONS

The proposed DMMA footprint area is underlain by a thick (100 feet +/-) deposit of mostly granular soils consisting of relatively clean to slightly silty sands containing broken shell and grading to clayey at deeper depths. The sands are generally firm (medium dense) in terms of relative density. A soft clay was found in individual layer thicknesses of 2 to 10 feet beginning at depths of about 30 feet below the existing ground surface. One of the 100-foot deep SPT borings showed hard limestone in its bottom 7 feet.

The clay occurs in two to three discrete layers between elevations of about -26 feet and -69 feet NAVD. Maximum aggregate clay layer thicknesses are 11 feet, 14 feet, and 23 ½ feet beneath the west, middle and east sections, respectively, of the DMMA.

The presence of the clay layer is beneficial with respect to management of seepage from the impoundment. Seepage of impounded waters will predominately move laterally in the shallow sand layers above the clay and allow for effective capture in a perimeter ditch system. Conversely, the clay is soft and locally thick which will cause significant dike and weir structure settlement at the east end of the DMMA.

Three design dike sections (west, middle, and east) were used for engineering analysis to account for the variability in both topography and subsoil conditions from west to east across the site. Maximum dike (embankment fill) heights of 5 ½ feet, 17 ½ feet, and 21 feet were considered for the west, middle, and east design sections, respectively.

Slope stability analyses indicated sufficient stability in the dike sections, based on USACE criteria, for end-of-construction, steady-state seepage, and transient seepage conditions. Placement of a toe drain beneath the dike's downstream (outboard) slope is required to maintain sufficient stability under steady-state seepage conditions. Given the magnitude of estimated dike settlement, we recommend that the toe drain be extended upward as a chimney drain. The perimeter ditch stability, in the middle and east sections, fell below UASCE required minimum factors of safety for steady-state seepage and rapid draw down conditions. Those ditch sections became marginal at the time of the third dredging event (Year 20 of DMMA operation). Placement of rip-rap lining on the interior ditch slope would maintain sufficient stability throughout the 50-year life span of the DMMA.

Estimated dike settlements from elastic compression of the sand strata added to consolidation of the clay layers are summarized in the following table.

Table 11 Summary of Settlement Estimates

Design Section	Estimated Range of Sand Settlement (inches)	Estimated Range of Consolidation Settlement (inches)	Total Estimated Range of Settlement (inches)
East	½ to 2 ½	4 ½ to 14	5 to 16 ½
Middle	½ to 2 ½	2 ½ to 5 ½	3 to 8
West	½ to 1	½ to 2	1 to 3

The estimated combined settlement values should be considered for earthwork volume estimates and to establish crest over-build elevations.

The sand settlement will be immediate occurring simultaneously with placement of the dike fill. Clay consolidation could take up to six years following the end of dike construction but could be reduce to less than three years by installation of wick drains.

The magnitude and duration of clay consolidation will impact both design and construction of the weir structure. The weir foundation slab will need to be supported on deep, driven, pre-cast concrete piles to limit total structure settlement to less than 1 inch. The walkway part of the structure, which typically includes short (20 feet +/-) timber piles for nominal vertical and lateral support, could experience total and differential settlements of up to 14 inches. The most practical option to reduce that settlement would be insertion of wick drains to accelerate clay consolidation prior to placement of the structure.

The perimeter ditch along the north, south and east sides of the dikes will be deepened, and widened, as compared to the typical DMMA drainage ditch for seepage (saline plume) management. The ditch bottom will be extended to elevations between +3 and 0 feet NAVD to allow control of ditch water between elevations of +4.5 and +1.5 feet NAVD. The target operational control of the ditch is +3 feet NAVD, but that level may need to adjusted up or down during wet (high groundwater) and dry (low groundwater) seasons, respectively, to increase seepage capture.

Seepage analyses estimated a maximum flow to the toe drain of about 25 cubic feet per day per lineal foot (cfd/lf) of dike under stead-state conditions. Steady-state seepage generates an additional 60 cfd/lf of flow directly into the perimeter ditch while operating with a control elevation of + 3 feet NAVD.

The groundwater flow gradient mimics the topographic decline from west to east across the site.

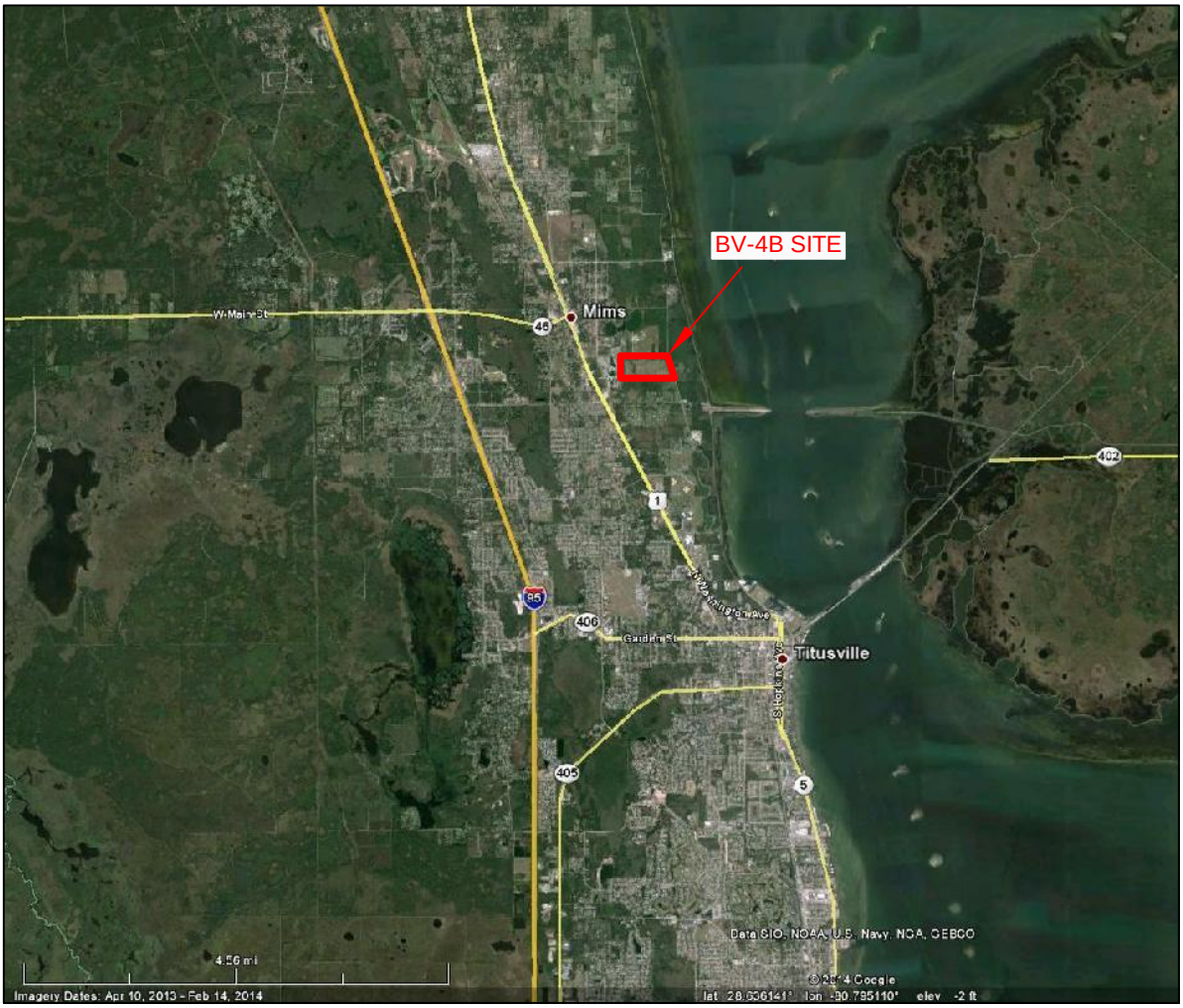
Depths to groundwater measured in on-site monitoring wells during the study period (i.e. early part of the rainy season) ranged from 1 1/2 to 13 1/2 feet below the existing ground surface. Groundwater control (dewatering) will likely be needed to accomplish fill placement at lower elevations and borrow excavation in the dry.

Borrow excavations up to 10 feet bls should produce a blend of relatively clean to slightly silty fine sands that would meet the engineering properties adopted for analysis and therefore be suitable for general embankment fill.

12.0 GENERAL COMMENTS

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless DUNKELBERGER reviews the changes and either verifies or modifies the conclusions of this report in writing.



SOURCE: GOOGLE EARTH PRO

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	

VICINITY MAP

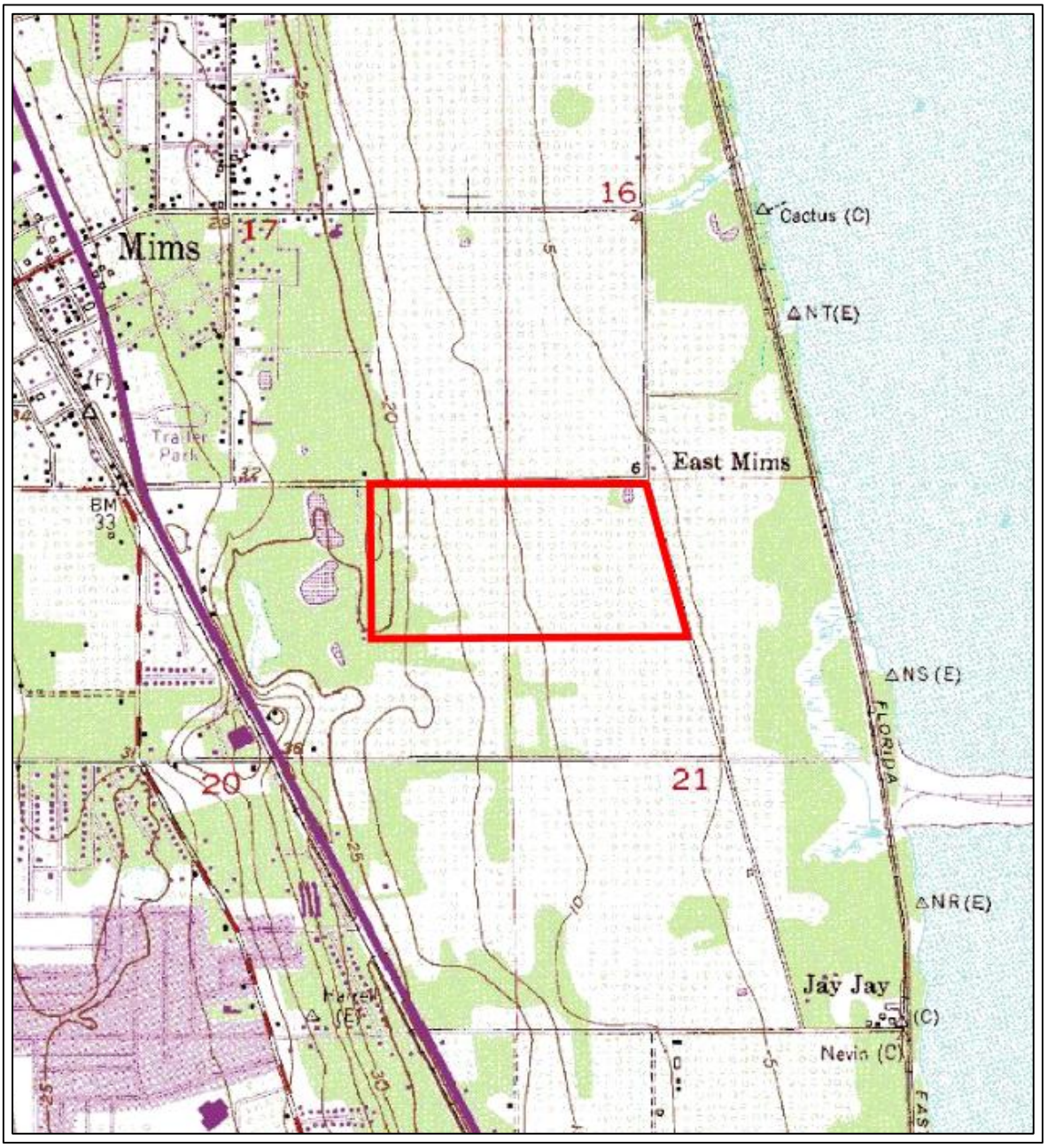
BV-4B

ST. LUCIE COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	1

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



SCALE 1 : 20 000

1000 0 1000 2000 3000 4000 5000

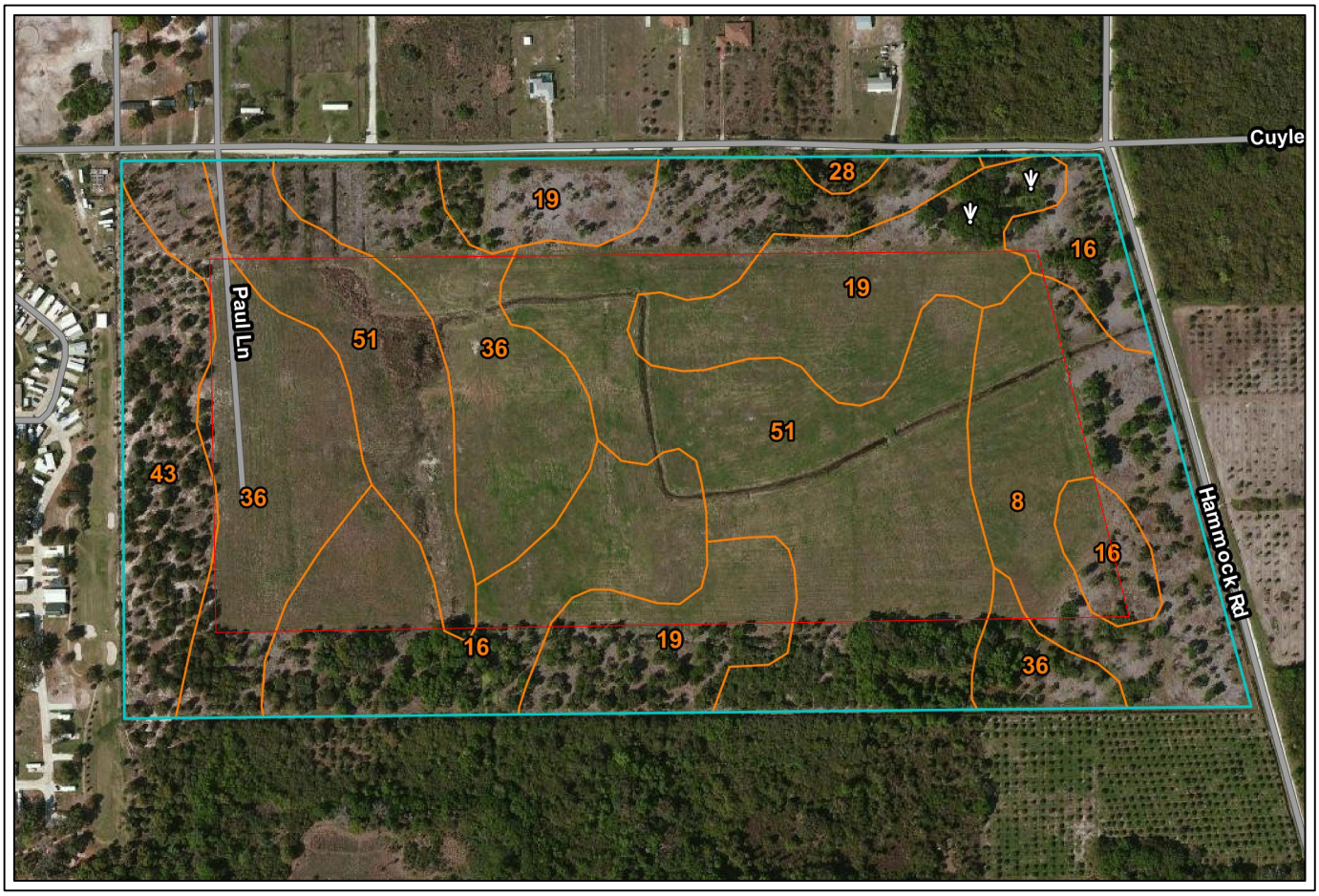
CONTOUR INTERVAL 5 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

N

JENSEN BEACH, FLORIDA
1949; PHOTO REVISED 1983
7.5 MINUTE SERIES (TOPOGRAPHIC)

Project Mngr: DSD	Project No. HB145006	DUNKELBERGER engineering & testing, inc. A Terracon COMPANY	TOPOGRAPHIC VICINITY MAP	SHEET
Drawn By: BML	Scale: AS SHOWN	607 NW COMMODITY COVE PORT ST. LUCIE, FL 34986	GEOTECHNICAL SITE EXPLORATION	2
Checked By: BML	File No. -	PH. (772) 343-9787 FAX. (772) 343-9404	TAYLOR ENGINEERING, INC.	
Approved By: DSD	Date: 7-3-14		BV-4B	
			Indian River County Florida	



SCALE 1 : 6000

200 0 200 400 600 800 1000

SOIL LEGEND

8	BRADENTON FINE SAND, LIMESTONE SUBSTRATUM
16	COPELAND-BRADENTON-WABASSO COMPLEX, LIMESTONE SUBSTRATUM
19	RIVIERA SAND
28	IMMOKALEE SAND
36	MYAKKA SAND
43	PAOLA FINE SAND, 0 TO 5 PERCENT SLOPES
51	POMPANO SAND

SITE BOUNDARY

DMMA FOOTPRINT BOUNDARY

N

U.S.D.A. SOIL SURVEY FOR INDIAN RIVER COUNTY, FLORIDA
ISSUED: JANUARY 1987

Project Mngr: DSD	Project No. HB145006	DUNKELBERGER engineering & testing, inc. A Terracon COMPANY	SOILS MAP
Drawn By: BML	Scale: AS SHOWN	607 NW COMMODITY COVE PORT ST. LUCIE, FL 34986	GEOTECHNICAL SITE EXPLORATION
Checked By: BML	File No. -	PH. (772) 343-9787 FAX. (772) 343-9404	TAYLOR ENGINEERING, INC.
Approved By: DSD	Date: 7/3/14		BV-4B
			Indian River County Florida

SHEET 3



SOURCE: MORGAN & EKLUND, INC.

0' 250' 500' 1000'

LEGEND

MW-1M - MONITORING WELL LOCATION, NUMBER, & GROUND ELEVATION (FEET-NAVD88)

PZ-1 - PIEZOMETER (MONITORING WELL) INSTALLED BY DUNKELBERGER (FEET-NAVD88)

Locations are approximate.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	2-11-15

MONITORING WELL LOCATION PLAN

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
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SOURCE: MORGAN & EKLUND, INC.

0' 100' 200' 400'

LEGEND

⊕ B-101 - STANDARD PENETRATION TEST BORING LOCATION AND NUMBER

⊕ CPT-102 - CONE PENETRATION TEST BORING LOCATION AND NUMBER

⊕ HB-301 - HAND AUGER BORING LOCATION AND NUMBER

Locations are approximate.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	2-11-15

BORING LOCATION PLAN

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
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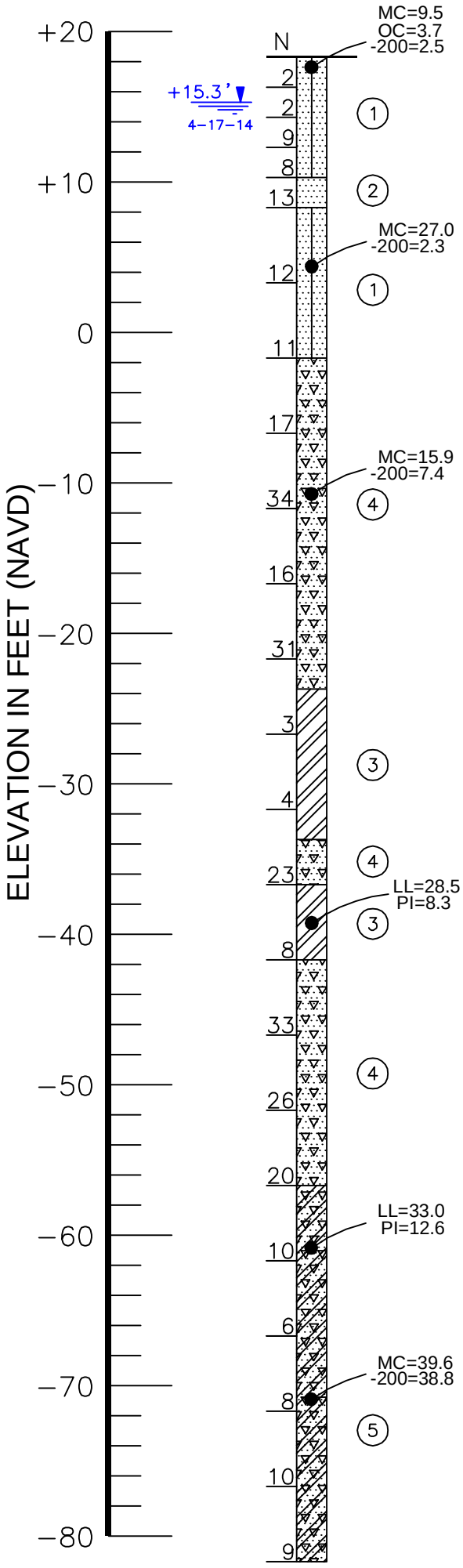
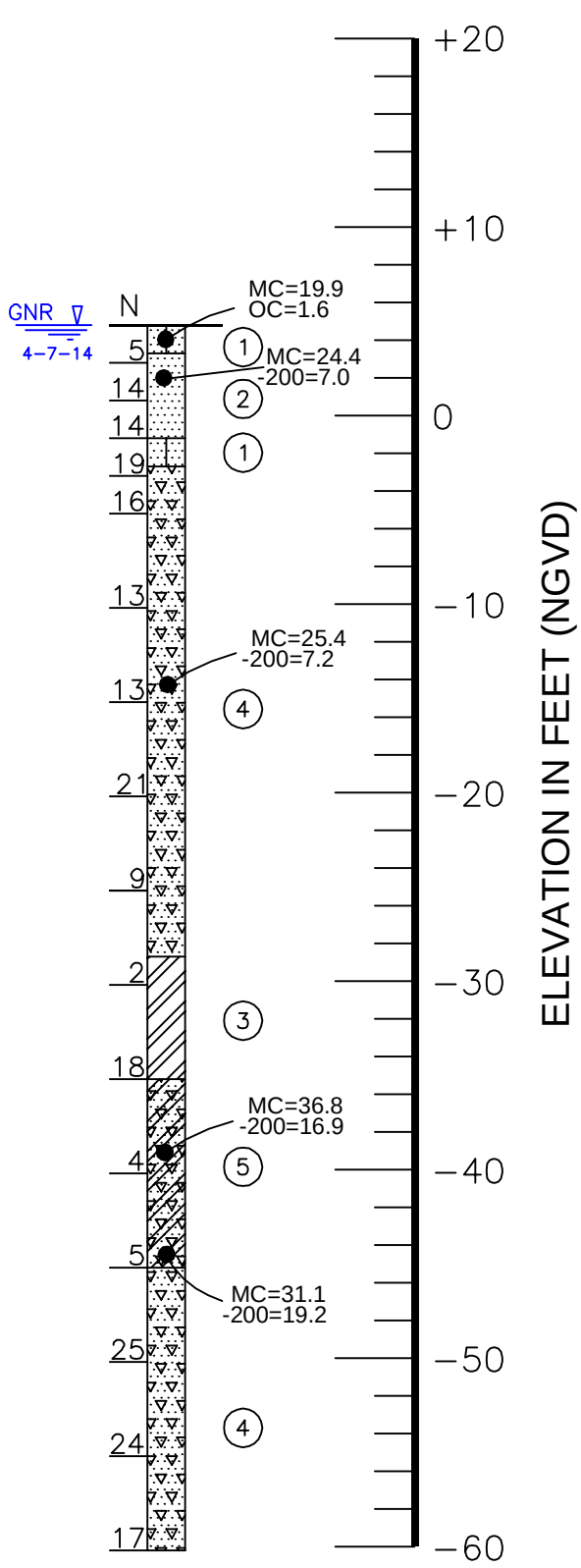
BORING NO. B-101
ELEVATION: +18.3'

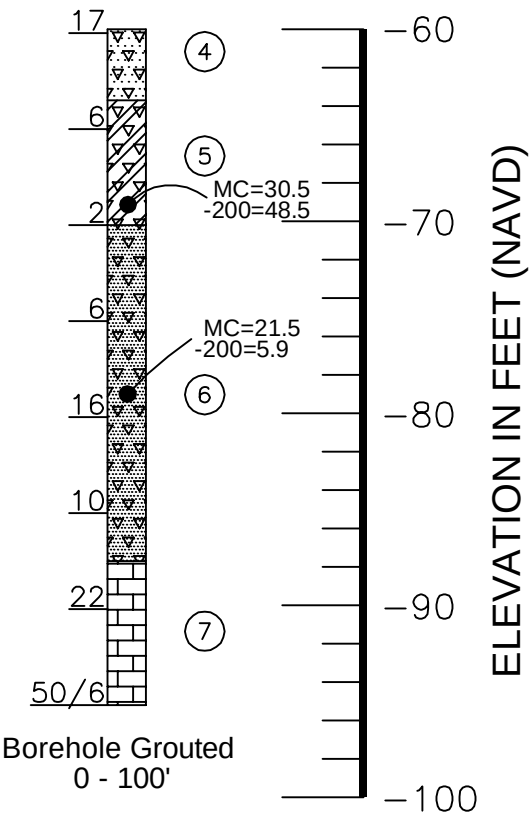


Borehole Grouted
0 - 100'

BORING NO. B-102
ELEVATION: +4.8'



B-102
continued



Borehole Grouted
0 - 100'

LL – Liquid Limit (%)
PI – Plasticity Index (%)
MC – Moisture Content (%)
OC – Organic Content (%)
-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)
N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)
B-101 – Standard Penetration Test (SPT) boring and number
50/6 – Indicates fifty SPT hammer blows were required to drive the sampler 6 inches
GNR 4-7-14 – Groundwater not recorded
+15.3' 4-17-14 – Elevation of groundwater (feet-NAVD) & date measured

LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using a track mounted BR-2500 drilling rig.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 10'
REVISED	2-11-15

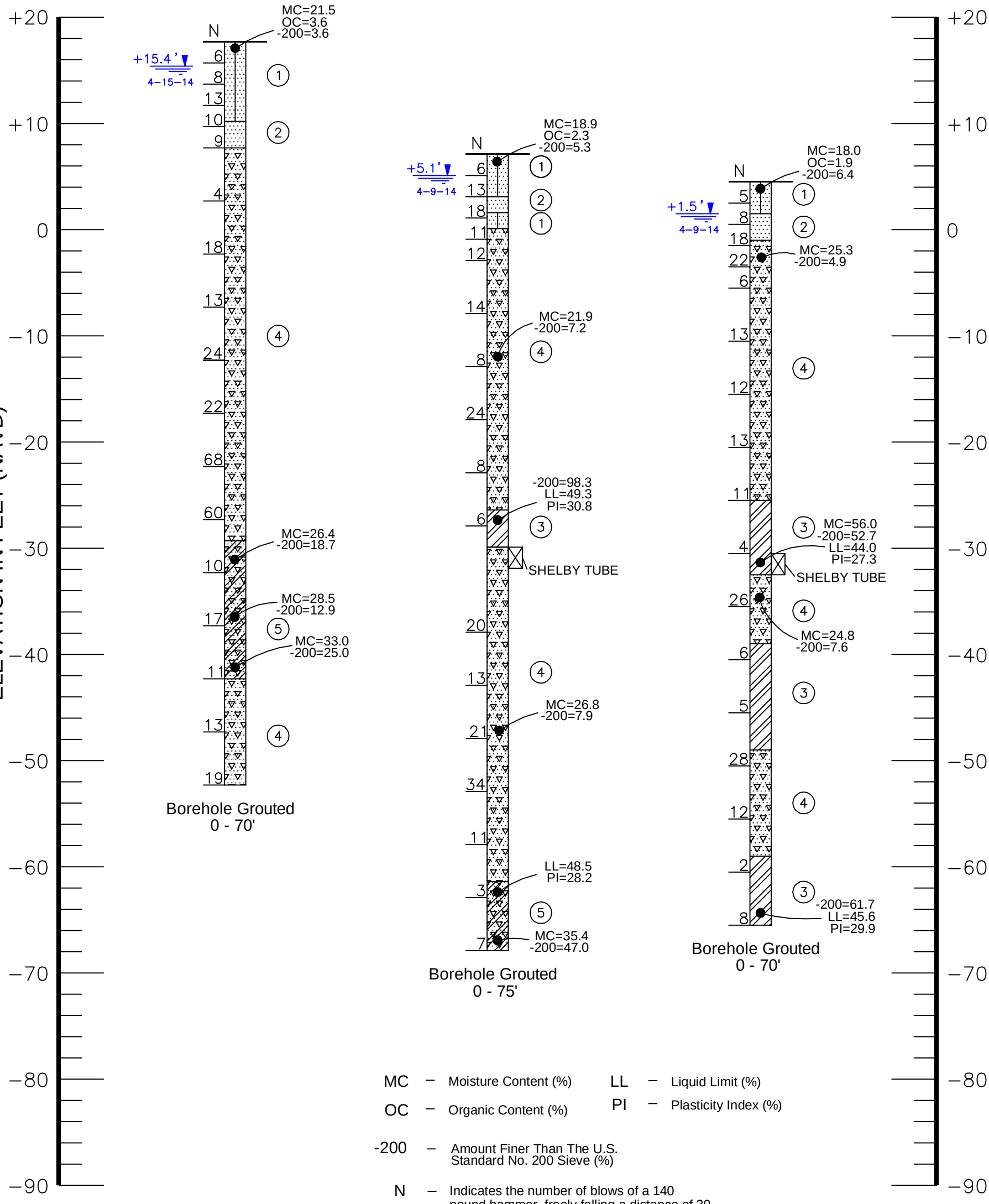
SUBSURFACE PROFILES

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	6



MC – Moisture Content (%)
OC – Organic Content (%)
LL – Liquid Limit (%)
PI – Plasticity Index (%)

-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

B-201 – Standard Penetration Test (SPT) boring and number

+5.1' 4-9-14 – Elevation of groundwater (feet-NAVD) & date measured

LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using a track mounted BR-2500 drilling rig.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 10'
REVISED	2-11-15

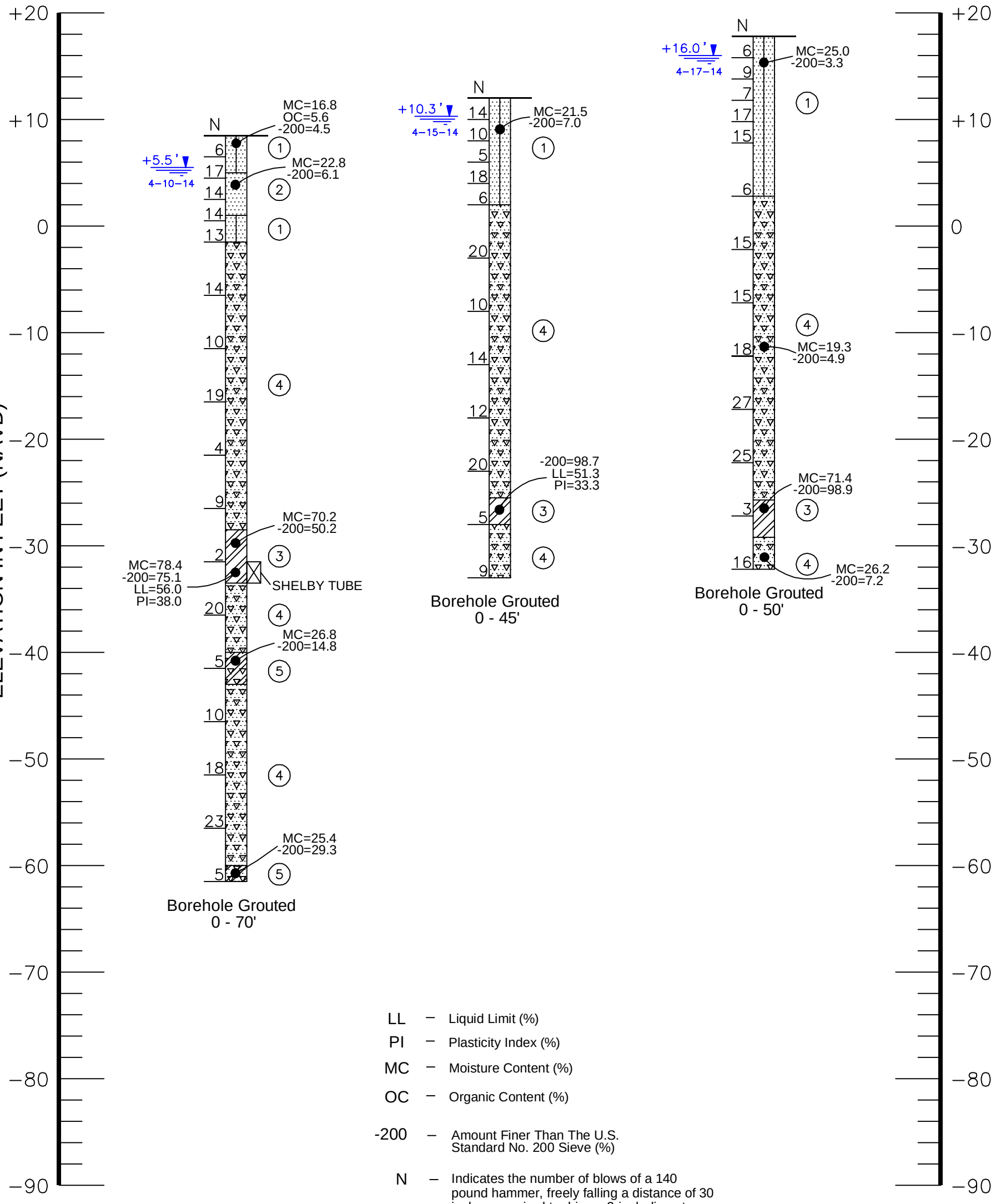
SUBSURFACE PROFILES

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	7



LL – Liquid Limit (%)

PI – Plasticity Index (%)

MC – Moisture Content (%)

OC – Organic Content (%)

-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

B-204 – Standard Penetration Test (SPT) boring and number

+5.5 ' ▼ 4−10−14 – Elevation of groundwater (feet-NAVD) & date measured

LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using a track mounted BR-2500 drilling rig.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 10'
REVISED	2-11-15

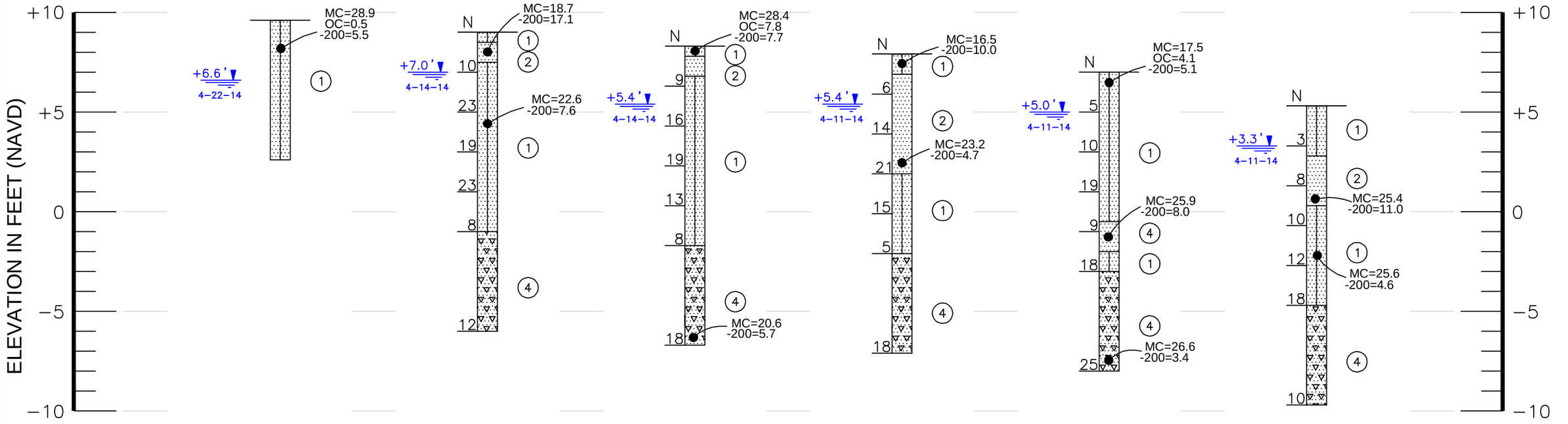
SUBSURFACE PROFILES

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	8



LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

MC – Moisture Content (%)

OC – Organic Content (%)

-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

HB-301 – Hand auger boring and number

B-302 – Standard Penetration Test (SPT) boring and number

+6.6' 4−22−14 – Elevation of groundwater (feet-NAVD) & date measured

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using either a track mounted BR-2500 drilling rig or hand turned augering equipment.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 5'
REVISED	2-11-15

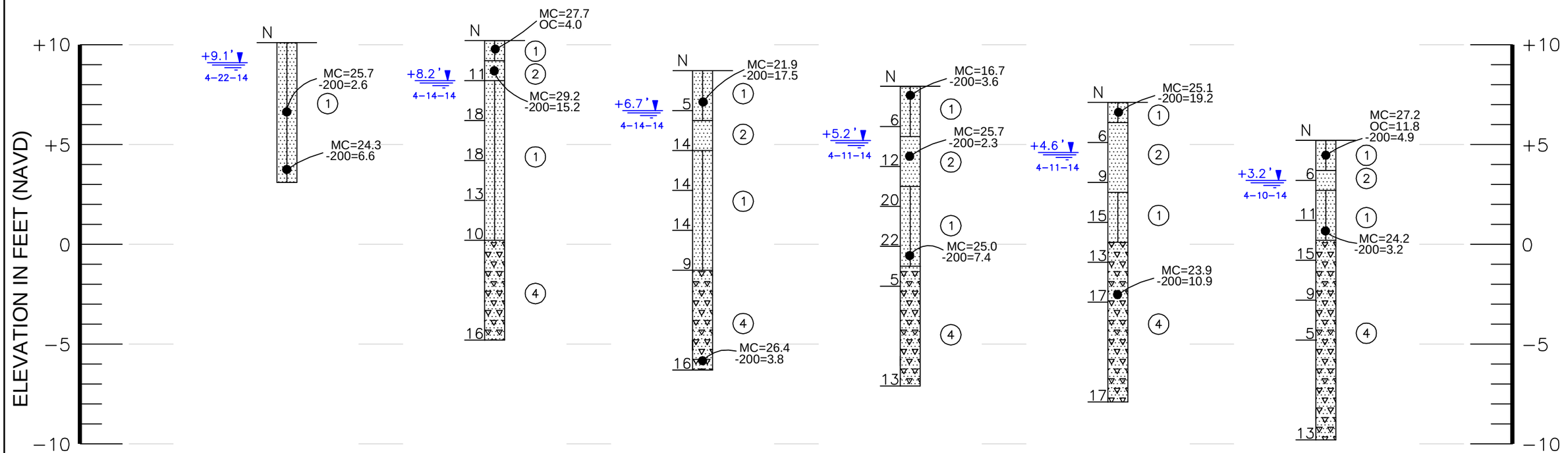
SUBSURFACE PROFILES

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	9



LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

MC – Moisture Content (%)

OC – Organic Content (%)

-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

HB-307 – Hand auger boring and number

B-308 – Standard Penetration Test (SPT) boring and number

+9.1' 4−22−14 – Elevation of groundwater (feet-NAVD) & date measured

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using either a track mounted BR-2500 drilling rig or hand turned augering equipment.

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(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 5'
REVISED	2-11-15

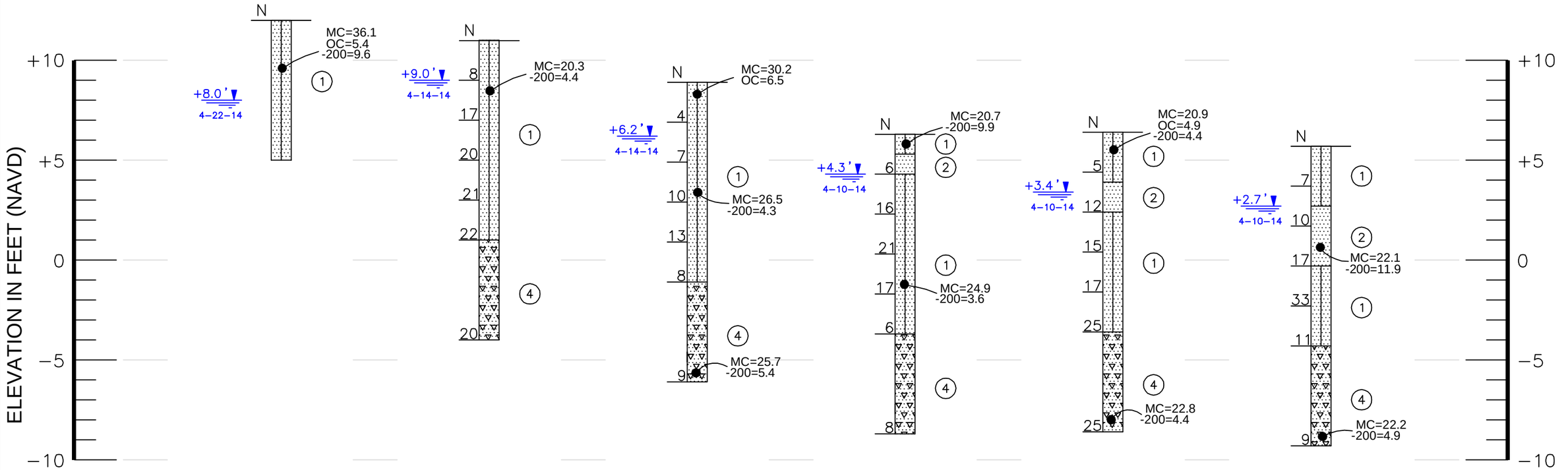
SUBSURFACE PROFILES

BV-4B

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	10



LEGEND

1. Gray to brown fine SAND, trace to slightly silty (SP, SP-SM)
2. Orange to light brown fine SAND, trace to slightly silty, with varying amounts of cementation (SP, SP-SM)
3. Green to gray CLAY with traces of silt (CL)
4. Green to gray fine SAND, trace to slightly silty, with varying amounts of broken shell (SP, SP-SM)
5. Green clayey fine SAND with varying amounts of broken shell (SC)
6. Light gray cemented SAND with little broken shell (SP)
7. White LIMESTONE

MC – Moisture Content (%)

OC – Organic Content (%)

-200 – Amount Finer Than The U.S. Standard No. 200 Sieve (%)

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

HB-313 – Hand auger boring and number

B-314 – Standard Penetration Test (SPT) boring and number

+8.0' 4-22-14 – Elevation of groundwater (feet-NAVD) & date measured

NOTES

(1) Borings were drilled from April 7 to 22, 2014 using either a track mounted BR-2500 drilling rig or hand turned augering equipment.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater elevations shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

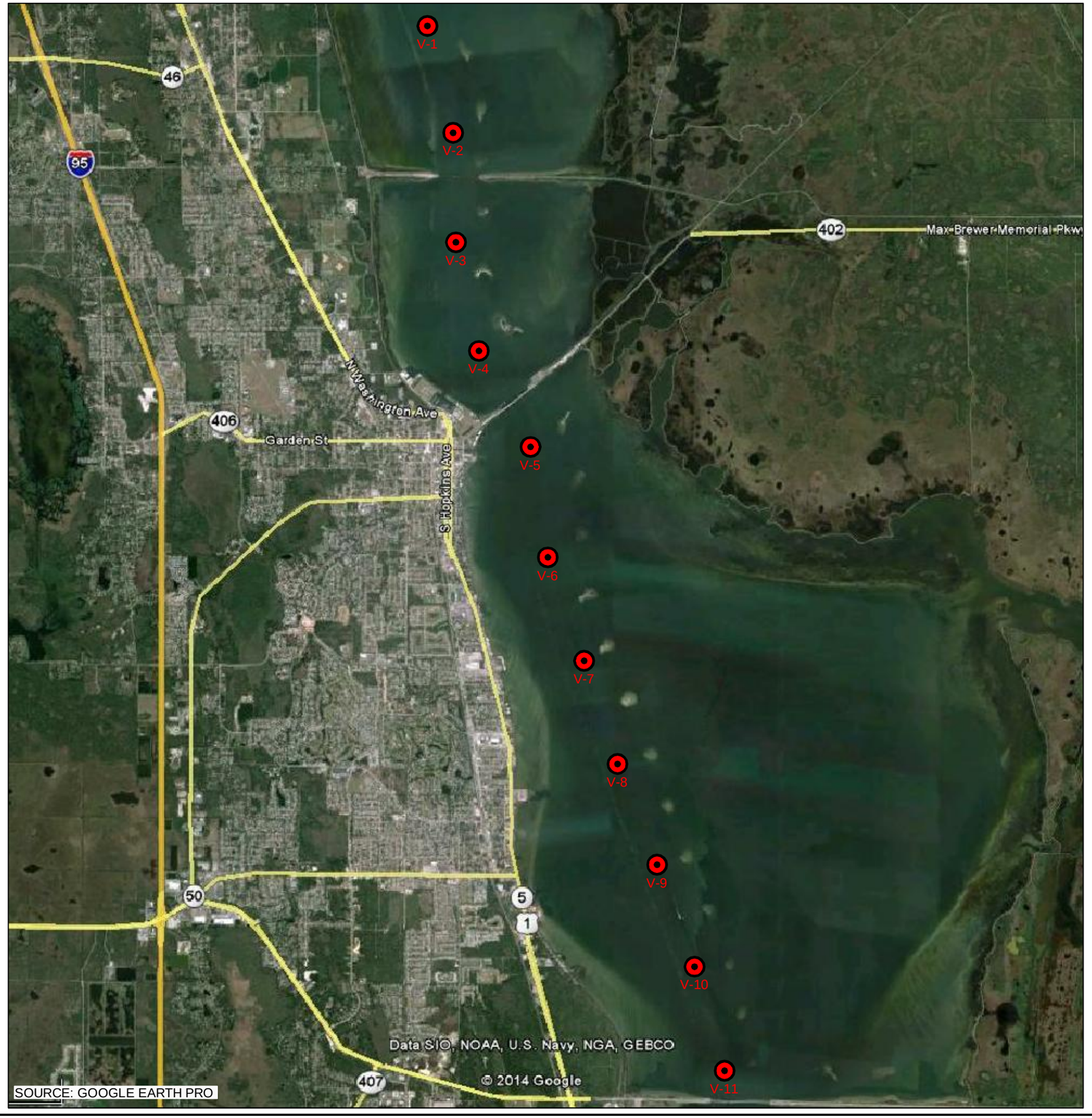
DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	1" = 5'
REVISED	2-11-15

SUBSURFACE PROFILES

BV-4B

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-15-14	HB145006	11



SOURCE: GOOGLE EARTH PRO

NORTH

GPS COORDINATES

VIBRACORE NO.	LATITUDE	LONGITUDE
V-1	28.670879°	-80.810932°
V-2	28.656616°	-80.807132°
V-3	28.642014°	-80.806635°
V-4	28.627647°	-80.803229°
V-5	28.614797°	-80.795287°
V-6	28.600175°	-80.792778°
V-7	28.586305°	-80.787243°
V-8	28.572490°	-80.782196°
V-9	28.559086°	-80.776264°
V-10	28.545470°	-80.770384°
V-11	28.531579°	-80.765871°

LEGEND

V-1 - VIBRACORE LOCATION AND NUMBER

Locations are approximate.

0' 0.5 MI 1 MI 2 MI

DRAWN	JJ
CHECKED	BL
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	2-11-15

VIBRACORE LOCATION PLAN

BV-4B

ST. LUCIE COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc. A Terracon COMPANY

DATE	PROJ. NO.	SHEET
7-24-14	HB145006	12



SOURCE: MORGAN & EKLUND, INC.

0' 100' 200' 400'

LEGEND

MW-A - MONITORING WELL NEST LOCATION AND NUMBER.

Each nest to include 3 monitoring wells installed to shallow, intermediate, and deep depths.
Locations are approximate.

DRAWN	BML
CHECKED	BML
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	

PROPOSED MONITORING WELL PLAN

BV-4B DMMA

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	SHEET
10-24-14	HB145006	13

Table 1.1
Summary of Site Soil Index Properties
BV-4B DMMA, Brevard County, Florida

Sample Location	Sample Depth (ft)	Moisture Content (%)	Amount Passing No. 200 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Organic Content (%)
B-101	0.0 - 1.0	9.5	2.5				3.7
B-101	13.5 - 15.0	27	2.3				
B-101	28.5 - 30.0	15.9	7.4				
B-101	58.5 - 60.0			28.5	20.2	8.3	
B-101	78.5 - 80.0			33	20.4	12.6	
B-101	88.5 - 90.0	39.6	38.8				
B-102	0.0 - 1.5	19.9					1.6
B-102	2.5 - 3.5	24.4	7.0				
B-102	18.5 - 20.0	25.4	7.2				
B-102	43.5 - 45.0	36.8	16.9				
B-102	48.5 - 50.0	31.1	19.2				
B-102	73.5 - 75.0	30.5	48.5				
B-102	83.5 - 85.0	21.5	5.9				
B-201	0.0 - 0.5	21.5	3.6				3.6
B-201	48.5 - 50.0	26.4	18.7				
B-201	53.5 - 55.0	28.5	12.9				
B-201	58.5 - 60.0	33	25.0				
B-202	0.0 - 1.0	18.9	5.3				2.3
B-202	18.5 - 20.0	21.9	7.2				
B-202	33.5 - 35.0		98.3	49.3	18.5	30.8	
B-202	53.5 - 55.0	26.8	7.9				
B-202	68.5 - 70.0			48.5	20.3	28.2	
B-202	73.5 - 75.0	35.4	58.4				
B-203	0.0 - 1.0	18	6.4				1.9
B-203	5.5 - 8.0	25.3	4.9				
B-203	38.5 - 40.0	24.8	7.6				
B-203	68.5 - 70.0		61.7	45.6	15.7	29.9	
B-204	0 - 1.5	16.8	4.5				5.6
B-204	3.5 - 5.5	22.8	6.1				
B-204	38.5 - 40.0	70.2	50.2				
B-204	48.5 - 50.0	26.8	14.8				
B-204	68.5 -70.0	25.4	29.3				
B-206	2.0 - 3.5	21.5	7.0				
B-206	38.5 - 40.0		98.7	51.3	18	33.3	
B-207	2.0 - 3.0	25	3.3				
B-207	28.5 - 30.0	19.3	4.9				
B-207	43.5 - 45.0	71.4	98.9				
B-207	48.5 - 50.0	26.2	7.2				

Table 1.2
Summary of Site Soil Index Properties
BV-4B DMMA, Brevard County, Florida

Sample Location	Sample Depth (ft)	Moisture Content (%)	Amount Passing No. 200 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Organic Content (%)
HB-301	0.0 - 3.0	28.9	5.5				0.5
B-302	0.5 - 1.5	18.7	17.1				
B-302	4.0 - 5.0	22.6	7.6				
B-303	0.0 - 0.5	28.4	7.7				7.8
B-303	13.5 - 15.0	20.6	5.7				
B-304	0.0 - 1.0	16.5	10				
B-304	2.5 - 6.0	23.2	4.7				
B-305	0.0 - 1.0	17.5	5.1				4.1
B-305	7.5 - 9.0	25.9	8				
B-305	13.5 - 15.0	26.6	3.4				
B-306	3.5 - 5	25.4	11				
B-306	5.0 - 8.0	25.6	4.6				
HB-307	0.0 - 3.5	25.7	2.6				
HB-307	3.5 - 7.0	24.3	6.6				
B-308	0.0 - 1.0	27.7					4
B-308	1.0 - 2.0	29.2	15.2				
B-309	1.0 - 2.0	21.9	17.5				
B-309	13.5 - 15.0	26.4	3.8				
B-310	0.0 - 1.0	16.7	3.6				
B-310	2.5 - 5.0	25.7	2.3				
B-310	7.0 - 9.0	25	7.4				
B-311	0.0 - 1.0	25.1	19.2				
B-311	9.0 - 10.0	23.9	10.9				
B-312	0.0 - 1.5	27.2	11.8				4.9
B-312	2.5 - 5.0	24.2	3.2				
HB-313	0.0 - 2.5	36.1	9.6				5.4
B-314	2.0 - 3.0	20.3	4.4				
B-315	0.0 - 1.0	30.2					6.5
B-315	5.0 - 6.0	26.5	4.3				
B-315	13.5 - 15.0	25.7	5.4				
B-316	0.0 - 1.0	20.7	9.9				
B-316	5.0 - 8.0	24.9	3.6				
B-317	0.0 - 1.5	20.9	4.4				4.9
B-317	13.5 - 15.0	22.8	4.4				
B-318	3.0 - 6.0	22.1	11.9				
B-318	13.5 - 15.0	22.2	4.9				

Table 2.1
Summary of Sieve Analysis
BV-4B DMMA, Brevard County, Florida
SPT Samples

Sample Location	Sample Number	USCS	Amount Passing Sieve Size (%)								
			1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200
B-101	13.5 -15.0	SP	100.0	100.0	100.0	99.9	99.9	99.8	99.3	66.6	2.6
B-101	88.5 - 90.0	SC	100.0	100.0	98.4	90.0	82.3	77.8	75.3	71.8	41.7
B-102	18.5 - 20.0	SP-SM	100.0	100.0	99.2	94.4	90.1	89.1	89.1	87.3	8.7
B-102	28.5 - 30.0	SC	100.0	100.0	98.2	94.2	89.5	87.3	83.5	62.6	17.6
B-202	53.5 - 55.0	SP-SM	100.0	100.0	99.9	99.5	98.3	97.6	97.2	83.8	9.0
B-203	0.0 - 1.0	SP-SM	100.0	100.0	100.0	100.0	99.8	99.0	98.7	89.6	7.2
B-204	3.5 - 5.5	SP-SM	100.0	100.0	99.7	98.3	97.6	96.8	96.6	82.6	6.7
B-206	2.0 - 4.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.4	98.8	66.4	7.3
B-207	48.5 - 50.0	SP-SM	100.0	99.6	96.0	82.0	62.5	52.3	45.4	24.6	7.2
B-302	4.0 - 5.5	SP-SM	100.0	100.0	100.0	99.9	99.9	99.5	99.0	80.9	8.2
B-304	0.0 - 1.0	SP-SM	100.0	100.0	99.3	98.7	98.2	97.3	97.2	83.6	10.7
B-305	13.5 - 15.0	SP	100.0	100.0	100.0	100.0	99.9	98.1	92.5	70.6	3.8
B-306	3.5 - 5.0	SP-SM	100.0	100.0	100.0	100.0	99.8	99.8	99.8	88.2	11.2
B-309	13.5 - 15.0	SP	100.0	100.0	100.0	99.7	98.7	95.2	92.2	74.7	4.1
B-310	2.5 - 5.0	SP	100.0	100.0	100.0	99.8	99.7	99.5	99.1	73.4	3.0
B-312	2.5 - 5.0	SP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.4	3.8
B-315	4.0 - 6.0	SP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.6	4.8
B-317	13.5 - 15.0	SP	100.0	100.0	99.4	97.8	94.7	91.7	88.8	69.6	5.1
HB-307	0.0 - 3.5	SP	100.0	100.0	100.0	99.9	99.6	92.8	90.1	59.7	3.0

Table 2.2
Summary of Hydrometer Analysis
BV-4B DMMA, Brevard County, Florida
SPT Samples

Sample Location	Sample Depth (ft)	USCS	Percent Finer by Weight											
			0.0750	0.0372	0.0268	0.0172	0.0137	0.0101	0.0073	0.0052	0.0037	0.0026	0.0019	0.0011
B-101	43.5 - 50.0	CL	95.2	90.9	86.7	82.3	80.2	78.1	75.8	71.6	69.8	66.0	62.0	60.8
B-102	33.5 - 35.0	CL	58.8	42.9	38.9	36.9	34.9	34.9	32.7	32.5	30.7	29.1	29.1	26.3

Table 2.3
Summary of Sieve Analysis
BV-4B DMMA, Brevard County, Florida
Interior Borrow Fill

Sample Location	Sample Depth (ft)	USCS	Amount Passing Sieve Size (%)								
			1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200
Area 1	0.0 - 10.0	SP-SM	100.0	100.0	99.2	98.0	96.8	95.9	95.6	81.3	8.9
Area 2	0.0 - 10.0	SP-SM	100.0	99.3	96.9	94.2	91.6	90.0	88.6	74.0	7.9
Area 3	0.0 - 10.0	SP	100.0	100.0	99.9	99.8	99.7	99.5	98.9	72.3	4.3
Area 4	0.0 - 10.0	SP-SM	100.0	100.0	99.2	98.4	97.1	96.1	95.4	75.8	8.3
Area 5	0.0 - 10.0	SP	100.0	100.0	99.7	99.0	98.1	97.2	96.3	71.3	5.0
Area 6	0.0 - 10.0	SP	100.0	100.0	100.0	99.9	99.7	97.4	95.3	62.7	5.5

Note: Interior borrow fill area was divided into 6 areas where bulk samples were recovered

Table 3
Proctor Compaction Results
BV-4B DMMA, Brevard County, Florida
Bulk Samples

Sample Location	Sample Depth (ft)	USCS	Fines Content (%)	Moisture Content (%)	Dry Unit Weight (pcf)
Area 1	0.0 - 10.0	SP-SM	8.3	12.9	100.9
Area 2	0.0 - 10.0	SP-SM	7.1	13.8	107.3
Area 3	0.0 - 10.0	SP	3.8	14.4	100.6
Area 4	0.0 - 10.0	SP-SM	7.8	13.1	103.4
Area 5	0.0 - 10.0	SP	5.5	12.1	104.7
Area 6	0.0 - 10.0	SP-SM	6.1	14.7	102.8

Note: Interior area of the proposed dike was divided into 6 areas where bulk samples were recovered

Table 4
Limerock Bearing Ratio (LBR) Results
BV-4B DMMA, Brevard County, Florida
Bulk Samples

Sample Location	Sample Depth (ft)	USCS	Fines Content (%)	Moisture Content (%)	Dry Unit Weight (pcf)	LBR
B-303 and B-304 (Composite)	0.0 - 2.0	SP-SM	6.6	12.9	101.6	40.4
B-313	0.0 - 2.0	SP-SM	9.7	11.1	89.5	10.3
B-317 and B-318 (Composite)	0.0 - 2.0	SP-SM	6.5	12.5	104.0	61.3

Table 5.1
Summary of Hydraulic Conductivity Test Results
BV-4B DMMA, Brevard County, Florida
Bulk Samples

Sample Location	Sample Depth (ft)	USCS	Sample Type	Fines Content (%)	Initial Conditions		Confining Stress (psi)	Hydraulic Conductivity	
					Moisture Content (%)	Dry Unit Weight (pcf)		cm/sec	ft/day
Area 1	0.0 - 10.0	SP-SM	Remolded	-	11.4	97.0	-	2.21E-03	6.25
Area 2	0.0 - 10.0	SP-SM	Remolded	-	13.5	103.0	-	2.44E-03	6.92
Area 3	0.0 - 10.0	SP	Remolded	-	13.5	97.2	-	2.42E-03	6.85
Area 4	0.0 - 10.0	SP-SM	Remolded	-	13.4	97.6	-	3.49E-03	9.88
Area 5	0.0 - 10.0	SP	Remolded	-	12.2	99.1	-	4.44E-03	12.58
Area 6	0.0 - 10.0	SP	Remolded	-	14.1	98.0	-	3.30E-03	9.36

Note: Interior area of the proposed dike was divided into 6 areas where bulk samples were recovered

Table 5.2
Summary of Hydraulic Conductivity Test Results
BV-4B DMMA, Brevard County, Florida
Fine Grained Samples

Sample Location	Sample Depth (ft)	USCS	Sample Type	Fines Content (%)	Initial Conditions		Confining Stress (psi)	Hydraulic Conductivity	
					Moisture Content (%)	Dry Unit Weight (pcf)		cm/sec	ft/day
B-203	35 -37	CL	Undisturbed	52.7	56.0	70.5	3.0	3.93E-08	0.00
B-204	40 - 42	CL/CH	Undisturbed	75.1	78.4	51.0	4.0	9.75E-08	0.00

Table 6
Summary Consolidated-Undrained (CU) Triaxial Shear Test Results
BV-4B DMMA, Brevard County, Florida
Bulk Samples

Sample Location	Sample Depth (ft)	USCS	Total Strength Parameters		Effective Strength Parameters	
			Cohesion (C, ksf)	Internal Friction Angle (ϕ, deg)	Cohesion (C, ksf)	Internal Friction Angle (ϕ, deg)
Area 1	0.0 - 10.0	SP-SM	0.09	38.2	0.08	33.1
Area 3	0.0 - 10.0	SP	0.43	39.7	0.13	35.5
Area 6	0.0 - 10.0	SP-SM	0.72	37.9	0.47	33.1

Note: Interior area of the proposed dike was divided into 6 areas where bulk samples were recovered

Table 7
Summary Consolidation Test Results
BV-4B DMMA, Brevard County, Florida
Undisturbed Samples

Sample Location	Sample Depth (ft)	USCS	Moisture Content (%)	Dry Unit Weight (pcf)	Fines Content (%)	Vertical Strain (%)				
						1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-203	35 -37	CL	56.0	67.0	52.7	3.25	6.19	10.58	16.49	22.75
B-204	40 - 42	CL/CH	78.4	47.1	75.1	4.90	11.08	20.39	29.91	37.29

APPENDIX A
CONE PENETROMETER TEST (CPT) LOGS

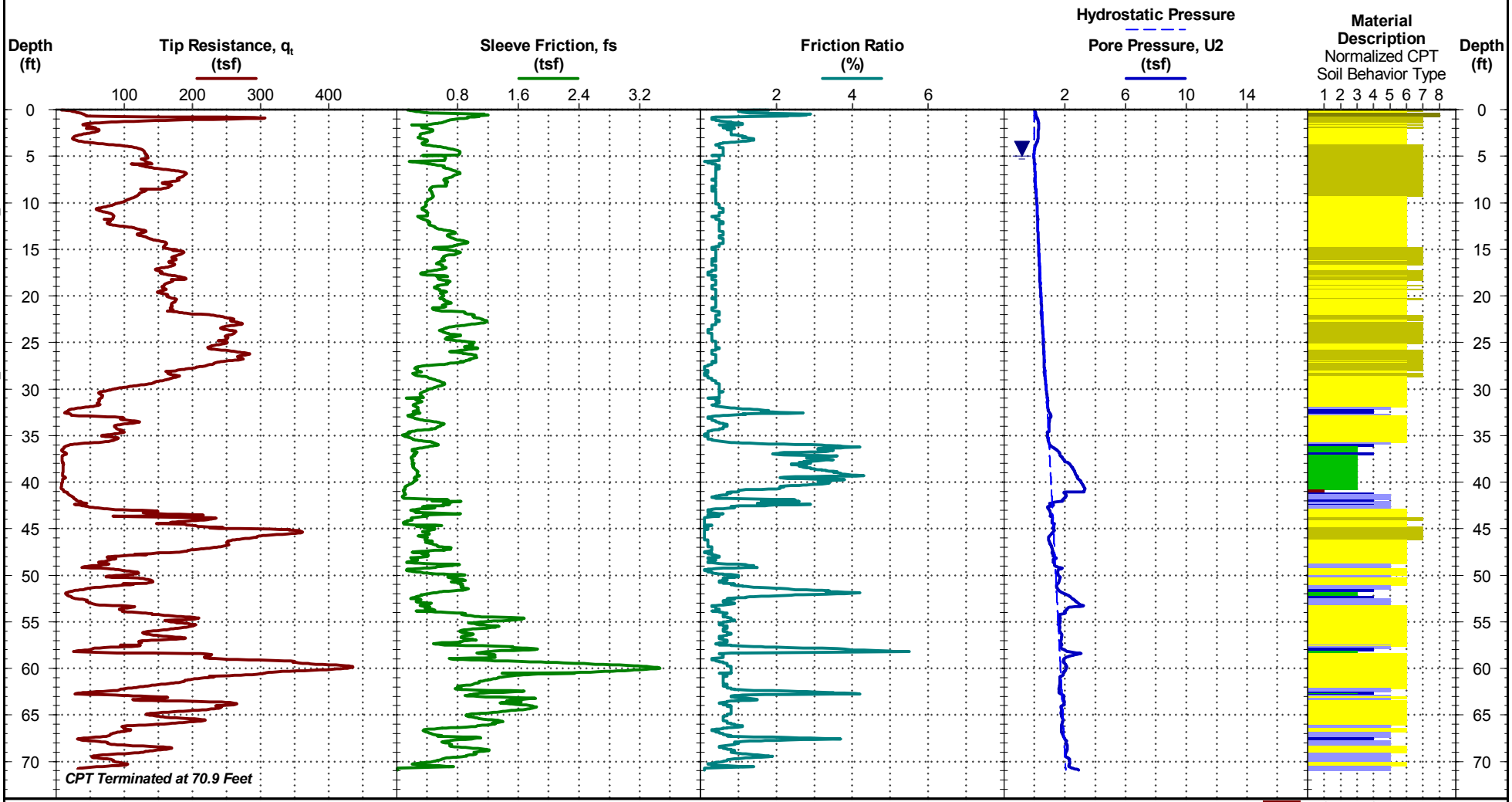
CPT LOG NO. CPT-102

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

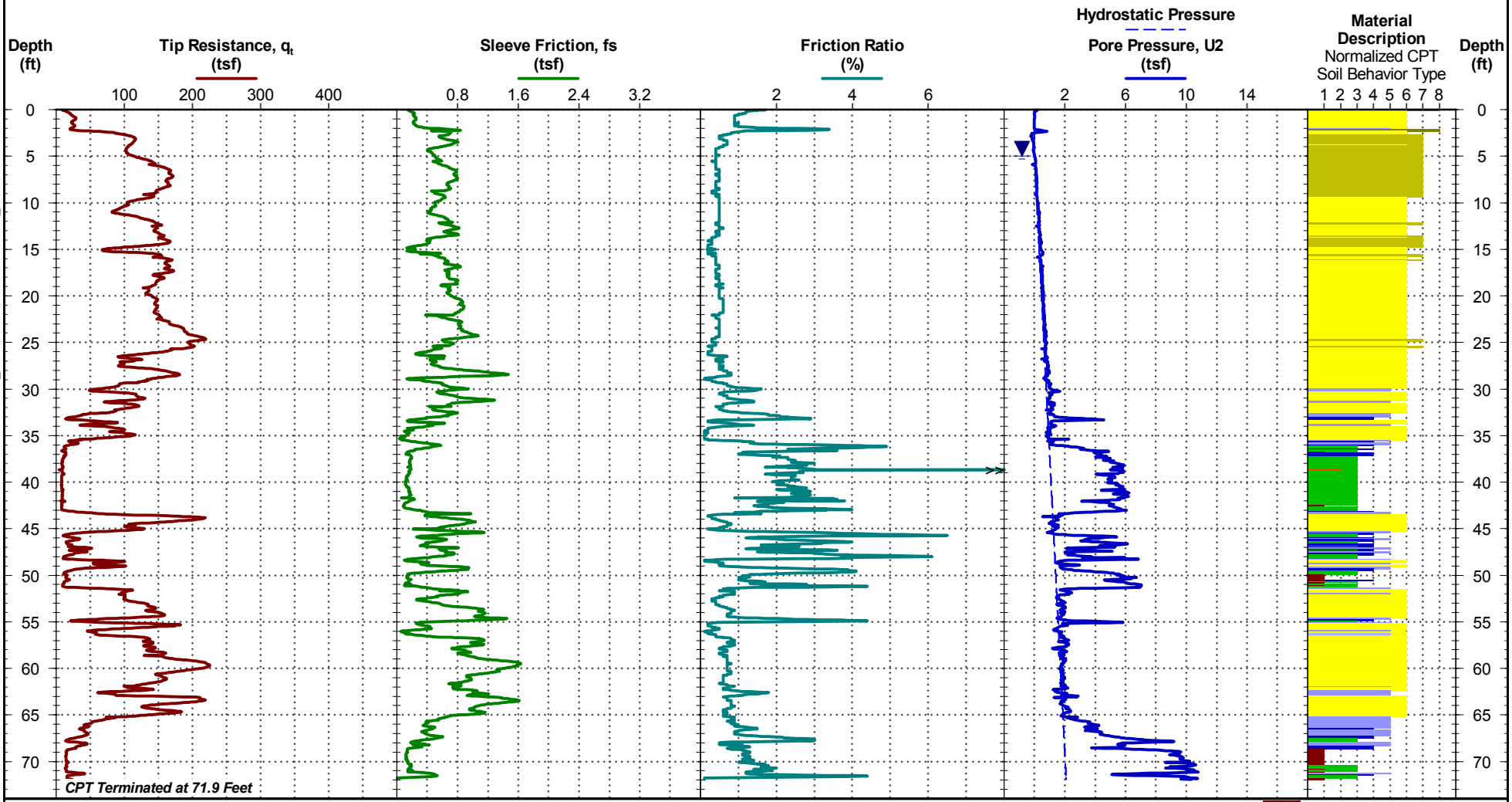
CPT LOG NO. CPT-103

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

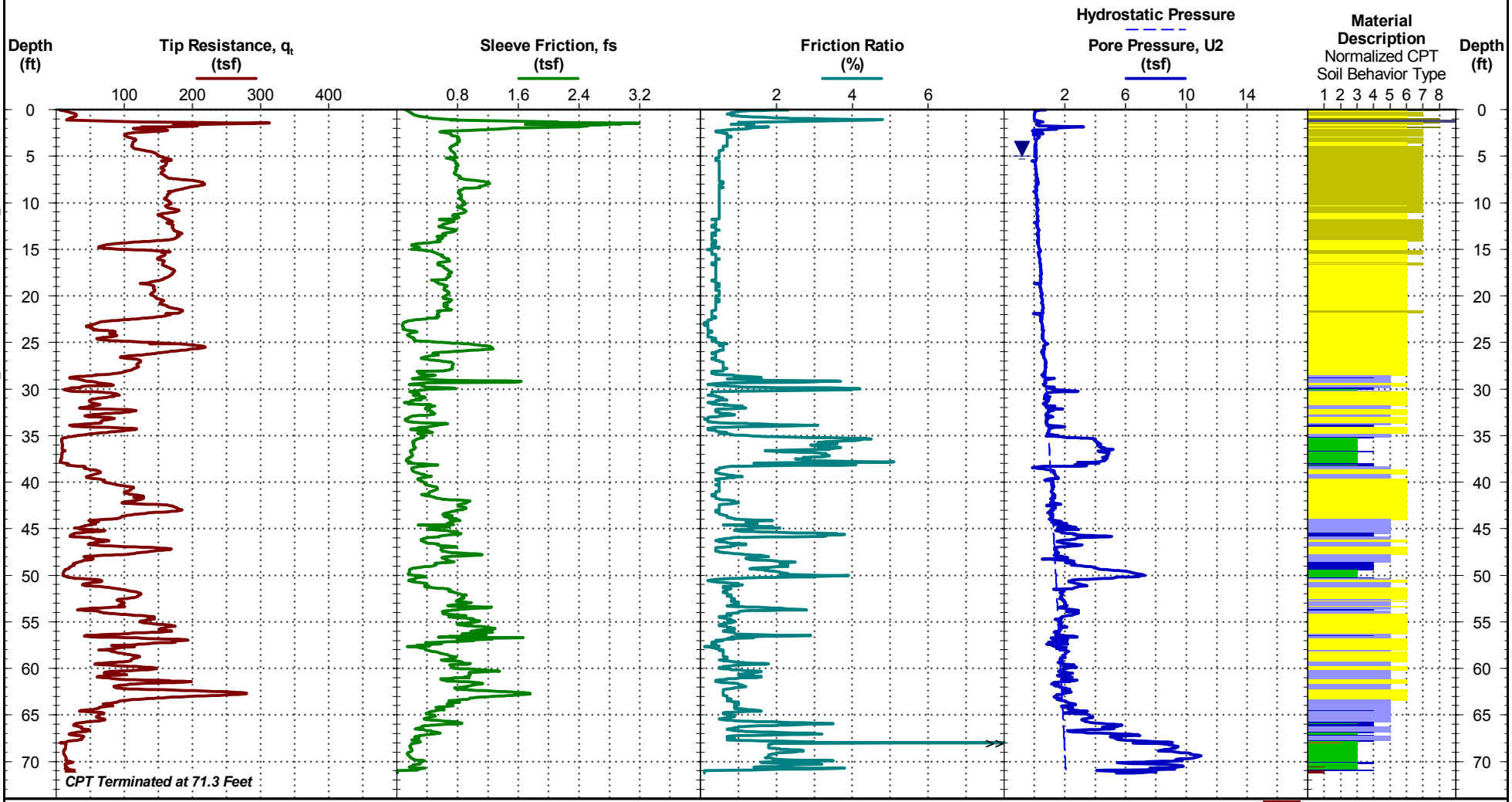
CPT LOG NO. CPT-104

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/16/2014	CPT Completed: 4/16/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

