

CITY OF HOUSTON

LAKE HOUSTON REDEVELOPMENT AUTHORITY

TAX INCREMENT REINVESTMENT ZONE NUMBER TEN

NORTH PARK DRIVE

OVERPASS PROJECT (T-1013)

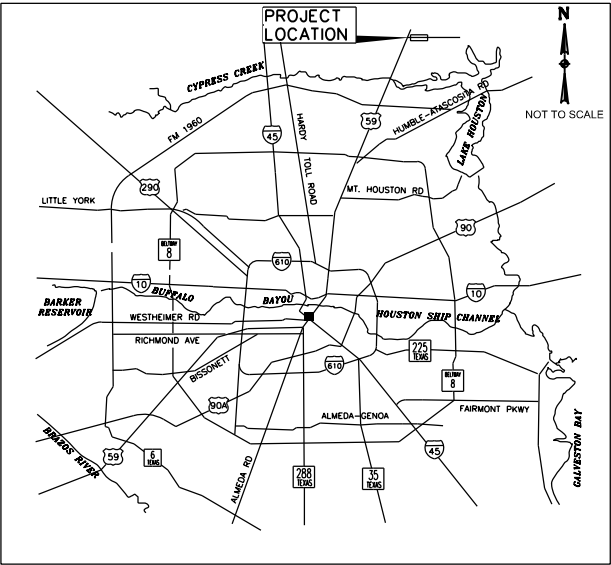
FUNCTIONAL CLASSIFICATION:
MAINLANES: URBAN ARTERIAL
FRONTAGE ROADS: MAJOR COLLECTORS
CROSS STREETS: URBAN ARTERIAL

DESIGN SPEED:
NORTH PARK DRIVE = 45 MPH
LOOP 494 = 45 MPH
FRONTAGE ROAD = 40 MPH
U-TURN = 15 MPH

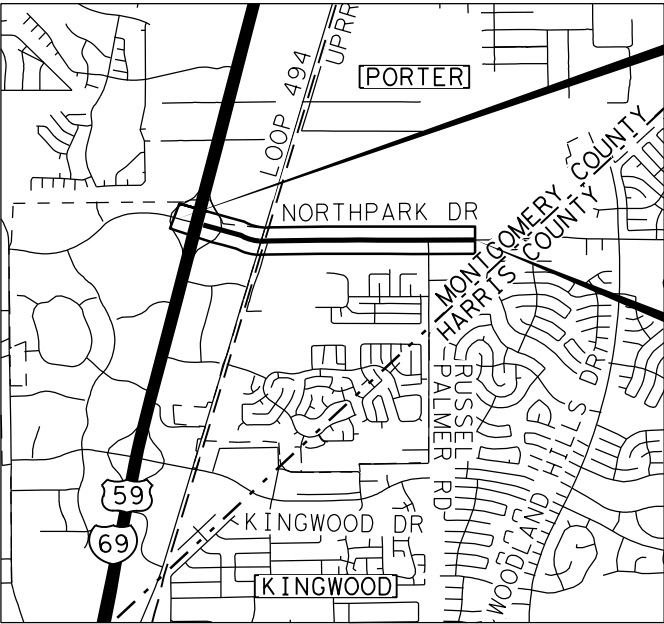
ADT	
NORTH PARK	
ML	51,628 (2025)
	53,397 (2035)
	55,226 (2045)

PROPOSED DESIGN STANDARDS (ROADWAY):
TXDOT ROADWAY DESIGN MANUAL 2020
CHAPTER 3; 4R, SECTION2; URBAN STREETS

PROPOSED DESIGN STANDARDS (TRAFFIC):
TMUTCD & APPLICABLE TRAFFIC STANDARDS



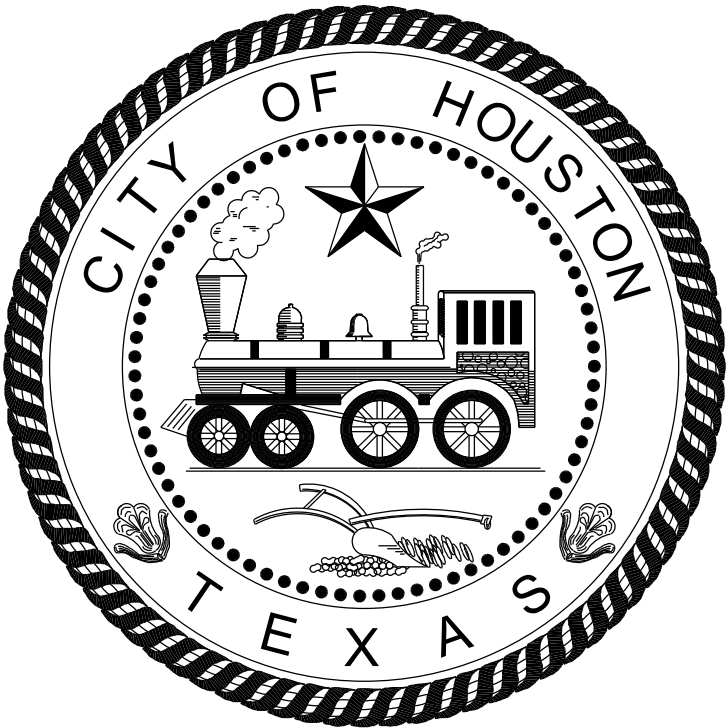
LOCATION MAP



VICINITY MAP
KEY MAP NO 296S, 296T, 296U
GIMS MAP NO 5670B, 5770A

BEGIN PROJECT
NORTH PARK DRIVE
STA 3+12.37
N= 10026346.4517
E= 3904489.1660

END PROJECT
NORTH PARK DRIVE
STA 85+91.62
N= 10026.096.1893
E= 3912697.7022



MAYOR
SYLVESTER TURNER

CONTROLLER
CHRIS BROWN

DISTRICT
COUNCIL MEMBERS

AMY PECK DISTRICT A	TARSHA JACKSON DISTRICT B	ABBIE KAMIN DISTRICT C	CAROLYN EVANS-SHABAZZ DISTRICT D
DAVE MARTIN DISTRICT E	TIFFANY D. THOMAS DISTRICT F	GREG TRAVIS DISTRICT G	KARLA CISNEROS DISTRICT H
ROBERT GALLEGOS DISTRICT I	EDWARD POLLARD DISTRICT J	MARTHA CASTEX-TATUM DISTRICT K	

COUNCIL MEMBERS
AT-LARGE

MIKE KNOX POSITION 1	DAVID W. ROBINSON POSITION 2
MICHAEL KUBOSH POSITION 3	LETITIA PLUMMER POSITION 4
SALLIE ALCORN POSITION 5	

LHRA
BOARD MEMBERS

SECRETARY JEFFERY NIELSEN	CHAIRMAN STANLEY SARMAN	DIRECTOR DR. MARTIN BASALDUA
DIRECTOR KIMBERLY BRUSATORI	VICE CHAIR PHILIP IVY	DIRECTOR NOLAN CORREA
	TREASURER TOM BROAD	

TDLR REGISTRATION #: TABS2021011708

NO.		DATE	REVISION	APP.
HNTB		1301 FANNIN STREET SUITE 2000 HOUSTON, TEXAS 77002 (346) 352-5620 TX FIRM No. 420		
SURVEYED BY: MCKIM & CREED FB NO. 101776-00				
FOR CITY OF HOUSTON USE ONLY				
DIRECTOR OF HOUSTON PUBLIC WORKS		DATE		
SHEET NO 01 OF 714 SHEETS				

TEMPORARY TRAFFIC SIGNALS

- 166
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 1 - STEP 1
- 167
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 2 - STEP 1
- 168
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 2 - STEP 2
- 169
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 2 - STEP 3
- 170
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 3 - STEP 1
- 171
- TEMPORARY SIGNAL LAYOUT SL 494 AND NORTH PARK DR PHASE 3 - STEP 2
- 172
- TEMPORARY SIGNAL WIRING SCHEDULE SL 494 AND NORTH PARK DR
- 173
- SIGNAL DETAILS SL 494 AND NORTH PARK DR
- 174
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 1 - STEP 1
- 175
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 1 - STEP 2
- 176
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 1 - STEP 3
- 177
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 1 - STEP 4
- 178
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 2 - STEP 1 THRU 3
- 179
- TEMPORARY SIGNAL LAYOUT RUSSELL PALMER AND NORTH PARK DR PHASE 3 - STEP 1 THRU 2
- 180
- TEMPORARY SIGNAL WIRING SCHEDULE RUSSELL PALMER AND NORTH PARK DR
- 181
- TEMPORARY SIGN DETAILS
- 182
- MISC TEMPORARY SIGNAL DETAILS

TEMPORARY TRAFFIC SIGNAL STANDARDS, SELECTED BY ROBERTSON JON P. BELARMINO, P.E.,
HNTB CORPORATION

- 182A
- TRAFFIC CONTROL PLAN FOR SIGNAL CONSTRUCTION ***
- 183
- SIGNAL DETAILS/STANDARDS CONSTRUCTION DETAILS FOR TRAFFIC SIGNALS (WOOD POLE) CD/TS/WP **
- 184
- SIGNAL DETAILS/STANDARDS SIGNAL HEAD SPAN WIRE MOUNT DETAILS SHS/WMD **
- 185
- SIGNAL DETAILS/STANDARDS VIDS CAMERA MOUNTING DETAILS **
- 185A
- CLAMP ON FITTING ASSEMBLY FOR LUMINARE MAST ARM CFA-12 *

ROADWAY DETAILS

- 186-188
- SURVEY CONTROL INDEX
- 189-190
- HORIZONTAL AND VERTICAL CONTROL DATA
- 191-201
- HORIZONTAL ALIGNMENT DATA
- 202-209A
- HORIZONTAL ALIGNMENT LAYOUT
- 210-218
- REMOVAL PLAN NORTH PARK DRIVE
- 219
- REMOVAL PLAN LOOP 494
- 220-229
- PLAN AND PROFILE NORTH PARK DRIVE
- 230-232
- PLAN AND PROFILE WBFR
- 233-235
- PLAN AND PROFILE EBFR
- 236
- PLAN AND PROFILE WB U-TURN
- 237
- PLAN AND PROFILE EB U-TURN
- 238-240
- PLAN AND PROFILE LOOP 494
- 241
- PLAN AND PROFILE ANDERSON RD
- 242
- PLAN AND PROFILE KINGS MILL PARK DRIVE
- 243
- PLAN AND PROFILE WB SIDE PATH
- 244
- PLAN AND PROFILE EB SIDE PATH
- 245-249
- INTERSECTION LAYOUTS
- 250-251
- DRIVEWAY SUMMARY
- 252
- FIXED BOLLARD DETAIL
- 253
- RAMP DETAIL

ROADWAY STANDARDS, SELECTED BY KATE LIGHT, P.E., HNTB CORPORATION
AND FRED SIGNORELLI, P.E., FHRA

- 254-255
- TRAFFIC RAIL SINGLE SLOPE (TYPE SSTR) *
- 256
- SINGLE SLOPE CONCRETE BARRIER CAST-IN-PLACE (TYPE 1) - SSCB(1)-16 *
- 257
- METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT-GF(31)-19 *
- 258
- METAL BEAM GUARD FENCE (DOWNSTREAM ANCHOR TERMINAL)-TL-3 MASH COMPLIANT-GF(31)DAT-19 *
- 259-260
- METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT-GF(31)TR TL3-20 *
- 261
- METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT-GF(31)MS-19 *
- 261A
- SINGLE GUARDRAIL TERMINAL - SGT(12S)31-18 *
- 262
- CONCRETE CURB AND CURB AND GUTTER - CCCG-12 *
- 262A
- CONCRETE CURB AND CURB AND GUTTER - CCCG-12 (MOD)
- 263-266
- PEDESTRIAN FACILITIES CURB RAMPS - PED-12-A *
- 267-269
- DRIVEWAY DETAILS - DD **
- 270
- U-TURN CURB DETAIL NEW CONSTRUCTION **
- 271
- CONCRETE CURB AND DIRECTION ISLAND DETAILS - CC & DID **
- 272
- FAST TRACK CONTINUOUSLY REINFORCED CONCRETE PAVEMENT DETAILS - CRCP-FT **
- 273
- SMART CUSHION (NARROW) - SMT(N)-16 *
- 274
- CRASH CUSHION SUMMARY SHEET **
- 275-276
- CONTINUOUSLY REINFORCED CONCRETE PAVEMENT HOUSTON SUPPLEMENT - (CRCP-HS) **
- 277-279
- WIDE FLANGE PAVEMENT TERMINALS FOR CONTINUOUSLY & JOINTED
REINFORCED CONCRETE PAVEMENT DETAILS **

- 280
- MEDIAN NOSE DETAIL - HOUMEDNS **
- 281
- MOW STRIP - MS **
- 282
- FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER **
- 282A
- STANDARD DETAIL SIDEWALK ***

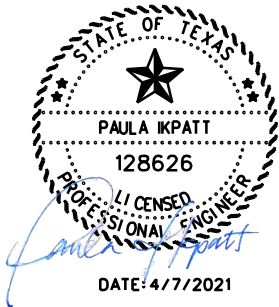
RETAINING WALL DETAILS

- 283-288
- RETAINING WALL PLAN AND PROFILE
- 289
- BORING LOG RW-01
- 290
- BORING LOG RW-02
- 291
- BORING LOG RW-03
- 292
- BORING LOG RW-04

RETAINING WALL STANDARDS, SELECTED BY PAULA IKPATT, P.E., HNTB CORPORATION

- 293-294
- MECHANICALLY STABILIZED RETAINING WALL - RW(MSE) *
- 295-297
- RETAINING WALL DETAILS VERTICAL SCHEME GREEN RIBON - RWD-VS **
- 298
- SURFACE FINISHES FOR CONCRETE VERTICAL SCHEME - SFC-VS **
- 299
- TRAFFIC RAIL FOUNDATION FOR MSE - RW(TRF) *
- 300
- EARTHWORK MEASUREMENT AT RETAINING WALLS - RW(EM) *
- 301
- MECHANICALLY STABILIZED RETAINING WALL (CEMENT STABILIZED BACKFILL) - MSRW-CSB **
- 302
- CEMENT STABILIZED BACKFILL EMBANKMENT (FOR USE WITH BRIDGE RETAINING
WALLS AT BRIDGE ABUTMENTS) - CSBE-RW **
- 303
- DESIGN DATA FOR (MSE) RETAINING WALL - RW(MSE)DD *
- 304-305
- LIGHTING BRACKET FOR MSE RETAINING WALL TRAFFIC RAIL FOUNDATION - RW(LB) *
- 306-307
- ROADWAY INLET FOR MSE RETAINING WALL TRAFFIC RAIL FOUNDATION - RW(RI) *

(*) STATEWIDE TXDOT STANDARD
(**) HOUSTON DISTRICT STANDARD
(***) CITY OF HOUSTON STANDARD
(****) UPRR STANDARD



NO.	REVISIONS			BY	DATE
<div><div><div><div><div>HNTB</div><div>The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4000 HOUSTON, TX 77002</div></div></div><div><div>Revised/Intent Autho</div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div><div>NORTH PARK DRIVE</div><div>NORTH PARK DRIVE</div><div>INDEX OF SHEETS</div></div></div></div>					
SHEET 2 OF 4					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
			3		

VOLUME II

DRAINAGE DETAILS

308	EXTERNAL DRAINAGE AREA MAP
309-311	DRAINAGE AREA MAP
312-314	HYDRAULIC COMPUTATIONS
315-324	DRAINAGE PLAN & PROFILE NORTH PARK DR
325-327	DRAINAGE PLAN & PROFILE OFFSITE DRAINAGE
328	DRAINAGE PLAN & PROFILE DRAINAGE BYPASS
329-330	DRAINAGE PLAN & PROFILE LOOP 494
331-339	DRAINAGE LATERALS
340-341	DRAINAGE DITCH PLAN & PROFILE LOOP 494 LT
342-343	DRAINAGE DITCH PLAN & PROFILE LOOP 494 RT
344	DRAINAGE DITCH PLAN & PROFILE ANDERSON LT
345	DRAINAGE DITCH PLAN & PROFILE ANDERSON RT
346	DRAINAGE DITCH PLAN & PROFILE NORTH PARK
346A	DRAINAGE CULVERT CROSSING
346B	JUNCTION BOX DETAILS JB-17
346C	JUNCTION BOX DETAILS JB-21
346D	JUNCTION BOX DETAILS JB-23
346E	JB-17 JUNCTION BOX STRUCTURAL DETAILS
346F	JB-17 JUNCTION BOX STRUCTURAL DETAILS
346G	JB-21 JUNCTION BOX STRUCTURAL DETAILS
346H	JB-21 JUNCTION BOX STRUCTURAL DETAILS
346I	JB-23 JUNCTION BOX STRUCTURAL DETAILS
346J	JB-23 JUNCTION BOX STRUCTURAL DETAILS

DRAINAGE STANDARDS, SELECTED BY FRED SIGNORELLI, P.E., EHRA

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347 PRECAST MISCELLANEOUS DETAILS (SCP-MD) *
348 PRECAST 4' SPAN BOXES (SCP-4) *
349 PRECAST 6' SPAN BOXES (SCP-6) *
350 PRECAST 7' SPAN BOXES (SCP-7) *
351 PRECAST 8' SPAN BOXES (SCP-8) *
352 PRECAST END TREATMENT P/D SQUARE (PSET-SP) *
353 PRECAST END TREATMENT TYPE II - PARALLEL DRAINAGE (PSET-RP) *
354 SAFETY END TREATMENT FOR 12" DIA TO 72" DIA PIPE CULVERTS (SET-PD) *
355 CURB INLET TYPE C (WITH OR WITHOUT EXTENSION) (HIL-C) **
356 INLET TYPE AZ (HIL-AZ) **
357 INLET TYPE AZR (HIL-AZR) **
358 MANHOLES TYPES A&B (MH-A/B) **
359 MISCELLANEOUS SEWER DETAILS (MSD) **
360 GUTTER DEPRESSION DETAILS FOR CURB INLETS (GD) **
361-362 EXCAVATION AND BACKFILL DIAGRAMS (E&BD) **
363 PRECAST JUNCTION BOX (PJB) *
364 DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX (PDD) *
365 INLET TYPE A (HIL-A) **
366 HARRIS COUNTY FLOOD CONTROL DISTRICT NOTES (HCFCD-N) **
367 HCFCD STORM SEWER OUTFALL DETAILS (HCFCD-SSOD) **
368-377 OMIT

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UTILITIES

378 STANDARD NOTES WATER, WASTEWATER, & SWPPP
379 STANDARD NOTES WATER, WASTEWATER, & SWPPP
380 PROPOSED WATERLINE RELOCATION PLAN AND PROFILE- BEGIN TO STA 20+00
381 PROPOSED WATERLINE RELOCATION PLAN - STA 20+00 TO STA 32+50
382 PROPOSED WATERLINE RELOCATION PROFILE - STA 20+00 TO STA 32+50
383 PROPOSED WATERLINE RELOCATION PLAN AND PROFILE- BSTA 32+50 TO STA 45+00

UTILITY STANDARDS

384 STANDARD DETAILS WATER AND WASTEWATER - 01 ***
385 STANDARD DETAILS WATER AND WASTEWATER - 02 ***
386 STANDARD DETAILS WATER AND WASTEWATER - 03 ***

BRIDGE

387-389	BRIDGE LAYOUT
390	BRIDGE TYPICAL SECTION
391	ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS
392-394	FOUNDATION LAYOUT
395	FOUNDATION ESTIMATED QUANTITIES

396	FOUNDATION DETAILS
397-399	ABUTMENT 1 DETAILS
400-402	ABUTMENT 9 DETAILS
403-405	BENT 2 DETAILS
406-408	BENT 3 DETAILS
409-411	BENT 4 DETAILS
412-414	BENT 5 DETAILS
415-417	BENT 6 DETAILS
418-420	BENT 7 & 8 DETAILS
421-425	COLUMN DETAILS
426	FRAMING PLAN UNIT 1
427	FRAMING PLAN UNIT 2
428	FRAMING PLAN UNIT 3
429-430	FRAMING PLAN
431	SLAB PLAN UNIT 1
432	SLAB PLAN UNIT 2
433	SLAB PLAN UNIT 3
434	SLAB DETAILS TRANSVERSE SECTION
435	SLAB DETAILS
436-438	PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)
439	BORING LOG BRG-01
440	BORING LOG BRG-02
441	BORING LOG BRG-03
442	BORING LOG BRG-04
443	BORING LOG BRG-05

BRIDGE STANDARDS. SELECTED BY JENNIFER BOHLANDER, P.E., HNTB CORPORATION

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444-445 BRIDGE DECK DRAIN DETAILS (BD-2) (MOD) *
446-447 BRIDGE LIGHTING DETAILS (BL) *
448-450 BRIDGE MOUNTED CLEARANCE SIGN (BMCS) *
451 CEMENT STABILIZED BACKFILL EMBANKMENT (FOR USE WITH BRIDGE RETAINING
WALLS AT BRIDGE ABUTMENTS) (CSBE-RW) (HOU DIST) **
452-453 PRESTRESSED CONCRETE I-GIRDER DETAILS (IGD) *
454-456 ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) *
457-458 MISCELLANEOUS SLAB DETAILS (IGMS) (MOD) *
459 THICKENED SLAB END DETAILS (IGTS) (MOD) *
460-461 MINIMUM ERECTION & BRACING REQUIREMENTS (MEBR(C)) *
462-464 PRESTRESSED CONCRETE PANELS (PCP) (MOD) *
465 PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB) *
466-467 PERMANENT METAL DECK FORMS (PMDF) *
468 SEALED EXPANSION JOINT (TYPE M) (SEJ-M) *
469 SURFACE FINISHES FOR CONCRETE VERTICAL SCHEME (SFC-VS) (HOU DIST) **
470-471 CONCRETE SINGLE SLOPE TRAFFIC RAIL (TL-4) (36" TALL) (SSTR) *
472-474 WIDE FLANGE PAVEMENT TERMINALS FOR CONTINUOUSLY & JOINTED
REINFORCED CONCRETE PAVEMENT DETAILS (WFPT) (HOU DIST) **

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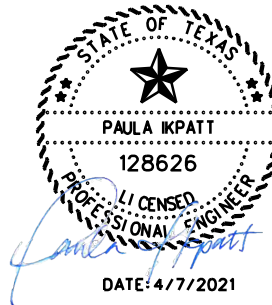
PERMANENT TRAFFIC SIGNALS

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475 TRAFFIC SIGNAL PLAN NOTES
476 EXISTING SITE CONDITIONS IH-69 AT NORTHPARK DR
477 NEW SIGNAL LAYOUT IH-69 AT NORTHPARK DR
478 CABLE SCHEMATIC IH-69 AT NORTHPARK DR
479 SIGNAL DETAILS IH-69 AT NORTHPARK DR
480 TRAFFIC SIGNAL POLE SCHEDULE IH-69 AT NORTHPARK DR
481 EXISTING SITE CONDITIONS SL 494 AT NORTHPARK DR
482 NEW SIGNAL LAYOUT SL 494 AT NORTHPARK DR
482A LOOP DETECTION LAYOUT SL 494 AT NORTHPARK DR
482B STOP LINE & PREFORMED LOOP DETECTION SCH SL 494 AT NORTHPARK DR
483-484 CABLE SCHEMATIC SL 494 AT NORTHPARK DR
485-487A SIGNAL DETAILS SL 494 AT NORTHPARK DR
488-489 RAILROAD PREEMPT SL 494 AT NORTHPARK DR
489A INTERCONNECTION DIAGRAM SL 494 AT NORTHPARK DR
490 EXISTING SITE CONDITIONS RUSSELL PALMER AT NORTHPARK DR
491 NEW SIGNAL LAYOUT RUSSELL PALMER AT NORTHPARK DR
491A LOOP DETECTION LAYOUT RUSSELL PALMER AT NORTHPARK DR
491B STOP LINE & PREFORMED LOOP DETECTION SCH RUSSELL PALMER AT NORTHPARK DR
492-493 CABLE SCHEMATIC RUSSELL PALMER AT NORTHPARK DR
494 TRAFFIC SIGNAL POLE SCHEDULE RUSSELL PALMER AT NORTHPARK DR
495-496 SIGNAL DETAILS RUSSELL PALMER AT NORTHPARK DR
497 SIGN DETAILS

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(*) STATEWIDE TXDOT STANDARD
(**) HOUSTON DISTRICT STANDARD
(***) CITY OF HOUSTON STANDARD
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NO.	REVISIONS						BY	DATE	
<div>HNTB</div>				<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>					
<div><div>LHA</div><div>Lake Houston Authority</div></div>				<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ -10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div>					
<div>CITY OF HOUSTON</div> <div>HOUSTON PUBLIC WORKS</div> <div>NORTH PARK DRIVE</div> <div>NORTH PARK DRIVE</div> <div>INDEX OF SHEETS</div>									
SHEET 3 OF 4									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.		
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CHECKED:	HOU	MONTGOMERY	0912	37			232	4	

PERMANENT TRAFFIC SIGNAL STANDARDS, SELECTED BY ROBERTSON JON P. BELARMINO, P.E.,
HNTB CORPORATION

498	TYPICAL MAST ARM/POLE FIXTURE CONFIGURATION ***
499-500	TRAFFIC SIGNAL STRUCTURES ***
501	POLE FOUNDATION DETAILS ***
502	PEDESTAL POLE WITH DRILL DRAFT FOUNDATION ***
502A	PULL BOXES COH STANDARDS
503-505	CONTROLLER FOUNDATIONS ***
506	LOOP DETECTOR INSTALLATION DETAILS ***
507	OVERHEAD STREET NAME SIGN MOUNTING DETAILS ***
508	METER LOOP ***
508A	GENERAL NOTES AND GROUND MOUNTING SIGN COH STANDARDS
508B	STREET NAME SIGN AND SIGN MOUNTING COH STANDARDS
508C	GROUND MOUNTED SIGN SIZES COH STANDARDS
508D	TYPICAL SIGN PLACEMENT COH STANDARDS
509	ELECTRICAL DETAILS CONDUITS & NOTES ED(1)-14 *
510	ELECTRICAL DETAILS CONDUCTORS ED(3)-14 *
511	ELECTRICAL DETAILS SERVICE NOTES & DATA ED(5)-14 *
512	ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES ED(6)-14 *
513	ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS ED(8)-14 *
514	MAST ARM DAMPING PLATE DETAILS MA-DPD-20 *
515	TRAFFIC SIGNAL HEAD WITH BACKPLATE TS-BP-20 *

ILLUMINATION

516	ILLUMINATION ELECTRICAL SERVICE SUMMARY
517-521	ILLUMINATION VOLTAGE DROP SUMMARY
522-529	ILLUMINATION PLAN
530	ILLUMINATION INTERSECTION DETAIL
531	ILLUMINATION CIRCUIT DIAGRAM

ILLUMINATION STANDARDS

532	BRIDGE LIGHTING DETAILS (BL) *
533	ELECTRICAL DETAILS CONDUITS & NOTES ED(1) - 14 *
534	ELECTRICAL DETAILS CONDUITS SUPPORTS ED(2) - 14 *
535	ELECTRICAL DETAILS CONDUCTORS ED(3) - 14 *
536	ELECTRICAL DETAILS GROUND BOXES ED(4) - 14 *
537	ELECTRICAL DETAILS SERVICE NOTES & DATA ED(5) - 14 *
538	ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES ED(6) - 14 *
539	ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP ED(7) - 14 *
540	ELECTRICAL DETAILS DUCT CABLE/HDPE CONDUIT ED(11) - 14 *
541	ROADWAY ILLUMINATION DETAILS RID(1) - 20 *
542	ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS) RID(2) - 20 *
543	ROADWAY ILLUMINATION DETAILS (UNDERPASS LIGH FIXTURES) RID(3) - 20 *
544	ROADWAY ILLUMINATION POLES RIP(1) - 19 *
545	ROADWAY ILLUMINATION POLES RIP(2) - 19 *
546	ROADWAY ILLUMINATION POLES RIP(3) - 19 *
547	ROADWAY ILLUMINATION POLES RIP(4) - 19 *
548	LIGHTING BRACKET FOR MSE RETAINING WALL TRAFFIC RAIL FOUNDATION RW(LB) *

SIGNING & PAVEMENT MARKINGS

549-552	PAVEMENT MARKING AND SIGNAGE - NORTH PARK DR
553-554	PAVEMENT MARKING AND SIGNAGE - LOOP 494

SIGNING & PAVEMENT MARKINGS STANDARDS

555	GENERAL NOTES AND LEGENDS ***
556	LEFT/RIGHT TURN "ONLY" AND ARROW SPACING ***
557	STANDARD PAVEMENT MARKING - (WORDS) ***
558	STANDARD PAVEMENT MARKING - SYMBOLS ***
559	STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE ***
560	POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS (PM(2)-20) *
561	RAILROAD CROSSING PAVEMENT MARKINGS DETAILS ***
562	TYPICAL CROSSWALK DETAILS ***
563	LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1 ***
564	LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2 ***
564A	TWO WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS TXDOT (PM(3)-20) *

ITS

565	ITS PROJECT LAYOUT
566-572	ITS PLAN

ITS STANDARDS

573	ITS CONDUIT TRENCH DETAILS - ITS(27)-16 *
574	ITS CONDUIT BORE AND STEEL CASING DETAILS - ITS(28)-16 *
575	ITS CONDUIT HANGER DETAILS - ITS(29)-16 *
576	STRUCTURE MOUNTED ITS CONDUIT - ITS(30)-16 *
577	PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL - ITS(31)-16 *
578	EXPANSION/DEFLECTION JOINT - ITS(32)-16 *
579	ITS CONDUIT TRANSITION AT ABUTEMENT - ITS(33)-16 *
580	ITS CONDUIT RISER - ITS(34)-16 *
581	ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER - ITS(37)-16 *
582	ITS GROUND BOX DETAILS TYPE "1" WITH STEEL COVER - ITS(38)-17 *

RAILROAD

583	CONCRETE PANEL CROSSING LAYOUT EBFR
584	CONCRETE PANEL CROSSING LAYOUT WBFR
585-587	EXISTING RAIL PLAN AND PROFILE

RAILROAD STANDARDS, SELECTED BY KATE LIGHT, P.E., HNTB CORPORATION

588	RAILROAD CROSSING SIGNING AND STRIPING - RCD(2)-16 *
589	RAILROAD CROSSING SIGNING, STRIPING AND DEVICE PLACEMENT - RCD(1)-16 *
590-592	RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION *
593-593A	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION *
594	RAILROAD SCOPE OF WORK *

ENVIRONMENTAL ISSUES

595-608	STORMWATER POLLUTION PREVENTION PLAN
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EROSION CONTROL STANDARDS

609	STORMWATER POLLUTION PREVENTION PLAN STANDARD DETAILS ***
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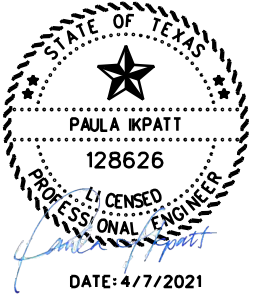
LANDSCAPING/IRRIGATION

610	SHEET ORIENTATION
611	SUMMARY OF LANDSCAPE QUANTITIES
612-613	GENERAL NOTES
614	CLEARING AND GRUBBING
616-620	TREE PRESERVATION
621	TREE PROTECTION
622	TREE TRANSPLANTING
623	POND DEVELOPMENT - POND-01
624	GRADING AND EXCAVATION - POND-02
625	GRADING AND EXCAVATION - POND-03
626-630	POND SECTIONS
631	POND AERATION
632-648	HARDSCAPE LAYOUT
649-651B	HARDSCAPE DETAILS
652-668	PLANTING PLAN
669-670	LANDSCAPE LIGHTING DETAILS
671	IRRIGATION MAINLINE DIAGRAM
672-687	IRRIGATION PLAN
688-694	IRRIGATION DETAILS
695-698	PLANTING AND ESTABLISHMENT (MOD)
699	FERTILIZERS AND SOIL AMENDMENTS
700	PROJECT CONDITIONS
701-702	PLANTING AND ESTABLISHMENT MAINTENANCE REQUIREMENTS
703	TRANSPLANTED TREE INVENTORY TXDOT
704-707	TRANSPLANTED TREE INVENTORY COH
708	ELECTRICAL SITE PLAN
709	ELECTRICAL ONE LINE DIAGRAM AND ELECTRICAL SCHEDULES
710	ONE LINE DIAGRAM
711	ELECTRICAL DETAILS

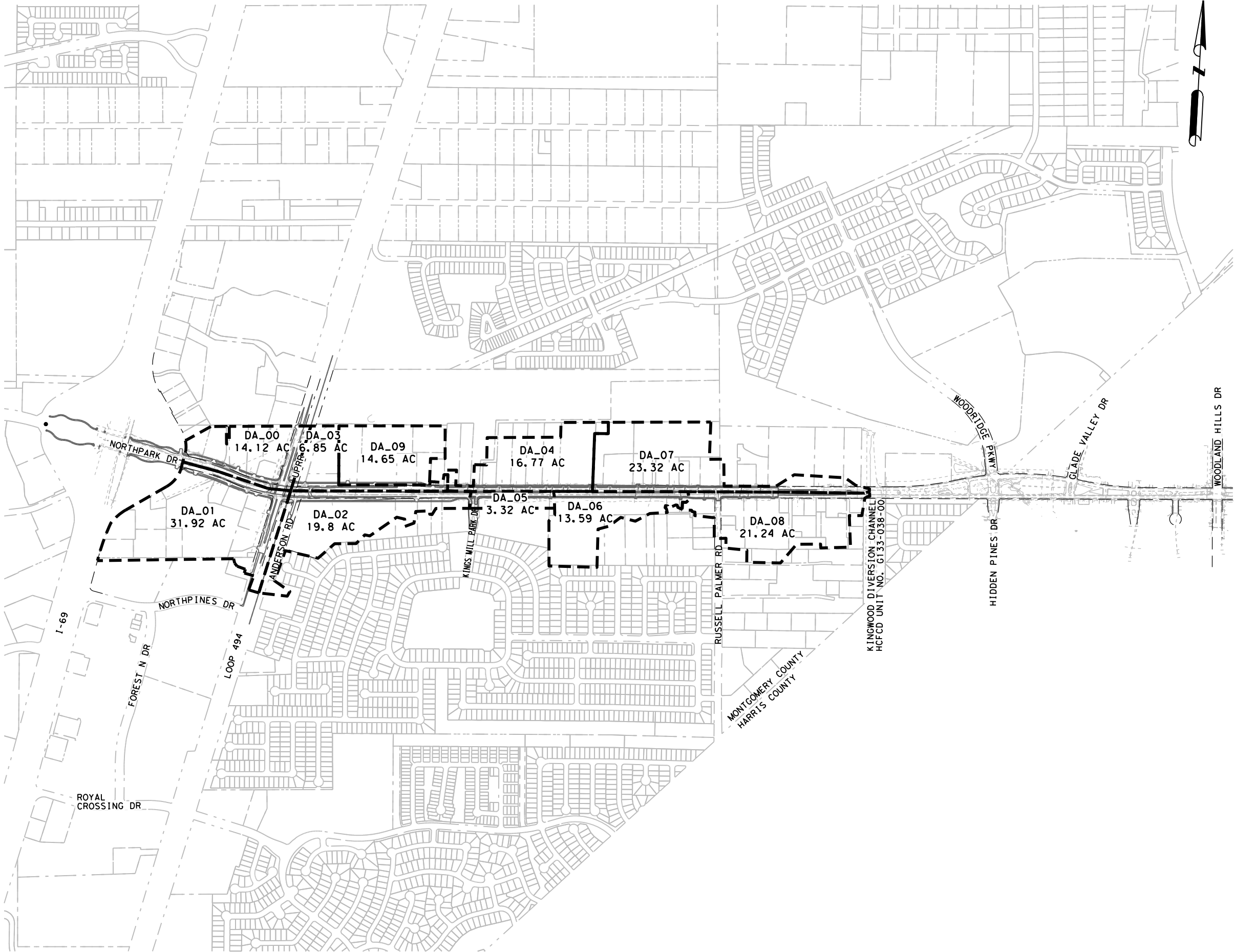
EQUALIZER PIPE

712	EQUALIZER PIPE LAYOUT
713	PLAN AND PROFILE 60" RCP EQUALIZER PIPE
714	PLAN AND PROFILE 48" RCP INFLOW AND OUTFLOW PIPE

(*) STATEWIDE TXDOT STANDARD
(**) HOUSTON DISTRICT STANDARD
(***) CITY OF HOUSTON STANDARD
(****) UPRR STANDARD



NO.		REVISIONS		BY	DATE
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON					
HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE					
NORTH PARK DRIVE					
INDEX OF SHEETS					
SHEET 4 OF 4					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON	WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No. SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 5



LEGEND

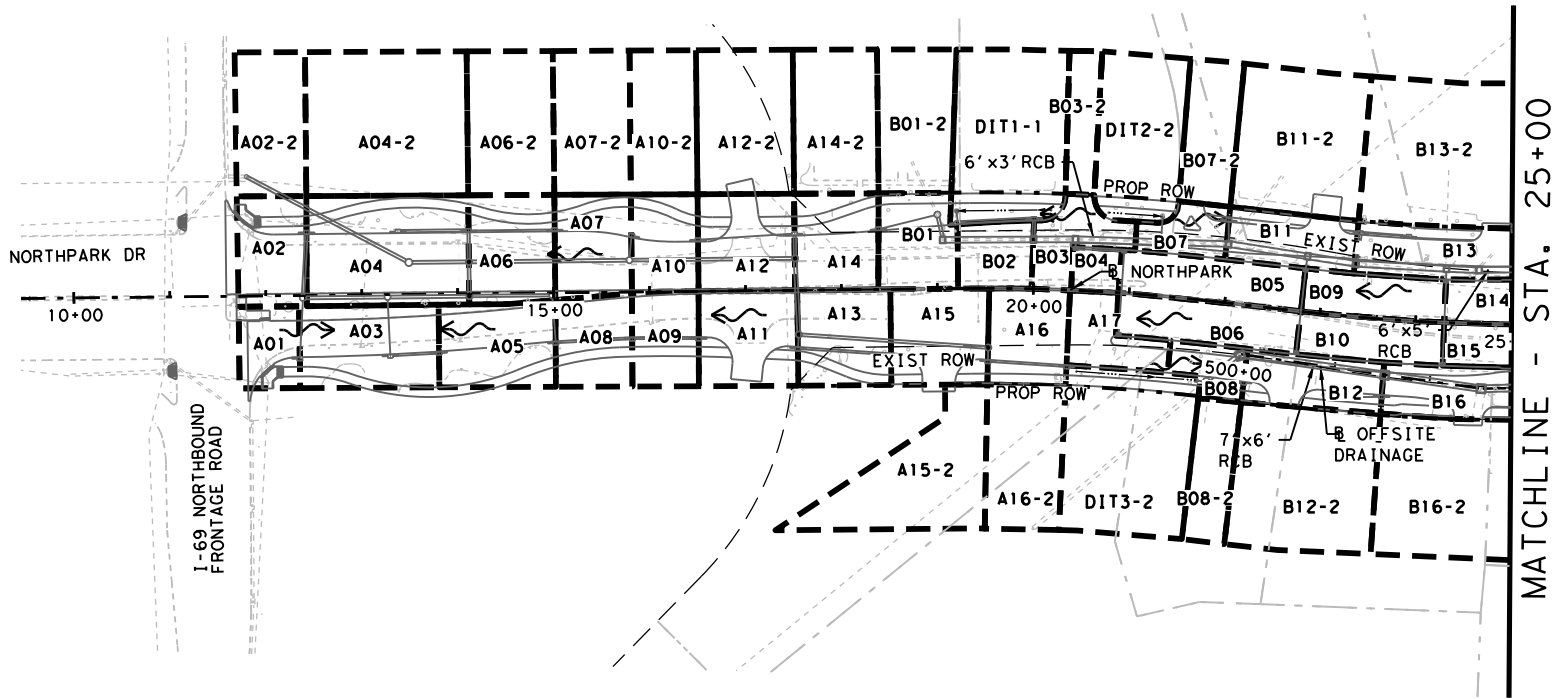
- DRAINAGE AREA BOUNDARY
- DRAINAGE AREA ID

NOTES:
1. SEE NORTH PARK DRIVE DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



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DESIGN FREQUENCY: 100-YR		
DRAINAGE AREA ID	AREA (AC)	DISCHARGE (CFS)
A01	0.12	1.43
A02	0.19	1.59
A02-2	0.25	1.84
A03	0.29	3.1
A04	0.44	4.99
A04-2	0.58	5.78
A05	0.24	2.63
A06	0.23	2.64
A06-2	0.31	2.26
A07	0.2	2.26
A07-2	0.28	2.01
A08	0.17	1.85
A09	0.16	1.72
A10	0.16	1.82
A10-2	0.24	1.93
A11	0.23	2.86
A12	0.23	2.83
A12-2	0.35	3.55
A13	0.22	2.64
A14	0.2	2.36
A14-2	0.3	3.85
A15	0.23	3.02
A15-2	0.38	4.48
A16	0.19	2.43
A16-2	0.27	2.64
A17	0.13	1.82
B01	0.18	2.22
B01-2	0.27	3.34
B02	0.12	1.69
B03	0.14	1.88
B03-2	0.11	1.32
B04	0.05	0.71
B05	0.2	2.71
B06	0.2	2.65
B07	0.1	1.33
B07-2	0.19	1.95
B08	0.11	1.43
B08-2	0.15	2.03
B09	0.15	2.08
B10	0.17	2.33
B11	0.17	2.25
B11-2	0.46	5.43
B12	0.18	2.29
B12-2	0.43	5.17
B13	0.26	3.39
B13-2	0.67	7.83
B14	0.17	2.33
B15	0.16	2.23
B16	0.28	3.63
B16-2	0.78	10.16
DIT1-1	0.49	5.43
DIT2-2	0.35	4.16
DIT3-2	0.53	6.45



LEGEND

PROPOSED DITCH

DRAINAGE AREA BOUNDARY

DIRECTION OF FLOW

DRAINAGE AREA ID

- NOTES:
1. SEE NORTHARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

2. SYSTEM "A" OUTFALLS TO I-69
SYSTEM "B" OUTFALLS TO BENS BRANCH HCFC UNIT NO. G103-33-00
SYSTEM "C" OUTFALLS TO KINGWOOD DIVERSION CHANNEL HCFC UNIT NO. G103-38-00

4/1/2021

SCALE : 1"=200'

NO.

REVISIONS

BY

DATE

EHRA ENGINEERING

10011 Meadow Glen Lane

Houston, Texas 77042

EHRAInc.com | 713.784.4500

TRPE NO F-726 | TRPLS No. 10092300

HNTB Corporation

The HNTB Companies

Infrastructure Solutions

Firm Registration Number 420

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT AUTHORITY

& TRIZ 10

c/o HUNTON ANDREWS KURTH LLP

800 TRAVIS, SUITE 4200

HOUSTON, TX 77007

NORTHARK DRIVE

DRAINAGE AREA MAP

NORTHARK DRIVE

BEGIN TO STA 25+00

SHEET 1 OF 3

DESIGNED:

FED. RD. DIV. No.

STATE

CITY OF HOUSTON WBS

HIGHWAY No.

CHECKED:

6

TEXAS

SEE TITLE SHEET

CS

DRAWN:

STATE DISTRICT

COUNTY

CONTROL No.

SECTION No.

JOB No.

SHEET No.

CHECKED:

HOU

MONTGOMERY

0912

37

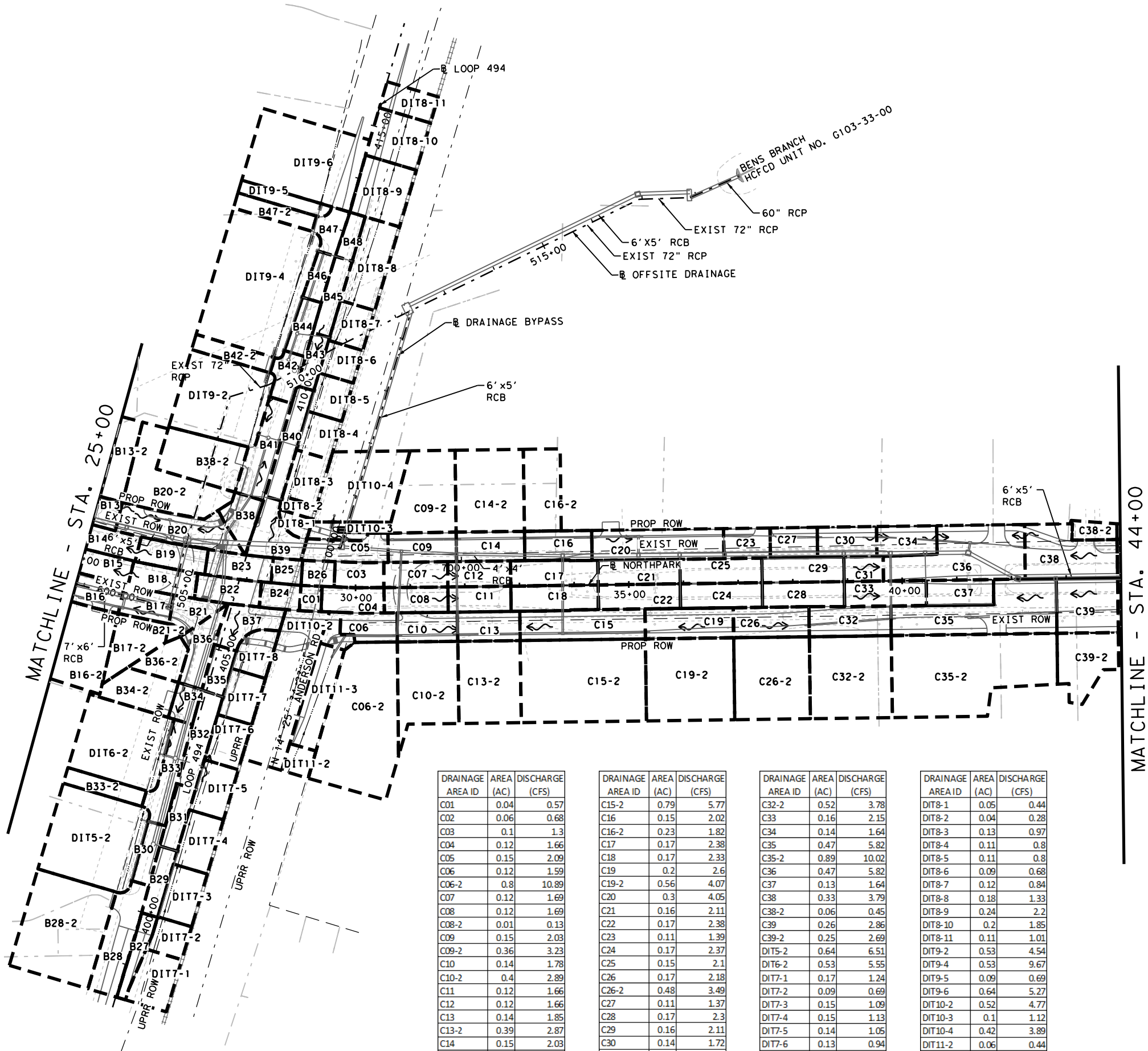
232

309

4/1/2021

3:52:43 PM

DESIGN FREQUENCY: 100-YR		
DRAINAGE AREA ID	AREA (AC)	DISCHARGE (CFS)
B17	0.11	1.5
B17-2	0.18	2.49
B18	0.16	2.19
B19	0.14	1.84
B20	0.27	3.62
B20-2	0.37	4.93
B21	0.1	1.23
B21-2	0.01	0.13
B22	0.06	0.78
B23	0.13	1.74
B24	0.08	1.06
B25	0.06	0.78
B26	0.06	0.87
B27	0.09	1.2
B28	0.26	3.04
B28-2	0.63	6.3
B29	0.09	1.26
B30	0.08	1.07
B31	0.1	1.29
B32	0.16	2.13
B33	0.16	2.19
B33-2	0.1	1.4
B34	0.07	0.85
B34-2	0.19	2.51
B35	0.08	1.14
B36	0.15	1.93
B36-2	0.11	1.45
B37	0.15	2
B38	0.11	0.21
B38-2	0.29	3.68
B39	0.16	2.23
B40	0.15	2.07
B41	0.2	2.79
B42	0.09	1.28
B42-2	0.1	1.35
B43	0.07	1.02
B44	0.09	1.22
B45	0.11	1.47
B46	0.07	0.95
B47	0.08	1.13
B47-2	0.1	1.35
B48	0.06	0.82



- NOTES:
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 - SYSTEM "A" OUTFALLS TO I-69
SYSTEM "B" OUTFALLS TO BENS BRANCH HCFCU UNIT NO. G103-33-00
SYSTEM "C" OUTFALLS TO KINGWOOD DIVERSION CHANNEL HCFCU UNIT NO. G103-38-00



NO.	REVISIONS	BY	DATE
<div><div><div>EHRA</div><div>HNTB</div><div>CITY OF HOUSTON HOUSTON PUBLIC WORKS</div></div><div><div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300</div><div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRF 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div></div>			
NORTH PARK DRIVE			
DRAINAGE AREA MAP			
NORTH PARK DRIVE			
STA 25+00 TO STA 44+00			
SHEET 2 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB NO.	SHEET NO.
		232	310

MATCHLINE - STA. 44+00

DESIGN FREQUENCY: 100-YR			DRAINAGE AREA ID			DRAINAGE AREA ID			DRAINAGE AREA ID			DRAINAGE AREA ID			DRAINAGE AREA ID			DRAINAGE AREA ID		
DRAINAGE AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)	AREA ID	AREA (AC)	DISCHARGE (CFS)
C40	0.25	2.78	C45	0.1	1.15	C52	0.09	1.15	C57	0.4	4.71	C62	0.09	1.21	C67	0.2	2.55	C72	0.45	5.56
C40-2	0.17	1.24	C46	0.15	1.69	C52-2	0.21	2	C57-2	0.85	10.34	C62-2	0.21	1.38	C67-2	0.52	3.79	C72-2	0.94	11.41
C41	0.21	2.54	C47	0.03	0.4	C53	0.08	1.03	C58	0.37	4.62	C63	0.14	1.82	C68	0.27	3.53	C73	0.23	2.85
C41-2	0.3	4.08	C48	0.04	0.5	C53-2	0.14	1.88	C58-2	0.62	7.4	C63-2	0.31	1.89	C68-2	0.55	6.7	C73-2	0.52	6.03
C42	0.32	3.6	C49	0.39	4.78	C54	0.22	2.67	C59	0.23	2.88	C64	0.16	2.08	C69	0.19	2.46	C74	0.39	4.88
C42-2	0.22	1.59	C49-2	0.51	5.11	C54-2	0.47	6.06	C59-2	0.51	6.44	C64-2	0.37	3.96	C69-2	0.52	3.39	C74-2	0.98	6.61
C43	0.2	2.36	C50	0.12	1.51	C55	0.17	2.03	C60	0.23	2.95	C65	0.23	3.02	C70	0.26	3.34	C75	0.22	2.76
C43-2	0.16	2.19	C50-2	0.27	1.99	C55-2	0.27	3.13	C60-2	0.37	3.86	C65-2	0.52	2.94	C70-2	0.52	6.83	C75-2	0.44	3.33
C44	0.13	1.4	C51	0.08	0.96	C56	0.16	1.91	C61	0.09	1.08	C66	0.22	2.65	C71	0.19	2.48	C76	0.19	2.25
C44-2	0.08	0.58	C51-2	0.18	2.39	C56-2	0.34	4.15	C61-2	0.21	2.25	C66-2	0.51	5.45	C71-2	0.52	3.42	C76-2	0.42	5.33

LEGEND

--- PROPOSED DITCH

--- DRAINAGE AREA BOUNDARY

--- DIRECTION OF FLOW

ID DRAINAGE AREA ID

- NOTES:**
- SEE NORTH-PARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.
 - SYSTEM "A" OUTFALLS TO I-69
SYSTEM "B" OUTFALLS TO BENS BRANCH HCFC UNIT NO. G103-33-00
SYSTEM "C" OUTFALLS TO KINGWOOD DIVERSION CHANNEL HCFC UNIT NO. G103-38-00

MATCHLINE - STA. 67+00

DRAINAGE AREA ID			DRAINAGE AREA ID			DRAINAGE AREA ID		
AREA (AC)	DISCHARGE (CFS)		AREA (AC)	DISCHARGE (CFS)		AREA (AC)	DISCHARGE (CFS)	
C77	0.23	2.97	C82	0.4	5.13	C88-2	0.52	5.86
C77-2	0.56	6.94	C82-2	0.78	6.32	C89	0.21	2.58
C78	0.23	2.92	C83	0.58	2.06	C90	0.31	3.65
C78-2	0.32	3.53	C83-2	0.21	2.68	C90-2	0.27	1.96
C79	0.22	2.9	C84	0.23	3	C91	0.43	5.37
C79-2	0.39	4.85	C85	0.16	2.09	C91-2	1.08	12.6
C80	0.2	2.66	C85-2	0.77	9.37	C92	0.46	4.74
C80-2	0.54	6.35	C86	0.08	1.06	C92-2	0.82	6.4
C81	0.2	2.7	C87	0.1	1.2	C93	0.47	5.37
C81-2	0.5	5.97	C88	0.21	2.55	C93-2	1.19	15.21
						C94	0.56	5.87
						C94-2	0.53	4.22
						C95	0.57	6.16
						C95-2	1.24	15.98

STATE OF TEXAS

FREDERICK J. SIGNORELLI

123290

PROFESSIONAL ENGINEER

4/1/2021

0' 100' 200'

SCALE : 1"=200'

NO.	REVISIONS	BY	DATE

EHRA

10011 Meadowglade Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No 10092300

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

Lake Houston Redevelopment Authority & TR2 10
c/o HUNTON ANDREWS KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTH-PARK DRIVE

DRAINAGE AREA MAP

NORTH-PARK DRIVE

STA 44+00 TO END

DESIGNED:

FED. RD. DIV. No.

