



U.S. Army Corps of Engineers  
Charleston District

## APPENDIX G

**CHARLESTON HARBOR POST 45  
BENEFICIAL USE OF DREDGED MATERIAL  
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT  
*CHARLESTON, SOUTH CAROLINA***

**Subsurface Investigation and  
Geotechnical Laboratory Results in  
Support of Beneficial Use Analysis**

30 September 2016

July 26, 2016

**U.S. Army Corps of Engineers**  
Attn: Mr. Mitchell Hall, P.G.  
Chief, Geotechnical & Environmental  
Remediation Section,  
69 Darlington Avenue  
Wilmington, NC 28403-1343



**RE: Subsurface Investigation and Geotechnical Laboratory Testing Results  
Charleston Harbor Post 45 Preconstruction Engineering and Design  
Beneficial Use of Disposal Material  
Charleston County, South Carolina**

American Vibracore Services, Inc. is pleased to submit this report regarding the completion of the vibracore field work and lab analysis phases of this project.

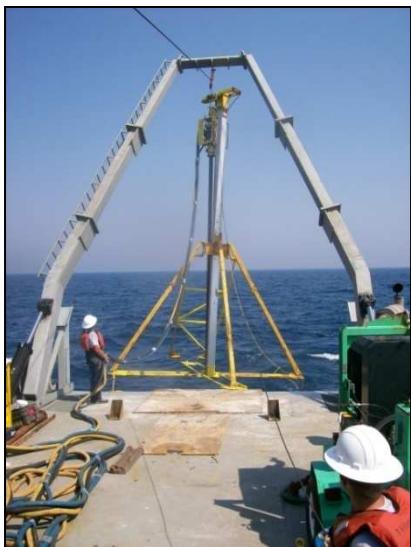
### **Overview**

American Vibracore Services, Inc. (AVS) under contract from the U.S. Army Corps of Engineers, Wilmington District, conducted vibracore sampling and wash probe operations for this project.

The field work was conducted in the Lower Reaches and Entrance Channel of Charleston Harbor, Charleston, South Carolina from May 13<sup>th</sup> through May 15<sup>th</sup>, 2016. A total of 29 vibracores were collected to within 20 feet of locations designated by USACE, Wilmington District.

A total of 30 wash probes were completed in the outer 7-miles of the Charleston Harbor entrance channel including the 3-mile extension. The cores were analyzed per USACE project guidelines, and a report of the findings is listed herein.

## **Vibracore and Washprobe Program**



AVS utilized the vessel MV Thunderforce as a work platform for vibracore and washprobe operations. AVS's large pneumatic vibracore machine was used to extract vibracore samples to a depth of 20 feet or until refusal as defined by penetration less than 0.1 feet per 10 second interval was encountered. Core locations were surveyed utilizing Real Time Kinematic (RTK) Global Positioning System (GPS) to accuracies within 0.2 feet both vertically and horizontally by McKim and Creed Inc. surveyors located in Wilmington, North Carolina. Core locations can be viewed in site maps prepared for individual reach's and are listed in the following report under Appendix A, Figures 1-3.

Washprobes were completed by retrofitting the existing pneumatic vibracore unit with a neckdown flange to accommodate the specified 2" diameter washprobe pipe. Using already established jetting procedures, washprobes were advanced through the sea floor surface to minimum termination elevations of -60 feet below Mean Lower Low Water (MLLW). No washprobe refusal was encountered during the jetting program and all washprobe locations are depicted on the site map contained in Appendix A as Figure 4.



## **Core Processing and Laboratory Testing**

All cores collected from the project were transported to AVS's laboratory facility, where they were split, logged, sampled, and preserved. Laboratory testing was conducted in the form of American Society for Testing and Materials (ASTM) D422 grain size analysis and hydrometer testing, ASTM D2487 soils classification for engineering purposes, and visual limestone and shell content analysis for designated sieve sizes. Additionally, the cores were photographed and compiled into mosaic log sheets as a visual supplement to the core logs. All stratigraphic horizons are reported relative to MLLW elevations.

Grain size analysis was conducted utilizing the following sieve sizes: ¾ in, ½ in, 3/8 in, No. 4, No. 10, No. 20, No. 40, No. 60, No. 100, and No. 200, and all fines passing the No. 200 sieve were subjected to hydrometer testing. In total, 87 gradational samples were collected for analysis and 23 archive samples were collected as indicated by the USACE and will be delivered to the USACE, Wilmington District to allow for additional testing should it be required at a later date.

## **Reporting**

This final report includes the vibracore logs in gINT formatting, core photographic mosaic logs, tabulated washprobe sounding data, penetrometer records, maps of coring/washprobe locations, and lab data with gradation tables and curves for each sample tested. Incremental deliveries of preliminary data were submitted to the USACE for review throughout the duration of the study. All recommendations provided from preliminary submittals have been included in the final deliverable.

This report serves as a compilation of all findings in the Subsurface Investigation and Geotechnical Laboratory Testing Results, Charleston Harbor, Post-45 Preconstruction Engineering and Design, Beneficial Use of Disposal Material, Charleston County, SC study. The information contained herein meets or exceeds requirements established by the USACE which was agreed upon by AVS and reflects work completed to the most current standards and procedures unless otherwise requested.

In addition, AVS is dedicated to safe work practices and is pleased to report that all work related to this project was completed with zero reportable incidents.

## **Closing**

We appreciate the opportunity to be of service to the U.S. Army Corps of Engineers on this project and look forward to a continued relationship.

**Respectfully Submitted,**

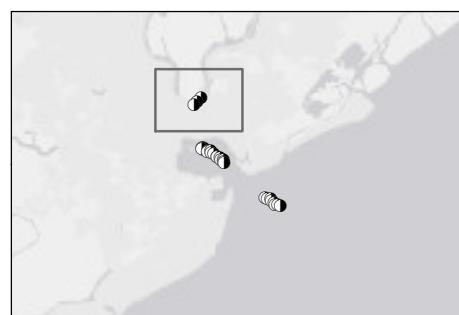


Frederick G Kaub P.G.  
Registered Geologist # 1344  
State of Florida

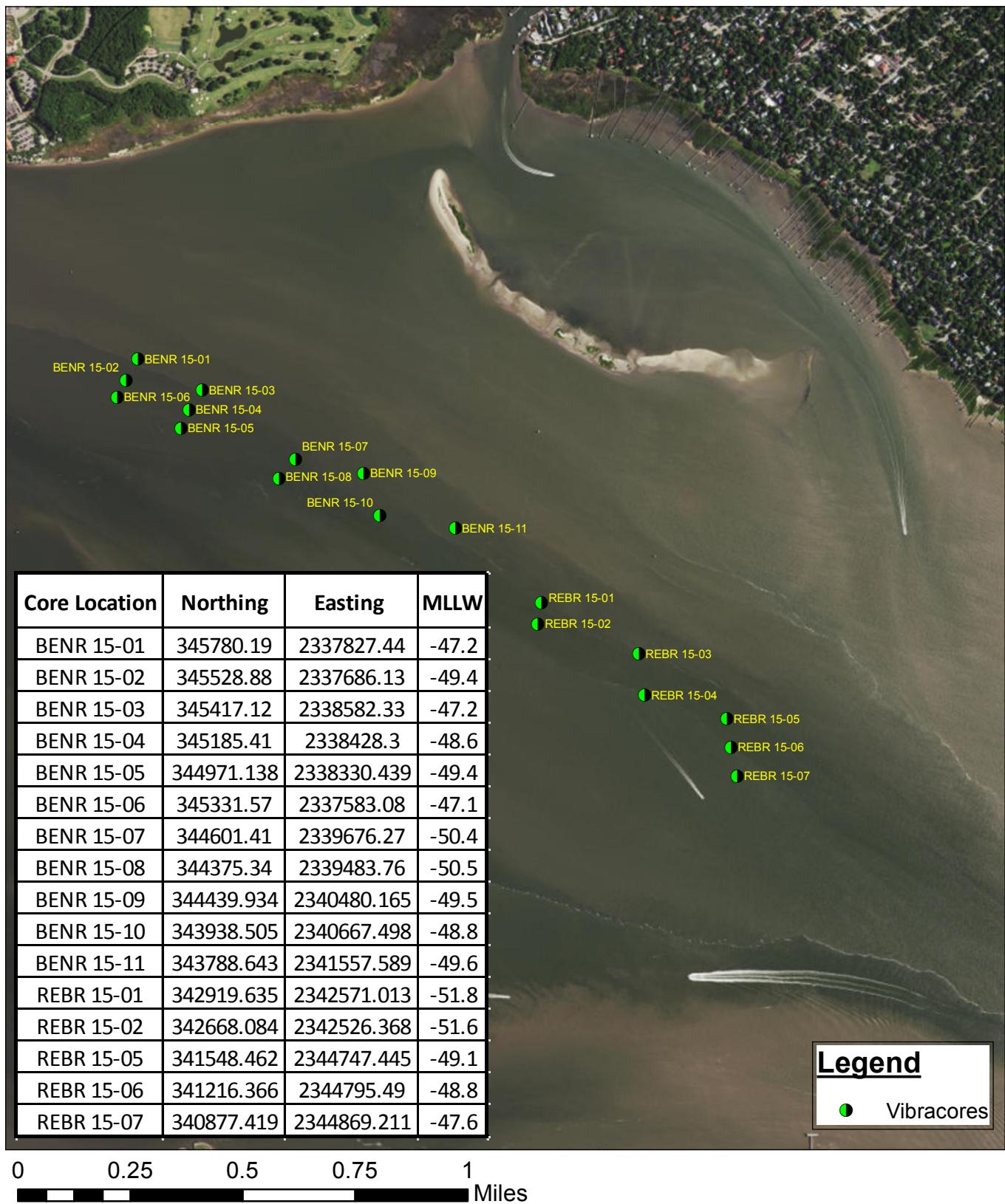
# Figure 1: Wando Reach



  
**AMERICAN VIBRACORE**  
SERVICES



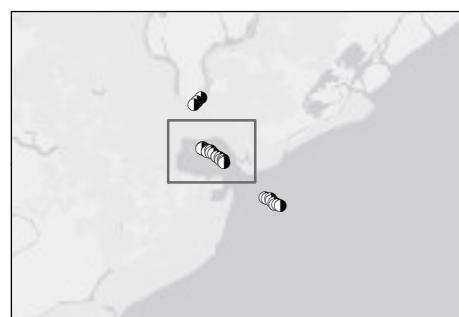
# Figure 2: Bennis & Rebellion Reach



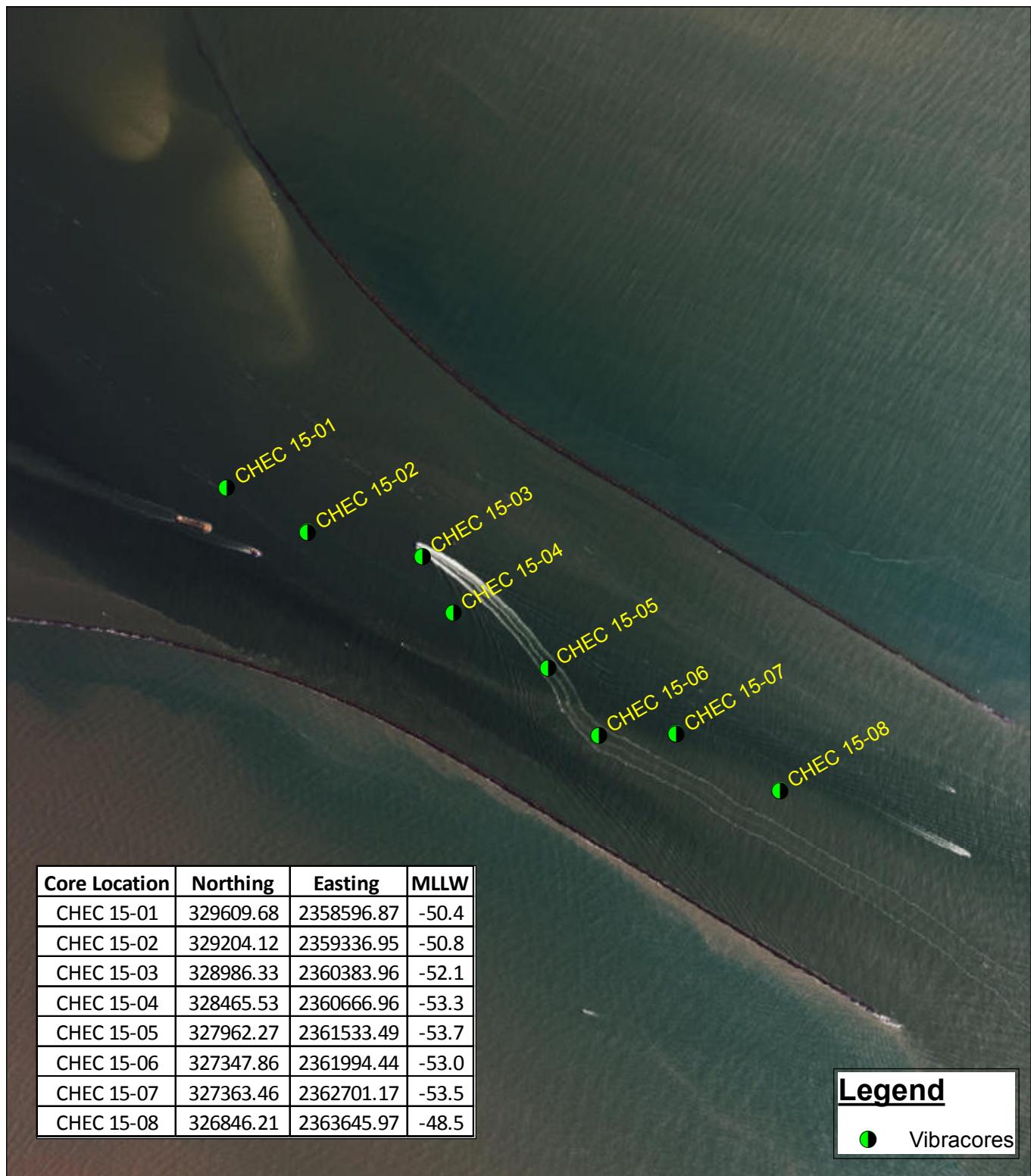
0      0.25      0.5      0.75      1  
Miles



Map document prepared by American Vibracore Services



# Figure 3: Charleston Harbor Entrance Channel



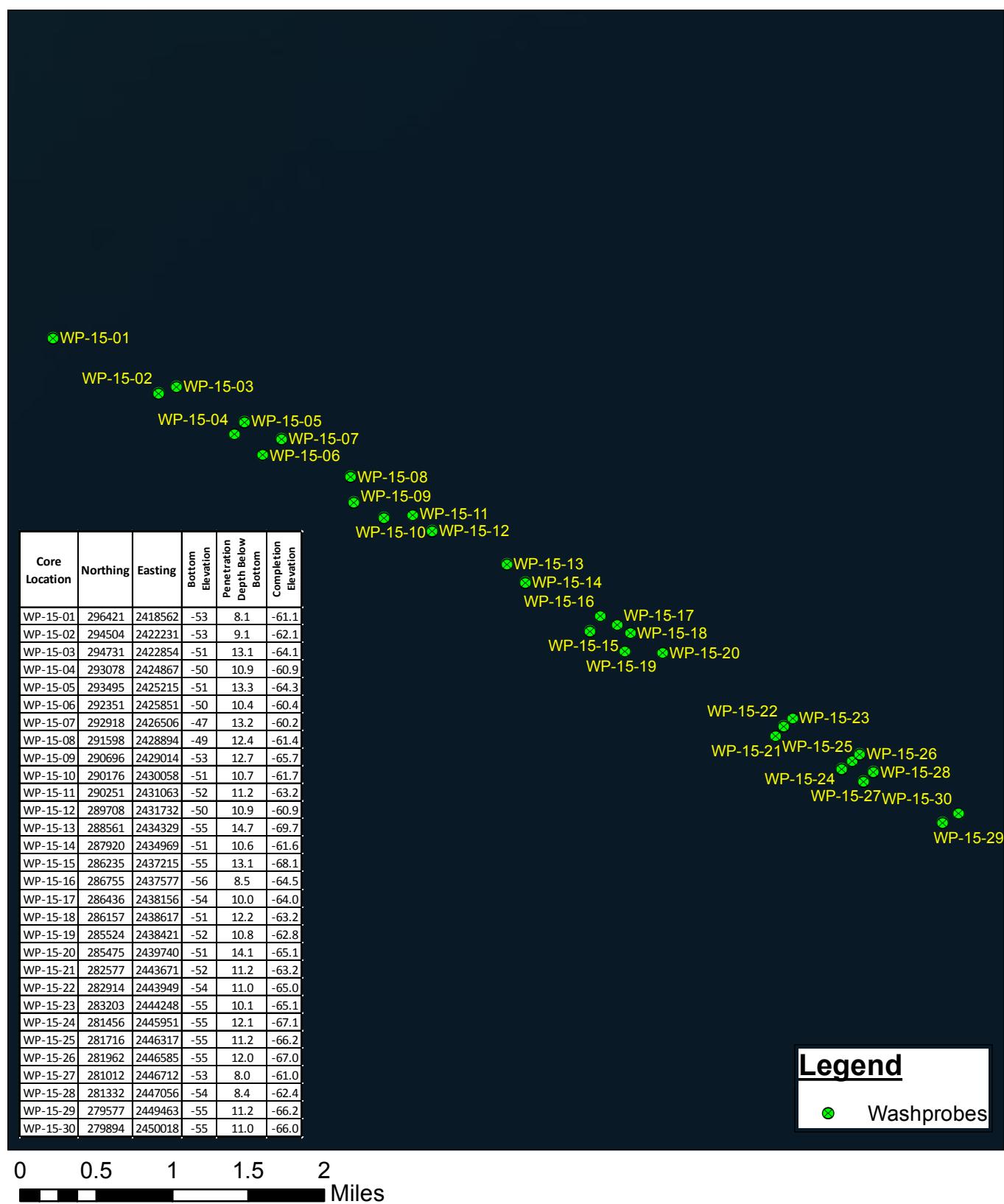
0      0.25      0.5      0.75      1  
Miles



