SECTION 31 43 16.16

VERIFICATION DRILLING

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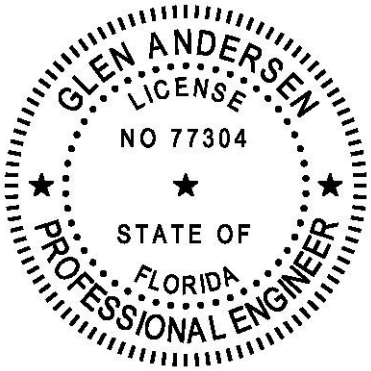
Engineer's Seal



Digital Signature

DN: cn=Glen R. Andersen, o=Wood Environment & Infrastructure Solutions, Inc., ou, email=glen.andersen@woodplc.com, c=US
Date: 2021.07.28 17:58:53 -04'00'

GLEN ANDERSEN P.E., STATE OF FLORIDA, PROFESSIONAL ENGINEER, LICENSE NO. 77304.

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY GLEN ANDERSEN ON 28 JULY 2021, USING AN SHA AUTHENTICATION CODE.

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SECTION 31 43 13.16

VERIFICATION DRILLING

PART 1 GENERAL

1.1 SUMMARY

The work specified in this section entails the drilling and sampling of the Cutoff Wall segments constructed using the Deep Soil Mixing (DSM) and Jet Grouting methods to verify that the Cutoff Wall Acceptance Criteria has been met.

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.

ASTM D 2488 (Description and Identification of Soils (Visual-Manual Procedure)

1.3 REQUIREMENTS

The Contractor shall provide drilling and sampling of the completed Cutoff Wall to verify its continuity and to obtain samples of sufficient quality for required laboratory testing visual and petrographic analyses. This is to be accomplished by means of core drilling. Other drilling methods will be accepted if suitable for the conditions of the site and Cutoff Wall materials to be sampled. The equipment and techniques to be used shall be submitted in the Drilling Plan.

Acceptance of a segment of Cutoff Wall will not be approved until the verification drilling and testing is performed, and the acceptance criteria noted herein are satisfied. The Contractor shall plan activities accordingly.

Seven (7) drill holes shall be located by the Engineer; two in the Jet Grout Walls, 2 in th DSM walls behind the Training Walls, and three in the downstream channel. Up to four (4) additional drill holes may be required by the Engineer at no additional cost.

Core Drilling: Drilling of cores shall be by any approved standard and accepted method of rotary core drilling that will provide continuous and complete cores of a minimum diameter of 2¼ inches over the entire depth of the constructed Cutoff Wall and with a minimum diameter to accept an inclinometer casing. The method used shall provide excellent recovery of cores from the cutoff wall with potential sand lenses and unmixed zones, and not cause damage to the Cutoff Wall.

The Contractor shall provide a qualified Borehole Logger to oversee all drilling, sampling and field-testing operations. This individual shall be responsible for the preparation of drilling logs and for the preparation of all samples for delivery. The presence of an Owner's representative or the keeping of separate drilling records by the Engineer shall not relieve the Contractor of the responsibility for the work specified herein.

1.4 SUBMITTALS

A. Drilling and Testing Plan: Prior to starting work, the Contractor shall submit a plan for the drilling, sampling, and testing procedures. The plan shall include, but shall not be limited to, the proposed methods of drilling, sampling, and testing, including a description of the equipment that will be used. The plan shall also include a listing of any subcontractors that will be used and a description of how the subcontractors are to be used. No work shall be performed until this plan has been approved and no deviation from the approved plan will be permitted without prior approval by the Engineer.

B. Drilling and Testing Reports: The Contractor shall submit complete drilling/coring logs in addition to photographs of all core samples.

1.5 QUALIFICATIONS

A. Driller: The driller shall have experience using coring equipment similar to the equipment to be used for this contract and experience coring through soilcrete walls with properties similar to those being specified for this project. The experience shall include a minimum of 3 years performing geotechnical drilling and the previous completion of at least 3 projects requiring coring to depth in excess of 60 feet using equipment similar to that being used for this contract.