STATE

CITY OF HOUSTON WBS

HIGHWAY No.

CHECKED:

6

TEXAS

SEE TITLE SHEET

CS

DRAWN:

STATE DISTRICT

COUNTY

CONTROL No.

SECTION No.

JOB No.

SHEET No.

CHECKED:

HOU

MONTGOMERY

0912

37

232

311

100 YEAR
ON GRADE INLETS CONFIGURATION

ID	Type	Length (ft)	Slopes Long. (%)	Trans. (%)	Spread N	Curb Depression (ft)	Grate Type	Grate Length (ft)	Grate Width (ft)	Max Ponded Width (ft)	Max Ponded Depth (ft)
A01	Curb	10	0.64	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
A02	Curb	15	0.64	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
A05	Curb	15	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
A06	Curb	15	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
A07	Curb	15	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
A08	Curb	10	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
A09	Curb	10	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
A10	Curb	10	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
A11	Curb	15	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
A12	Curb	15	0.36	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
A13	Curb	15	0.21	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
A14	Curb	15	0.30	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
A15	Curb	15	0.39	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
A16	Curb	15	0.21	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
A17	Curb	15	0.64	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B01	Curb	15	0.25	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B02	Curb	15	0.11	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B03	Curb	15	0.23	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
B04	Grate	n/a	0.77	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B05	Grate	n/a	1.39	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B06	Grate	n/a	1.39	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B07	Curb	15	1.76	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
B08	Curb	15	1.31	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
B09	Grate	n/a	3.75	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B10	Grate	n/a	3.75	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B11	Curb	15	0.66	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B12	Curb	15	0.66	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B14	Grate	n/a	5.62	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B15	Grate	n/a	5.62	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
B17	Curb	10	0.23	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
B18	Grate	n/a	5.08	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B19	Grate	n/a	5.02	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B21	Curb	5	1.16	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B22	Grate	n/a	3.10	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B23	Grate	n/a	2.92	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B24	Grate	n/a	1.18	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B25	Grate	n/a	0.90	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B26	Grate	n/a	1.00	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
B27	Curb	10	1.00	2.00	0.015	0.25	n/a	n/a	n/a	12.90	0.5
B28	Curb	5	1.00	2.00	0.015	0.25	n/a	n/a	n/a	12.80	0.5
B29	Curb	10	1.00	2.00	0.015	0.25	n/a	n/a	n/a	13.06	0.5
B30	Curb	10	1.00	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B31	Curb	10	0.62	2.00	0.015	0.25	n/a	n/a	n/a	12.50	0.5
B34	Curb	10	0.88	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B35	Curb	10	1.10	2.00	0.015	0.25	n/a	n/a	n/a	12.90	0.5
B36	Curb	15	1.10	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B37	Curb	15	1.10	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
B38	Curb	5	1.26	2.00	0.015	0.25	n/a	n/a	n/a	12.33	0.5
B39	Curb	15	1.12	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
B42	Curb	5	0.12	2.00	0.015	0.25	n/a	n/a	n/a	11.67	0.5
B43	Curb	5	0.12	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B44	Curb	5	0.12	2.00	0.015	0.25	n/a	n/a	n/a	11.67	0.5
B45	Curb	10	0.12	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
B46	Curb	5	0.21	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
B47	Curb	5	0.12	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
B48	Curb	5	0.11	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5

100 YEAR
ON GRADE INLETS CONFIGURATION

			Slopes								
ID	Type	Length (ft)	Long. (%)	Trans. (%)	Spread N	Curb Depression (ft)	Grate Type	Grate Length (ft)	Grate Width (ft)	Max Ponded Width (ft)	Max Ponded Depth (ft)
C01	Grate	n/a	0.64	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C02	Curb	10	2.03	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C03	Grate	n/a	2.49	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C04	Grate	n/a	2.50	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C05	Curb	15	2.33	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C06	Curb	15	1.82	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C07	Grate	n/a	4.41	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C08	Grate	n/a	4.41	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C09	Curb	15	0.56	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C10	Curb	10	0.65	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C11	Grate	n/a	6.00	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C12	Grate	n/a	6.00	2.00	0.015	n/a	Curved Vane	3.44	1.14	12.00	0.5
C13	Curb	10	0.69	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
C14	Curb	15	0.29	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C16	Curb	15	1.27	2.00	0.015	0.25	n/a	n/a	n/a	14.50	0.5
C17	Grate	n/a	5.49	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C18	Grate	n/a	5.49	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C19	Curb	15	0.54	2.00	0.015	0.25	n/a	n/a	n/a	14.00	0.5
C21	Grate	n/a	3.60	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C22	Grate	n/a	3.60	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C23	Curb	10	0.83	2.00	0.015	0.25	n/a	n/a	n/a	14.50	0.5
C24	Grate	n/a	1.72	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C25	Grate	n/a	1.72	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C26	Curb	10	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C27	Curb	10	0.12	2.00	0.015	0.25	n/a	n/a	n/a	14.50	0.5
C28	Grate	n/a	0.36	2.00	0.015	n/a	Parall	4	2.21	13.00	0.5
C29	Grate	n/a	0.36	2.00	0.015	n/a	Parall	4	2.21	12.00	0.5
C30	Curb	10	0.25	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
C31	Grate	n/a	0.36	2.00	0.015	n/a	Parall	4	2.21	13.00	0.5
C32	Curb	15	0.24	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
C33	Grate	n/a	0.36	2.00	0.015	n/a	Parall	4	2.21	15.00	0.5
C34	Curb	10	0.15	2.00	0.015	0.25	n/a	n/a	n/a	13.00	0.5
C37	Grate	n/a	0.38	2.00	0.015	n/a	Parall	4	2.21	12.67	0.5
C38	Curb	15	1.12	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C39	Curb	15	1.30	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C40	Curb	15	0.85	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C41	Curb	15	0.85	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C42	Curb	15	0.85	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C43	Curb	15	0.85	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C44	Curb	15	1.01	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C45	Curb	15	0.91	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C47	Curb	10	0.40	2.00	0.015	0.25	n/a	n/a	n/a	18.00	0.5
C48	Curb	10	0.35	2.00	0.015	0.25	n/a	n/a	n/a	18.00	0.5
C50	Curb	10	0.58	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C51	Curb	10	0.58	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C52	Curb	10	0.58	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C53	Curb	5	0.71	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C54	Curb	15	0.71	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C55	Curb	10	0.71	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C56	Curb	15	0.71	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C59	Curb	15	0.99	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C60	Curb	15	0.94	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C61	Curb	5	0.04	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C62	Curb	10	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.50	0.5
C63	Curb	10	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C64	Curb	10	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C65	Curb	15	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.80	0.5
C66	Curb	10	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C67	Curb	15	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C68	Curb	15	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C69	Curb	15	0.41	2.00	0.015	0.25	Parall	n/a	n/a	12.00	0.5
C70	Curb	15	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C71	Curb	15	0.41	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C73	Curb	10	0.36	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C75	Curb	15	0.40	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C76	Curb	15	0.40	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C77	Curb	15	0.40	2.00	0.015	0.25	n/a	n/a	n/a	12.87	0.5
C78	Curb	15	0.40	2.00	0.015	0.25	n/a	n/a	n/a	12.70	0.5
C79	Curb	15	1.44	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
C80	Curb	15	1.43	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C81	Curb	15	0.18	2.00	0.015	0.25	n/a	n/a	n/a	12.40	0.5
C84	Curb	15	0.49	2.00	0.015	0.25	n/a	n/a	n/a	12.50	0.5
C85	Curb	15	0.49	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C86	Curb	10	0.49	2.00	0.015	0.25	n/a	n/a	n/a	12.00	0.5
C87	Curb	10	0.19	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C88	Curb	15	0.24	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C89	Curb	15	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C90	Curb	5	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C91	Grate	n/a	0.35	2.00	0.015	n/a	Parall	2.48	2.48	12.67	0.5
C92	Curb	5	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C93	Curb	5	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C94	Curb	5	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C95	Curb	5	0.35	2.00	0.015	0.25	n/a	n/a	n/a	12.67	0.5
C96	Grate	n/a	0.31	2.00	0.015	n/a	Parall	2.48	2.48	13.00	0.5
DIT4	Grate	n/a	0.66	2.00	0.015	n/a	Parall	2.48	2.48	13.00	0.5
DIT3-Grate	n/a	2.49	2.00	0.015	n/a	n/a	Parall	2.48	2.48	12.33	0.5

100 YEAR
ON GRADE INLETS COMPUTATION

ID	Type	Discharge (cfs)	Capacity (cfs)	Max By Pass (cfs)	By Pass Flow (cfs)	To ID	Length Required (ft)	Actual Length (ft)	Comp. Ponded Width (ft)	Comp. Ponded Depth (ft)
A01	Curb	1.427	1.427	0.5	0	A03	8.29	10	8.78	0.18
A02	Curb	1.586	1.586	0.5	0	A04	10.39	15	9.15	0.17
A05	Curb	2.633	2.633	0.5	0	A03	12.67	15	12.27	0.24
A06	Curb	2.639	2.639	0.5	0	A04	10.33	15	12.27	0.25
A07	Curb	2.261	2.261	0.5	0	A06	9.47	15	11.58	0.23
A08	Curb	1.848	1.847	0.5	0.001	A05	10.18	10	10.75	0.21
A09	Curb	1.717	1.717	0.5	0	A08	8.11	10	10.44	0.21
A10	Curb	1.819	1.819	0.5	0	A07	8.38	10	10.67	0.21
A11	Curb	2.865	2.865	0.5	0	A09	10.82	15	12.65	0.25
A12	Curb	2.834	2.834	0.5	0	A10	10.75	15	12.60	0.25
A13	Curb	2.641	2.641	0.5	0	A11	11.39	15	13.61	0.26
A14	Curb	2.365	2.365	0.5	0	A12	11.41	15	12.20	0.24
A15	Curb	3.015	3.015	0.5	0	A13	13.95	15	12.77	0.25
A16	Curb	2.493	2.493	0.5	0	A15	10.99	15	13.32	0.26
A17	Curb	3.481	3.421	0.5	0.06	A16	16.75	15	12.12	0.24
B01	Curb	2.221	2.221	0.5	0	A14	10.56	15	12.35	0.25
B02	Curb	1.686	1.686	0.5	0	B01	6.14	15	12.92	0.26
B03	Curb	2.582	2.582	0.5	0	B02	10.91	15	12.17	0.30
B04	Grate	2.364	1.657	0.5	0.706	B03	n/a	n/a	10.23	0.21
B05	Grate	4.114	2.461	0.5	1.654	B04	n/a	n/a	11.27	0.23
B06	Grate	4.132	2.473	0.5	1.659	A17	n/a	n/a	11.26	0.23
B07	Curb	1.33	1.33	0.5	0	B11	11.45	15	7.02	0.13
B08	Curb	1.427	1.427	0.5	0	B12	11.31	15	7.69	0.14
B09	Grate	3.639	2.235	0.5	1.404	B05	n/a	n/a	8.91	0.18
B10	Grate	3.778	2.298	0.5	1.48	B06	n/a	n/a	9.04	0.18
B11	Curb	2.245	2.245	0.5	0	B13	10.82	15	10.32	0.21
B12	Curb	2.294	2.294	0.5	0	B16	13.11	15	10.43	0.20
B14	Grate	3.994	2.435	0.5	1.559	B09	n/a	n/a	8.56	0.17
B15	Grate	3.79	2.34	0.5	1.451	B10	n/a	n/a	8.41	0.17
B17	Curb	1.502	1.502	0.5	0	B16	8.14	10	10.87	0.21
B18	Grate	2.733	1.175	0.5	1.558	B15	n/a	n/a	7.58	0.15
B19	Grate	2.887	1.219	0.5	1.668	B14	n/a	n/a	7.77	0.16
B21	Curb	1.228	1.228	0.5	0	B17	4.11	5	7.01	0.26
B22	Grate	1.199	0.658	0.5	0.541	B18	n/a	n/a	6.11	0.12
B23	Grate	2.003	0.951	0.5	1.051	B19	n/a	n/a	7.51	0.15
B24	Grate	1.06	0.638	0.5	0.422	B22	n/a	n/a	6.99	0.14
B25	Grate	0.777	0.514	0.5	0.263	B23	n/a	n/a	6.55	0.13
B26	Grate	0.87	0.556	0.5	0.314	C03	n/a	n/a	6.71	0.13
B27	Curb	1.197	1.197	0.5	0	B29	8.33	10	7.54	0.15
B28	Curb	3.041	3.041	0.5	0	B30	2.18	5	7.80	0.94
B29	Curb	1.257	1.257	0.5	0	B31	8.56	10	7.68	0.15
B30	Curb	1.069	1.069	0.5	0	B33	8.99	10	7.25	0.14
B31	Curb	1.291	1.291	0.5	0	B32	9.11	10	8.52	0.16
B34	Curb	0.849	0.849	0.5	0	B33	6.66	10	6.80	0.14
B35	Curb	1.142	1.142	0.5	0	B32	9.53	10	7.29	0.14
B36	Curb	1.927	1.927	0.5	0	B34	13.10	15	8.87	0.17
B37	Curb	1.998	1.998	0.5	0	B35	11.37	15	8.97	0.18
B38	Curb	0.205	0.205	0.5	0	B41	3.29	5	3.73	0.08
B39	Curb	2.235	2.235	0.5	0	B40	14.39	15	9.37	0.18
B42	Curb	1.278	1.278	0.5	0	B41	0.81	5	8.86	0.96
B43	Curb	1.02	1.02	0.5	0	B40	4.73	5	10.51	0.21
B44	Curb	1.223	1.223	0.5	0	B41	0.80	5	8.58	0.96
B45	Curb	1.468	1.468	0.5	0	B43	5.81	10	12.04	0.24
B46	Curb	0.952	0.952	0.5	0	B44	0.83	5	5.40	0.89
B47	Curb	1.134	1.134	0.5	0	B46	0.77	5	9.10	0.85
B48	Curb	0.816	0.816	0.5	0	B43	4.82	5	9.92	0.19

100 YEAR
ON GRADE INLETS COMPUTATION

ID	Type	Discharge (cfs)	Capacity (cfs)	Max By Pass (cfs)	By Pass Flow (cfs)	To ID	Length Required (ft)	Actual Length (ft)	Comp. Ponded Width (ft)	Comp. Ponded Depth (ft)
C01	Grate	0.571	0.415	0.5	0.156	C04	n/a	n/a	6.22	0.12
C02	Curb	0.68	0.68	0.5	0		8.43	10	8.33	0.09
C03	Grate	1.61	0.819	0.5	0.79	C07	n/a	n/a	7.13	0.14
C04	Grate	1.815	0.896	0.5	0.919	C08	n/a	n/a	7.42	0.15
C05	Curb	2.093	2.093	0.5	0	C09	14.90	15	9.61	0.14
C06	Curb	1.594	1.594	0.5	0	C10	11.96	15	8.87	0.14
C07	Grate	2.476	1.082	0.5	1.394	C12	n/a	n/a	7.64	0.15
C08	Grate	2.605	1.122	0.5	1.483	C11	n/a	n/a	7.78	0.15
C09	Curb	2.026	2.026	0.5	0	C14	11.76	15	10.27	0.20
C10	Curb	1.78	1.78	0.5	0	C13	9.44	10	9.49	0.19
C11	Grate	3.141	1.298	0.5	1.844	C18	n/a	n/a	7.74	0.16
C12	Grate	3.053	1.272	0.5	1.781	C17	n/a	n/a	7.66	0.15
C13	Curb	1.85	1.798	0.5	0.052	C15	11.59	10	9.55	0.18
C14	Curb	2.03	2.03	0.5	0	C16	10.46	15	11.83	0.22
C16	Curb	2.015	2.015	0.5	0	C20	11.79	15	8.77	0.18
C17	Grate	4.16	2.52	0.5	1.639	C21	n/a	n/a	8.66	0.18
C18	Grate	4.174	2.527	0.5	1.647	C22	n/a	n/a	8.67	0.18
C19	Curb	2.605	2.605	0.5	0	C15	13.64	15	11.35	0.22
C21	Grate	3.746	2.296	0.5	1.45	C25	n/a	n/a	8.99	0.18
C22	Grate	4.028	2.423	0.5	1.605	C24	n/a	n/a	9.23	0.19
C23	Curb	1.386	1.386	0.5	0	C20	10.11	10	8.28	0.16
C24	Grate	3.972	2.379	0.5	1.593	C28	n/a	n/a	10.68	0.21
C25	Grate	3.55	2.187	0.5	1.363	C31	n/a	n/a	10.24	0.21
C26	Curb	2.18	2.18	0.5	0	C32	9.24	10	11.61	0.23
C27	Curb	1.375	1.375	0.5	0	C23	6.84	10	11.76	0.23
C28	Grate	3.891	2.818	0.5	1.073	C33	n/a	n/a	12.15	0.31
C29	Grate	2.107	1.599	0.5	0.508	C31	n/a	n/a	11.32	0.23
C30	Curb	1.718	1.718	0.5	0	C34	7.47	10	11.17	0.22
C31	Grate	2.883	2.076	0.5	0.807	C36	n/a	n/a	12.73	0.26
C32	Curb	2.167	2.167	0.5	0	C35	8.41	15	12.31	0.25
C33	Grate	3.226	2.277	0.5	0.949	C37	n/a	n/a	13.28	0.27
C34	Curb	1.64	1.64	0.5	0	C36	7.94	10	12.09	0.23
C37	Grate	2.591	1.89	0.5	0.701	C39	n/a	n/a	12.10	0.24
C38	Curb	3.79	3.487	0.5	0.304	C36	19.89	15	11.38	0.22
C39	Curb	3.557	3.517	0.5	0.04	C35	16.36	15	10.80	0.22
C40	Curb	2.784	2.784	0.5	0	C42	13.05	15	10.96	0.21
C41	Curb	2.539	2.539	0.5	0	C43	12.39	15	10.59	0.20
C42	Curb	3.597	3.596	0.5	0	C44	15.07	15	12.07	0.23
C43	Curb	2.362	2.362	0.5	0	C49	11.90	15	10.31	0.20
C44	Curb	1.4	1.4	0.5	0		11.80	15	12.24	0.12
C45	Curb	1.147	1.147	0.5	0		10.68	15	12.39	0.11
C47	Curb	0.396	0.396	0.5	0		6.73	10	17.41	0.06
C48	Curb	0.504	0.504	0.5	0		7.37	10	18.44	0.07
C50	Curb	1.51	1.51	0.5	0	C46	8.47	10	9.36	0.18
C51	Curb	0.963	0.963	0.5	0	C49	6.57	10	7.91	0.15
C52	Curb	1.15	1.15	0.5	0	C50	7.26	10	8.46	0.16
C53	Curb	1.034	0.914	0.5	0.119	C55	7.16	5	7.82	0.15
C54	Curb	2.672	2.672	0.5	0	C56	12.25	15	11.16	0.21
C55	Curb	2.146	2.125	0.5	0.021	C58	10.82	10	10.28	0.20
C56	Curb	1.908	1.908	0.5	0	C57	11.92	15	9.63	0.18
C59	Curb	2.881	2.881	0.5	0	C57	13.79	15	10.79	0.21
C60	Curb	2.948	2.948	0.5	0	C58	13.81	15	10.98	0.21
C61	Curb	1.085	1.085	0.5	0	C59	3.87	5	13.22	0.26
C62	Curb	1.209	1.209	0.5	0	C63	6.91	10	9.19	0.10
C63	Curb	1.819	1.819	0.5	0	C65	8.70	10	10.71	0.21
C64	Curb	2.082	2.082	0.5	0	C66	9.39	10	11.26	0.22
C65	Curb	3.017	3.017	0.5	0	C67	11.55	15	12.90	0.25
C66	Curb	2.654	2.636	0.5	0.018	C68	10.67	10	12.04	0.24
C67	Curb	2.549	2.549	0.5	0	C69	10.52	15	12.15	0.23
C68	Curb	3.552	3.552	0.5	0	C70	12.66	15	13.69	0.26
C69	Curb	2.455	2.455	0.5	0	C71	10.30	15	11.98	0.23
C70	Curb	3.336	3.336	0.5	0	C72	12.22	15	13.36	0.26
C71	Curb	2.479	2.479	0.5	0	C74	10.36	15	12.03	0.23
C73	Curb	2.849	2.823	0.5	0.026	C72	10.80	10	12.80	0.25
C75	Curb	2.762	2.762	0.5	0	C74	10.91	15	12.48	0.24
C76	Curb	2.245	2.245	0.5	0	C73	9.75	15	11.64	0.22
C77	Curb	2.969	2.969	0.5	0	C76	11.36	15	12.80	0.25
C78	Curb	2.924	2.924	0.5	0	C75	11.28	15	12.80	0.25
C79	Curb	2.896	2.896	0.5	0	C81	15.06	15	10.07	0.19
C80	Curb	2.663	2.614	0.5	0.05	C82	16.84	15	9.54	0.18
C81	Curb	2.7	2.7	0.5	0	C83	8.79	15	13.84	0.28
C84	Curb	2.998	2.998	0.5	0	C82	12.00	15	12.46	0.24

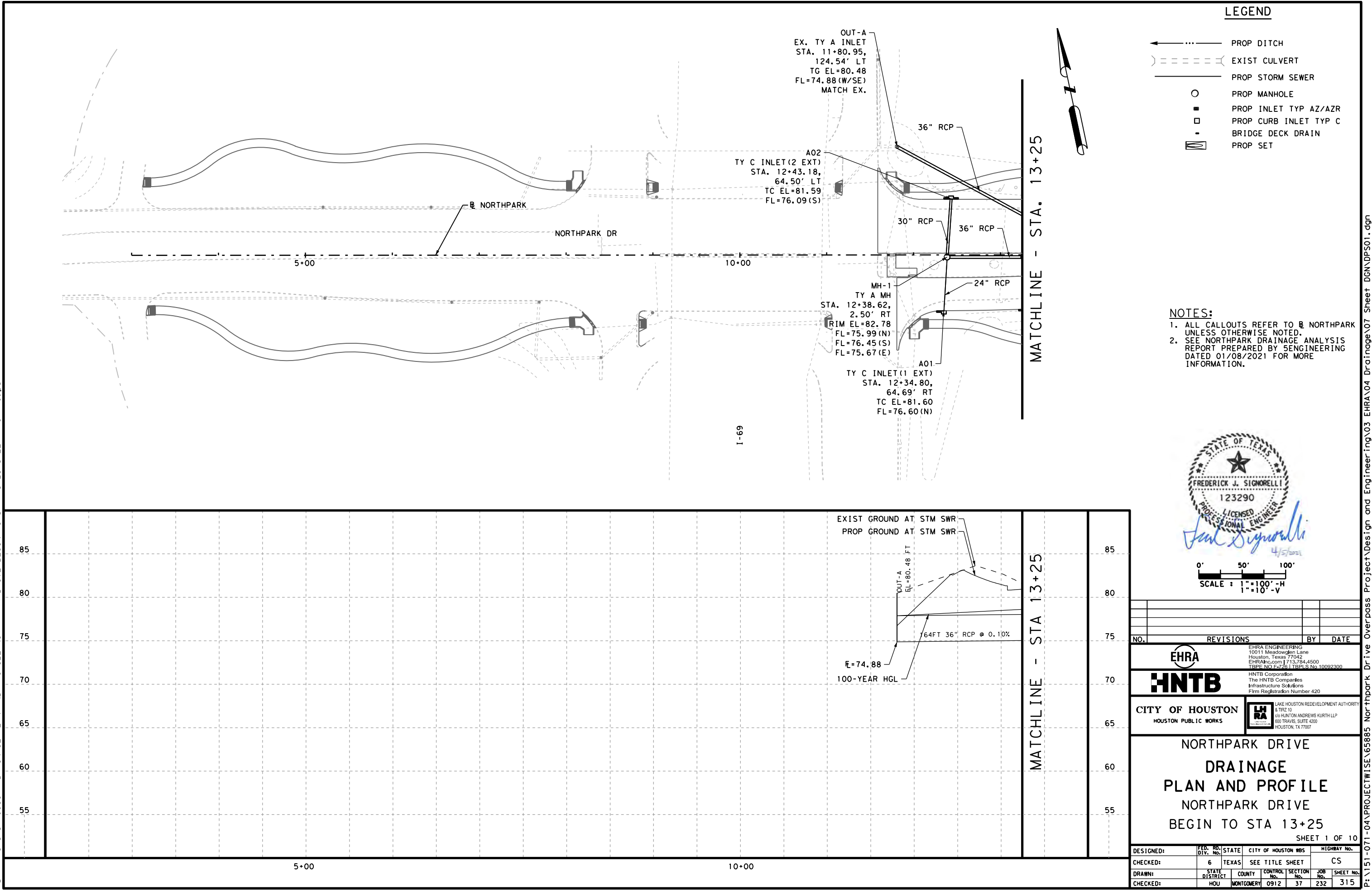
100 YEAR DRAINAGE AREA DATA

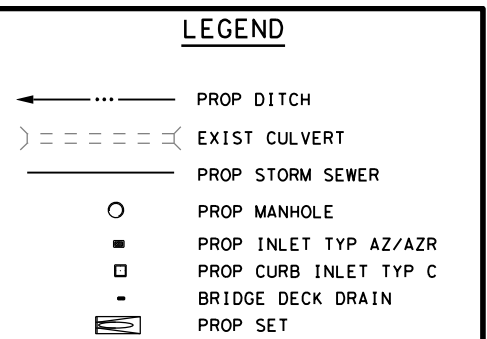
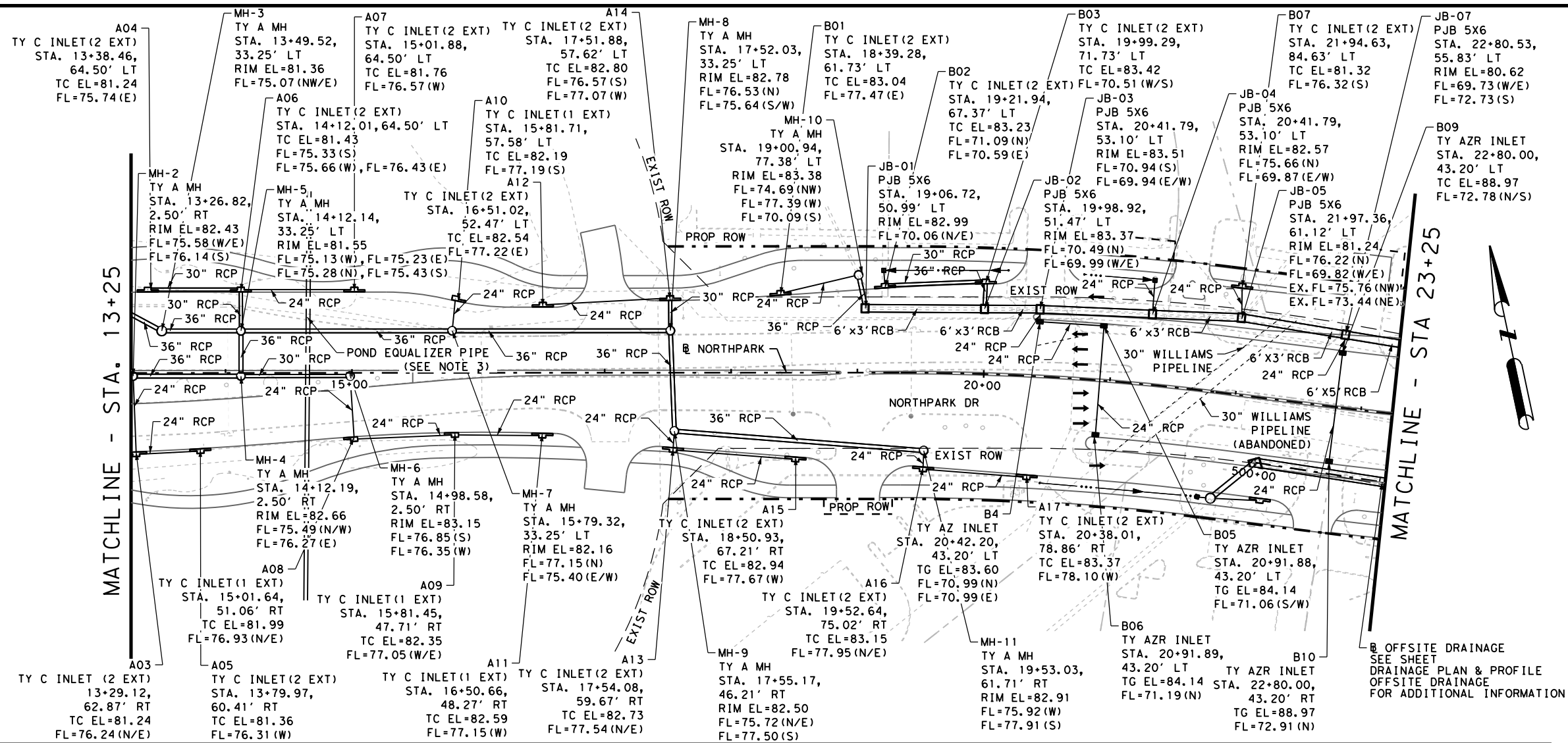
ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge
A01	0.79	0.12	10.00	10.00	12.75	1.43
A02	0.78	0.19	10.00	21.96	9.54	1.59
A02-2	0.50	0.25	10.00	10.00	12.75	1.84
A03	0.74	0.29	10.00	10.00	12.75	3.10
A04	0.77	0.44	10.00	10.00	12.75	4.99
A04-2	0.93	0.58	10.00	21.96	9.54	5.78
A05	0.74	0.24	10.00	10.00	12.75	2.63
A06	0.78	0.23	10.00	10.00	12.75	2.64
A06-2	0.50	0.31	10.00	10.00	12.75	2.27
A07	0.79	0.20	10.00	10.00	12.75	2.26
A07-2	0.50	0.28	10.00	10.00	12.75	2.01
A08	0.74	0.17	10.00	10.00	12.75	1.85
A09	0.75	0.16	10.00	10.00	12.75	1.72
A10	0.77	0.16	10.00	10.00	12.75	1.82
A10-2	0.55	0.24	10.00	10.00	12.75	1.93
A11	0.83	0.23	10.00	10.00	12.75	2.87
A12	0.83	0.23	10.00	10.00	12.75	2.83
A12-2	0.70	0.35	10.00	10.00	12.75	3.55
A13	0.81	0.22	10.00	10.00	12.75	2.64
A14	0.80	0.20	10.00	10.00	12.75	2.37
A14-2	0.87	0.30	10.00	10.00	12.75	3.85
A15	0.88	0.23	10.00	10.00	12.75	3.02
A15-2	0.80	0.38	10.00	10.00	12.75	4.48
A16	0.87	0.19	10.00	10.00	12.75	2.43
A16-2	0.66	0.27	10.00	10.00	12.75	2.64
A17	0.93	0.13	10.00	10.00	12.75	1.82

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge
DIT1-1	0.76	0.49	10.00	10.00	12.75	5.43
DIT2-2	0.81	0.35	10.00	10.00	12.75	4.17
DIT3-2	0.83	0.53	10.00	10.00	12.75	6.45
DIT5-2	0.70	0.64	10.00	10.00	12.75	6.51
DIT6-2	0.72	0.53	10.00	10.00	12.75	5.55
DIT7-1	0.50	0.17	10.00	10.00	12.75	1.24
DIT7-2	0.50	0.09	10.00	10.00	12.75	0.69
DIT7-3	0.50	0.15	10.00	10.00	12.75	1.09
DIT7-4	0.50	0.15	10.00	10.00	12.75	1.13
DIT7-5	0.50	0.14	10.00	10.00	12.75	1.05
DIT7-6	0.50	0.13	10.00	10.00	12.75	0.94
DIT7-7	0.50	0.13	10.00	10.00	12.75	0.96
DIT7-8	0.55	0.12	10.00	10.00	12.75	0.95
DIT8-1	0.65	0.05	10.00	10.00	12.75	0.44
DIT8-2	0.50	0.04	10.00	10.00	12.75	0.28
DIT8-3	0.50	0.13	10.00	10.00	12.75	0.97
DIT8-4	0.50	0.11	10.00	10.00	12.75	0.80
DIT8-5	0.50	0.11	10.00	10.00	12.75	0.80
DIT8-6	0.50	0.09	10.00	10.00	12.75	0.68
DIT8-7	0.50	0.12	10.00	10.00	12.75	0.84
DIT8-8	0.50	0.18	10.00	10.00	12.75	1.33
DIT8-9	0.63	0.24	10.00	10.00	12.75	2.20
DIT8-10	0.63	0.20	10.00	10.00	12.75	1.85
DIT8-11	0.62	0.11	10.00	10.00	12.75	1.01
DIT9-2	0.58	0.53	10.00	10.00	12.75	4.54
DIT9-4	0.58	0.53	10.00	10.00	12.75	9.67
DIT9-5	0.50	0.09	10.00	10.00	12.75	0.69
DIT9-6	0.56	0.64	10.00	10.00	12.75	5.27
DIT10-2	0.63	0.52	10.00	10.00	12.75	4.77
DIT10-3	0.78	0.10	10.00	10.00	12.75	1.12
DIT10-4	0.63	0.42	10.00	10.00	12.75	3.89
DIT11-1	0.58	0.06	10.00	10.00	12.75	0.51
DIT11-2	0.50	0.06	10.00	10.00	12.75	0.44
DIT11-3	0.61	0.21	10.00	10.00	12.75	1.88

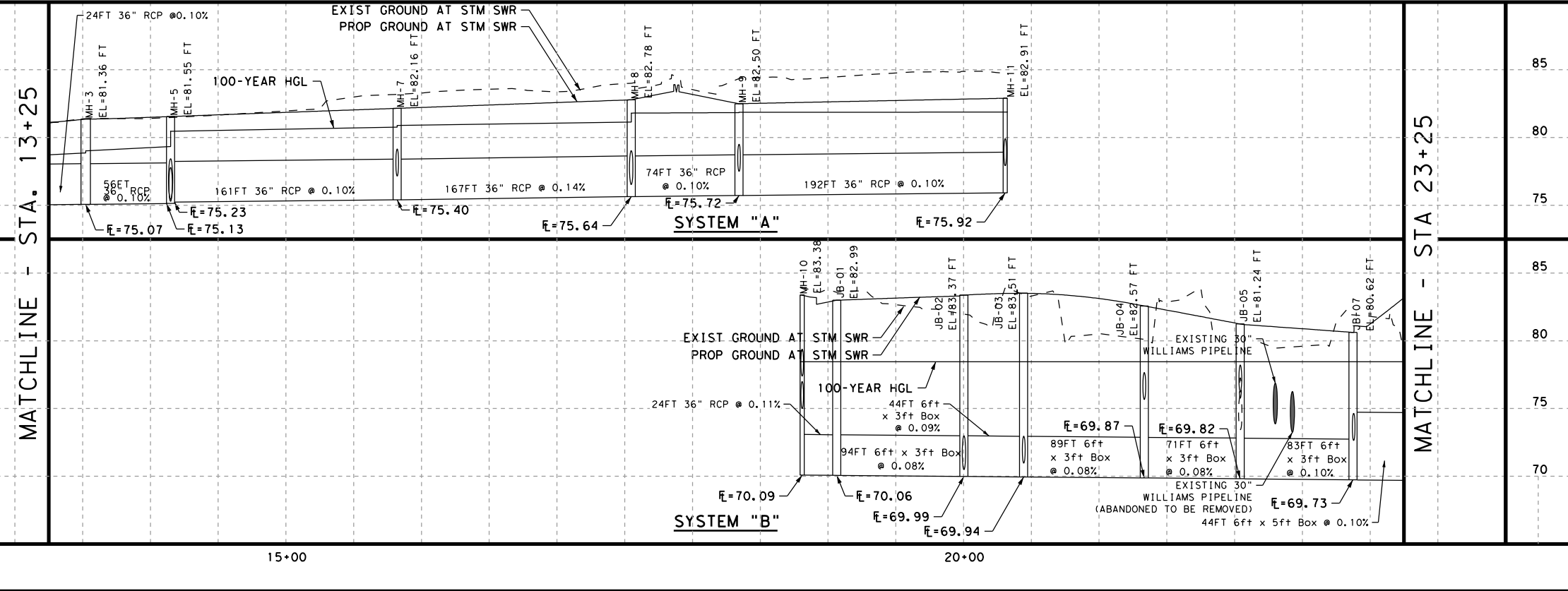
ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge
B01	0.83	0.18	10.00	10.00	12.75	2.22
B01-2	0.84	0.27	10.00	10.00	12.75	3.34
B02	0.93	0.12	10.00	10.00	12.75	1.69
B03	0.93	0.14	10.00	10.00	12.75	1.88
B03-2	0.82	0.11	10.00	10.00	12.75	1.32
B04	0.93	0.05	10.00	10.00	12.75	0.71
B05	0.93	0.20	10.00	10.00	12.75	2.71
B06	0.93	0.20	10.00	10.00	12.75	2.65
B07	0.92	0.10	10.00	10.00	12.75	1.33
B07-2	0.70	0.19	10.00	10.00	12.75	1.95
B08	0.88	0.11	10.00	10.00	12.75	1.43
B08-2	0.91	0.15	10.00	10.00	12.75	2.03
B09	0.93	0.15	10.00	10.00	12.75	2.08
B10	0.93	0.17	10.00	10.00	12.75	2.33
B11	0.90	0.17	10.00	10.00	12.75	2.25
B11-2	0.80	0.46	10.00	10.00	12.75	5.43
B12	0.87	0.18	10.00	10.00	12.75	2.29
B12-2	0.83	0.43	10.00	10.00	12.75	5.17
B13	0.91	0.26	10.00	10.00	12.75	3.39
B13-2	0.80	0.67	10.00	10.00	12.75	7.83
B14	0.93	0.17	10.00	10.00	12.75	2.33
B15	0.93	0.16	10.00	10.00	12.75	2.23
B16	0.90	0.28	10.00	10.00	12.75	3.63
B16-2	0.89	0.78	10.00	10.00	12.75	10.16
B17	0.90	0.11	10.00	10.00	12.75	1.50
B17-2	0.93	0.18	10.00	10.00	12.75	2.49
B18	0.93	0.16	10.00	10.00	12.75	2.19
B19	0.93	0.14	10.00	10.00	12.75	1.84
B20	0.91	0.27	10.00	10.00	12.75	3.63
B20-2	0.92	0.37	10.00	10.00	12.75	4.93
B21	0.85	0.10	10.00	10.00	12.75	1.23
B21-2	0.75	0.01	10.00	10.00	12.75	0.13
B22	0.93	0.06	10.00	10.00	12.75	0.78
B23	0.93	0.13	10.00	10.00	12.75	1.74
B24	0.93	0.08	10.00	10.00	12.75	1.06
B25	0.93	0.06	10.00	10.00	12.75	0.78
B26	0.93	0.06	10.00	10.00	12.75	0.87
B27	0.93	0.09	10.00	10.00	12.75	1.20
B28	0.81	0.26	10.00	10.00	12.75	3.04
B28-2	0.68	0.63	10.00	10.00	12.75	6.30
B29	0.93	0.09	10.00	10.00	12.75	1.26
B30	0.87	0.08	10.00	10.00	12.75	1.07
B31	0.93	0.10	10.00	10.00	12.75	1.29
B32	0.93	0.16	10.00	10.00	12.75	2.13
B33	0.93	0.16	10.00	10.00	12.75	2.19
B33-2	0.93	0.10	10.00	10.00	12.75	1.40
B34	0.84	0.07	10.00	10.00	12.75	0.85
B34-2	0.91	0.19	10.00	10.00	12.75	2.51
B35	0.93	0.08	10.00	10.00	12.75	1.14
B36	0.91	0.15	10.00	10.00	12.75	1.93
B36-2	0.89	0.11	10.00	10.00	12.75	1.45
B37	0.93	0.15	10.00	10.00	12.75	2.00
B38	0.13	0.11	10.00	10.00	12.75	0.21
B38-2	0.88	0.29	10.00	10.00	12.75	3.68
B39	0.93	0.16	10.00	10.00	12.75	2.24
B40	0.93	0.15	10.00	10.00	12.75	2.07
B41	0.93	0.21	10.00	10.00	12.75	2.79
B42	0.93	0.09	10.00	10.00	12.75	1.28
B42-2	0.93	0.10	10.00	10.00	12.75	1.36
B43	0.93	0.08	10.00	10.00	12.75	1.02
B44	0.93	0.09	10.00	10.00	12.75	1.22
B45	0.93	0.11	10.00	10.00	12.75	1.47
B46	0.93	0.07	10.00	10.00	12.75	0.95
B47	0.93	0.08	10.00	10.00	12.75	1.13
B47-2	0.92	0.10	10.00	10.00	12.75	1.35
B48	0.93	0.06	10.00	10.00	12.75	0.82




ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge
C01	0.93	0.04	10.00	10.00	12.75	0.57
C02	0.83	0.06	10.00	10.00	12.75	0.68
C03	0.93	0.10	10.00	10.00	12.75	1.30
C04	0.93	0.12	10.00	10.00	12.75	1.66
C05	0.93	0.15	10.00	10.00	12.75	2.09
C06	0.91	0.12	10.00	10.00	12.75	1.59
C06-2	0.93	0.80	10.00	10.00	12.75	10.89
C07	0.93	0.12	10.00	10.00	12.75	1.69
C08	0.93	0.12	10.00	10.00	12.75	1.69
C08-2	0.89	0.01	10.00	10.00	12.75	0.13
C09	0.90	0.16	10.00	10.00	12.75	2.03
C09-2	0.62	0.36	10.00	10.00	12.75	3.23
C10	0.90	0.14	10.00	10.00	12.75	1.78
C10-2	0.50	0.40	10.00	10.00	12.75	2.89
C11	0.93	0.12	10.00	10.00	12.75	1.66
C12	0.93	0.12	10.00	10.00	12.75	1.66
C13	0.90	0.14	10.00	10.00	12.75	1.85
C13-2	0.50	0.39	10.00	10.00	12.75	2.87
C14	0.90	0.16	10.00	10.00	12.75	2.03
C14-2	0.58	0.43	10.00	10.00	12.75	3.64
C15	0.90	0.29	10.00	10.00	12.75	3.77
C15-2	0.50	0.79	10.00	10.00	12.75	5.78
C16	0.90	0.15	10.00	10.00	12.75	2.02
C16-2	0.54	0.23	10.00	10.00	12.75	1.82
C17	0.93	0.18	10.00	10.00	12.75	2.38
C18	0.93	0.17	10.00	10.00	12.75	2.33
C19	0.87	0.20	10.00	10.00	12.75	2.61
C19-2	0.50	0.56	10.00	10.00	12.75	4.07
C20	0.91	0.31	10.00	10.00	12.75	4.05
C21	0.93	0.16	10.00	10.00	12.75	2.11
C22	0.93	0.18	10.00	10.00	12.75	2.38
C23	0.88	0.11	10.00	10.00	12.75	1.39
C24	0.93	0.17	10.00	10.00	12.75	2.37
C25	0.93	0.15	10.00	10.00	12.75	2.10
C26	0.85	0.17	10.00	10.00	12.75	2.18
C26-2	0.50	0.48	10.00	10.00	12.75	3.49
C27	0.86	0.11	10.00	10.00	12.75	1.38
C28	0.93	0.17	10.00	10.00	12.75	2.30
C29	0.93	0.16	10.00	10.00	12.75	2.11
C30	0.86	0.14	10.00	10.00	12.75	1.72
C31	0.93	0.07	10.00	10.00	12.75	1.01
C32	0.79	0.19	10.00	10.00	12.75	2.17
C32-2	0.50	0.52	10.00	10.00	12.75	3.78
C33	0.93	0.16	10.00	10.00	12.75	2.15
C34	0.83	0.14	10.00	10.00	12.75	1.64
C35	0.84	0.47	10.00	10.00	12.75	5.82
C35-2	0.77	0.89	10.00	10.00	12.75	1

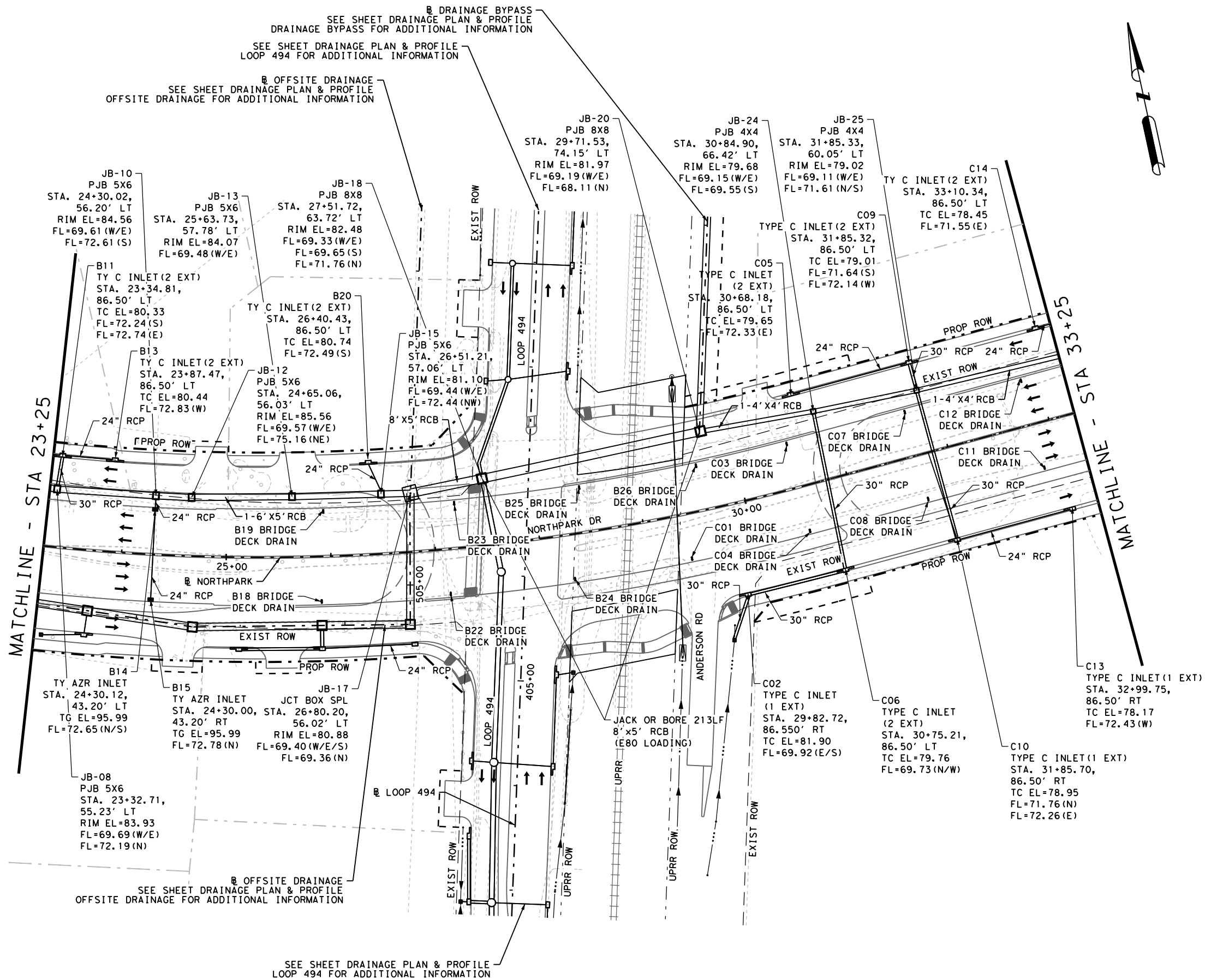




- NOTES:**
1. ALL CALLOUTS REFER TO NORTH PARK UNLESS OTHERWISE NOTED.
 2. CONTACT WILLIAMS PIPELINE PRIOR TO BEGINNING EXCAVATION.
 3. SEE POND DRAWINGS FOR DETAILS.
 4. SYSTEM "B" HGL PROVIDED BY 5ENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



NO.	REVISIONS					BY	DATE		
		<div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300</div>							
		<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>							
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS					<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY 61212 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div>				
NORTH PARK DRIVE									
DRAINAGE									
PLAN AND PROFILE									
NORTH PARK DRIVE									
STA 13+25 TO STA 23+25									
SHEET 2 OF 10									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.		
CHECKED:	6	TEXAS	SEE TITLE SHEET				CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	316			



LEGEND

- PROP DITCH
- EXIST CULVERT
- PROP STORM SEWER
- PROP MANHOLE
- PROP INLET TYP AZ/AZR
- PROP CURB INLET TYP C
- BRIDGE DECK DRAIN
- ▤ PROP SET

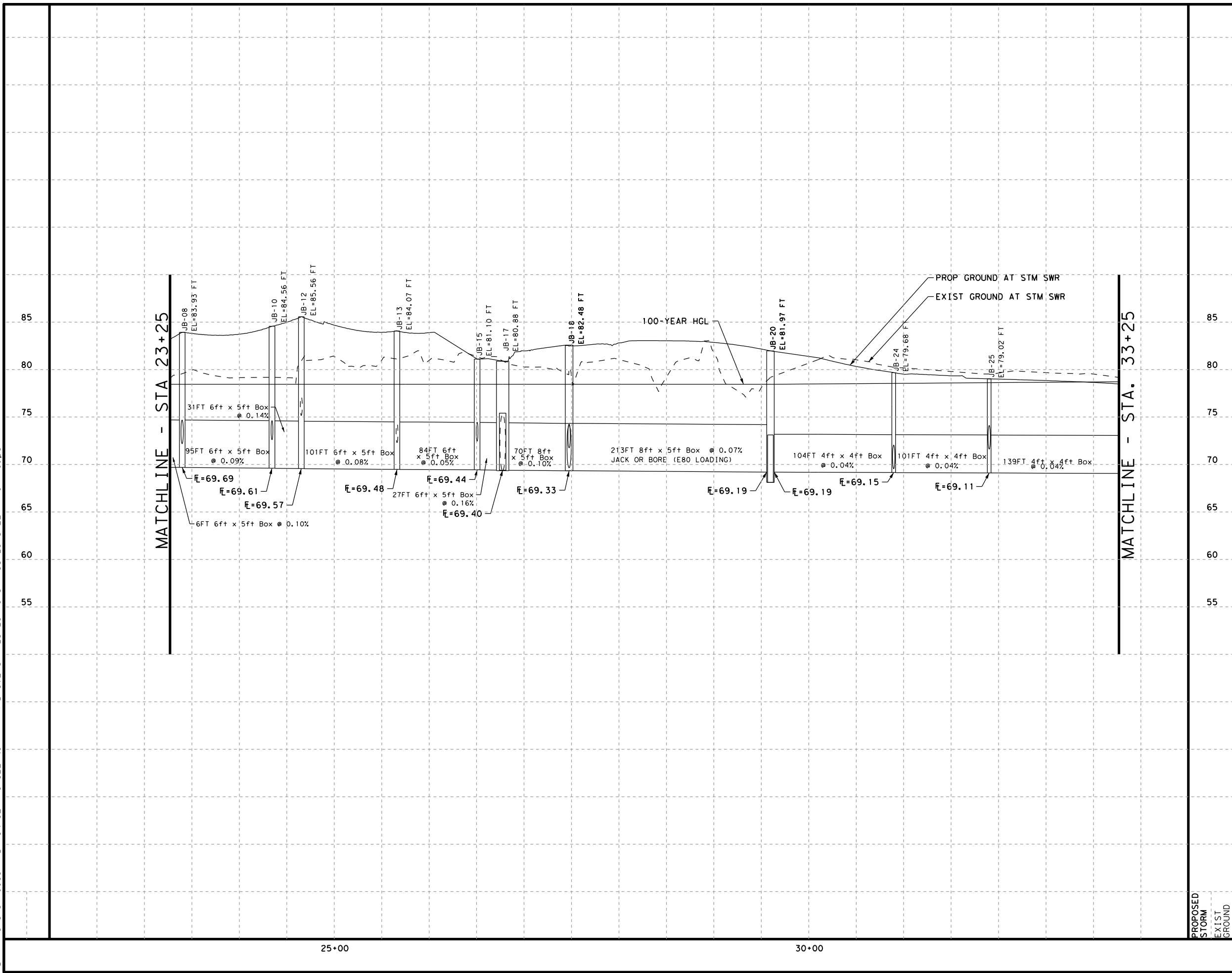
NOTES:

1. ALL CALLOUTS REFER TO NORTH PARK UNLESS OTHERWISE NOTED.
2. SEE BRIDGE LAYOUT FOR LOCATION OF BRIDGE DECK DRAINS.
3. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

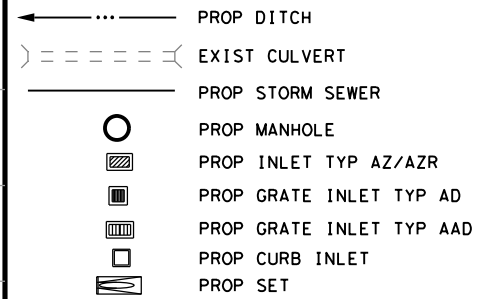


0' 50' 100'
SCALE: 1"=100'-H
1"=10'-V

REVISIONS				BY	DATE
NO.					
<div><div><div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300</div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div>Lake Houston Redevelopment Authority & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div>					
NORTH PARK DRIVE DRAINAGE PLAN NORTH PARK DRIVE STA 23+25 TO STA 33+25					
SHEET 3 OF 10					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					SHEET No. 317

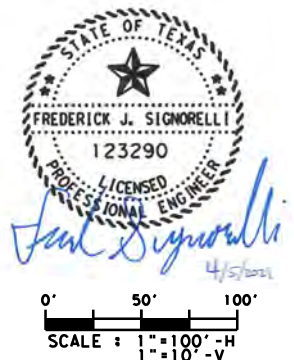


LEGEND



NOTES:

1. HGL PROVIDED BY 5ENGINEERING.
SEE NORTHPARK DRAINAGE ANALYSIS
REPORT PREPARED BY 5ENGINEERING
DATED 01/08/2021 FOR MORE
INFORMATION.



