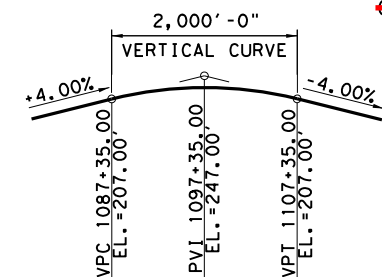
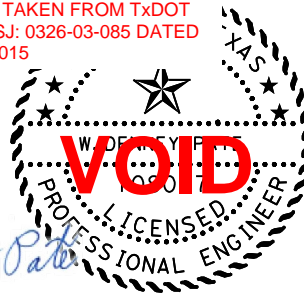


GENERAL NOTES:

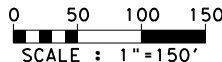
1. FOR DESIGN CRITERIA AND MATERIAL NOTES, SEE GENERAL NOTES I THRU IV SHEETS.
2. FOR TYPICAL SECTIONS, SEE MAIN SPAN TYPICAL CROSS-SECTIONS SHEETS.
3. BORING NOT SHOWN IN PLAN FOR CLARITY, SEE FOUNDATION LAYOUT SHEETS FOR DETAILS.
4. FOR HYDRAULIC DATA, SEE HYDRAULIC DATA SHEETS.
5. CHANNEL DIMENSIONS SHOWN ARE MEASURED ALONG BRIDGE C.

NBI. NO. XX-XXX-X-XXXX-XX-XXX
DESIGN SPEED = 70 MPH
ADT (2020) = 60,300
ADT (2040) = 81,500
ROADWAY FUNCTION = URBAN FREEWAY

6. ADT IS TAKEN FROM TxDOT
MEMO CSJ: 0326-03-085 DATED
JAN 27, 2015



STA = 1097+35.00
EL = 247.00'
ex = -20.00'
K = 250
L = 2,000.00'



HL-93 LOADING			
1	9/24/18	UPDATE TRANSITION PIER LOCATION	WDP
2	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
3	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC
NO.	DATE	REVISION	APRV



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TBPE FIRM #F-4883

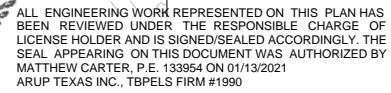


Texas Department of Transportation [®] 201

US-181 HARBOR BRIDGE

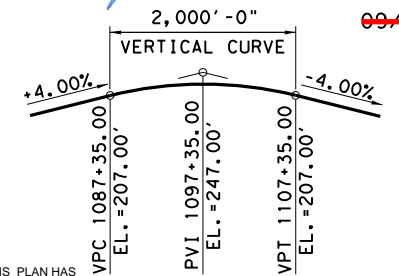
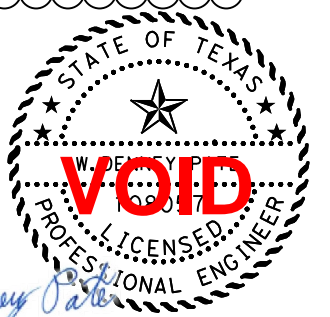
MAIN SPAN
BRIDGE LAYOU

DESIGN MF	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS CFR	X	(See Title Sheet)		US-181
CHECK MC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	
CHECK MCP	CONTROL	SECTION	JOB	
	0101	06	095	



0 50 100 150
SCALE : 1" = 150'

NBI. NO. XX-XXX-X-XXXX-XX-XXX
DESIGN SPEED = 70 MPH
ADT (2020) = 60,300
ADT (2040) = 81,500
ROADWAY FUNCTION = URBAN FREEWAY



HL-93 LOADING			
1	9/24/18	UPDATE TRANSITION PIER LOCATION	WDP
2	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
3	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC
NO.	DATE	REVISION	APRV



FLATIRON/Dragados LLC




FIGG
BPE FIRM #F-4883



Texas Department of Transportation [®] 2016

US-181 HARBOR BRIDGE

MAIN SPAN
BRIDGE LAYOUT II

DESIGN MF	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS CFR	X	(See Title Sheet)		US-181
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	
CHECK MCP	CONTROL	SECTION	JOB	
	0101	06	095	

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1.0 DESIGN NOTES

A. GENERAL

- 1.ALL STRUCTURAL DESIGN ELEMENTS SHALL CONFORM TO THE REQUIREMENTS AND CRITERIA CONTAINED IN THE COMPREHENSIVE DEVELOPMENT AGREEMENT (CDA) AND THE TECHNICAL PROVISIONS (TP).
- 2.ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED OTHERWISE (UNO) AND MUST BE CORRECTED FOR VERTICAL GRADE AND/OR SUPERELEVATION WHERE APPLICABLE.
- 3.IN CASE OF CONFLICT BETWEEN THE DESIGN DRAWINGS AND TXDOT STANDARD DRAWINGS, DESIGN DRAWING INFORMATION PREVAILS.
- 4.CONSTRUCTION JOINTS OTHER THAN THOSE SHOWN ON THE PLANS WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL BY THE ENGINEER.
- 5.ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4" UNLESS NOTED OTHERWISE.
- 6.SEE UTILITY PLAN FOR IDENTIFICATION AND RELOCATION OF EXISTING UTILITIES.
- 7.SEE ROADWAY PLANS FOR ROADWAY TYPICAL SECTIONS.
- 8.SEE RETAINING WALL PLANS FOR RETAINING WALL LIMITS AND DETAILS.
- 9.SEE MAIN SPAN AESTHETIC TREATMENTS PACKAGE FOR ALL AESTHETIC DETAILS NOT SHOWN HEREIN.
- 10.SEE BRIDGE LAYOUTS FOR LOCATION OF BRIDGE DECK DRAINS.
- 11.SEE BRIDGE DRAINAGE PLANS FOR DECK DRAIN PIPE SIZE, LOCATION, AND DETAILS.
- 12.SEE ILLUMINATION PLANS FOR LOCATION OF CONDUITS AND LIGHTING FIXTURES ON BRIDGE STRUCTURES.
- 13. STAYS WILL BE STRESSED FROM LOWER END EXCEPT WHEN SPECIFICALLY NOTED OTHERWISE. SEE ERECTION MANUAL FOR SPECIFICS.

2.0 SPECIFICATIONS

A. PROJECT SPECIFIC

- 1.GOVERNING SPECIFICATIONS, SPECIAL SPECIFICATIONS AND SPECIAL PROVISIONS.

B. TEXAS DEPARTMENT OF TRANSPORTATION

- 1."STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES", NOVEMBER 2014. 400 ITEMS SHALL BE PER PROJECT TECHNICAL PROVISIONS ATTACHMENT 13-1.
- 2."BRIDGE DESIGN MANUAL-LRFD", REVISED OCTOBER 2015.
- 3."GEOTECHNICAL MANUAL", DECEMBER 2012
- 4."BRIDGE DETAILING GUIDE", AUGUST 2014
- 5."BRIDGE INSPECTION MANUAL", REVISED AUGUST 2013

C. DESIGN

- 1.AASHTO "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION", WITH 2015 INTERIM REVISIONS.
- 2.AASHTO "AASHTO MANUAL FOR BRIDGE EVALUATION, 2ND EDITION", WITH 2011 AND 2013, 2014 AND 2015 INTERIM REVISIONS.
- 3.AASHTO "GUIDE DESIGN SPECIFICATIONS FOR BRIDGE TEMPORARY WORKS, 1ST EDITION", WITH 2008 INTERIM REVISIONS.
- 4.POST-TENSIONING INSTITUTE COMMITTEE "RECOMMENDATIONS FOR STAY CABLE DESIGN, TESTING AND INSTALLATION", MAY 2012.
- 5.CEB-FIP "MODEL CODE 1990 1ST EDITION", 1990 - CONCRETE MATERIAL PROPERTIES.

3.0 DESIGN METHOD

EXCEPT AS NOTED BELOW, ALL STRUCTURAL COMPONENTS ARE DESIGNED BY LOAD RESISTANCE FACTOR DESIGN (LRFD) METHOD.

- A. PRESTRESSED CONCRETE - FLEXURAL MEMBERS, USING SERVICE LOADS AND VERIFIED FOR COMPLIANCE WITH STRENGTH AND EXTREME LOADS.
- B. REINFORCED CONCRETE - SHALL BE DESIGNED BY STRENGTH AND EXTREME DESIGN LOADS AND VERIFIED WITH SERVICE LOADS FOR CRACK CONTROL.
- C. BEARINGS - HIGH LOAD MULTI-ROTATIONAL (HLMR) BEARINGS USING SERVICE AND STRENGTH LOADS.
- D. FOUNDATIONS - STRUCTURAL CAPACITY OF FOUNDATION ELEMENTS (FOOTING, PILE OR DRILLED SHAFT) SHALL BE EVALUATED AND DESIGNED USING STRENGTH AND EXTREME LOADS PER LRFD SECTION 10. SERVICE LOADS ARE USED FOR CHECKING THE GEOTECHNICAL CAPACITY AND SETTLEMENT OF PILE/SHAFTS AND CHECKING ELEMENTS FOR CRACK CONTROL. DRILLED SHAFT CAPACITY IS BASED ON THE PROJECT SPECIFIC O-CELL LOAD TEST.
- E. STAY CABLE - STAY CABLES ARE DESIGNED TO SATISFY THE STRENGTH, EXTREME EVENT AND FATIGUE LIMIT STATES. SLIP AND FORCE TRANSFER SHALL MEET THE REQUIREMENTS OF SECTION 5.7.2.2 OF PTI DC45.1-12.

4.0 DESIGN LOADINGS

- A. LOAD MODIFIERS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND THE TXDOT BRIDGE DESIGN MANUAL
 $\gamma_p = 1.0$, $\gamma_R = 1.0$, $\gamma_I = 1.05$ (FOR SUPERSTRUCTURE INCLUDING STAY CABLES AND TOWERS)
- B. PERMANENT LOADS (DC, DW, EV, EH, ES, EL, CR, SH, PS)
 - 1.UNIT WEIGHT OF STRUCTURAL CONCRETE (DC) IN ACCORDANCE WITH AASHTO LRFD TABLE 3.5.1-1
 - 2.FUTURE WEARING SURFACE = 19 PSF (EXCLUSIVE OF REMOVED LOADS)
 - 3.TRAFFIC RAILING - T80HT SHAPE = 447 PLF EACH
 - 4.UTILITY ALLOWANCE = 200 PLF
 - 5.PEDESTRIAN FENCING = 200 PLF (INCLUDES CURB WEIGHT)
- C. LIVE LOAD (LL, IM, PL, CE, BR, LS)
 - 1.LIVE LOAD SHALL BE IN ACCORDANCE WITH AASHTO LRFD SECTION 3
 - 2.DEFLECTION LIMIT = $L/375$ NEW HARBOR BRIDGE
 - 3.H-10 DESIGN VEHICLE FOR PEDESTRIAN FACILITIES PER TP 13.2.1.5.b.
 - 4.DESIGN SPEED
MAINLINES = 70 MPH
- D. WIND LOADS (WS, WL)
MAIN SPAN STRUCTURE - WIND LOADINGS PER BLWTL REPORT "A STUDY OF WIND EFFECTS FOR THE HARBOR BRIDGE" - MAY 2017.
CABLE WIND LOAD IN ACCORDANCE WITH SECTION 5.2 OF BLWTL REPORT.
- E. THERMAL FORCES (TU,TG)
 - 1.PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
 - 2.MEAN TEMPERATURE = 70 DEG. F
 - 3.TEMPERATURE RISE = 35 DEG. F (TMAX DESIGN = 105 DEG. F)
 - 4.TEMPERATURE FALL = 35 DEG. F (TMIN DESIGN = 35 DEG. F)
 - 5.UNIFORM TEMPERATURE DIFFERENTIAL BETWEEN STAY-CABLES AND BRIDGE (DECK, TOWERS, END PIERS) IS -10 DEG. F AND +20 DEG. F
 - 6.THE TEMPERATURE DIFFERENTIAL BETWEEN THE NORTH AND SOUTH SURFACES OF TOWER IS $\pm 10^{\circ}F$
 - 7.NON-LINEAR TEMPERATURE GRADIENT PER AASHTO LRFD 3.12.3.

F. CREEP AND SHRINKAGE (CR, SH)

TIME DEPENDENT STRAINS ARE CALCULATED IN ACCORDANCE WITH "CEB-FIP MODEL CODE 1990" WITH A RELATIVE HUMIDITY OF 75%.

G. SCOUR

SCOUR CONDITIONS ARE NOT APPLICABLE TO NEW HARBOR BRIDGE.

H. VESSEL IMPACT

VESSEL IMPACT LOADING IS NOT APPLICABLE, GIVEN THE PHYSICAL LOCATION OF MAIN SPAN TOWERS AND PIERS.

I. SEISMIC

SEISMIC DESIGN IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE SPECIFICATIONS AND BRIDGE DESIGN MANNUAL - LRFD.

J. CONSTRUCTION LOADS

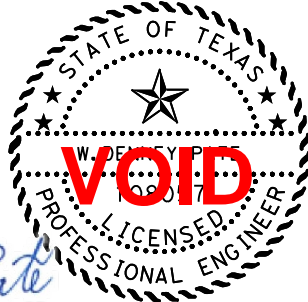
- 1.CONSTRUCTION LOADING IN ACCORDANCE WITH SECTION 5.14.2.3.2 OF "AASHTO LRFD BRIDGE SPECIFICATIONS" FOR SEGMENTAL CONCRETE BRIDGES. SEE ERECTION SCHEMATIC DRAWINGS FOR SPECIFIC LOADS ASSUMED FOR DESIGN.
- 2.WIND LOADS DURING CONSTRUCTION SHALL BE BASED ON THE BLWTL PROJECT SPECIFIC WIND LOAD RECOMMENDATION.
- 3.SEISMIC LOADS ARE NOT CONSIDERED DURING CONSTRUCTION.
- 4.SPECIFIC LOADS HAVE BEEN INCLUDED AS PROVIDED BY THE CONTRACTOR (FDLLC) FOR MAJOR PIECES OF ERECTION EQUIPMENT (CRANES, TRANSPORTERS, ACCESS PLATFORMS, ETC.). "OTHER LOADS" AND THE CONSTRUCTION LOAD COMBINATIONS IN ACCORDANCE WITH LRFD 5.14.2.3.2.

