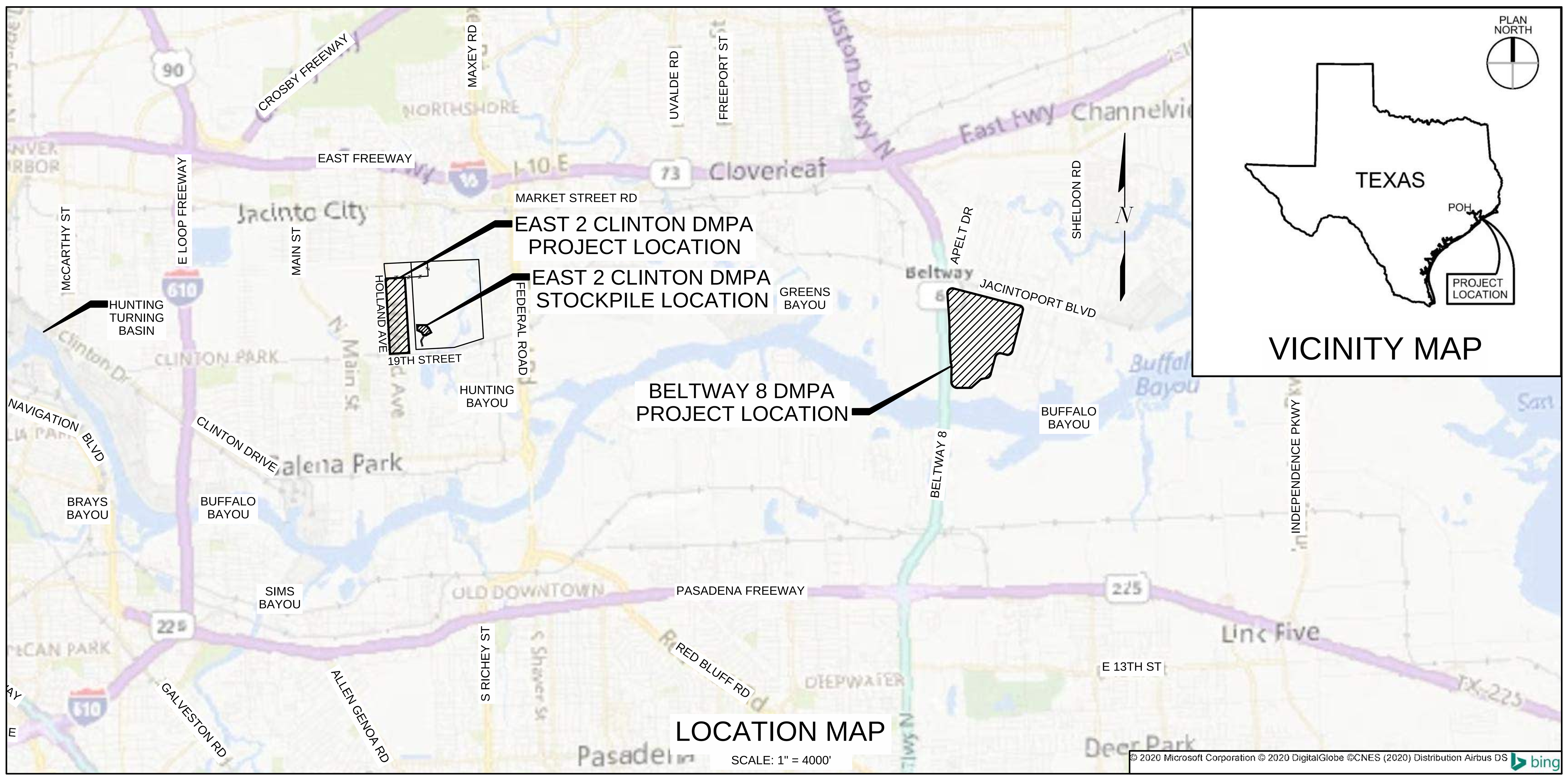
US Army Corps of Engineers®
GALVESTON DISTRICT

PORT HOUSTON
THE INTERNATIONAL PORT OF TEXAS™

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

HOUSTON SHIP CHANNEL (HSC), TEXAS
EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE # 8
SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU
TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA



SOLICITATION NO.: W912HY-XX-X-XXXX

CONTRACT NO.: WXXXXX-XX-X-XXX

ISSUE DATE: DECEMBER 2020

VOLUME # 1 OF 1

This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes.

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BELTWAY 8 DMPA

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING
DESIGN & SUPPORT

PROJECT TITLE:
HOUSTON SHIP CHANNEL (HSC)
EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE # 8

SHEET TITLE:
SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

COVER SHEET

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	JDL/JB
CHECKER:	N.McLELLAN
DATE:	12/08/2020
SCALE:	AS NOTED

DRAWING NO. C90-D13-P11-002

SHEET NO. G-001 REV. NO. B

95% REVIEW

TIME: 12-08-20 – 3:45pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-G-001.dwg

GENERAL NOTES AND LEGEND

GENERAL REQUIREMENTS

1. CONTRACTOR SHALL NOT COMMENCE ANY CONSTRUCTION OPERATION UNTIL THE CONTRACTOR HAS VERIFIED THAT CONSTRUCTION / ENVIRONMENTAL PERMITS FOR THIS PROJECT HAVE BEEN ACQUIRED.
2. ALL EXISTING CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL NOTIFY THE PORT AUTHORITY AND ENGINEER IMMEDIATELY OF ANY CONFLICT OR DISCREPANCIES.
3. DESIGN AND CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE STATE AND LOCAL CODES AND STANDARDS, THE PROJECT SPECIFICATIONS AND PROJECT DRAWINGS. NOTES PROVIDED IN DRAWINGS SHALL TAKE PRECEDENCE OVER PROJECT SPECIFICATION DOCUMENTS. SPECIFIC NOTES ON DETAIL DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES. STATE AND LOCAL CODES SHALL TAKE PRECEDENCE OVER PROJECT SPECIFICATIONS AND NOTES ON DRAWINGS. CONTRACTOR SHALL NOTIFY OWNER/ENGINEER IMMEDIATELY OF ANY CONFLICTS BETWEEN STATE AND LOCAL CODES, PROJECT SPECIFICATIONS AND PROJECT DRAWINGS PRIOR TO ANY CONSTRUCTION.
4. CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL ELEVATIONS, COORDINATES, DIMENSIONS, EXISTING CONDITIONS, AND INFORMATION INDICATED ON THE CONTRACT DOCUMENTS PRIOR TO COMMENCEMENT OF SITE WORK. THE ENGINEER/OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES FOUND ON THE CONTRACT DOCUMENTS OR FOUND TO EXIST BETWEEN THE FIELD CONDITIONS AND THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL TAKE CORRECTIVE ACTION AS DIRECTED BY THE ENGINEER/OWNER.
5. CONTRACTOR SHALL SUBMIT STORM WATER POLLUTION PREVENTION PLAN (SW3P):
   - . CONSTRUCTION ACTIVITY MAY NOT COMMENCE UNTIL SW3P IS APPROVED BY ENGINEER/OWNER.
   - . REFER TO SPECIFICATION SECTION TEMPORARY STORM-WATER POLLUTION CONTROL FOR ADDITIONAL REQUIREMENTS.
6. ALL DATA COLLECTED AND PRESENTED IN THIS DOCUMENT IS INDICATIVE OF CONDITIONS AT THE TIME OF DESIGN AND IS NOT MEANT TO BE CONCLUSIVE.
7. CONTRACTOR SHALL COLLECT THE DATA NECESSARY TO ASSURE SAFETY OF THEIR CREWS DURING ALL CLEARING, DIGGING, DREDGING, MOVING AND BORING OF SPUD BARGES. WORKER SAFETY SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS.
8. LOCATIONS OF ALL PIPELINES AND UTILITIES SHOWN ON DRAWINGS ARE APPROXIMATE.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING THE LOCATION, ORIENTATION AND DEPTH OF ALL PIPELINES WITHIN THE CONSTRUCTION AND STAGING AREAS BEFORE ANY DIGGING, DREDGING, MOVING, AND BORING SPUD BARGES.
10. THE CONTRACTOR SHALL TAKE MEASURES TO PROTECT ALL EXISTING IMPROVEMENTS WITHIN AND ADJACENT TO THE WORK AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR'S ACTIVITIES SHALL BE REPLACED OR REPAIRED AT THE EXPENSE OF THE CONTRACTOR AND AT NO COST TO THE PORT AUTHORITY. STRUCTURES THAT ARE TO BE PROTECTED FROM DAMAGE OR REPAIRED IF DAMAGED INCLUDE BUT ARE NOT LIMITED TO FENCES, LEVEE EMBANKMENTS, OUTLET STRUCTURES, DRAINAGE PIPES, ROADS, DITCHES, PRIVATE OR PUBLIC GROUNDS, AND OTHER STRUCTURES OR IMPROVEMENTS.
11. ANOMALIES IDENTIFIED AND PRESENTED IN SIDESCAN SONAR AND MAGNETOMETER SURVEYS ARE APPROXIMATE AND NOT INCLUSIVE OF ALL OBJECTS AND DEBRIS.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING ALL DEBRIS AND OBSTRUCTIONS THAT CAN HAVE AN ADVERSE IMPACT ON CREW SAFETY DURING ALL OPERATIONS INCLUDING BUT NOT LIMITED TO DREDGING OPERATIONS, DIGGING OPERATIONS AND REPOSITIONING OF SPUD BARGE OPERATIONS.
13. THE CONTRACTOR SHALL REMOVE ALL EXISTING DEBRIS LYING ON THE BOTTOM WITHIN THE DREDGE AREA AND DISPOSE OF UNDER THE DIRECTION OF THE CONTRACTING OFFICER AND IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. FOR PAYMENT, CONTRACTOR SHALL PROVIDE LANDFILL TICKET(S) INDICATING THE DATE OF DISPOSAL.
14. THE CONTRACTOR SHALL NOTIFY THE TEXAS ONE CALL SYSTEM (811) A MINIMUM OF 48-HOURS PRIOR TO EXCAVATION (DIGGING, DREDGING, JETTING, ETC.) OR ANY DEMOLITION ACTIVITY. THIS ACTION HOWEVER, SHALL IN NO WAY BE INTERPRETED AS RELIEVING THE CONTRACTOR OF THE RESPONSIBILITY UNDER THE TERMS OF THE CONTRACT AS SET OUT IN THE PLANS AND SPECIFICATIONS. PIPELINE SAFETY AND THE PROTECTION OF PIPELINES OR OTHER UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY HIS OPERATIONS AT HIS OWN EXPENSE AND TO THE SATISFACTION OF THE UTILITY COMPANY INVOLVED.
15. KNOWN PIPELINE AND UTILITY CROSSINGS WITHIN THE VICINITY OF THE REQUIRED WORK AREA ARE SHOWN ON THESE DRAWINGS. THIS INFORMATION WAS PROVIDED TO ENGINEER BY PORT OF HOUSTON AND THE U.S. ARMY CORPS OF ENGINEERS. ENGINEER HAS NOT PERFORMED FIELD INVESTIGATIONS TO VERIFY LOCATION OF PIPELINES AND UTILITIES OR THAT ALL EXISTING PIPELINES AND UTILITY CROSSINGS HAVE BEEN IDENTIFIED. THE CONTRACTOR IS REQUIRED TO INVESTIGATE PIPELINE AND UTILITY CROSSINGS, INCLUDING REQUIRED PRE-CONSTRUCTION HAZARD SURVEYS.
16. PRIOR TO COMMENCING DREDGING, CONTRACTOR SHALL PERFORM A HAZARD SURVEY (MAGNETOMETER, SIDE-SCAN SONAR, SUB-BOTTOM PROFILER, AND/OR SIMILAR METHOD) OVER THE ENTIRE AREA TO BE DREDGED TO SEARCH FOR SURFACE DEBRIS, UNCHARTED PIPELINES, AND/OR OTHER ANOMALIES ON OR BELOW THE EXISTING SEA FLOOR. HAZARD SURVEY SHALL BE SUPPLEMENTED WITH PROBING AS REQUIRED TO DETERMINE DEPTH OF UNCHARTED HAZARDS/OBSTRUCTIONS. PROBING SHALL BE COORDINATED WITH UTILITY OWNERS. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR DETERMINING NECESSARY EXTENT AND METHODS OF PRE-DREDGE HAZARD SURVEY. PLANNED SCOPE OF PRE-DREDGE HAZARD SURVEY SHALL BE SUMMARIZED IN SURVEYING PLAN (PARAGRAPH 1.5.B). RESULTS OF THE PRE-DREDGE HAZARD SURVEY SHALL BE PROVIDED WITH A SUMMARY OF FINDINGS, INTERPRETATION OF ANY LOCATED ANOMALIES, AND CONSIDERATIONS FOR DREDGING.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING THE LOCATION, ORIENTATION AND DEPTH BY WHATEVER MEANS NECESSARY (METAL DETECTION EQUIPMENT, PROBES, EXCAVATION, SURVEY) OF ALL PIPELINES WITHIN THE CONSTRUCTION AND STAGING AREAS BEFORE ANY CONSTRUCTION ACTIVITY BEGINS INCLUDING DIGGING, DREDGING, MOVING, AND BORING OF SPUD BARGES.
18. THE LOCATIONS OF EXISTING UTILITIES AND SUBSTRUCTURES SHOWN HEREIN HAVE BEEN TAKEN FROM AVAILABLE RECORDS. HDR ENGINEERING, INC., THE GOVERNMENT AND PORT AUTHORITY DOES NOT WARRANT THE COMPLETENESS OR CORRECTNESS OF THE LOCATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND PROTECT EXISTING SUBSTRUCTURES. SHOULD UTILITIES, PIPELINES OR CABLING BE ENCOUNTERED THAT ARE NOT INDICATED, THE CONTRACTING OFFICER SHALL BE NOTIFIED IMMEDIATELY.
19. PRIOR TO BEGINNING ANY EXCAVATION OR DREDGING WORK IN THE AREA OF EXISTING UTILITIES, THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES OWNER FOR EXACT LOCATIONS AND DEPTHS TO PREVENT ANY DAMAGE OR INTERFERENCE WITH PRESENT FACILITIES.
20. CONTRACTOR SHALL RESTORE UTILITY AND GROUND TO ITS ORIGINAL CONDITION AFTER WORK IS COMPLETE. NO SEPARATE PAYMENT SHALL BE MADE FOR SUCH WORK, CONTRACTOR IS RESPONSIBLE FOR DAMAGES THAT OCCUR DUE TO FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES ENCOUNTERED.
21. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL TRAFFIC CONTROL DEVICES DURING THE COURSE OF THE CONSTRUCTION PERIOD.
22. THE CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE US ARMY CORPS OF ENGINEERS (USACE) PERMIT OBTAINED BY THE OWNER FOR THIS PROJECT. REFER TO US ARMY CORPS OF ENGINEERS PERMIT NO. SWG-2006-00997.

GENERAL REQUIREMENTS CONT'D

23. THIS PROJECT IS SUBJECT TO ENVIRONMENTAL PROTECTION AGENCY (EPA) NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION STORM WATER DISCHARGE REGULATIONS AND REQUIREMENTS. THE CONTRACTOR SHALL EXECUTE A NOTICE OF INTENT AND IMPLEMENT THE POLLUTION PREVENTION PLAN PER USACE COMPLY WITH ALL REPORTING AND INSPECTION REQUIREMENTS SET FORTH IN THE NPDES REGULATION.
24. ALL EXISTING ROADWAYS AND OTHER FEATURES WHICH ARE DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
25. CONTRACTOR SHALL MAINTAIN ALL REGULATORY AND WARNING SIGNS DURING THE CONSTRUCTION PERIOD.
26. CONTRACTOR SHALL SUBMIT TO ENGINEER ALL MATERIAL CERTIFICATES PRIOR TO FABRICATION.
27. CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO AS TO NOT INTERFERE WITH, OR BE DETRIMENTAL TO VESSEL AND VEHICULAR TRAFFIC AND THE DAILY OPERATION OF THE OWNER DURING THE COURSE OF THE WORK.
28. WORKER SAFETY IN EXCAVATIONS AND TRENCHES SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS, 29 CFR 1926, SUBPART P EXCAVATIONS, TRENCHING, AND SHORING. CONTRACTOR SHALL ALSO COMPLY WITH ALL APPLICABLE STATE AND LOCAL REQUIREMENTS. A COPY OF THE GEOTECHNICAL REPORT CAN BE OBTAINED FROM THE OWNER FOR USE BY THE CONTRACTOR IN THE DESIGN OF THE TRENCH SAFETY SYSTEM.
29. THE CONTRACTOR SHALL OBTAIN THE REQUIRED PERMITS AS MAY BE REQUIRED BEYOND THE AUTHORIZATIONS PROVIDED TO PERFORM THE WORK.
30. THE CONTRACTOR SHALL PERFORM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH USACE-EM-385-1-1, NAVFAC P307, OSHA AND CONTRACT DOCUMENTS.
31. CONTRACTOR SHALL KEEP CONSTRUCTION ACTIVITIES UNDER SURVEILLANCE, MANAGEMENT, AND CONTROL TO MINIMIZE INTERFERENCE WITH, DISTURBANCE TO AND DAMAGE OF FISH AND WILDLIFE. PRIOR TO BEGINNING OF CONSTRUCTION OPERATIONS, CONTRACTOR SHALL LIST SPECIES THAT REQUIRE SPECIFIC ATTENTION AND DESCRIBE MEASURES FOR THEIR PROTECTION. AT A MINIMUM, CONTRACTOR SHALL HAVE PERSONNEL ONSITE WHO ARE TRAINED TO IDENTIFY AND CONTINUOUSLY OBSERVE THE WORK AREA FOR THE ENDANGERED AND/OR PROTECTED SPECIES. REFER TO SPECIFICATION SECTION 01 16 60.00 ADD (ENVIRONMENTAL PROTECTION MEASURES) FOR ADDITIONAL REQUIREMENT.
32. CONTRACTOR, SUBCONTRACTORS AND OTHER CONTRACTED ENTITIES SHALL SUCCESSFULLY COMPLETE ALL THE TRAINING COURSES AND REQUIREMENTS REQUIRED BY OWNER IN ORDER TO ACCESS THE PROJECT SITE AND CARRY OUT THE CONTRACTED WORK. CONTRACTOR SHALL POSSESS ALL THE REQUIRED IDENTIFICATION DOCUMENTS AND SHALL ACCESS THE PROJECT SITE THROUGH OWNER SECURITY CHECK POINT AND FOLLOW OWNERS CHECK-IN/-OUT PROCEDURE ON A DAILY BASIS. THE IDENTIFICATION DOCUMENTS INCLUDE, AS A MINIMUM, VALID TRANSPORTATION WORKER IDENTIFICATION CREDENTIAL (TWIC®) CARD AND VALID DRIVER'S LICENSE.
33. CONTACT OWNER FOR TRAINING INFORMATION AND PARKING REQUIREMENTS: FIRST NAME, LAST NAME, TITLE, PHONE NUMBERS (OFFICE) AND (CELL).
34. FOR FINAL PAYMENT AND CONTRACT CLOSEOUT, CONTRACTOR SHALL PROVIDE A MULTI-BEAM SURVEY OF THE COMPLETED CHANNEL (REFER TO SPECIFICATION 35 20 00.00.00 ADD, "CONSTRUCTION SURVEYING"). IN ADDITION, CONTRACTOR SHALL PARTICIPATE IN A FINAL WALK-THROUGH WITH CONTRACTING OFFICER PORT AUTHORITY, AND PROPERTY OWNERS TO DOCUMENT POST-CONSTRUCTION CONDITION OF STAGING AREAS, AND TO IDENTIFY ANY REMAINING PUNCH-LIST ITEMS PRIOR TO DEMOBILIZATION. CONTRACTOR IS RESPONSIBLE FOR LEAVING STAGING AREAS IN A CONDITION THAT IS ACCEPTABLE TO PROPERTY OWNER, CONTRACTING OFFICER, AND PORT AUTHORITY.
35. THE PROJECT MAY BE ADJACENT TO SENSITIVE ENVIRONMENTAL HABITAT AREAS. THE CONTRACTOR SHALL AVOID/MINIMIZE IMPACTS TO THESE AREAS DURING THE COURSE OF CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR'S ACTIVITIES SHALL BE RESTORED AT THE EXPENSE OF THE CONTRACTOR AND AT NO COST TO THE PORT AUTHORITY. THE PORT AUTHORITY SHALL BE THE SOLE ASSESSOR AS TO WHETHER ENVIRONMENTAL IMPACTS HAVE OCCURRED AS A RESULT OF THE CONTRACTOR'S ACTIVITIES. THE PORT AUTHORITY RESERVES THE RIGHT TO SUSPEND WORK AT ANY TIME IF IMPACTS OCCUR AND UNTIL SATISFACTORY CORRECTIVE MEASURES ARE IMPLEMENTED BY THE CONTRACTOR.

SOIL BORINGS

1. FOR GRAPHICAL LOCATIONS OF ALL BORINGS, REFER TO SHEET B-001.
2. BORING LOGS ARE FROM GEOTECHNICAL REPORT TITLED: "GEOTECHNICAL STUDY HOUSTON SHIP CHANNEL EXPANSION CHANNEL IMPROVEMENT PROJECT", REPORT NO. HG1910092.2.1-DES DATED 7/10/2020; PREPARED BY HVJ ASSOCIATES.
3. SOIL INVESTIGATION DATA IS PROVIDED FOR THE INFORMATION AND CONVENIENCE OF THE CONTRACTOR. THE OWNER AND ENGINEER DISCLAIM ANY RESPONSIBILITY FOR THE ACCURACY, TRUE LOCATION AND EXTENT OF THE SOIL INVESTIGATION THAT HAS BEEN PREPARED BY OTHERS. THEY FURTHER DISCLAIM RESPONSIBILITY FOR INTERPRETATION OF THAT DATA BY THE CONTRACTOR, AS IN PROJECTING SOIL-BEARING VALUES, SOIL STABILITY, AND THE PRESENCE, LEVEL, AND EXTENT OF UNDERGROUND WATER, ETC. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH SUBSURFACE AND GROUND WATER CONDITIONS PRIOR TO CONSTRUCTION.
4. SOIL INVESTIGATION REPORTS ARE NOT A PART OF THE CONTRACT DOCUMENTS. SOIL BORING LOGS ARE INCLUDED ON THIS SHEET FOR REFERENCE PURPOSES ONLY.
5. A COPY OF THE ENTIRE SOIL INVESTIGATION REPORT IS AVAILABLE FOR REVIEW AT THE ENGINEER'S AND THE OWNER'S OFFICE.
6. SURFACE ELEVATIONS SHOWN ON BORING LOGS ARE APPROXIMATE. CONTRACTOR SHALL CONDUCT HIS OWN SURVEYS FOR CURRENT ELEVATIONS.

SHOP DRAWINGS

1. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS SHOWN ON THE DRAWINGS, PRIOR TO PREPARATION OF SHOP DRAWINGS.
2. SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER BEFORE PURCHASE OF ANY MATERIALS OR START OF FABRICATION.
3. THE USE OF REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS IS PROHIBITED.

WETLANDS

1. THE CONTRACTOR IS RESPONSIBLE FOR DELINEATING ALL WETLANDS WITH A CERTIFIED BIOLOGIST PRIOR TO MOBILIZING TO THE SITE. AN ANALYSIS COMPARING WHICH WETLANDS CAN BE IMPACTED AND WHICH ARE TO BE UNDISTURBED NEEDS TO BE PERFORMED IN COORDINATION WITH OWNER/ENGINEER PRIOR TO ENTERING CONSTRUCTION AND STAGING AREAS.

LEGEND

- ABANDONED OIL AND GAS WELL
- BORING
- CONE PENETRATION
- SURVEY CONTROL POINTS
- DISTRIBUTION STRUCTURE
- HORIZONTAL CONTROL MONUMENT
- LIGHT POLE
- IRRIGATION CONTROL VALVE
- TELEPHONE PEDESTAL
- DRAINAGE GRATE INLET
- DRAINAGE GRATE INLET WITH CONCRETE FLUME
- CULVERT BOX AND HEADWALL
- PIPELINE SIGN
- TRANSMISSION STRUCTURE
- TEMPORARY STOCKPILE AREA
- WETLANDS DELINEATION
- PROPOSED KEYWAY
- BORROW AREA FOR DIKE CONSTRUCTION
- CLEAR GRUB AND STRIPPING
- SPOT ELEVATIONS
- CONTOUR LINE
- DITCH
- DISTRIBUTION LINE
- TRANSMISSION LINE
- RIVER LINE
- FENCE
- PIPELINE
- EXISTING RIGHT OF WAY LINES — R/W
- EXISTING LEASE LINES
- NATURAL GRADE (EXISTING GROUND)
- ELECTRIC LINE — E
- HIGH PRESSURE - GAS LINE — HG
- COMMUNICATIONS - UNDERGROUND LINE — COMM
- TELEPHONE LINE — T
- STORM DRAIN — SD
- WATER LINE — W
- RAILROAD TRACKS
- PLACEMENT AREA PROPOSED DIKE
- DROP-OUTLET STRUCTURE

FINAL GRADING

1. TRANSITIONS IN GRADES SHALL BE SMOOTH AND UNIFORM.
2. GRADING SHALL BE PERFORMED IN SUCH A MANNER THAT WATER IS NOT PONDED ON GROUND SURFACES.
3. ALL AREAS WHICH HAVE BEEN FILLED AND AREAS STRIPPED OF VEGETATION SHALL BE PROTECTED FROM EROSION AND REVEGETATED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.