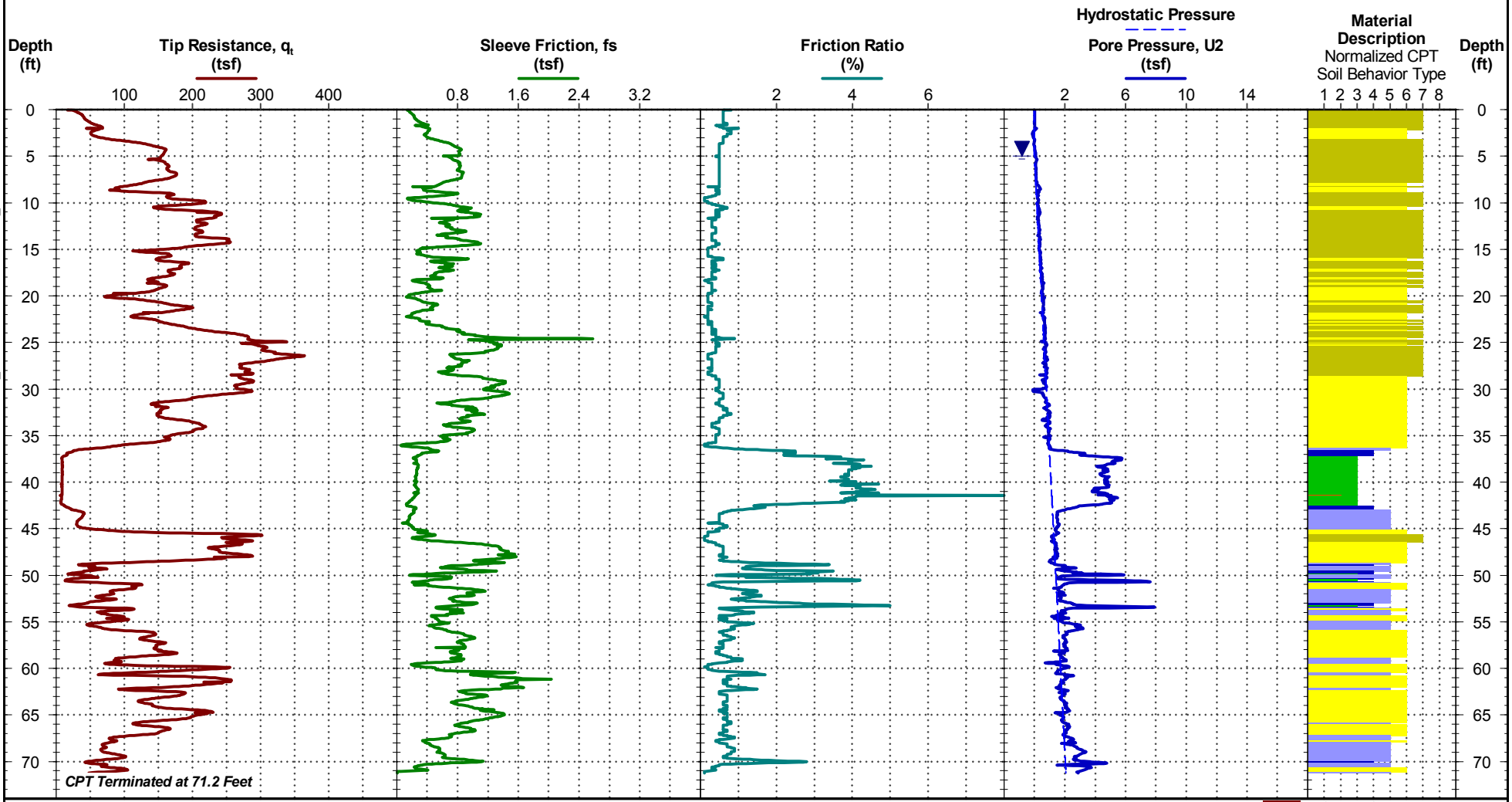
CPT LOG NO. CPT-106

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

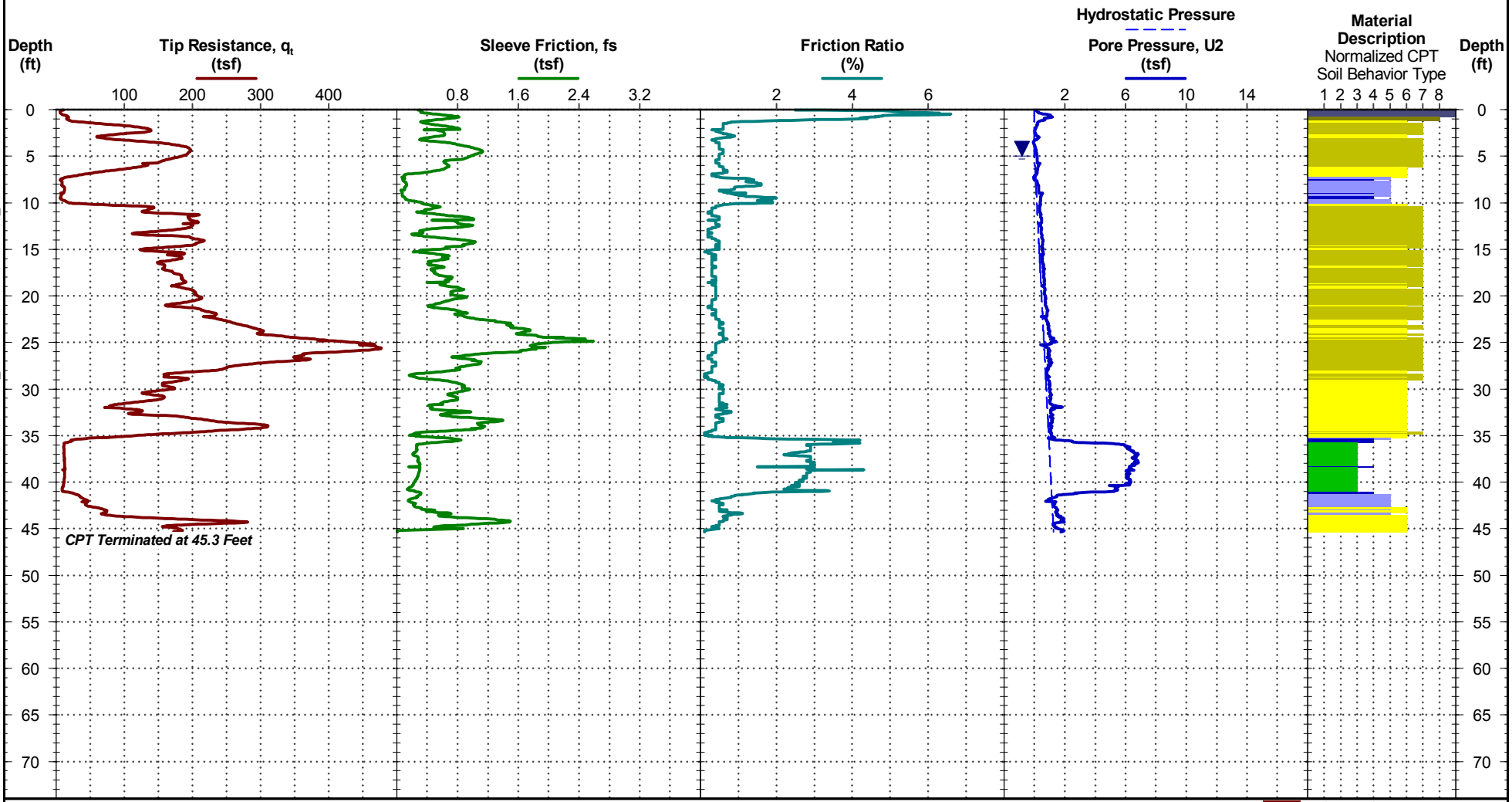
CPT LOG NO. CPT-201

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

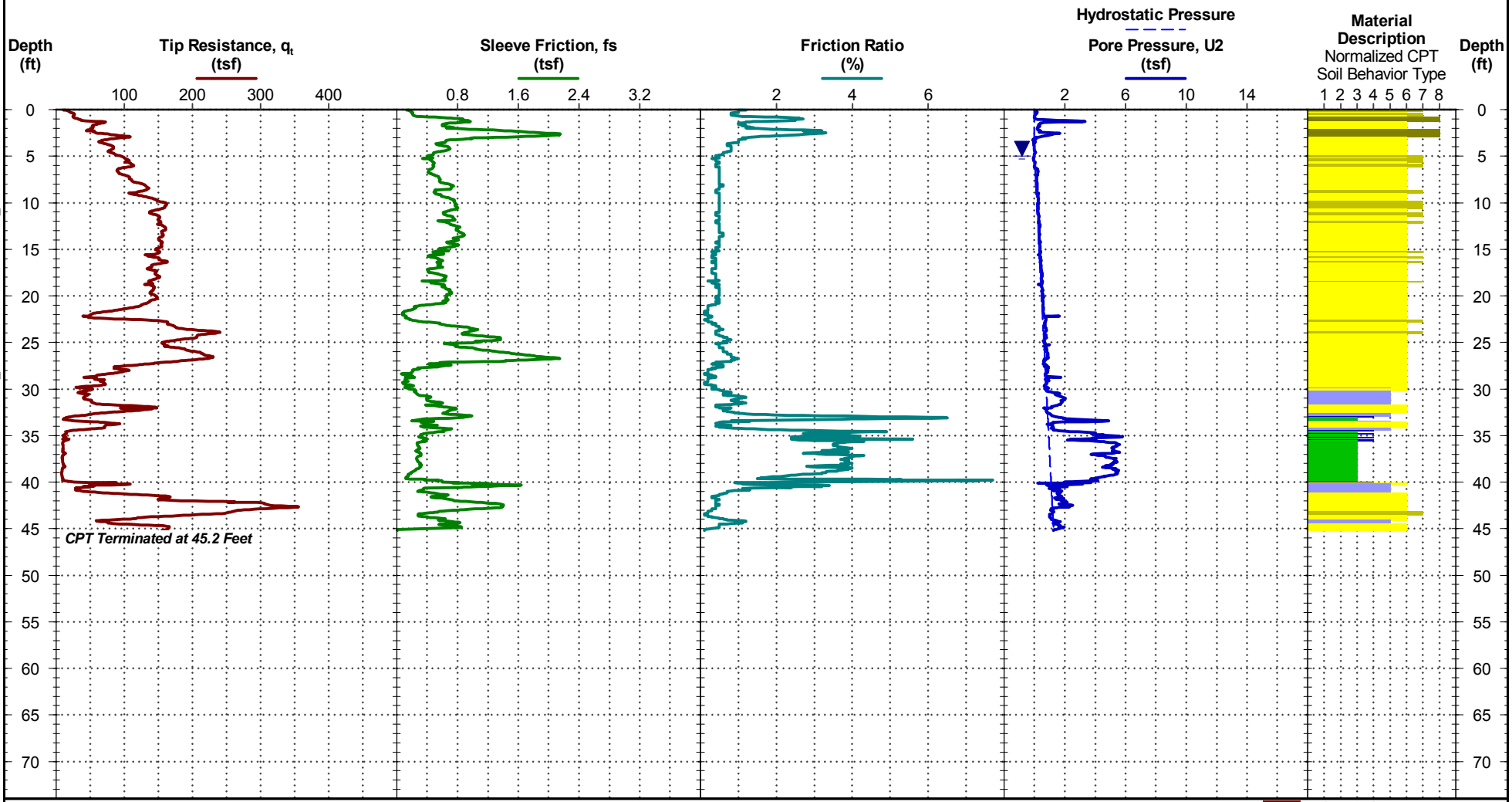
CPT LOG NO. CPT-202

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

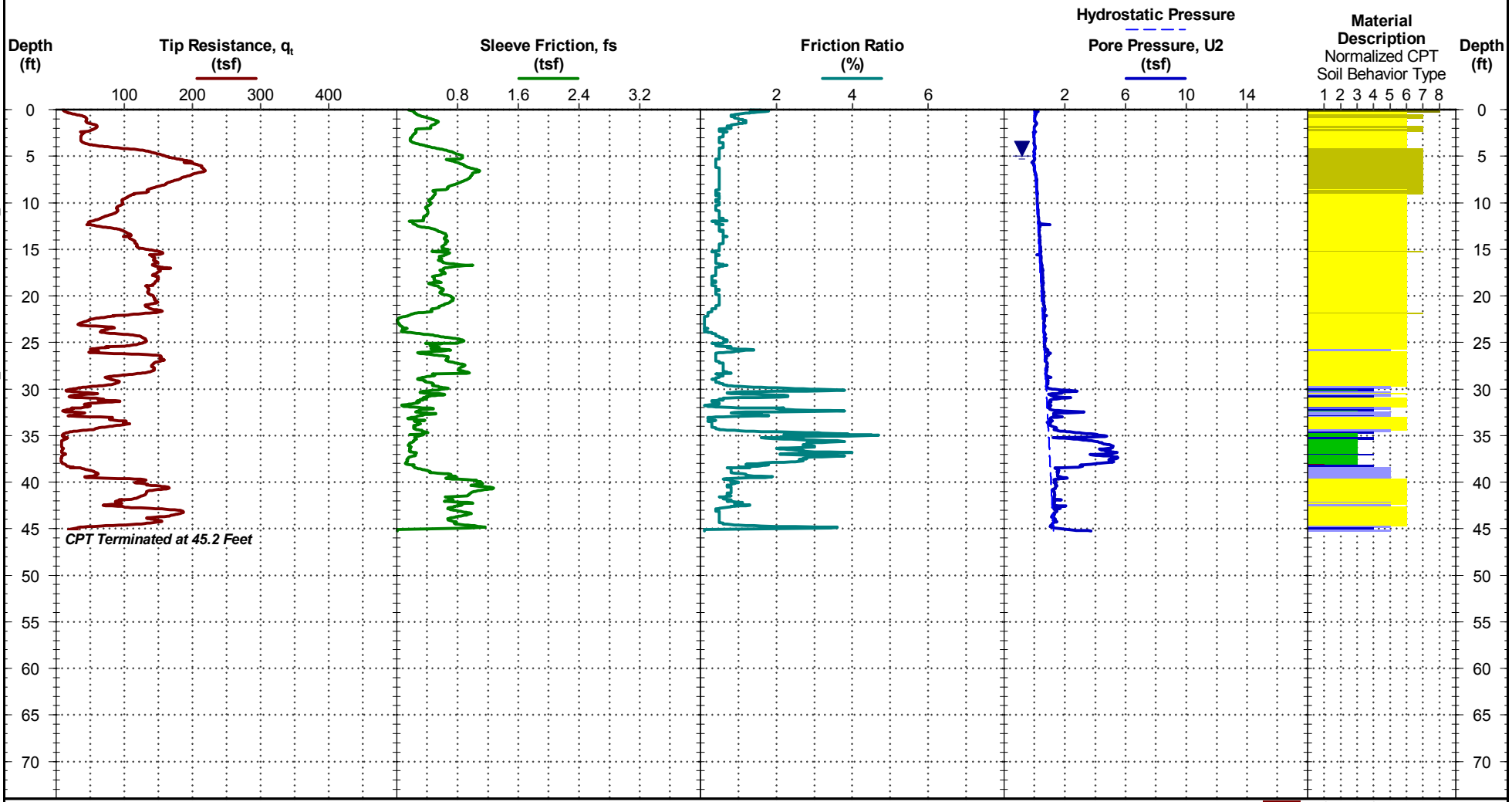
CPT LOG NO. CPT-203

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

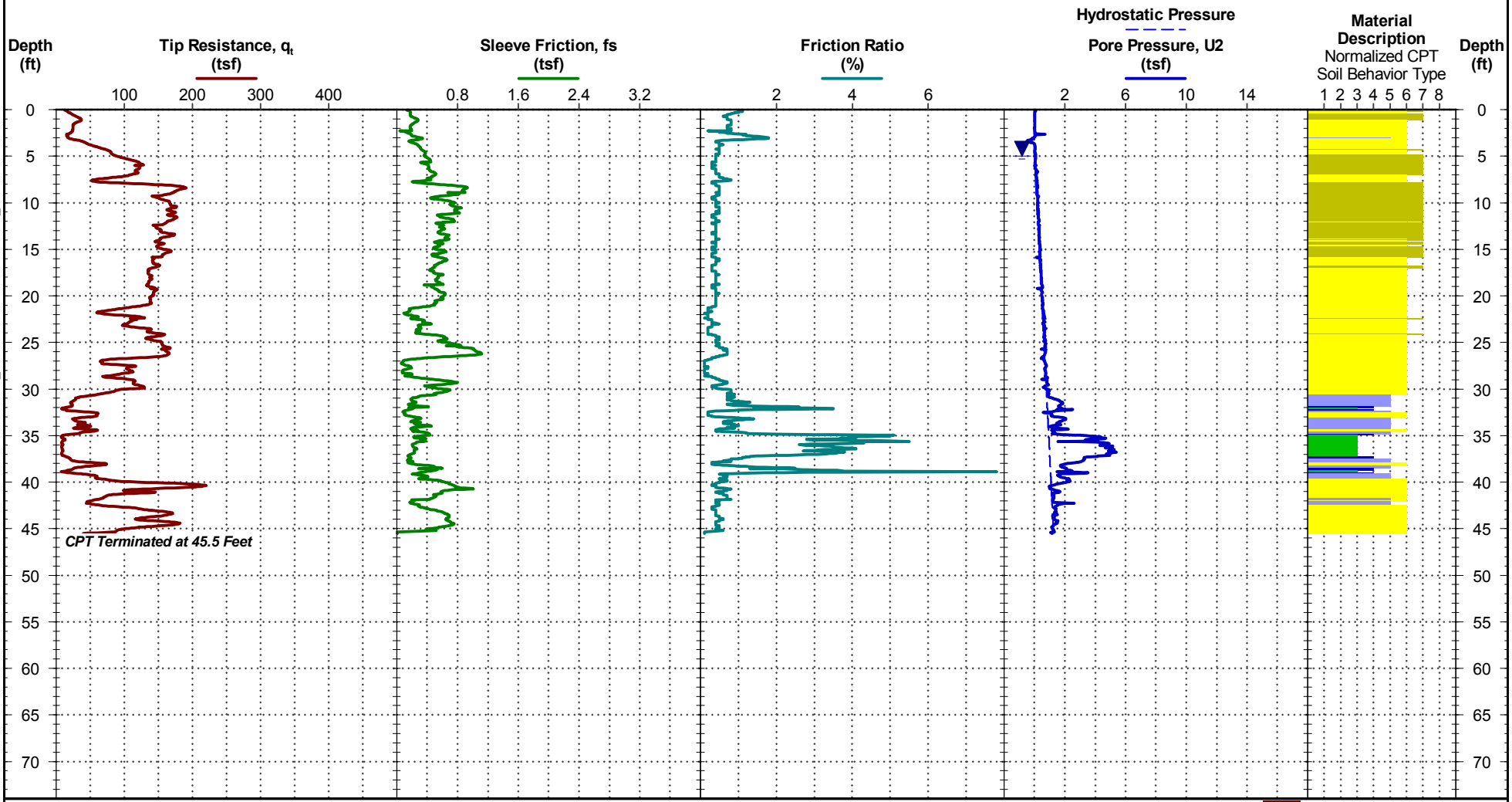
CPT LOG NO. CPT-204

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/16/2014	CPT Completed: 4/16/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

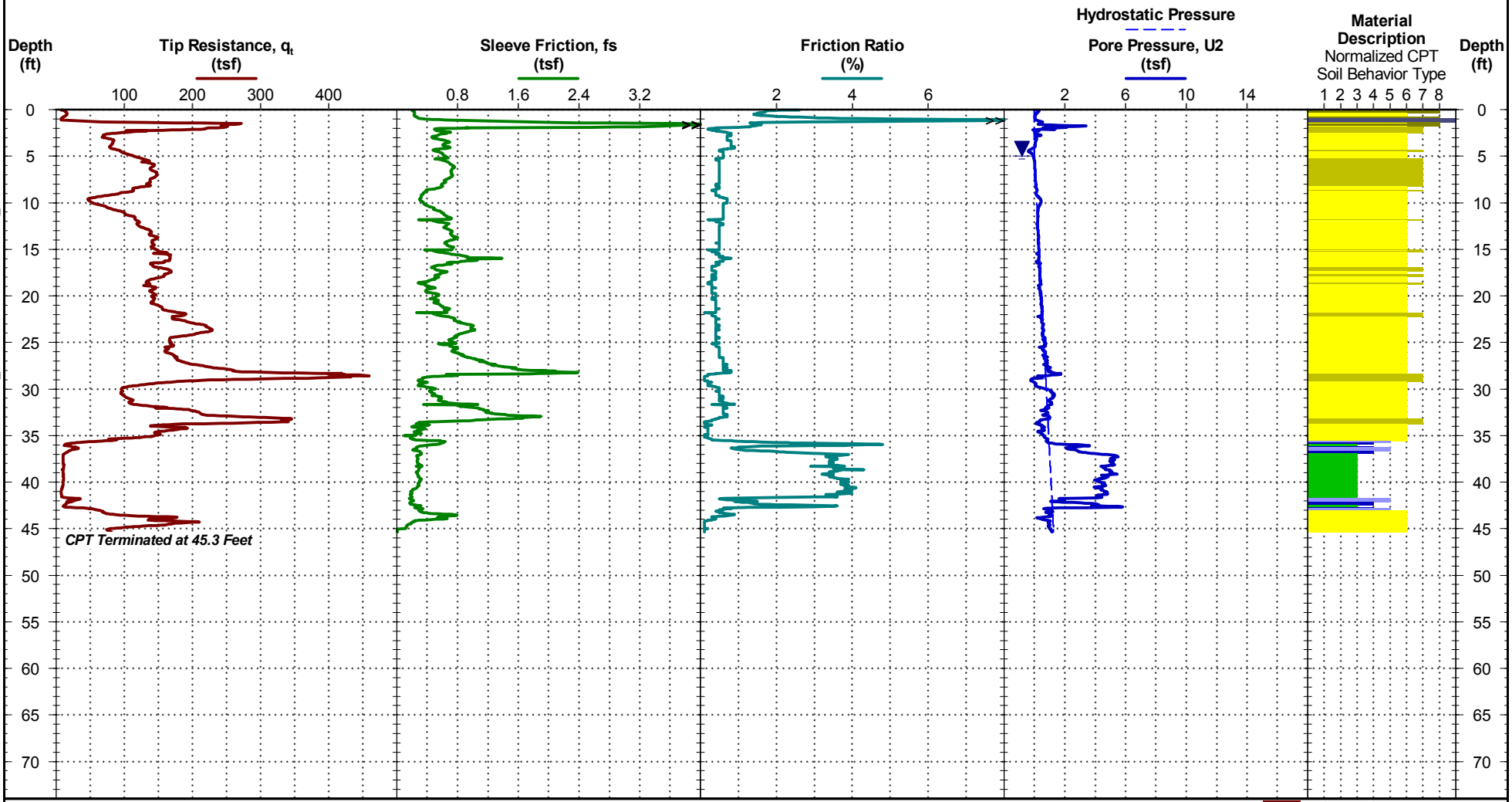
CPT LOG NO. CPT-205

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



See Exhibit A-3 for description of field procedures.
See Appendix C for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Probe no. DDG1276 with net area ratio of 0.8
U2 pore pressure transducer location
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/16/2014	CPT Completed: 4/16/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-102

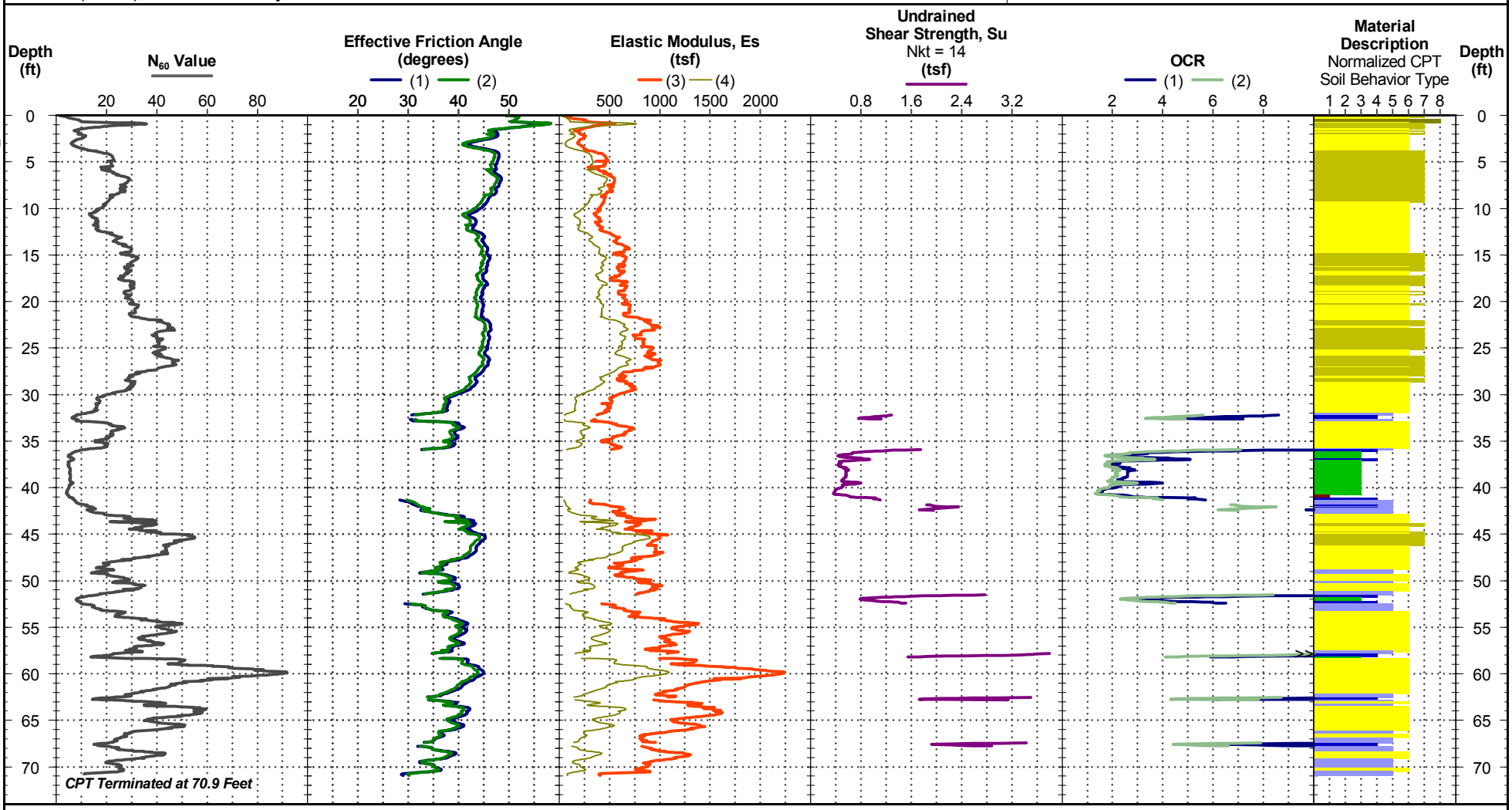
SEE CPT LOG NO. CPT-102 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-103

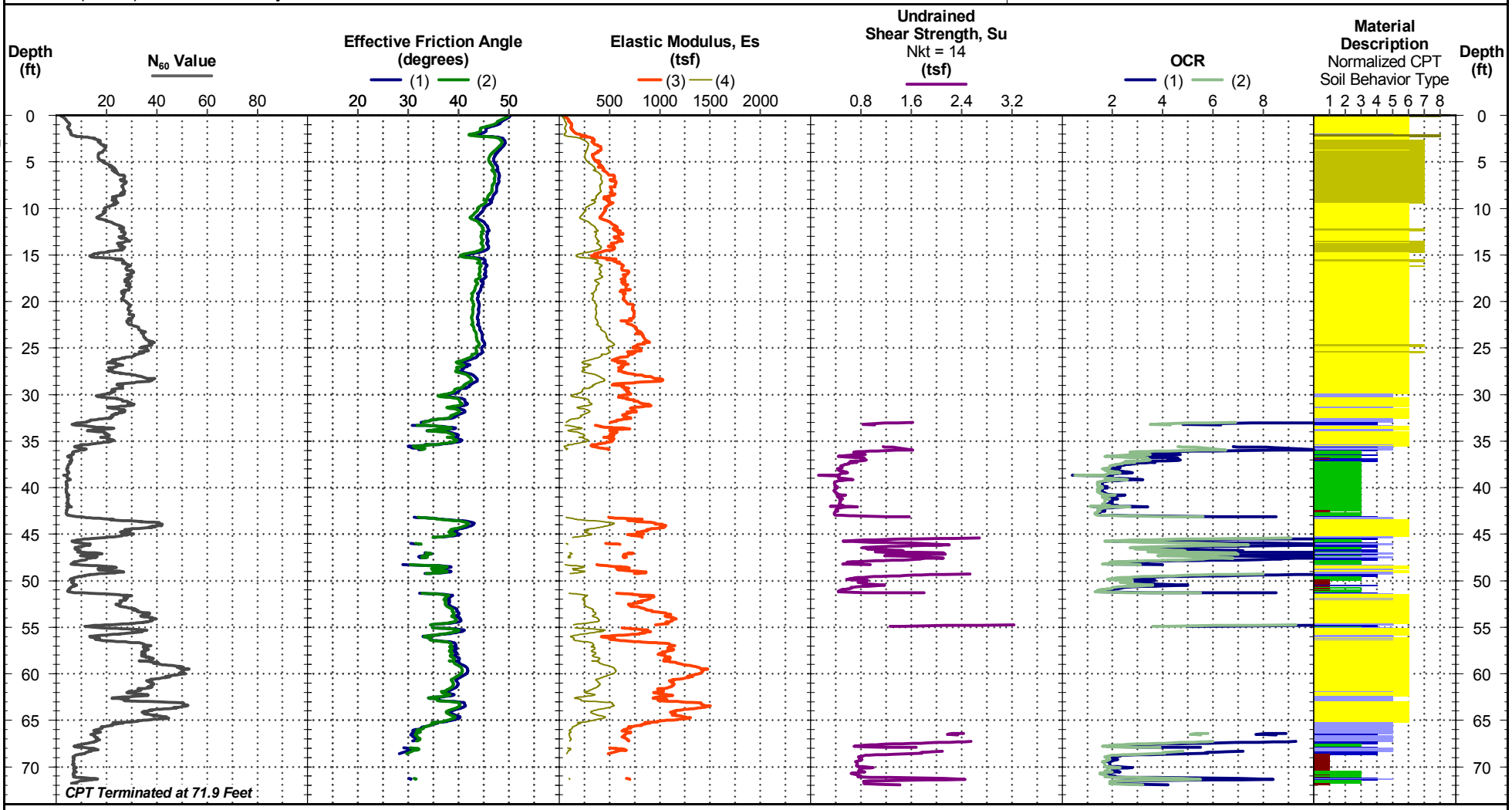
SEE CPT LOG NO. CPT-103 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-104

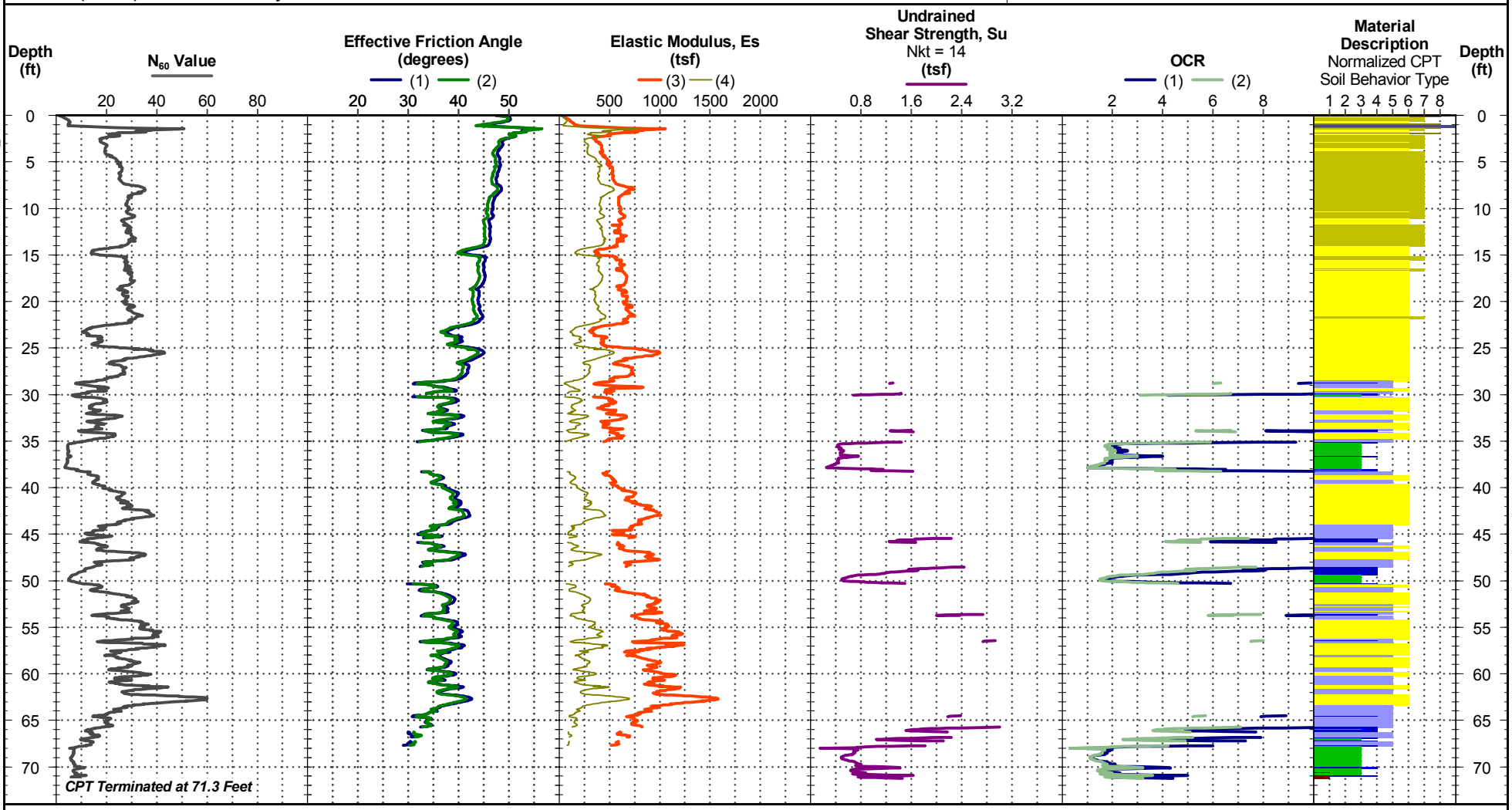
SEE CPT LOG NO. CPT-104 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/16/2014	CPT Completed: 4/16/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-106

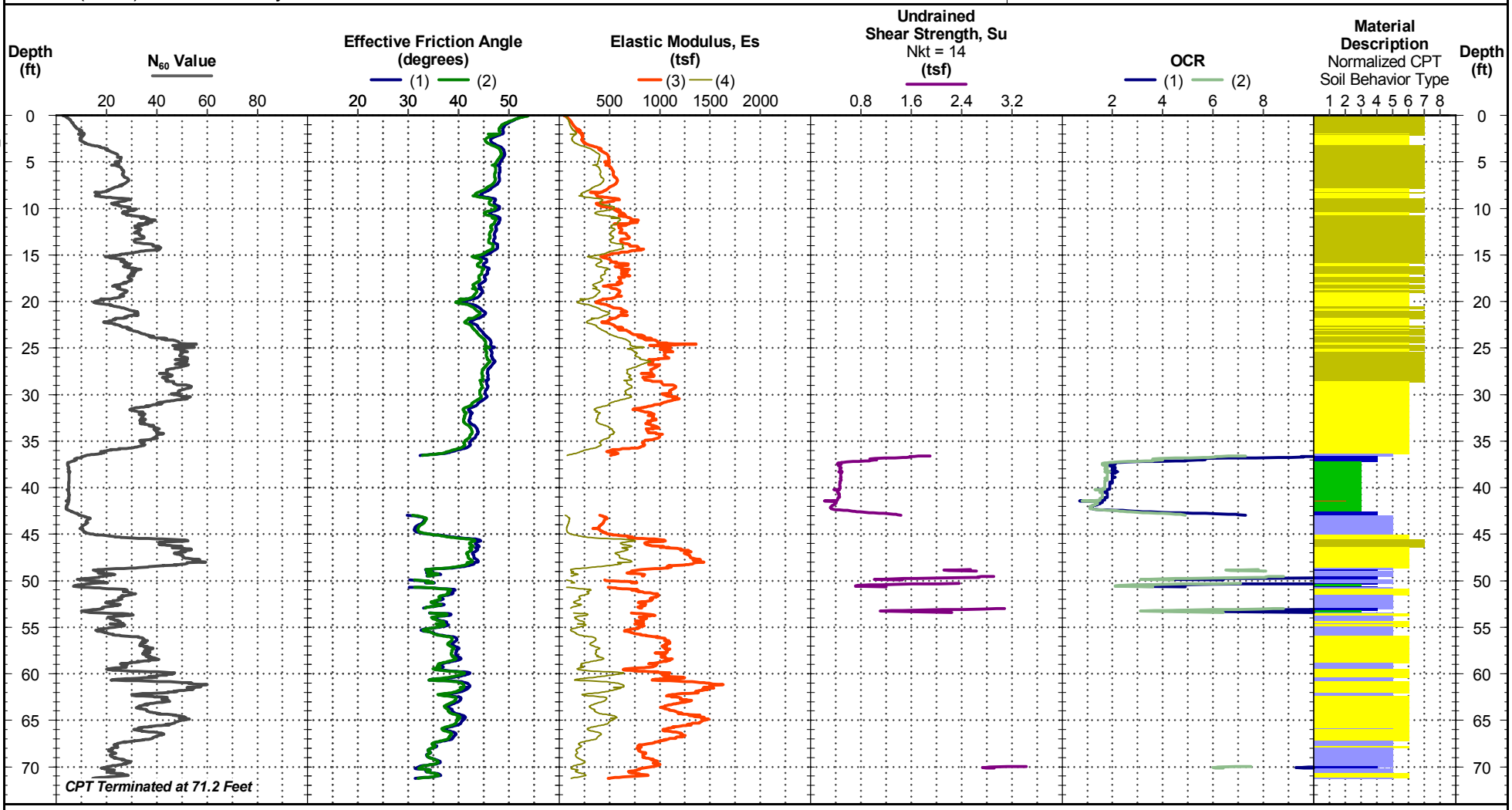
SEE CPT LOG NO. CPT-106 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-201

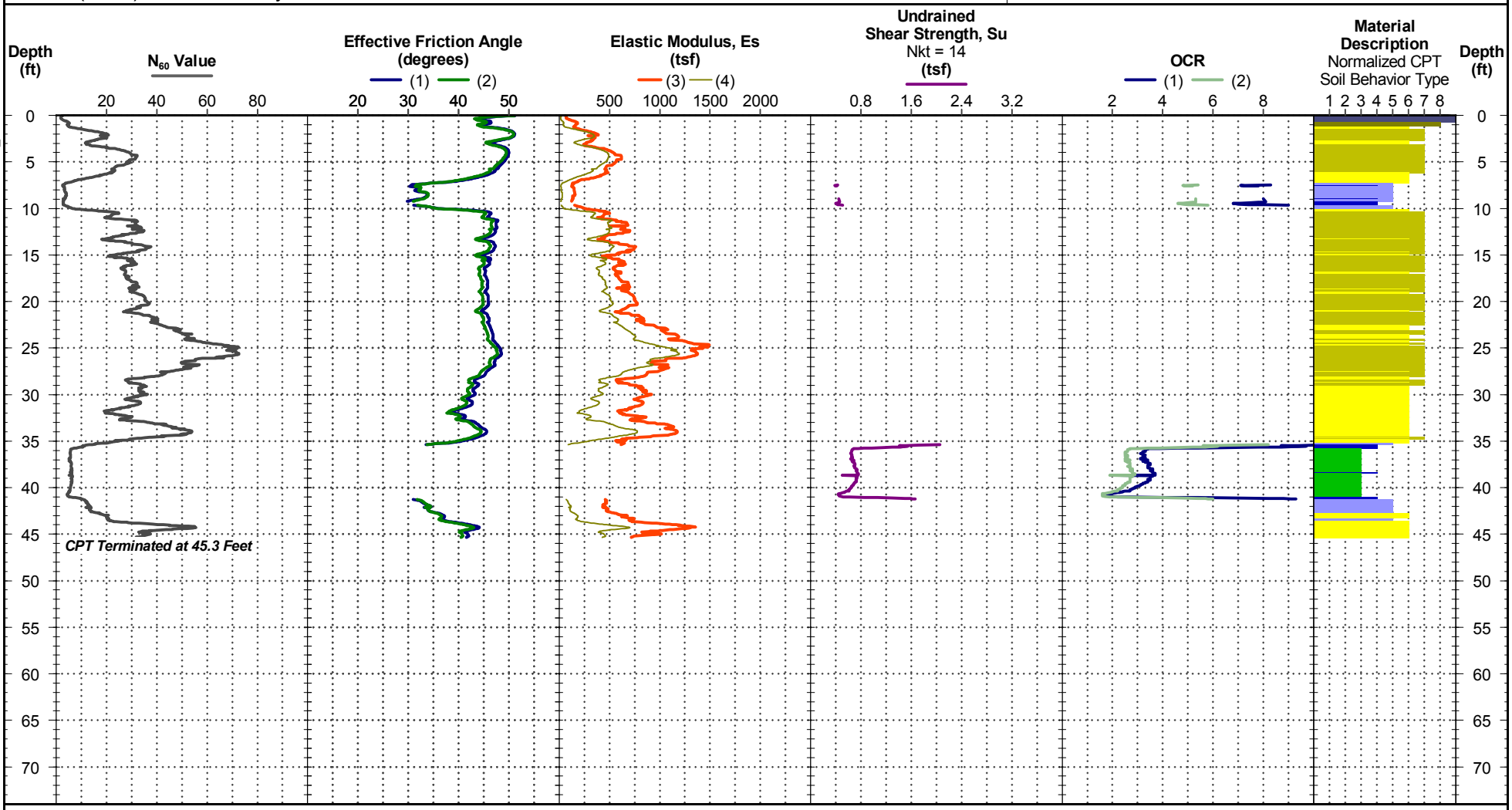
SEE CPT LOG NO. CPT-201 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-202

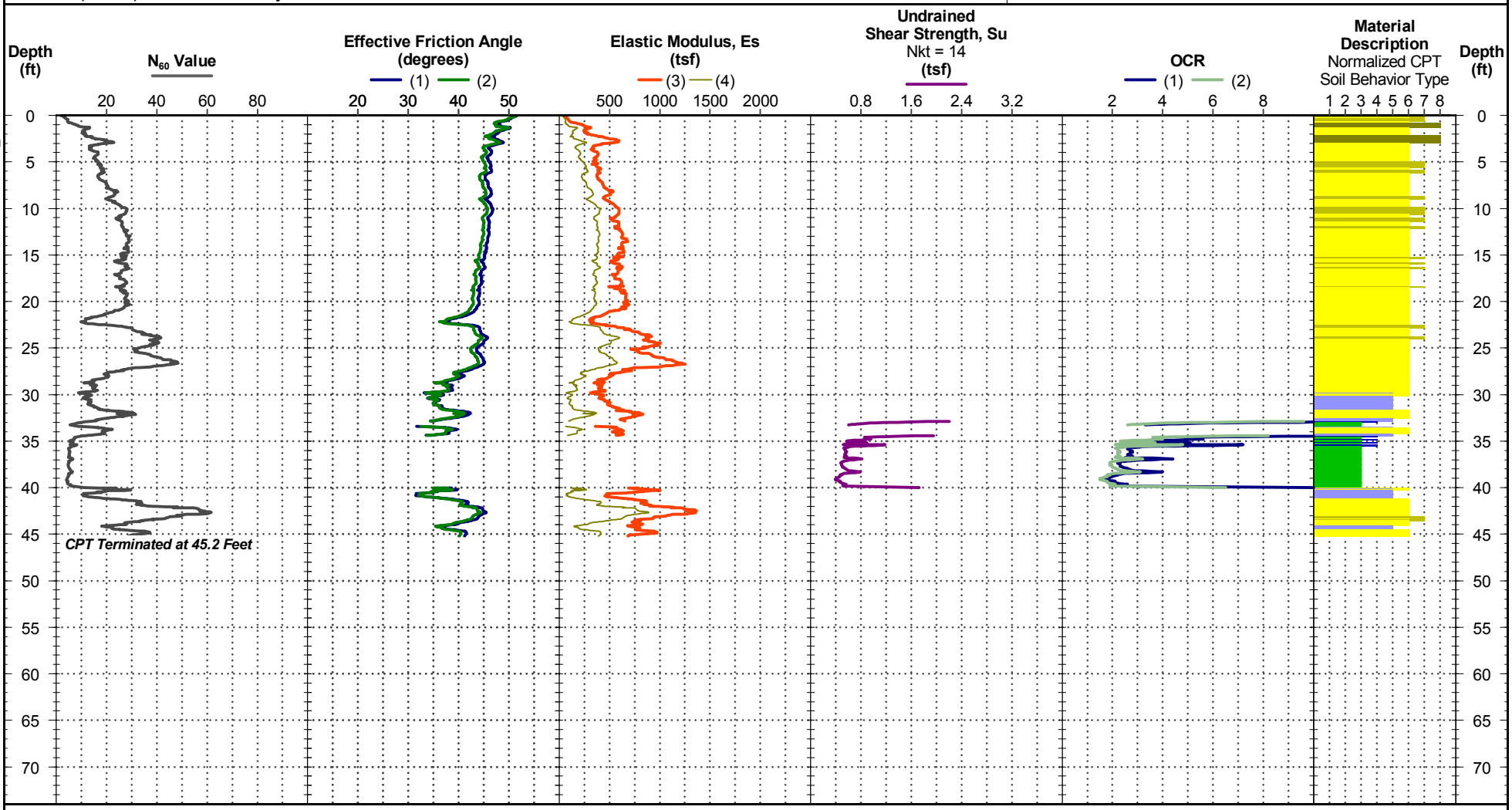
SEE CPT LOG NO. CPT-202 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION

▼ 5 ft estimated water depth
(used in normalizations and correlations; see Appendix C)

Notes:
Probe no. DDG1276 with net area ratio of 0.8
Manufactured by Vertek; calibrated 11/21/2013
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

DUNKELBERGER engineering & testing, inc.
A Terracon COMPANY

CPT Started: 4/15/2014	CPT Completed: 4/15/2014
Rig: 835	Operator: Doug McLellan
Project No.: HB145006	Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-203

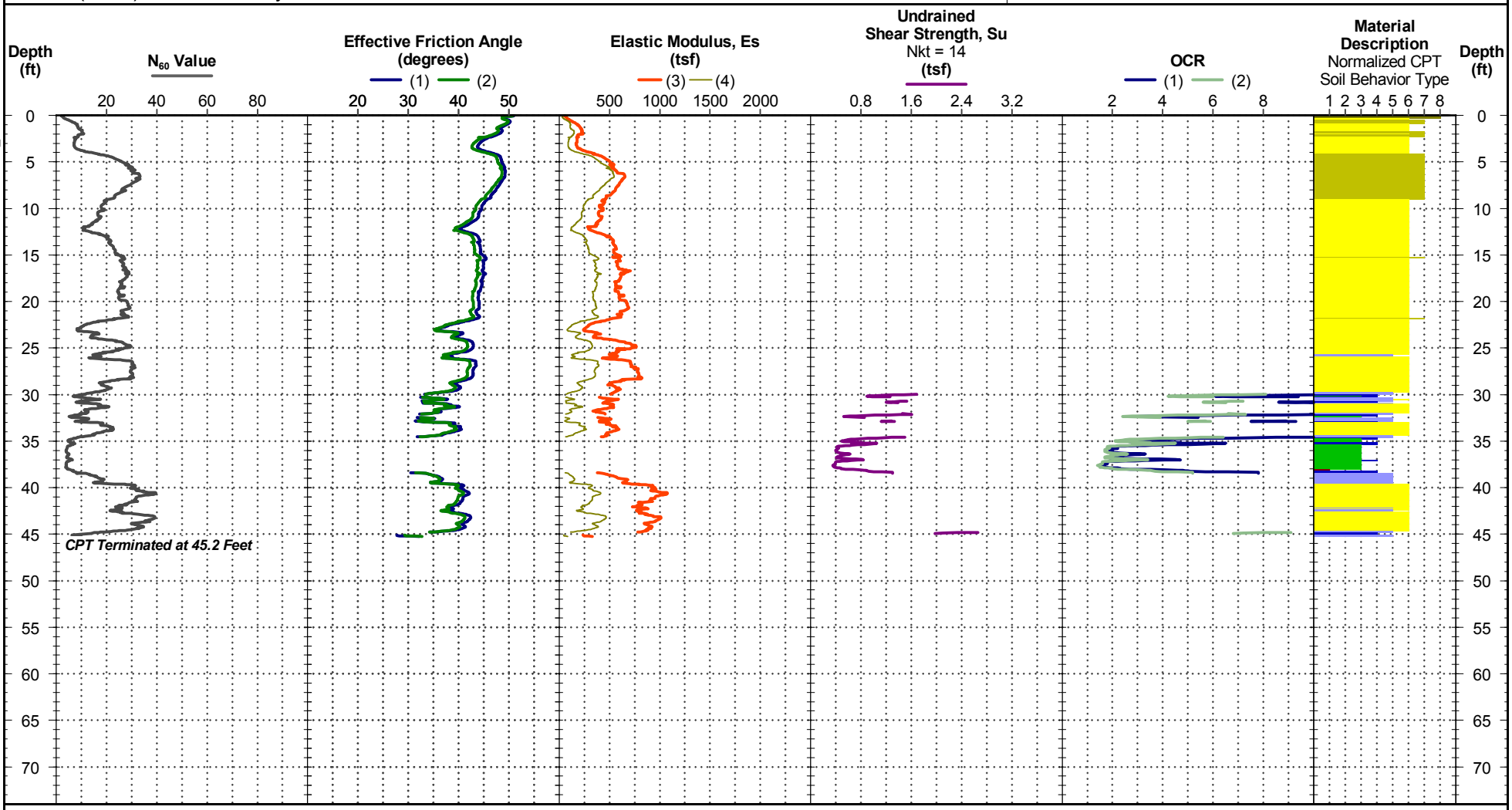
SEE CPT LOG NO. CPT-203 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION	Notes:			
▼ 5 ft estimated water depth (used in normalizations and correlations; see Appendix C)	Probe no. DDG1276 with net area ratio of 0.8 Manufactured by Vertek; calibrated 11/21/2013 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	DUNKELBERGER engineering & testing, inc. A Terracon COMPANY	CPT Started: 4/15/2014 Rig: 835 Project No.: HB145006	CPT Completed: 4/15/2014 Operator: Doug McLellan Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-204

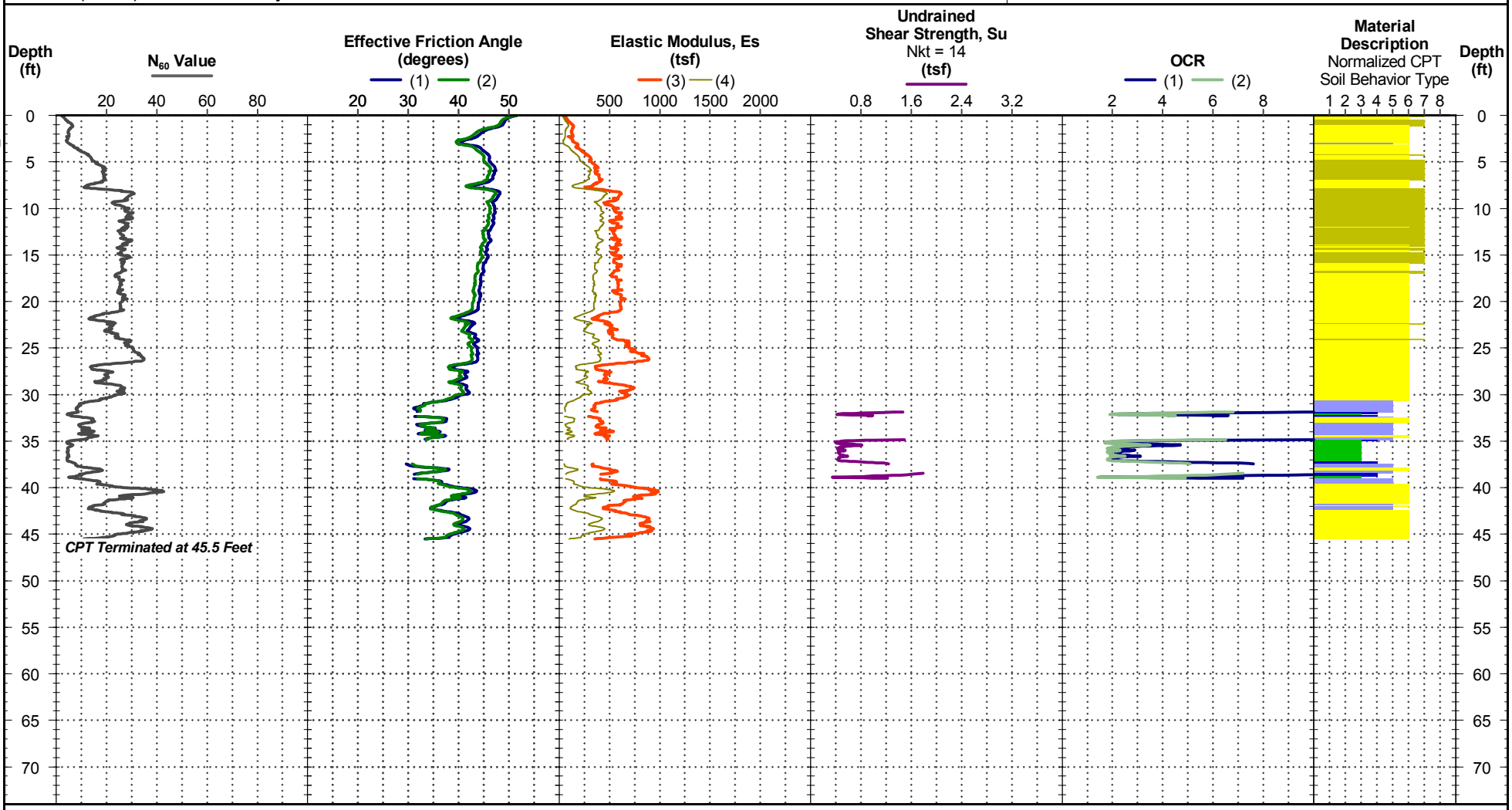
SEE CPT LOG NO. CPT-204 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION	Notes:	DUNKELBERGER engineering & testing, inc. A Terracon COMPANY	CPT Started: 4/16/2014	CPT Completed: 4/16/2014
▼ 5 ft estimated water depth (used in normalizations and correlations; see Appendix C)	Probe no. DDG1276 with net area ratio of 0.8 Manufactured by Vertek; calibrated 11/21/2013 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in		Rig: 835	Operator: Doug McLellan
			Project No.: HB145006	Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT CORRELATIVE PARAMETER LOG NO. CPT-205

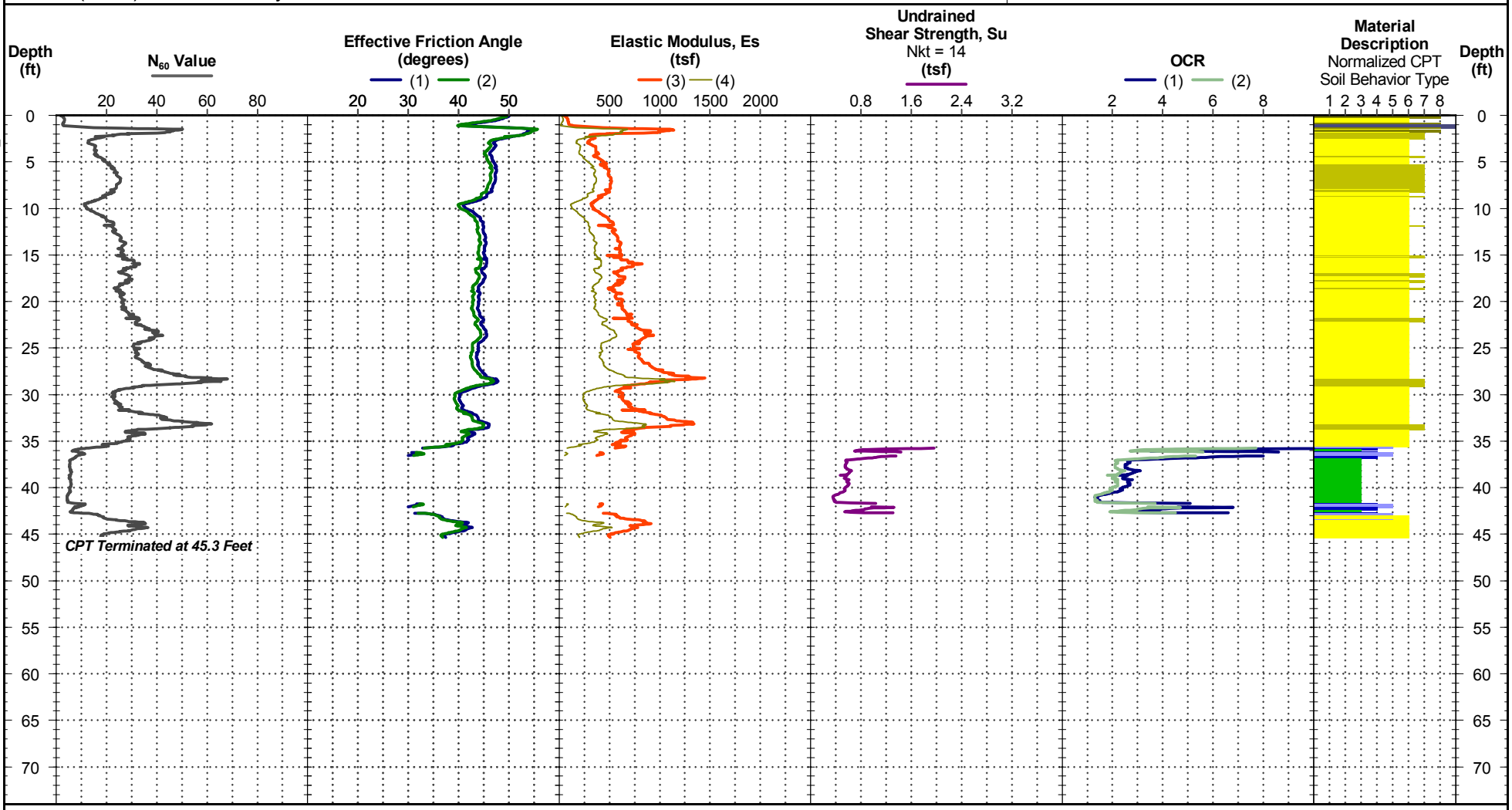
SEE CPT LOG NO. CPT-205 FOR DETAILED TEST RESULTS

PROJECT: Dredged Material Management Area BV-4B

CLIENT: Taylor Engineering, Inc.

TEST LOCATION: See Exhibit A-2

SITE: BV-4B
(Mims) Brevard County, Florida



Tip resistance, sleeve resistance, porewater pressure, and tilt angle are measured. Other parameters presented are derived from interpretations of the measured data, based upon published correlations, but do not necessarily represent actual values that would be derived from direct testing. Appendix C provides the formulas used for these correlations and presents estimates of the relative reliability associated with the correlated parameters.

WATER LEVEL OBSERVATION	Notes:			
▼ 5 ft estimated water depth (used in normalizations and correlations; see Appendix C)	Probe no. DDG1276 with net area ratio of 0.8 Manufactured by Vertek; calibrated 11/21/2013 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	DUNKELBERGER engineering & testing, inc. A Terracon COMPANY	CPT Started: 4/16/2014	CPT Completed: 4/16/2014
			Rig: 835	Operator: Doug McLellan
			Project No.: HB145006	Exhibit: A-18

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT CORRELATIVE PARAMETERS REPORT HB14006_CPT.GPJ TERRACON2012_W INSITU.GDT 7/15/14

CPT GENERAL NOTES

DESCRIPTION OF MEASUREMENTS AND CALIBRATIONS

To be reported per ASTM D5778:

Uncorrected Tip Resistance, q_c
Measured force acting on the cone divided by the cone's projected area

Corrected Tip Resistance, q_t
Cone resistance corrected for porewater and net area ratio effects
$q_t = q_c + U2(1 - a)$
Where a is the net area ratio, a lab calibration of the cone typically between 0.70 and 0.85

Pore Pressure, U1/U2
Pore pressure generated during penetration
U1 - sensor on the face of the cone
U2 - sensor on the shoulder (more common)

Sleeve Friction, fs
Frictional force acting on the sleeve divided by its surface area

Normalized Friction Ratio, FR
The ratio as a percentage of fs to q_t, accounting for overburden pressure

To be reported per ASTM D7400, if collected:

Shear Wave Velocity, Vs
Measured in a Seismic CPT and provides direct measure of soil stiffness

DESCRIPTION OF GEOTECHNICAL CORRELATIONS

Normalized Tip Resistance, Q_t
$Q_t = (q_t - \sigma_{v0})/\sigma'_{v0}$

Over Consolidation Ratio, OCR
$OCR\ (1) = 0.25(Q_t)^{1.25}$
$OCR\ (2) = 0.33(Q_t)$

Undrained Shear Strength, Su
$Su = Q_t \times \sigma'_{v0}/N_{kt}$
N_{kt} is a geographical factor (shown on Su plot)

Sensitivy, St
$St = (q_t - \sigma_{v0}/N_{kt}) \times (1/fs)$

Effective Friction Angle, ϕ'
$\phi'\ (1) = \tan^{-1}(0.373[\log(q_t/\sigma'_{v0}) + 0.29])$
$\phi'\ (2) = 17.6 + 11[\log(Q_t)]$

Unit Weight
$UW = (0.27[\log(FR)]+0.36[\log(q_t/atm)]+1.236) \times UW_{water}$
σ_{v0} is taken as the incremental sum of the unit weights

Small Strain Shear Modulus, G_0
$G_0\ (1) = \rho Vs^2$
$G_0\ (2) = 0.015 \times 10^{(0.55Ic + 1.68)}(q_t - \sigma_{v0})$

Soil Behavior Type Index, Ic
$Ic = [(3.47 - \log(Q_t))^2 + (\log(FR) + 1.22)^2]^{0.5}$

SPT N_{60}
$N_{60} = (q_t/atm) / 10^{(1.1268 - 0.2817Ic)}$

Elastic Modulus, Es (assumes $q/q_{ultimate} \sim 0.3$, i.e. FS = 3)
$Es\ (1) = 2.6\Psi G_0$ where $\Psi = 0.56 - 0.33\log Q_{t,clean\ sand}$
$Es\ (2) = G_0$
$Es\ (3) = 0.015 \times 10^{(0.55Ic + 1.68)}(q_t - \sigma_{v0})$
$Es\ (4) = 2.5q_t$

Constrained Modulus, M
$M = \alpha_M(q_t - \sigma_{v0})$
For Ic > 2.2 (fine-grained soils)
$\alpha_M = Q_t$ with maximum of 14
For Ic < 2.2 (coarse-grained soils)
$\alpha_M = 0.0188 \times 10^{(0.55Ic + 1.68)}$

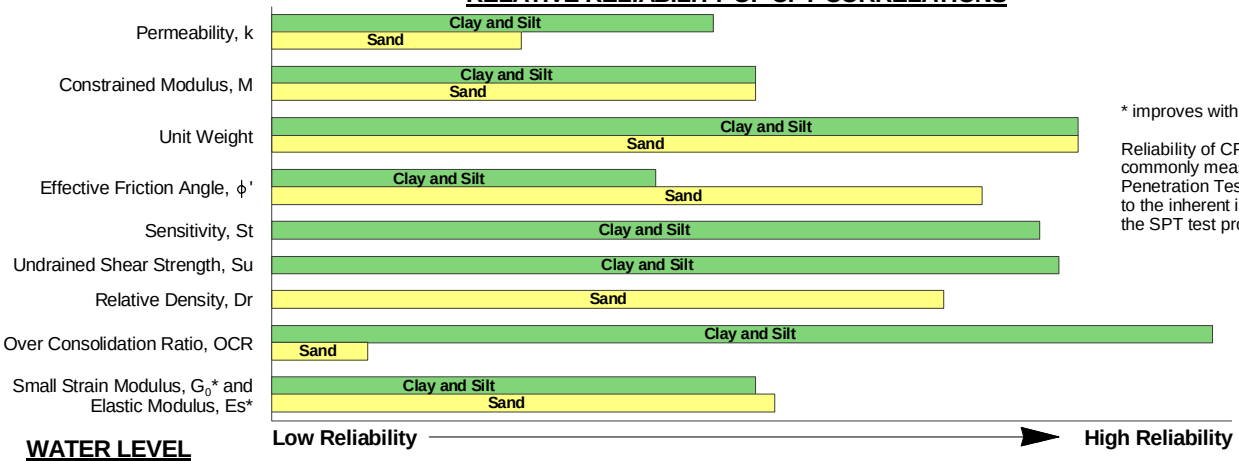
Hydraulic Conductivity, k
For $1.0 < Ic < 3.27$ $k = 10^{(0.952 - 3.04Ic)}$
For $3.27 < Ic < 4.0$ $k = 10^{(-4.52 - 1.37Ic)}$

Relative Density, Dr
$Dr = (Q_t / 350)^{0.5} \times 100$

REPORTED PARAMETERS

CPT logs as provided, at a minimum, report the data as required by ASTM D5778 and ASTM D7400 (if applicable). This minimum data include tip resistance, sleeve resistance, and porewater pressure. Other correlated parameters may also be provided. These other correlated parameters are interpretations of the measured data based upon published and reliable references, but they do not necessarily represent the actual values that would be derived from direct testing to determine the various parameters. The following chart illustrates estimates of reliability associated with correlated parameters based upon the literature referenced below.

RELATIVE RELIABILITY OF CPT CORRELATIONS



* improves with seismic Vs measurements

Reliability of CPT-predicted N_{60} values as commonly measured by the Standard Penetration Test (SPT) is not provided due to the inherent inaccuracy associated with the SPT test procedure.

WATER LEVEL

The groundwater level at the CPT location is used to normalize the measurements for vertical overburden pressures and as a result influences the normalized soil behavior type classification and correlated soil parameters. The water level may either be "measured" or "estimated:"

Measured - Depth to water directly measured in the field

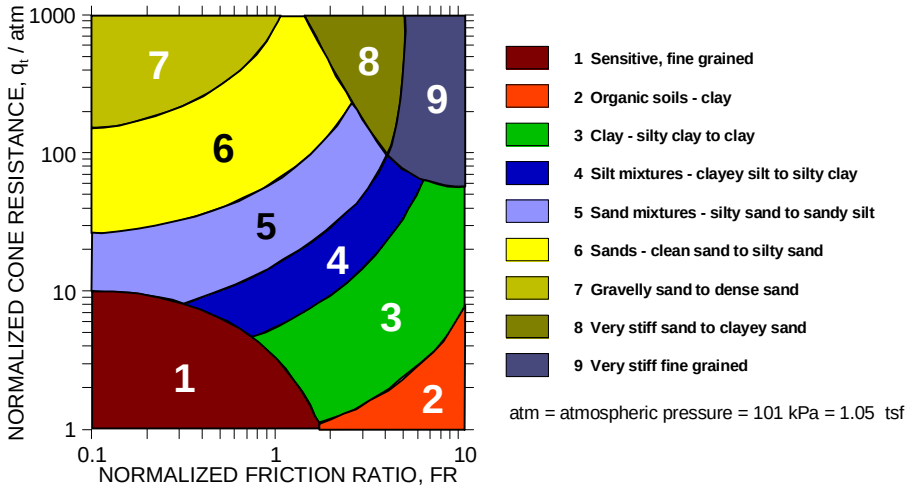
Estimated - Depth to water interpolated by the practitioner using pore pressure measurements in coarse grained soils and known site conditions

While groundwater levels displayed as "measured" more accurately represent site conditions at the time of testing than those "estimated," in either case the groundwater should be further defined prior to construction as groundwater level variations will occur over time.

CONE PENETRATION SOIL BEHAVIOR TYPE

The estimated stratigraphic profiles included in the CPT logs are based on relationships between corrected tip resistance (q_t), friction resistance (fs), and porewater pressure (U2). The normalized friction ratio (FR) is used to classify the soil behavior type.

Typically, silts and clays have high FR values and generate large excess penetration porewater pressures; sands have lower FRs and do not generate excess penetration porewater pressures. Negative pore pressure measurements are indicative of fissured fine-grained material. The adjacent graph (Robertson et al.) presents the soil behavior type correlation used for the logs. This normalized SBT chart, generally considered the most reliable, does not use pore pressure to determine SBT due to its lack of repeatability in onshore CPTs.



atm = atmospheric pressure = 101 kPa = 1.05 tsf

REFERENCES

Kulhawy, F.H., Mayne, P.W., (1997). "Manual on Estimating Soil Properties for Foundation Design," Electric Power Research Institute, Palo Alto, CA.

Mayne, P.W., (2013). "Geotechnical Site Exploration in the Year 2013," Georgia Institue of Technology, Atlanta, GA.

Robertson, P.K., Cabal, K.L. (2012). "Guide to Cone Penetration Testing for Geotechnical Engineering," Signal Hill, CA.

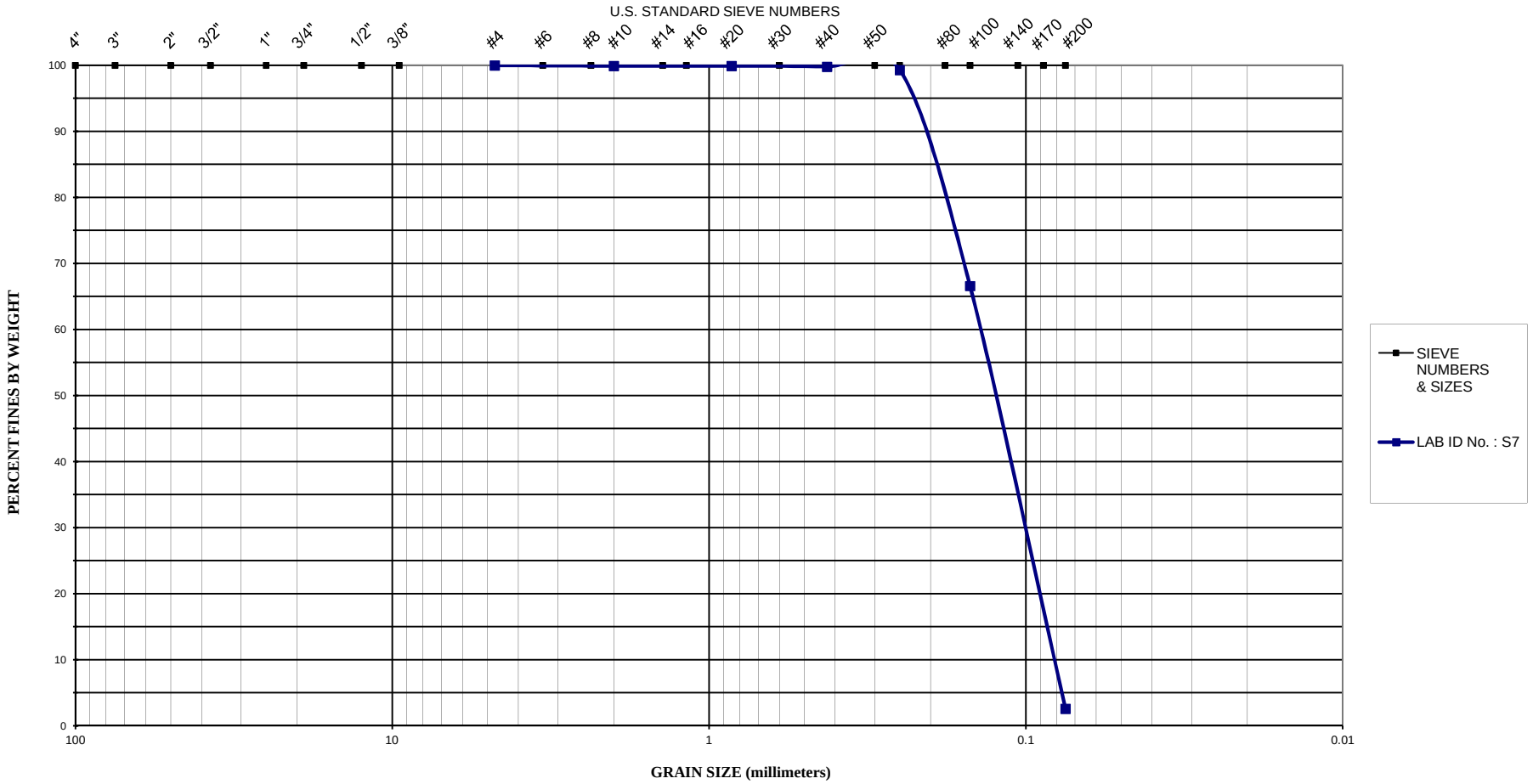
Schmertmann, J.H., (1970). "Static Cone to Compute Static Settlement over Sand," *Journal of the Soil Mechanics and Foundations Division*, 96(SM3), 1011-1043.