Map document prepared by American Vibracore Services



# Figure 4: Charleston Harbor Washprobes



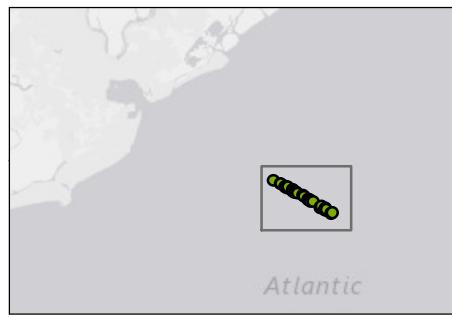
## Legend

● Washprobes

0    0.5    1    1.5    2 Miles



Map document prepared by American Vibracore Services



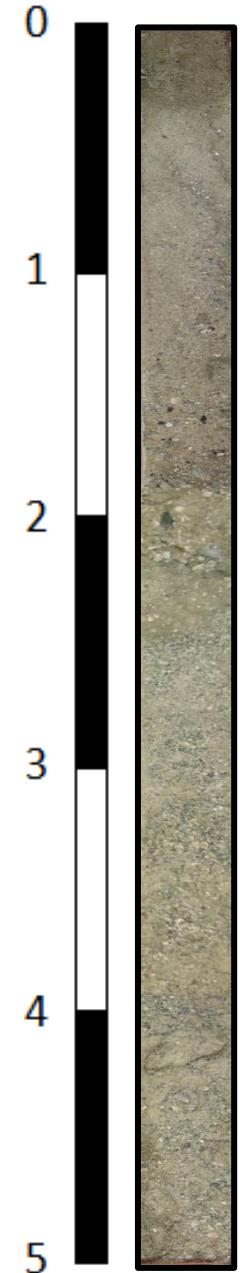


Charleston Harbor  
2016

BENR -15-01

Top of Core  
Elevation  
-47.2' MLLW

Scale in Feet



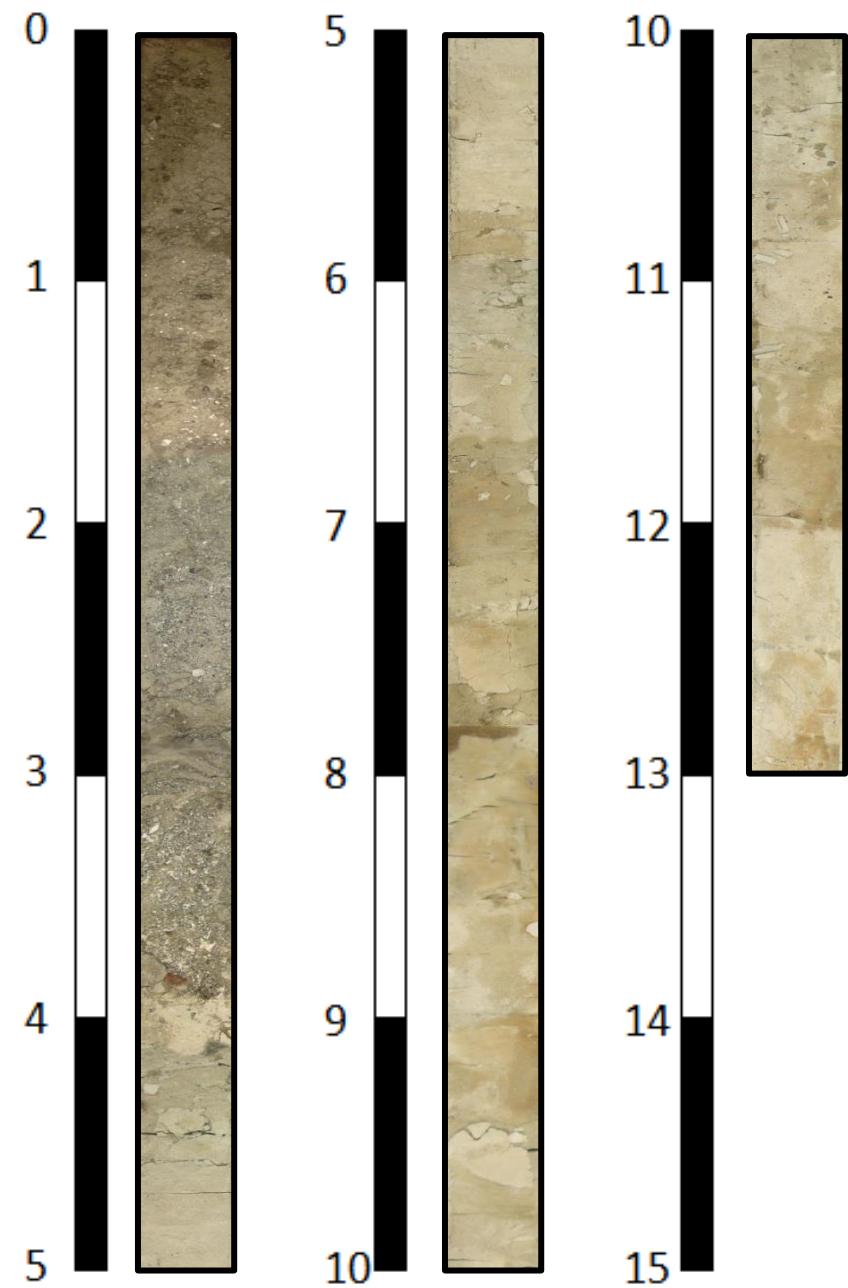


Charleston Harbor  
2016

BENR -15-02

Top of Core  
Elevation  
-49.4' MLLW

Scale in Feet



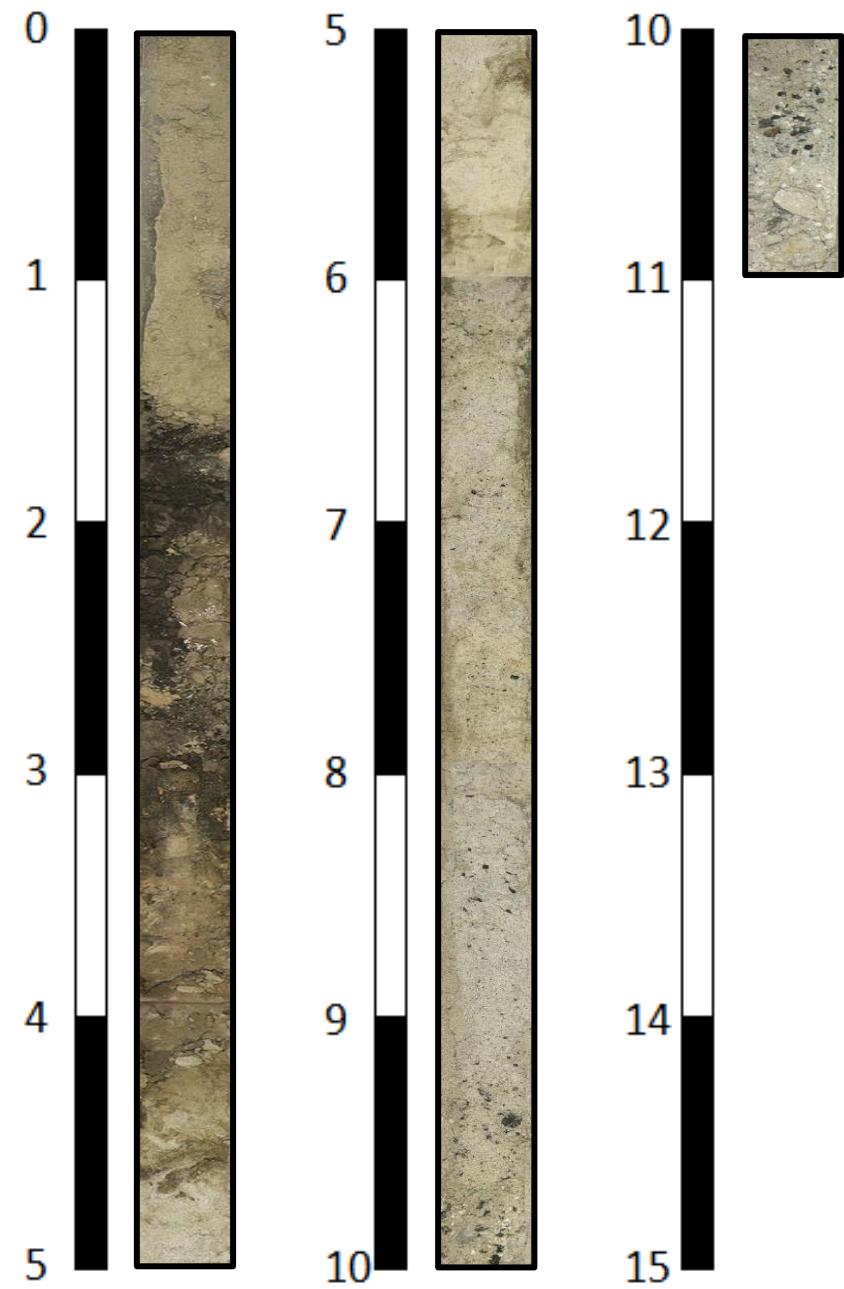


Charleston Harbor  
2016

BENR -15-03

Top of Core  
Elevation  
-47.2' MLLW

Scale in Feet





Charleston Harbor  
2016

BENR -15-04

Top of Core  
Elevation  
-48.6' MLLW

Scale in Feet



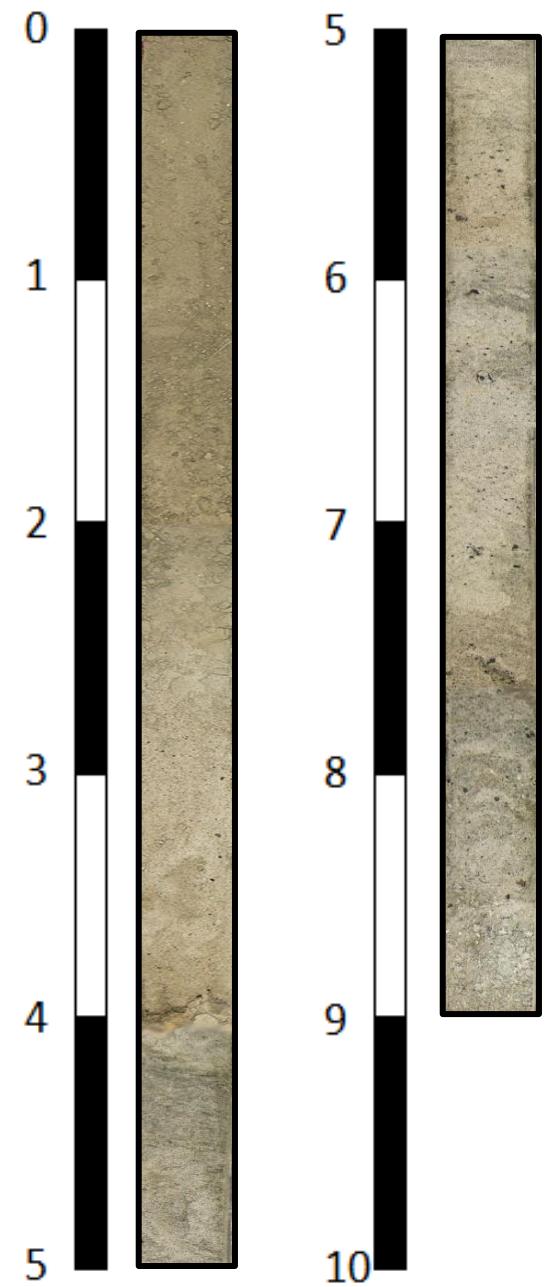


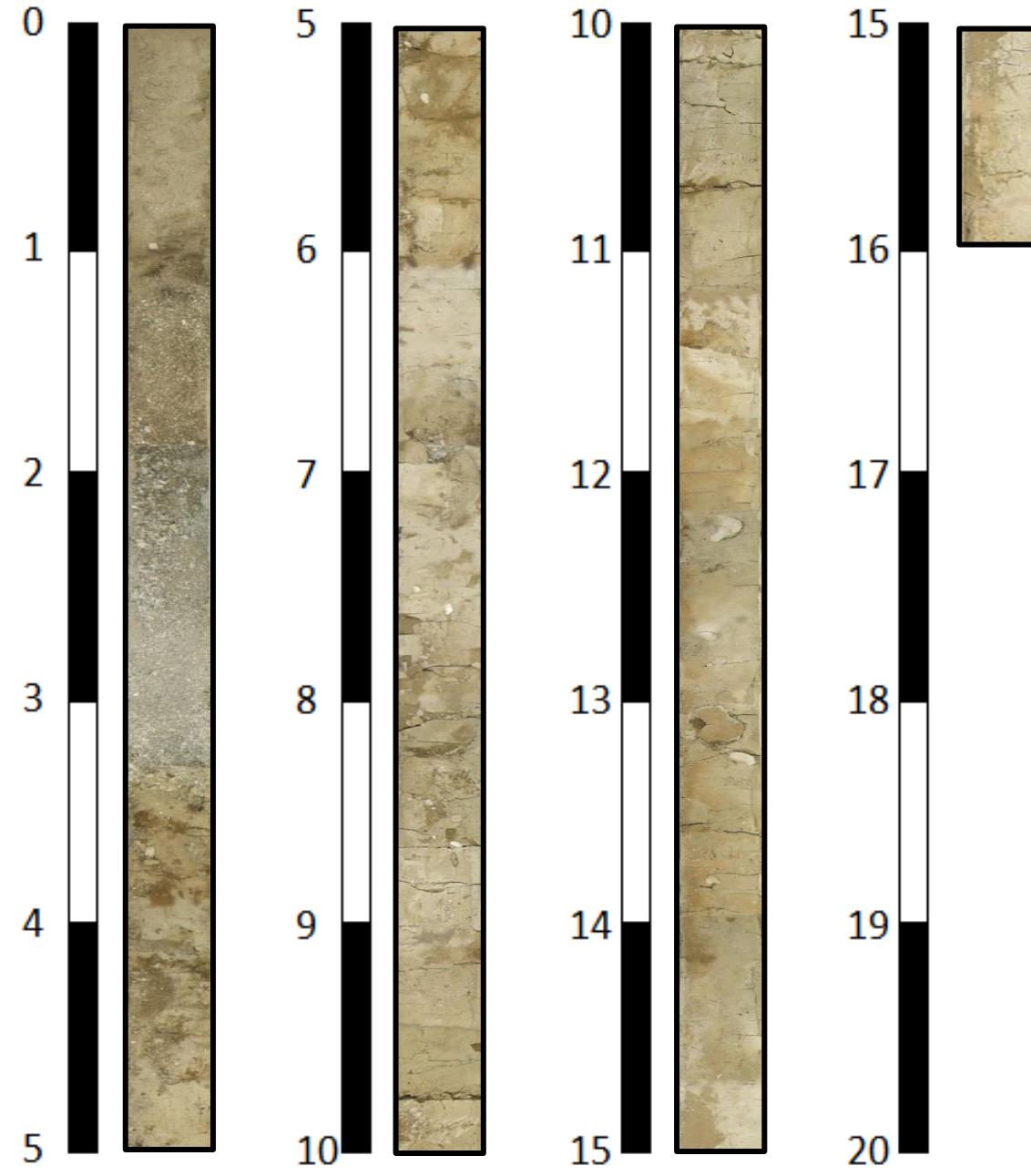
Charleston Harbor  
2016

BENR -15-05

Top of Core  
Elevation  
-49.4' MLLW

Scale in Feet





Charleston Harbor  
2016

BENR -15-06

Top of Core  
Elevation  
-47.1' MLLW

Scale in Feet

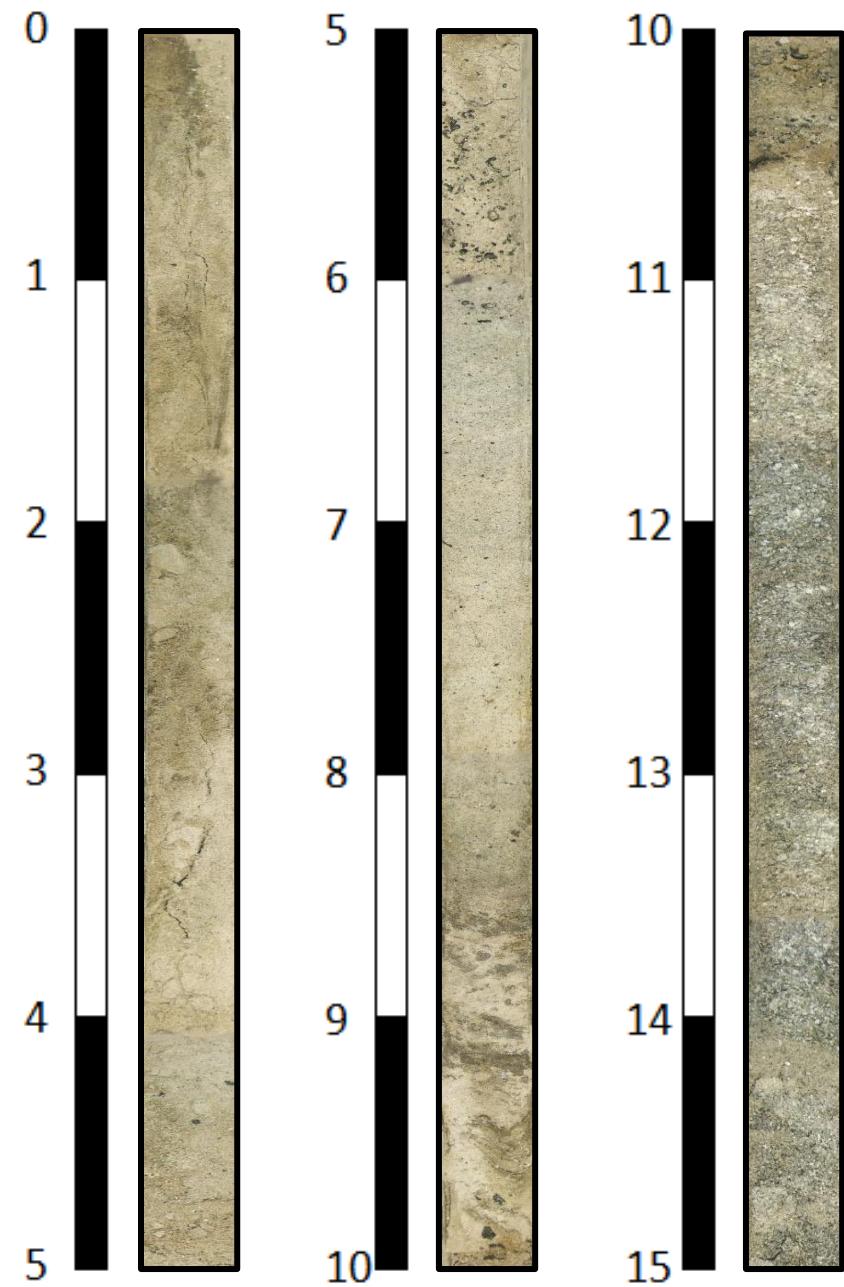


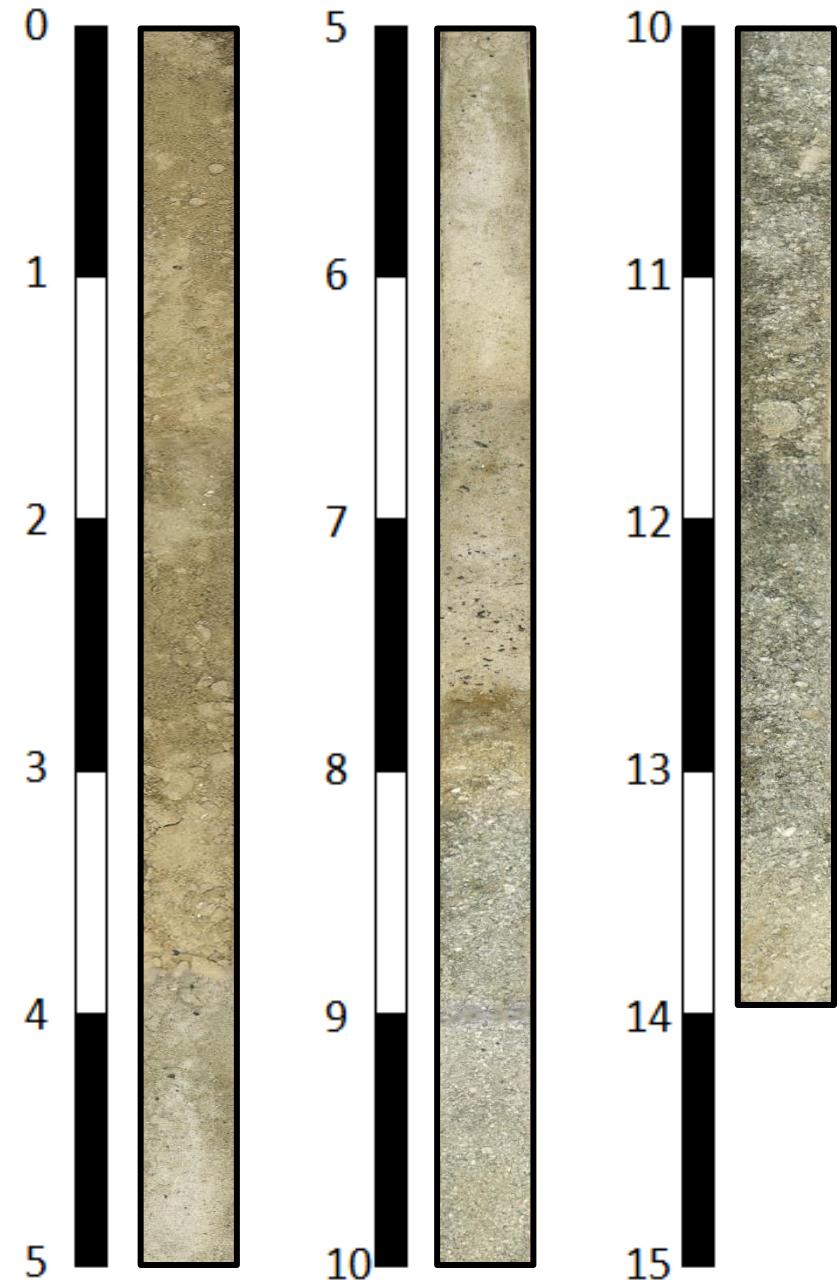
Charleston Harbor  
2016

BENR -15-07

Top of Core  
Elevation  
-50.4' MLLW

Scale in Feet



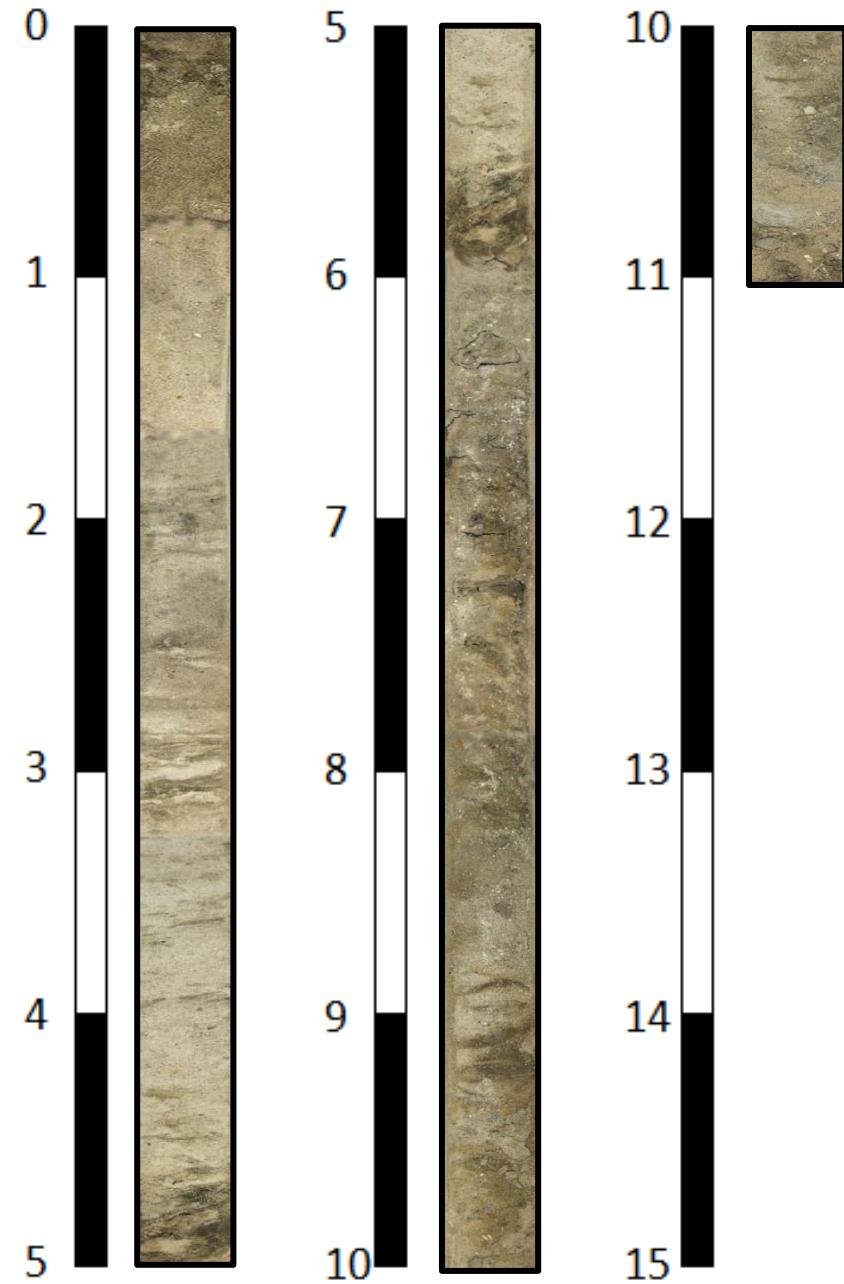


Charleston Harbor  
2016

BENR -15-08

Top of Core  
Elevation  
-50.5' MLLW

Scale in Feet

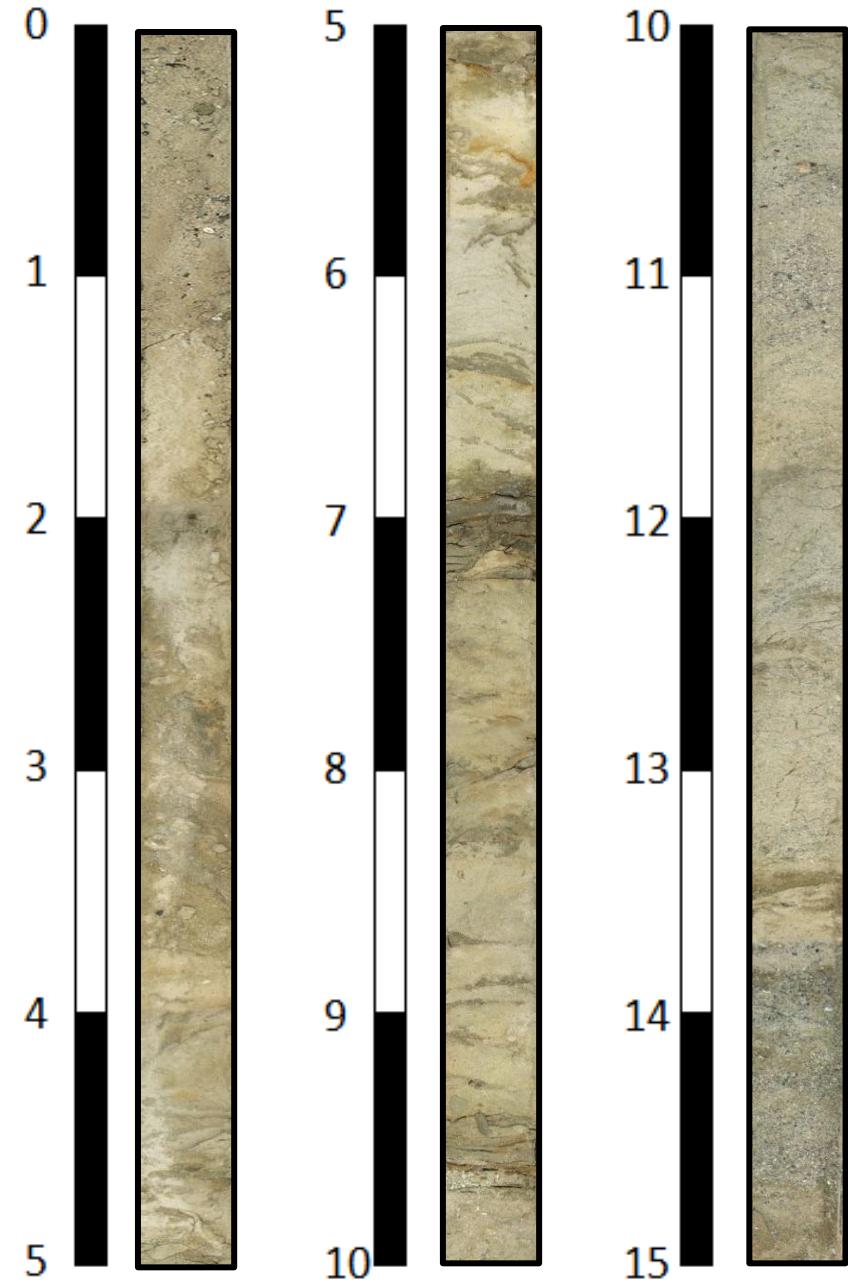


Charleston Harbor  
2016

BENR -15-09

Top of Core  
Elevation  
-49.5' MLLW

Scale in Feet



Charleston Harbor  
2016

BENR -15-10

Top of Core  
Elevation  
-48.8' MLLW

Scale in Feet

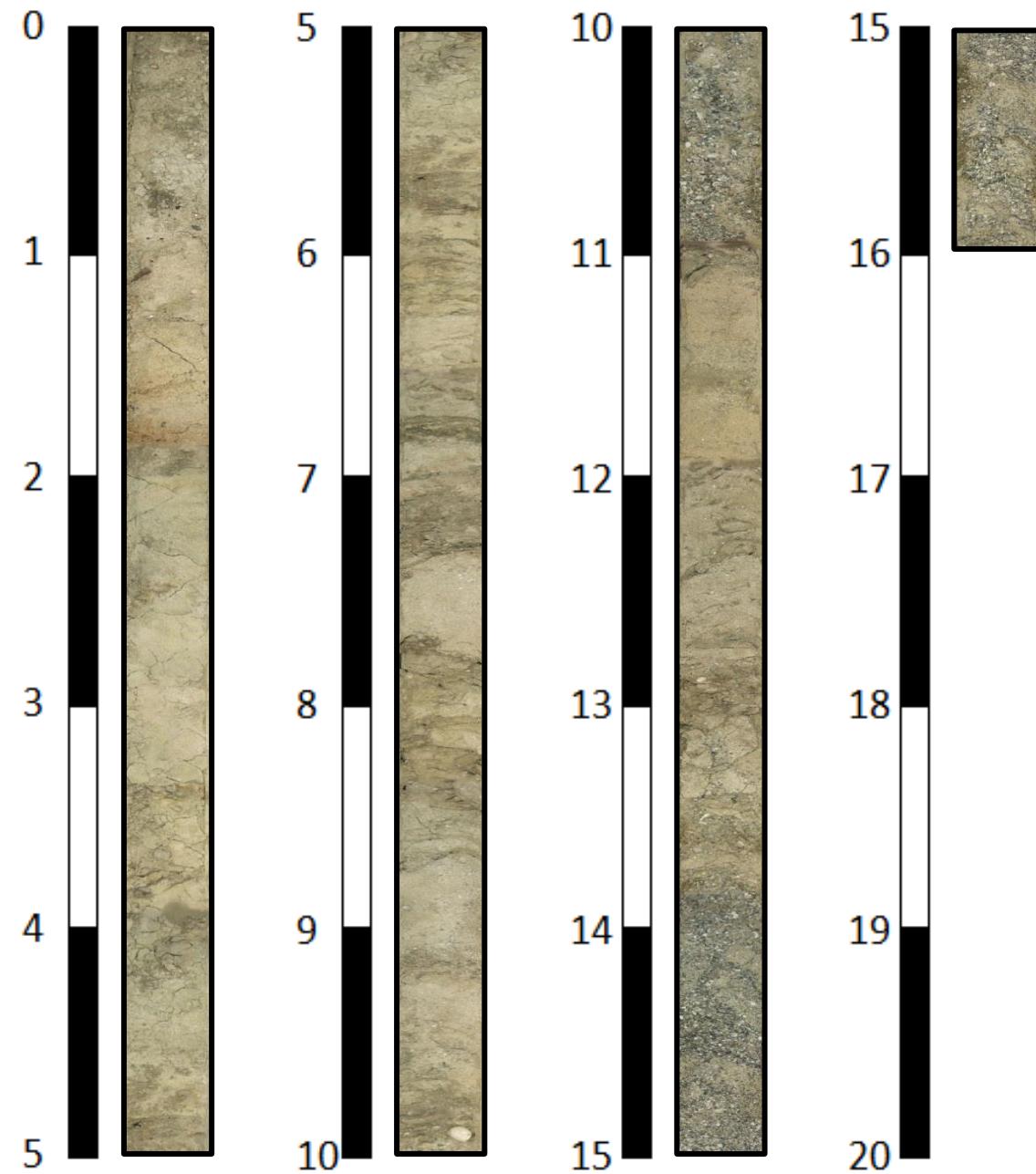


Charleston Harbor  
2016

BENR -15-11

Top of Core  
Elevation  
-49.6' MLLW

Scale in Feet



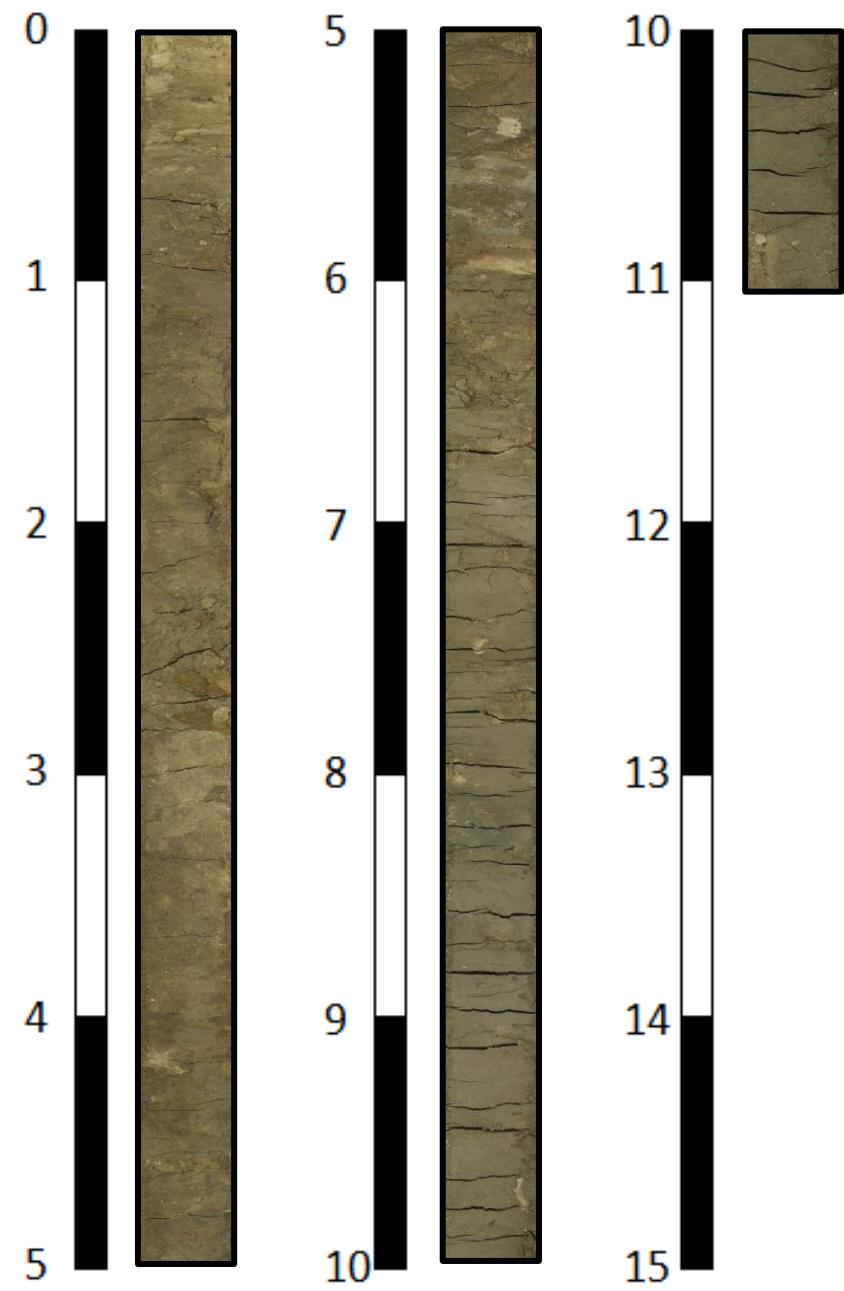


Charleston Harbor  
2016

CHEC -15-01

Top of Core  
Elevation  
-50.4' MLLW

Scale in Feet



Charleston Harbor  
2016

CHEC -15-02

Top of Core  
Elevation  
-50.8' MLLW

Scale in Feet



Charleston Harbor  
2016

CHEC -15-03

Top of Core  
Elevation  
-52.1' MLLW

Scale in Feet



Charleston Harbor  
2016

CHEC -15-04

Top of Core  
Elevation  
-53.3' MLLW

Scale in Feet

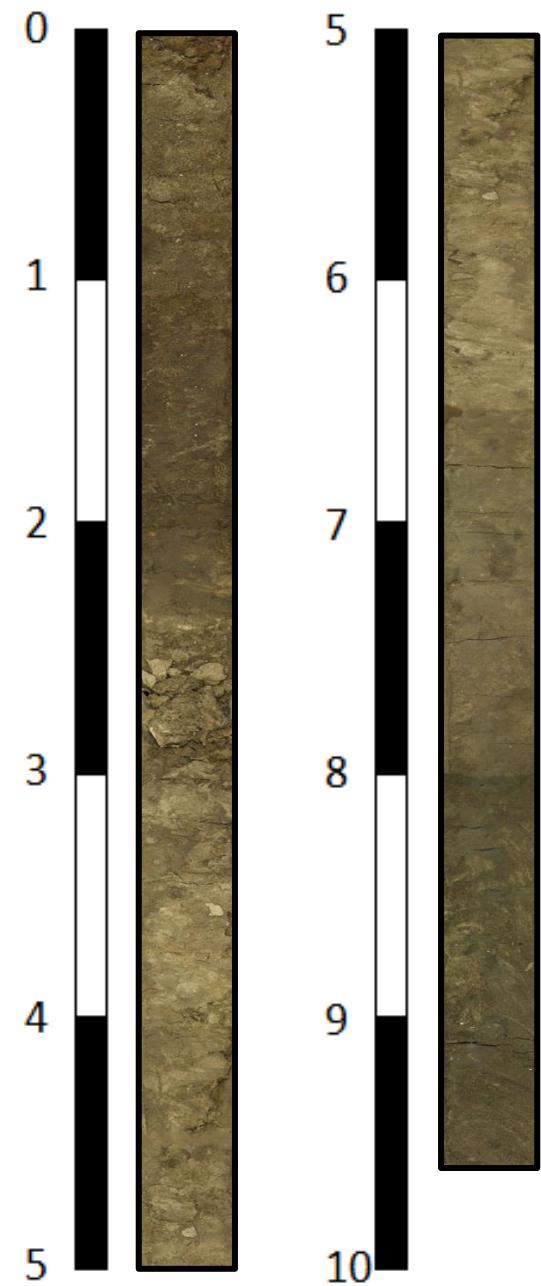


Charleston Harbor  
2016

CHEC -15-05

Top of Core  
Elevation  
-53.7' MLLW

Scale in Feet





Charleston Harbor  
2016

CHEC -15-06

Top of Core  
Elevation  
-53.0' MLLW

Scale in Feet



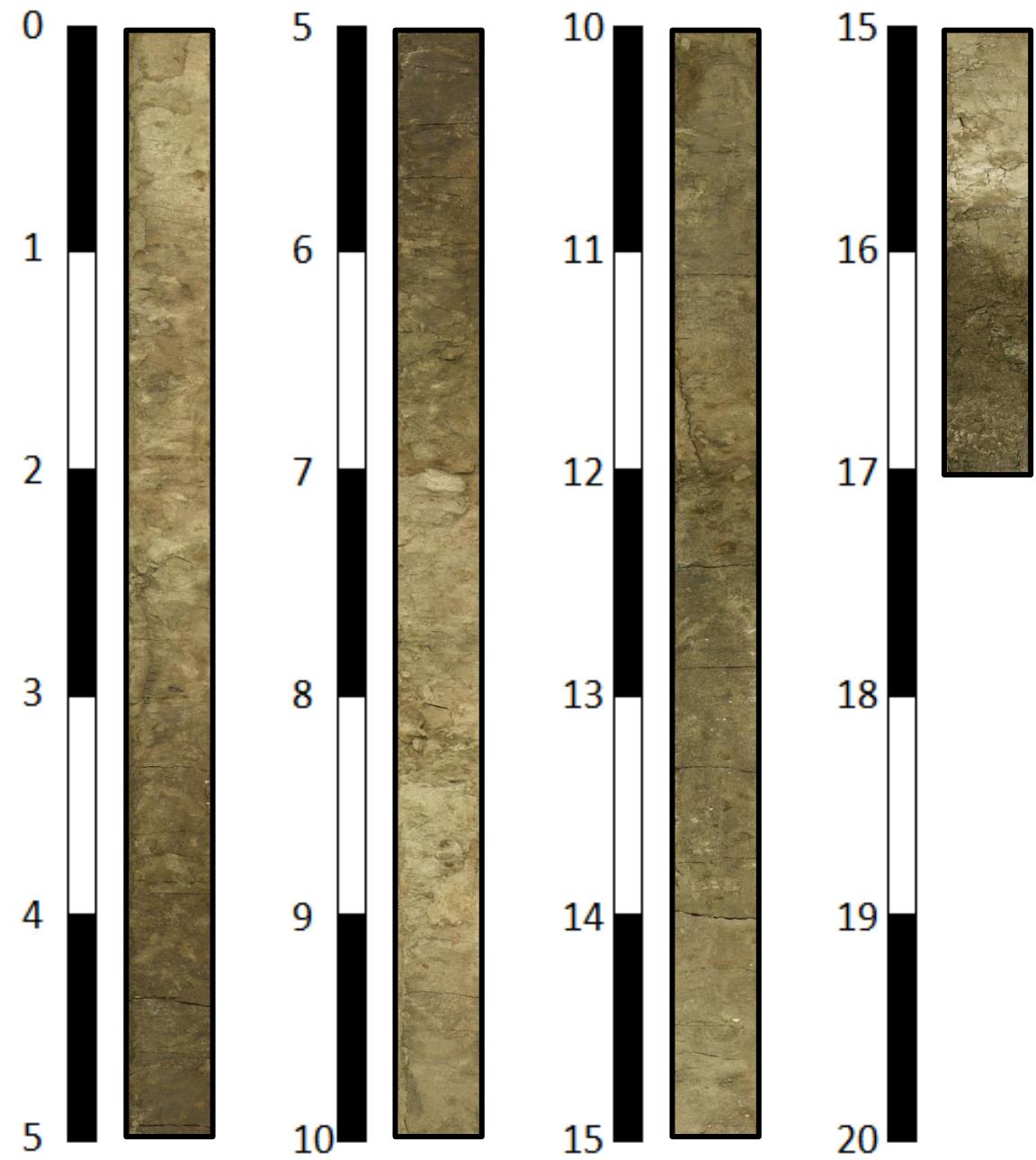


Charleston Harbor  
2016

CHEC -15-07

Top of Core  
Elevation  
-53.5' MLLW

Scale in Feet



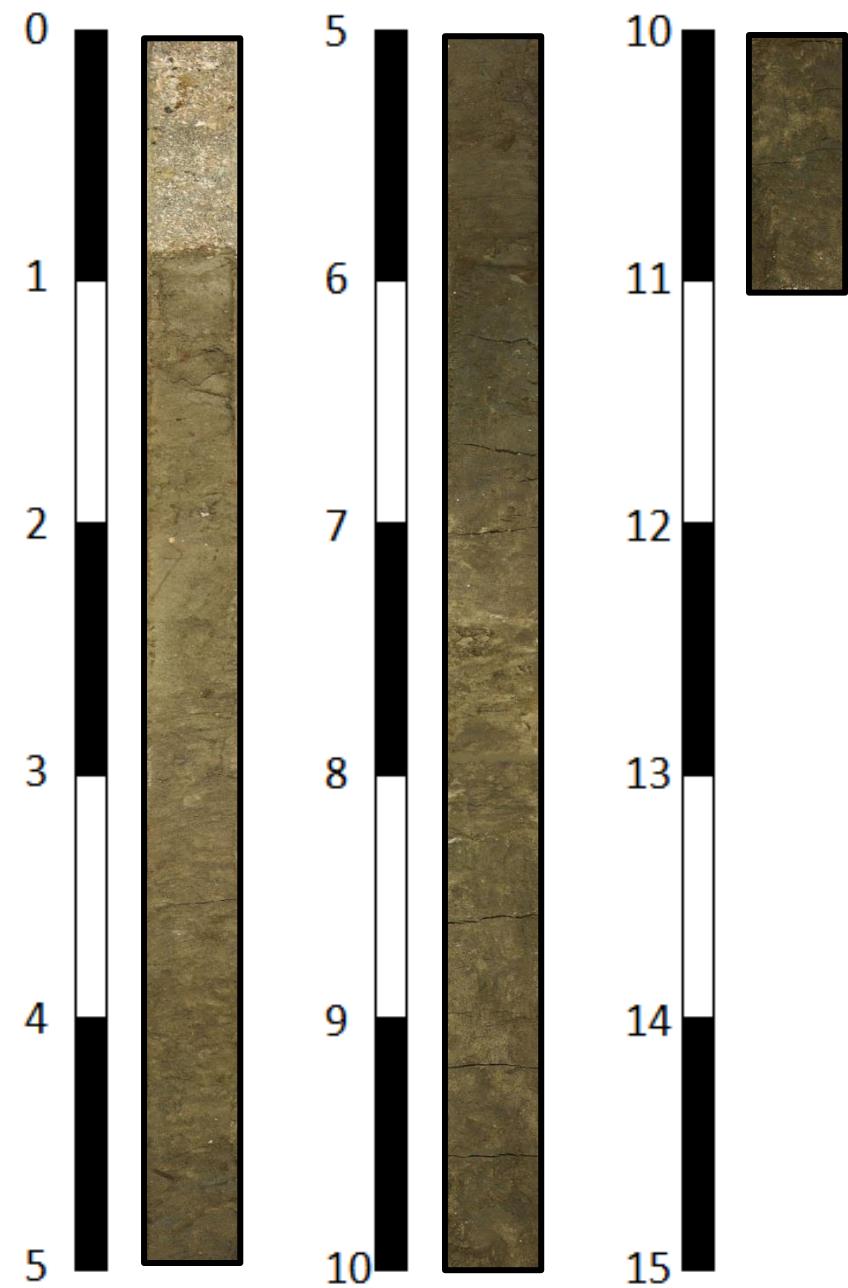


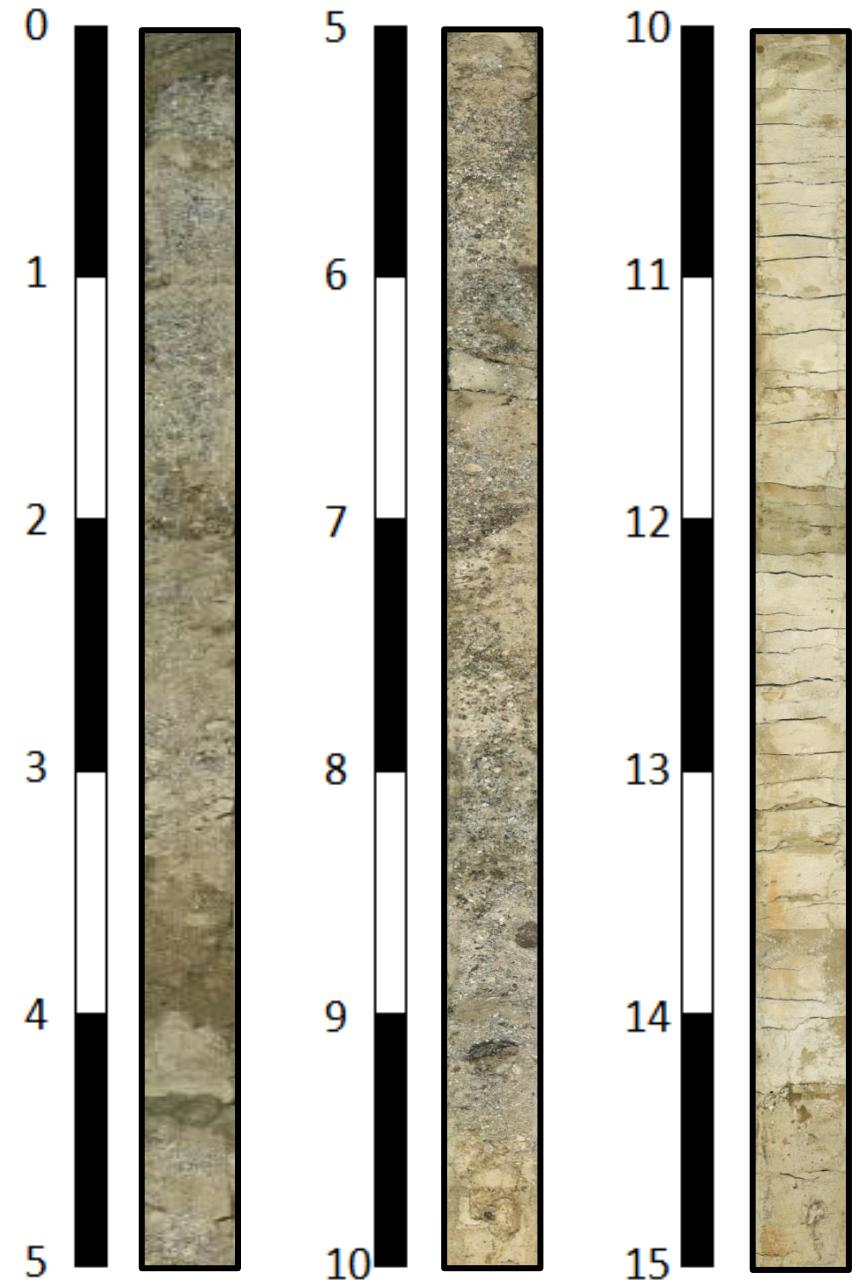
Charleston Harbor  
2016

CHEC -15-08

Top of Core  
Elevation  
-48.5' MLLW

Scale in Feet





Charleston Harbor  
2016

REBR -15-01

Top of Core  
Elevation  
-51.8' MLLW

Scale in Feet

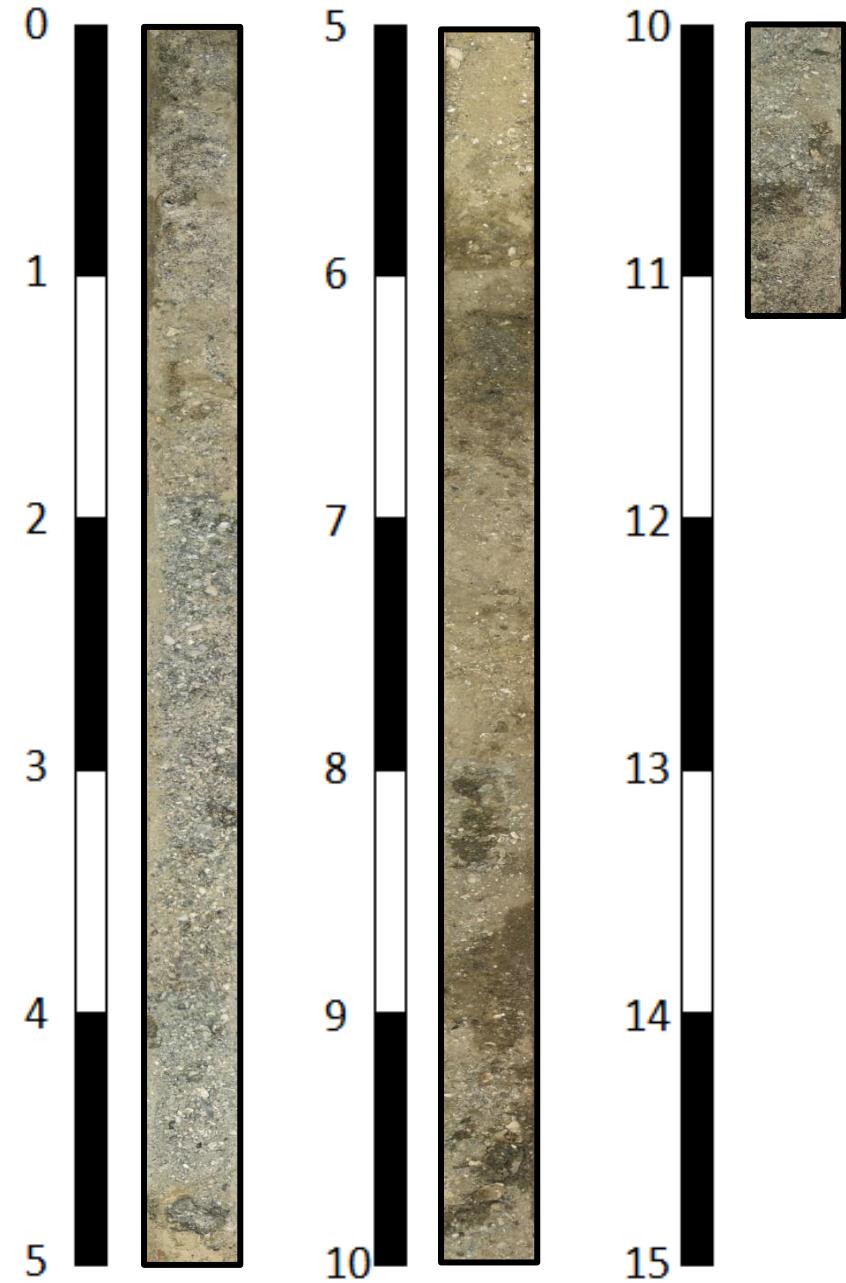


Charleston Harbor  
2016

REBR -15-02

Top of Core  
Elevation  
-51.6' MLLW

Scale in Feet



Charleston Harbor  
2016

REBR -15-03

Top of Core  
Elevation  
-49.8' MLLW

Scale in Feet

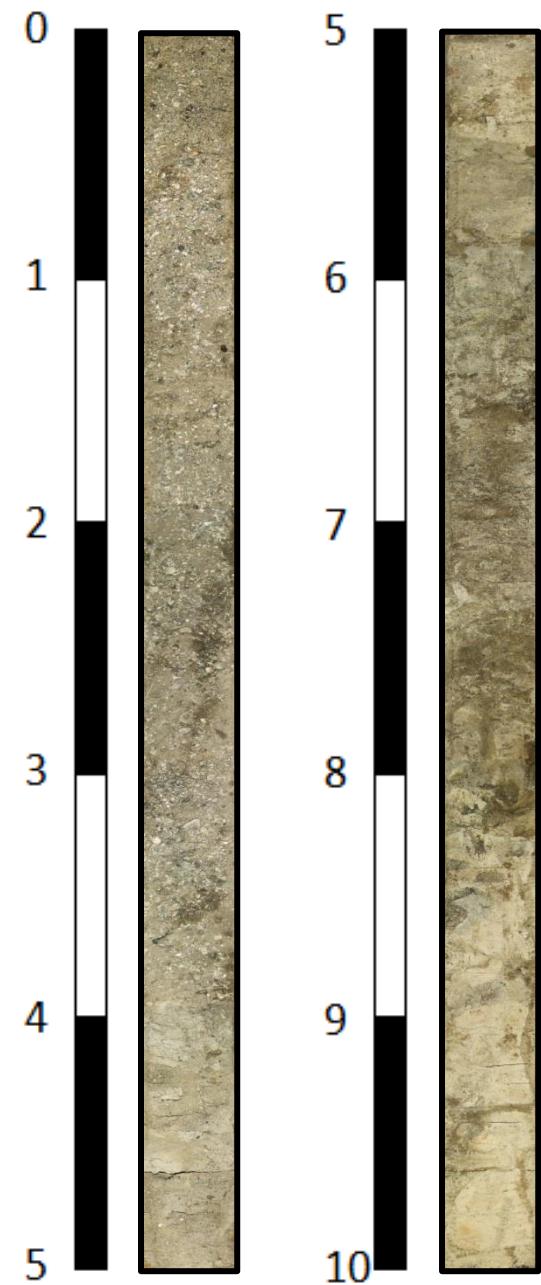


Charleston Harbor  
2016

REBR -15-04

Top of Core  
Elevation  
-48.9' MLLW

Scale in Feet



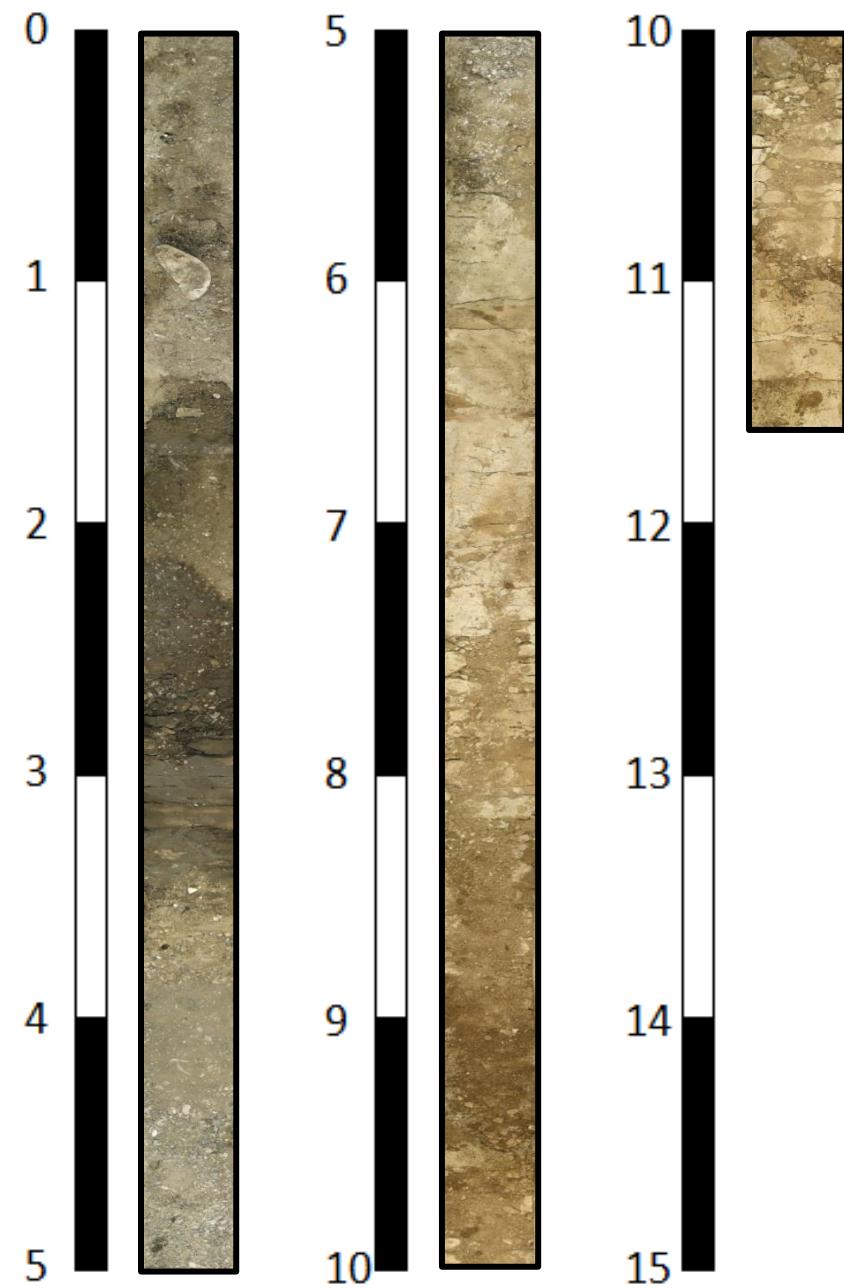


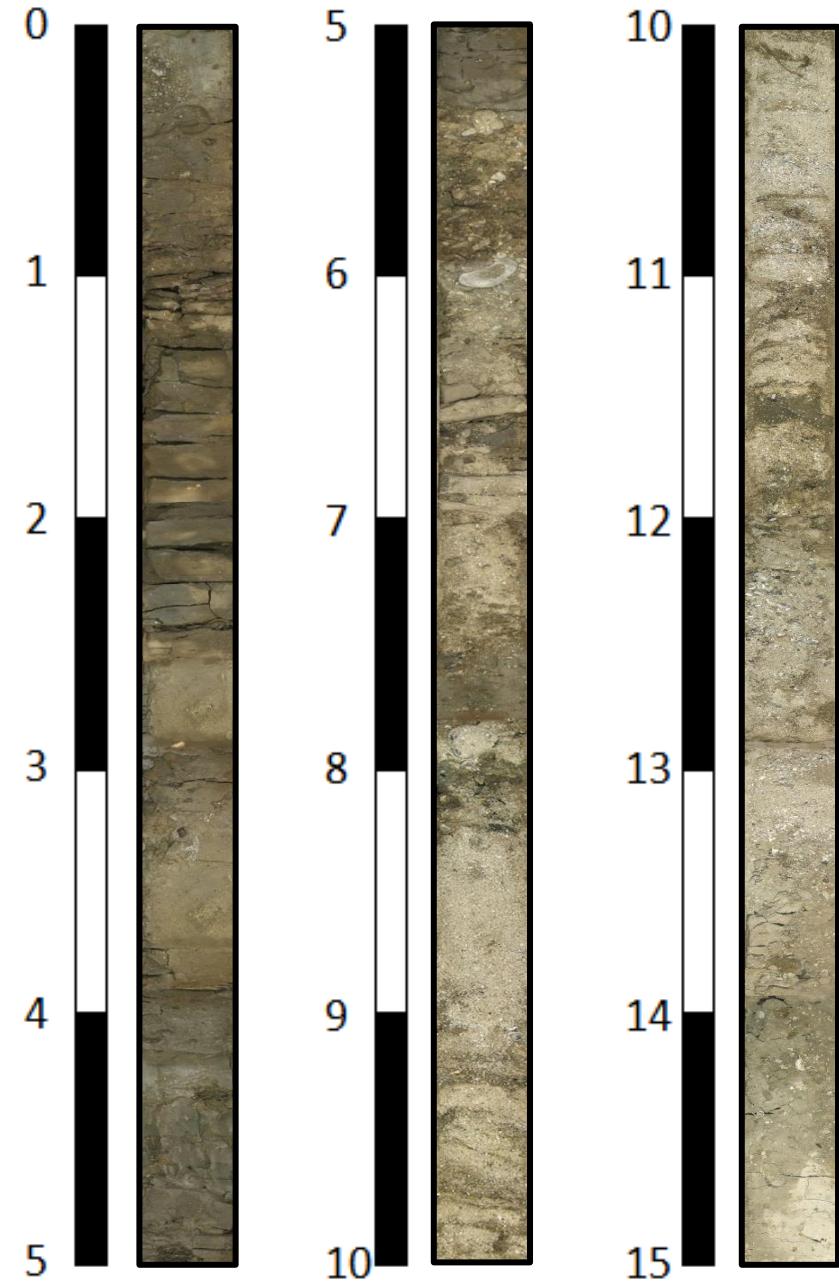
Charleston Harbor  
2016

REBR -15-05

Top of Core  
Elevation  
-49.1' MLLW

Scale in Feet



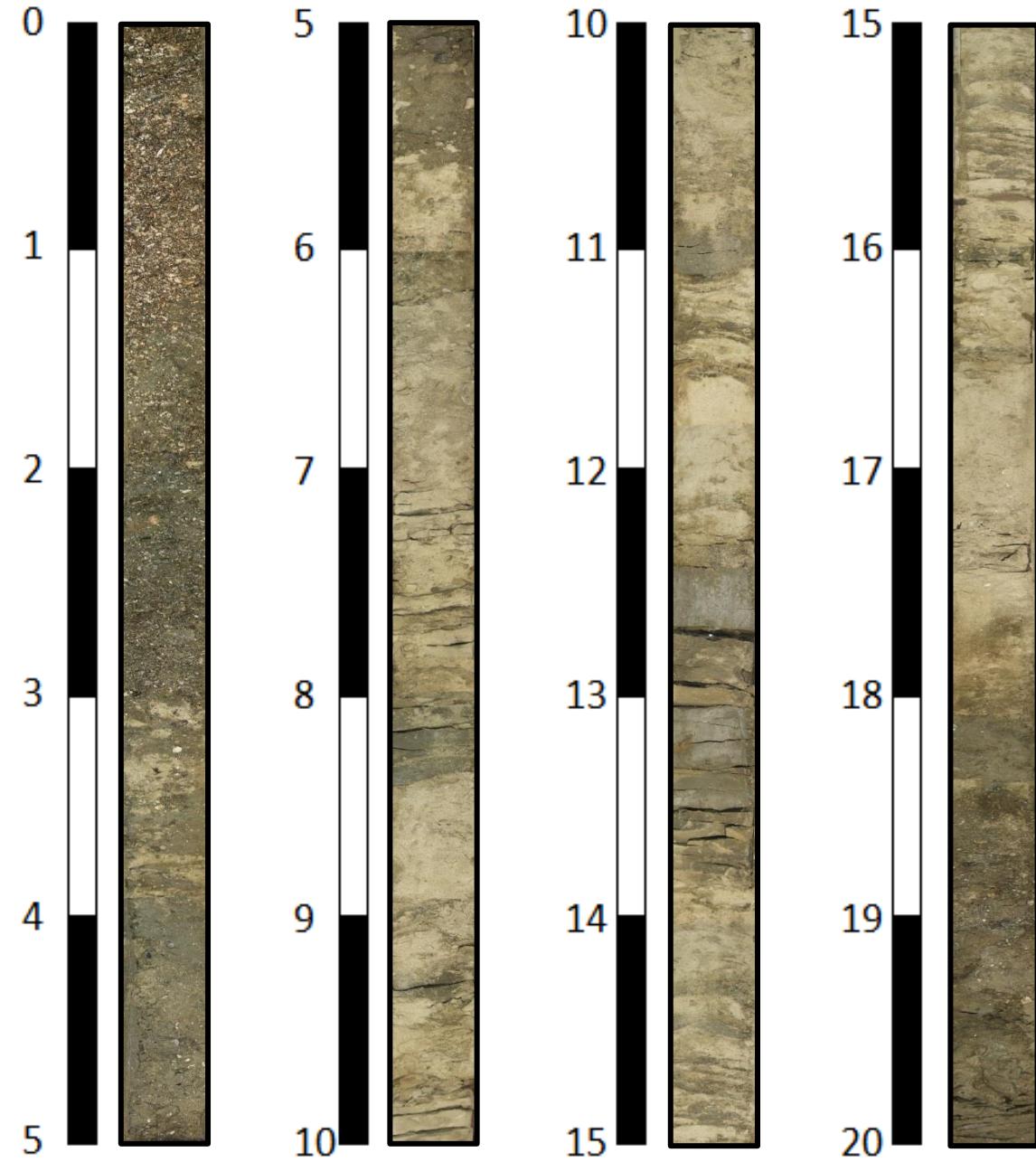


Charleston Harbor  
2016

REBR -15-06

Top of Core  
Elevation  
-48.8' MLLW

Scale in Feet

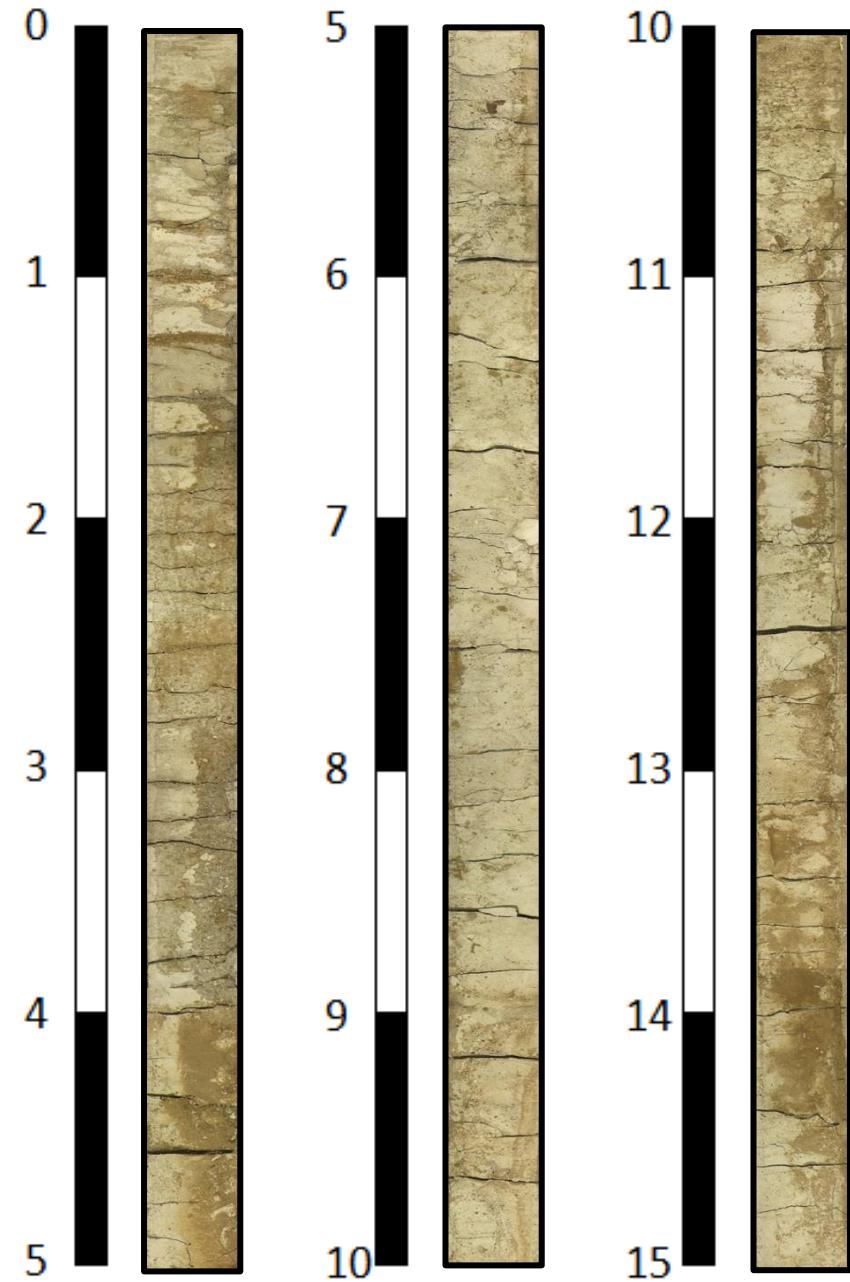


Charleston Harbor  
2016

REBR -15-07

Top of Core  
Elevation  
-47.6' MLLW

Scale in Feet



Charleston Harbor  
2016

WLRW -15-01

Top of Core  
Elevation  
-40.1' MLLW

Scale in Feet

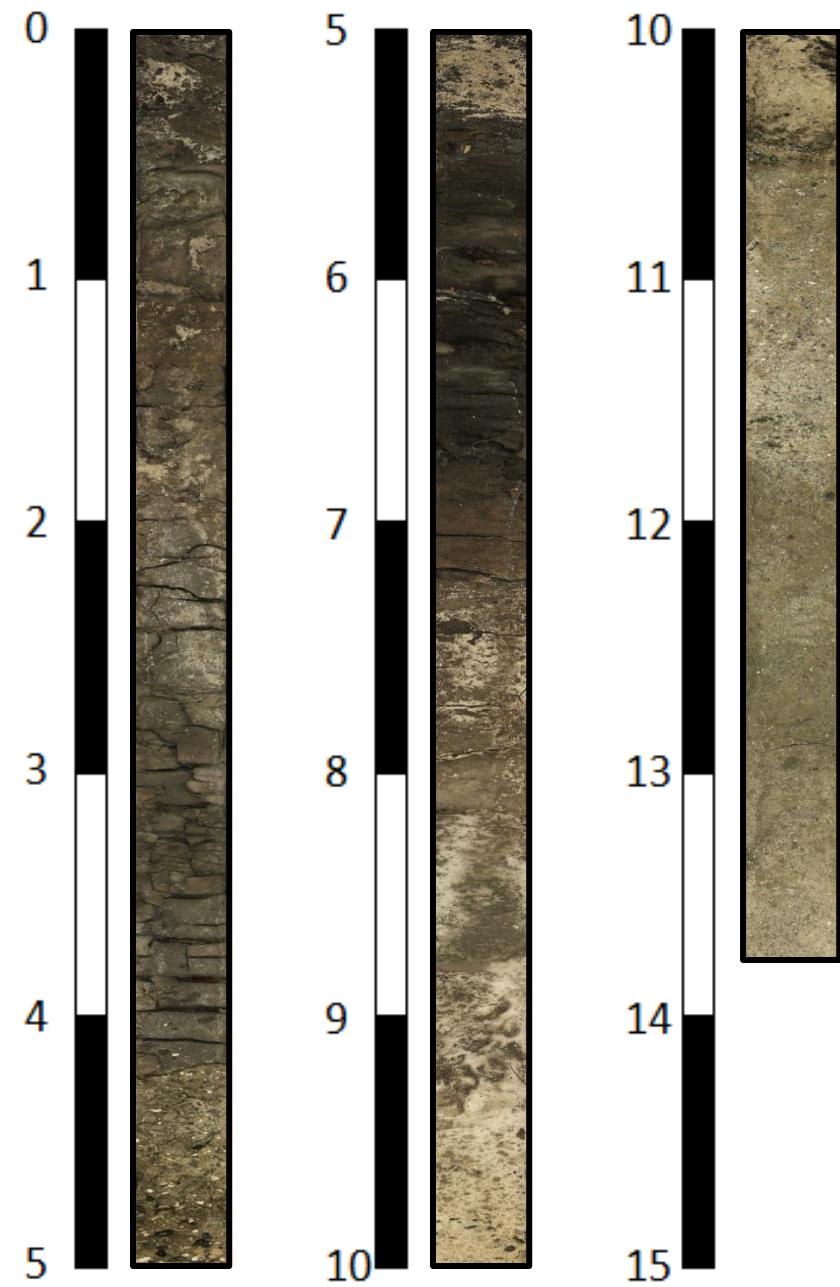


Charleston Harbor  
2016

WLRW -15-02

Top of Core  
Elevation  
-38.7' MLLW

Scale in Feet





Charleston Harbor  
2016

WLRW -15-03

Top of Core  
Elevation  
-47.0' MLLW

Scale in Feet



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** BENR-15-01

**Date** 05/13/2016

**Top of Hole** -47.2 MLLW  
**Elevation**

**Coordinate System**

**Start Time** 10:03:37

**Penetration** 10.5'

State Plane Coordinates (SPC)