SITE WORK / EARTH WORK

1. AT LEAST 21 DAYS PRIOR TO COMMENCEMENT OF SITE WORK, SUBMIT A WORK PLAN FOR REVIEW BY ENGINEER IN ACCORDANCE WITH TECHNICAL SPECIFICATION 31 24 00
2. ACCESS ROADS SHALL BE CONSTRUCTED TO ACCOMMODATE THE INTENDED LOADS AND FREQUENCY AND BE MAINTAINED IN A WELL-DRAINED AND FUNCTIONAL CONDITION DURING THE CONTRACT PERIOD.
3. AREAS TO RECEIVE FILL SHALL BE EXCAVATED AND CLEARED OF ALL UNSUITABLE MATERIALS AS DEFINED IN THE TECHNICAL SPECIFICATIONS.
4. UNLESS OTHERWISE SPECIFIED, COMPACT ALL FILL TO A MINIMUM 90% STANDARD PROCTOR DENSITY AND +/- 2 PERCENT OF OPTIMUM MOISTURE IN COMPACTED LIFTS NOT TO EXCEED 8 INCHES.
5. UNLESS OTHERWISE SPECIFIED, SUBGRADE MATERIAL SHALL BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY AND +/- 2 PERCENT OF OPTIMUM MOISTURE TO A MINIMUM DEPTH OF 6 INCHES.
6. WHERE THE EMBANKMENT SUBGRADE IS TO BE ATOP DREDGE MATERIAL, THE DREDGE MATERIAL SHALL BE REMOVED AND REWORKED AS PER TECHNICAL SPECIFICATION 31 24 00.
7. ALL NECESSARY EARTHWORK SHALL BE PERFORMED SO THAT EXISTING ADJACENT PROPERTIES, FEATURES, SLOPES AND SITE CONDITIONS REMAIN STABLE DURING AND AFTER CONSTRUCTION ACTIVITIES. IN ADDITION, REFER TO SPECIFICATIONS SECTION 02 22 13 ADD (CONSTRUCTION VIBRATION MONITORING) AND SECTION 31 09 00.01 ADD (GEOTECHNICAL CONSTRUCTION VIBRATION MONITORING)

HORIZONTAL AND VERTICAL CONTROL

1. HORIZONTAL COORDINATES ARE REFERENCED TO TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD83 (GEOID 12B) US SURVEY FEET.
2. ON THE E2 CLINTON PROJECT SITE, AERIAL PHOTOGRAPHY SHOWN ON THESE DRAWINGS WAS PROVIDED BY FUGRO USA LAND, INC. AND FLOWN DECEMBER 14, 2019.
3. EXCEPT AS NOTED OTHERWISE, ALL TOPOGRAPHIC AND MAGNETOMETER SURVEY DATA SHOWN ON E2 CLINTON DRAWINGS WERE OBTAINED BY FUGRO USA LAND, INC. ON DECEMBER 14, 2019.
4. ALL TOPOGRAPHIC AND BATHYMETRIC SURVEYS ARE INDICATIVE OF CONDITIONS AT THE TIME OF SURVEY.
5. ELEVATIONS ARE REFERENCED TO TEXAS SOUTH CENTRAL ZONE 4204, NAVD88 (GEOID 12B) US SURVEY FEET.

SURVEY CONTROL MONUMENTS

NAD 83, TEXAS SOUTH CENTRAL ZONE, US SURVEY FEET

NAME	PID NO.	NORTHING (Y)	EASTING (X)	ELEV (NAVD 88)
877 077 C MANCHESTER HOUSTON TCOON	DO9988	N 13830815.26	E 3152837.53	29.31
877 0553 070035 RM GREENS BAYOU TCOON	DO9979	N 13839400.29	E 3180394.36	12.85
877 0743 C BATTLESHIP TEXAS - UPSTREAM TCOONDN	DO9987	N 13842917.12	E 3209339.21	11.14

BELTWAY 8 DMPA

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

GENERAL NOTES AND LEGEND

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	JDL/JB
CHECKER:	N.McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-002

SHEET NO. G-002 REV. NO. B

95% REVIEW

ABBREVIATIONS

ABBREVIATIONS:

&	AMPERSAND
AG	AGRICULTURAL
CB	CATCH BASIN
CC	CENTER OF CURVE
CHD	CHORD
℄ / CL	CENTERLINE
CONC.	CONCRETE
CON'T.	CONTINUED
CMP	CORRUGATED METAL PIPE
CO.	COUNTY
CPP	CORRUGATED POLYETHYLENE PIPE
CY	CUBIC YARDS
D	DELTA ANGLE
DIA	DIAMETER
DIST	DISTANCE
DOF	DRAINAGE OUTFALL
DMPA	DREDGE MATERIAL PLACEMENT AREA
DNSTR	DOWNSTREAM
DWG	DRAWING
EA	EACH
E2	EAST 2
EL/ELEV	ELEVATION
EXP.	EXPLORATION
EX	EXISTING
FT	FEET
FL	FLOWLINE
G.P.I.S.D.	GALENA PARK INDEPENDENT SCHOOL DISTRICT
HDPE	HIGH DENSITY POLYETHYLENE
HP	HIGH POINT
HORIZ.	HORIZONTAL
INC.	INCORPORATED
INV	INVERT
I.S.D.	INDEPENDENT SCHOOL DISTRICT
L	LENGTH
LF	LINEAR FEET
MH	MANHOLE
MAX	MAXIMUM
MIN	MINIMUM
MLLW	MEAN LOW LOW WATER
N/A	NOT APPLICABLE
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NO. / #	NUMBER
NG	NATURAL GROUND
%	PERCENT
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
POB	POINT OF BEGINNING
POE	POINT OF ENDING
PT	POINT OF TANGENCY
PROP	PROPOSED
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
REV.	REVISION
RD	ROAD
R/W	RIGHT OF WAY
S	SLOPE
SD	STORM DRAIN
S.E.T.	SAFETY END TREATMENT
SF	SQUARE FEET
STA	STATION
ST	STREET
SW3P	STORMWATER POLLUTION PREVENTION PLAN
OT	TANGENT
TBD	TO BE DETERMINED
TEMP.	TEMPORARY
T.O.C.	TOP OF CONCRETE
T.O.S.	TOP OF STEEL
TYP	TYPICAL
UPSTR	UPSTREAM
VERT.	VERTICAL
WT	WALL THICKNESS
W/	WITH

BELTWAY 8 DMPA

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:
HOUSTON SHIP CHANNEL (HSC)
EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE # 8

SHEET TITLE:
SEGMENT 4
BOGGY BAYOU TO SIMS BAYOU TURNING BASIN
E2 CLINTON DMPA & BELTWAY 8 DMPA
ABBREVIATIONS

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	JDL/JB
CHECKER:	N.McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-002

SHEET NO. G-003 REV. NO. B

95% REVIEW

ALIGNMENT DATA

DRAINAGE OUTFALL ALIGNMENT DATA

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

POINT	STATION	NORTHING	EASTING
POB	0+00.00	13841876.17	3164021.18
PI	2+67.78	13842143.50	3164005.54
PI	3+34.00	13842209.26	3164013.34
PI	4+98.90	13842373.88	3164003.85
PI	7+64.50	13842629.41	3164076.29
PI	8+86.69	13842683.23	3164185.99
POE	10+85.00	13842873.14	3164243.11

PERIMETER DIKE ALIGNMENT DATA

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

CURVE NO.	POINT	STATION	NORTHING	EASTING	RADIUS	LENGTH	DELTA	DIRECTION
	POB	0+00.00	13838625.76	3163717.47				
	PC	32+36.05	13841856.30	3163528.82				
	PC	32+36.05	13841856.30	3163528.82				
	PI	---	13841956.12	3163522.99	100.00	157.06	89°59'34"	RIGHT
	CC		13841862.13	3163628.65				
	PT	33+93.11	13841961.96	3163622.81				
	PT	33+93.11	13841961.96	3163622.81				
	PC	38+79.92	13841990.40	3164108.78				
	PC	38+79.92	13841990.40	3164108.78				
	PI	---	13841996.24	3164208.61	100.00	157.08	90°00'00"	RIGHT
	CC		13841890.57	3164114.62				
	PT	40+37.00	13841896.41	3164214.45				
	PT	40+37.00	13841896.41	3164214.45				
	PC	72+00.13	13838738.68	3164399.24				
	PC	72+00.13	13838738.68	3164399.24				
	PI	---	13838563.09	3164409.52	175.00	275.77	90°17'26"	RIGHT
	CC		13838728.46	3164224.54				
	PT	74+75.91	13838553.71	3164233.88				
	PT	74+75.91	13838553.71	3164233.88				
	PC	78+87.74	13838531.73	3163822.63				
	PC	78+87.74	13838531.73	3163822.63				
	PI	---	13838526.42	3163723.28	100.00	156.58	89°42'39"	RIGHT
	CC		13838631.59	3163817.30				
	PT	80+44.31	13838625.75	3163717.47				
	PT	80+44.31	13838625.75	3163717.47				
	POE	80+44.31	13838625.75	3163717.47				

TEMPORARY STOCKPILE AREA TEMP. ACCESS ROAD ALIGNMENT

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

POINT	STATION	NORTHING	EASTING
POB	0+23.20	13838739.08	3165232.81
C1 PC	2+46.94	13838955.57	3165176.32
C1 PI	2+98.23	13839008.18	3165162.59
C1 CC		13838987.13	3165297.07
C1 PT	3+49.51	13839054.09	3165191.72
POE	6+24.59	13839286.37	3165339.08

CURVE DATA (C1):	
DELTA:	47°00'59"
RADIUS:	125.00'
TANGENT:	54.37'
LENGTH:	102.57'
DIRECTION:	RIGHT

DMPA EAST ACCESS ROAD ALIGNMENT

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

CURVE NO.	POINT	STATION	NORTHING	EASTING	RADIUS	LENGTH	DELTA	DIRECTION
	POB	0+00.00	13838479.94	3164466.34				
	PC	0+00.00	13838479.94	3164466.34				
	PC	0+00.00	13838479.94	3164466.34				
	PI	--	13838520.13	3164408.00	100.00	123.28	70°37'56"	RIGHT
	CC		13838562.29	3164523.07				
	PT	1+23.28	13838588.50	3164426.57				
	PT	1+23.28	13838588.50	3164426.57				
	PC	1+23.28	13838588.50	3164426.57				
	PC	1+23.28	13838588.50	3164426.57				
	PI	--	13838693.36	3164455.05	300.00	208.50	39°49'14"	LEFT
	CC		13838667.13	3164137.05				
	PT	3+31.78	13838792.14	3164409.77				
	PT	3+31.78	13838792.14	3164409.77				
	PC	3+31.78	13838792.14	3164409.77				
	PC	3+31.78	13838792.14	3164409.77				
	PI	--	13838826.29	3164394.11	200.00	74.27	21°16'38"	RIGHT
	CC		13838875.48	3164591.58				
	PT	4+06.05	13838863.79	3164391.92				
	POE	4+06.05	13838863.79	3164391.92				

DMPA WEST ACCESS ROAD ALIGNMENT

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

CURVE NO.	POINT	STATION	NORTHING	EASTING	RADIUS	LENGTH	DELTA	DIRECTION
	POB	0+00.00	13838337.93	3164513.87				
	PC	0+66.55	13838404.33	3164509.38				
	PC	0+66.55	13838404.33	3164509.38				
	PI	--	13838516.99	3164501.77	100.00	169.20	96°56'38"	LEFT
	CC		13838397.59	3164409.61				
	PT	2+35.75	13838495.81	3164390.86				
	PT	2+35.75	13838495.81	3164390.86				
	PC	3+29.78	13838478.18	3164298.50				
	PC	3+29.78	13838478.18	3164298.50				
	PI	--	13838470.20	3164256.72	200.00	83.82	24°00'43"	RIGHT
	CC		13838674.63	3164260.99				
	PT	4+13.60	13838479.92	3164215.31				
	PT	4+13.60	13838479.92	3164215.31				
	PC	6+44.62	13838532.68	3163990.39				
	PC	6+44.62	13838532.68	3163990.39				
	PI	--	13838539.21	3163962.57	200.00	56.76	16°15'40"	LEFT
	CC		13838337.97	3163944.71				
	PT	7+01.38	13838537.68	3163934.04				
	POE	7+01.38	13838537.68	3163934.04				

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: ____ DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

ALIGNMENT DATA E2 CLINTON

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N.McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-002

SHEET NO. G-004 REV. NO. B

95% REVIEW

VALUES TO BE UPDATED AT FINAL SUBMITTAL

PERIMETER DIKE ALIGNMENT DATA

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

CURVE NO.	POINT	STATION	NORTHING	EASTING	RADIUS	LENGTH	DELTA	DIRECTION
	POB	0+00.00	13841621.22	3191848.28				
	PC	34+30.45	13840961.63	3195169.29				
	PI	36+30.30	13840711.55	3195362.76	200'	314.01'	89°57'27"	RIGHT
	PT	37+44.46	13840518.03	3195312.83				
	PC	58+42.34	13838486.70	3194788.66				
	PI	60+92.50	13838244.47	3194726.15	250'	392.86'	90°02'14"	RIGHT
	PT	62+35.20	13838307.13	3194483.97				
	PC	64+87.04	13838370.22	3194240.15				
	PI	67+34.44	13838432.19	3194000.64	250'	390.09'	89°24'05"	LEFT
	PT	68+77.12	13838193.33	3193936.17				
	PC	76+81.00	13837417.23	3193726.69				
	PI	78+40.26	13837263.47	3193685.19	250'	283.61'	64°59'55"	RIGHT
	PT	79+64.61	13837236.10	3193528.30				
	PC	83+13.93	13837176.06	3193184.18				
	PI	83+80.20	13837164.67	3193118.90	250'	129.56'	29°41'32"	LEFT
	PT	84+43.48	13837122.44	3193067.83				
	PC	91+07.67	13836699.17	3192555.98				
	PI	91+97.65	13836641.83	3192486.64	250'	172.74'	39°35'20"	RIGHT
	PT	92+80.41	13836641.83	3192396.67				
	PC	96+44.18	13836641.83	3192032.89				
	PI	99+47.77	13836641.83	3191729.31	300'	474.80'	90°40'31"	RIGHT
	PT	101+18.98	13836945.40	3191732.91				
	PC	109+16.51	13837742.86	3191742.39				
	PI	109+57.82	13837784.18	3191742.88	250'	81.89'	18°46'04"	LEFT
	PT	109+98.40	13837823.45	3191730.06				
	PC	110+54.09	13837876.39	3191712.77				
	PI	110+86.69	13837907.38	3191702.64	250'	64.84'	14°51'36"	RIGHT
	PT	111+18.93	13837939.93	3191700.81				
	PI	121+42.63	13838962.01	3191643.18				
	PC	126+06.57	13839425.95	3191643.13				
	PI	130+03.97	13839823.35	3191643.08	11477.17'	794.49'	3°57'58"	LEFT
	PT	134+01.06	13840219.80	3191615.55				
	PC	145+45.88	13841361.87	3191536.23				
	PI	148+93.06	13841708.21	3191512.18	250'	473.35'	108°29'04"	RIGHT
	PT & POE	168+86.11	13841621.22	3191848.28				

TIME: 7-25-20 - 5:45pm User: JBURD DWG: C:\pwworking\central01\d1796030\2010-HSC00_G_C_BS-SEG2-4.dwg

PORT OF HOUSTON AUTHORITY, TEXAS

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE 8

SHEET TITLE:

SEGMENT 4
BOGGY BAYOU TO HUNTING BAYOU TURNING BASIN
E2 CLINTON DMPA & BELTWAY 8 DMPA

ALIGNMENT DATA

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	C.LOWE
CADD:	J.BURD
CHECKER:	A.COLWELL
DATE:	12/08/2020
SCALE:	AS NOTED

DRAWING NO. C90-D13-P11-002

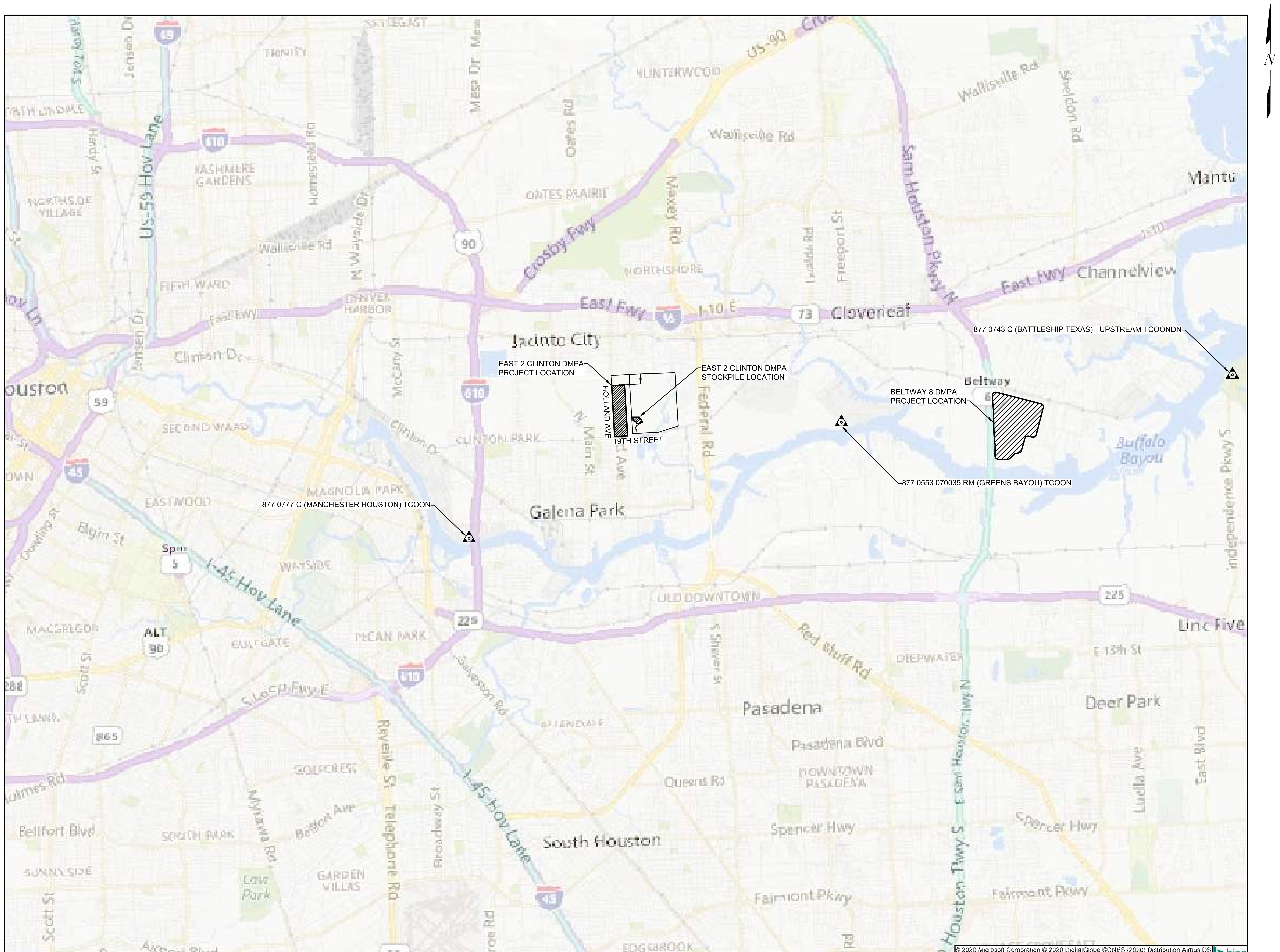
SHEET NO. G-005 REV. NO. B

BELTWAY 8 DMPA

95% REVIEW

SURVEY NOTES:

1. HORIZONTAL COORDINATES ARE REFERENCED TO TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD83 (GEOID 12B) US SURVEY FEET.
2. AERIAL PHOTOGRAPHY SHOWN ON THIS DRAWING WAS OBTAINED FROM BING MAPS/Digital Globe AND Distribution Airbus DS AND WAS FLOWN IN 2020.
3. EXCEPT AS NOTED OTHERWISE, ALL TOPOGRAPHIC AND MAGNETOMETER SURVEY DATA SHOWN ON E2 CLINTON DRAWINGS WERE OBTAINED BY FUGRO USA LAND, INC. ON DECEMBER 14, 2019.
4. ELEVATIONS ARE REFERENCED TO TEXAS SOUTH CENTRAL ZONE 4204, NAVD88 (GEOID 12B) US SURVEY FEET.



SURVEY NOTES AND SURVEY CONTROL

SCALE: 1" = 4000'

0 4000' 8000'

SURVEY CONTROL MONUMENTS

NAD 83, TEXAS SOUTH CENTRAL ZONE 4204, US SURVEY FEET

NAME	PID NO.	NORTHING (Y)	EASTING (X)	ELEV (NAVD 88)
877 077 C MANCHESTER HOUSTON TCOON	DO9988	N 13830815.26	E 3152837.53	29.27
877 0553 070035 RM GREENS BAYOU TCOON	DO9979	N 13839400.29	E 3180394.36	12.90
877 0743 C BATTLESHIP TEXAS - UPSTREAM TCOONDN	DO9987	N 13842917.12	E 3209339.21	11.10

BELTWAY 8 DMPA

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR

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TBPELS FIRM
Registration No. F-754

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PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

SURVEY NOTES AND SURVEY CONTROL

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

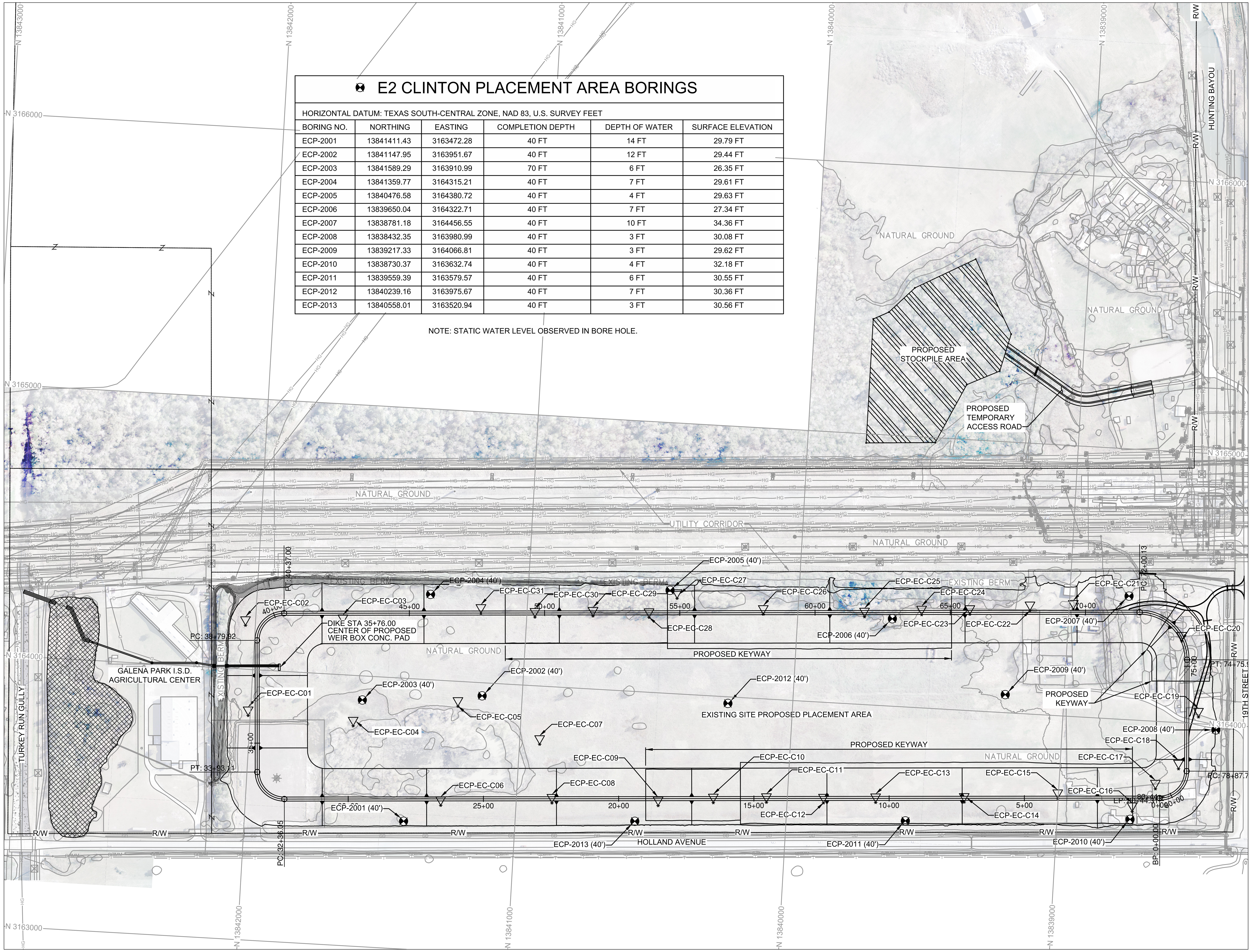
DESIGNER:	G.PENNISON
CADD:	JDL/JB
CHECKER:	N.McLELLAN
DATE:	12/08/2020
SCALE:	AS NOTED

DRAWING NO. C90-D13-P11-002

SHEET NO. V-001 REV. NO. B

95% REVIEW

TIME: 12-07-20 – 3:11pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-V-001.dwg



E2 CLINTON PLACEMENT AREA BORINGS

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

BORING NO.	NORTHING	EASTING	COMPLETION DEPTH	DEPTH OF WATER	SURFACE ELEVATION
ECP-2001	13841411.43	3163472.28	40 FT	14 FT	29.79 FT
ECP-2002	13841147.95	3163951.67	40 FT	12 FT	29.44 FT
ECP-2003	13841589.29	3163910.99	70 FT	6 FT	26.35 FT
ECP-2004	13841359.77	3164315.21	40 FT	7 FT	29.61 FT
ECP-2005	13840476.58	3164380.72	40 FT	4 FT	29.63 FT
ECP-2006	13839650.04	3164322.71	40 FT	7 FT	27.34 FT
ECP-2007	13838781.18	3164456.55	40 FT	10 FT	34.36 FT
ECP-2008	13838432.35	3163980.99	40 FT	3 FT	30.08 FT
ECP-2009	13839217.33	3164066.81	40 FT	3 FT	29.62 FT
ECP-2010	13838730.37	3163632.74	40 FT	4 FT	32.18 FT
ECP-2011	13839559.39	3163579.57	40 FT	6 FT	30.55 FT
ECP-2012	13840239.16	3163975.67	40 FT	7 FT	30.36 FT
ECP-2013	13840558.01	3163520.94	40 FT	3 FT	30.56 FT

NOTE: STATIC WATER LEVEL OBSERVED IN BORE HOLE.