Terracon

APPENDIX B
LABORATORY TESTING REPORTS

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-101 **LAB ID No. :** S7 **Sample Date :** 4/17/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown fine SAND, trace silt	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-1

DUNKELBERGER
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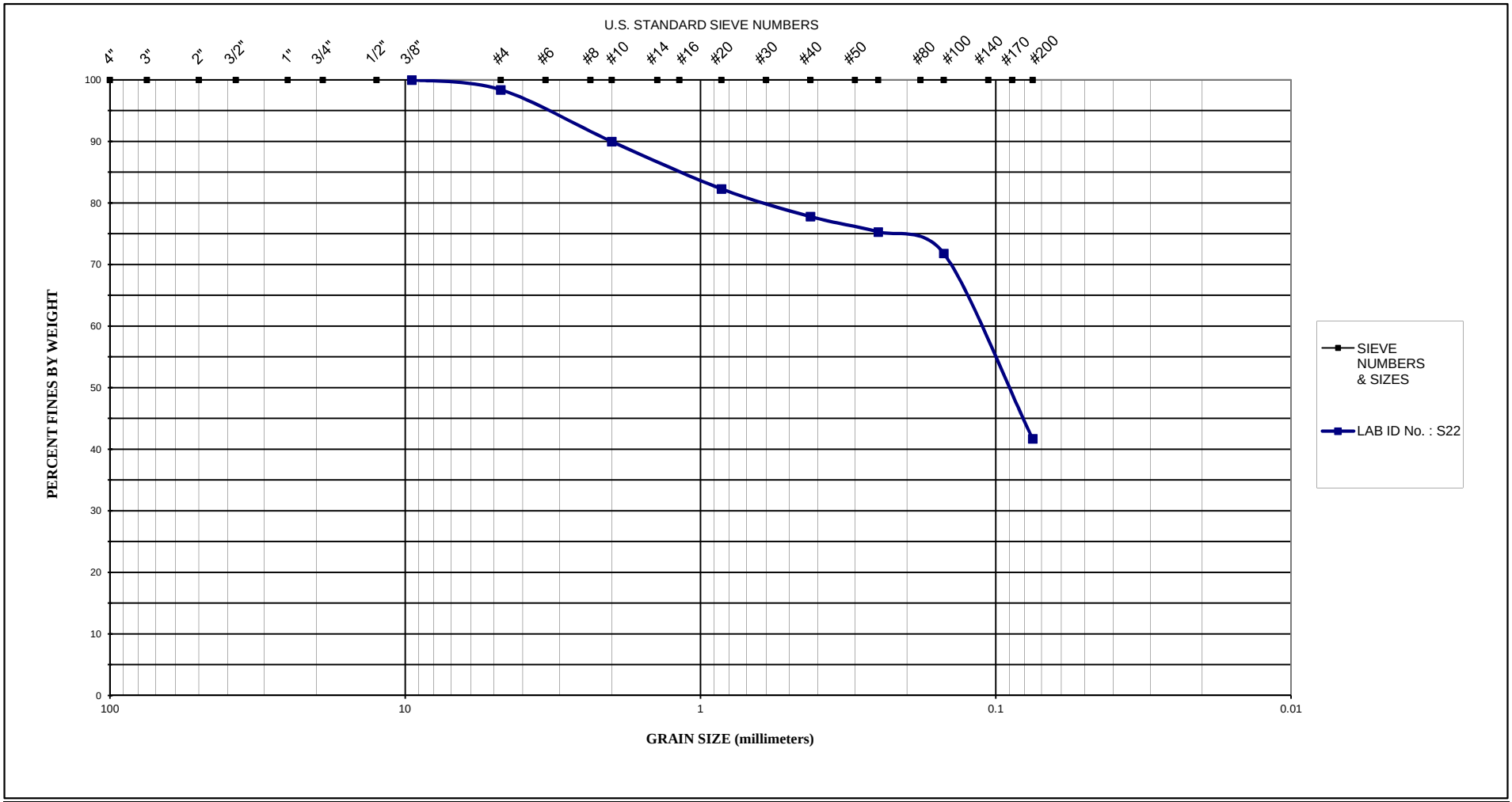
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-101 **LAB ID No. :** S22 **Sample Date :** 4/17/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green clayey fine SAND with broken shell	SC	0.12					---	---

Exhibit B-2

DUNKELBERGER
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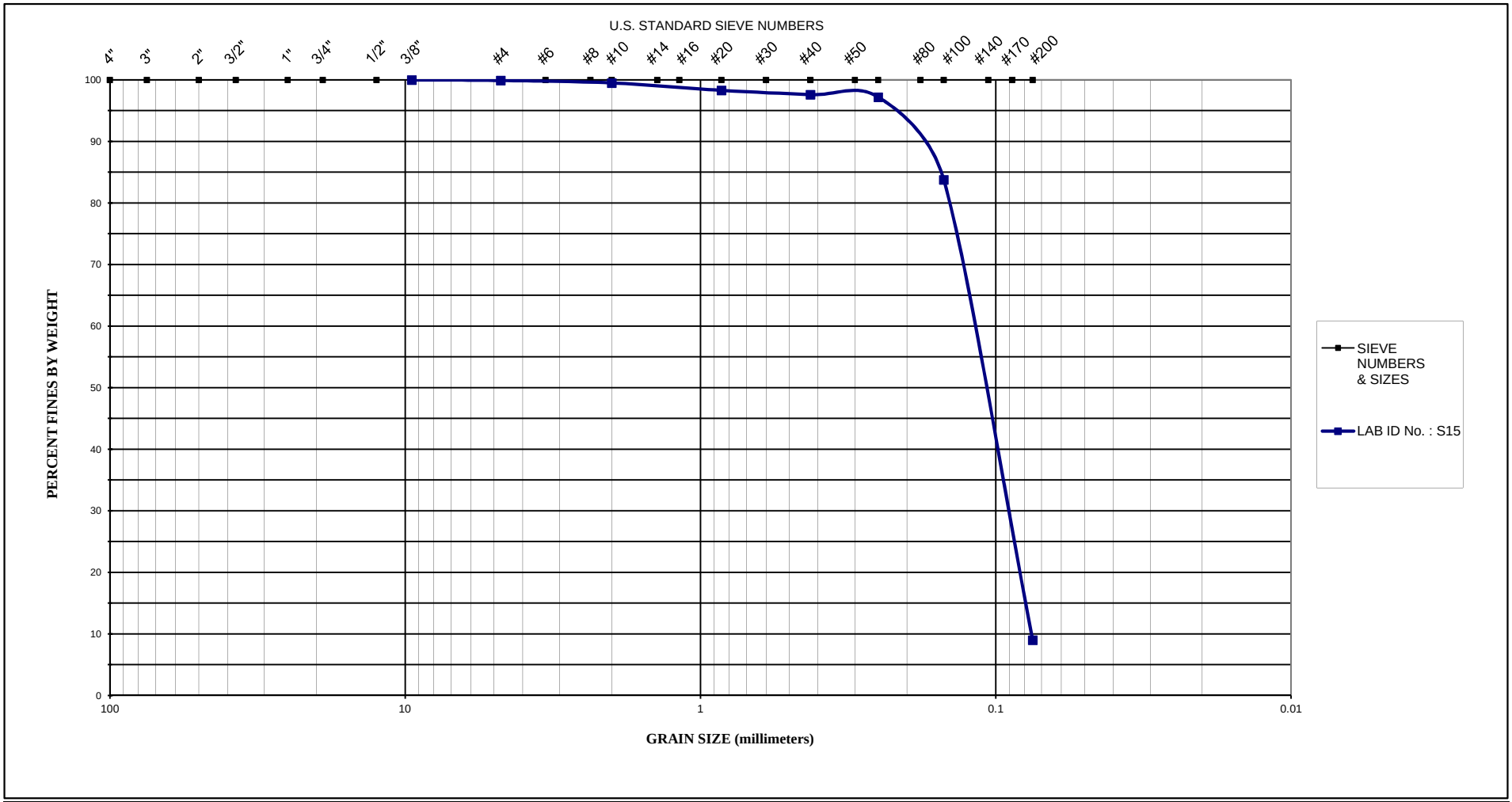
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-202 **LAB ID No. :** S15 **Sample Date :** 4/9/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray slightly silty fine SAND, trace broken shell	SP-SM	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-3

DUNKELBERGER
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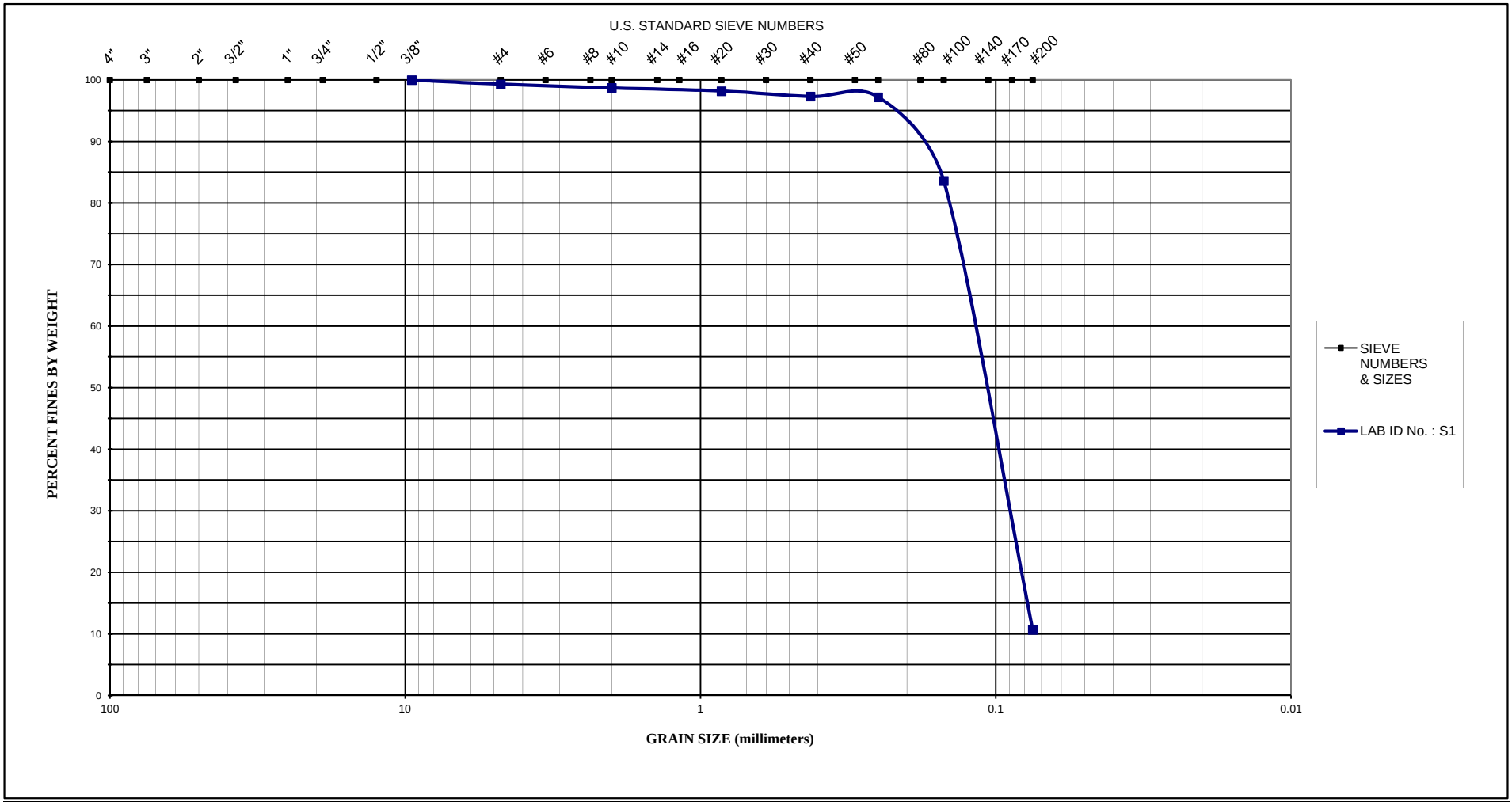
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

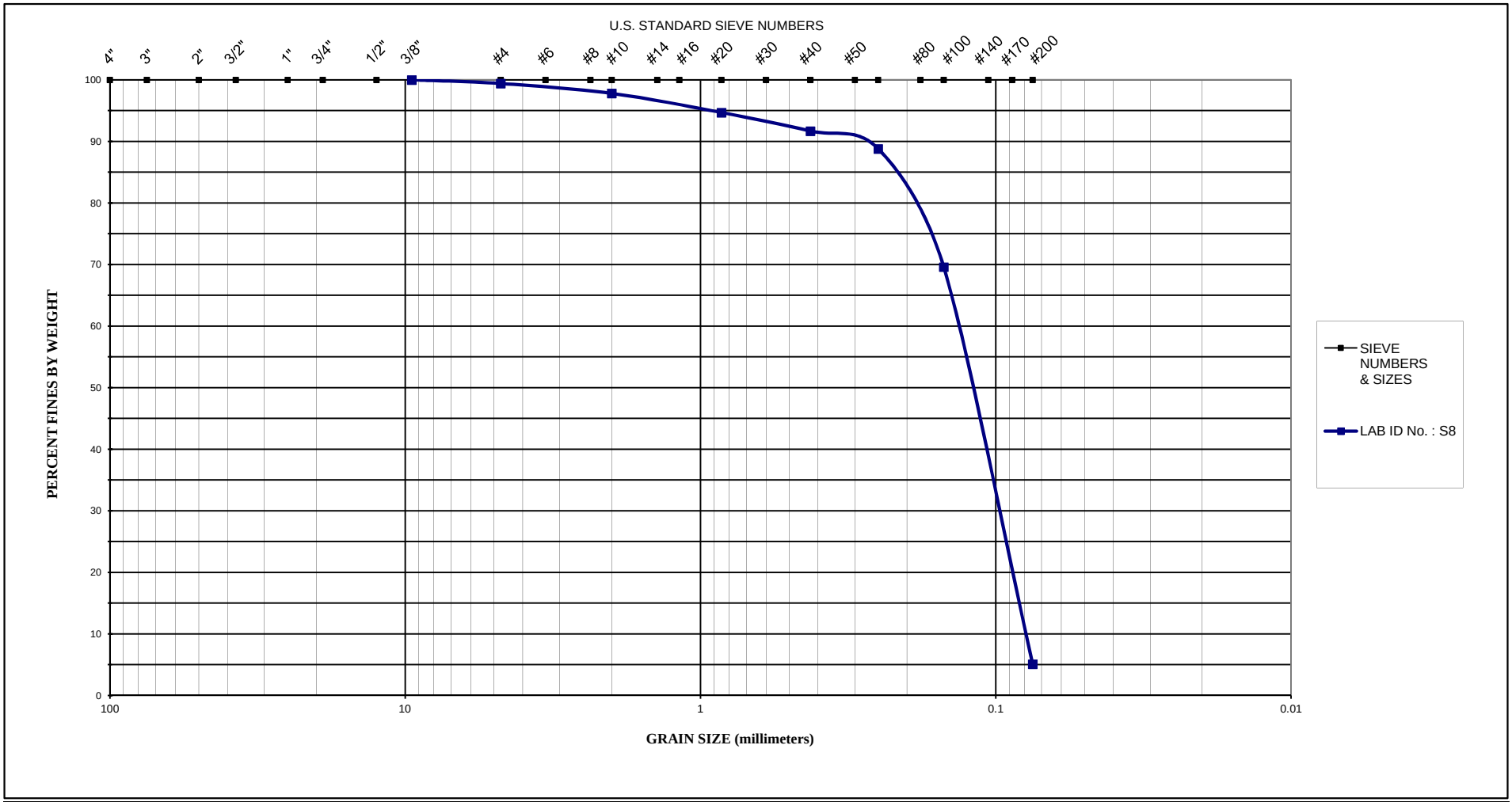
Sample Location : B-304 **LAB ID No. :** S1 **Sample Date :** 4/11/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown slightly silty fine SAND	SP-SM	0.13	0.09				---	---

Exhibit B-4

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-317 **LAB ID No. :** S8 **Sample Date :** 4/10/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray fine SAND with broken shell, trace of silt	SP	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-5

DUNKELBERGER
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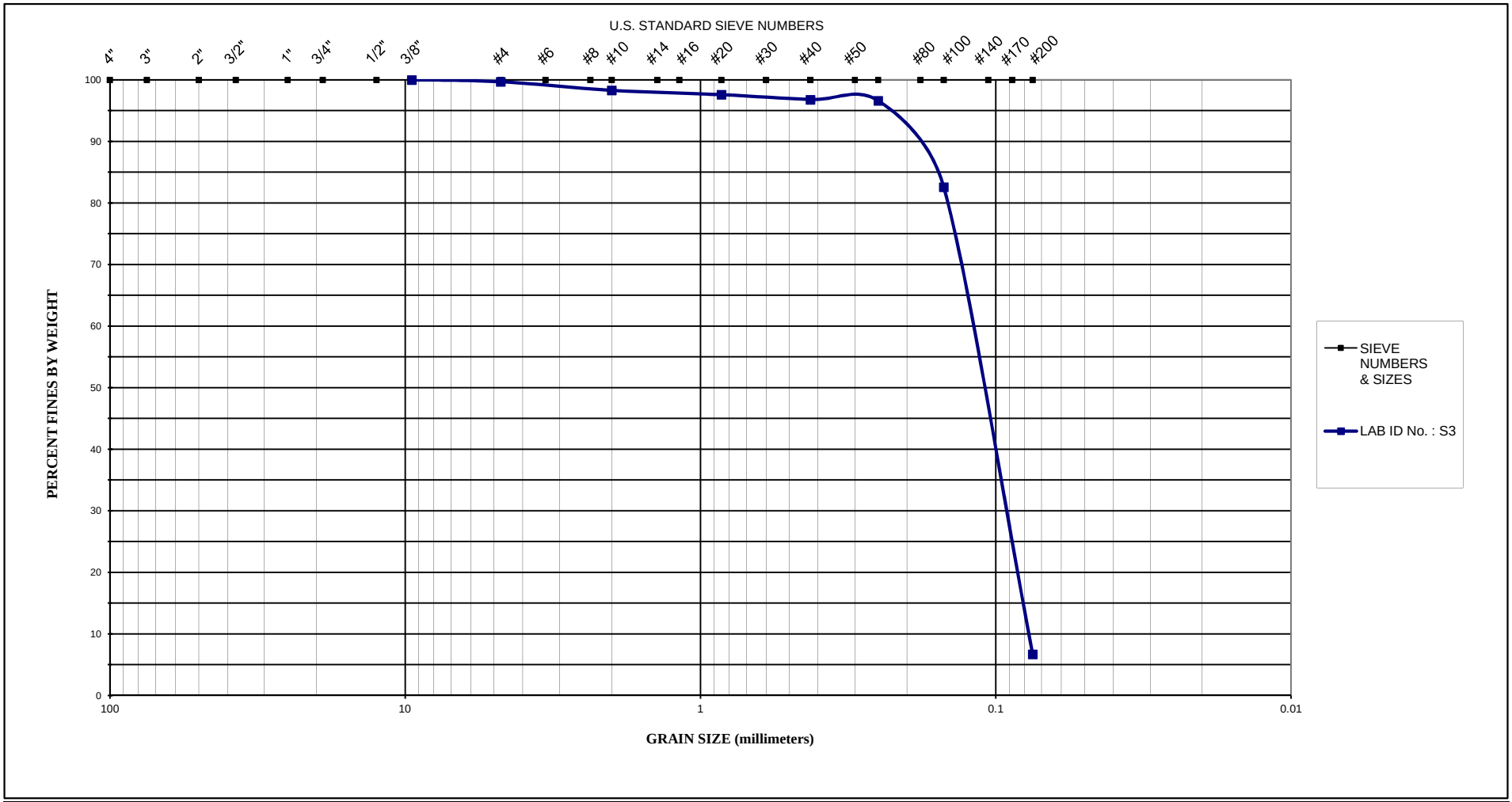
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-204 **LAB ID No. :** S3 **Sample Date :** 4/10/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Orange to light brown slighlty silty fine SAND	SP-SM	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-6

DUNKELBERGER
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Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-102 **LAB ID No. :** S9 **Sample Date :** 4/7/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray slightly silty fine SAND with broken shell	SP-SM	0.12	0.09	0.08	1.50	0.84	---	---

Exhibit B-7

DUNKELBERGER
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Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

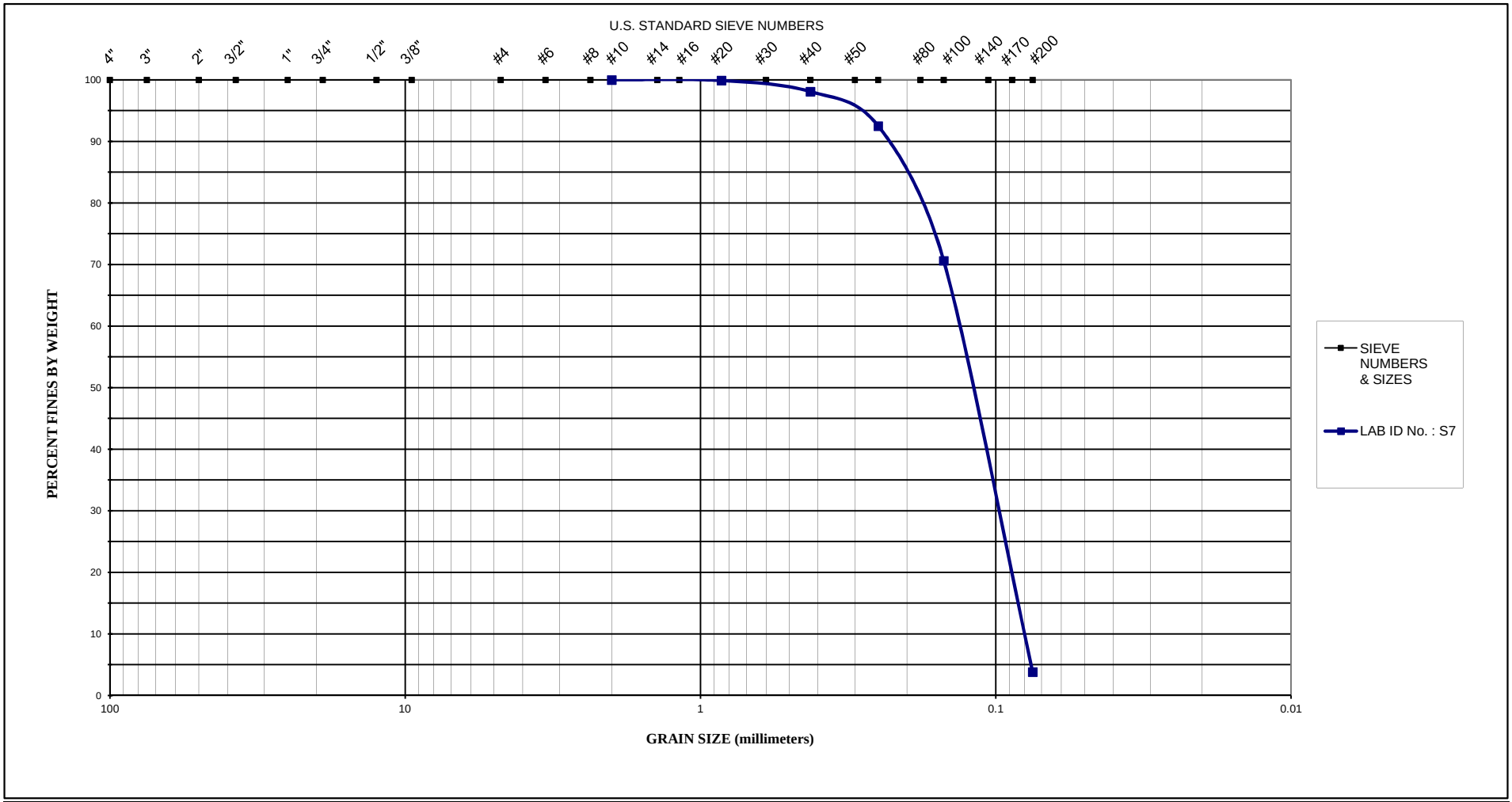
Sample Location : B-102 **LAB ID No. :** S14 **Sample Date :** 4/7/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray clayey fine SAND with broken shell	SC	0.15	0.09				---	---

Exhibit B-8

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-305 **LAB ID No. :** S7 **Sample Date :** 4/11/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray fine SAND with traces of broken shell	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-9

DUNKELBERGER
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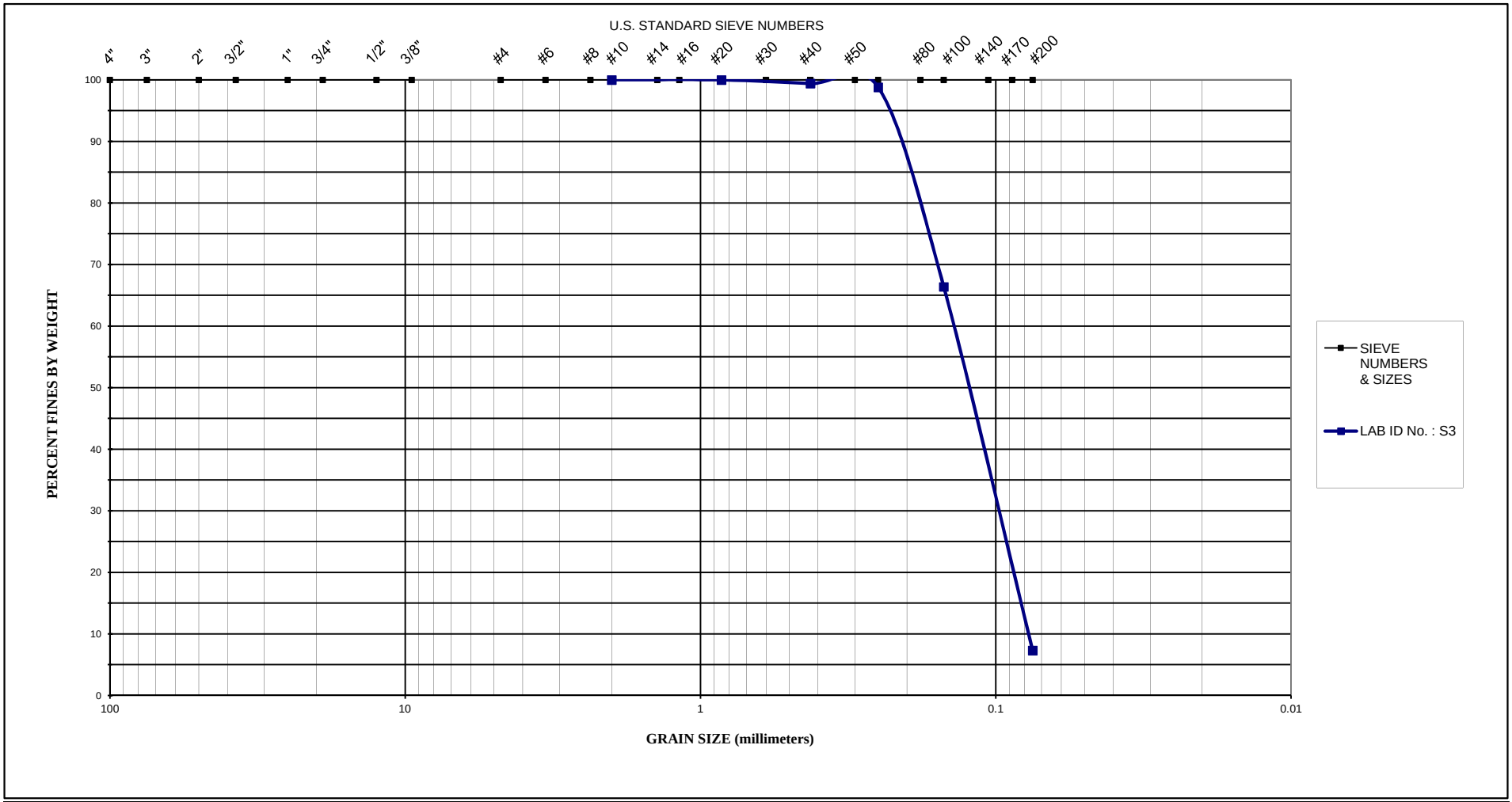
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-206 **LAB ID No. :** S3 **Sample Date :** 4/15/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown slightly silty fine SAND	SP-SM	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-10

DUNKELBERGER
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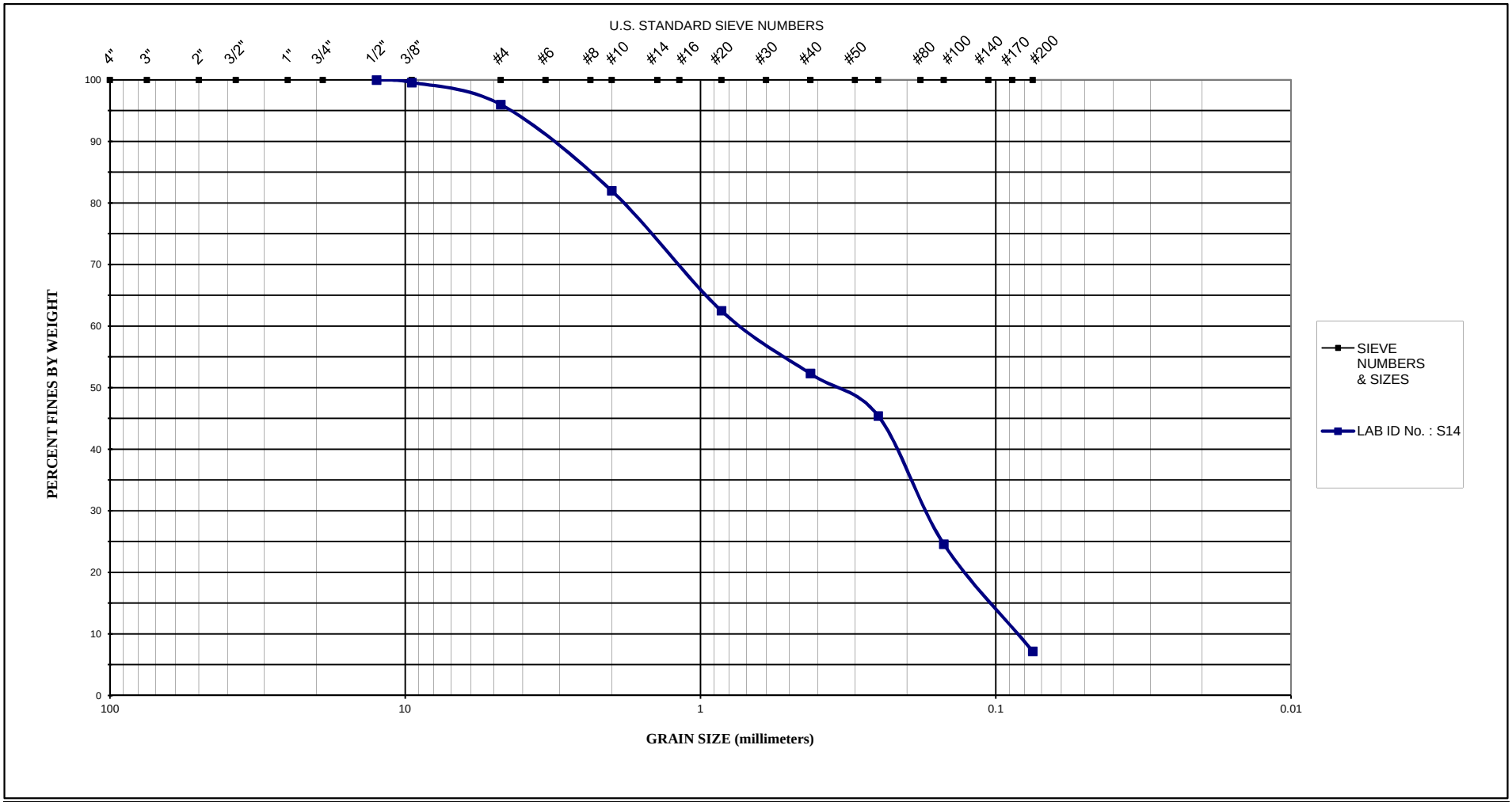
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-207 **LAB ID No. :** S14 **Sample Date :** 4/17/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray slightly silty fine SAND with some broken shell	SP-SM	0.73	0.17	0.08	9.13	0.49	---	---

Exhibit B-11

DUNKELBERGER
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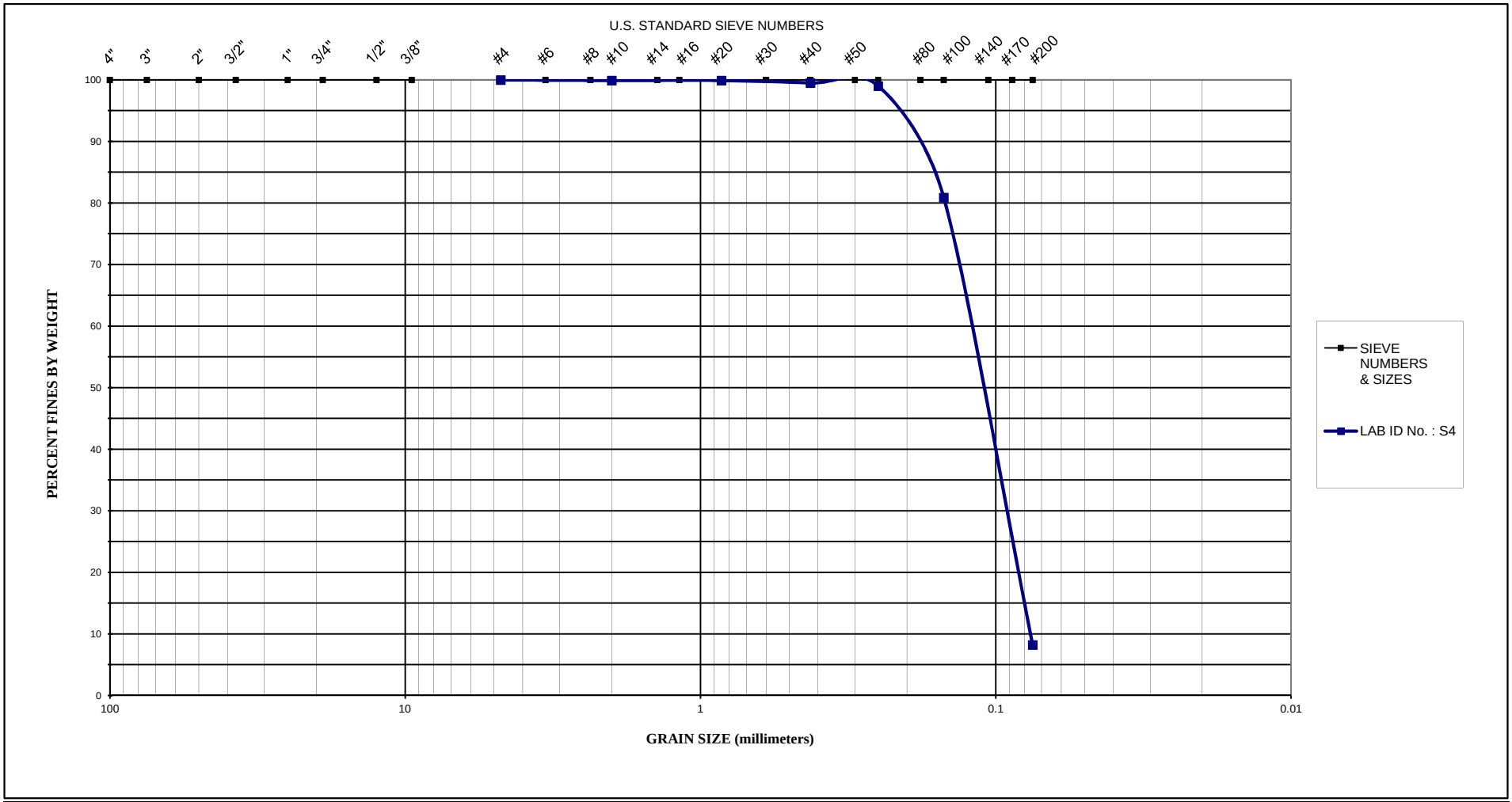
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-302 **LAB ID No. :** S4 **Sample Date :** 4/14/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown slightly silty fine SAND	SP-SM	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-12

DUNKELBERGER
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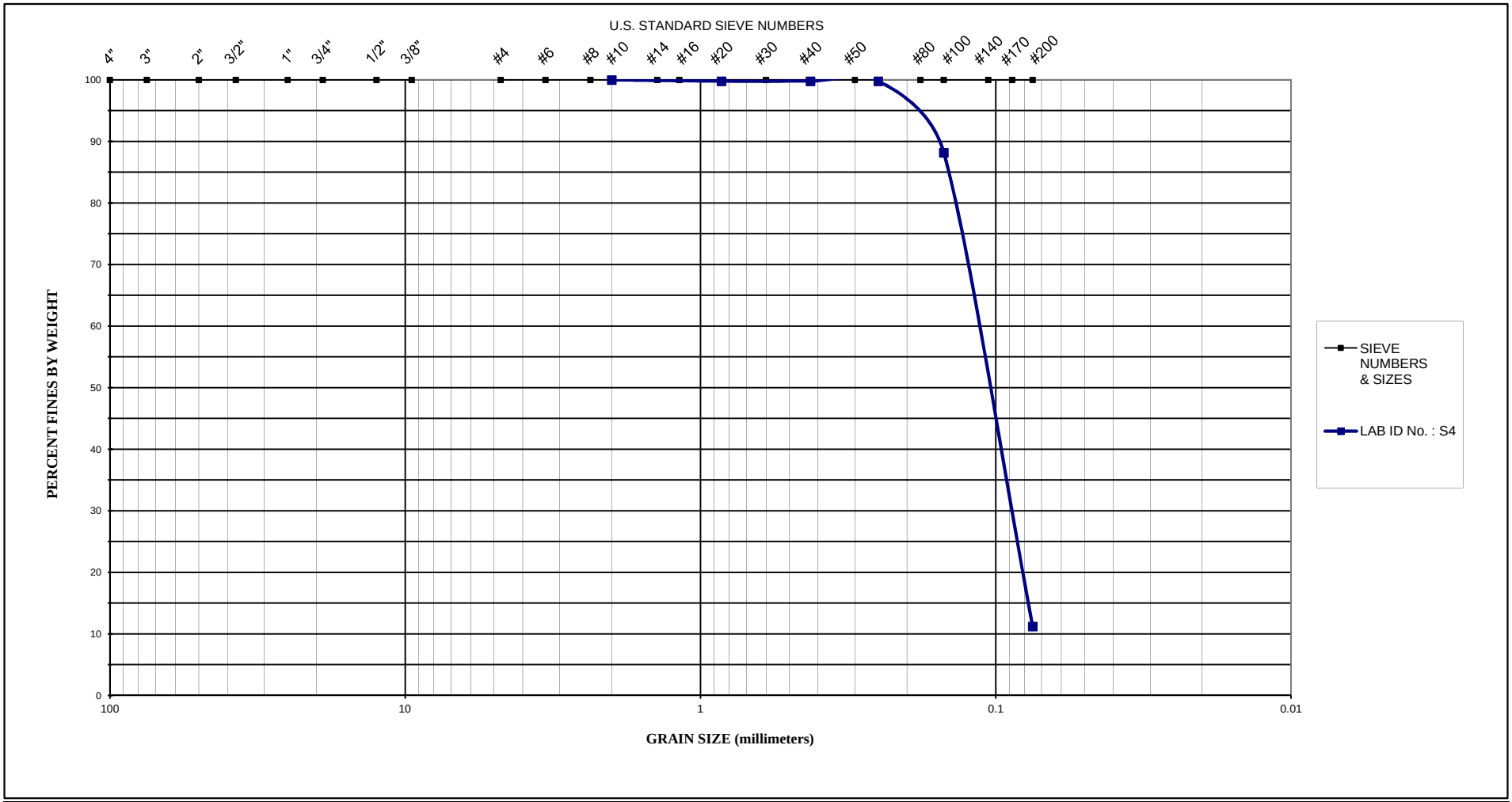
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-306 **LAB ID No. :** S4 **Sample Date :** 4/11/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Orange to light brown slightly silty fine SAND	SP-SM	0.12	0.09				---	---

Exhibit B-13

DUNKELBERGER
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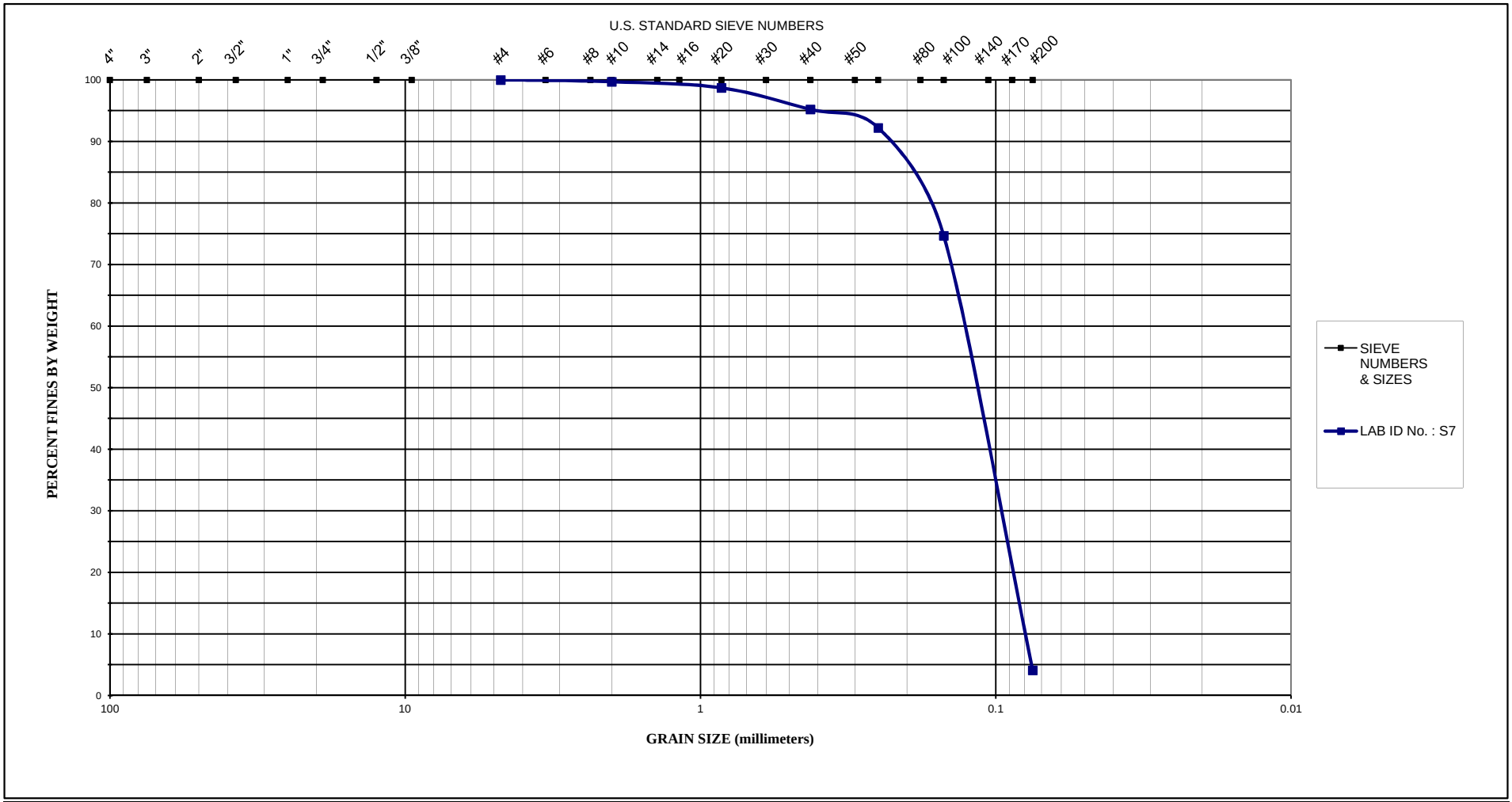
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-309 **LAB ID No. :** S7 **Sample Date :** 4/14/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Green to gray fine SAND with broken shell, trace silt	SP	0.14	0.10	0.08	1.75	0.89	---	---

Exhibit B-14

DUNKELBERGER
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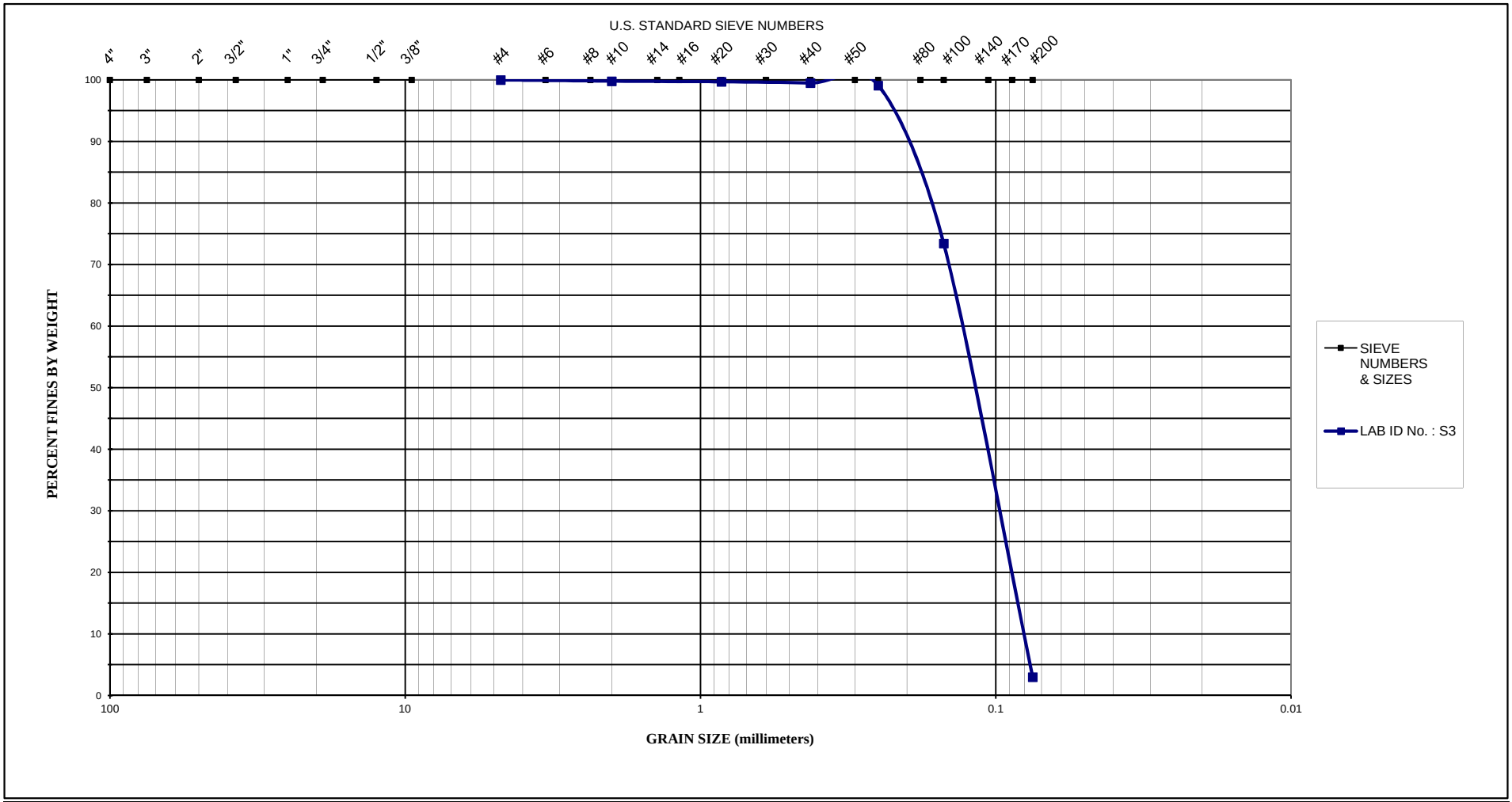
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-310 **LAB ID No. :** S3 **Sample Date :** 4/11/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Orange to light brown fine SAND, trace silt	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-15

DUNKELBERGER
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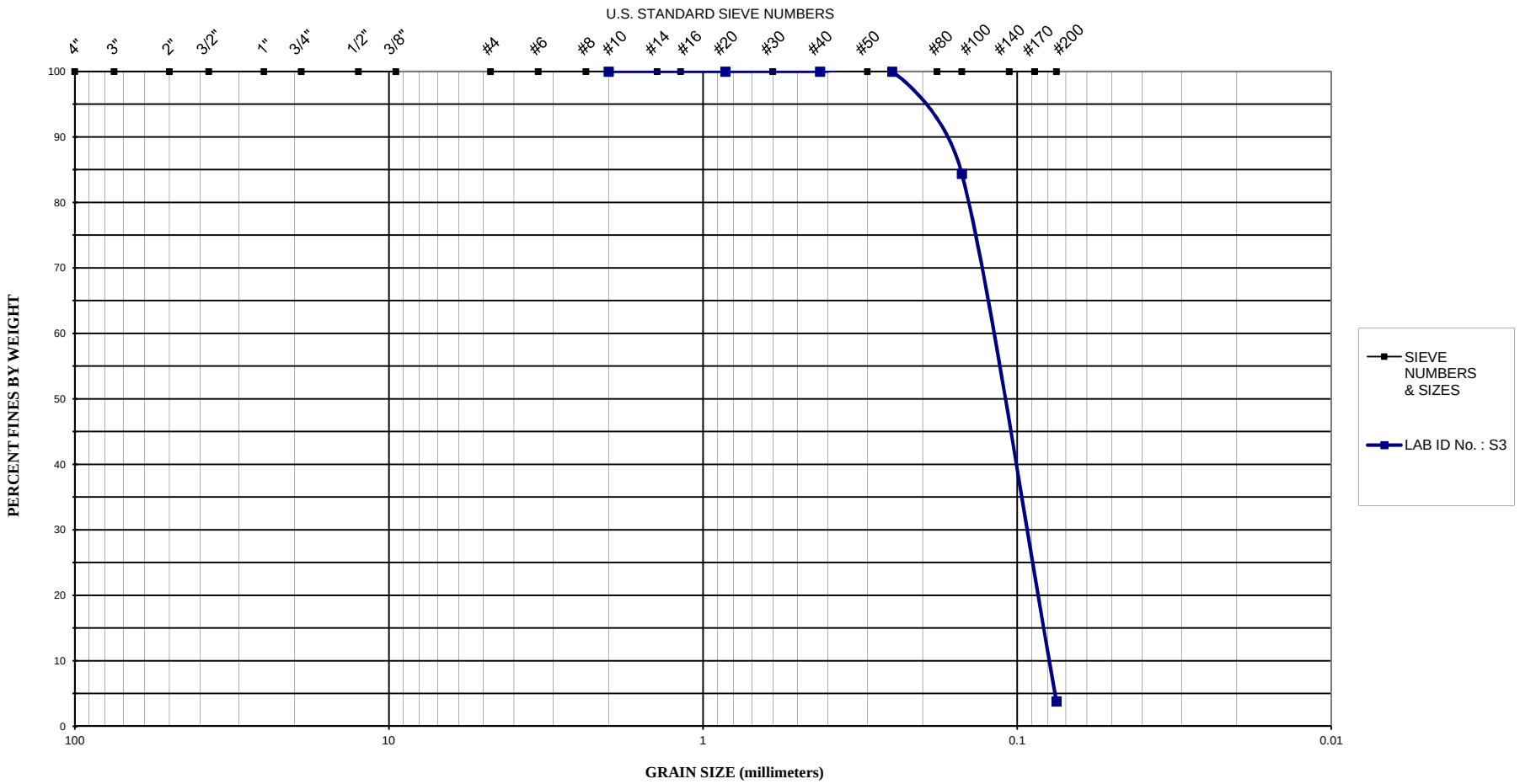
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-312 **LAB ID No. :** S3 **Sample Date :** 4/10/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown fine SAND, trace silt	SP	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-16

DUNKELBERGER
engineering & testing, inc.
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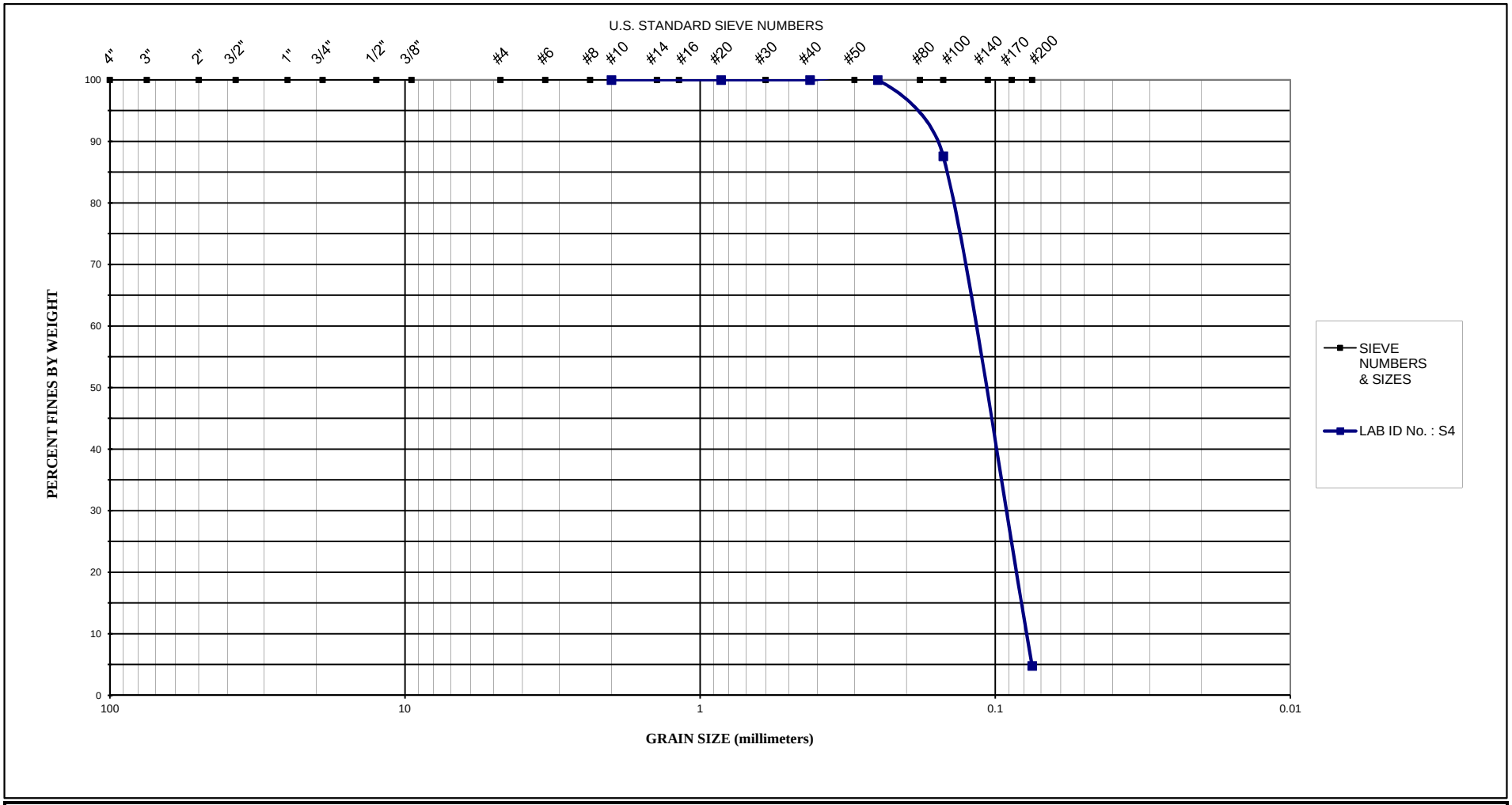
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-315 **LAB ID No. :** S4 **Sample Date :** 4/14/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown fine SAND, trace silt	SP	0.13	0.09	0.08	1.63	0.78	---	---

Exhibit B-17

DUNKELBERGER
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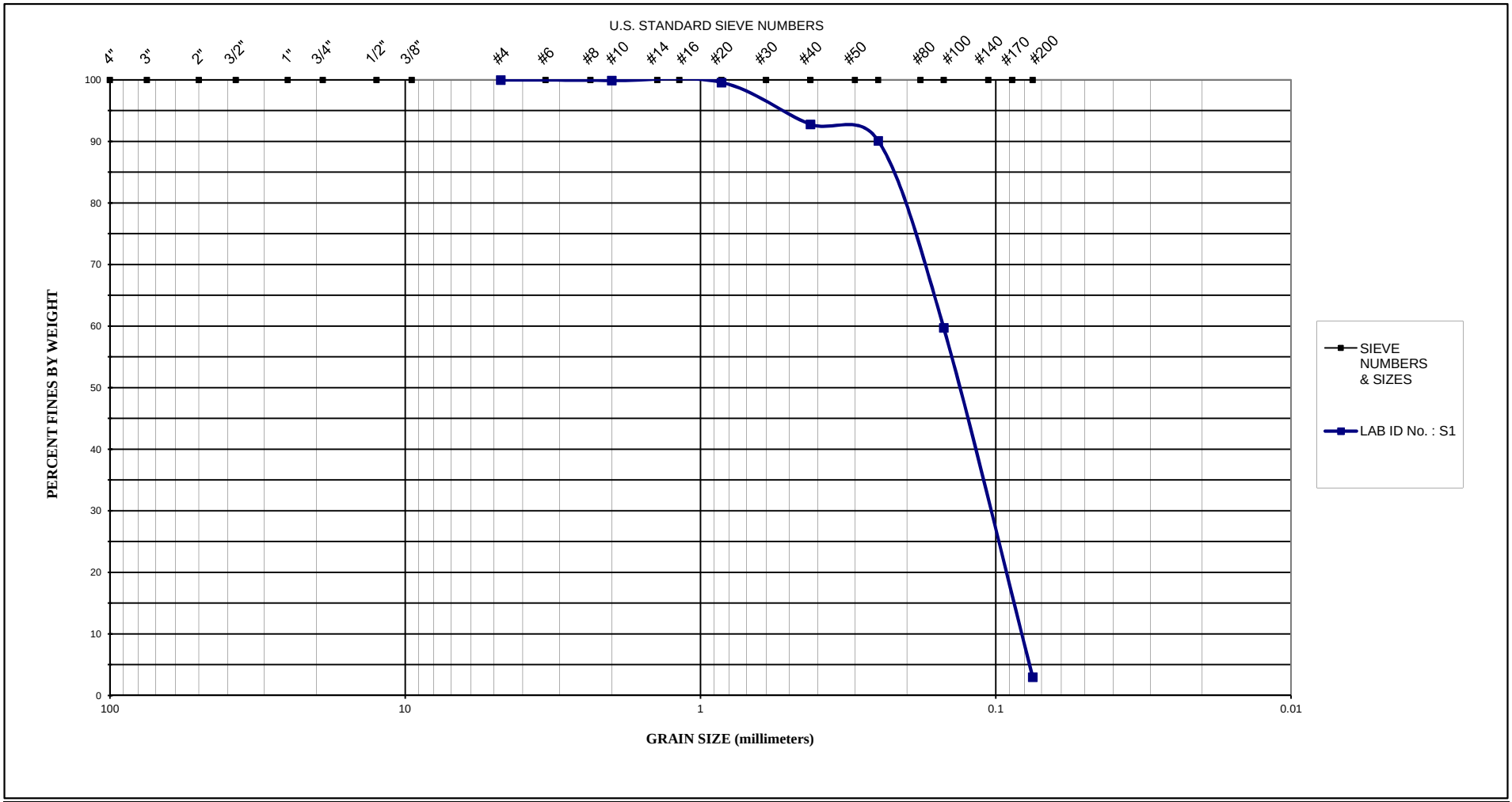
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

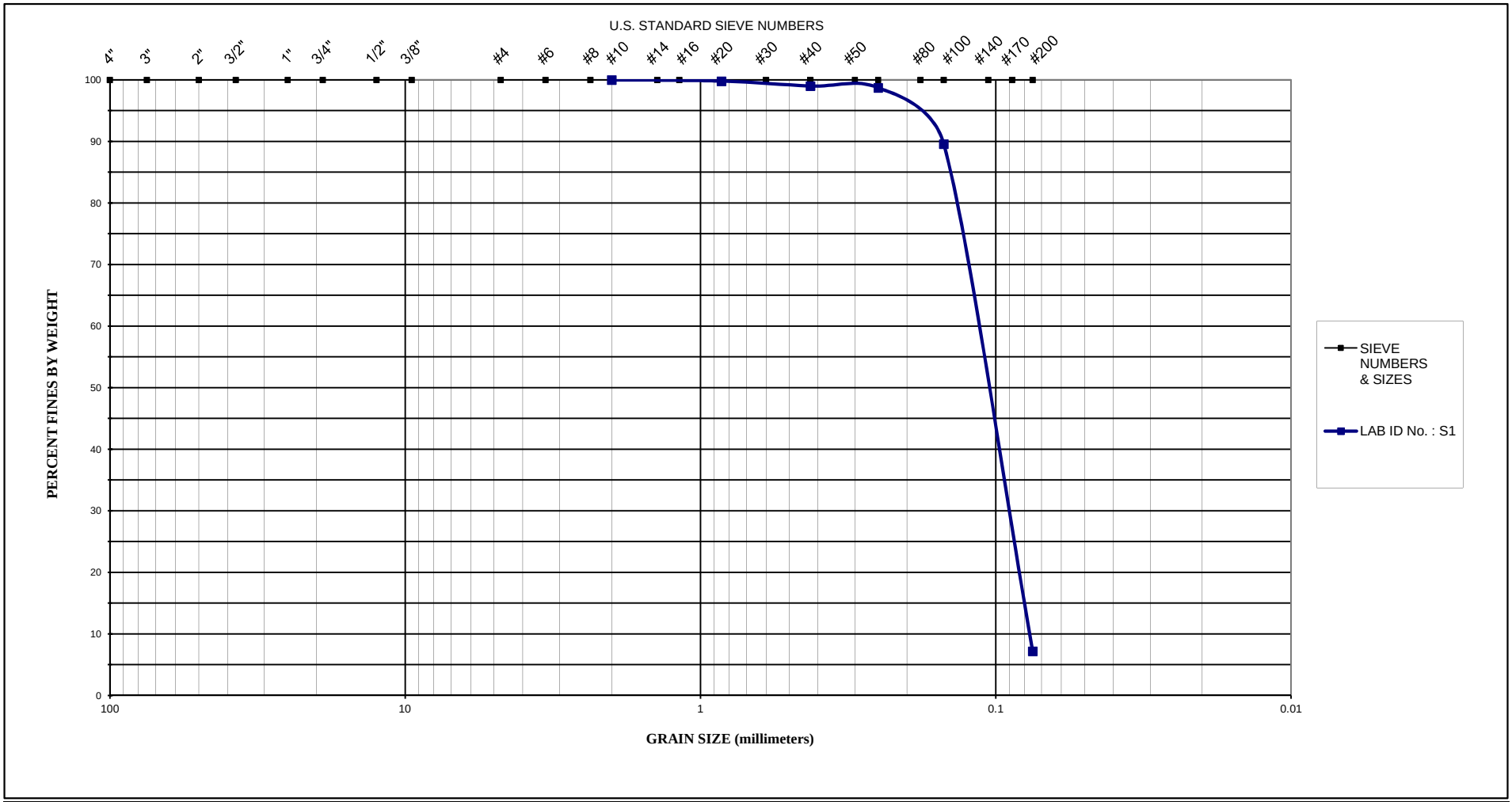
Sample Location : HB-307 **LAB ID No. :** S1 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown fine SAND, trace silt	SP	0.16	0.11	0.08	2.00	0.95	---	---

Exhibit B-18

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

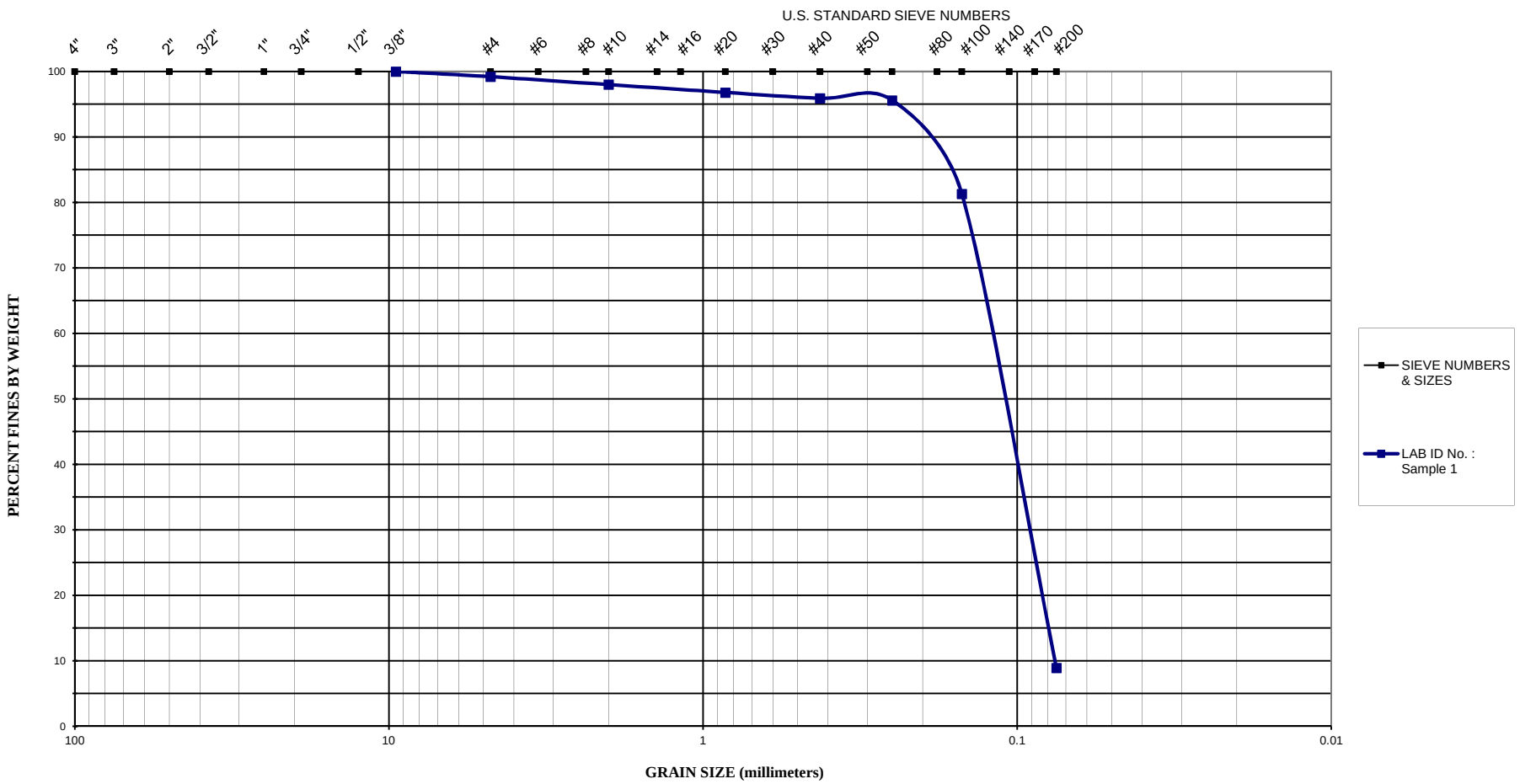
Sample Location : B-203 **LAB ID No. :** S1 **Sample Date :** 4/9/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown slighlty silty fine SAND	SP-SM	0.16	0.11	0.08	2.00	0.95	---	---

Exhibit B-19

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

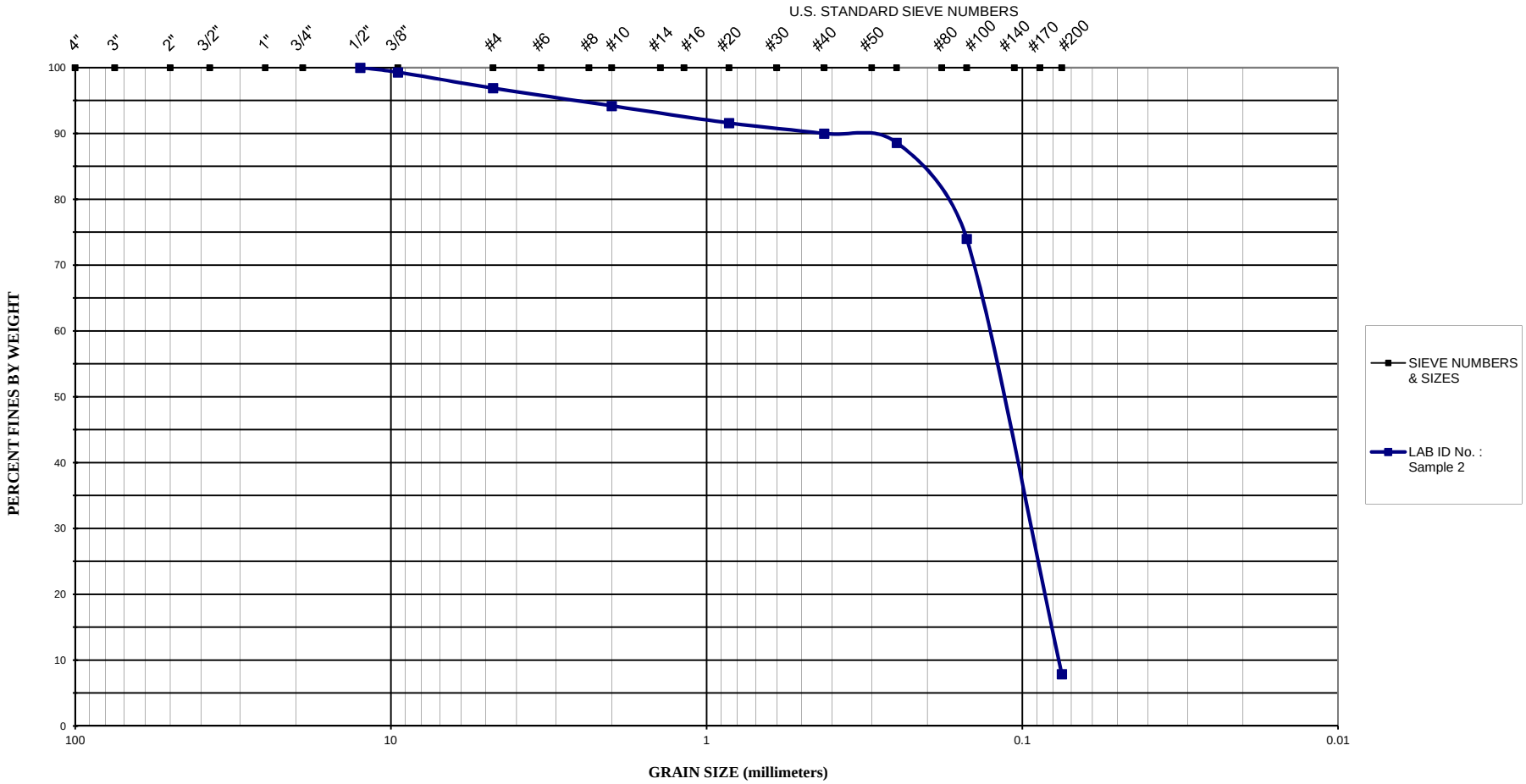
Sample Location : Interior | B306 & B-312 **LAB ID No. :** Sample 1 **Sample Date :** 4/21/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown fine SAND, traces of silt	SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit B-20

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : Interior | B311 & B-305 **LAB ID No. :** Sample 2 **Sample Date :** 4/21/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown fine SAND, traces of silt	SP, SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit B-21