B. Logger: The individual logging the core boring shall be a geologist or geotechnical engineer with a minimum of 3 years' experience conducting subsurface investigations, and soil/rock classifications.

PART 2 PRODUCTS

2.1 EQUIPMENT AND SUPPLIES

A. Equipment to be furnished by the Contractor for core drilling shall include core-drilling machinery of a type approved by the Engineer, complete with all the accessories and materials needed to take continuous cores of a diameter greater than 2-1/4 inches to the specified depths. The Contractor shall use, as a minimum, a standard ball-bearing, swivel-head, double-tube core barrel, or equivalent. The capacity of the core barrel shall not exceed 10.5 feet of core. Supplies for core drilling to be furnished by the Contractor shall include, but not be limited to, all casing, drill rods, core barrels, coring bits, piping, pumps, water, tools, drilling fluids and sample containers required for core samples. Selection of the type of bit shall be at the Contractor's discretion provided that the selected bit produces high quality core capable of providing suitable samples for visual identification and petrographic analyses.

PART 3 EXECUTION

3.1 CORE DRILLING

A. Procedure: All holes shall be drilled vertically to within 2 feet of the finished depth of the Cutoff Wall taking care to not penetrate through the bottom of the Cutoff Wall. The drilling speed, down pressure and drilling fluid pressure shall be controlled to ensure maximum core quality and recovery and minimize any damage to the cutoff wall. The Logger shall exercise particular care in recording zones of loss of drilling fluid circulation, cavities, rough drilling, and other unusual occurrences. At selected locations, an inclinometer casing may be inserted in the core hole by the Engineer to provide a measurement of the actual position of the core

hole.

B. Arrangement of Core Samples: All cores shall be arranged neatly in the partitioned boxes in the same sequence in which they occurred. A digital photograph of the boxed core samples shall be taken clearly showing the label and the core sample, before sample or preservation activities.

C. Preservation of Core: The Contractor shall protect the filled core boxes from direct sunlight and precipitation by some form of shelter that allows ventilation to the boxes. Upon final completion of the Cutoff Wall construction, the cores shall be disposed of by the Contractor unless otherwise instructed by the Owner.

3.2 SUPPLEMENTAL BORINGS

Core borings that are abandoned by the Contractor shall be supplemented by other borings adjacent to the original. Actual locations of any supplemental borings will be established by the Engineer. No payment will be made for borings that were abandoned.

3.3 BACKFILLING

The Contractor shall preserve all holes in good condition until final measurement has been accepted at the hole location. The Contractor shall submit a plan for backfilling of the core holes that will reestablish the seepage control function of the cutoff wall. This plan shall be approved by the Engineer prior to coring operations. No separate payment will be made for backfilling core holes.

3.4 RECORDS

The Contractor shall keep accurate drilling logs, photographs, and records of all work accomplished under this contract and shall deliver complete, legible copies of these logs and records to the Engineer with applicable field and laboratory testing identified before acceptance of the section of Cutoff Wall represented by the boring. At a minimum, the following information shall be included in the records for each hole:

A. Hole designation and elevation of top of hole.

B. Driller and Logger name.

C. Make, size, and manufacturer's model designation of drilling equipment.

D. Hole diameter.

E. Dates and time when drilling operations were performed.

F. Time required for drilling each core run.

G. Rotation speed, hydraulic pressure, drilling fluid pressure, and any unusual occurrences which could indicate abnormalities in the Cutoff Wall.

H. Depths at which core samples were recovered, including top and bottom depth of each run.

I. Classification and description by depths of materials cored including composition, texture, presence, and orientation of bedding or fractures, presence of inclusions, and the recovery and RQD for each cored interval.

J. Depths at which drill water is lost and regained and amounts.

K. Termination depth of borehole.

-- End of Section --