1 BORING LAYOUT AND CONE PENETRATION TESTING LAYOUT

SCALE: 1" = 200'

0 200' 400'

NOTE:

1. UNDERGROUND UTILITY LINES IN UTILITY LINE CORRIDOR INCLUDE HIGH PRESSURE GAS PIPELINES.

E2 CLINTON PLACEMENT AREA CONE PENETRATIONS

HORIZONTAL DATUM: TEXAS SOUTH-CENTRAL ZONE, NAD 83, U.S. SURVEY FEET

CPT NO.	NORTHING	EASTING	SURFACE ELEVATION
ECP-EC-C01	13842007.50	3163829.78	28.94
ECP-EC-C02	13842036.40	3164162.18	29.11
ECP-EC-C03	13841677.10	3164189.63	29.75
ECP-EC-C04	13841617.69	3163813.77	25.94
ECP-EC-C05	13841235.09	3163908.64	28.70
ECP-EC-C06	13841277.75	3163539.02	30.20
ECP-EC-C07	13840925.50	3163785.29	29.86
ECP-EC-C08	13840867.67	3163571.28	29.47
ECP-EC-C09	13840475.15	3163583.92	30.49
ECP-EC-C10	13840272.13	3163606.34	30.07
ECP-EC-C11	13840076.08	3163619.01	29.78
ECP-EC-C12	13839865.38	3163628.97	29.76
ECP-EC-C13	13839672.96	3163641.52	30.77
ECP-EC-C14	13839346.16	3163661.57	29.45
ECP-EC-C15	13839001.61	3163694.90	30.14
ECP-EC-C16	13838724.06	3163662.57	29.79
ECP-EC-C17	13838643.22	3163750.90	28.34
ECP-EC-C18	13838562.09	3163829.71	29.62
ECP-EC-C19	13838499.27	3164025.40	34.60
ECP-EC-C20	13838577.32	3164302.27	34.42
ECP-EC-C21	13838984.22	3164397.09	27.55
ECP-EC-C22	13839143.83	3164382.42	25.31
ECP-EC-C23	13839364.92	3164356.24	27.59
ECP-EC-C24	13839542.80	3164344.16	28.30
ECP-EC-C25	13839753.19	3164324.68	28.45
ECP-EC-C26	13840127.54	3164312.61	30.39
ECP-EC-C27	13840449.01	3164353.04	29.12
ECP-EC-C28	13840548.42	3164276.82	29.15
ECP-EC-C29	13840755.58	3164270.14	29.31
ECP-EC-C30	13840969.71	3164253.71	29.34
ECP-EC-C31	13841169.91	3164256.78	29.16

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

BORING LAYOUT AND CONE PENETRATION TESTING LAYOUT

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAN
DATE:	12/08/2020
SCALE:	AS NOTED

DRAWING NO. C90-D13-P11-002

SHEET NO. B-001 REV. NO. B

E2 CLINTON DMPA

95% REVIEW

TIME: 12-08-20 – 3:20pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-001.dwg

BORING LOGS ECP-2001 THRU ECP-2007

PAGE 1 OF 1

LOG OF BORING ECP-2001

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841411.43; E: 3163472.28
DEPTH OF WATER: 14 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 29.79 FT
DATE: 1/27/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 25 FT
WET ROTARY: 25 TO 40 FT

UNDRAINED SHEAR STRENGTH, TSF: ○ HAND PENETROMETER; ● UNCONFINED COMPRESSION; ■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION; △ TORVANE (0.5 1.0 1.5 2.0 2.5)

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Firm to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ sand pockets at 0'-2' -w/ sand seams at 0'-10'		96.4		29	53	17	36
			88	26			
-w/ ferrous stains at 8'-10' -w/ calcareous nodules at 8'-14'			104	22			
				23			
			100	24			
				22			
			105	23			
Stiff, reddish brown and gray, LEAN CLAY WITH SAND (CL)		74.5		16	27	16	11
Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ sand seams at 23'-25' -w/ ferrous stains and calcareous nodules at 23'-25'		89.7	101	27	70	35	35
				15			
-w/ calcareous nodules at 33'-35'			109	20			
-w/ calcareous nodules at 38'-40'				20			

Remarks: Groundwater was encountered at 14' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-30

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 1

LOG OF BORING ECP-2002

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841147.95; E: 3163951.67
DEPTH OF WATER: 12 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 29.44 FT
DATE: 1/27/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 18 FT
WET ROTARY: 18 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Firm to stiff, gray and brown, FAT CLAY WITH SAND (CH) -w/ roots at 0'-2'		83.6		26	55	15	40
			104	22			
				20			
Stiff to very stiff, reddish brown and gray, LEAN CLAY WITH SAND (CL) -w/ ferrous stains at 10'-12' -w/ calcareous nodules at 10'-14'		71.6	112	20	42	22	20
-w/ sand pockets at 14'-16'		77.7		21	32	12	20
-w/ calcareous nodules at 18'-20'			119	15			
			106	22	38	17	21
		84.2	116	16	39	13	26
				17	47	19	28
				19			

Remarks: Groundwater was encountered at 12' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-31

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 2

LOG OF BORING ECP-2003

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841589.29; E: 3163910.99
DEPTH OF WATER: 6 FT
COMPLETION DEPTH: 70 FT
OFFSET: N/A
SURFACE ELEVATION: 26.35 FT
DATE: 1/27/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Firm to stiff, gray and dark gray, FAT CLAY (CH) -w/ roots at 0'-2'		87.7	99	23	60	16	44
			103	22			
-w/ calcareous nodules at 4'-6'							
Stiff to very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ calcareous nodules at 8'-20'		71.5	102	26	36	13	23
			119	15			
			115	17			
Very stiff, gray and reddish brown, FAT CLAY WITH SAND (CH)		76.2		23	53	14	39
Very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL)		79.6		17	35	11	24
-w/ ferrous stains at 28'-30'			113	17			
Stiff to very stiff, gray and reddish brown, FAT CLAY WITH SAND (CH)		83.4		18	50	14	36

Remarks: Groundwater was encountered at 6' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-32

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 2 OF 2

LOG OF BORING ECP-2003

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841589.29; E: 3163910.99
DEPTH OF WATER: 6 FT
COMPLETION DEPTH: 70 FT
OFFSET: N/A
SURFACE ELEVATION: 26.35 FT
DATE: 1/27/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Stiff to very stiff, gray and reddish brown, FAT CLAY WITH SAND (CH) [Continued...] -w/ sandstones at 43'-45'		83.9		16	57	33	24
			113	21			
Very dense, reddish brown, SANDY SILT (ML)	76	50.0		23	NP	NP	NP
Very stiff to hard, reddish brown, FAT CLAY (CH)		94.9	111	21	66	34	32
Stiff to hard, reddish brown, SILTY CLAY (CL-ML)	13	96.9		10	27	20	7
-w/ sand seams at 69'-70'	48						

Remarks: Groundwater was encountered at 6' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-32

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 1

LOG OF BORING ECP-2004

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841359.77; E: 3164315.21
DEPTH OF WATER: 7 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 29.61 FT
DATE: 1/27/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 8 FT
WET ROTARY: 8 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Firm to stiff, gray, reddish brown and brown, LEAN CLAY WITH SAND (CL)		76.8		23	44	13	31
			86	35			
Firm to stiff, gray and reddish brown, FAT CLAY (CH)		99.1		36	72	18	54
-w/ ferrous stains at 10'-14' -w/ calcareous nodules at 10'-16'			106	20			
Stiff to hard, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ calcareous nodules at 16'-18'		76.7	109	19	49	23	26
-w/ calcareous nodules at 23'-25'				18	38	17	21
			115	15			
		79.7		16	47	19	28

Remarks: Groundwater was encountered at 7' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-33

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 1

LOG OF BORING ECP-2005

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13840476.58; E: 3164380.72
DEPTH OF WATER: 4 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 29.63 FT
DATE: 1/28/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 4 FT
WET ROTARY: 6 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Firm, dark gray and brown, FAT CLAY (CH) -w/ roots at 0'-2'		95.3		31	74	21	53
Very soft, brown, LEAN CLAY WITH SAND (CL)	WOH						
	WOH	83.5		31	33	16	17
Very soft to very stiff, brown and gray, FAT CLAY (CH) -w/ gasoline odor at 6'-10' -w/ silt seams at 8'-10'		97.8		38	74	16	58
-w/ calcareous nodules at 10'-12'			110	19			
-w/ sand pockets at 12'-14'							
Very stiff, gray and reddish brown, SANDY LEAN CLAY (CL)		57.7		20	24	16	8
-w/ calcareous nodules at 16'-18'		65.4	113	17	35	18	17
Very stiff to hard, gray, brown and reddish brown, LEAN CLAY WITH SAND (CL) -w/ calcareous nodules at 18'-20'							
-w/ calcareous nodules at 23'-25'			118	15			
			117	16			
		83.0		16	41	12	29
-w/ calcareous nodules at 38'-40'				19			

Remarks: Groundwater was encountered at 4' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-34

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 1

LOG OF BORING ECP-2006

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839650.04; E: 3164322.71
DEPTH OF WATER: 7 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 27.34 FT
DATE: 1/28/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 8 FT
WET ROTARY: 8 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Soft to stiff, brown and dark gray, LEAN CLAY (CL)				21			
-w/ roots at 0'-2' -w/ silt seams at 2'-6'		99.5		28	32	20	12
			94	32			
				36			
				18	48	14	34
Stiff to very stiff, gray and reddish brown, FAT CLAY WITH SAND (CH) -w/ calcareous nodules at 10'-12' -w/ sand pockets at 12'-14'		82.0	112	18	54	14	40
Firm to very stiff, gray and reddish brown, LEAN CLAY (CL) -w/ calcareous nodules at 14'-18' -w/ sand seams at 16'-18'		86.7		19	45	13	32
-w/ sand pockets at 18'-20'				15			
Very stiff to hard, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ sand seams at 23'-25'				14			
		78.1		14	33	12	21
			115	16			
			112	19			
-w/ calcareous nodules at 38'-40'				26			

Remarks: Groundwater was encountered at 7' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-35

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

PAGE 1 OF 1

LOG OF BORING ECP-2007

PROJECT: HSC Expansion-E2 Clinton Placement Area
PROJECT NO.: HG1910092.2.1
LOCATION: N: 13838781.18; E: 3164456.55
DEPTH OF WATER: 10 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 34.36 FT
DATE: 1/29/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 12 FT
WET ROTARY: 12 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
Stiff to very stiff, brown, SANDY LEAN CLAY (CL) -w/ roots at 0'-2' -w/ gravel at 2'-4'							
Very loose to medium dense, brown and gray, SILTY CLAYEY SAND (SC-SM)	20						
		34.3		11	20	13	7
	8						
				20			
	2						
				17			
Firm to very stiff, gray and reddish brown, LEAN CLAY (CL) -w/ sand seam at 12'-14'		92.2		22	40	13	27
			106	23			
-w/ calcareous nodules at 18'-20'				18			
Very soft to very stiff, reddish brown and gray, SANDY LEAN CLAY (CL) -w/ calcareous nodules at 23'-25'		68.6		18	41	13	28
				18			
Very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL)		79.6	107	21	45	23	22
				13			

Remarks: Groundwater was encountered at 10' during drilling operations.

Drilled By: CH Logged By: Edgar HVJ Associates PLATE A-36

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

NOTE:

BORING LOGS DATED □ANUARY 27, 2020 THROUGH □ANUARY 29, 2020 ARE PROVIDED BY HV□ASSOCIATES. FOR INFORMATION ONLY.

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:
DESIGN PREPARED BY:
HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:
This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes.
95% REVIEW

APPROVED: DATE
PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:
HOUSTON SHIP CHANNEL (HSC)
EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE # 8

SHEET TITLE:
SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA
BORING LOGS ECP-2001 THRU ECP-2007 SHEET 1 OF 2

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-002
SHEET NO. B-002
REV. NO. B

95% REVIEW

TIME: 12-07-20 – 4:04pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-002.dwg

BORING LOGS ECP-2008 THRU ECP-2013

LOG OF BORING ECP-2008

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13838432.35; E: 3163980.99
DEPTH OF WATER:3 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 30.08 FT — DATE: 1/29/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 4 FT
WET ROTARY: 4 TO 40 FT

DESCRIPTION OF MATERIAL:
- Loose, dark gray and brown, SILTY SAND (SM) -w/ gravel and shells at 0'-6'
- Soft to stiff, brown and gray, FAT CLAY WITH SAND (CH) -w/ shells at 6'-8' -w/ ferrous stains at 12'-14' -w/ calcareous nodules at 12'-14'
- Stiff to very stiff, gray and reddish brown, FAT CLAY (CH) -w/ ferrous stains at 14'-20' -w/ calcareous nodules at 14'-20'
- Soft to very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ sand pockets at 33'-35' -w/ ferrous stains at 38'-40' -w/ calcareous nodules at 38'-40'

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
			13			
6						
	32.1		23	18	16	2
	71.0		36	54	17	37
		105	23			
	90.8		29	76	21	55
		112	17			
		104	22			
	79.6		18	24	12	12
		112	19			
	78.8			40	18	22
			16			

UNDRAINED SHEAR STRENGTH, TSF: ○ HAND PENETROMETER; ● UNCONFINED COMPRESSION; ■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION; △ TORVANE (0.5 1.0 1.5 2.0 2.5)

Remarks: Groundwater was encountered at 3' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-37

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

LOG OF BORING ECP-2009

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839217.33; E: 3164066.81
DEPTH OF WATER:3 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 26.92 FT — DATE: 1/28/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 4 FT
WET ROTARY: 4 TO 40 FT

DESCRIPTION OF MATERIAL:
- Very soft to very stiff, gray and brown, SANDY LEAN CLAY (CL) -w/ sand pockets at 6'-8'
- Stiff to very stiff, gray and brown, LEAN CLAY WITH SAND (CL)
- Stiff to very stiff, gray and reddish brown, SANDY LEAN CLAY (CL)
- Soft to stiff, gray and reddish brown, SILTY CLAY WITH SAND (CL-ML)
- Stiff to hard, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ ferrous stains at 23'-25' -w/ calcareous nodules at 38'-40'

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	68.6		21	25	17	8
WOH						
	69.8		23	26	12	14
		110	20			
	74.6	110	19	44	15	29
		112	17			
	62.3			25	17	8
	70.1		16	18	12	6
	79.2		18	28	11	17
		114	19			
			19			

Remarks: Groundwater was encountered at 3' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-38

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

LOG OF BORING ECP-2010

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13838730.37; E: 3163632.74
DEPTH OF WATER:4 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 32.18 FT — DATE: 1/29/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 6 FT
WET ROTARY: 6 TO 40 FT

DESCRIPTION OF MATERIAL:
- Very loose, brown, SILTY SAND (SM) -w/ roots at 0'-2' -w/ clay seams at 6'-8' -w/ gasoline odor at 6'-8'
- Very soft to very stiff, gray and reddish brown, FAT CLAY (CH) -w/ gasoline odor at 8'-10' -w/ roots at 10'-12' -w/ ferrous stains at 10'-12' -w/ ferrous stains at 14'-18' -w/ sand seams at 23'-40'

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
			13			
WOH						
	20.1		20	NP	NP	NP
WOH						
WOH						
			37			
		68	56			
	92.7		33	83	20	63
		96	29			
	94.0		25	69	20	49
	98.9		23	60	18	42
		118	16			
		115	17			
			16			

Remarks: Groundwater was encountered at 4' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-39

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

LOG OF BORING ECP-2011

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839559.39; E: 3163579.57
DEPTH OF WATER:6 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 30.55 FT — DATE: 1/29/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 8 FT
WET ROTARY: 8 TO 40 FT

DESCRIPTION OF MATERIAL:
- Very soft to firm, dark gray and brown, FAT CLAY (CH) -w/ roots at 0'-4'
- Soft to very stiff, gray and reddish brown, FAT CLAY WITH SAND (CH) -w/ gasoline odor at 6'-8' -w/ sand pockets at 14'-16'
- Brown and gray, CLAYEY SAND (SC)
- Very stiff, reddish brown, FAT CLAY (CH)
- Soft to very stiff, gray and reddish brown, SANDY LEAN CLAY (CL)

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	87.4		33	65	20	45
	51.3		22			
			29			
	80.2		36	100	22	78
		113	17			
			14			
	48.3		20	24	16	8
24	95.4		24	58	16	42
	68.9		20	28	11	17
			12			
			16			

Remarks: Groundwater was encountered at 6' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-40

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

LOG OF BORING ECP-2012

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13840239.16; E: 3163975.67
DEPTH OF WATER:7 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 30.36 FT — DATE: 1/28/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 8 FT
WET ROTARY: 8 TO 40 FT

DESCRIPTION OF MATERIAL:
- Soft to firm, gray and brown, FAT CLAY (CH)
- Soft to very stiff, gray and brown, FAT CLAY WITH SAND (CH) -w/ silt seams at 4'-6'
- Medium dense, gray and reddish brown, CLAYEY SAND (SC)
- Very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ ferrous stains at 28'-30' -w/ calcareous nodules at 28'-30'
- Very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ calcareous nodules at 38'-40'

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	96.1		38	74	26	48
	84.5	74	48	83	29	54
		103	22	51	17	34
	44.2		16	44	13	31
16						
	86.3	111	18	42	15	27
		116	16			
			15			
	84.0		16	44	13	31
			17			

Remarks: Groundwater was encountered at 7' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-41

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

LOG OF BORING ECP-2013

PAGE 1 OF 1

PROJECT: HSC Expansion-E2 Clinton Placement Area — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13840558.01; E: 3163520.94
DEPTH OF WATER:3 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: 30.56 FT — DATE: 1/29/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: 0 TO 4 FT
WET ROTARY: 4 TO 40 FT

DESCRIPTION OF MATERIAL:
- Firm, dark gray and reddish brown, FAT CLAY WITH SAND (CH)
- Firm to stiff, gray and brown, SANDY SILTY CLAY (CL-ML)
- Stiff to very stiff, gray and reddish brown, FAT CLAY (CH) -w/ sand seams at 8'-10' -w/ ferrous stains at 10'-16' -w/ calcareous nodules at 12'-20'
- Stiff to very stiff, gray and reddish brown, LEAN CLAY WITH SAND (CL) -w/ calcareous nodules at 38'-40'

STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	84.6		32	67	22	45
	60.6		26	23	17	6
		103	24			
	88.8		25	61	15	46
		102	24			
	97.3		22	60	18	42
	73.7		17	34	11	23
		112	19			
			16			
			17			

Remarks: Groundwater was encountered at 3' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates — PLATE A-42

COH HG1910092.2.1 - E. CLINTON DRIVE.GPJ 5/5/20

NOTE:
BORING LOGS DATED JANUARY 28, 2020 AND JANUARY 29, 2020 ARE PROVIDED BY HVJ ASSOCIATES. FOR INFORMATION ONLY.

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT: DESIGN PREPARED BY: HDR Engineering, INC TBPELS FIRM Registration No. F-754

SEAL: This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes. 95% REVIEW

APPROVED: DATE
PORT CONTRACT REPRESENTATIVE MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE: HOUSTON SHIP CHANNEL (HSC) EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP) PROJECT 11: PACKAGE # 8

SHEET TITLE: SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA BORING LOGS ECP-2008 THRU ECP-2013 SHEET 2 OF 2

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

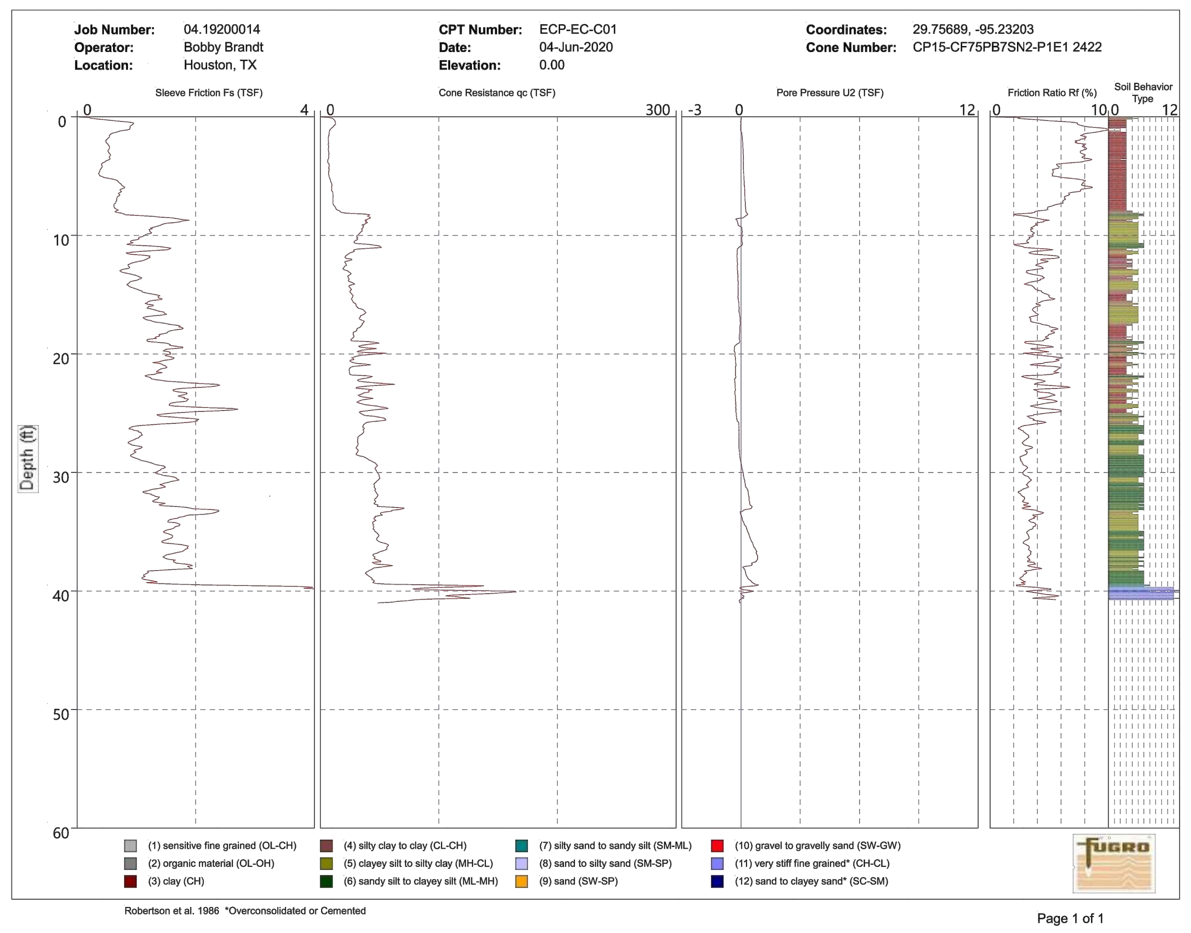
DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