K. SETTLEMENT

FOUNDATION SETTLEMENT SHALL BE CONSIDERED AS PER PSI TECHNICAL LETTER TL-SSPNP REV 0 DATED AUGUST 31, 2017.



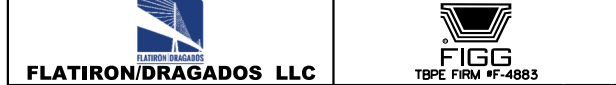
ALL ENGINEERING WORK REPRESENTED ON THIS PLAN HAS BEEN REVIEWED UNDER THE RESPONSIBLE CHARGE OF LICENSE HOLDER AND IS SIGNED/SEALED ACCORDINGLY. THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MATTHEW CARTER, P.E. 133954 ON 01/13/2021
ARUP TEXAS INC., TBPELS FIRM #1990



HL-93 LOADING

1	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
2	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC

NO.	DATE	REVISION	APRV
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US-181 HARBOR BRIDGE

GENERAL NOTES I
NEW HARBOR BRIDGE

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MF	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CFR	TEXAS	CRP	NUECES	
CHECK MC	CONTROL	SECTION	JOB	
CHECK MCP	0101	06	095	

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5.0 MATERIALS

A. CONCRETE (56 DAY SPECIFIED COMPRESSIVE STRENGTH, F'c)

1. PRECAST OR CIP SEGMENTAL SUPERSTRUCTURE (NEW HARBOR BRIDGE)
(CLASS H) (HPC)

PIER AND EJ SEGMENTS	AS SHOWN ON PLANS
SUPERSTRUCTURE SEGMENTS	AS SHOWN ON PLANS
CLOSURE SEGMENTS	AS SHOWN ON PLANS
MEDIAN SLAB	AS SHOWN ON PLANS
DELTA FRAME	F'c = 10.0 KSI

2. PRECAST (CLASS H) OR CIP STAY CABLE TOWERS (CLASS F) (HPC)

LOWER TOWER LEGS	F'c = 8.0 KSI
NODAL ZONE	F'c = 10.0 KSI
STRUTS	F'c = 10.0 KSI
LIFTS 1 THRU 15 ABOVE DECK	F'c = 10.0 KSI
REMAINDER OF UPPER TOWER	F'c = 8.0 KSI
TOWER TABLE (CLASS H)	F'c = 10.0 KSI

3. CIP SUBSTRUCTURE (CLASS F) (HPC)

(PIERS, FOOTINGS AND PEDESTALS) F'c = 5.5 KSI (UNO)

4. PRECAST PRESTRESSED CONCRETE PILES (CLASS H) (HPC) F'c = 7.0 KSI,
F'ci = 6.0 KSI (MAX)

5. DRILLED SHAFTS (CLASS SS) (HPC) F'c = 3.6 KSI
6. BARRIERS (CLASS C) (HPC) F'c = 3.6 KSI

B. PRESTRESSING STRANDS

1. ASTM A416, GRADE 270 7 WIRE STRANDS, LOW-RELAXATION

2. STRAND DIAMETER (POST-TENSIONED)	0.6"
NOMINAL AREA	0.217 IN ²
NOMINAL WEIGHT	0.74 LB/FT

3. STRAND DIAMETER (POST-TENSIONED)

NOMINAL AREA	0.62"
NOMINAL WEIGHT	0.232 IN ²
	0.778 LB/FT

4. STRAND DIAMETER (PRE-TENSIONED)

NOMINAL AREA	0.5"
NOMINAL WEIGHT	0.153 IN ²
	0.53 LB/FT

5. MODULUS OF ELASTICITY 28,500 KSI
6. MAXIMUM JACKING STRESS 216 KSI

7. MAXIMUM STRESSES WHEN ANCHORED PER AASHTO LRFD

8. ANCHOR SET (POST-TENSIONED, (TO BE VERIFIED DURING CONSTRUCTION): 0.375"

9. FRICTION COEFFICIENT (PLASTIC DUCT) 0.23

10. FRICTION COEFFICIENT (GALVANIZED RIGID STEEL DEVIATOR DUCTS) 0.25

11. WOBBLE COEFFICIENT (INTERNAL DUCTS) 0.00020

12. WOBBLE COEFFICIENT (EXTERNAL DUCTS) 0.00

C. POST-TENSIONING BARS

1. BARS ASTM A722, GRADE 150, TYPE II FOR 1¼",
1⅜" AND 1¾" BAR SIZES

2. MODULUS OF ELASTICITY 30,000 KSI
3. MAXIMUM JACKING STRESS 108 KSI
4. MAXIMUM ANCHORING STRESS 105 KSI

5. ANCHOR SET (TO BE VERIFIED BY LIFT OFF DURING CONSTRUCTION) 0.00"

D. CABLE STAYS

1. ASTM A416, 0.6 INCH DIAMETER 7-WIRE STRANDS, GRADE 270, LOW RELAXATION, WELDLESS GRADE CONFORMING TO THE REQUIREMENTS OF ASTM A416, A416M "STANDARD SPECIFICATION FOR STEEL STRAND, UNCOATED SEVEN-WIRE FOR PRESTRESSED CONCRETE."

2. BAR TENDONS SHALL NOT BE USED AS STAYS.

3. VIBRATION SUPPRESSION SYSTEM IS NOT DETAILED ON THESE DRAWINGS. STAY CABLE SYSTEM SUPPLIER TO PROPOSE TYPE AND CAPACITY OF CABLE DAMPERS AND OTHER VIBRATION CONTROL MEASUREMENTS.

4. ANTI-VANDALISM SYSTEM IS PROVIDED BY STAY CABLE SYSTEM SUPPLIER.

5. STAY CABLE (HDPE DUCT) SHALL NOT BE FILLED WITH GROUT.

E. REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL (EXCEPT AS NOTED IN PARAGRAPHS BELOW) CONFORM TO ASTM A615, GRADE 60 (OR GRADE 75 WHERE SPECIFICALLY NOTED); OR ASTM A706 WHERE SPECIFICALLY NOTED.

2. ALL DIMENSIONS PERTAINING TO LOCATION OF REINFORCEMENT ARE SHOWN TO THE CENTERLINE OF BARS EXCEPT WHERE THE CLEAR DIMENSION IS SHOWN TO A CONCRETE (OR OTHER) SURFACE.

3. MECHANICAL SPLICING COUPLERS (WHERE USED) SHALL BE CAPABLE OF DEVELOPING 125% OF THE BAR YIELD STRENGTH FOR THE BARS BEING COUPLED.

4. ALL REINFORCING STEEL LOCATED ENTIRELY IN THE DECK (TO INCLUDE LONGITUDINAL CLOSURE STRIP) AND BRIDGE RAILINGS OF THE NEW HARBOR BRIDGE (CABLE-STAYED UNIT) SHALL BE EPOXY COATED.

5. FOR TOWERS AND FOUNDATION ELEMENTS THAT SUPPORT THE TOWERS OF THE NEW HARBOR BRIDGE, IN THE SPLASH ZONE, ALL SURFACE REINFORCING STEEL AND VERTICAL REINFORCING STEEL WITHIN 1 FOOT OF THE ELEMENTS SURFACE SHALL BE EPOXY COATED.

6. SPACERS ARE TO BE PROVIDED BETWEEN ADJACENT LAYERS OF PARALLEL REINFORCING BARS, SPACERS SHALL BE PLACED AT INTERVAL OF NOT MORE THAN 60 X DIAMETER OF SMALLEST BAR.

7. LAP SPLICE BETWEEN TWO DIFFERENT SIZE OF BARS, LAP LENGTH OF SMALLER BAR DIAMETER SHOULD BE USED.

8. HEADED BAR REINFORCING (ASTM A970) SHALL HAVE HEADS WITH A NET AREA OF 4 TIMES THE AREA OF THE REINFORCING BAR AND SHALL BE ON A PREQUALIFIED PRODUCT LIST.

F. CONCRETE COVER

AS PER THE CORROSION PROTECTION PLAN.

1. SEGMENTAL SUPERSTRUCTURE, TOP OF DECK 2.5" *
2. SEGMENTAL SUPERSTRUCTURE, BOTTOM OF DECK 1.25"
3. SEGMENTAL SUPERSTRUCTURE, WEBS AND BOTTOM SLAB (EXTERIOR SURFACE) 2"
4. SEGMENTAL SUPERSTRUCTURE, WEBS AND BOTTOM SLAB (INTERIOR SURFACE) 1.5"
5. OTHER SUPERSTRUCTURE ITEMS (DELTA FRAME, SIGN SUPPORTS, ETC.) 2"
6. SUBSTRUCTURE SURFACES CAST AGAINST EARTH OR SUBMERGED IN WATER 4"
7. SUBSTRUCTURE EXTERIOR FORMED SURFACES, EXCEPT AS NOTED ABOVE 3"
8. SUBSTRUCTURE INTERNAL FORMED SURFACES 3"
9. BEARING PEDESTALS 2"
10. DRILLED SHAFTS 6"
11. PRESTRESSED PILING 2"
12. TRAFFIC BARRIERS 1.5"

NOTE: CONCRETE COVERS SHOWN DO NOT INCLUDE PLACEMENT AND FABRICATION TOLERANCES UNLESS SHOWN AS MINIMUM COVER. SEE SPECIFICATIONS FOR ALLOWABLE TOLERANCES.

* THIS VALUE INCLUDES ½" CONCRETE WEARING SURFACE AT END OF CONSTRUCTION. AN ADDITIONAL ½" MILLING SURFACE IS REQUIRED FOR THE CASTING OF THE SEGMENTS.

G. BEARINGS

1. SEGMENTAL BOX GIRDERS
HLMR (POT OR DISK BEARING)

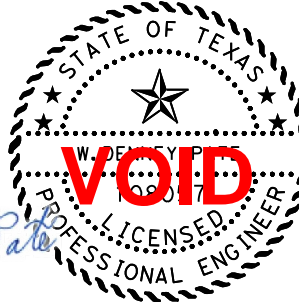
H. MASS CONCRETE

UNLESS OTHERWISE APPROVED BY THE ENGINEER, CONCRETE POURS WITH ALL ORTHOGONAL DIMENSIONS EXCEEDING 3 FEET ARE DEFINED AS MASS CONCRETE EXCEPT AS NOTED BELOW:

1. HOLLOW SECTIONS OF LOWER TOWER



ALL ENGINEERING WORK REPRESENTED ON THIS PLAN HAS BEEN REVIEWED UNDER THE RESPONSIBLE CHARGE OF LICENSE HOLDER AND IS SIGNED/SEALED ACCORDINGLY. THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MATTHEW CARTER, P.E. 133954 ON 01/13/2021 ARUP TEXAS INC., TBPELS FIRM #1990



HL-93 LOADING

1	02/26/19	REVISED NOTES	WDP
2	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
3	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC
NO.	DATE	REVISION	APRV

FLATIRON/Dragados LLC	TBPE FIRM #F-4883



US-181 HARBOR BRIDGE

GENERAL NOTES II
NEW HARBOR BRIDGE

DESIGN MF	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS CFR	STATE TEXAS	DISTRICT CRP	COUNTY NUECES	SHEET NO. 007
CHECK MC	CONTROL	SECTION	JOB	
CHECK MCP	0101	06	095	NHB 08

6.0 DESIGN LIMIT STATES AND CONDITIONS

- A. SEGMENTAL SUPERSTRUCTURE
THE SUPERSTRUCTURE SHALL BE DESIGNED FOR APPLICABLE SERVICE AND STRENGTH LIMIT STATES AS DEFINED BY THE LOAD GROUP IN THE LRFD SPECIFICATIONS. USE CLASS 1 EXPOSURE CONDITION WITH $\gamma_e = 1.00$ FOR CRACK CONTROL COMPUTATIONS.
- B. THE SUBSTRUCTURE SHALL BE DESIGNED FOR THE APPLICABLE STRENGTH AND EXTREME EVENT LIMIT STATES AS DEFINED BY THE LOAD GROUPS IN THE LRFD SPECIFICATIONS.
- C. CRACK CONTROL FOR FLEXURAL ELEMENTS PER THE AASHTO LRFD CRACK CONTROL PROVISIONS WITH CLASS 1 EXPOSURE CONDITIONS.
- D. STAY CABLE
FACTORED LOAD DESIGN PER PTI STAY CABLE RECOMMENDATIONS.

7.0 SCREEDING AND ELEVATIONS OF DECK SLABS

SCREED AND/OR ERECT THE RIDING SURFACE OF ALL PORTIONS OF ALL DECK SLABS, TO ACHIEVE THE FINAL GRADE ELEVATIONS SHOWN IN THE PLANS; AFTER ALL DEFLECTIONS (INCLUDING TIME DEPENDENT DEFORMATIONS) AND DECK GRINDING/PLANING. THE CONTRACTOR SHALL DETERMINE ALL TEMPORARY AND PHASE BY PHASE ERECTED LOCATIONS, ELEVATIONS AND POSITIONS (X, Y & Z) TO ACHIEVE THE SPECIFIED FINAL POSITIONS, BASED UPON THE CONTRACTOR'S FINAL CONSTRUCTION LOADS, SCHEDULE, MATERIAL PROPERTIES, TEMPORARY SUPPORT STIFFNESS, MEANS AND METHODS, ETC.

8.0 PHASING OF WORK

WORK PHASING AND PROGRESSION OF THE WORK SHALL CONFORM TO THE TRAFFIC CONTROL PLANS AND OTHER REQUIREMENTS OF THE CONTRACT.

9.0 ELEVATIONS

ALL ELEVATIONS ARE BASED ON THE NAVD88 COORDINATE SYSTEM.