NO.	REVISIONS	BY	DATE
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EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TBPE NO F-726 | TBPLS No 10092300



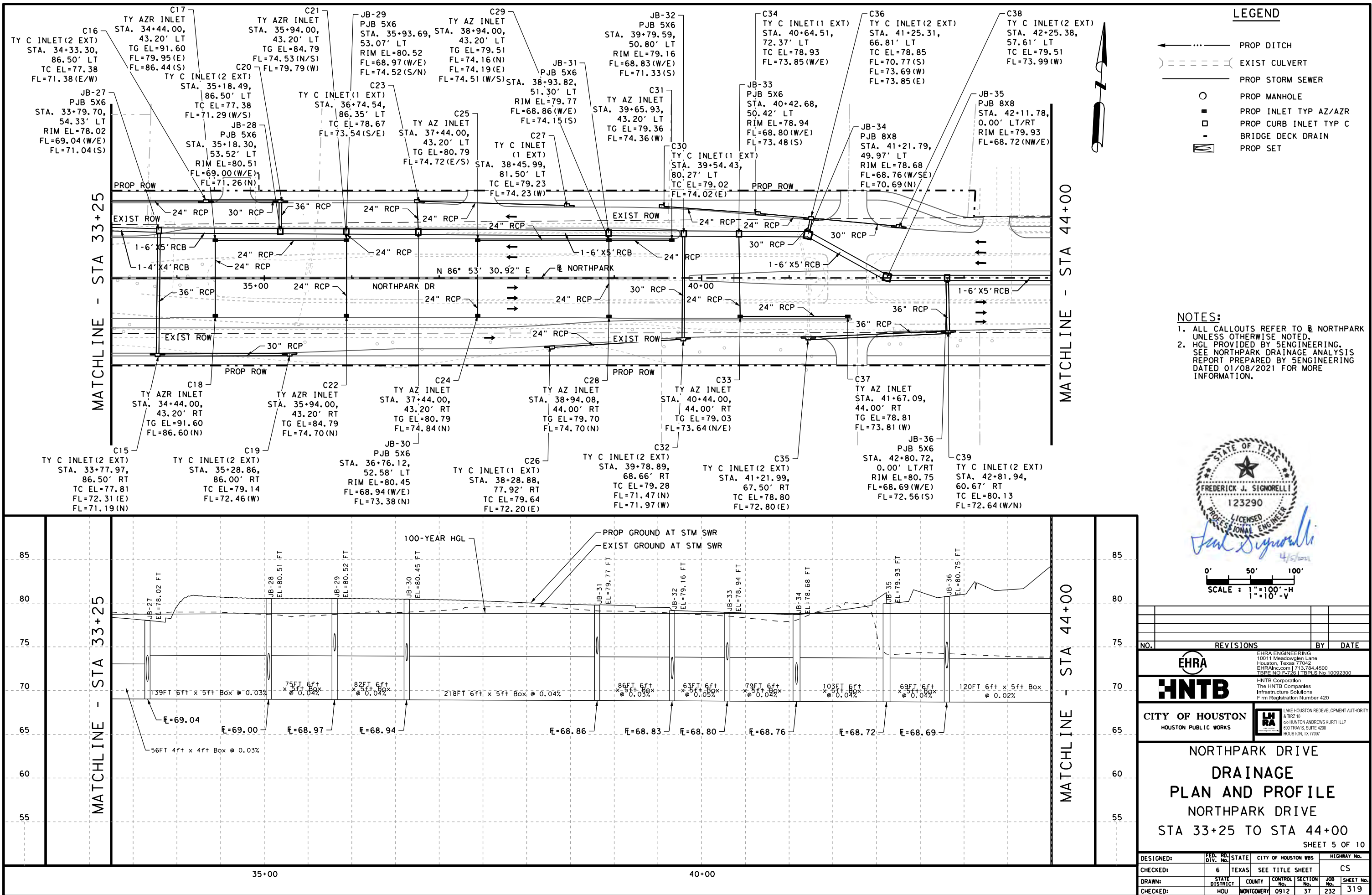
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420



NORTHPARK DRIVE
DRAINAGE
PROFILE
NORTHPARK DRIVE
STA 23+25 TO STA 33+25

SHEET 4 OF 10

DESIGNED:	FED. RD. DIV.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	318

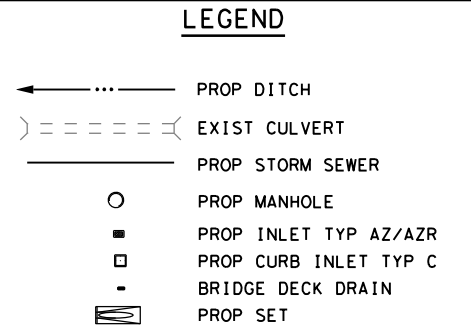
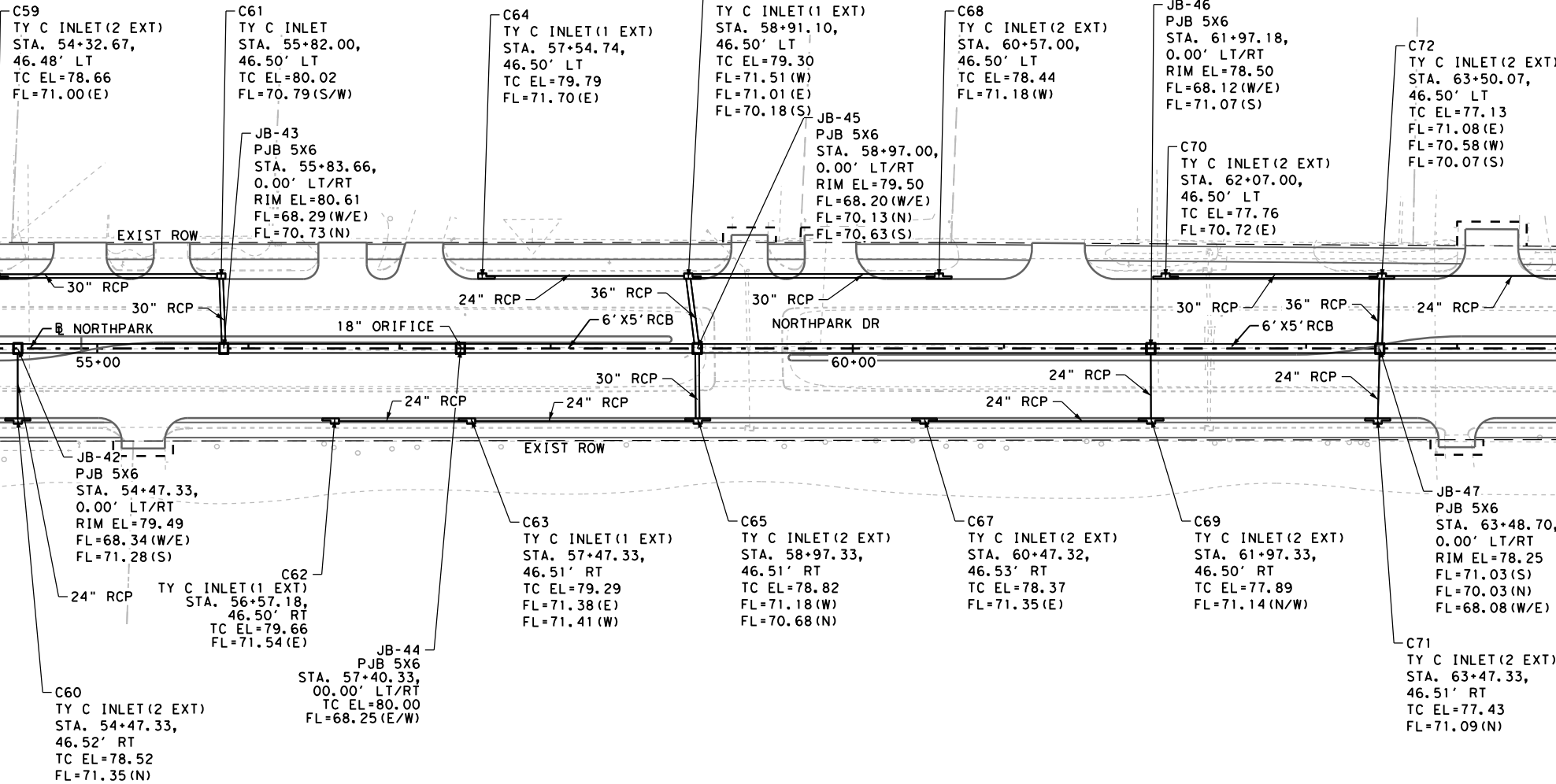


MATCHLINE - STA 54+25

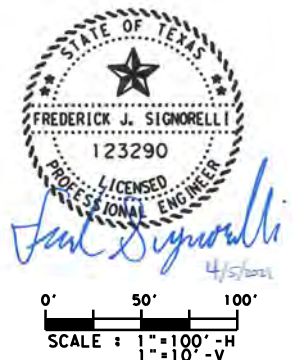
MATCHLINE - STA 54+25

MATCHLINE - STA 64+75

MATCHLINE - STA 64+75



- NOTES:**
- ALL CALLOUTS REFER TO NORTH PARK UNLESS OTHERWISE NOTED.
 - HGL PROVIDED BY SENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



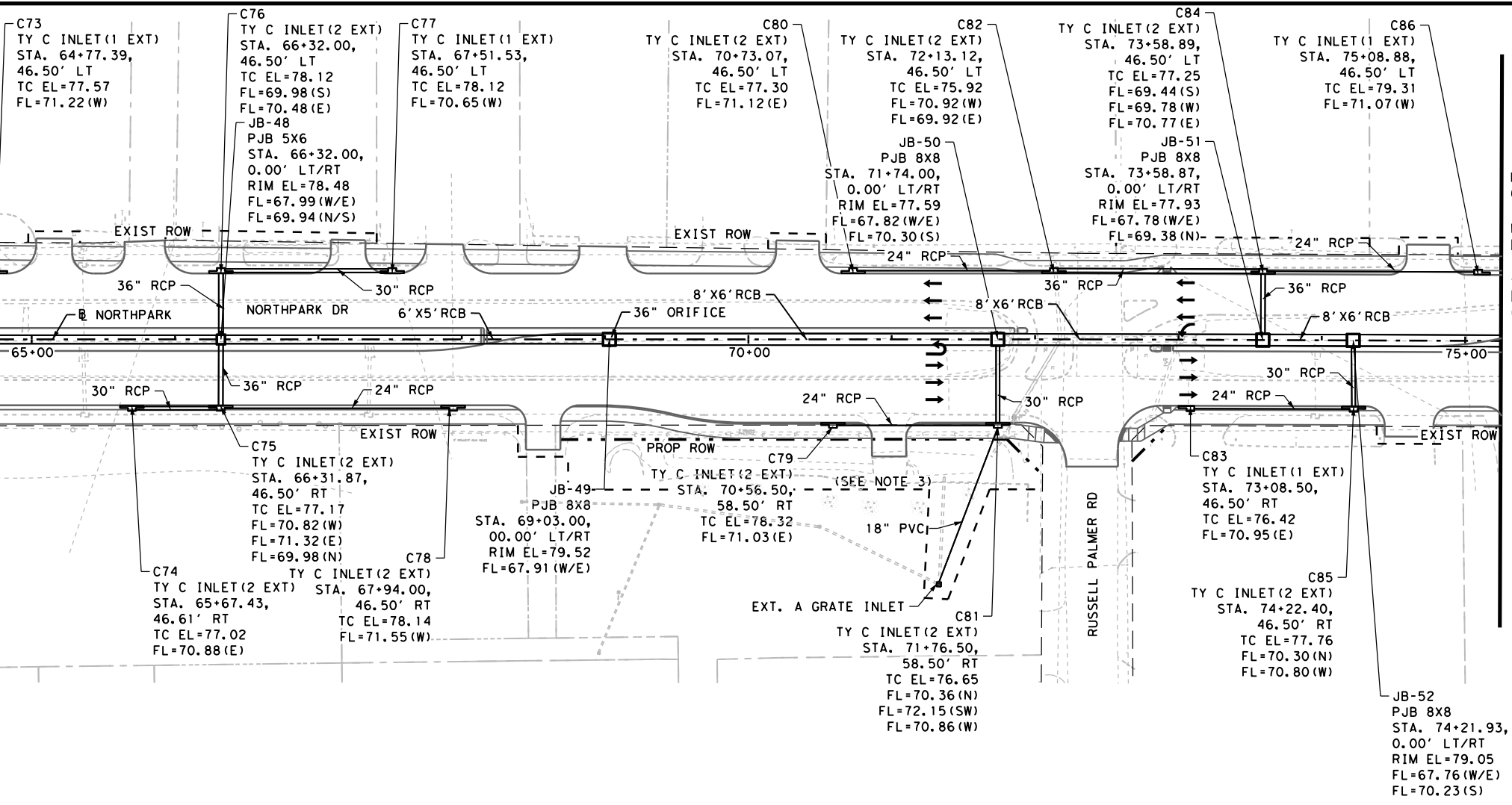
REVISIONS				BY	DATE
NO.					
<div><div><div>EHRA ENGINEERING</div><div>10011 Meadowglen Lane</div><div>Houston, Texas 77042</div><div>EHRAInc.com 713.784.4500</div><div>TRPE NO F-726 TRPLS No. 10092300</div></div><div><div>HNTB</div><div>HNTB Corporation</div><div>The HNTB Companies</div><div>Infrastructure Solutions</div><div>Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div>Lake Houston Redevelopment Authority & TRF 10</div><div>by HUNTON ANDREWS KURTH LLP</div><div>800 TRAVIS, SUITE 4200</div><div>HOUSTON, TX 77007</div></div></div>					
<div><div>NORTH PARK DRIVE</div><div>DRAINAGE</div><div>PLAN AND PROFILE</div><div>NORTH PARK DRIVE</div><div>STA 54+25 TO STA 64+75</div><div>SHEET 7 OF 10</div></div>					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION	JOB NO.	SHEET NO.
CHECKED:	HOU	MONTGOMERY	0912 37	232	321

MATCHLINE - STA 64+75

MATCHLINE - STA 64+75

MATCHLINE - STA 75+25

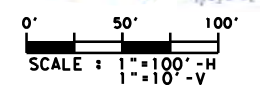
MATCHLINE - STA 75+25



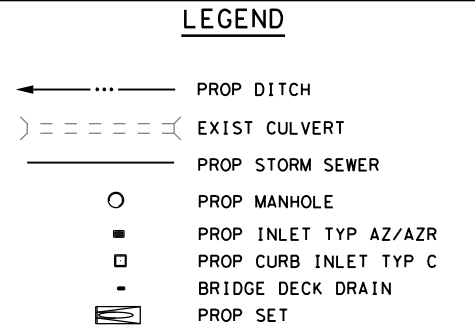
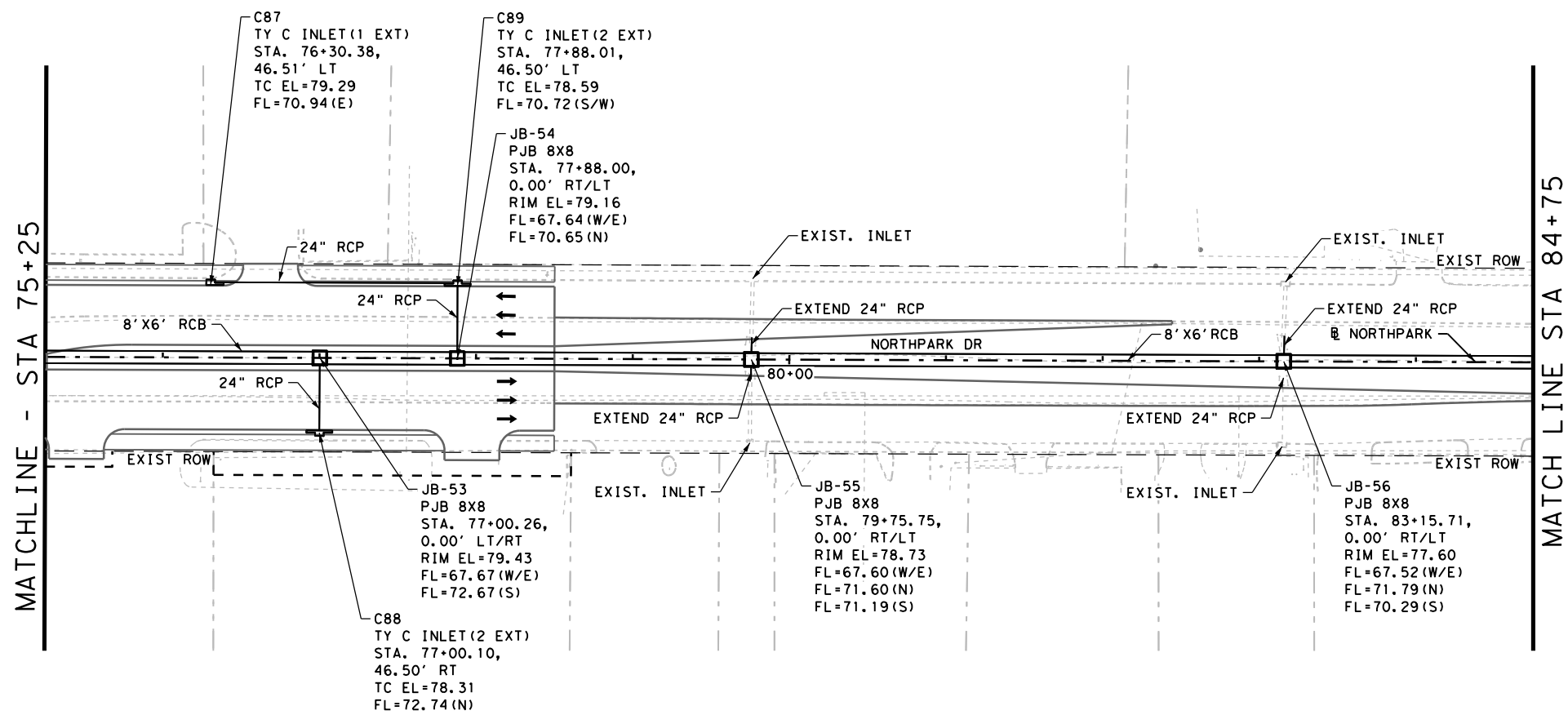
LEGEND

- PROP DITCH
- EXIST CULVERT
- PROP STORM SEWER
- PROP MANHOLE
- PROP INLET TYP AZ/AZR
- PROP CURB INLET TYP C
- BRIDGE DECK DRAIN
- PROP SET

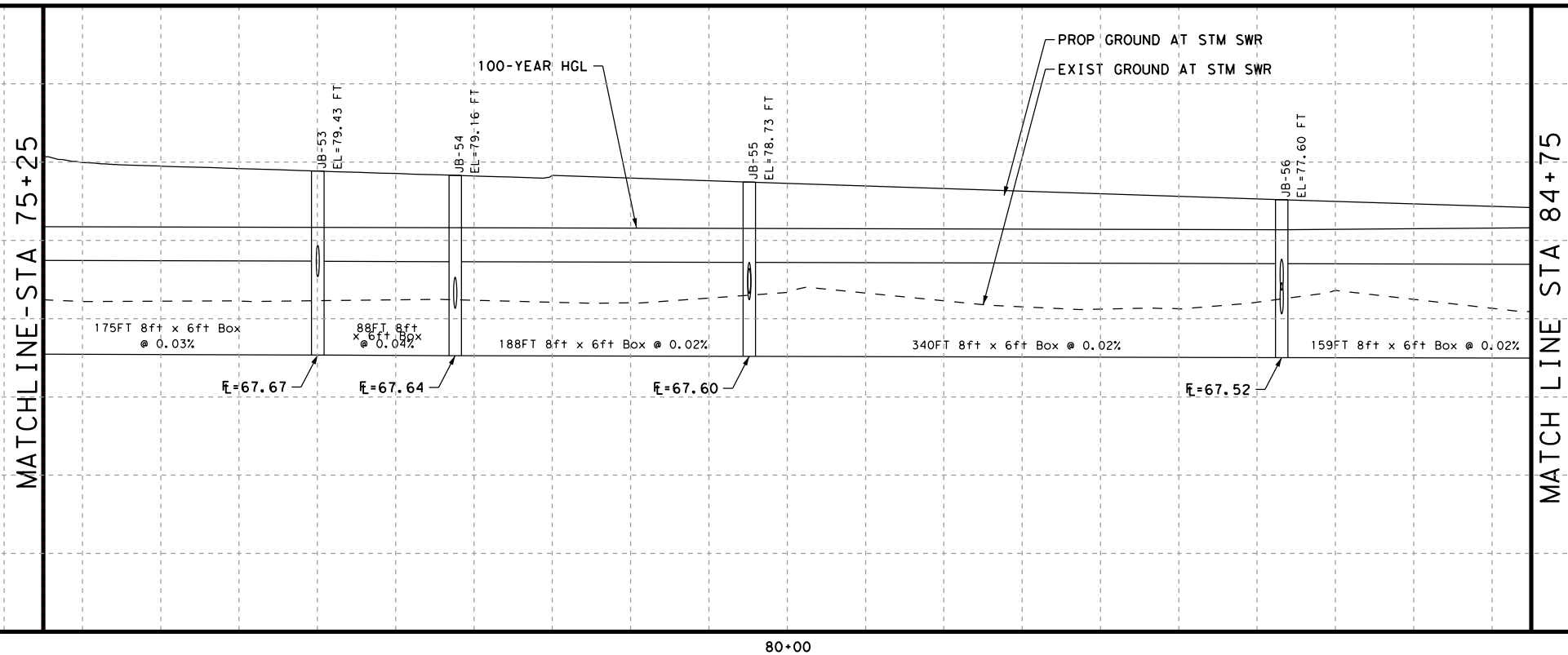
- NOTES:**
1. ALL CALLOUTS REFER TO NORTH PARK UNLESS OTHERWISE NOTED.
 2. HGL PROVIDED BY ENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.
 3. CONTRACTOR SHALL INSTALL TEMPORARY FENCE, BACKFILL EXISTING DETENTION POND AS DIRECTED BY THE ENGINEER.



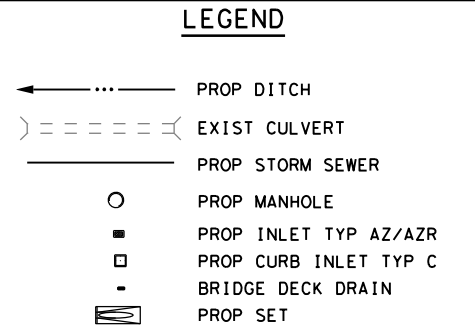
NO.		REVISIONS		BY	DATE		
<div><div><div>EHRA</div></div><div><div>EHRA ENGINEERING</div><div>10011 Meadow Glen Lane</div><div>Houston, Texas 77042</div><div>EHRAInc.com 713.784.4500</div><div>TRPE NO F-726 TRPLS No. 10092300</div></div></div>		<div><div><div>HNTB</div><div>HNTB Corporation</div><div>The HNTB Companies</div><div>Infrastructure Solutions</div><div>Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div><div>LH</div><div>RA</div><div>Lake Houston Redevelopment Authority</div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY</div><div>6 TR2 10</div><div>600 HUNTON ANDREWS KURTH LLP</div><div>600 TRAVIS, SUITE 4200</div><div>HOUSTON, TX 77007</div></div></div>					
<div><div><div>NORTH PARK DRIVE</div><div>DRAINAGE</div><div>PLAN AND PROFILE</div><div>NORTH PARK DRIVE</div><div>STA 64+75 TO STA 75+25</div></div><div>SHEET 8 OF 10</div></div>							
DESIGNED:		FED. DIV. NO.	STATE	CITY OF HOUSTON WBS		HIGHWAY NO.	
CHECKED:		6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:		HOU	MONTGOMERY	0912	37	232	322



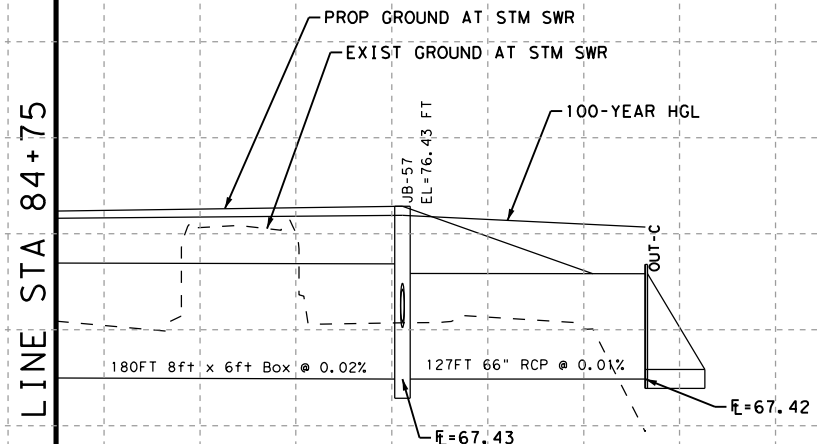
- NOTES:**
1. ALL CALLOUTS REFER TO NORTH PARK UNLESS OTHERWISE NOTED.
 2. HGL PROVIDED BY 5ENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.






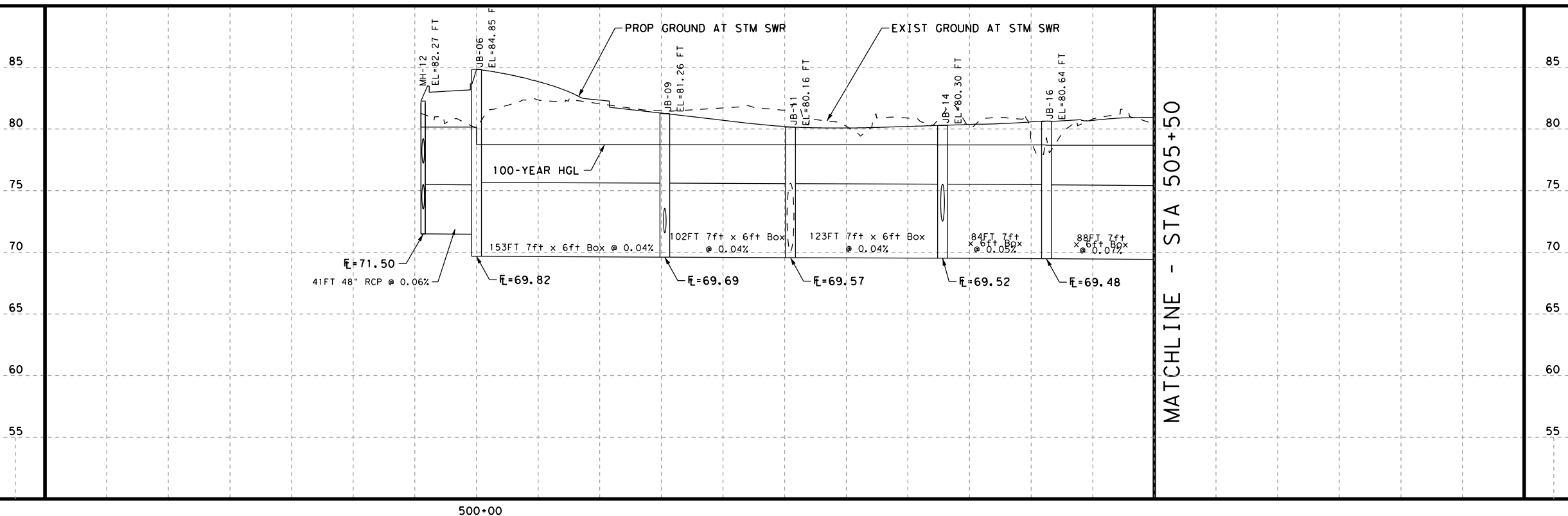
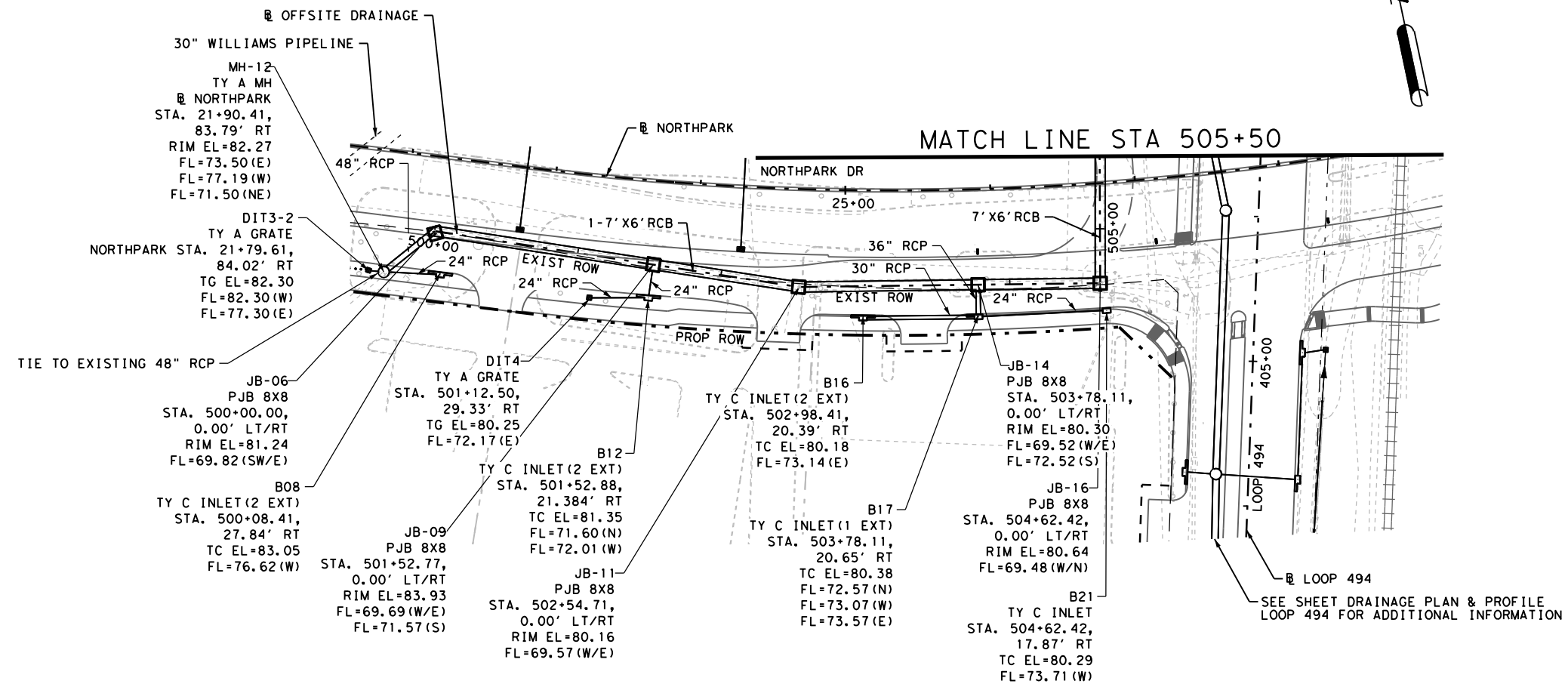
REVISIONS				BY	DATE
NO.					
<div><div><div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-725 TRPLS No. 10092300</div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRF 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div>					
NORTH PARK DRIVE DRAINAGE PLAN AND PROFILE NORTH PARK DRIVE STA 75+25 TO STA 84+75 SHEET 9 OF 10					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB SHEET NO.
CHECKED:	HOU	MONTGOMERY	0912	37	232 323











- NOTES:**
1. ALL CALLOUTS REFER TO @ NORTH PARK UNLESS OTHERWISE NOTED.
 2. HCL PROVIDED BY SENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

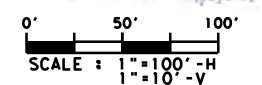





NO.	REVISIONS						BY	DATE	
			EHRA ENGINEERING 10011 Meadows Glen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO. F-2261 TRPLS No. 10082300						
			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS					LAKE HOUSTON REDEVELOPMENT AUTHORITY & TR2 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007				
NORTH PARK DRIVE DRAINAGE PLAN AND PROFILE NORTH PARK DRIVE STA 84+75 TO END									
SHEET 10 OF 10									
DESIGNED:	FED. RD. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.			
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS			
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	324			



- ### LEGEND
- | | |
|-------------------------------------------------------------------------------------|-----------------------|
|  | PROP DITCH |
|  | EXIST CULVERT |
|  | PROP STORM SEWER |
|  | PROP MANHOLE |
|  | PROP INLET TYP AZ/AZR |
|  | PROP CURB INLET TYP C |
|  | BRIDGE DECK DRAIN |
|  | PROP SET |




- NOTES:**
1. ALL CALLOUTS REFER TO OFFSITE DRAINAGE UNLESS OTHERWISE NOTED.
 2. HGL PROVIDED BY ENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

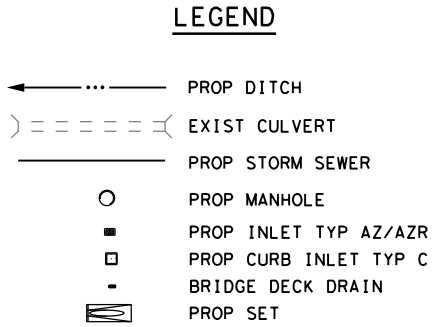
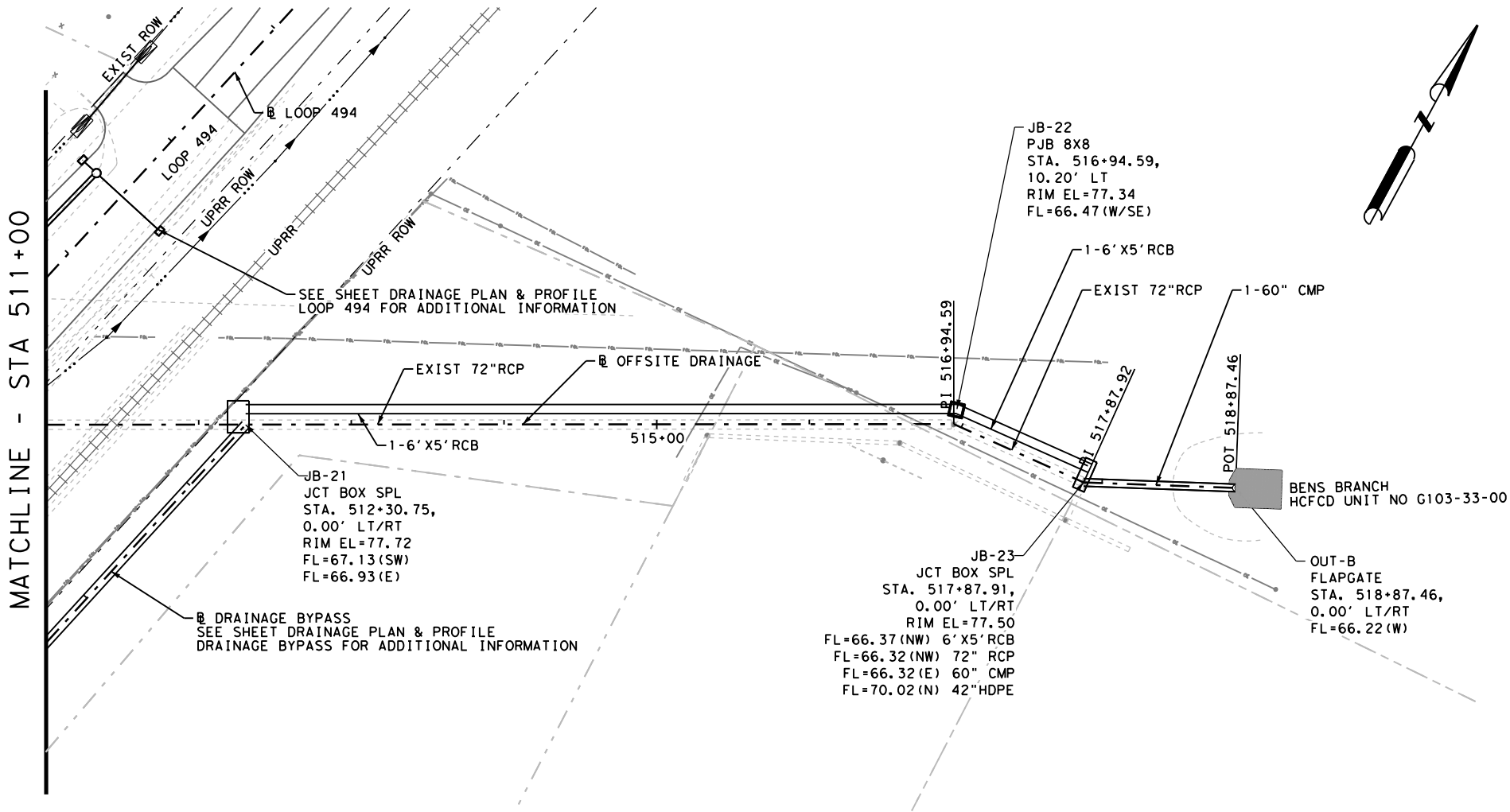


NO.	REVISONS	BY	DATE
 		EHRA ENGINEERING 10011 Meadowlawn Lane Houston, Texas 77042 EHRAInc.com 713-784-4500 TBPE NO F-726 TBPI S.No. 10082300 HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420	
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & THZ 10 c/o HUNTING ANDREWS KURTH LLP 800 TRAVERS SUITE 4200 HOUSTON, TX 77007	
<h1 style="margin: 0;">NORTH PARK DRIVE</h1> <h1 style="margin: 0;">DRAINAGE</h1> <h1 style="margin: 0;">PLAN AND PROFILE</h1> <h1 style="margin: 0;">OFFSITE DRAINAGE</h1> <h1 style="margin: 0;">BEGIN TO STA 505+50</h1>			
SHEET 1 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON HBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No. SECTION No.
CHECKED:	HOU	MONTGOMERY	0912 37
			JOB No. SHEET No.
			232 325



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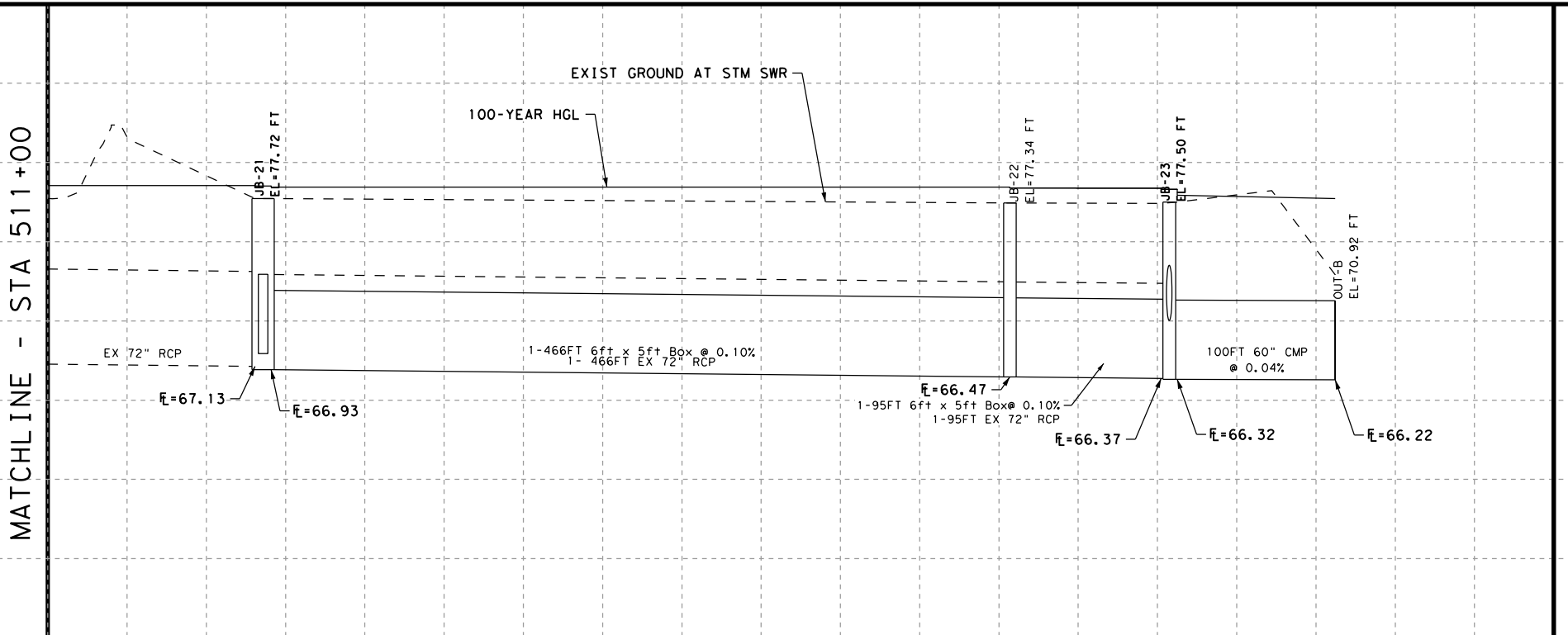
NO.	REVISONS				BY	DATE	
 		EHRA ENGINEERING 10011 Meadowlane Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRF# NO F-7261 TRF# S No. 10092300					
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRF 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS STREET 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE DRAINAGE PLAN AND PROFILE OFFSITE DRAINAGE STA 505+50 TO STA 511+00							
SHEET 2 OF 3							
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	326	



- NOTES:
- ALL CALLOUTS REFER TO OFFSITE DRAINAGE UNLESS OTHERWISE NOTED.
 - HGL PROVIDED BY 5ENGINEERING. SEE NORTHPARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