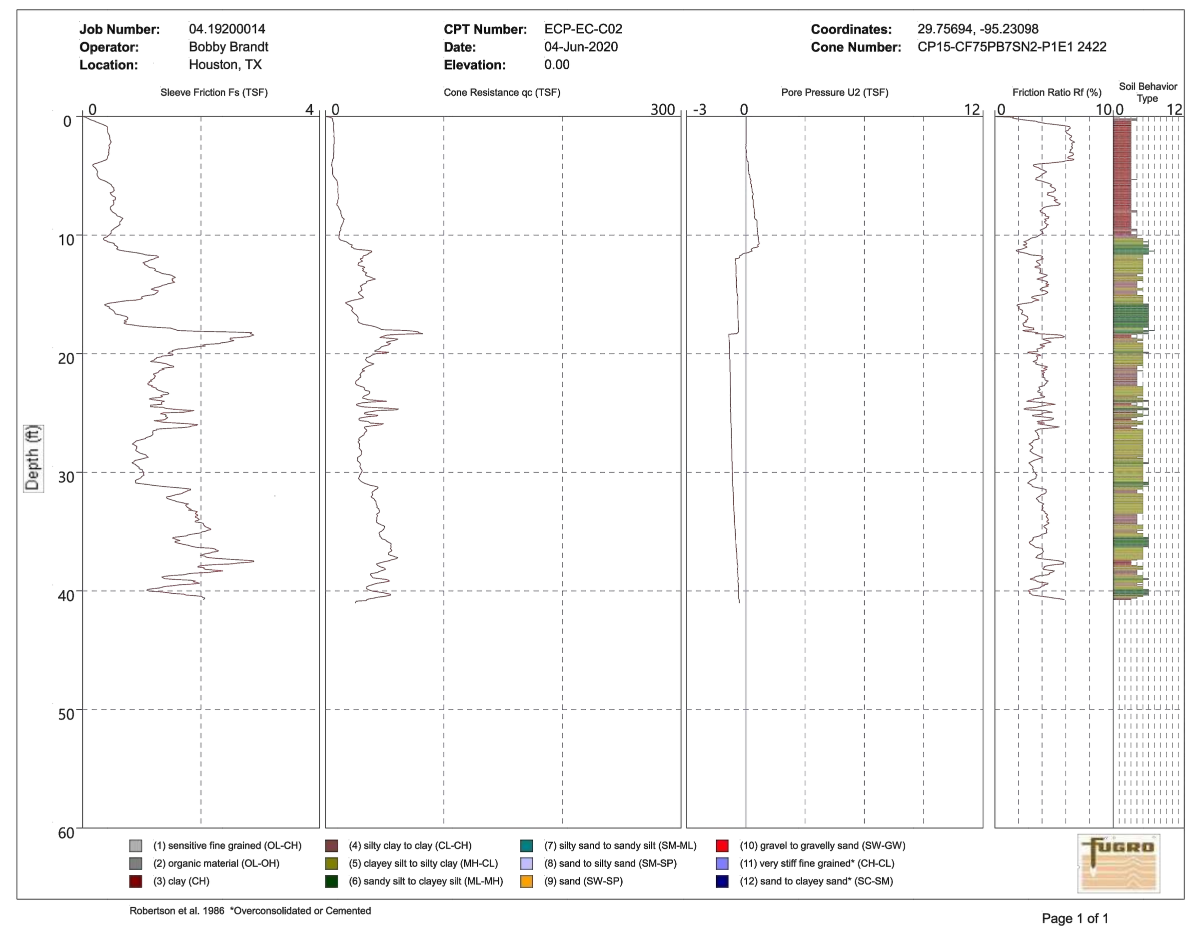
DRAWING NO. C90-D13-P11-002
SHEET NO. B-003 REV. NO. B

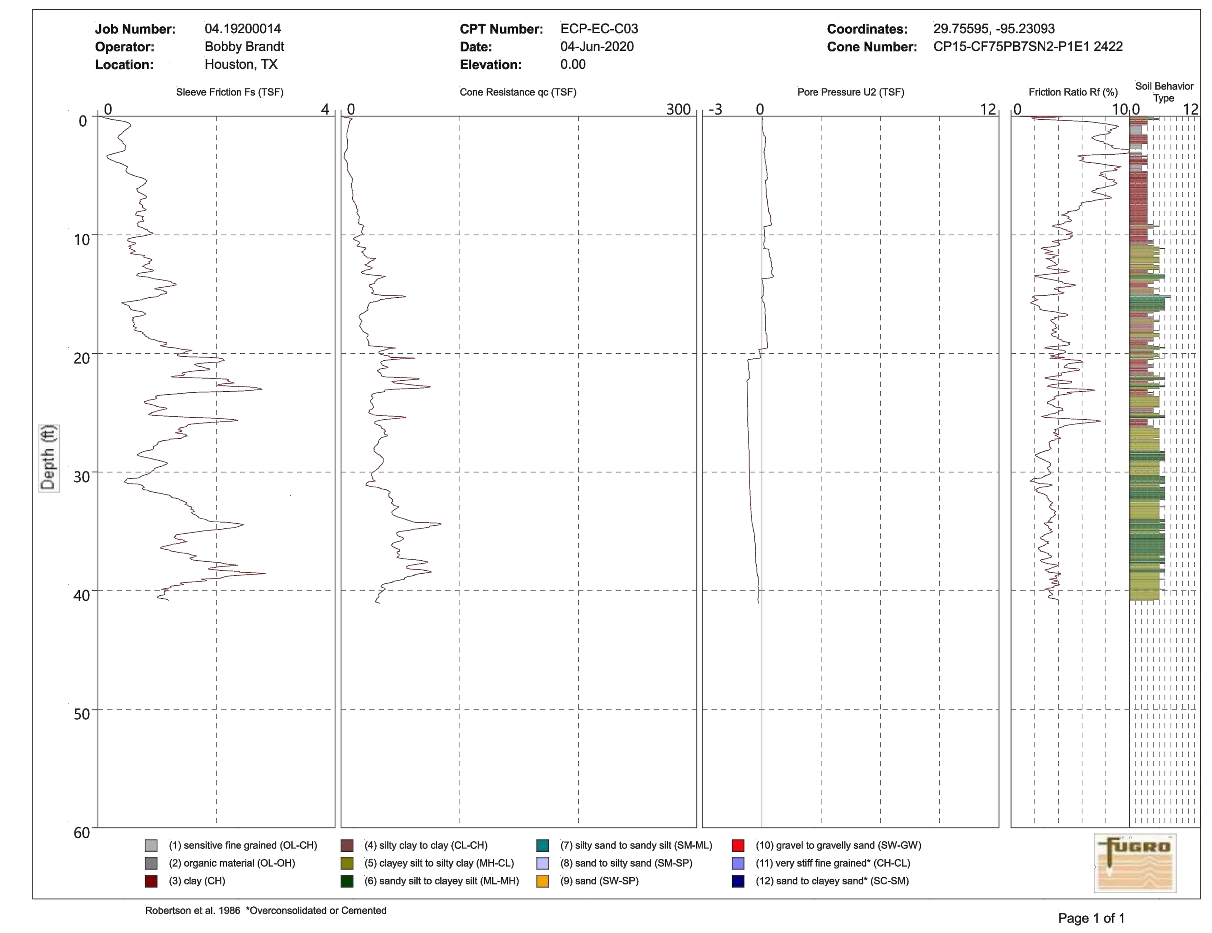
95% REVIEW

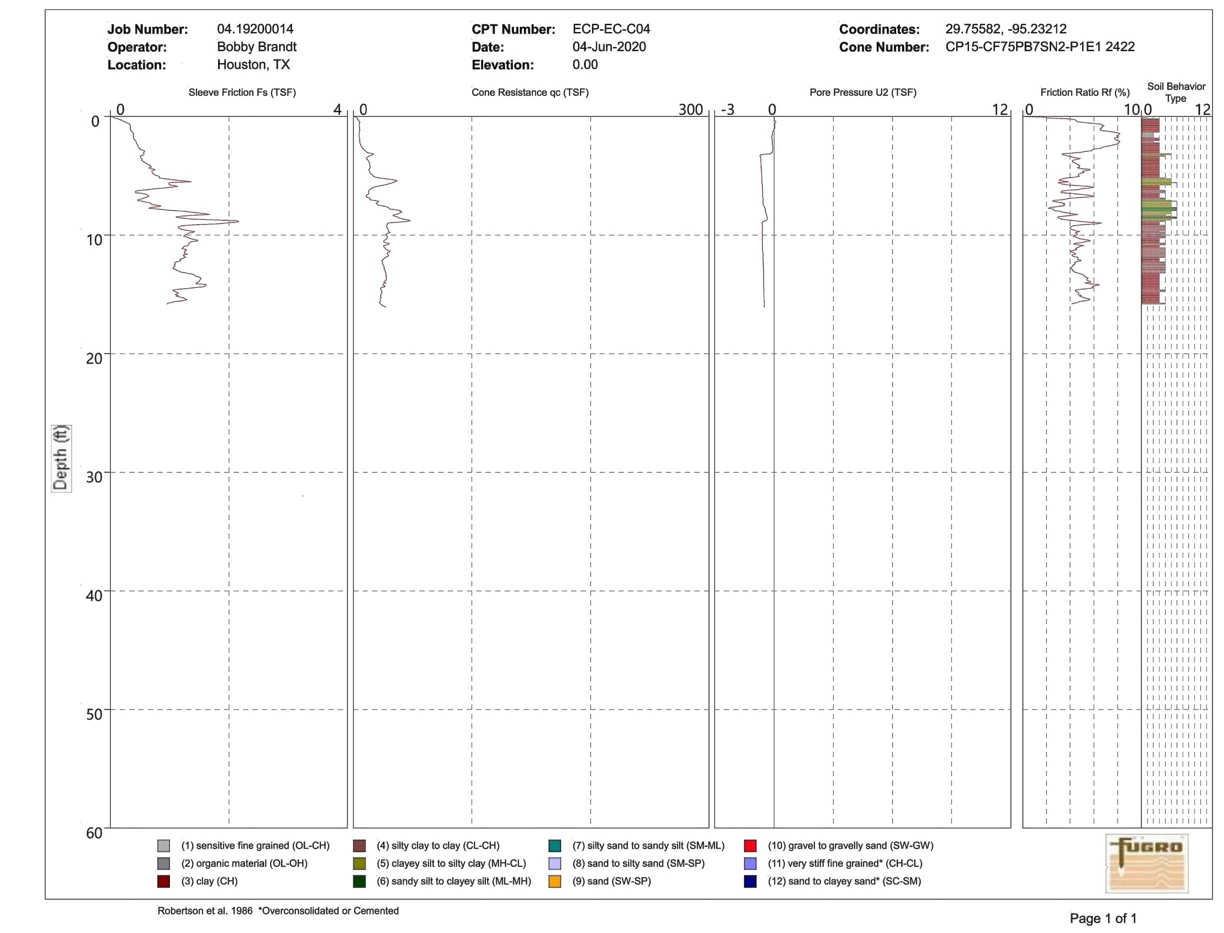
TIME: 12-07-20 – 4:13pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-003.dwg

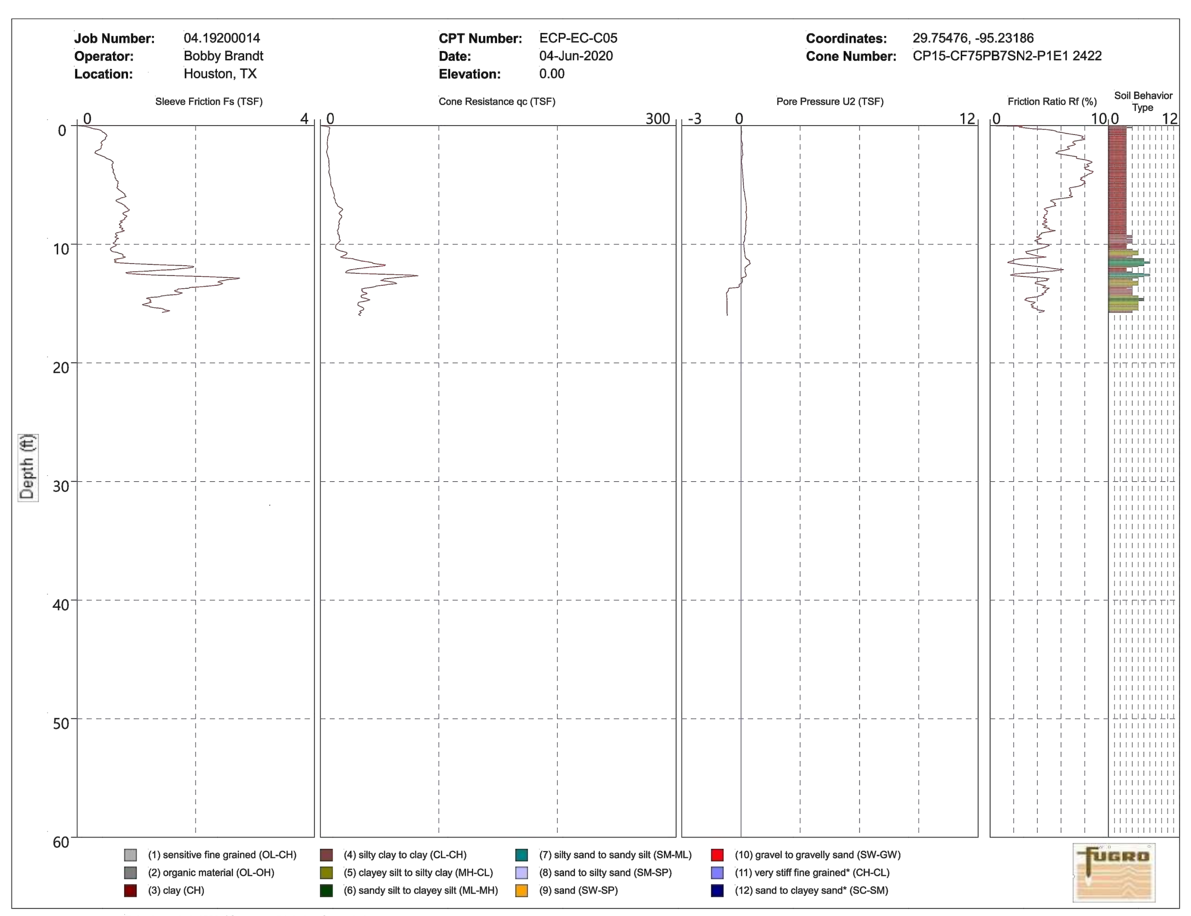
CONE PENETRATION LOGS - ECP-EC-C01 THRU ECP-EC-C012