10.0 SEGMENT CASTING AND ERECTION

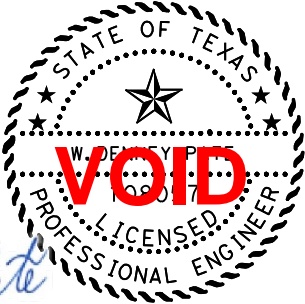
- A. **NOT USED.**
- B. THE MINIMUM CONCRETE STRENGTH AT THE TIME OF RELEASING FORMS FOR THE PRECAST SEGMENTS SHALL BE 2500 PSI. 50% OF TRANSVERSE PRESTRESSING (HALF OF THE STRANDS IN EACH ANCHORAGE) SHALL BE STRESSED PRIOR TO RELEASING FORMS FOR SUPERSTRUCTURE SEGMENTS. THE REMAINING TRANSVERSE PRESTRESSING SHALL NOT BE STRESSED UNTIL AFTER THE SEGMENT HAS ACHIEVED THE MINIMUM CONCRETE STRENGTH OF 4000 PSI AND HAS BEEN USED IN THE MATCH-CAST POSITION AND SEPARATED FROM THE NEWLY CAST SEGMENT. THE ACTUAL CONCRETE STRENGTH AT TIME OF TRANSVERSE STRESSING SHALL ALSO NOT BE LESS THAN SHOWN ON THE APPROVED PRESTRESSING SYSTEM SUPPLIER'S SHOP DRAWINGS.
- C. THE MINIMUM CONCRETE STRENGTH OF PRECAST SEGMENTS WHEN FIRST ERECTED SHALL NOT BE LESS THAN THE MINIMUM 56-DAY STRENGTH SHOWN IN THE PLANS.
- D. THE MINIMUM AGE OF PRECAST SEGMENTS WHEN FIRST ERECTED SHALL NOT BE LESS THAN THAT SHOWN IN THE **ERECTION MANUAL.**
- E. THE MINIMUM STRENGTH OF CLOSURE JOINT CONCRETE CAST BETWEEN PRECAST ELEMENTS SHALL BE 3500 PSI AT THE TIME OF STRESSING LONGITUDINAL POST-TENSIONING AND BEFORE THE CLOSURE JOINT FORMWORK IS REMOVED.
- F. THE CONTRACTOR'S SELECTED SEQUENCE, MEANS, AND METHODS OF FORMWORK REMOVAL SHALL NOT RESULT IN ANY DAMAGE OR DISTRESS TO THE CONCRETE OF THE SEGMENTS OR OTHER BRIDGE COMPONENTS.

11.0 POST-TENSIONING

- A. THE MINIMUM STRENGTH FOR STRESSING OF LONGITUDINAL POST-TENSIONING TENDONS SHALL NOT BE LESS THAN NOTED IN PRIOR SECTION 10.0 AND AS SHOWN ELSEWHERE IN THE PLANS.
- B. ANCHORAGE BLOCKOUTS AND OTHER NECESSARY DETAILS FOR STRESSING LOCAL ZONE REINFORCEMENT AND END ANCHORAGE PROTECTION SHALL BE DETERMINED BY THE CONTRACTOR BASED UPON THE CONTRACTOR'S SELECTED, AND OWNER APPROVED, PRESTRESSING SYSTEM.
- C. THE PLANS ILLUSTRATE THE USE OF SPIRALS AS A SCHEMATIC REPRESENTATION OF LOCAL REINFORCEMENT ADJACENT TO STRAND TENDON ANCHORAGES. THE CONTRACTOR AND THE PRESTRESSING SYSTEM SUPPLIER SHALL DEVELOP AND UTILIZE LOCAL REINFORCEMENT (BURSTING STEEL) CONSISTENT WITH THAT NEEDED BY THE SYSTEM SUPPLIED AND WHICH ALSO FITS WITHOUT CONFLICT TO OTHER EMBEDDED ITEMS WITHIN THE ELEMENT. SUCH LOCAL REINFORCEMENT FOR PRESTRESSING ANCHORAGES MAY BE SPIRALS, CLOSED HOOPS, TIES OR OTHER GRID REINFORCEMENT AS DETERMINED BY THE CONTRACTOR AND PRESTRESSING SYSTEM SUPPLIER.





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ARUP TEXAS INC., TBPELS FIRM #1990



HL-93 LOADING

1	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
2	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC

NO.	DATE	REVISION	APRV
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 FLATIRON/Dragados LLC	 FIGG TBPE FIRM #F-4883
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US-181 HARBOR BRIDGE			
GENERAL NOTES III NEW HARBOR BRIDGE			

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MF	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CFR	TEXAS	CRP	NUECES	
CHECK	CONTROL	SECTION	JOB	
MC	0101	06	095	
MCP				

008
NHB 0C

- 12.0 CAST-IN-PLACE CLOSURE SEGMENT DIMENSIONS
- THE CAST-IN-PLACE CLOSURE SEGMENT DIMENSIONS SHALL BE FIELD VERIFIED BEFORE FABRICATING THE REINFORCING STEEL BARS FOR THESE LOCATIONS. IT IS ANTICIPATED THAT DUE TO ACCUMULATED TOLERANCES, CREEP AND SHRINKAGE, TEMPERATURE VARIATIONS AND VERTICAL PROFILE, FIELD DIMENSIONS WILL BE DIFFERENT FROM THOSE SHOWN IN THE PLANS. THEREFORE, ACTUAL DIMENSIONS SHALL BE USED AS THE BASIS FOR REINFORCEMENT DIMENSIONS AND THEY SHALL BE ADJUSTED AS NEEDED PRIOR TO FABRICATION.
- 13.0 HANDLING DEVICES
- LIFTING ATTACHMENTS ARE NOT SHOWN IN THE PLANS AND WILL BE UTILIZED TO EFFICIENTLY LIFT BRIDGE ELEMENTS. DETAILS WILL BE INCLUDED IN THE ERECTION MANUAL.
- 14.0 JACKING OF MAIN SPAN SUPERSTRUCTURE CLOSURE
- JACKING OF THE MAIN SPAN CENTER CLOSURE IS INCLUDED IN THIS CONTRACT. ADDITIONAL JACKING, AT THIS OR OTHER LOCATIONS, MAY BE NECESSARY BASED ON AS-BUILT CONDITIONS.
- 15.0 TEMPORARY SHORING NEAR EXISTING STRUCTURES
- THE DESIGN, CONSTRUCTION, MAINTAINING AND REMOVAL OF TEMPORARY SHORING NEAR EXISTING STRUCTURES WILL BE PROVIDED AS REQUIRED BY SECTION 455-1.1.
- 16.0 CRITICAL TEMPORARY AND EXISTING WALLS
- THE CONTRACTOR SHALL ENSURE THAT EXCAVATION OR OTHER CONSTRUCTION ACTIVITIES DO NOT AFFECT THE PERFORMANCE OF CRITICAL TEMPORARY OR EXISTING WALLS.

18.0 REFERENCE CONDITION

UNLESS NOTED OTHERWISE THE GEOMETRY SHOWN ON THE DRAWINGS CORRESPONDS TO THE REFERENCE CONDITION DESCRIBED BELOW:

- A. TIME: 30,000 DAYS AFTER BRIDGE OPENING
- B. TEMPERATURE: 70°F
- C. LOADING: PERMANENTLY APPLIED LOADS
- D. SETTLEMENT: 14" OF SETTLEMENT AT THE TOWERS

19.0 FUTURE DEEPENING OF CHANNEL

DESIGN ALLOWS FOR FUTURE DEEPENING OF THE CHANNEL UP TO -68' OVER THE EXTENT OF THE FEDERAL CHANNEL LIMITS AS SHOWN IN ATTACHMENT L TO THE CONSTRUCTION ACCESS AGREEMENT BETWEEN TXDOT AND PORT OF CORPUS CHRISTI AUTHORITY. IF THE CHANNEL IS DEEPEINED LATERAL SUPPORT MUST BE MAINTAINED TO THE TOWER FOUNDATIONS WHICH MAY REQUIRE DESIGN AND CONSTRUCTION OF ENGINEERED SLOPES OR EARTH RETAINING STRUCTURES BETWEEN THE BULKHEAD LINES AND THE TOWER FOUNDATIONS.

- 17.0 CONCRETE SURFACE FINISH
- A. AS REQUIRED BY ITEM 420.4.13 OF ATTACHMENT 13-1 TO THE TECHNICAL PROVISIONS, APPLY AN ORDINARY SURFACE FINISH TO ALL CONCRETE SURFACES. THIS IS MEANT TO ENSURE THE CONCRETE SURFACE HAS A UNIFORM APPEARANCE, WHETHER FLAT OR TEXTURED, AND IS ACCOMPLISHED BY THE FOLLOWING:
- 1.CHIP AWAY ALL LOOSE OR BROKEN MATERIAL TO SOUND CONCRETE WHERE POROUS, SPALLED, OR HONEYCOMBED AREAS ARE VISIBLE AFTER FORM REMOVAL.
- 2.REPAIR SPALLS IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE TXDOT CONCRETE REPAIR MANUAL AVAILABLE ON TXDOT’S WEBSITE.
- 3.CLEAN AND FILL HOLES OR SPALLS CAUSED BY THE REMOVAL OF FORM TIES, ETC., WITH LATEX GROUT, CEMENT GROUT, OR EPOXY GROUT AS APPROVED. FILL ONLY THE HOLES. DO NOT BLEND THE PATCH WITH THE SURROUNDING CONCRETE ON SURFACES TO RECEIVE A RUB FINISH IN ACCORDANCE WITH ITEM 427, "SURFACE FINISHES FOR CONCRETE", CHIP OUT EXPOSED PARTS OF METALS CHAIRS TO A DEPTH OF ½ IN. AND REPAIR THE SURFACE.
- 4.REMOVE ALL FINS, RUST STAINING, RUNS, DRIPS, OR MORTAR FROM SURFACES THAT WILL BE EXPOSED. SMOOTH ALL FORM MARKS AND CHAMFER EDGES BY GRINDING OR DRY-RUBBING.
- 5.ENSURE ALL REPAIRS ARE DENSE, WELL-BONDED, AND PROPERLY CURED. FINISH EXPOSED LARGE REPAIRS TO BLEND WITH THE SURROUNDING CONCRETE WHERE A HIGHER CLASS OF FINISH IS NOT SPECIFIED.
- B. SELECT LOCATIONS REQUIRE THE APPLICATION OF AN OPAQUE SEALER, IN ADDITION TO THE ORDINARY SURFACE FINISH DESCRIBED IN (A), ABOVE. THE PENETRATING-TYPE OPAQUE SEALER SHALL MEET ALL CRITERIA IN THE TXDOT DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS), SECTION DMS-8110, "COATINGS FOR CONCRETE". THE COLOR OF THE COATING SHALL MATCH FEDERAL STANDARD 595B COLOR 35630 CONCRETE GRAY. THE COATING SHALL BE APPLIED TO A DRY SURFACE IN 2 COATS AT A MAXIMUM RATE OF 200 SQUARE FEET PER GALLON. TABLE 1 DESCRIBES THE REQUIREMENTS FOR COATING WITH OPAQUE SEALER FOR EACH BRIDGE ELEMENT.

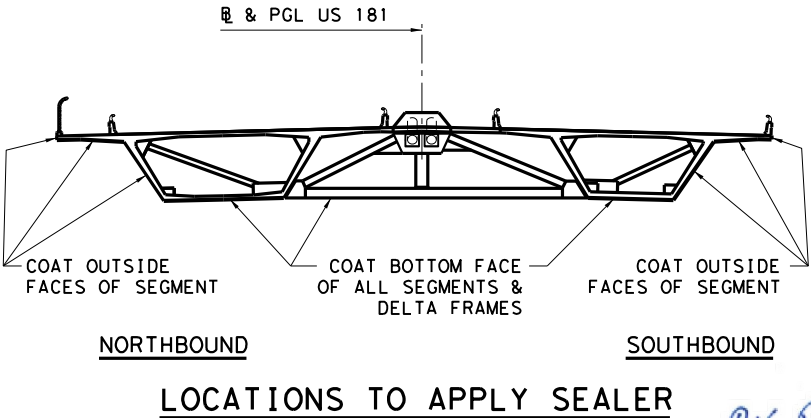
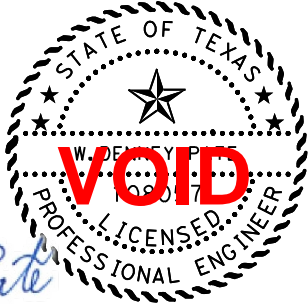


TABLE 1. OPAQUE SEALER COATING REQUIREMENTS.	
ELEMENT	CONCRETE COATING REQUIREMENT
TOWER	OPAQUE SEALER IS NOT REQUIRED
CONCRETE TRAFFIC BARRIER	OPAQUE SEALER IS REQUIRED ON ALL CONCRETE SURFACES OF THE BARRIER THROUGHOUT THE PROJECT CORRIDOR. <div>EXTERNAL</div>
PIERS	OPAQUE SEALER IS REQUIRED ON ALL <div>Y</div> CONCRETE SURFACES OF PIERS, THROUGHOUT THE PROJECT CORRIDOR.
DELTA FRAMES	OPAQUE SEALER IS REQUIRED ON THE BOTTOM SURFACE OF ALL DELTA FRAMES
BEAMS AND GIRDERS	OPAQUE SEALER REQUIRED TO BE APPLIED TO GIRDERS THROUOUT THE PROJECT CORRIDOR. FOR CONCRETE GIRDERS, COAT THE OUTSIDE FACES OF EXTERIOR GIRDERS AND THE BOTTOM FACE OF ALL.