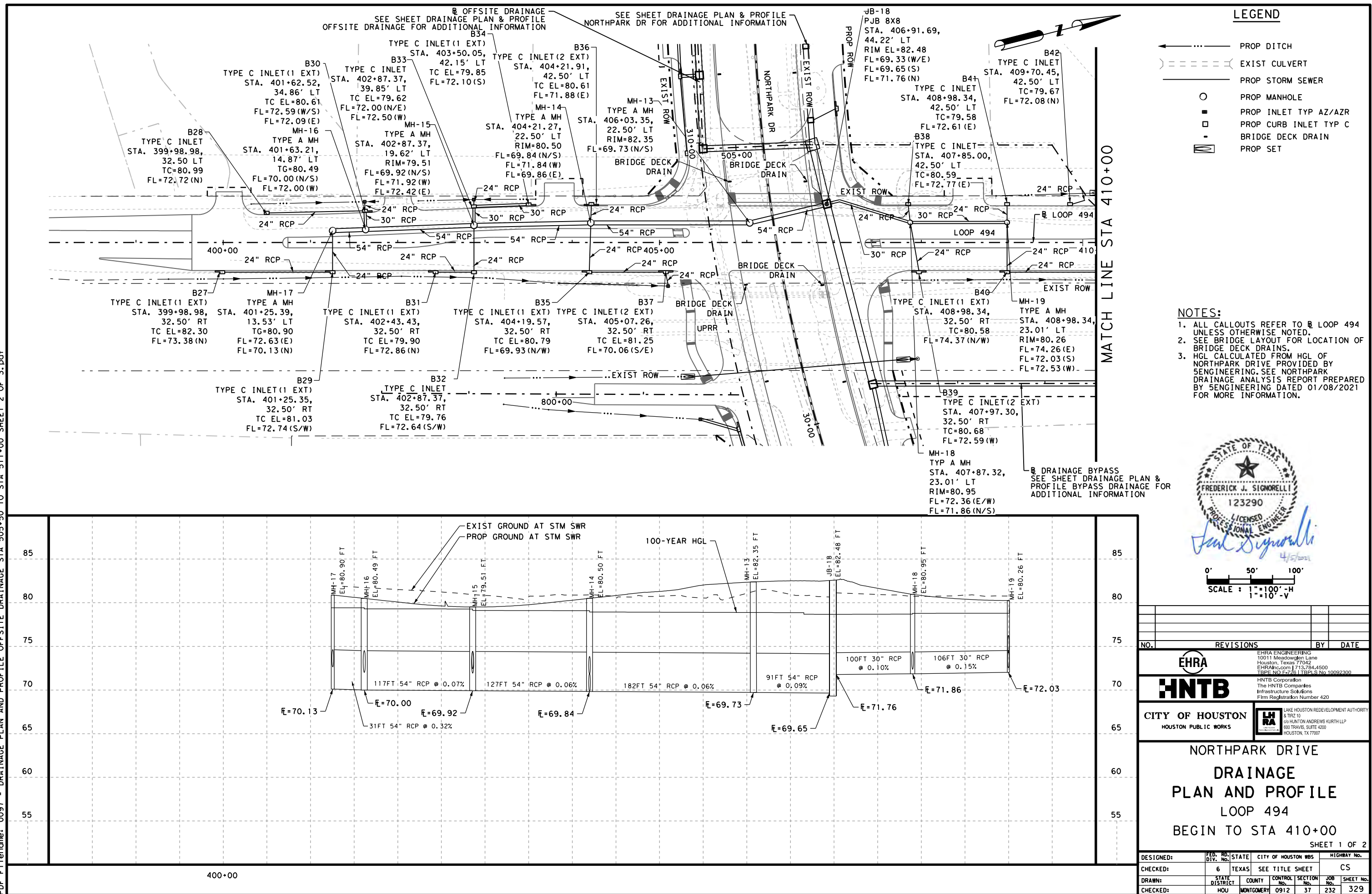


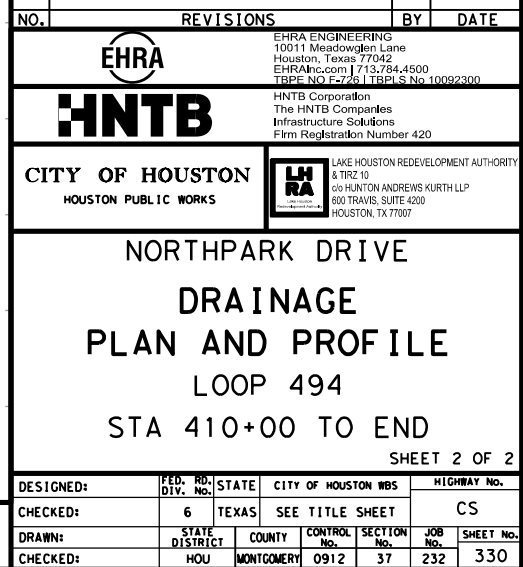
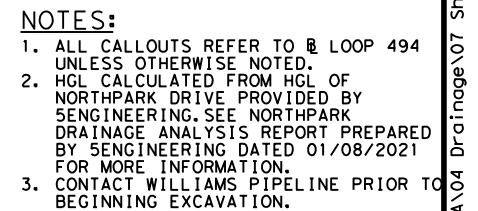
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1" = 10' -V

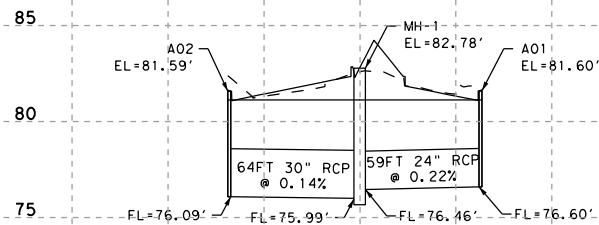


REVISIONS				BY	DATE
NO.					
<div><div><div>EHRA</div><div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300</div></div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div>Lake Houston Redevelopment Authority & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div>					
NORTHPARK DRIVE DRAINAGE PLAN AND PROFILE OFFSITE DRAINAGE STA 511+00 TO END					
SHEET 3 OF 3					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
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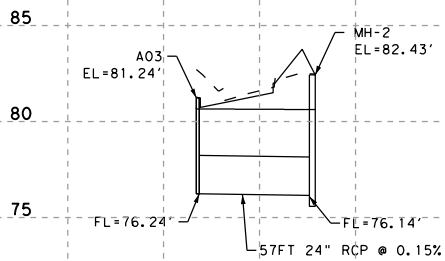




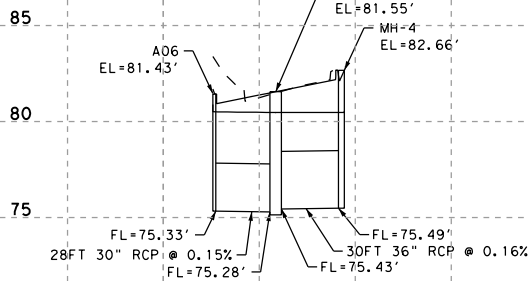




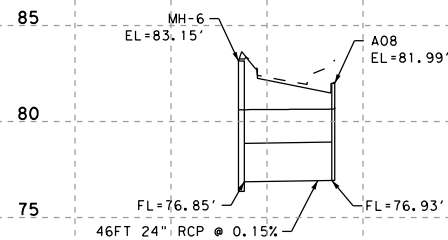
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@ NORTH PARK



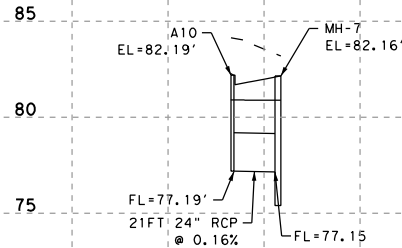
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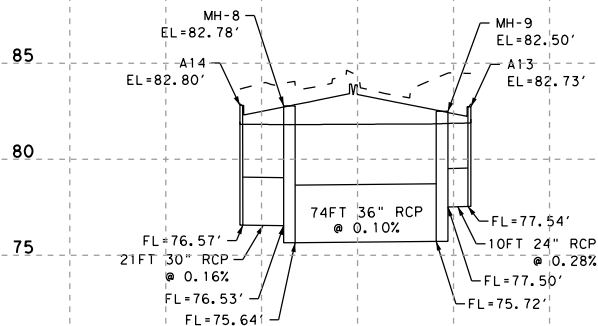
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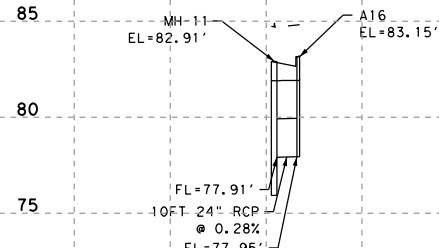
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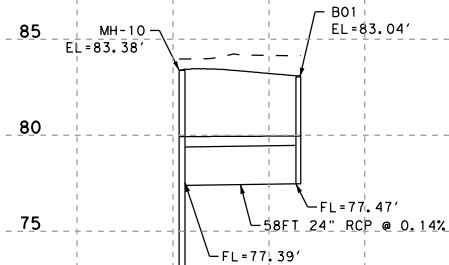
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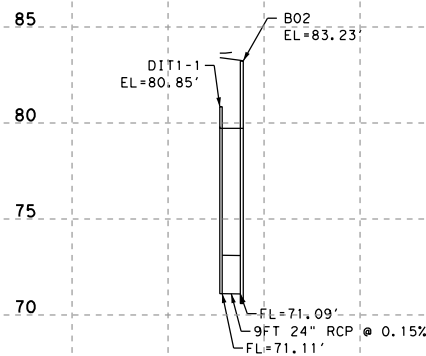
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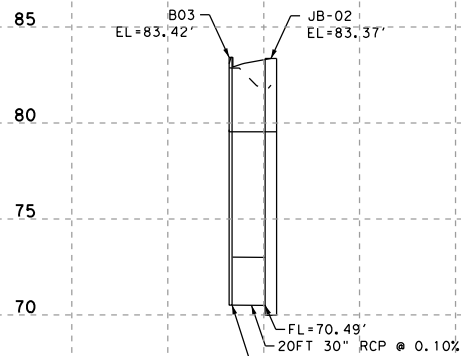
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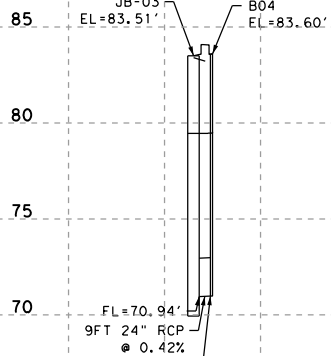
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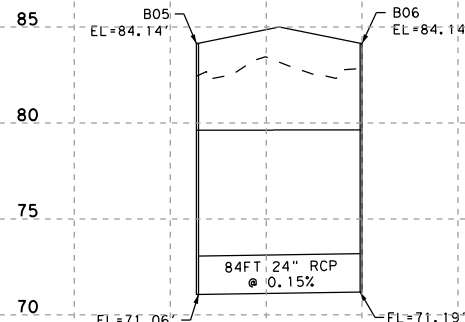
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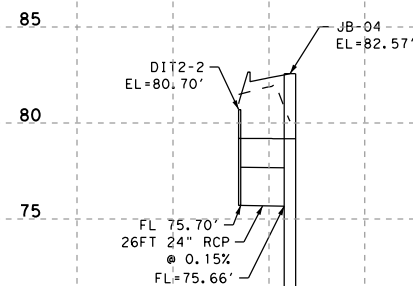
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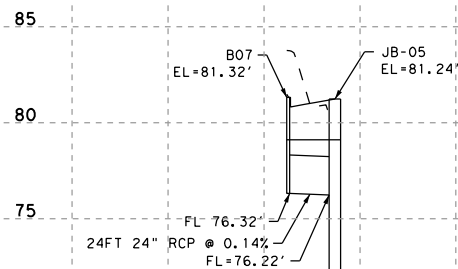
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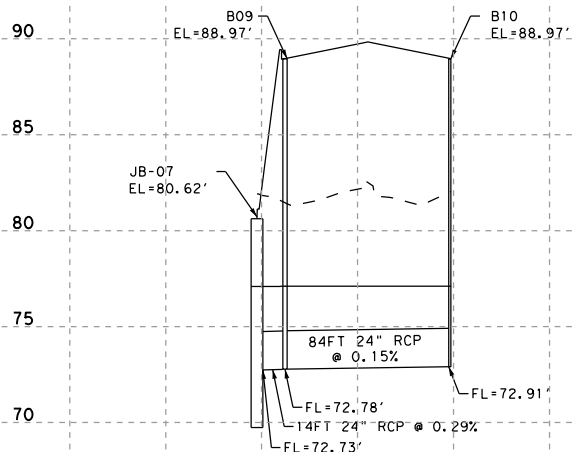
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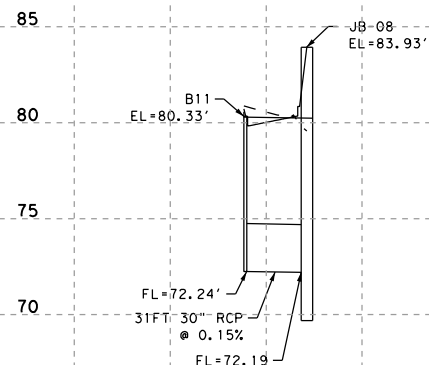
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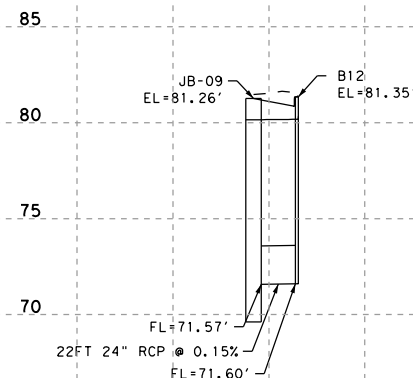
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@ NORTH PARK



STA 22+80.53
@ NORTH PARK

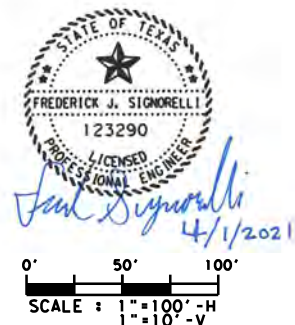


STA 23+32.71
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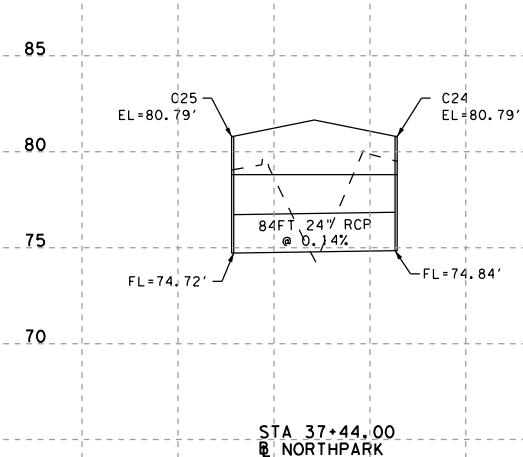
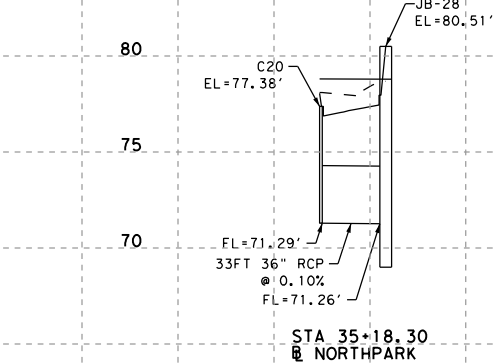
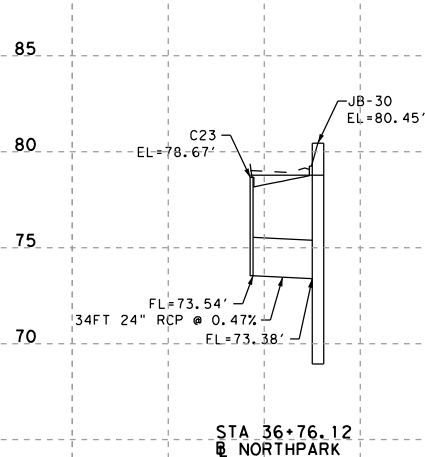
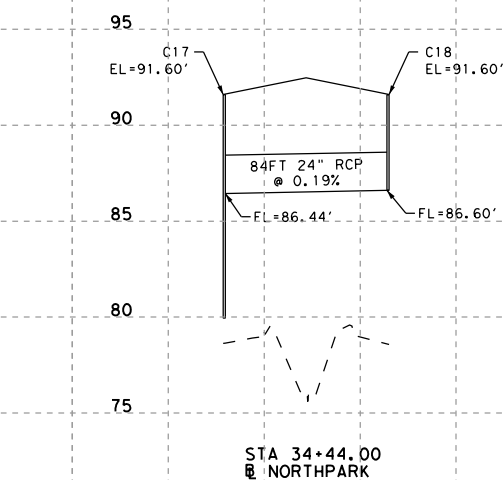
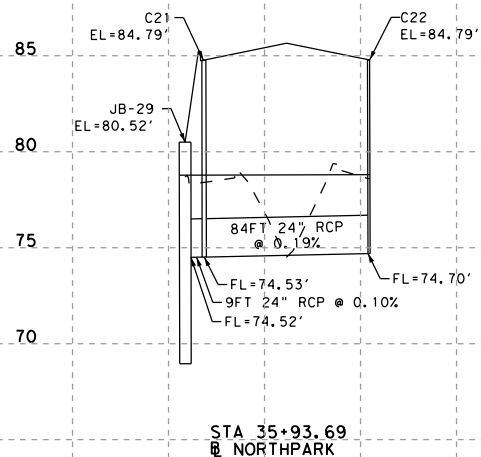
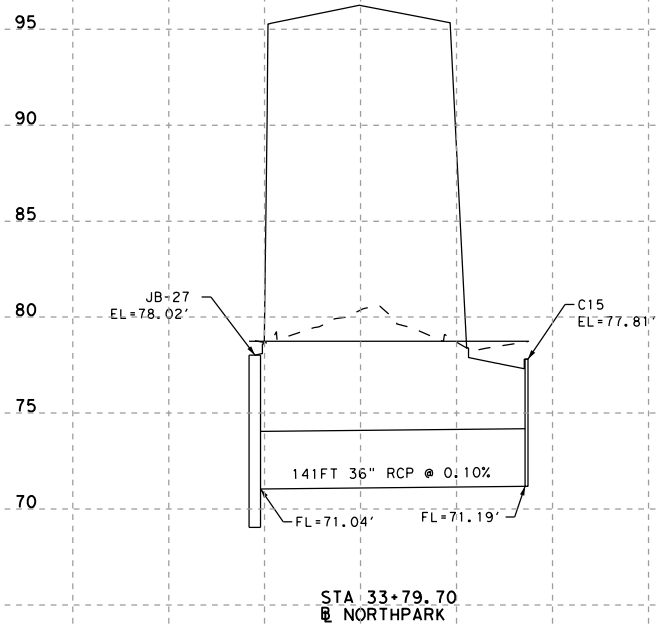
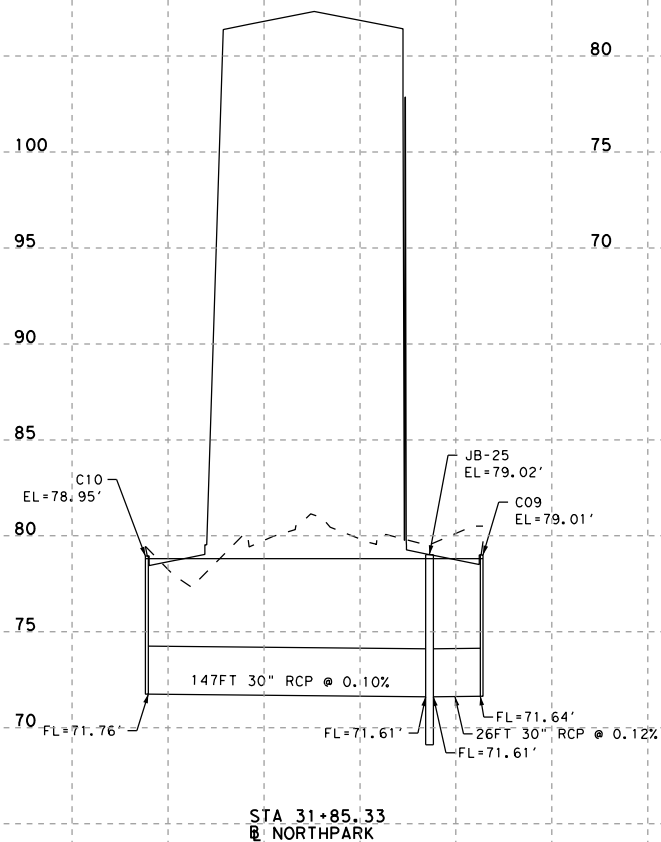
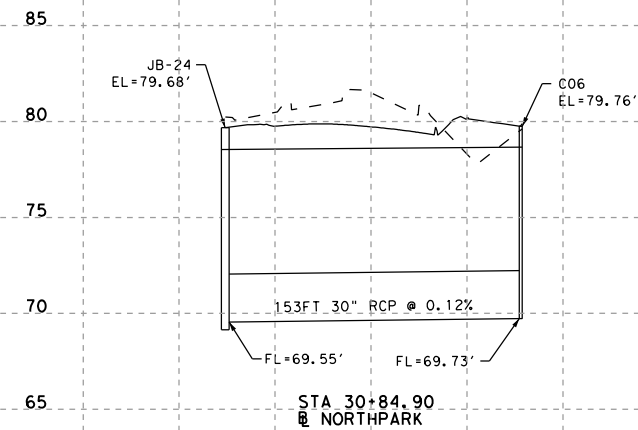
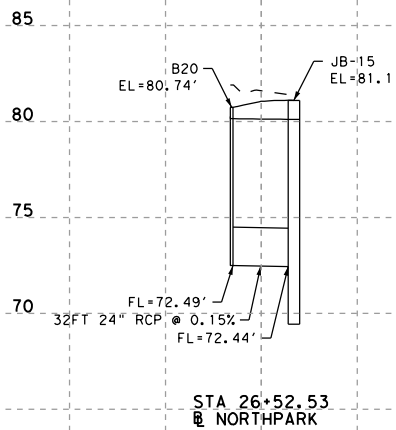
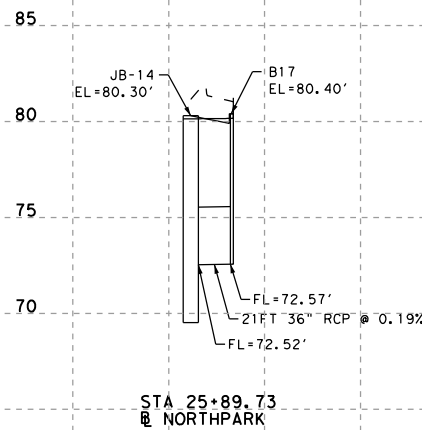
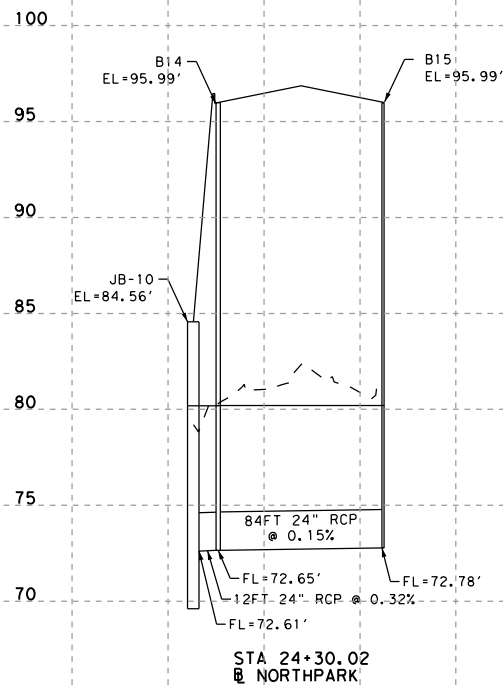


STA 23+71.92
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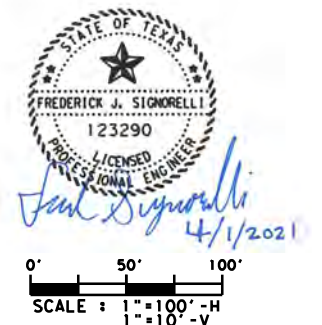
NOTES:
1. HGL PROVIDED BY SENGINEERRING.
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REPORT PREPARED BY SENGINEERING
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NO.		REVISIONS		BY	DATE
<div><div><div>EHRA</div><div>HNTB</div><div>CITY OF HOUSTON HOUSTON PUBLIC WORKS</div></div><div><div>STATE OF TEXAS FREDERICK J. SIGNORELLI 123290 LICENSED PROFESSIONAL ENGINEER 4/1/2021</div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div>		<div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TBPLS No 10092300</div> <div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>			
<div><div><div>NORTH PARK DRIVE</div><div>DRAINAGE</div><div>LATERALS</div></div></div>					
SHEET 1 OF 9					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 331



NOTES:
1. HGL PROVIDED BY SENGINEERING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



NO.	REVISIONS	BY	DATE
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EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No. 10092300

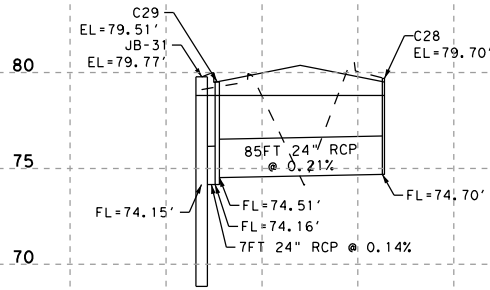
HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

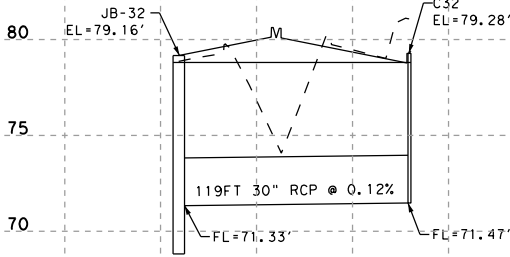
LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTH PARK DRIVE DRAINAGE LATERALS

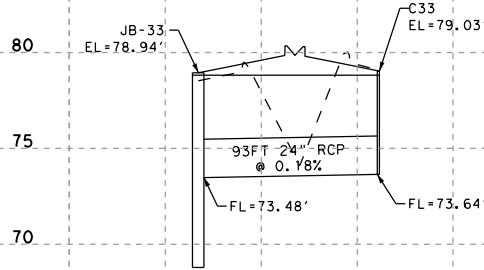
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CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
			232	332



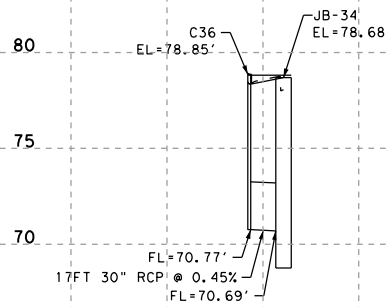
STA 38+93.82
NORTHPARK



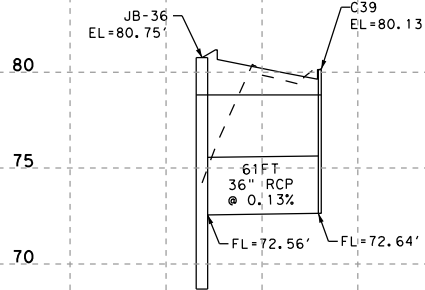
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B NORTH PARK



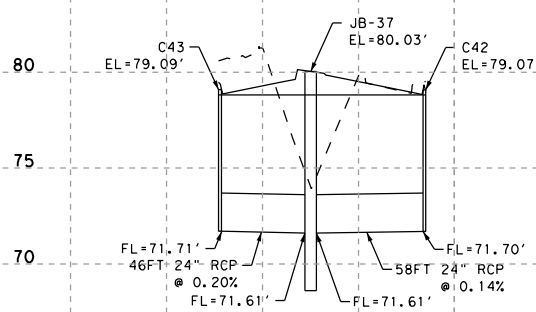
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NORTHPARK



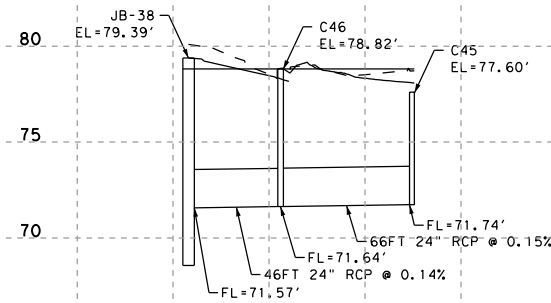
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NORTHPARK



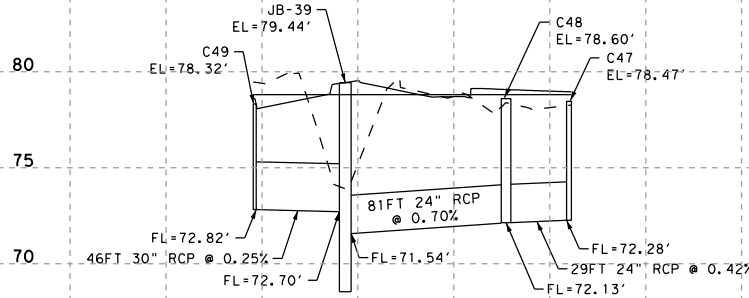
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NORTHPARK



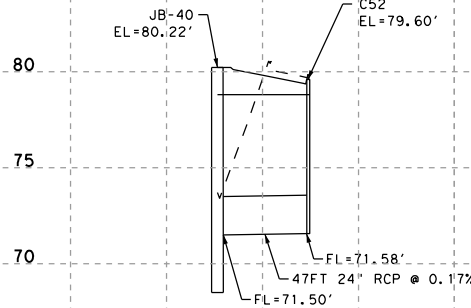
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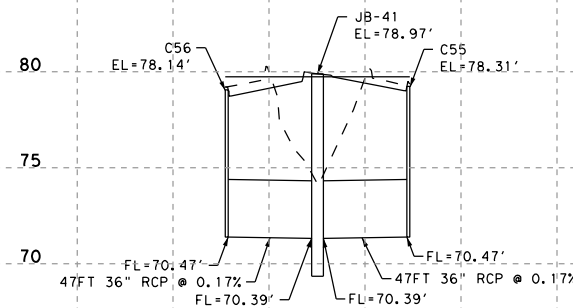
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NORTHPARK



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NORTHPARK



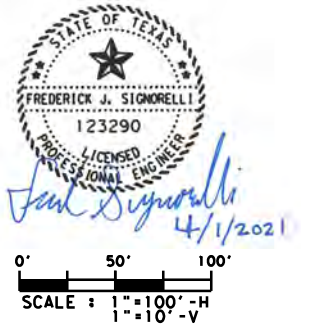
STA 49+12.63
B NORTH PARK



STA 51+82.7
NORTHPARK

NOTES:

1. HGL PROVIDED BY 5ENGINEERING.
SEE NORTHPARK DRAINAGE ANALYSIS
REPORT PREPARED BY 5ENGINEERING
DATED 01/08/2021 FOR MORE
INFORMATION.



NO.	REVISIONS	BY	DATE
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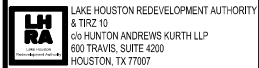


EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TBPE NO F-726 | TBPLS No 10092300



HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

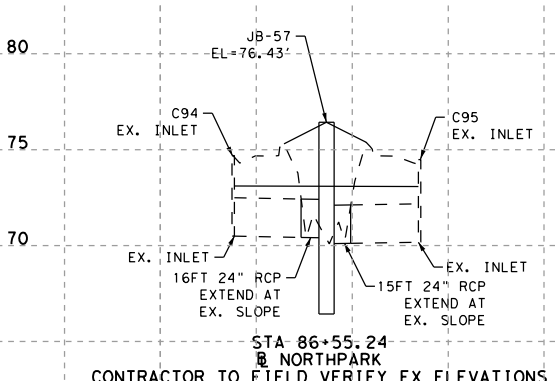
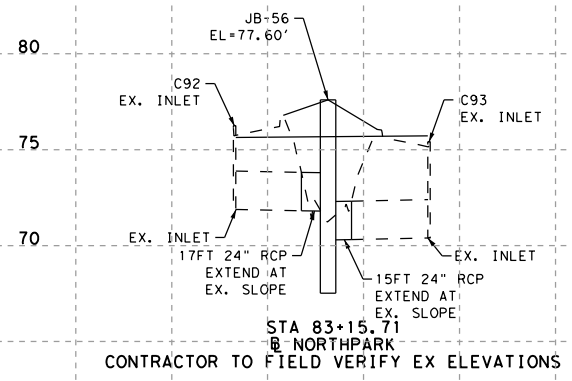
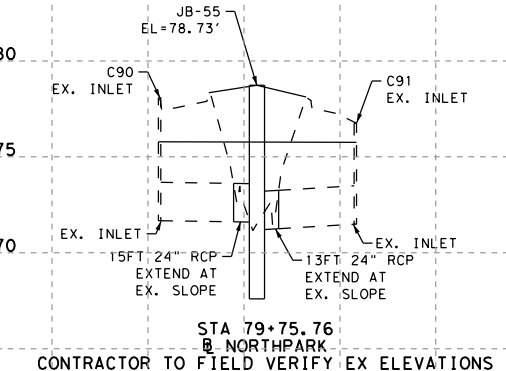
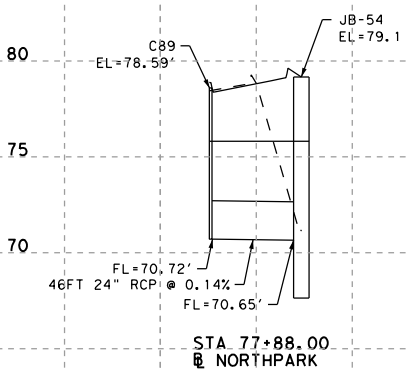
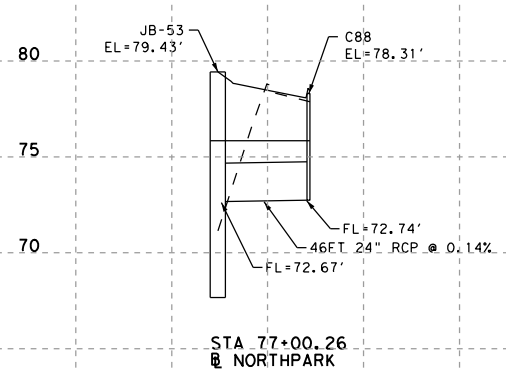
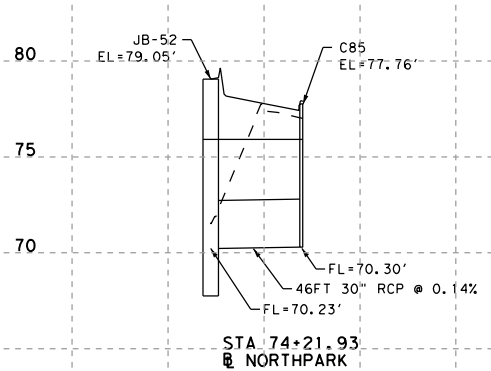
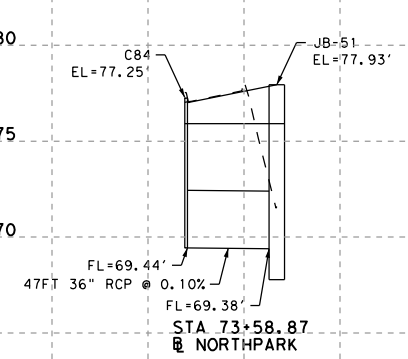
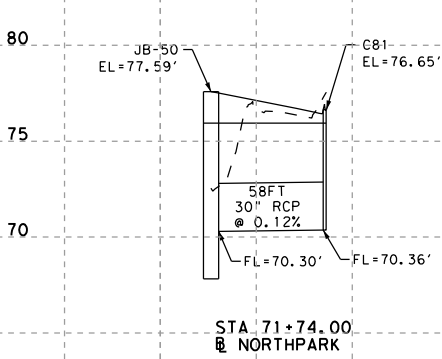
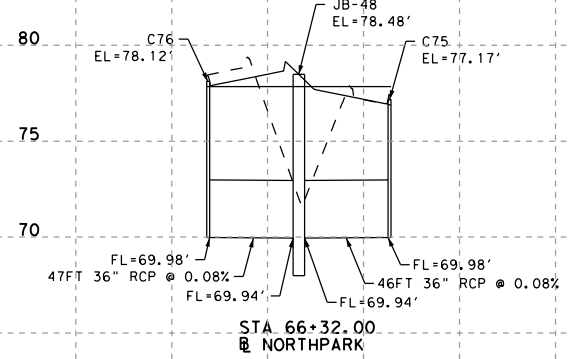
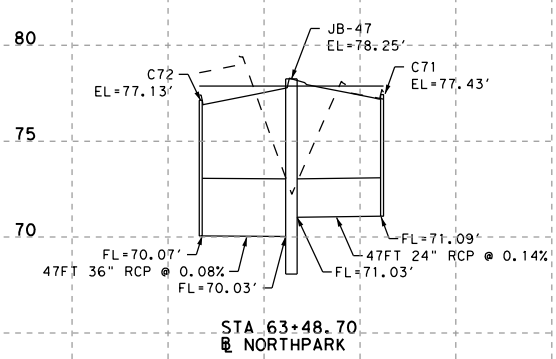
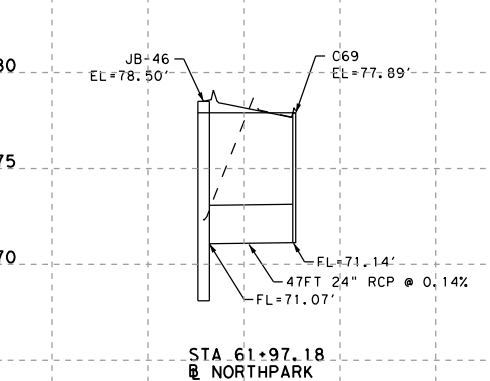
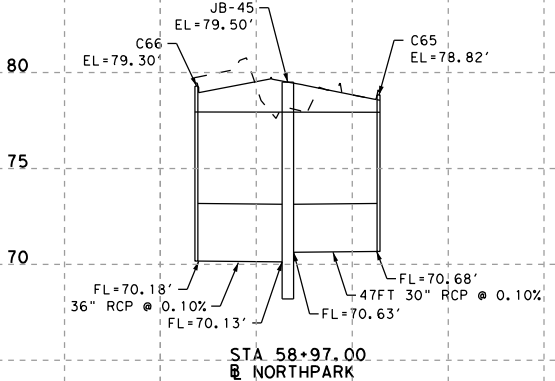
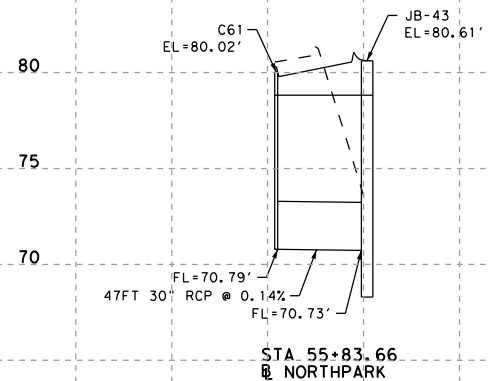
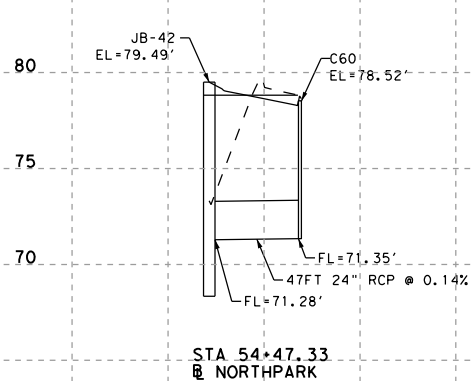
CITY OF HOUSTON
HOUSTON PUBLIC WORKS



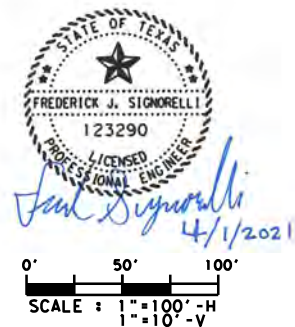
NORTHPARK DRIVE
DRAINAGE
LATERALS

SHEET 3 OF 9

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	333



NOTES:
1. HGL PROVIDED BY SENGINERRING.
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INFORMATION.



0' 50' 100'
SCALE : 1" = 100' -H
1" = 10' -V

NO.	REVISIONS	BY	DATE
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EHRA ENGINEERING
10011 Meadowlark Lane
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TRPE NO F-726 | TRPLS No. 10092300

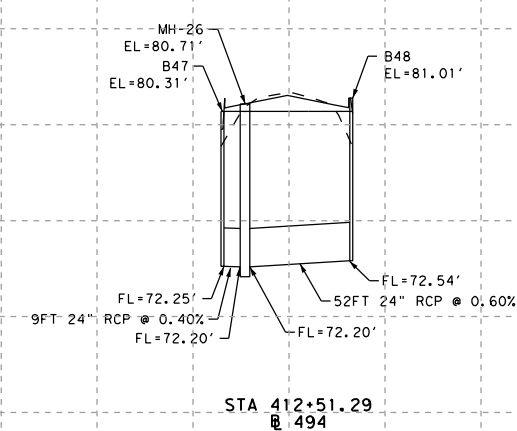
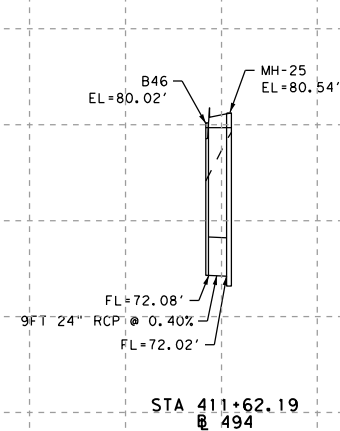
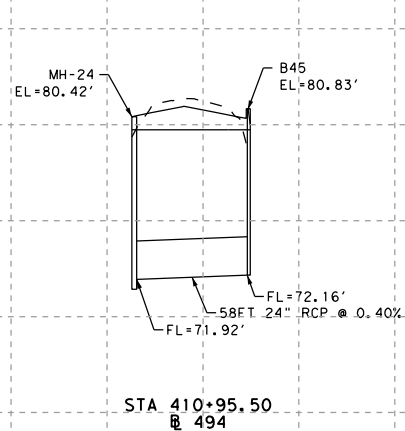
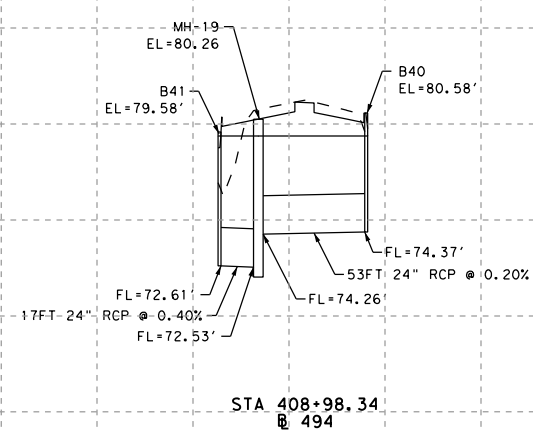
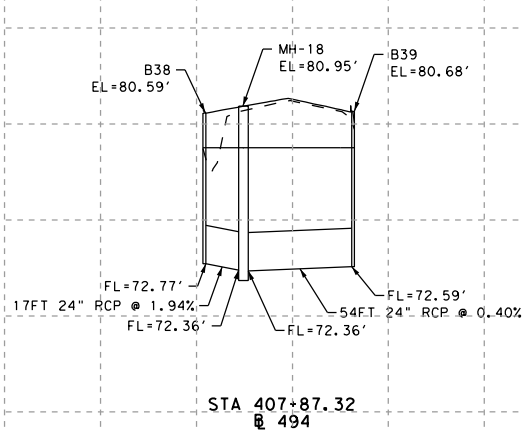
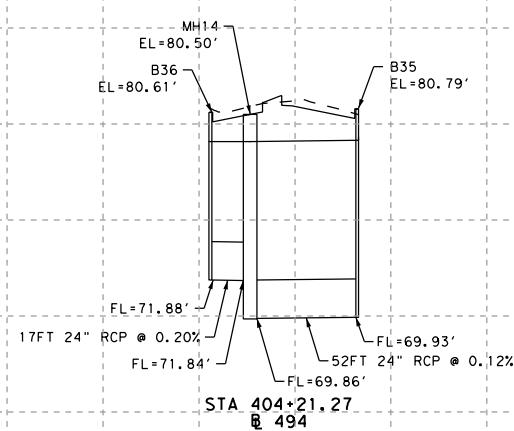
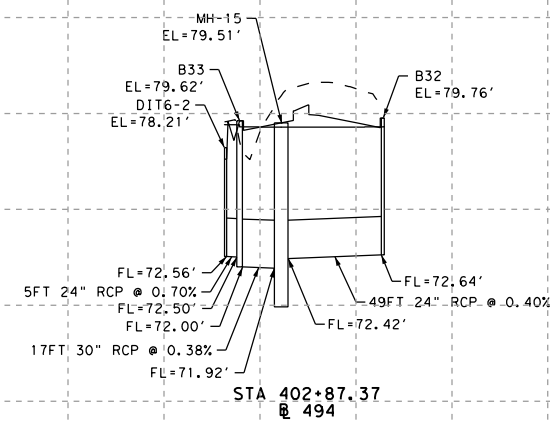
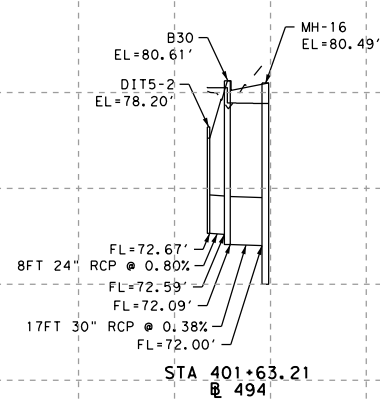
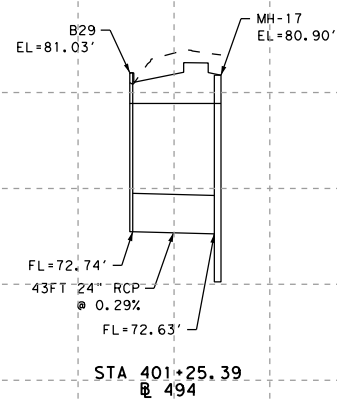
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
DRAINAGE
LATERALS

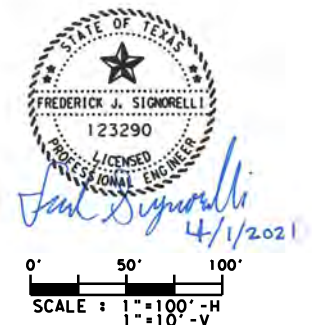
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DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS		HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	334



NOTES:

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HNTB

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**LH
RA**
LAKE HOUSTON
REDEVELOPMENT AUTHORITY

LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTHPARK DRIVE
DRAINAGE
LATERALS

SHEET 5 OF 9

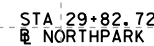
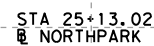
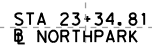
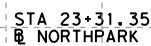
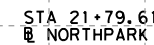
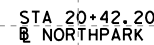
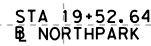
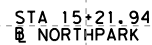
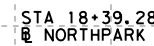
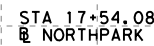
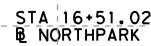
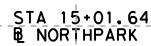
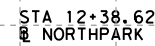
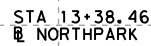
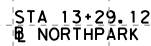
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	CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
	DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
	CHECKED:	HOU	MONTGOMERY	0912	37	232	335

4/1/2021

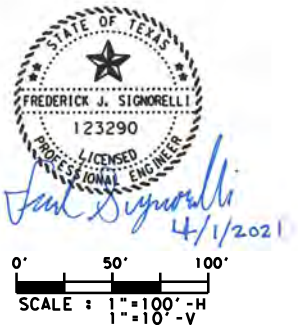
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PROPOSED
STORM
EXIST
GROUND

P:\151-071-04\PROJECTWISE\65885 Northpark Drive Overpass Project\Design and Engineering\03 EHRA\04 Drainage\07 Sheet DGN\05.dgn

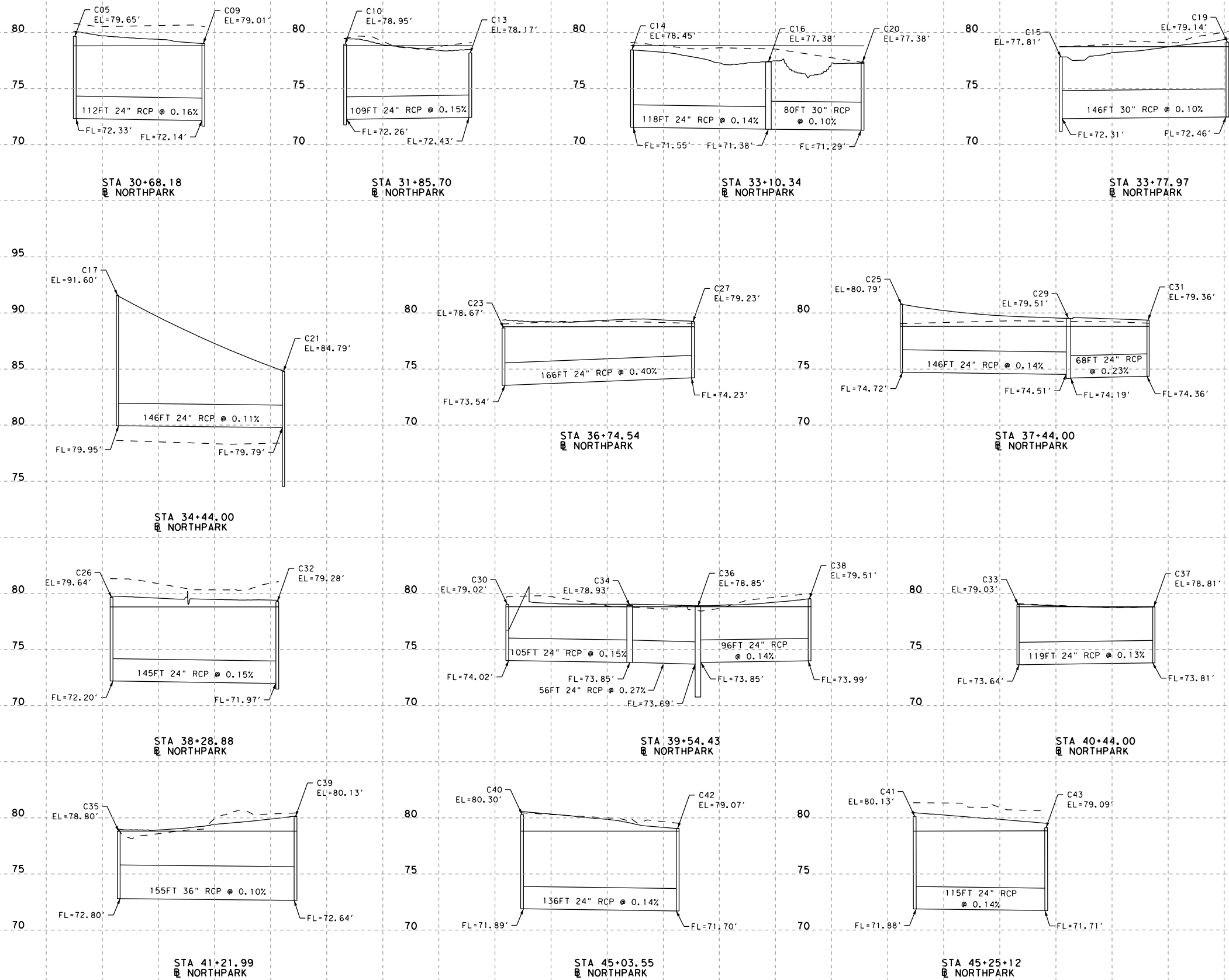


1. HGL PROVIDED BY 5ENGINEERING.
SEE NORTHPARK DRAINAGE ANALYSIS
REPORT PREPARED BY 5ENGINEERING
DATED 01/08/2021 FOR MORE
INFORMATION.