**End Time** 10:07:01

**Recovery** 5.0 FT

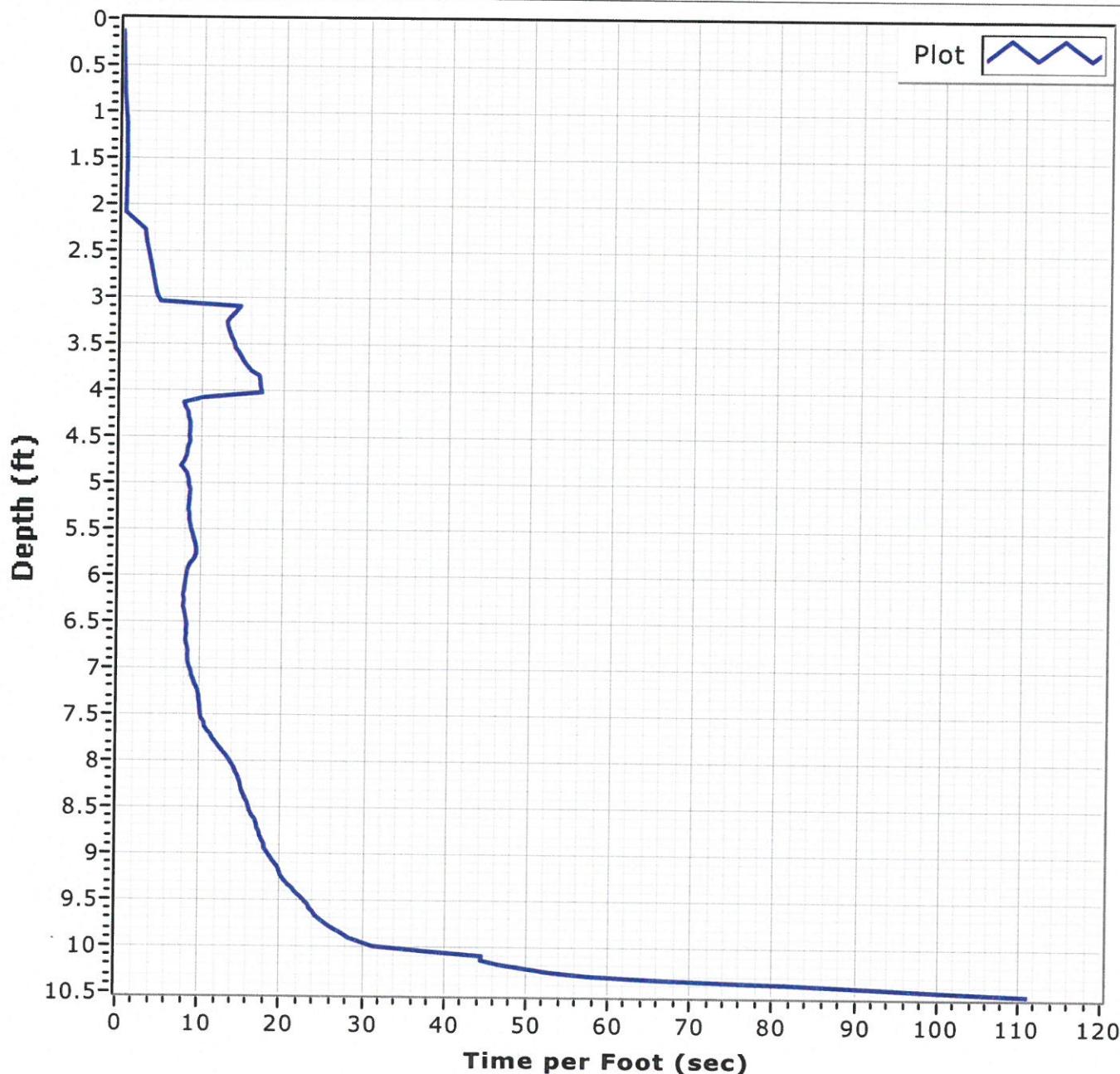
**Zone**

**Total Time** 00:03:24

X N 345780.2

Y E 2337827.4

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** BENR-15-02

**Date** 05/13/2016

**Top of Hole** -49.4 MLLW  
**Elevation**

**Coordinate System**

**Start Time** 10:21:23

**Penetration** 12.5'

State Plane Coordinates (SPC)

**End Time** 10:26:18

**Recovery** 13.0 FT

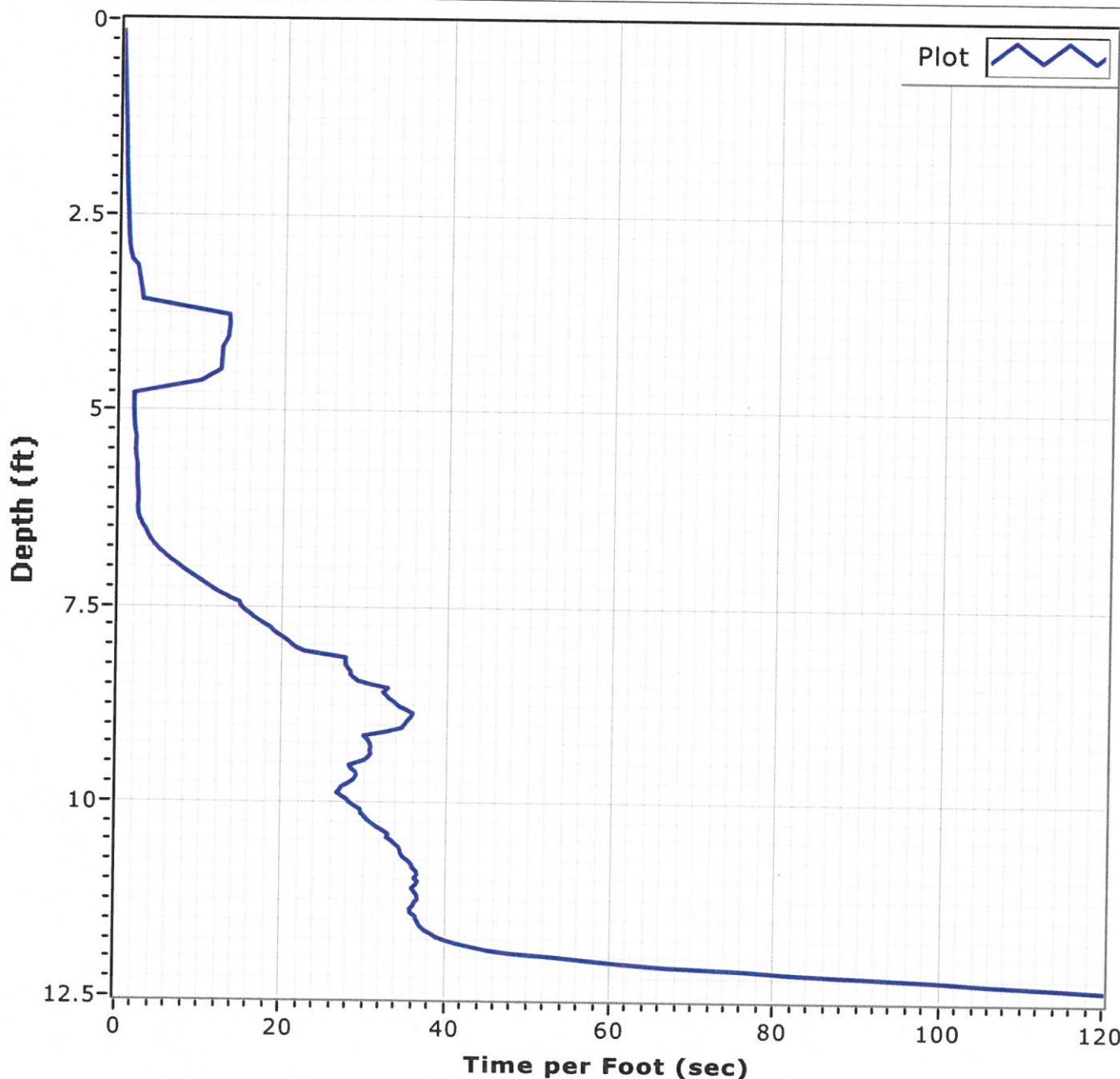
**Zone**

**Total Time** 00:04:54

X N 345528.9

Y E 2337686.1

**Comments**

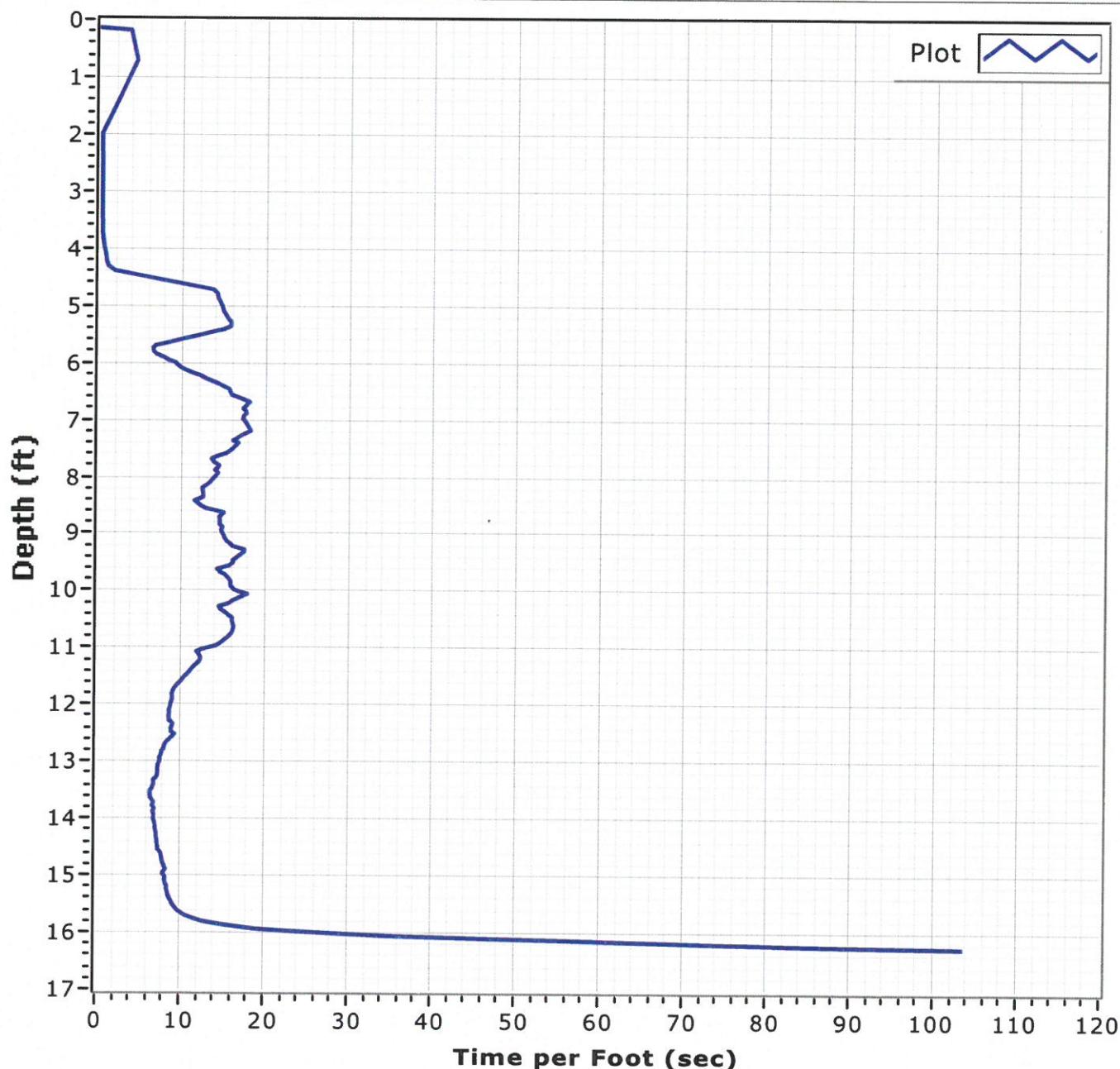


**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES**Core Identifier** BENR-15-03**Coordinate System**

State Plane Coordinates (SPC)

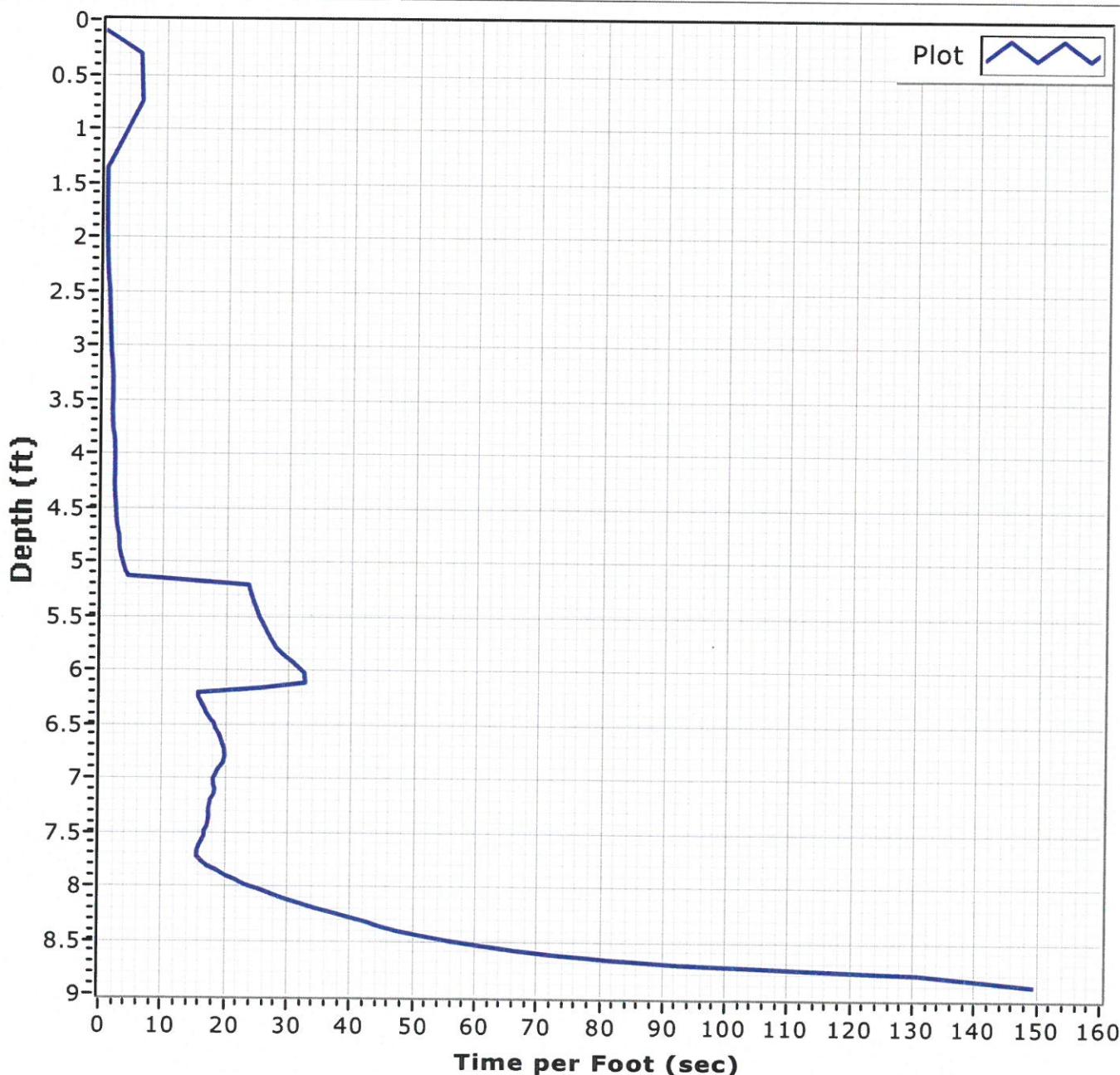
**Date** 05/13/2016**Top of Hole** -47.2 MLLW  
**Elevation****Zone****X** N 345417.1**Start Time** 11:02:31**Penetration** 16.3'**Y** E 2338582.3**End Time** 11:06:35**Recovery** 11.0 FT**Total Time** 00:04:04**Comments**

**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES**Core Identifier** BENR-15-04**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016**Top of Hole** -48.6 MLLW  
**Elevation****Start Time** 11:18:19**Penetration** 8.9'**End Time** 11:22:10**Recovery** 7.0 FT**Zone****X** N 345185.4**Total Time** 00:03:51**Y** E 2338428.3**Comments**

**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** BENR-15-05

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016

**Start Time** 12:44:30

**Top of Hole** -49.4 MLLW  
**Elevation**

**Zone**

X N 344971.1

**End Time** 12:48:11

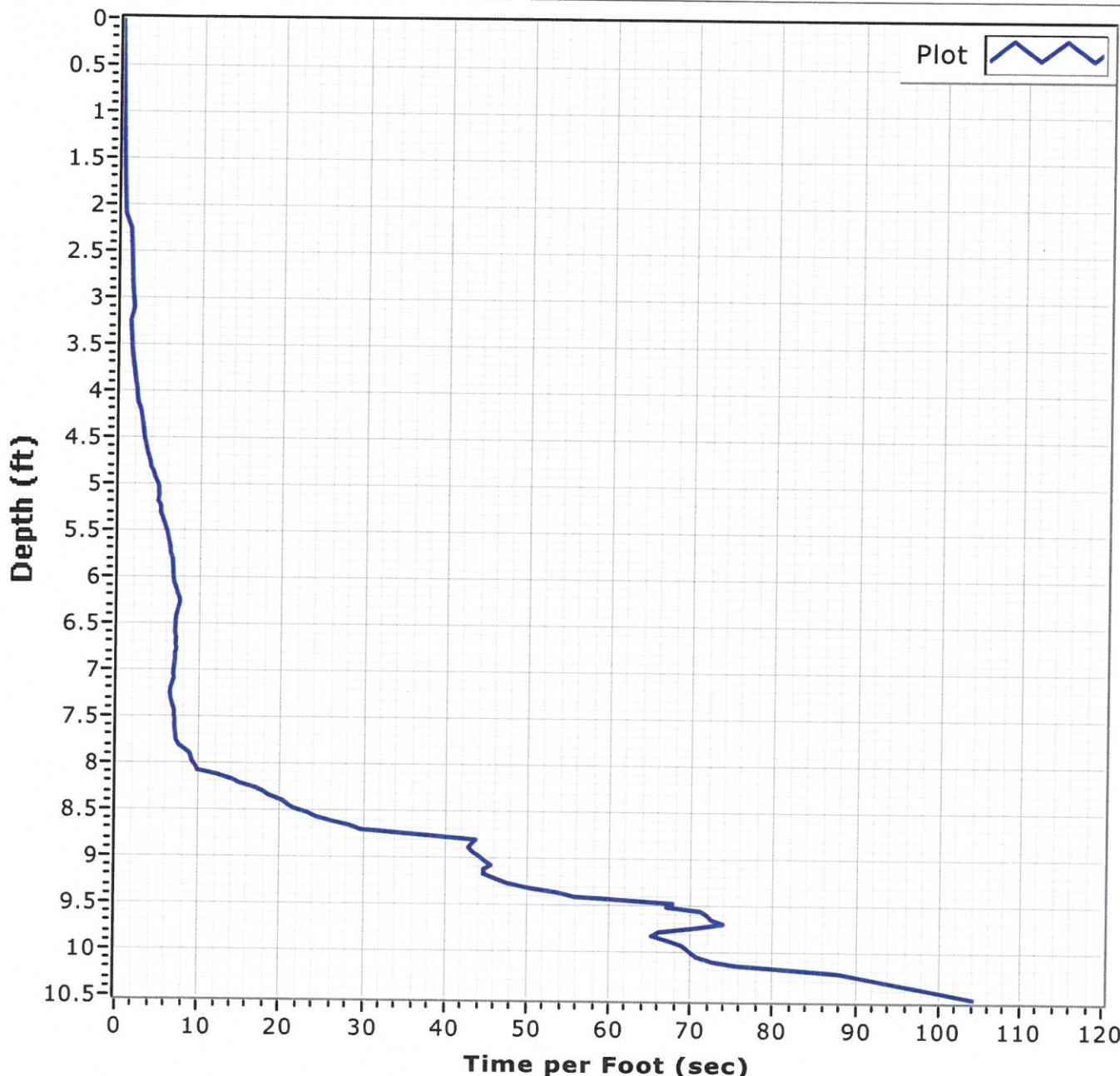
**Penetration** 10.5'

Y E 2338330.4

**Total Time** 00:03:40

**Recovery** 9.5 FT

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** BENR-15-06

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016

**Top of Hole** -47.1 MLLW  
**Elevation**

**Zone**

X N 345331.6

**Start Time** 10:40:10

**Penetration** 15.7'

Y E 2337583.1

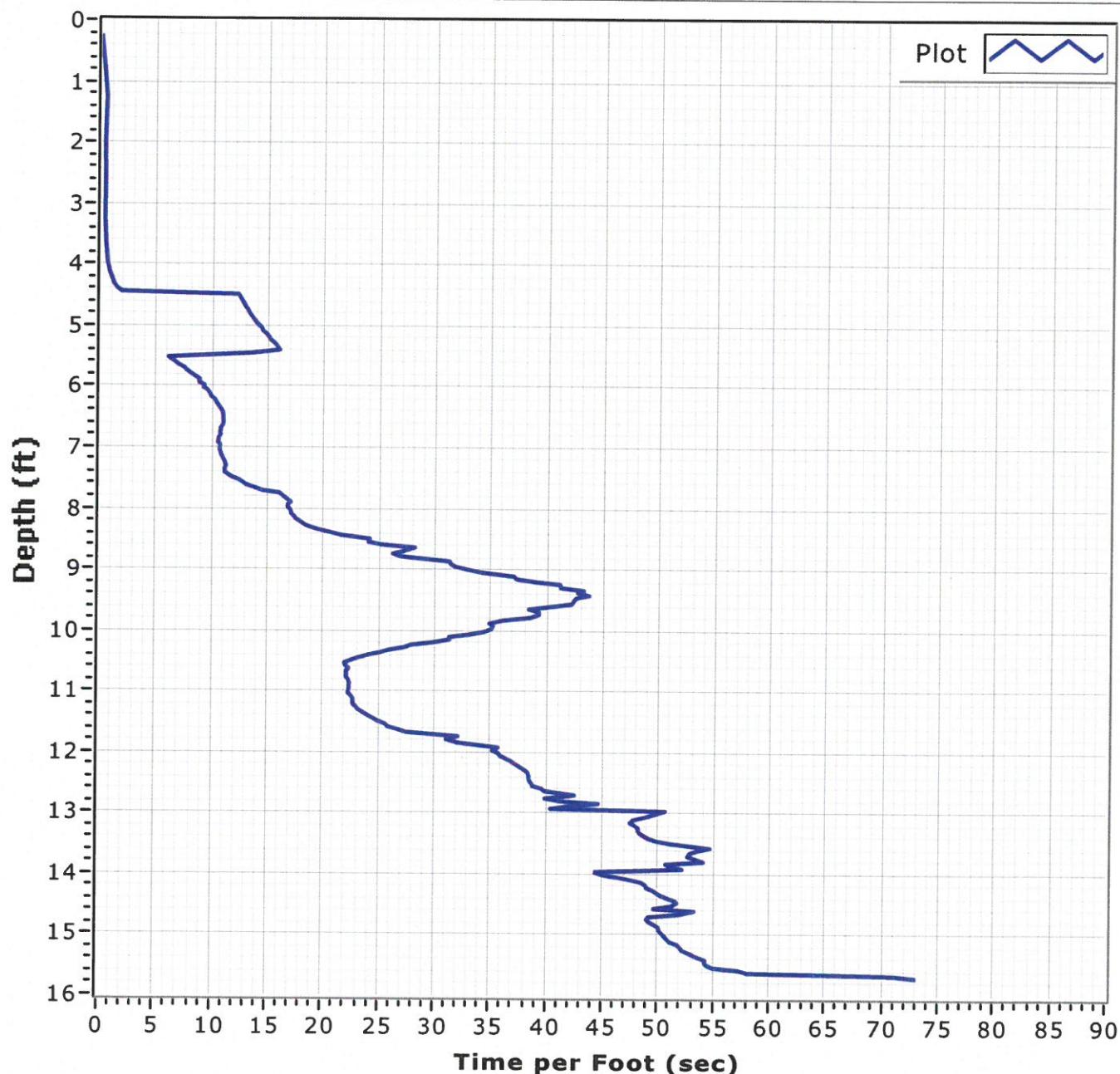
**End Time** 10:46:33

**Recovery** 16.0 FT

**Total Time** 00:06:22

**Comments**

--



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** BENR-15-07

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016

**Top of Hole** -50.4 MLLW  
**Elevation**

**Zone**

X N 344601.4

**Start Time** 13:24:49

**Penetration** 16.5'

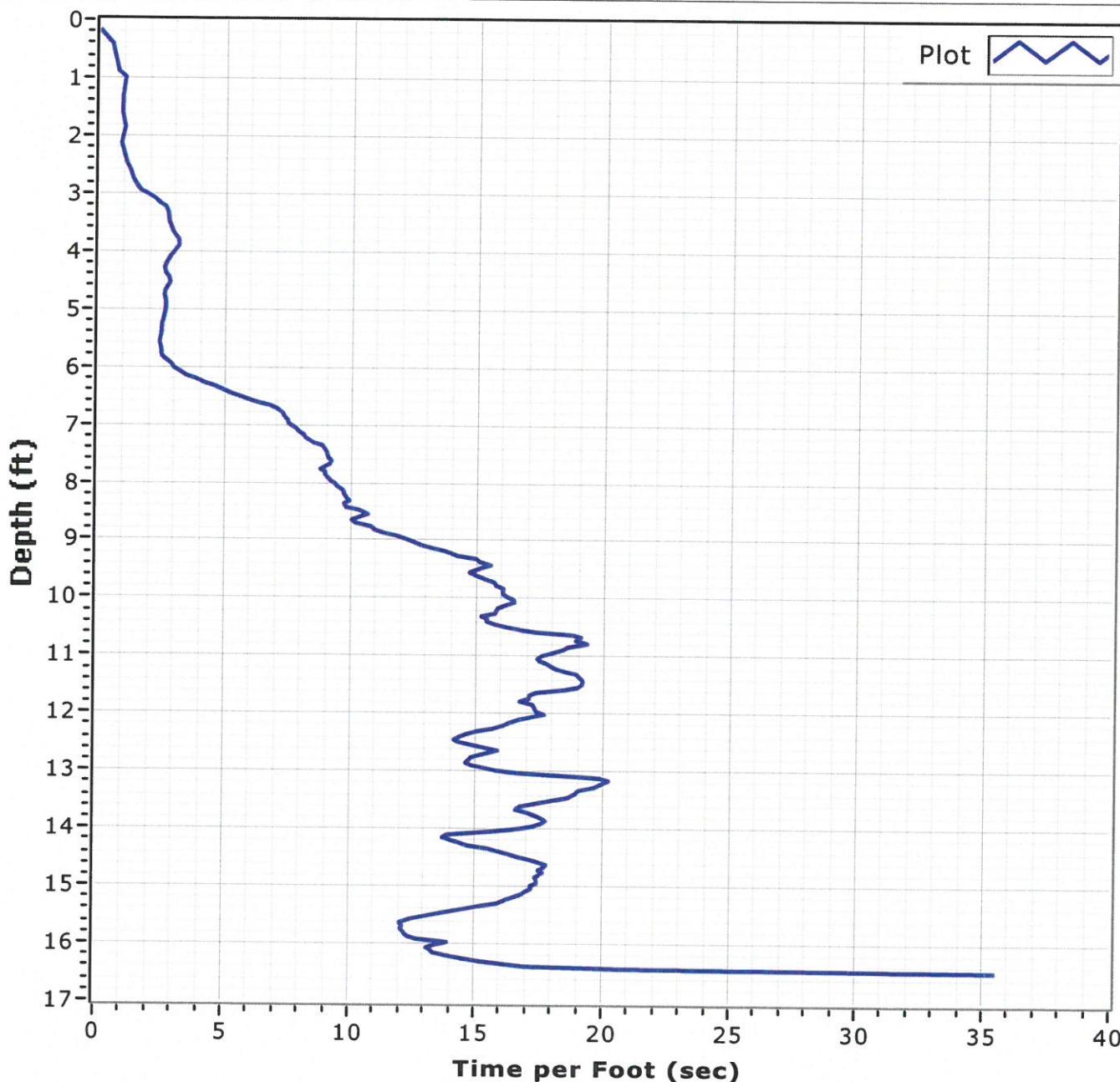
Y E 2339676.3

**End Time** 13:27:53

**Recovery** 15.0 FT

**Total Time** 00:03:04

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** BENR-15-08

**Coordinate System**

State Plane Coordinates (SPC)

**Zone**

X N 344375.3

Y E 2339483.8

**Date** 05/13/2016

**Start Time** 13:02:45

**End Time** 13:05:33

**Total Time** 00:02:47

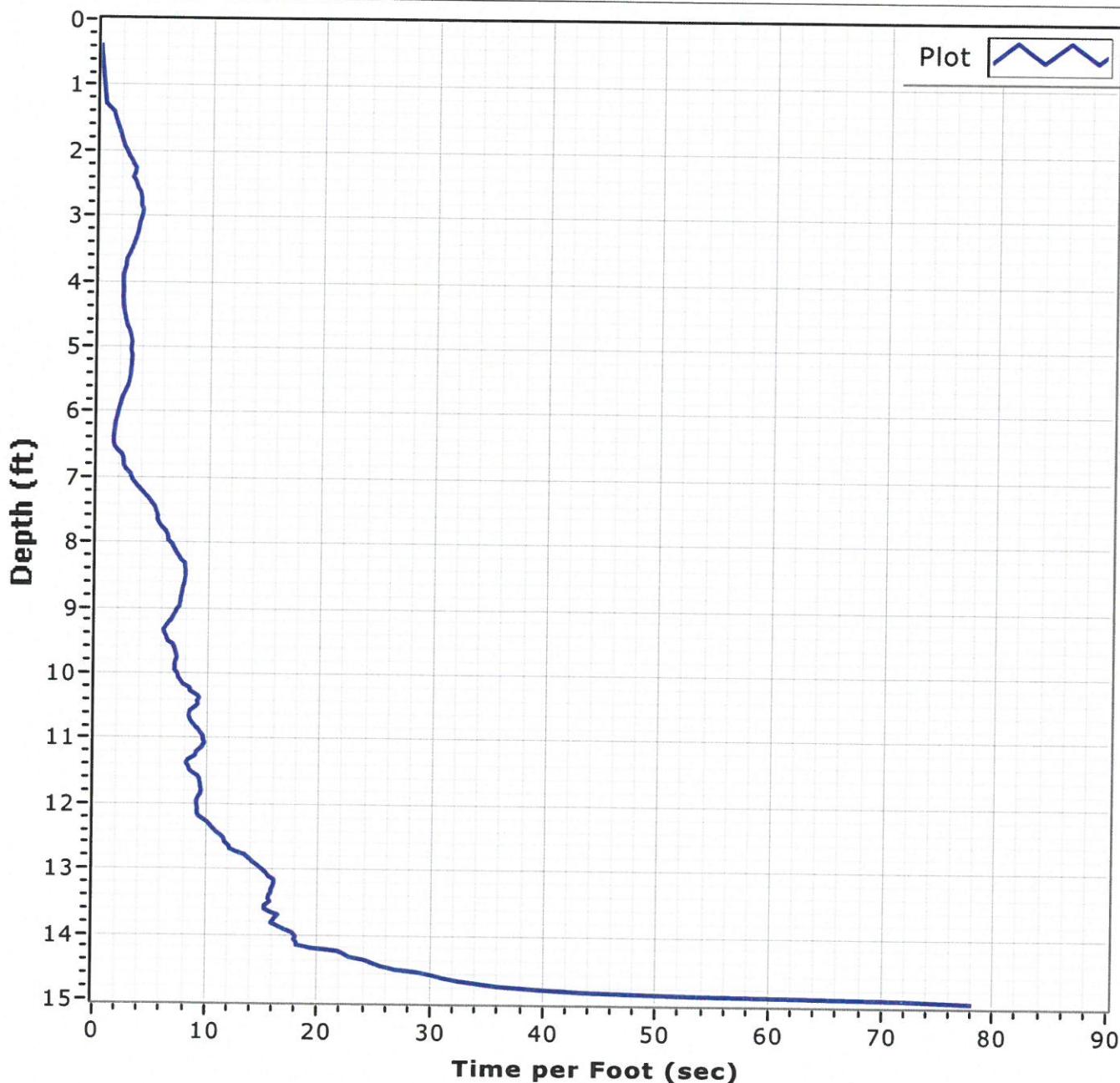
**Top of Hole** -50.5 MLLW  
**Elevation**