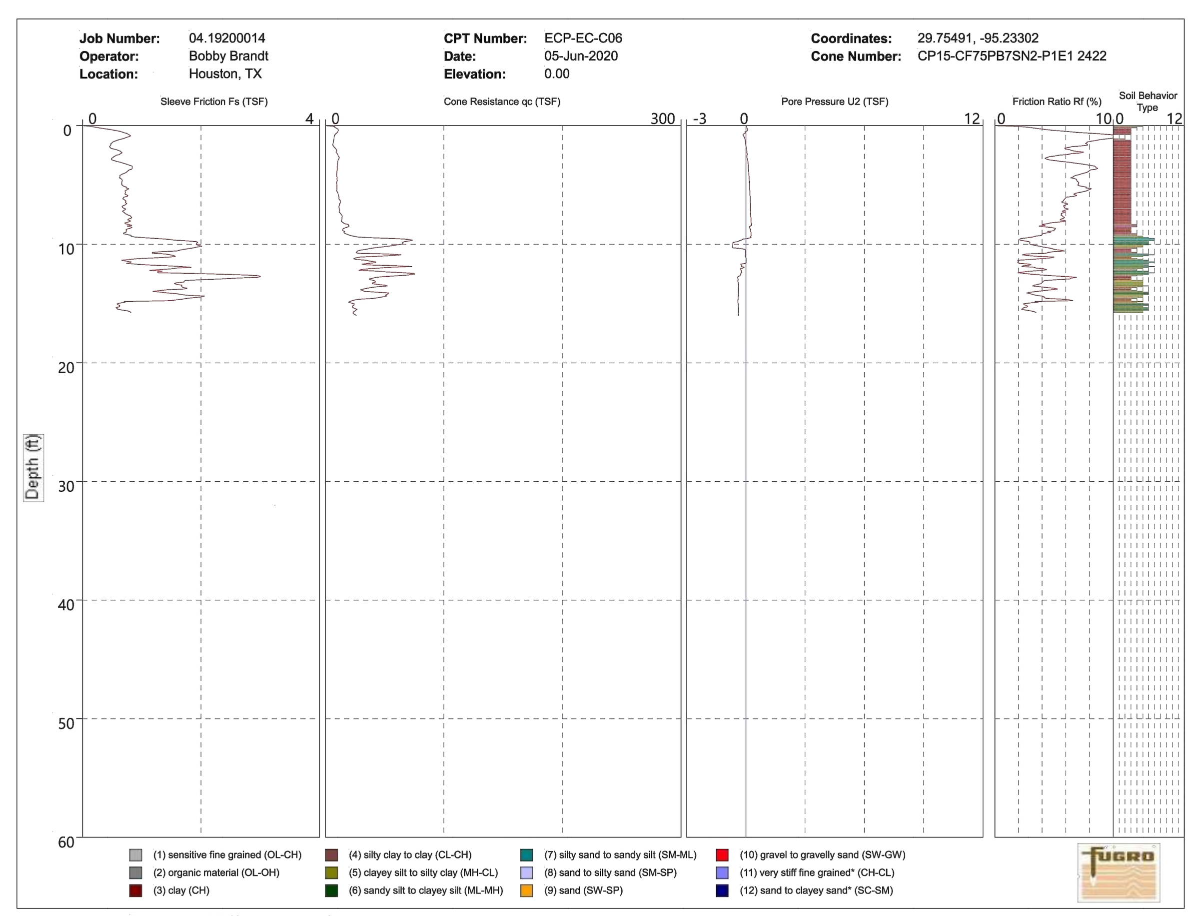


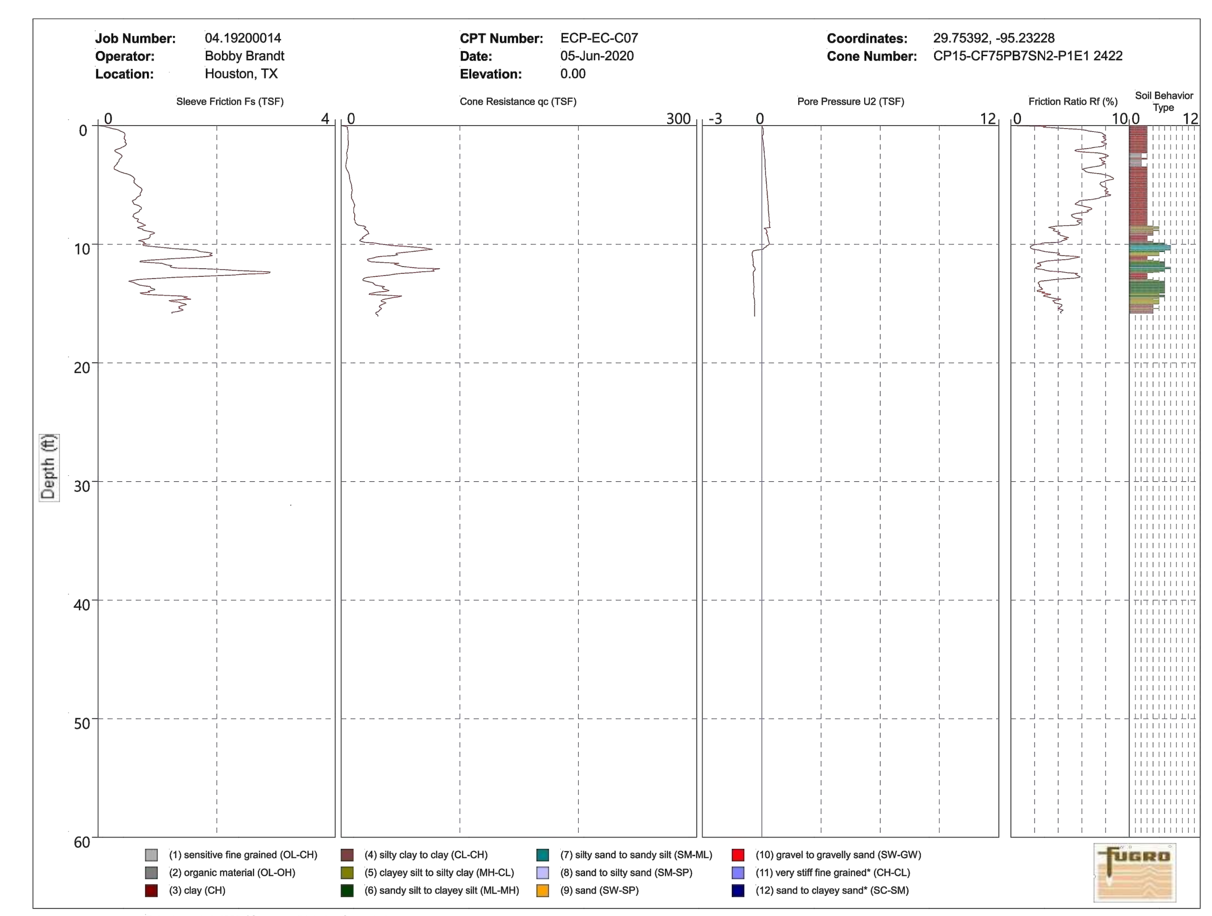


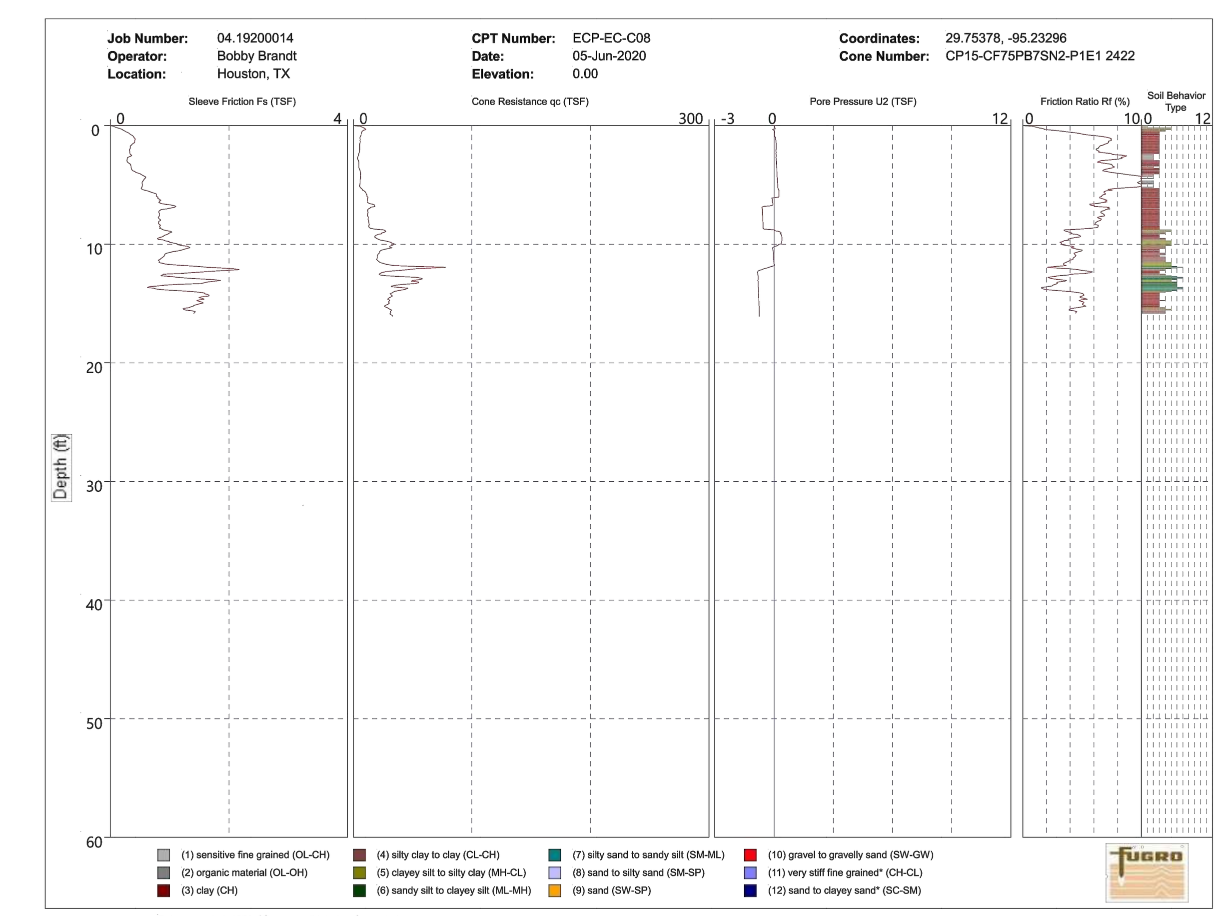


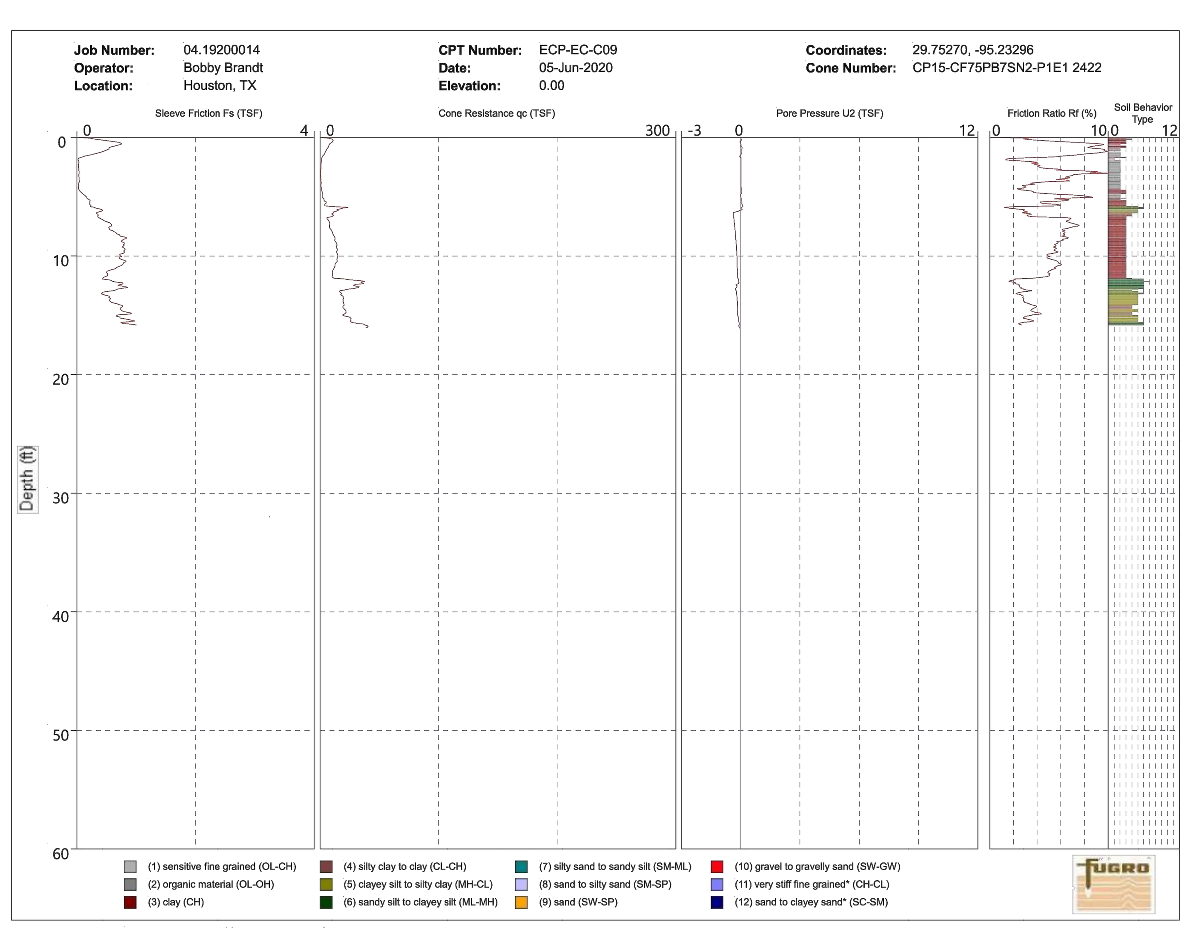


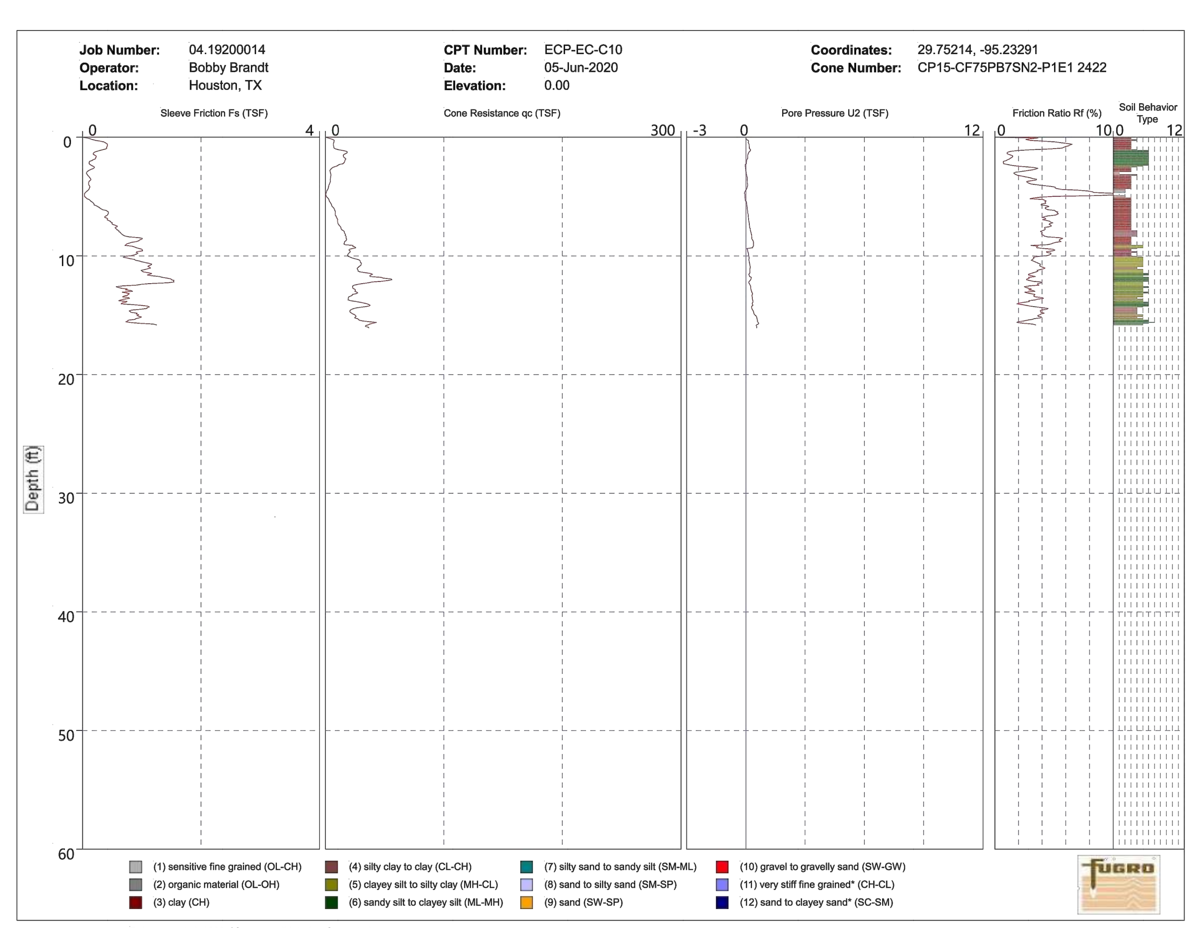


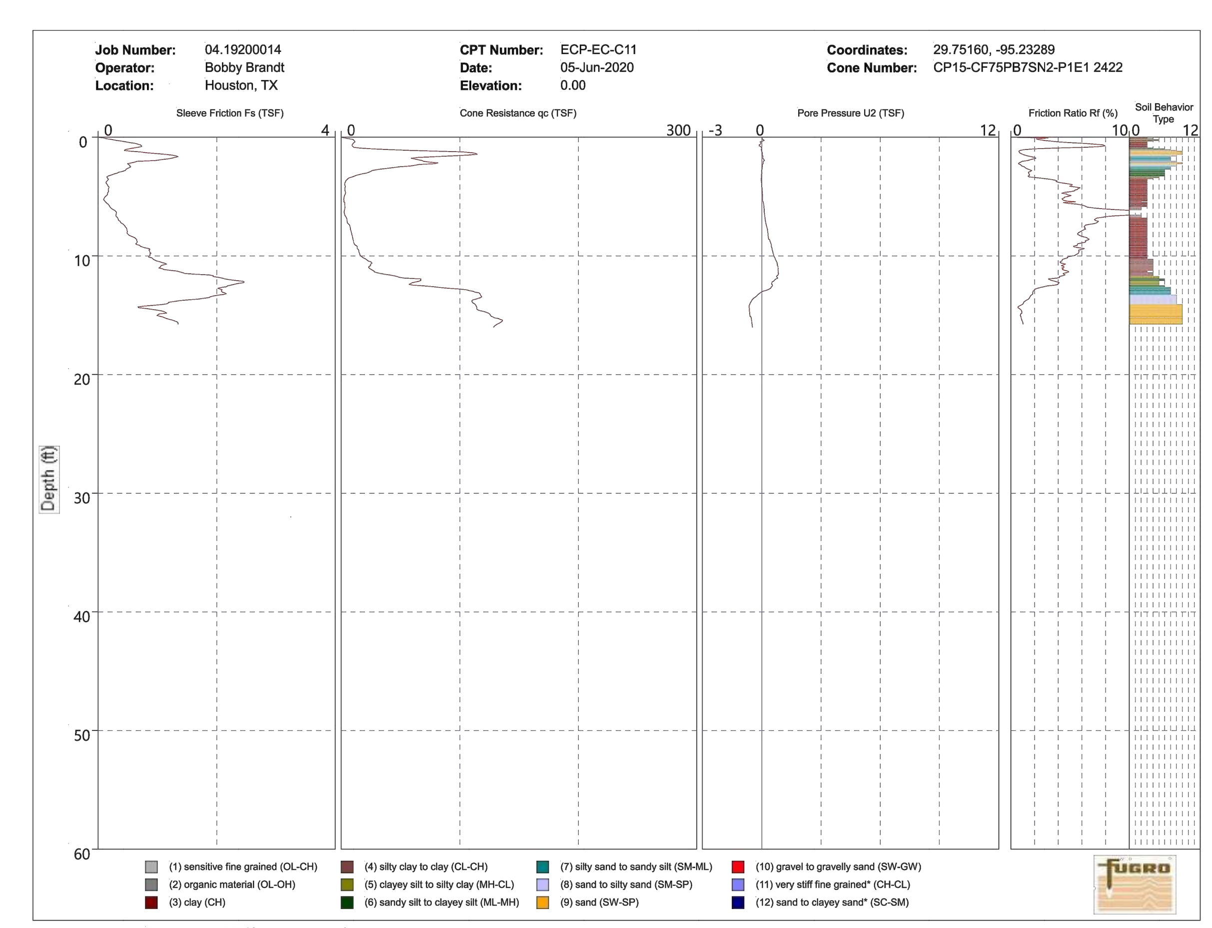


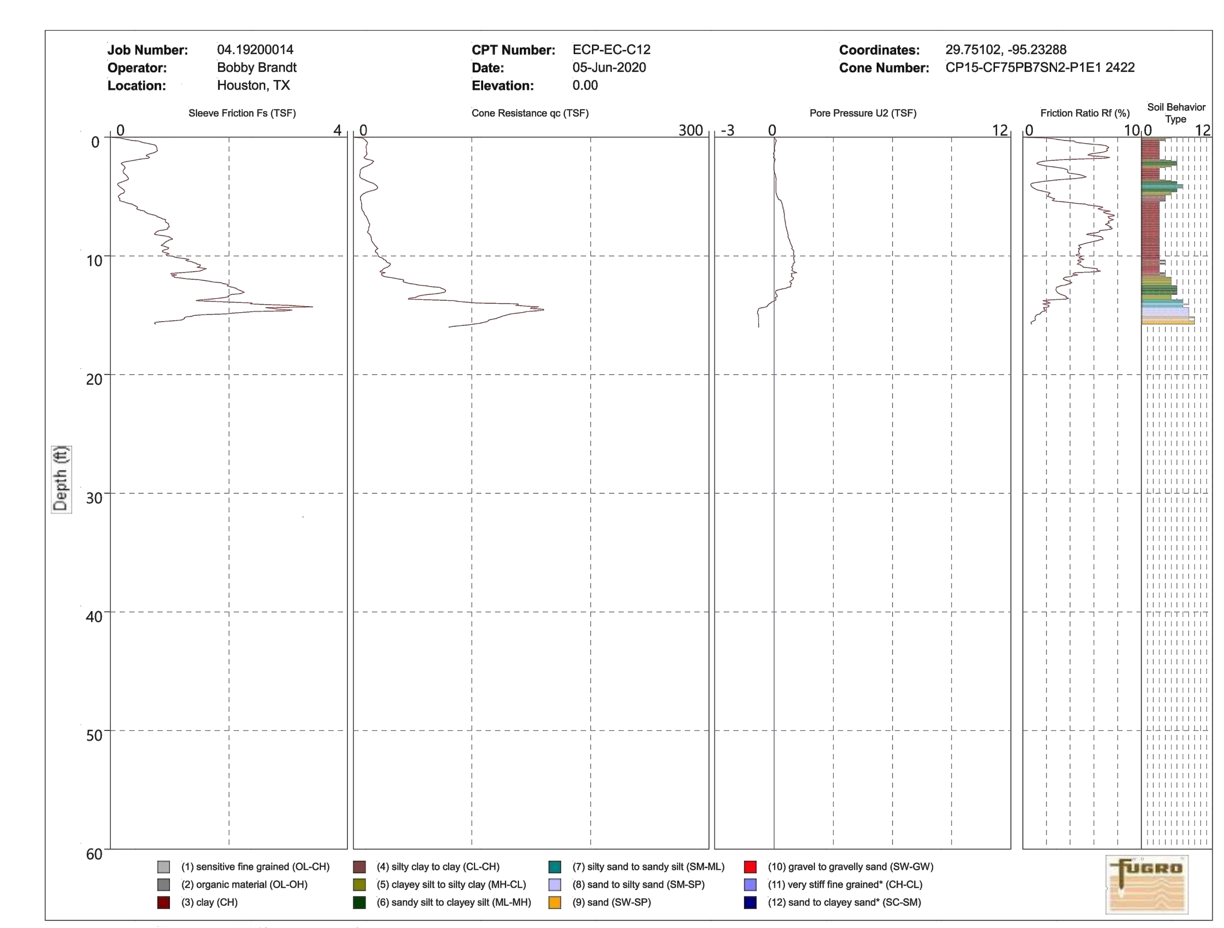












NOTE:

CONE PENETRATION LOGS DATED JUNE 04, 2020 THROUGH JUNE 06, 2020 ARE PROVIDED BY FUGRO USA. FOR INFORMATION ONLY.

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: ____ DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

CONE PENETRATION TEST LOGS SHEET 1 OF 3

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAND
DATE:	12/08/2020
SCALE:	NO SCALE