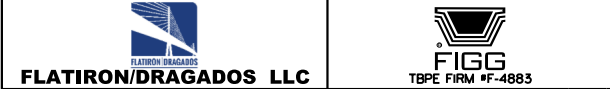
ALL ENGINEERING WORK REPRESENTED ON THIS PLAN HAS BEEN REVIEWED UNDER THE RESPONSIBLE CHARGE OF LICENSE HOLDER AND IS SIGNED/SEALED ACCORDINGLY. THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MATTHEW CARTER, P.E. 133954 ON 01/13/2021
ARUP TEXAS INC., TBPELS FIRM #1990



HL-93 LOADING

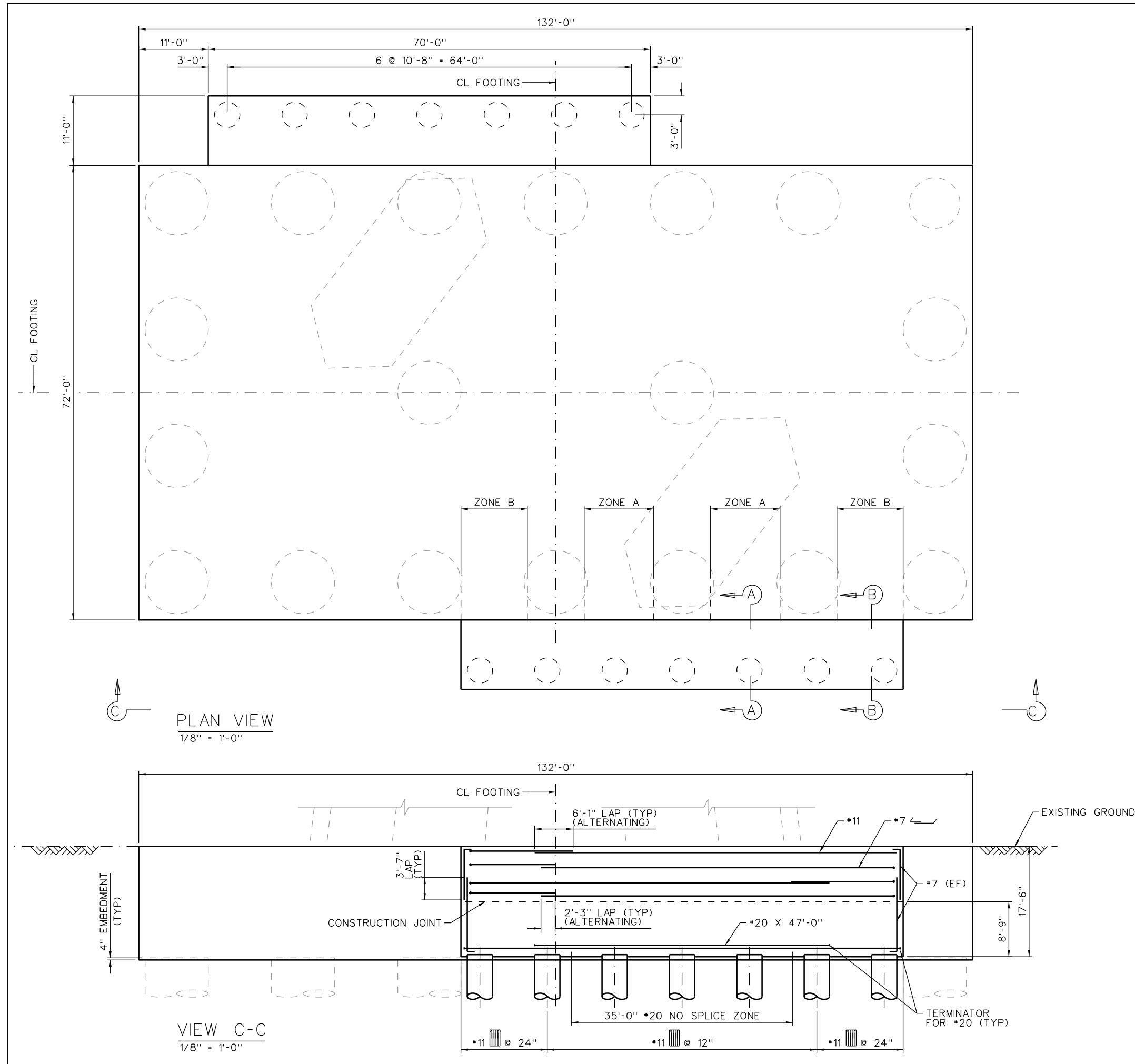
1	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
2	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC

NO.	DATE	REVISION	APRV
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US-181 HARBOR BRIDGE			
GENERAL NOTES IV NEW HARBOR BRIDGE			



DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MF	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CFR	TEXAS	CRP	NUECES	
CHECK	CONTROL	SECTION	JOB	
MC	0101	06	095	
MCP				



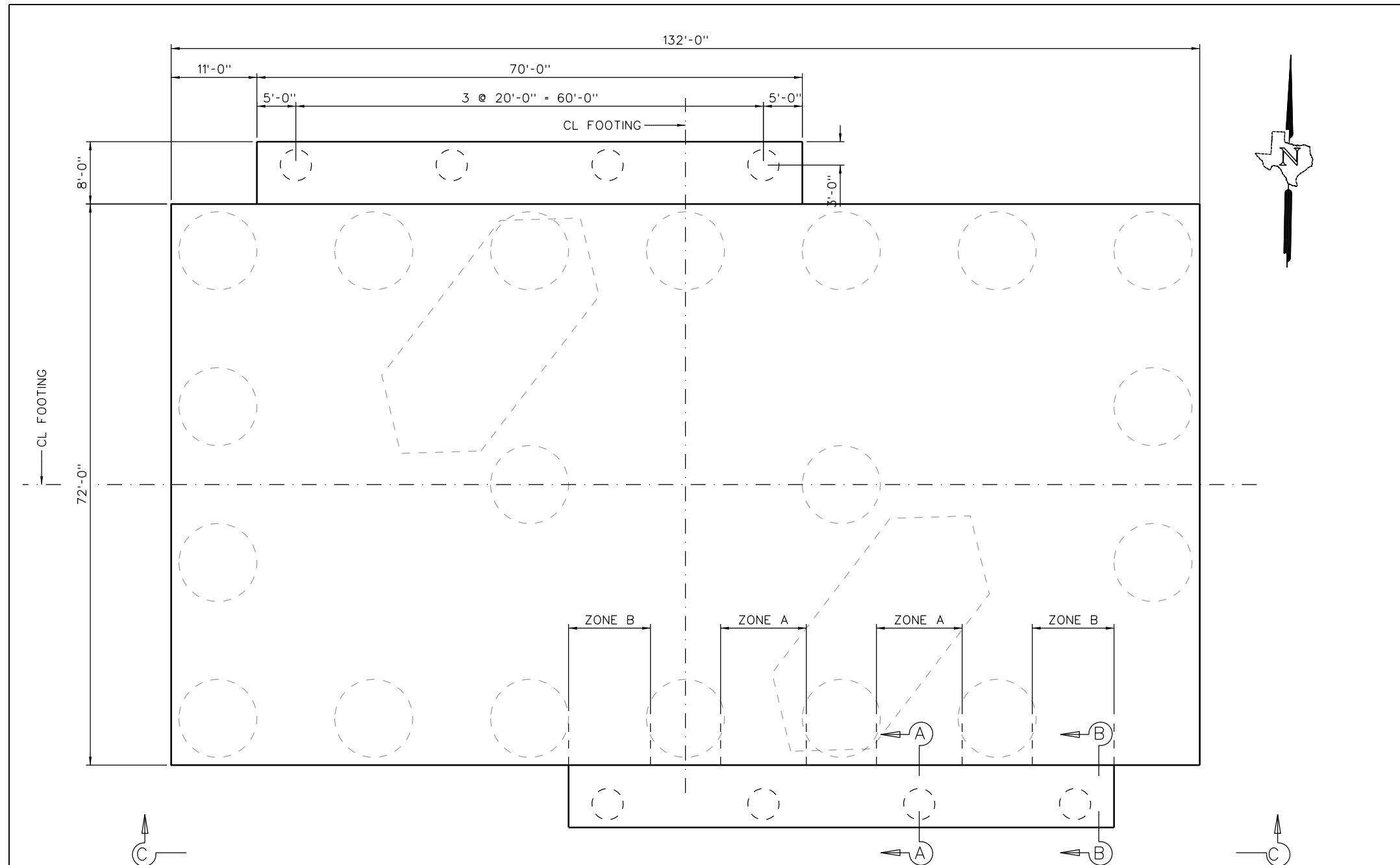
- NOTES:
1. ALL DETAILS SHOWN ARE PRELIMINARY AND SUBJECT TO DEVELOPMENT.
 2. EXTENSION TO FOOTING SHALL BE 5.5 KSI CONCRETE.
 3. LENGTH OF 4FT DIAMETER DRILLED SHAFTS SHALL BE SIMILAR TO EXISTING DRILLED SHAFTS.

NOT FOR CONSTRUCTION

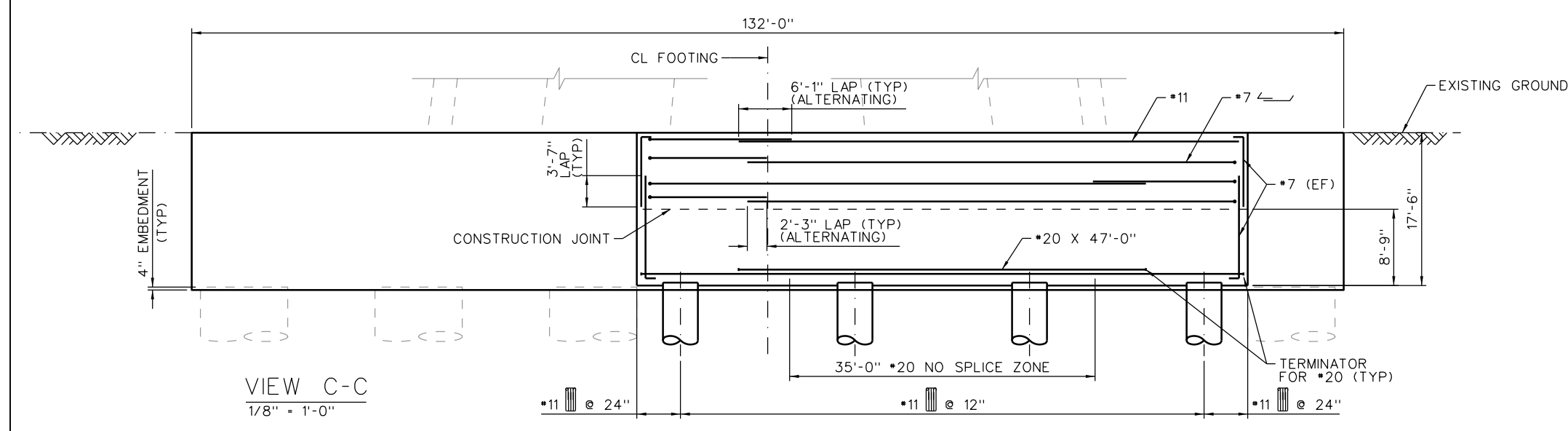
SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")

NO	DATE	REVISION	APPV	
<div> FLATIRON DRAGADOS LLC</div>			<div>ARUP CFC</div>	
<div> <i>Texas Department of Transportation</i></div>				
US-181 HARBOR BRIDGE				
MAIN SPAN				
TOWER 1NT & 1ST				
FOOTING EXTENSION I				
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QM	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
RG	TEXAS	CRP	NUECES	SK 10
CHECK LT	CONTROL	SECTION	JOB	
CHECK MC	0101	06	095	

SK
10






PLAN VIEW
1/8" = 1'-0"



VIEW C-C
1/8" = 1'-0"

- NOTES:
1. ALL DETAILS SHOWN ARE PRELIMINARY AND SUBJECT TO DEVELOPMENT.
 2. EXTENSION TO FOOTING SHALL BE 5.5 KSI CONCRETE.
 3. LENGTH OF 4FT DIAMETER DRILLED SHAFTS SHALL BE SIMILAR TO EXISTING DRILLED SHAFTS.

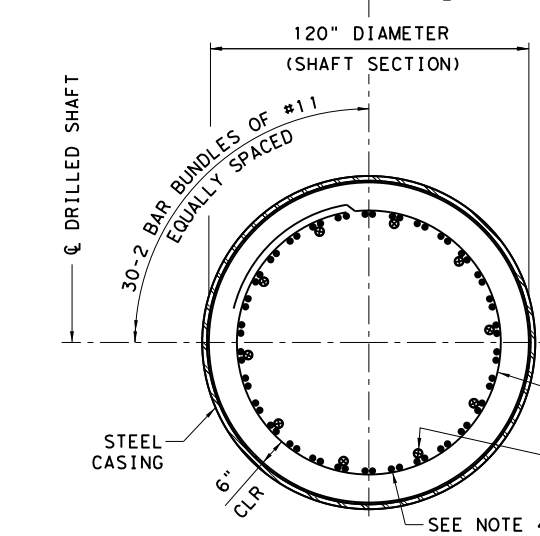
NOT FOR CONSTRUCTION

SCALES SHOWN FOR FULL SIZE DRAWINGS (22"x34")				
NO	DATE	REVISION	APPROVAL	
 FLATIRON DRAGADOS LLC				
 <i>Texas Department of Transportation</i>				
US-181 HARBOR BRIDGE				
MAIN SPAN TOWER 1ST FOOTING EXTENSION I				
DESIGN QM	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS RG	X	(See Title Sheet)		US-181
CHECK LT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	SK 12
	CONTROL	SECTION	JOB	
	0101	06	095	

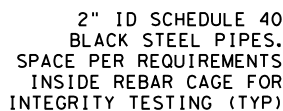


VARIES

DS1101 - DS1105



This drawing is for a typical 120" diameter shaft in the South Tower. Drawings for the 48" diameter shafts are under development. Bottom of casing elevation and length of the shafts will remain the same.