**Penetration** 15.0'

**Recovery** 14.0 FT

**Comments**

--



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** BENR-15-09

**Date** 05/14/2016

**Top of Hole** -49.5 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 07:05:01

**Zone**

**End Time** 07:11:22

**Penetration** 16.3'

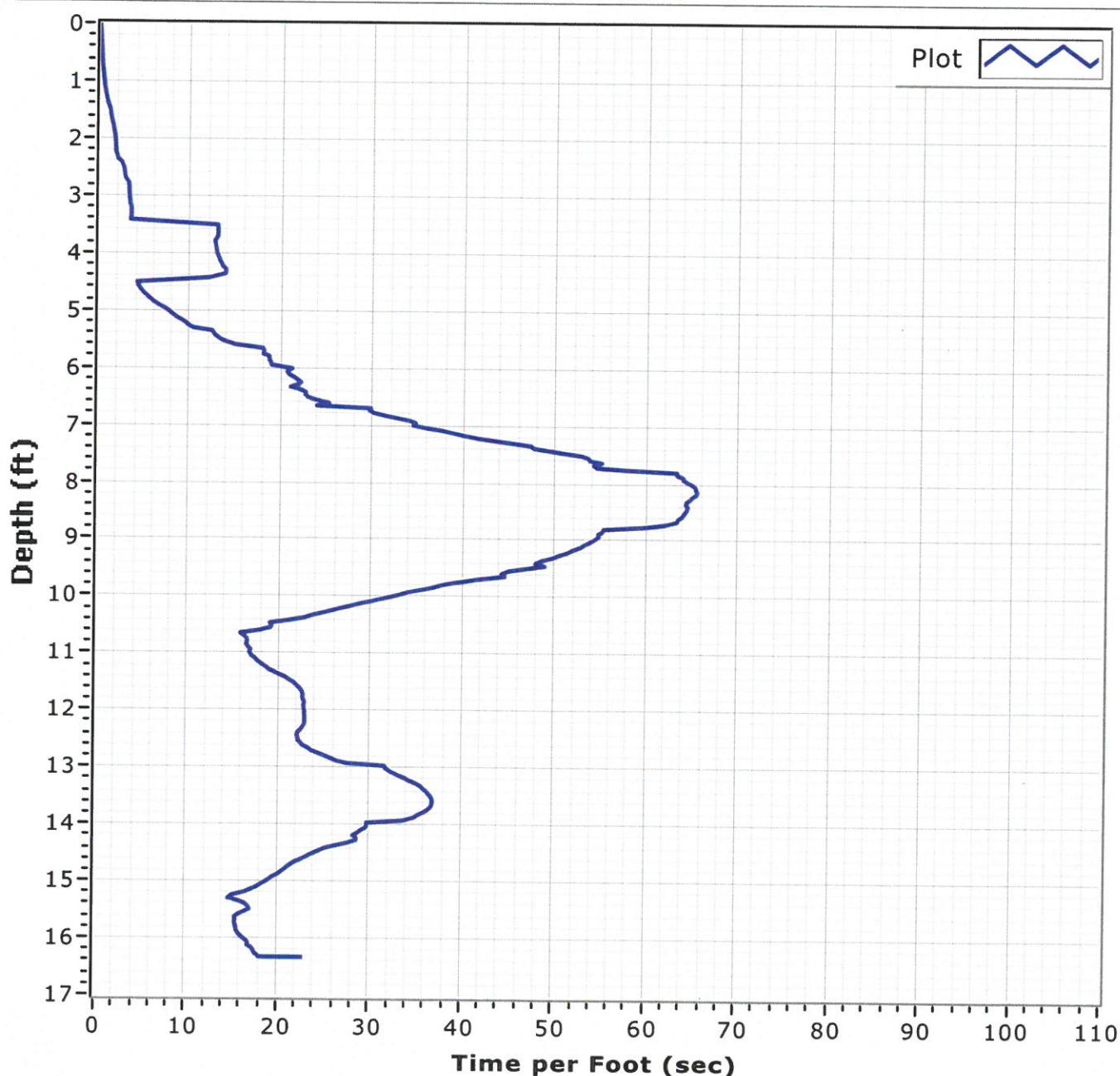
X N 344439.9

**Total Time** 00:06:21

**Recovery** 11.0 FT

Y E 2340480.2

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** BENR-15-10

**Date** 05/14/2016

**Top of Hole** -48.8 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 07:50:13

**Zone**

**End Time** 07:53:01

**Penetration** 15.3'

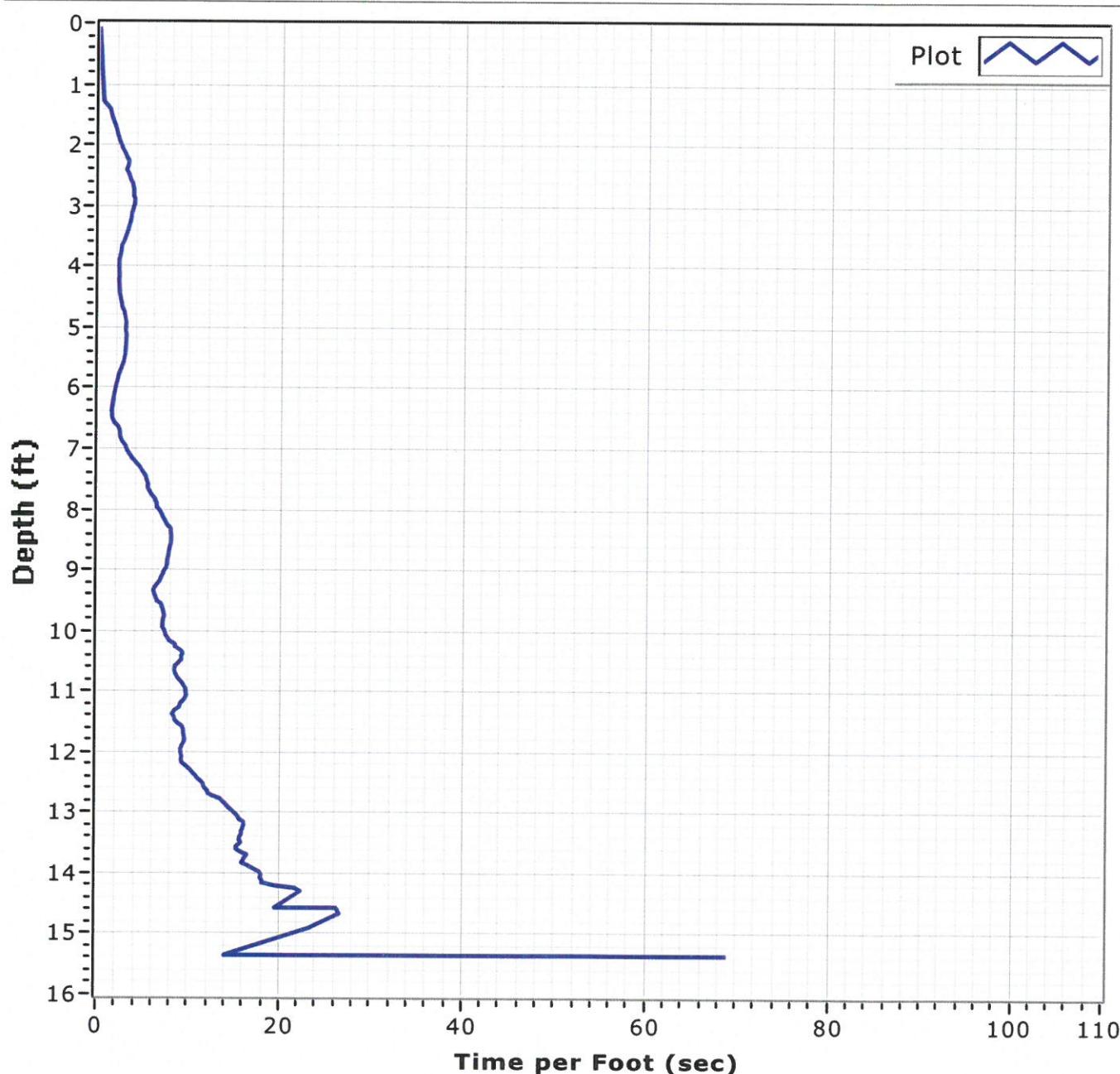
X N 343938.5

**Total Time** 00:02:47

**Recovery** 15.0 FT

Y E 2340667.5

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** BENR-15-11

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -49.6 MLLW  
**Elevation**

**Zone**

X N 343788.6

**Start Time** 08:06:23

**Penetration** 16.5'

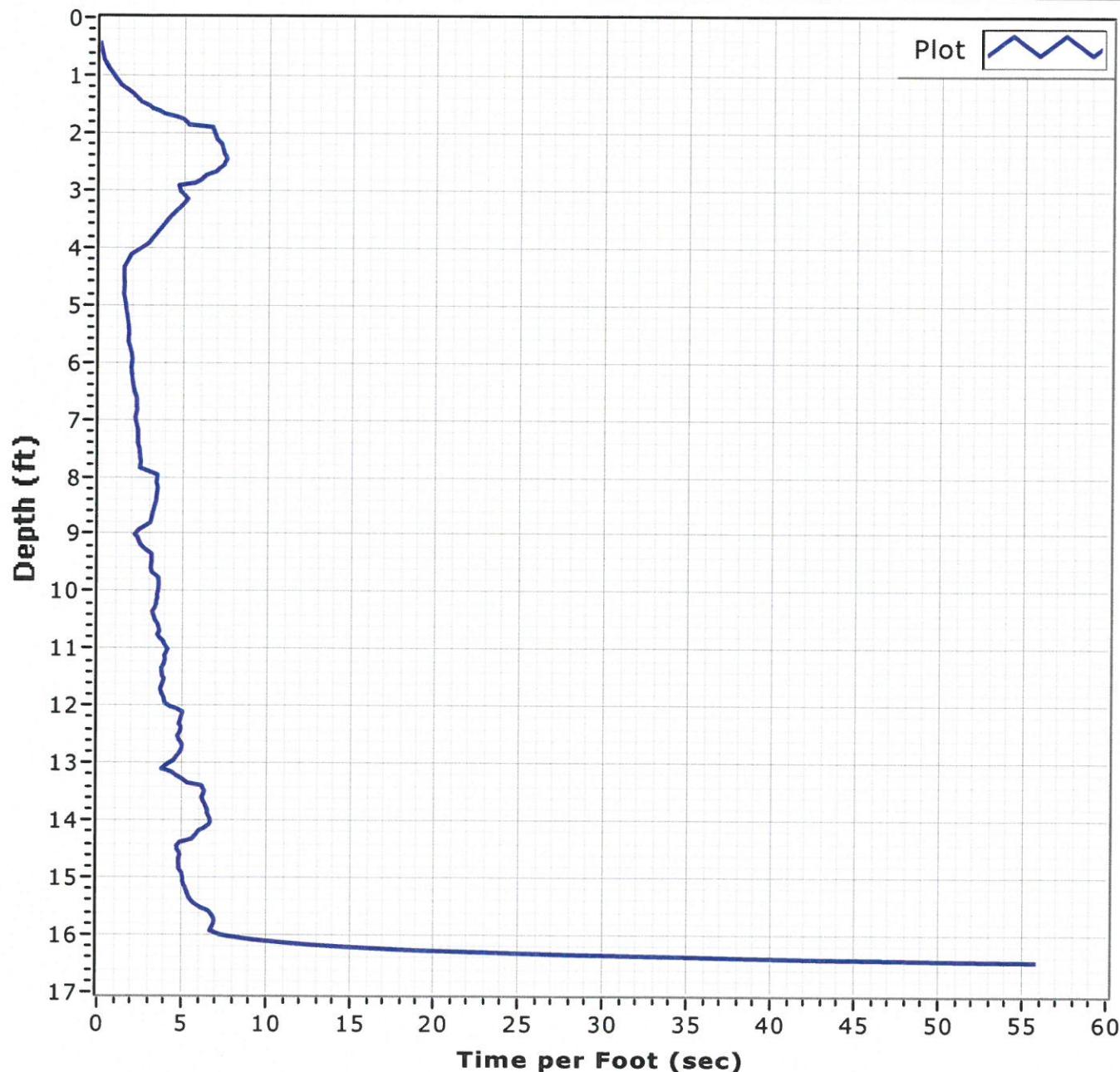
Y E 2341557.6

**End Time** 08:08:16

**Recovery** 16.0 FT

**Total Time** 00:01:53

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** CHEC-15-01

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Start Time** 13:58:29

**Top of Hole** -50.4 MLLW  
**Elevation**

**Zone**

X N 329609.7

**End Time** 14:03:02

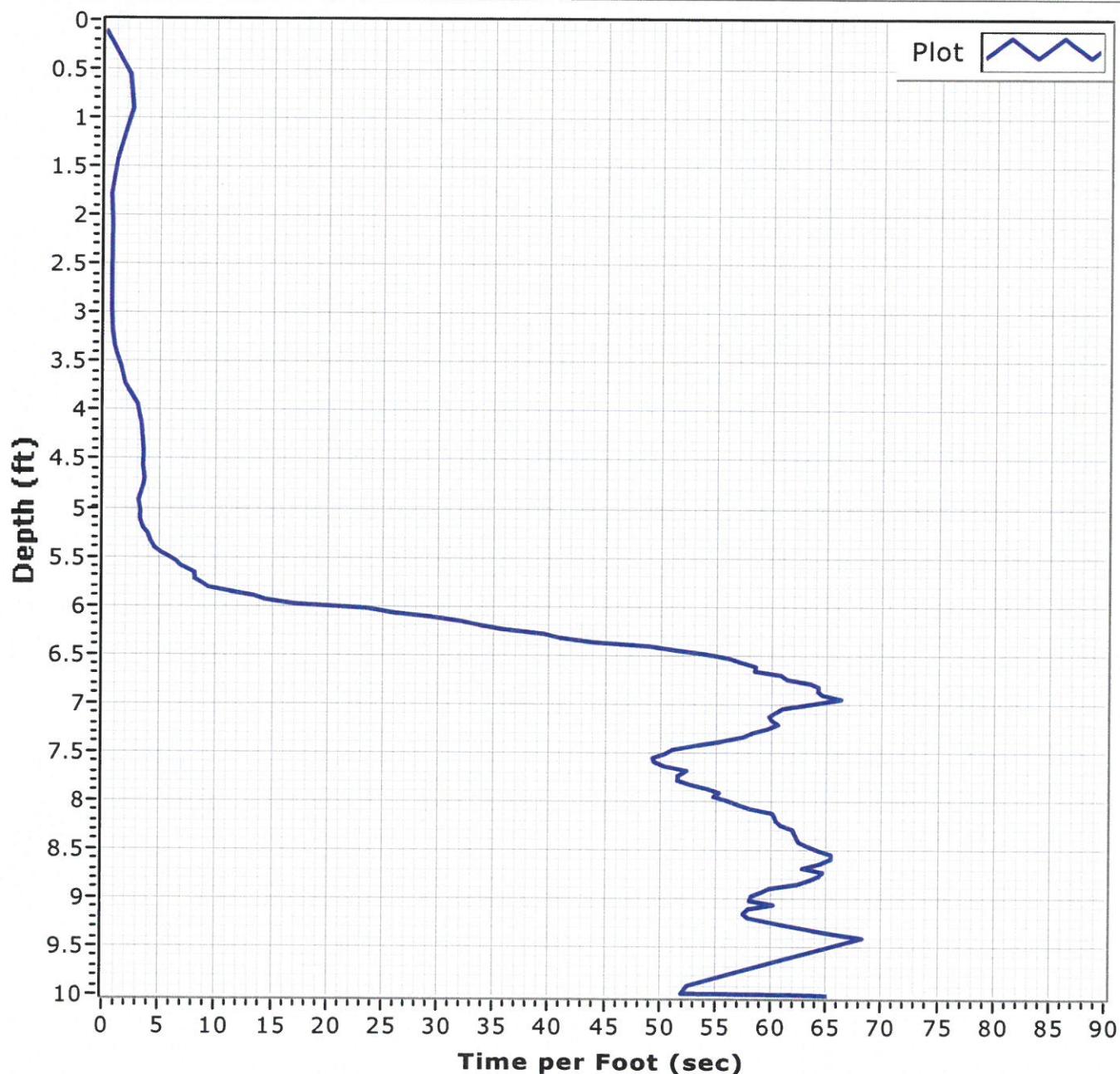
**Penetration** 10.0'

Y E 2358596.9

**Total Time** 00:04:33

**Recovery** 11.6 FT

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** CHEC-15-02

**Date** 05/14/2016

**Top of Hole** -50.8 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 13:41:21

**Penetration** 10.6'

**Zone**

**End Time** 13:44:32

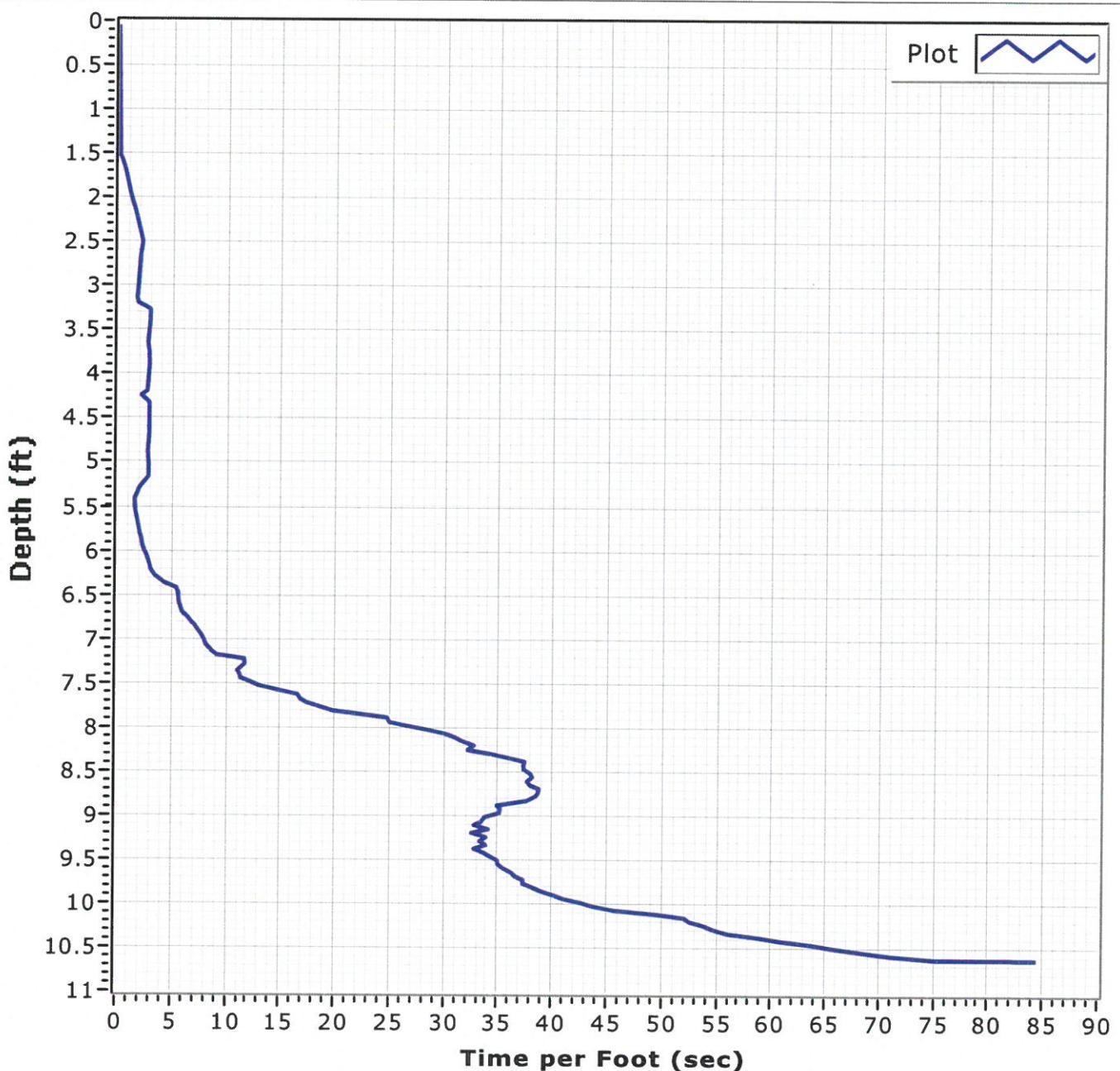
**Recovery** 11.0 FT

**X** N 329204.1

**Total Time** 00:03:10

**Y** E 23593367.0

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** CHEC-15-03

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -52.1 MLLW  
**Elevation**

**Zone**

X N 328986.3

**Start Time** 13:19:36

**Penetration** 9.6'

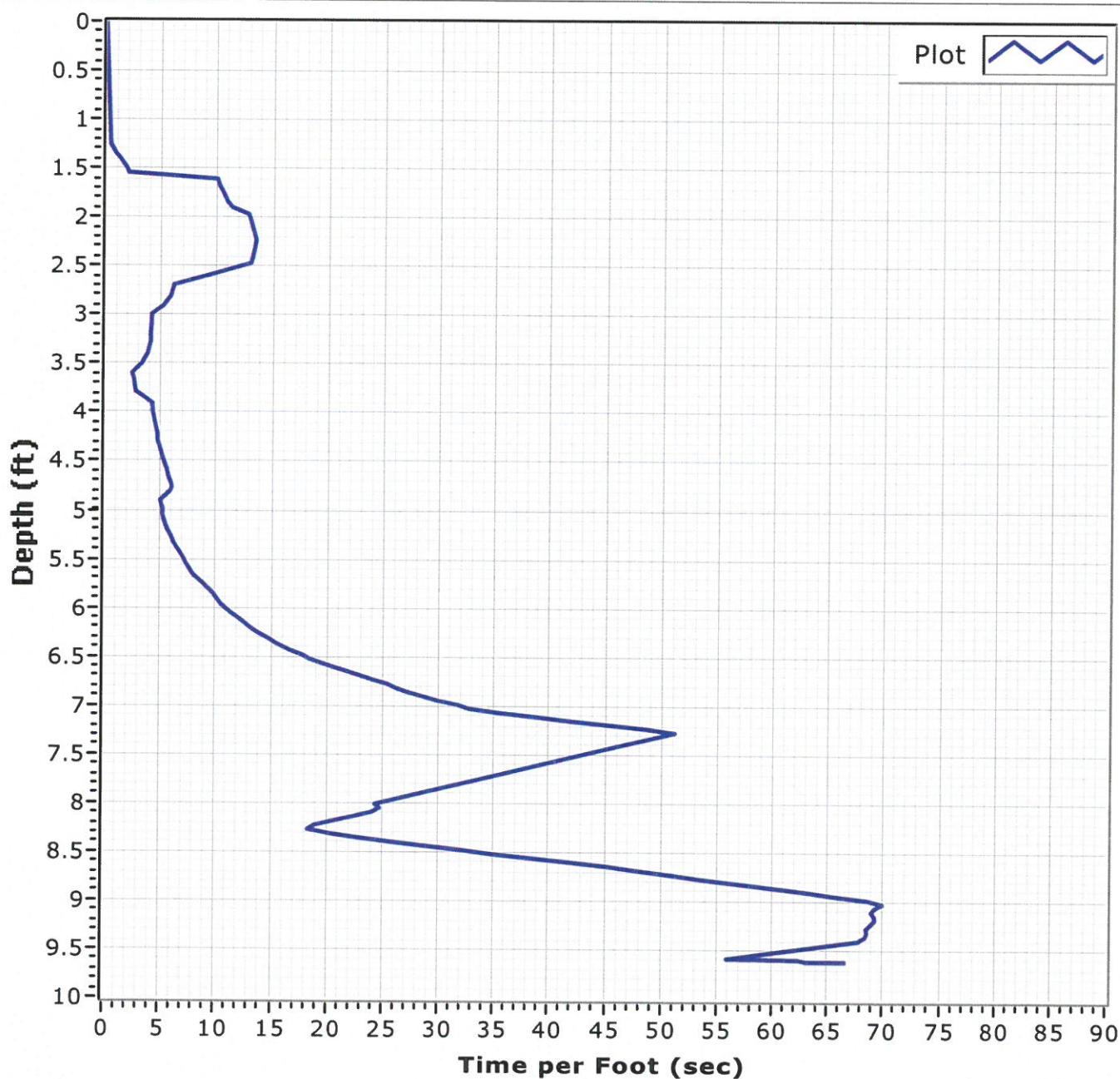
Y E 2360384.0

**End Time** 13:23:00

**Recovery** 11.0 FT

**Total Time** 00:03:24

**Comments**



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** CHEC-15-04

**Date** 05/14/2016

**Top of Hole** -53.3 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 13:02:25

**Zone**

**End Time** 13:06:32

**Penetration** 9.5'

X N 328465.5

**Total Time** 00:04:06

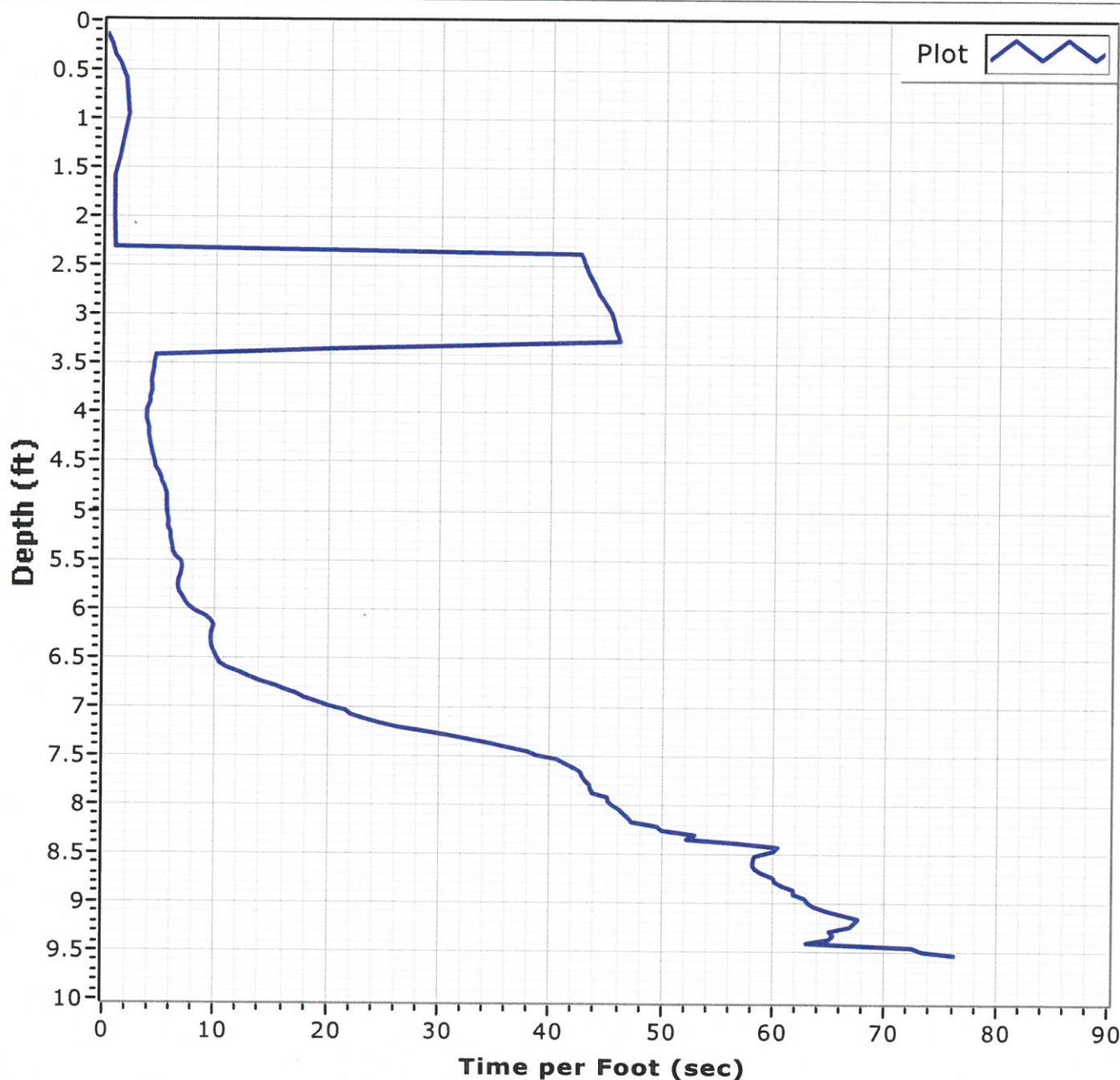
**Recovery** 14.6 FT

Y E 2360667.0

**Comments**

PEN 14.6 WIRE BROKE AT 9.6

REC 14.6



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** CHEC-15-05

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -53.7 MLLW  
**Elevation**

**Zone**

X N 327962.3

**Start Time** 12:42:39

**Penetration** 10.2'

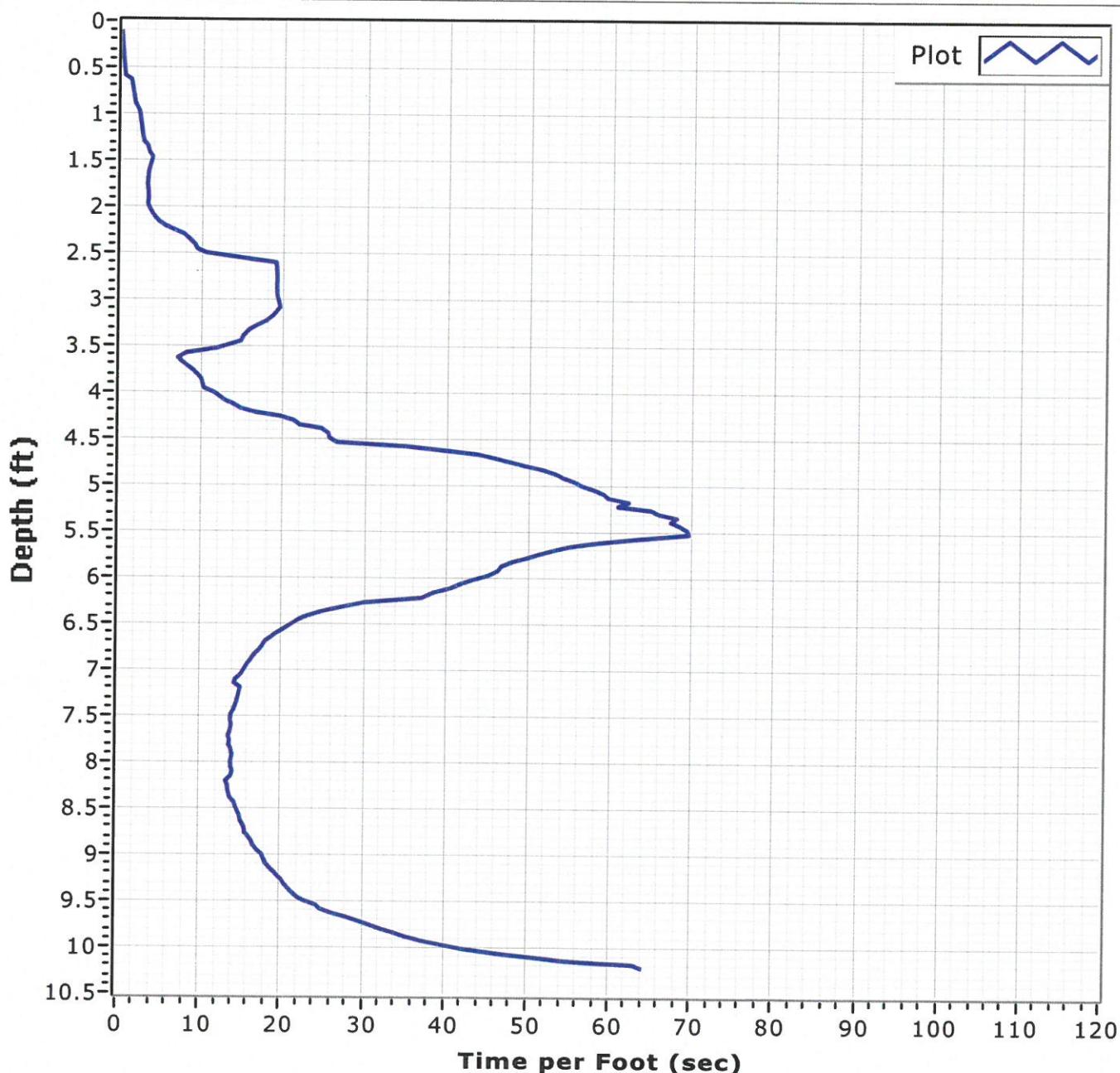
Y E 2361533.5

**End Time** 12:46:53

**Recovery** 9.6 FT

**Total Time** 00:04:14

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** CHEC-15-06

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -53 MLLW  
**Elevation**

**Zone**

X N 327347.9

**Start Time** 12:21:58

**Penetration** 6.0'

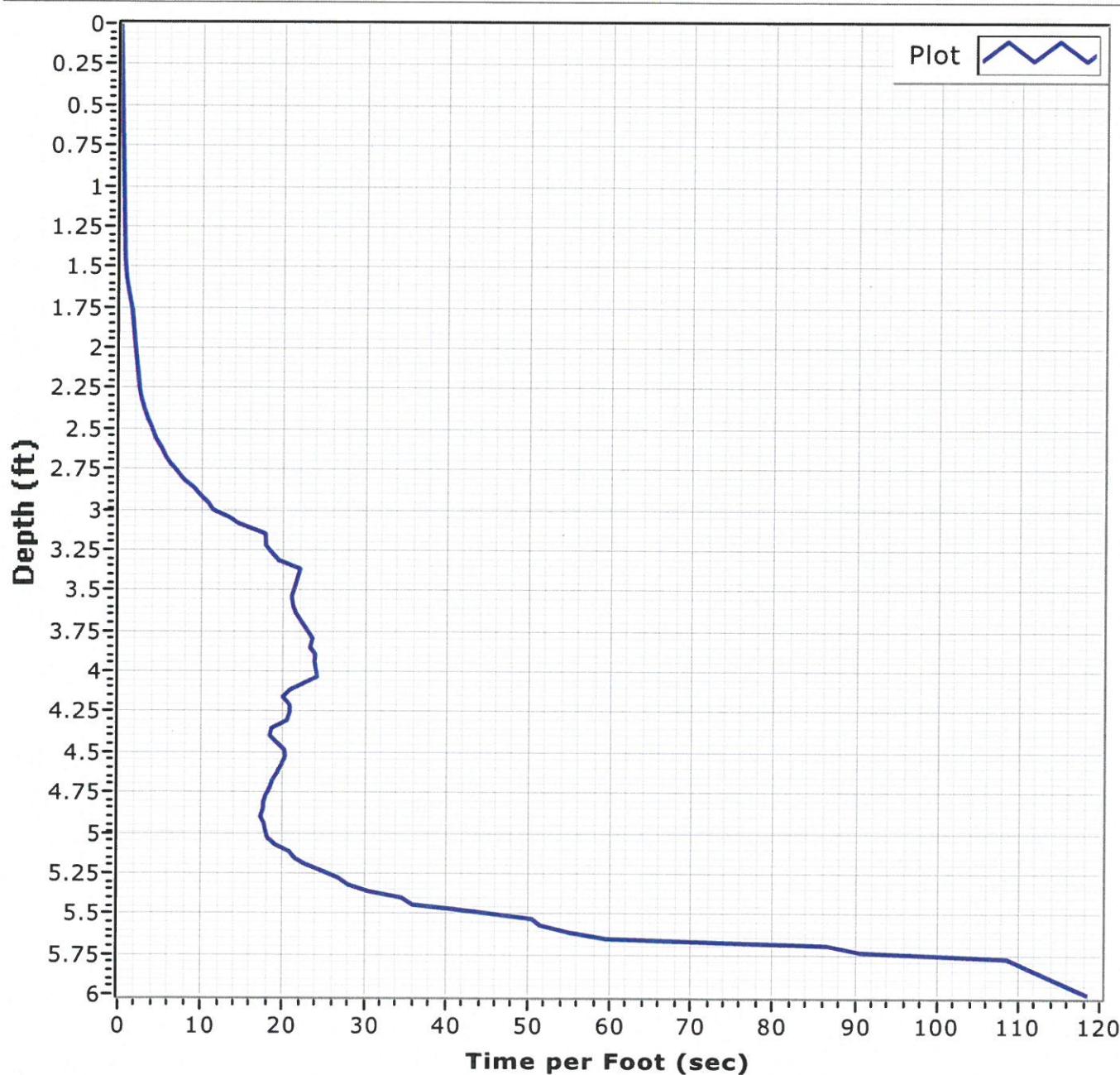
Y E 2361994.4

**End Time** 12:24:52

**Recovery** 6.9 FT

**Total Time** 00:02:54

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** CHEC-15-07

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -53.5 MLLW  
**Elevation**

**Zone**

X N 327363.5

**Start Time** 11:59:41

**Penetration** 10.4'

Y E 2362701.2

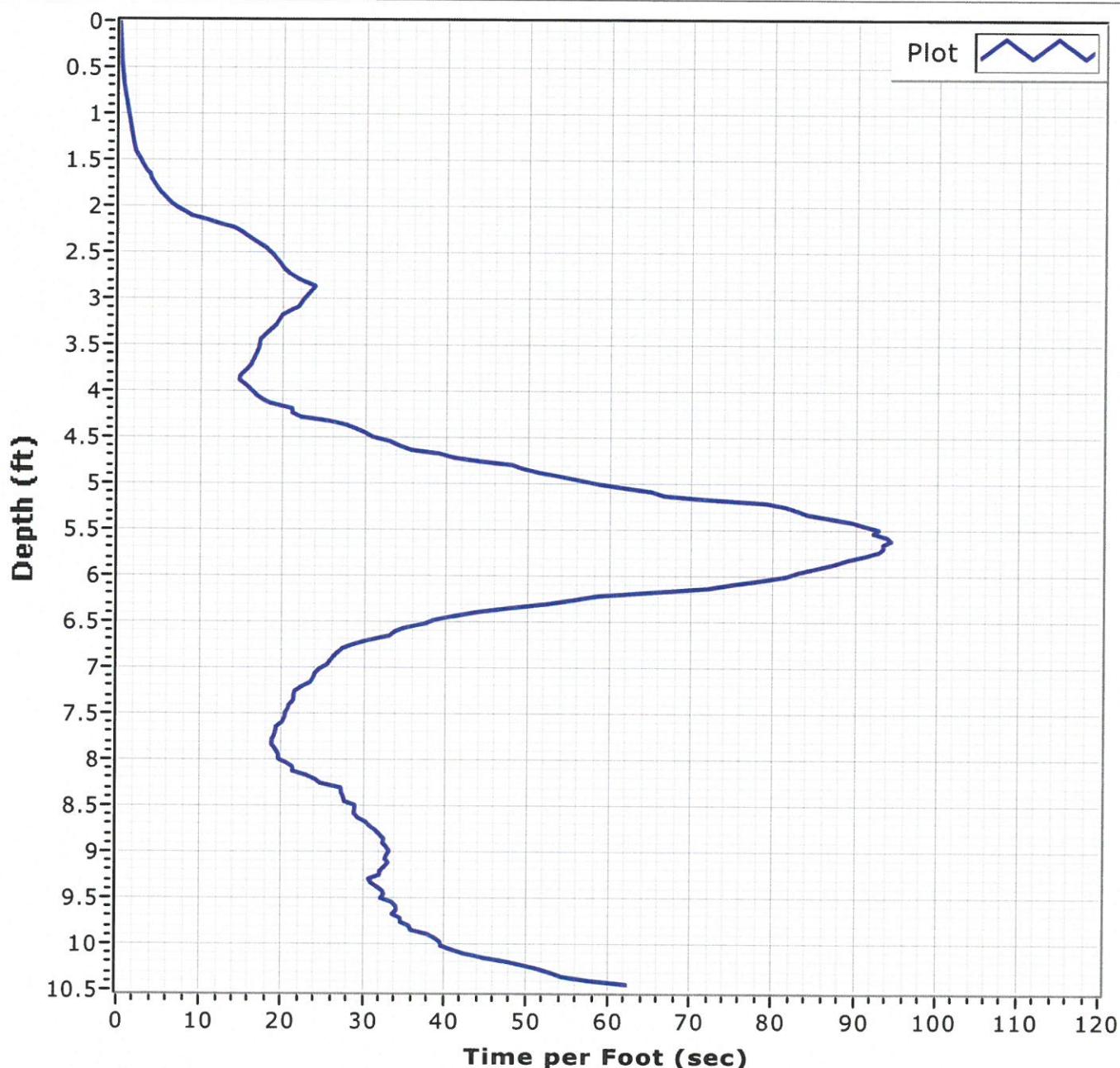
**End Time** 12:05:23

**Recovery** 17.0 FT

**Total Time** 00:05:42

**Comments**

PENETROMETER CABLE ISSUE at 10.4 ft . PEN 20FT REC 17



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** CHEC-15-08

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -48.5 MLLW  
**Elevation**

**Start Time** 11:41:05

**Penetration** 10.0'

**End Time** 11:45:15

**Recovery** 11.0 FT

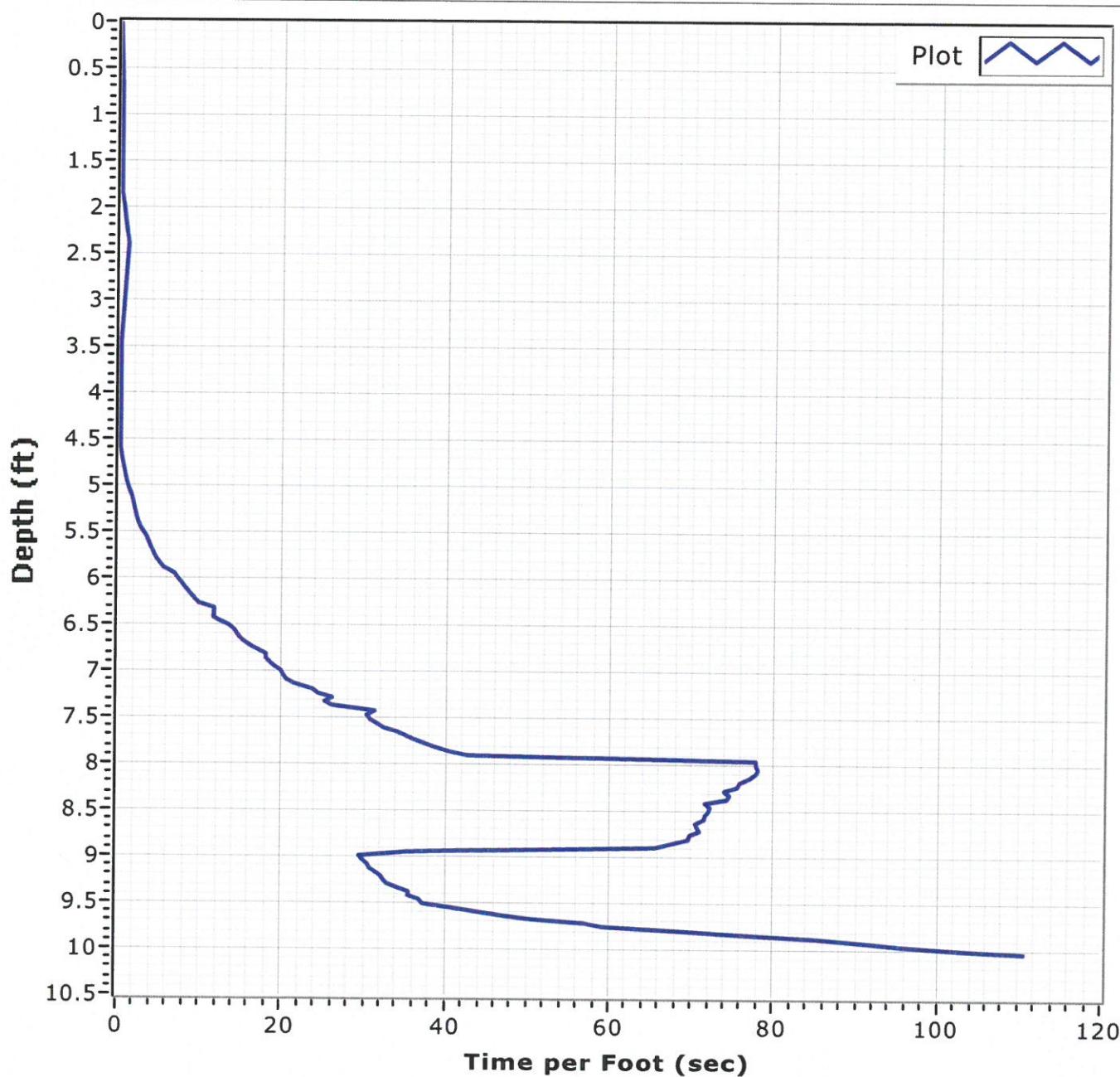
**Total Time** 00:04:09

**Zone**

X N 326846.2

Y E 2363646.0

**Comments**



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** REBR-15-01

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Start Time** 08:20:49

**Top of Hole** -51.8 MLLW  
**Elevation**

**Zone**

X N 342919.6

**End Time** 08:24:48

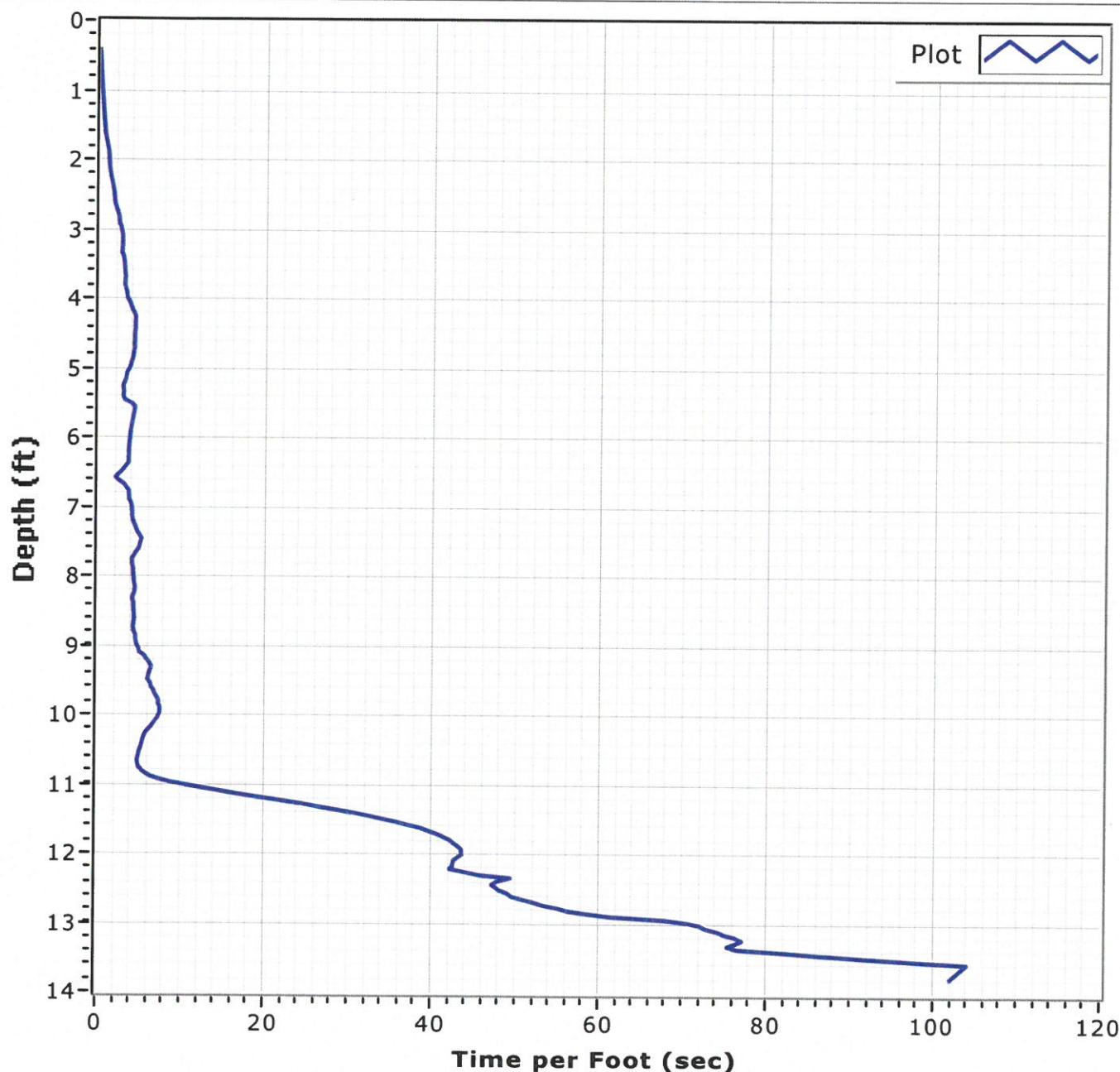
**Penetration** 13.8'