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

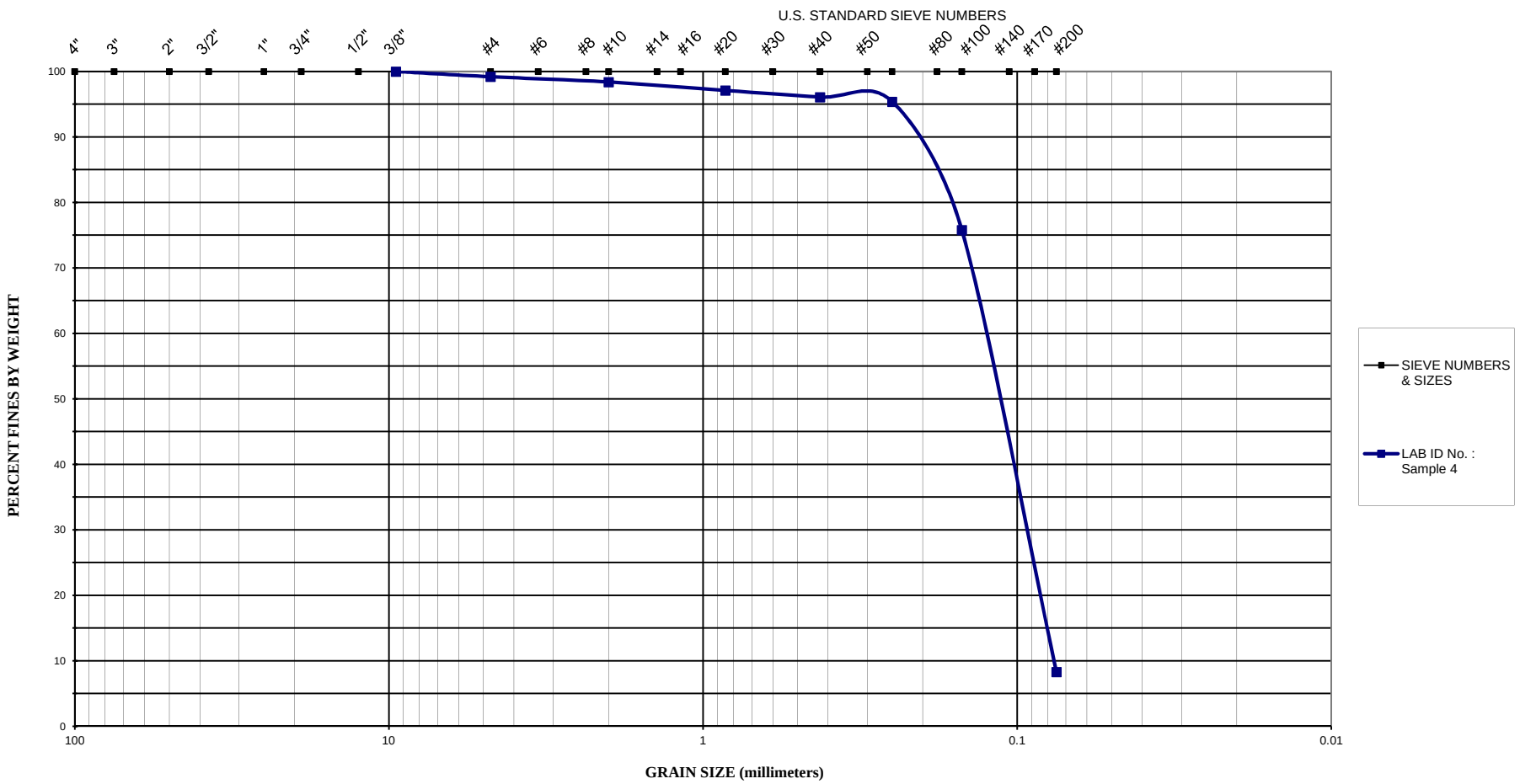
Sample Location : Interior | B310 & B-316 **LAB ID No. :** Sample 3 **Sample Date :** 4/21/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown fine SAND, traces of silt	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-22

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

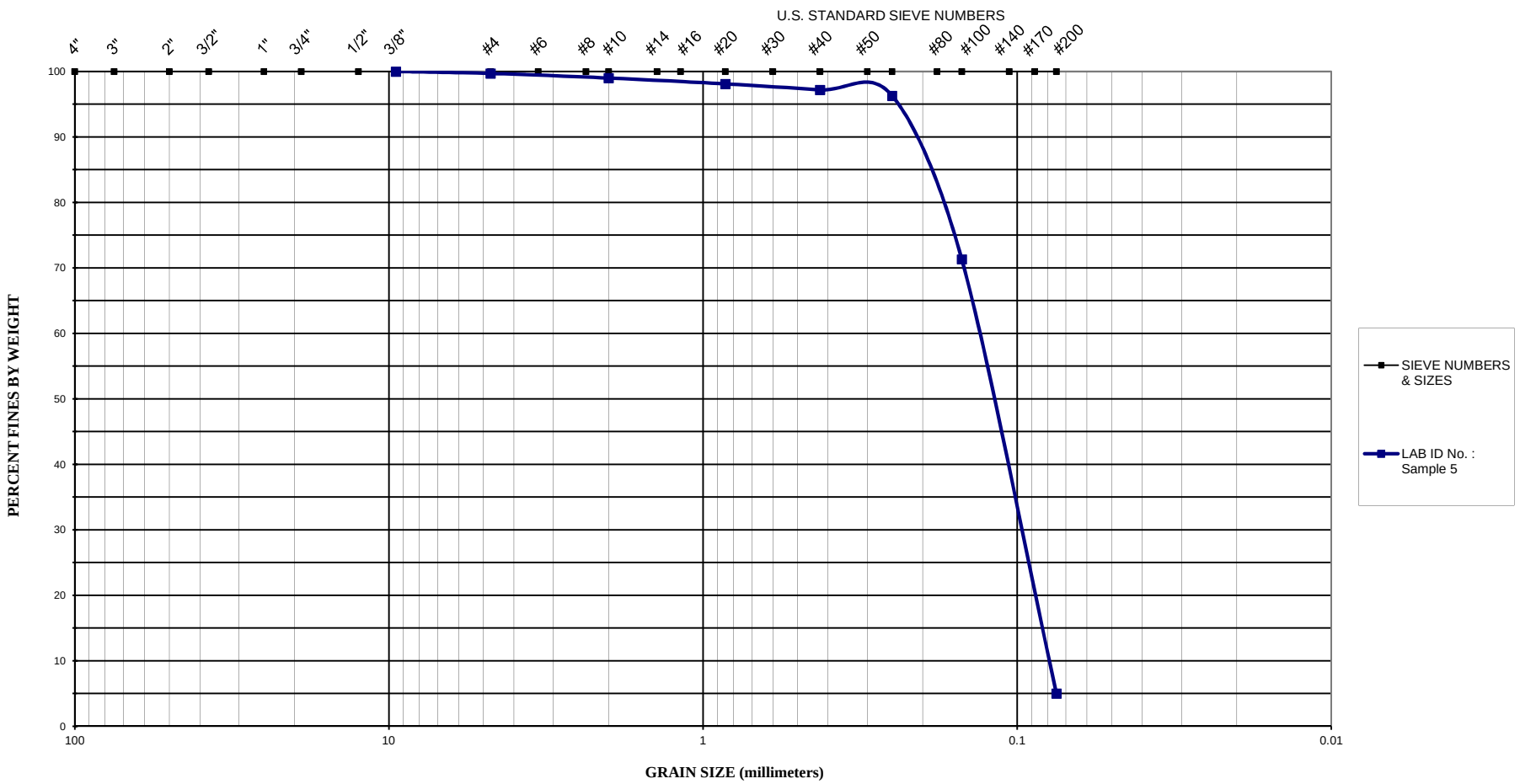
Sample Location : Interior | B309 & B-315 **LAB ID No. :** Sample 4 **Sample Date :** 4/21/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown fine SAND, traces of silt	SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit B-23

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

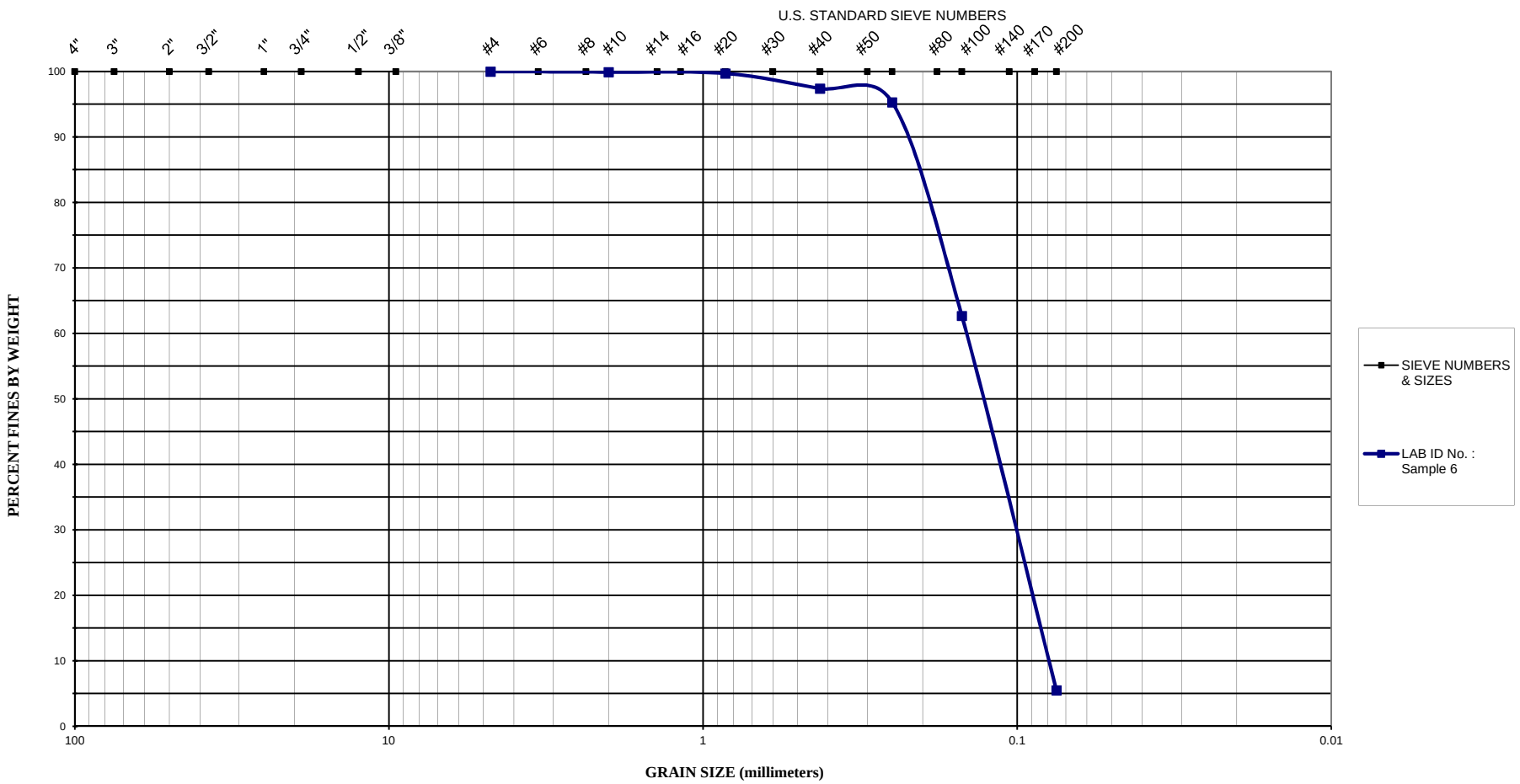
Sample Location : Interior | B310 & B-316 **LAB ID No. :** Sample 5 **Sample Date :** 4/21/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown fine SAND, traces of silt	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit B-24

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

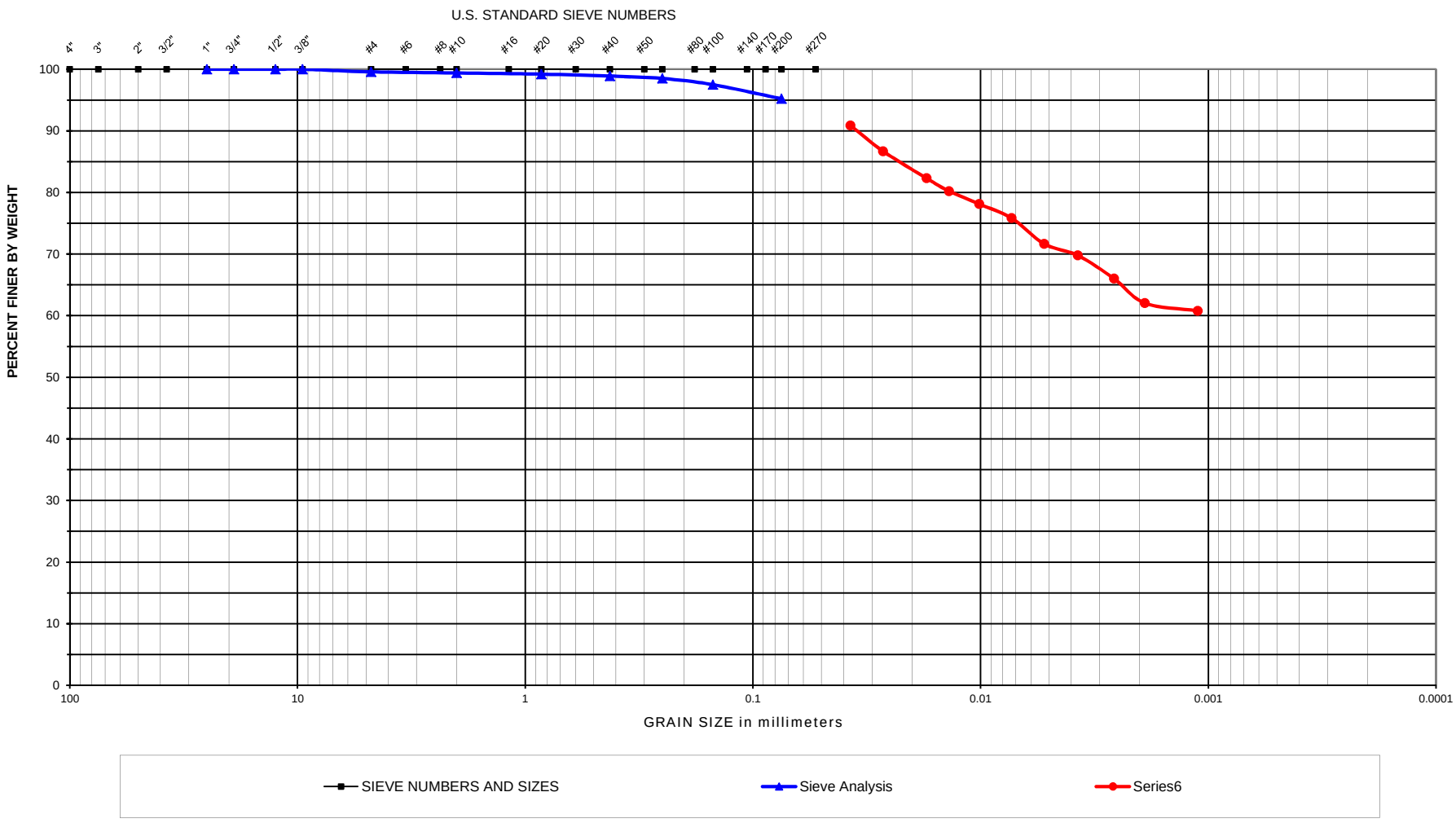
Sample Location : Interior | B301 & B-307 **LAB ID No. :** Sample 6 **Sample Date :** 4/23/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray to brown fine SAND, traces of silt	SP	0.16	0.10	0.08	2.00	0.78	---	---

Exhibit B-25

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

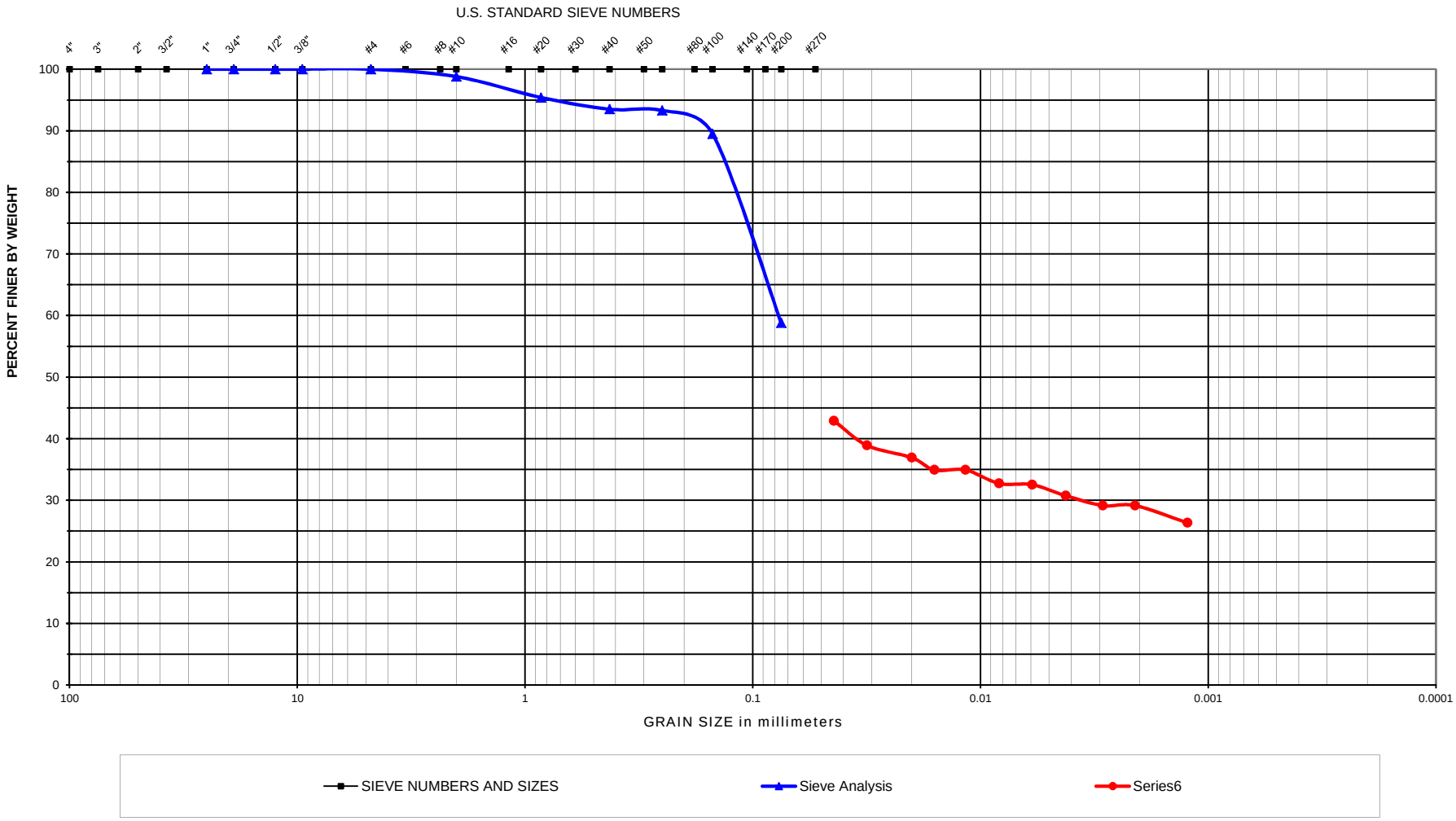
Sample Location : B-101 **LAB ID No. :** S13 **Sample Date :** 4/17/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permeability
Green to gray CLAY	CL	0.00					---	---

Exhibit B-26

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : B-102 **LAB ID No. :** S12 **Sample Date :** 4/17/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permeability
		0.00					---	---

Exhibit B-27

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (1) B-306, B-312, B-318 **Date of Report:** 5/1/2014
Description: Light brown slightly silty fine SAND. (SP-SM)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	982.2	grams
Wet Unit Weight:	108.1	pcf
Dry Unit Weight:	97.0	pcf
Void Ratio:	1.358	

MOISTURE CONTENT DETERMINATION

Tare Number:	139	
Weight Wet + Tare	414.20	grams
Weight Dry + Tare	380.40	grams
Weight Water	33.80	grams
Weight Tare	83.90	grams
Weight Dry Soil	296.50	grams
Moisture Content	11.4	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	26.0	23.6	2.4	0.31	5	113	9.8 E-04	30.1	0.76	2.3 E-03
2	29.2	24.8	4.4	0.58	5	69	1.6 E-03	27.5	0.82	2.3 E-03
3	31.8	24.8	7.0	0.92	5	42	2.6 E-03	27.5	0.82	2.3 E-03
4	33.4	24.0	9.4	1.23	5	33	3.3 E-03	27.8	0.81	2.2 E-03
5	41.7	30.3	11.4	1.50	5	26	4.2 E-03	29.2	0.78	2.2 E-03
6	44.3	31.1	13.2	1.73	5	23	4.8 E-03	29.7	0.77	2.1 E-03
7	46.0	31.0	15.0	1.97	5	20	5.5 E-03	29.4	0.77	2.2 E-03
8	47.7	30.5	17.2	2.26	5	18	6.1 E-03	29.5	0.77	2.1 E-03
9	47.4	28.2	19.2	2.52	5	16	6.9 E-03	29.7	0.77	2.1 E-03
10	46.8	26.0	20.8	2.73	5	14	7.9 E-03	29.8	0.76	2.2 E-03
11	46.0	23.7	22.3	2.93	5	13	8.5 E-03	29.7	0.77	2.2 E-03
12	48.5	24.3	24.2	3.18	5	12	9.2 E-03	29.8	0.76	2.2 E-03
13	51.5	26.2	25.3	3.32	10	23	9.6 E-03	30.1	0.76	2.2 E-03
14	52.2	24.8	27.4	3.60	10	22	1.0 E-02	30.0	0.76	2.1 E-03
15	52.4	22.7	29.7	3.90	10	21	1.0 E-02	30.1	0.76	2.0 E-03
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
								(Run 1-9)	**Average**	**2.2 E-03**

Exhibit B-28

BV-4B
Sand Sample (Area 1) B-306, B-312, B-318
Constant Head Permeability Test
Project Number HB145006

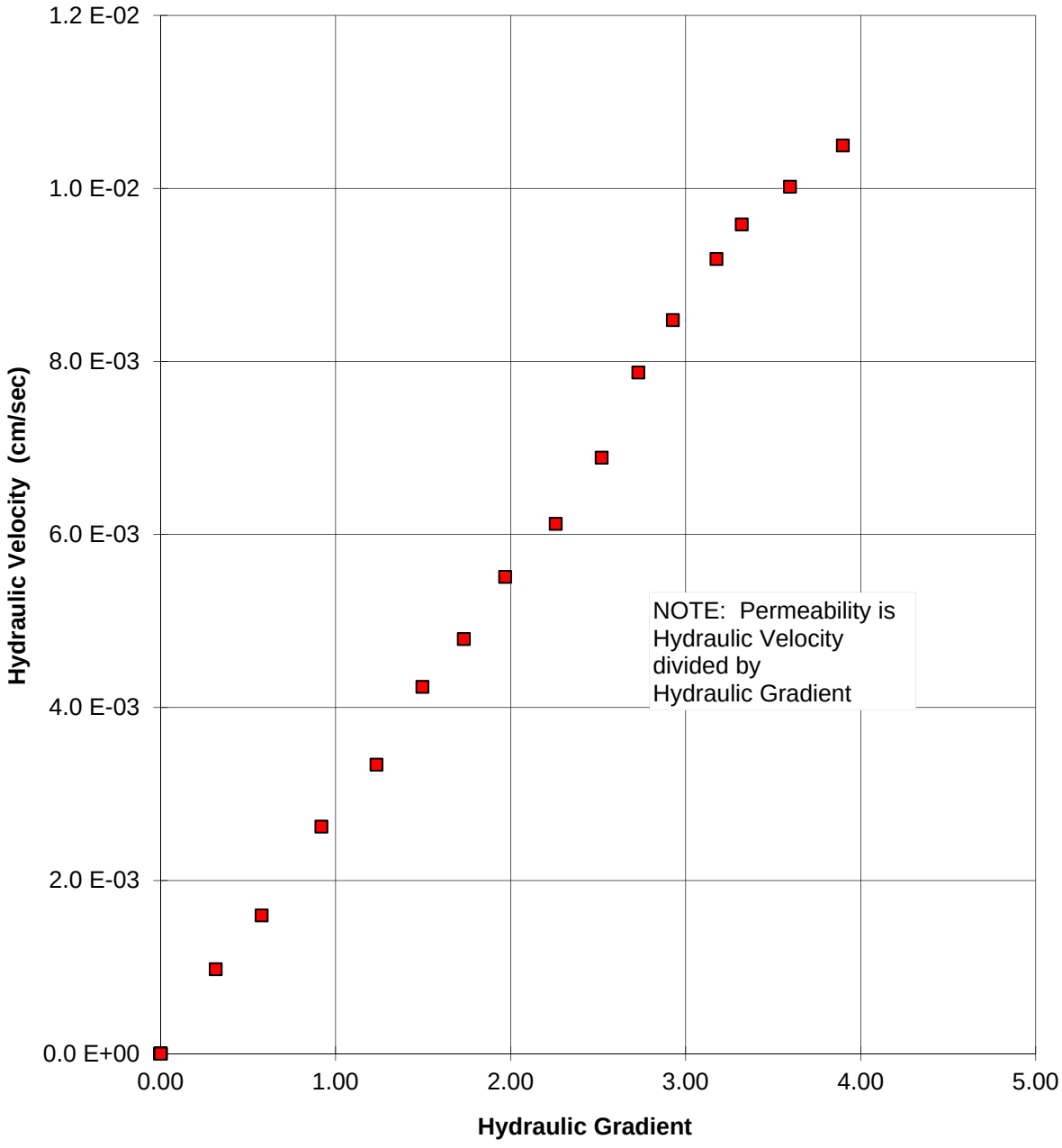


Exhibit B-29

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (2) B-305, B-311, B-317 **Date of Report:** 5/5/2014
Description: Light brown slightly silty fine SAND. (SP-SM)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	1062.4	grams
Wet Unit Weight:	116.9	pcf
Dry Unit Weight:	103.0	pcf
Void Ratio:	1.573	

MOISTURE CONTENT DETERMINATION

Tare Number:	139	
Weight Wet + Tare	326.10	grams
Weight Dry + Tare	297.30	grams
Weight Water	28.80	grams
Weight Tare	83.90	grams
Weight Dry Soil	213.40	grams
Moisture Content	13.5	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	22.0	20.1	1.9	0.25	5	150	7.3 E-04	28.5	0.80	2.3 E-03
2	23.9	20.2	3.7	0.49	5	73	1.5 E-03	28.8	0.79	2.5 E-03
3	25.7	20.0	5.7	0.75	5	46	2.4 E-03	28.8	0.79	2.5 E-03
4	30.1	22.5	7.6	1.00	5	34	3.2 E-03	28.8	0.79	2.6 E-03
5	32.0	22.5	9.5	1.25	5	27	4.1 E-03	29.3	0.78	2.5 E-03
6	33.9	22.5	11.4	1.50	5	22	5.0 E-03	29.3	0.78	2.6 E-03
7	35.7	22.5	13.2	1.73	5	19	5.8 E-03	29.2	0.78	2.6 E-03
8	35.7	22.5	13.2	1.73	10	38	5.8 E-03	29.2	0.78	2.6 E-03
9	44.8	29.7	15.1	1.98	10	33	6.7 E-03	30.0	0.76	2.6 E-03
10	46.6	29.6	17.0	2.23	10	29	7.6 E-03	30.1	0.76	2.6 E-03
11	50.0	29.2	20.8	2.73	10	28	7.9 E-03	24.6	0.89	2.6 E-03
								(Run 1-3)	**Average**	**2.4 E-03**

Exhibit B-30

BV-4B
Sand Sample (Area 2) B-305, B-311, B-317
Constant Head Permeability Test
Project Number HB145006

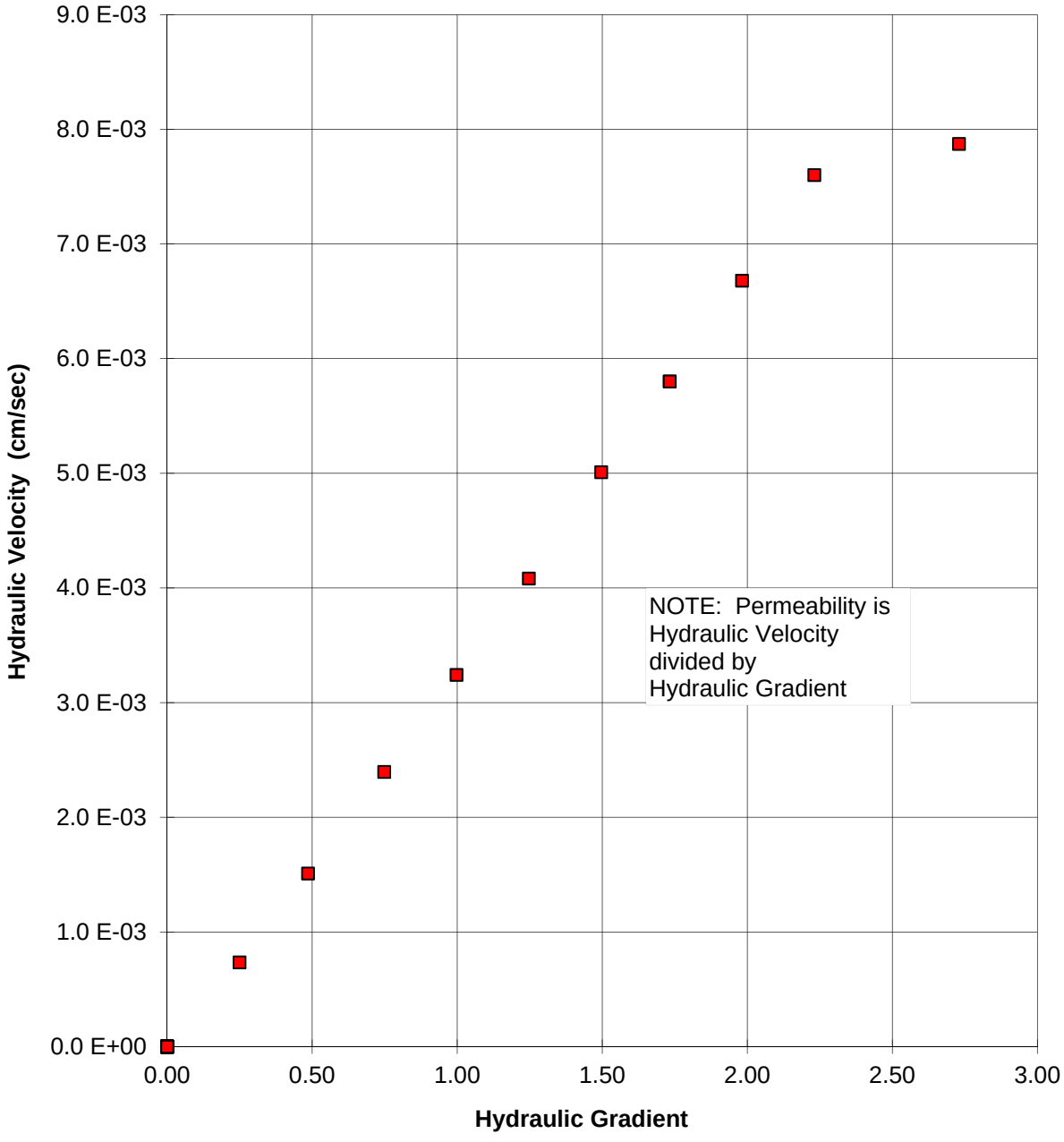


Exhibit B-31

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (3) B-304, B-310, B-315 **Date of Report:** 5/5/2014
Description: Light brown fine SAND with traces of silt. (SP)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	1003.0	grams
Wet Unit Weight:	110.4	pcf
Dry Unit Weight:	97.2	pcf
Void Ratio:	1.365	

MOISTURE CONTENT DETERMINATION

Tare Number:	126	
Weight Wet + Tare	386.10	grams
Weight Dry + Tare	350.40	grams
Weight Water	35.70	grams
Weight Tare	86.20	grams
Weight Dry Soil	264.20	grams
Moisture Content	13.5	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	27.0	24.7	2.3	0.30	2.5	63	8.7 E-04	29.0	0.78	2.3 E-03
2	28.9	25.2	3.7	0.49	2.5	36	1.5 E-03	29.1	0.78	2.5 E-03
3	32.7	26.0	6.7	0.88	2.5	21	2.6 E-03	26.2	0.85	2.5 E-03
4	34.7	27.0	7.7	1.01	2.5	19	2.9 E-03	26.3	0.85	2.4 E-03
5	36.5	27.2	9.3	1.22	2.5	16	3.4 E-03	26.4	0.85	2.4 E-03
6	46.1	34.7	11.4	1.50	2.5	13	4.2 E-03	26.6	0.84	2.4 E-03
7	46.1	34.7	11.4	1.50	5	26	4.2 E-03	26.6	0.84	2.4 E-03
8	47.8	34.6	13.2	1.73	5	22	5.0 E-03	26.5	0.85	2.4 E-03
9	49.6	34.4	15.2	1.99	5	19	5.8 E-03	26.5	0.85	2.5 E-03
10	48.8	31.8	17.0	2.23	5	16	6.9 E-03	27.4	0.82	2.5 E-03
11	48.0	28.9	19.1	2.51	5	15	7.3 E-03	27.9	0.81	2.4 E-03
12	47.4	26.5	20.9	2.74	5	14	7.9 E-03	28.0	0.81	2.3 E-03
13	47.4	26.5	20.9	2.74	10	28	7.9 E-03	28.0	0.81	2.3 E-03
14	49.1	26.2	22.9	3.01	10	25	8.8 E-03	28.3	0.80	2.4 E-03
15	50.9	26.3	24.6	3.23	10	23	9.6 E-03	28.3	0.80	2.4 E-03
16	52.6	25.8	26.8	3.52	10	21	1.0 E-02	28.4	0.80	2.4 E-03
17	56.6	28.0	28.6	3.75	10	19	1.2 E-02	30.1	0.76	2.3 E-03
18	56.1	25.5	30.6	4.02	10	18	1.2 E-02	30.2	0.75	2.3 E-03
								(Run 1-8)	**Average**	**2.4 E-03**

Exhibit B-32

BV-4B
Sand Sample (Area 3) B-304, B-310, B-315
Constant Head Permeability Test
Project Number HB145006

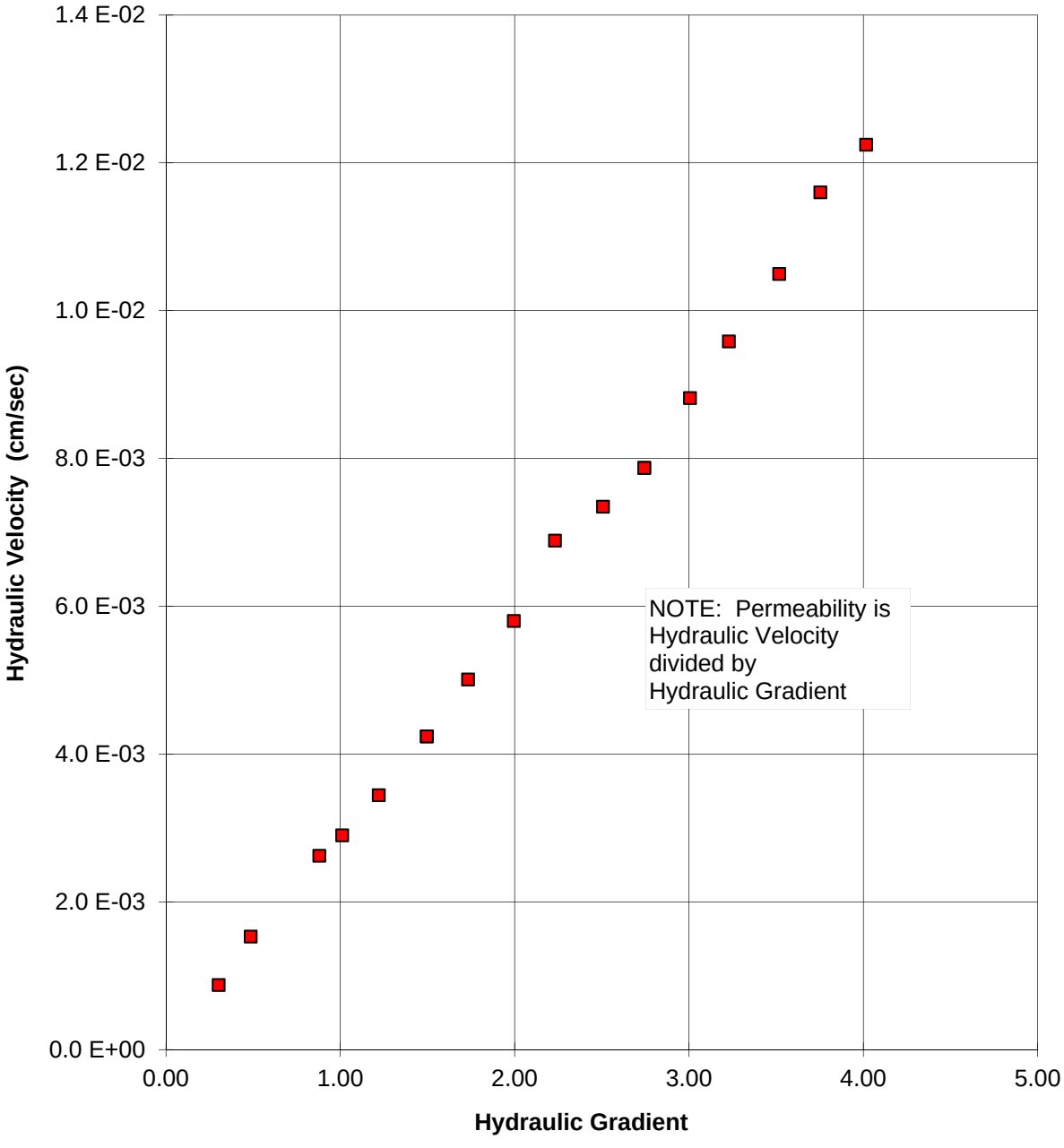


Exhibit B-33

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (4) B-303, B-309, B-315 **Date of Report:** 5/8/2014
Description: Light brown slightly silty fine SAND. (SP-SM)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	1005.7	grams
Wet Unit Weight:	110.7	pcf
Dry Unit Weight:	97.6	pcf
Void Ratio:	1.375	

MOISTURE CONTENT DETERMINATION

Tare Number:	145	
Weight Wet + Tare	326.40	grams
Weight Dry + Tare	298.20	grams
Weight Water	28.20	grams
Weight Tare	88.50	grams
Weight Dry Soil	209.70	grams
Moisture Content	13.4	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	24.4	22.6	1.8	0.24	2.5	48	1.1 E-03	29.5	0.77	3.8 E-03
2	28.4	24.6	3.8	0.50	2.5	25	2.2 E-03	29.6	0.77	3.4 E-03
3	30.3	24.6	5.7	0.75	2.5	17	3.2 E-03	29.5	0.77	3.3 E-03
4	32.1	24.5	7.6	1.00	2.5	12	4.6 E-03	29.5	0.77	3.6 E-03
5	34.1	24.6	9.5	1.25	2.5	10	5.5 E-03	29.6	0.77	3.4 E-03
6	35.6	24.2	11.4	1.50	2.5	8	6.9 E-03	30.2	0.75	3.5 E-03
7	34.9	21.6	13.3	1.75	5	13	8.5 E-03	30.2	0.75	3.7 E-03
8	44.2	29.0	15.2	1.99	5	12	9.2 E-03	30.5	0.75	3.4 E-03
9	48.0	30.9	17.1	2.24	5	9	1.2 E-02	30.6	0.74	4.1 E-03
								(Run 1-6)	**Average**	**3.5 E-03**

Exhibit B-34

BV-4B
Sand Sample # (Area 4) B-303, B-309, B-315
Constant Head Permeability Test
Project Number HB145006

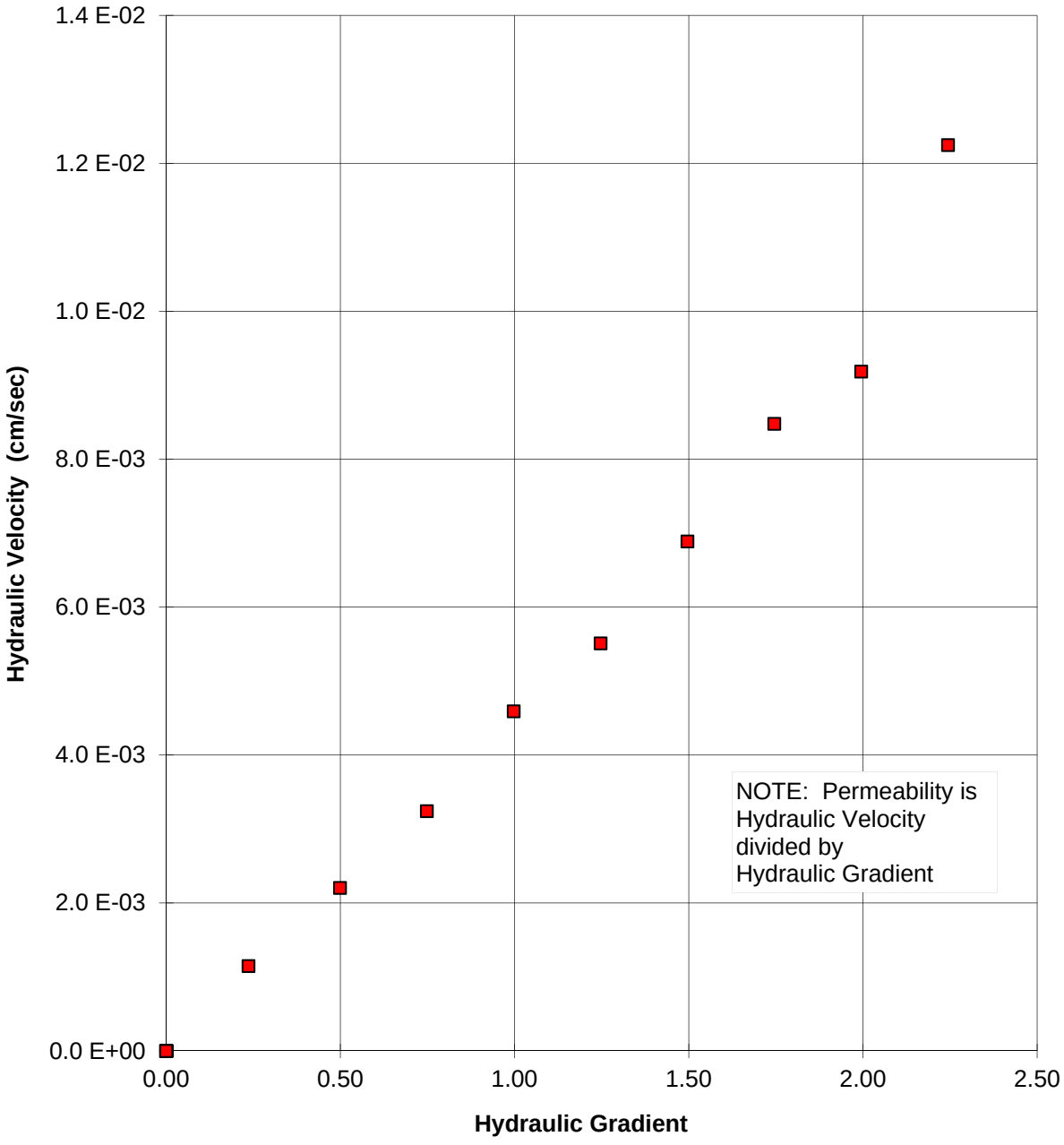


Exhibit B-35

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (5) B-302, B-308, B-314 **Date of Report:** 5/13/2014
Description: Light brown fine SAND with traces of silt. (SP)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	1010.0	grams
Wet Unit Weight:	111.1	pcf
Dry Unit Weight:	99.1	pcf
Void Ratio:	1.427	

MOISTURE CONTENT DETERMINATION

Tare Number:	105	
Weight Wet + Tare	331.70	grams
Weight Dry + Tare	307.40	grams
Weight Water	24.30	grams
Weight Tare	108.30	grams
Weight Dry Soil	199.10	grams
Moisture Content	12.2	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	24.4	22.5	1.9	0.25	2.5	37	1.5 E-03	29.6	0.77	4.6 E-03
2	26.3	22.9	3.4	0.45	2.5	23	2.4 E-03	29.6	0.77	4.1 E-03
3	28.1	23.4	4.7	0.62	2.5	16	3.4 E-03	29.6	0.77	4.3 E-03
4	30.1	23.9	6.2	0.81	2.5	11	5.0 E-03	29.6	0.77	4.7 E-03
5	32.0	24.4	7.6	1.00	2.5	9	6.1 E-03	29.7	0.77	4.7 E-03
6	33.9	24.8	9.1	1.19	5	15	7.3 E-03	29.7	0.77	4.7 E-03
7	35.8	25.3	10.5	1.38	5	13	8.5 E-03	29.6	0.77	4.7 E-03
8	35.2	23.2	12.0	1.57	5	11	1.0 E-02	29.8	0.76	4.9 E-03
9	34.7	21.2	13.5	1.77	5	10	1.1 E-02	29.9	0.76	4.7 E-03
								(Run 1-4)	**Average**	**4.4 E-03**

Exhibit B-36

BV-4B
Sand Sample # (Area 5) B-302, B-308, B-314
Constant Head Permeability Test
Project Number HB145006

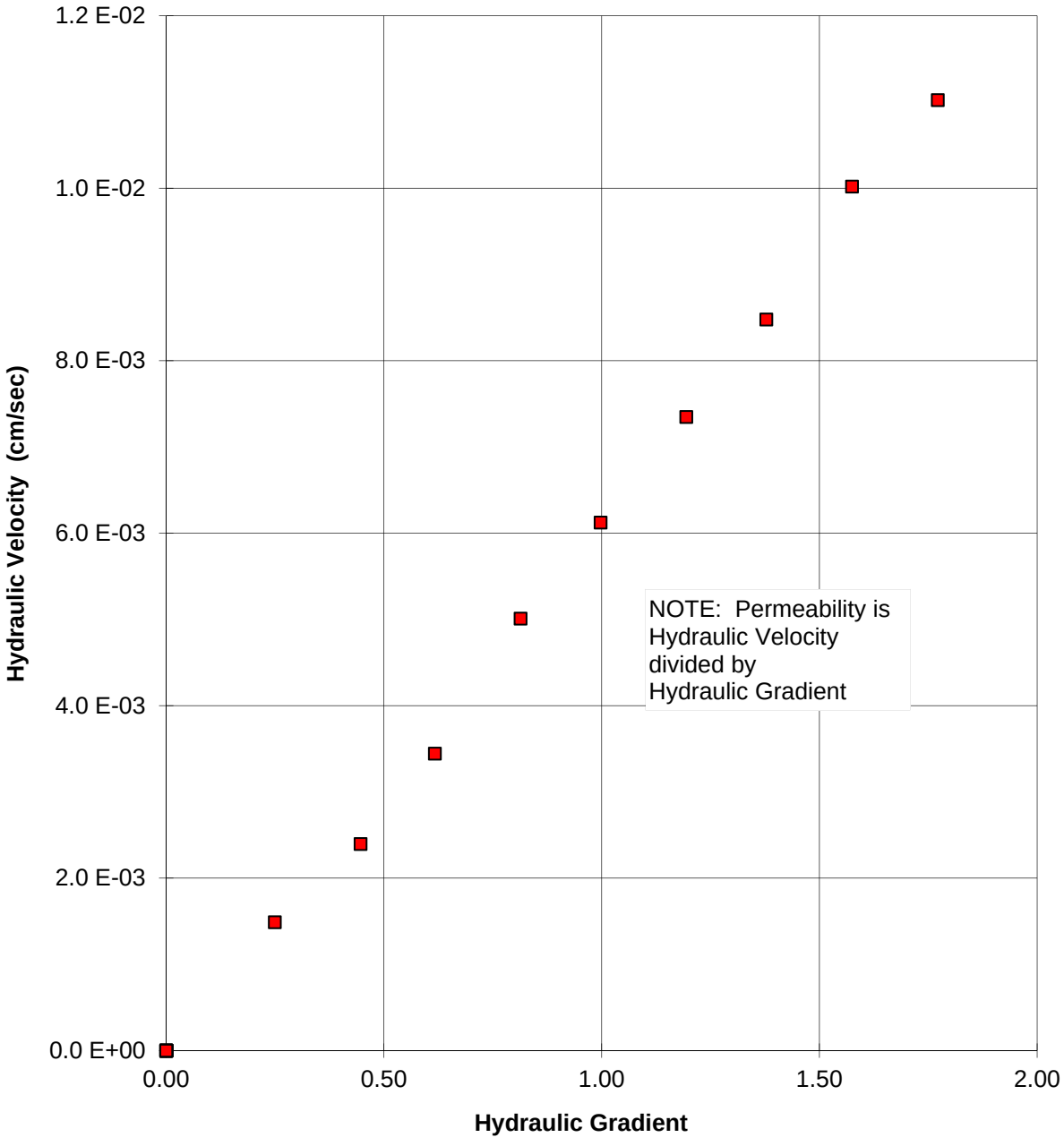


Exhibit B-37

CONSTANT HEAD PERMEAMETER
DATA SHEET

Project Name: BV-4B **Project Number:** HB145006
Sample Number: (6) HB-301, HB-307, HB-313 **Date of Report:** 5/14/2014
Description: Light brown fine SAND with traces of silt. (SP)

UNIT WEIGHT DETERMINATION

Sample Diameter:	7.60	cm
Sample Area:	45.36	sq cm
Sample Length:	12.50	cm
Sample Volume:	567.06	cc
Sample Weight:	1016.6	grams
Wet Unit Weight:	111.9	pcf
Dry Unit Weight:	98.0	pcf
Void Ratio:	1.391	

MOISTURE CONTENT DETERMINATION

Tare Number:	146	
Weight Wet + Tare	294.90	grams
Weight Dry + Tare	269.00	grams
Weight Water	25.90	grams
Weight Tare	85.80	grams
Weight Dry Soil	183.20	grams
Moisture Content	14.1	%
Distance Between Manometers:	7.62	cm

RUN	H1	H2	h	h/L	Q	Elapsed Time	Q/At	TEMP	TEMP CORRECT	k
	(cm)	(cm)	(cm)		(cc)	(sec)	(cm/sec)	(Deg C)		(cm/sec)
1	24.2	22.8	1.4	0.18	2.5	64	8.6 E-04	28.7	0.79	3.7 E-03
2	26.5	23.3	3.2	0.42	2.5	36	1.5 E-03	28.6	0.79	2.9 E-03
3	28.7	23.9	4.8	0.63	2.5	22	2.5 E-03	28.6	0.79	3.2 E-03
4	30.7	24.5	6.2	0.81	2.5	17	3.2 E-03	28.6	0.79	3.2 E-03
5	32.7	25.1	7.6	1.00	2.5	13	4.2 E-03	28.7	0.79	3.4 E-03
6	34.6	25.5	9.1	1.19	5	26	4.2 E-03	28.7	0.79	2.8 E-03
7	36.4	26.0	10.4	1.36	5	22	5.0 E-03	28.8	0.79	2.9 E-03
								(Run 1-2)	**Average**	**3.3 E-03**

Exhibit B-38

BV-4B
Sand Sample # (Area 6) HB-301, HB-307, HB-313
Constant Head Permeability Test
Project Number HB145006

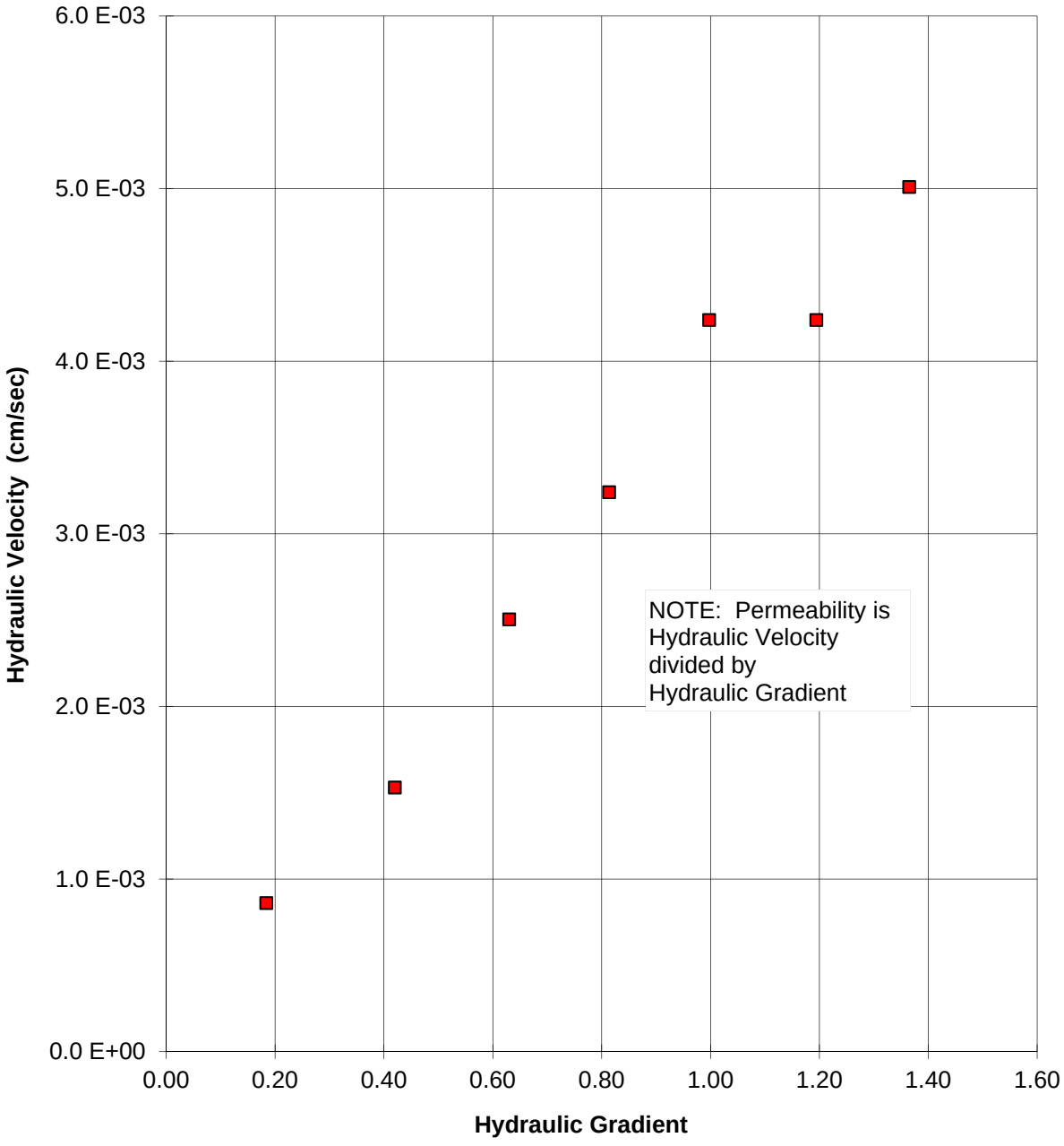


Exhibit B-39

HYDRAULIC CONDUCTIVITY TEST RESULTS

(ASTM D 5084 - Method A)

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

PROJECT NAME: BV-4B
SAMPLE ID: B-203 (35-37 feet)

Average Hydraulic Conductivity for Last Four Tests = 9.75E-08 cm/sec

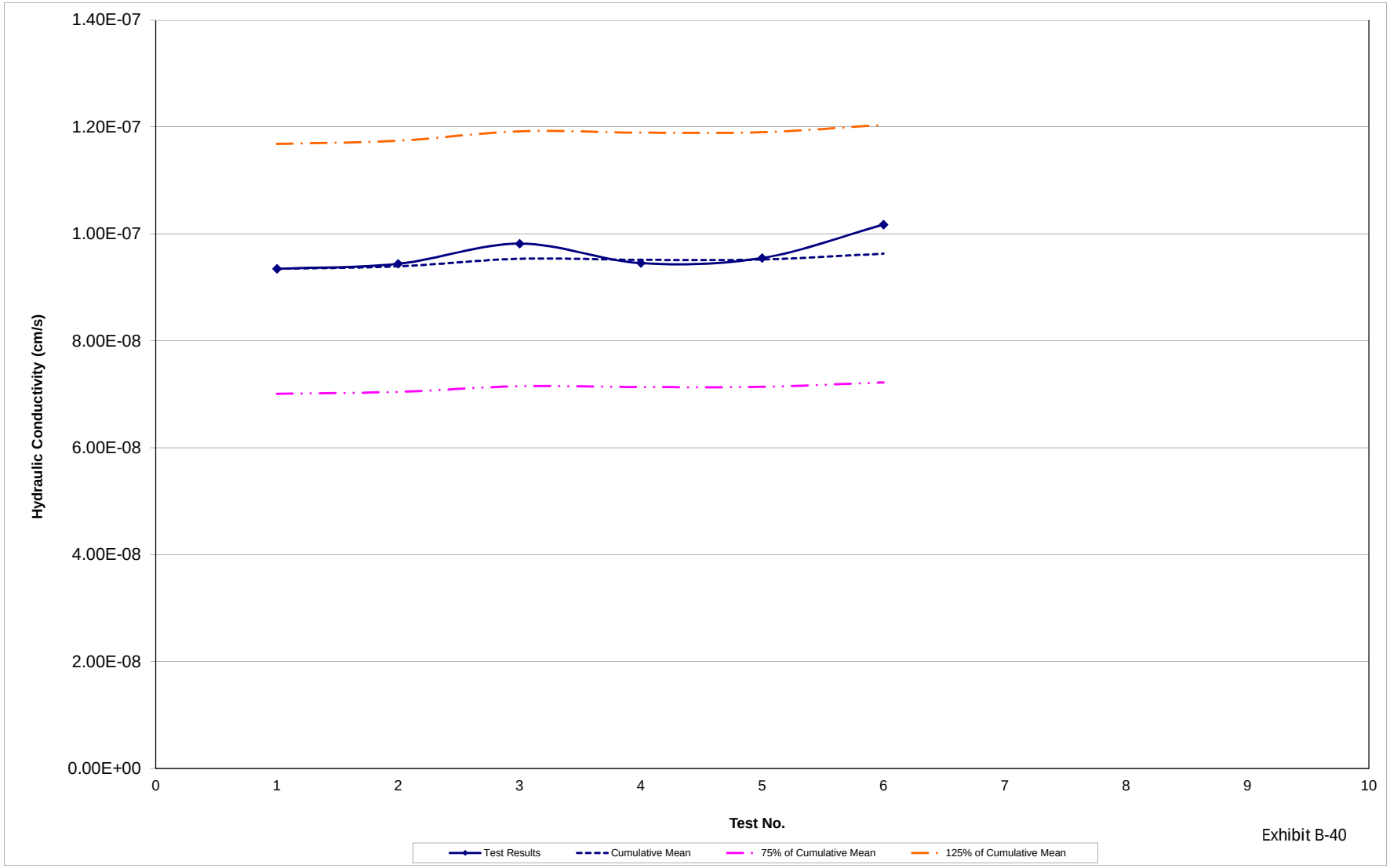


Exhibit B-40

HYDRAULIC CONDUCTIVITY TEST RESULTS

(ASTM D 5084 - Method C)

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

PROJECT NAME: BV-4B
SAMPLE ID: B-204 (40-42 feet)

Average Hydraulic Conductivity for Last Four Tests = 3.93E-08 cm/sec

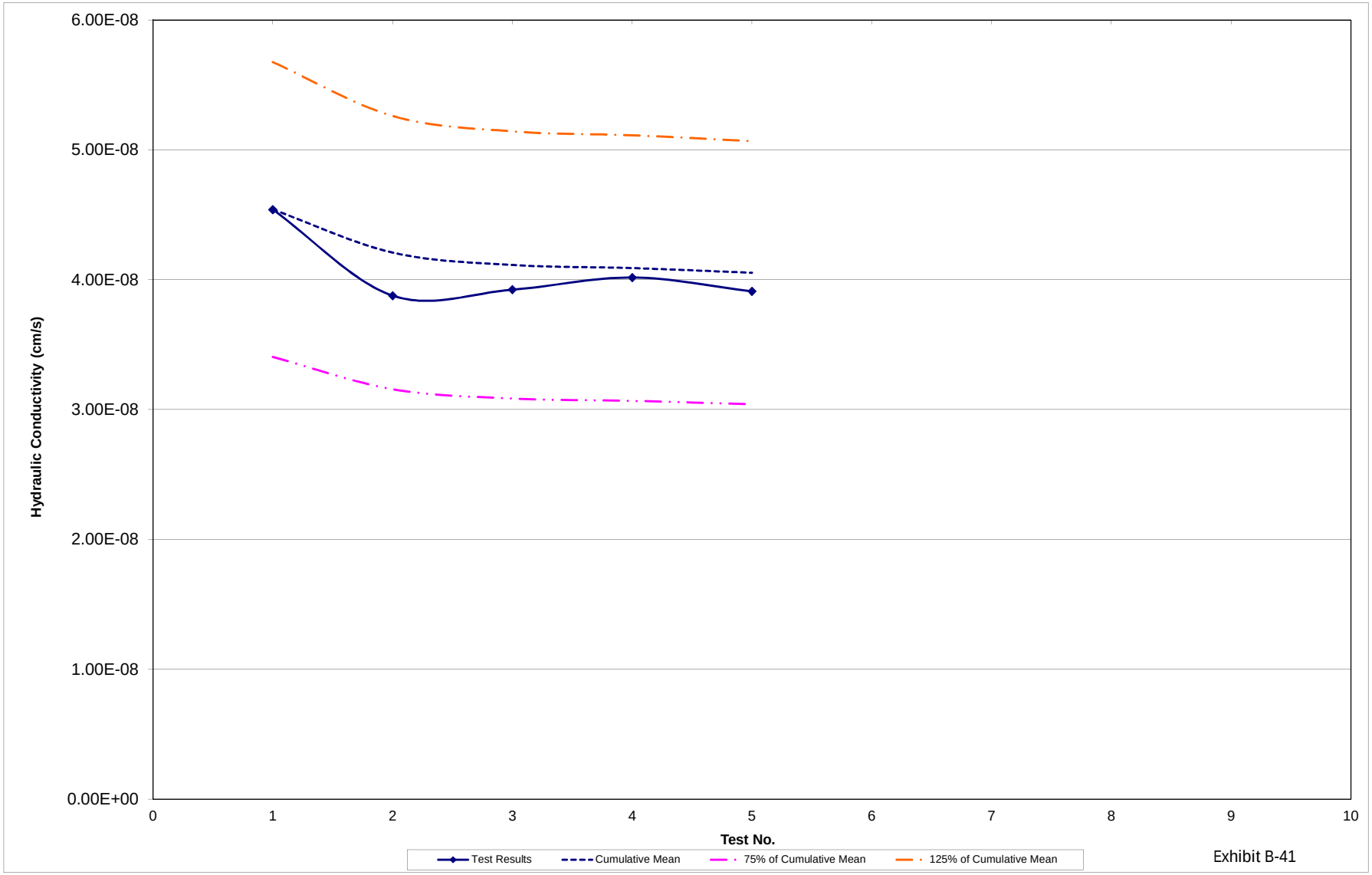
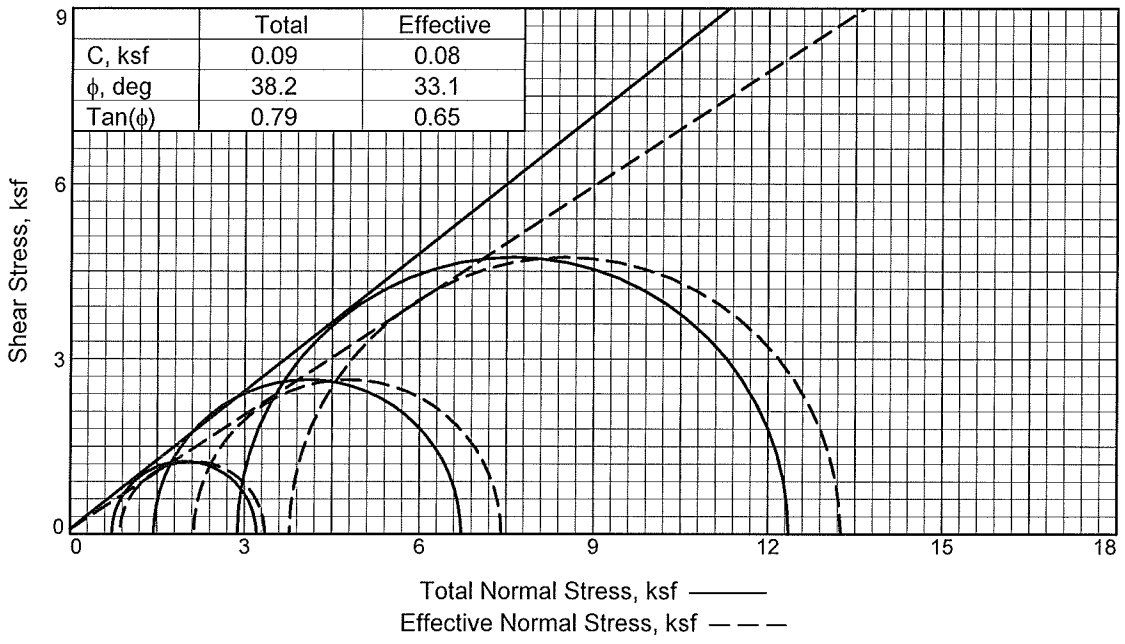
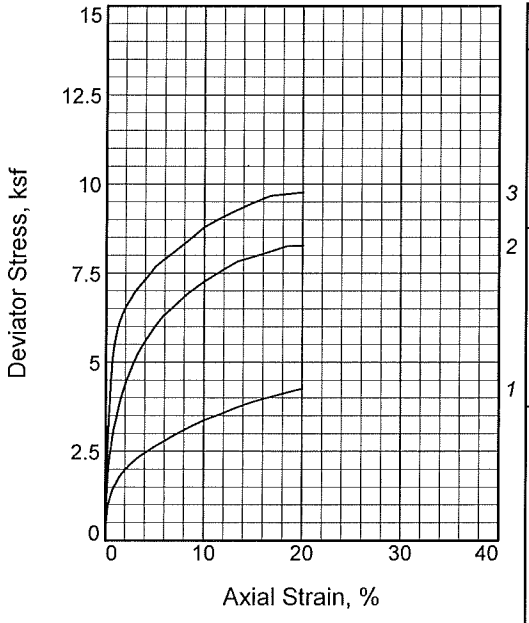


Exhibit B-41





Sample No.		1	2	3
Initial	Water Content, %	9.2	9.2	9.2
	Dry Density, pcf	95.9	96.0	95.9
	Saturation, %	33.5	33.6	33.5
	Void Ratio	0.7253	0.7224	0.7253
	Diameter, in.	2.85	2.85	2.85
	Height, in.	5.99	5.98	5.99
At Test	Water Content, %	27.3	27.2	27.1
	Dry Density, pcf	95.9	96.1	96.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7245	0.7207	0.7184
	Diameter, in.	2.85	2.85	2.85
	Height, in.	5.99	5.98	5.98
Strain rate, %/min.		0.10	0.10	0.10
Back Pressure, psi		39.00	39.90	39.90
Cell Pressure, psi		44.00	49.90	59.90
Fail. Stress, ksf		2.5	5.3	9.5
Total Pore Pr., ksf		5.5	5.1	4.9
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		3.4	7.4	13.3
$\bar{\sigma}_3$ Failure, ksf		0.9	2.1	3.8

Type of Test:
CU with Pore Pressures
Sample Type: Bulk
Description: Brown Slightly Silty Fine SAND w/ small rock fragments

Assumed Specific Gravity= 2.65
Remarks:

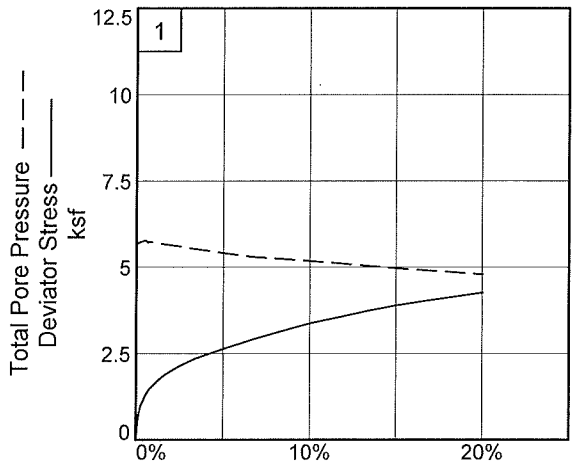
Client: Taylor Engineering

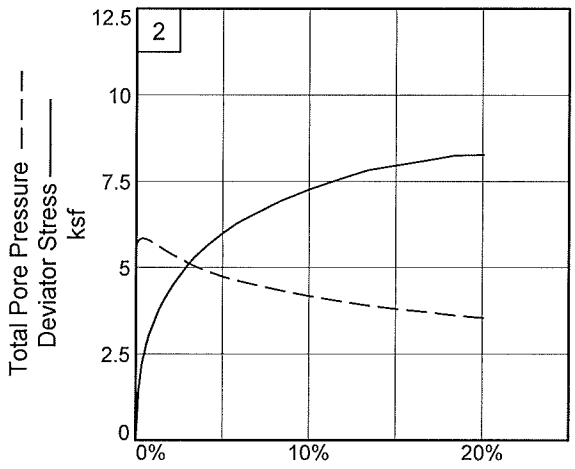
Project: BV-4B DMMA

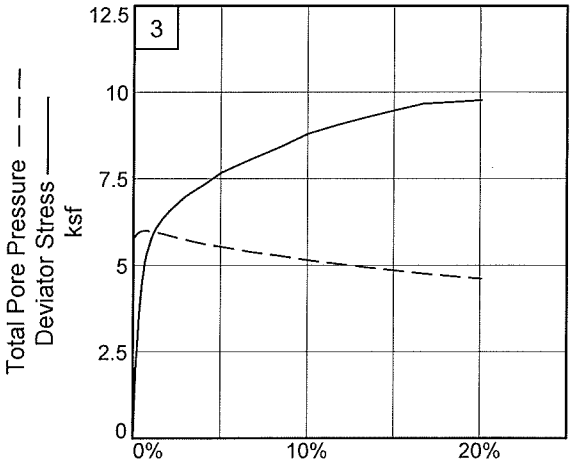
Source of Sample: Sample No. 1
Sample Number: 1
Proj. No.: HB145006 **Date Sampled:** 4/21/2014

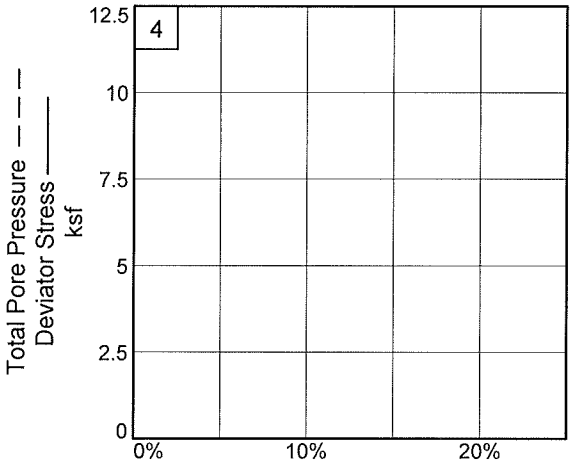
TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Jacksonville, Florida

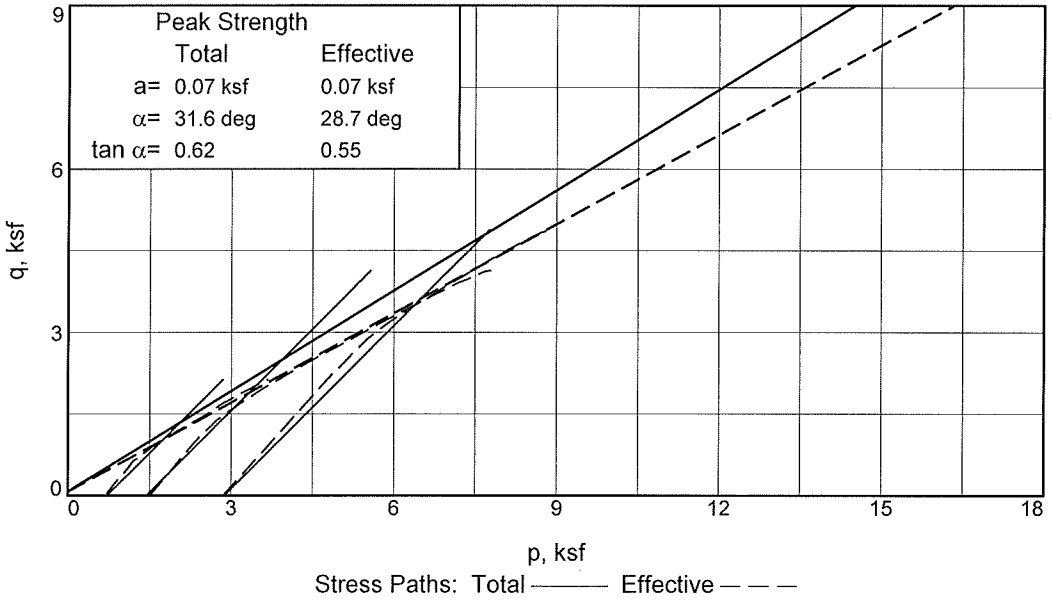
Tested By: CRM Sr









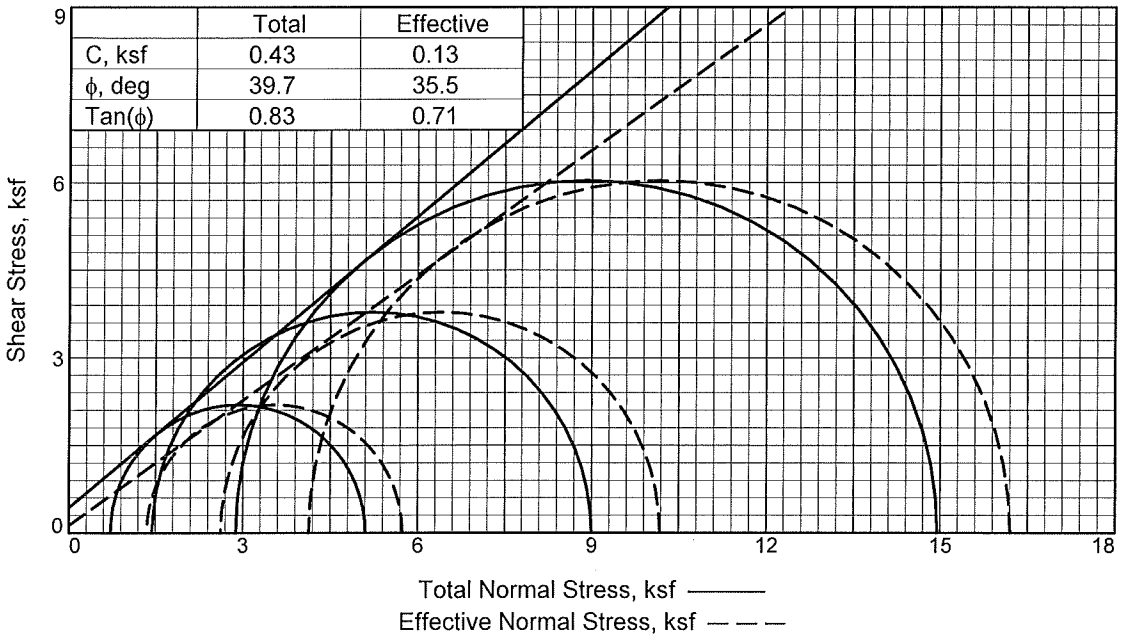


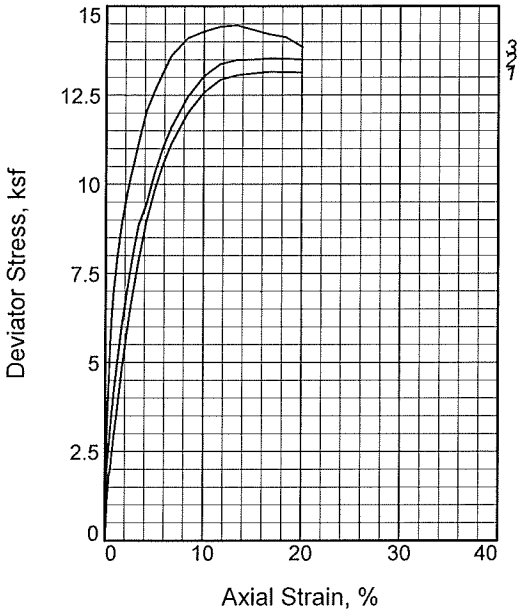
Client: Taylor Engineering
Project: BV-4B DMMA
Source of Sample: Sample No. 1 **Sample Number:** 1
Project No.: HB145006

Terracon Consultants, Inc.