DRILLED SHAFT REINFORCEMENT PER SHAFT

DRILLED SHAFT SCHEDULE

1. ALTERNATE LAP SPlice LOCATIONS OF ADJACENT TIES.
2. SHAFT SECTION DETAILS ARE CONSISTENT WITH RFP TP ATTACHMENT 13-1, ITEM 416, SEC. 3.5.
- ③ THE REINFORCEMENT SHOWN FROM TOP OF SHAFT DOWN 100 FT. REPRESENTS STRUCTURAL NEEDS. REINFORCING STEEL BELOW THAT ELEVATION IS PROVIDED FOR THE MEANS AND METHODS OF CONSTRUCTION AND IS SHOWN ON THIS DRAWING AS AGREED TO BY THE DEVELOPER.
4. USE TEMPLATE OR OTHER MEANS TO ENSURE ORIENTATION OF DOWEL GROUP IS ORTHOGONAL TO FOOTING DIMENSIONS.
5. THE INITIAL LENGTH OF CASING IS EQUAL TO 55'-0". THE THICKNESS OF THE CASING IS EQUAL TO 1/2".
6. THE STEEL CASING IS NOT ACCOUNTED FOR IN

**THE CAPACITY VERIFICATION OF THE DRILLED SHAFTS.
ONLY THE LENGTH BELOW THE TOP OF SHAFT WILL
REMAIN IN PLACE PERMANENTLY.**

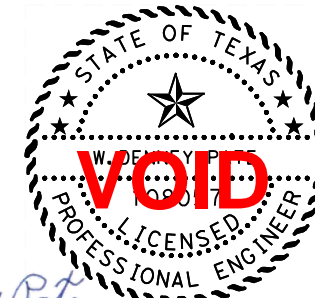
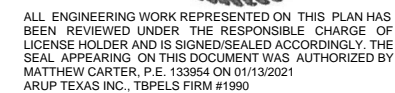
⑦ THE TOP ELEVATION OF DRILLED SHAFTS SHALL BE ADJUSTED 14" HIGHER THAN THE ELEVATION SHOWN ON THIS DRAWING TO COMPENSATE FOR ANTICIPATED SETTLEMENT/DISPLACEMENT. THE LOWER ELEVATION OF THE SHAFT SHALL REMAIN UNCHANGED BY THE ADJUSTMENT AT THE TOP.

1	10/31/17	REVISED DEVELOPMENT LENGTH, DIM, TABLES AND UPDATE NOTES.	WDP
2	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
3	01/13/21	TBPELS NO. ADDED AND NOTE 6 UPDATED	MC
NO.	DATE	REVISION	APRV



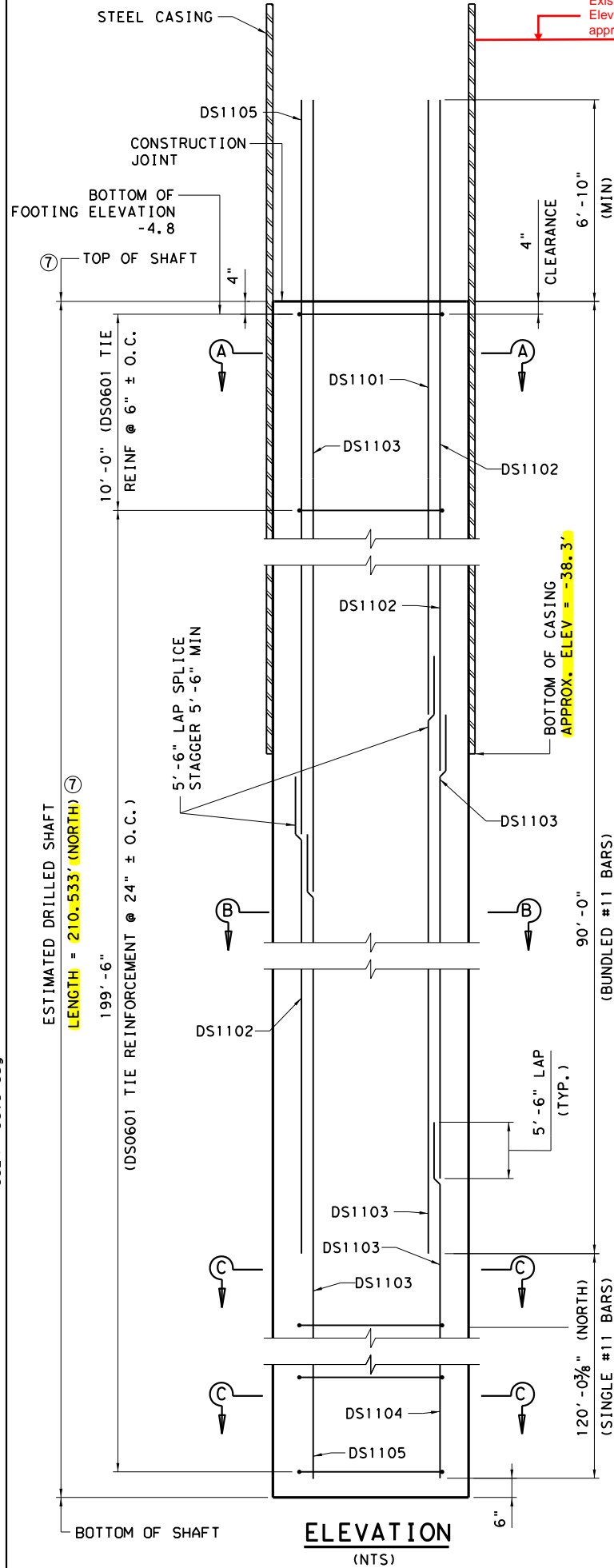
MAIN SPAN
DRILLED SHAFT DETAILS
TYPE A

DESIGN EDL	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS CFR	X	(See Title Sheet)		US-181
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MC	TEXAS	CRP	NUECES	NHB 31
CHECK	CONTROL	SECTION	JOB	
MCP	0101	06	095	



W. Denney Pate

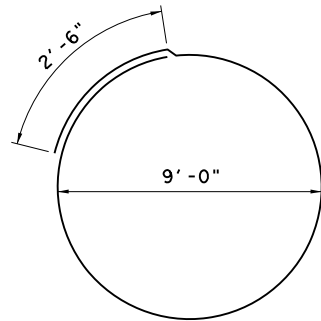
~~10/31/17~~



BAR BENDING DIAGRAMS
(ALL DIMENSIONS ARE OUT TO OUT)



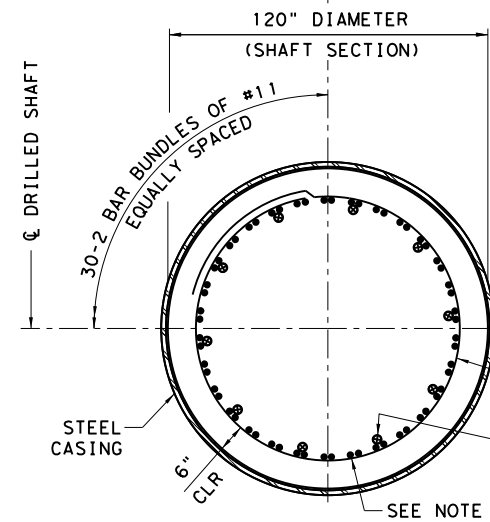
DS1101 - DS1105



DS0601

SHORT DIMENSION OF FOOTING

CL DRILLED SHAFT

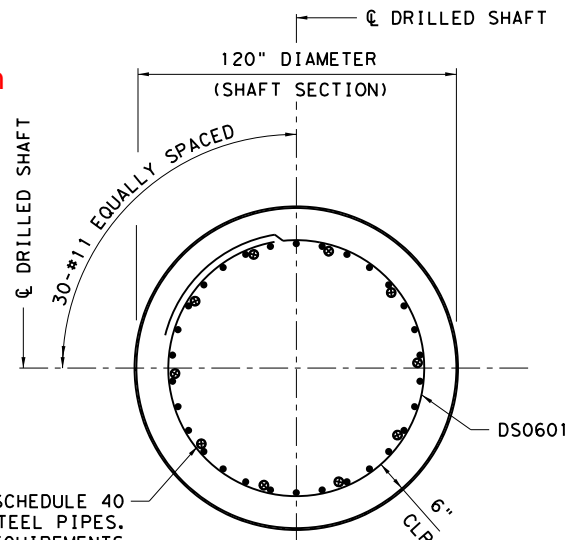


SECTION A-A

This drawing is for a typical 120" diameter shaft in the North Tower. Drawings for the 48" diameter shafts are under development. Bottom of casing elevation and length of the shafts will remain the same.

ELEV = -104.467' ③

2" ID SCHEDULE 40 BLACK STEEL PIPES. SPACE PER REQUIREMENTS INSIDE REBAR CAGE FOR INTEGRITY TESTING (TYP)



SECTION C-C

DRILLED SHAFT REINFORCEMENT PER SHAFT

PIER NO	DS0601		DS1101		DS1102		DS1103		DS1104 ⑦		DS1105 ⑦	
	NO	LENGTH	NO	LENGTH	NO	LENGTH	NO	LENGTH	NO	LENGTH	NO	LENGTH
1NT	121	30'-10"	15	43'-6"	45	49'-0"	90	60'-0"	15	22'-1"	30	54'-7"

DRILLED SHAFT SCHEDULE

ABUTMENT OR PIER NUMBER	DRILLED SHAFT DIAMETER	COMPRESS LOAD CAPACITY (TONS) ⑧	UPLIFT LOAD CAPACITY (TONS)	TOP OF SHAFT ELEV ⑦	INSTALLATION CRITERIA		DESIGN CRITERIA			
					TIP ELEV (FT)	DRILLED SHAFT LENGTH (FT) ⑦	SERVICE DESIGN COMP LOAD (TONS)	SERVICE DESIGN TENSION LOAD (TONS)	DOWN DRAG (TONS)	MAX SCOUR DEPTH (FT)
1NT	120"	6317.5	2625	-4.467	-215.00	210.533	5245	0	N/A	N/A

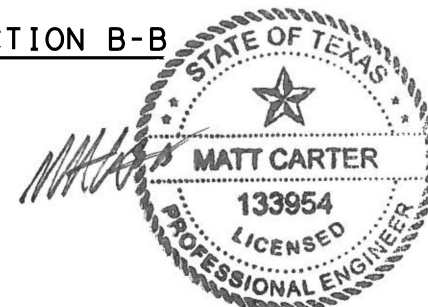
NOTES:

1. ALTERNATE LAP SPLICE LOCATIONS OF ADJACENT TIES.
2. SHAFT SECTION DETAILS ARE CONSISTENT WITH RFP TP ATTACHMENT 13-1, ITEM 416, SEC. 3.5.
3. THE REINFORCEMENT SHOWN FROM TOP OF SHAFT DOWN 100 FT. REPRESENTS STRUCTURAL NEEDS. REINFORCING STEEL BELOW THAT ELEVATION IS PROVIDED FOR THE MEANS AND METHODS OF CONSTRUCTION AND IS SHOWN ON THIS DRAWING AS AGREED TO BY THE DEVELOPER.
4. USE TEMPLATE OR OTHER MEANS TO ENSURE ORIENTATION OF DOWEL GROUP IS ORTHOGONAL TO FOOTING DIMENSIONS.
5. THE INITIAL LENGTH OF CASING IS EQUAL TO 55'-0". THE THICKNESS OF THE CASING IS EQUAL TO 1/2".
6. THE STEEL CASING IS NOT ACCOUNTED FOR IN THE CAPACITY VERIFICATION OF THE DRILLED SHAFTS. ONLY THE LENGTH BELOW THE TOP OF SHAFT WILL REMAIN IN PLACE PERMANENTLY.

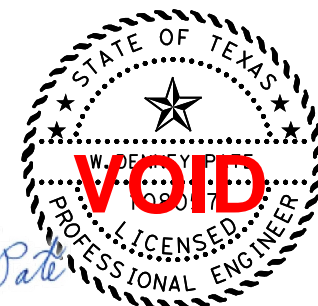
- ⑦ THE TOP ELEVATION OF DRILLED SHAFTS SHALL BE ADJUSTED 14" HIGHER THAN THE ELEVATION SHOWN ON THIS DRAWING TO COMPENSATE FOR ANTICIPATED SETTLEMENT DISPLACEMENT. THE LOWER ELEVATION OF THE SHAFT SHALL REMAIN UNCHANGED BY THE ADJUSTMENT AT THE TOP.

- ⑧ THE BASE GEOTECHNICAL CAPACITY FOR THE 10' SHAFT IS 4,750 TONS AND WITH THE 33% STRESS ALLOWANCE FOR LOAD CASES INCLUDING TEMPORARY TRANSIENT LOADS BECOMES 6,317.5 TONS.

SECTION B-B

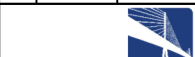


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HL-93 LOADING

1	08/07/18	UPDATED DRILLED SHAFTS CAPACITIES, LOAD AND NOTE	WDP
2	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
3	01/13/21	TBPELS NO. ADDED AND NOTE 6 UPDATED	MC
NO.	DATE	REVISION	APRV

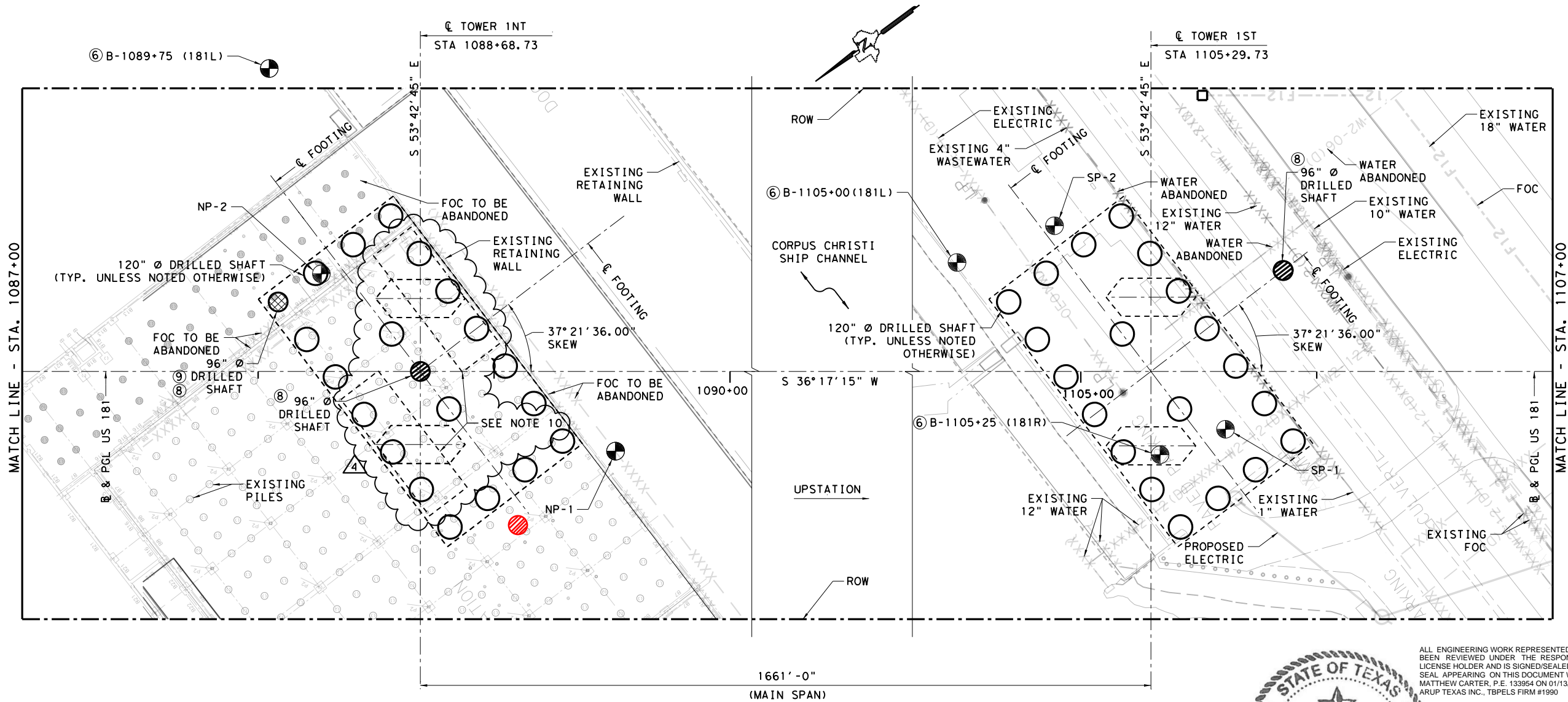


US-181 HARBOR BRIDGE

MAIN SPAN
DRILLED SHAFT DETAILS
TYPE D

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EDL	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CFR	TEXAS	CRP	NUECES	NHB 32B
CHECK	CONTROL	SECTION	JOB	
MC	0101	06	095	
MCP				