Y E 2342571.0

**Total Time** 00:03:59

**Recovery** 15.0 FT

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** REBR-15-02

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/14/2016

**Top of Hole** -51.6 MLLW  
**Elevation**

**Zone**

X N 342668.1

**Start Time** 08:39:05

**Penetration** 10.0'

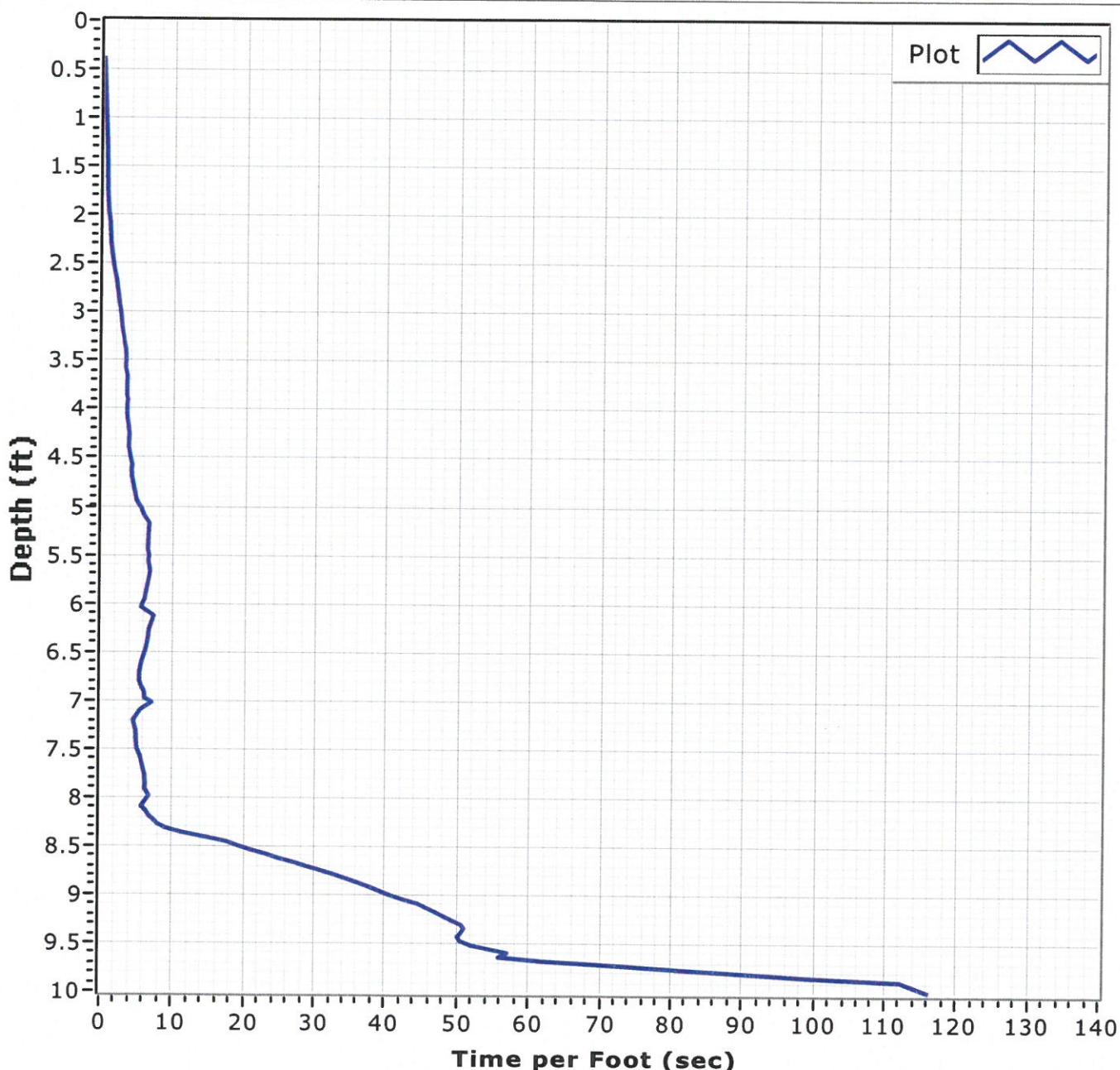
Y E 2342526.4

**End Time** 08:42:13

**Recovery** 10.0 FT

**Total Time** 00:03:08

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** REBR-15-03

**Date** 05/14/2016

**Top of Hole** -49.8 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 08:59:17

**Zone**

**End Time** 09:01:49

**Penetration** 11.7'

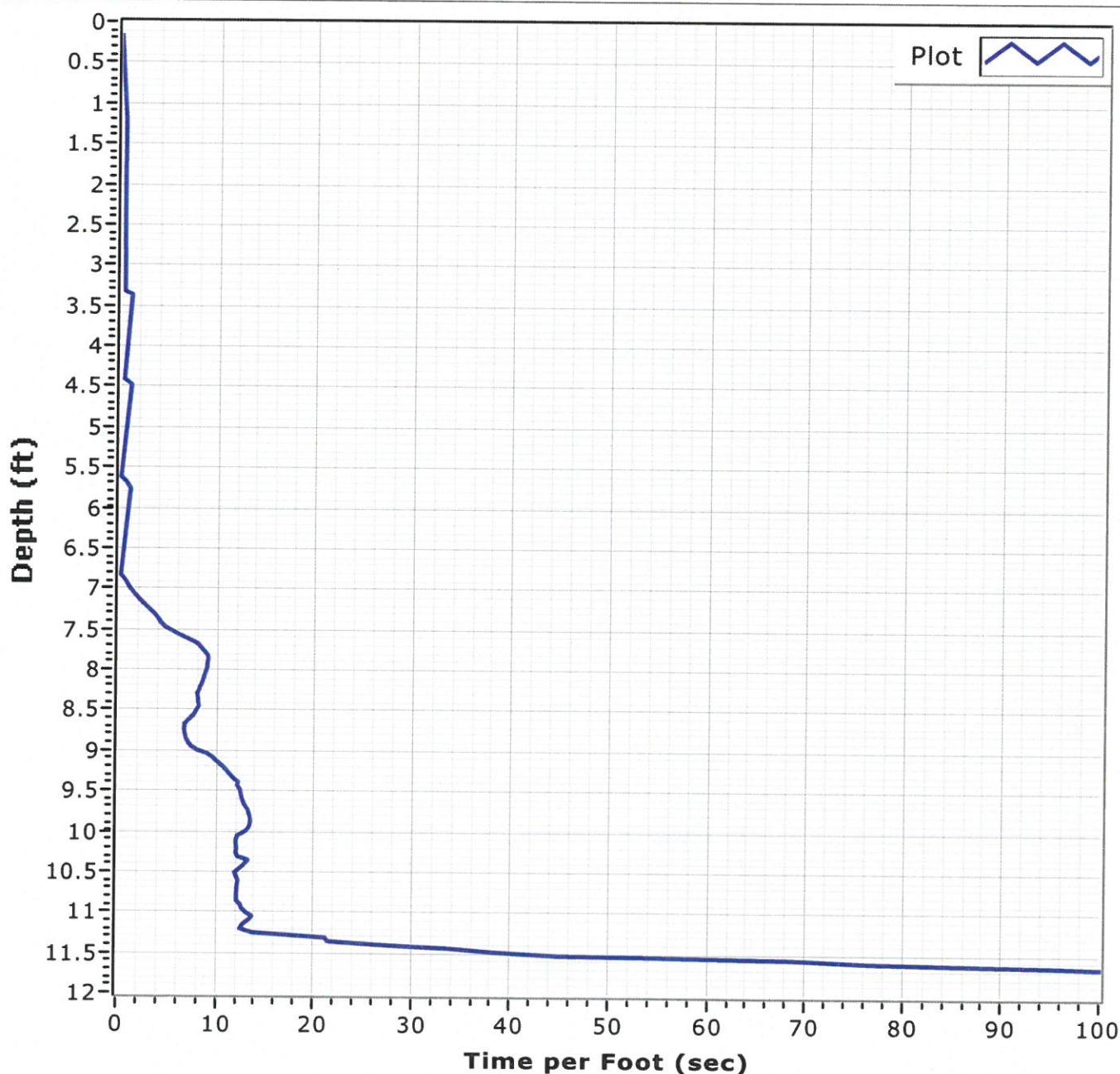
X N 342315.6

**Total Time** 00:02:32

**Recovery** 11.2 FT

Y E 2343712.0

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** REBR-15-04

**Date** 05/14/2016

**Top of Hole** -48.9 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 09:13:07

**Zone**

**End Time** 09:15:59

**Penetration** 10.0'

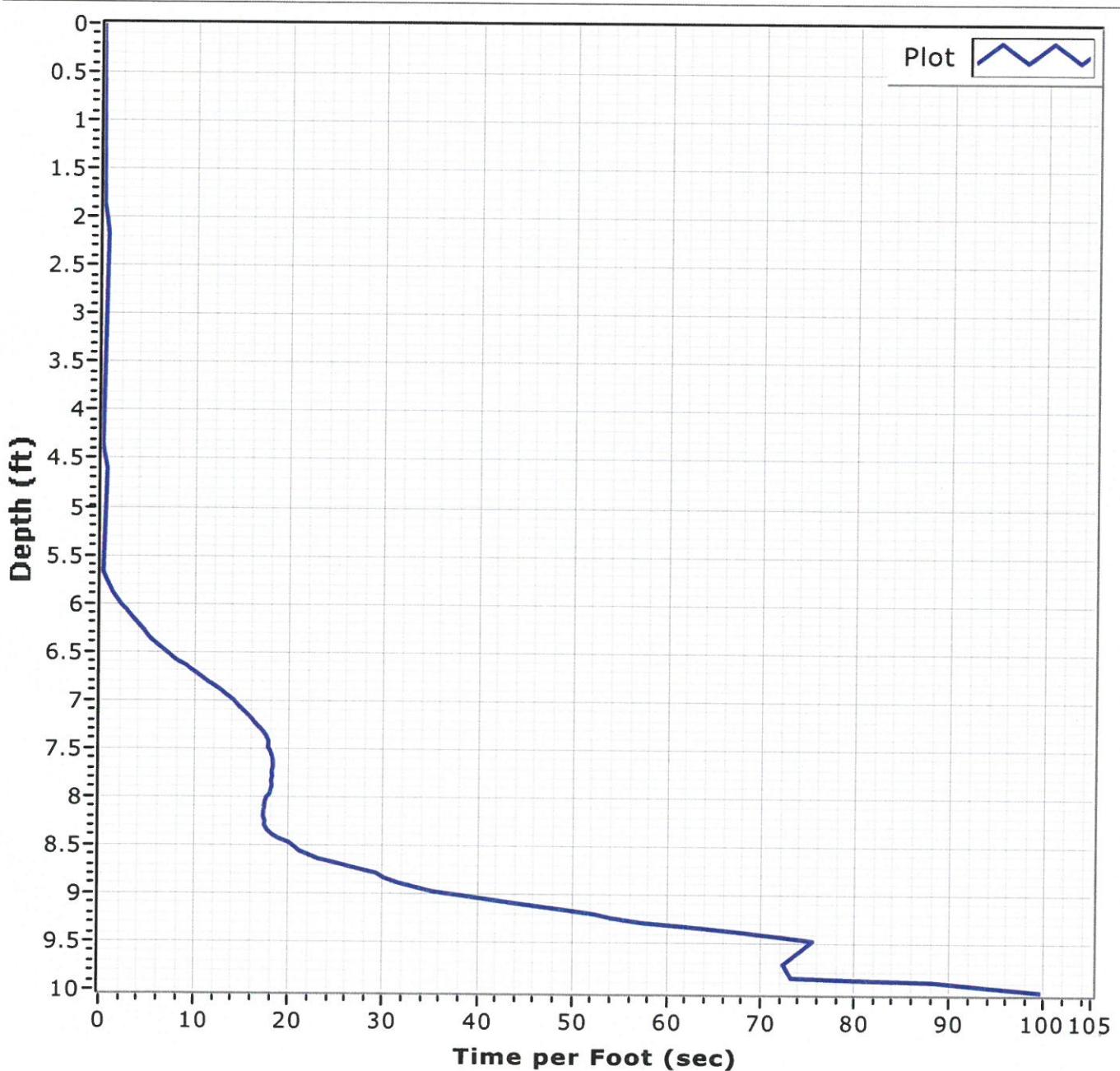
X N 341826.7

**Total Time** 00:02:52

**Recovery** 10.0 FT

Y E 2343778.4

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** REBR-15-05

**Date** 05/14/2016

**Top of Hole** -49.1 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 09:40:51

**Zone**

**End Time** 09:44:12

**Penetration** 11.0'

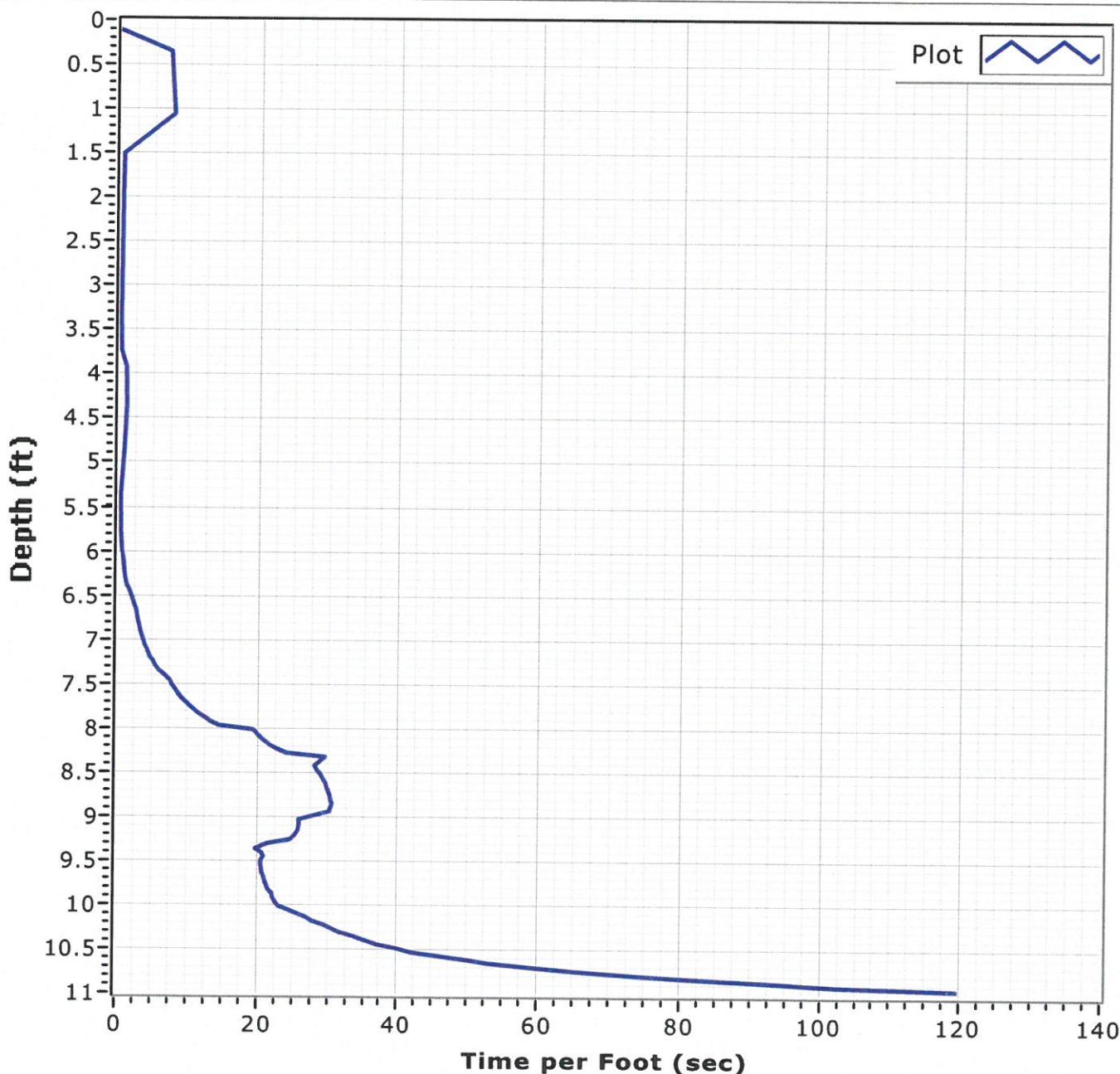
X N 341548.5

**Total Time** 00:03:21

**Recovery** 11.6 FT

Y E 2344747.4

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** REBR-15-06

**Date** 05/14/2016

**Top of Hole** -48.8 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 09:58:31

**Penetration** 18.0'

**Zone**

**End Time** 10:01:40

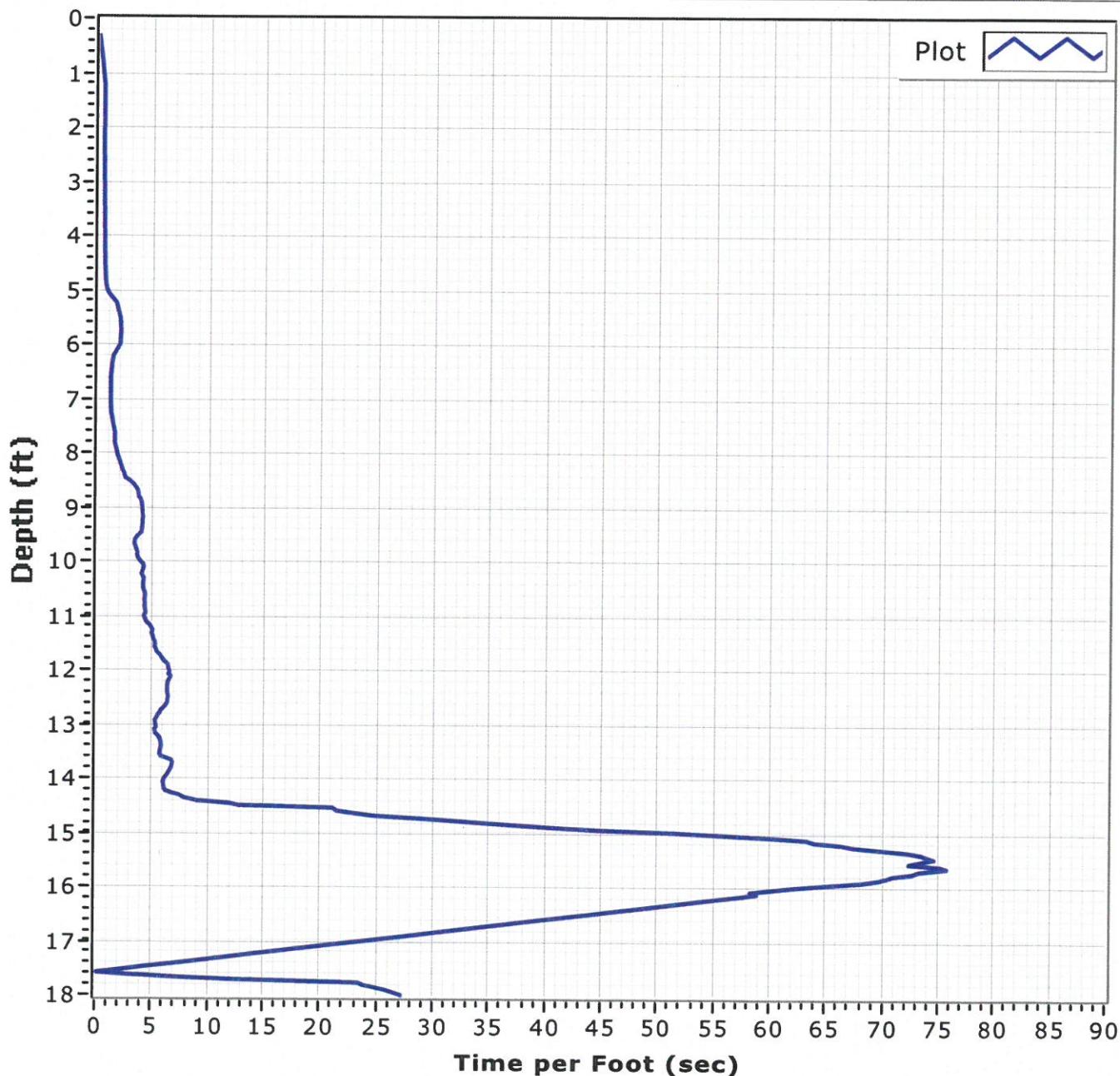
**Recovery** 18.0 FT

X N 341216.4

**Total Time** 00:03:08

Y E 2344795.5

**Comments**



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** REBR-15-07

**Date** 05/14/2016

**Top of Hole** -47.6 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 10:16:02

**Zone**

**End Time** 10:17:04

**Penetration** 20.0'

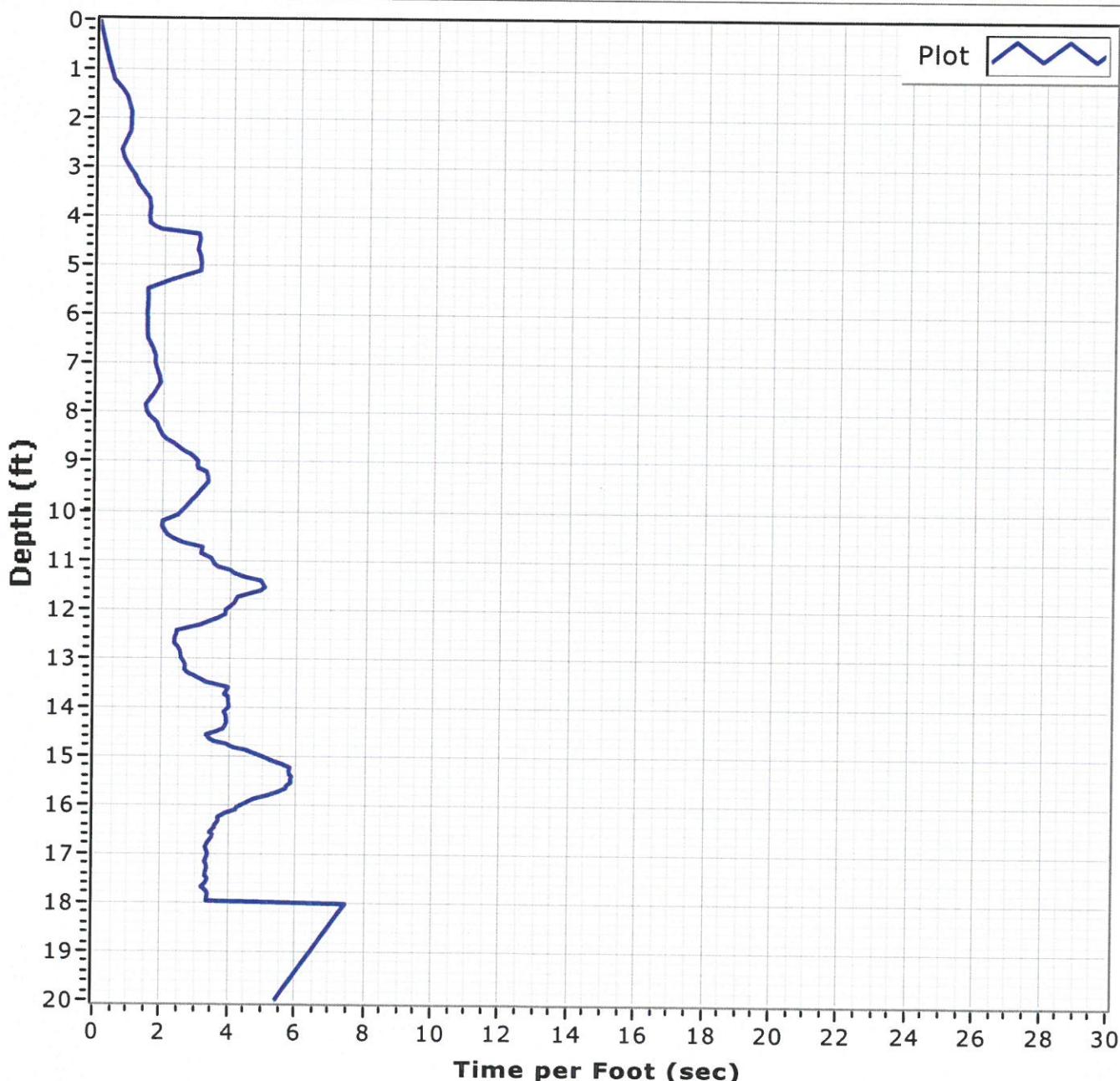
X N 340877.4

**Total Time** 00:01:02

**Recovery** 20.0 FT

Y E 2344869.2

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WLRW-15-01

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016

**Start Time** 08:15:33

**Top of Hole** -40.1 MLLW  
**Elevation**

**Zone**

X N 361935.4

**End Time** 08:24:55

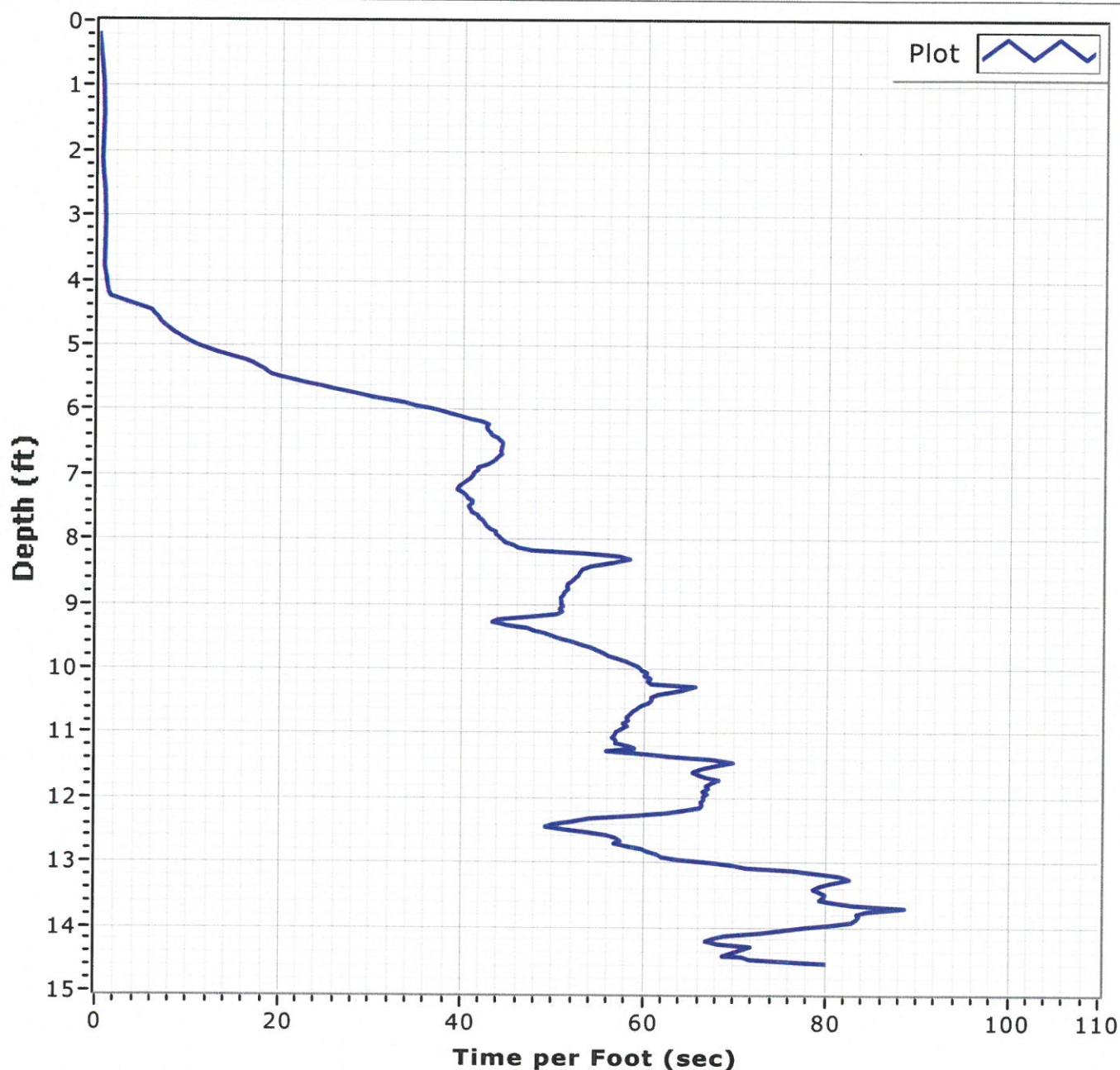
**Penetration** 14.6'

Y E 2337041.5

**Total Time** 00:09:21

**Recovery** 15ft

**Comments**

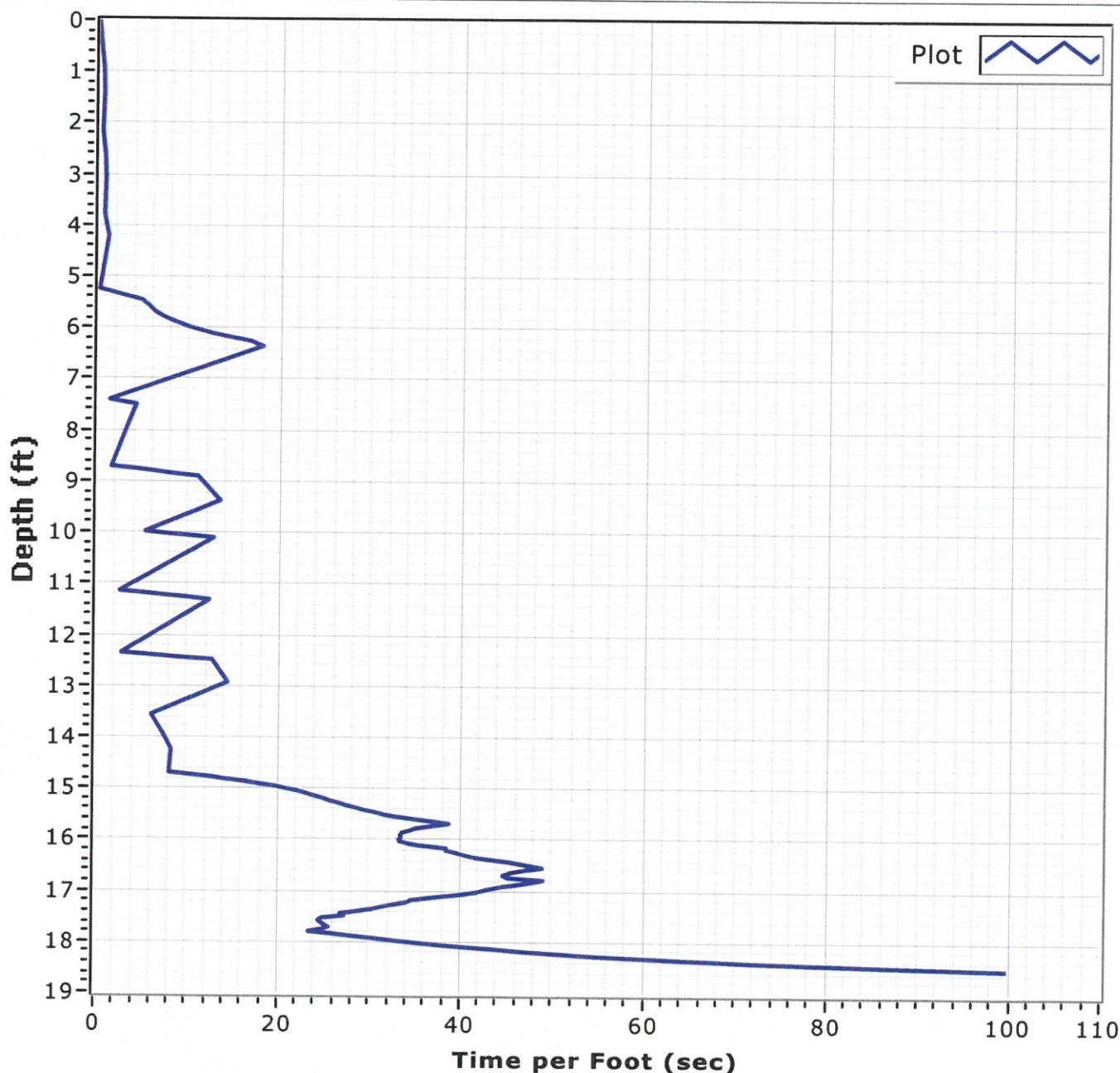


**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES**Core Identifier** WLRW-15-02**Date** 05/13/2016**Top of Hole** -38.7 MLLW  
**Elevation****Coordinate System****Start Time** 08:45:54

State Plane Coordinates (SPC)

**End Time** 08:50:55**Penetration** 18.5'**Zone****Total Time** 00:05:01**Recovery** 13.8**X** N 360660.9**Y** E 2335850.9**Comments**

**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WLRW-15-03

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/13/2016

**Start Time** 09:05:06

**Top of Hole** -47 WLLW  
**Elevation**

**Zone**

X N 359759.1

**End Time** 09:11:13

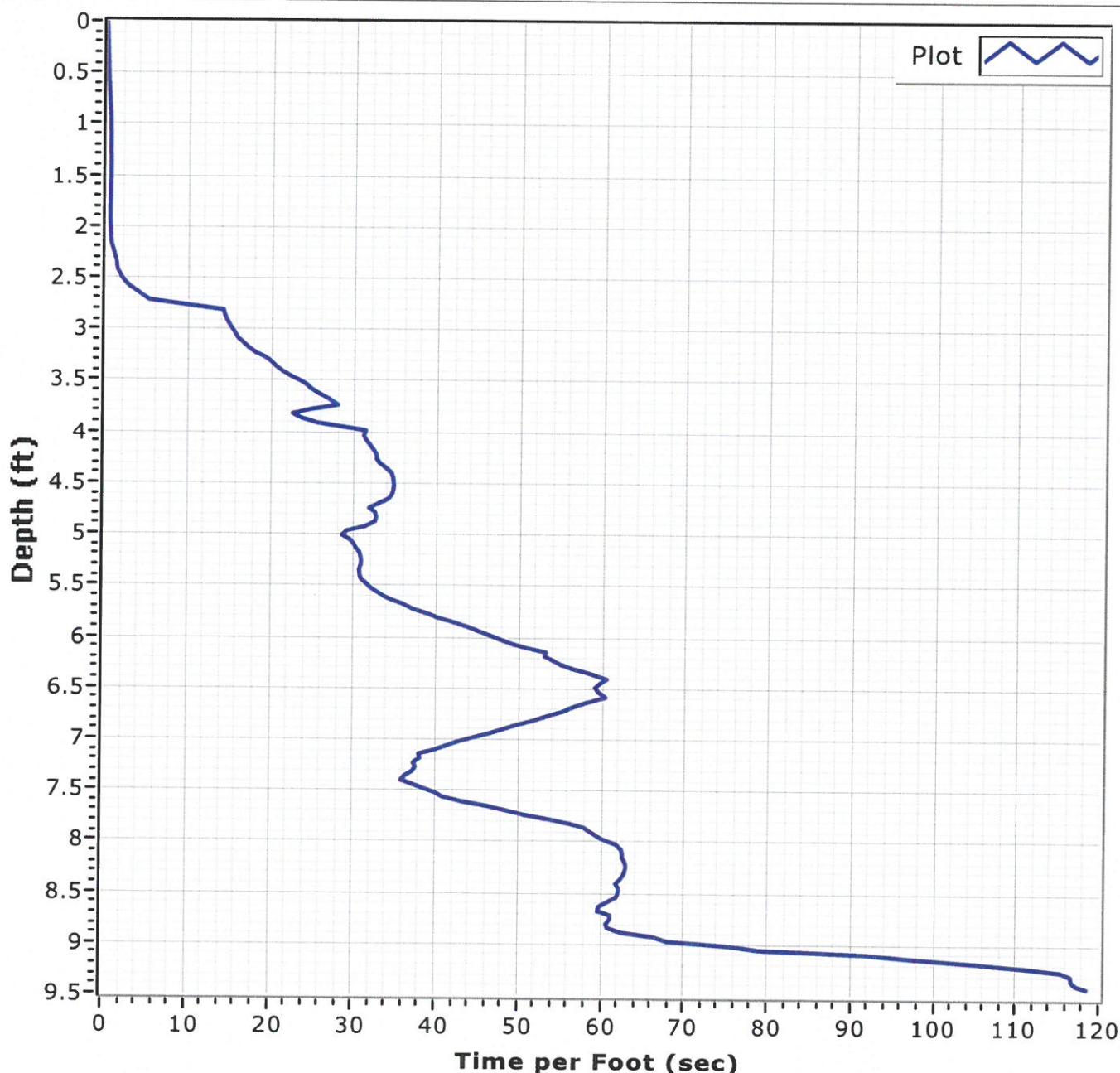
**Penetration** 9.4'