Tested By: CRM Sr

Exhibit B-43





Sample No.		1	2	3
Initial	Water Content, %	10.0	10.0	10.0
	Dry Density, pcf	95.9	95.9	95.9
	Saturation, %	36.7	36.7	36.7
	Void Ratio	0.7246	0.7243	0.7246
	Diameter, in.	2.85	2.85	2.85
	Height, in.	5.99	5.99	5.99
At Test	Water Content, %	27.2	27.2	27.1
	Dry Density, pcf	96.1	96.1	96.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7220	0.7208	0.7194
	Diameter, in.	2.85	2.85	2.85
	Height, in.	5.99	5.99	5.98
Strain rate, %/min.		0.10	0.10	0.10
Back Pressure, psi		39.90	39.90	40.00
Cell Pressure, psi		44.90	49.90	60.00
Fail. Stress, ksf		4.4	7.6	12.1
Total Pore Pr., ksf		5.1	4.6	4.5
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		5.7	10.2	16.2
$\bar{\sigma}_3$ Failure, ksf		1.4	2.6	4.1

Type of Test: CU with Pore Pressures

Sample Type: Bulk

Description: Brown Fine SAND w/ small shell fragments

Assumed Specific Gravity= 2.65

Remarks:

Client: Taylor Engineering

Project: BV-4B DMMA

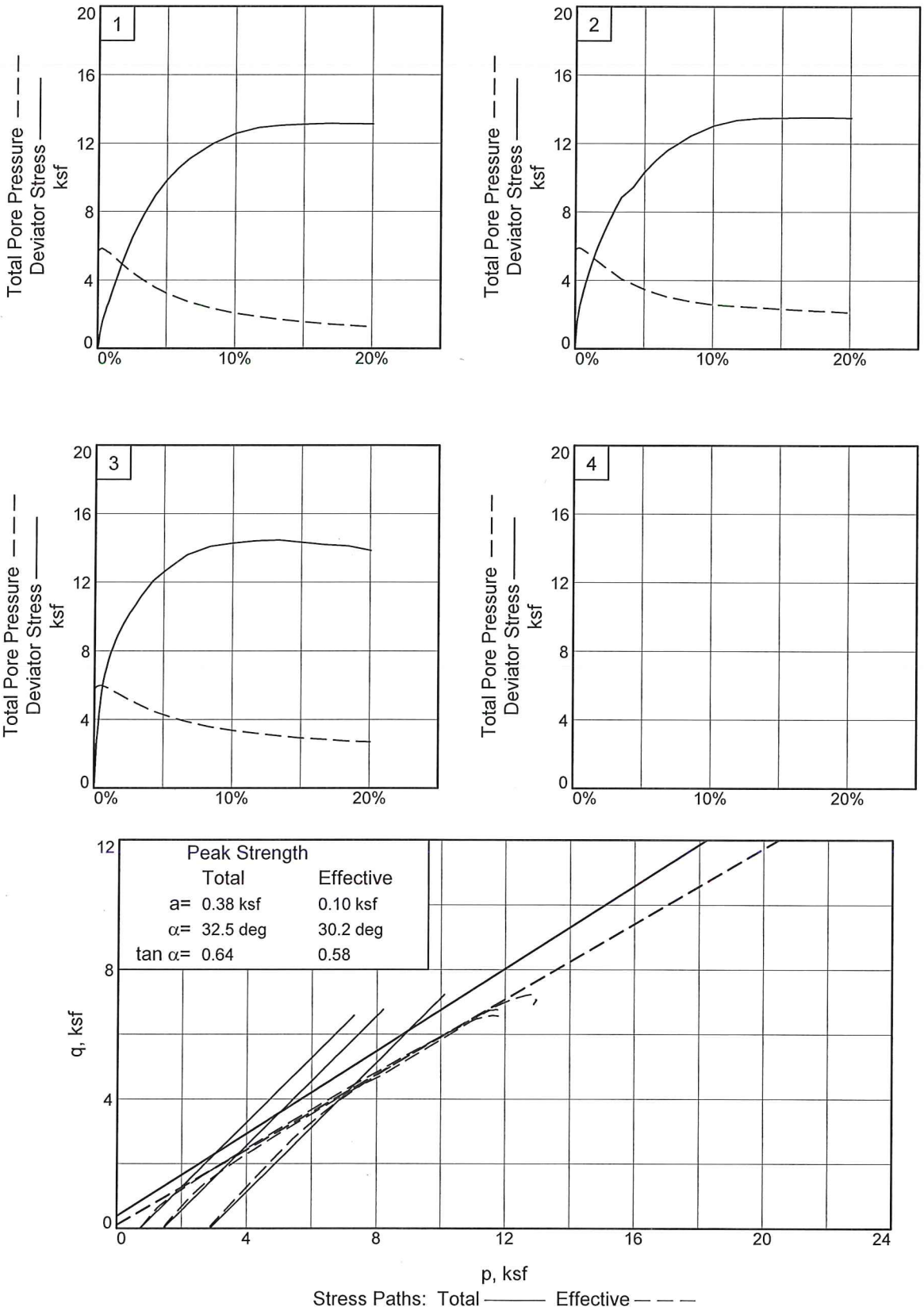
Source of Sample: Sample No. 3

Sample Number: 3

Proj. No.: HB145006 **Date Sampled:** 4/21/2014

TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Jacksonville, Florida

Tested By: CRM Sr

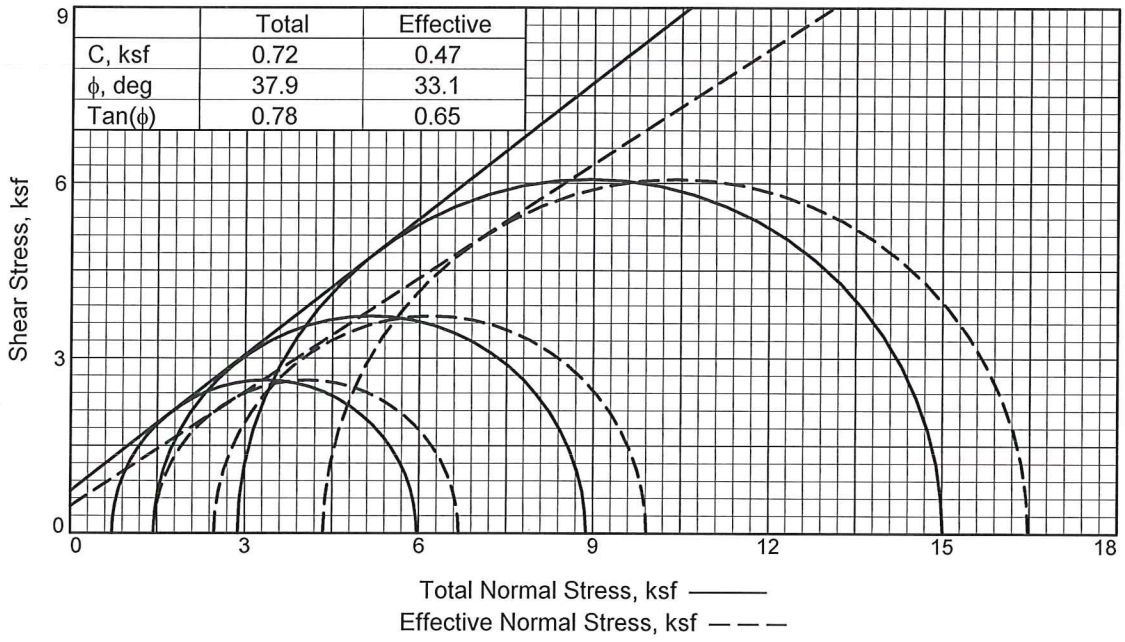


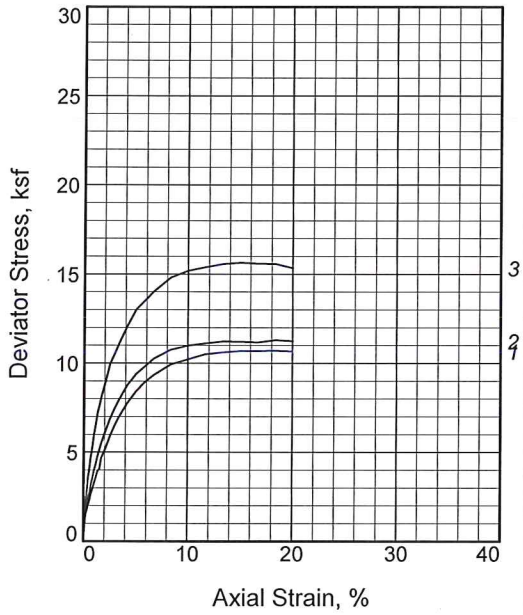
Client: Taylor Engineering
Project: BV-4B DMMA
Source of Sample: Sample No. 3 **Sample Number:** 3
Project No.: HB145006

Terracon Consultants, Inc.

Tested By: CRM Sr

Exhibit B-45





Sample No.		1	2	3
Initial	Water Content, %	11.8	11.8	11.8
	Dry Density, pcf	97.5	97.7	97.6
	Saturation, %	44.9	45.0	44.9
	Void Ratio	0.6967	0.6939	0.6956
	Diameter, in.	2.85	2.85	2.85
	Height, in.	6.01	6.00	6.01
At Test	Water Content, %	26.2	26.1	26.0
	Dry Density, pcf	97.6	97.9	98.0
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6942	0.6905	0.6880
	Diameter, in.	2.85	2.85	2.85
	Height, in.	6.01	6.00	6.00
Strain rate, %/min.		0.10	0.10	0.10
Back Pressure, psi		40.00	40.10	40.10
Cell Pressure, psi		45.00	50.10	60.10
Fail. Stress, ksf		5.2	7.4	12.1
Total Pore Pr., ksf		5.0	4.7	4.3
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		6.7	9.9	16.5
$\bar{\sigma}_3$ Failure, ksf		1.4	2.5	4.3

Type of Test:
CU with Pore Pressures

Sample Type: Bulk

Description: Brown Slightly Silty Fine SAND

Assumed Specific Gravity= 2.65

Remarks:

Client: Taylor Engineering

Project: BV-4B DMMA

Source of Sample: Sample No. 6

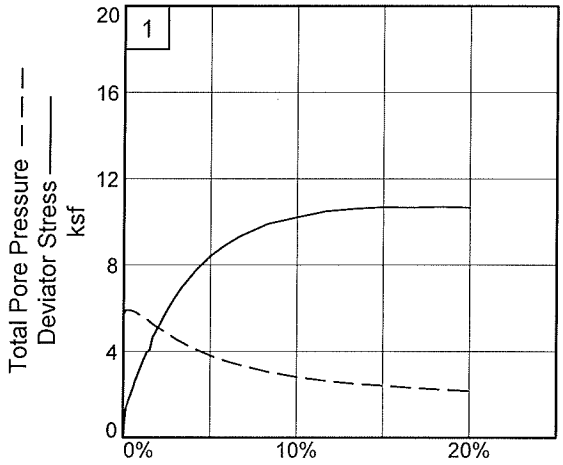
Sample Number: 6

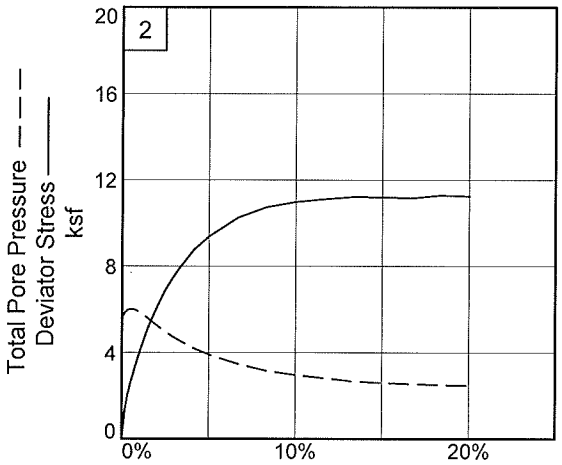
Proj. No.: HB145006 **Date Sampled:** 4/21/2014

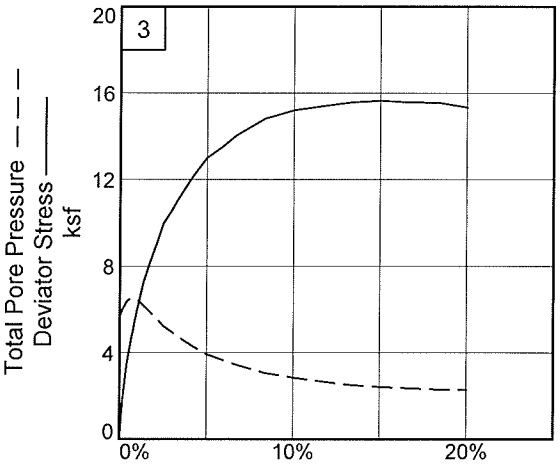
TRIAXIAL SHEAR TEST REPORT
Terracon Consultants, Inc.
Jacksonville, Florida

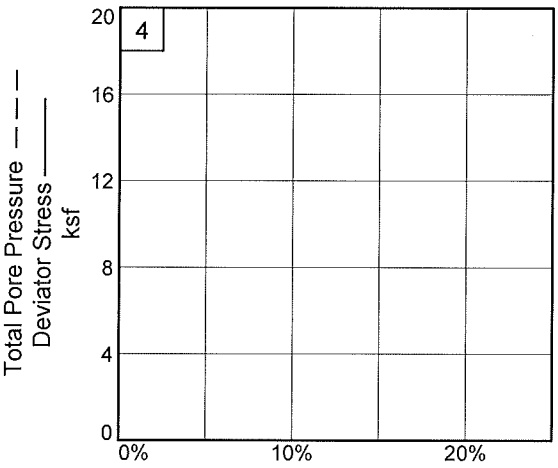
Tested By: CRM Sr

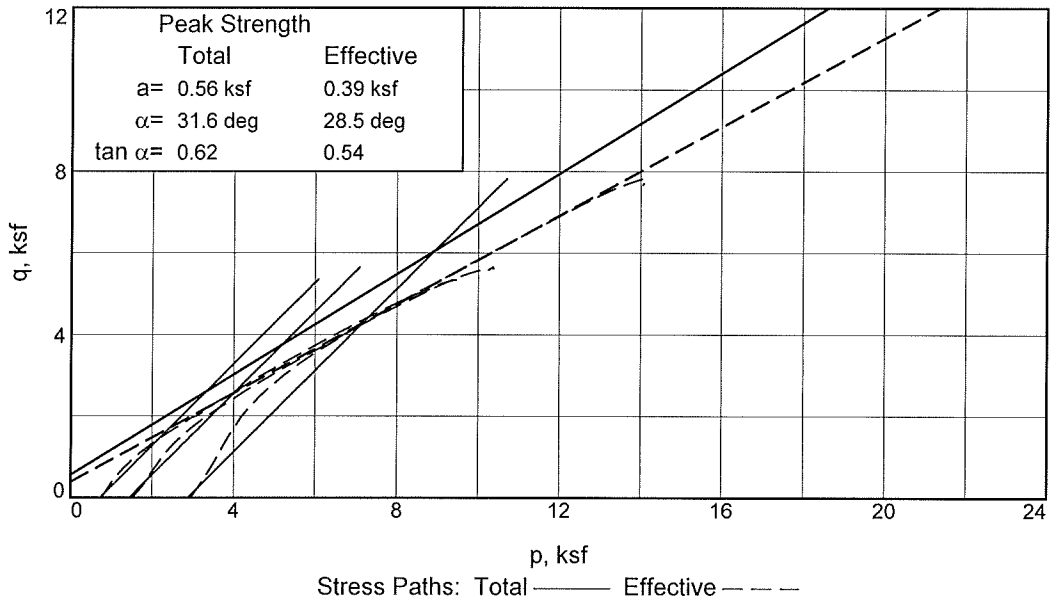
Exhibit B-46











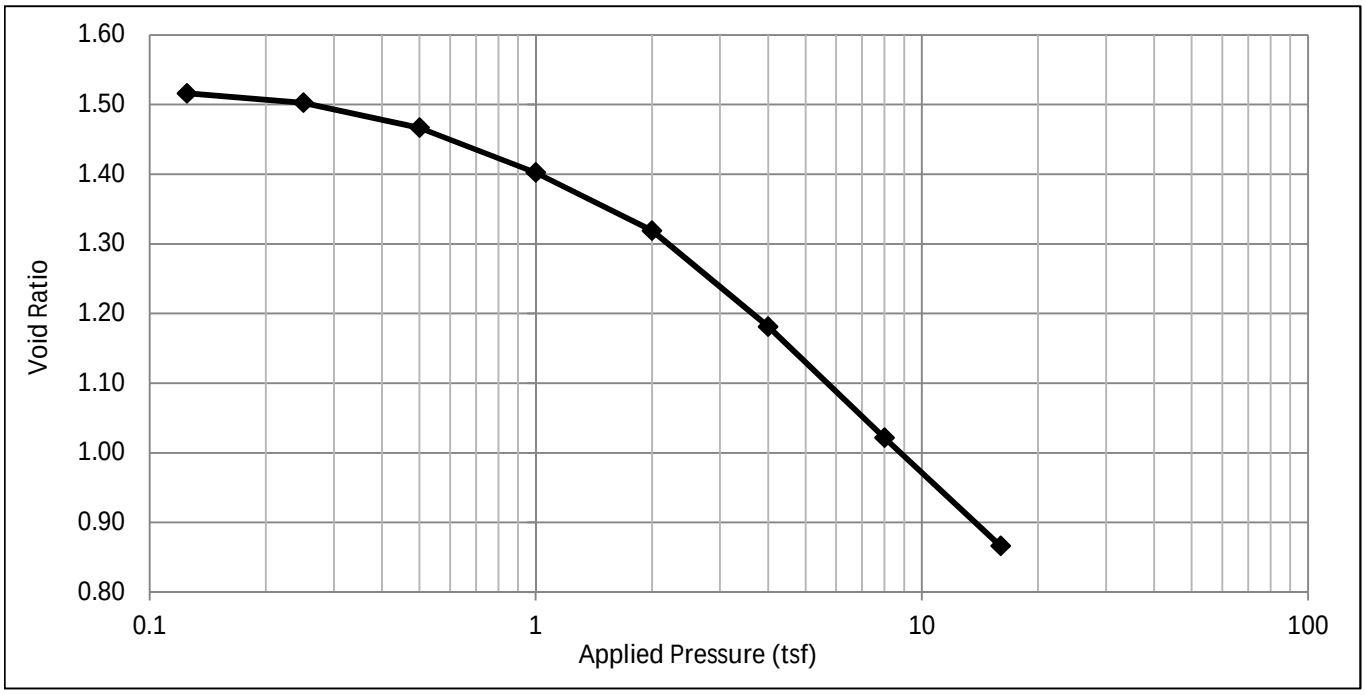
Client: Taylor Engineering
Project: BV-4B DMMA
Source of Sample: Sample No. 6 **Sample Number:** 6
Project No.: HB145006

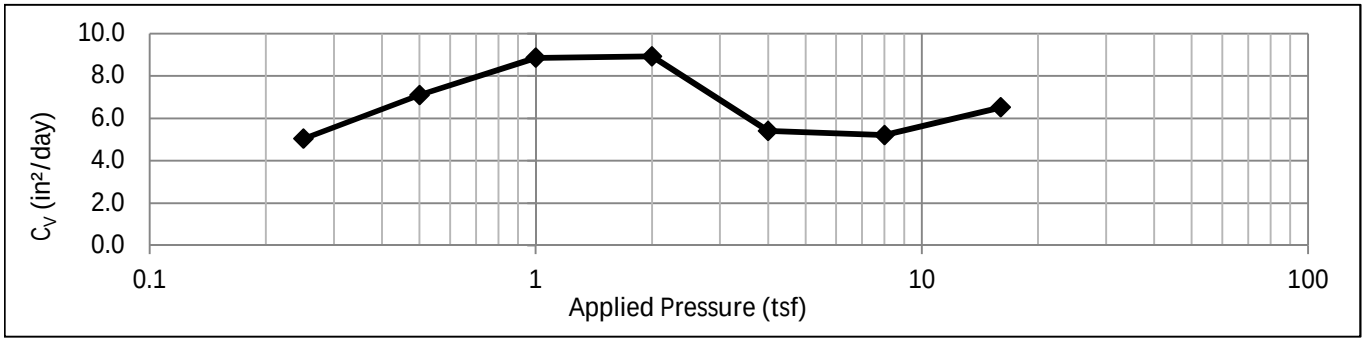
Terracon Consultants, Inc.

Tested By: CRM Sr

Exhibit B-47

CONSOLIDATION TEST REPORT





Boring	Sample Depth (feet)	Material Description	USCS
B-203	35 to 37	Dark gray to green clay with traces of sand and shell fragments	CL

LL	PI	SG (Assume)	Dry Density (pcf)		Moisture Content (%)		Void Ratio		P_C (ksf)	C_C	C_R	-200 (%)
			Initial	Final	Initial	Final	Initial	Final				
44.0	27.3	2.7	67.0		56.0	45.0	1.52		2.40	0.52	-	64.5

Project	Project Number	Client
BV-4B DMMA Brevard County, Florida	HB145006	Taylor Engineering

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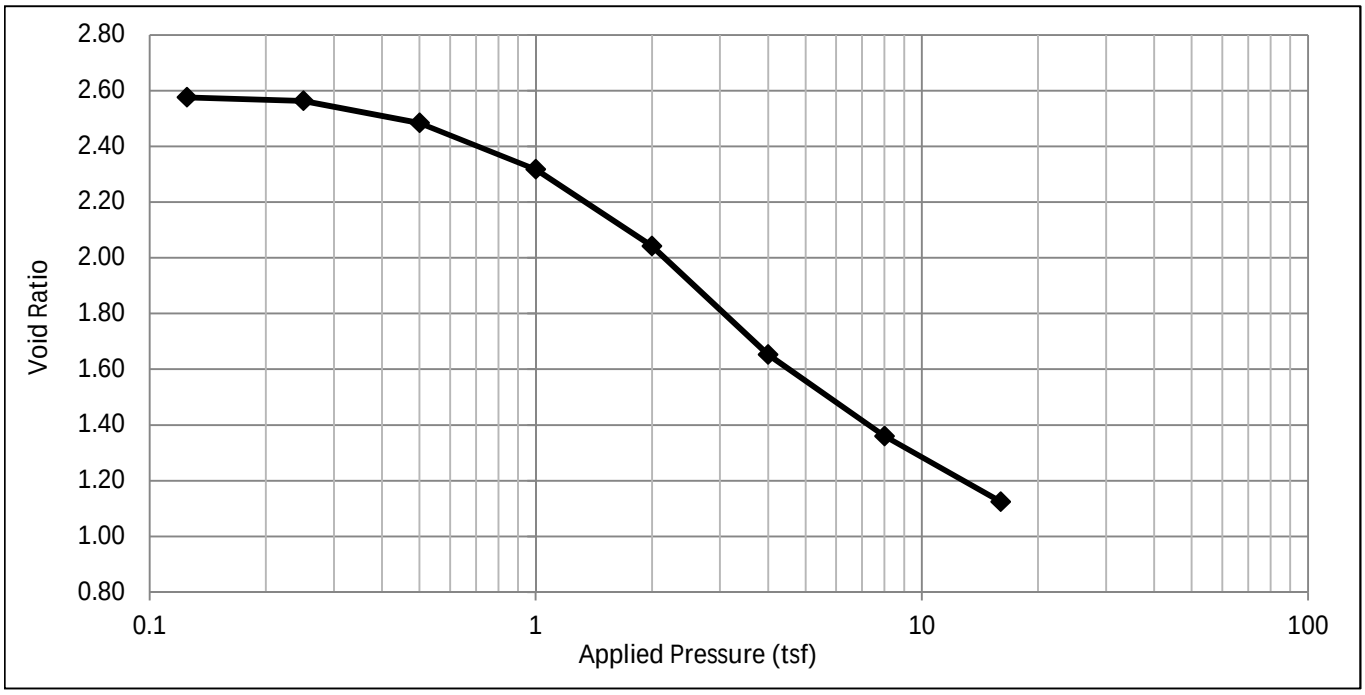
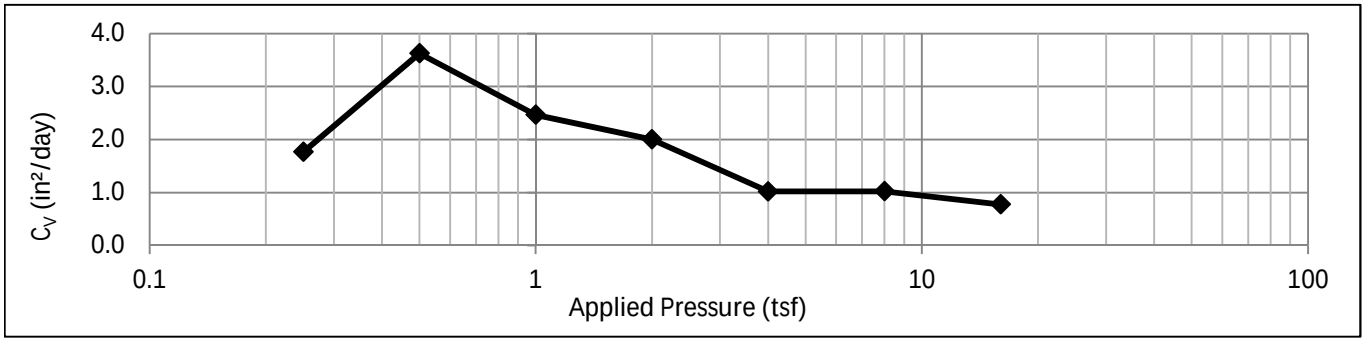
engineering & testing, inc.
A Terracon COMPANY

Exhibit B-48

CONSOLIDATION TEST REPORT





Boring	Sample Depth (feet)	Material Description	USCS
B-204	40 to 42	Dark gray to green clay with traces of sand and shell fragments	CL/CH

LL	PI	SG (Assume)	Dry Density (pcf)		Moisture Content (%)		Void Ratio		P_C (ksf)	C_C	C_R	-200 (%)
			Initial	Final	Initial	Final	Initial	Final				
56.0	38.0	2.7	47.1	-	78.4	56.0	2.58	-	2.00	0.78	-	95.5

Project	Project Number	Client
BV-4B DMMA Brevard County, Florida	HB145006	Taylor Engineering

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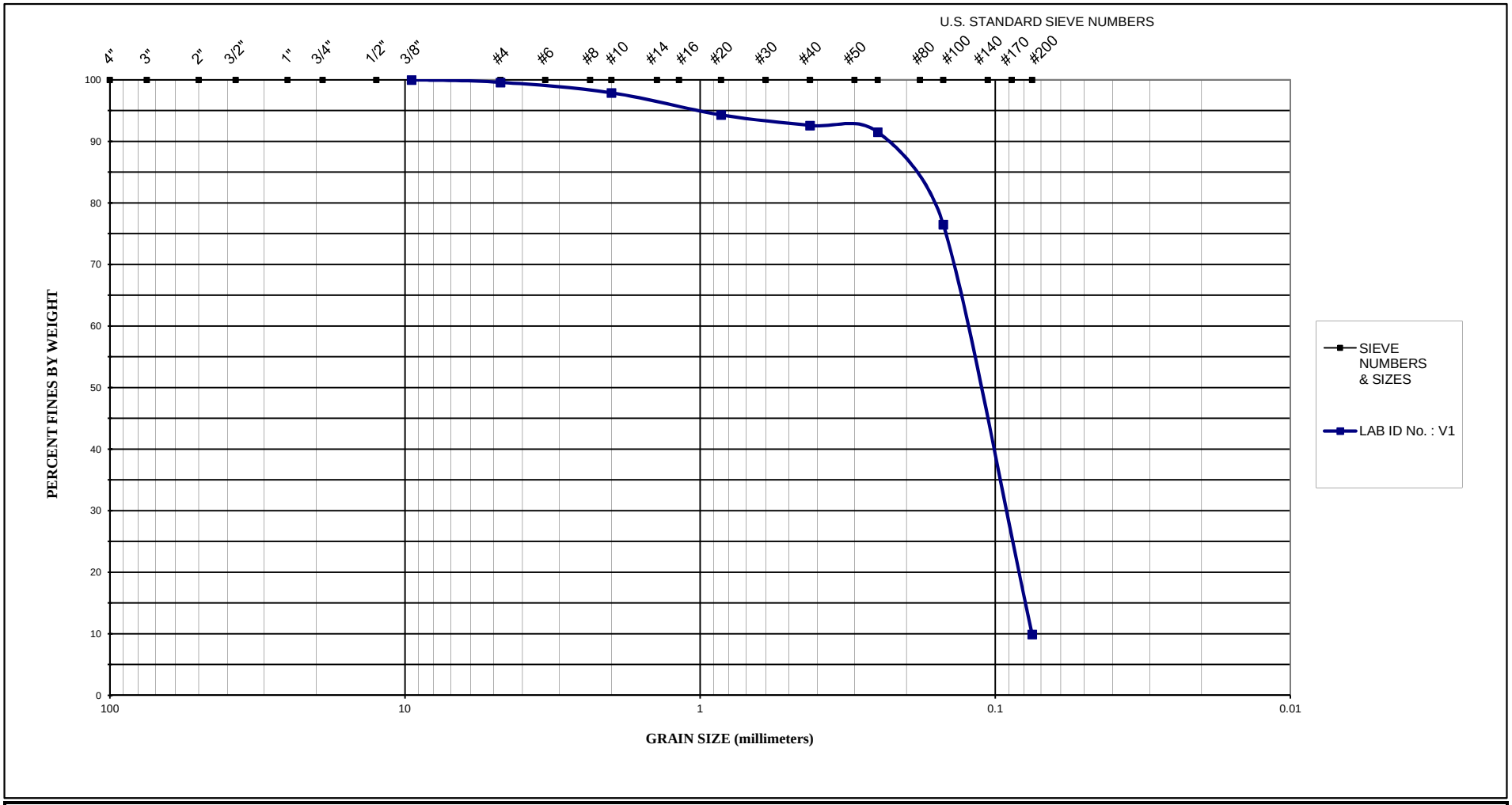
engineering & testing, inc.
A Terracon COMPANY

Exhibit B-49

APPENDIX C
DREDGED MATERIAL LABORATORY RESULTS

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

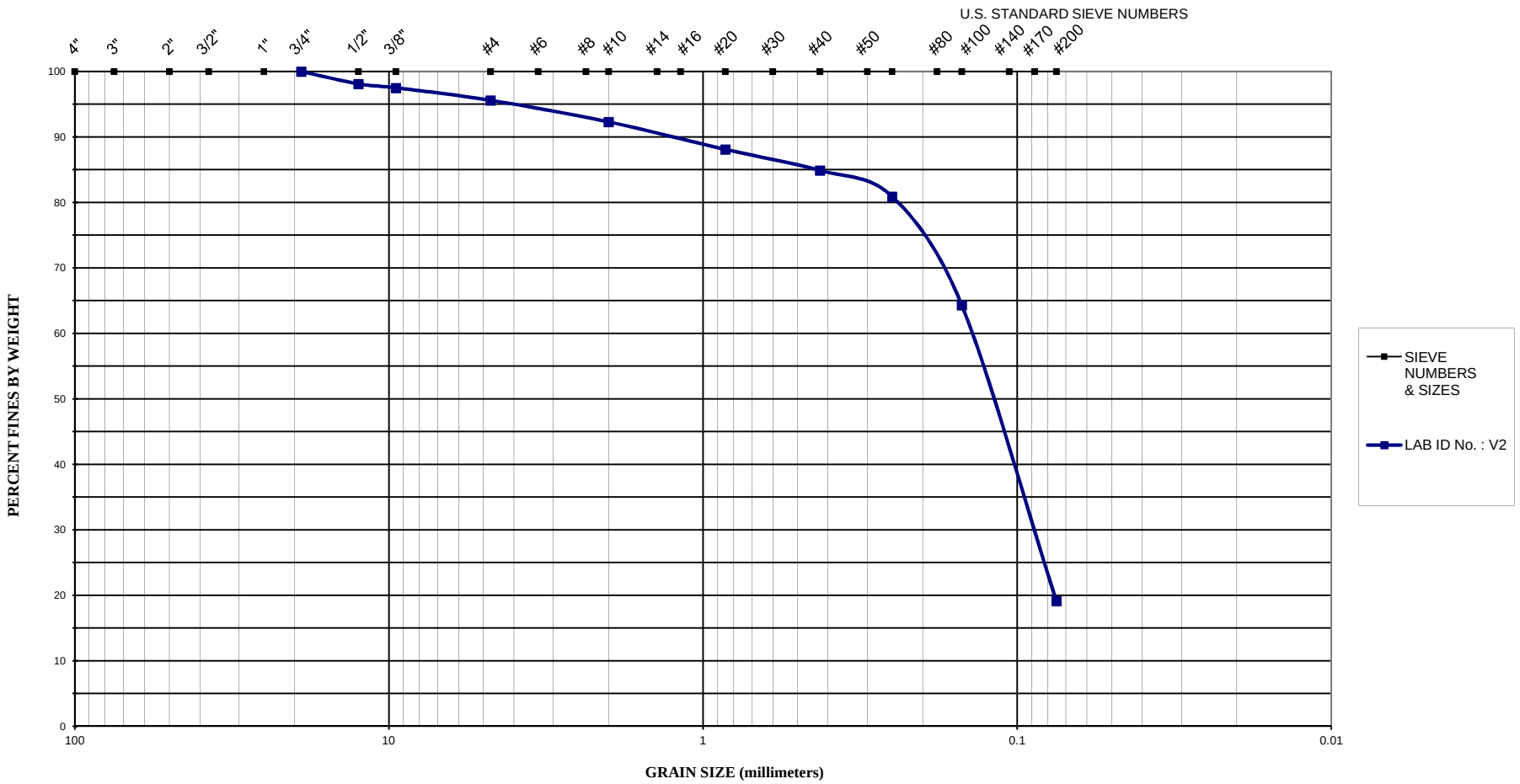
Sample Location : ICWW **LAB ID No. :** V1 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Brown, Gray slightly silty fine SAND with shell fragments	SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit C-1

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

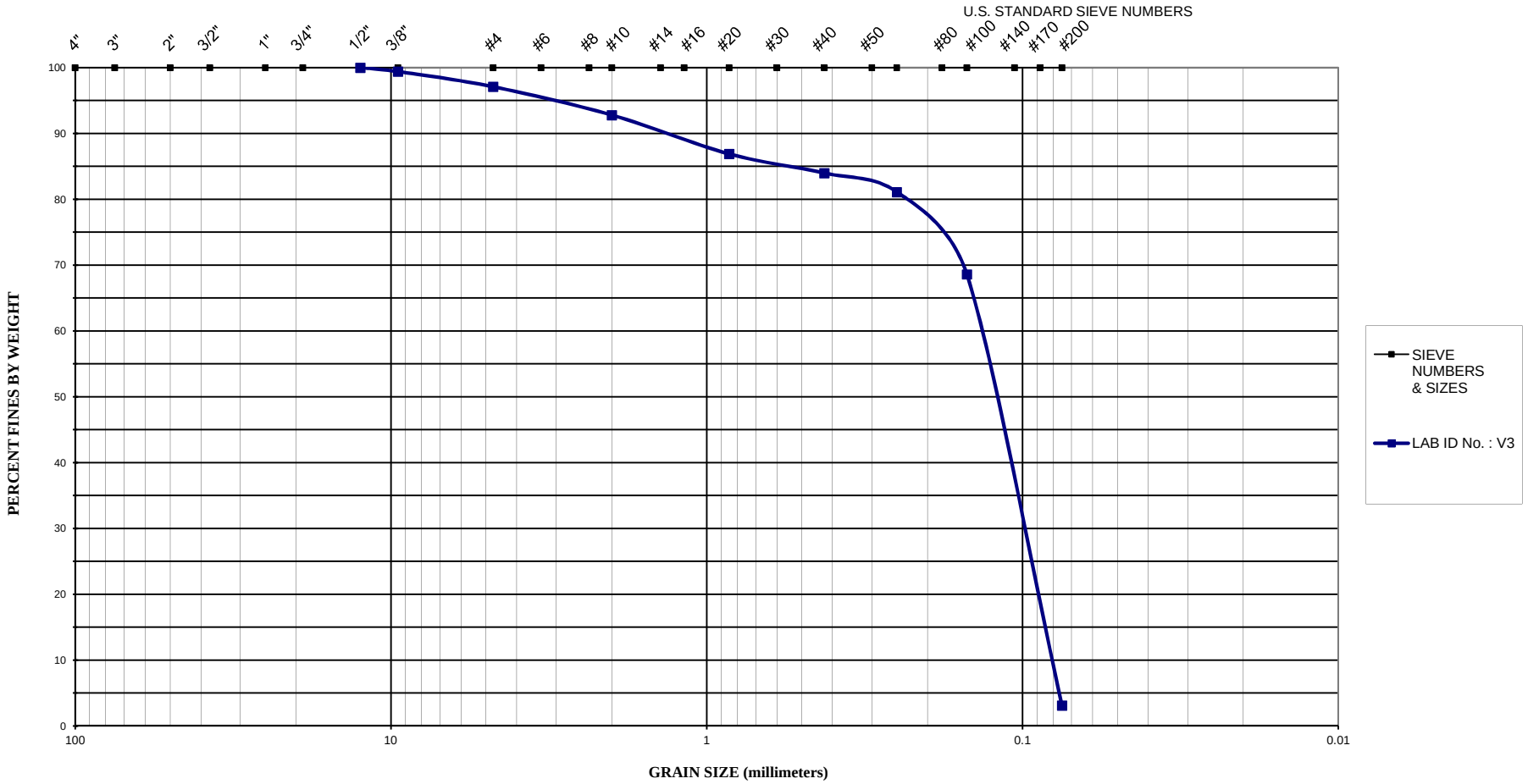
Sample Location : ICWW **LAB ID No. :** V2 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Dk brn silty medium to fine SAND with shell fragments, trace organics	SM	0.16	0.09				---	---

Exhibit C-2

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

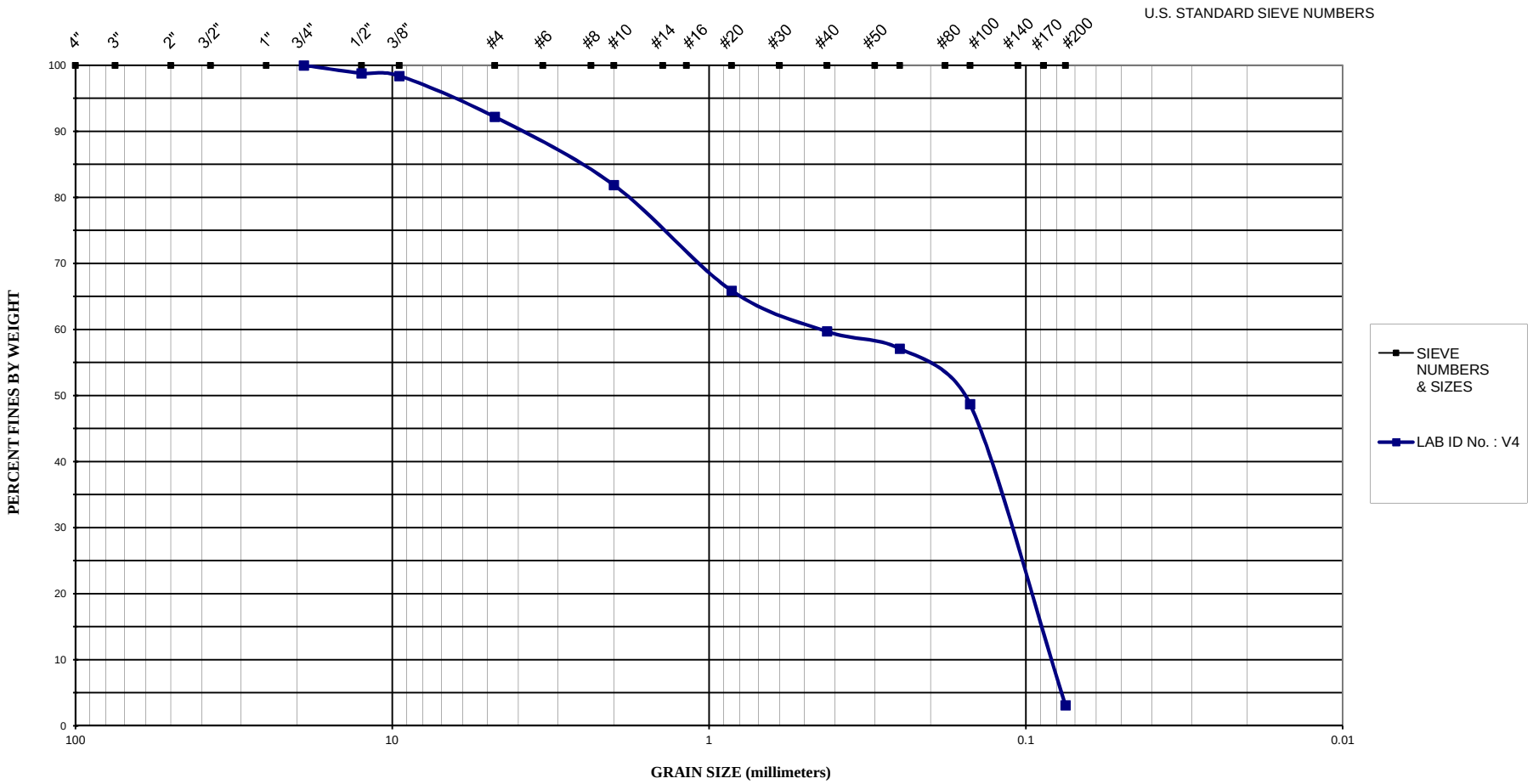
Sample Location : ICWW **LAB ID No. :** V3 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray medium to fine SAND with shell fragsments	SP	0.15	0.10	0.08	1.88	0.83	---	---

Exhibit C-3

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

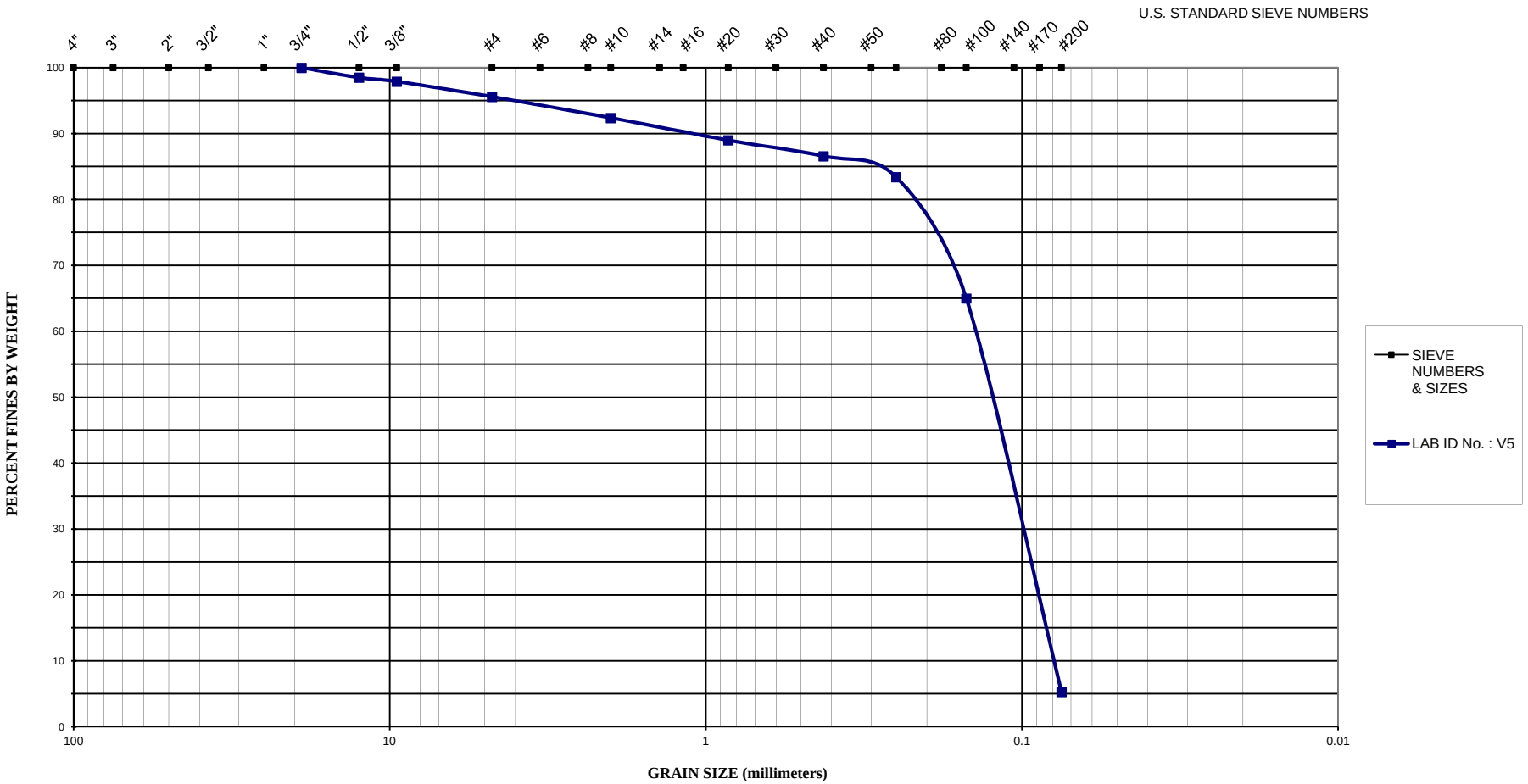
Sample Location : ICWW **LAB ID No. :** V4 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray medium to fine SAND with shell fragments	SP	0.43	0.12	0.08	5.38	0.42	---	---

Exhibit C-4

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

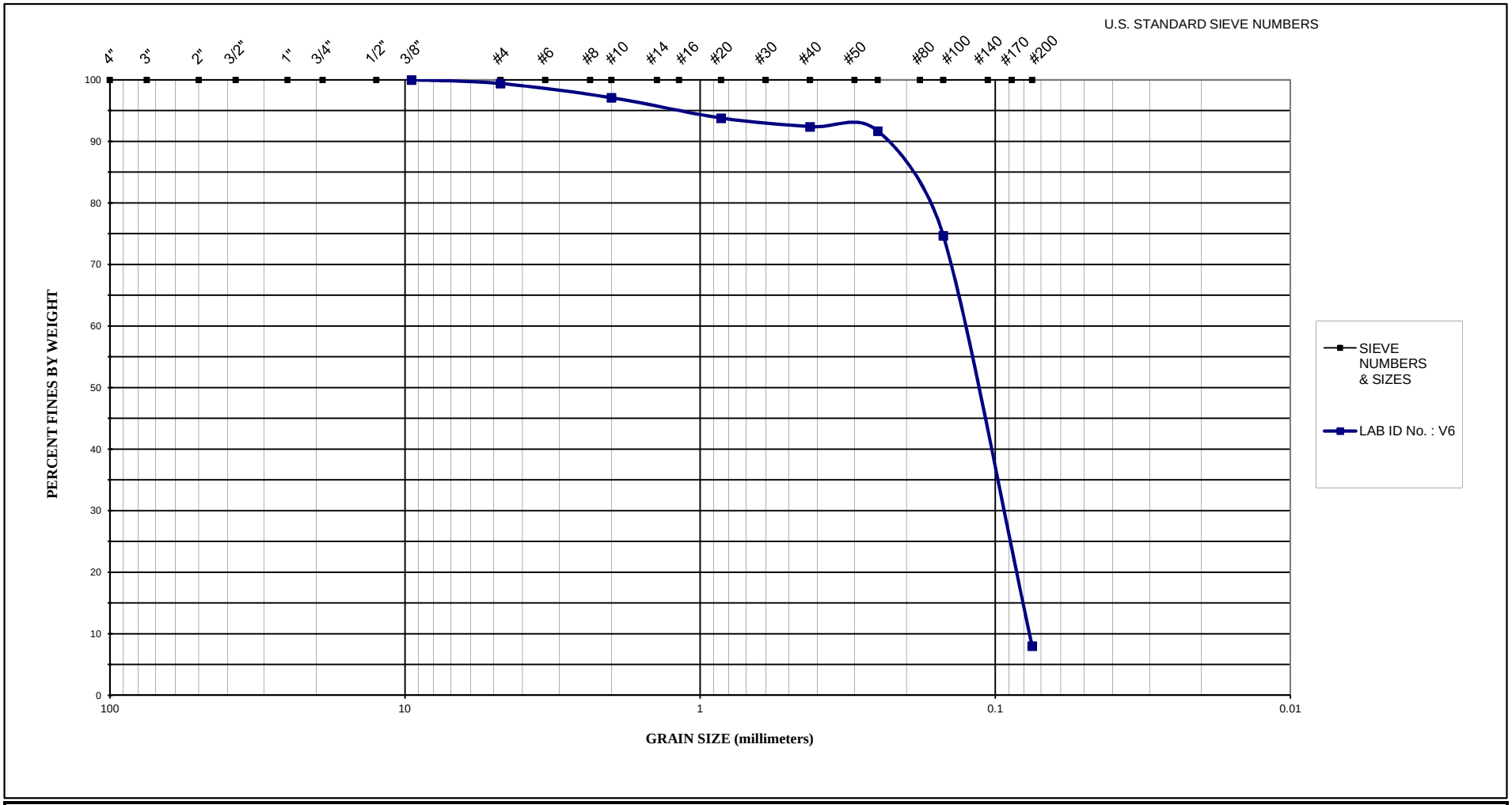
Sample Location : ICWW **LAB ID No. :** V5 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gray medium to fine SAND with shell fragments, traces of silt, organics	SP	0.16	0.10	0.08	2.00	0.78	---	---

Exhibit C-5

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

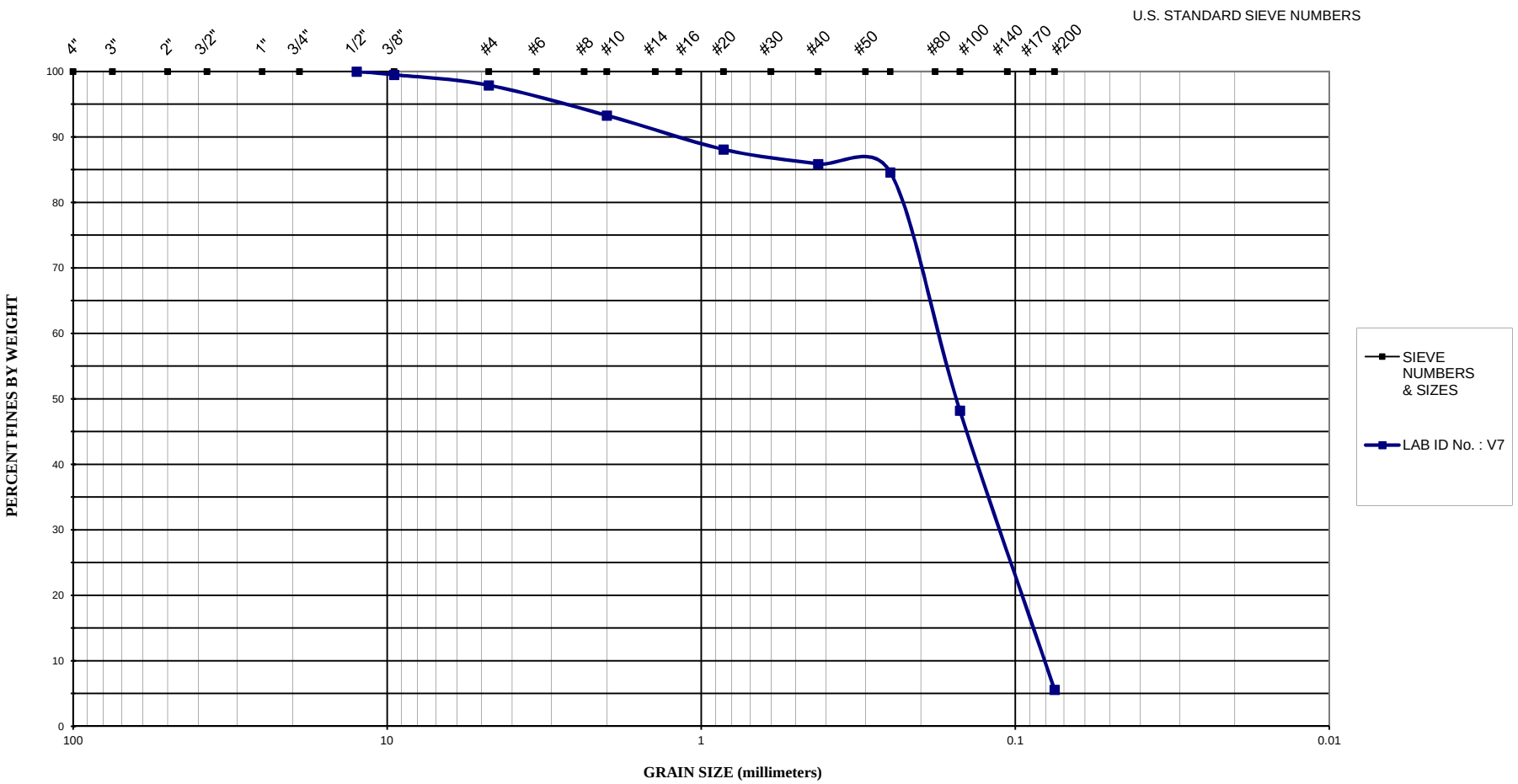
Sample Location : ICWW **LAB ID No. :** V6 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light brown slightly silty fine SAND with shell fragments, organics	SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit C-6

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

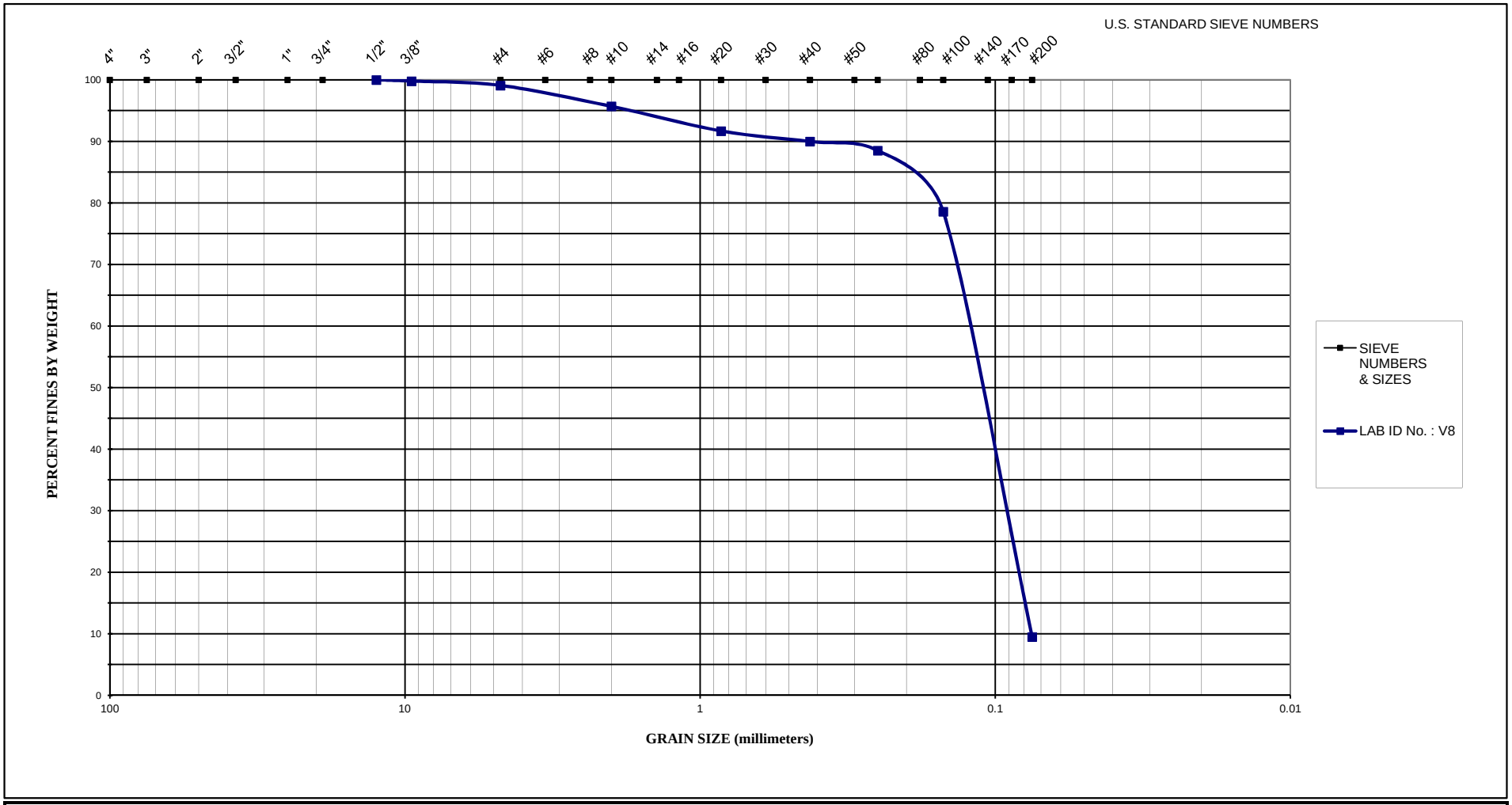
Sample Location : ICWW **LAB ID No. :** V7 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Dk gray slightly silty med. to fine SAND with shell fragments, organics	SP-SM	0.18	0.12	0.08	2.25	1.00	---	---

Exhibit C-7

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : ICWW **LAB ID No. :** V8 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Gry slighlty silty med. to fine SAND with shell fragments, organic seams	SP-SM	0.14	0.09	0.08	1.75	0.72	---	---

Exhibit C-8

DUNKELBERGER
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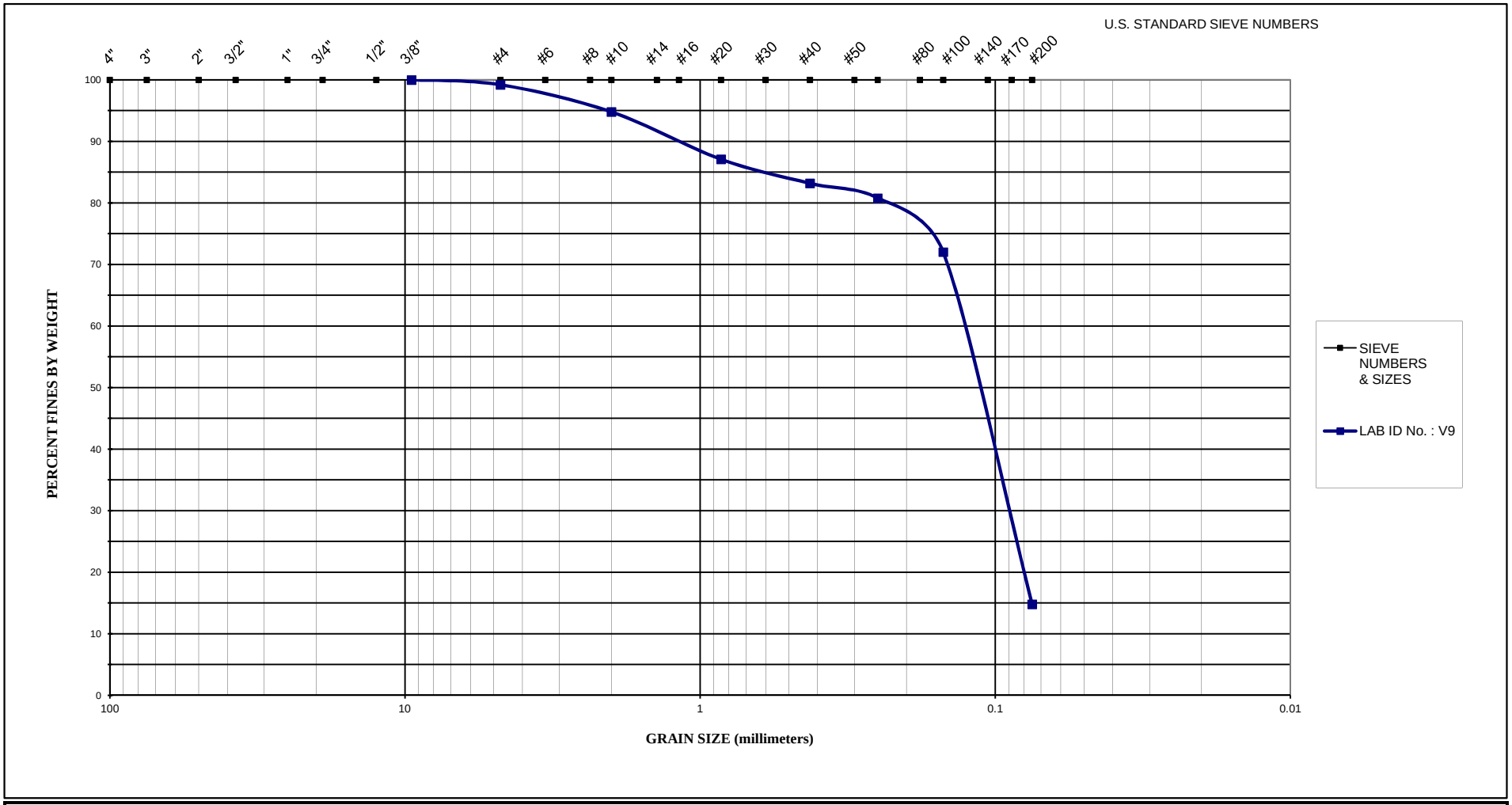
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : ICWW **LAB ID No. :** V9 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Dark gray silty organic medium to fine SAND with shell fragments	SM	0.14	0.09				---	---

Exhibit C-9

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : ICWW **LAB ID No. :** V10 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Dk gray slighly silty organic medium to fine SAND with shell fragments	SP-SM	0.18	0.10	0.08	2.25	0.69	---	---

Exhibit C-10

DUNKELBERGER
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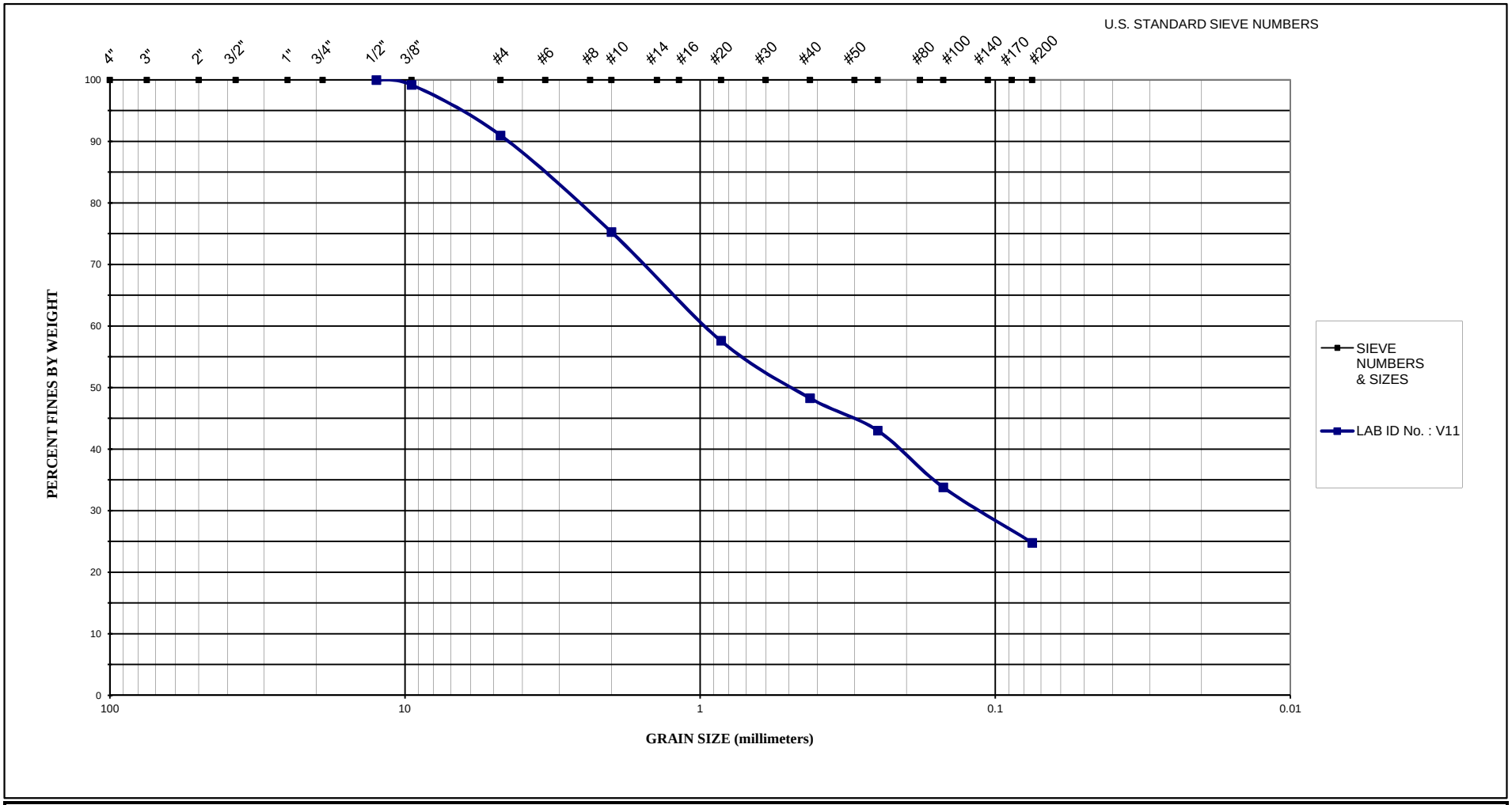
Particle Size Analysis of Soil



Project Name : BV-4B DMMA **Project No. :** HB145006

Sample Location : ICWW **LAB ID No. :** V11 **Sample Date :** 4/22/14

Soil Description	Soil Class	D60	D30	D10	C_u	C_c	K (cm/sec)	Permability
Light gray clayey SAND, mostly shell	SC	1.00	0.12				---	---

Exhibit C-11

Influent Parameters: Chloride Content: 88.8 ppm
pH: 8.6

Sample ID V1

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.70	0.00			
331	9.24	65.31	1	18480	8.2
691	18.72	132.32	2	2400	8.3
991	26.16	184.91	3	960	8.6
1531	36.72	259.56	4	960	8.9
2085	46.56	329.11	5	960	8.5
2580	52.80	373.22	6	1200	8.6
			Sum/Avg		
			Comp	2880	8.0

PBEL Results:
pH = 7.0
TCLP = 240 mg/L
Total Chl = 4290 mg/kg

Sample ID V2

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.70	0.00			
1531.0	8.88	62.77	1	13920	8.2
			2		
			3		
			4		
			5		
			6		
			Sum/Avg		
			Comp		

PBEL Results:
pH = 7.1
TCLP = 310 mg/L
Total Chl = 6470 mg/kg

Sample ID V5

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.65	0.00	-	-	-
135	24.60	173.89	1	4560	8.1
178	28.92	204.42	2	1200	8.1
295	39.00	275.67	3	720	8.9
450	45.12	318.93	4	960	8.6
615	53.88	380.86	5		
			6		
			Sum/Avg		
			Comp	3120	8.3

PBEL Results:
pH = 6.6
TCLP = 280 mg/L
Total Chl = 5220 mg/kg

Sample ID V6

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.70	0.00	-	-	-
368	9.12	64.47	1	12720	7.9
942	18.36	129.78	2	2640	8.4
1482	27.00	190.85	3	1200	9.1
2176	36.60	258.71	4	720	9.2
3705	44.52	314.69	5	1440	8.8
4876	54.12	382.55	6	960	8.8
			Sum/Avg		
			Comp	4080	

PBEL Results:
pH = 6.5
TCLP = 170 mg/L
Total Chl = 4110 mg/kg

Sample ID V9

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.65	0.00	-	-	-
119	9.24	65.31	1	18720	7.7
643	18.24	128.93	2	9360	8
1843	26.40	186.61	3	1440	9.2
4141	35.88	253.62	4	1200	8.9
8620	44.88	317.24	5	1440	9.2
14375	50.76	358.80	6	1440	8.8
			Sum/Avg		
			Comp	5520	8.6

PBEL Results:
pH = 6.5
TCLP = 360 mg/L
Total Chl = 9160 mg/kg

Sample ID V10

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.65	0.00	-	-	-
110	37.56	265.50	1	3840	8.2
190	46.20	326.57	2	1440	8.6
197	48.24	340.99	3	960	8.8
266	52.44	370.68	4		
			5		
			6		
			Sum/Avg		
			Comp	5280	7.9

PBEL Results:
pH = 6.6
TCLP = 450 mg/L
Total Chl = 9880 mg/kg

Influent Parameters: Chloride Content: 88.8 ppm
pH: 8.6

Sample ID V3

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.55	0.00			
149	24.36	172.19	1	4800	7.6
169	27.24	192.55	2	1944	8.4
270	38.52	272.28	3	1440	8.6
341	46.08	325.72	4	720	8.3
446	53.40	377.46	5	720	8.2
			6		
			Sum/Avg		
			Comp	1200	7.2

PBEL Results:
pH = 6.5
TCLP = 220 mg/L
Total Chl = 4620 mg/kg

Sample ID V4

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.70	0.00			
138	48.24	340.99	1	1920	8.3
189	51.96	367.28	2	1200	8
			3		
			4		
			5		
			6		
			Sum/Avg		
			Comp	3250	8.8