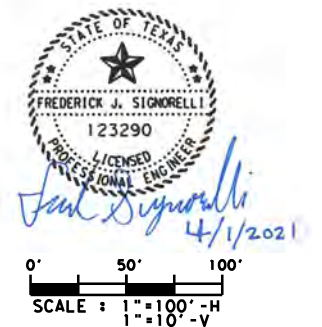


NORTHPARK DRIVE
DRAINAGE
LATERALS
PARALLELS

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	336



NOTES:
1. HGL PROVIDED BY SENGINEERRING.
SEE NORTH PARK DRAINAGE ANALYSIS
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NO.	REVISIONS	BY	DATE
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EHRA
EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No. 10092300

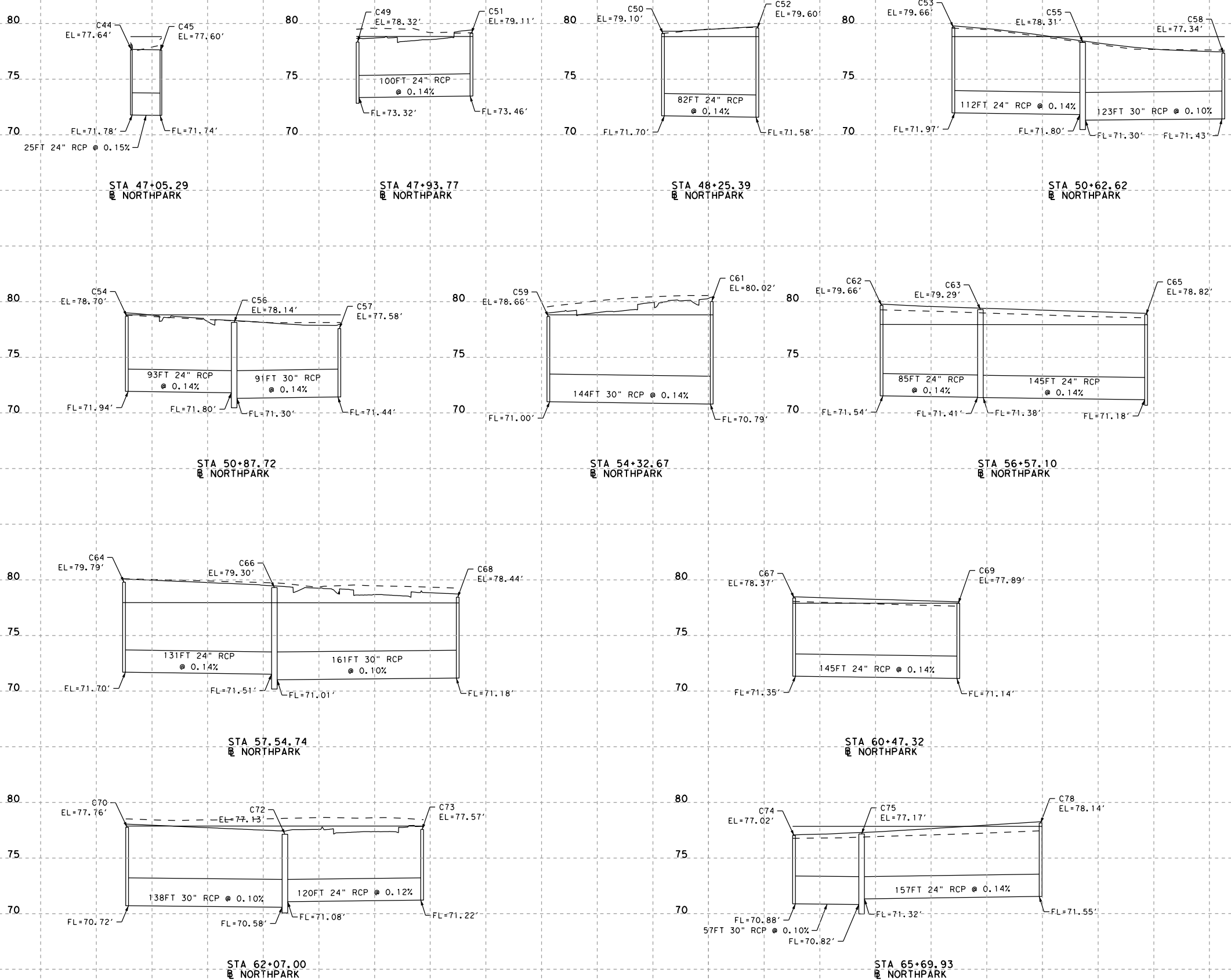
HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

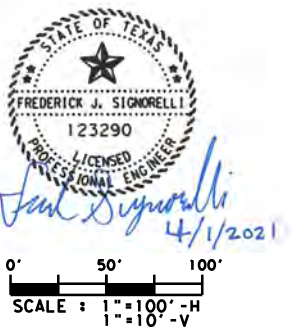
LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TRIZ 10
c/o HUNTON ANDREWS KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTH PARK DRIVE DRAINAGE LATERALS PARALLELS

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.
CHECKED:	HOU	MONTGOMERY	0912	37
				232
				337



NOTES:
1. HGL PROVIDED BY SENGINERRING.
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REPORT PREPARED BY SENGINEERING
DATED 01/08/2021 FOR MORE
INFORMATION.



0' 50' 100'
SCALE : 1" = 100' - H
1" = 10' - V

NO.	REVISIONS	BY	DATE

EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO. F-725 | TRPLS No. 10092300

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TR2 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

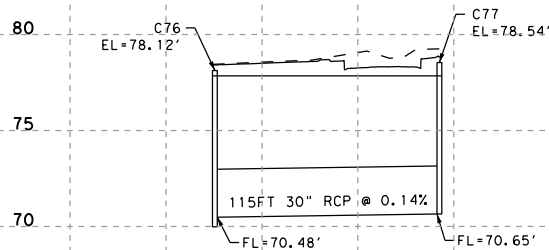
NORTH PARK DRIVE

DRAINAGE LATERALS PARALLELS

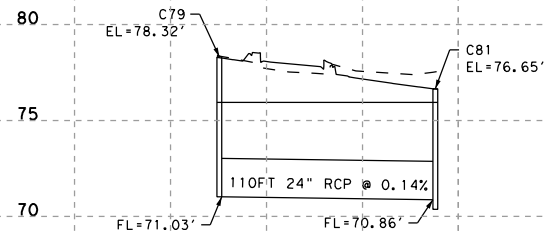
SHEET 8 OF 9

DESIGNED:	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY NO.
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DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

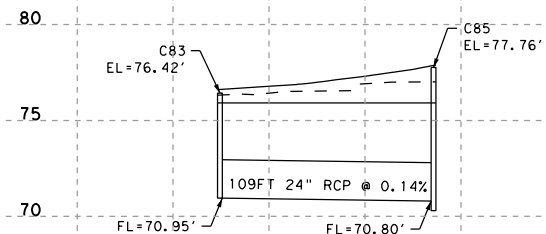
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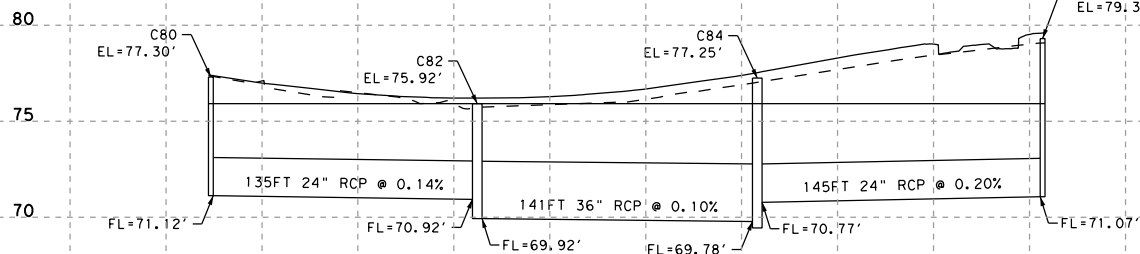
STA 66+32.00
@ NORTH PARK



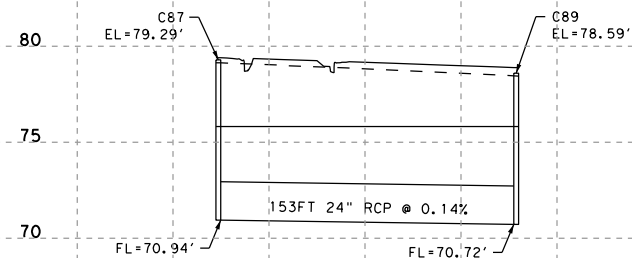
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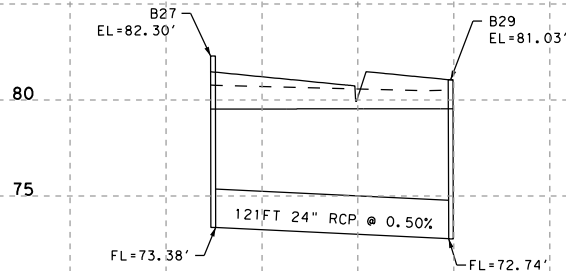
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@ NORTH PARK



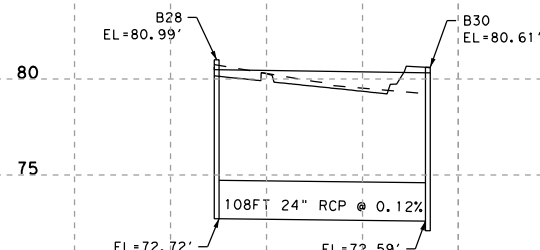
STA 70+73.07
@ NORTH PARK



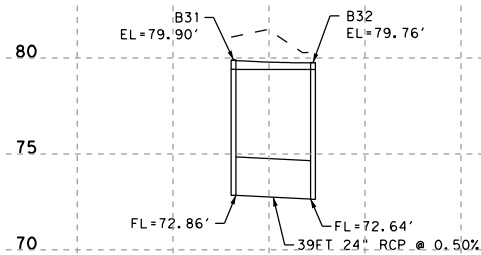
STA 76+30.38
@ NORTH PARK



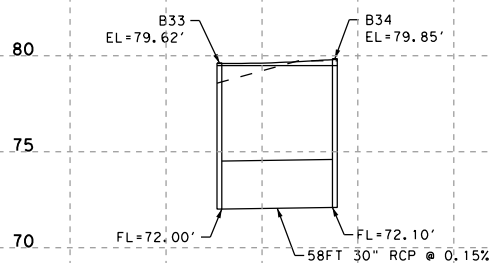
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@ 494



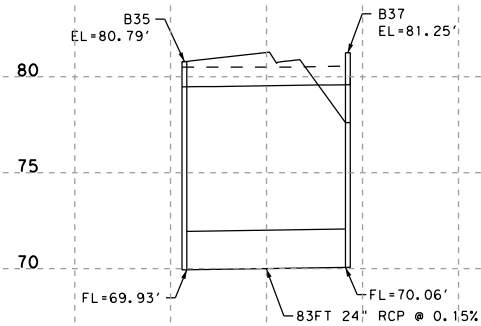
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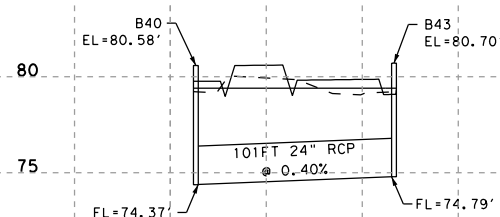
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@ 494



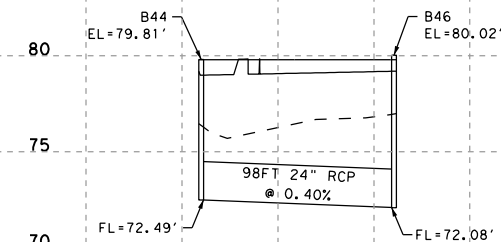
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@ 494



STA 404+19.57
@ 494



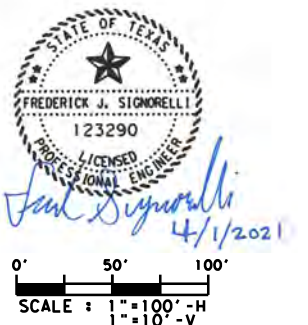
STA 408+98.34
@ 494



STA 410+59.29
@ 494

NOTES:

1. HGL PROVIDED BY SENGINEERRING. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



NO.	REVISIONS	BY	DATE
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EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No. 10092300

HNTB
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The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

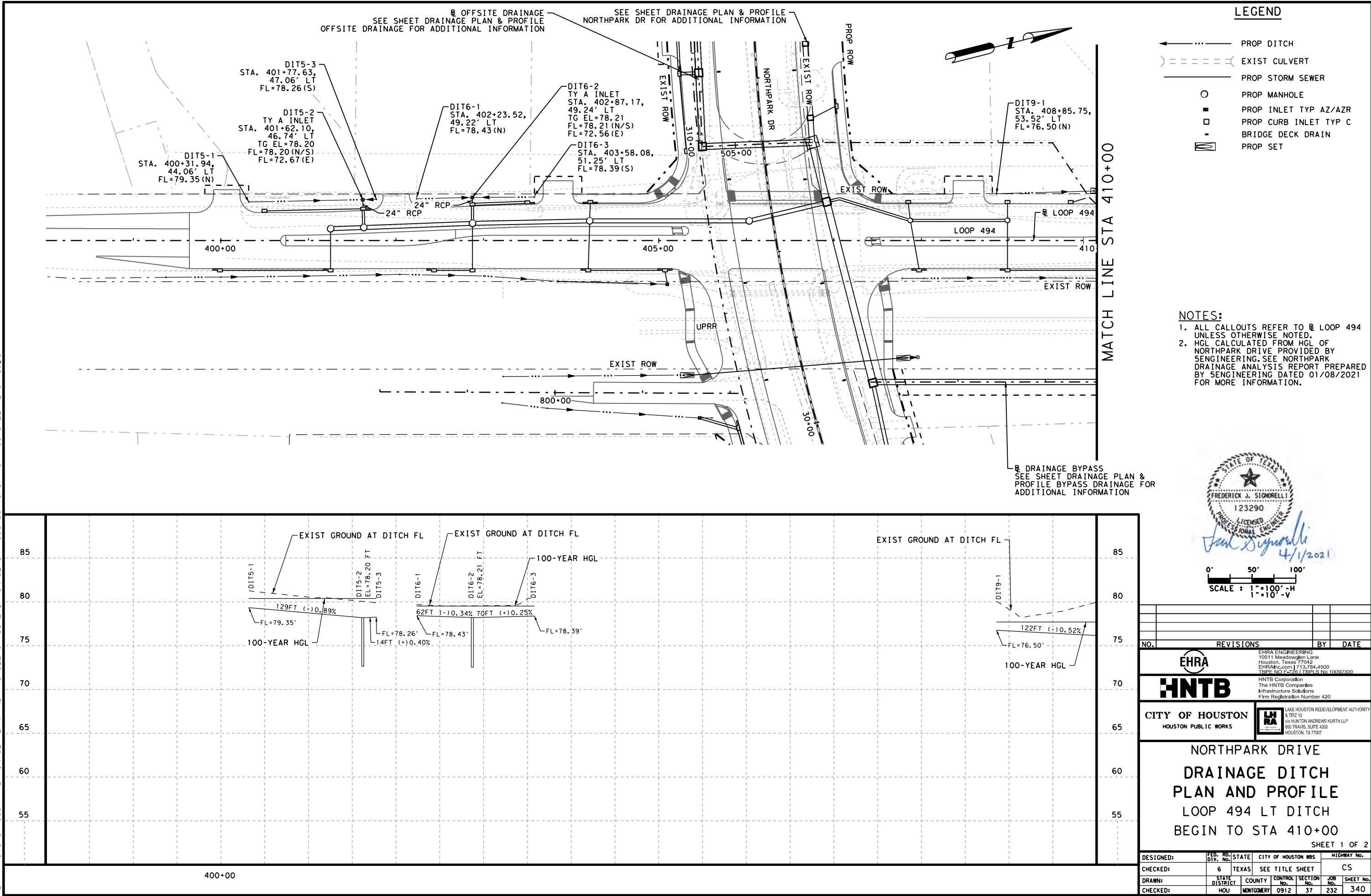
NORTH PARK DRIVE
DRAINAGE
LATERALS
PARALLELS

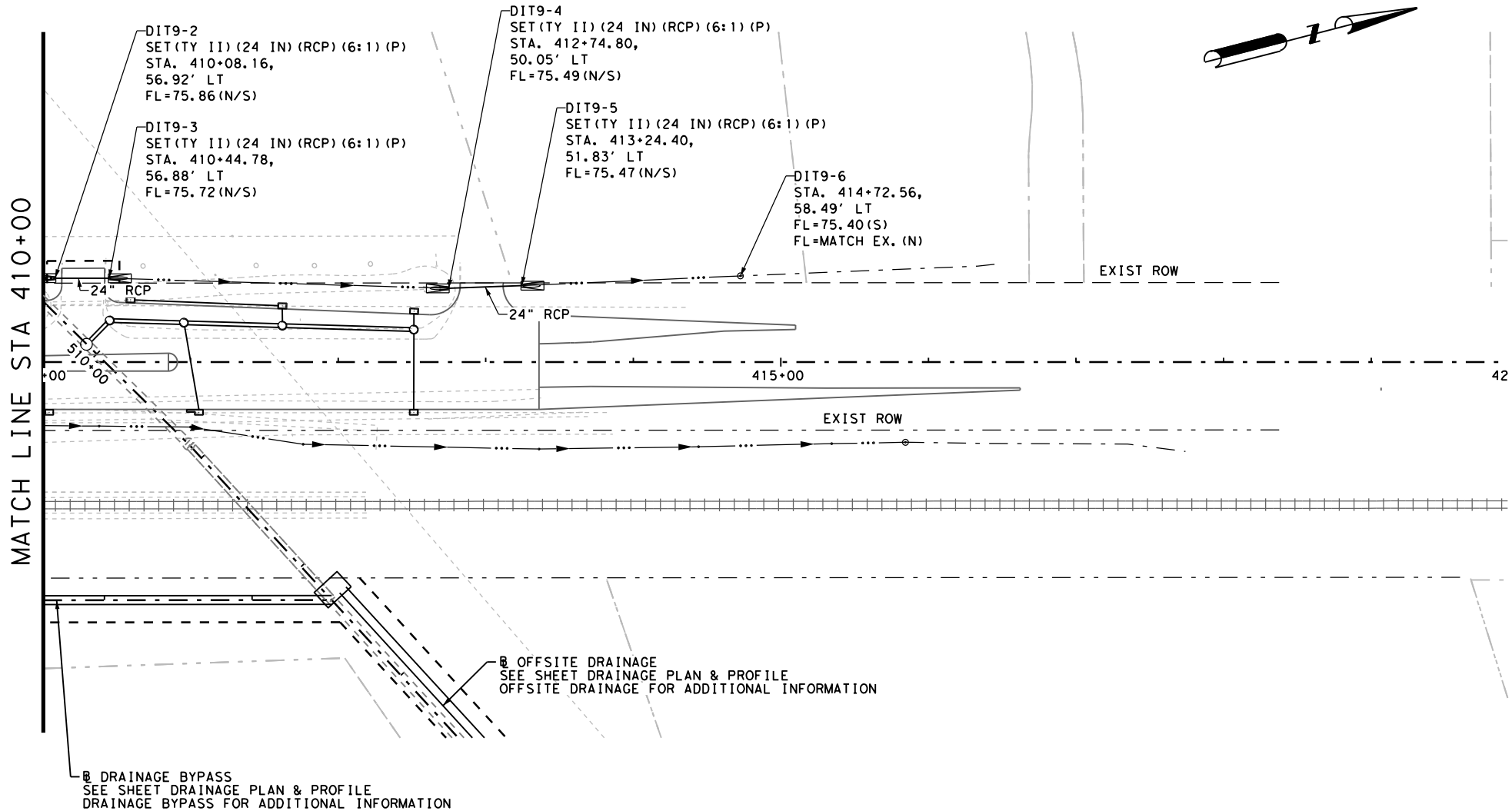
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
			232	339

4/1/2021

SHEET 9 OF 9

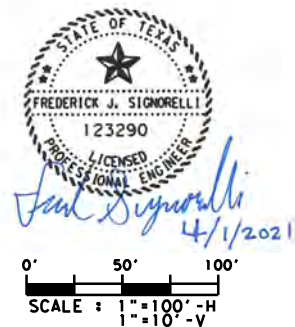
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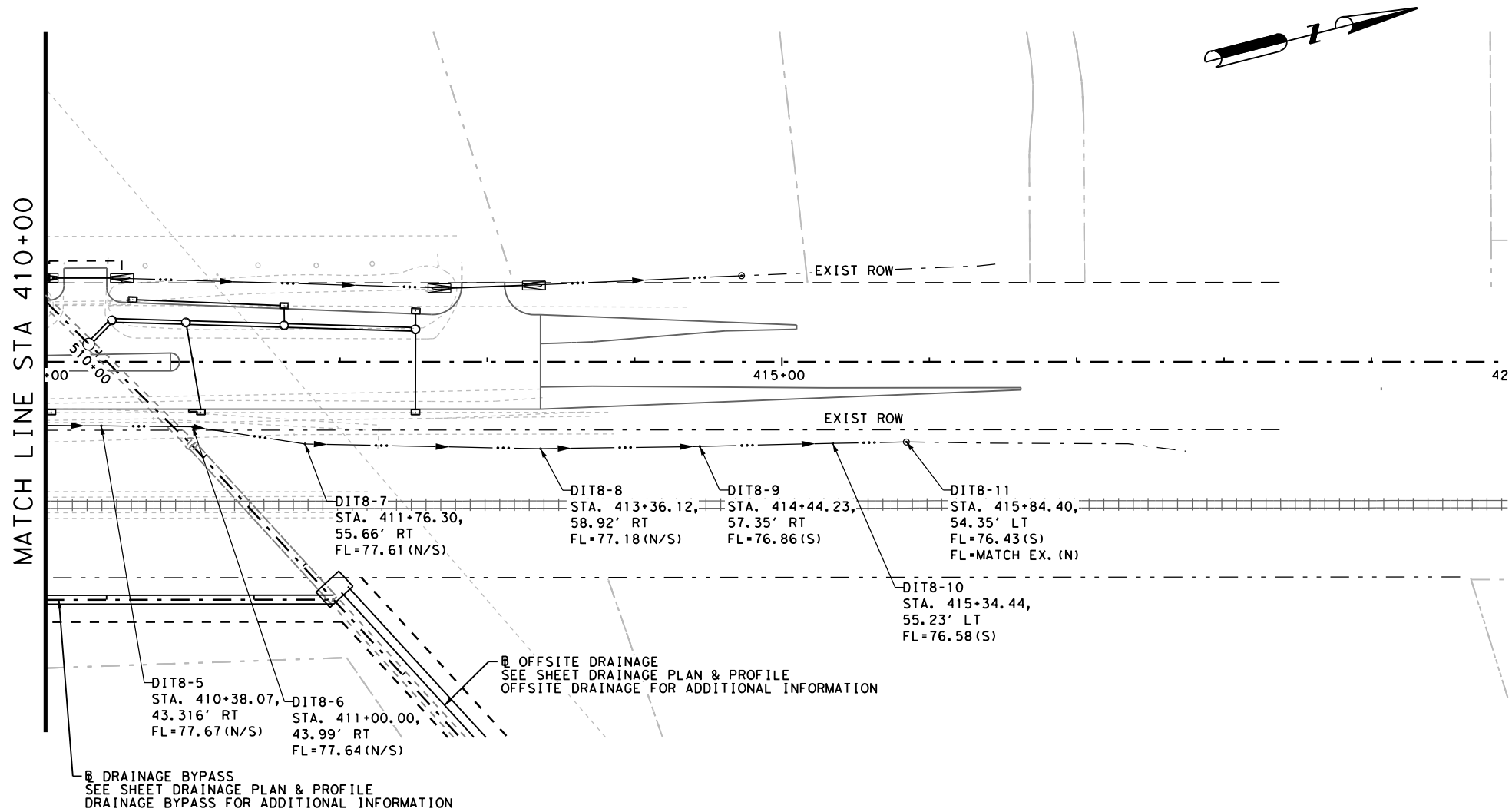
- LEGEND**
- PROP DITCH
 - EXIST CULVERT
 - PROP STORM SEWER
 - PROP MANHOLE
 - PROP INLET TYP AZ/AZR
 - PROP CURB INLET TYP C
 - BRIDGE DECK DRAIN
 - ▭ PROP SET

- NOTES:**
1. ALL CALLOUTS REFER TO R LOOP 494 UNLESS OTHERWISE NOTED.
 3. SEE NORTHPARK DRAINAGE ANALYSIS REPORT PREPARED BY SENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



REVISIONS				BY	DATE
NO.					
<div><div><div>EHRA ENGINEERING 10011 Meadowglen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300</div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>CITY OF HOUSTON HOUSTON PUBLIC WORKS</div><div><div>Lake Houston Redevelopment Authority & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div></div>					
<div><div><div>NORTHPARK DRIVE DRAINAGE DITCH PLAN AND PROFILE LOOP 494 LT DITCH STA 410+00 TO END</div><div>SHEET 2 OF 2</div></div></div>					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 341

NO.	REVISONS				BY	DATE	
			EHRA ENGINEERING 10011 Meadowlark Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRSF NO. F-7261 TRFPLS NO. 10092300				
			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420				
CITY OF HOUSTON HOUSTON PUBLIC WORKS					LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77007		
<p style="text-align: center;"> NORTH PARK DRIVE DRAINAGE DITCH PLAN AND PROFILE LOOP 494 RT DITCH BEGIN TO STA 410+00 </p>							
SHEET 1 OF 2							
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	342	

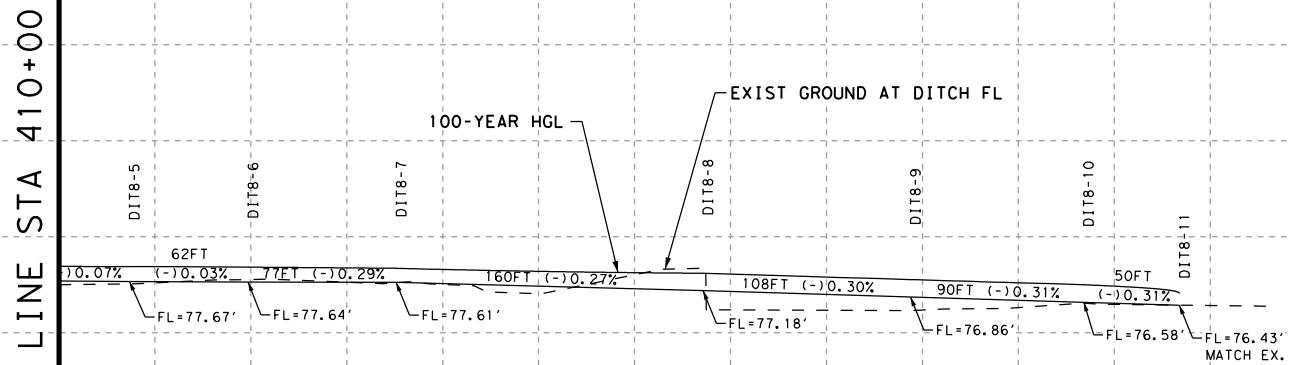
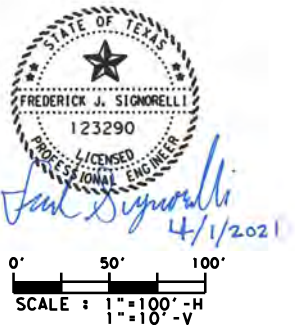


LEGEND

- | | |
|--|-----------------------|
| | PROP DITCH |
| | EXIST CULVERT |
| | PROP STORM SEWER |
| | PROP MANHOLE |
| | PROP INLET TYP AZ/AZR |
| | PROP CURB INLET TYP C |
| | BRIDGE DECK DRAIN |
| | PROP SET |

NOTES:

1. ALL CALLOUTS REFER TO @ LOOP 494 UNLESS OTHERWISE NOTED.
2. SEE NORTHPARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



NO.	REVISIONS	BY	DATE
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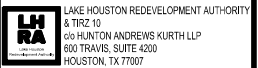


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Houston, Texas 77042
EHRAInc.com | 713.784.4500
TBPE NO F-726 | TBPLS No 10092300



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Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

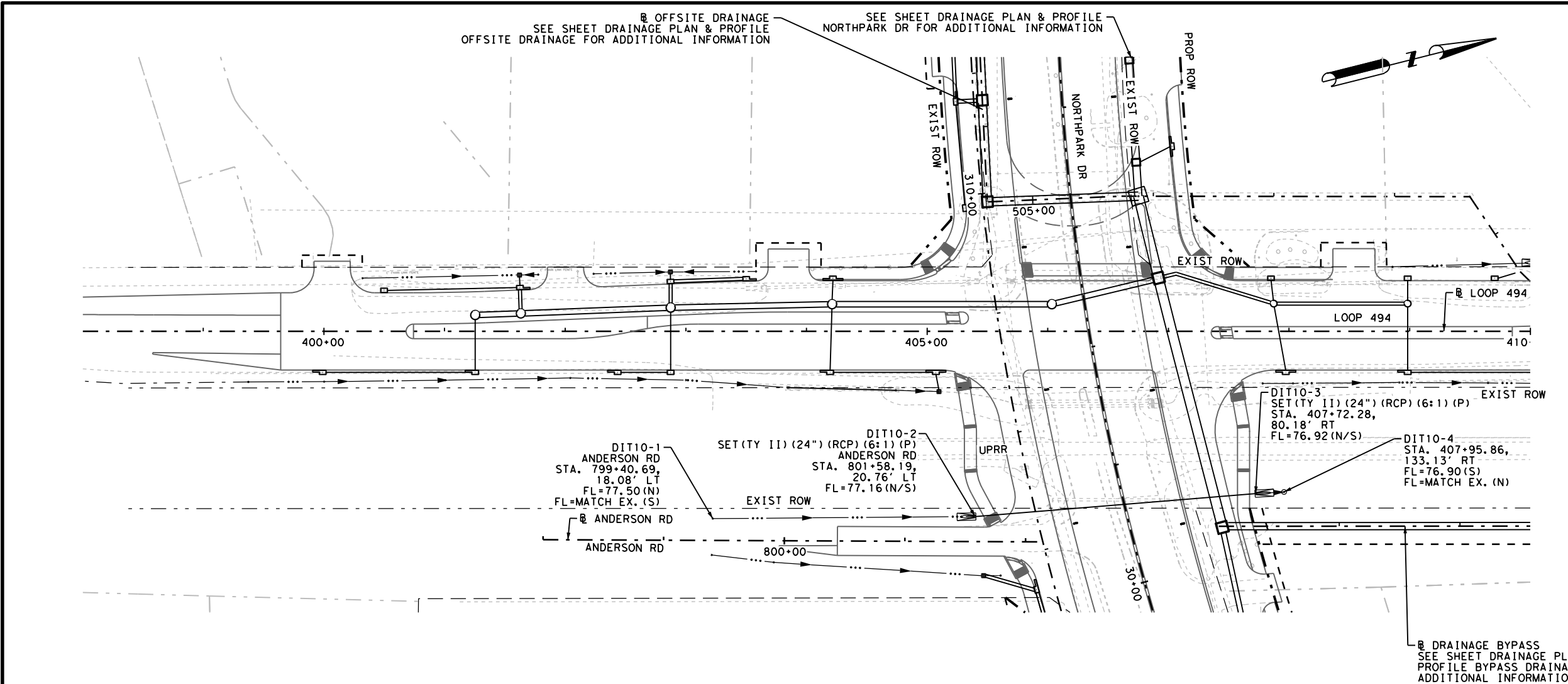


NORTHPARK DRIVE
DRAINAGE DITCH
PLAN AND PROFILE
LOOP 494 RT DITCH
STA 410+00 TO END

SHEET 2 OF 2

DESIGNED:	FED. RD. DIV.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	343

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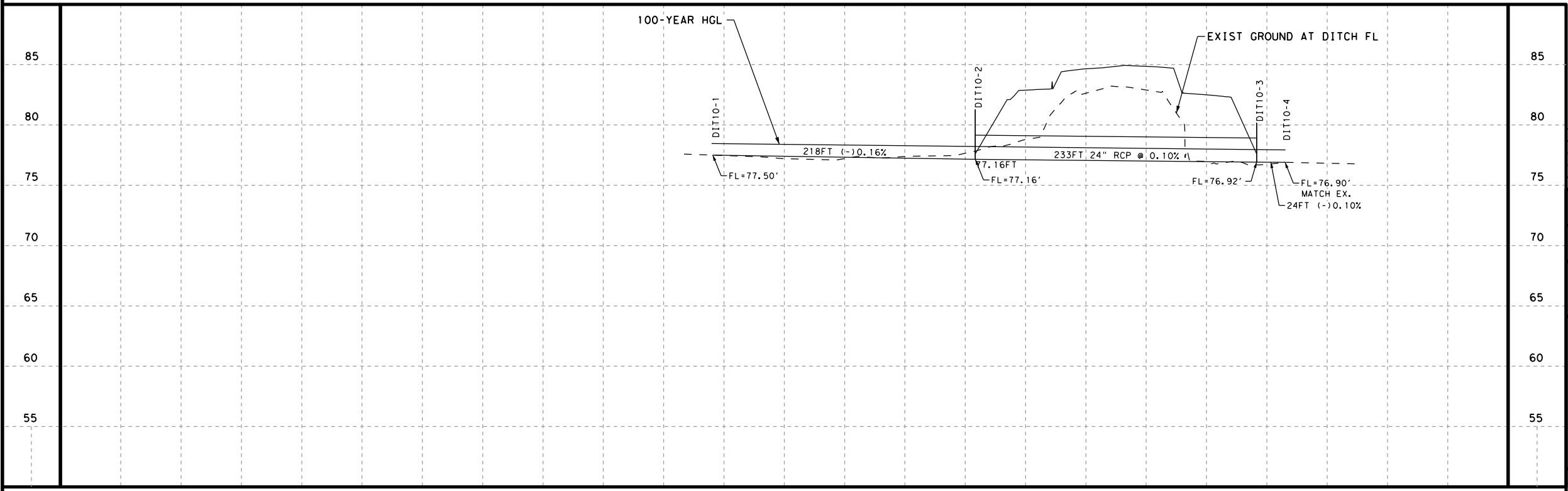
LEGEND

- PROP DITCH
- EXIST CULVERT
- PROP STORM SEWER
- PROP MANHOLE
- PROP INLET TYP AZ/AZR
- PROP CURB INLET TYP C
- - - BRIDGE DECK DRAIN
- ▭ PROP SET

- NOTES:**
1. ALL CALLOUTS REFER TO LOOP 494 UNLESS OTHERWISE NOTED.
 2. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

STATE OF TEXAS
FREDERICK J. SIGNORELLI
123290
LICENSED PROFESSIONAL ENGINEER
4/1/2021

0' 50' 100'
SCALE : 1" = 100' -H
1" = 10' -V



NO.	REVISIONS	BY	DATE

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EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
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TRPE NO F-726 | TRPLS No. 10092300

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Infrastructure Solutions
Firm Registration Number 420

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LRA
LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TRIZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

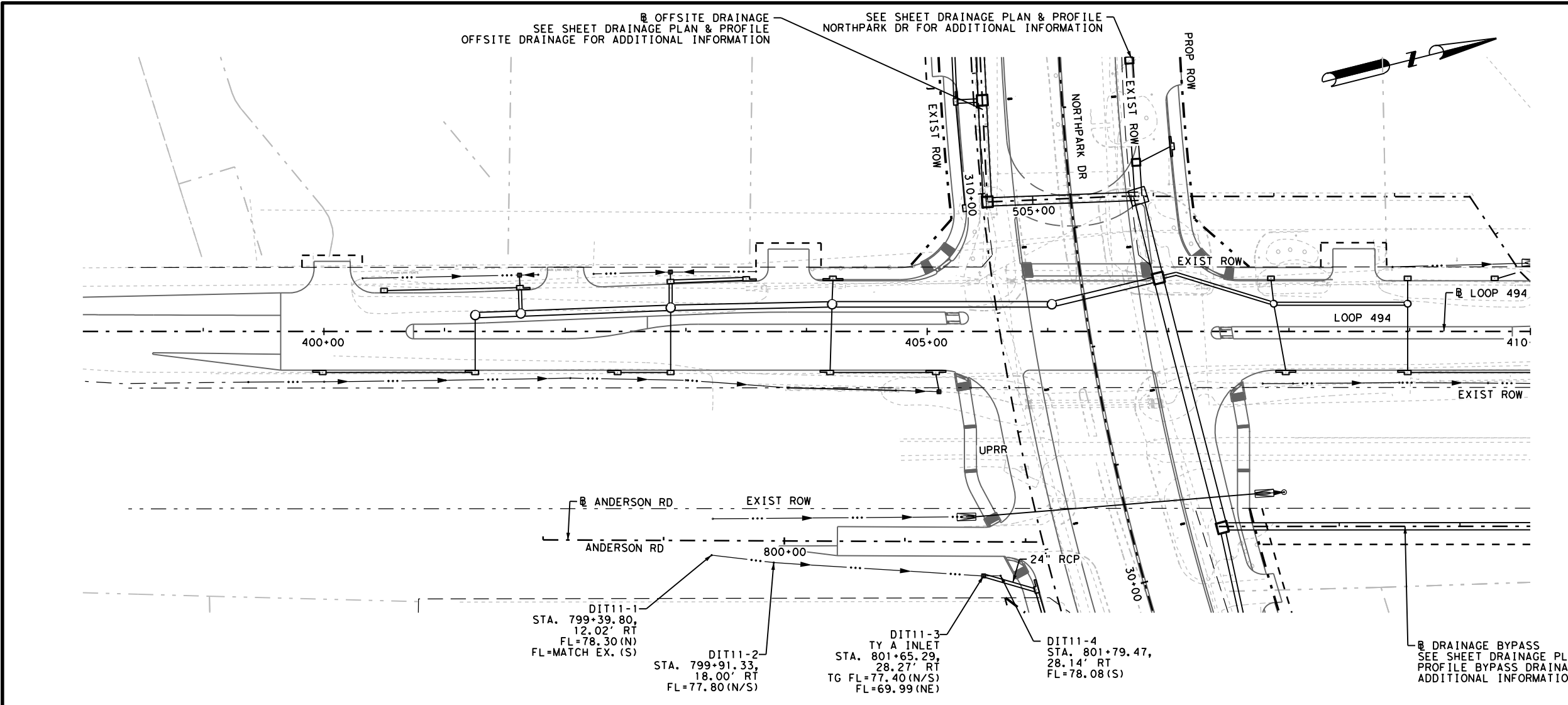
**NORTH PARK DRIVE
DRAINAGE
PLAN AND PROFILE
ANDERSON RD LT DITCH
BEGIN TO END**

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
			232	344

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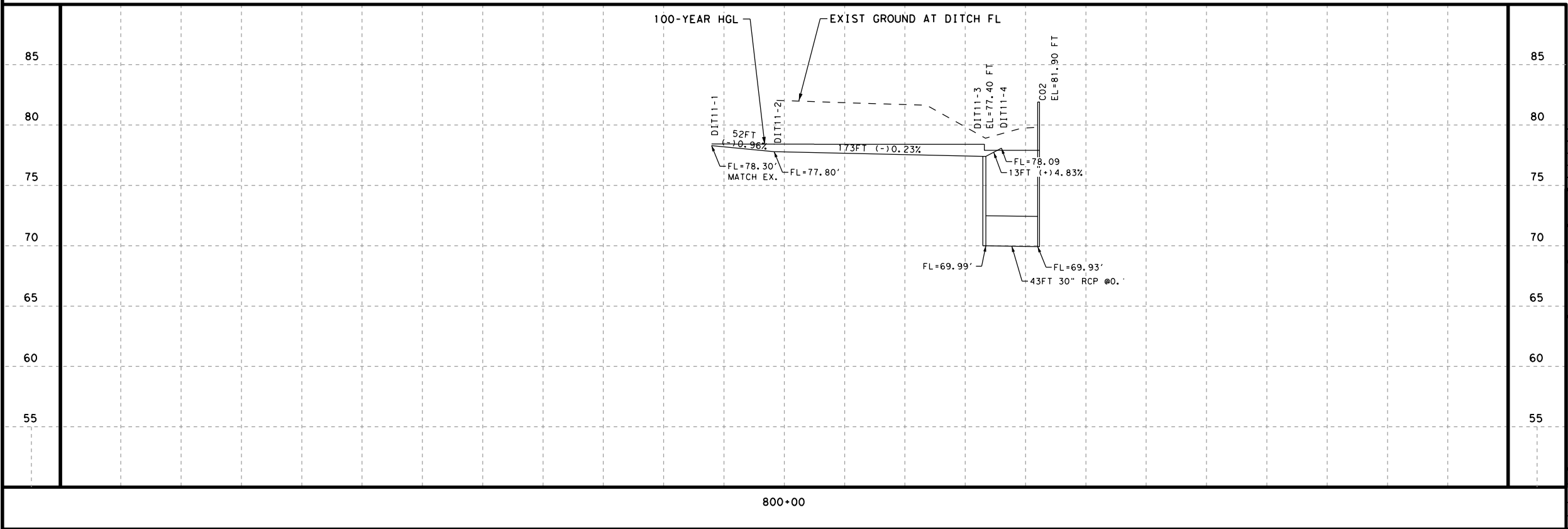
LEGEND

- PROP DITCH
- - - - - EXIST CULVERT
- PROP STORM SEWER
- PROP MANHOLE
- PROP INLET TYP AZ/AZR
- PROP CURB INLET TYP C
- - - - - BRIDGE DECK DRAIN
- ▭ PROP SET

- NOTES:**
1. ALL CALLOUTS REFER TO ANDERSON RD UNLESS OTHERWISE NOTED.
 2. SEE NORTHSPARK DRAINAGE ANALYSIS REPORT PREPARED BY 5ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.

STATE OF TEXAS
FREDERICK J. SIGNORELLI
123290
LICENSED PROFESSIONAL ENGINEER
4/1/2021

0' 50' 100'
SCALE : 1" = 100' -H
1" = 10' -V



NO.	REVISIONS	BY	DATE

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Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No. 10092300

HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

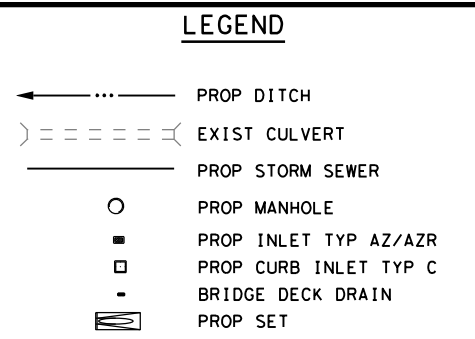
LRA
LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TRIZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTHSPARK DRIVE
DRAINAGE
PLAN AND PROFILE
ANDERSON RD RT DITCH
BEGIN TO END

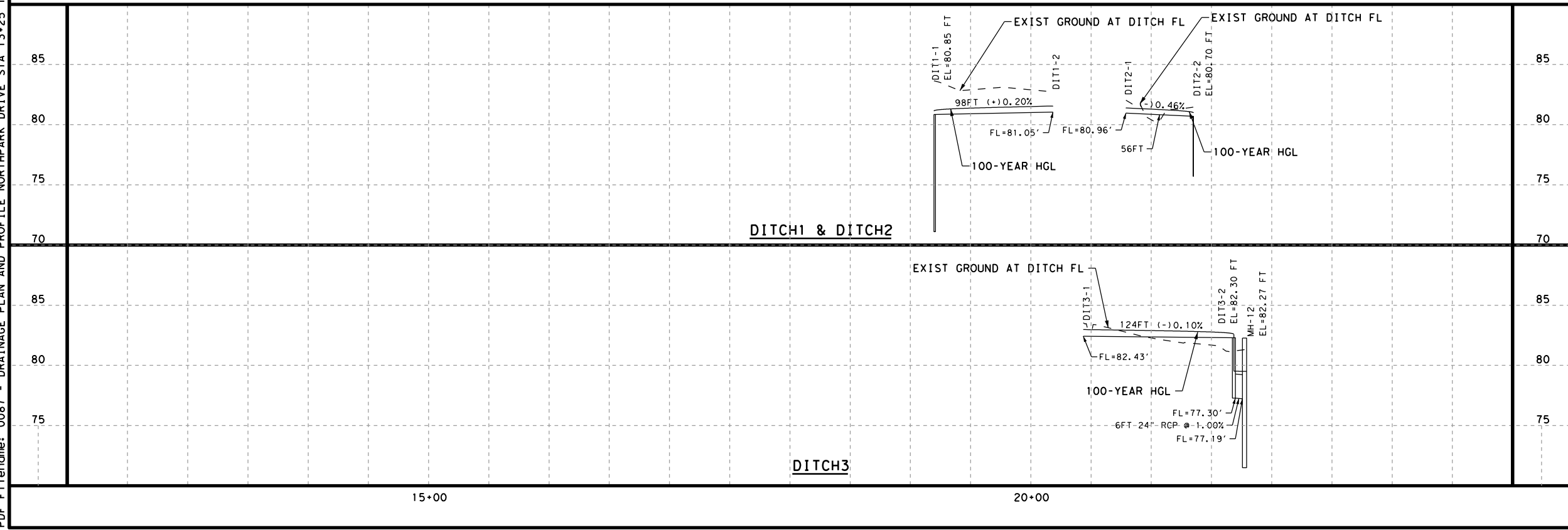
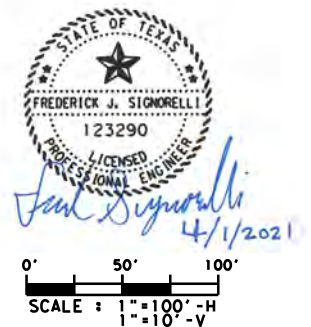
SHEET 1 OF 1




DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
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DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

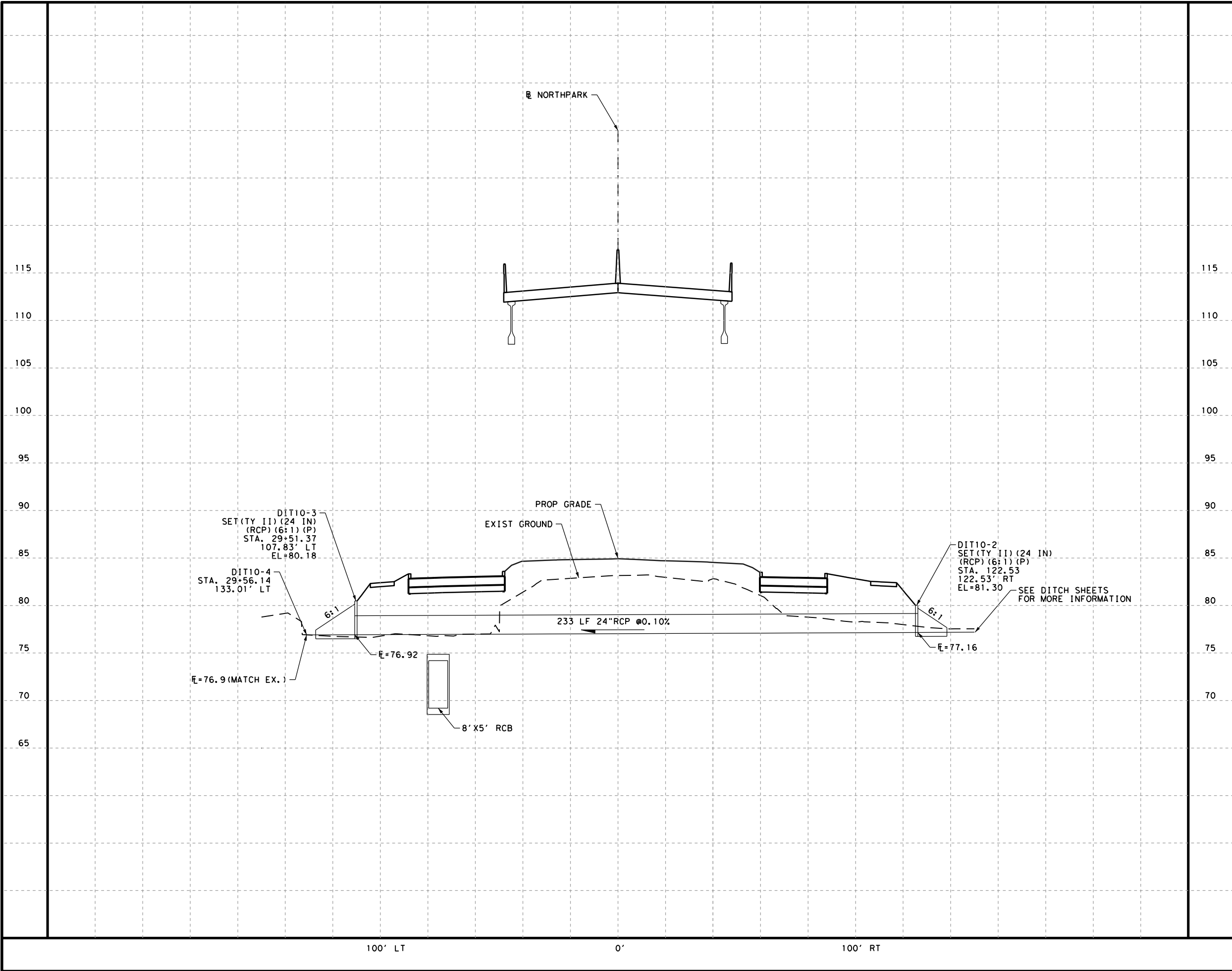
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- NOTES:**
1. ALL CALLOUTS REFER TO @ NORTH PARK UNLESS OTHERWISE NOTED.
 2. CONTACT WILLIAMS PIPELINE PRIOR TO BEGINNING EXCAVATION.
 3. SEE NORTH PARK DRAINAGE ANALYSIS REPORT PREPARED BY ENGINEERING DATED 01/08/2021 FOR MORE INFORMATION.