Y E 2334918.7

**Total Time** 00:06:07

**Recovery** 10ft

**Comments**



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-01

**Date** 05/15/2016

**Water Depth** -53 MLLW

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 13:33:21

**Zone**

**End Time** 13:38:32

**Penetration** 8.1'

X N 296421

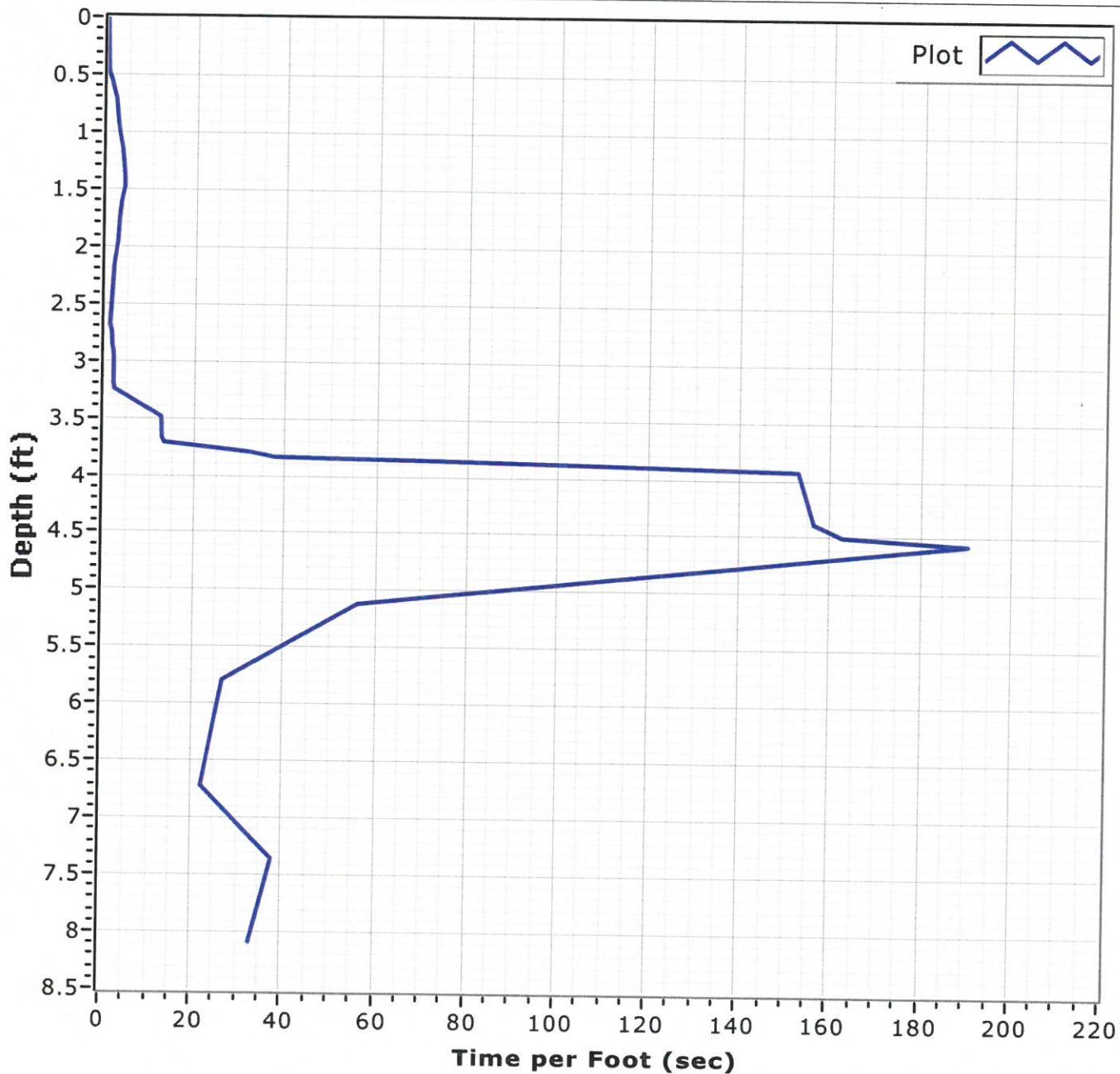
**Total Time** 00:05:11

**Recovery** WASH

Y E 2418562

**Comments**

JETTED TO 8.1



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-02

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 14:02:00

**Top of Hole** -53 MLLW  
**Elevation**

**Zone**

X N 294504

**End Time** 14:02:49

**Penetration** 9.1'

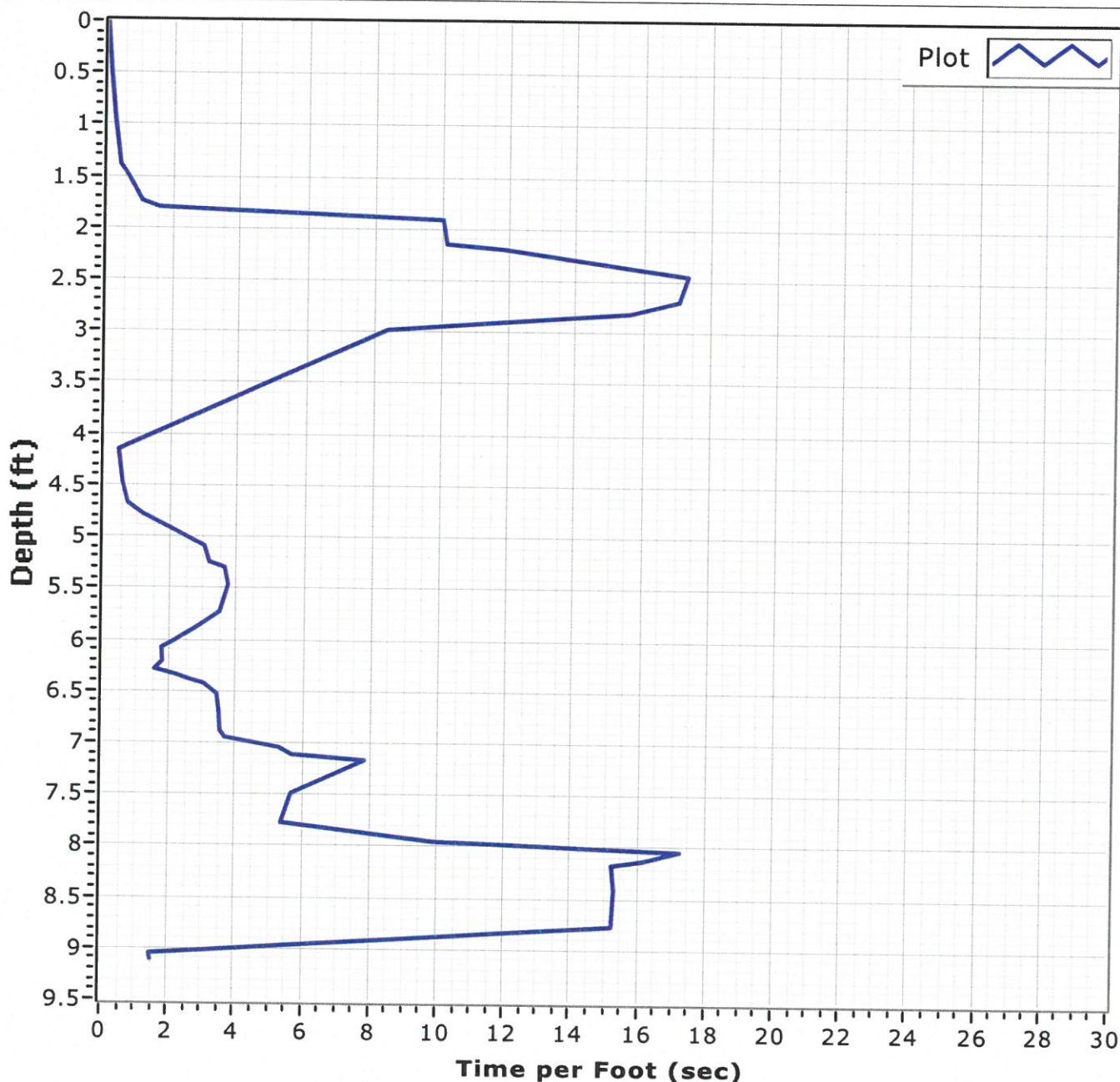
Y E 2422231

**Total Time** 00:00:48

**Recovery** WASH

**Comments**

JETTED TO 9.1



**Project**

**CHARLESTON HARBOR 2016**

**AVS**  
**AMERICAN VIBRACORE**  
**S E R V I C E S**

**Core Identifier** WP-15-03

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 14:09:08

**Top of Hole** -51 MLLW  
**Elevation**

**Zone**

**End Time** 14:09:24

**Penetration** 13.1'

X N 294731

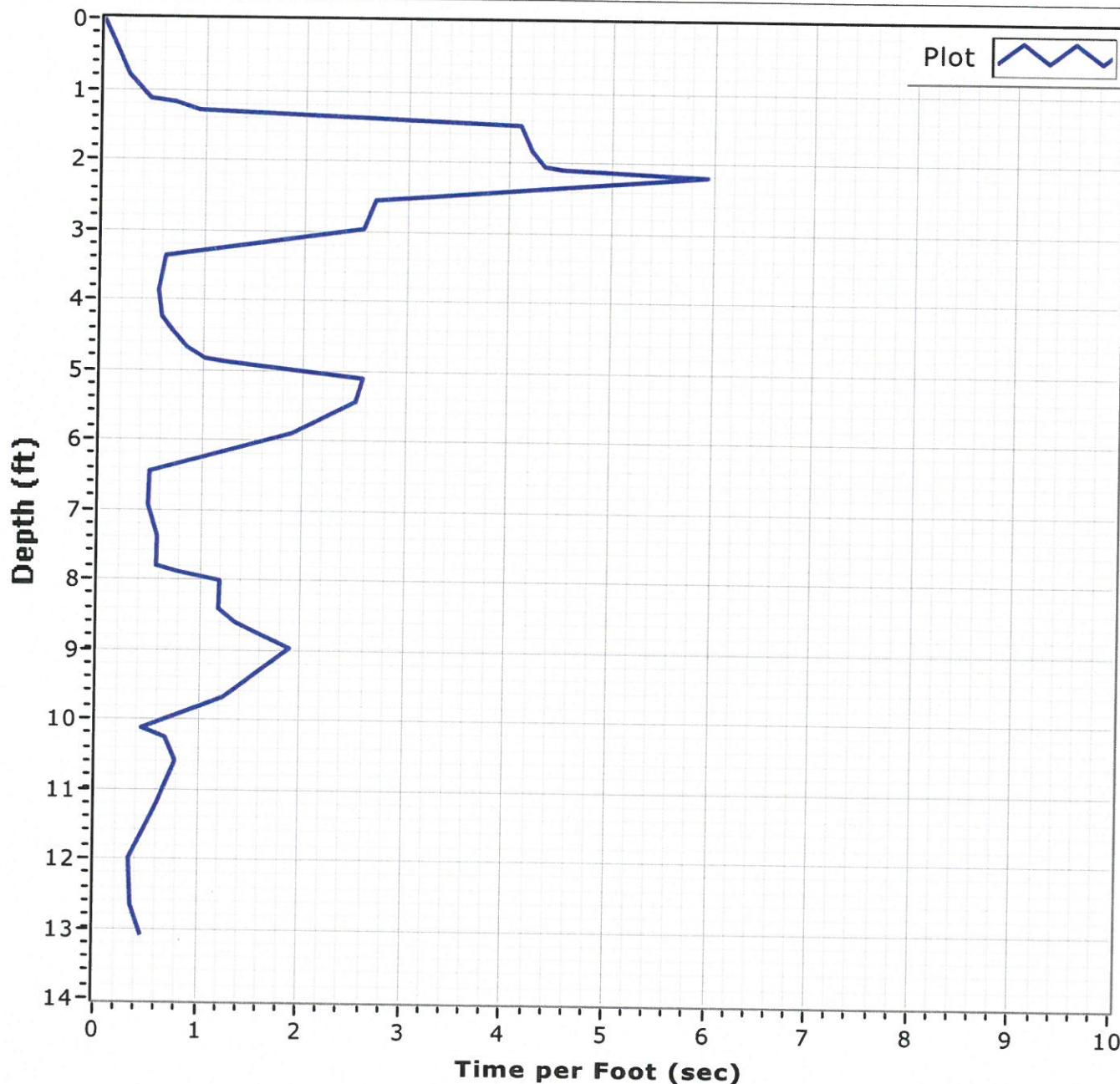
**Total Time** 00:00:16

**Recovery** WASH

Y E 2422854

**Comments**

JETTED TO 13.1



**Project**

**CHARLESTON HARBOR 2016**

**AVS**  
**AMERICAN VIBRACORE**  
**S E R V I C E S**

**Core Identifier** WP-15-04

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 14:26:37

**Top of Hole** -50 MLLW  
**Elevation**

**Zone**

X N 293078

**End Time** 14:26:48

**Penetration** 10.9'

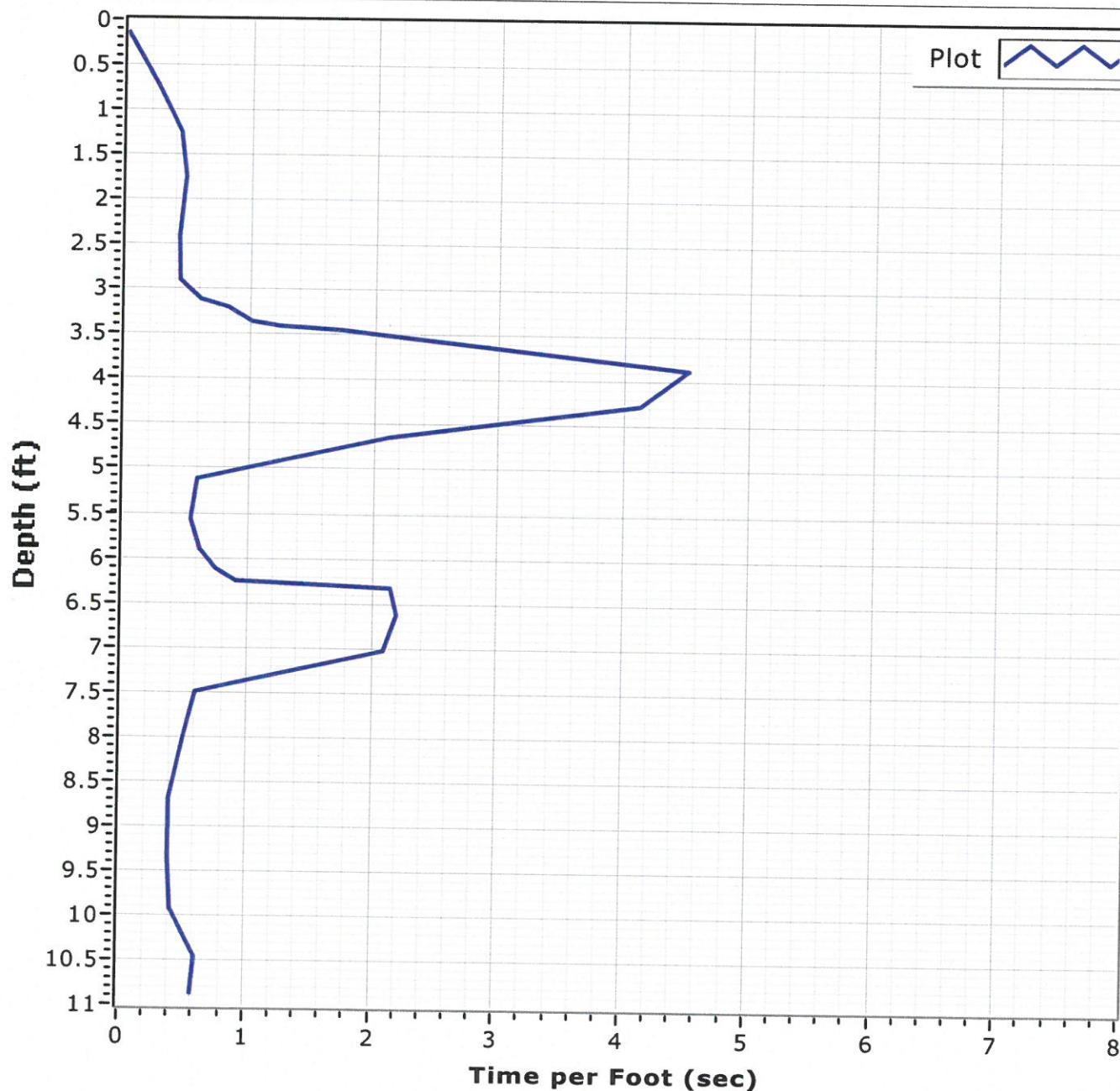
**Total Time** 00:00:11

**Recovery** WASH

Y E 2424867

**Comments**

JETTED TO 10.9



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-05

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -51 MLLW  
**Elevation**

**Zone**

X N 293495

**Start Time** 14:33:50

**Penetration** 13.3'

Y E 2425215

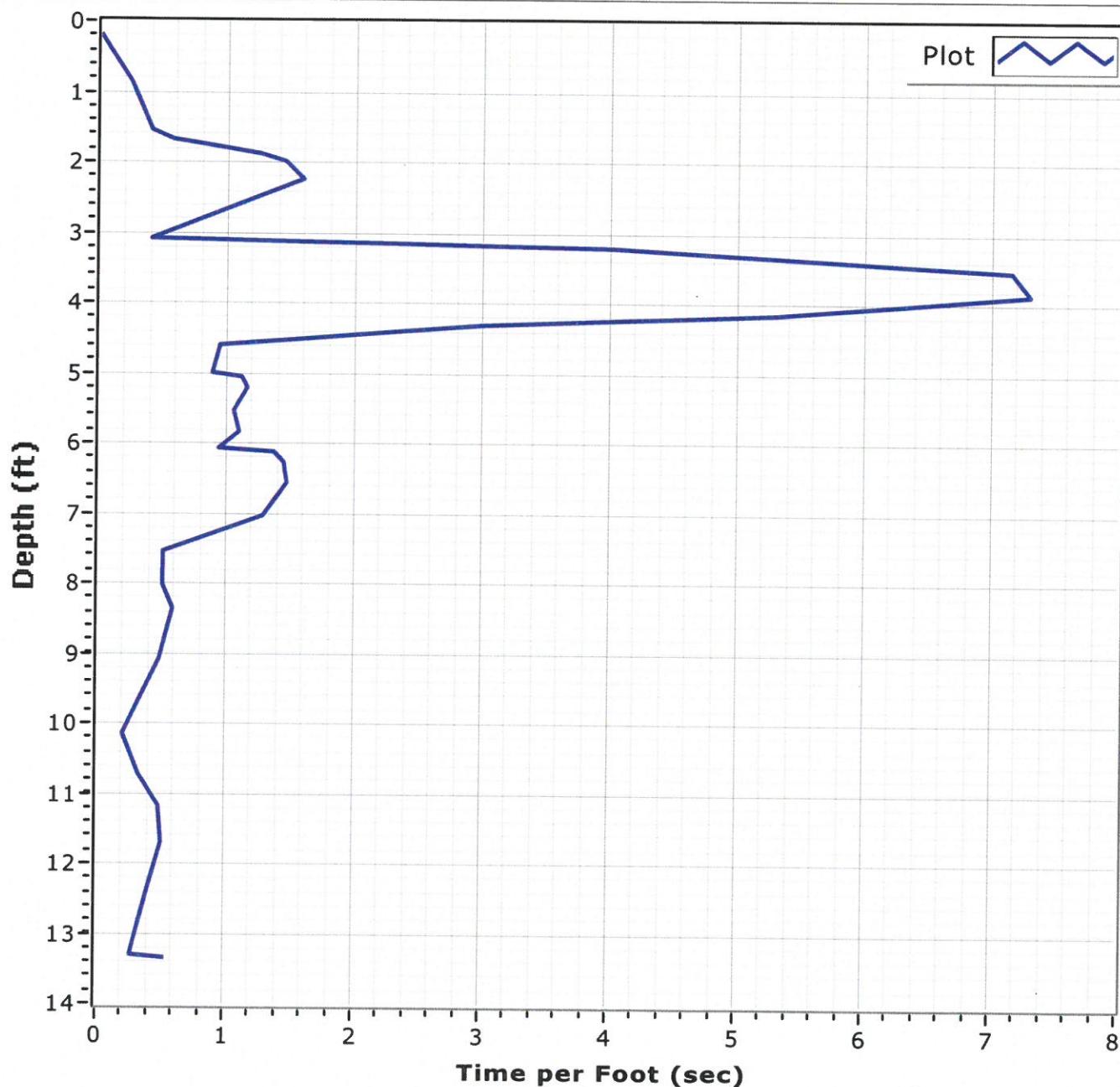
**End Time** 14:34:05

**Recovery** WASH

**Total Time** 00:00:15

**Comments**

JETTED TO 13.3



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-06

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -50 MLLW  
**Elevation**

**Zone**

X N 292351

**Start Time** 14:44:34

**Penetration** 10.4'

Y E 2425851

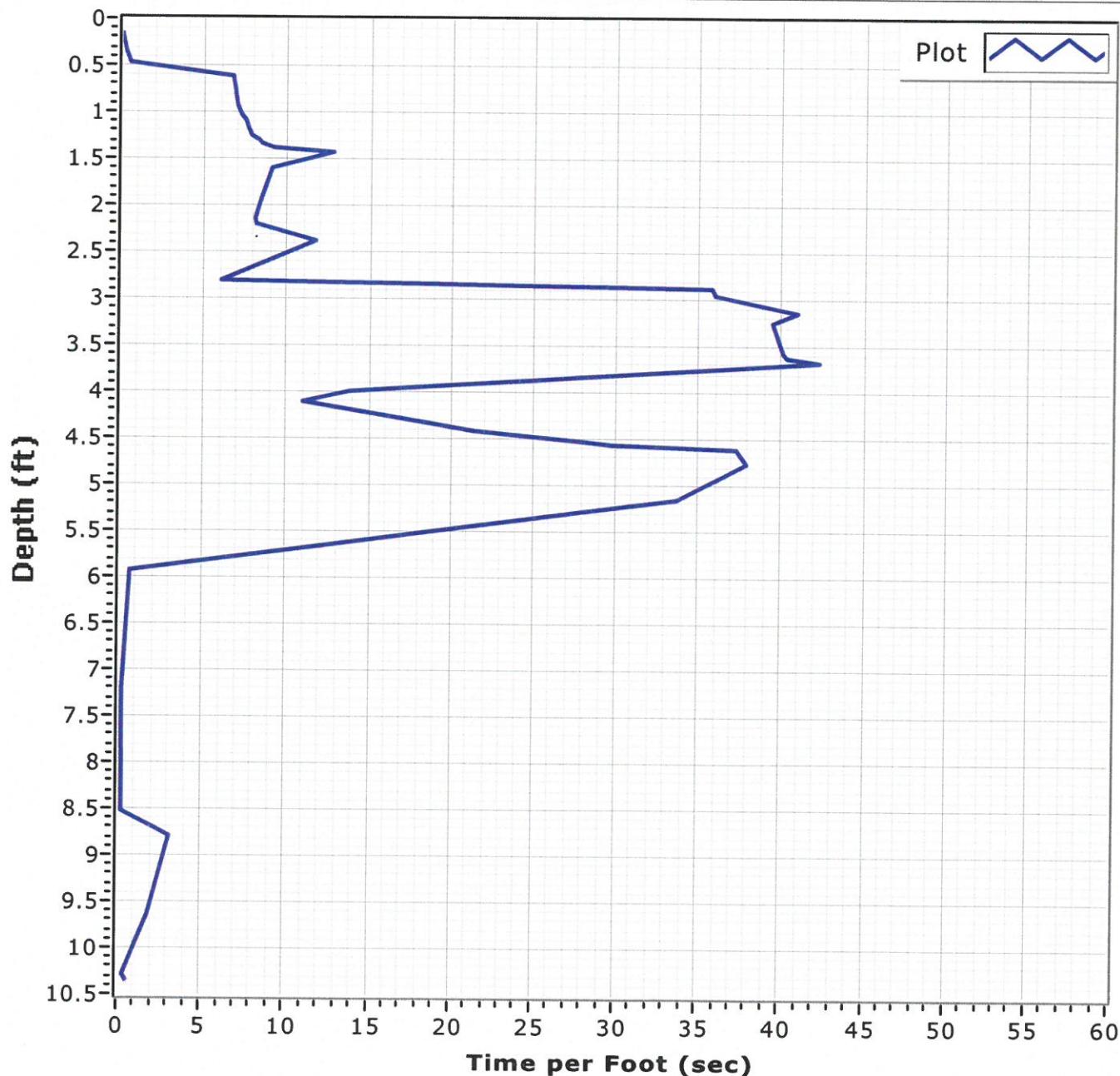
**End Time** 14:46:21

**Recovery** WASH

**Total Time** 00:01:47

**Comments**

JETTED TO 10.4



**Project**

CHARLESTON HARBOR 2016

**AVS****AMERICAN VIBRACORE  
SERVICES****Core Identifier** WP-15-07**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016**Top of Hole** -47 MLLW  
**Elevation****Zone**