PBEL Results:
pH = 6.4
TCLP = 240 mg/L
Total Chl = 4610 mg/kg

Sample ID V7

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.73	0.00	-	-	-
122	33.24	234.96	1	3840	8.4
170	38.64	273.13	2	1200	9
218	44.76	316.39	3	1200	9
266	48.84	345.23	4	960	9.2
318	52.80	373.22	5		
			6		
			Sum/Avg		
			Comp	3600	8

PBEL Results:
pH = 6.4
TCLP = 250 mg/L
Total Chl = 5560 mg/kg

Sample ID V8

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.63	0.00	-	-	-
309	9.48	67.01	1	12000	7.9
1095	18.12	128.08	2	3120	8.7
2403	26.28	185.76	3	960	9.0
4102	36.00	254.47	4	1200	9.0
6714	46.56	329.11	5	960	8.3
9461	54.24	383.40	6	960	8.7
			Sum/Avg		
			Comp	4320	7.9

PBEL Results:
pH = 7.0
TCLP = 200 mg/L
Total Chl = 5380 mg/kg

Sample ID V11

Elapsed (min)	Disp (in)	Vol (in³)	Sample #	Chloride (ppm)	pH
0	0.65	0.00	-	-	-
300	9.36	66.16	1	12720	7.8
606	19.32	136.57	2	4800	7.8
966	27.60	195.09	3	1920	8.6
1446	35.40	250.23	4	1200	8.6
2264	45.72	323.18	5	1200	8.5
3030	54.00	381.70	6	960	8.6
			Sum/Avg		
			Comp	3600	7.9

PBEL Results:
pH = 6.5
TCLP = 300 mg/L
Total Chl = 6420 mg/kg

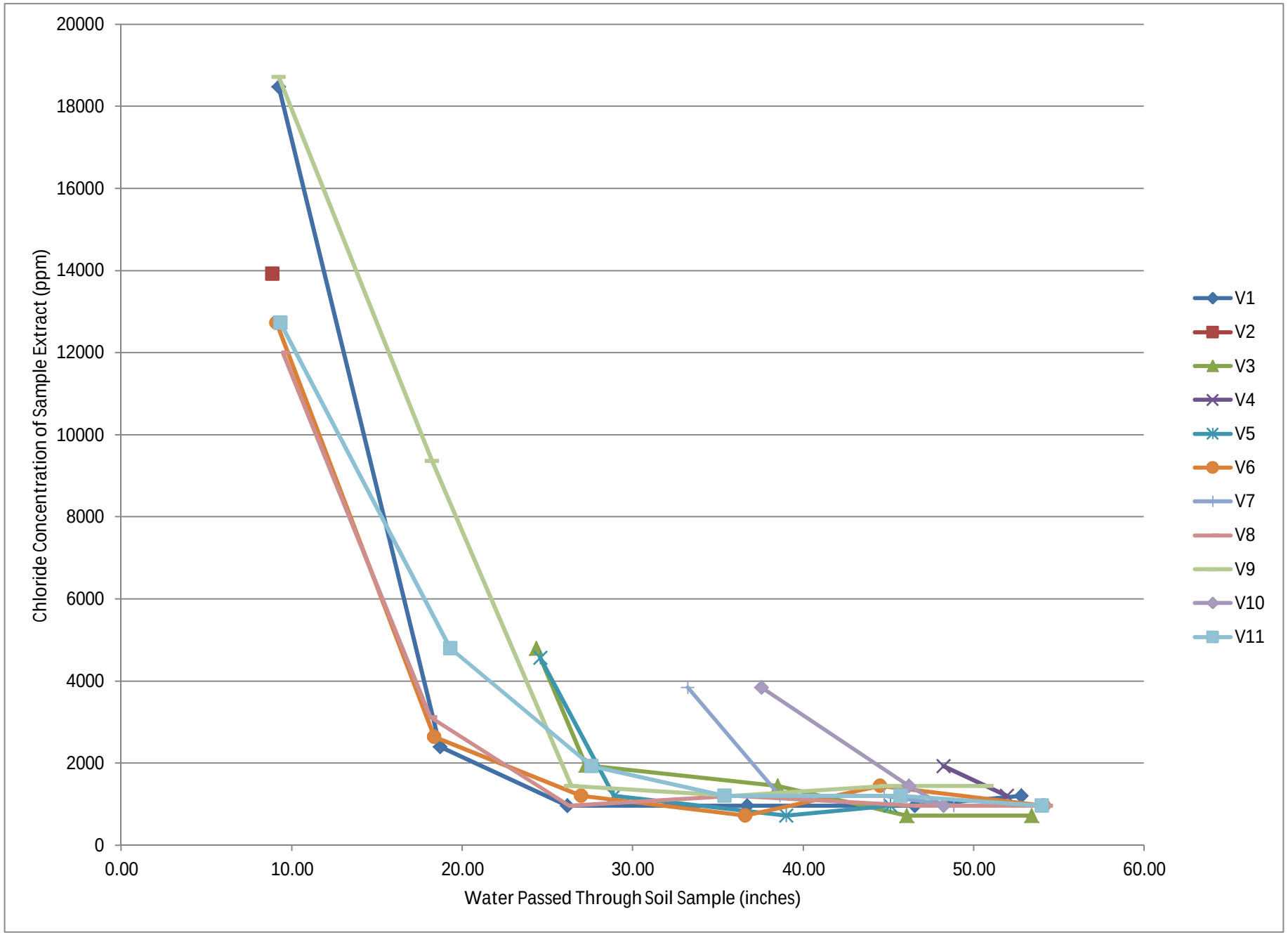

20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Chloride Concentration of Sample Extract (ppm)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Water Passed Through Soil Sample (inches)
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11

Exhibit C-14

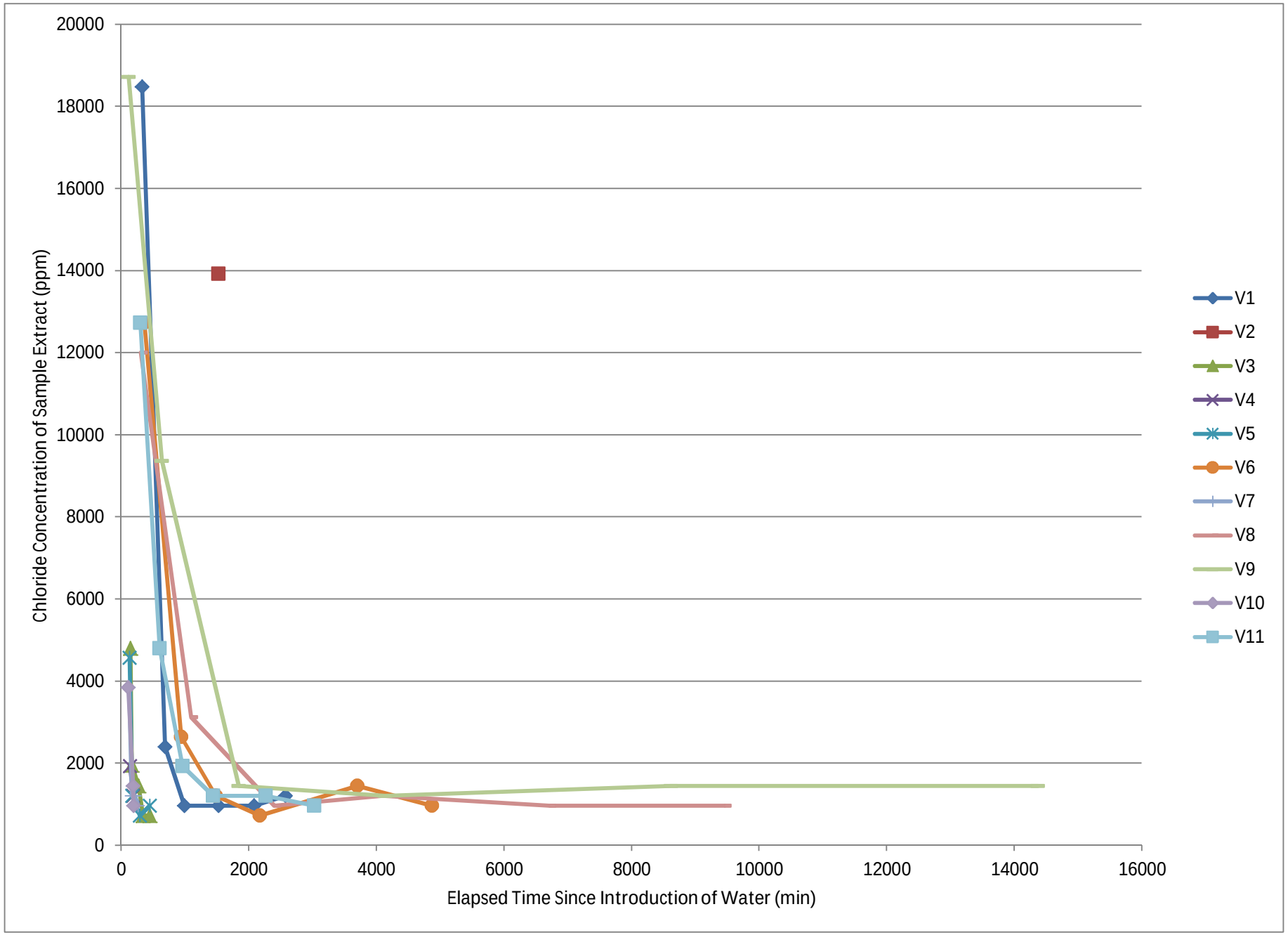

20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Chloride Concentration of Sample Extract (ppm)
0
2000
4000
6000
8000
10000
12000
14000
16000
Elapsed Time Since Introduction of Water (min)
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11

Exhibit C-15

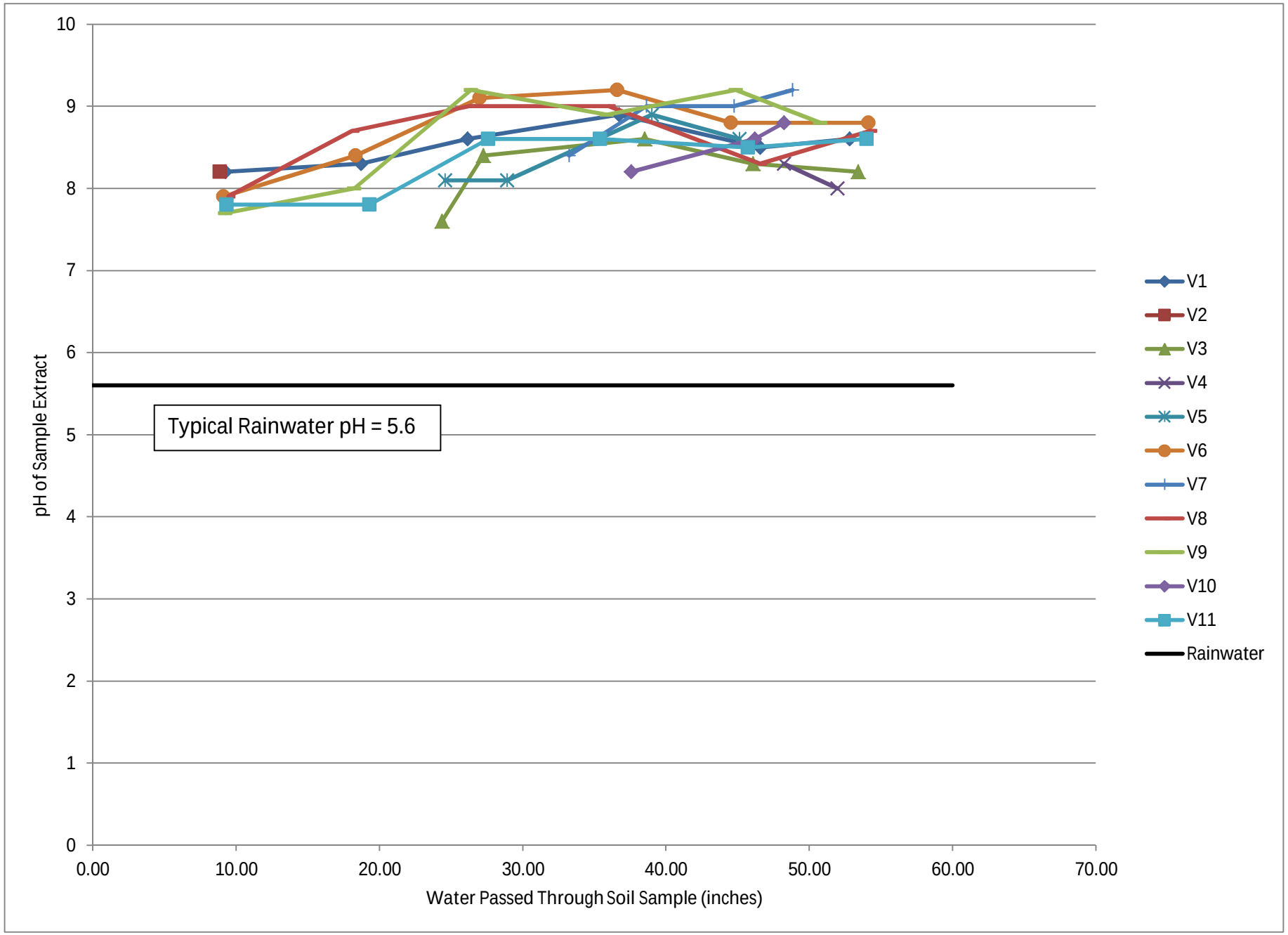

10
9
8
7
6
5
4
3
2
1
0
pH of Sample Extract
Typical Rainwater pH = 5.6
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
Water Passed Through Soil Sample (inches)
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11
Rainwater

Exhibit C-16

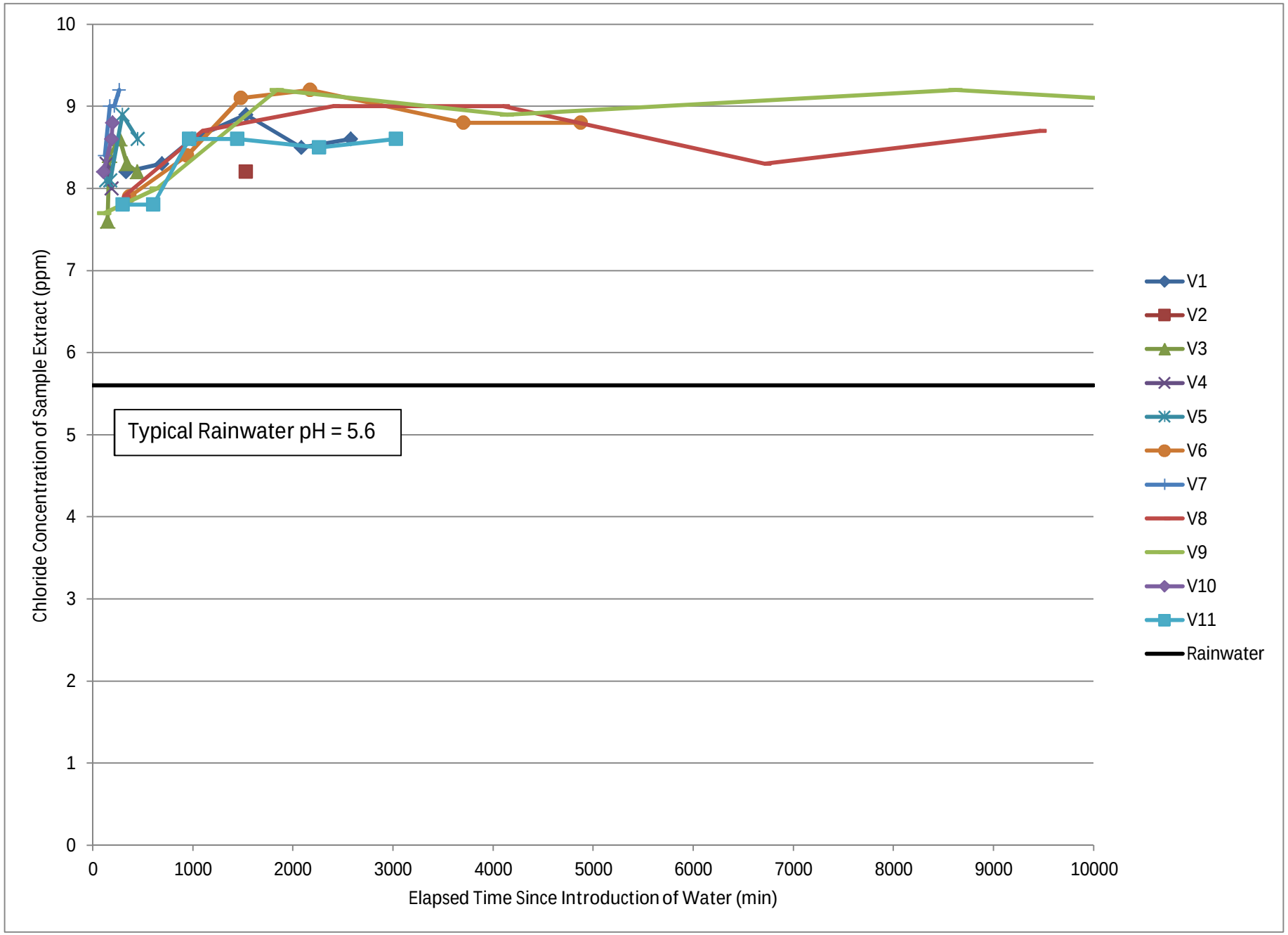
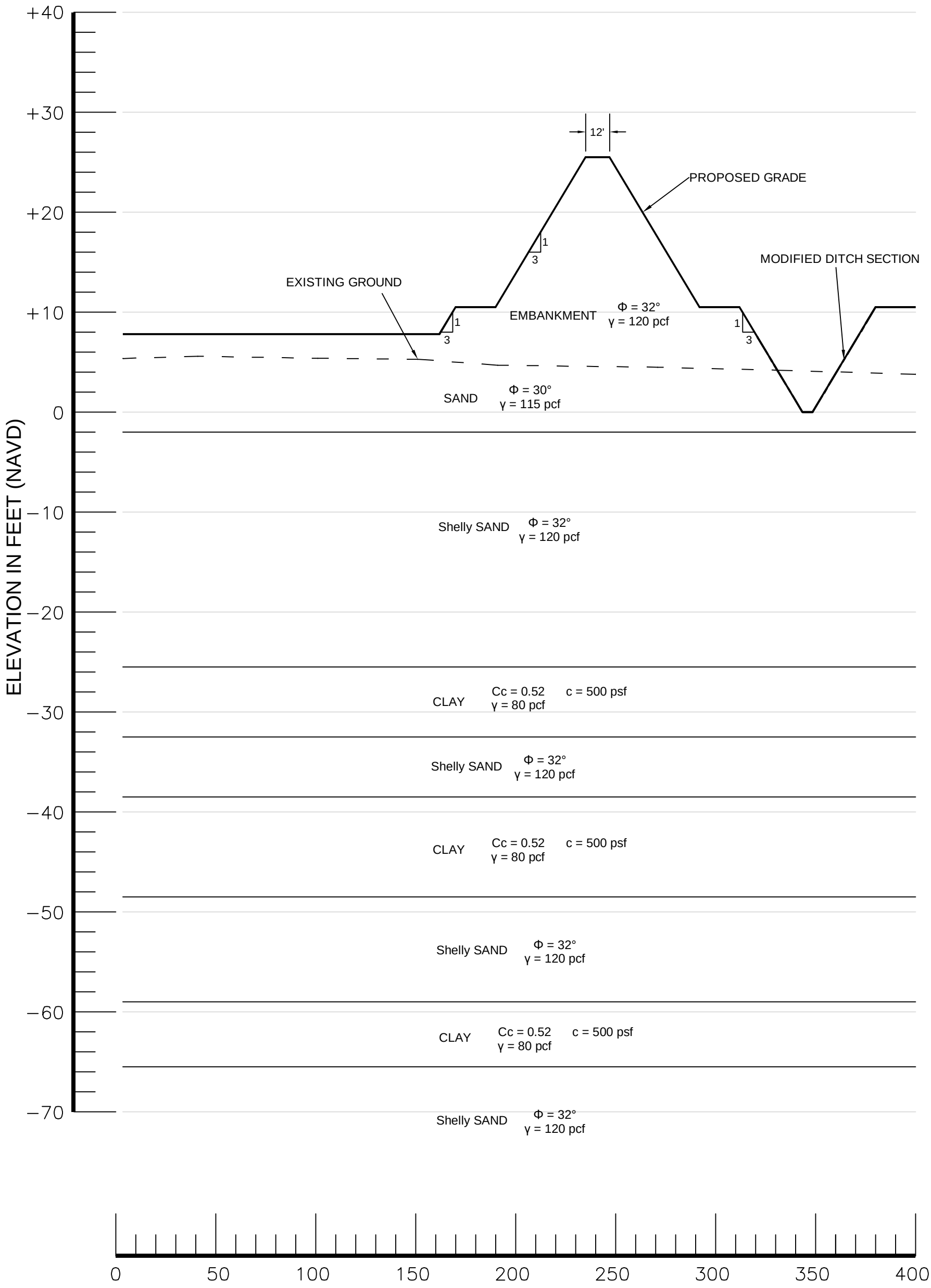

10
9
8
7
6
5
4
3
2
1
0
Chloride Concentration of Sample Extract (ppm)
Typical Rainwater pH = 5.6
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time Since Introduction of Water (min)
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
V11
Rainwater

Exhibit C-17

APPENDIX D
CROSS SECTIONS

WEST

EAST



NOTES:

(1) Proposed dike section: Figure 2-2 by Taylor Engineering, Inc. dated June 1992

(2) Existing ground: Topographic Survey Sheet S1 by SEA Diversified dated October 14, 2014

(3) Modified ditch section: proposed "site control" feature; Dunkelberger Preliminary Geotechnical Engineering Report (Phases I/II) dated December 8, 2014

(4) Unit weights are saturated

DRAWN	JJ
CHECKED	JJ
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	

CROSS SECTION - EAST

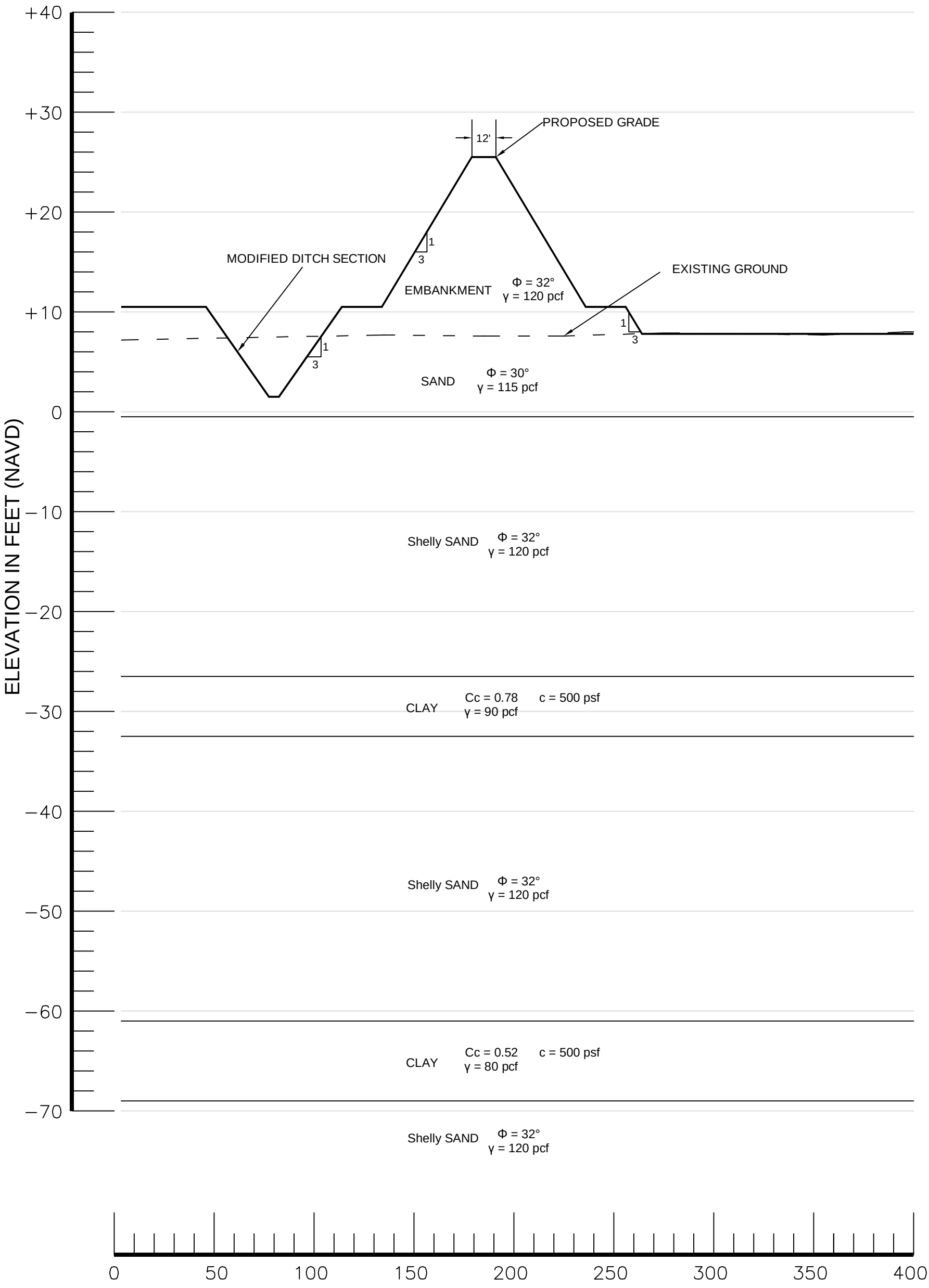
BV-4B PHASE III

BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc. A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
2-10-15	HB145006	D-1

NORTH SOUTH



NOTES:

(1) Proposed dike section: Figure 2-2 by Taylor Engineering, Inc. dated June 1992

(2) Existing ground: Topographic Survey Sheet S1 by SEA Diversified dated October 14, 2014

(3) Modified ditch section: proposed "site control" feature; Dunkelberger Preliminary Geotechnical Engineering Report (Phases I/II) dated December 8, 2014

(4) Unit weights are saturated

DRAWN	JJ
CHECKED	JJ
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	

CROSS SECTION - MIDDLE

BV-4B PHASE III

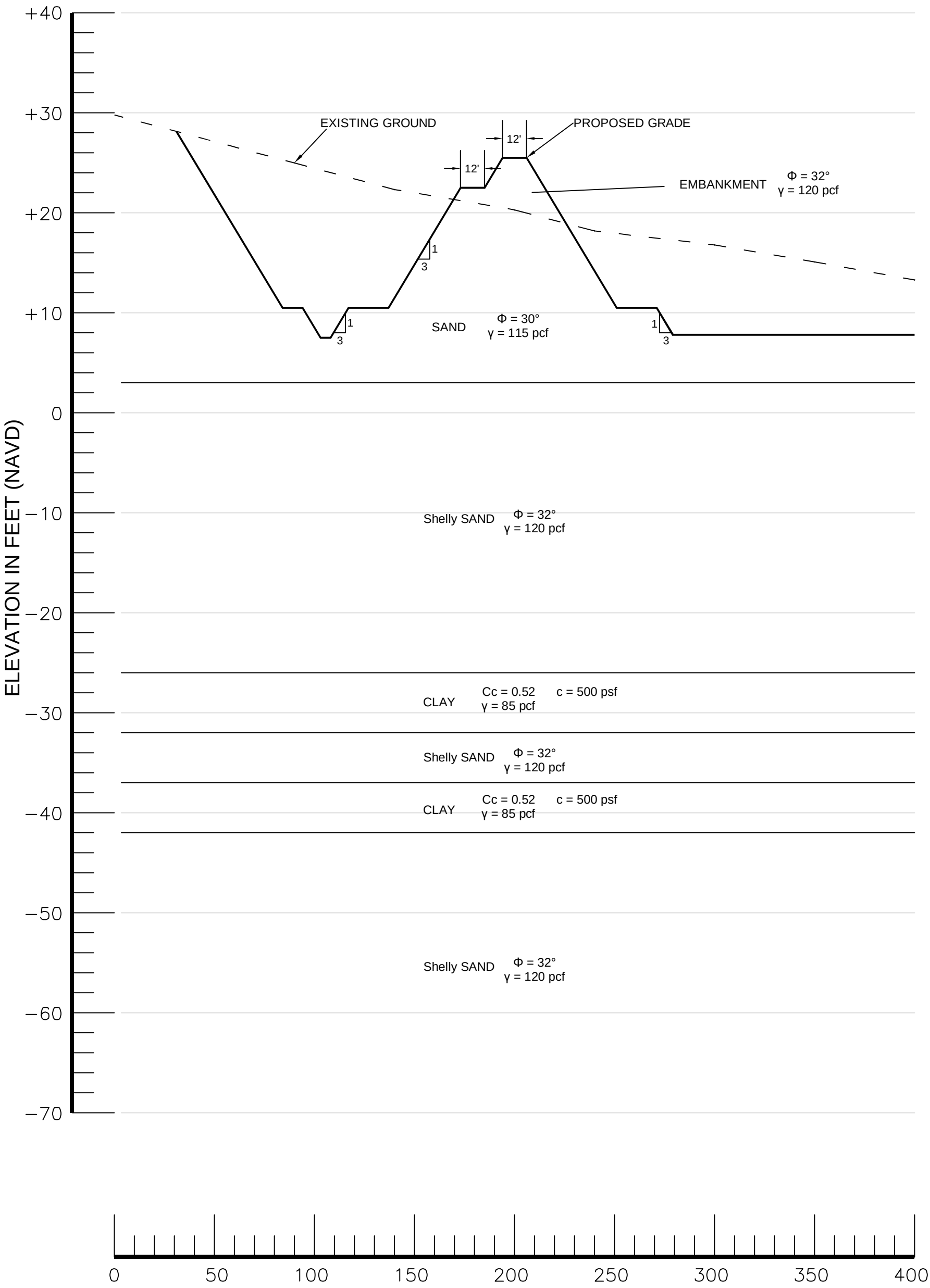
BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc. A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
2-10-15	HB145006	D-2

WEST

EAST



NOTES:

(1) Proposed dike section: Figure 2-2 by Taylor Engineering, Inc. dated June 1992

(2) Existing ground: Topographic Survey Sheet S1 by SEA Diversified dated October 14, 2014

(3) Modified ditch section: proposed "site control" feature; Dunkelberger Preliminary Geotechnical Engineering Report (Phases I/II) dated December 8, 2014

(4) Unit weights are saturated

DRAWN	JJ
CHECKED	JJ
APPROVED	DSD
SCALE	SEE SCALE BAR
REVISED	

CROSS SECTION - WEST

BV-4B PHASE III

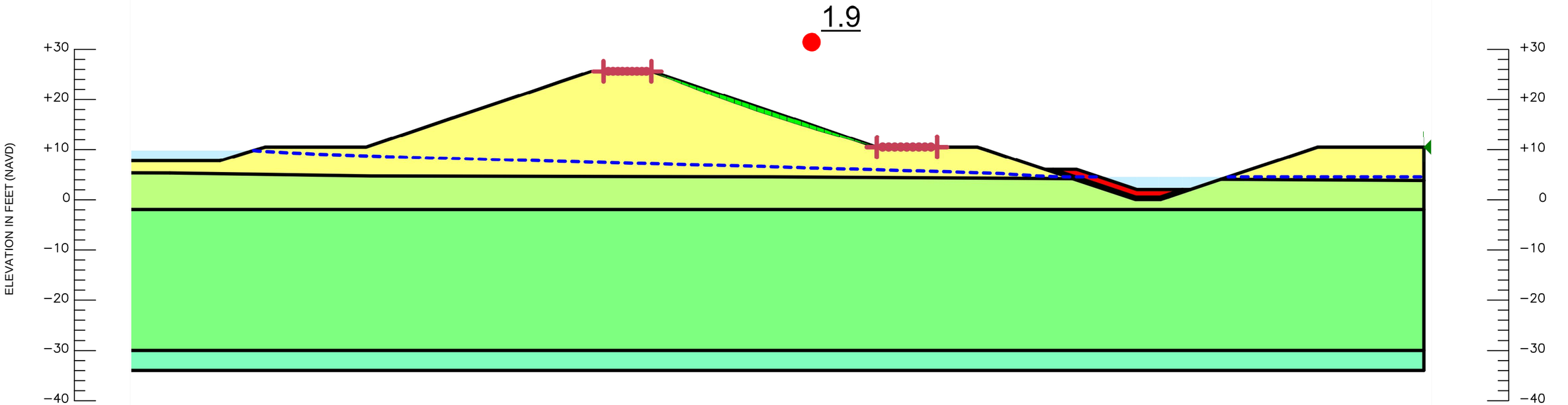
BREVARD COUNTY, FLORIDA

DUNKELBERGER engineering & testing, inc. A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
2-10-15	HB145006	D-3

APPENDIX E
SLOPE STABILITY ANALYSIS RESULTS

DIKE STABILITY



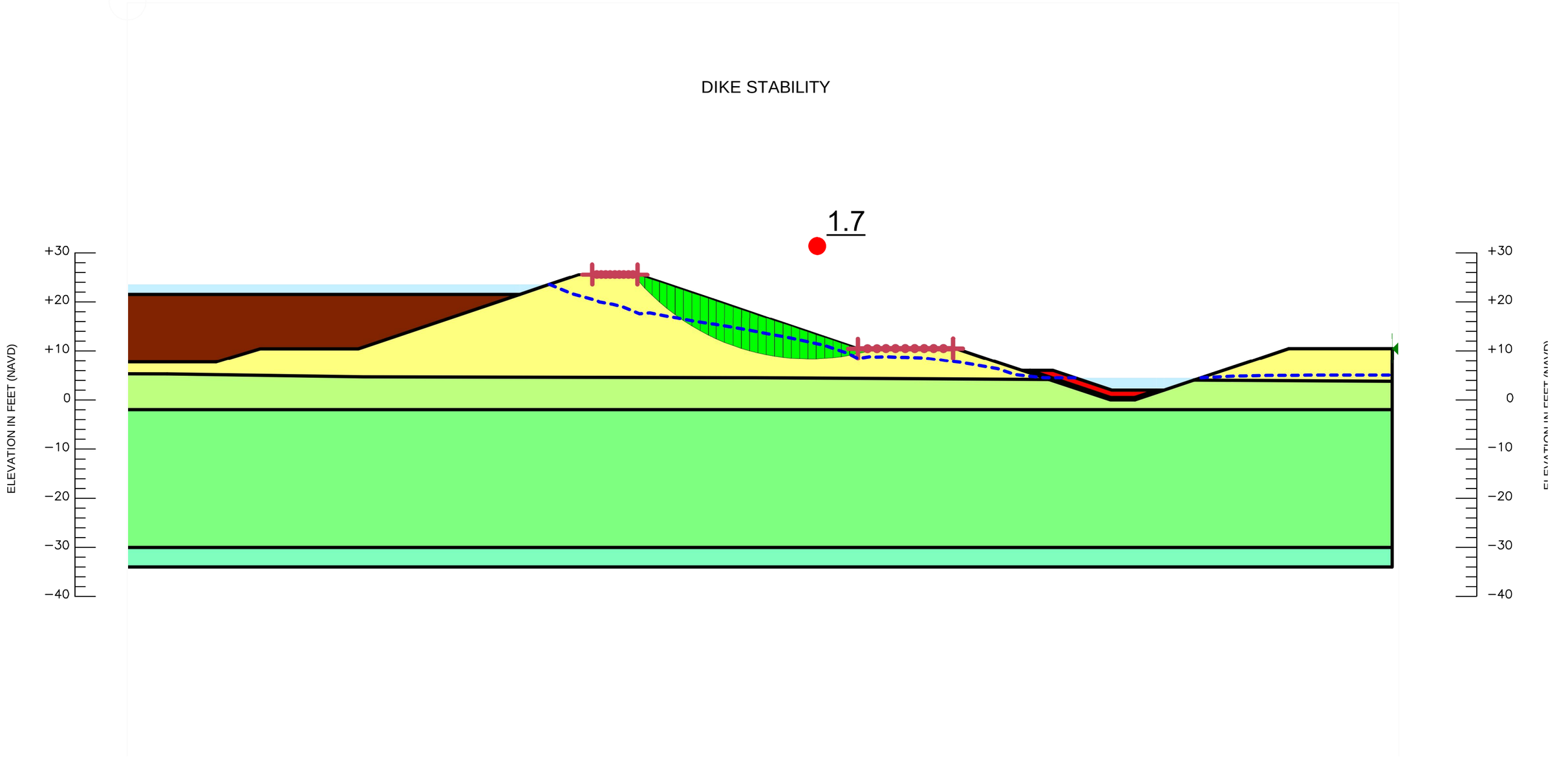
DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-1

DIKE STABILITY



DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
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DATE	PROJ. NO.	EXHIBIT
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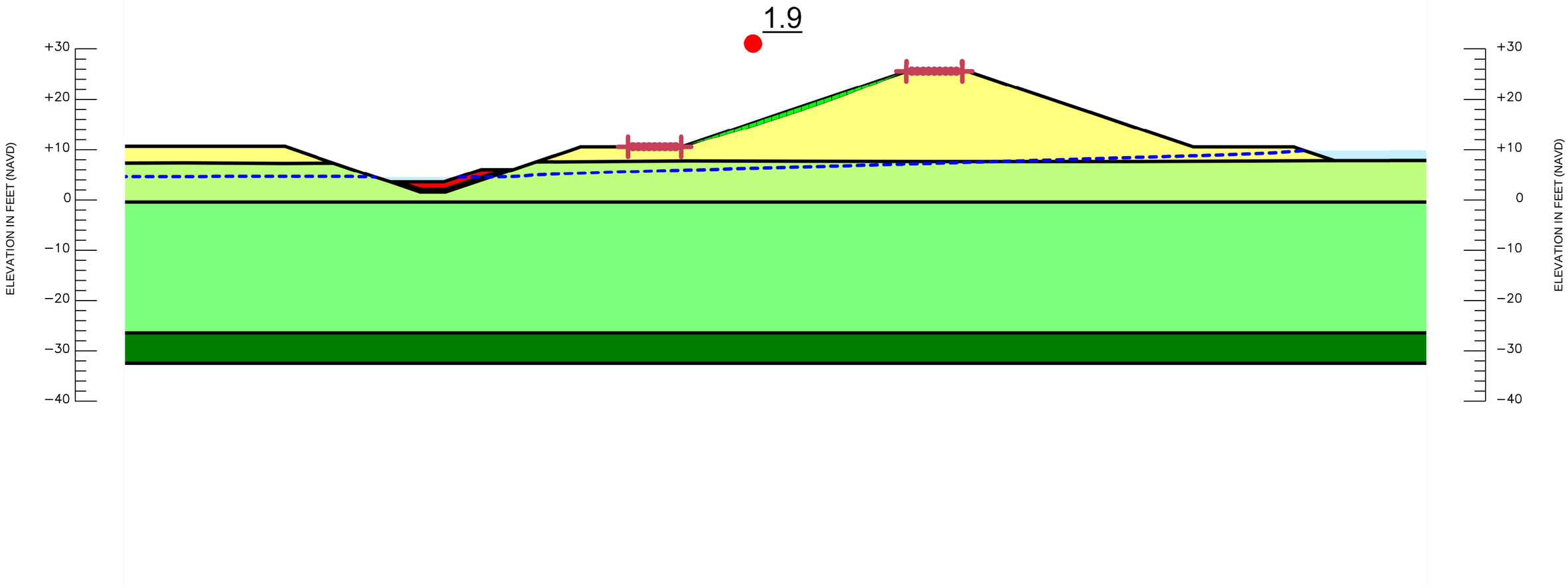
DIKE STABILITY



DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
MIDDLE SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
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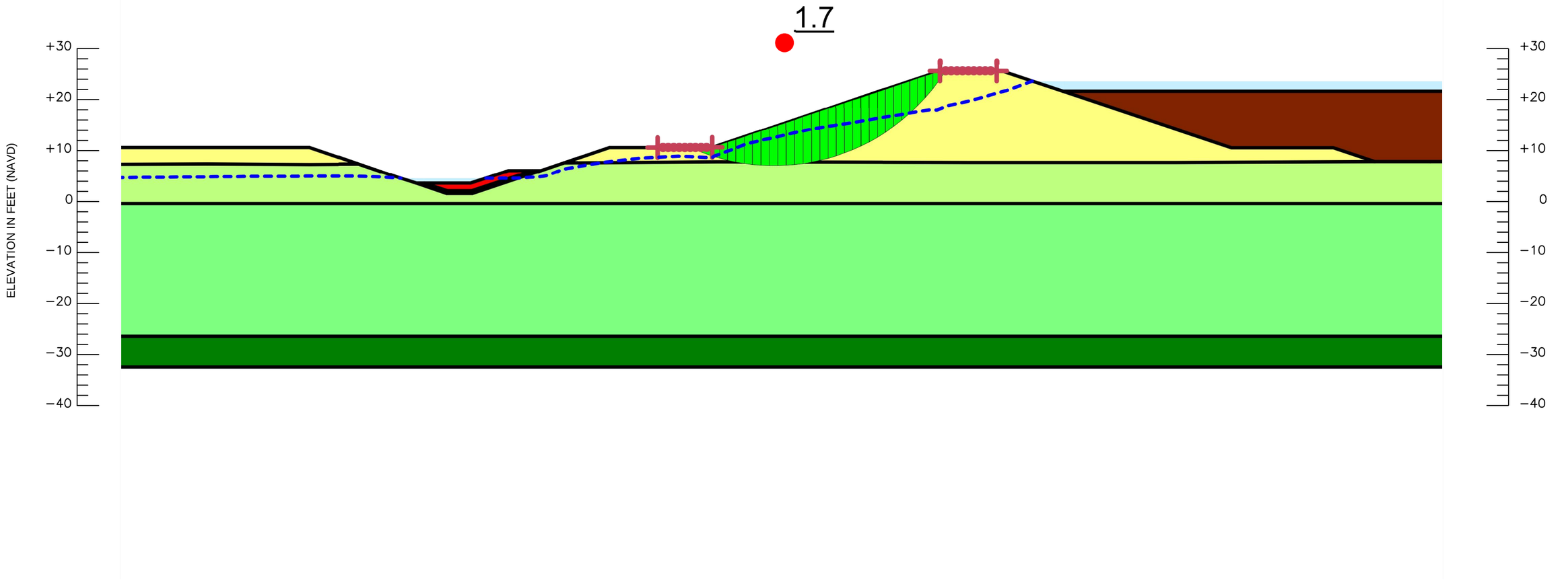
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-3

DIKE STABILITY



DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
MIDDLE SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
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A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
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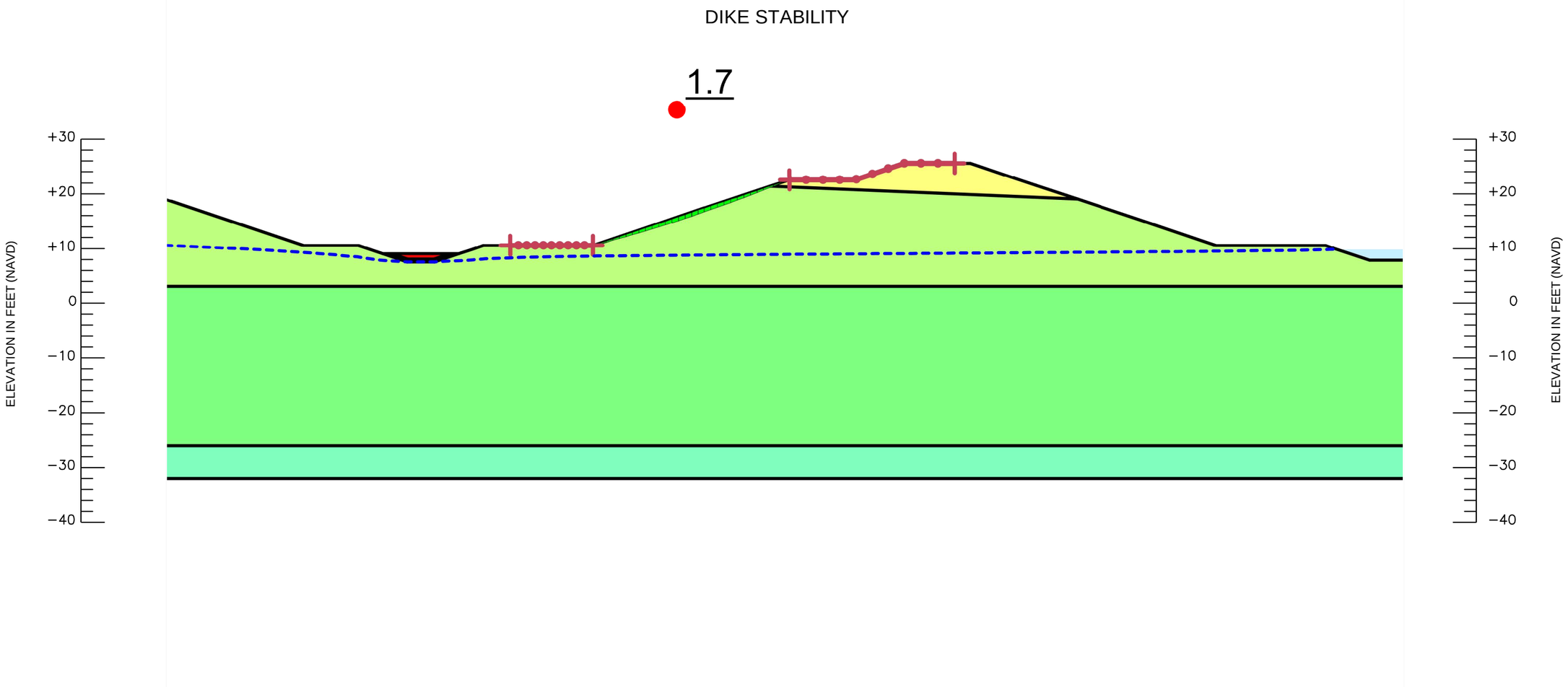
DIKE STABILITY



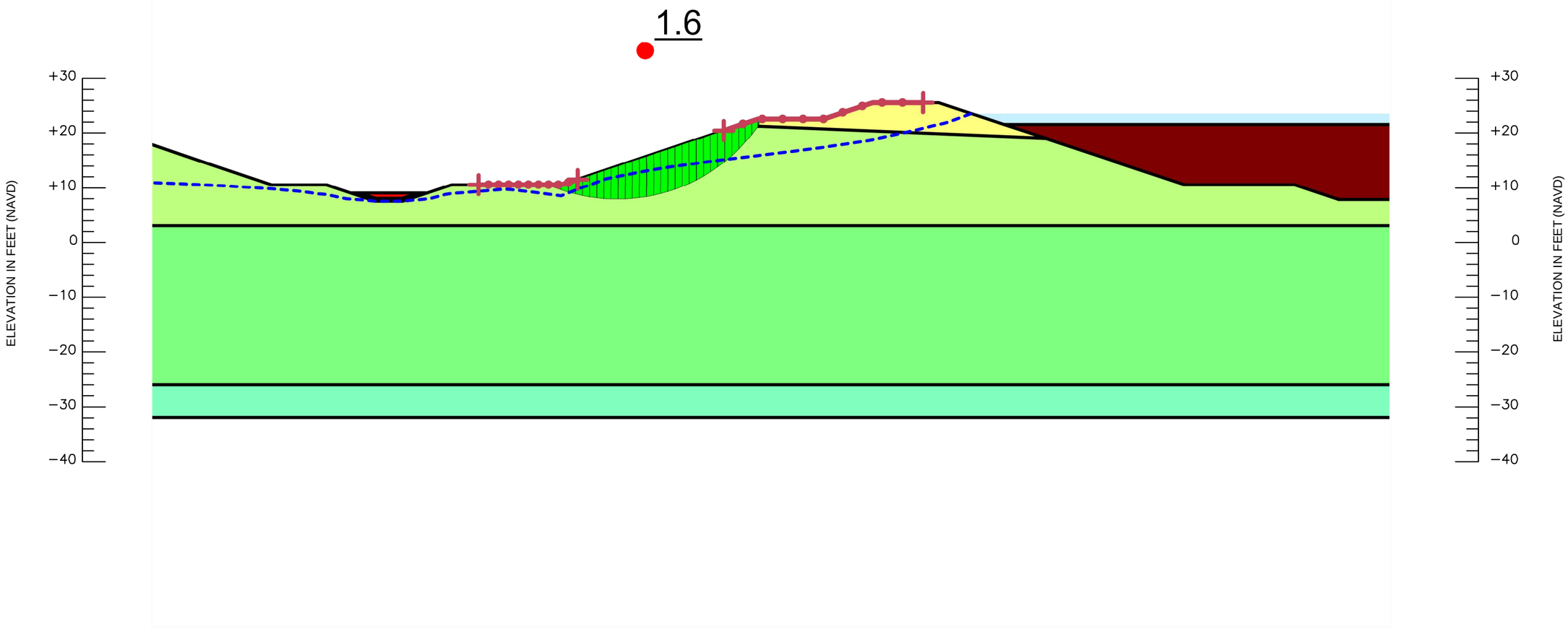
DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-5

DIKE STABILITY



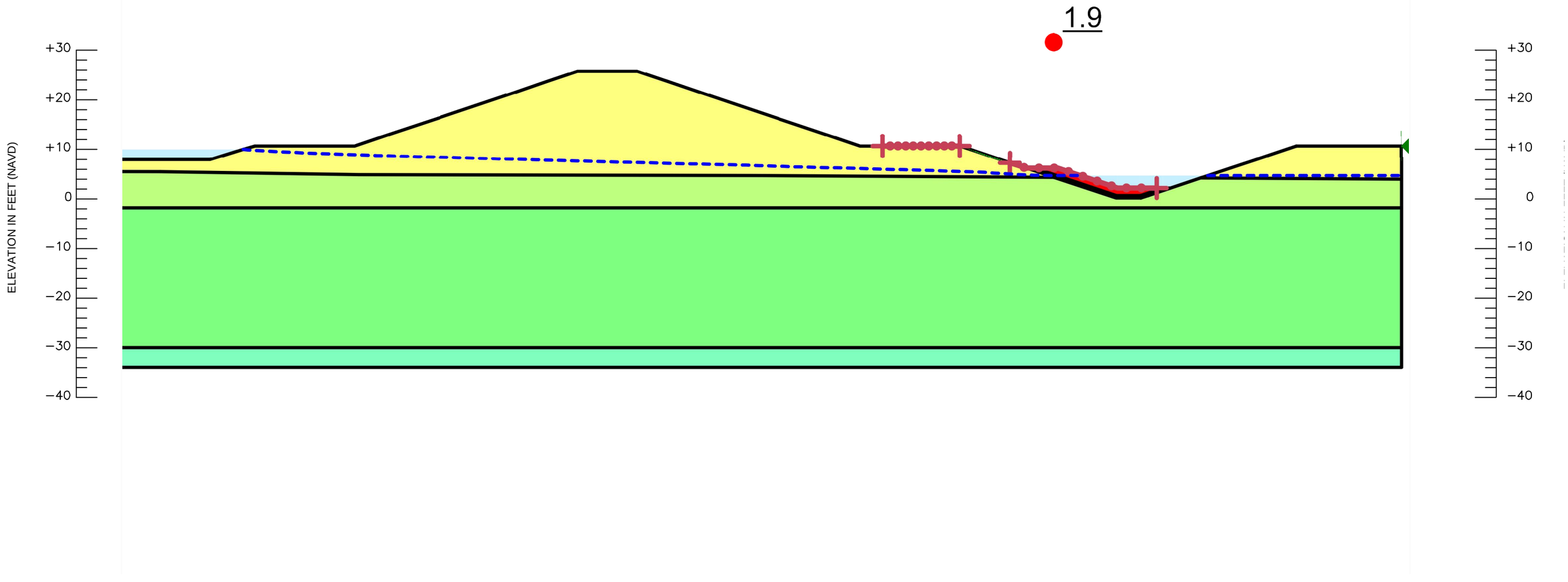
DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-6

DITCH STABILITY



DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
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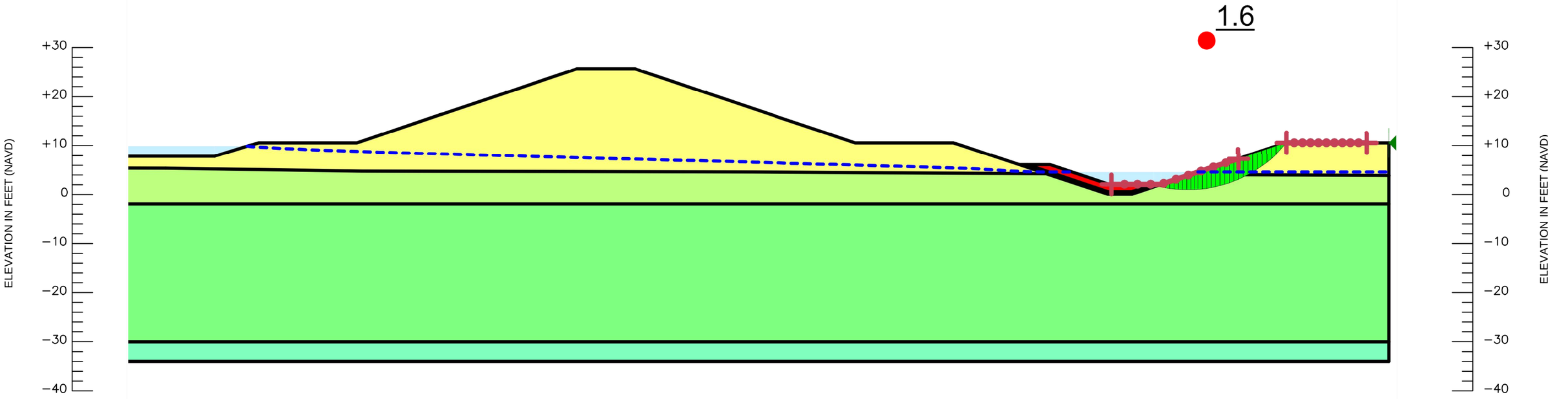
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-7

DITCH STABILITY



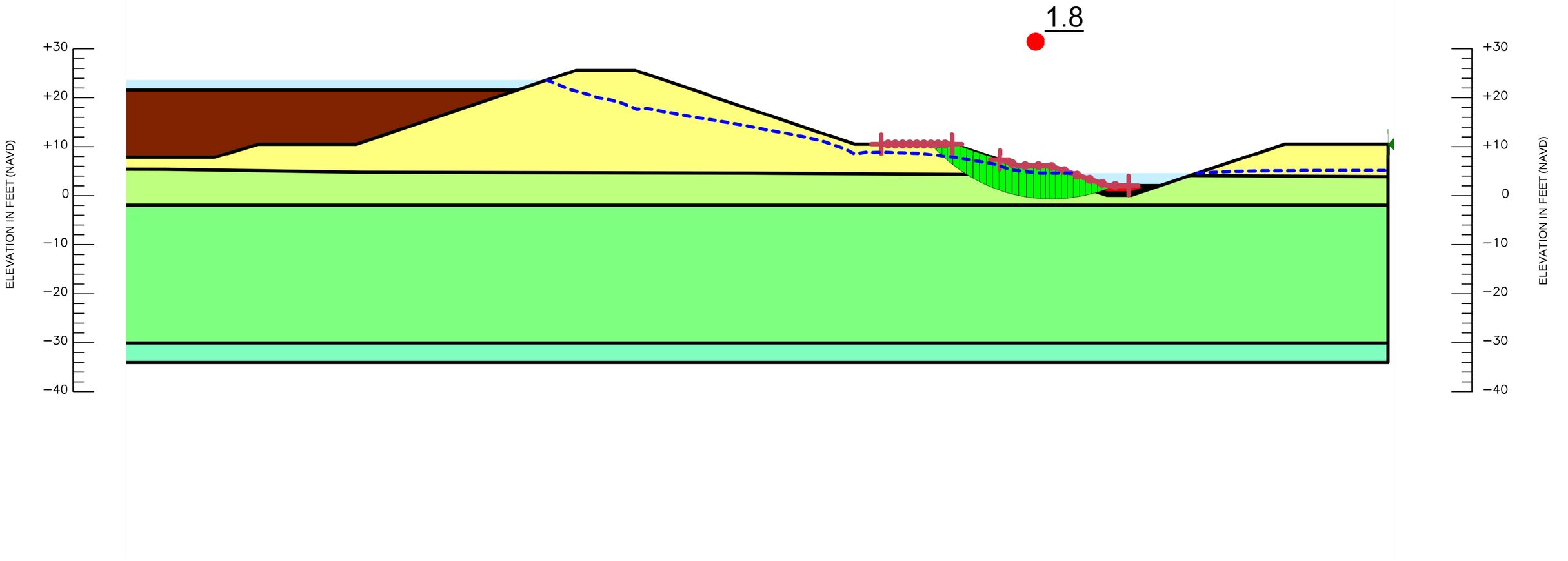
DRAWN	BL
CHECKED	BL
APPROVED	DSD
SCALE	AS SHOWN
REVISED	

SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

DUNKELBERGER
engineering & testing, inc.
A Terracon COMPANY

DATE	PROJ. NO.	EXHIBIT
3/18/15	HB145006	E-8

DITCH STABILITY



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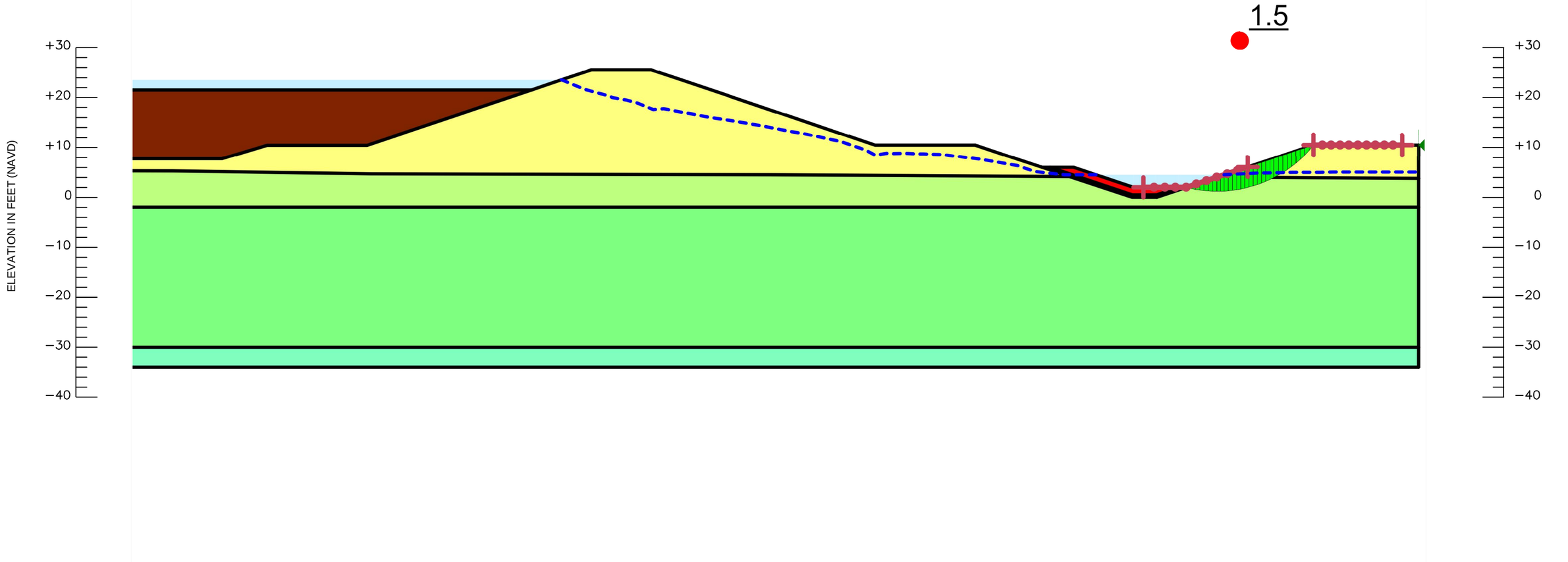

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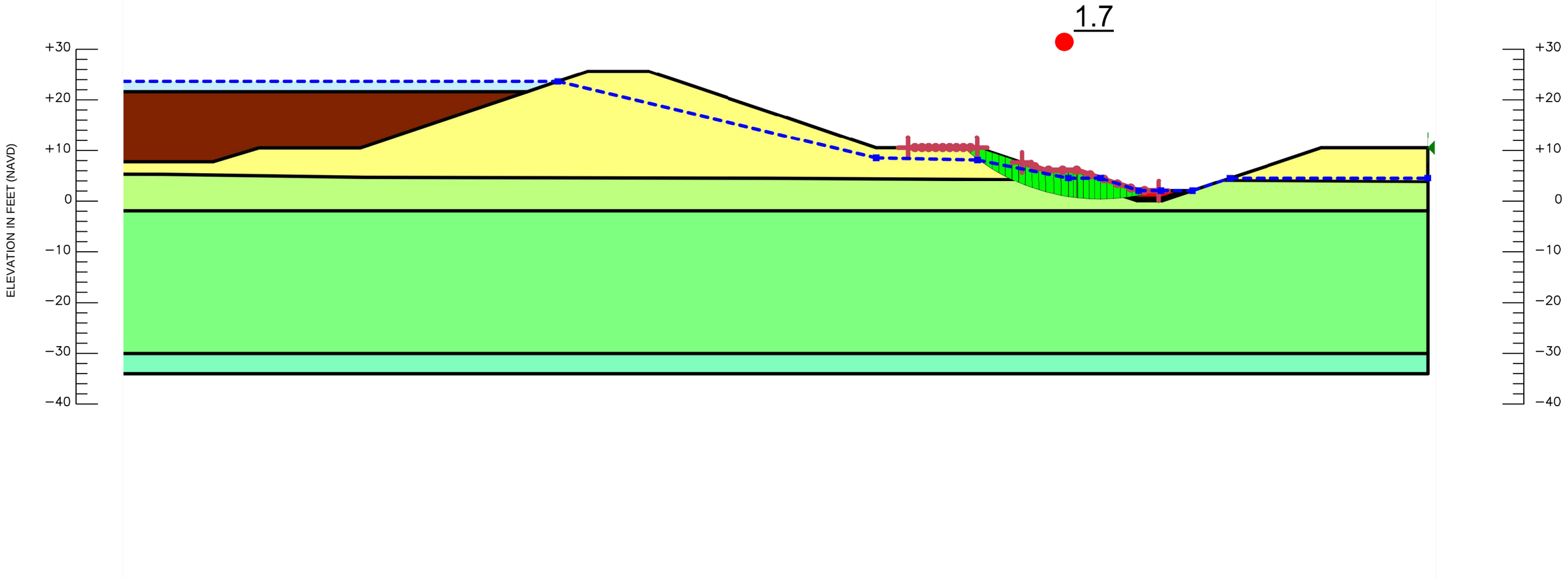

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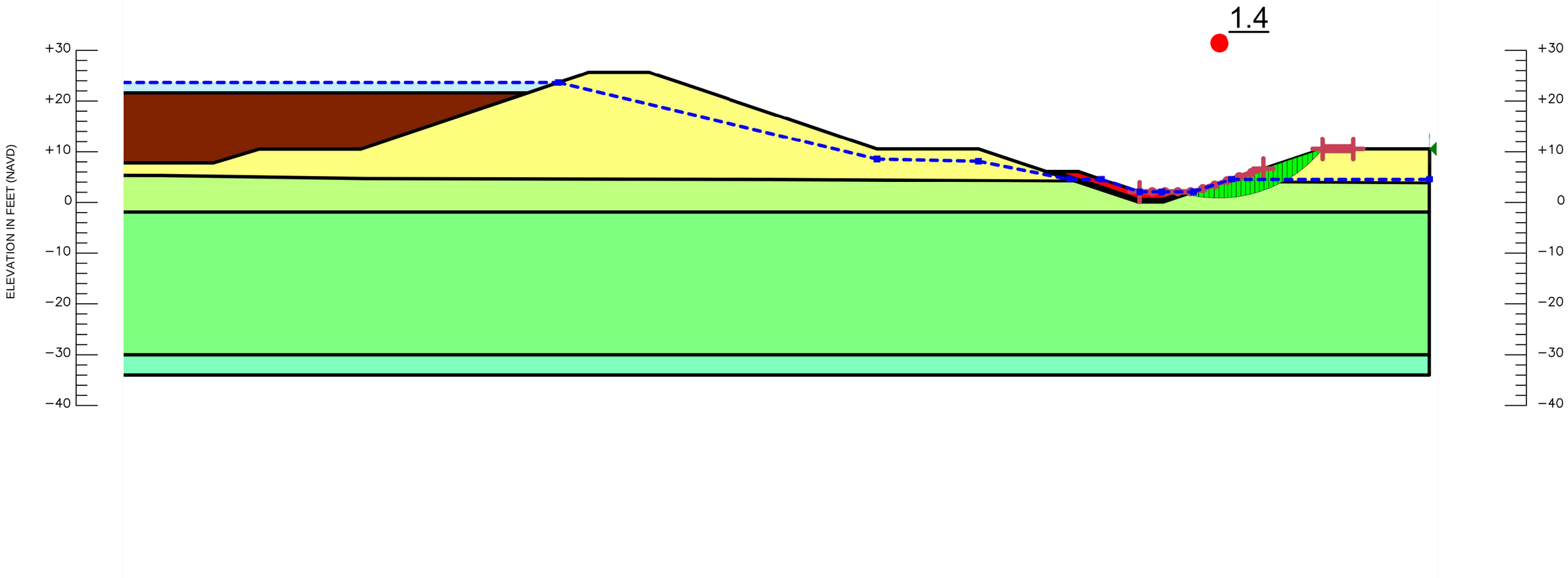

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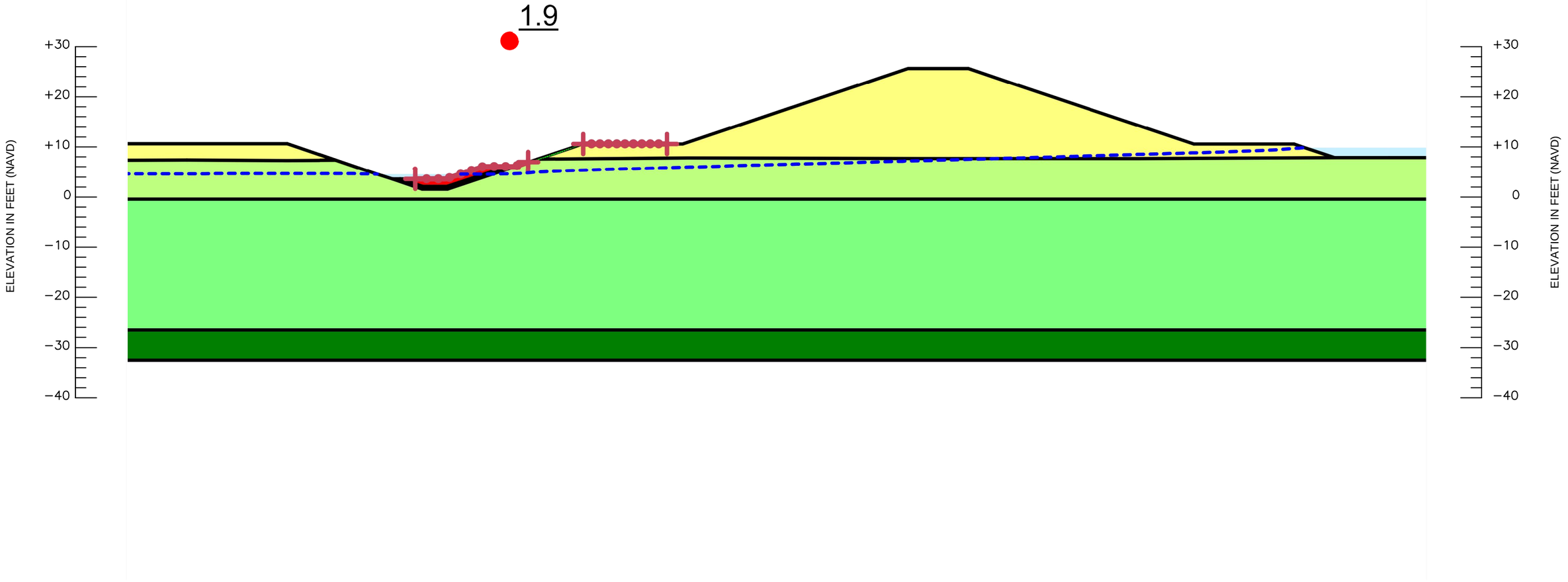

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SEEPAGE AND STABILITY ANALYSIS
MIDDLE SECTION - END OF CONSTRUCTION
BV-4B
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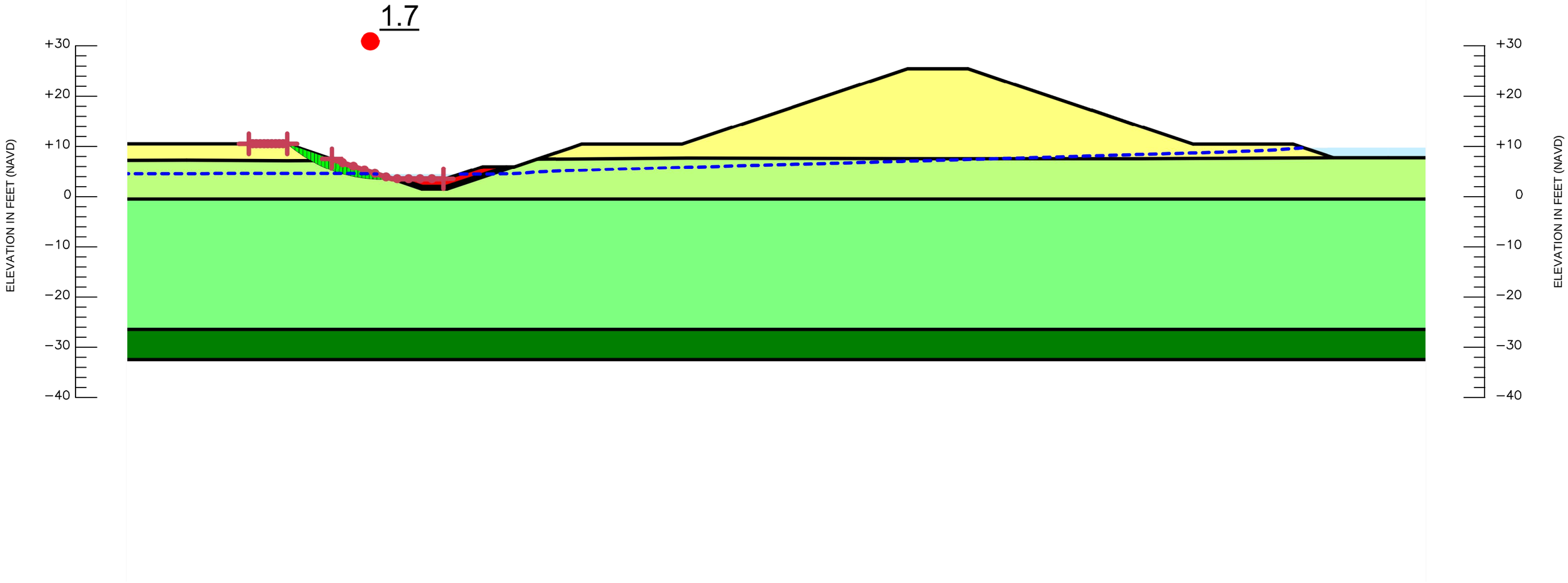

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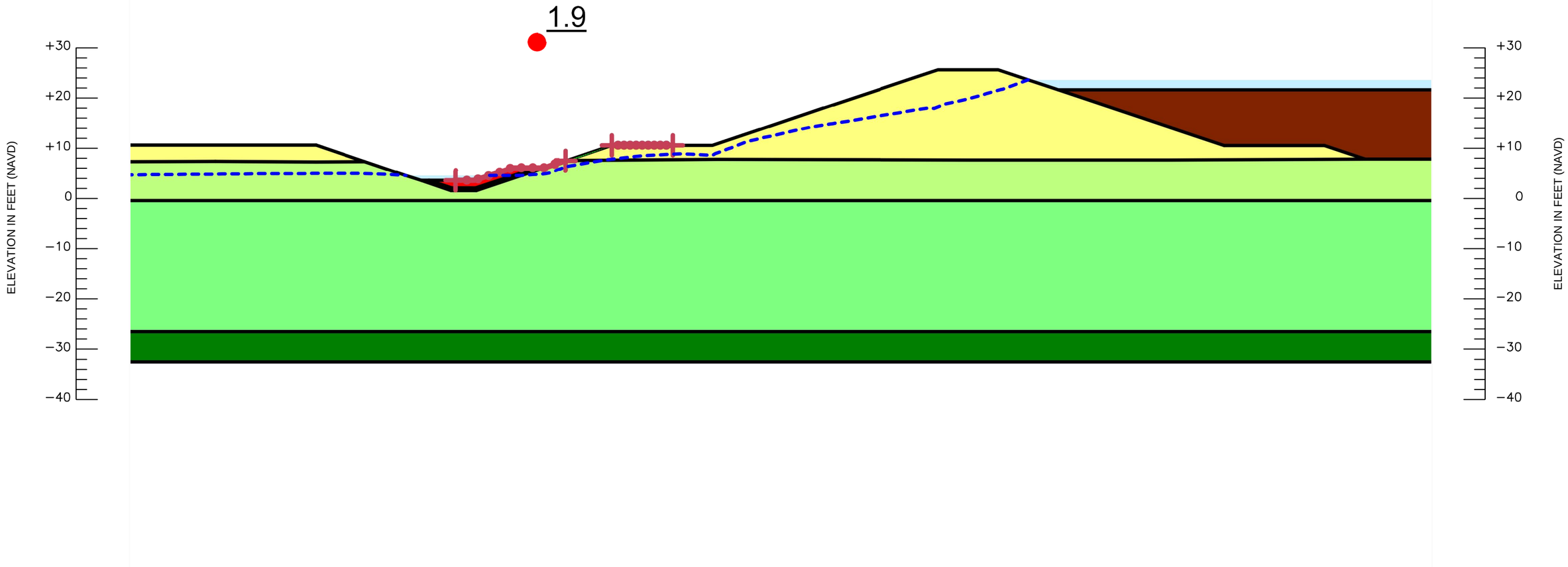