No.				REVISIONS			BY		DATE
				EHRA ENGINEERING 10011 Meadowlark Lane Houston, Texas 77042 EHRAnet.com 713.784.4500 TRF# NO. F-7226 TBPLS No. 10092300					
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 800 TRANS. SUITE 4200 HOUSTON, TX 77007					
NORTH PARK DRIVE DRAINAGE PLAN AND PROFILE NORTH PARK DRIVE DITCH									
SHEET 1 OF 1									
DESIGNED:	FED. DIV.	Rd. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.				
CHECKED:		6	TEXAS	SEE TITLE SHEET	CS				
DRAWN:	STATE DISTRICT	COUNTY	COUNTRY	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	346			



0' 10' 20'
SCALE : 1"=20'-H
1"=10'-V

NO.	REVISIONS	BY	DATE

EHRA ENGINEERING
10011 Meadowglen Lane
Houston, Texas 77042
EHRAInc.com | 713.784.4500
TRPE NO F-726 | TRPLS No. 10092300

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT AUTHORITY
& TRIZ 10
c/o HUNTON ANDREWS KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TX 77007

NORTH PARK DRIVE

DRAINAGE

CULVERT CROSSING

NORTH PARK DRIVE

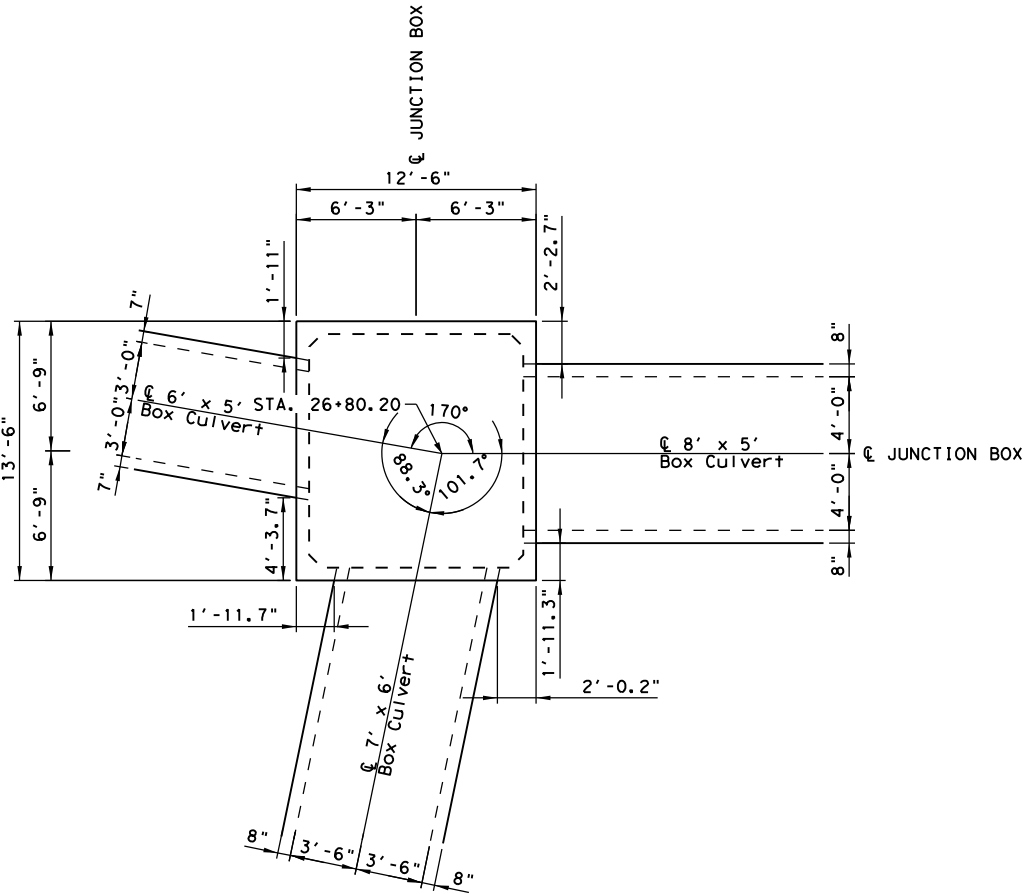
STA. 29+33

SHEET 1 OF 1

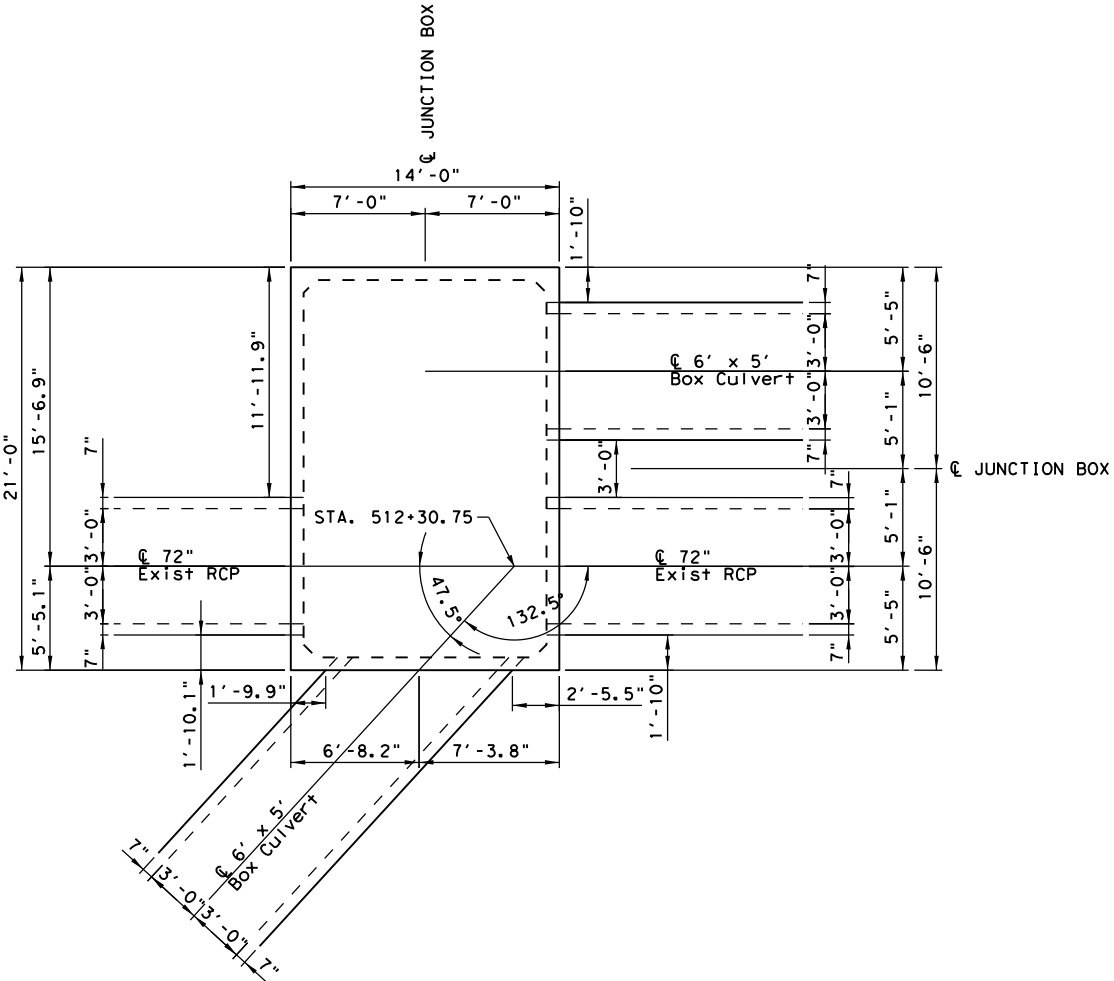
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DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37


4/1/2021

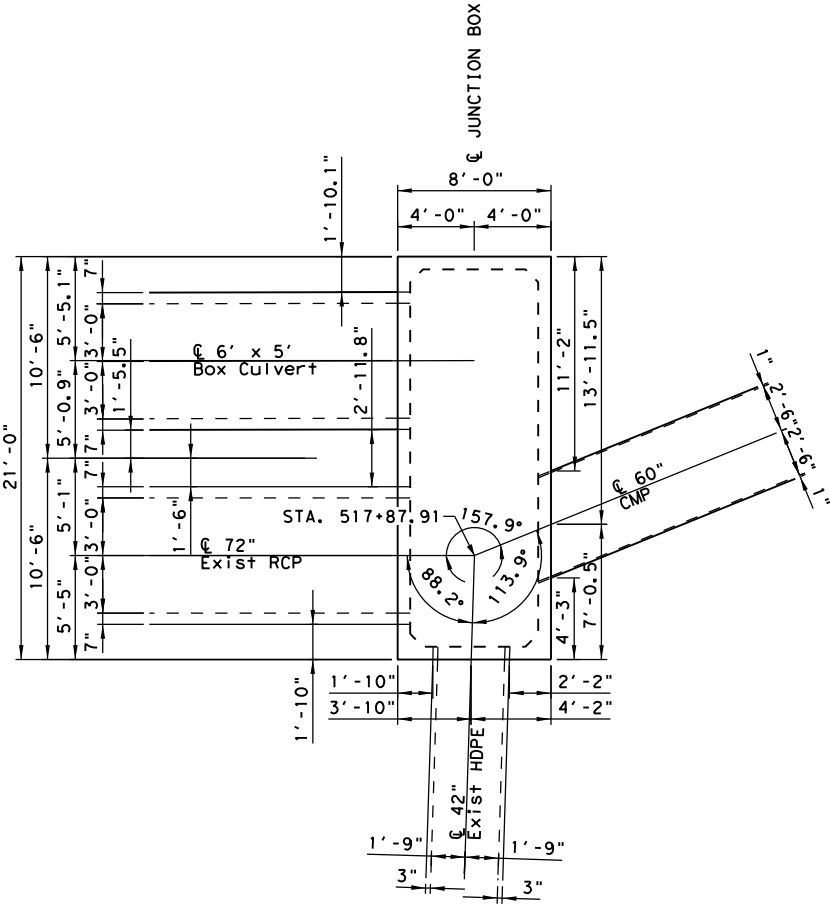
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NO.		REVISIONS		BY	DATE
EHRA		EHRA ENGINEERING 10011 Meadow Glen Lane Houston, Texas 77042 EHRAInc.com 713.784.4500 TRPE NO F-726 TRPLS No. 10092300			
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LHRA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE JUNCTION BOX DETAILS JB-17 NORTH PARK DRIVE STA 26+80.20					
SHEET 1 OF 3					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 346B



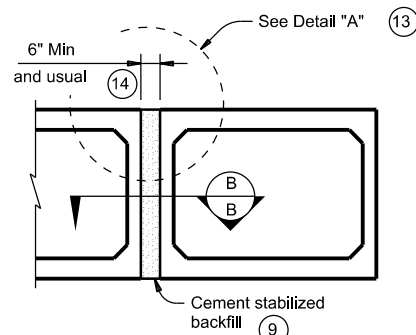
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		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TR2 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE JUNCTION BOX DETAILS JB-21 OFFSITE DRAINAGE STA 512+30.75					
SHEET 2 OF 3					
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					346C



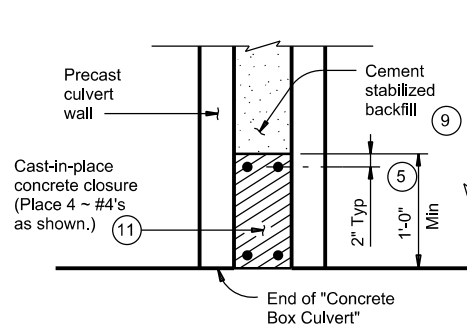
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						HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS						 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE JUNCTION BOX DETAILS JB-23 OFFSITE DRAINAGE STA 517+87.91									
SHEET 3 OF 3									
DESIGNED:	FED. RD. DIV.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.					
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS					
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	346D			

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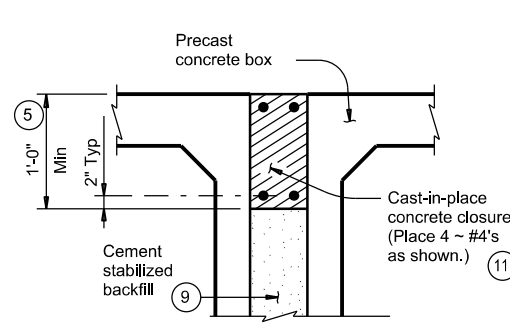
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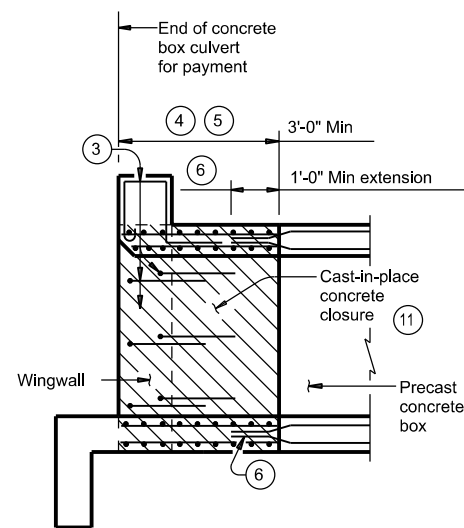
MULTIPLE UNIT PLACEMENT



SECTION B-B

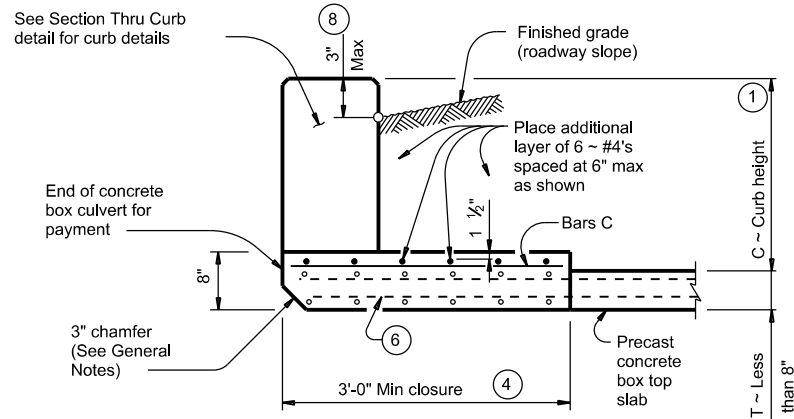


DETAIL "A"

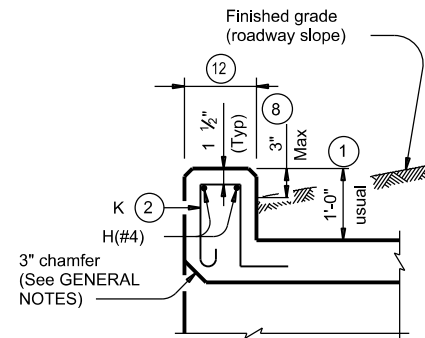


WINGWALL CONNECTION

(Also applies to safety end treatment.)

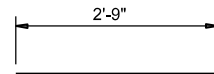


SECTION THRU TOP SLABS LESS THAN 8"

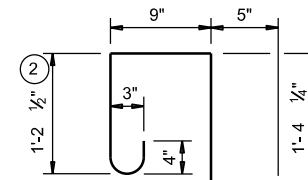


SECTION THRU CURB

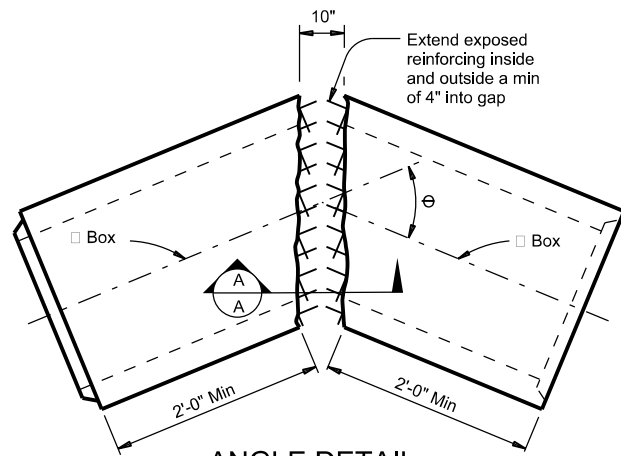
QUANTITIES PER FOOT OF CURB	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



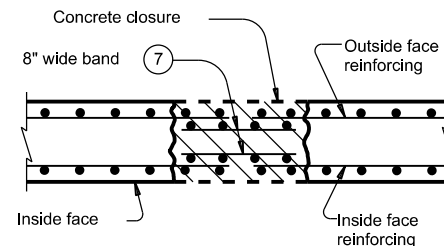
BARS C (#4)
(Spa = 1'-0" Max)



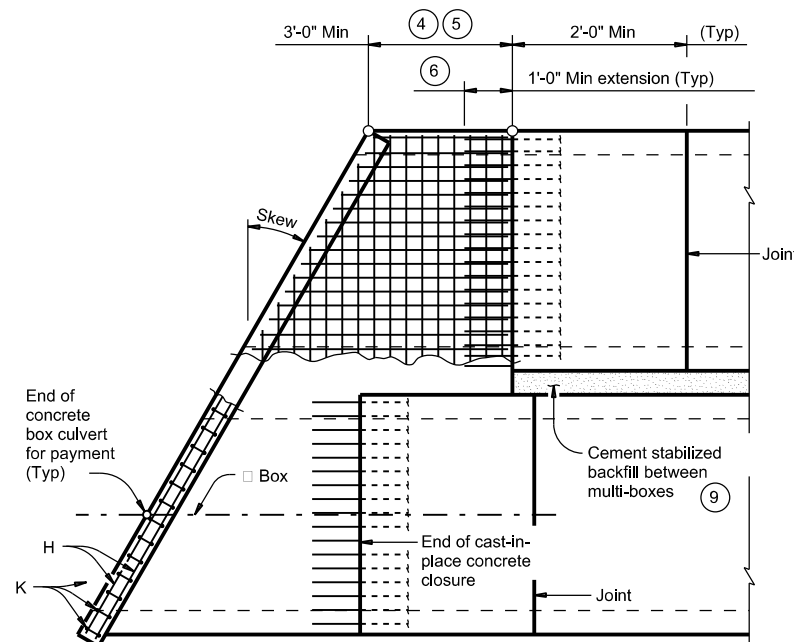
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- All curb concrete and reinforcing is considered part of the box culvert for payment.
- Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:


Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete ($f_c = 3,600$ psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out-to-out of bars.

HL93 LOADING



Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS

PRECAST

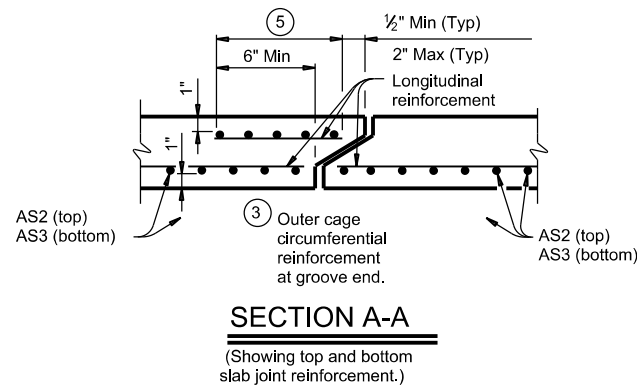
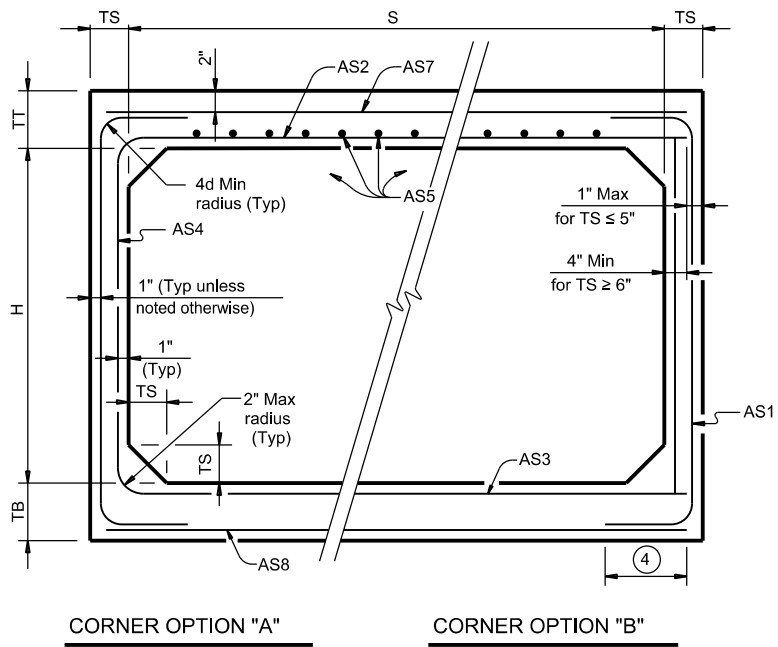
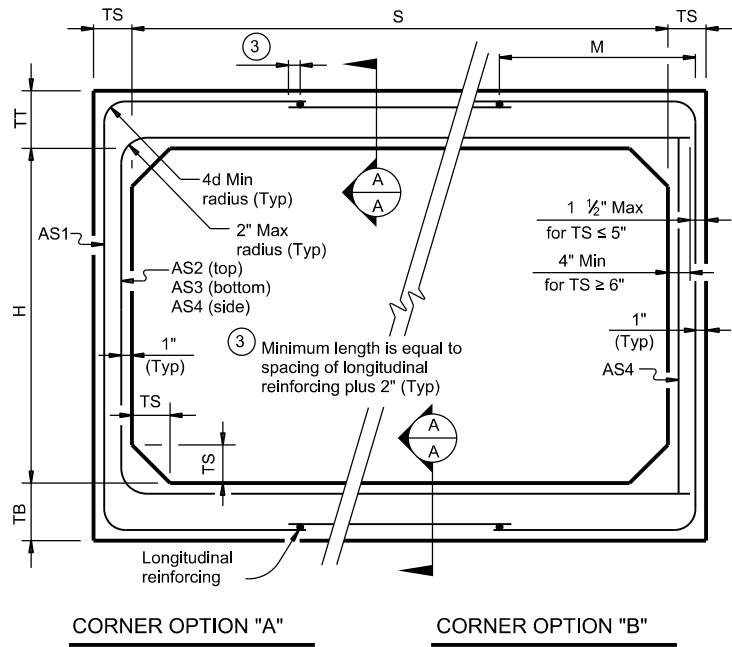
MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CR: LMW	DWR: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		347

DISCLAIMER:
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MATERIAL NOTES:
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f' c = 5,000 psi).

GENERAL NOTES:
Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

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Texas Department of Transportation

**Bridge
Division
Standard**

SINGLE BOX CULVERTS

PRECAST

4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
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	HOU	MONTGOMERY		348

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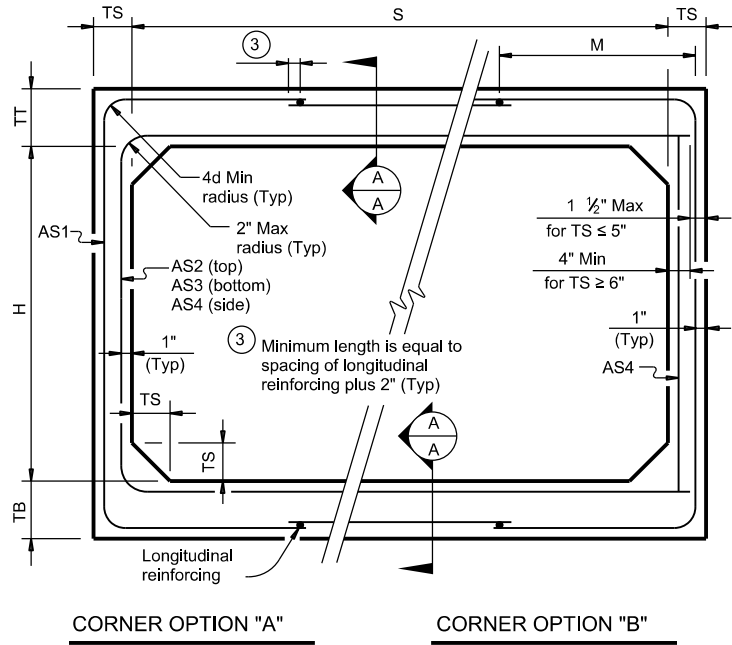
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BOX DATA

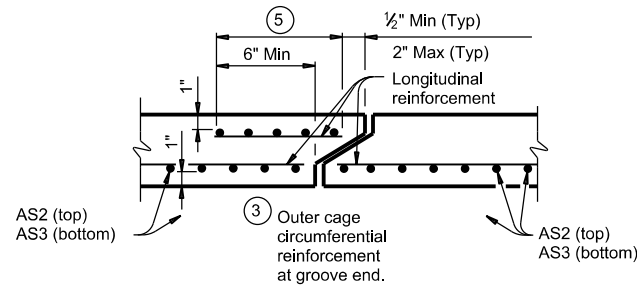
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S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
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6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	-	-	-	6.8
6	2	7	7	7	3 - 5	43	0.20	0.17	0.17	0.17	-	-	-	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	-	-	-	6.8
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6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	-	-	-	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	-	-	-	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	-	-	-	6.8
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6	3	7	7	7	3 - 5	39	0.17	0.18	0.17	0.17	-	-	-	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	-	-	-	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	-	-	-	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	-	-	-	7.5
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6	5	7	7	7	3 - 5	43	0.17	0.23	0.21	0.17	-	-	-	8.9
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6	6	7	7	7	3 - 5	52	0.17	0.24	0.22	0.17	-	-	-	9.6
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6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	-	-	-	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	-	-	-	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	-	-	-	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	-	-	-	9.6

① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

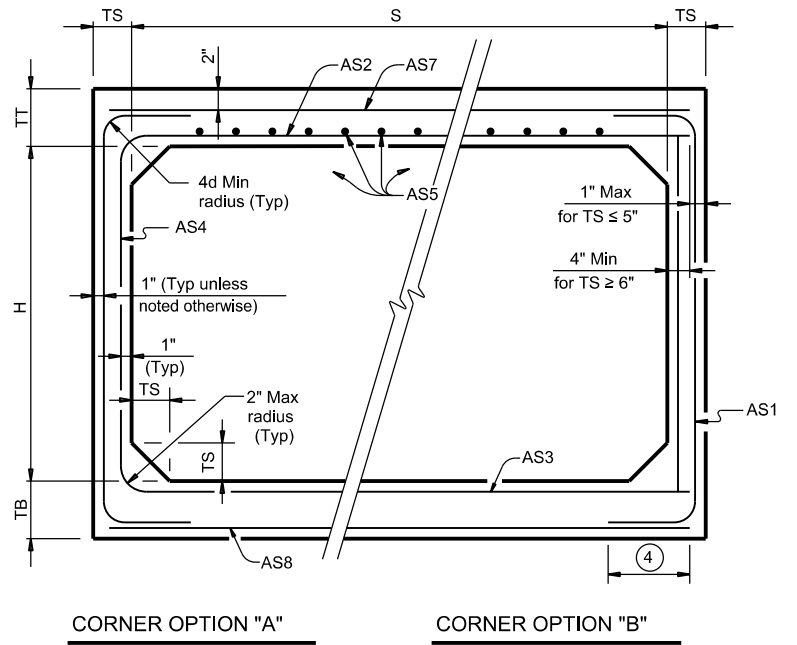


FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)


MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete ($f'c = 5,000$ psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
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Texas Department of Transportation

Bridge Division
Standard

SINGLE BOX CULVERTS
PRECAST
6'-0" SPAN

SCP-6

FILE:	scp06sts-20.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0912	37	232	CS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		349	

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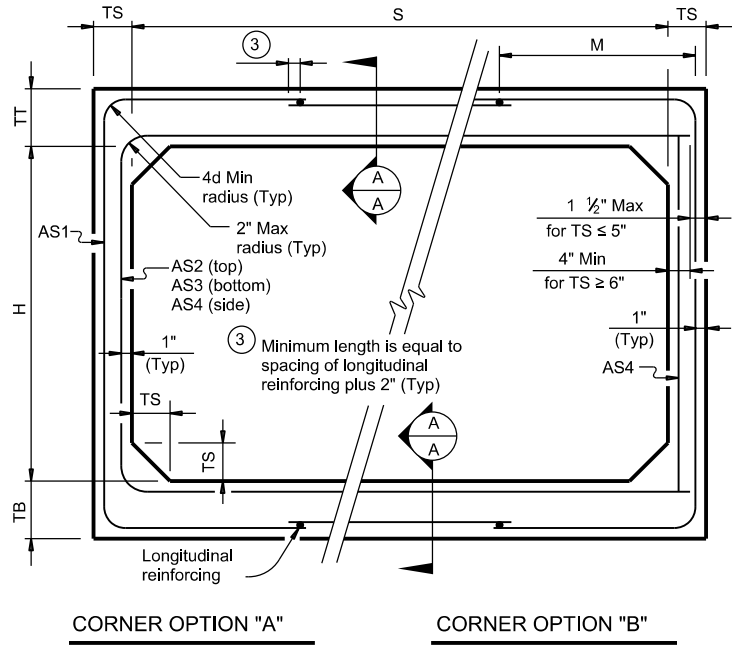
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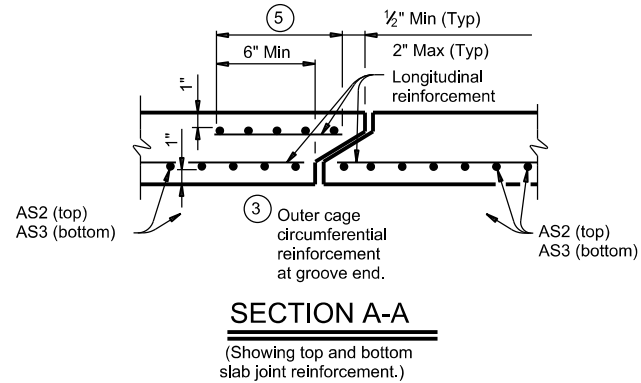
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②							^① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
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7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	-	-	-	9.6
7	3	8	8	8	3 - 5	43	0.19	0.19	0.19	0.19	-	-	-	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	-	-	-	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	-	-	-	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	-	-	-	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	-	-	-	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	-	-	-	9.6
7	4	8	8	8	< 2	-	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	-	-	-	10.4
7	4	8	8	8	3 - 5	43	0.19	0.22	0.19	0.19	-	-	-	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	-	-	-	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	-	-	-	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	-	-	-	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	-	-	-	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	-	-	-	10.4
7	5	8	8	8	< 2	-	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	-	-	-	11.2
7	5	8	8	8	3 - 5	43	0.19	0.24	0.21	0.19	-	-	-	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	-	-	-	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	-	-	-	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	-	-	-	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	-	-	-	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	-	-	-	11.2
7	6	8	8	8	< 2	-	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	-	-	-	12.0
7	6	8	8	8	3 - 5	47	0.19	0.25	0.23	0.19	-	-	-	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	-	-	-	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	-	-	-	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	-	-	-	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	-	-	-	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	-	-	-	12.0
7	7	8	8	8	< 2	-	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	-	-	-	12.8
7	7	8	8	8	3 - 5	59	0.19	0.27	0.25	0.19	-	-	-	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	-	-	-	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	-	-	-	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	-	-	-	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	-	-	-	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	-	-	-	12.8

① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

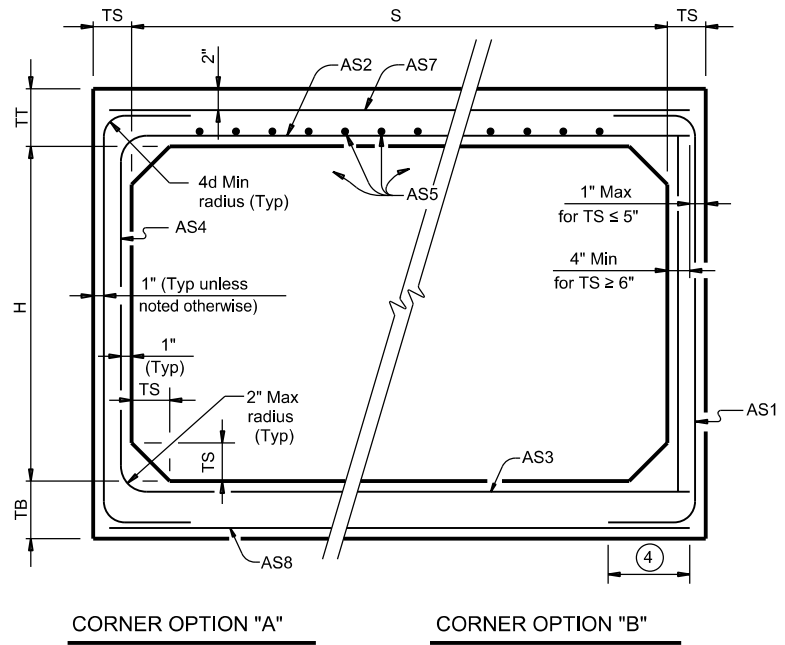


FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)


MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete ($f'c = 5,000$ psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

 Texas Department of Transportation				Bridge Division Standard	
<div>SINGLE BOX CULVERTS</div> <div>PRECAST</div> <div>7'-0" SPAN</div>					
SCP-7					
FILE: scp07sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0912	37	232	CS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		350	


DATE: 4/1/2021 3:50:03 PM
FILE: scp08sts-20.dgn

- ① For box length = 8'-0"
- ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



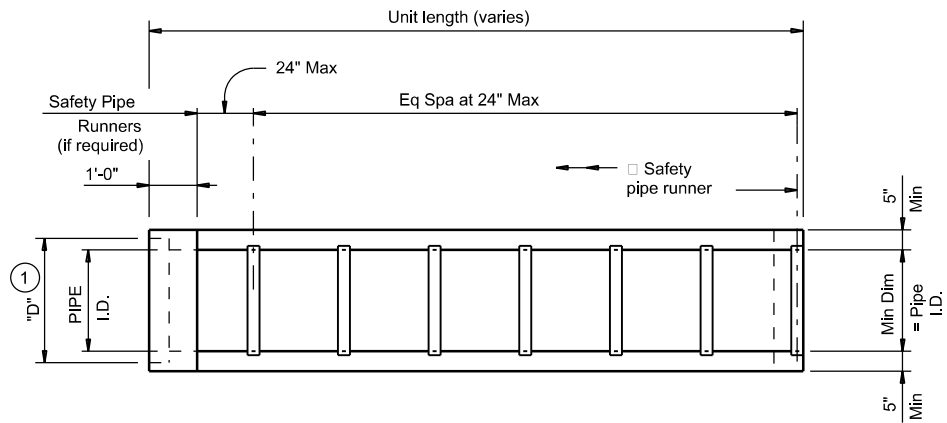
MATERIAL NOTES:
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete ($f'c = 5,000$ psi).

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

 Texas Department of Transportation				Bridge Division Standard	
<h1 style="margin: 0;">SINGLE BOX CULVERTS</h1> <h2 style="margin: 0;">PRECAST</h2> <h3 style="margin: 0;">8'-0" SPAN</h3>					
<h1 style="margin: 0;">SCP-8</h1>					
FILE: scp08sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CS: TxDOT	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0912	37	232	CS	
	DIST	COUNTY		SHEET NO.	
	HOU	MONTGOMERY		351	

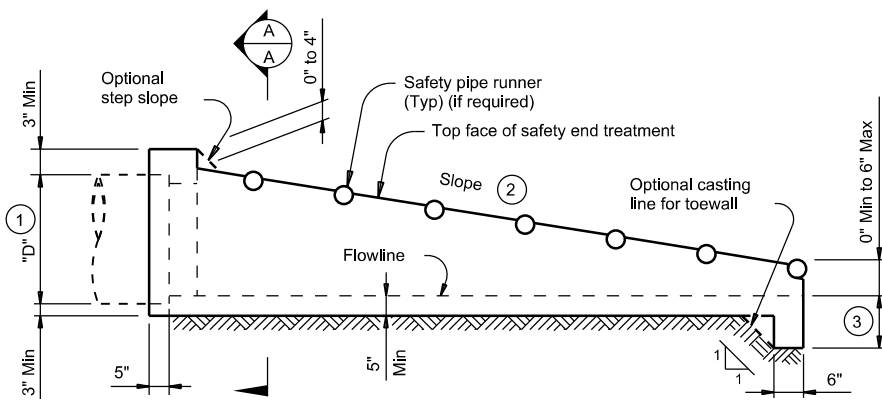
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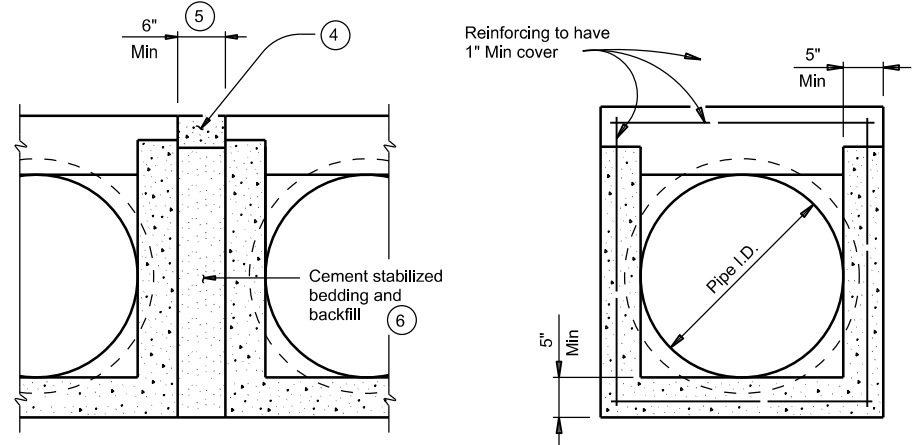
PLAN

(Showing bell end connection.)



LONGITUDINAL ELEVATION

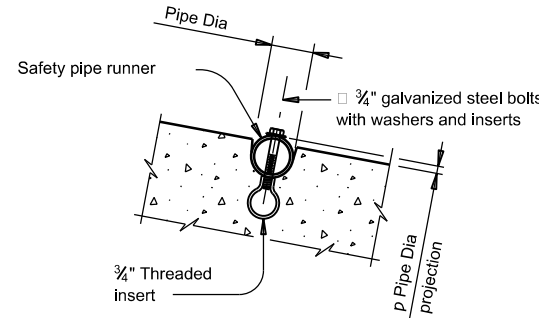
(Showing bell end connection.)



MULTIPLE PIPE INSTALLATION

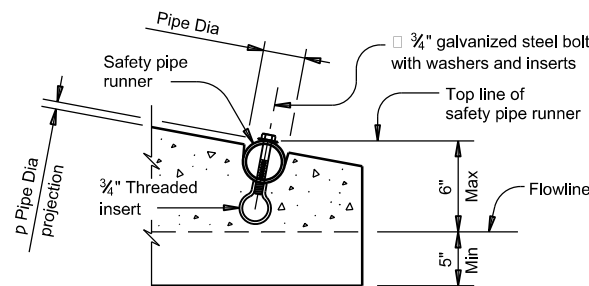
OPTION WITH SQUARE BOTTOM

SECTION A-A

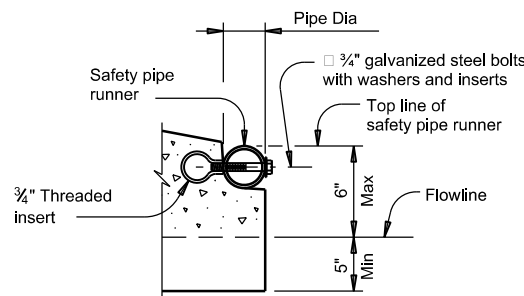


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



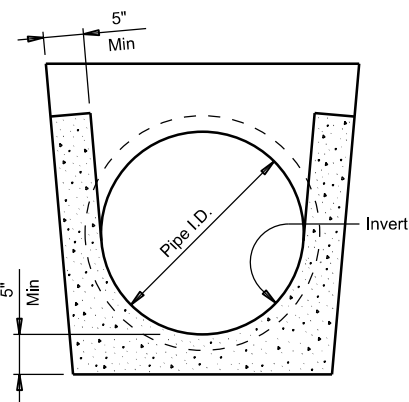
OPTION A



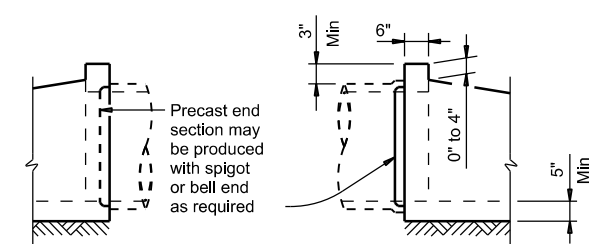
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



OPTION WITH INVERT BOTTOM



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness ⑦	"D" ①	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' - 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 1/4"	1.30"	20.50"	6:1	6' - 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 1/2"	1.60"	24.00"	6:1	8' - 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' - 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 1/2"	2.65"	38.50"	6:1	14' - 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' - 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 1/2"	N/A	52.50"	6:1	21' - 2"	Yes	Yes	4" STD	4.500"	4.026"

- ① Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.
- ② Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
- ③ Toewall to be used only when dimension is shown elsewhere in the plans.
- ④ Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
- ⑤ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
- ⑥ Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
- ⑦ Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40)

or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12

or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe". Connect TP by grouting. See PBGC standard for grouted connections with TP and precast safety end treatment.



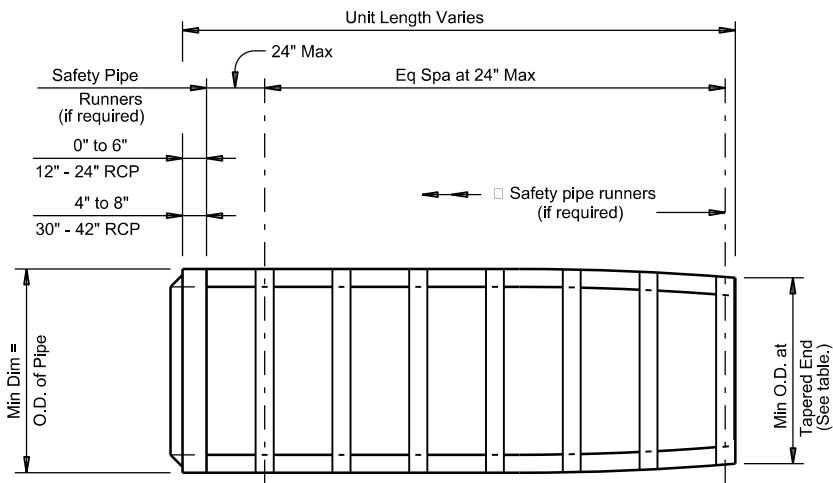
PRECAST SAFETY END TREATMENT TYPE II ~ PARALLEL DRAINAGE

PSET-SP

FILE:	psetspss-20.dgn	DN:	RLW	CK:	KLR	DW:	JTR	CK:	GAF
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0912	37	232	CS				
		DIST	COUNTY		SHEET NO.				
		HOU	MONTGOMERY		352				

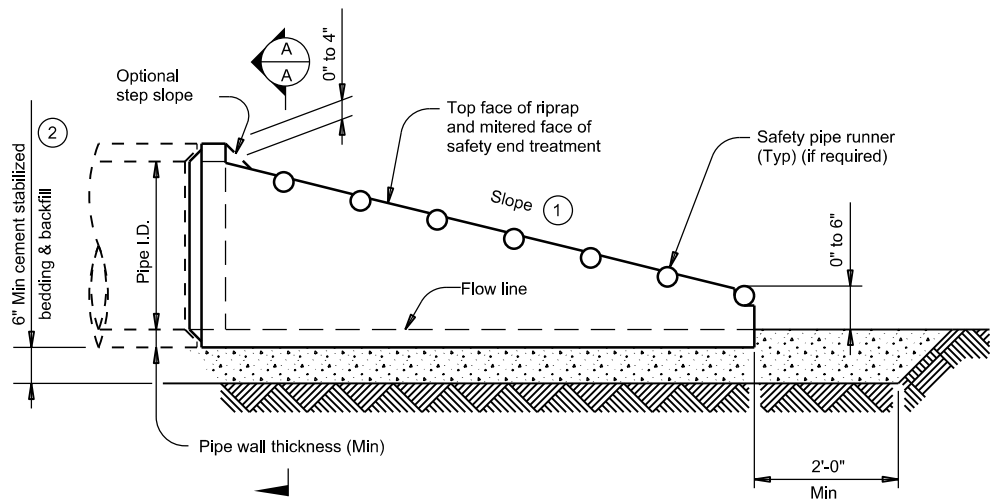
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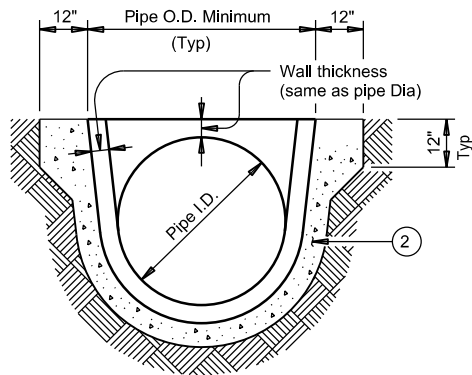
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

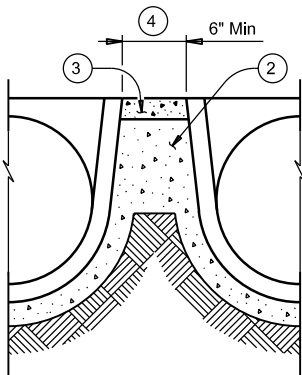


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)



SECTION A-A

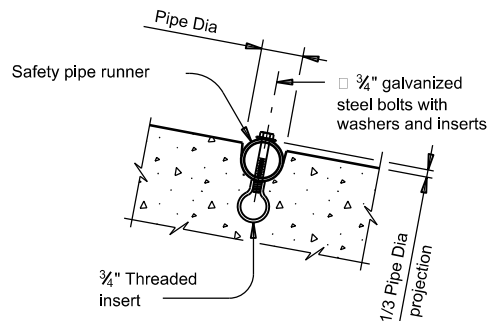


MULTIPLE PIPE INSTALLATION

- ① Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

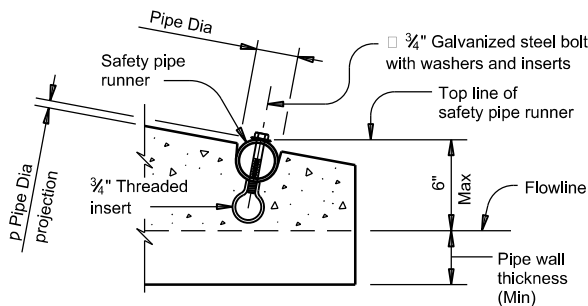
Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

- ③ Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
- ④ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
- ⑤ Safety pipe runners are required for multiple pipe culverts with more than two pipes.

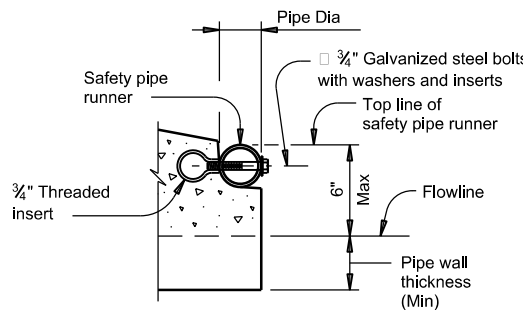


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	⑤	3" STD	3.500"	3.068"
15"	2 1/4"	19 1/2"	19"	0.07 Circ.	6:1	5' - 8"	No	⑤	3" STD	3.500"	3.068"
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	6:1	7' - 3"	No	⑤	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	⑤	3" STD	3.500"	3.068"
30"	3 1/2"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.