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DATE: 6/24/2019
TIME: 2:57:00 PM
USER: lcavanough



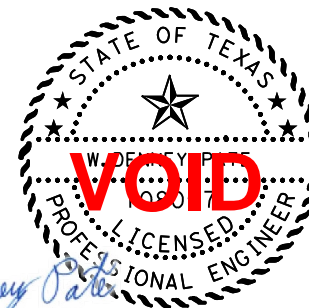
FOUNDATION LAYOUT

- NOTES:
- FOR ADDITIONAL INFORMATION, SEE GENERAL NOTES SHEETS.
 - FOR DRILLED SHAFT LENGTHS AND ELEVATIONS, SEE DRILLED SHAFT DETAILS SHEETS.
 - FOR SOIL BORING DATA, SEE BORING LOG SHEETS.
 - FOR FOOTING DIMENSIONS, SEE FOOTING DIMENSIONS SHEETS.
 - CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF EXISTING STRUCTURES AND UTILITIES PRIOR TO CONSTRUCTION.
 - BORING BY HVJ. FOR HVJ BORING DATA, SEE HVJ GEOTECHNICAL REPORT DATED 9/29/2014.
 - FOR BORING COORDINATES SEE BORING LOGS.
 - FOR 96" DIAMETER DRILLED SHAFT DETAILS, SEE LOAD TEST PACKAGE.
 - THIS SHAFT INCLUDES LOAD CELLS WITH BOTTOM OF LOAD CELLS AT ELEVATIONS -160 AND -210 AND THE ASSOCIATED LOCAL DISCONTINUITY OF REINFORCEMENT.
 - ADDITIONAL PRECAST PILES IN THIS REGION ARE NOT SHOWN ON THIS SHEET. FOR PRECAST PILE LAYOUT, SEE MAIN SPAN PRECAST PILE LAYOUT - TOWER 1NT SHEET.

FOOTING VARIABLES					
FOOTING	NORTHING	EASTING	TRANSVERSE BEARING	OFFSET	BOTTOM OF FOOTING ELEVATION
1NT	17186724.541	1340493.377	N 88° 55' 39" E	0'	-4.8
1ST	17185385.678	1339510.337	N 88° 55' 39" E	0'	-4.8

LEGEND

- BORE HOLE
- LOAD TEST SHAFT
- LOAD TEST AND PRODUCTION SHAFT



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0 10 20 30 40 50
SCALE : 1"=50'

HL-93 LOADING

1	9/19/17	UPDATED DRILLED SHAFT LAYOUT	WDP
2	9/29/17	ADDED 8' SHAFT	WDP
3	04/24/18	UPDATED NOTE	WDP
4	06/24/19	ADDITIONAL PRECAST PILES	WDP
5	12/08/20	NEW LEAD ENGINEERING FIRM REVIEW	MC
6	01/13/21	TBPELS FIRM NO. ADDED. NO CHANGE	MC



US-181 HARBOR BRIDGE

MAIN SPAN FOUNDATION LAYOUT I - TOWERS 1NT & 1ST

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
EDL	X	(See Title Sheet)		US-181
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CFR	TEXAS	CRP	NUECES	NHB 6
CHECK	CONTROL	SECTION	JOB	
MC	0101	06	095	

KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

SOIL DENSITY OR CONSISTENCY BASED ON TCP VALUES

Soil Materials	Major Divisions		Symbol	Name	
Sand	50% or more passes No. 4 sieve	Less than 5% passes No. 200 sieve	SP	Poorly Graded Sands	
		More than 12% passes No. 200 sieve	Limits plot below "A" line & hatched zone on plasticity chart	SM	Silty Sands
			Limits plot above "A" line & hatched zone on plasticity chart	SC	Clayey Sands
Clay & Silt	50% or more passes No. 200 sieve	Liquid Limit Less than 50%	ML	Inorganic Silts	
			CL	Inorganic clays of low to medium plasticity, Lean Clays	
		Liquid Limit 50% or more	CH	Inorganic clays of high plasticity, Fat Clays	

**For soils having 5-12% passing the No. 200 sieve, dual symbol is used.*

SOIL DENSITY OR CONSISTENCY BASED ON TCP VALUES

Density (Granular)	Consistency (Cohesive)	TCP Value (blows/ft)	Field Identification
Very Loose	Very Soft	0 – 8	Sample (height twice diameter) sags under own weight
Loose	Soft	8 – 20	Sample can be pinched or imprinted easily with finger
Slightly Compact	Stiff	20 – 40	Sample can be imprinted with considerable pressure
Compact	Very Stiff	40 – 80	Sample can only be imprinted slightly with fingers
Dense	Hard	80 – 100/5"	Sample cannot be imprinted with fingers but can be penetrated with pencil
Very Dense	Very Hard	100/5" – 100/0"	Sample cannot be penetrated with Pencil

BASED ON SPT VALUES

Density (Granular)	SPT Value (blows/ft)
Very Loose	Less than 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	More than 50

Consistency (Cohesive)	SPT Value (blows/ft)
Very Soft	Less than 2
Soft	2 to 4
Medium Stiff	4 to 8
Stiff	8 to 15
Very Stiff	15 to 30
Hard	More than 30

COHESIVE SOIL CONSISTENCY BASED ON POCKET PEN. VALUES

Description	Pocket Pen.	Criteria
Very Soft	Less than 0.5	Thumb will penetrate soil more than 1 in.
Soft	0.5 to 1.0	Thumb will penetrate soil about 1 in.
Medium Stiff	1.0 to 2.0	Thumb will indent soil about ½ in.
Stiff	2.0 to 3.5	Thumb will indent soil about ¼ in.
Very Stiff	3.5 to 4.5	Thumb will indent soil about 1/8 in.
Hard	Greater than 4.5 (4.5+)	Thumb will not indent soil but readily indented with thumbnail

SOIL MOISTURE CONDITION

Description	Condition
Absence of moisture, dusty, dry to touch	Dry
Damp but no visible water	Moist
Visible free water	Wet

MATERIAL SYMBOLS

CLAY (CL)

CLAY (CH)

SAND

SILT

OTHER (e.g. Pavement, Concrete, Fill, etc.)

Professional Service Industries, Inc. (PSI)

PSI 09/29/17

HL-93 LOADING

NO.	DATE	REVISION	APRV
US-181 HARBOR BRIDGE			
MAIN SPAN BORING LOGS TERMS AND SYMBOLS			
DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS PSI	STATE TEXAS	DISTRICT CRP	COUNTY NUECES
CHECK PSI	CONTROL 0101	SECTION 06	JOB 095
CHECK PSI			
			HIGHWAY NO. US-181 SHEET NO. NHB 8B

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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

1 of 7

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft
District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CONCRETE, 11.25" Suspended Concrete Dock, and 7' Air Void							
5										
5.9										
		0 (6) 0 (6)	SAND, very loose, moist, gray, clayey (SC)			37				HP: 0.25
						29				SPT-N: 2
-1.1		1 (6) 2 (6)				27	29	14		HP: 1.00; -#200: 38%
			CLAY, very soft, moist, gray, with some shells (CH)			44				SPT-N: 2
		2 (6) 1 (6)				44				SPT-N: 2
25		1 (6) 1 (6)		100	8.5	40	55	36	111	HP: 1.00; -#200: 91%
30		2 (6) 2 (6)								
						35				SPT-N: 0
35		1 (6) 2 (6)				45				HP: 0.50
-26.1		5 (6) 5 (6)								
40										
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2										
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.										
Driller: PSI Houston			Logger: DV			Organization: PSI				
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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

2 of 7

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft
District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CLAY, soft, moist, gray, sandy, with some shells (CL)			25			SPT-N: 6	
45		5 (6) 6 (6)		0	16	22	47	33	128	HP: 2.50; -#200: 90%
-36.1		50 (6) 50 (4)	SAND, dense, moist, light gray, clayey (SC)			20			SPT-N: 17	
50										
55		50 (4.5) 50 (3.5)								
-44.1			CLAY, stiff to very stiff, moist, brown to gray (CH)			16			SPT-N: 31	
60		14 (6) 15 (6)		0	33.2	32	89	61	122	HP: 4.50; -#200: 99%
65		14 (6) 13 (6)				38			SPT-N: 12	
70		14 (6) 17 (6)				36			HP: 5.00	
75		17 (6) 20 (6)				32			SPT-N: 18	
80		16 (6) 21 (6)				35			HP: 4.00	
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2										
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.										
Driller: PSI Houston			Logger: DV			Organization: PSI				
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NOTES:

- SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
- THIS DRAWING IS APPLICABLE TO TOWER INT.
- FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
- STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC	Engineering • Consulting • Testing TBPE, FIRM # F-3307



US-181 HARBOR BRIDGE MAIN SPAN BORING LOGS I (NP-1)

SHEET 1 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 9
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

3 of 7

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft
District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CLAY, stiff to very stiff, moist, brown to gray (CH)							
85		18 (6) 20 (6)								
		20 (6) 23 (6)		0	33.6	34	82	57	121	SPT-N: 24 HP: 4.50; -#200: 92%
-79.1			SAND, compact to dense, moist, gray, clayey (SC)							
95		35 (6) 32 (6)								
		34 (6) 50 (4.5)								
100										
		50 (1) 50 (3.5)								
105										
		37 (6) 38 (6)								
110										
		50 (4.5) 50 (6)		475	50.6	19	58	40	130	SPT-N: 18 HP: 2.00; -#200: 47%
-102.6			CLAY, very stiff to hard, moist, light gray, with sand (CH)							
120		45 (6) 38 (6)								
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2										
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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

4 of 7

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft
District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft


Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
-117.1			CLAY, very stiff to hard, moist, light gray, with sand (CH)			30				SPT-N: 38
	125	24 (6) 21 (6)		516.7	52.1	35	98	70	129	HP: 3.25; #200: 77%
			SAND, dense, moist, gray, with clay (SP-SC)			20				SPT-N: 30; #200: 10%
	130	32 (6) 39 (6)								
	135	50 (3) 50 (2)								
							19	NP	NP	SPT-N: 79; #200: 9%
	140	48 (6) 36 (6)								
							19			SPT-N: 66; #200: 16%
	145	36 (6) 50 (3)								
							17	NP	NP	SPT-N: 97; #200: 9%
	150	50 (5) 50 (5)								
							17			SPT-N: 99; #200: 11%
155	46 (6) 50 (5)				14	30	19	HP: 0.25; #200: 14%		
160	50 (4) 50 (3)									
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2										
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NOTES:

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4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

 FLATIRON DRAGADOS LLC	 Engineering • Consulting • Testing TBPE, FIRM # F-3307
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US-181 HARBOR BRIDGE MAIN SPAN BORING LOGS I (NP-1)

SHEET 2 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 10
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



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DRILLING LOG

5 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft

District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
165		50 (3.5) 50 (2)	SAND, dense, moist, gray, with clay (SP-SC)			18			SPT-N: 49; #200: 16%
170		32 (6) 33 (6)	CLAY, very stiff, moist, gray (CH)			17			SPT-N: 53; #200: 10% HP: 5.00; #200: 96%
						35	80	51	
175		27 (6) 36 (6)							
180		50 (6) 50 (2)	SAND, dense to very dense, moist, gray, silty, with fat clay layer interbedded at 190' (SM)			38			SPT-N: 17; #200: 95% HP: 3.50; #200: 24%
				0	18.7	21	NP	NP 117	
185		50 (3) 50 (2.5)							
190		50 (3.5) 50 (5)				21			SPT-N: 50; #200: 10% HP: 4.00; #200: 97%
						33	63	40	
195		50 (3.5) 50 (1)							
200		50 (1) 50 (1)				22			SPT-N: 50; #200: 13%

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2

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Driller: PSI Houston Logger: DV Organization: PSI

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DRILLING LOG

6 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft

District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
205		50 (3) 50 (3.5)	SAND, dense to very dense, moist, gray, silty, with fat clay layer interbedded at 190' (SM)			20	NP	NP	SPT-N: 50; #200: 5%
210		50 (5) 50 (3)	SAND, dense, moist, gray, silty, clayey (SM/SC)			18			SPT-N: 79; #200: 18% SPT-N: 80; #200: 17%
215		50 (4) 50 (5.5)							
220		33 (6) 37 (6)	CLAY, very stiff to hard, moist, bluish gray (CH)			31			SPT-N: 28; #200: 29% HP: 4.5+; #200: 92%
						25	64	41	
225		40 (6) 50 (4)							
230		50 (5) 50 (2.5)	CLAY, very stiff to hard, moist, bluish gray, sandy, with sandy silt interbedded (CL)			29			SPT-N: 44; #200: 80% HP: 2.50; #200: 53%
						21	32	16	
235		50 (4.5) 50 (3)							
240		50 (3) 50 (2)				25			SPT-N: 64; #200: 55% HP: 0.25; #200: 54%
						26	NP	NP	