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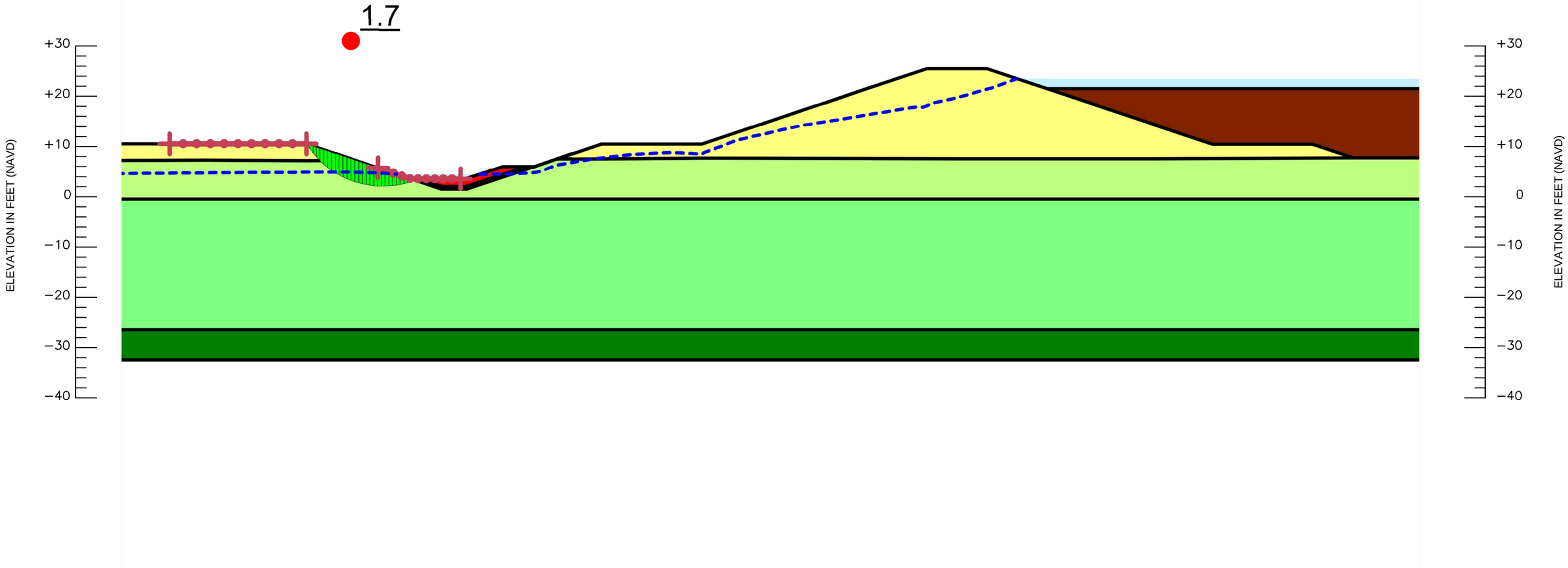

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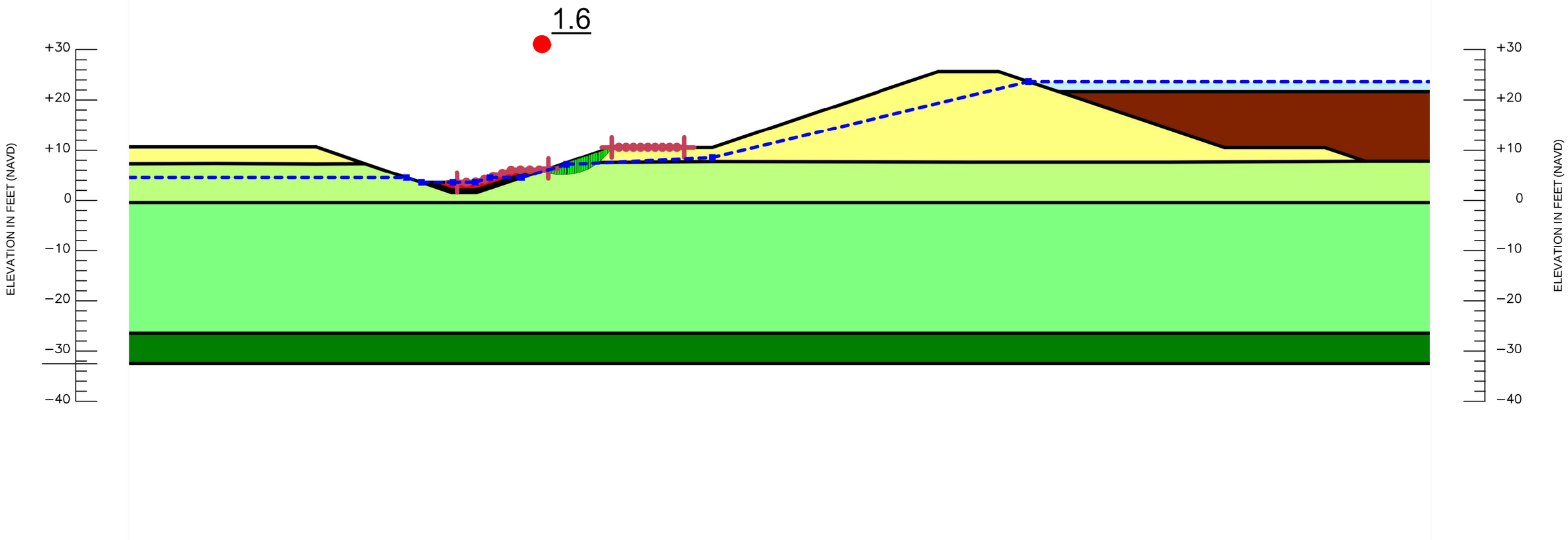

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SEEPAGE AND STABILITY ANALYSIS
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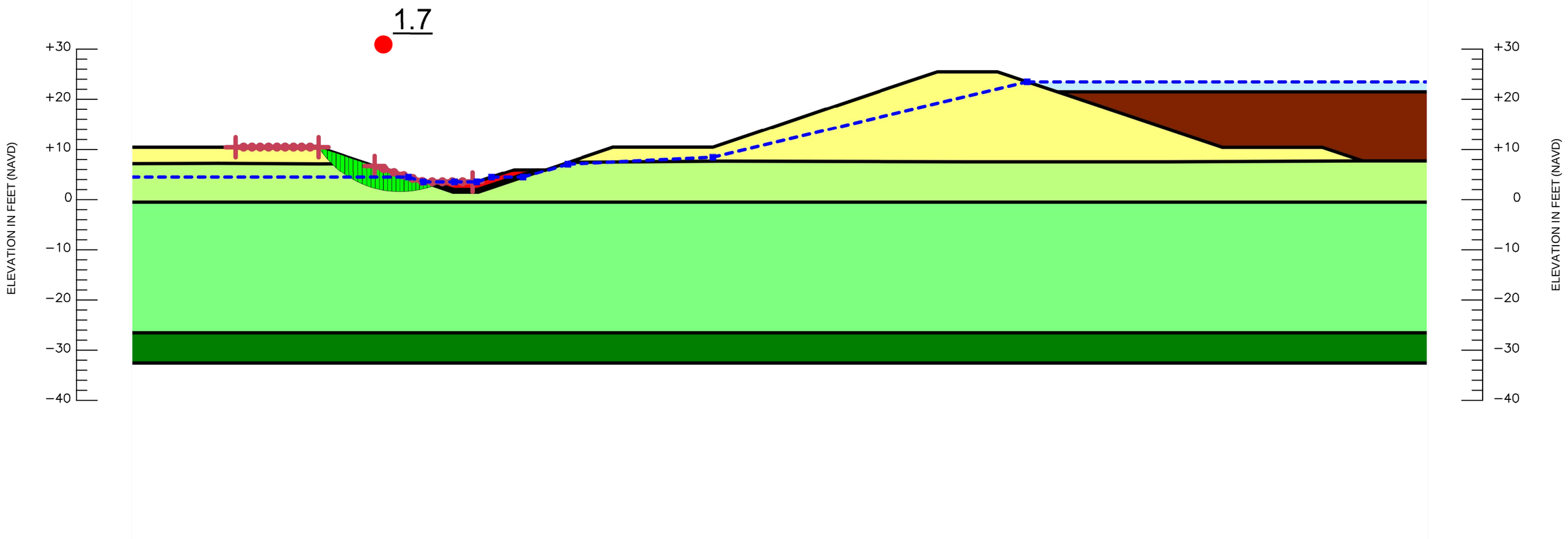

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SEEPAGE AND STABILITY ANALYSIS
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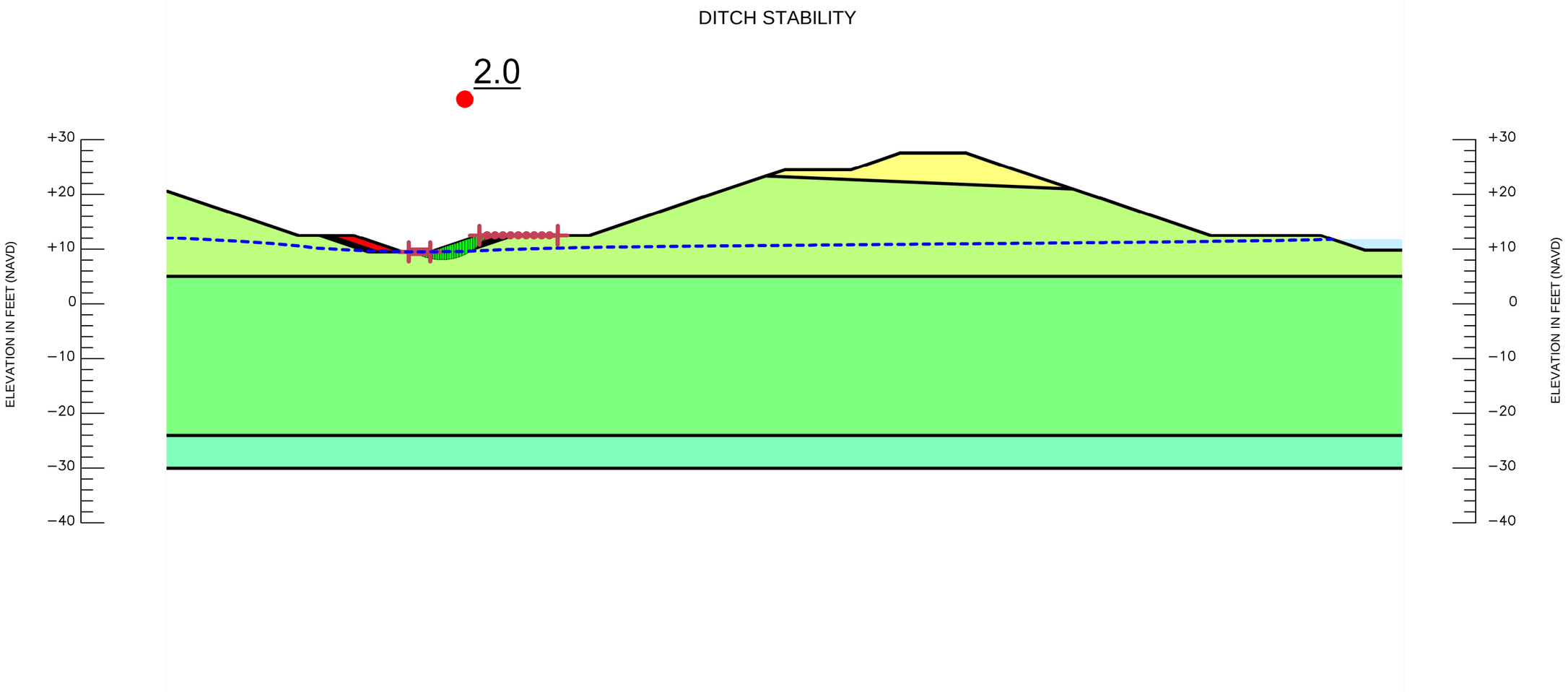

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - END OF CONSTRUCTION
BV-4B
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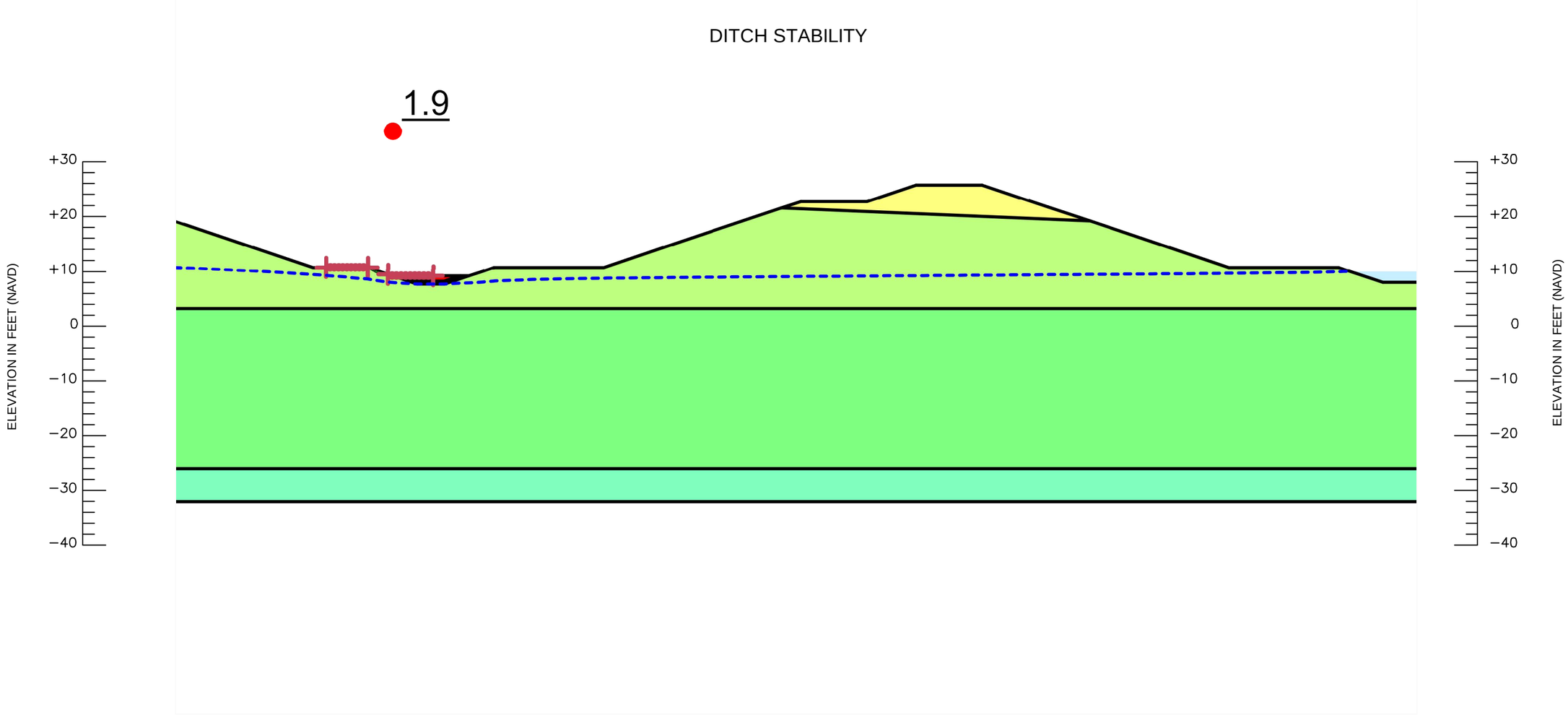

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

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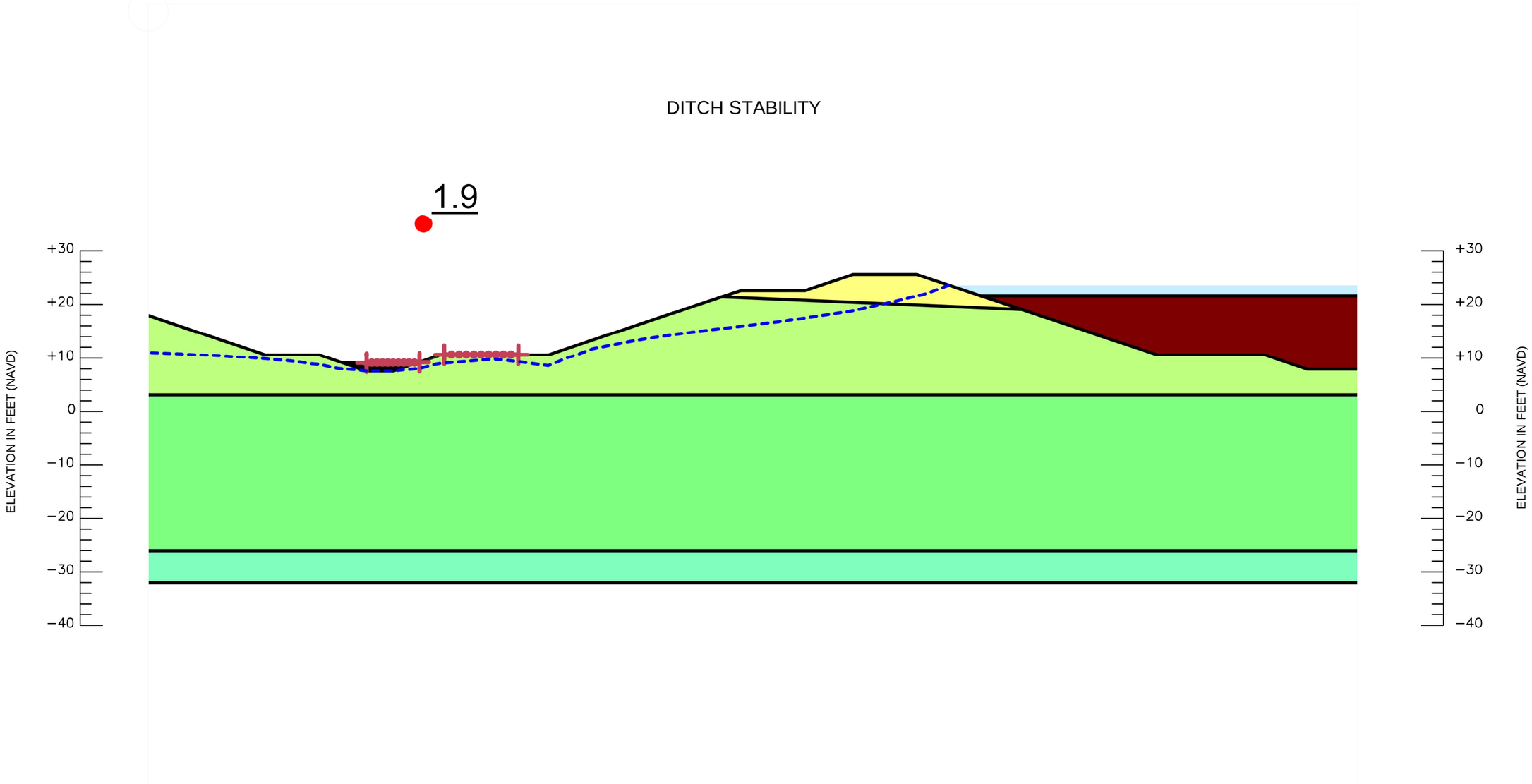

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

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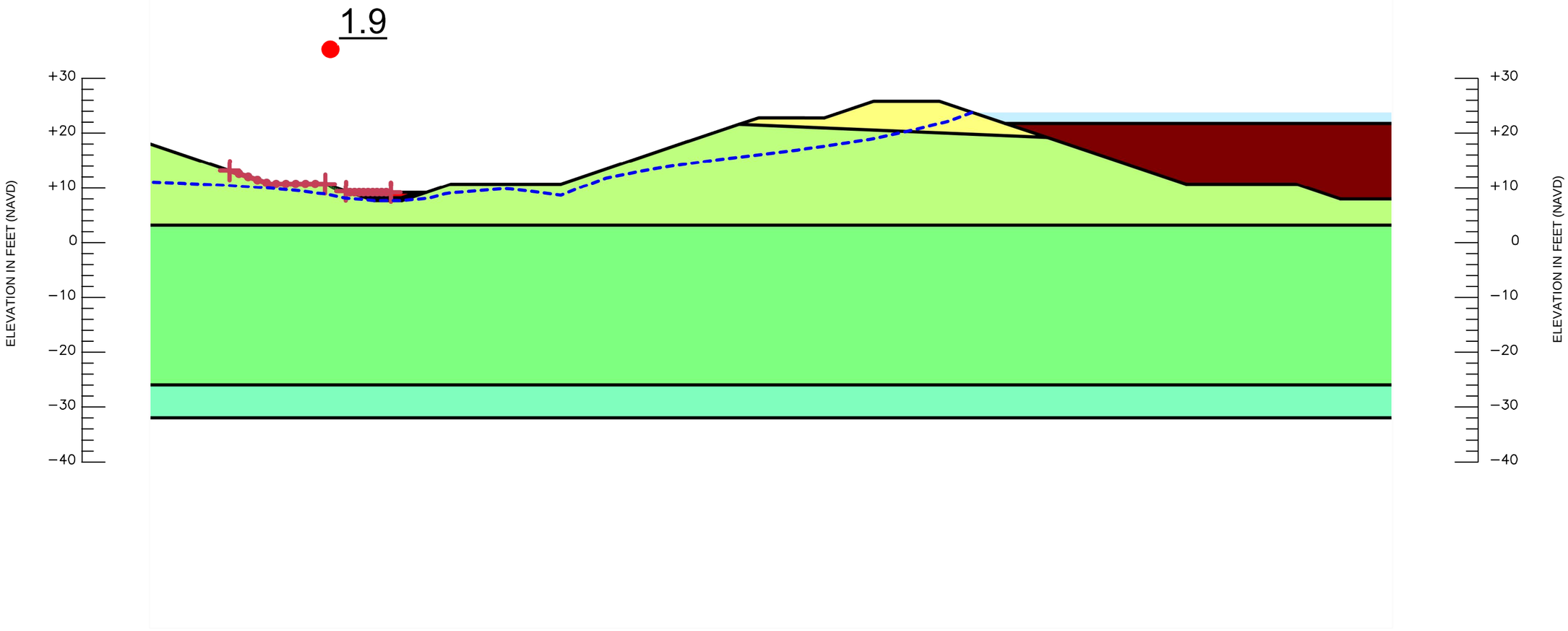

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

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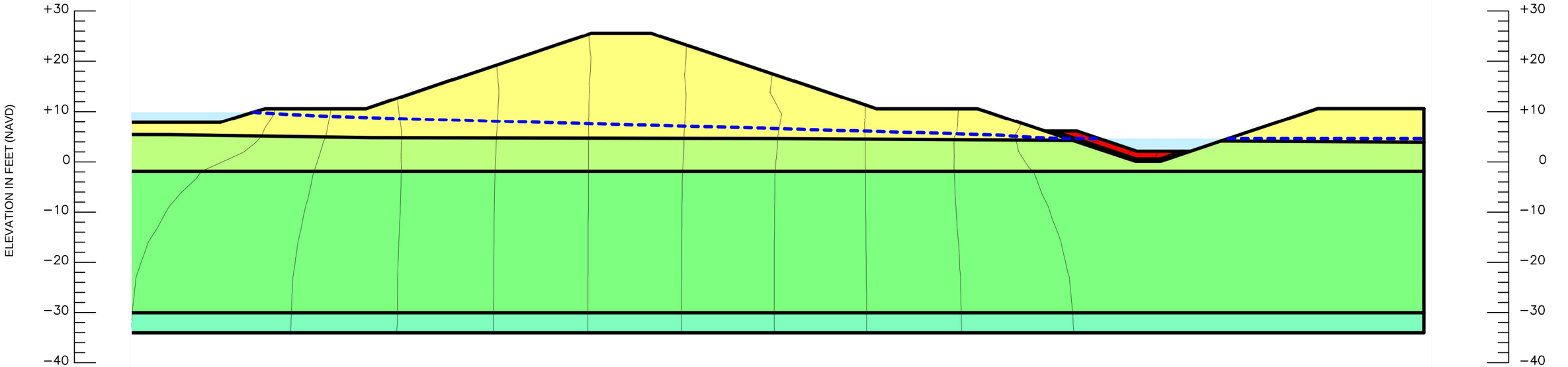
APPENDIX F
SEEPAGE ANALYSIS RESULTS

SEEPAGE



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SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

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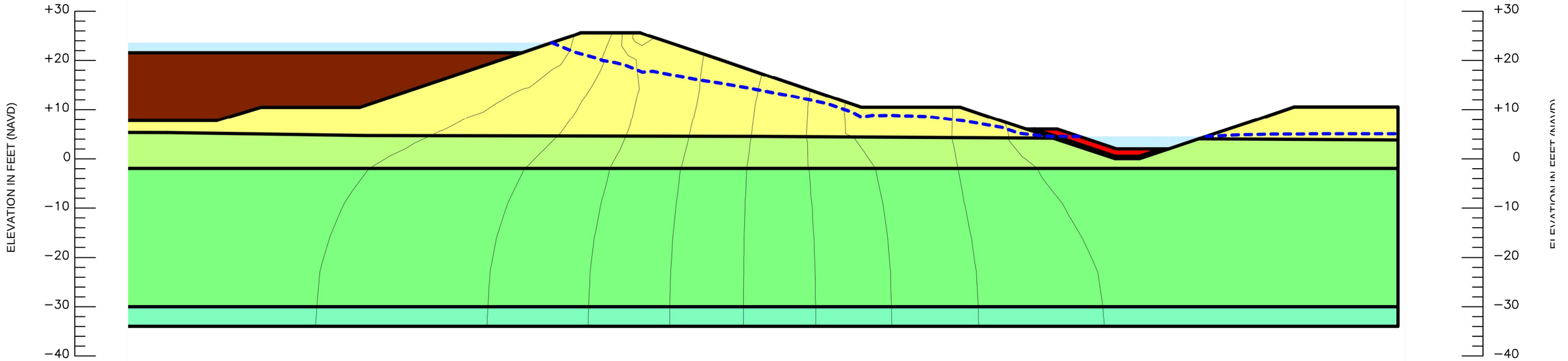

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SEEPAGE AND STABILITY ANALYSIS
EAST SECTION - STEADY STATE SEEPAGE
BV-4B
BREVARD COUNTY, FLORIDA

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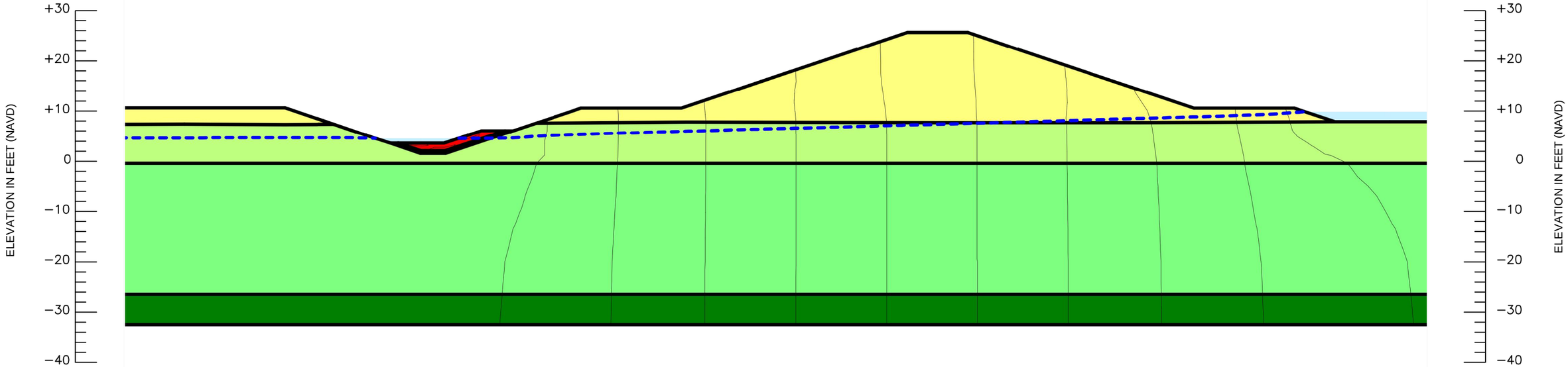

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SEEPAGE AND STABILITY ANALYSIS
MIDDLE SECTION - END OF CONSTRUCTION
BV-4B
BREVARD COUNTY, FLORIDA

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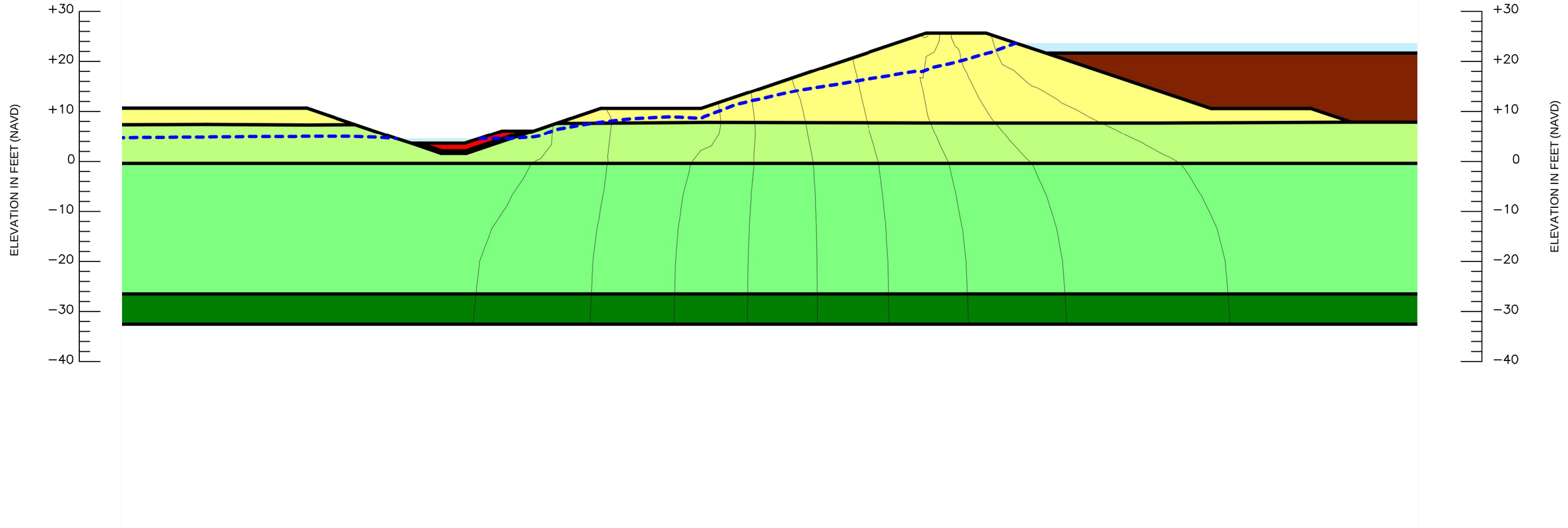

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SEEPAGE AND STABILITY ANALYSIS
MIDDLE SECTION - STEADY STATE SEEPAGE
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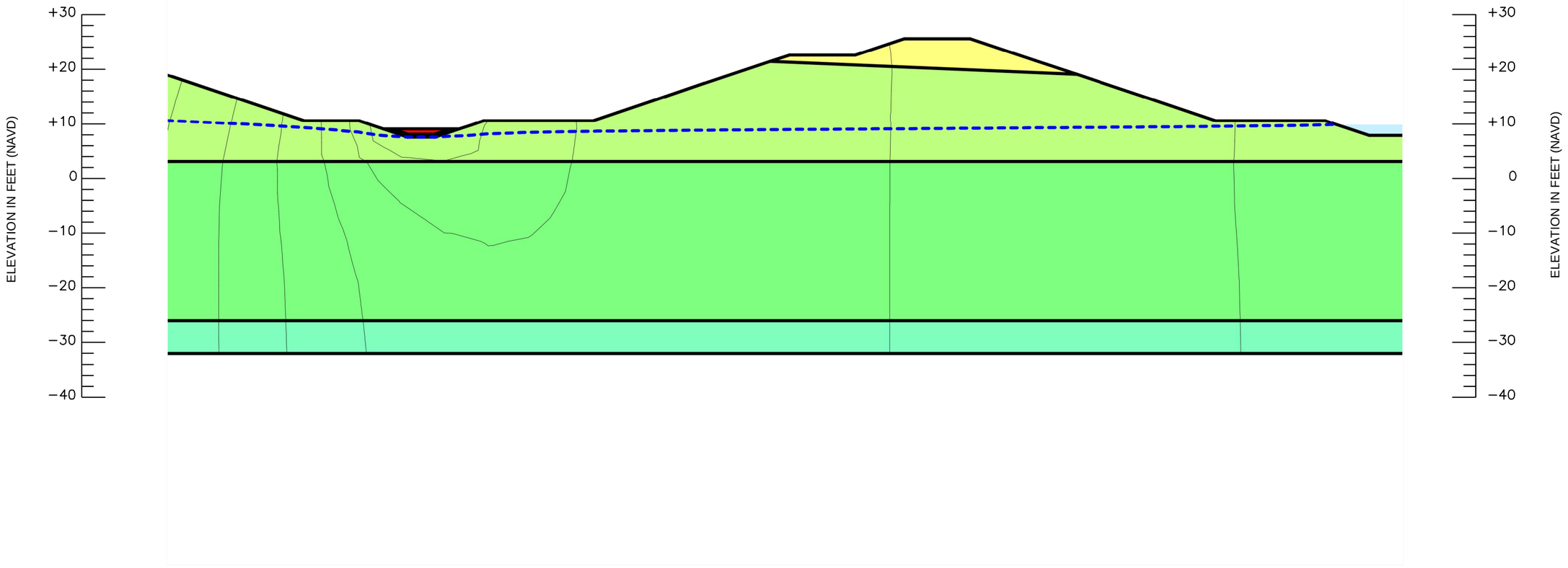

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - END OF CONSTRUCTION
BV-4B

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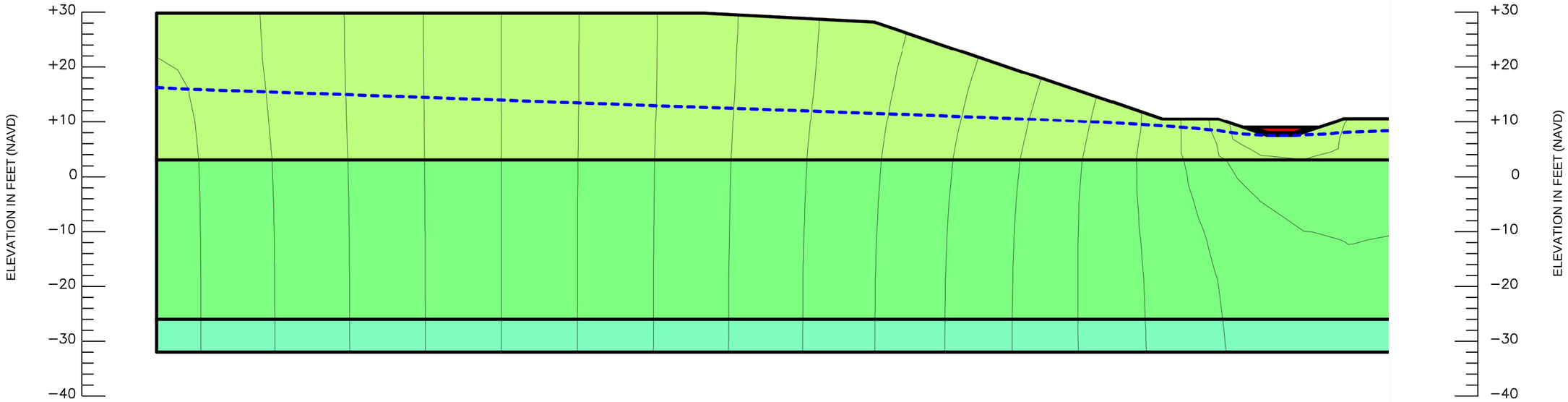

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - CUT SLOPE
BV-4B
BREVARD COUNTY, FLORIDA

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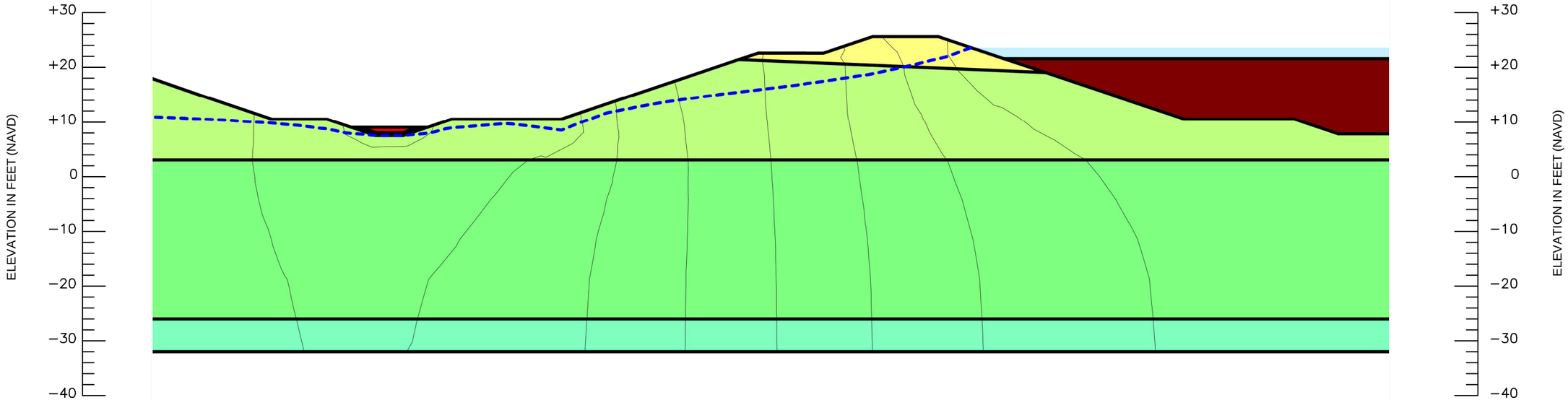

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - STEADY STATE SEEPAGE
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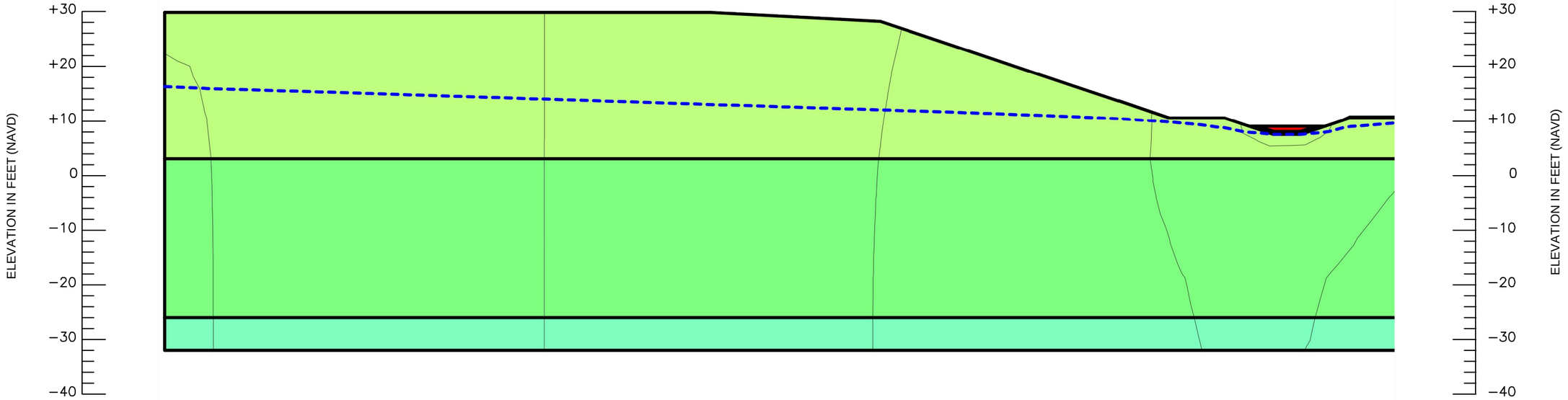

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SEEPAGE AND STABILITY ANALYSIS
WEST SECTION - CUT SLOPE
BV-4B
BREVARD COUNTY, FLORIDA

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APPENDIX G
FB-Deep Pile Capacity Curves

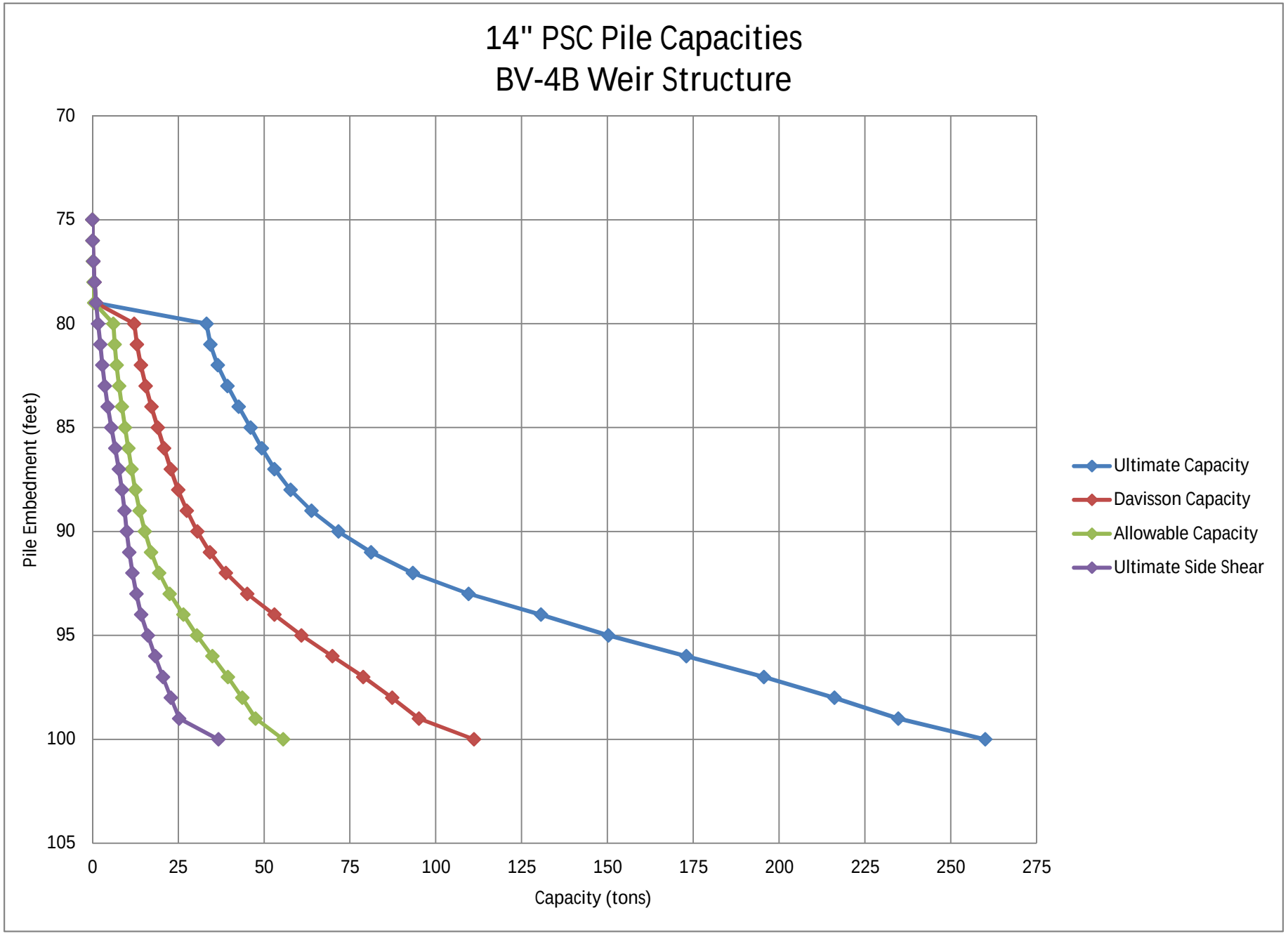
14" PSC Pile Capacities
BV-4B Weir Structure
Pile Embedment (feet)
70
75
80
85
90
95
100
105
0
25
50
75
100
125
150
175
200
225
250
275
Capacity (tons)
Ultimate Capacity
Davisson Capacity
Allowable Capacity
Ultimate Side Shear

Exhibit G-1

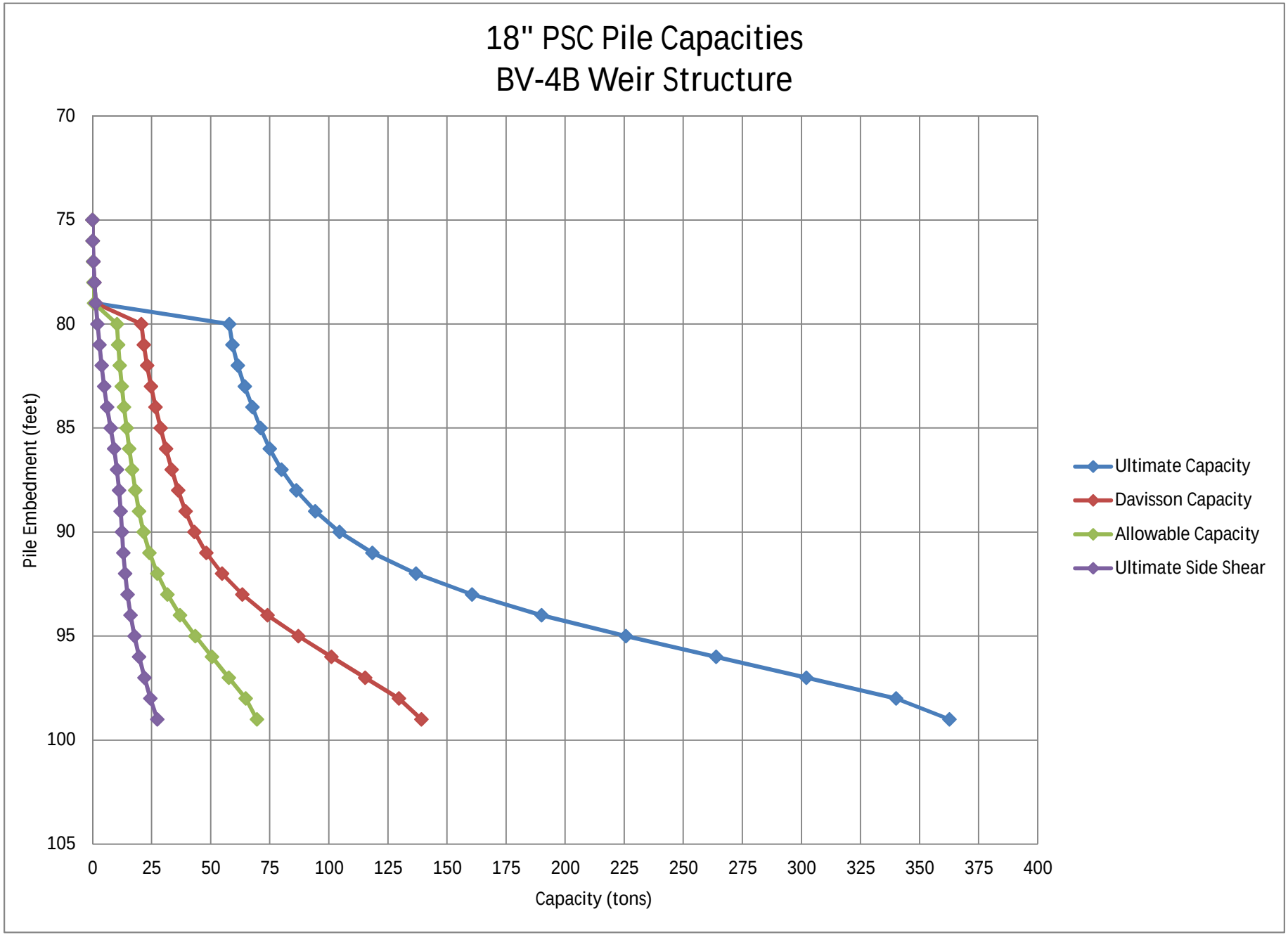
18" PSC Pile Capacities
BV-4B Weir Structure
Pile Embedment (feet)
70
75
80
85
90
95
100
105
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
Capacity (tons)
Ultimate Capacity
Davisson Capacity
Allowable Capacity
Ultimate Side Shear

Exhibit G-2



DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION

BREVARD COUNTY, FLORIDA

APPENDIX C

Environmental Report

TAYLOR ENGINEERING, INC.

Biological Site Assessment

Florida Inland Navigation District
Dredged Material Management Area BV-4B
Brevard County, Florida
June 2015

10151 Deerwood Park Blvd., Building 300, Suite 300
Jacksonville, Florida 32256
904-731-7040 | www.taylorengineering.com

Biological Site Assessment
Florida Inland Navigation District Dredged Material Management Area BV-4B
Brevard County, Florida

Prepared for

Florida Inland Navigation District

by

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

C2014-026
June 2015

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1.0 INTRODUCTION

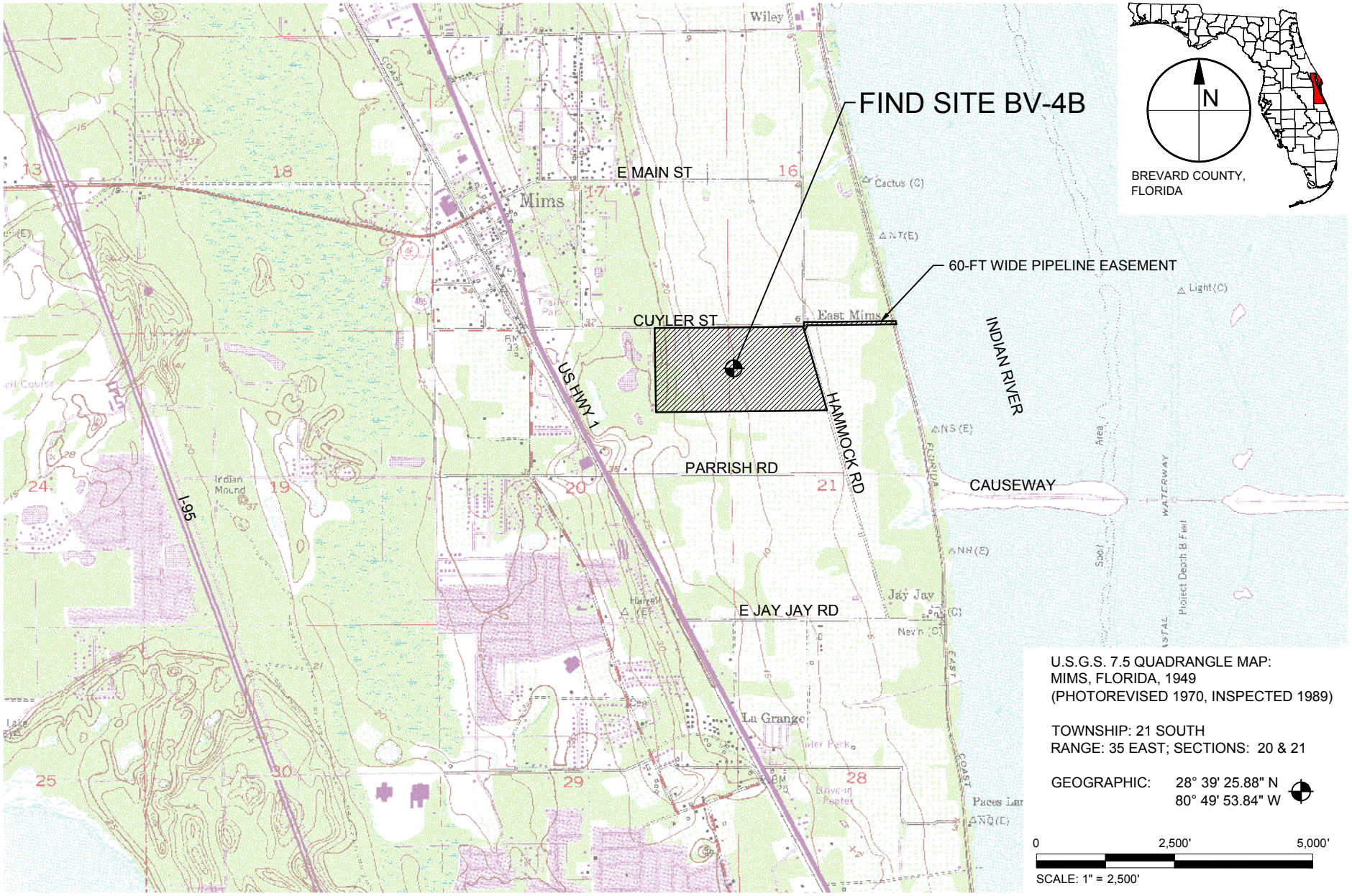
The Florida Inland Navigation District (FIND) contracted Taylor Engineering to complete a biological site assessment of dredged material management area BV-4B in northern Brevard County. FIND intends to use the site to construct a dredged material management facility to provide long-term storage of sediments dredged from the northern half of Reach II of the Intracoastal Waterway (ICW) in Brevard County. The biological site assessment included wetlands delineation, natural communities characterization and mapping, and listed species evaluation. The findings detailed in this report will provide the necessary information to support the design and environmental permitting phases of the project.

2.0 SITE LOCATION AND GENERAL DESCRIPTION

The 101-acre BV-4B property is located in Mims, northern Brevard County, Florida (Figure 1). The site lies about 0.4 mile west of the Indian River and is bordered by Cuyler Street to the north, undeveloped land and a citrus grove to the south, Hammock Road to the east, and an RV park and golf course to the west. A 60-foot wide pipeline easement extends off the northeast corner of the property approximately 1,700 feet east to the Indian River. Prior to FIND's land acquisition in the early 1990s, the BV-4B property was farmed for citrus production for many years. After citrus production ended, exotic vegetation (primarily Brazilian pepper) recruited onto the property and for years dominated much of the vegetative community. In 2009, the U.S. Army Corps of Engineers (USACE) cleared, grubbed, and grassed the central portion of the site leaving an approximate 250-ft wide buffer of existing vegetation around the site perimeter. In 2010, FIND followed up with a project to remove the remaining exotic vegetation from the property including areas within the 250-foot vegetated buffer. A band of wetlands oriented from the north to south occurs on the western side of the property. Smaller wetlands also occur within the site buffer and within the pipeline easement. Several drainage ditches exist onsite with the most prominent extending from the larger wetland area on the western side of the property to the eastern property boundary along and irregular alignment. FIND actively maintains the cleared portions of the property through periodic mowing.

3.0 ASSESSMENT METHODOLOGY

Prior to the field investigation, Taylor Engineering environmental staff reviewed existing information including the Brevard County Soil Survey, National Wetlands Inventory maps, topographic



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

FIGURE 1
LOCATION MAP
FIND BV-4B BIOLOGICAL SITE ASSESSMENT
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	
DATE	JUNE 2015

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-LOCATION MAP.DWG 6/4/2015 5:13:03 PM

maps, historical aerial photographs, Geographic Information System (GIS) environmental data from various sources, Florida Natural Areas Inventory (FNAI) databases, and U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) protected species lists and databases. We used this information to complete a preliminary desktop analysis of natural resource conditions and to develop the field investigation plan.

Taylor Engineering environmental staff performed the field investigation of the BV-4B property over several days from May through June 2014. The pipeline easement investigation occurred in January 2015.

The wetlands delineation portion of the survey entailed identification, characterization, and mapping jurisdictional wetlands in accordance with the USACE Wetlands Delineation Manual (USACE, 1987), the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (USACE, 2010), and the Florida Wetlands Delineation Manual (FDEP, 1995). Wetlands delineation includes an assessment of vegetation, hydrology based on physical and biological indicators, and soils to determine the location of the wetland/upland interface. Taylor Engineering field staff completed USACE wetland determination data forms (Appendix A) that documented upland and wetland conditions within the project area. To demarcate the wetland line, field staff attached survey flags, each labeled with a unique identifier, to live, woody vegetation along the wetland boundary. In areas where live, woody vegetation did not exist, field staff installed pushpin flags into the soil. In June 2014, regulatory staff from FDEP and USACE visited the BV-4B property to review the delineated wetland boundaries. Following the wetland boundary review and approval by agency staff, a licensed surveyor (Sea Diversified, Inc.) recorded the final horizontal location of each wetlands delineation flag and pushpin flag.

Taylor Engineering environmental staff mapped and characterized on-site habitats according to the Florida Land Use, Cover, and Forms Classification System (FLUCCS). This effort included evaluation of habitat signatures identified in aerial photographs during the desktop analysis. For each habitat signature, Taylor Engineering characterized the vegetative community and evaluated the habitat for the potential occurrence of listed species.

Taylor Engineering assessed the likelihood of listed species presence on site via review of information obtained from FWC, USFWS, and FNAI and general field observations of habitat conditions. Taylor Engineering did not conduct a detailed listed species survey for this assessment.

4.0 ASSESSMENT RESULTS AND DISCUSSION

4.1 Soils

The Soil Survey of Brevard County, Florida identifies seven soil types occurring within the BV-4B property and pipeline easement (Figure 2). Observations made during the field investigations indicate that the 2009 site clearing and grubbing project significantly disturbed surficial soils within the clearing footprint. The following provides a brief description of each soil type/map unit identified in the soil survey in order of abundance.

Pampano Sand (Map Unit 51)

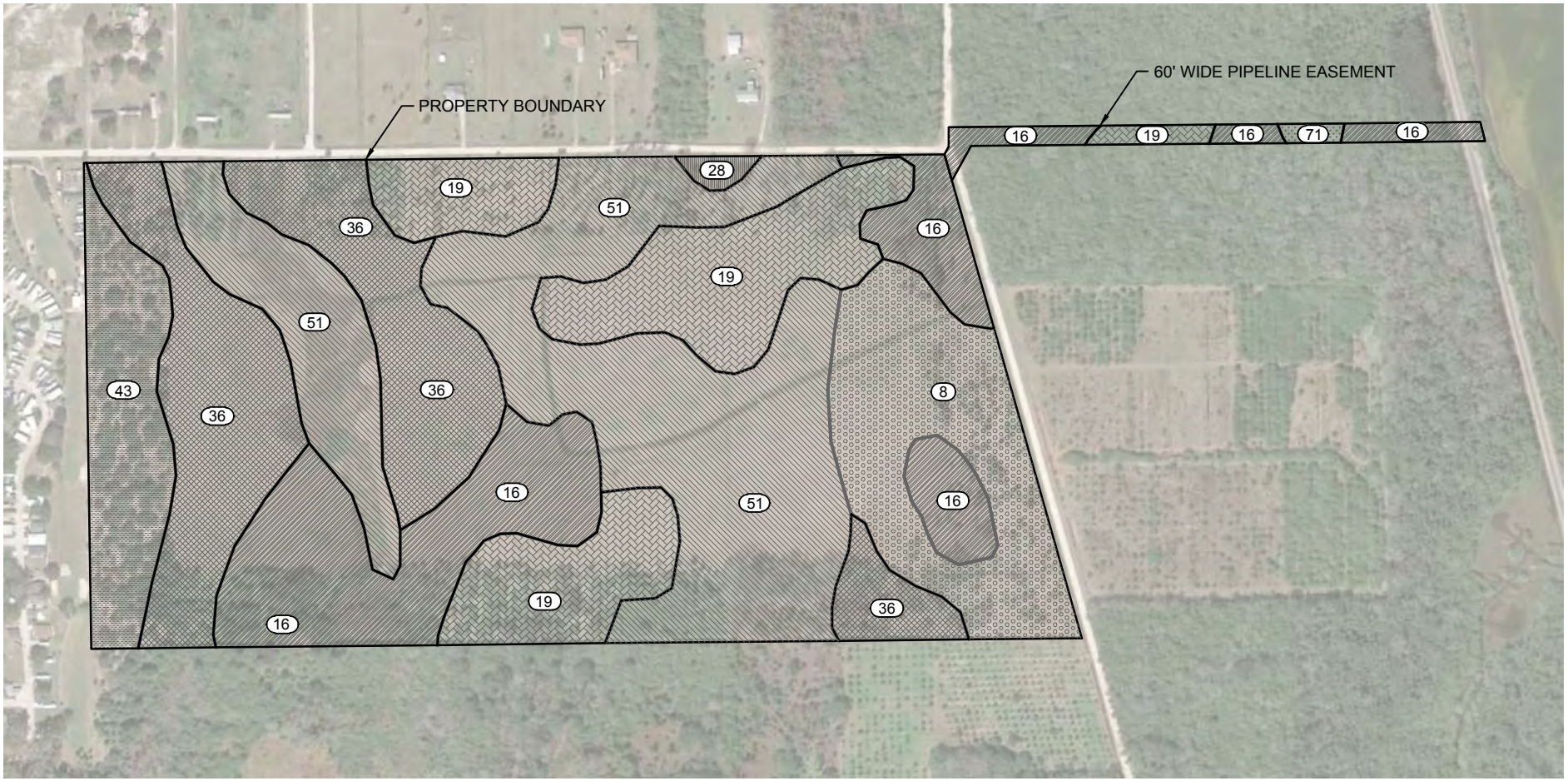
Formed on thick beds of sandy marine sediments, the Pampano series consists of very deep, very poorly and poorly drained, rapidly permeable soils in depressions, flatwoods, drainageways, and broad flats. Slopes generally range from 0 to 2 percent with water table elevations within 10 inches of the soil surface for 2 to 6 months each year. This soil type is associated with both uplands and wetlands within the assessment area.

Myakka Sand (Map Unit 36)

Formed in sandy marine deposits, the Myakka series comprise very deep, very poorly or poorly drained, moderately rapid or moderately permeable soils that occur primarily in mesic flatwood communities of peninsular Florida. Slopes range from 0 to 8 percent. Water table depths are less than 18 inches below ground surface for 1 to 4 months a year and may recede to 40 inches during dry years. Depressional areas may hold standing water for long periods (6-9 months or greater). This soil is mostly associated with uplands within the assessment area.

Riviera Sand (Map Unit 19)

The Riviera series formed in stratified sandy and loamy marine sediments and consists of very deep, poorly drained, very slowly permeable soils on broad flats and flatwoods, and in depressions. Slopes range from 0 to 2 percent. The water table is generally within 10 inches of the ground surface for 2 to 4 months of the year and between 10 and 30 inches for the remainder of the year. Ponded water



SOILS CLASSIFICATIONS

ID	NAME
8	BRADENTON FINE SAND, LIMESTONE SUBSTRATUM
16	COPELAND-BRADENTON-WABASSO COMPLEX, LIMESTONE SUBSTRATUM
19	RIVIERA SAND
28	IMMOKALEE SAND
36	MYAKKA SAND, 0 TO 2 PERCENT SLOPES
43	PAOLA FINE SAND, 0 TO 5 PERCENT SLOPES
51	POMPANO SAND
71	WABASSO SAND

N

0 500' 1,000'

SCALE: 1" = 500'

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

FIGURE 2
NRCS SOILS MAP
FIND BV-4B BIOLOGICAL SITE ASSESSMENT
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	
DATE	JUNE 2015

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON FLEWELLING X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-SOILS.DWG 6/4/2015 5:13:13 PM

occupies low-lying and depressional areas from several days up to a year. This soil is generally associated with uplands within the assessment area.

Copeland-Bradenton-Wabasso Complex, Limestone Substratum (Map Unit 16)

This soil complex consists of several nearly level, very poorly drained sandy soils on low flats underlain by limestone. Slopes range from 0 to 2 percent. In most years, the water table is within 10 inches of the ground surface for more than 6 months. In dry seasons, groundwater depths range from 10 to 30 inches. In general, these soils are flooded for 7 days to one month once every 5 to 20 years. In some areas, soils are underlain by coquina instead of limestone. This soil is associated with wetland and upland habitats within the property.

Bradenton Fine Sand (Map Unit 8)

Formed in unconsolidated loamy marine sediments, the Bradenton series consists of very deep, moderately permeable soils on low ridges and floodplains. Slopes range from 0 to 2 percent. During most years, the water table occurs within 18 inches of the soil surface for 2 to 6 months of the year. This soil type is mostly associated with uplands within the property.

Paola Fine Sand (Map Unit 43)

Occurring on uplands, the Paola series comprises very deep, excessively drained, and very rapidly permeable soils formed in thick sandy marine deposits. Slopes range from 0 to 20 percent and the water table is generally deeper than 72 inches from the soil surface. This soil type is associated with the highest site elevations located on the western side of the property.

Immokalee Sand (Map Unit 28)

Formed in sandy marine sediments, the Immokalee series consists of very deep, very poorly and poorly drained soils on flatwoods and in depressions. Slopes generally range from 0 to 2 percent, but occasionally up to 5 percent depending on location. During most years, the water table occurs at depths of 6 to 18 inches below ground surface for 1 to 4 months and between 18 inches and 36 inches for 2 to 10 months. Depressional areas often hold standing water for 6 to 9 months (or more) in most years. During

dry periods, the water table may recede to depths greater than 60 inches. This soil type is associated with site uplands and is restricted to a small area in the northeast portion of the property.

Wabasso Sand (Map Unit 71)

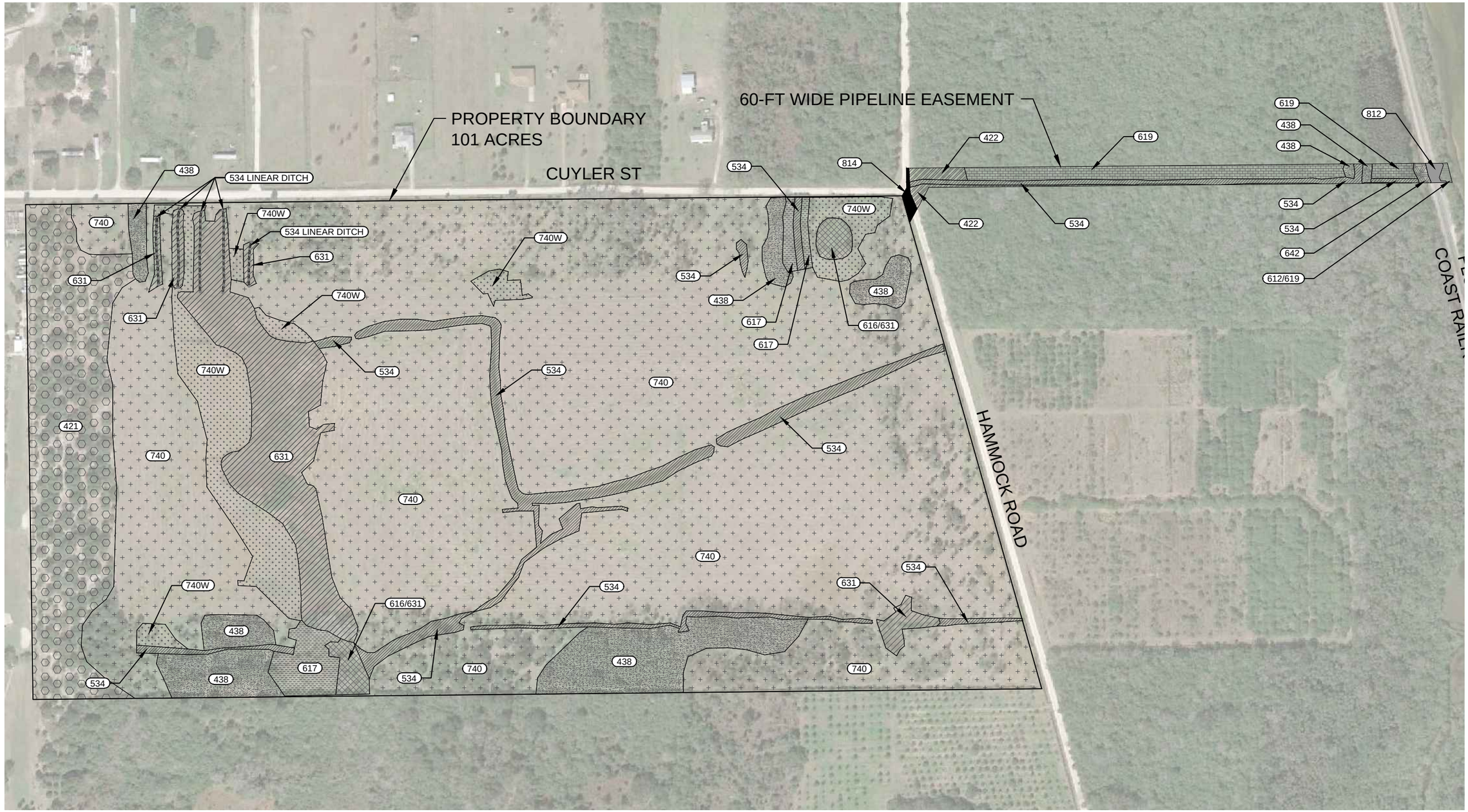
The Wabasso series formed in sandy and loamy marine sediments and consists of very deep, very poorly to poorly drained, and slowly permeable soils that generally occur on flatwoods, floodplains, and depressions. Slopes range from 0 to 2 percent. During most years, the water table occurs at depths between 10 and 40 inches below ground surface for more than 6 months. During wet seasons, the water table may rise to within 10 inches of the soil surface for less than 60 days and during dry seasons the water table may recede to depths greater than 40 inches. This soil type is associated with wetlands within the pipeline easement.

4.2 Community Classification

Habitats identified during the field investigation include disturbed land, xeric oak, wetland scrub, mixed hardwoods, disturbed land (wet), drainage/irrigation ditches, exotic wetland hardwoods, mixed wetland hardwoods, inland pond and sloughs/wetland scrub, Brazilian pepper, and saltwater marsh (Figure 3). This section briefly describes each community type in order of abundance within the BV-4B property, including the pipeline easement.

Disturbed Land (FLUCCS 740)

Totaling 71.9 acres, disturbed land comprises the dominant community type within the BV-4B property. This community includes the areas disturbed by the 2009 clearing and grubbing and 2010 exotic vegetation removal projects. FIND actively maintains (i.e. mows) the vegetation within these areas. Vegetation within this community type consists of grasses and herbaceous species. Dominant species include bahiagrass (*Paspalum notatum*), smutgrass (*Sporobolus indicus*), cogongrass (*Iperata cylindrica*), and common ragweed (*Ambrosia artemisiifolia*). Other less common species include spiderwort (*Tradescantia ohiensis*), bermudagrass (*Cynodon dactylon*), peppervine (*Ampelopsis arborea*), Caeser's weed (*Urena lobata*), and hemp vine (*Mikania scandens*).



BV-4B PROPERTY FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
421	8.33	XERIC OAK
438	5.30	MIXED HARDWOODS
534	3.37	DRAINAGE / IRRIGATION DITCHES
616 / 631	0.60	INLAND PONDS AND SLOUGHS / WETLAND SCRUB
617	1.09	MIXED WETLAND HARDWOODS
631	5.74	WETLAND SCRUB
740	71.92	DISTURBED LAND
740W	4.65	DISTURBED LAND - WET

BV-4B PIPELINE EASEMENT FLUCCS CLASSIFICATIONS

CODE	ACRES	DESCRIPTION
422	0.32	BRAZILIAN PEPPER
438	0.07	MIXED HARDWOODS
534	0.54	DRAINAGE / IRRIGATION DITCHES
612/619	0.03	MANGROVE SWAMP/EXOTIC WETLAND HARDWOODS
619	1.25	EXOTIC WETLAND HARDWOODS
642	0.05	SALTWATER MARSH
812	0.06	RAILROADS
814	0.07	ROADS

NOTES
1. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
2. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
3. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE (JULY 2014); SURVEYED BY SEA DIVERSIFIED, INC.
4. COMMUNITIES CLASSIFIED ACCORDING TO FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM (FLUCCS)

N

0 300' 600'

SCALE: 1" = 300'

FIGURE 3
EXISTING COMMUNITIES
FIND BV-4B BIOLOGICAL SITE ASSESSMENT
BREVARD COUNTY, FLORIDA

PROJECT	C2014-026
DRAWN BY	AF
SHEET	
DATE	JUNE 2016

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

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

ANTON FLEWELLING X:\SY\S\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\PERMIT\C2014-026 P-EXISTFLUCCS.DWG 6/1/2016 4:39:19 PM

Xeric Oak (FLUCCS 421)

Located at the west end of the property within the site clearing buffer, the 8.33-acre xeric oak community occupies the highest ground on the site with elevations reaching 25 feet +/- above sea level. Oak species including live oak (*Quercus virginiana*), sand live oak (*Quercus geminata*), and laurel oak (*Quercus hemispherica*) dominate the low- to moderately-dense forest canopy. Other tree species include cabbage palm (*Sabal palmetto*), Hercules club (*Zanthoxylum clava-herculis*), and southern red cedar (*Juniperus virginiana*). Species such as lantana (*Lantana carmara*), Brazilian pepper (*Schinus terebinthifolius*), American beautyberry (*Callicarpa americana*), and the various tree species noted above occupied the shrub stratum. Taylor Engineering environmental staff noted several active gopher tortoise (*Gopherus polyphemus*) burrows within this community type during the field investigation.