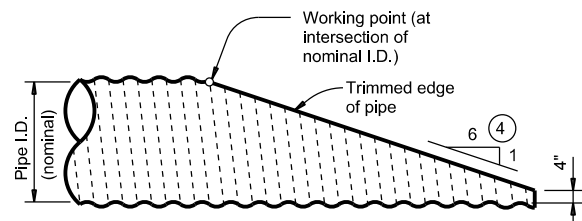
PRECAST SAFETY END TREATMENT
TYPE II ~ PARALLEL DRAINAGE

PSET-RP

FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		353

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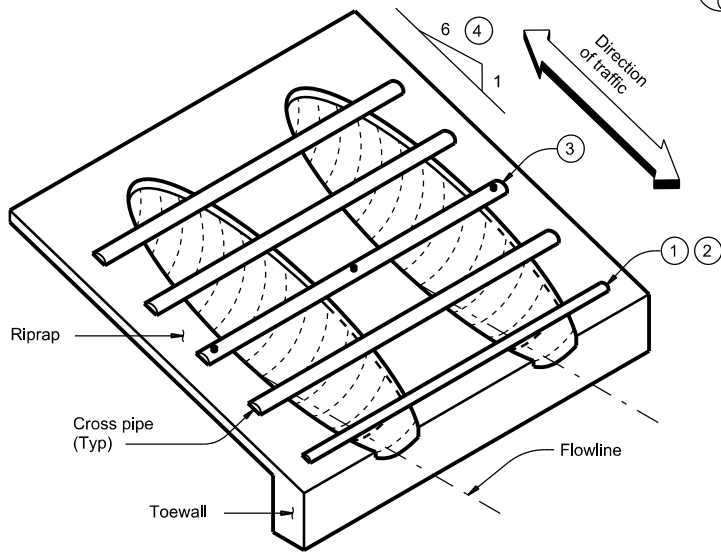
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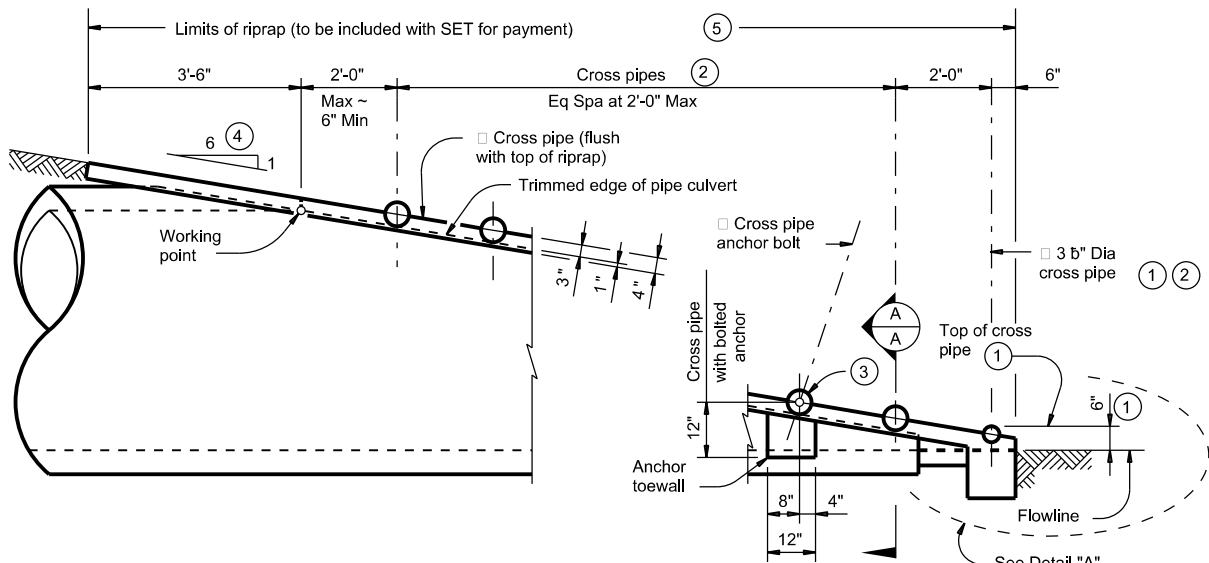
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

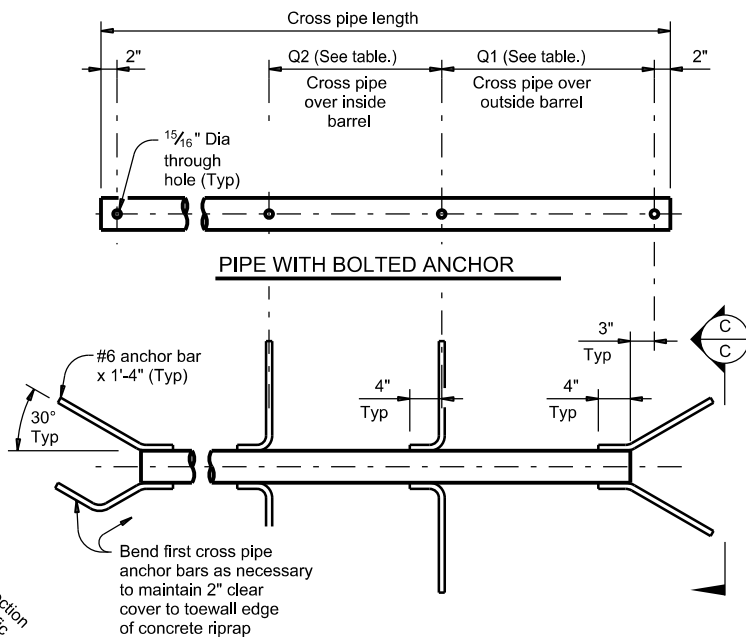


ISOMETRIC VIEW OF TYPICAL INSTALLATION

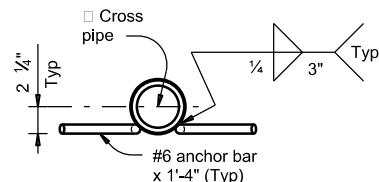


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)

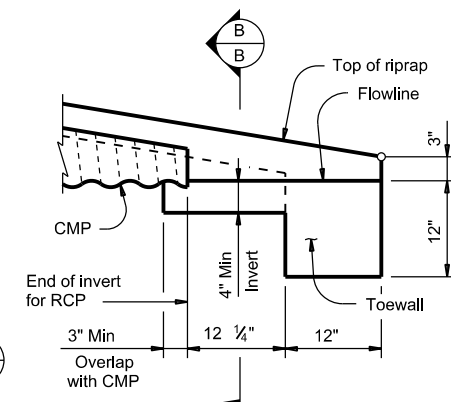


PIPE WITH ANCHOR BARS



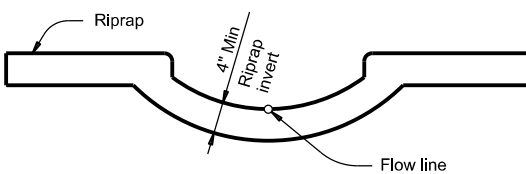
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

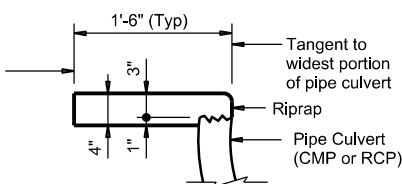
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



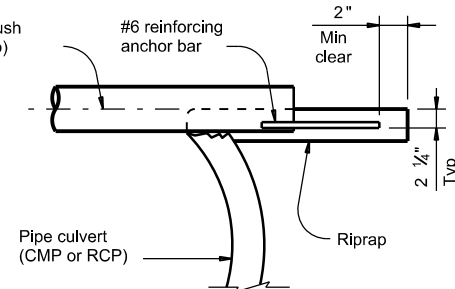
SECTION B-B

(Cross pipes not shown for clarity.)

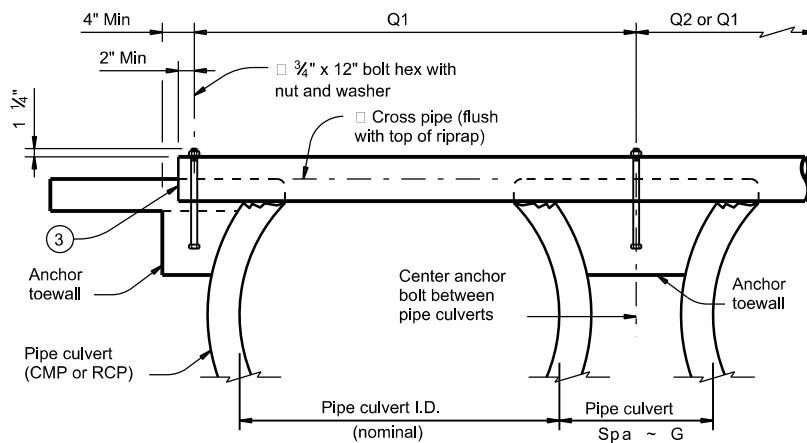
Limits of riprap (to be included with SET for payment)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	2 or more pipe culverts	
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	All pipe culverts	4" Std (4.500" O.D.)
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	5" Std (5.563" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"		
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"	All pipe culverts	5" Std (5.563" O.D.)
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

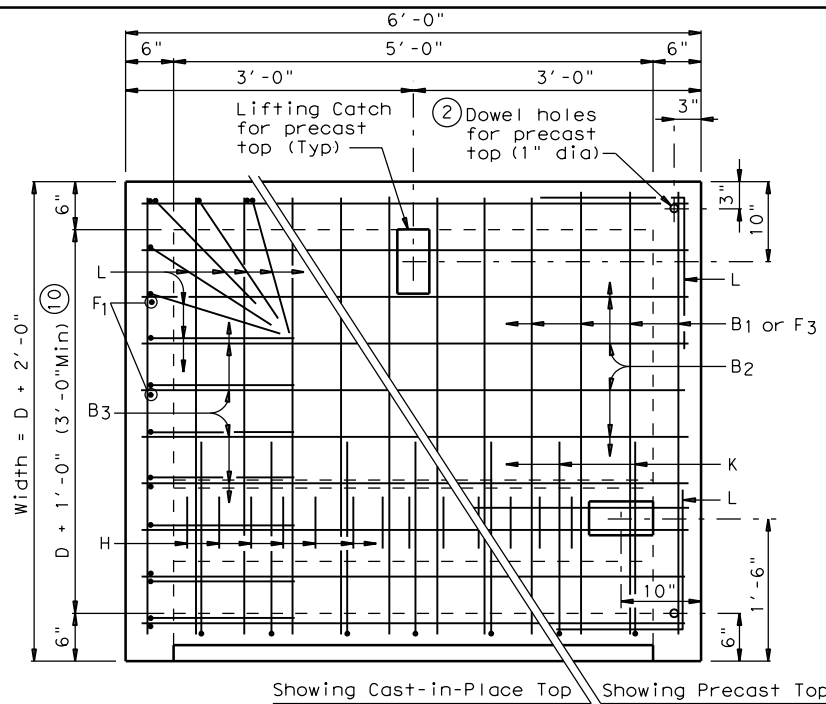
MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.
Provide ASTM A307 bolts and nuts.
Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".
Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

					Bridge Division Standard				
SAFETY END TREATMENT									
FOR 12" DIA TO 72" DIA									
PIPE CULVERTS									
TYPE II ~ PARALLEL DRAINAGE									
SETP-PD									
FILE:	setppdse-20.dgn	DN:	GAF	CK:	CAT	DW:	JRP	CK:	GAF
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0912	37	232	CS				
		DIST	COUNTY		SHEET NO.				
		HOU	MONTGOMERY		354				

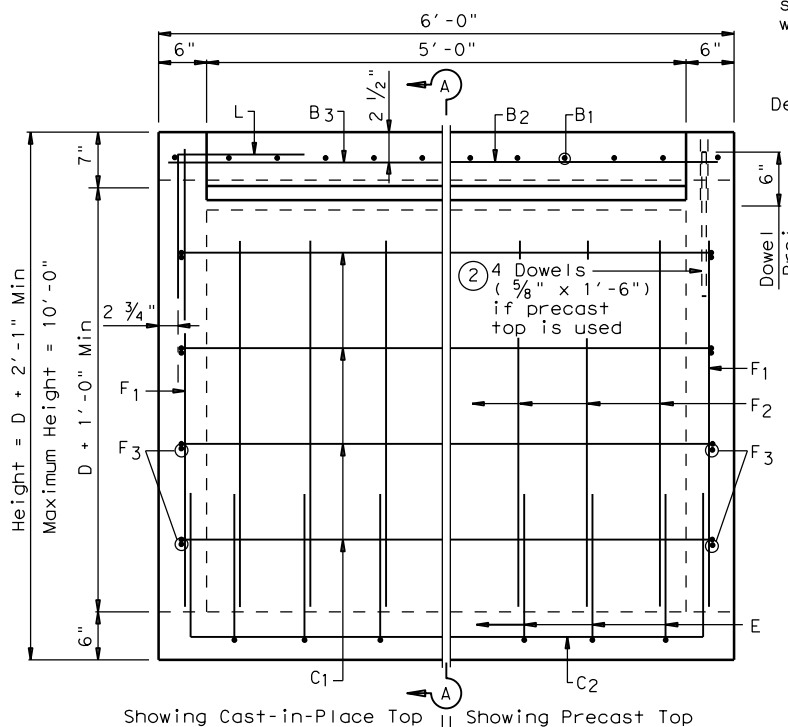


PLAN

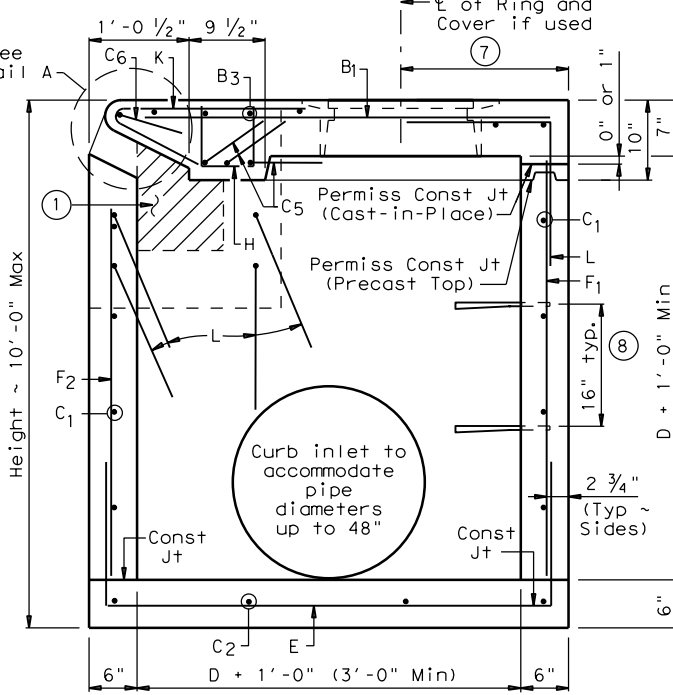
PREFABRICATED INLET

⑥ For reinforcing steel and dimensions not shown, see fabricator's shop drawings. Structure shall be of the size required to accommodate size of pipe shown elsewhere in the plans. Length of inlet = 6'-0"

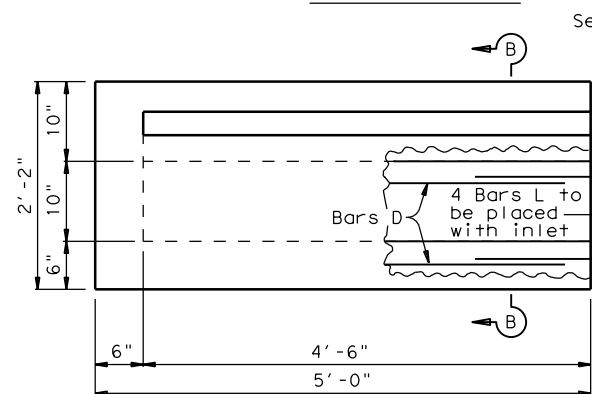
② If precast top is used, provide 4 x 3/8" dia x 1'-6" smooth bars in inlet walls for 1" dia holes



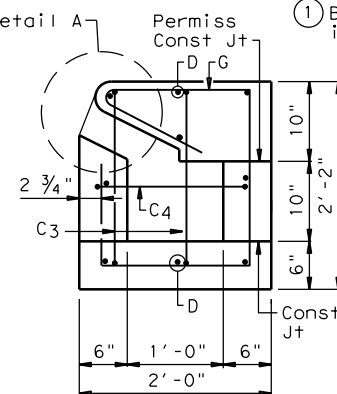
ELEVATION



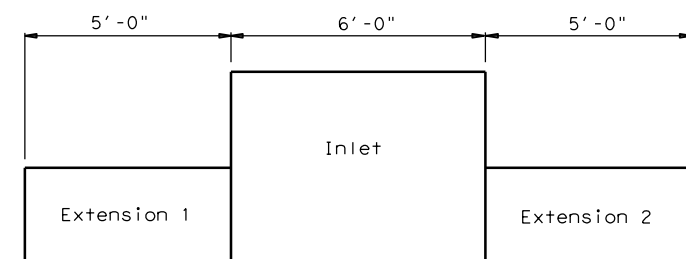
SECTION A-A



EXTENSION ELEVATION

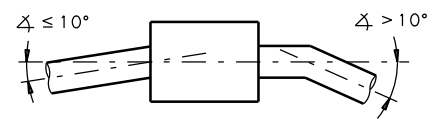


SECTION B-B



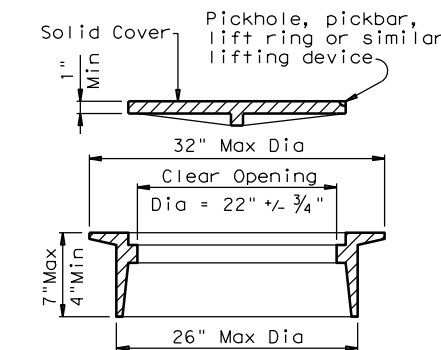
EXTENSION PLACEMENT

Note: If more than one extension is required, they should be located as indicated above. No slope is required in flowline of extension.



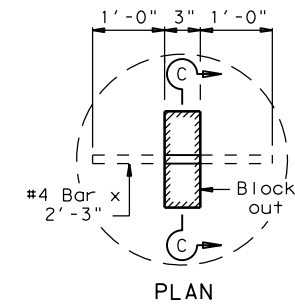
PIPE CONNECTION DETAIL

Connecting pipes should enter within 10° of normal to inlet wall. If necessary, pipe elbow or curved approach alignment should be used to stay within this limit.

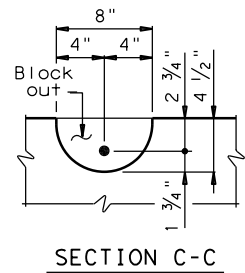


RING AND COVER DETAILS

EJIW No V-1814 or Neenah No R5900-FTX

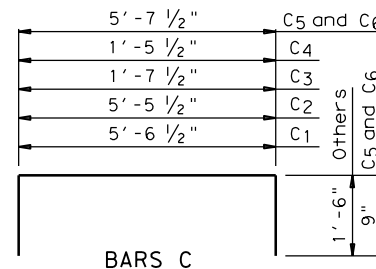


PLAN

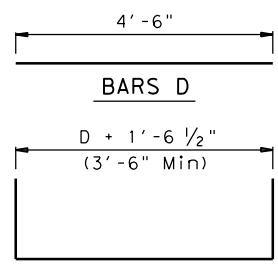


SECTION C-C

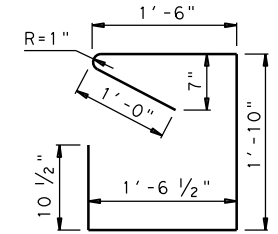
LIFTING CATCH



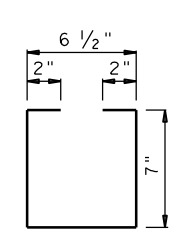
BARS C



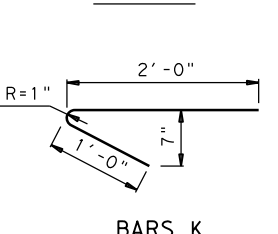
BARS D



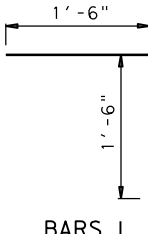
BARS G



BARS H



BARS K



BARS L

GENERAL NOTES:

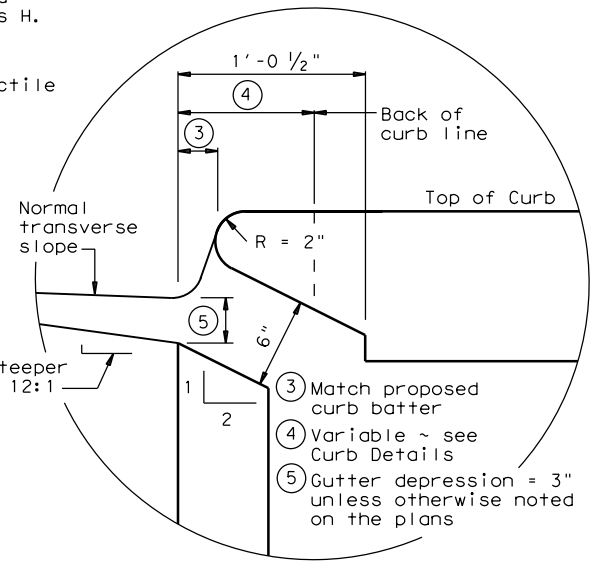
No alternate designs nor alternate details shall be permitted for precast or cast in place inlets.

Quantities shown herein are for Contractor's information only. Unless otherwise shown in the plans, payment will be made for each inlet of the type specified and for each extension. Each five foot curb opening of extension is considered "one extension" regardless of whether placed monolithically or precast. Extension length shall be in multiples of 5 feet.

Engineer has the option of specifying cast-in-place top with ring and cover or removable precast top as specified elsewhere in plans. Shop drawings are required for Precast Inlets.

In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer.

Ring and cover shall conform to the requirements of AASHTO M306, "Standard Specification for Drainage Structure Castings". Materials shall conform to ASTM A48, Class 35B for gray iron castings or ASTM A536, Grade 65-45-12 for ductile iron castings. Aluminum alloy castings shall not be permitted.



DETAIL A

INSTALL A 3 FT. (HORIZ.) x 6 IN. (VERT.) OPENING ON THE BACK OF THE INLET WHEN SPECIFIED ELSEWHERE ON THE PLANS. MOVE STEPS AS NEEDED. NO REINFORCING ON OPENING/ON 2 IN. ADJACENT TO OPENING.

DESIGNERS: CLARIFY FLOWLINE OF OPENING AND INCLUDE OPENING IN HYDRAULIC CALCULATIONS.

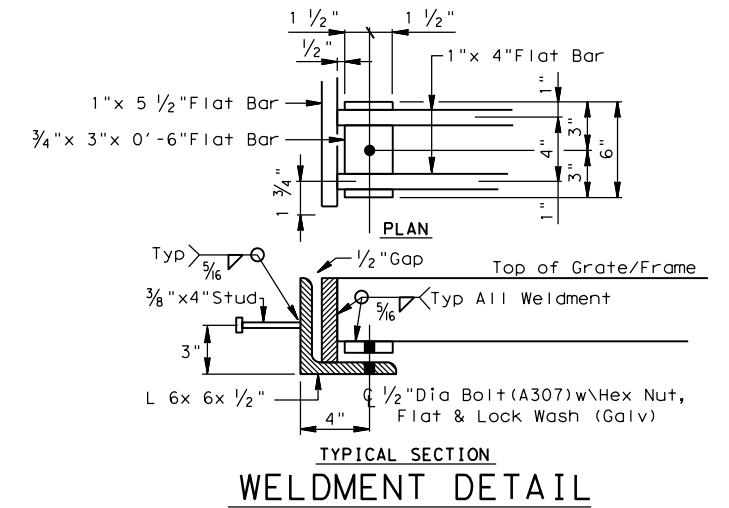
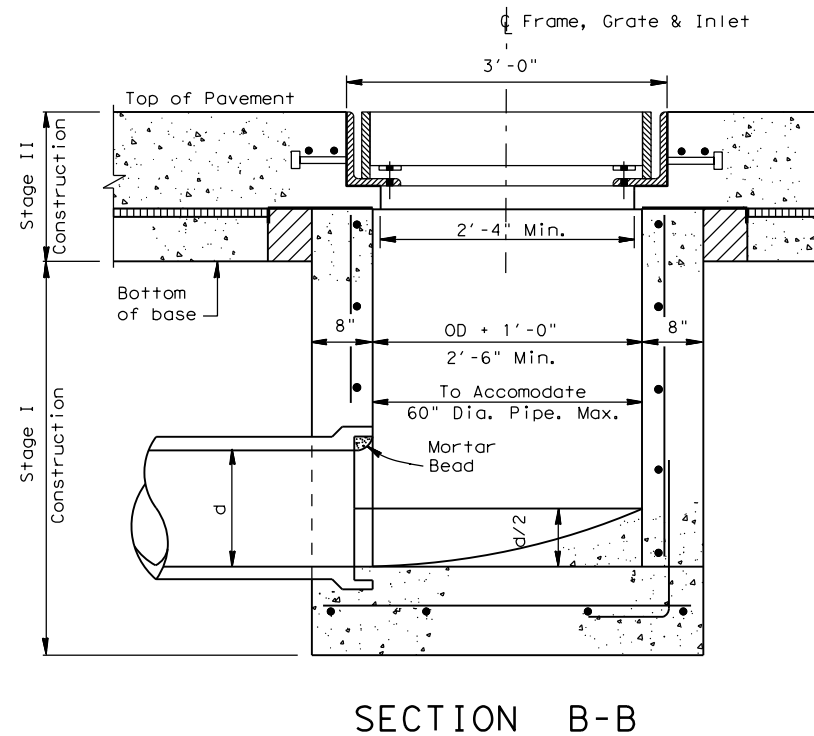
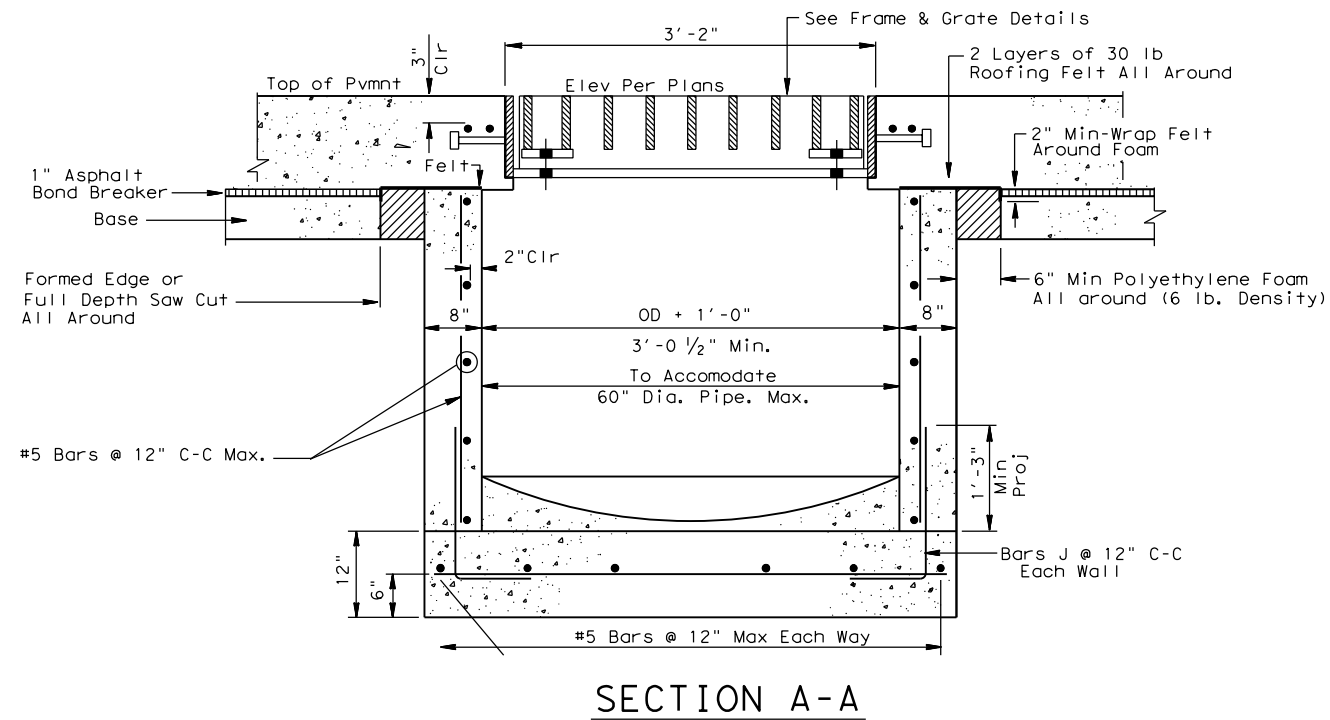
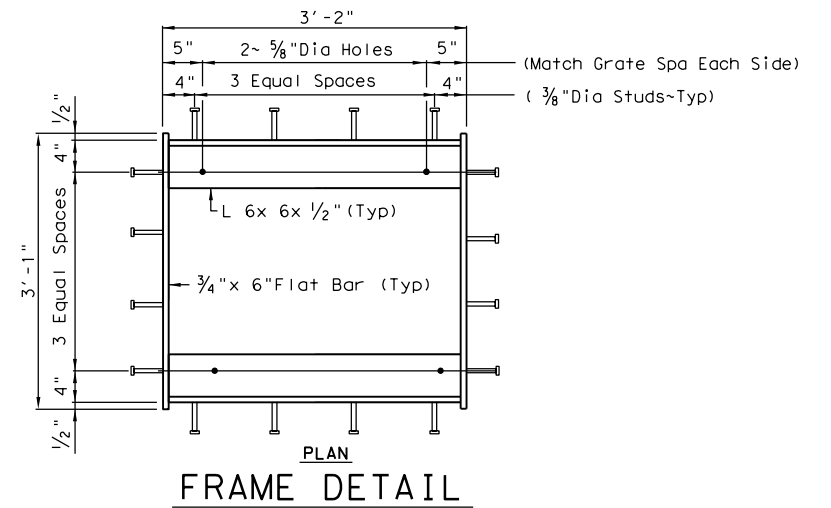
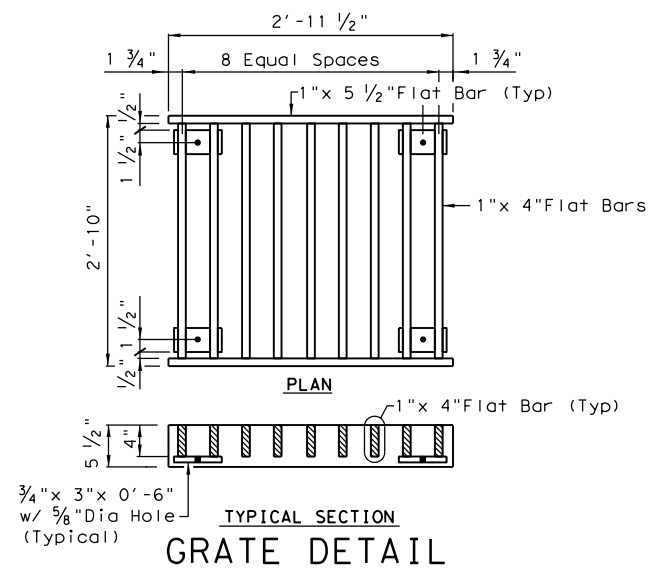
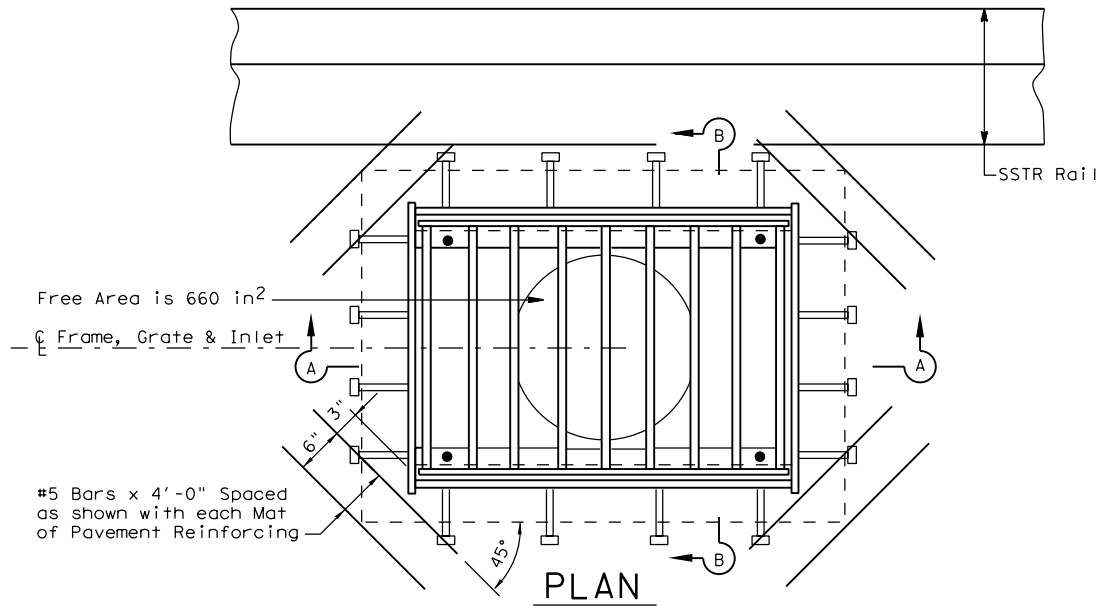
Texas Department of Transportation
Houston District

CURB INLET TYPE C
(WITH OR WITHOUT EXTENSION)

HIL-C

FILE: STDD1.DGN	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT	STD:
© TxDOT Feb 2010	DIST	FED REG	PROJECT NO.		SHEET
2/2010 Added note concerning opening on the back of inlet.	HOUS	6			355
10/2014 Removed Note 10	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	MONTGOMERY	0912	37	232	CS

D = Diameter
R = Radius



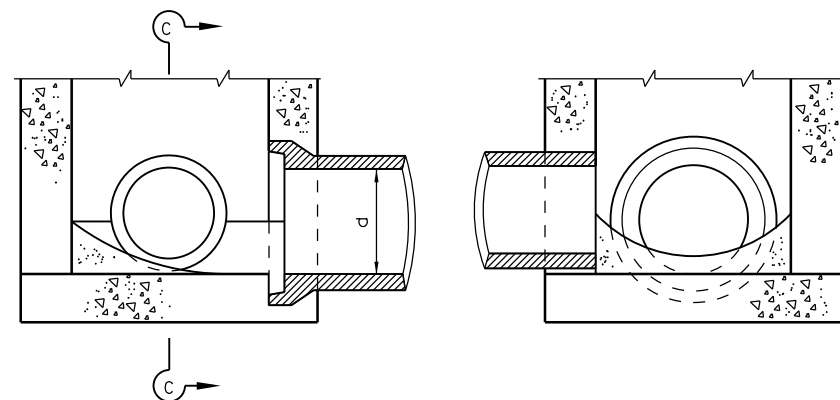
GENERAL NOTES:

All steel is ASTM-A36 and shall be galvanized after fabrication.

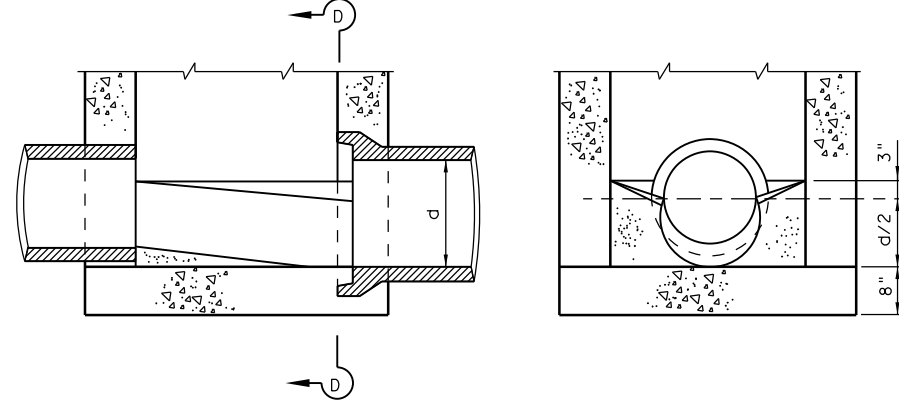
Cost Of Furnishing And Installing Frames, Grates, Additional Pavement Reinforcing, Roofing Felt And Polyethylene Foam Shall Be Included In The Unit Price Bid For The Type Of Inlet Selected.

All Concrete Shall Be Class C.

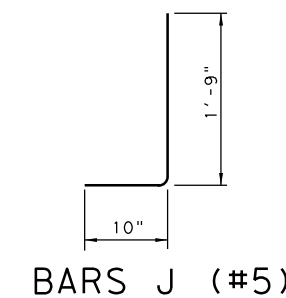
Shop Drawings Will Be Required For Precast Construction Of Inlets.



Showing Shaping Of Invert, Pipe Entering From Adjacent Sides



Showing Shaping Of Invert, Pipe Entering From Adjacent Sides



d = Diameter
R = Radius

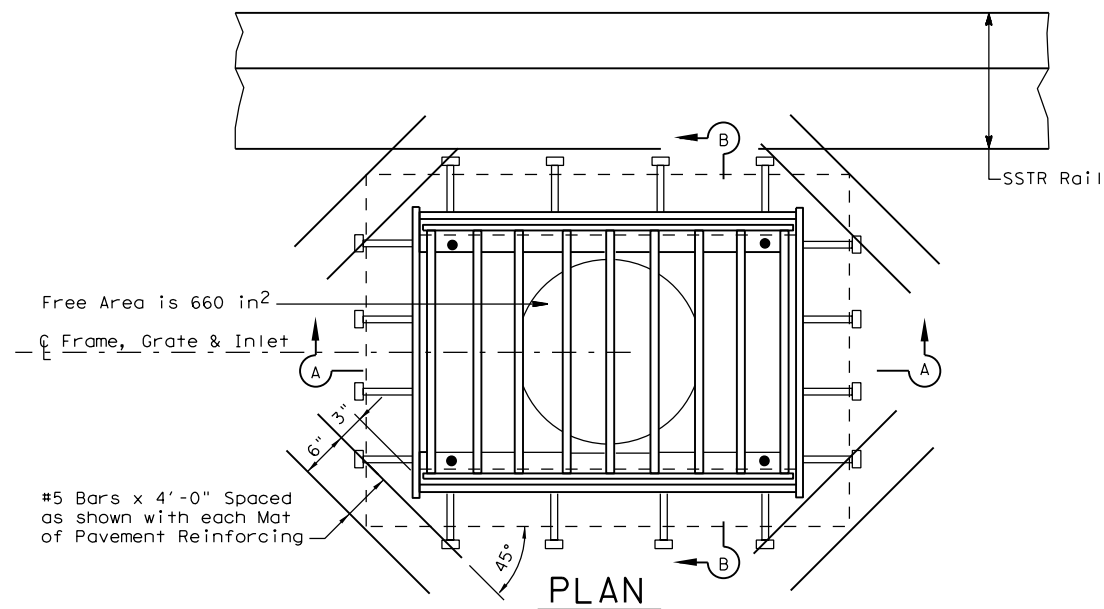
FOR TRAFFIC LOADS



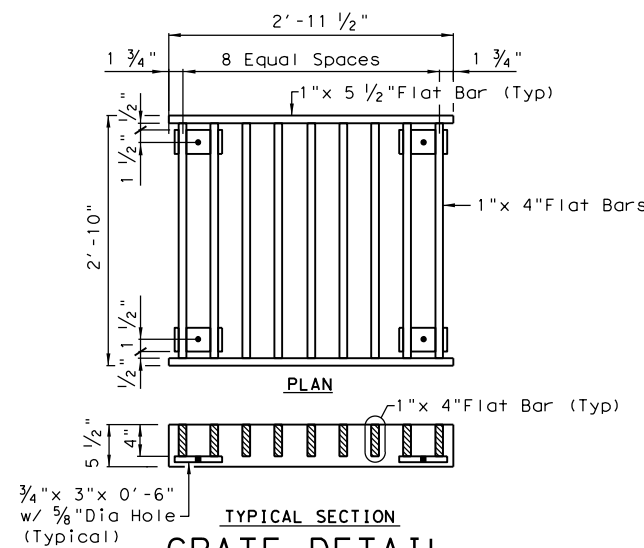
INLET TYPE AZ

HIL-AZ

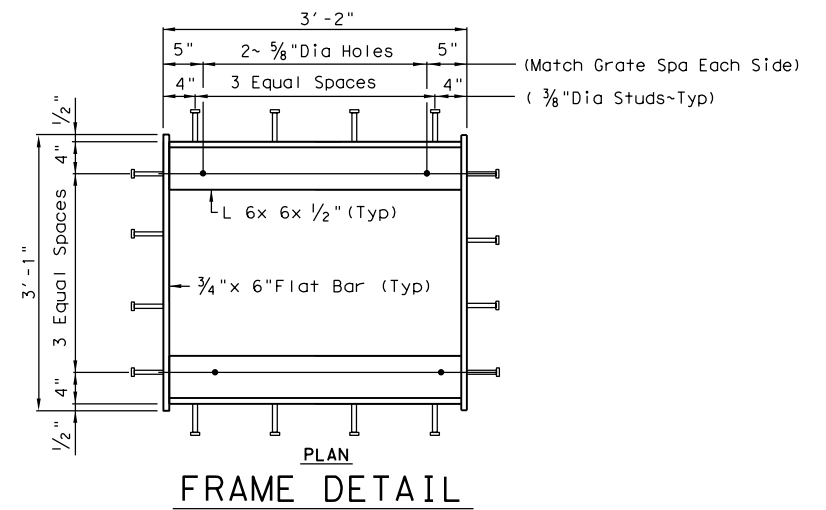
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© TxDOT	2014	DIST	FED REG	PROJECT NO.			SHEET
REVISIONS	HOUS	6					356
	COUNTY	CONTROL	SECT	JOB	HIGHWAY		
	MONTGOMERY	0912	37	232	CS		



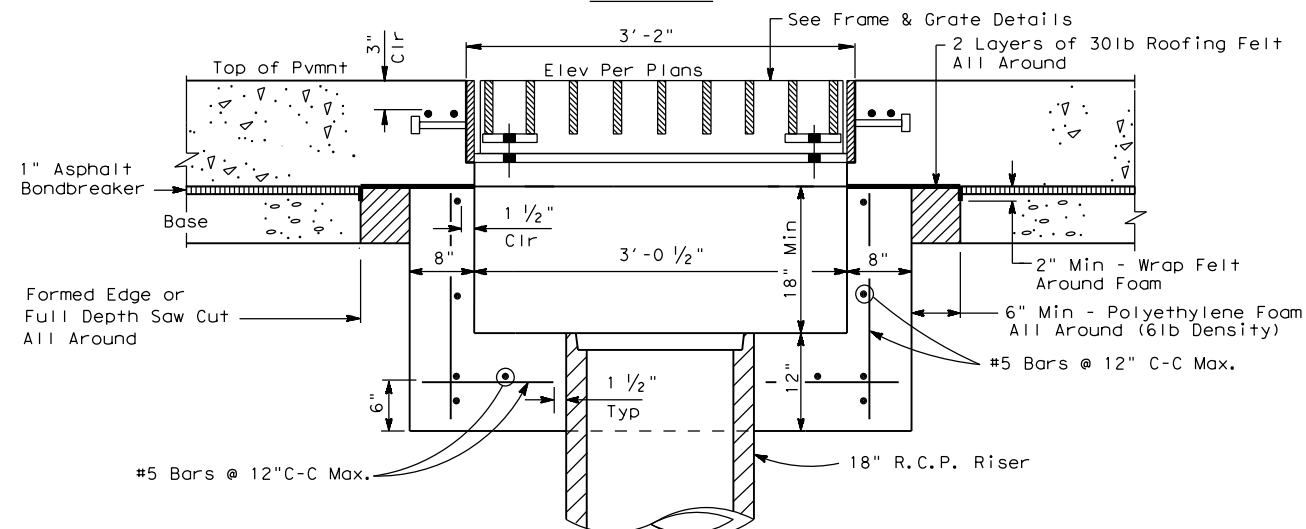
PLAN



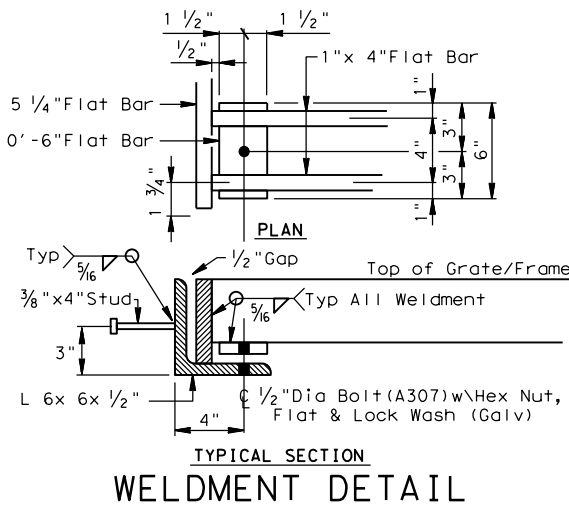
TYPICAL SECTION
GRATE DETAIL



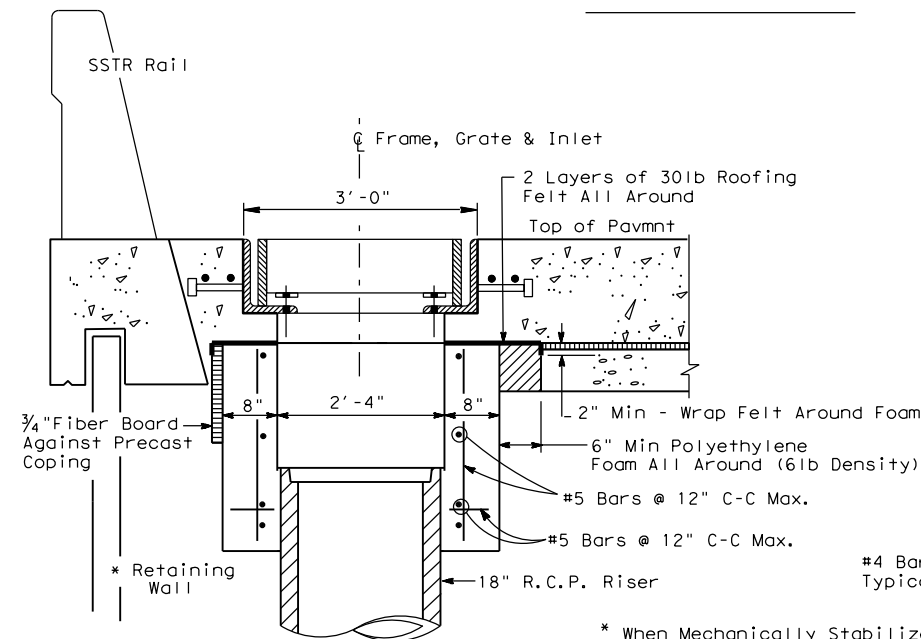
FRAME DETAIL



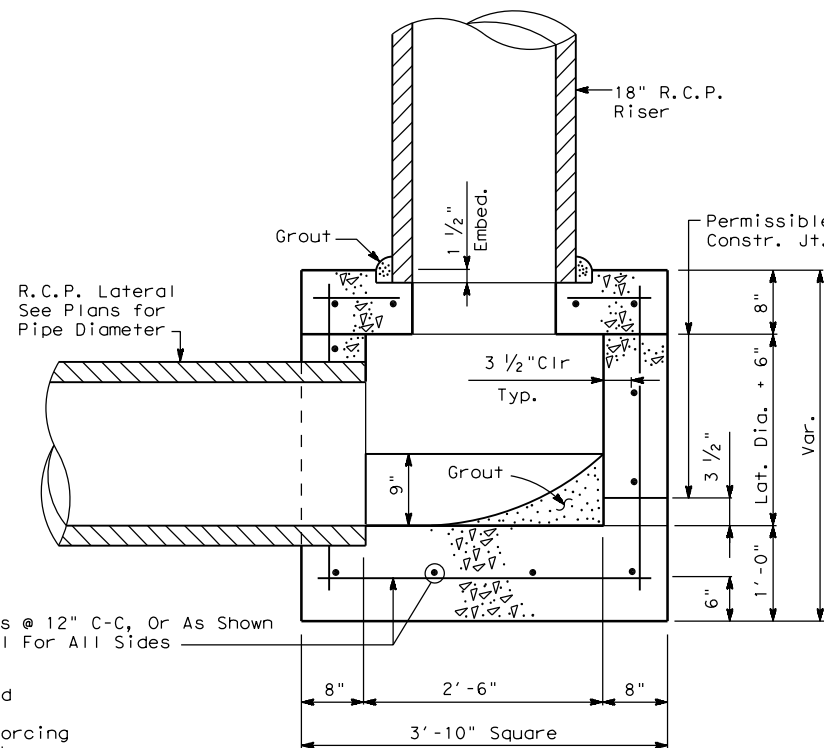
SECTION A-A



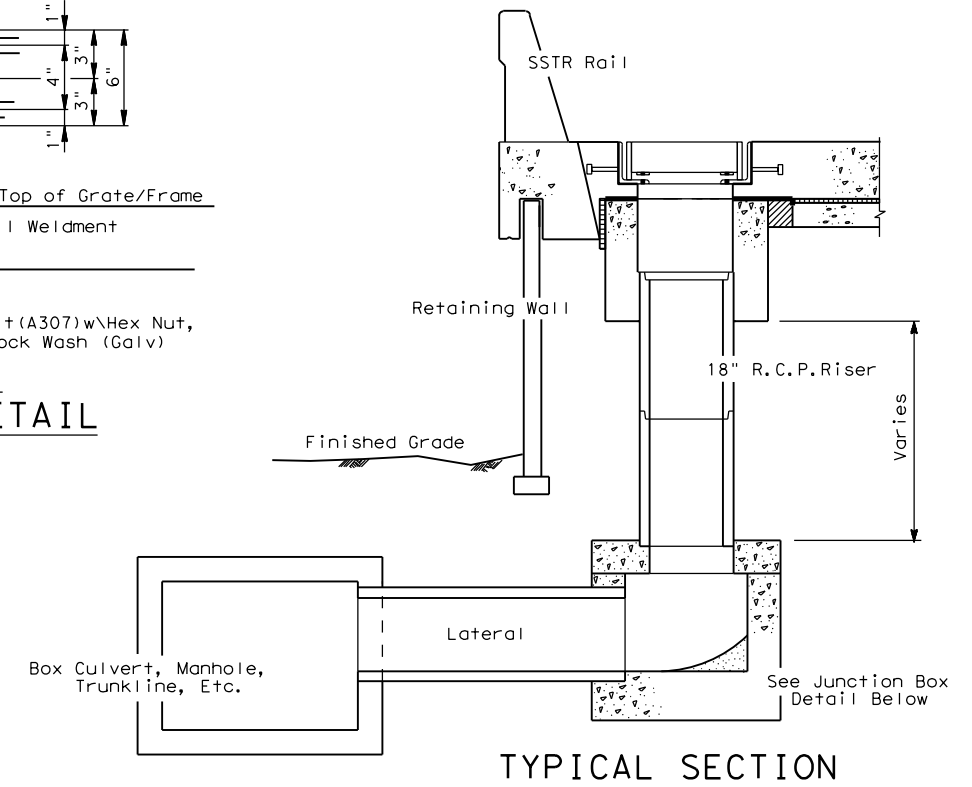
TYPICAL SECTION
WELDMENT DETAIL



SECTION B-B



JUNCTION BOX DETAIL



TYPICAL SECTION

GENERAL NOTES:

All steel is ASTM-A36 and shall be galvanized after fabrication. Cost Of Furnishing And Installing Frames, Grates, Additional Pavement Reinforcing, Roofing Felt, Polyethylene Foam, Vertical Riser and Junction Box Shall Be Included In The Unit Price Bid For The Type Of Inlet Selected.

All Concrete Shall Be Class C.

Shop Drawings Will Be Required For Precast Construction Of Inlets.