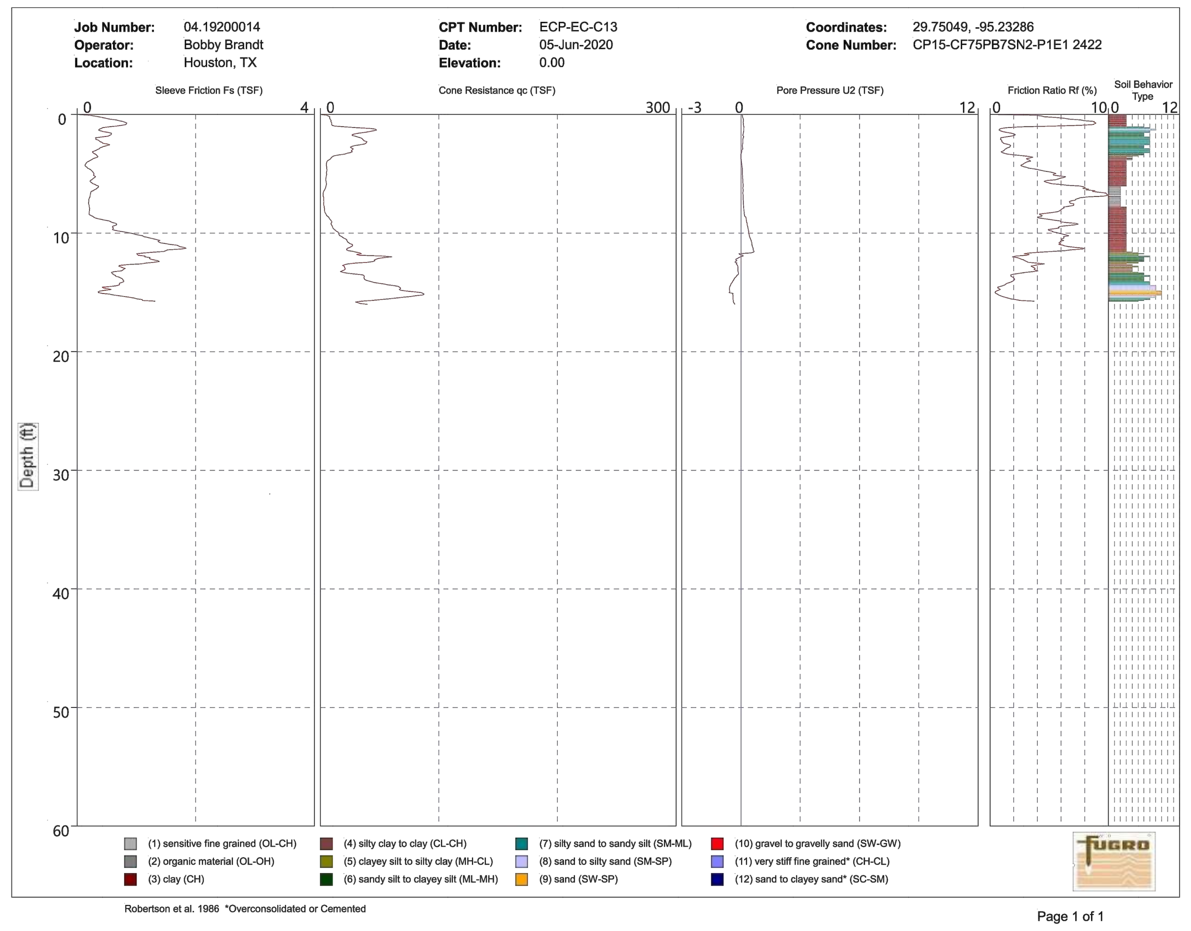
DRAWING NO. C90-D13-P11-002

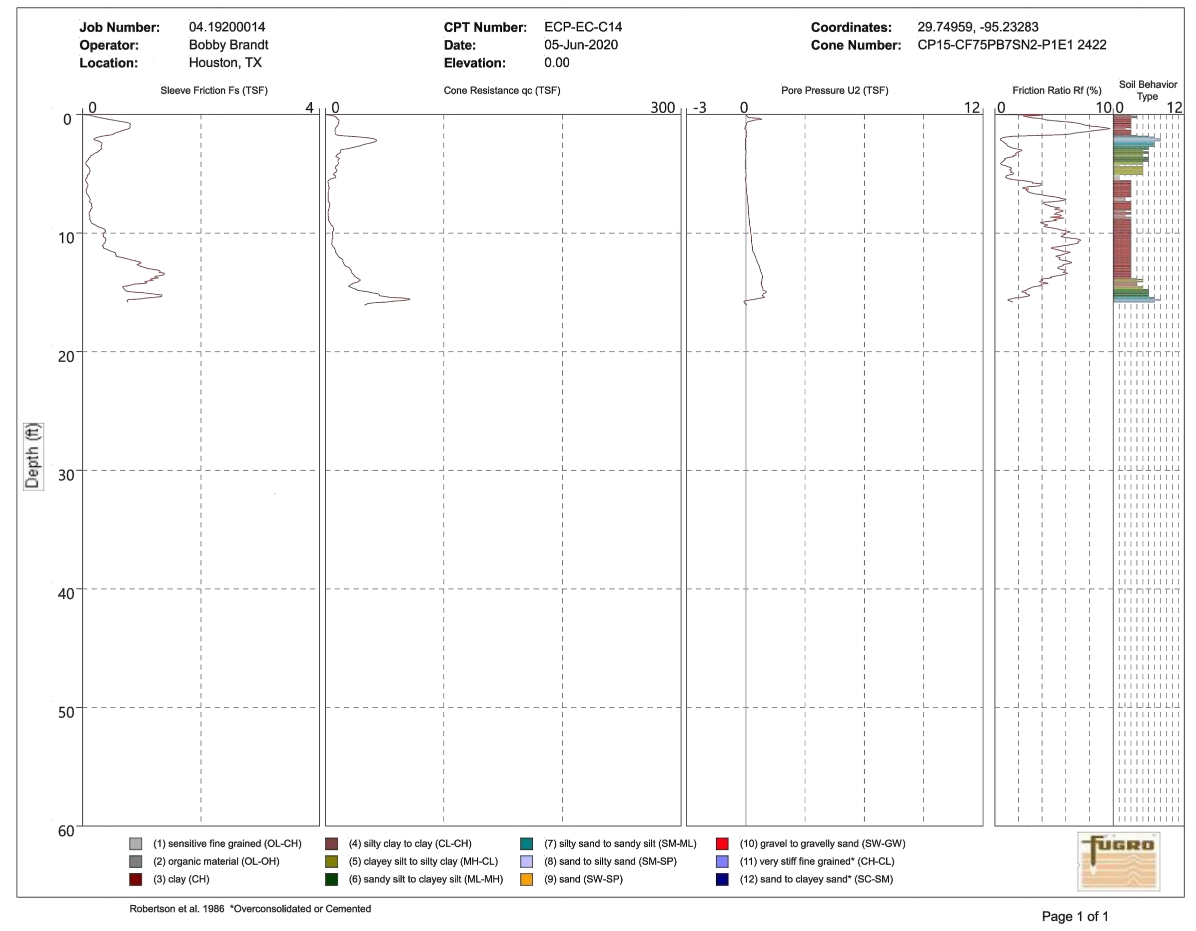
SHEET NO. B-004 | REV. NO. B

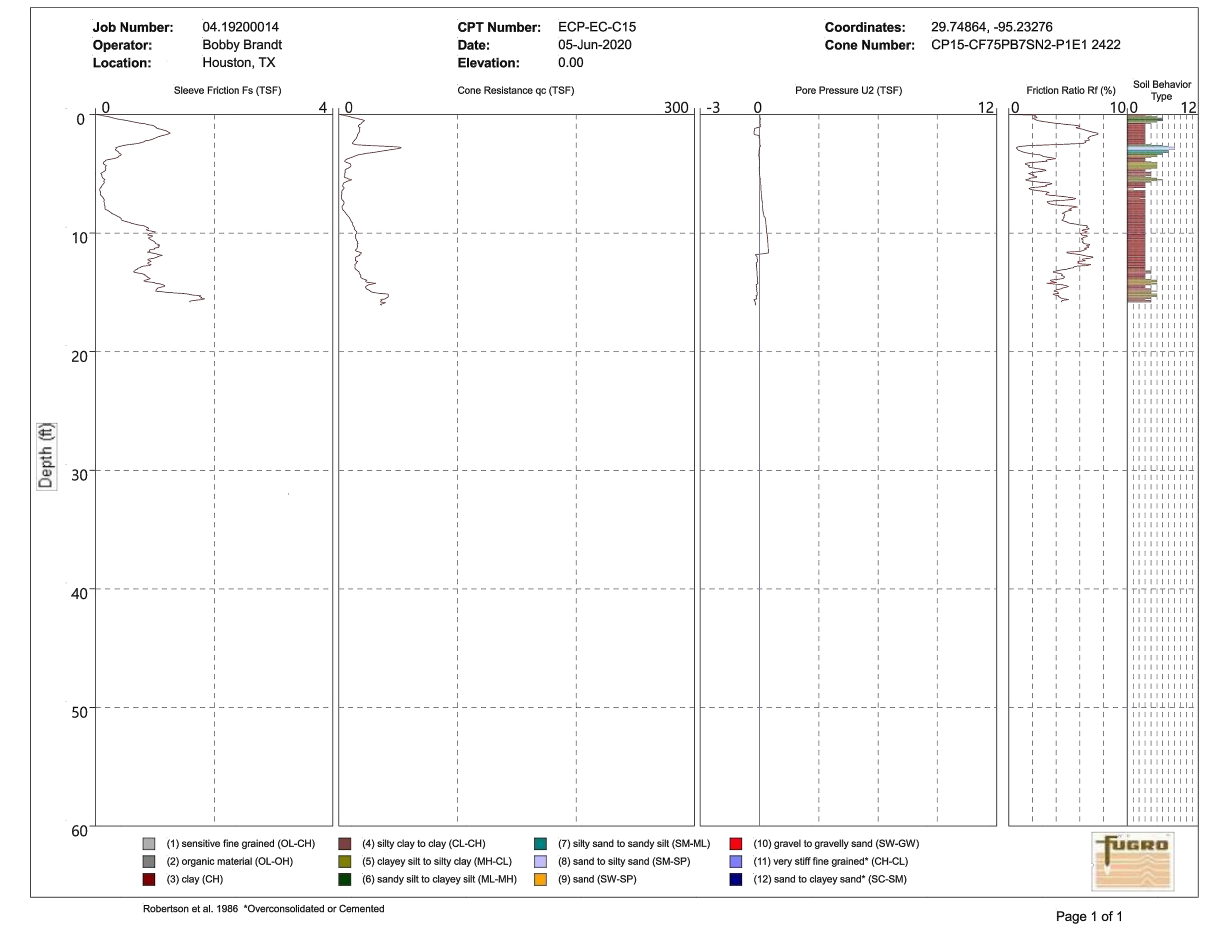
95% REVIEW

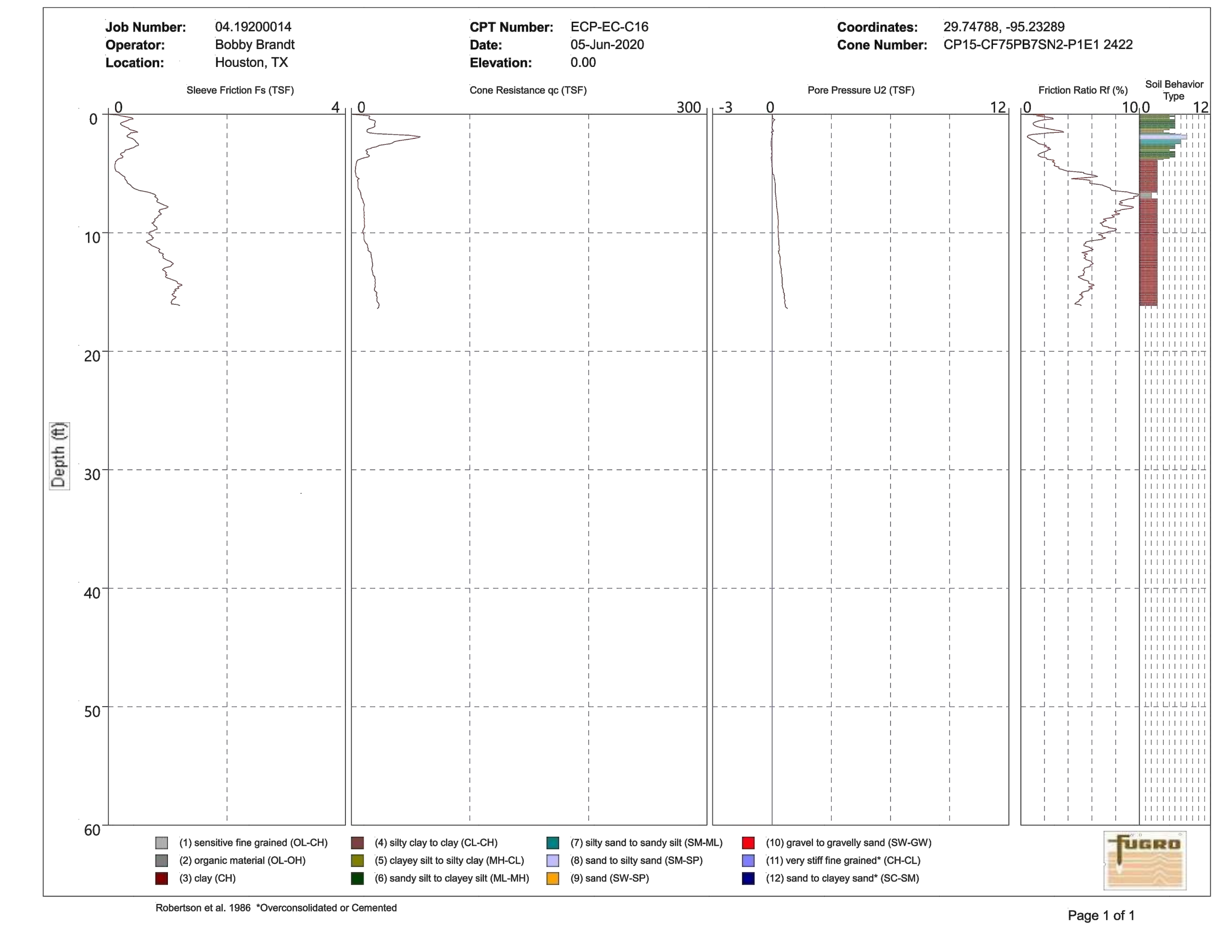
TIME: 12-07-20 – 4:22pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-004.dwg

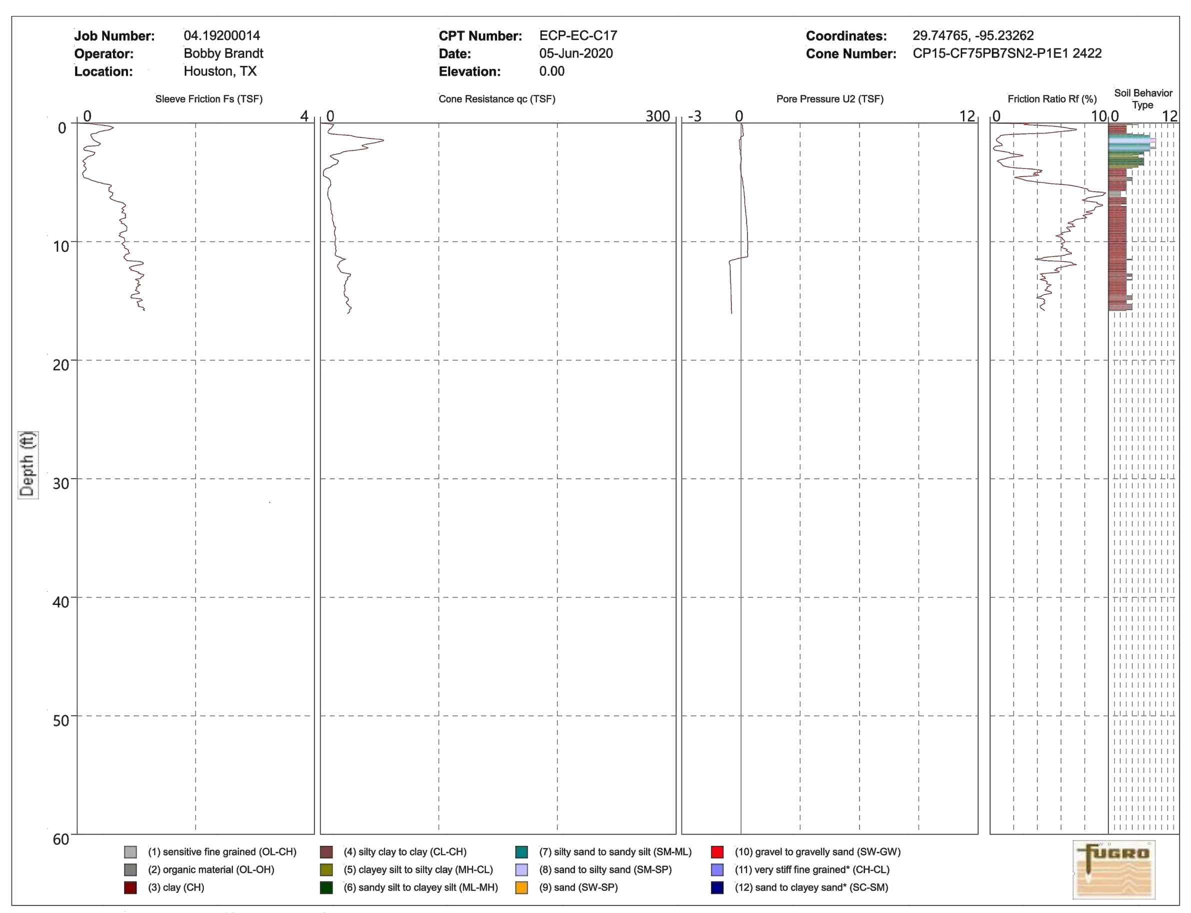
CONE PENETRATION LOGS - ECP-EC-C013 THRU ECP-EC-C024