Wetland Scrub (FLUCCS 631)

This community comprises 5.8 acres and occurs within the western portion of the property. A review of historical aerial photographs and previous environmental site documentation prepared by Water and Air Research, Inc. (1991) indicate that a section of the primary drainage ditch that runs through the property previously traversed through the middle of the wetland scrub community. Uplands bordered the ditch on either side. Over time, due to lack of ditch maintenance, the ditch likely lost some of its capacity to convey water resulting in a spreading effect and creation of additional wetlands including this community. Dominant vegetation in this community includes a mix of invasive and nuisance species such as Carolina willow (*Salix caroliniana*), Brazilian pepper, cattail (*Typha latifolia*), and Peruvian primrose (*Ludwigia peruviana*).

Mixed Hardwoods (FLUCCS 438)

Mixed hardwood communities within the property and pipeline easement total 5.3 acres. The two largest mixed hardwood communities occur along the southern property boundary adjacent to portions of the east-west oriented drainage ditch. These communities continue offsite to the south. The most developed mixed hardwood habitat occurs on southeast portion of the property. Some exotic species such as camphor tree (*Cinnamomum camphora*) and chinaberry (*Melia azedarach*) have invaded the edges of this forested community; however, this area represents the most undisturbed natural habitat on the BV-4B property. The second largest mixed hardwood habitat occurs near the southwest corner of the site. The 2010 exotic removal effort partially disturbed this area resulting in a less dense forest canopy. Small

mixed hardwood habitats also occur adjacent to drainage ditches near the northeast and northwest corners of the site and near the eastern end of the pipeline easement. Typical plant associations within the mixed hardwood communities include canopy and shrub species such as live oak, swamp laurel oak (*Quercus laurifolia*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), sweetgum (*Liquidambar styriciflua*), cabbage palm, camphor tree (*Cinnamomum camphora*), Brazilian pepper, youpon holly (*Ilex vomitoria*), wax myrtle (*Myrica cerifera*), winged elm (*Rhus copallina*), and American beautyberry. Groundcover and herbaceous species include poison ivy (*Toxicodendron radicans*), braken fern (*Pteridium aquilinum*), ceaserweed (*Urena lobata*), spiderwort (*Tradescantia sp.*), lantana, Virginia creeper (*Parthenocissus quinquefolia*), greenbrier (*Smilax spp.*), and swamp fern (*Blechum serrulatum*).

Disturbed Land – Wet (FLUCCS 740w)

Totaling 4.7 acres, this community type includes disturbed wetland areas that undergo periodic mowing. The largest area of this community types is contiguous to the wetland scrub area on the western side of the property. Typical vegetation in this community type includes species such as bahiagrass, flat sedge (*Cyperus* spp.), soft rush (*Juncus effusus*), yellow canna (*Canna flaccida*), cattail, rattlebush (*Sesbania herbacea*), and dog fennel (*Eupatoriam capillifolium*)

Drainage/Irrigation Ditches (FLUCCS 534)

This community type includes the onsite drainage and irrigation ditches historically used for the citrus operation. The largest ditch, approximately 20-feet wide, runs through the middle of the property, connects to the wetland scrub community to the west, and continues offsite to the east. Dominant vegetation within this ditch includes cattail, pickerelweed (*Pontederia cordata*), yellow canna, and water hemlock (*Cicuta maculate*). A smaller east-west oriented ditch runs near the southern property boundary. This ditch also continues offsite to the east. The ditch is minimally vegetated where the forest canopy of the adjacent uplands overhangs the ditch and blocks sunlight. Typical vegetative species occupying the non-shaded portion of the ditch include wild taro (*Colocasia esculenta*), Peruvian primrose, and water hemlock.

An un-vegetated drainage ditch, approximately eight feet wide, occurs along the southern boundary of the pipeline easement. Site observations indicate that water periodically overtops the bank and floods the adjacent land. This ditch hydrologically connects to the Indian River.

Exotic Wetland Hardwoods (FLUCCS 619)

This community composes the majority of the habitat within the pipeline easement and occurs immediately north of a drainage ditch that runs along the southern boundary of the easement. Observations made during the site investigation indicate the drainage ditch periodically overflows and floods the adjacent lands providing the necessary hydrology for wetland development. Brazilian pepper dominates the vegetative community with the exception of the eastern end where Australian pine (*Casuarina equisetifolia*) is dominant.

Mixed Wetland Hardwoods (FLUCCS 617)

This community type, totaling 1.1 acres, occurs in two areas within the BV-4B property. The first occurs in the northeast corner of the site where a narrow band of mixed wetland hardwood community has developed on either side of a manmade ditch. The second occurs on the western side of the site along the southern property boundary and immediately adjacent to an inland pond/wetland scrub community. Dominant vegetation within this habitat type includes canopy and shrub species such as sugarberry, red maple (*Acer rubrum*), American elm, cabbage palm, laurel oak, Brazilian pepper, and paper mulberry (*Broussonetia papyrifera*). Air potato (*Doscorea bulbifera*), an invasive vine, also commonly occurrs in this community.

Inland Ponds and Sloughs / Wetland Scrub (FLUCCS 616/631)

Totaling just over one-half acre, this community type is associated with small topographic depressions in two areas of the property. The first occurs at the southern end of the large wetland scrub community on the western side of the site. The second occurs near the northeast corner of the site. Small areas of open water with densely vegetated edges characterize these wetland communities. Vegetation in this habitat included Carolina willow, Peruvian primrose, buttonbush (*Cephalanthus occidentalis*), cattail, yellow canna, Chinese tallow (*Sapium sebiferum*), and saltbush (*Baccharis halimifolia*).

Brazilian Pepper (FLUCCS 422)

This community type is characterized by upland habitat dominated by Brazilian pepper within the pipeline easement. It occurs at the western end of the easement and as a narrow band on side-cast spoil (likely from ditch construction) between the drainage ditch and the southern easement boundary.

Saltwater Marsh (FLUCCS 642)

The saltwater marsh community occurs at the eastern end of the pipeline easement, immediately west of the railroad embankment. The community hydrologically connects to the Indian River through a culvert underneath the railroad. Vegetation within this habitat includes species such as black (*Avicennia germinans*) and white (*Laguncularia racemosa*) mangroves, saltwort (*Batis maritima*), glasswort (*Salicornia sp.*), Brazilian pepper, and sea-oxeye daisy (*Borrichia frutescens*).

Mangrove Swamp / Exotic Wetland Hardwoods (FLUCCS 612/619)

This community type occurs at the eastern end of the pipeline easement where the easement meets the Indian River. This shoreline wetland community contains species such as black mangrove mixed with Brazilian pepper, southern red cedar (*Juniperus virginiana*), cabbage palm and wax myrtle.

4.3 Listed Species

Site BV-4B provides suitable habitat for a number state- and federally-listed species including birds, reptiles, and amphibians (Table 1).

Table 1 Listed Species that May Occur within the Study Area

Class	Common Name	Scientific Name	Federal Status [1]	State Status [2]
Birds	Audubon's crested caracara	*Polyborus plancus audubonii*	Threatened	Threatened
	Burrowing owl	*Athene cunicularia*	N/A	Special Concern
	Florida sandhill crane	*Grus canadensis pratensis*	N/A	Threatened
	Little blue heron	*Egretta caerulea*	N/A	Special Concern
	Snowy egret	*Egretta thula*	N/A	Special Concern
	Tricolored heron	*Egretta tricolor*	N/A	Special Concern
	White ibis	*Eudocimus albus*	N/A	Special Concern
	Wood stork	*Mycteria americana*	Threatened	Threatened
Reptiles	Eastern indigo snake	*Drymarchon corais couperi*	Threatened	Threatened
	Gopher tortoise*	*Gopherus polyphemus*	Candidate	Threatened
Amphibians	Gopher frog	*Lithobates capito*	N/A	Special Concern

[1] Federally-listed and Candidate Species in Brevard, FL; USFWS website (accessed May 2015)
[2] List of Imperiled Species, FWC (accessed May 2015) / FNAI Report for Matrix Units 57882 and 58187
* Species observed within study area during the June 2014 field investigation

Birds

The majority of the BV-4B property contains habitat suitable for supporting Audubon's crested caracara, a state- and federally-listed threatened species. According to the Multi-Species Recovery Plan obtained from the FWC's website (http://myfwc.com/wildlifehabitats/imperiled/profiles/birds/audubons-crested-caracara/), this species utilizes dry or wet prairie areas with scattered cabbage palms, scrub oaks (*Quercus geminata*), and cypress (*Taxodium spp.*). Caracaras prefer to nest in the tops of cabbage palms. Given the openness of the cleared areas that now function somewhat similarly to wet and dry prairies and the abundance of cabbage palms on the site, it is possible that nesting could occur within the study area.

The upland cleared and maintained areas may provide suitable habitat for burrowing owls, a state-listed species of special concern. According to the FWC's Imperiled Species Profile (http://myfwc.com/wildlifehabitats/imperiled/profiles), the burrowing owl prefers to inhabit open dry prairies that have very little understory. Land management practices (e.g., clearing, grubbing, and periodic mowing) implemented at the study site have created habitat conditions suitable for burrowing owls.

The state-listed threatened Florida sandhill crane is a non-migratory, monogamous species that nests in freshwater ponds and marshes. Foraging habitat includes freshwater marshes, prairies, and pastures. Portions of the BV-4B property including the maintained herbaceous site interior, drainage ditches, and non-forested wetlands provide suitable habitat for foraging and potentially nesting.

The wetlands and drainage ditch habitats within the BV-4B property provide suitable foraging and nesting habitat for several wading birds including the little blue heron, snowy egret, tricolored heron, and white ibis — all state-listed species of special concern. These habitats also provide foraging opportunities for the wood stork, a state- and federally-listed threatened species. Site BV-4B does not occur within the boundaries any wood stork core foraging areas, identified by a 15-mile buffer radius from any wood stork nesting colonies in Florida's central counties.

Taylor Engineering reviewed the FWC database for known bald eagle (*Haliaeetus leucocephalus*) nesting locations in the site vicinity. The FWC database provided the locations of seven bald eagle nests within five miles of the study area. The closest nest occurs about 1.25 miles east-southeast of the BV-4B property. Although the FWC and USFWS have delisted the bald eagle due to recovery, the Bald and

Golden Eagle Act and U.S. Migratory Bird Treaty Act continue to provide legal protection for the species.

Reptiles

The west end of the property consists of xeric upland habitat. Taylor Engineering environmental staff observed gopher tortoise burrows during the June 2014 site visit. The gopher tortoise is federally-listed as a candidate species and state-listed as a threatened species. In accordance with FWC Gopher Tortoise Permitting Guidelines (FWC, 2015), gopher tortoise permitting and relocation is required for disturbances within a 25-foot radius of any active or inactive gopher tortoise burrow. Prior to any construction activities within the study area, the site will require a survey of all suitable gopher tortoise habitat by an FWC-authorized Gopher Tortoise Agent. The results of gopher tortoise surveys are valid for 90 days from the date of the field survey. Any proposed impact to potentially-occupied gopher tortoise burrows will require a permit from the FWC. Gopher tortoise burrows may also provide habitat for the state- and federally-listed eastern indigo snake, a known gopher tortoise burrow commensal.

Amphibians

The gopher frog, a state-listed species of special concern, inhabits xeric upland habitats and uses gopher tortoise burrows for cover. As such, the gopher frog may occur within the BV-4B property. Per the Species Action Plan for the Gopher Frog (FWC, 2013), the FWC has recommended removal of the gopher frog from the list of species of special concern. Until de-listing, however, all gopher frogs encountered during gopher tortoise relocation activities must be translocated to other suitable habitat on-site.

5.0 WETLANDS AGENCY VERIFICATION

Taylor Engineering environmental staff (Chris Ellis and David Stites, Ph.D.) met with FDEP (Kim Eisele, Jason Seyfert, and Lorne Malo) and USACE (Jim Carr) staff at the BV-4B site on July 9, 2014 to verify the delineated wetland boundary. After a thorough review of the flagged wetland line within the BV-4B property, Taylor Engineering and agency staff agreed on a few minor adjustments to the wetland boundary. The information presented in this report incorporates the adjusted wetland boundary. Appendix B contains the informal wetlands jurisdictional determination letter provided by the FDEP.

REFERENCES

Florida Department of Environmental Protection. 1995. *Florida Wetlands Delineation Manual.* Tallahassee, FL.

Florida Fish and Wildlife Conservation Commission. 2015. *Gopher Tortoise Permitting Guidelines*. Tallahassee, Florida.

Florida Fish and Wildlife Conservation Commission. 2013. *A Species Action Plan for the Gopher Frog*. Tallahassee, Florida.

United States Army Corps of Engineers. 1987. *Corps of Engineers Wetlands Delineation Manual.* Wetlands Research Program Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

United States Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. ERDC/EL TR 10-20. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

APPENDIX A

USACE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-48 City/County: BREVARD Sampling Date: 5/14/15

Applicant/Owner: FIND State: FL Sampling Point: A-WET

Investigator(s): C.ELLIS / D.STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 0-2

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 23.97"N Long: 80° 50' 00.04"W Datum: WGS

Soil Map Unit Name: POMPANO SAND NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ✓ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0.5
Water Table Present?	Yes _____	No _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: A-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: 30' R)			
1. SALIX CAROLINIANA	50	Y	OBL
2. LUDWIGIA PERUVIANA	20	Y	OBL
3. SCHINUS TEREBINTHIFOLIUS	20	Y	FAC
4. TYPHA SPP.	10	N	OBL
5.			
6.			
7.			
8.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: A-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-0.5	10YR 2/1	100					MUCK	
0.5-2	10YR 3/1	100					SAND	
2-7	10YR 6/1	50					SAND	
2-7	10YR 4/1	50					LOAMY SAND	
7-12	10YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ✓ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-9B City/County: BREVARD Sampling Date: 5/14/15

Applicant/Owner: FIND State: _____ Sampling Point: A-UP

Investigator(s): C. ELLIS / D. STITES Section, Township, Range: S20 T21S R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): FLAT Slope (%): 0-2

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 24.00"N Long: 80° 49' 59.57" W Datum: WGS

Soil Map Unit Name: POMPANO SAND NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: A-UP

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 30' R)			
1. PASPALUM NOTATUM	90	Y	FACU
2. SPOROBOLUS INDICUS	5	N	FACU
3. AMBROSIA ARTEMISIIFOLIA	2	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: A-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					SAND	
7-12	10YR 4/2	100					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD CO. Sampling Date: 5/14/15

Applicant/Owner: FWD State: FL Sampling Point: C-WET

Investigator(s): Q. ELLIS / D. STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 31.36" N Long: 80° 49' 47.24" W Datum: WGS

Soil Map Unit Name: COPELAND - BRADENTON - WABASSO COMPLEX NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): > 12"
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: C-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 20'R)			
1. CANNA FLACCIDA	40	Y	OBL
2. CYPERUS ODORATUS	20	Y	FACW
3. LUDWIGIA PERUVIANA	10	N	OBL
4. AMBROSIA ARTEMISIIFOLIA	5	N	FACU
5. CYPERUS HASPAN	5	N	OBL
6. SALIX CAROLINIANA	2	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	82 = Total Cover		
50% of total cover: 41	20% of total cover: 16		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: C-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					MUCKY SAND	
5-12	10YR 3/1	60					SAND	
5-12	10YR 6/1	40					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✓ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD Sampling Date: 5/14/15

Applicant/Owner: FIND State: FL Sampling Point: C-UP

Investigator(s): C. ELLIS / D. STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): FLAT Slope (%): 0-2 %

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 30.49" N Long: 80° 49' 42.37" W Datum: WGS

Soil Map Unit Name: BRADENTON FINE SAND NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): 7 12"
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: C-UP

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 20' R)			
1. PASPALUM NOTATUM	95	Y	FACU
2. TRADESCANTIA OHIENSIS	3	N	FAC
3. AMBROSIA ARTEMISIIFOLIA	2	N	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: C-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	50						
0-3	10YR 7/1	50						
3-12	10YR 4/1	50						
3-12	10YR 7/2	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD Sampling Date: 5/20/15

Applicant/Owner: FIND State: FL Sampling Point: E-UP

Investigator(s): C.ELLIS / D.STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): FLAT Slope (%): 0-2

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 31.67" N Long: 80° 49' 53.75" W Datum: WGS

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: E-UP

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 20'R)			
1. PASPALUM NOTATUM	98	Y	FACU
2. AMBROSIA ARTEMISIIFOLIA	2	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: E-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 6/1	100					SAND	
1-12	10YR 6/3	90					SAND	
1-12	10YR 4/1	10					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD CO. Sampling Date: 5/20/15

Applicant/Owner: FWD State: FL Sampling Point: E-WET

Investigator(s): C. ELLIS / D. STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): FLAT Slope (%): 0-2

Subregion (LRR or MLRA): LRR U Lat: 28° 39' 30.93" N Long: 80° 49' 53.68" W Datum: WGS

Soil Map Unit Name: POMPANO SAND NWI classification: –

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1"

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: E-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 20' R)			
1. PASPALUM NOTATUM	50	Y	FACU
2. CANNA FLACCIDA	25	Y	OBL
3. CAREX STIPATE	20	Y	OBL
4. SETARIA SP.	3	N	FAC
5. CYPERUS ODORATUS	2	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: E-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					L.SAND	
4-6	10YR 4/1	100					SAND	
6-12	10YR 6/1	60					SAND	
6-12	10YR 4/1	40					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ✓ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD Sampling Date: 3/20/2015

Applicant/Owner: FIND State: FL Sampling Point: F-UP

Investigator(s): C.ELLIS / D.STITES Section, Township, Range: S 20, T 21 S, R 35 E

Landform (hillslope, terrace, etc): _____ Local relief (concave, convex, none): FLAT Slope (%): 0-2

Subregion (LRR or MLRA): LRRU Lat: 28° 39' 23.27" N Long: 80° 49' 50.41" W Datum: WGS

Soil Map Unit Name: POMPANO SAND NWI classification: –

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: F-UP

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 20'R)			
1. PASPALUM NOTATUM	90	Y	FACU
2. AMBROSIA ARTEMISIIFOLIA	5	N	FACU
3. SPOROBOLUS INDICUS	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: F-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					L. SAND	
6-12	10YR 3/1	50					SAND	
6-12	10YR 5/1	50					SAND	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: BV-4B City/County: BREVARD Sampling Date: 5/20/15

Applicant/Owner: FIND State: FL Sampling Point: F-WET

Investigator(s): C. ELLIS / D. STITES Section, Township, Range: S20, T21S, R35E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRRU Lat: 28° 39' 23.49"N Long: 80° 49' 51.15"W Datum: WGS

Soil Map Unit Name: POMPANO SAND NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ✓ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): >12 IN
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: F-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 5'R)			
1. CANNA FLACCIDA	75	Y	OBL
2. LUDWIGIA PERUVIANA	20	Y	OBL
3. AMBROSIA ARTEMISIIFOLIA	5	N	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

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Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: F-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-0.5	10YR 2/1	100					muck	
0.5-12	10YR 3/1	100					S. Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ✓ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ✓ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
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- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

APPENDIX B

FDEP Informal Wetlands Jurisdiction Letter

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
CENTRAL DISTRICT
3319 MAGUIRE BOULEVARD, SUITE 232
ORLANDO, FLORIDA 32803-3767

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN P. STEVERSON
SECRETARY

February 6, 2015

Florida Inland Navigation District
%Mark. T. Crosley, Executive Director
1314 Marcinski Road
Jupiter, FL 33477
mcrosley@aicw.org

RE: Informal Wetlands Jurisdictional Determination
Brevard County
Vacant land off Cuyler Street (101 acres)
Center Property Coordinates: N: 28° 39' 25.84" W: 80° 49' 54.4"
Mims, FL 32754

File Nos. 05-0327292-001
SPCD-ERP-2577

Dear Mr. Crosley:

DEP staff inspected the site listed above on July 9, 2014 to review the wetland line previously flagged for this property by Chris Ellis of Taylor Engineering and found:

> The wetland line reviewed and adjusted in the field and depicted on the survey dated January 28, 2015 appears to be an accurate representation of the landward extent of the wetlands on the property pursuant to Section 62-340, Florida Administrative Code. Before any development of these wetlands, **you would need a permit from DEP.**

Please contact Kim Eisele at kim.eisele@dep.state.fl.us or 407-897-2950 with any questions regarding a permit. Permit applications can be obtained from Ms. Eisele or from the Department's web site at www.dep.state.fl.us/water/wetlands/erp.

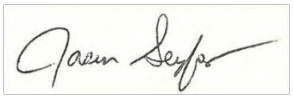
Also, prior to any construction activity of one or more acres of upland, you will need a National Pollution Discharge Elimination System (NPDES) Permit. Construction can include soil disturbance, clearing, grading and excavation. Please contact the NPDES Stormwater Section at 850-245-7522 for assistance.

Important notes:

1) Other federal, state, or local land development restrictions may apply to your property. You may need authorizations from agencies like U.S Army Corps of Engineers (321-504-3771), Brevard County (321-633-2016) or Florida Fish and Wildlife Conservation Commission (352-732-1225).
2) This wetland determination review is informal and is for pre-application planning purposes only.
3) If you desire a binding jurisdictional determination, then you should petition the Department for a jurisdictional declaratory statement under 62-343.040, Florida Administrative Code, or you should apply to DEP for an Environmental Resource Permit.
4) DEP will consider this informal determination review to be valid for pre-application planning purposes for no longer than 5 years from the date of the site inspection July 9, 2019.

If you have any questions, please feel free to contact me at jason.seyfert@dep.state.fl.us or 407-897-4344, or the letterhead address.

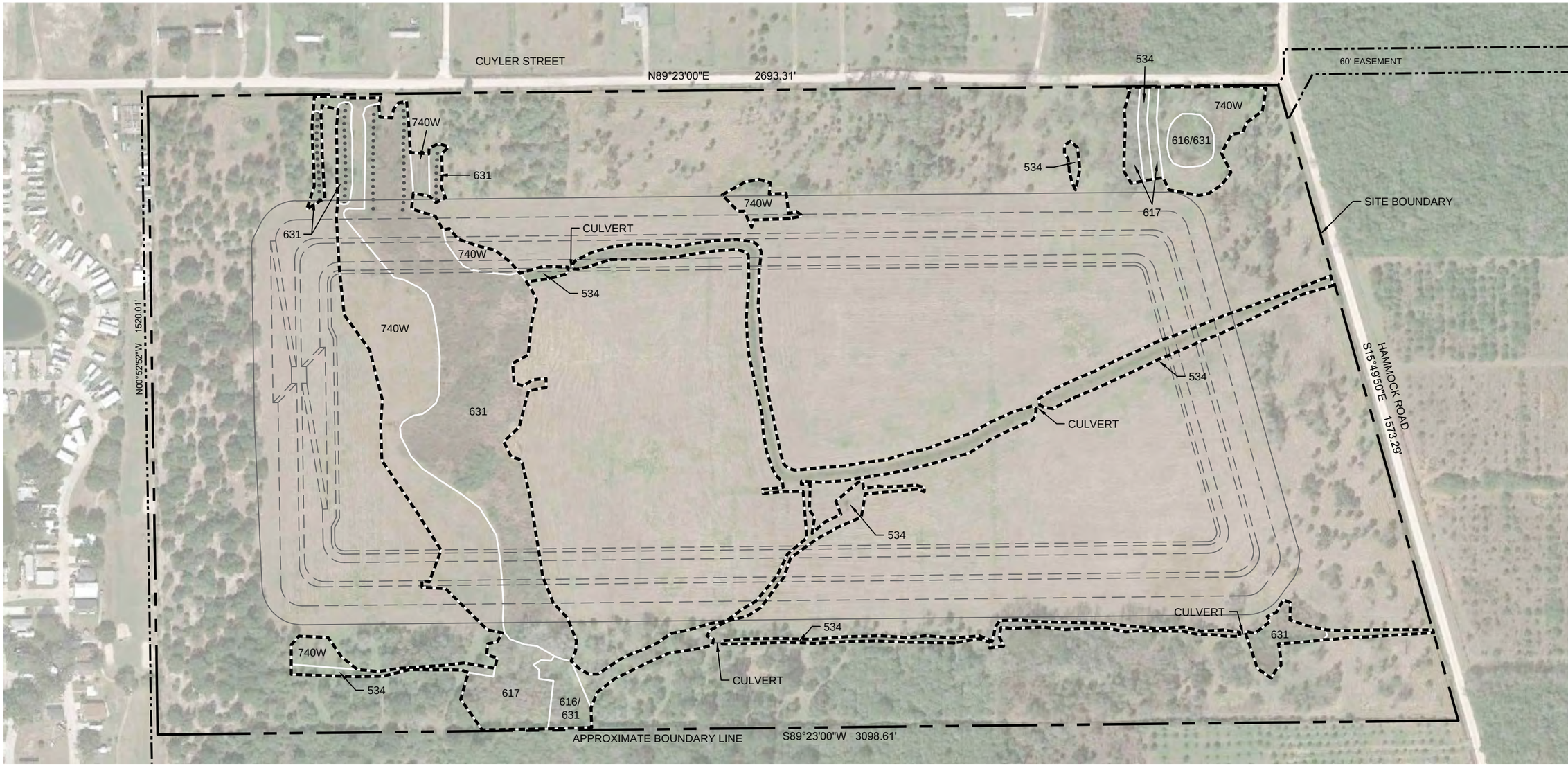
Sincerely,



Jason Seyfert
Environmental Specialist II
Submerged Lands and Environmental
Resource Program

Enclosure: Aerial with approximate wetland area

Cc:
Amanda Elmore, Brevard County Office of Natural Resources (amanda.elmore@brevard-county.us) and Lee Ann McCullough-Wham, Brevard County Office of Natural Resources Lee Ann McCullough-Wham, Brevard (LeeAnn.McCullough-Wham@brevardcounty.us)
Chris Ellis, Taylor Engineering (CEllis@Taylorengineering.com)
Kim Eisele, FDEP



FLUCCS CLASSIFICATIONS

•••••••••	534	DRAINAGE / IRRIGATION DITCHES (0.20 AC.)
	534	DRAINAGE / IRRIGATION DITCHES (3.3 AC.)
	616 / 631	INLAND PONDS AND SLOUGHS / WETLAND SCRUB (0.6 AC.)
	617	MIXED WETLAND HARDWOODS (1.1 AC.)
	631	WETLAND SCRUB (5.7 AC.)
	740W	DISTURBED LAND - WET (4.7 AC.)

NOTES:

1. ALL COORDINATES SHOWN ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), NAD83.
2. AERIAL REFERENCE: GOOGLE EARTH, FEB 2014
3. BOUNDARY INFORMATION TAKEN FROM SURVEY BY ST. JOHNS SURVEY COMPANY, FILE # 250-022C, DATED AUGUST 21, 1991.
4. JURISDICTIONAL WETLAND BOUNDARY DELINEATED BY TAYLOR ENGINEERING, INC.; FIELD-VERIFIED BY FDEP & USACE; SURVEYED BY SEA DIVERSIFIED, INC.

JURISDICTIONAL WETLAND BOUNDARY

N

0 250' 500'

SCALE: 1" = 250'

PROJECT C2014-026
DRAWN BY CAS
SHEET 1 of 1
DATE 1-28-15

JURISDICTIONAL WETLAND BOUNDARIES
FIND BV-4B DREDGED MATERIAL MANAGEMENT AREA
BREVARD COUNTY, FLORIDA

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

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

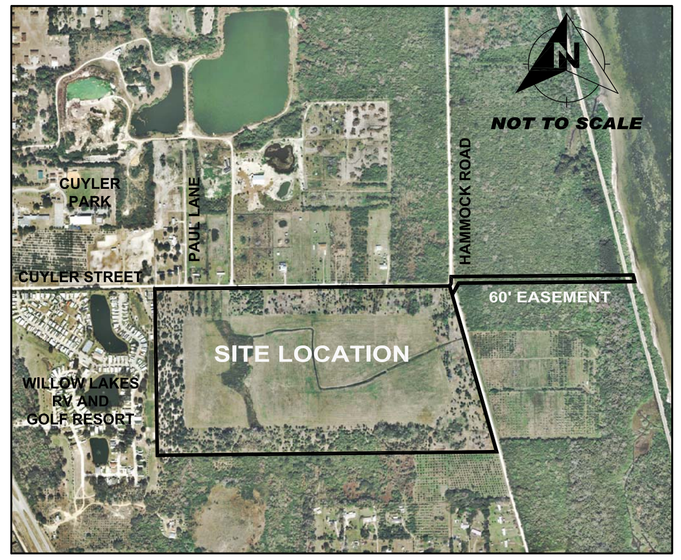
CATHY SHELL X:\SYS\PROJECTS\C2014-026 FIND BV-4B DESIGN & PERMITTING\FIGURES\C2014-026 F-JURISWETLANDS_2.DWG 1/28/2015 8:22:54 AM

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX D

Survey

TOPOGRAPHIC SURVEY
OF
FLORIDA INLAND NAVIGATION DISTRICT (FIND)
DMMA BV-4B; BREVARD COUNTY, FLORIDA



AERIAL MAP

TOPOGRAPHIC SURVEY NOTES:

1. REFER TO SEA DIVERSIFIED, INC. SURVEY NO. 13-2155.B
2. THIS TOPOGRAPHIC SURVEY WAS PERFORMED ON JULY 31, 2014 THROUGH OCTOBER 25, 2014. PREPARED FOR TAYLOR ENGINEERING AND FLORIDA INLAND NAVIGATION DISTRICT.
3. ALL AZIMUTHS ARE GRID, RECKONED CLOCKWISE FROM NORTH.
4. THE COORDINATES SHOWN HEREON ARE IN FEET AND ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE (0901), TRANSVERSE MERCATOR PROJECTION, NORTH AMERICAN DATUM, 1983 (NAD83).
5. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM (1988) AND WERE OBTAINED USING REAL-TIME KINEMATIC (RTK) GLOBAL POSITIONING AND TOTAL STATION METHODOLOGIES.
6. ALL ABOVE GROUND UTILITIES AND IMPROVEMENTS WERE LOCATED AS PART OF THIS SURVEY. UNDERGROUND UTILITIES AND IMPROVEMENTS WERE NOT LOCATED AS PART OF THIS SURVEY AND SHOULD BE FIELD VERIFIED PRIOR TO ANY CONSTRUCTION ACTIVITIES.
7. AERIAL PHOTOGRAPHY WAS OBTAINED FROM THE FLORIDA STATE MAINTAINED WEB SITE WWW.LABINS.ORG AND HAD A FLIGHT DATE OF 2011.
8. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF THE SURVEY ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
9. BACKGROUND INFORMATION (BOUNDARY SURVEY) WAS PROVIDED BY THE CLIENT IN PLANS ENTITLED BOUNDARY & 60' RIGHT OF WAY SURVEY PREPARED BY ST. JOHNS SURVEY COMPANY DATED AUGUST 19, 1991, UNDER FILE NO. 250-022C. FOUND PROPERTY CORNERS WERE FIELD LOCATED AND DEPICTED ON PLANS SHEETS S1 & S2..
10. THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.
11. THE INTENT OF THIS SPECIFIC PURPOSE SURVEY WAS TO VERIFY AND LOCATE THE ONSITE TOPOGRAPHY AND OBTAIN LOCATIONS OF THE WETLAND LINE DEMARCATED BY OTHERS.
12. THE LOCATION AND INFORMATION OF THE GEOTECHNICAL BORINGS WERE SUPERIMPOSED ON THE MAP BASED ON INFORMATION PROVIDED MORGAN & EKLUND, INC. UNDER COMMISSION NO. 5612.00, DATED 4-7-14 AND WAS NOT FIELD VERIFIED BY SDI.

ABBREVIATIONS	
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
FND	FOUND
HDPE	HIGH DENSITY POLYEHTYLENE PIPE
IR / C	IRON ROD AND CAP
MON	MONUMENT
NAVD	NORTH AMERICAN VERTICAL DATUM
NGS	NATIONAL GEODETIC SURVEY
PKD	PK NAIL AND DISK
RCP	REINFORCED CONCRETE PIPE
TOB	TOP OF BANK
TOS	TOE OF SLOPE
USACE	UNITED STATES ARMY CORPS OF ENGINEERS
INV.	INVERT
TOP	TOP OF PIPE

LEGEND	
~~	TREE LINE
4.1	GROUND ELEVATION BY SEA DIVERSIFIED
(W)	MONITORING WELL
△	MONUMENT / CONTROL POINT
○—○	POWER POLE / OVERHEAD POWER
~~	WETLAND LINE
(B)B-318	INDICATES BORING LOCATION AND DESIGNATION
(FO)	INDICATES FIBER OPTIC MARKER

***THIS IS NOT A BOUNDARY SURVEY**

PREPARED FOR:

TAYLOR ENGINEERING, INC.

10151 DEERWOOD PARK BOULEVARD
BUILDING 300, SUITE 300
JACKSONVILLE, FLORIDA 32256

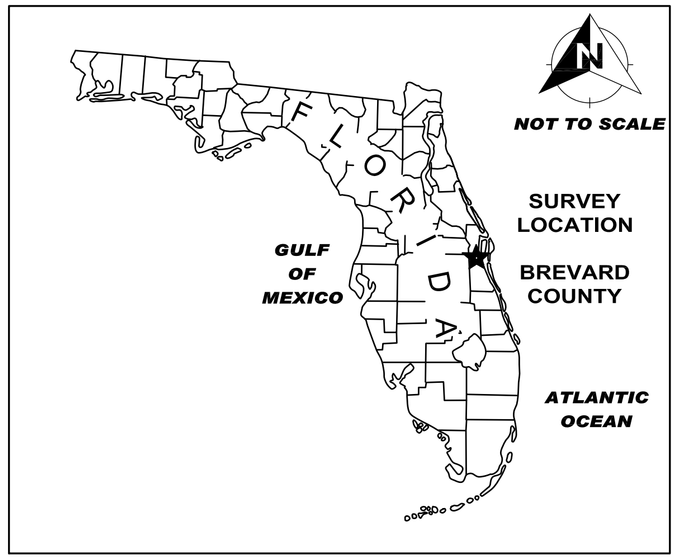
PREPARED BY:

SEA DIVERSIFIED, INC.

21 NW 2ND STREET
DELRAY BEACH, FLORIDA 33444

SHEET INDEX	
C-1	COVER / NOTES
S1	SITE ELEVATIONS / BORING LOCATIONS
S2	WETLAND DELINEATION / CONTOURS

SURVEY CONTROL					
	NAD 83/11 SPCS 0901		NAVD 88		
MONUMENT	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	STAMPING	DESCRIPTION
TITUSVILLE SE BASE	1559789.83	712991.22	25.73	TITUSVILLE SE BASE 1933	USC&GS CONCRETE MONUMENT
BREVARD GPS 1063	1577786.53	710992.60	N/A	GPS 1064 1993	BREVARD COUNTY DEEP ROD MONUMENT
J 228 RESET	1570359.18	707462.34	36.77	J 228 RESET 1975	DISK IN CONCRETE STORM DRAIN
I95 73 B17	1574865.11	679991.56	37.45	I95 73 B17	DISK SET IN CONC. MONUMENT (PID AK5214)



LOCATION MAP



VICINITY MAP

GEOTECHNICAL BORING DATA			
	NAD 83/11 SPCS 0901 US FEET		NAVD 88
LOCATION	NORTHING	EASTING	ELEVATION
B-201	1571277	709131	17.7
CPT-207	1571569	709117	17.8
CPT 101	1571818	709117	19.2
B-101	1572078	709122	18.3
CPT-201	1572088	709470	10.5
CPT-102	1572092	709822	9.5
B-202	1572090	710225	7.1
CPT-202	1572092	710541	7.3
CPT-103	1572092	710849	6.0
B-203	1572090	711162	4.5
CPT-203	1571859	711230	4.6
CPT-104	1571627	711300	4.7
B-102	1571303	711360	4.8
CPT-204	1571257	711062	5.9
CPT-105	1571255	710724	7.0
B-204	1571250	710416	8.5
CPT-205	1571250	710108	9.5
CPT-106	1571250	709825	11.3
CPT-206	1571247	709501	12.0
B-301	1571900	709418	9.6
B-302	1571900	709726	9.0
B-303	1571900	710044	8.3
B-304	1571900	710359	7.9
B-305	1571900	710672	7.0
B-306	1571900	711002	5.3
B-307	1571675	709431	10.1
B-308	1571675	709739	10.2
B-309	1571675	710056	8.7
B-310	1571675	710371	7.9
B-311	1571675	710684	7.1
B-312	1571675	711014	5.2
B-318	1571479	711028	5.7
B-317	1571479	710698	6.4
B-316	1571479	710385	6.3
B-315	1571479	710070	8.9
B-314	1571479	709753	11.0
B-313	1571479	709445	12.0

GEOTECHNICAL BORINGS WERE SUPERIMPOSED ON THE MAP BASED ON INFORMATION PROVIDED MORGAN & EKLUND, INC. UNDER COMMISSION NO. 5612.00, DATED 4-7-14.

I HEREBY CERTIFY THAT THE TOPOGRAPHIC SURVEY SHOWN HEREON IS BASED ON A RECENT FIELD SURVEY CONDUCTED UNDER MY PERSONAL DIRECTION AND IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF AND MEETS THE MINIMAL TECHNICAL STANDARDS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES.

_____ _____
WILLIAM T. SADLER JR., P.E., P.S.M. DATE
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER
FLORIDA REGISTRATION NO. 5859

REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROJECT: *TOPOGRAPHIC SURVEY OF FIND DMMA BV-4B BREVARD COUNTY, FLORIDA*

SHEET TITLE: *COVER SHEET / NOTES*

PREPARED FOR: *TAYLOR ENGINEERING, INC.* 10151 DEERWOOD PARK BLVD. BLDG. 300, STE. 300 JACKSONVILLE, FL 32256

PREPARED BY: *SEA DIVERSIFIED, INC.* SURVEYING AND ENGINEERING APPLICATIONS 21 NW 2ND STREET DELRAY BEACH, FLORIDA 33444 TEL: (561) 243-4920 FAX: (561) 243-4957 WWW.SEADIVERSIFIED.COM

DATE:	10-14-2014
DRAWN BY:	W.J.R.
CHECKED BY:	R.W.B.
SCALE:	AS NOTED
SHEET:	C1

CADD ID: 13-2155.B
TOTAL NUMBER OF SHEETS: 3

SDI P.N. 13-2155.B

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X708700 X709200 X709700 X710200 X710700 X711200 X711700

CUYLER STREET

FOUND BRASS DISC IN 4"x4" CONC. MONUMENT SJSC LB 4888

UNPAVED ROAD

FOUND IR

CONCRETE MONUMENT (NOT FOUND)

N89°23'00"E 2693.31'

EDGE OF UNPAVED ROAD

6' CHAIN LINK FENCE

UNPAVED ROAD

FOUND IR / C SJSC LB 4888

FOUND BRASS DISC IN 4"x4" CONC. MONUMENT SJSC LB 4888

EDGE OF UNPAVED ROAD

SEE DETAIL 1

60' EASEMENT

TOB

TOS

SEE BELOW FOR CONTINUATION

Y1572400

15' FLORIDA POWER AND LIGHT EASEMENT (O.R.B. 2974, PG. 4116)

N00°52'52"W 1520.01'

DITCH

PROPOSED PERIMETER DITCH BY OTHERS

24" HDPE E. INV EL. 4.30'

24" HDPE W. INV EL. 4.21'

DITCH

TOB

TOS

PROPOSED DREDGED MATERIAL MANAGEMENT AREA - BY OTHERS

B-101 B-201 B-301 B-307 B-313 B-314 B-315 B-309 B-308 B-302 B-303 B-304 B-310 B-311 B-316 B-317 B-318 B-312 B-305 B-306 B-202 B-203 B-204 B-102

CPT-101 CPT-201 CPT-206 CPT-106 CPT-205 CPT-105 CPT-204 CPT-202 CPT-103 CPT-203 CPT-104 CPT-207

BARN

VEGETATION / TREE LINE (TYP.)

6' CHAIN LINK FENCE

WETLAND AREA (TYP.) (LOCATION DETERMINED BY FIELD LOCATED FLAGS PLACED BY OTHERS)

POSSIBLE CULVERT NOT IDENTIFIED IN FIELD

APPROXIMATE BOUNDARY LINE

S89°23'00"W 3098.61'

CONCRETE MONUMENT (NOT FOUND)

6' CHAIN LINK FENCE

24" RCP W. INV. EL. 0.63'

EDGE OF UNPAVED ROAD

HAMMOCK ROAD

S15°49'50"E 1572.29'

24" HDPE E. INV EL. 2.57'

24" HDPE W. INV EL. 2.08'

DITCH

TOB

TOS

PROPOSED PERMITER DITCH BY OTHERS

PROPOSED DREDGED MATERIAL MANAGEMENT AREA - BY OTHERS

Y1571900

Y1571400

DITCH

POSSIBLE CULVERT NOT IDENTIFIED IN FIELD

24" PIPE N. INV. EL. -1.11'

24" PIPE S. INV. EL. -1.33'

6' CHAIN LINK FENCE

CONCRETE MONUMENT (NOT FOUND)

FOUND IR/C SJSC LB 4888

FOUND BRASS DISC IN 4"x4" CONC. MONUMENT SJSC LB 4888

SEE ABOVE FOR CONTINUATION

X712200 X712700 X713200

N89°27'41"E 1559.14'

60' EASEMENT

TOB

TOS

24" CMP W. INV. EL. -1.59"

24" CMP E. INV. EL. -1.41'

S89°27'41"W 1505.09'

18" CMP W. INV. EL. -1.48

18" CMP E. INV. EL. -1.18'

FOUND BRASS DISC: USACE IW BV-221 1992 JACKSONVILLE

EDGE OF ROCK

30" RCP W. INV. EL. -2.02'

30" RCP W. INV. EL. -2.2'

RAILROAD TRACKS

30" RCP TOP EL. 0.45' BOTTOM OF PIPE BURIED

30" RCP TOP EL. 0.38' BOTTOM OF PIPE BURIED

SEE DETAIL 2

N00°45'08"W 35.00'

N89°27'41"E 1567.66'

FOUND IR / C SJSC LB 4888

FOUND BRASS DISC IN 4"x4" CONC. MONUMENT SJSC LB 4888

S28°32'09"W 123.31'

DETAIL 1

NOT TO SCALE

TOPOGRAPHY NOT SHOWN FOR CLARITY

N89°27'41"E 102.97'

1211.35'

N14°24'58"W 61.80'

RAIL ROAD TRACKS

S14°24'58"E 61.80'

1280.00'

S89°27'41"W 102.97'

FOUND SURVEY DISC ARMY CORPS OF ENGINEERS STAMPED (IW BV-221 1992 JACKSONVILLE)

DETAIL 2

NOT TO SCALE

TOPOGRAPHY NOT SHOWN FOR CLARITY

NOTES:

1. PROPOSED DMMA CONSTRUCTION LAYOUT PROVIDED BY TAYLOR ENGINEERING & IS DISPLAYED FOR GRAPHICAL PURPOSES ONLY.
2. WETLAND AREA LOCATION DETERMINED BY FIELD LOCATED FLAGS PLACED BY OTHERS.
3. REFER TO COVER SHEET FOR ADDITIONAL SURVEY NOTES.
4. SEE COVER PAGE FOR BORING DATA.

****THIS IS NOT A BOUNDARY SURVEY***

SDI P.N. 13-2155.B

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REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROJECT: **TOPOGRAPHIC SURVEY OF FIND DMMA BV-48** BREVARD COUNTY, FLORIDA

SHEET TITLE: **TOPOGRAPHIC SURVEY**

PREPARED FOR: **TAYLOR ENGINEERING, INC.** 10151 DEERWOOD PARK BLVD. BLDG. 300, STE. 330 JACKSONVILLE, FL 32256

SEA DIVERSIFIED, INC. SURVEYING AND ENGINEERING APPLICATIONS
21 NW 2ND STREET DELRAY BEACH, FLORIDA 33444
TEL: (561) 243-4920 FAX: (561) 243-4957 WWW.SEADIVERSIFIED.COM

PREPARED BY: SEA DIVERSIFIED

DATE:	10-14-2014
DRAWN BY:	W.J.R.
CHECKED BY:	R.W.B.
SCALE:	1" = 100'

SHEET: **S1**

CADD ID: 13-2155.B
TOTAL NUMBER OF SHEETS: 3

X708700 X709200 X709700 X710200 X710700 X711200 X711700

CUYLER STREET

FOUND BRASS DISC
IN 4"x4" CONC. MONUMENT
SJSC LB 4888

UNPAVED ROAD

FOUND IR
CONCRETE MONUMENT
(NOT FOUND)

N89°23'00"E 2693.31'

EDGE OF UNPAVED ROAD

UNPAVED ROAD

FOUND IR / C
SJSC LB 4888

FOUND BRASS DISC
IN 4"x4" CONC. MONUMENT
SJSC LB 4888

EDGE OF UNPAVED ROAD

60' EASEMENT

Y1572400

8' CHAIN LINK FENCE

15' FLORIDA POWER AND LIGHT EASEMENT
(O.R.B. 2974, PG. 4116)

N00°52'52"W 1520.01'

DITCH

PROPOSED PERIMETER
DITCH BY OTHERS

24" HDPE
E. INV EL. 4.30'

24" HDPE
W. INV EL. 4.21'

PROPOSED DREDGED MATERIAL
MANAGEMENT AREA - BY OTHERS

DITCH

TOB

TOS

24" RCP
W. INV. EL. 0.63'

EDGE OF UNPAVED ROAD

Y1571900

BARN

VEGETATION / TREE
LINE (TYP.)

DITCH

TOB

TOS

HAMMOCK ROAD

S15°49'50"E 1573.29'

24" HDPE
E. INV EL. 2.57'

24" HDPE
W. INV EL. 2.08'

DITCH

TOB

TOS

TOB

TOS

PROPOSED DREDGED MATERIAL
MANAGEMENT AREA - BY OTHERS

PROPOSED PERIMETER
DITCH BY OTHERS

6' CHAIN LINK
FENCE

6' CHAIN LINK
FENCE

Y1571400

PROPOSED DREDGED MATERIAL
MANAGEMENT AREA - BY OTHERS

DITCH

POSSIBLE CULVERT
NOT IDENTIFIED IN FIELD

24" PIPE
N. INV. EL. -1.11'

24" PIPE
S. INV. EL. -1.33'

POSSIBLE CULVERT
NOT IDENTIFIED IN FIELD

WETLAND AREA (TYP.)
(LOCATION
DETERMINED BY
FIELD LOCATED FLAGS
PLACED BY OTHERS)

APPROXIMATE BOUNDARY LINE

S89°23'00"W 3098.61'

6' CHAIN LINK FENCE

CONCRETE
MONUMENT
(NOT FOUND)

CONCRETE
MONUMENT
(NOT FOUND)

FOUND IR/C
SJSC LB 4888

FOUND BRASS DISC
IN 4"x4" CONC. MONUMENT
SJSC LB 4888

GRID NORTH

NOTES:

1. PROPOSED DMMA CONSTRUCTION LAYOUT PROVIDED BY TAYLOR ENGINEERING & IS DISPLAYED FOR GRAPHICAL PURPOSES ONLY.
2. REFER TO COVER SHEET FOR ADDITIONAL SURVEY NOTES.

***THIS IS NOT A BOUNDARY SURVEY**

SDI P.N. 13-2155.B

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REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROJECT:

TOPOGRAPHIC SURVEY OF FIND DMMA BV-4B
BREVARD COUNTY, FLORIDA

SHEET TITLE:

WETLAND DEMARCATION

PREPARED FOR:

TAYLOR ENGINEERING, INC.
10151 DEERWOOD PARK BLVD.
BUILDING 300, SUITE 330
JACKSONVILLE, FL 32256

PREPARED BY:

SEA DIVERSIFIED, INC.
SURVEYING AND ENGINEERING APPLICATIONS
21 NW 2ND STREET
DELRAY BEACH, FLORIDA 33444
TEL: (561) 243-4920 FAX: (561) 243-4957
WWW.SEADIVERSIFIED.COM

DATE:	10-14-2014
DRAWN BY:	W.J.R.
CHECKED BY:	R.W.B.
SCALE:	1" = 100'

SHEET:

S2

CADD ID: 13-2155.B
TOTAL NUMBER OF SHEETS: 3

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX E

Draft Submittal Register

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* *RJ- REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 00 73 19 SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS												
01	00 73 19	Accident Prevention Plan	X		X							
02	00 73 19	Accident Reports			X							
SECTION 01 29 00 MEASUREMENT AND PAYMENT												
03	01 29 00	Schedule of Values	X	X								
04	01 29 00	Construction Schedule	X	X								
05	01 29 00	Revised Construction Schedules		X								
SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION												
06	01 31 00	List of Subcontractors	X		X							
07	01 31 00	Signature of Authority	X		X							
SECTION 01 33 00 SUBMITTAL PROCEDURES												
08	01 33 00	Final Submittal Register	X	X								
SECTION 01 35 43 ENVIRONMENTAL PROTECTION												
09	01 35 43	Environmental Protection Plan and Certification Form	X	X								
10	01 35 43	Erosion and Sediment Control Plan	X		X							
11	01 35 43	Listed Species Requirements	X	X								
12	01 35 43	Copy of Project Permits and Inspection Logs			X							
SECTION 01 40 00 CONTRACTOR QUALITY CONTROL												
13	01 40 00	Quality Control Plan	X	X								
SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS												
14	01 50 00	Mobilization/Demobilization Plan	X		X							
15	01 50 00	Hurricane and Severe Storm Plan	X		X							
16	01 50 00	Temporary Site Facility Drawings	X		X							
SECTION 01 78 00 PROJECT CLOSEOUT												
17	01 77 00	Record Drawings		X								
18	01 77 00	As-Built Drawings		X								
20	01 77 00	Request for Inspection			X							
21	01 77 00	Aerial Photos			X							

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* *RJ - REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 03 30 00 CAST-IN-PLACE CONCRETE												
22	03 30 00	Cast-in-Place Concrete Mixture Design	X	X								
23	03 30 00	Concrete Mix Materials	X	X								
24	03 30 00	Concrete Curing Materials and Methods	X	X								
25	03 30 00	Mass Concrete Temperature Monitoring Plan and Concrete Temperature Modeling (if required)	X	X								
26	03 30 00	Steel Reinforcement Certification and Shop Drawings	X	X								
27	03 30 00	Ancillary Materials	X	X								
28	03 30 00	Concrete Testing Reports		X								
29	03 30 00	Notice Ready for Inspection			X							
SECTION 31 10 00 SITE CLEARING AND GRUBBING												
30	31 10 00	Vegetative and Rubbish Disposal Verification			X							
SECTION 31 23 00 DIKE AND EARTHWORK CONSTRUCTION												
31	31 23 00	Geotechnical Engineer and Testing Laboratory Credentials	X	X								
32	31 23 00	Settlement and Pore Water Pressure Instrumentation	X	X								
33	31 23 00	Foundation Preparation Grading Plan	X	X								
34	31 23 00	Dewatering Plan	X	X								
35	31 23 00	Toe/Blanket and Drain Material Information	X	X								
36	31 23 00	Water Source for Dike Compaction	X	X								
37	32 23 00	Drainage Inlets and HDPE Drain Pipes	X	X								
38	31 23 00	Topsoil Handling and Temporary Storage Plan	X	X								
39	31 23 00	Dike Construction Quality Control Tests and Measurements		X								
40	31 23 00	Pipe Bedding Compaction Tests		X								
41	31 23 00	Dike Foundation and Pre-Payment Site Survey		X								
42	31 23 00	Settlement and Pore Water Pressure Construction Monitoring Data/Reports		X								
43	31 23 00	Pipe Invert Surveys		X								
44	31 23 00	Payment Surveys		X								
45	31 23 00	Pipe Inspection Video/Report		X								
46	31 23 00	Instrumentation Monitoring Report		X								
SECTION 31 23 33 TRENCHING AND SHORING FOR PIPE INSTALLATION												
47	31 23 33	Trench Shoring Shop Drawings (if required)	X	X								
48	31 23 33	Backfill Compaction Testing		X								

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* *RJ - REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 32 92 19 GRASSING ESTABLISHMENT												
49	32 92 19	Grass Establishment Plan	X	X								
50	32 92 19	Grassing Material Certificates		X								
51	32 92 19	Grass Watering and Maintenance Records		X								
SECTION 33 05 61 PRECAST CONCRETE MANHOLES AND INLETS												
52	33 05 61	Precast Plant Certification	X	X								
53	34 05 61	Product Information	X	X								
54	36 05 61	Drainage Structures Shop Drawings	X	X								
SECTION 33 40 00 STEEL BOX WEIRS AND ALUMINUM WALKWAY												
55	33 40 00	Epoxy Anchor Product Data	X	X								
56	33 40 00	Neoprene Bearing Pad Data	X	X								
57	33 40 00	Weir Shop Drawings	X	X								
58	33 40 00	Walkway Shop Drawing	X	X								
59	33 40 00	Weir Coating System	X	X								
60	33 40 00	Welding Certification	X		X							
61	33 40 00	Hardware Product Data	X	X								
62	33 40 00	Aluminum Grating Product Data	X	X								
63	33 40 00	Weir Fabricated Flap Valve Shop Drawings and Material Data	X	X								
64	33 40 00	Fabricated Weir Lift Plan	X	X								
65	33 40 00	Weir Board Product Data	X	X								
66	33 40 00	Mobile Storage Container Information										
67	33 40 00	Mobile Storage Container Inspection Notice										
68	33 40 00	Weir Neoprene Gasket Material and Adhesive	X	X								
69	33 40 00	Weir Shop Inspection Notice			X							
70	33 40 00	Walkway Shop Inspection Notice			X							
71	33 40 00	Weir Coating Inspection Report		X								
72	33 40 00	Certified Steel Mill Reports			X							
73	33 40 00	Certified Aluminum Mill Reports			X							
SECTION 33 46 00 HDPE SOLID WALL PIPE												
74	33 46 00	HDPE Pipe Product Information	X	X								
75	33 46 00	HDPE Weir Pipe Shop Drawings	X	X								
76	33 46 00	Leak Testing Plan	X	X								
77	33 46 00	Results of Leak Test		X								

Dredged Material Management Area BV-4B Construction

			TYPE			CONTRACTOR ACTION/SCHEDULE DATES				ENGINEER ACTION		REMARKS
TRANSMITTAL NO	SPEC. SECTION NO.	DESCRIPTION OF ITEMS SUBMITTED	PRECONSTRUCTION SUBMITTAL	ENGINEER APPROV	INFORMATION ONLY	REVIEWER	SUBMISSION DATE	APPRV NEEDED BY	MATL NEEDED BY	DATE	APPROVAL CODE	APPROVAL CODES: AP- *APPROVED AS SUBMITTED* AC- *APPROVED AS CORRECTED* RR- *REVISE AND RESUBMIT, MAKE CORRECTIONS NOTED* *RJ - REJECTED, DEVELOP REPLACEMENT* NR- SUBMITTAL NOT REQUIRED-RETURNED WITHOUT REVIEW IO - SUBMITTAL RECEIVED FOR INFORMATION ONLY SI - SUBMIT SPECIFIED ITEM
SECTION 34 71 00 ROADWAY STABLIZATION												
78	34 71 00	Stabilization Material Information	X	X								
79	34 71 00	Compaction Control and Quality Control Tests		X								
SECTION 35 42 37 RIP-RAP SPLASH PAD AND EROSION PROTECTION STONE												
80	35 42 37	Riprap Product Data	X	X								
81	35 42 37	Stone Test Results	X	X								
82	35 42 37	Filter Fabric Product Data	X	X								
SECTION 40 05 61 RESILIENT WEDGE GATE VALVE												
83	40 05 61	Valve General Information		X								

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX F

General Forms

CERTIFICATION LETTER ACKNOWLEDGING ALL PERMITS ARE ON FILE

I _____ have a copy of all permits for

_____ project and have read and

understand the conditions in the permit.

Signature of Contractor

AFFIDAVIT

STATE OF FLORIDA

COUNTY OF _____

Before me, the undersigned authority, authorized to administer oaths and take acknowledgements, personally appeared _____, who, after being first duly sworn, upon oath deposes and says that all lienors contracting directly with, or directly employed by (him, them, it) and that all taxes imposed by Chapter 212, Florida Statutes (Sales and Use Tax) as amended, have been paid and discharged, and that all bills, wages, fees, claims, and other charges incurred by _____ in connection with the construction of:_____

_____

_____have been paid in full.

SIGNED:

By: _____

WITNESSES:

By: _____

Sworn and subscribed to before me this day _____, 20___AD.

_____
Notary Public
State of Florida-at-Large
My Commission Expires: _____

FINAL RELEASE OF LIEN

KNOW ALL MEN BY THESE PRESENT, that _____ _____ for and in consideration of the sum of_____ Dollars ($) paid to _____ by the _____ _____receipt of which is hereby acknowledged, do(es) hereby release and quitclaim to the Owner, its successors or assigns, all liens, lien rights, claims or demands of any kind whatsoever which _____ now has (have) or might have against the property, building, and/or for any incidental expense for the construction of:_____

_____

_____

thereon or in otherwise improving said property situated as above described.

IN WITNESS WHEREOF have (has) hereunto set hand and seal this day of , 20 , A.D.

WITNESS:

_____ _____

(Seal)

Sworn and subscribed to before me this day _____, 20___AD.

_____

Notary Public
State of Florida-at-Large
My Commission Expires: _____

CERTIFICATION OF CONTRACTOR

According to the best of my knowledge and belief, I certify that all items and amounts shown on Application for Payment No. _____ are correct, and that all work has been performed and/or materials supplied in full accordance with the terms and conditions of this Contract, dated _____, 20_____, between _____ (Owner) and _____ (Contractor);

I further certify that all taxes imposed by Chapter 212, Florida Statutes (Sales and Use Tax Act), as amended, have been paid and discharged; and that there are no Vendor's, Mechanic's or other Liens or right to liens or conditional sales contacts which should be satisfied or discharged before such payment is made.

Date: _____ Contractor: _____

STATE OF FLORIDA

COUNTY OF_____

Personally appeared before me this _____ day of _____,20__

_____ known (or made known) to me as the _____

_____ (Owner) (Partner) (Corporate Officer) – Give Title of _____

_____ Contractor(s), who subscribed and swore to the above instrument in my presence.

_____
Notary Public
State of Florida-at-Large
My Commission Expires: _____

The Contractor shall execute this Certificate and attach it to each Application for Payment.

DREDGED MATERIAL MANAGEMENT AREA BV-4B CONSTRUCTION
BREVARD COUNTY, FLORIDA

APPENDIX G

Listed Species Information

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service
August 12, 2013

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida for use by applicants and their construction personnel. At least **30 days prior** to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov; South Florida Field Office: verobeach@fws.gov; Panama City Field Office: panamacity@fws.gov). As long as the signatory of the e-mail certifies compliance with the below Plan (including use of the attached poster and brochure), no further written confirmation or "approval" from the USFWS is needed and the applicant may move forward with the project.

If the applicant decides to use an eastern indigo snake protection/education plan other than the approved Plan below, written confirmation or "approval" from the USFWS that the plan is adequate must be obtained. At least 30 days prior to any clearing/land alteration activities, the applicant shall submit their unique plan for review and approval. The USFWS will respond via e-mail, typically within 30 days of receiving the plan, either concurring that the plan is adequate or requesting additional information. A concurrence e-mail from the appropriate USFWS Field Office will fulfill approval requirements.

The Plan materials should consist of: 1) a combination of posters and pamphlets (see **Poster Information** section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated (see **Pre-Construction Activities** and **During Construction Activities** sections below).

POSTER INFORMATION

Posters with the following information shall be placed at strategic locations on the construction site and along any proposed access roads (a final poster for Plan compliance, to be printed on 11" x 17" or larger paper and laminated, is attached):

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands

and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION UNDER FEDERAL AND STATE LAW: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

IF YOU SEE A <u>LIVE</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the live eastern indigo snake sufficient time to move away from the site without interference;
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A <u>DEAD</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

Telephone numbers of USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office – (904) 731-3336
Panama City Field Office – (850) 769-0552
South Florida Field Office – (772) 562-3909

PRE-CONSTRUCTION ACTIVITIES

1. The applicant or designated agent will post educational posters in the construction office and throughout the construction site, including any access roads. The posters must be clearly visible to all construction staff. A sample poster is attached.

2. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss identification of the snake, its protected status, what to do if a snake is observed within the project area, and applicable penalties that may be imposed if state and/or federal regulations are violated. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office (a final brochure for Plan compliance, to be printed double-sided on 8.5" x 11" paper and then properly folded, is attached). Photos of eastern indigo snakes may be accessed on USFWS and/or FWC websites.

3. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan, which includes notification of the appropriate USFWS Field Office. The contact information for the USFWS is provided on the referenced posters and brochures.

DURING CONSTRUCTION ACTIVITIES

1. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting (example: discovery of snake sheds, tracks, lots of refugia and cavities present in the area of clearing activities, and presence of gopher tortoises and burrows).

2. If an eastern indigo snake is discovered during gopher tortoise relocation activities (i.e. burrow excavation), the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.

3. Periodically during construction activities, the applicant's designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed. Construction personnel should be reminded of the instructions (above) as to what is expected if any eastern indigo snakes are seen.

POST CONSTRUCTION ACTIVITIES

Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion. The report can be sent electronically to the appropriate USFWS e-mail address listed on page one of this Plan.


Photo: Dirk Stevenson

ATTENTION:

THREATENED EASTERN INDIGO SNAKES MAY BE PRESENT ON THIS SITE!!!

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IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

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Killing, harming, or harassing indigo snakes is strictly prohibited and punishable under State and Federal Law.

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LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

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LEGAL STATUS: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

August 12, 2013

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Please read the following information provided by the U.S. Fish and Wildlife Service to become familiar with standard protection measures for the eastern indigo snake.

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK
2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:



Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

Noise Best Management Practices (BMPs) for Piling Installation

The following best management practices are designed to reduce the exposure to sea turtles, smalltooth sawfish, and sturgeon to potential harmful daily noise exposure levels associated with pile driving during dock and seawall construction activities.

Noise BMP Plan A (For all projects): Sea Turtle, Smalltooth Sawfish, and Sturgeon Construction Conditions

The permittee shall comply with the following protected species construction conditions:

a. All construction personnel are responsible for observing water-related activities to detect the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing species protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which protected species cannot become entangled, be properly secured, and be regularly monitored to avoid protected species' entrapment. Barriers may not block protected species entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. If a protected species is seen within 100 yd of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 ft of a protected species. Operation of any mechanical construction equipment shall cease immediately if a protected species is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

e. Any injury to a protected species shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

f. All work must occur during daylight hours.

Noise BMP Plan B (for Impact Pile-Driving Installation of 6 or More Concrete Piles per Day)

The permittee shall follow all conditions defined in the Noise BMP Plan A above plus the conditions provided below:

1. It must be determined if the project occurs in open water or a confined space. This differentiation is important because if a project occurs in a confined space, an animal may not move through or past a noise source to escape it. A *confined space* is defined as any area that has a solid object (e.g., shoreline, seawall, jetty) or structure within 150 feet (ft) of the pile installation site that would effectively serve as a barrier or otherwise prevent animals from moving past it to exit the area. This does not include objects such as docks or other pile-supported structures that would not stop animal movement or significantly reflect noise.

2. If the project is located in open water, up to 10 concrete piles measuring up to 24-in diameter may be installed per day.

3. If the project is located in a confined space, up to 5 concrete piles measuring up to 24-in diameter may be installed per day.

4. If more than 5 piles will be installed per day in a confined space, noise abatement measures (below) are required for all of the concrete piles installed that day with a maximum of 10 piles installed per day.

Noise Abatement Measures: Approved noise abatement measures include noise attenuation piles (TNAP) and/or bubble curtains.

TNAP design must be constructed of a double-walled tubular casing (a casing within a larger casing), with at least a 5-inwide hollow space completely filled with closed-cell foam or other noise dampening material between the walls. The TNAP must be long enough to be seated firmly on the sea bottom, fit over the pile being driven, and extend at least 3 ft above the surface of the water.

Bubble curtain design must adhere to the guidelines for unconfined and confined bubble curtains defined below, and be followed as detailed in the USACE permit application. The use of *any* other alternative noise control method must receive prior approval by NMFS and the USACE.

If the required noise abatement measure discussed above cannot be used, then the pile must be installed by a different method using the appropriate noise BMPs defined in this document. (e.g., concrete piles may be installed by vibratory hammer instead, following BMP Plan A).

Bubble Curtain Specifications for Pile Driving
When using an impact hammer to drive or proof concrete piles, use one of the following sound attenuation methods:

1. If water velocity is equal to or less than 1.6 ft per second (1.1 miles per hour) for the entire installation period, surround the pile being driven by a confined or

unconfined bubble curtain that will distribute small air bubbles around 100% of the pile perimeter for the full depth of the water column.

a. General - An unconfined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe, and a frame. The frame facilitates transport and placement of the system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation.

b. The aeration pipe system shall consist of multiple layers of perforated pipe rings, stacked vertically in accordance with the following:

Water Depth (m)	No. of Layers
0 to less than 5	2
5 to less than 10	4
10 to less than 15	7
15 to less than 20	10
20 to less than 25	13

c. The pipes in all layers shall be arranged in a geometric pattern which shall allow for the pile being driven to be completely enclosed by bubbles for the full depth of the water column and with a radial dimension such that the rings are no more than 0.5 m from the outside surface of the pile.

i. The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without burial and shall accommodate sloped conditions.

ii. Air holes shall be 1.6 millimeter (mm) (1/16-in) in diameter and shall be spaced approximately 20 mm (3/4 in) apart. Air holes with this size and spacing shall be placed in 4 adjacent rows along the pipe to provide uniform bubble flux.

iii. The system shall provide a bubble flux 3.0 m^3 per minute per linear meter of pipe in each layer (32.91 ft^3 per minute per lin ft of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

V_t = 3.0 m^3/min/m * Circumference of the aeration ring in m

or

V_t = 32.91 ft^3/min/ft * Circumference of the aeration ring in ft

iv. Meters shall be provided as follows:

• Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

• Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated.

Flow meters shall be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

2. If water velocity is greater than 1.6 ft per second (1.1 miles per hour) at any point during installation or if constructing a seawall, surround the pile or area being driven by a confined bubble curtain (e.g., a bubble ring surrounded by a fabric or non-metallic sleeve). The confined bubble curtain will distribute air bubbles around 100% of the pile perimeter for the full depth of the water column, according to specifications below.

    a. General - A confined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe(s), and a means of confining the bubbles.

    b. The confinement shall extend from the substrate to a sufficient elevation above the maximum water level expected during pile installation such that when the air delivery system is adjusted properly, the bubble curtain does not act as a water pump (i.e., little or no water should be pumped out of the top of the confinement system).

    c. The confinement shall contain resilient pile guides that prevent the pile and the confinement from coming into contact with each other and do not transmit vibrations to the confinement sleeve and into the water column (e.g., rubber spacers, air-filled cushions).

    d. In-water less than 15 m deep, the system shall have a single aeration ring at the substrate level. In-waters greater than 15 m deep, the system shall have at least 2 rings: 1 at the substrate level and the other at mid-depth.

    e. The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without sinking into the substrate and shall accommodate for sloped conditions.

f. Air holes shall be 1.6 mm (1/16-in) in diameter and shall be spaced approximately 20 mm (3/4 in) apart. Air holes with this size and spacing shall be placed in 4 adjacent rows along the pipe to provide uniform bubble flux.

g. The system shall provide a bubble flux of 2.0 m^3 per minute per linear meter of pipe in each layer (21.53 ft^3 per minute per lin ft of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

Vt = 2.0 m3/min/m * Circumference of the aeration ring in m

or

Vt = 21.53 ft3/min/ft * Circumference of the aeration ring in ft

h. Flow meters shall be provided as follows:

Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

ii. Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated.

iii. Flow meters shall be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

South Florida Ecological Services Office

DRAFT

February 12, 2004

STANDARD PROTECTION MEASURES FOR THE ATLANTIC SALT MARSH SNAKE

1. Develop educational materials on Atlantic salt marsh snakes and on the ecological communities and hydrological functions of coastal saltwort flats and salt grass-bordered tidal creeks in Indian River County. Educational materials could include a combination of posters, videos, pamphlets, and lectures (*e.g.*, an observer trained to identify Atlantic salt marsh snakes could instruct construction personnel before any clearing activities occur). You may also fund development of educational materials by a local environmental organization or institution.

2. Post informational signs throughout the construction site and along any proposed access road containing the following information:

   a. a description of Atlantic salt marsh snakes, their habits, and protection under Federal Law;

   b. instructions not to injure, harass, or kill this species;

   c. directions to cease activities, and to contact the U.S. Fish and Wildlife Service if an Atlantic salt marsh snake is encountered; and,

   d. telephone numbers of pertinent agencies to be contacted if a dead Atlantic salt marsh snake is encountered.

   Informational posters should be submitted for review as part of the consultation package.

3. An Atlantic salt marsh snake monitoring report must be submitted to the South Florida Ecological Services Office within 60 days of the conclusion of activities. The report should be submitted whether or not Atlantic salt marsh snakes are observed. the report should contain the following information:

   a. any sightings of Atlantic salt marsh snakes and

   b. other obligations required by the Florida Fish and Wildlife Conservation Commission, as stipulated in the permit.

ATLANTIC SALT MARSH SNAKE

Nerodia clarkii taeniata



Photo of Atlantic salt march snake. Photo courtesy of USFWS/Photo by Robert S. Simmons.

FAMILY: Colubridae

STATUS: Threatened throughout its range (*Federal Register*, November 29, 1977)

DESCRIPTION: The Atlantic salt marsh snake is a slender, heavily keeled water snake about 2 feet in total length, with a pattern of stripes that are variously broken into blotches. The dorsal ground color is pale olive, patterned with a pair of dark brown stripes running down the back and enclosing a pale mid-dorsal stripe. These dark stripes usually become fragmented posteriorly into a series of elongate blotches. There is also a row of dark blotches along the lower sides of the body, which merge to form stripes in the neck region. The ventral surface is black with a median series of yellowish spots. This snake feeds on small fish in shallow water. It is most active at night, during periods of low tide.

REPRODUCTION AND DEVELOPMENT: Little is known about the life history of this snake, but it is probably similar to the Gulf salt marsh snake. Females of the Gulf Coast race produce from 2 to 14 live young, usually in mid-summer.

RANGE AND POPULATION LEVEL: Although historically reported from coastal areas of Volusia, Brevard, and Indian River counties, Florida, it now appears to be restricted to a limited coastal strip in Volusia County. Its population level is currently unknown.

HABITAT: The Atlantic salt marsh snake inhabits coastal salt marshes and mangrove swamps. Specifically, it occurs along shallow tidal creeks and pools, in a saline environment ranging from brackish to full strength. It is often associated with fiddler crab burrows.

REASONS FOR CURRENT STATUS: Extensive drainage and development within the coastal zone has reduced the available habitat of this species. Continued filling of coastal wetlands will further limit the range of this already restricted reptile. Additionally, creating impoundments in marshlands for mosquito control may eliminate habitat by changing water salinity. There is also a concern that habitat disturbance within these regions may have broken down natural isolating mechanisms between the Atlantic salt marsh snake and the adjacent freshwater snake (*Nerodia fasciata pictiventris*). This breakdown may be responsible for hybridization between these species.

MANAGEMENT AND PROTECTION: Along with efforts to discourage further loss of habitat, there is also a need for extensive studies on the life history and status of this species.

REFERENCES:

Kochman, H.I. 1992. Atlantic Salt Marsh Snake. Pages 111-116 in Paul E. Mohler, ed., Rare and Endangered Biota of Florida, Volume III. Amphibians and Reptiles. University Press of Florida, Gainesville. Page 291.

U.S. Fish and Wildlife Service. 1993. Atlantic Salt Marsh Snake Recovery Plan. Atlanta, Georgia. 19 pages.

U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan for the threatened and endangered species. Vero Beach, Florida.

For more information please contact:

Bill Brooks
U.S. Fish and Wildlife Service
6620 Southpoint Drive South, Suite 310
Jacksonville, Florida 32216
904/232-2580
billy_brooks@fws.gov

Last Updated: 4/2001
Last Reviewed 9/2005