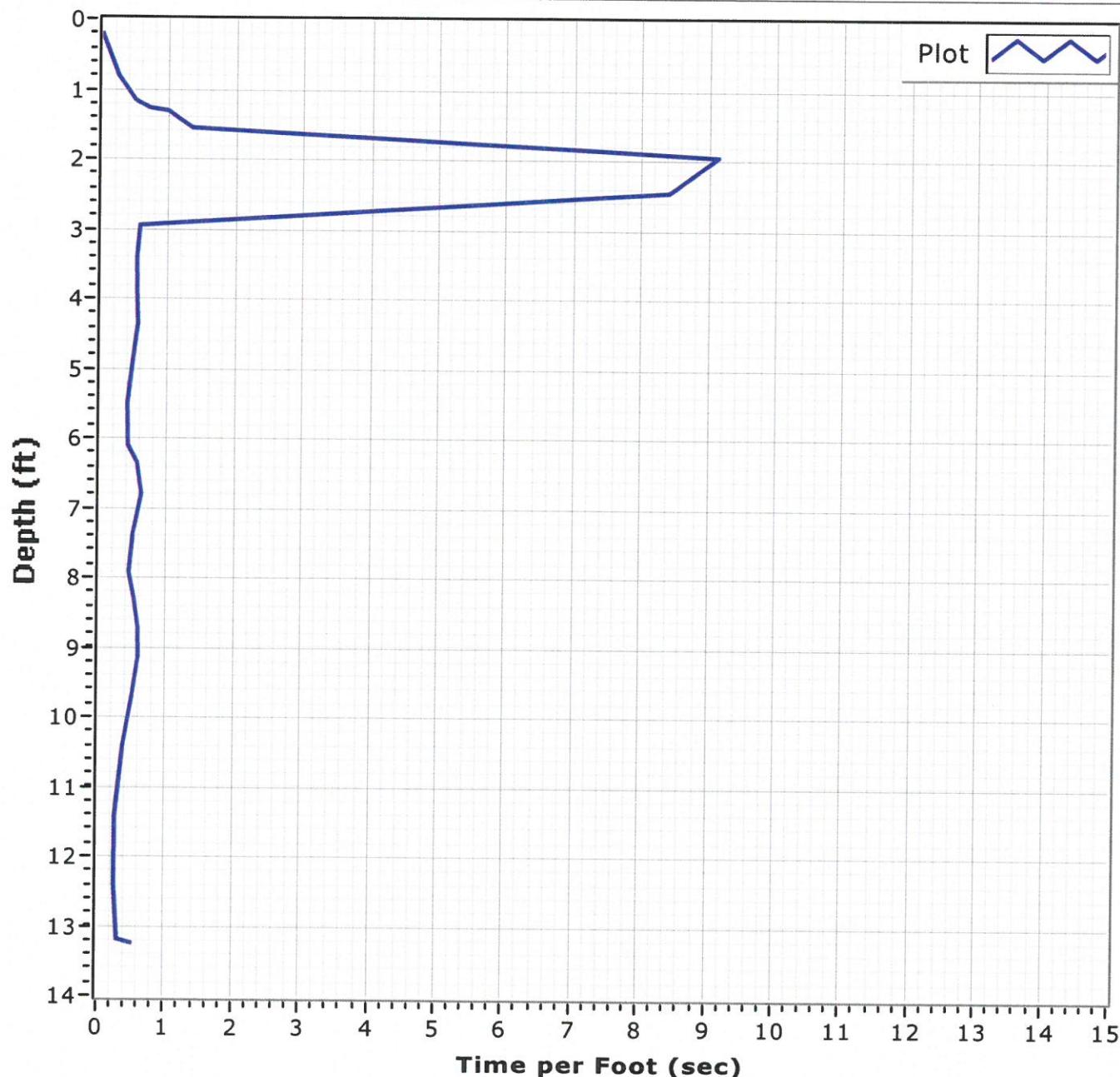
X N 292918

**Start Time** 14:52:19**Penetration** 13.2'

Y E 2426506

**End Time** 14:52:34**Recovery** WASH**Total Time** 00:00:14**Comments**

JETTED TO 13.2



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-08

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -49 MLLW  
**Elevation**

**Zone**

X N 291598

**Start Time** 15:12:35

**Penetration** 12.4'

**End Time** 15:12:35

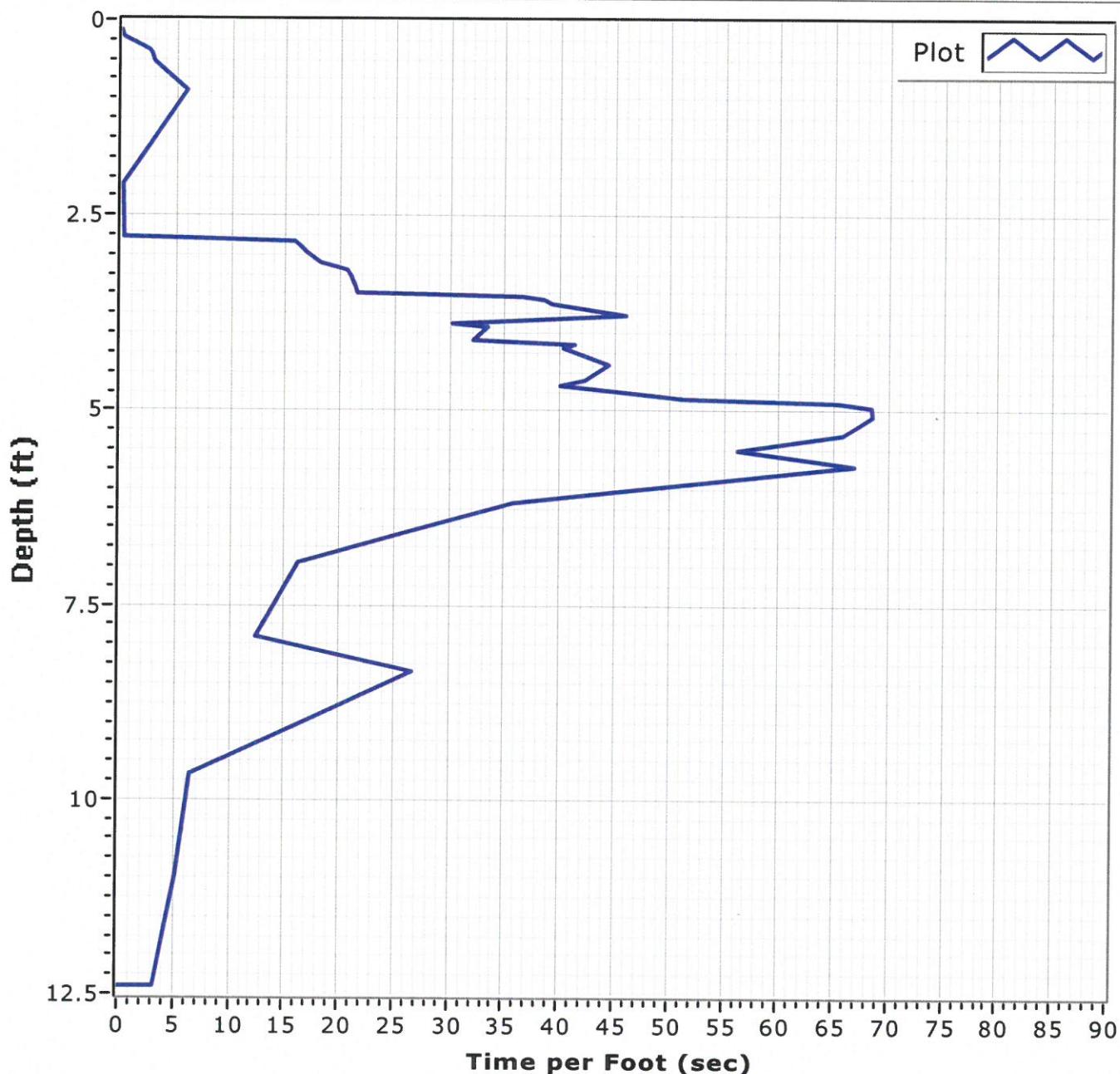
**Recovery** WASH

**Total Time** 00:00:00

Y E 2428894

**Comments**

JETTED TO 12.4



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-09

**Date** 05/15/2016

**Top of Hole** -53 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 15:29:47

**Penetration** 12.7'

**Zone**

**End Time** 15:29:58

**Recovery** WASH

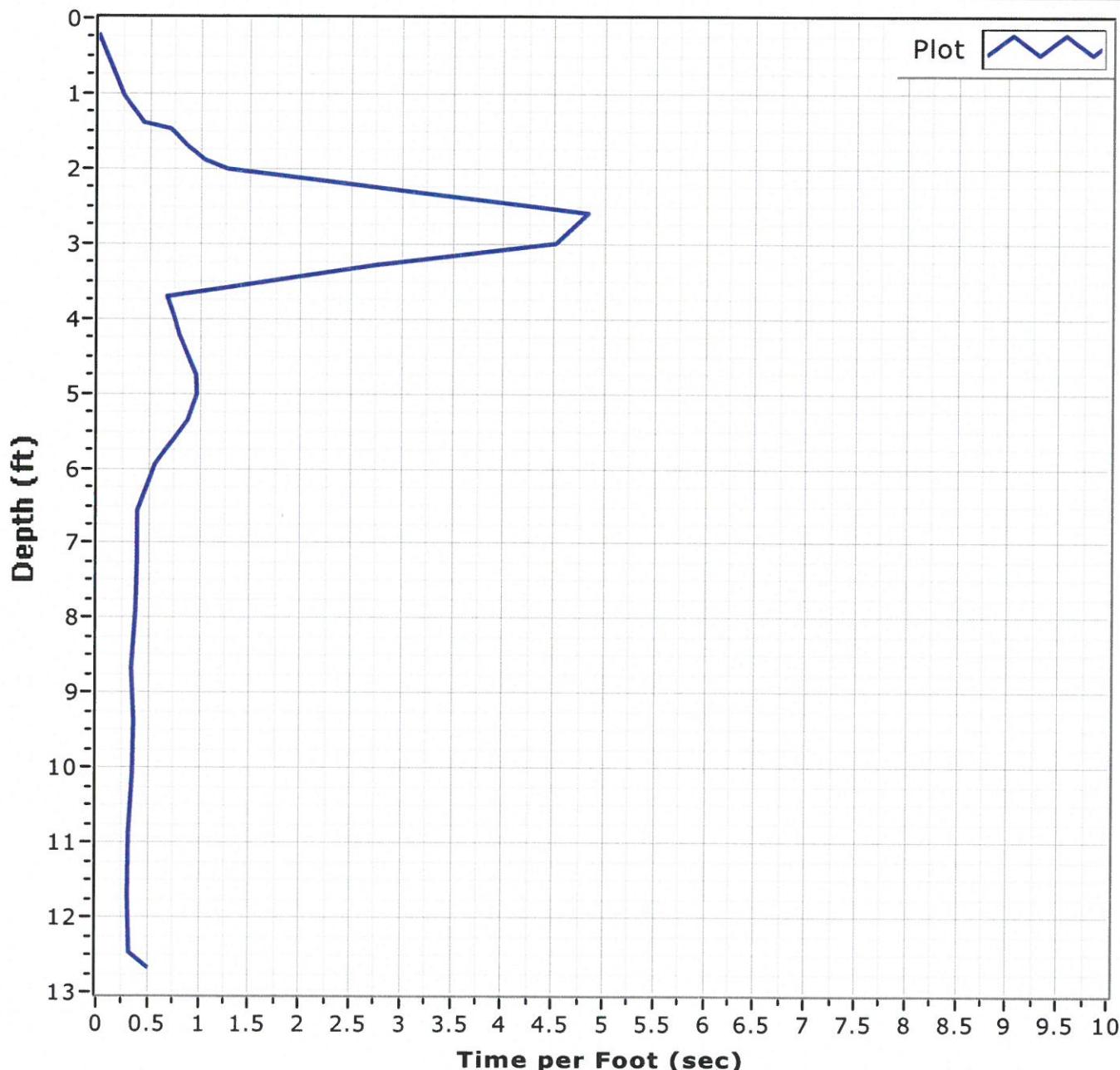
X N 290696

**Total Time** 00:00:10

Y E 2429014

**Comments**

JETTED TO 12.7



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-10

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -51 MLLW  
**Elevation**

**Zone**

X N 290176

**Start Time** 15:39:42

**Penetration** 10.7'

Y E 2430058

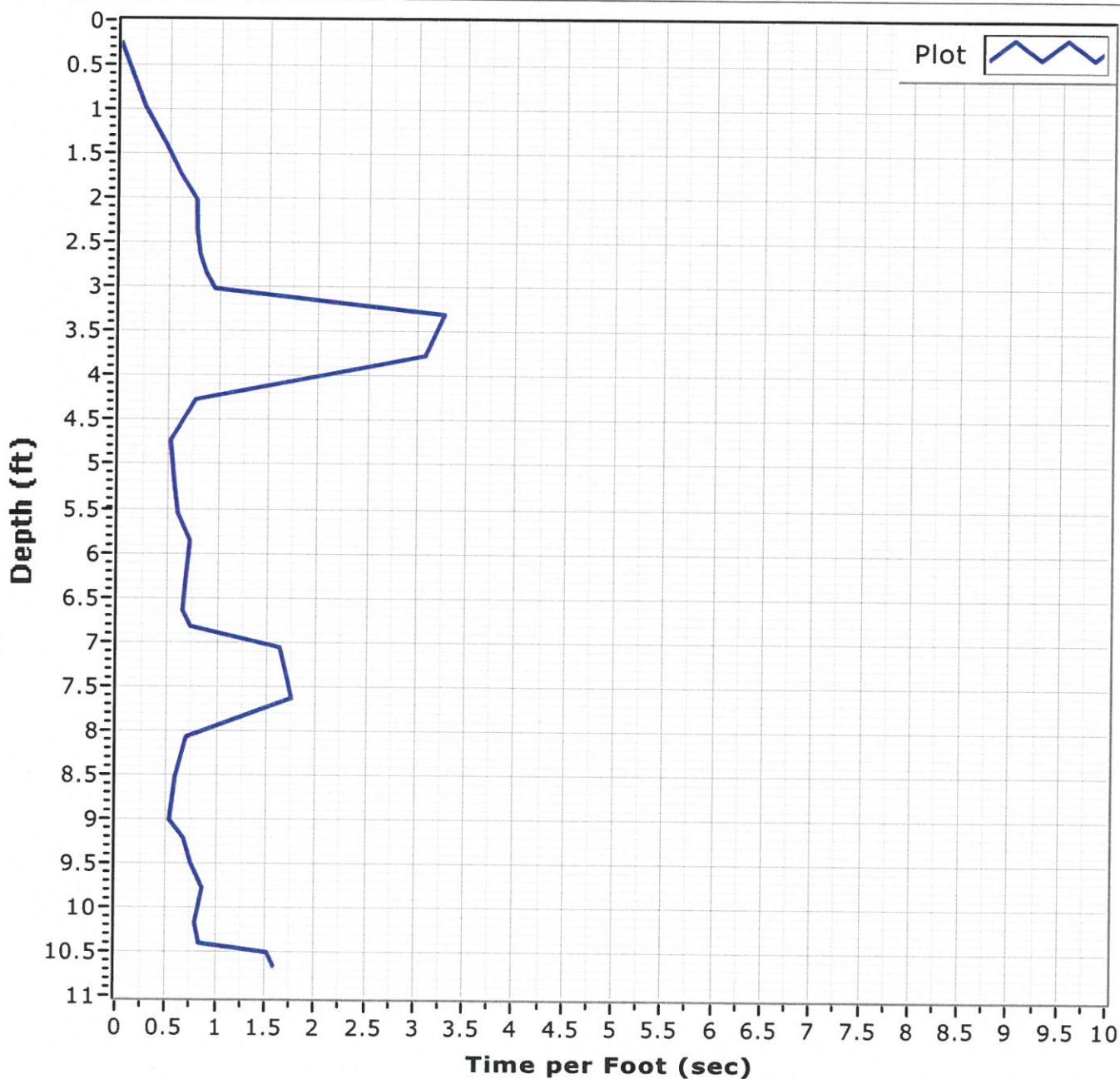
**End Time** 15:39:54

**Recovery** WASH

**Total Time** 00:00:11

**Comments**

JETTED TO 10.7



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-11

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 15:48:19

**Top of Hole** -52 MLLW  
**Elevation**

**Zone**

X N 290251

**End Time** 15:48:35

**Penetration** 11.2'

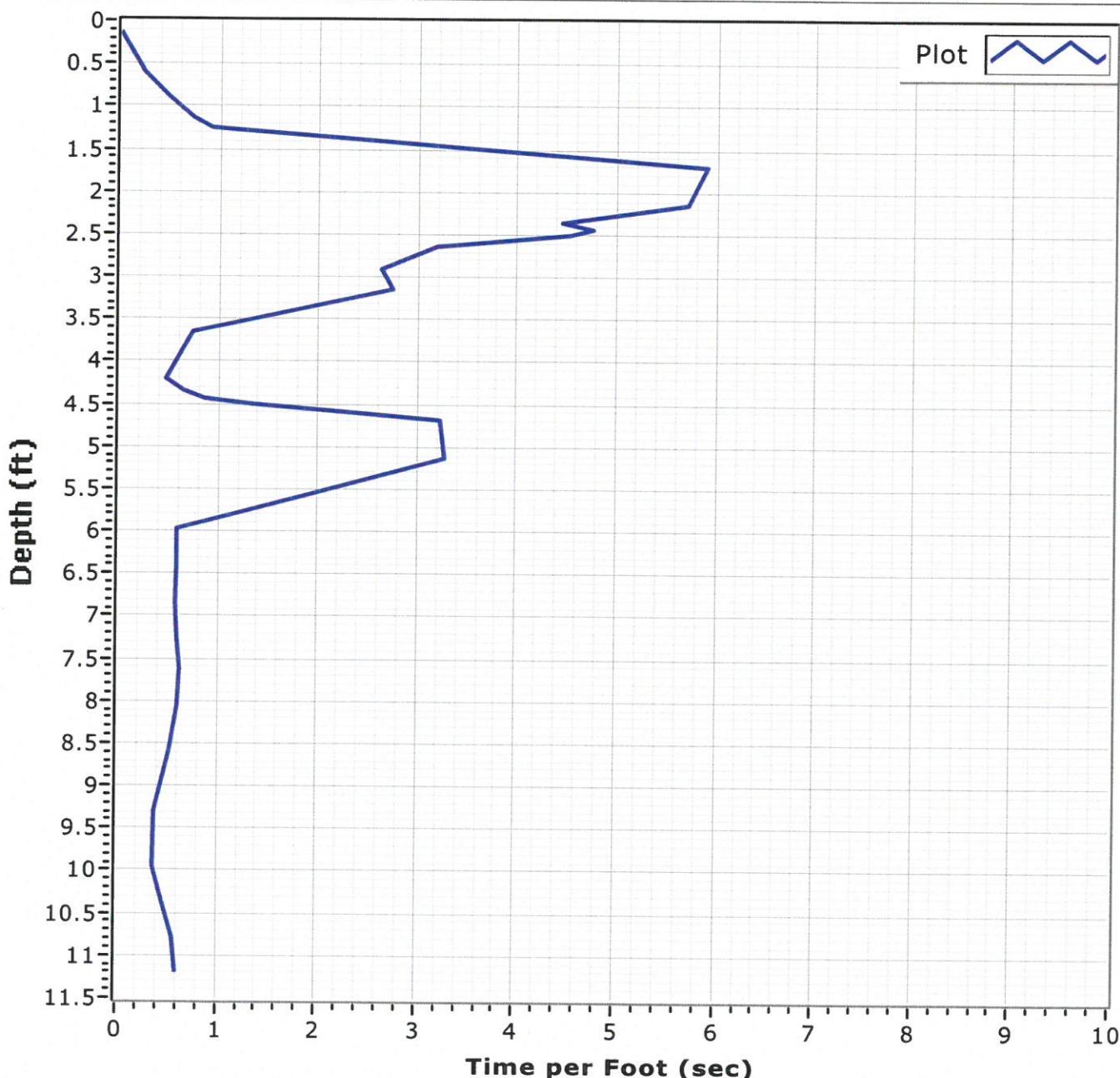
Y E 2431063

**Total Time** 00:00:16

**Recovery** WASH

**Comments**

JETTED TO 11.2



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-12

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -50 MLLW  
**Elevation**

**Start Time** 15:55:47

**Penetration** 10.9'

**End Time** 15:55:56

**Recovery** WASH

**Zone**

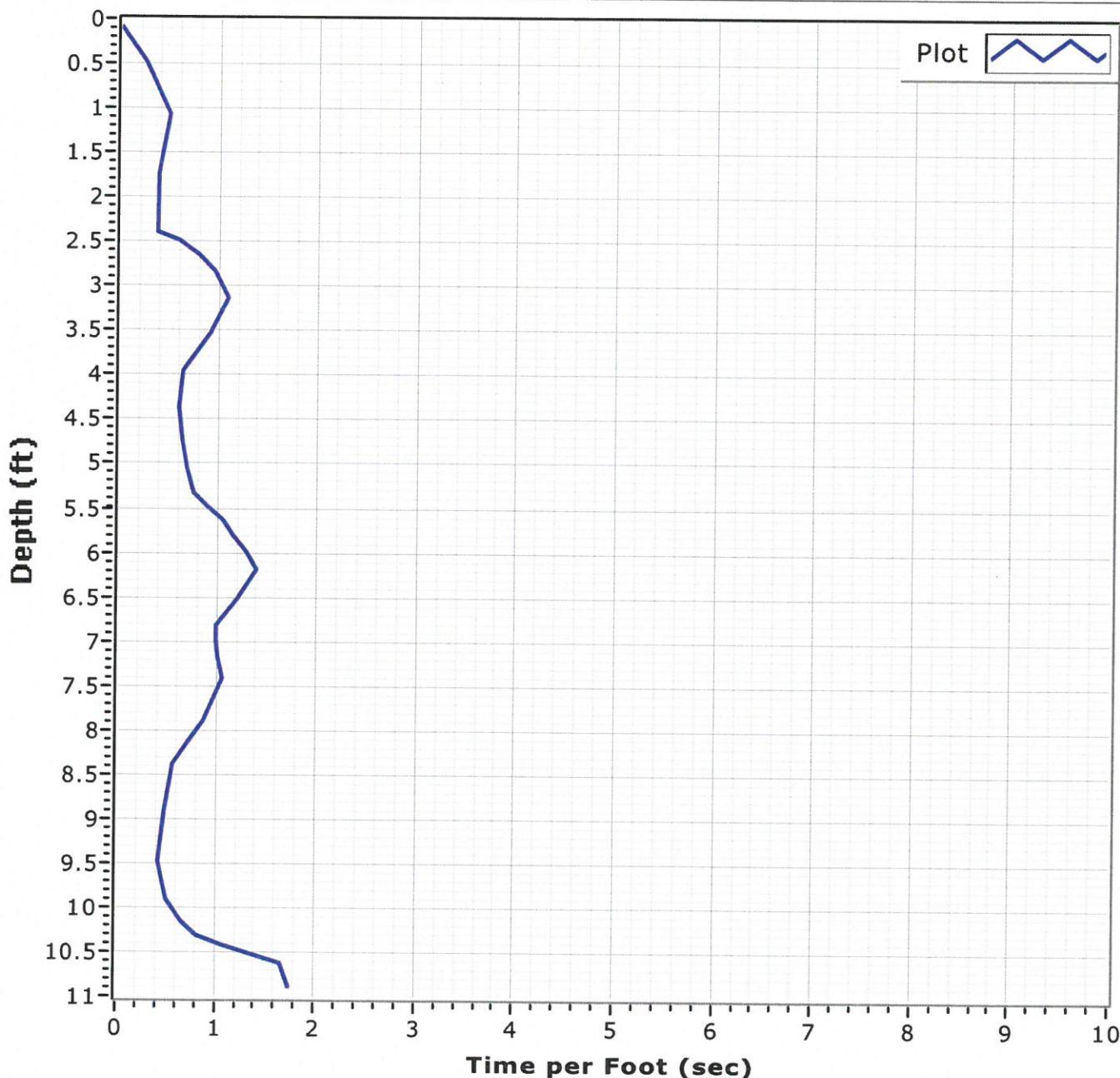
X N 289708

**Total Time** 00:00:09

Y E 2431732

**Comments**

JETTED TO 10.9



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-13

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 16:11:35

**Top of Hole** -55 MLLW  
**Elevation**

**Zone**

X N 288561

**End Time** 16:11:41

**Penetration** 14.7'

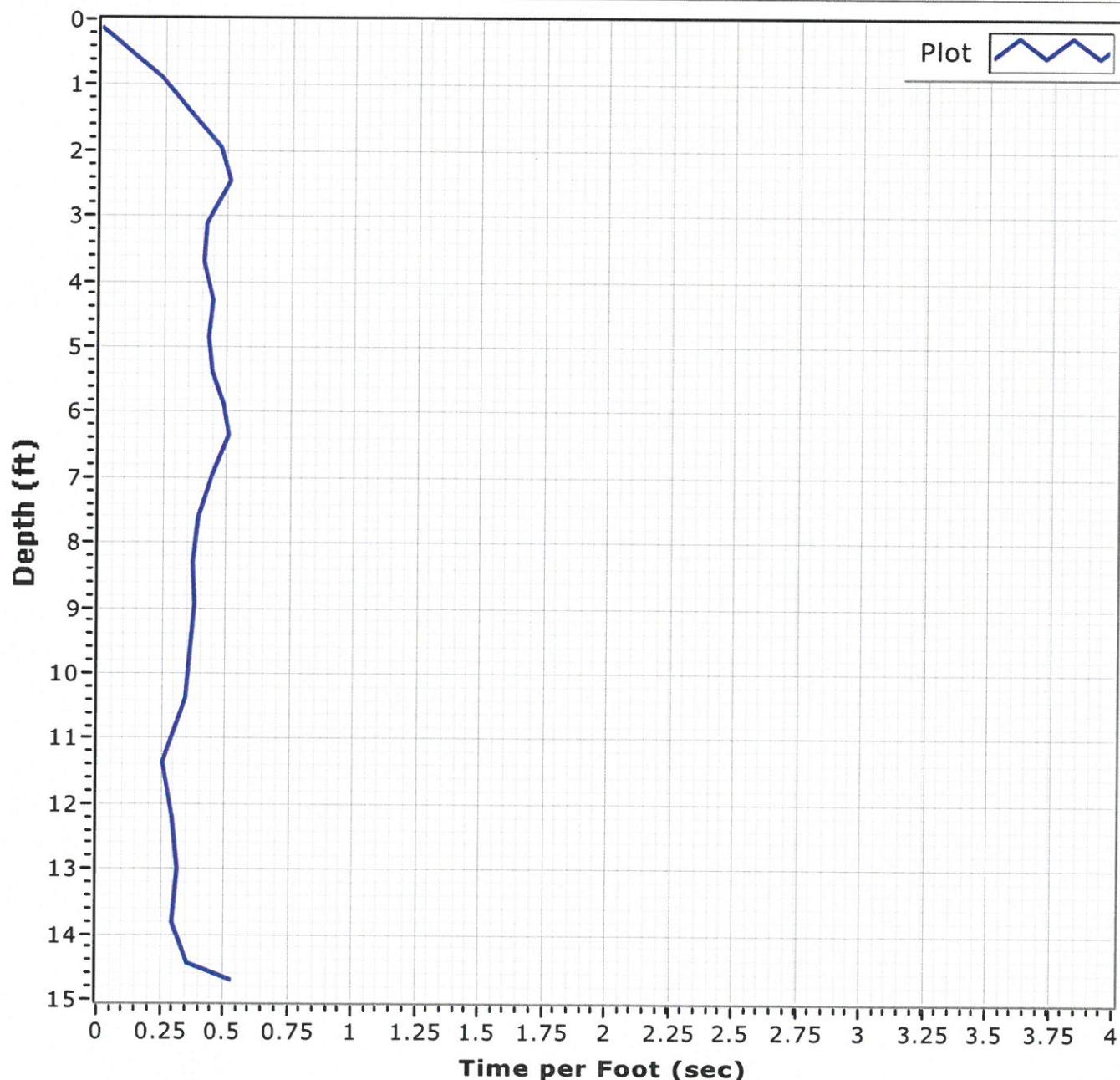
Y E 2434329

**Total Time** 00:00:05

**Recovery** WASH

**Comments**

JETTED TO 14.7



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-14

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 16:20:06

**Top of Hole** -51 MLLW  
**Elevation**

**Zone**

X N 287920

**End Time** 16:20:14

**Penetration** 10.6'

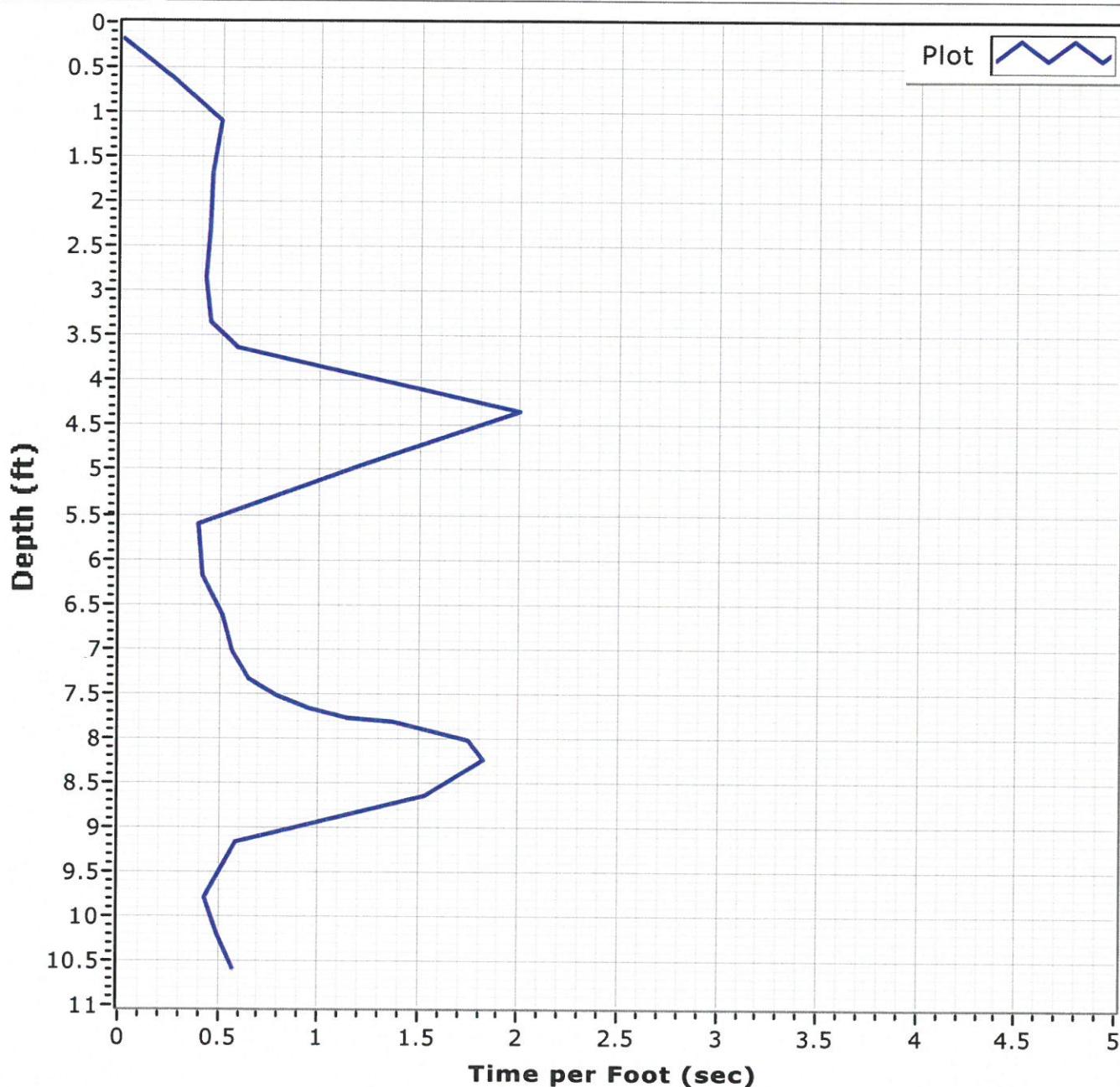
Y E 2434969

**Total Time** 00:00:08

**Recovery** WASH

**Comments**

JETTED TO 10.6



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-15

**Date** 05/15/2016

**Top of Hole** -55 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 16:37:34

**Penetration** 13.1'

**Zone**

**End Time** 16:37:43

**Recovery** WASH

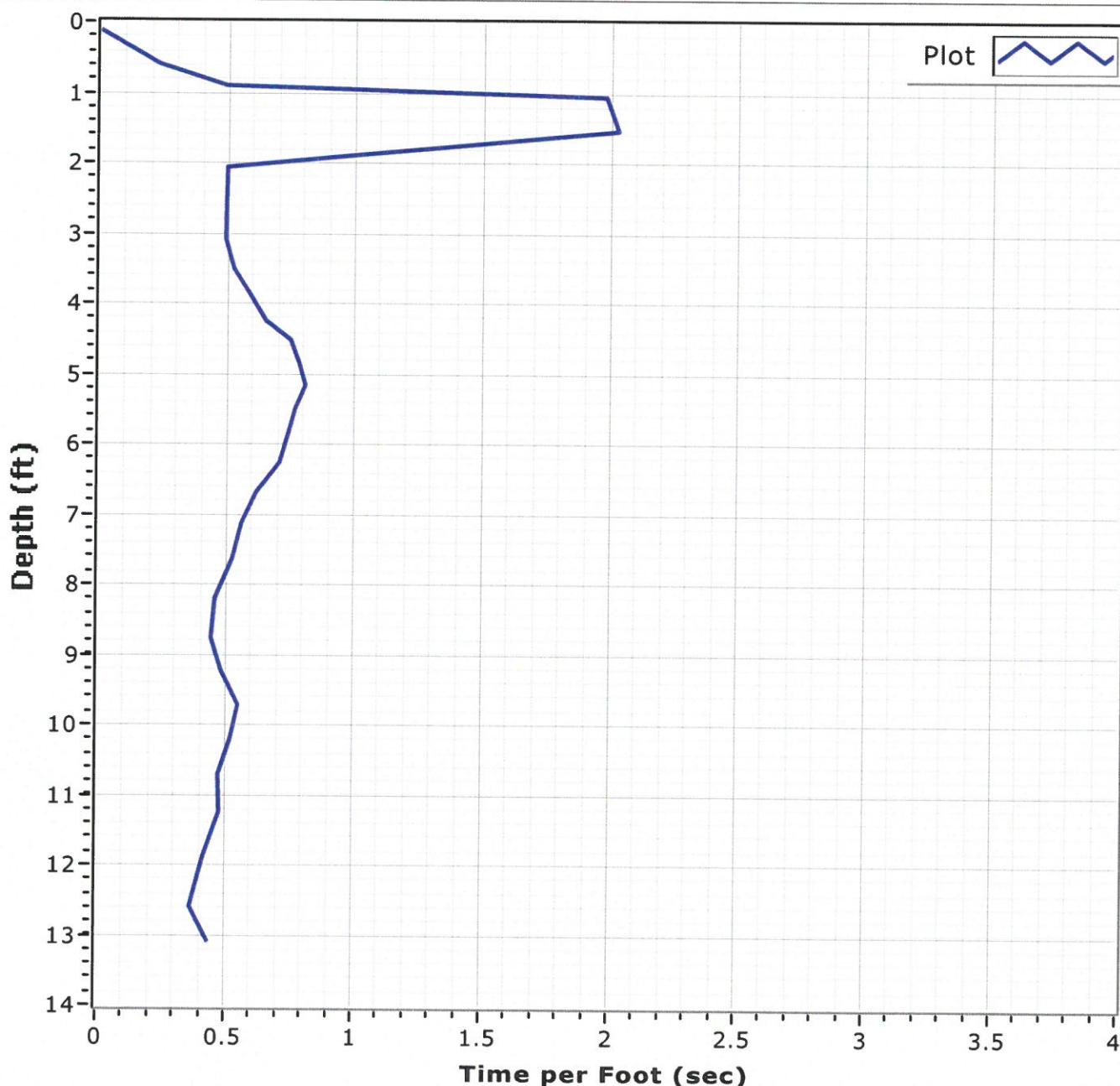
X N 286235

**Total Time** 00:00:08

Y E 2437215

**Comments**

JETTED TO 13.1



**Project**

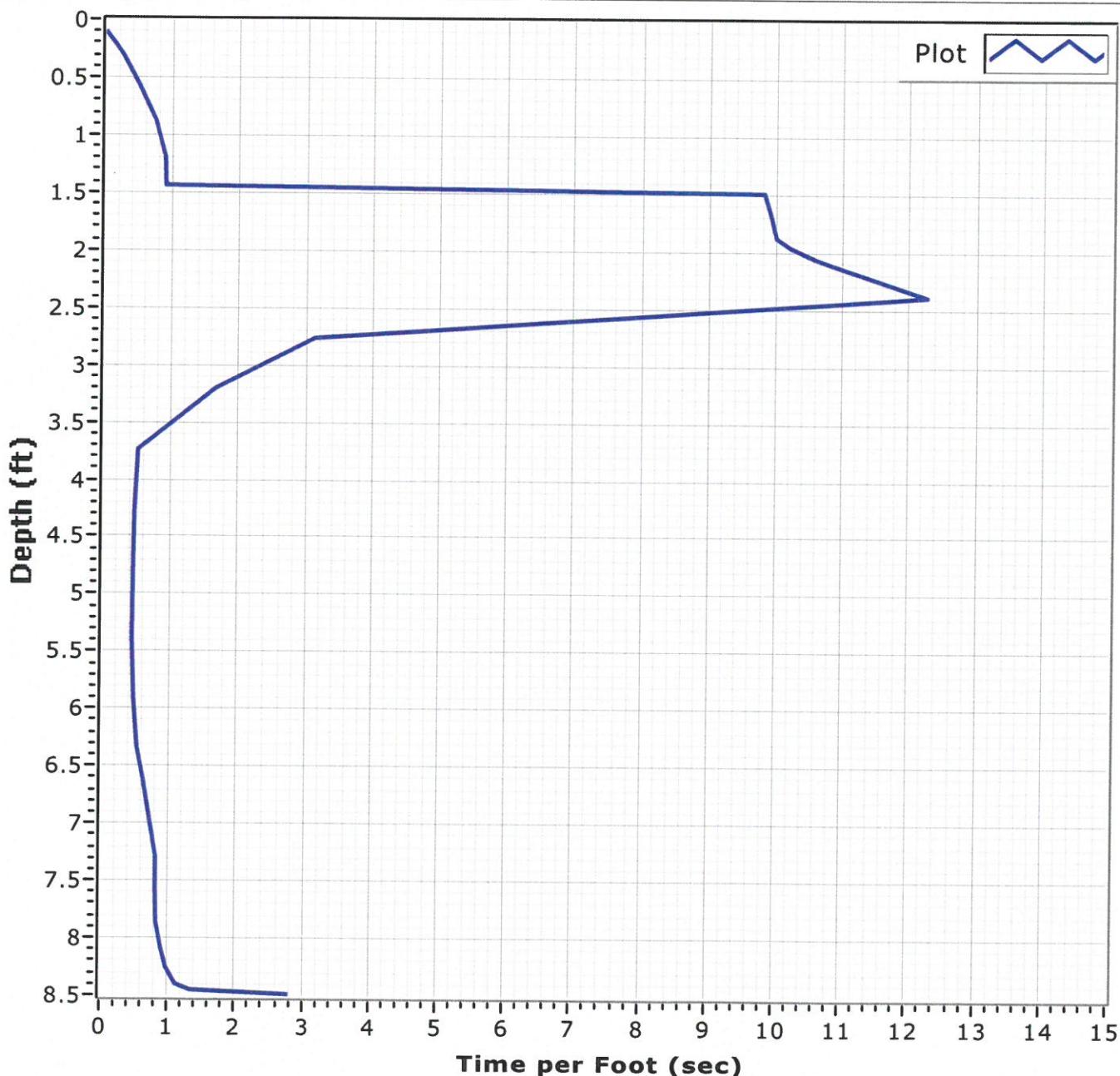
CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES**Core Identifier** WP-15-16**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016**Top of Hole** -56 MLLW  
**Elevation****Zone****X** N 286755**Start Time** 16:44:06**Penetration** 8.5'**Y** E 2437577**End Time** 16:44:25**Recovery** WASH**Total Time** 00:00:19**Comments**

JETTED TO 8.5



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-17

**Date** 05/15/2016

**Top of Hole** -54 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 16:50:32

**Zone**

**End Time** 16:50:45

**Penetration** 10.0'

X N 286436

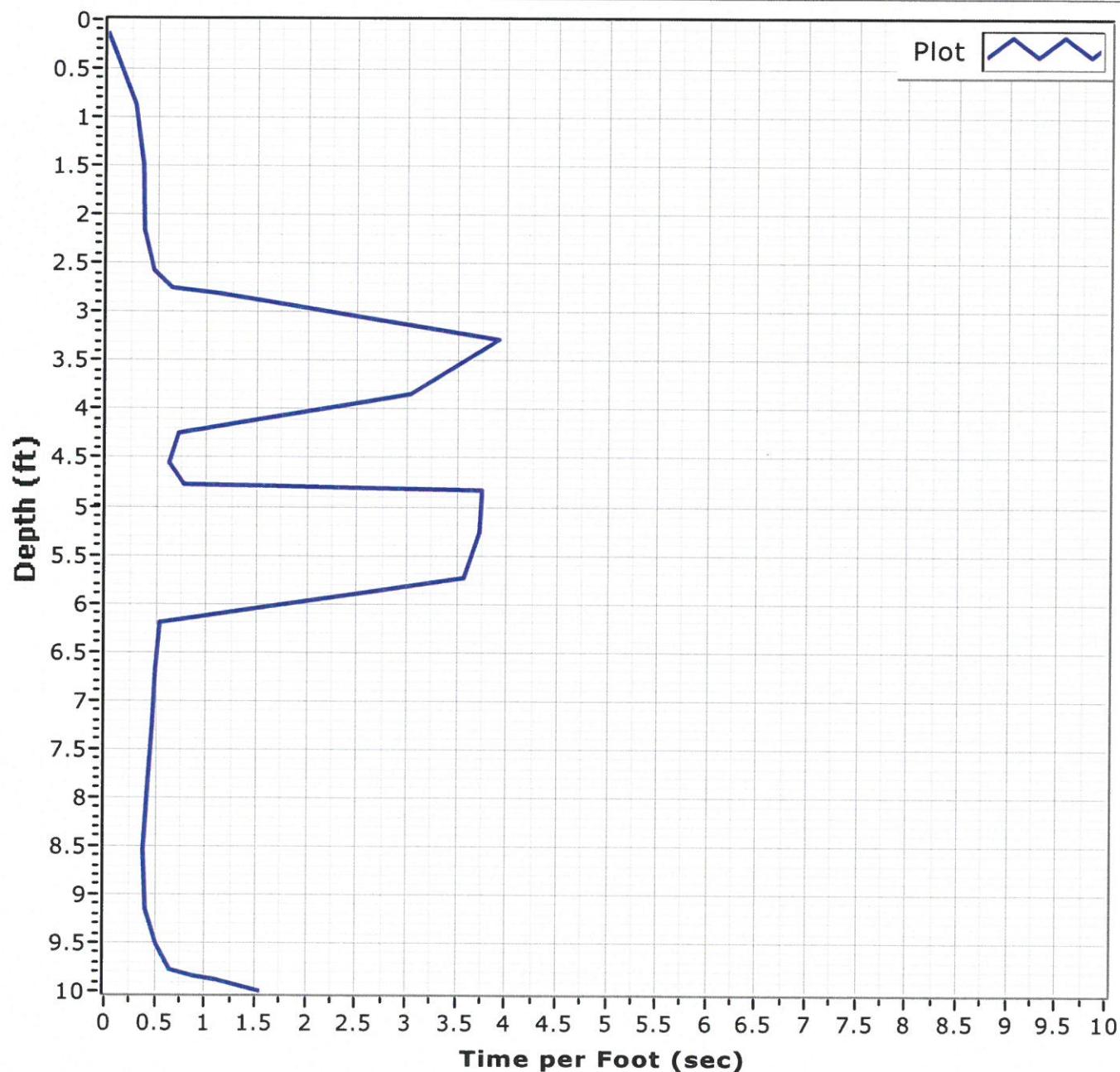
**Total Time** 00:00:12

**Recovery** WASH

Y E 2438156

**Comments**

JETTED TO 10.0



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-18

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 16:55:39

**Top of Hole** -51 MLLW  
**Elevation**

**Zone**

X N 286157

**End Time** 16:55:56

**Penetration** 12.2'

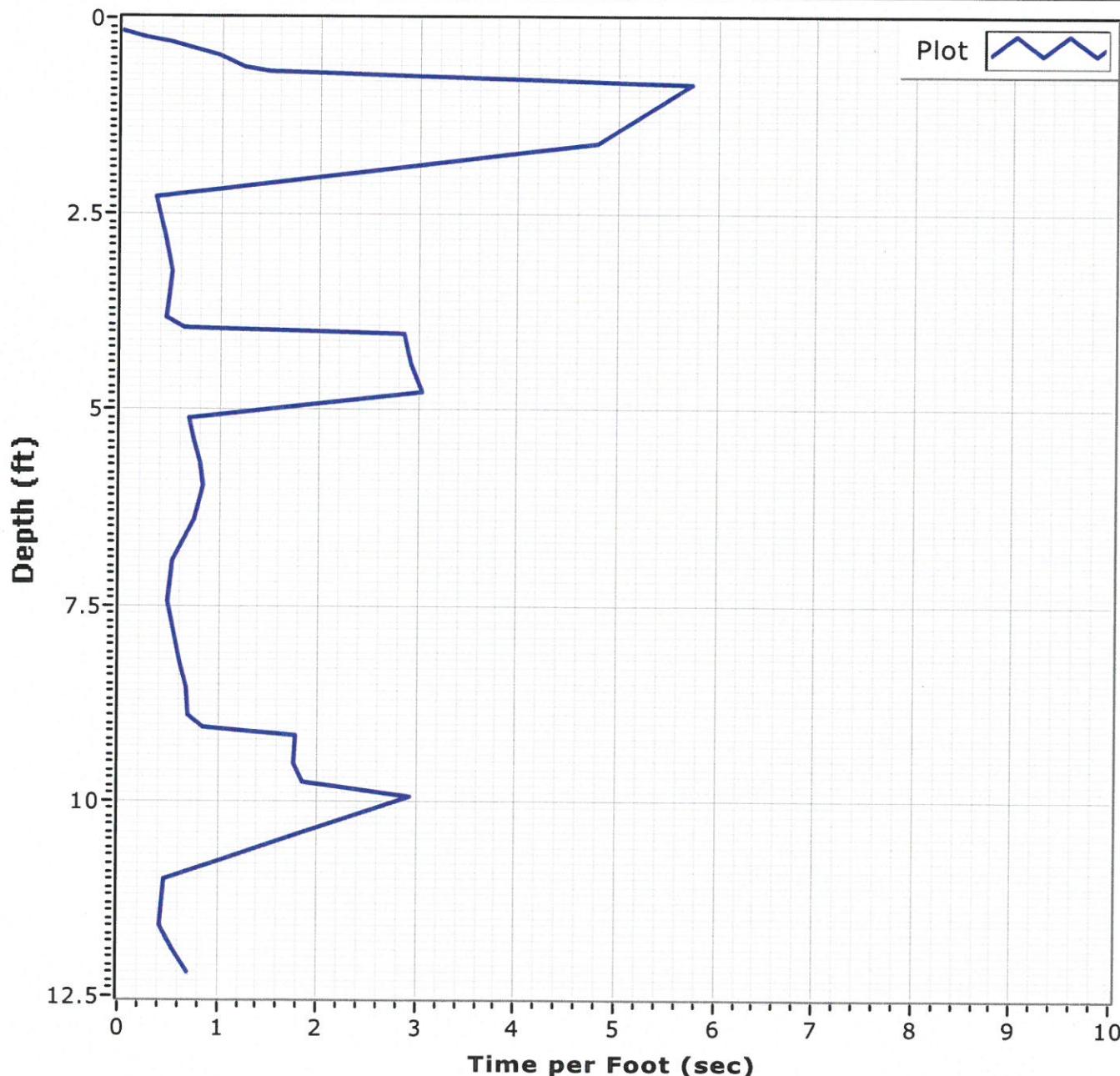
Y E 2438617

**Total Time** 00:00:17

**Recovery** WASH

**Comments**

JETTED TO 12.2



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-19

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Start Time** 17:00:56

**Top of Hole** -52 MLLW  
**Elevation**

**Zone**

**End Time** 17:01:15

**Penetration** 10.8'

**X** N 285524

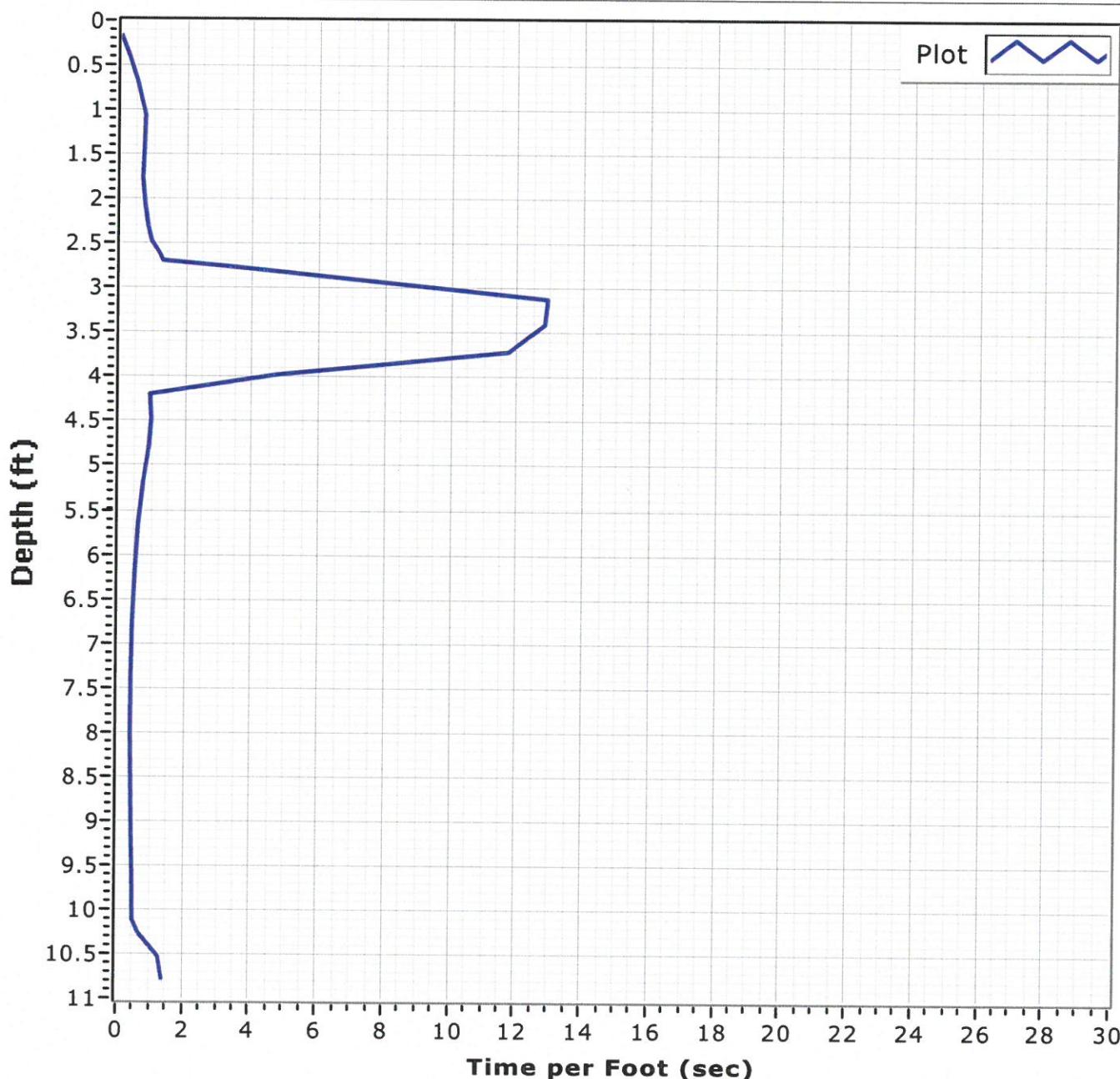
**Total Time** 00:00:19

**Recovery** WASH

**Y** E 2438421

**Comments**

JETTED TO 10.8



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-20

**Date** 05/15/2016

**Top of Hole** -51 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 17:09:27

**Penetration** 14.1'

**Zone**

**End Time** 17:09:35

**Recovery** WASH

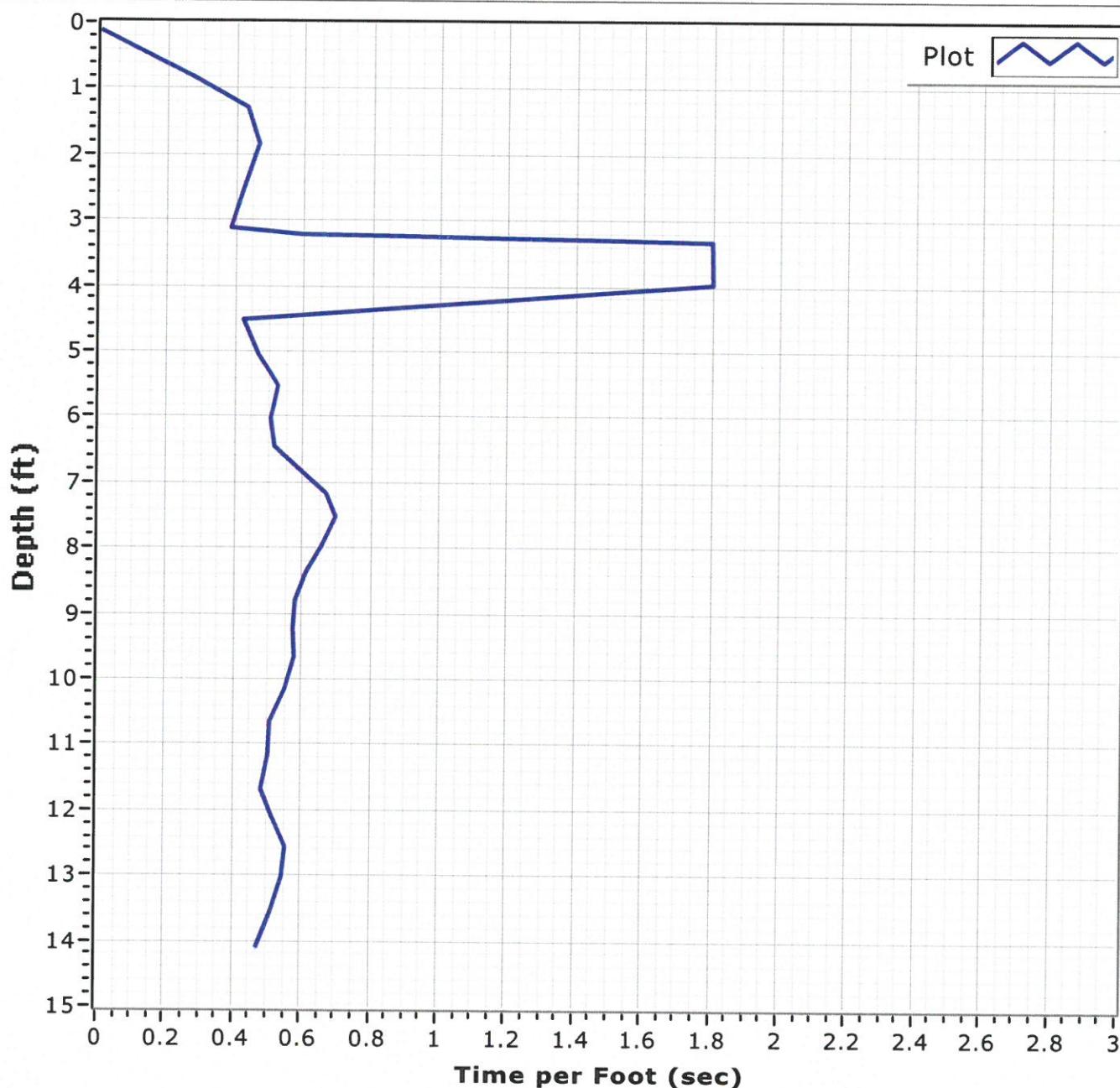
X N 285475

**Total Time** 00:00:08

Y E 2439740

**Comments**

JETTED TO 14.1



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

Core Identifier WP-15-21

Coordinate System

State Plane Coordinates (SPC)

Date 05/15/2016

Top of Hole -52 MLLW  
Elevation

Zone

Start Time 17:29:36

Penetration 11.2'

X N 282577

End Time 17:30:05

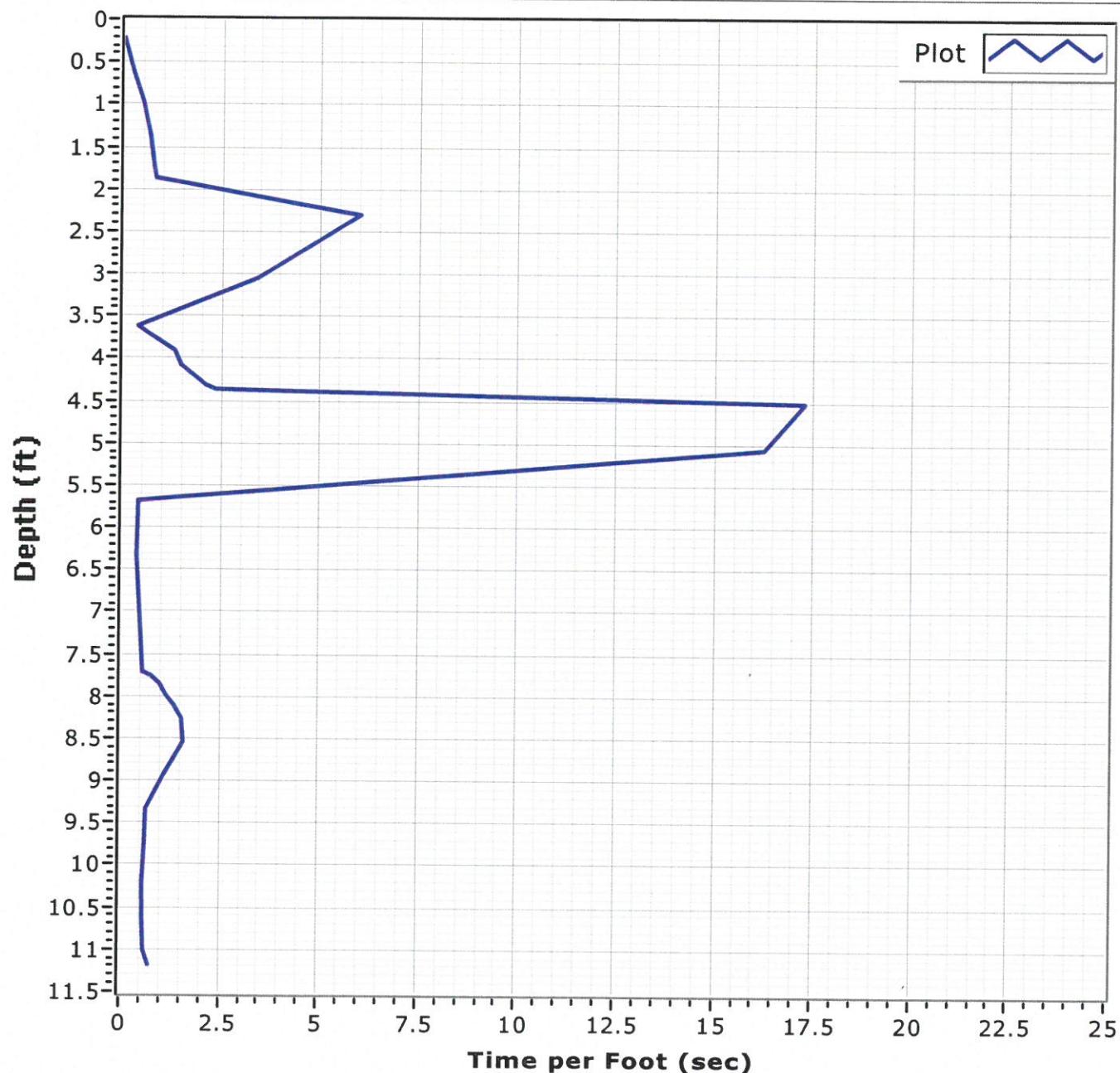
Recovery WASH

Y E 2443671

Total Time 00:00:29

**Comments**

JETTED TO 11.2



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-22

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -54 MLLW  
**Elevation**

**Zone**

X N 282914

**Start Time** 17:35:39

**Penetration** 11.0'

Y E 2443949

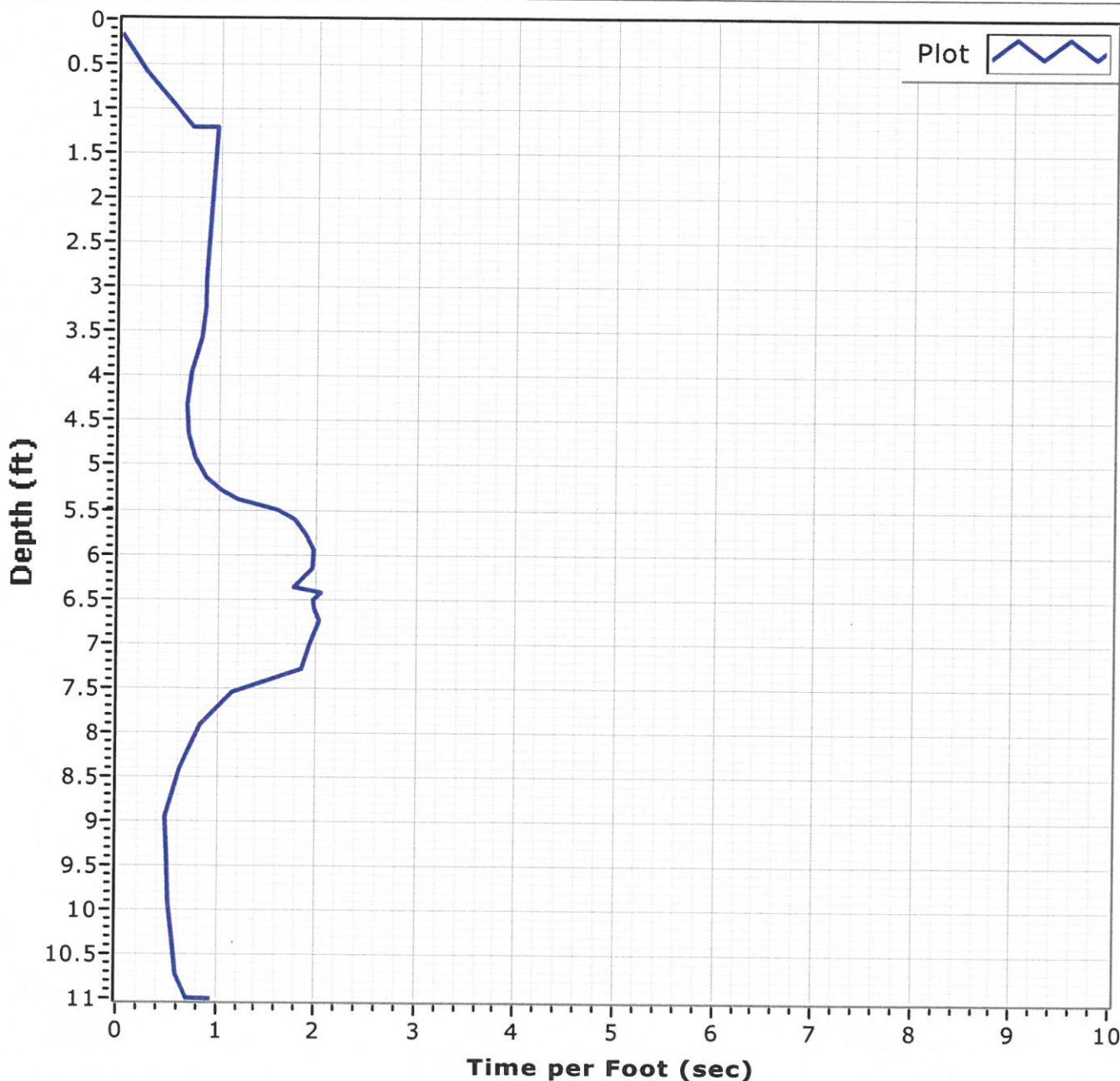
**End Time** 17:35:50

**Recovery** WASH

**Total Time** 00:00:10

**Comments**

JETTED TO 11.0



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-23

**Date** 05/15/2016

**Top of Hole** -55 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 17:40:14

**Penetration** 10.1'

**Zone**

**End Time** 17:40:22

**Recovery** WASH

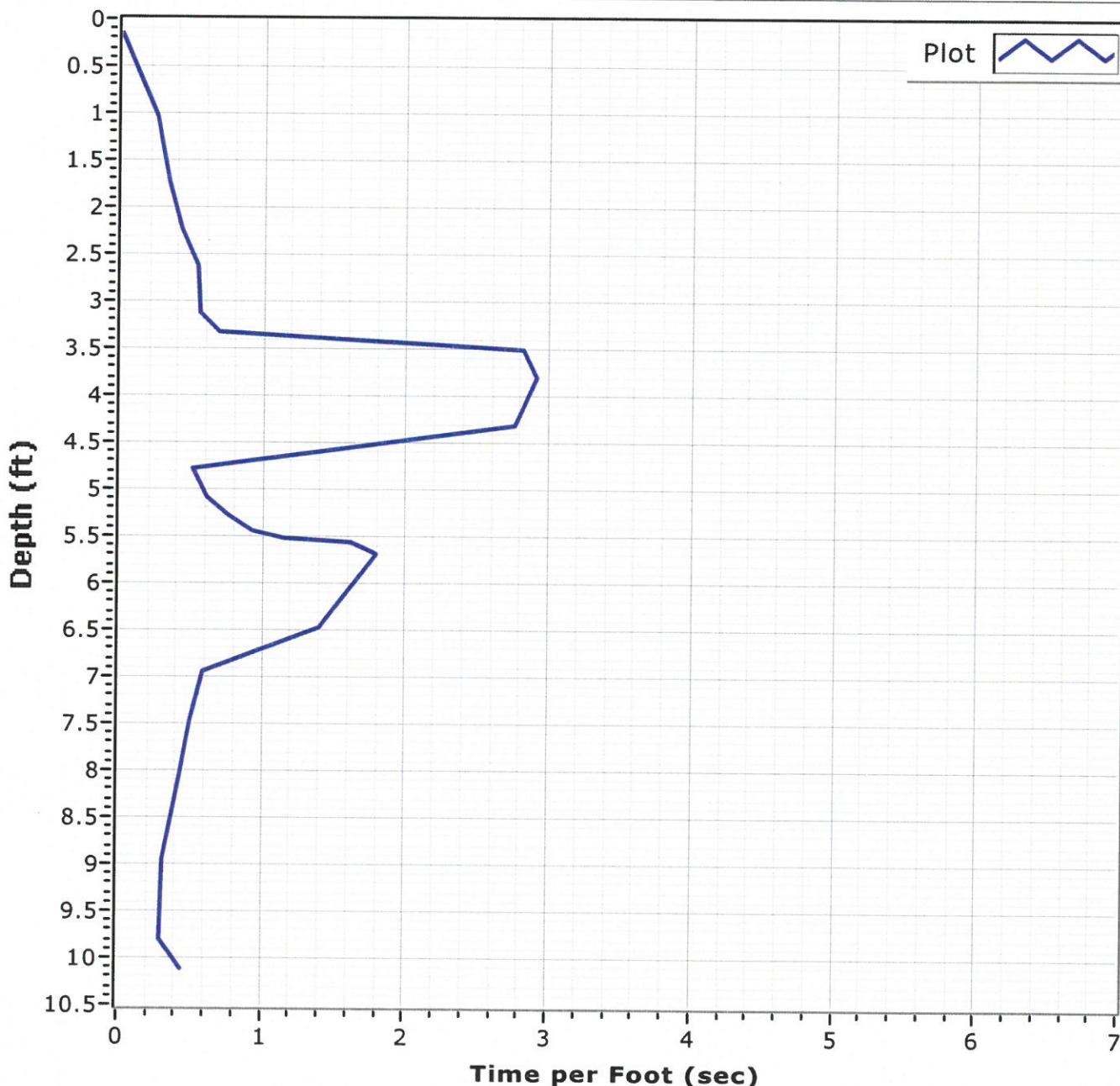
**X** N 283203

**Total Time** 00:00:08

**Y** E 2444248

**Comments**

JETTED TO 10.1



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-24

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -55 MLLW

Elevation

**Zone**

X N 281456

**Start Time** 17:57:25

**Penetration** 12.1'

**End Time** 17:57:43

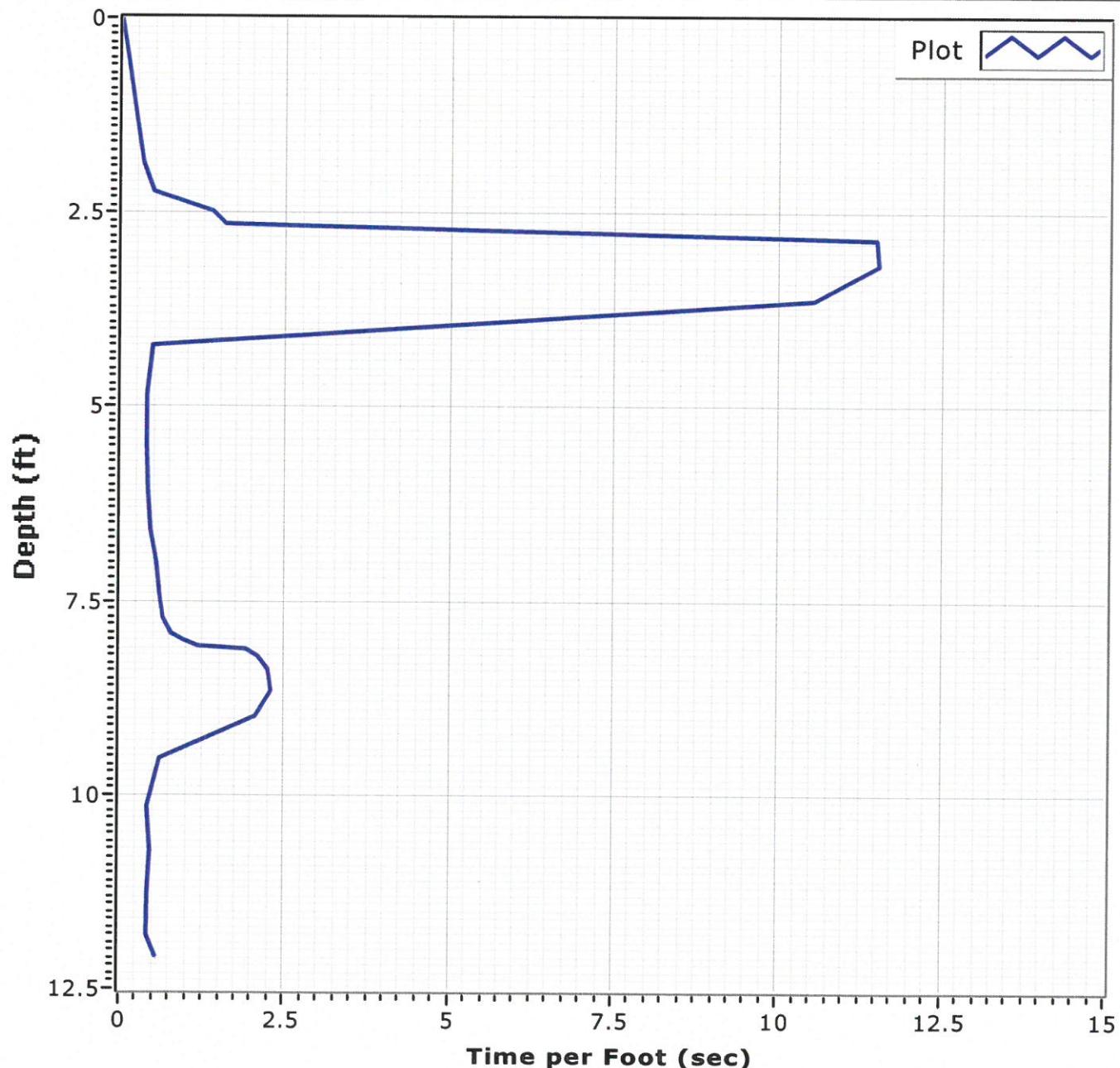
**Recovery** WASH

**Total Time** 00:00:18

Y E 2445951

**Comments**

JETTED TO 12.1



**Project** CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-25

**Date** 05/15/2016

**Top of Hole** -55 MLLW  
**Elevation**

**Coordinate System**

State Plane Coordinates (SPC)