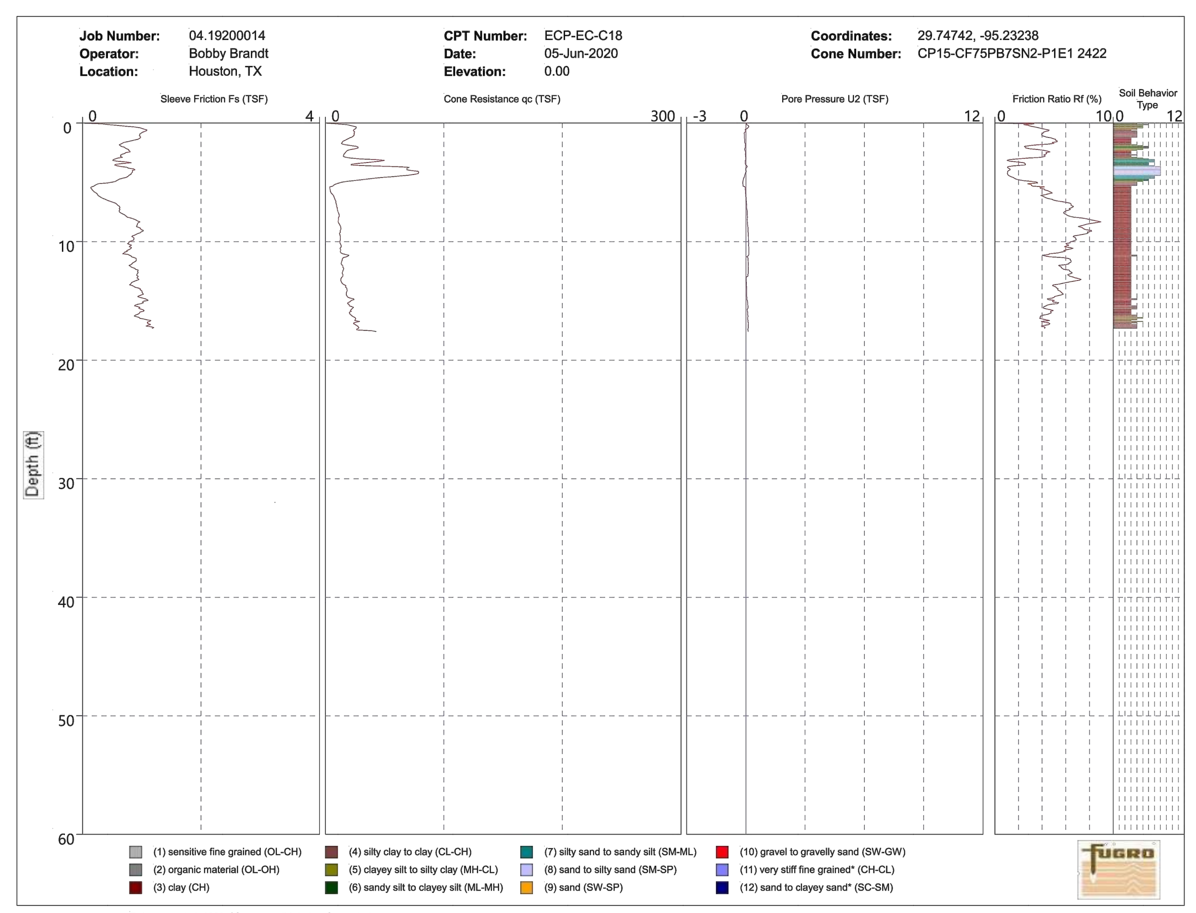


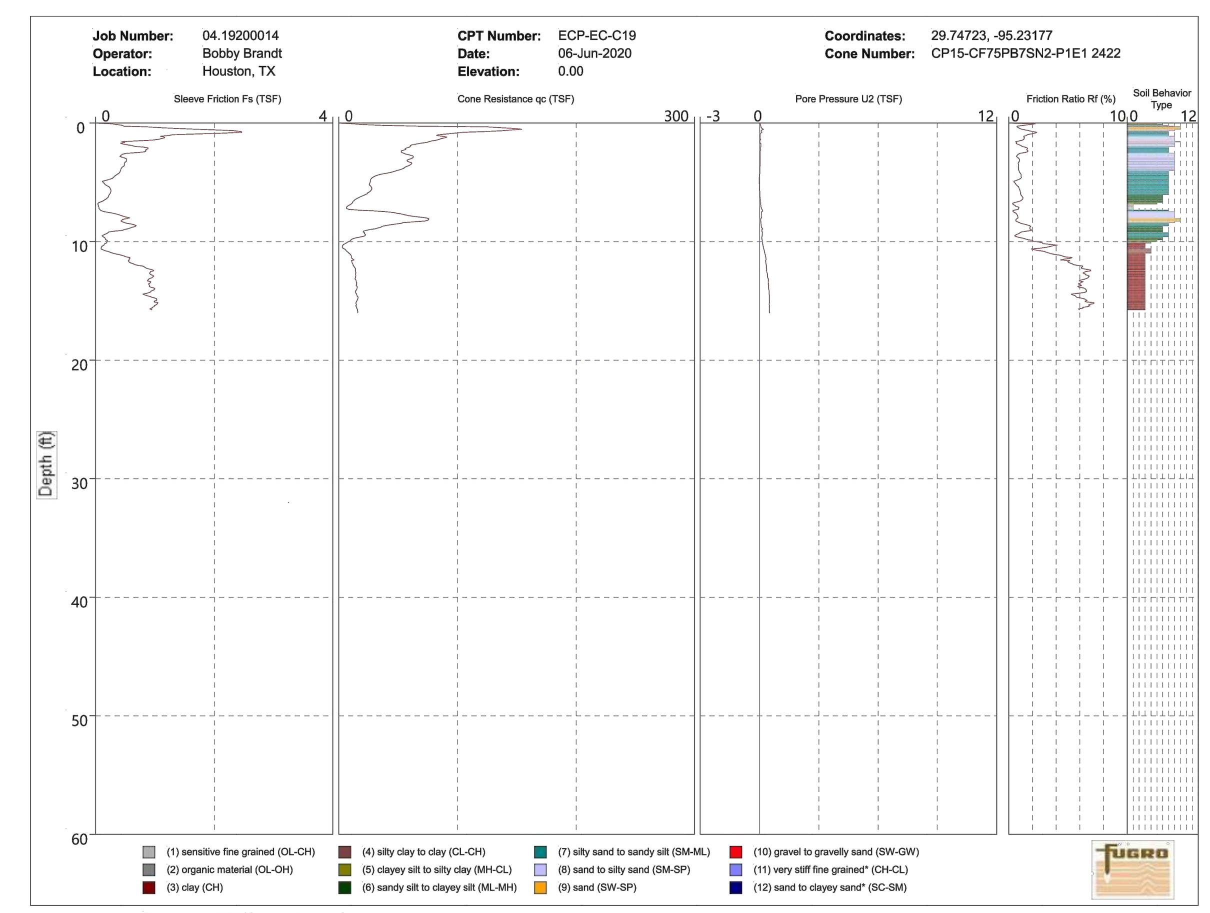


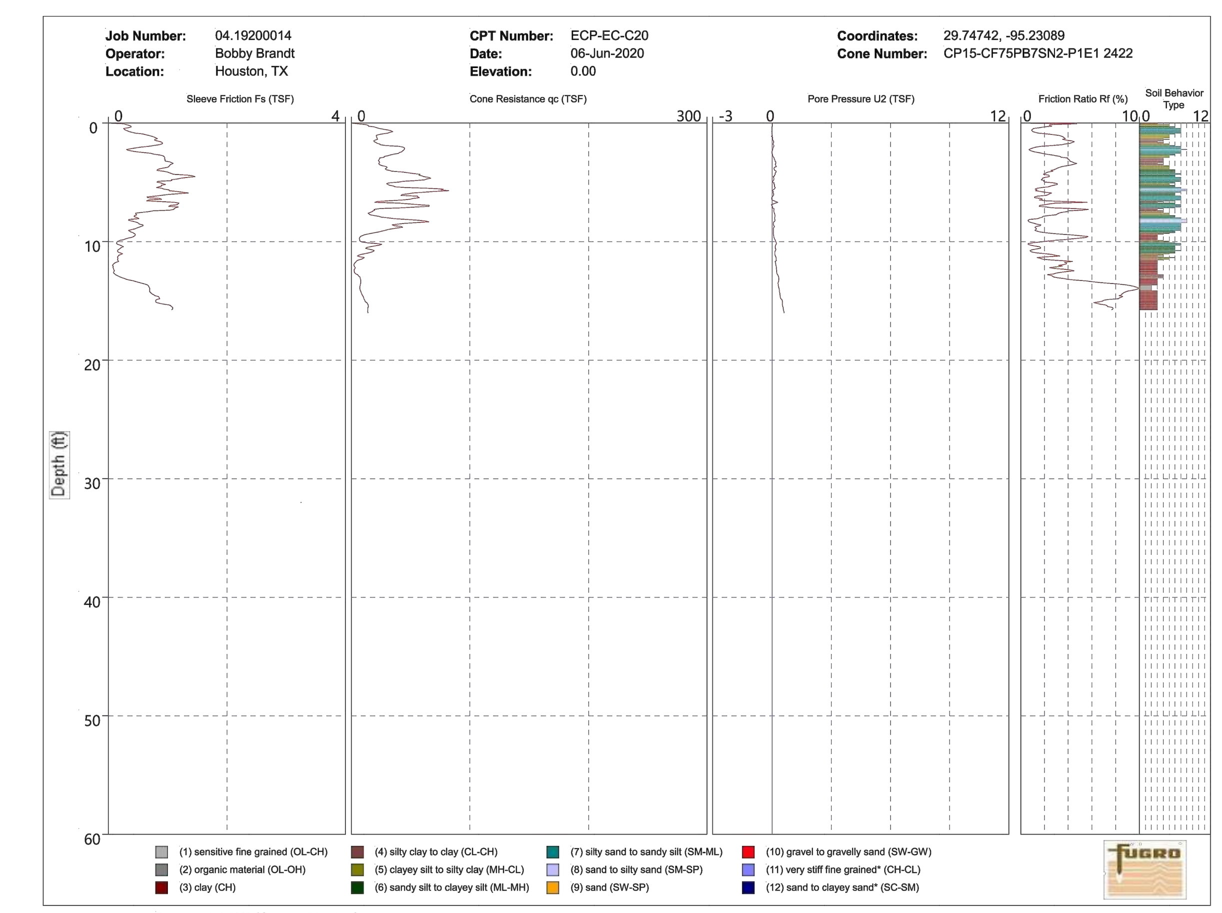


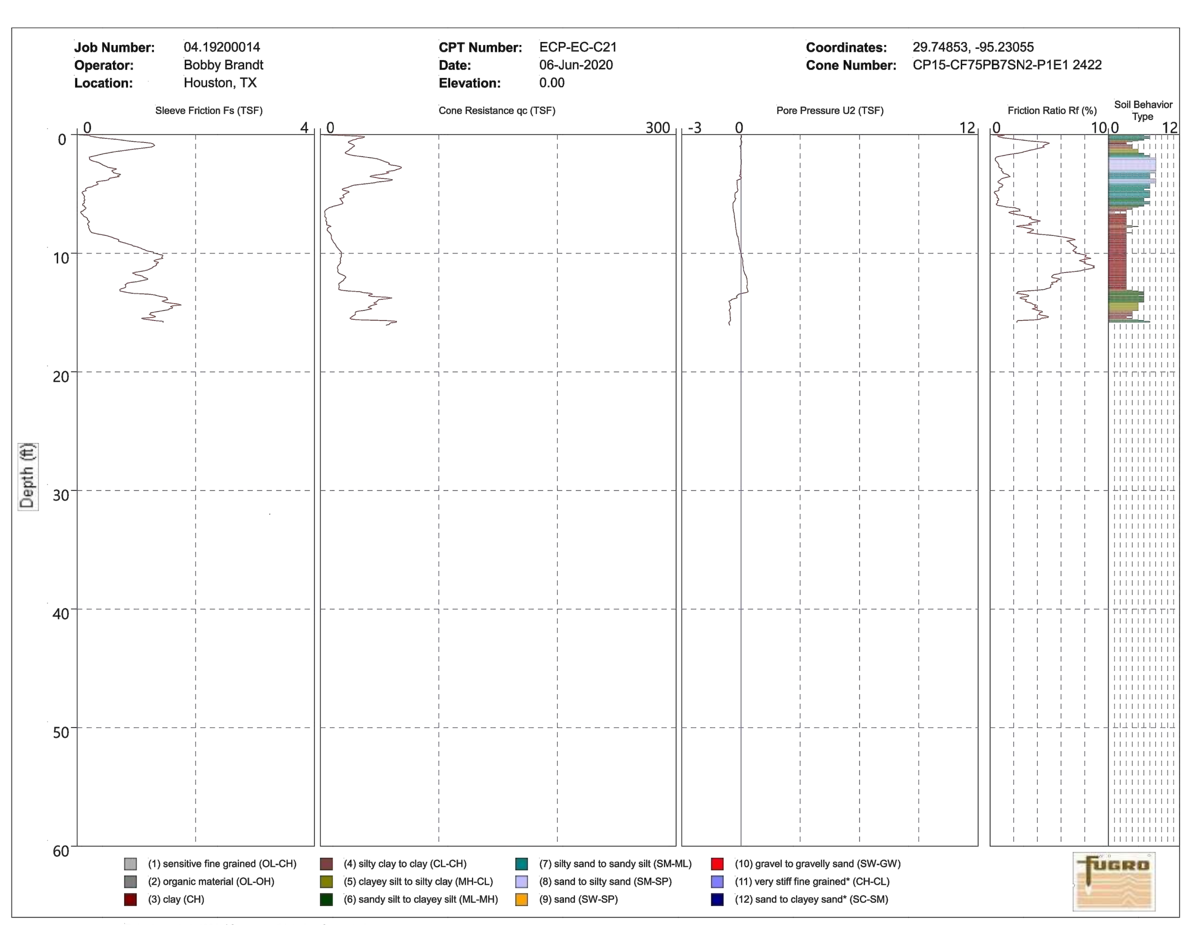


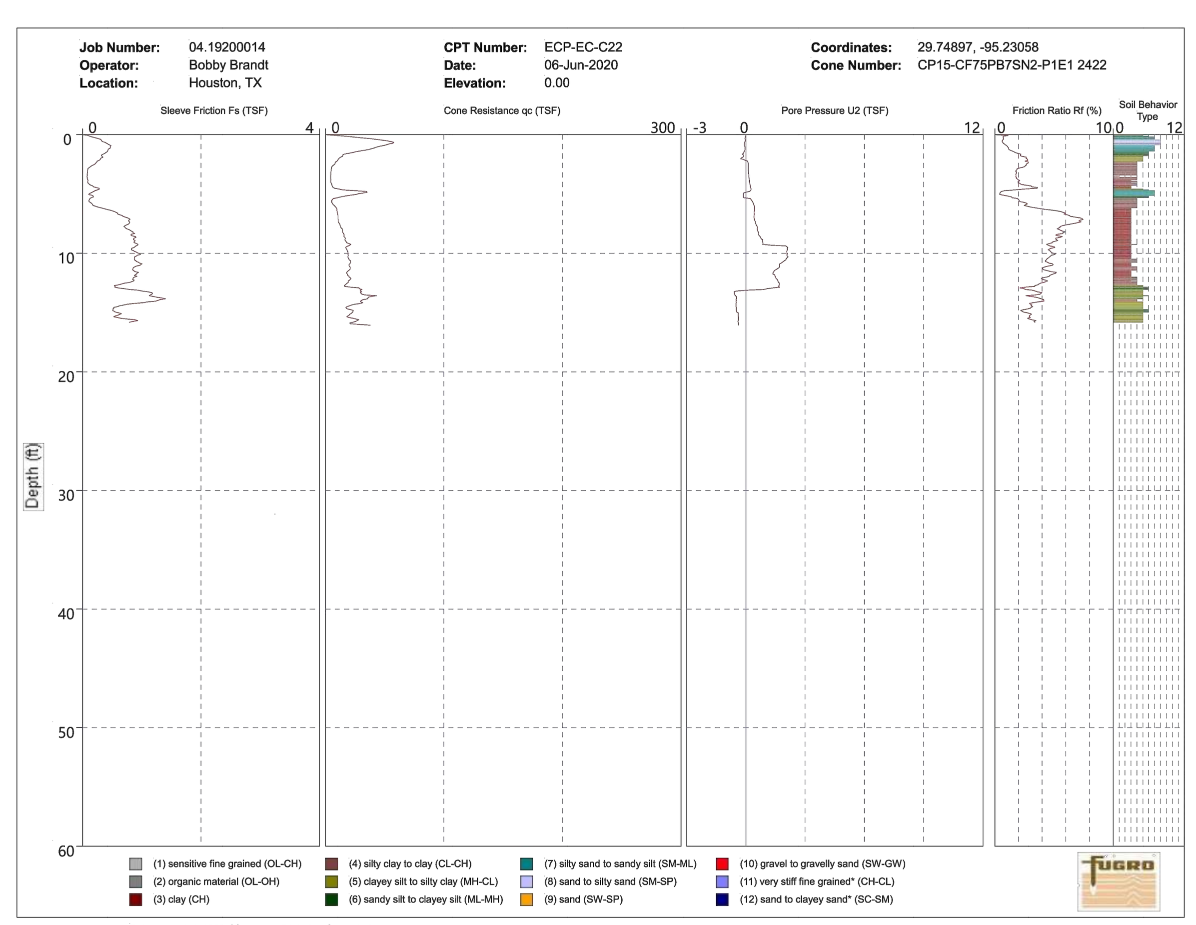


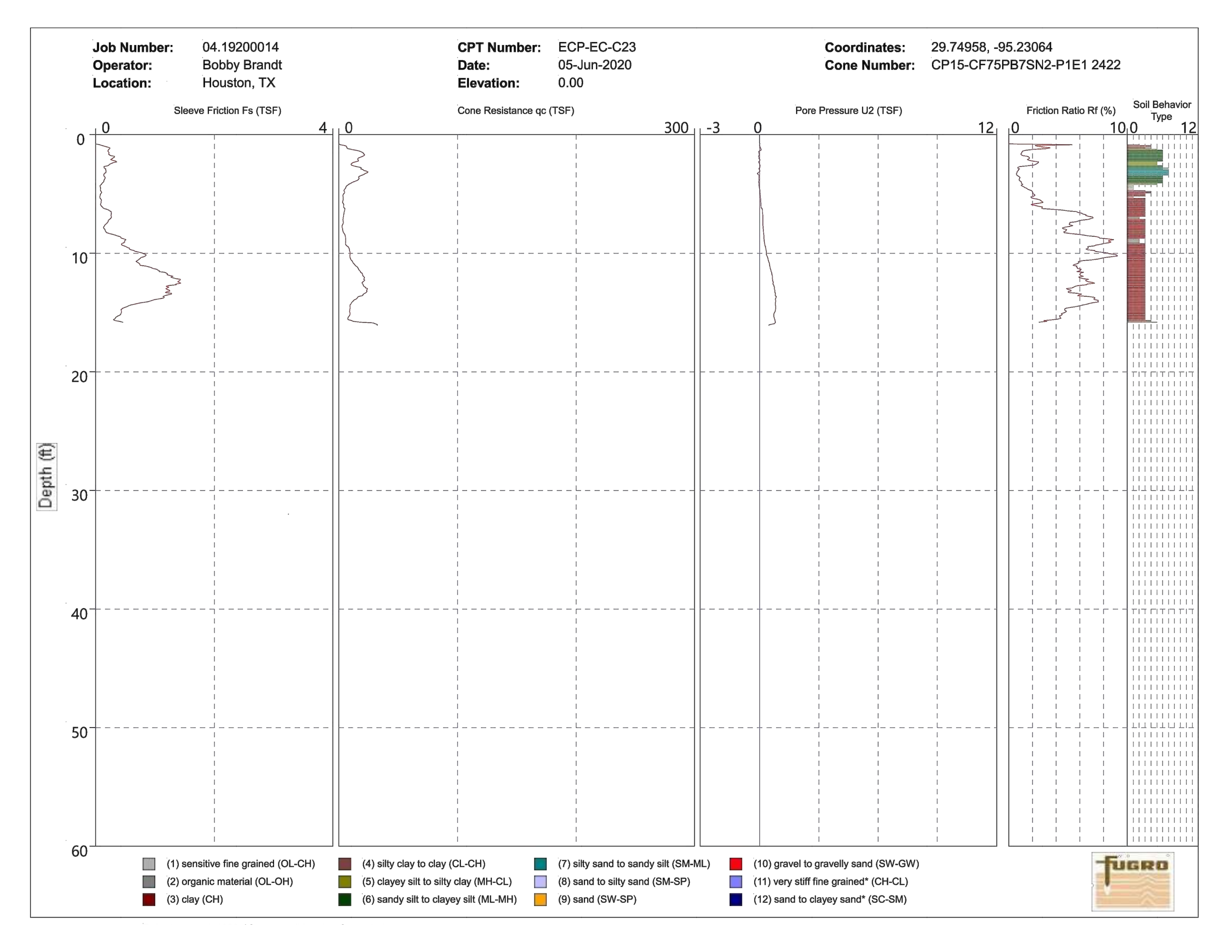


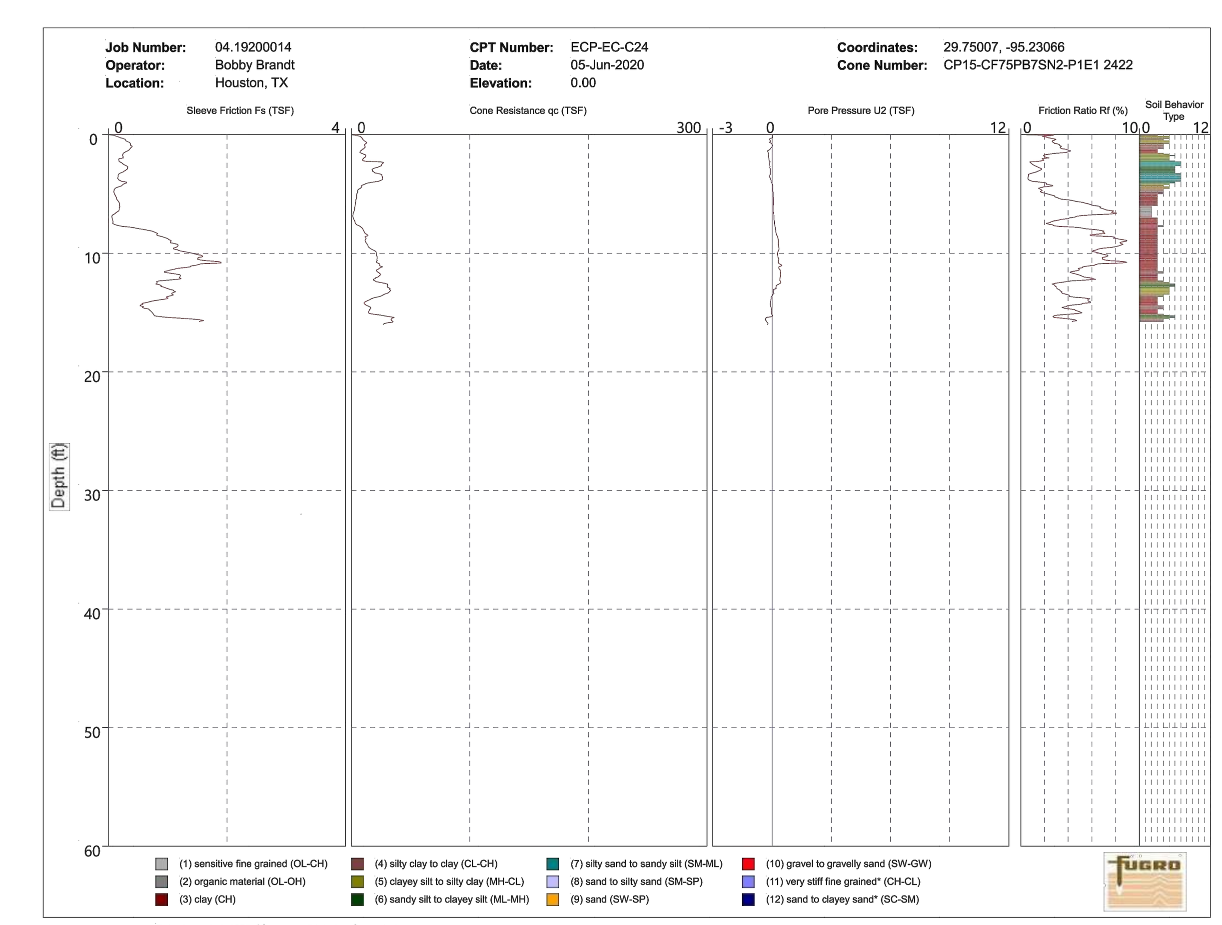












NOTE:
CONE PENETRATION LOGS DATED JUNE 04, 2020 THROUGH JUNE 06, 2020 ARE PROVIDED BY FUGRO USA. FOR INFORMATION ONLY.

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:
HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:
This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes.
95% REVIEW

APPROVED: DATE
PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:
HOUSTON SHIP CHANNEL (HSC)
EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE # 8

SHEET TITLE:
SEGMENT 4
BOGGY BAYOU TO SIMS BAYOU TURNING BASIN
E2 CLINTON DMPA & BELTWAY 8 DMPA
CONE PENETRATION TEST LOGS
SHEET 2 OF 3

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

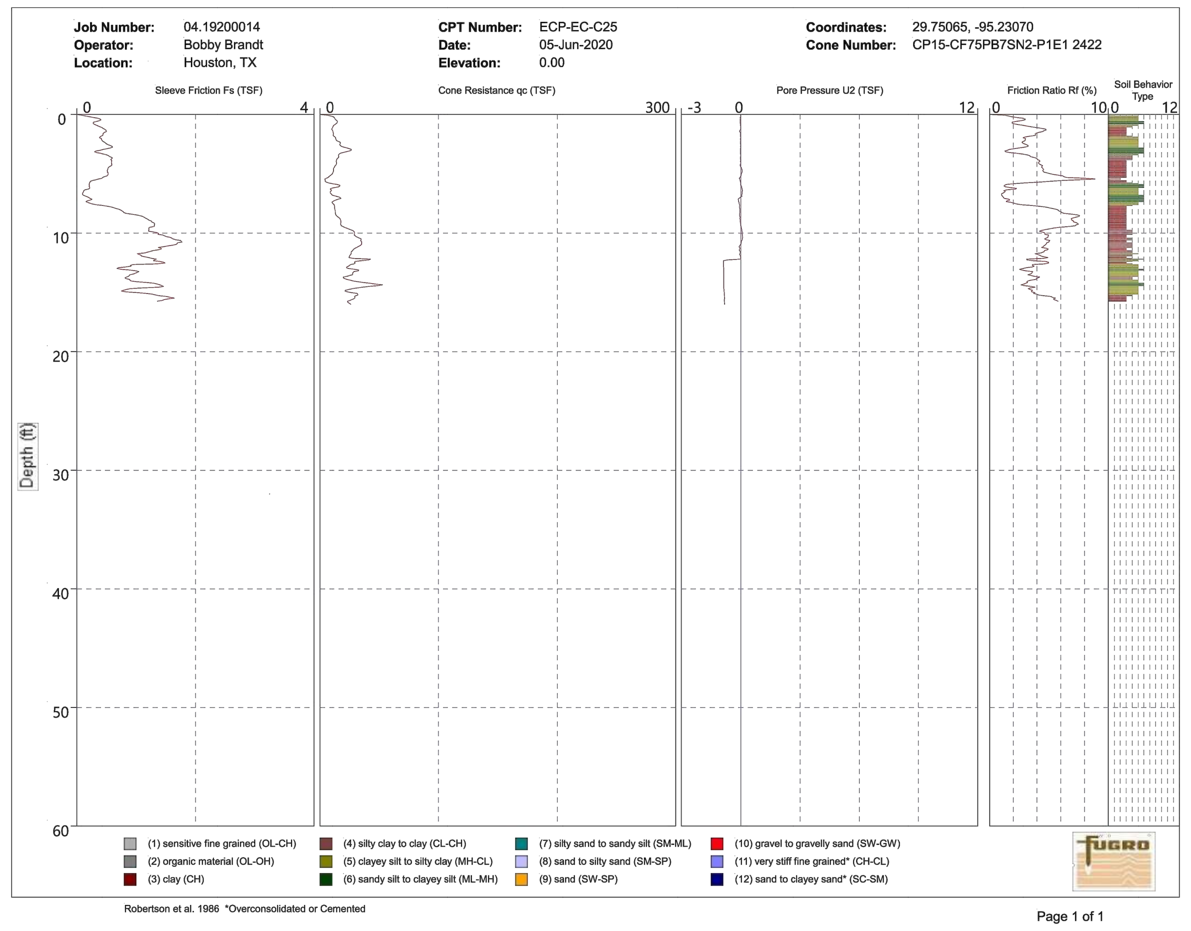
DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

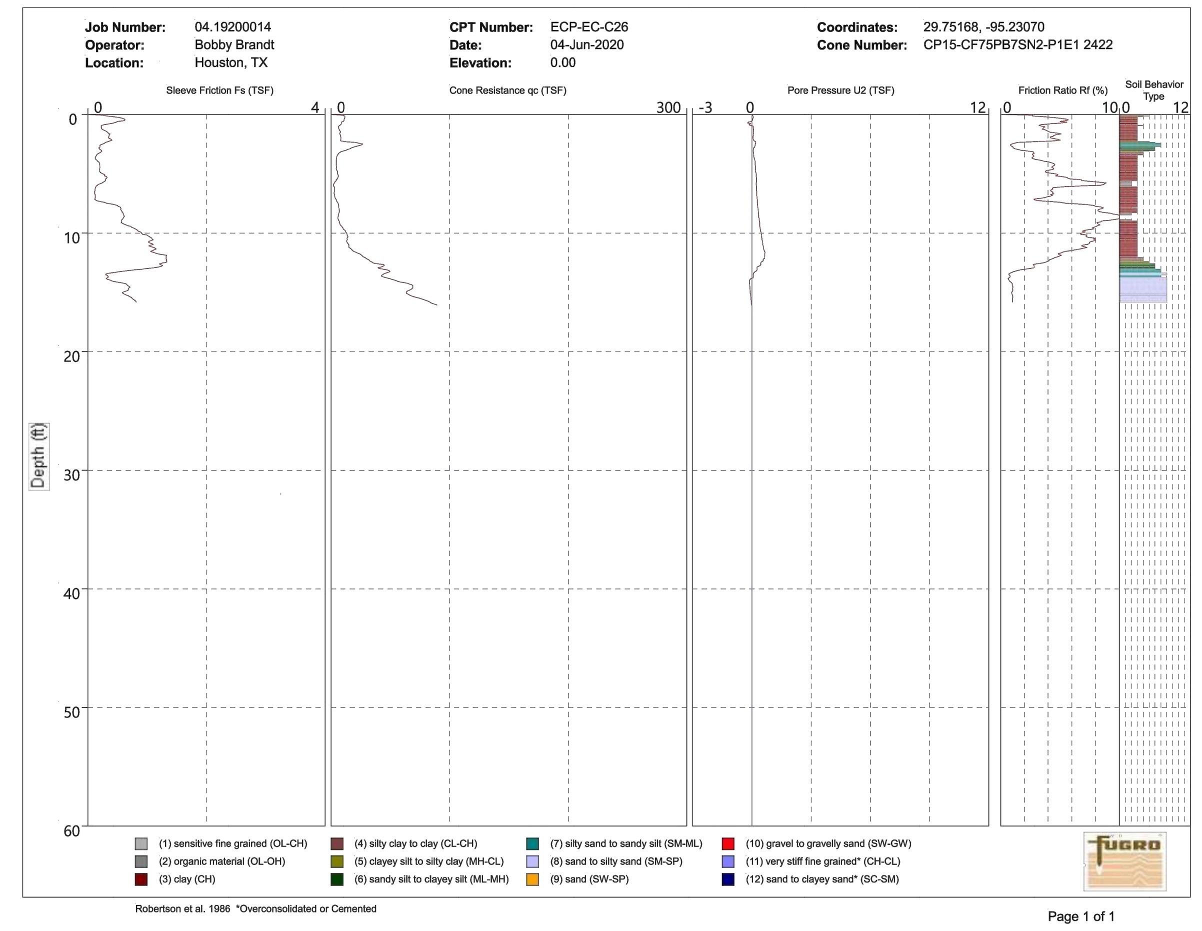
DRAWING NO. C90-D13-P11-002
SHEET NO. B-005
REV. NO. B

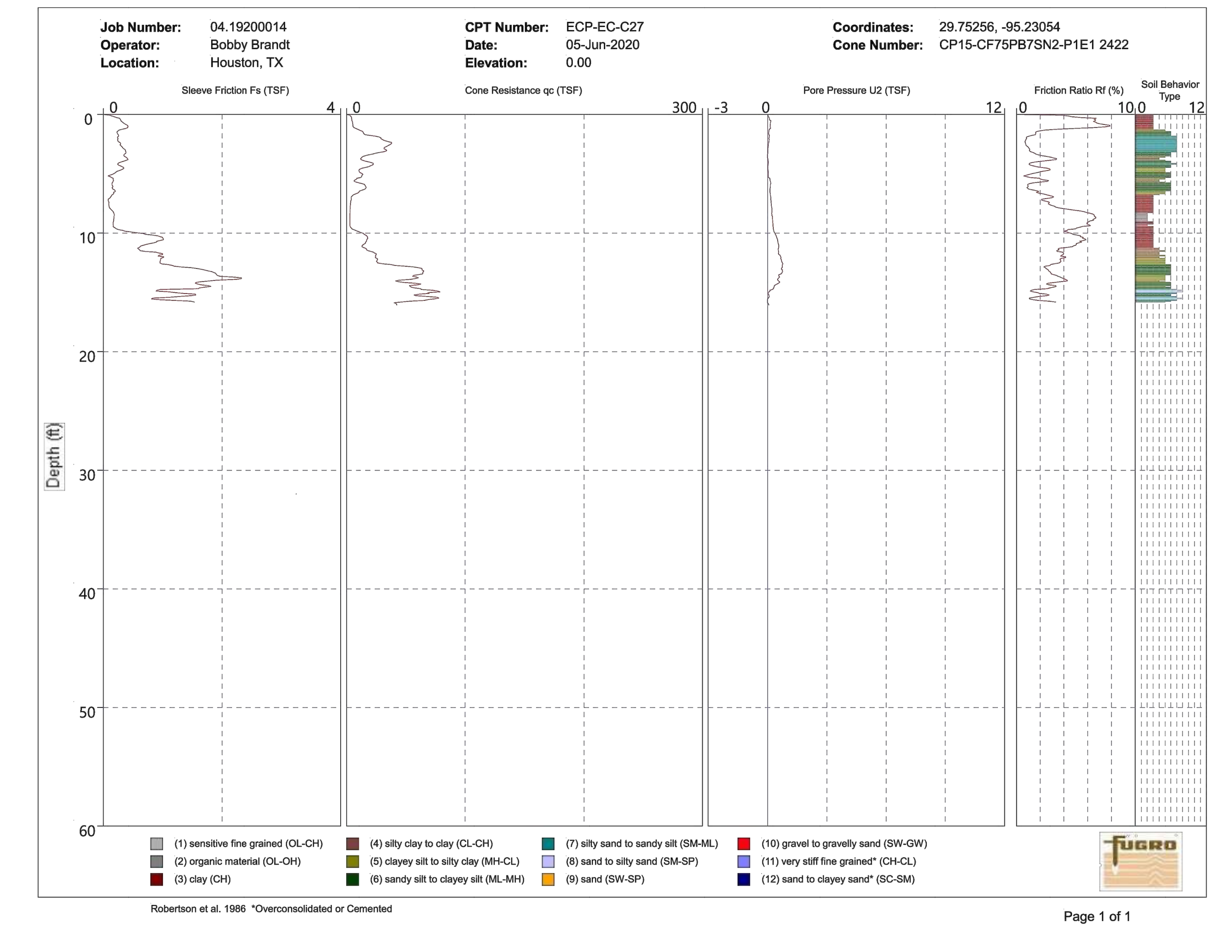
95% REVIEW

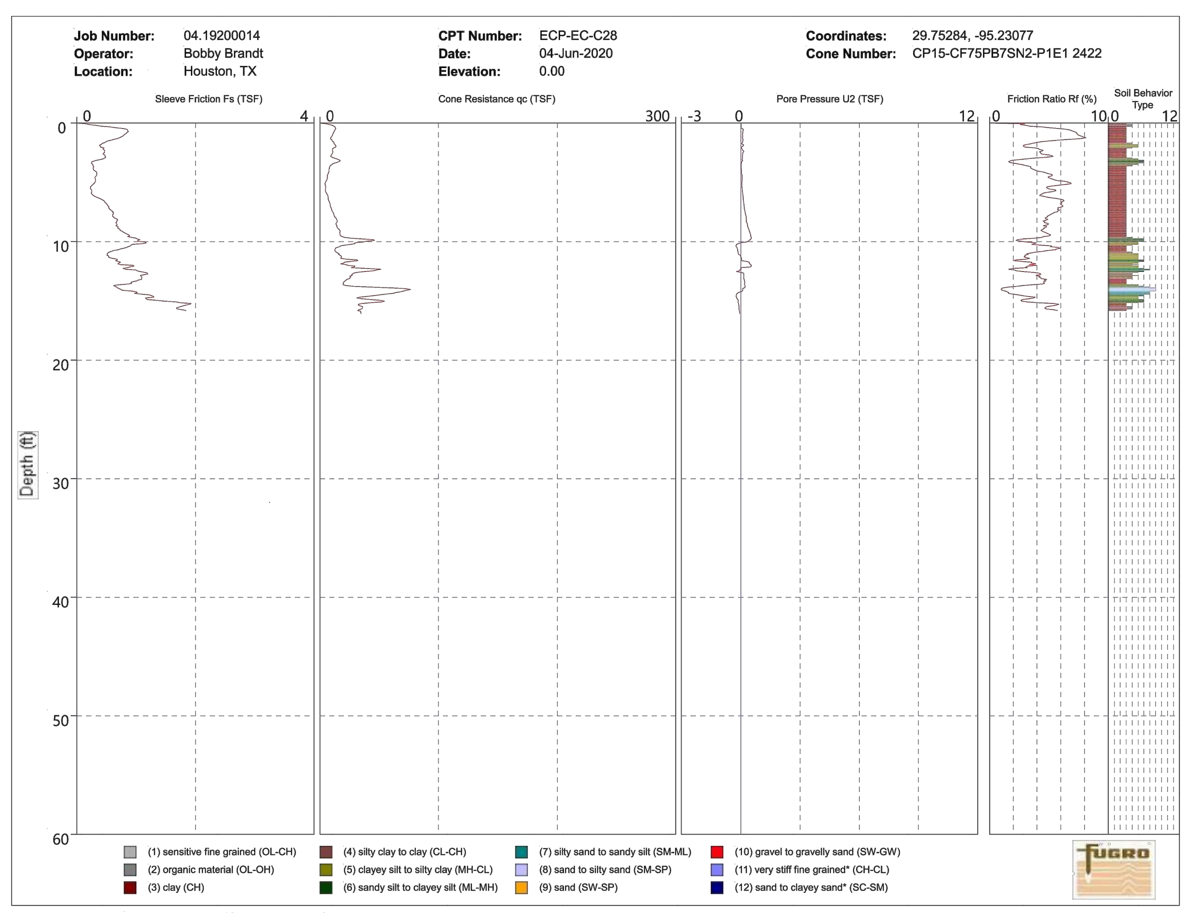
TIME: 12-07-20 – 4:28pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-005.dwg

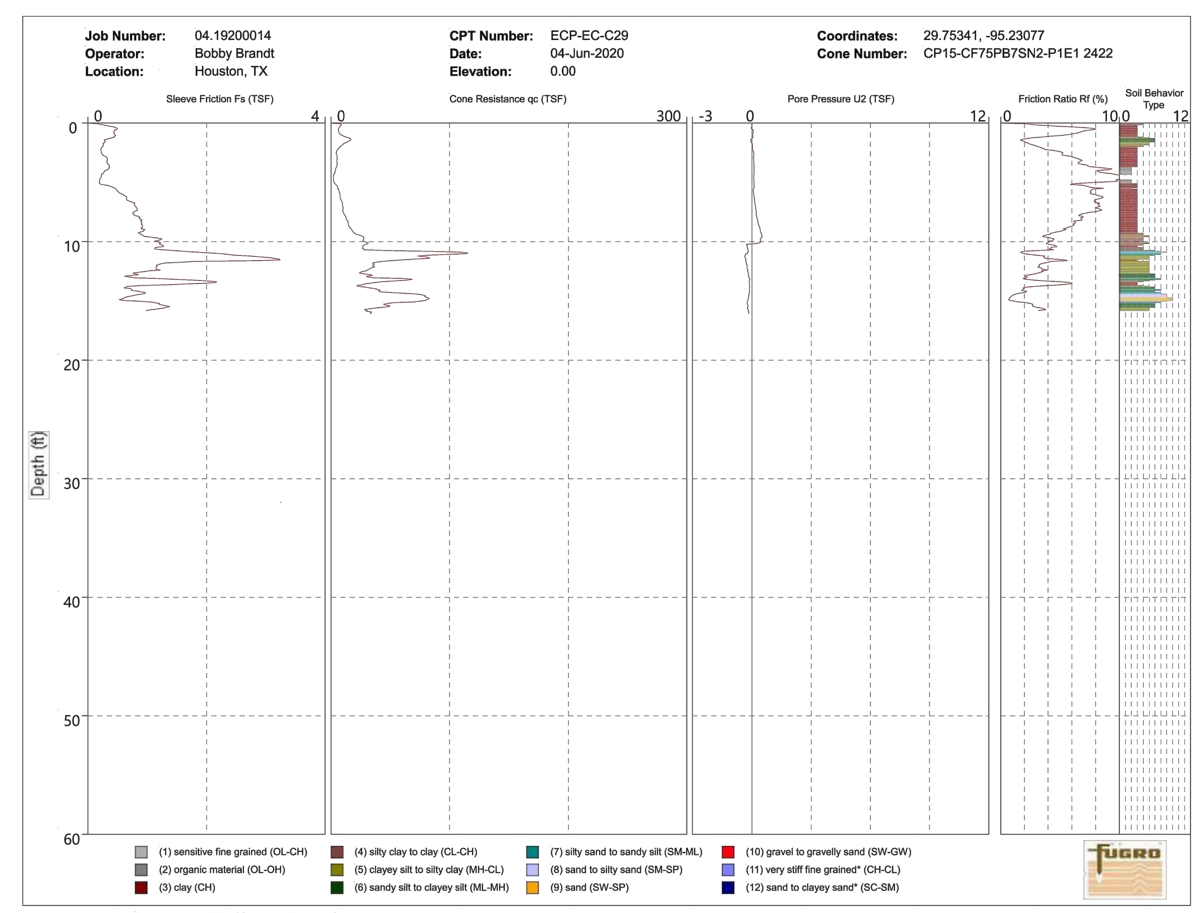
CONE PENETRATION LOGS - ECP-EC-C025 THRU ECP-EC-C031