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2

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Driller: PSI Houston Logger: DV Organization: PSI

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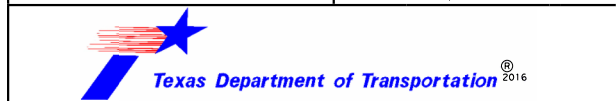
NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER INT.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC	PSI Information To Build On Engineering • Consulting • Testing TBPE, FIRM # F-3307



US-181 HARBOR BRIDGE MAIN SPAN BORING LOGS I (NP-1)

SHEET 3 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 11
CHECK PSI	CONTROL	SECTION	JOB	
PSI	0101	06	095	



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Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-1
Structure Pylon (North)
Station 1089+77.30
Offset 33.76 ft

District Corpus Christi
Date 1/10/16
Grnd. Elev. 13.85 ft
GW Elev. 3.85 ft

DRILLING LOG

7 of 7

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
245		32 (6) 40 (6)	CLAY, very stiff to hard, moist, bluish gray, sandy (CL)							
-235.1						25				SPT-N: 42; #200: 66%
250		50 (1.5) 50 (1.5)	SAND, very dense, moist, gray, poorly graded with silt (SP-SM)							
-239.1						22	NP	NP		SPT-N: 92; #200: 11%
255										
260										
265										
270										
275										
280										

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 253 feet. As surveyed coordinates: N17186677.83, E1340417.2

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: DV Organization: PSI

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NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
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4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC

PSI Information To Build On
Engineering • Consulting • Testing
TBPE, FIRM # F-3307

Texas Department of Transportation® 2016

US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS I
(NP-1)

SHEET 4 OF 4				
DESIGN PSI	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS PSI	X	(See Title Sheet)		US-181
CHECK PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 12
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	

STATE OF TEXAS
FRANCISCO JOSE ARIAS ESCUDERO
112293
PROFESSIONAL ENGINEER
PSI 09/29/17

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DRILLING LOG

1 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft

District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
12.8			PAVEMENT, 8.5" HMAC.							
			FILL, (Clay), very soft, dry, light brown			15				SPT-N: 7
9.3		2 (6) 3 (6)	CLAY, very soft to soft, moist, brown, sandy, with shells (CH)			18				SPT-N: 7
5						14				HP: 2.50
		4 (6) 3 (6)				29				SPT-N: 4
10										
		6 (6) 8 (6)			3.47	15.97	25	76	57	123
-3.2			CLAY, very soft to stiff, moist to wet, gray, sandy (CL)							
		1 (6) 1 (6)				26				SPT-N: 5
20										
		3 (6) 2 (6)				24				SPT-N: 2
25										
		1 (6) 1 (6)				32	45	27		HP: 0.50; #200: 81%
30										
		2 (6) 2 (6)				40				SPT-N: 2
35										
		2 (6) 3 (6)				40				HP: 0.50
40										

Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.



DRILLING LOG

2 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft

District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
			CLAY, very soft to stiff, moist to wet, gray, sandy (CL)								
45		2 (6) 2 (6)									
							52			SPT-N: 4	
50		4 (6) 5 (6)			12.5	11.25	25	42	26	120	HP: 0.25; #200: 65%
55		11 (6) 12 (6)									
						28				SPT-N: 10	
-46.2		28 (6) 50 (6)				18	40	23		HP: 3.00; #200: 55%	
			SAND, compact to dense, moist to wet, light gray to brown, clayey (SC)								
65		50 (4) 50 (6)									
-53.2			CLAY, stiff to very stiff, moist, light gray to gray (CH)	0	9.1	29	81	53	123	SPT-N: 14; #200: 93%	
70		12 (6) 12 (6)				34	74	53		HP: 4.50; #200: 87%	
75		18 (6) 14 (6)					30				SPT-N: 10
							32				HP: 4.50
80		18 (6) 20 (6)									

Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56

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NOTES:

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4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV
US-181 HARBOR BRIDGE MAIN SPAN BORING LOGS II (NP-2)			
SHEET 1 OF 4			
DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS PSI	STATE	DISTRICT	HIGHWAY NO. US-181
CHECK PSI	TEXAS	CRP	COUNTY SHEET NO.
CHECK PSI	CONTROL	SECTION	JOB NHB 13
	0101	06	095



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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft

District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

DRILLING LOG

3 of 7

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CLAY, stiff to very stiff, moist, light gray to gray (CH)							
85		20 (6) 20 (6)								
						30				SPT-N: 12
90		18 (6) 19 (6)				35				HP: 2.00
95		17 (6) 15 (6)								
					26				SPT-N: 19	
100		40 (6) 36 (6)		0	15.1	25	52	26	133	HP: 4.50; #200: 64%
105		26 (6) 29 (6)								
						17				SPT-N: 27
-96.2 110		39 (6) 36 (6)	SAND, compact to dense, moist, gray, clayey (SC)							
						19				SPT-N: 24; #200: 13%
115		50 (4.5) 47 (6)								
						20				SPT-N: 38
120		31 (6) 45 (6)								
Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56										
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.										

WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft

District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

DRILLING LOG

4 of 7



Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SAND, compact to dense, moist, gray, clayey (SC)			12				SPT-N: 55
125		35 (6) 33 (6)								
						14				SPT-N: 61; #200: 14%
130		42 (6) 50 (6)	CLAY, stiff, moist, gray (CH)							
-119.2						16				SPT-N: 29; #200: 8%
135		16 (6) 12 (6)				37	68	49		HP: 2.50; #200: 89%
			SAND, dense to very dense, wet to moist, gray, clayey (SP-SC)							
-126.2 140		50 (4) 50 (3)				18				SPT-N: 86; #200: 15%
145		50 (3.5) 50 (2.5)				20				SPT-N: 36; #200: 9%
150		50 (2.5) 50 (2)				20				SPT-N: 60; #200: 14%
155		50 (4) 50 (6)				13				SPT-N: 30; #200: 8%
160		50 (4.5) 50 (3)								
Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56										
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.										

NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER INT.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

	
FLATIRON/DRAGADOS LLC	
T&E, FIRM # F-3307	



US-181 HARBOR BRIDGE MAIN SPAN BORING LOGS II (NP-2)

SHEET 2 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 14
CHECK PSI	CONTROL	SECTION	JOB	
PSI	0101	06	095	



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USER: lcavanaugh



DRILLING LOG

5 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft
District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	
-149.2			SAND, dense to very dense, wet to moist, gray, clayey (SP-SC)			16			SPT-N: 33; #200: 9%
165		50 (4) 50 (3.5)	SAND, very dense, moist, gray, with clay seams (SC)			18			HP: 4.50; #200: 94%
170		50 (4) 50 (4.5)							
175		50 (3.5) 50 (3.5)				16	27	15	SPT-N: 41; #200: 29%
-164.2			CLAY, very stiff to hard, moist, gray, sandy (CL)			16	33	20	SPT-N: 38; #200: 30%
180		42 (6) 50 (6)				18	32	17	HP: 3.00; #200: 62%
185		23 (6) 50 (6)							
-172.7			SAND, dense, moist, gray, clayey (SC)			23			SPT-N: 29; #200: 24%
190		50 (4) 50 (4.5)							
195		50 (5) 50 (6)				20			SPT-N: 37; #200: 32%
-184.2			CLAY, very stiff to hard, moist, gray, sandy (CL)			19			SPT-N: 26; #200: 24%
200		29 (6) 33 (6)		0	41	33	46	29 113	HP: 3.00; #200: 85%
Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56									
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.									
Driller: PSI Houston Logger: WG Organization: PSI									
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DRILLING LOG

6 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft
District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	
205		50 (6) 40 (6)	CLAY, very stiff to hard, moist, gray, sandy (CL)						
-193.2			SAND, dense to very dense, moist, gray, clayey (SP-SM)			19			SPT-N: 53; #200: 11%
210		50 (1) 50 (0.5)							
215		50 (4) 50 (2)				20			SPT-N: 92; #200: 11%
220		50 (4) 50 (4)							
-209.2			CLAY, hard, moist, gray, sandy (CH)			22	20	5	SPT-N: 37; #200: 41%
225		50 (5) 45 (6)							
230		45 (6) 42 (6)				21	59	39	SPT-N: 20; #200: 90%
235		50 (6) 49 (6)				18			HP: 4.50; #200: 91%
-224.2			CLAY, hard, moist, gray, sandy (CL)			19	19	3	SPT-N: 100; #200: 55%
240		50 (3.75) 50 (3)							
Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56									
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.									
Driller: PSI Houston Logger: WG Organization: PSI									
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NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER INT.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV



US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS II
(NP-2)

SHEET 3 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 15
CHECK PSI	CONTROL	SECTION	JOB	
CHECK PSI	0101	06	095	



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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole NP-2
Structure Pylon (North)
Station 1088+52.63
Offset -41.39 ft

District Corpus Christi
Date 1/14/16
Grnd. Elev. 13.79 ft
GW Elev. -3.21 ft

DRILLING LOG

7 of 7

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			CLAY, hard, moist, gray, sandy (CL)			24	39	25		SPT-N: 32; #200: 57%
245		48 (6) 41 (6)								
						21				SPT-N: 24; #200: 33%
250		50 (4.5) 47 (6)								
-239.2						19	50	35		SPT-N: 37; #200: 64%
255										
260										
265										
270										
275										
280										

Remarks: Groundwater was noted at a depth of 17 feet. Boring depth 253 feet. As surveyed coordinates: N17186733.85, E1340551.56

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: WG Organization: PSI

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- NOTES:
1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
 2. THIS DRAWING IS APPLICABLE TO TOWER INT.
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HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC

PSI *Information To Build On*
Engineering • Consulting • Testing
TBPE, FIRM # F-3307



US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS II
(NP-2)

SHEET 4 OF 4

DESIGN PSI	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS PSI	X	(See Title Sheet)		US-181
CHECK PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 16
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



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DRILLING LOG

1 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft

District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	
10.8			PAVEMENT, 2" HMA, 10" Base			9			
			SAND, loose, moist, gray, clayey (SC)			19			HP: 0.50
5						17			HP: 1.00
						16			SPT-N: 1
10		6 (6) 7 (6)				28			SPT-N: 2
1.3			CLAY, very soft to soft, moist, gray to light brown, sandy (CH)						
15		0 (6) 0 (6)				40	69	48	HP: 0.50; #200: 56%
20		1 (6) 1 (6)				25			SPT-N: 2
25						30			SPT-N: 1
30		1 (6) 1 (6)				38			HP: 0.50
35		2 (6) 1 (6)				37			SPT-N: 0
40		2 (6) 2 (6)		0	7	35	52	33 111	HP: 0.50; #200: 85%

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: DV Organization: PSI

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DRILLING LOG

2 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft

District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	
			CLAY, very soft to soft, moist, gray to light brown, sandy (CH)						
45		7 (6) 7 (6)							
-35.7						24			SPT-N: 1
50		27 (6) 31 (6)	SAND, compact to dense, wet, gray to light brown, clayey (SC)			21			HP: 0.25
55		48 (6) 46 (6)							
						23			SPT-N: 16
60		34 (6) 43 (6)							
-50.7			CLAY, stiff, moist, multicolor, sandy (CH)			17			SPT-N: 21
65		12 (6) 14 (6)				27			HP: 4.50
70		13 (6) 13 (6)							
						38			SPT-N: 15
75		12 (6) 14 (6)				36			HP: 4.00
80		17 (6) 16 (6)							

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

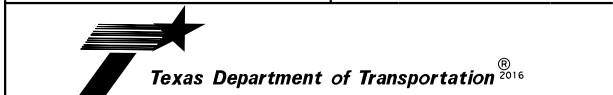
Driller: PSI Houston Logger: DV Organization: PSI

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- NOTES:
1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
 2. THIS DRAWING IS APPLICABLE TO TOWER 1ST.
 3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
 4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV



US-181 HARBOR BRIDGE			
MAIN SPAN BORING LOGS III (SP-1)			
SHEET 1 OF 4			
DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS PSI	STATE TEXAS	DISTRICT CRP	HIGHWAY NO. US-181
CHECK PSI	CONTROL	COUNTY NUECES	SHEET NO. NHB 17
CHECK PSI		JOB 0101 06 095	



PSI 8/15/17

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DRILLING LOG

3 of 7

County NUECES
Highway US-181/IH-37
Version 3.1 CSJ 0101-06-095

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft

District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
85		17 (6) 19 (6)	CLAY, stiff, moist, multicolor, sandy (CH)			34			SPT-N: 12
						36			HP: 3.25
-77.7 90		26 (6) 29 (6)	SAND, dense to very dense, wet, gray, clayey (SC)			19			SPT-N: 20
95		50 (5) 50 (5.5)		0	4.9	22	31	20 119	HP: 0.25; #200: 43%
100		50 (2.5) 50 (2)				22			SPT-N: 84
-92.7 105		27 (6) 30 (6)	CLAY, very stiff to hard, moist to dry, gray (CH)			20			SPT-N: 19
110		26 (6) 31 (6)				24	71	45	HP: 4.00; #200: 90%
115		40 (6) 49 (6)							
-105.7						21			SPT-N: 23
120		50 (4.5) 50 (4)	SAND, dense, moist, gray, clayey, with coal fragments (SC)						
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89									
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.									
Driller: PSI Houston Logger: DV Organization: PSI									
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DRILLING LOG

4 of 7

County NUECES
Highway US-181/IH-37
Version 3.1 CSJ 0101-06-095

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft

District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
125		30 (6) 30 (6)	SAND, dense, moist, gray, clayey, with coal fragments (SC)			16			SPT-N: 57
-113.7			CLAY, very stiff to hard, moist to dry, gray, with sand (CH)			24			SPT-N: 28
130		35 (6) 31 (6)		0	50	21	67	46 129	HP: 4.5+ #200: 89%
135		50 (6) 45 (6)				18			SPT-N: 32; #200: 80%
140		25 (6) 27 (6)				25	68	45	HP: 4.5+ #200: 90%
-145		50 (2) 50 (2)	SAND, dense to very dense, moist, gray, poorly graded, with coal fragments and some clay (SP-SC)			16			SPT-N: 69; #200: 10%
150		50 (6) 50 (4)				17			SPT-N: 36; #200: 14%
155		50 (4.5) 50 (2)				21			SPT-N: 43; #200: 8%
-147.7 160		31 (6) 31 (6)							
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89									
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.									
Driller: PSI Houston Logger: DV Organization: PSI									
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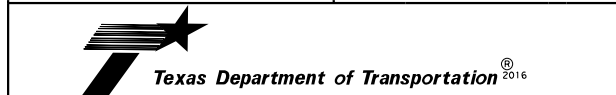
NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER 1ST.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC	Engineering • Consulting • Testing T&E, FIRM # F-3307



US-181 HARBOR BRIDGE

MAIN SPAN
BORING LOGS III
(SP-1)

SHEET 2 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 18
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



PSI 8/15/17

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USER: lcavanough

WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

5 of 7

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft
District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
165		50 (6) 50 (3.5)	CLAY, very stiff to very hard, moist, bluish gray, sandy, with sand and lean clay layers interbedded (CH)			18	47	31		SPT-N: 22; #200: 65%	
						34	52	37		HP: 1.25; #200: 78%	
170		50 (3) 50 (2)									
						19				SPT-N: 51; #200: 10%	
175		27 (6) 50 (6)				20	46	28		HP: 4.5+ #200: 78%	
180		40 (6) 50 (3)									
						23				SPT-N: 32; #200: 13%	
185		34 (6) 31 (6)									
						21				SPT-N: 29; #200: 56%	
190		50 (3) 50 (1)			20				HP: 4.25		
195		38 (6) 36 (6)									
					23				SPT-N: 38; #200: 36%		
200		50 (4.5) 50 (2.5)			28	65	41		HP: 4.50; #200: 78%		
Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89											
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.											

WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

DRILLING LOG

6 of 7

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft
District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
			CLAY, very stiff to very hard, moist, bluish gray, sandy, with sand and lean clay layers interbedded (CH)								
205		50 (3) 50 (2)									
210		29 (6) 30 (6)									SPT-N: 46; #200: 11%
215		43 (6) 39 (6)								SPT-N: 23; #200: 80%	
220		39 (6) 50 (6)								HP: 3.25	


- NOTES:
- SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
 - THIS DRAWING IS APPLICABLE TO TOWER 1ST.
 - FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
 - STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

**FLATIRON DRAGADOS LLC**

**PSI Information To Build On**
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**Texas Department of Transportation**®₂₀₁₆

US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS III
(SP-1)

SHEET 3 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 19
CHECK PSI	CONTROL	SECTION	JOB	
CHECK PSI	0101	06	095	



PSI 8/15/17

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TIME: 2:57:58 PM
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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole SP-1
Structure Pylon (South)
Station 1105+87.19
Offset 24.48 ft

District Corpus Christi
Date 12/12/15
Grnd. Elev. 12.31 ft
GW Elev. 2.31 ft

DRILLING LOG

7 of 7

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
245		16 (6) 16 (6)	CLAY, stiff, moist, gray, with sand (CH)							
236.7						25				SPT-N: 9; #200: 55%
250		18 (6) 17 (6)	SAND, slightly compact to very dense, moist, gray, clayey (SC)	0	25.9	19	31	19	127	HP: 2.25; #200: 42%
255		50 (1) 50 (0.5)								
244.2										
260										
265										
270										
275										
280										

Remarks: Groundwater was noted at a depth of 10 feet. Boring depth 256.5 feet. As surveyed coordinates: N17185374.68, E1339471.89

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: DV Organization: PSI

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- NOTES:
1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
 2. THIS DRAWING IS APPLICABLE TO TOWER 1ST.
 3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
 4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON/DRAGADOS LLC

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US-181 HARBOR BRIDGE

**MAIN SPAN
BORING LOGS III
(SP-1)**

SHEET 4 OF 4

DESIGN PSI	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS PSI	X	(See Title Sheet)		US-181
CHECK PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 20
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



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TIME: 2:58:00 PM
USER: lcvanough



DRILLING LOG

1 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
11.6			PAVEMENT, 2" HMA, 10" Base			7			HP: 4.50
			SAND, loose, moist, gray, clayey, with shells (SC)			21			HP: 0.50
5						17	34	18	HP: 0.25; #200: 46%
6.1			CLAY, very soft, moist, gray, sandy with shells (CL)			30			SPT-N: 0
						30			SPT-N: 0
10		0 (6) 1 (6)							
15		1 (6) 2 (6)				27			HP: 0.25
20		1 (6) 1 (6)				27			SPT-N: 0
25		1 (6) 2 (6)							
30		1 (6) 1 (6)		10	10.4	30	37	21	119 HP: 0.50; #200: 99%
35		1 (6) 1 (6)				29			SPT-N: 1
40		2 (6) 2 (6)				35			HP: 0.50

Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: WD Organization: PSI

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DRILLING LOG

2 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties			Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI Wet Den. (pcf)	
			CLAY, very soft, moist, gray, sandy with shells (CL)						
45		6 (6) 7 (6)							
-34.4			SAND, dense, moist, light brown, clayey, with shells (SC)			21			SPT-N: 9
50		50 (5) 50 (4.5)							
55		50 (5.5) 50 (4)							
60									
-50.4			CLAY, stiff to very stiff, moist, multicolor, with some sand and calcareous nodules (CH)			18			SPT-N: 44
65		11 (6) 14 (6)				28			HP: 4.50
70		14 (6) 14 (6)							
75		13 (6) 13 (6)				38			SPT-N: 11
						34			HP: 4.50
80		15 (6) 13 (6)							

Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31

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Driller: PSI Houston Logger: WD Organization: PSI

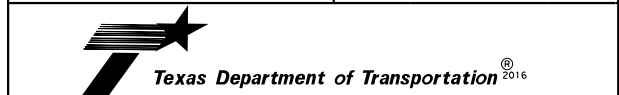
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NOTES:

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4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV



US-181 HARBOR BRIDGE

MAIN SPAN
BORING LOGS IV
(SP-2)

SHEET 1 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 21
CHECK PSI	CONTROL	SECTION	JOB	
	0101	06	095	



PSI 8/15/17

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USER: lcaavanaugh



DRILLING LOG

3 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
85		13 (6) 15 (6)	CLAY, stiff to very stiff, moist, multicolor, with some sand and calcareous nodules (CH)			32				SPT-N: 12
				0	27.4	38	87	50	114	#200: 99%
90		16 (6) 41 (6)	SAND, dense to very dense, wet, gray, silty, clayey (SC-SM)			18				HP: 3.75
						18	21	8		SPT-N: 24; #200: 16%
95		50 (6) 50 (5.5)				20				HP: 2.00
						18				SPT-N: 45
100		50 (2) 50 (4)				20	22	7	126	SPT-N: 60 #200: 30%
						29				
105		50 (3) 50 (2)								
110		40 (6) 50 (4)								
115		50 (4) 50 (3)								
120		50 (3.5) 50 (2)								

Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: PSI Houston Logger: WD Organization: PSI

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DRILLING LOG

4 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
125		50 (3) 50 (3.5)	SAND, dense to very dense, wet, gray, silty, clayey (SC-SM)			16				HP: 4.50
						21				HP: 3.50
130		50 (3) 50 (4)	CLAY, very stiff to hard, moist, greenish gray, shaley, with some sand (CH)			21				SPT-N: 80; #200: 64%
				65.9	83.9	29	79	53	123	SPT-N: 29; #200: 99%
135		21 (6) 24 (6)				27				HP: 0.75; #200: 93%
						34	51	38		HP: 4.50; #200: 72%
140		25 (6) 29 (6)				16				SPT-N: 17; #200: 14%
						17				HP: 0.50; #200: 10%
145		50 (4) 50 (3)	SAND, dense to very dense, wet, gray, silty, with coal fragments (SM)							
150		50 (2) 50 (1)								
155		50 (4) 50 (2.5)								
160		50 (1.5) 50 (2)								

Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31

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Driller: PSI Houston Logger: WD Organization: PSI

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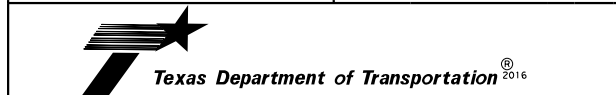
NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER 1ST.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV

FLATIRON DRAGADOS LLC	PSI Information To Build On Engineering • Consulting • Testing TBPE, FIRM # F-3307



US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS IV
(SP-2)

SHEET 2 OF 4			
DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)	
GRAPHICS PSI	STATE	DISTRICT	HIGHWAY NO. US-181
CHECK PSI	TEXAS	CRP	COUNTY SHEET NO.
CHECK PSI	CONTROL	SECTION	NHB 22
	0101	06	JOB 095



PSI 8/15/17

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USER: lcvanough



DRILLING LOG

5 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks		
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)			
-160.4			SAND, dense to very dense, wet, gray, silty, with coal fragments (SM)			19				SPT-N: 70; #200: 10%		
	165	38 (6) 50 (6)				16				SPT-N: 54; #200: 15%		
	170	50 (3) 50 (2.5)				18				SPT-N: 52; #200: 15%		
			CLAY, very stiff to hard, moist, greenish gray, sandy, with clayey sand interbedded (CL)									
	175	28 (6) 29 (6)		0	33.3	16	22	9	125	SPT-N: 30; #200: 54%		
	180	50 (3.5) 50 (3.5)				27					SPT-N: 71; #200: 61%	
	185	36 (6) 44 (6)				21					#200: 11%	
	190	35 (6) 47 (6)		0	25.7	23	37	24	126	HP: 2.75; #200: 54%		
	195	28 (6) 26 (6)				23					SPT-N: 45; #200: 24%	
	200	24 (6) 26 (6)				24	42	26			SPT-N: 22; #200: 84%	
	Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31											
	Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.											
Driller: PSI Houston			Logger: WD			Organization: PSI						
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DRILLING LOG

6 of 7

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095
Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft
District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

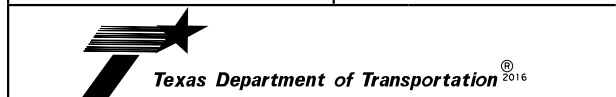
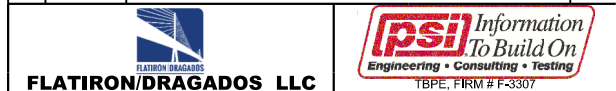
Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
-197.4210		50 (2.5) 50 (2)	CLAY, very stiff to hard, moist, greenish gray, sandy, with clayey sand interbedded (CL)							
	205									
		35 (6) 25 (6)	CLAY, very stiff, moist, bluish gray, with clayey sand layers interbedded (CH)			19				#200: 14%
	210									
		41 (6) 43 (6)				27	69	50		HP: 2.75; #200: 78%
	215			0	35.3	25	59	43	126	SPT-N: 28; #200: 86%
		50 (2) 50 (1)								
	220					24				HP: 1.50; #200: 17%
		22 (6) 23 (6)				37	85	52		SPT-N: 86; #200: 98%
	225									
		50 (1.5) 50 (1.5)				22				SPT-N: 32; #200: 17%
	230									
	26 (6) 28 (6)			30	73	54		#200: 91%		
235										
240		27 (6) 28 (6)			31	72	44		HP: 4.50; #200: 91%	
Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31										
Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.										
Driller: PSI Houston			Logger: WD			Organization: PSI				
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NOTES:

1. SEE "FOUNDATION LAYOUT I" SHEETS FOR FOUNDATION NOTES AND BORING LOCATIONS.
2. THIS DRAWING IS APPLICABLE TO TOWER 1ST.
3. FOR KEY TO TERMS AND SYMBOLS USED ON BORING LOGS SEE MAIN SPAN BORING LOGS TERMS AND SYMBOLS.
4. STATION AND OFFSET SHOWN ON DRILLING LOG IS BASED ON THE ORIGINAL RED ALTERNATIVE ALIGNMENT.

HL-93 LOADING

NO.	DATE	REVISION	APRV



US-181 HARBOR BRIDGE

MAIN SPAN
BORING LOGS IV
(SP-2)

SHEET 3 OF 4

DESIGN PSI	FED. RD. DIV. NO. X	FEDERAL AID PROJECT NO. (See Title Sheet)		HIGHWAY NO. US-181
GRAPHICS PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 23
CHECK PSI	CONTROL	SECTION	JOB	
CHECK PSI	0101	06	095	



PSI 8/15/17

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WinCore
Version 3.1

County NUECES
Highway US-181/IH-37
CSJ 0101-06-095

Hole SP-2
Structure Pylon (South)
Station 1105+14.71
Offset -61.77 ft

District Corpus Christi
Date 12/11/15
Grnd. Elev. 12.61 ft
GW Elev. -2.39 ft

DRILLING LOG

7 of 7

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
245		23 (6) 25 (6)	CLAY, very stiff, moist, bluish gray, with clayey sand layers interbedded (CH)							
						35				SPT-N: 65; #200: 92%
250		27 (6) 27 (6)				29	66	46		HP: 4.50; #200: 89%
-238.9										
255										
260										
265										
270										
275										
280										

Remarks: Groundwater was noted at a depth of 15 feet. Boring depth 251.5 feet. As surveyed coordinates: N17185382.06, E1339584.31

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.


Driller: PSI Houston Logger: WD Organization: PSI


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- NOTES:
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HL-93 LOADING

NO.	DATE	REVISION	APRV

**FLATIRON DRAGADOS LLC**

**PSI Information To Build On**
Engineering • Consulting • Testing
TBPE, FIRM # F-3307

**Texas Department of Transportation**®²⁰¹⁶

US-181 HARBOR BRIDGE
MAIN SPAN
BORING LOGS IV
(SP-2)

SHEET 4 OF 4

DESIGN PSI	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS PSI	X	(See Title Sheet)		US-181
CHECK PSI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PSI	TEXAS	CRP	NUECES	NHB 24
CHECK PSI	CONTROL	SECTION	JOB	
CHECK PSI	0101	06	095	