**Start Time** 18:03:08

**Penetration** 11.2'

**Zone**

**End Time** 18:03:08

**Recovery** WASH

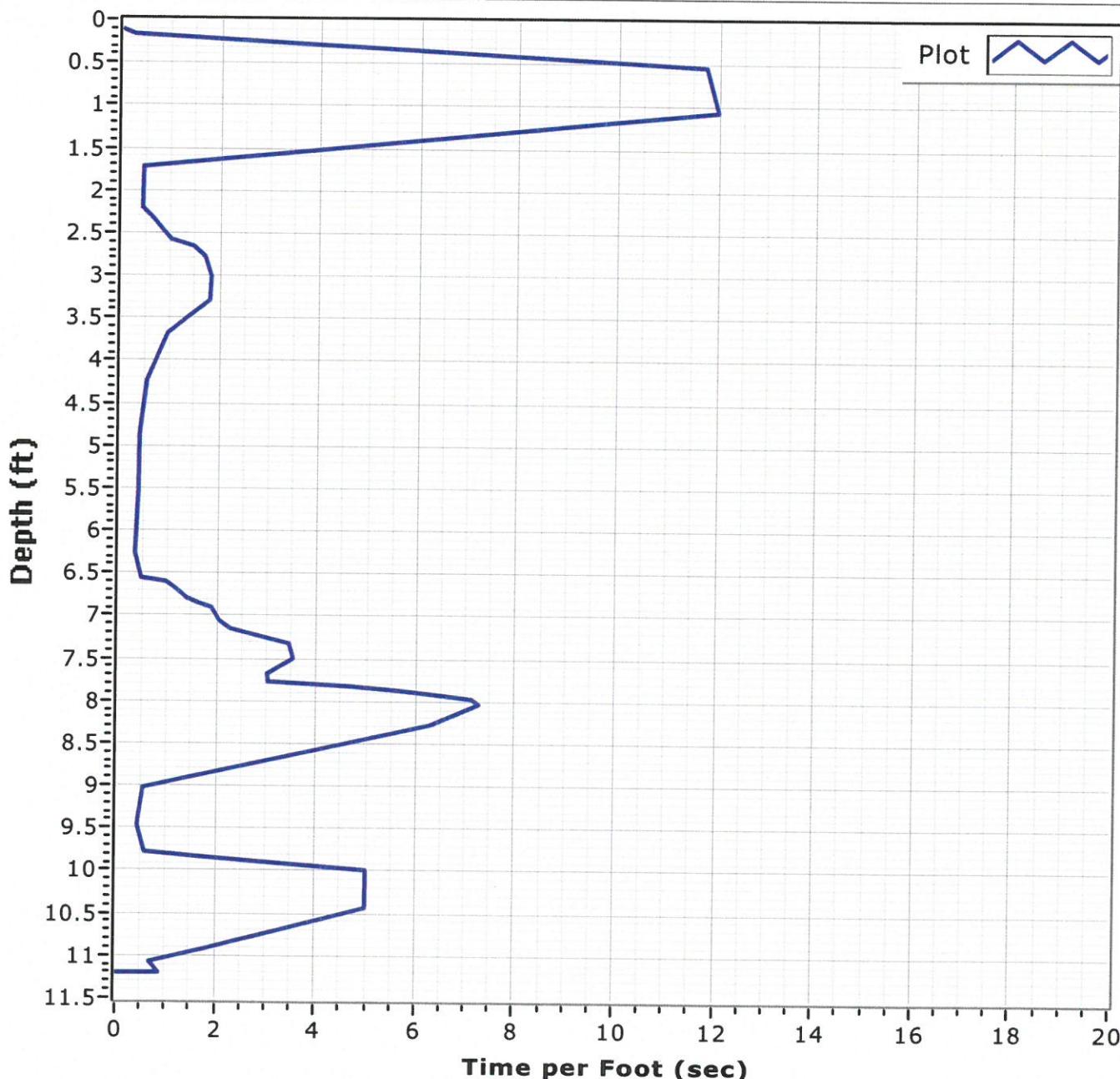
X N 281716

**Total Time** 00:00:00

Y E 2446317

**Comments**

JETTED TO 11.2



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-26

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -55 MLLW  
**Elevation**

**Zone**

X N 281962

**Start Time** 18:06:56

**Penetration** 12.0'

Y E 2446585

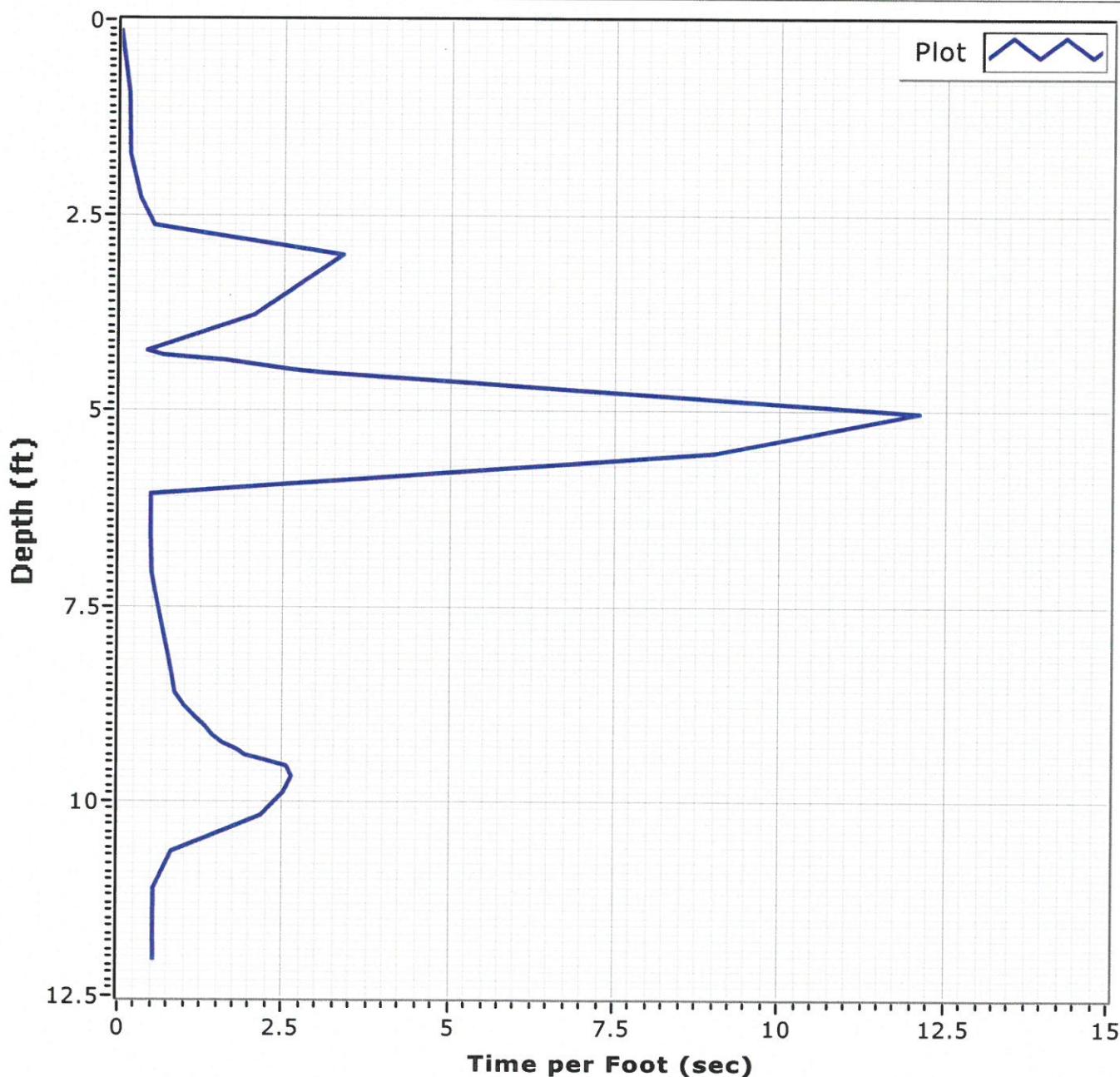
**End Time** 18:07:19

**Recovery** WASH

**Total Time** 00:00:22

**Comments**

JETTED TO 12.0



**Project**

CHARLESTON HARBOR 2016

**AVS**

AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-27

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -53 MLLW  
**Elevation**

**Zone**

X N 281012

**Start Time** 18:15:41

**Penetration** 8.0'

Y E 2446712

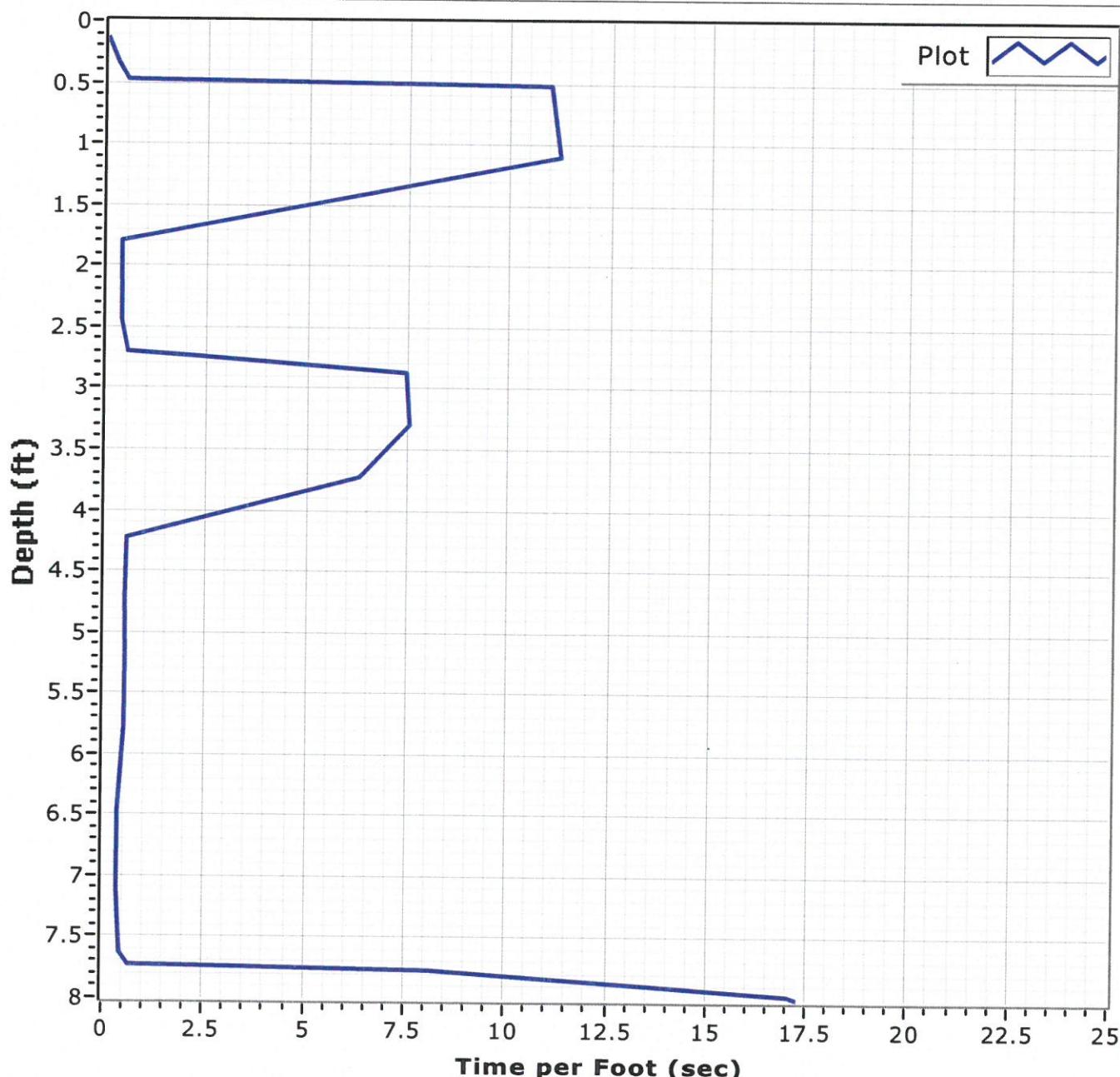
**End Time** 18:16:19

**Recovery** WASH

**Total Time** 00:00:38

**Comments**

JETTED TO 8.0



**Project**

CHARLESTON HARBOR 2016

**AVS**  
AMERICAN VIBRACORE  
SERVICES

**Core Identifier** WP-15-28

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -54 MLLW  
**Elevation**

**Zone**

X N 281332

**Start Time** 18:22:49

**Penetration** 8.4'

Y E 2447056

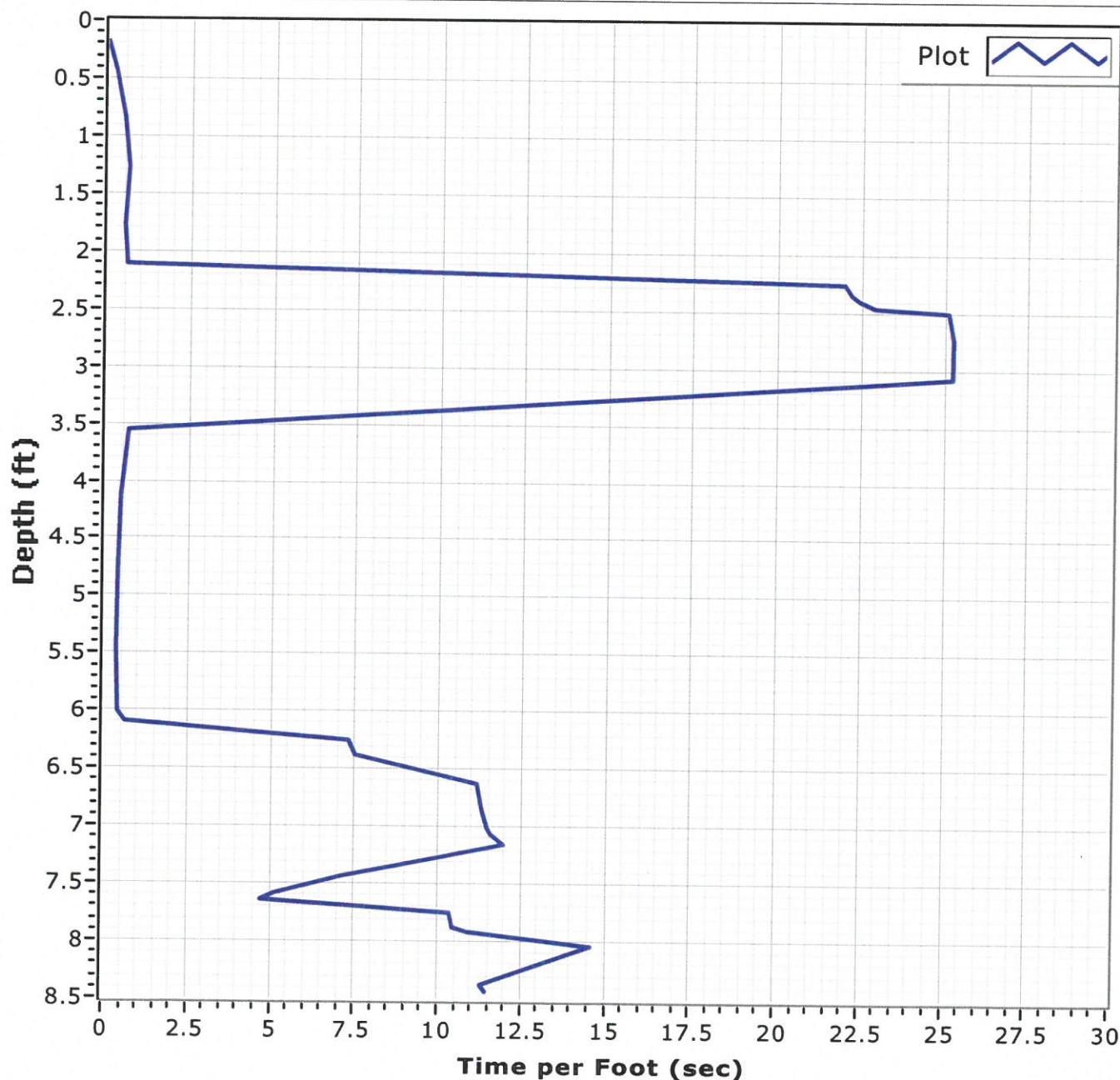
**End Time** 18:23:44

**Recovery** WASH

**Total Time** 00:00:54

**Comments**

JETTED TO 8.4



**Project**

CHARLESTON HARBOR 2016

**AVS**

**AMERICAN VIBRACORE  
SERVICES**

**Core Identifier** WP-15-29

**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016

**Top of Hole** -55 MLLW  
**Elevation**

**Zone**

X N 279577

**Start Time** 18:27:56

**Penetration** 11.2'

Y E 2449463

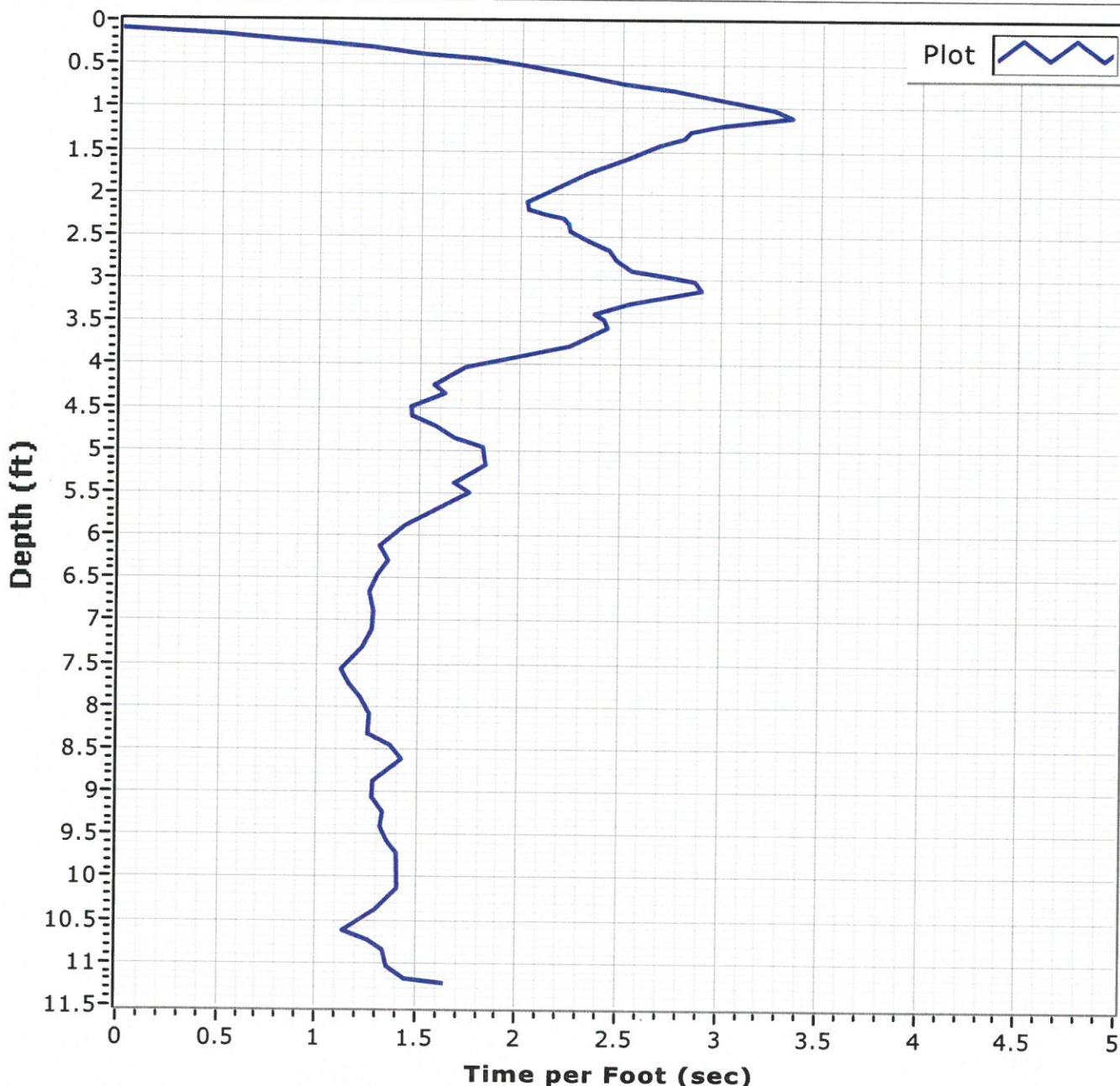
**End Time** 18:28:16

**Recovery** WASH

**Total Time** 00:00:20

**Comments**

JETTED TO 11.2



**Project****CHARLESTON HARBOR 2016****AVS****AMERICAN VIBRACORE  
SERVICES****Core Identifier** WP-15-30**Coordinate System**

State Plane Coordinates (SPC)

**Date** 05/15/2016**Top of Hole** -55 MLLW  
**Elevation****Zone**

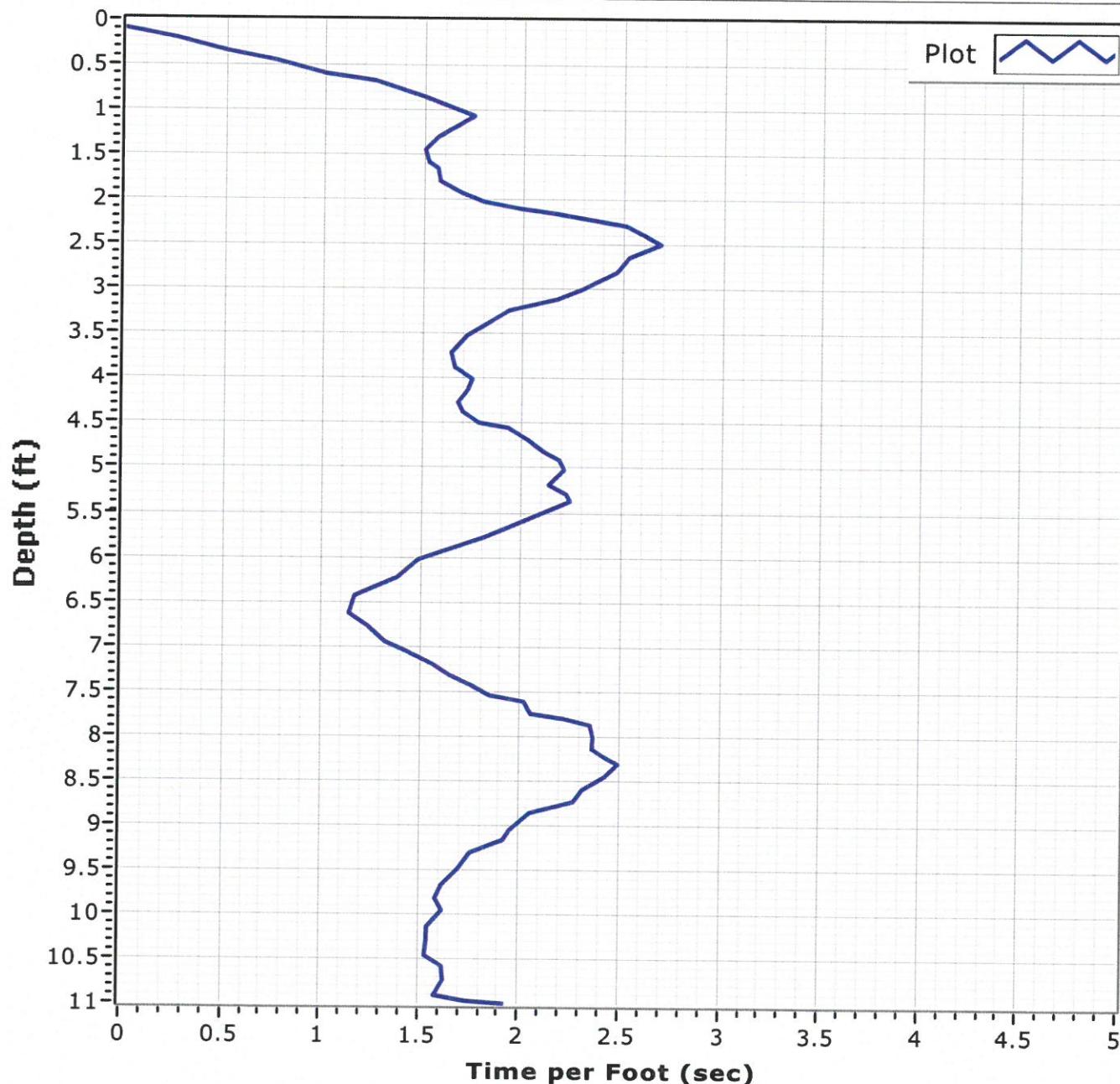
X N 279894

**Start Time** 18:29:09**Penetration** 11.0'

Y E 2450018

**End Time** 18:29:29**Recovery** WASH**Total Time** 00:00:20**Comments**

JETTED TO 11.0



**SUMMARY OF LABORATORY TESTING RESULTS  
FOR GRAIN SIZE ANALYSIS**

**POST 45 PRECONSTRUCTION ENGINEERING AND DESIGN B.U.D  
CHARLESTON HARBOR**

BORING NUMBER	SAMPLE No.	DEPTH (ft)	% SHELL	% LS	USCS	3/4	1/2	3/8	#4	#10	#20	#40	#60	#100	#200
BENR-15-01	1	0.0-1.0	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.8	99.2	94.4	76.7	17.5	2.8
BENR-15-01	2	1.0-2.6	1.5	0.5	SP	100.0	100.0	100.0	97.3	84.0	62.8	35.1	23.3	8.4	4.4
BENR-15-01	3	2.6-5.0	1.4	0.0	SP	100.0	100.0	100.0	98.4	88.7	61.5	33.0	22.2	5.4	3.6
BENR-15-02	1	0.0-2.0	0.3	0.1	SP	100.0	100.0	100.0	99.7	98.0	92.6	72.3	45.4	10.0	4.2
BENR-15-02	2	2.0-3.7	0.0	0.0	SP	100.0	100.0	100.0	97.9	83.2	41.6	7.3	4.5	2.4	2.1
BENR-15-02	3	3.7-13.0	0.3	0.7	SP-SM	100.0	99.4	99.4	98.4	96.0	84.9	60.0	35.4	12.0	6.5
BENR-15-03	1	0.0-2.0	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.5	98.1	92.4	26.7	7.7
BENR-15-03	2	2.0-4.1	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.8	99.2	98.3	75.6	40.1
BENR-15-03	3	4.1-6.0	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.1	96.4	94.3	50.3	10.5
BENR-15-03	4	6.0-9.8	0.5	0.0	SP	100.0	100.0	100.0	99.5	98.2	88.5	48.8	25.2	7.7	0.7
BENR-15-03	5	9.8-11.0	5.5	5.5	SP	100.0	100.0	97.4	86.4	70.7	41.4	13.4	5.9	2.5	1.6
BENR-15-04	1	0.0-3.9	0.1	0.2	SP	100.0	100.0	100.0	99.7	98.9	94.6	76.9	47.5	9.0	3.4
BENR-15-04	2	3.9-7.0	0.0	0.5	SP	100.0	100.0	100.0	99.5	99.0	92.0	64.3	16.1	3.2	1.7
BENR-15-05	1	0.0-2.2	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.4	96.8	38.6	8.8
BENR-15-05	2	2.2-8.8	0.0	0.0	SP	100.0	100.0	100.0	100.0	100.0	98.0	78.7	42.4	13.6	3.3
BENR-15-05	3	8.8-9.0	3.0	1.0	SP-SM	100.0	100.0	100.0	96.0	80.2	56.0	37.1	28.8	12.5	6.0
BENR-15-06	1	0.0-1.3	3.0	0.0	SP	100.0	100.0	100.0	96.9	84.2	62.5	27.5	19.8	9.2	5.4
BENR-15-06	2	1.3-3.6	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	98.2	85.2	62.6	38.9	13.5	8.4
BENR-15-06	3	3.6-6.0	0.0	0.0	SM	100.0	100.0	100.0	99.7	95.5	83.8	63.8	41.6	17.3	14.4
BENR-15-06	4	6.0-16.0	0.0	0.0	CL	100.0	100.0	100.0	100.0	100.0	99.9	99.6	98.9	96.2	80.5
BENR-15-07	1	0.0-5.2	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.4	94.3	75.1	42.5	7.2	1.7
BENR-15-07	2	5.2-6.1	3.0	27.0	SP	100.0	89.4	81.9	68.9	54.3	33.7	19.7	7.7	1.9	1.3

**SUMMARY OF LABORATORY TESTING RESULTS  
FOR GRAIN SIZE ANALYSIS**

**POST 45 PRECONSTRUCTION ENGINEERING AND DESIGN B.U.D  
CHARLESTON HARBOR**

BORING NUMBER	SAMPLE No.	DEPTH (ft)	% SHELL	% LS	USCS	3/4	1/2	3/8	#4	#10	#20	#40	#60	#100	#200
BENR-15-07	3	6.1-8.6	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.7	88.6	45.9	13.7	2.5	1.4
BENR-15-07	4	8.6-10.0	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.8	98.0	56.6	16.0
BENR-15-07	5	10.0-10.8	3.0	20.0	SP	100.0	94.9	87.4	77.5	63.9	45.7	27.2	13.2	5.6	2.5
BENR-15-07	6	10.8-15.0	2.1	0.0	SP	100.0	100.0	100.0	97.9	82.4	41.6	6.6	3.7	1.5	1.2
BENR-15-08	1	0.0-3.6	0.2	0.0	SP-SM	100.0	100.0	100.0	99.8	99.7	98.8	91.4	77.3	21.8	5.4
BENR-15-08	2	3.6-4.6	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.1	85.1	61.7	37.2	9.0	3.9
BENR-15-08	3	4.6-5.6	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.7	93.9	74.8	24.4	4.1	2.7
BENR-15-09	1	0.0-2.3	0.8	0.0	SP-SM	100.0	100.0	100.0	99.2	96.8	77.4	46.5	17.6	7.2	5.7
BENR-15-09	2	2.3-3.3	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	99.3	89.9	55.8	21.0	9.4	8.7
BENR-15-09	3	3.9-4.9	0.0	0.0	SP	100.0	100.0	100.0	100.0	99.8	96.4	77.0	27.5	3.4	2.4
BENR-15-09	4	5.7-6.7	0.4	0.0	SM	100.0	100.0	100.0	99.6	95.0	83.7	63.2	41.6	17.6	14.3
BENR-15-10	1	0.0-1.0	0.9	10.0	SP	100.0	100.0	95.7	89.1	82.2	64.3	40.9	23.7	7.1	3.1
BENR-15-10	2	1.4-2.4	0.1	0.0	SP-SM	100.0	100.0	100.0	99.5	99.3	99.0	98.5	86.6	18.4	8.1
BENR-15-10	3	2.4-3.4	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.7	88.6	17.6	5.2
BENR-15-10	4	3.8-6.0	0.0	0.0	SP-SC	100.0	100.0	100.0	100.0	100.0	100.0	99.3	88.4	21.0	9.1
BENR-15-10	5	6.0-7.0	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.5	87.0	25.2	16.7
BENR-15-11	1	0.0-1.5	7.2	1.5	SP	100.0	97.5	96.4	91.3	82.9	66.9	47.0	32.6	9.9	4.7
BENR-15-11	2	1.5-2.1	0.0	0.9	SP	100.0	100.0	100.0	99.1	95.9	79.5	46.4	23.5	7.0	4.1
BENR-15-11	3	2.1-3.1	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.5	97.6	28.8	6.4
BENR-15-11	4	5.4-6.4	0.0	0.0	SP-SM	100.0	100.0	100.0	100.0	100.0	99.9	99.7	96.4	27.2	14.8
BENR-15-11	5	6.4-6.9	0.0	0.0	SC	100.0	100.0	100.0	100.0	100.0	99.7	98.6	93.4	42.4	30.8
BENR-15-11	6	6.9-8.3	0.0	0.0	SC	100.0	100.0	100.0	100.0	100.0	99.4	97.2	82.8	42.1	31.5

**SUMMARY OF LABORATORY TESTING RESULTS  
FOR GRAIN SIZE ANALYSIS**

**POST 45 PRECONSTRUCTION ENGINEERING AND DESIGN B.U.D  
CHARLESTON HARBOR**

BORING NUMBER	SAMPLE No.	DEPTH (ft)	% SHELL	% LS	USCS	3/4	1/2	3/8	#4	#10	#20	#40	#60	#100	#200
CHEC-15-01	1	0.0-5.5	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.8	98.8	94.5	77.9	23.6
CHEC-15-01	2	5.5-7.6	1.5	0.0	SC	100.0	100.0	100.0	98.5	66.1	65.7	64.0	59.5	51.1	40.7
CHEC-15-02	1	0.0-6.0	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.4	97.7	92.5	72.9	27.3
CHEC-15-02	2	6.0-7.2	0.0	0.0	CL	100.0	100.0	100.0	100.0	100.0	99.9	98.3	92.4	81.0	59.9
CHEC-15-03	1	0.0-0.9	0.0	0.0	SM	100.0	100.0	100.0	100.0	99.9	99.3	97.6	89.3	64.7	34.6
CHEC-15-03	2	0.9-5.9	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.8	98.5	95.0	77.9	29.4
CHEC-15-04	1	0.0-0.6	1.0	0.0	SM	100.0	100.0	100.0	99.0	94.1	87.7	78.8	67.0	53.1	34.7
CHEC-15-04	2	0.6-4.7	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.4	98.0	95.4	80.9	48.1
CHEC-15-05	1	0.0-2.3	0.1	0.0	SM	100.0	100.0	100.0	99.9	99.9	99.5	97.1	94.1	56.9	16.1
CHEC-15-05	2	2.3-4.3	0.3	0.0	SM	100.0	100.0	100.0	99.7	99.1	97.3	94.9	92.3	72.4	41.3
CHEC-15-06	1	0.0-4.0	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.5	97.8	93.4	50.8	27.4
CHEC-15-06	2	4.0-5.0	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.8	97.9	94.9	55.3	23.1
CHEC-15-07	1	0.0-3.1	0.0	0.0	SM	100.0	100.0	100.0	100.0	99.9	99.5	97.9	94.2	53.9	28.7
CHEC-15-07	2	3.1-4.5	0.0	0.0	SM	100.0	100.0	100.0	100.0	100.0	99.8	97.7	94.6	61.5	20.6
CHEC-15-08	1	0.0-0.9	7.0	7.4	SP	100.0	95.6	92.2	85.3	73.2	58.5	37.5	14.3	4.0	2.5
CHEC-15-08	2	0.9-7.4	0.0	0.0	SM	100.0	100.0	100.0	100.0	99.9	99.5	97.9	92.3	46.1	19.3
REBR-15-01	1	0.0-0.6	10.8	0.0	SP-SM	100.0	100.0	98.1	89.2	66.3	49.0	34.6	22.1	11.1	8.5
REBR-15-01	2	0.6-1.9	7.0	0.0	SP-SM	100.0	100.0	99.1	93.0	82.5	64.7	38.8	17.0	7.2	5.6
REBR-15-01	3	1.9-4.2	6.3	0.0	SC	100.0	100.0	100.0	93.7	66.8	59.7	48.4	34.0	22.2	20.0
REBR-15-02	1	0.0-1.1	1.1	0.0	SP	100.0	100.0	100.0	98.9	89.8	61.4	16.7	5.4	3.0	2.3
REBR-15-02	2	1.1-3.2	3.9	3.8	SP	100.0	100.0	98.9	92.3	59.7	21.4	7.6	5.0	3.2	2.4
REBR-15-02	3	3.2-4.4	2.3	0.0	CL	100.0	100.0	100.0	97.7	84.6	81.2	78.4	76.2	56.2	47.1

**SUMMARY OF LABORATORY TESTING RESULTS  
FOR GRAIN SIZE ANALYSIS**

**POST 45 PRECONSTRUCTION ENGINEERING AND DESIGN B.U.D  
CHARLESTON HARBOR**

BORING NUMBER	SAMPLE No.	DEPTH (ft)	% SHELL	% LS	USCS	3/4	1/2	3/8	#4	#10	#20	#40	#60	#100	#200
REBR-15-03	1	0.0-1.5	9.3	0.0	SP-SM	100.0	100.0	100.0	90.7	71.2	63.0	39.2	21.0	8.6	6.9
REBR-15-03	2	1.5-4.7	2.3	2.2	SP	100.0	100.0	99.1	95.5	81.3	51.9	14.3	6.0	3.2	2.0
REBR-15-03	3	4.7-6.1	1.5	1.7	SP	100.0	100.0	100.0	96.8	89.1	74.5	62.3	52.6	16.0	4.4
REBR-15-04	1	0.0-1.2	9.1	0.0	SP	100.0	100.0	94.1	90.9	84.1	72.6	55.4	29.1	4.9	2.4
REBR-15-04	2	1.2-4.0	13.0	13.7	SP-SM	100.0	96.0	93.2	73.3	50.3	35.4	25.8	20.6	14.0	10.2
REBR-15-04	3	4.0-7.1	0.0	0.0	SM	100.0	100.0	100.0	100.0	94.5	93.5	91.4	82.2	59.0	34.4
REBR-15-05	1	0.0-2.7	10.0	7.7	SP-SM	100.0	96.7	91.2	82.3	63.1	51.5	35.7	27.9	12.9	8.5
REBR-15-05	2	2.7-3.9	0.6	0.0	CL	100.0	100.0	100.0	99.4	87.2	84.3	80.1	77.5	72.8	70.1
REBR-15-05	3	3.9-6.9	3.6	6.0	SM	100.0	93.5	93.5	90.4	88.2	84.3	79.7	73.1	58.1	37.1
REBR-15-06	1	0.0-6.2	2.9	0.0	CL	100.0	100.0	100.0	97.1	71.8	71.7	71.6	71.4	68.8	67.7
REBR-15-06	2	6.2-6.6	1.3	0.0	SM	100.0	100.0	100.0	98.7	89.5	86.3	81.9	66.3	21.5	16.8
REBR-15-06	3	6.6-7.1	2.0	0.0	CL	100.0	100.0	100.0	98.0	84.7	83.2	79.3	71.4	49.3	45.2
REBR-15-07	1	0.0-1.3	8.5	0.0	SP	100.0	97.7	96.9	91.5	79.3	65.0	44.0	11.2	2.5	1.7
REBR-15-07	2	1.3-2.3	1.5	0.3	SC	100.0	100.0	100.0	98.2	90.8	89.8	88.5	76.0	18.4	12.9
REBR-15-07	3	3.1-7.0	10.5	0.0	SP-SM	100.0	100.0	99.9	89.5	74.4	66.0	54.5	30.6	12.2	8.5
REBR-15-07	4	7.0-8.4	6.0	0.0	SM	100.0	100.0	100.0	94.0	61.2	61.1	61.0	60.8	48.5	30.1
WLRW-15-01	1	0.0-15.0	0.0	0.0	CL	100.0	100.0	100.0	100.0	100.0	99.8	99.4	97.8	91.6	67.9
WLRW-15-02	1	0-0.9	0.9	0.0	SP	100.0	100.0	100.0	100.0	96.9	80.3	47.8	25.0	7.9	5.0
WLRW-15-02	2	0.9-9.2	0.0	0.0	CL	100.0	100.0	100.0	100.0	99.9	99.8	99.1	97.7	94.6	78.0
WLRW-15-02	3	9.2-13.8	8.5	0.0	SP-SM	100.0	100.0	100.0	91.5	73.0	65.5	42.6	24.7	12.8	11.1
WLRW-15-03	1	0-10.0	0.0	0.0	CL	100.0	100.0	100.0	100.0	100.0	99.4	98.8	97.4	92.4	60.4