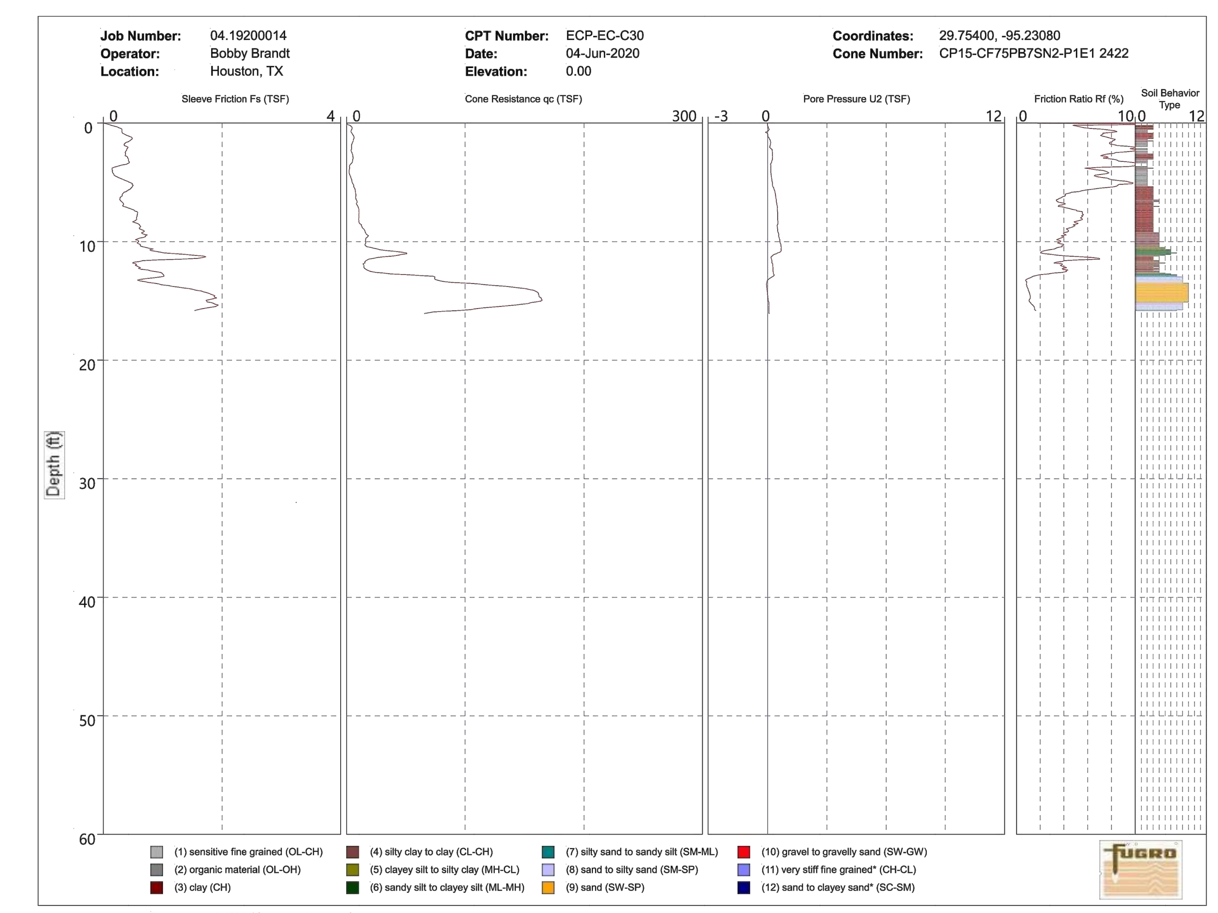


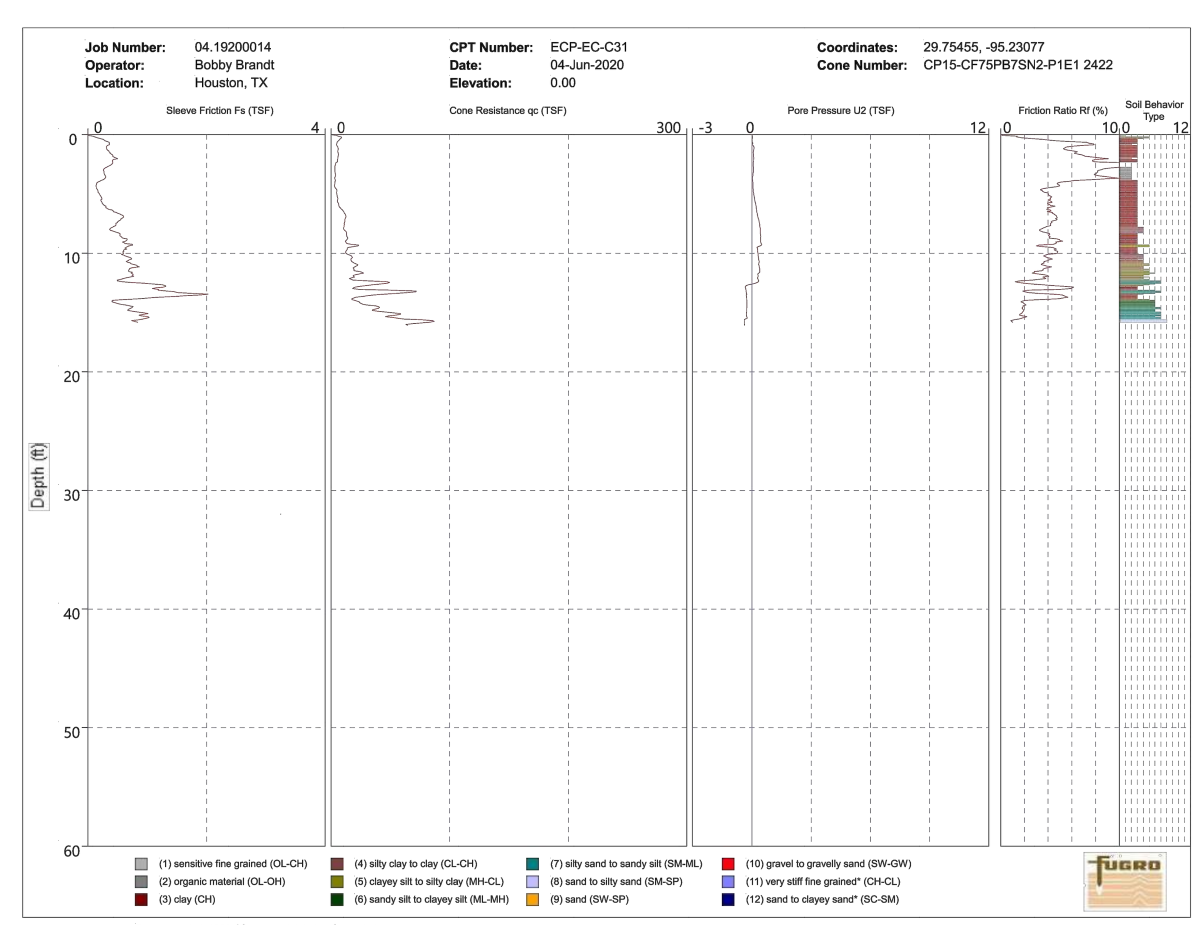












NOTE:

CONE PENETRATION LOGS DATED UNE 04, 2020 THROUGH UNE 06, 2020 ARE PROVIDED BY FUGRO USA. FOR INFORMATION ONLY.

E2 CLINTON DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

HDR Engineering, INC
TBPELS FIRM
Registration No. F-754

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE # 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO SIMS BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

CONE PENETRATION TEST LOGS SHEET 3 OF 3

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	G.PENNISON
CADD:	J.DELEON
CHECKER:	N. McLELLAN
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-002

SHEET NO. B-006 REV. NO. B

95% REVIEW

TIME: 12-07-20 - 4:33pm User: JDELEON DWG: C:\pwworking\central01\d1713444\C90-D13-P11-008-B-006.dwg

PORT OF HOUSTON AUTHORITY

CONSULTANT:

DESIGN PREPARED BY:

SEAL:

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95% REVIEW

APPROVED: DATE

PORT CONTRACT REPRESENTATIVE
MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE:

HOUSTON SHIP CHANNEL (HSC)

EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)

PROJECT 11: PACKAGE 8

SHEET TITLE:

SEGMENT 4 BOGGY BAYOU TO HUNTING BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA

BORING LAYOUT

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	C.LOWE
CADD:	J.BURD
CHECKER:	A.COLWELL
DATE:	12/08/2020
SCALE:	AS NOTED

DRAWING NO. C90-D13-P11-002

SHEET NO. B-007

REV. NO. B

BELTWAY 8 DMPA

95% REVIEW

TIME: 7-25-20 – 5:45pm User: JBURD DWG: C:\pwworking\central01\d1796030\2010-HSC00_G_C_BS-SEG2-4.dwg

BORING LOGS ECP-2014 THRU ECP-2021

LOG OF BORING ECP-2014

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841108.34; E: 3191496.25
DEPTH OF WATER: 6 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 6 FT
SURFACE ELEVATION: 23.2 FT — DATE: 4/15/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 8 FT; WET ROTARY: 8 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT
Very loose to loose, gray and brown, SAND -w/ roots at 0'-2' -w/ clay seams at 2'-4'	2, 3, 5, 5, 1
Soft to firm, gray and light brown, CLAY	4
-w/ sand seams at 12'-14'	5
Firm to very stiff, reddish brown and gray, CLAY -w/ calcareous nodules at 14'-16'	
-w/ ferrous stains at 23'-25'	
-w/ sand seams at 38'-40'	

Columns: ELEVATION, FT; DEPTH, FT; SYMBOL; SAMPLES; STANDARD PENETRATION TEST, BLOWS PER FOOT; PERCENT PASSING NO. 200 SIEVE; DRY UNIT WEIGHT, PCF; MOISTURE CONTENT, %; LIQUID LIMIT, %; PLASTIC LIMIT, %; PLASTICITY INDEX, %; UNDRAINED SHEAR STRENGTH, TSF (○ HAND PENETROMETER; ● UNCONFINED COMPRESSION; ■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION; △ TORVANE) 0.2 0.4 0.6 0.8 1.0

1.25

Remarks: Groundwater was encountered at 6' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates, Inc. — PLATE A-1

LOG OF BORING ECP-2015

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13840465.93; E: 3191537.93
DEPTH OF WATER: 13 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 11 FT
SURFACE ELEVATION: 24.15 FT — DATE: 4/15/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 14 FT; WET ROTARY: 14 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT
Dark gray, SAND -w/ roots at 0'-2'	
Stiff to very stiff, gray and reddish brown, CLAY	
Stiff, brown, SAND	10, 8
Stiff to very stiff, reddish brown and gray, CLAY	9
Medium dense, brown, SAND	
-w/ clay seams at 38'-40'	22

Remarks: Groundwater was encountered at 13' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates, Inc. — PLATE A-2

LOG OF BORING ECP-2016

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841700.43; E: 3191556.44
DEPTH OF WATER: 33 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 26 FT
SURFACE ELEVATION: 23.21 FT — DATE: 4/20/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 35 FT; WET ROTARY: 35 TO 40 FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT
Stiff to very stiff, dark gray and brown, CLAY -w/ shells and roots at 0'-2' -w/ sand seams at 2'-4'	
-w/ ferrous stains at 4'-6'	
Stiff to very stiff, reddish brown and gray, CLAY -w/ ferrous stains at 6'-8' -w/ sand pockets at 8'-10'	
-w/ calcareous nodules at 10'-12' -w/ ferrous stains at 10'-20'	
-w/ ferrous stains at 23'-25'	
Medium dense, brown, SAND	14
Stiff, gray and reddish brown, CLAY	

1.5, 1.5

Remarks: Groundwater was encountered at 33' during drilling operations.

Drilled By: CH Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-3

LOG OF BORING ECP-2017

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839877.84; E: 3191540.15
DEPTH OF WATER: 34 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 32.5 FT
SURFACE ELEVATION: 24.05 FT — DATE: 4/14/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 35 FT; WET ROTARY: 35 TO 40 FT

DESCRIPTION OF MATERIAL
Dark gray and brown, SAND -w/ roots at 0'-2'
Very stiff, gray and reddish brown, CLAY -w/ sand seams at 2'-8' -w/ ferrous stains at 4'-8'
-w/ calcareous nodules at 6'-8'
Stiff to very stiff, reddish brown and gray, CLAY
-w/ silt seams at 33'-35'

1.42, 1.6

Remarks: Groundwater was encountered at 34' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates, Inc. — PLATE A-4

LOG OF BORING ECP-2018

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841605.45; E: 3192117
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 36 FT
SURFACE ELEVATION: 24.62 FT — DATE: 4/15/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 40 FT; WET ROTARY: TO FT

DESCRIPTION OF MATERIAL
Stiff, gray and brown, CLAY -w/ roots at 0'-2' -w/ sand seams at 0'-6'
-w/ calcareous nodules and ferrous stains at 4'-6'
Stiff to very stiff, reddish brown and gray, CLAY -w/ calcareous nodules at 8'-10'
-w/ calcareous nodules at 23'-25'
-w/ sand seams at 38'-40'

1.83, 1.6, 1.6

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH Logged By: Edgar — HVJ Associates, Inc. — PLATE A-5

LOG OF BORING ECP-2019

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839359.17; E: 3191552.86
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 24.5 FT
SURFACE ELEVATION: 25.61 FT — DATE: 4/17/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 40 FT; WET ROTARY: TO FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT
Medium dense, brown, SAND -w/ roots at 0'-2'	10
Stiff to very stiff, reddish brown and brown, CLAY	28, 26, 9
Stiff to very stiff, reddish brown and gray, CLAY	
-w/ silt seams at 38'-40'	

1.5, 1.83, 1.6

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-6

LOG OF BORING ECP-2020

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13838845.48; E: 3191584.46
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 38 FT
SURFACE ELEVATION: 24.94 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 40 FT; WET ROTARY: TO FT

DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT
Firm to very stiff, reddish brown and gray, CLAY -w/ sand seams at 0'-2' and 4'-10' -w/ organics at 0'-2'	6
-w/ ferrous stains at 4'-10'	
-w/ calcareous nodules at 6'-10'	
Stiff to very stiff, reddish brown and gray, CLAY -w/ ferrous stains at 12'-20'	
-w/ calcareous nodules and ferrous stains at 23'-25'	
-w/ calcareous nodules at 33'-35'	
Soft to firm, reddish brown and gray, CLAY	
-w/ silt seams at 38'-40'	

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-7

LOG OF BORING ECP-2021

PAGE 1 OF 1

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13838211.73; E: 3191612.43
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 38 FT
SURFACE ELEVATION: 25.0 FT — DATE: 4/20/2020

SAMPLER: Shelby Tube/Split Spoon; DRY AUGER: 0 TO 40 FT; WET ROTARY: TO FT

DESCRIPTION OF MATERIAL
Stiff, dark gray and brown, CLAY -w/ organics at 0'-2'
Stiff to very stiff, brown and gray, CLAY -w/ ferrous stains at 4'-20' -w/ calcareous nodules at 6'-10'
-w/ calcareous nodules at 16'-20'
Very stiff, gray and reddish brown, CLAY
-w/ ferrous stains at 28'-30'
-w/ ferrous stains at 33'-35'

1.42, 1.85

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-8

NOTE:
BORING LOGS DATED JANUARY 27, 2020 THROUGH JANUARY 29, 2020 ARE PROVIDED BY HVJ ASSOCIATES. THIS NOTE INTENDED FOR INFORMATION ONLY.

BELTWAY 8 DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT: DESIGN PREPARED BY: HDR

SEAL: This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes.
95% REVIEW

APPROVED: DATE
PORT CONTRACT REPRESENTATIVE MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE: HOUSTON SHIP CHANNEL (HSC) EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP) PROJECT 11: PACKAGE 8

SHEET TITLE: SEGMENT 4 BOGGY BAYOU TO HUNTING BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA BORING LOGS ECP-2014 THRU ECP-2021 SHEET 1 OF 4

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	C.LOWE
CADD:	J.BURD
CHECKER:	A.COLWELL
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-008
SHEET NO. B-008 — REV. NO. B

95% REVIEW

BORING LOGS ECP-2022 THRU ECP-2029

LOG OF BORING ECP-2022

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839496.51; E: 3193531.34
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 26 FT
SURFACE ELEVATION: 24.62 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 40 FT — WET ROTARY: TO FT

DESCRIPTION OF MATERIAL:
- Firm to very stiff, dark gray, gray and brown, CLAY
- -w/ sand seam sat 0'-10'
- -w/ ferrous stains at 6'-10'
- -w/ calcareous nodules at 8'-10'
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ ferrous stains and calcareous nodules at 10'-16'
- -w/ calcareous nodules at 23'-25'
- -w/ silt seams at 38'-40'

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-9

LOG OF BORING ECP-2023

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13837755.28; E: 3191620.51
DEPTH OF WATER: 12 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 11.7 FT
SURFACE ELEVATION: 21.46 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 12 FT — WET ROTARY: 12 TO 40 FT

DESCRIPTION OF MATERIAL:
- Stiff to very stiff, gray and brown, CLAY
- -w/ sand seams at 0'-12'
- -w/ sand pockets at 8'-12'
- -w/ calcareous nodules at 10'-12'
- Very stiff, reddish brown and gray, CLAY
- -w/ calcareous nodules at 18'-20'
- -w/ calcareous nodules at 23'-25'

Remarks: Groundwater was encountered at 12' during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-10

LOG OF BORING ECP-2024

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13836977.07; E: 3191747.97
DEPTH OF WATER: 11 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: N/A FT
SURFACE ELEVATION: 28.49 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 12 FT — WET ROTARY: 12 TO 40 FT

DESCRIPTION OF MATERIAL:
- Firm to very stiff, dark gray and brown, CLAY
- -w/ roots at 0'-2'
- -w/ sand seams at 0'-8'
- -w/ calcareous nodules at 6'-8'
- Loose, brown, SAND (SPT: 9)
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ calcareous nodules at 12'-16'
- -w/ calcareous nodules and ferrous stains at 23'-25'

Remarks: Groundwater was encountered at 11' during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-11

LOG OF BORING ECP-2025

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13836629.4; E: 3192173.45
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 37 FT
SURFACE ELEVATION: 30.85 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 40 FT — WET ROTARY: TO FT

DESCRIPTION OF MATERIAL:
- Stiff, dark gray and reddish brown, CLAY
- -w/ roots at 0'-4'
- -w/ sand seams at 0'-8'
- -w/ ferrous stains at 6'-8'
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ calcareous nodules and ferrous stains at 8'-12'
- -w/ calcareous nodules and ferrous stains at 23'-25'

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-12

LOG OF BORING ECP-2026

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13839603.85; E: 3192221.43
DEPTH OF WATER: 38 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: N/A FT
SURFACE ELEVATION: 25.21 FT — DATE: 4/16/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 40 FT — WET ROTARY: TO FT

DESCRIPTION OF MATERIAL:
- Firm to stiff, dark gray and brown, CLAY
- -w/ organics at 0'-2'
- -w/ roots at 4'-6'
- -w/ calcareous nodules and ferrous stains at 6'-8'
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ ferrous stains at 8'-40'
- -w/ calcareous nodules at 16'-18'

Remarks: Groundwater was encountered at 38' during drilling operations.

Drilled By: CH — Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-13

LOG OF BORING ECP-2027

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841486.46; E: 3192656.24
DEPTH OF WATER: Dry FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: N/A FT
SURFACE ELEVATION: 23.13 FT — DATE: 4/20/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 40 FT — WET ROTARY: TO FT

DESCRIPTION OF MATERIAL:
- Stiff, gray and brown, CLAY
- -w/ organics at 0'-2'
- Stiff to very stiff, gray and reddish brown, CLAY
- -w/ ferrous stains at 6'-20'
- -w/ calcareous nodules at 6'-10'
- -w/ calcareous nodules at 18'-20'
- -w/ ferrous stains and calcareous nodules at 23'-25'
- -w/ ferrous stains at 28'-30'
- -w/ ferrous stains at 33'-35'
- -w/ ferrous stains 38'-40'

Remarks: Groundwater was not encountered during drilling operations.

Drilled By: CH — Logged By: Edgar/Vijay — HVJ Associates, Inc. — PLATE A-14

LOG OF BORING ECP-2028

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841319.93; E: 3193296.53
DEPTH OF WATER: Dry FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: N/A FT
SURFACE ELEVATION: 22.68 FT — DATE: 4/21/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 40 FT — WET ROTARY: TO FT

DESCRIPTION OF MATERIAL:
- Firm to stiff, gray and brown, CLAY
- -w/ calcareous nodules 4'-8'
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ calcareous nodules at 23'-25'
- -w/ sand seams and calcareous nodules at 38'-40'

Remarks: Groundwater was not encountered during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-15

LOG OF BORING ECP-2029

PROJECT: HSC Expansion - Beltway 8 DMPA — PROJECT NO.: HG1910092.2.1
LOCATION: N: 13841122.26; E: 3193909.75
DEPTH OF WATER: 33 FT — COMPLETION DEPTH: 40 FT
OFFSET: N/A — CAVE-IN DEPTH: 20 FT
SURFACE ELEVATION: 22.63 FT — DATE: 4/21/2020

SAMPLER: Shelby Tube/Split Spoon — DRY AUGER: 0 TO 30 FT — WET ROTARY: 30 TO 40 FT

DESCRIPTION OF MATERIAL:
- Firm to stiff, gray and reddish brown, CLAY
- -w/ roots at 0'-2'
- -w/ calcareous nodules and ferrous stains at 6'-8'
- Stiff to very stiff, reddish brown and gray, CLAY
- -w/ calcareous nodules and ferrous stains at 23'-25'
- -w/ silt seams at 25'-30'
- Medium dense to dense, brown, SAND (SPT: 12, 34)
- -w/ clay seams at 33'-35'

Remarks: Groundwater was encountered at 33' during drilling operations.

Drilled By: CH — Logged By: Edgar — HVJ Associates, Inc. — PLATE A-16

Column headings (all logs): ELEVATION, FT | DEPTH, FT | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL | STANDARD PENETRATION TEST, BLOWS PER FOOT | PERCENT PASSING NO. 200 SIEVE | DRY UNIT WEIGHT, PCF | MOISTURE CONTENT, % | LIQUID LIMIT, % | PLASTIC LIMIT, % | PLASTICITY INDEX, % | UNDRAINED SHEAR STRENGTH, TSF (○ HAND PENETROMETER; ● UNCONFINED COMPRESSION; ■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION; △ TORVANE) 0.2 0.4 0.6 0.8 1.0

NOTE:
BORING LOGS DATED JANUARY 28, 2020 AND JANUARY 29, 2020 ARE PROVIDED BY HVJ ASSOCIATES. THIS NOTE INTENDED FOR INFORMATION ONLY.

BELTWAY 8 DMPA

PORT OF HOUSTON AUTHORITY

CONSULTANT: DESIGN PREPARED BY: HDR

SEAL: This document is released for the purpose of interim review under the authority of T. NEIL McLELLAN, P.E., 67263, 12/08/20. It is not to be used for construction, bidding, or permit purposes.
95% REVIEW

APPROVED: DATE
PORT CONTRACT REPRESENTATIVE MANAGING DIRECTOR – ENGINEERING DESIGN & SUPPORT

PROJECT TITLE: HOUSTON SHIP CHANNEL (HSC) EXPANSION CHANNEL IMPROVEMENT PROJECT (ECIP)
PROJECT 11: PACKAGE 8

SHEET TITLE: SEGMENT 4 BOGGY BAYOU TO HUNTING BAYOU TURNING BASIN E2 CLINTON DMPA & BELTWAY 8 DMPA
BORING LOGS ECP-2022 THRU ECP-2029 SHEET 2 OF 4

REV	DATE	DESCRIPTION
A	8/15/20	65% SUBMITTAL
B	12/08/20	95% SUBMITTAL

DESIGNER:	C.LOWE
CADD:	J.BURD
CHECKER:	A.COLWELL
DATE:	12/08/2020
SCALE:	NO SCALE

DRAWING NO. C90-D13-P11-008
SHEET NO. B-009 — REV. NO. B

95% REVIEW