FOR TRAFFIC LOADS

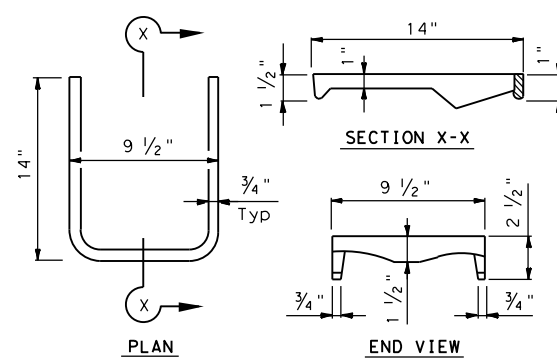
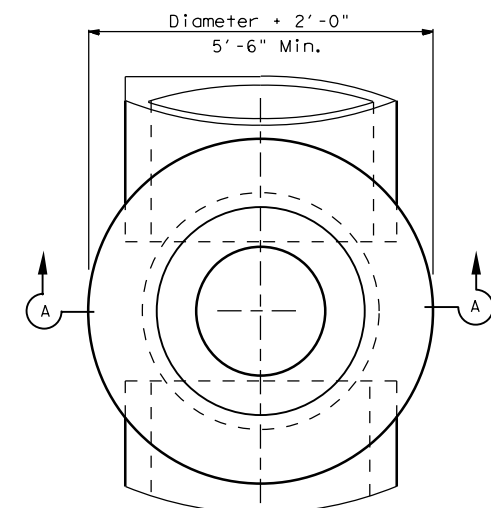
Texas Department of Transportation
Houston District

INLET TYPE AZR

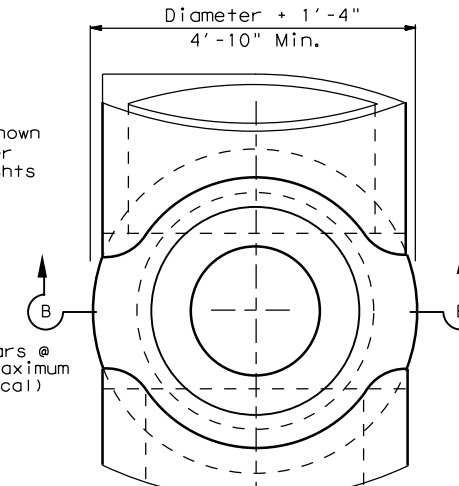
HIL-AZR

FILE:	STDD8.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	STD:
© TxDOT	2014	DIST	FED REG	PROJECT NO.	357	SHEET
REVISIONS	6	HOUS				
		COUNTY	CONTROL	SECT	JOB	HIGHWAY
		MONTGOMERY	0912	37	232	CS

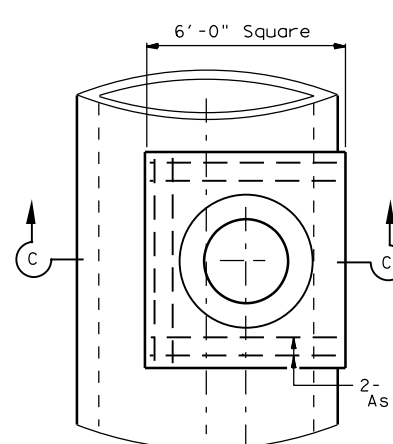
d = Diameter



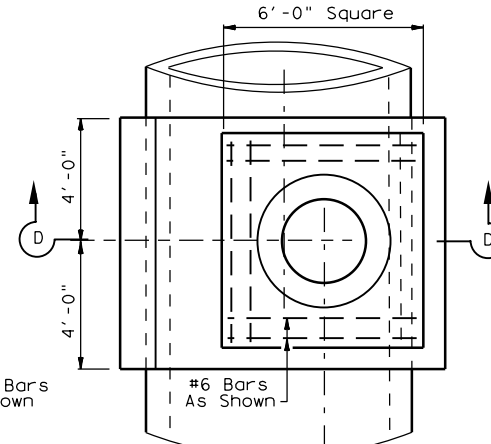
CAST IRON MANHOLE STEPS
(In Stock Locally)



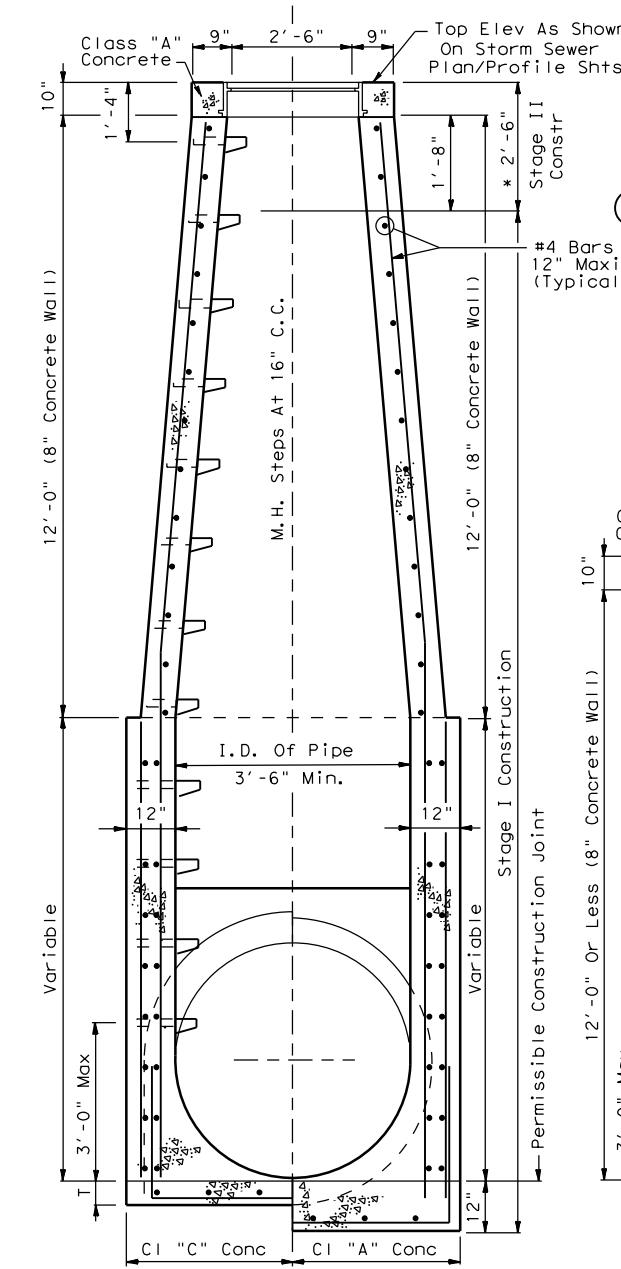
PLAN
12' HEIGHT & UNDER



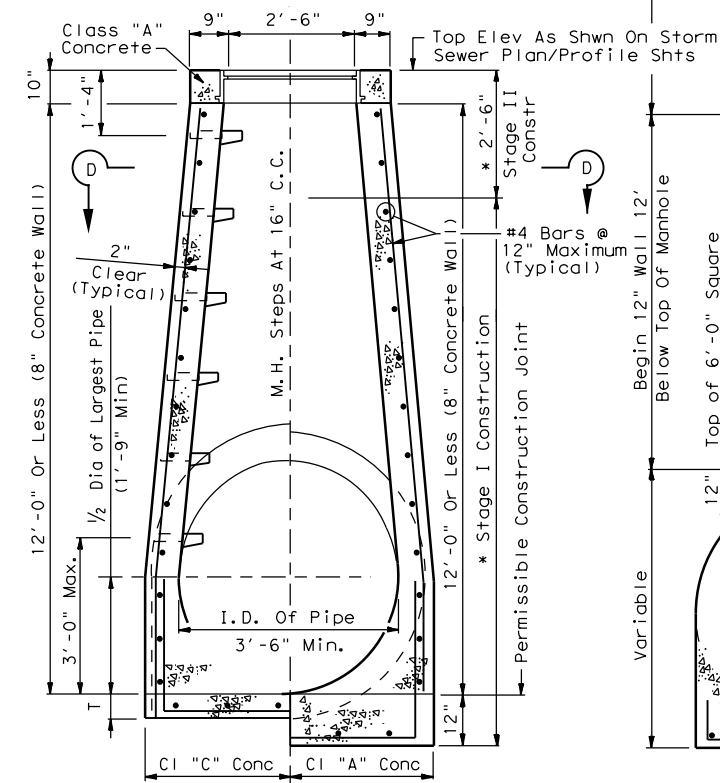
PLAN
MONOLITHIC SEWERS



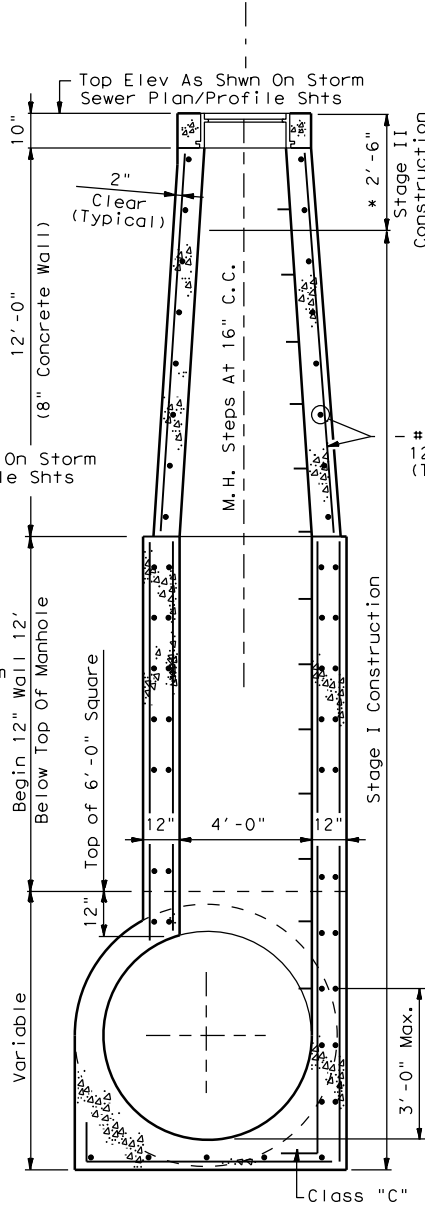
PLAN
PRECAST PIPE SEWERS



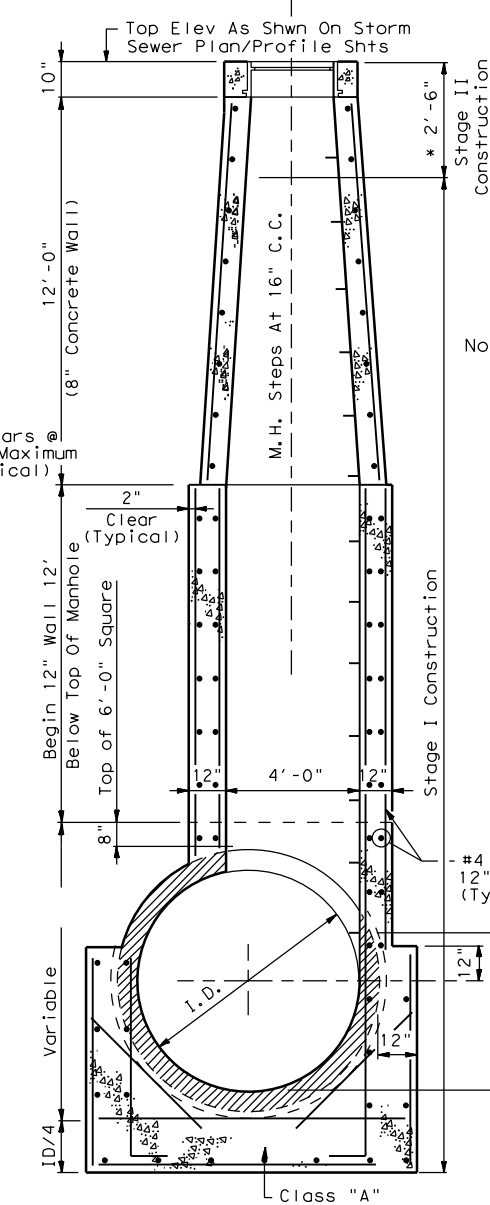
MONOLITHIC SEWERS PRECAST PIPE SEWERS
SECTION A-A



MONOLITHIC SEWERS PRECAST PIPE SEWERS
SECTION B-B



SECTION C-C



SECTION D-D

MANHOLE - TYPE A
FOR PIPES 54" AND SMALLER

MANHOLE - TYPE B
FOR PIPES 60" AND LARGER

GENERAL NOTES:

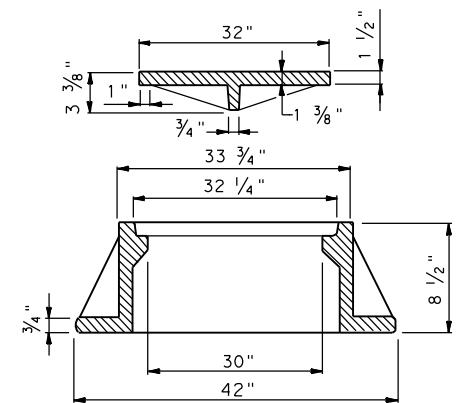
See Standard or Detail Sheet For Excavation And Backfill Diagrams.

All Manholes In Graded Areas Shall Be Built To Stage I And Finished After All Grading Operations Are Substantially Completed.

* But Not Less Than 6 Inches Above Highest Pipe.

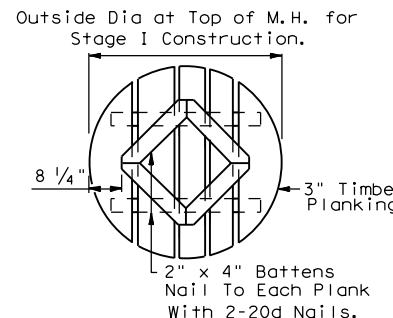
"T" Thickness Of Shell Equals That Of Larger Diameter Pipe.

Optional Monolithic Or Precast Designs Permitted. Optional Designs Shall Be Signed & Sealed By A Registered Professional Engineer.

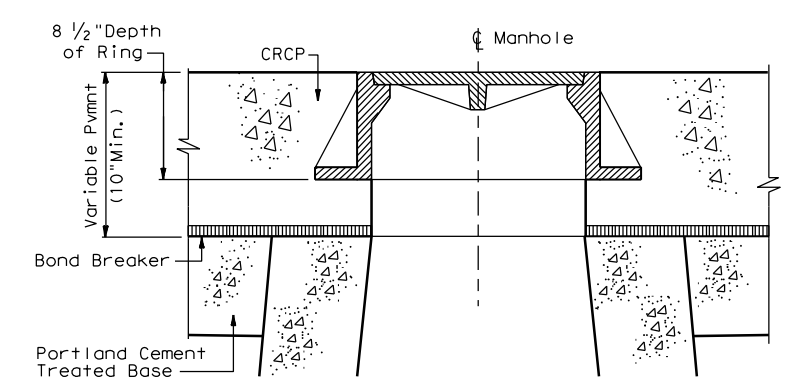


Heavy Duty 30" ID Ring as Required. Vulcan No. V-1419 w/ribbed cover, Neenah No. R1740-BTX

RING AND COVER



TEMPORARY TIMBER COVER



RING AND COVER CAST MONOLITHICALLY WITH PAVEMENT

FOR DIRECT TRAFFIC



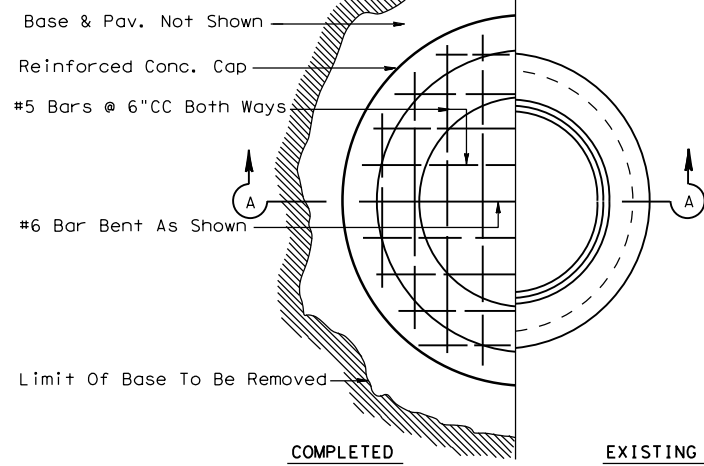
MANHOLES
TYPE A & B

MH-A/B

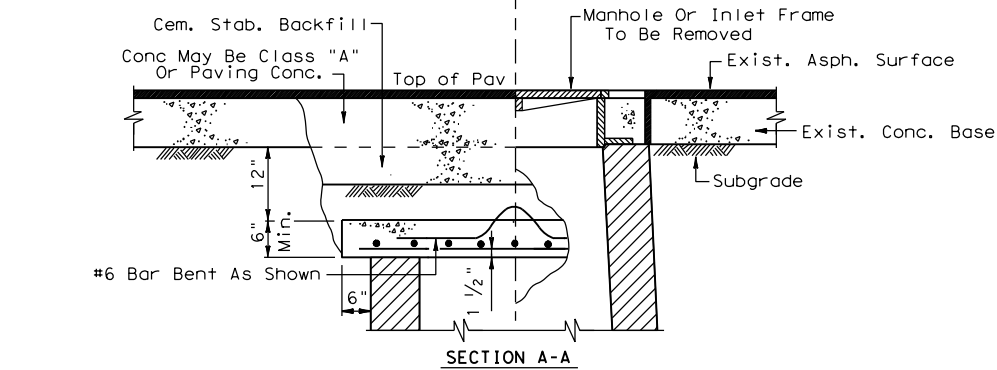
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© TxDOT December 2006	DIST	FED REG	PROJECT NO.	SHEET	
REVISIONS	HOUS	6		358	
3/15 MINOR CORRECTIONS	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	MONTGOMERY	0912	37	232	CS

d = Diameter
R = Radius

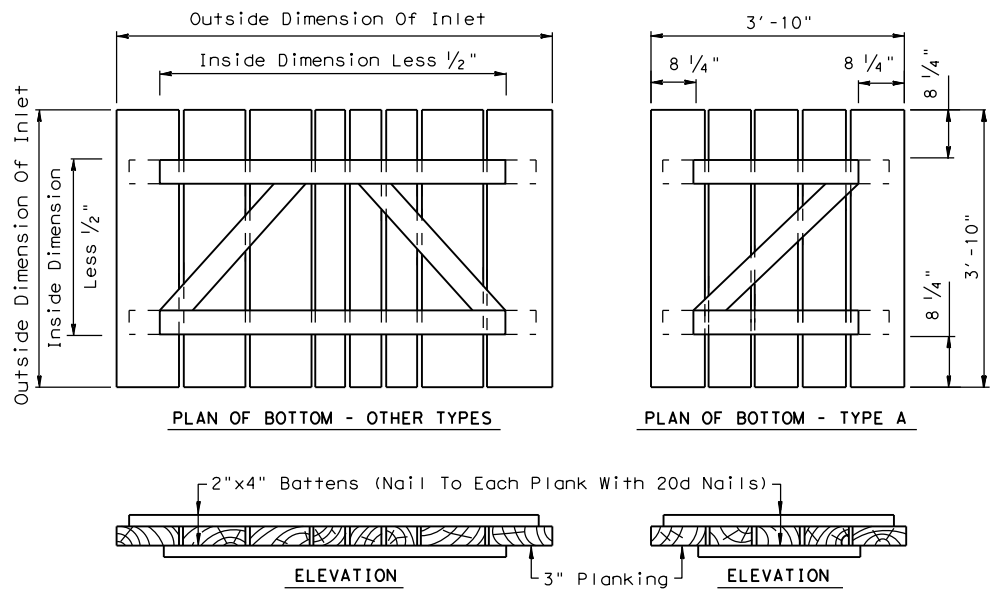
Note: No Conc Or Cem Stab Bkfl Required In Graded Areas.



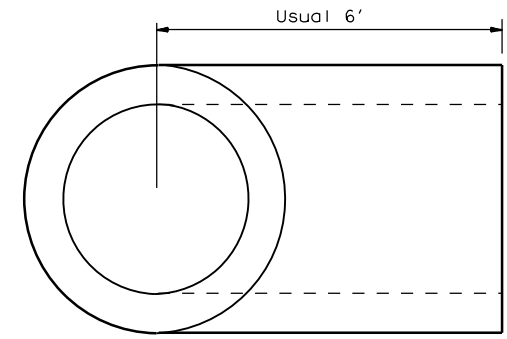
Note: Reinforced Conc. Cap Shall Be Precasted & Properly Cured Before Placing In Position.



DETAIL SHOWING METHOD OF CAPPING ABANDONED MANHOLES OR INLETS (GRADED OR PAVED AREAS)

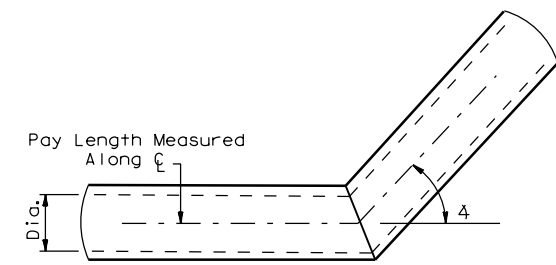


TEMPORARY COVERS FOR ALL TYPES OF INLETS



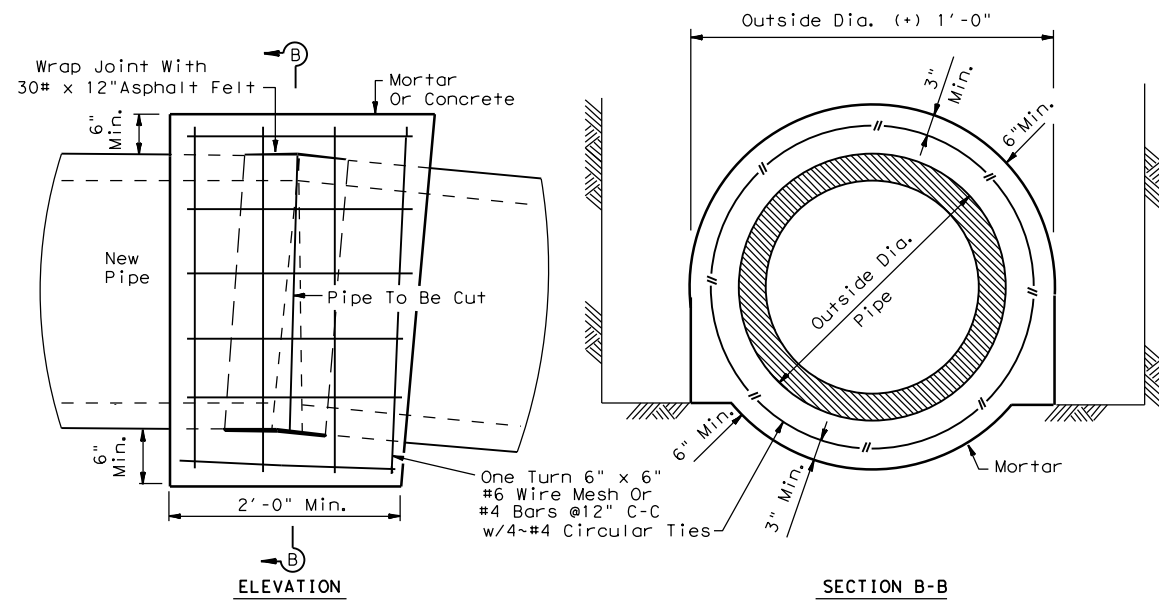
Note: Jointing Material Shall Conform To Requirements Of Item "Reinforced Concrete Pipe." Material For Tees Shall Conform To Requirements Of Item "Reinforced Concrete Pipe." Payment For Tee To Be In Accordance With Item "Reinforced Concrete Pipe."

PRECAST STORM SEWER TEE

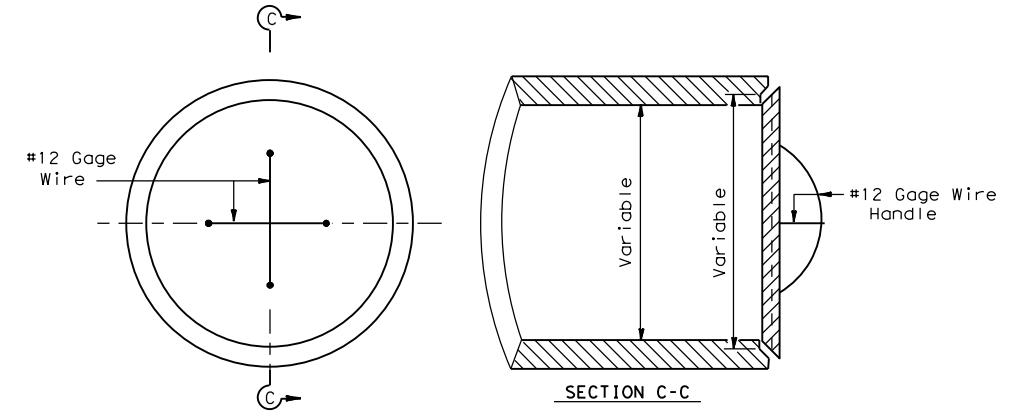


BENDING DETAIL

Note: Bending Of Proposed Pipe Sewer Or RCP In A Vertical & /Or Horizontal Plane Shall Be Accomplished By The Use Of A "Pipe Collar" Or A "Precast Elbow", As Approved By The Engineer. Price Of "Pipe Collar" Or, "Precast Elbow" Shall Be Subsidiary To The Unit Prices Bid For Item Reinforced Concrete Pipe. Pay Length Measurement To Be Along Horizontal C & Horizontal Plane Of Pipes.

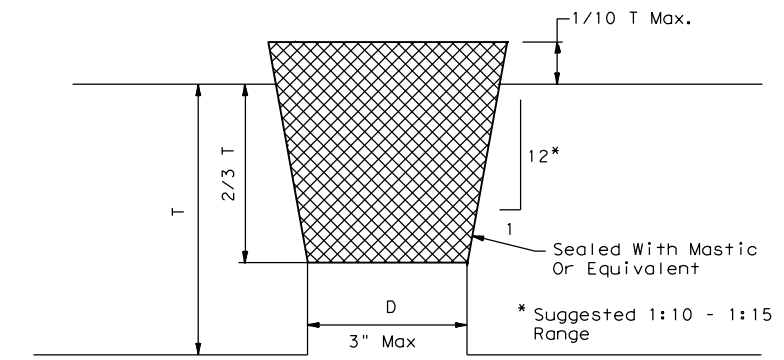


PIPE COLLAR DETAIL
For Horizontal Or Vertical Placement



Note: The Price Of Plug Shall Be Subsidiary To The Unit Bid Price For Pipe Sewer Or RCP. Mortar Joints To Be Used As Directed By The Engineer. Removal Of The Existing Plugs For Storm Sewer Or RCP Conns. Shall Be Considered Incidental To Item "Excavation And Backfill For Structures."

Concrete Plug For End Of Pipe Culvert Or Sewer
CONCRETE PLUG FOR PIPE



T = Wall Thickness On Top Of Box Or Pipe
D = Diameter Of Lifting Hole
Minimum Length Of Plug Is 2/3 T +/-
Minimum Diameter At Bottom Of Plug = D - 1/8"
Maximum 1/10 T Of Plug Not Seated In Lifting Hole
Note: The Plug Shall Be Cast With The Same Taper As The Lifting Hole.

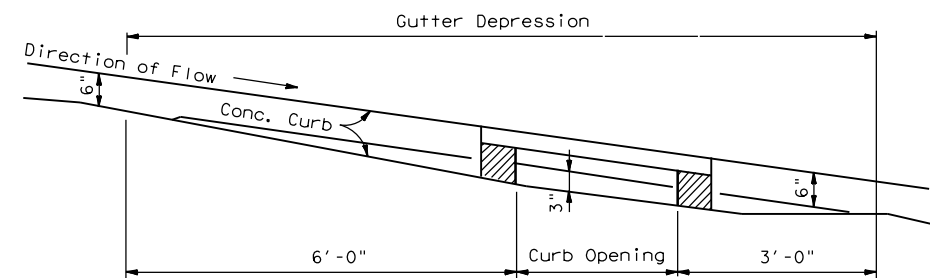
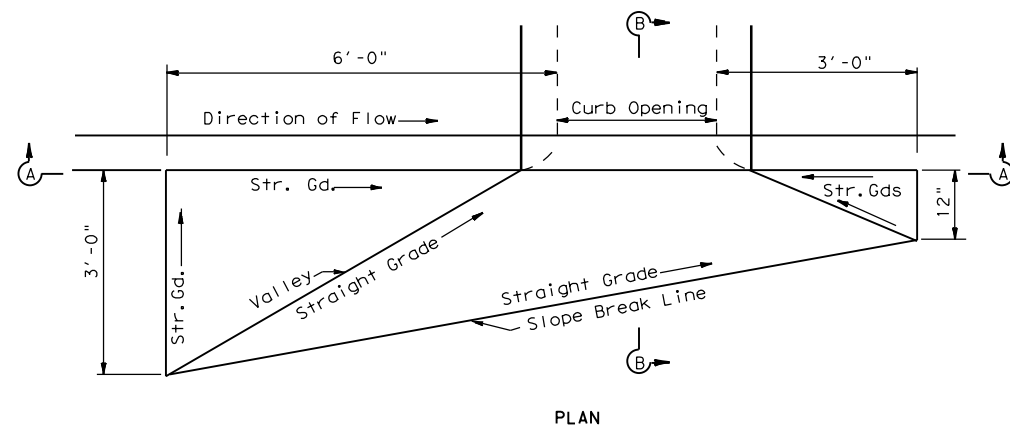
DETAIL OF PLUG FOR LIFTING HOLES IN RCB AND RCP

Texas Department of Transportation
Houston District (Bridge)

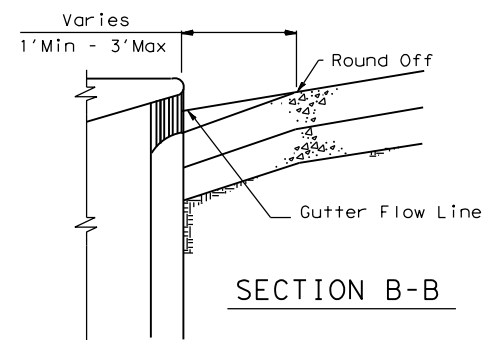
MISCELLANEOUS SEWER DETAILS

MSD

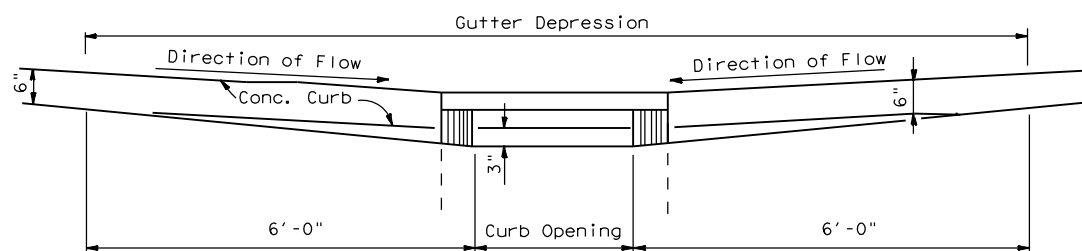
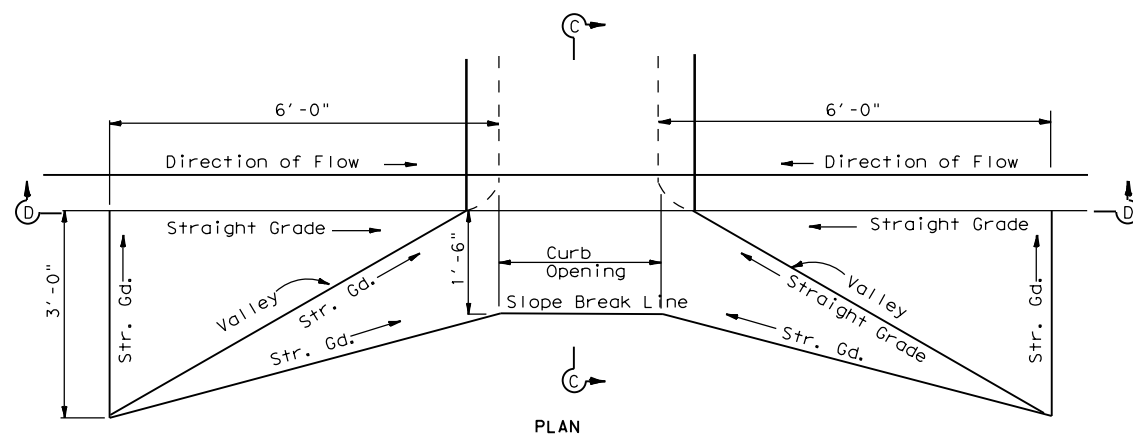
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© TxDOT Mar 2004	DISTRICT FED REG	PROJECT NO.	SHEET	
REVISIONS	HOUS 6		359	
3/2015 2014 Specs	COUNTY	CONTROL	SECT	JOB HIGHWAY
	MONTGOMERY	0912	37	232 CS



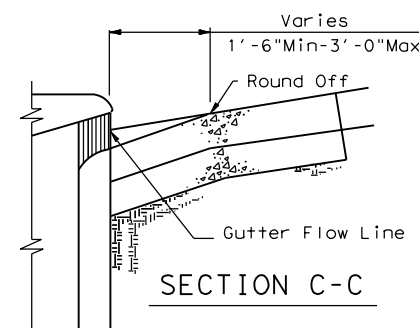
SECTION A-A
CURB INLET ON GRADE



SECTION B-B



SECTION D-D
CURB INLET AT SAG



SECTION C-C

GENERAL NOTES:

Base Course under Concrete Pavement shall be full depth and shall conform to surface depression details.

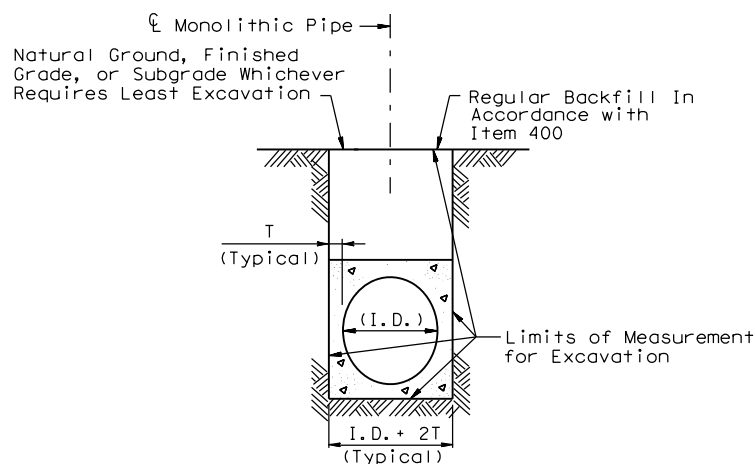


GUTTER DEPRESSION DETAILS
FOR CURB INLETS

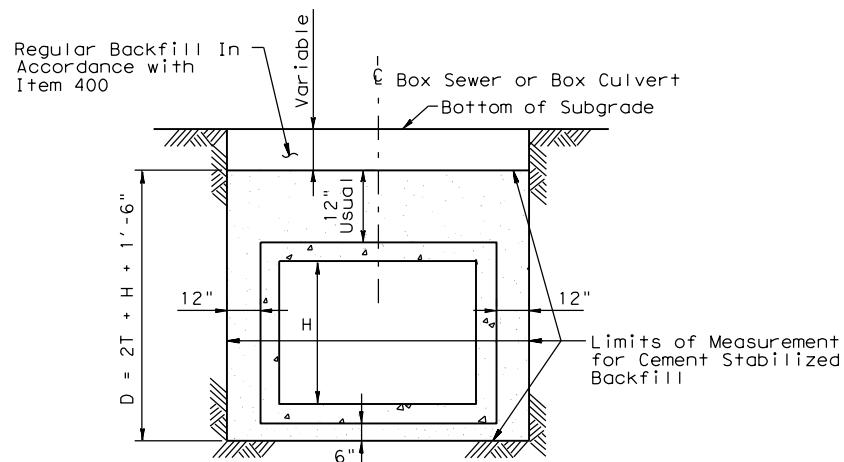
GD

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© TxDOT	Mar 2004	DIST	FED REG	PROJECT NO.							
REVISIONS		HOUS	6								
		COUNTY	CONTROL	SECT	JOB	HIGHWAY					
		MONTGOMERY	0912	37	232	CS					

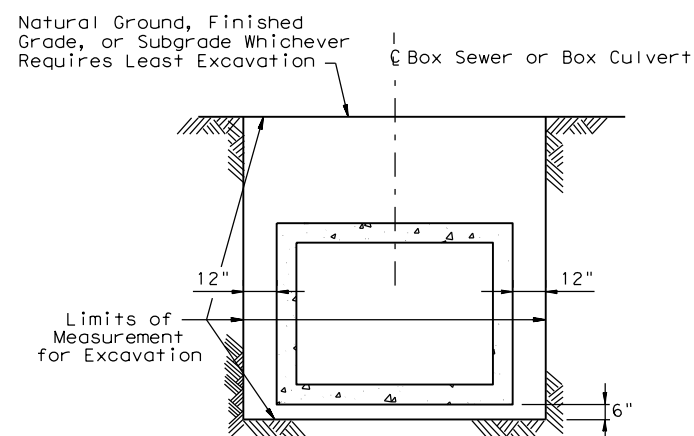
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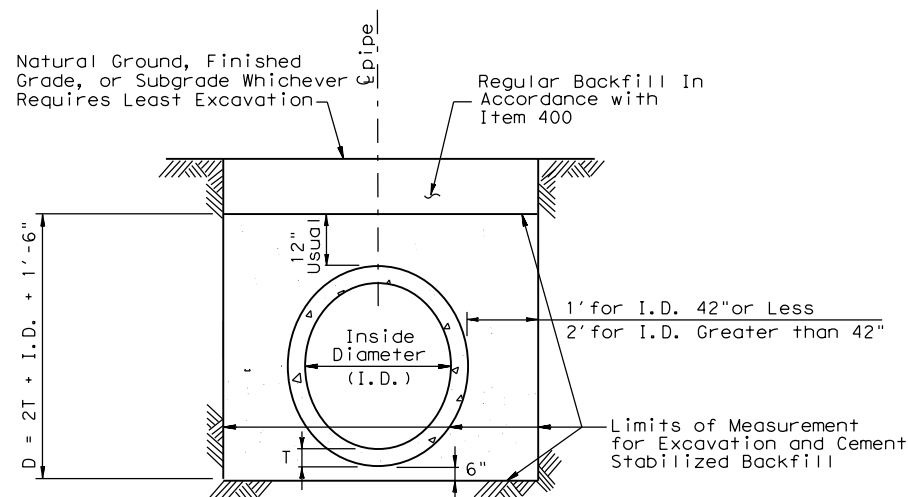
EXCAVATION DETAIL
MONOLITHIC PIPE
IN A PAVED OR GRADED AREA



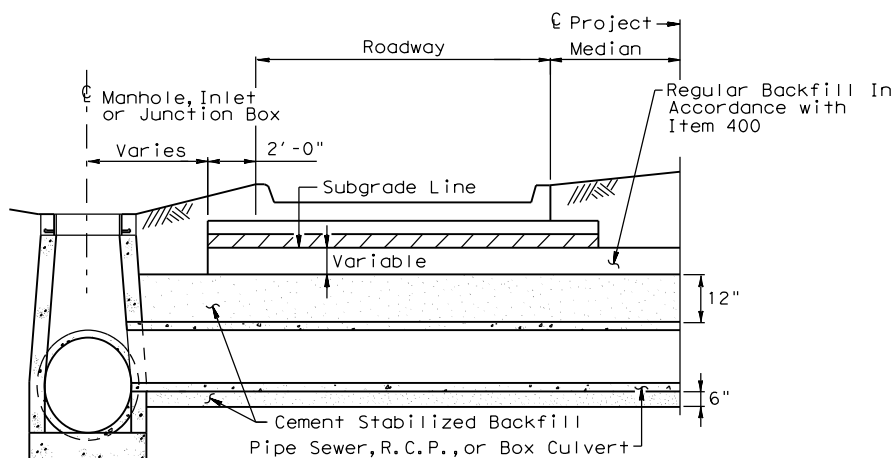
BACKFILL DETAIL
BOX CULVERTS
IN A GRADED OR PAVED AREA
INCLUDING DETOURS *



EXCAVATION DETAIL
BOX CULVERTS
IN A GRADED AREA



EXCAVATION & BACKFILL DETAIL
REINFORCED CONCRETE PIPE
IN A GRADED OR PAVED AREA
INCLUDING DETOURS



BACKFILL DETAIL
AT MANHOLE, INLET OR JUNCTION BOX

REINFORCED CONCRETE PIPE			
EXCAVATION AND BACKFILL QUANTITIES			
PIPE DIA. IN.	T FT.	CULVERT OR SEWER EXCAVATION IN A PAVED OR GRADED AREA C.Y. PER L.F. PER FT. OF DEPTH	CEMENT STABILIZED BACKFILL IN A PAVED OR GRADED AREA C.Y. PER L.F. OF PIPE
18	0.19	0.144	0.383
24	0.23	0.165	0.478
30	0.29	0.188	0.586
36	0.33	0.210	0.692
42	0.38	0.231	0.808
48	0.42	0.327	1.394
54	0.46	0.349	1.560
60	0.50	0.370	1.731
66	0.54	0.392	1.907
72	0.58	0.414	2.088
78	0.62	0.435	2.275
84	0.67	0.457	2.474

MONOLITHIC PIPE		
EXCAVATION QUANTITIES		
PIPE DIA. IN.	T FT.	EXCAVATION C.Y. PER L.F. PER FT. OF DEPTH
36	0.417	0.142
42	0.458	0.164
48	0.458	0.182
54	0.500	0.204
60	0.583	0.228
66	0.583	0.247
72	0.625	0.269
78	0.625	0.287
84	0.625	0.306

NOTE:
Cement stabilized backfill may be omitted in private driveways as indicated elsewhere in the plans.
Rubber gaskets shall be required for all joints on proposed cross drainage, pipe culverts and proposed storm sewer systems, unless otherwise shown in the plans.
* Backfill with cement stabilized material will be required for all structures under detours unless noted otherwise in the General Notes.

SHEET 1 OF 2

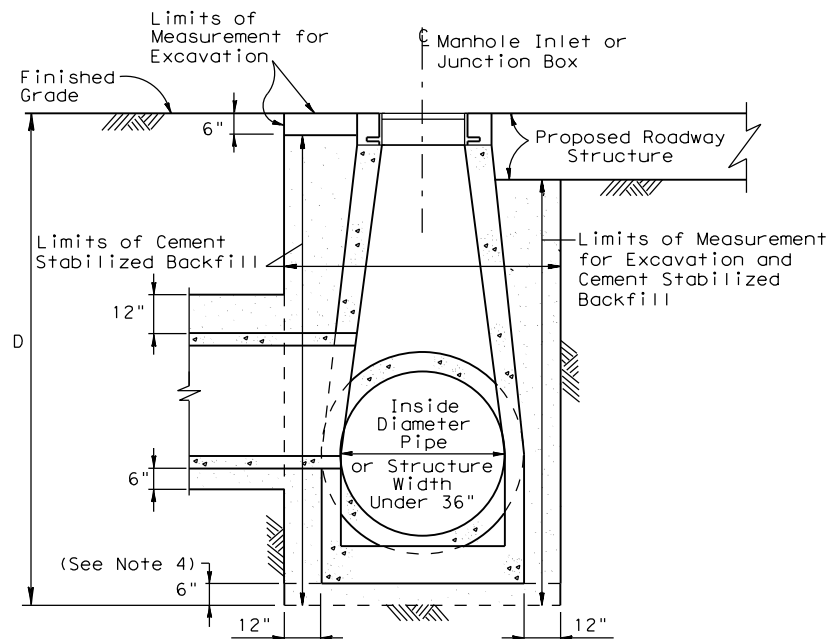
Texas Department of Transportation
Houston District

**EXCAVATION AND BACKFILL
DIAGRAMS**

E&BD

D = Depth
H = Height
T = Thickness
R = Radius
Dia = Diameter

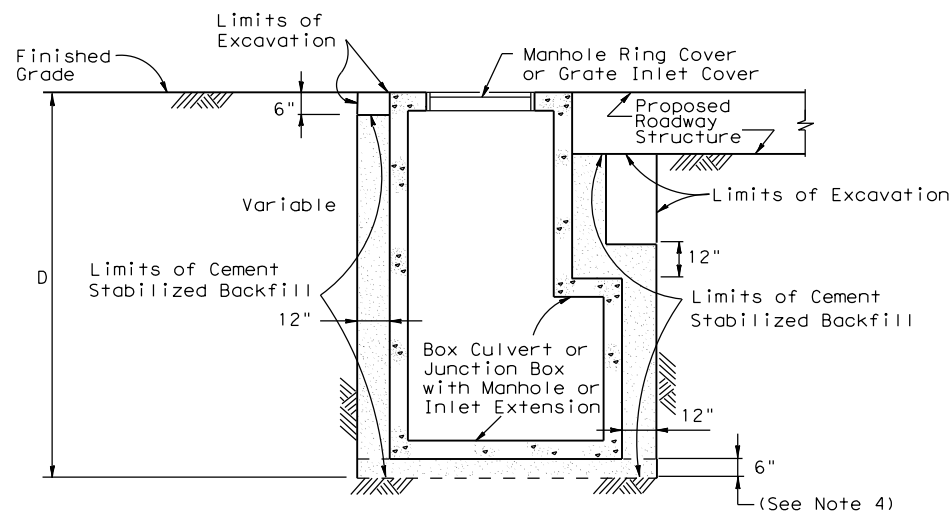
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© TxDOT FEB 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISED 11/05	HOUSTON	6		361
REVISED 2/2010 Added note to Table 1, Sht 2 of 2.	COUNTY	CONTROL	SECT	JOB
REVISED 6/12	MONTGOMERY	0912	37	232
REVISED 9/14				CS



EXCAVATION AND BACKFILL DETAIL

MANHOLES SMALLER THAN 36 IN.
IN A PAVED OR GRADED AREAS

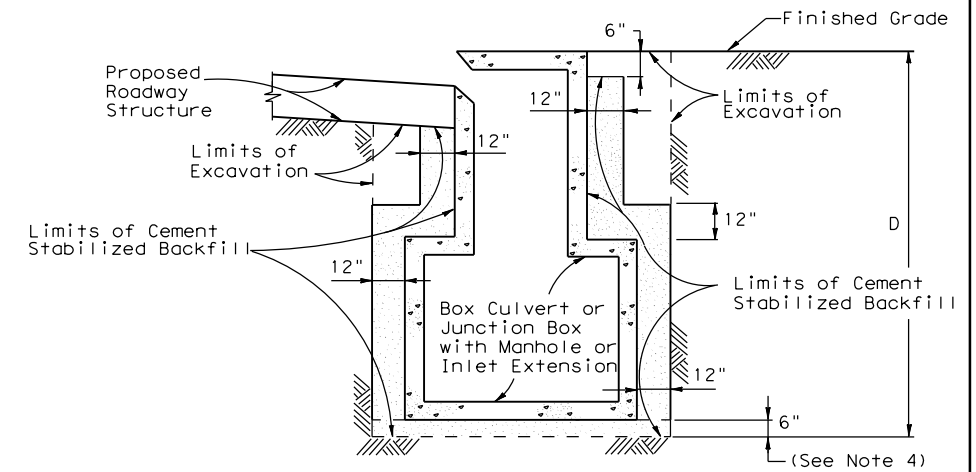
N. T. S.



EXCAVATION AND BACKFILL DETAIL

JUNCTION BOXES IN A
PAVED OR GRADED AREA

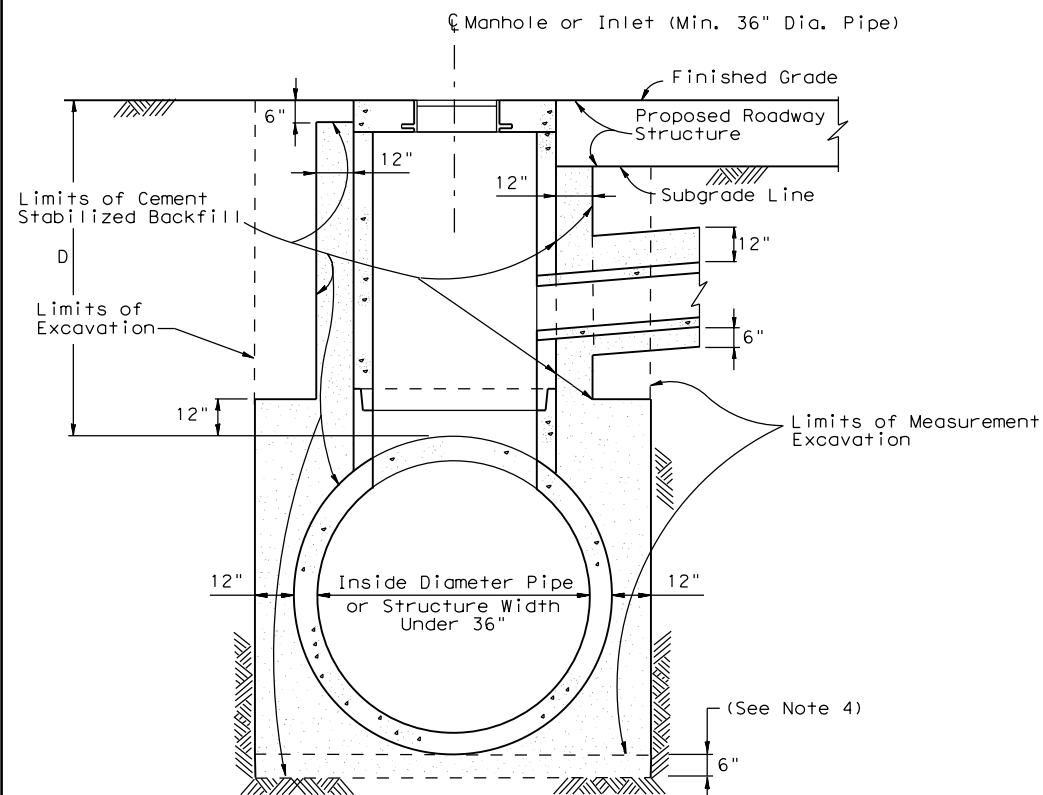
N. T. S.



EXCAVATION AND BACKFILL DETAIL

INLET EXTENSIONS ON A BOX CULVERT
IN A PAVED OR GRADED AREA

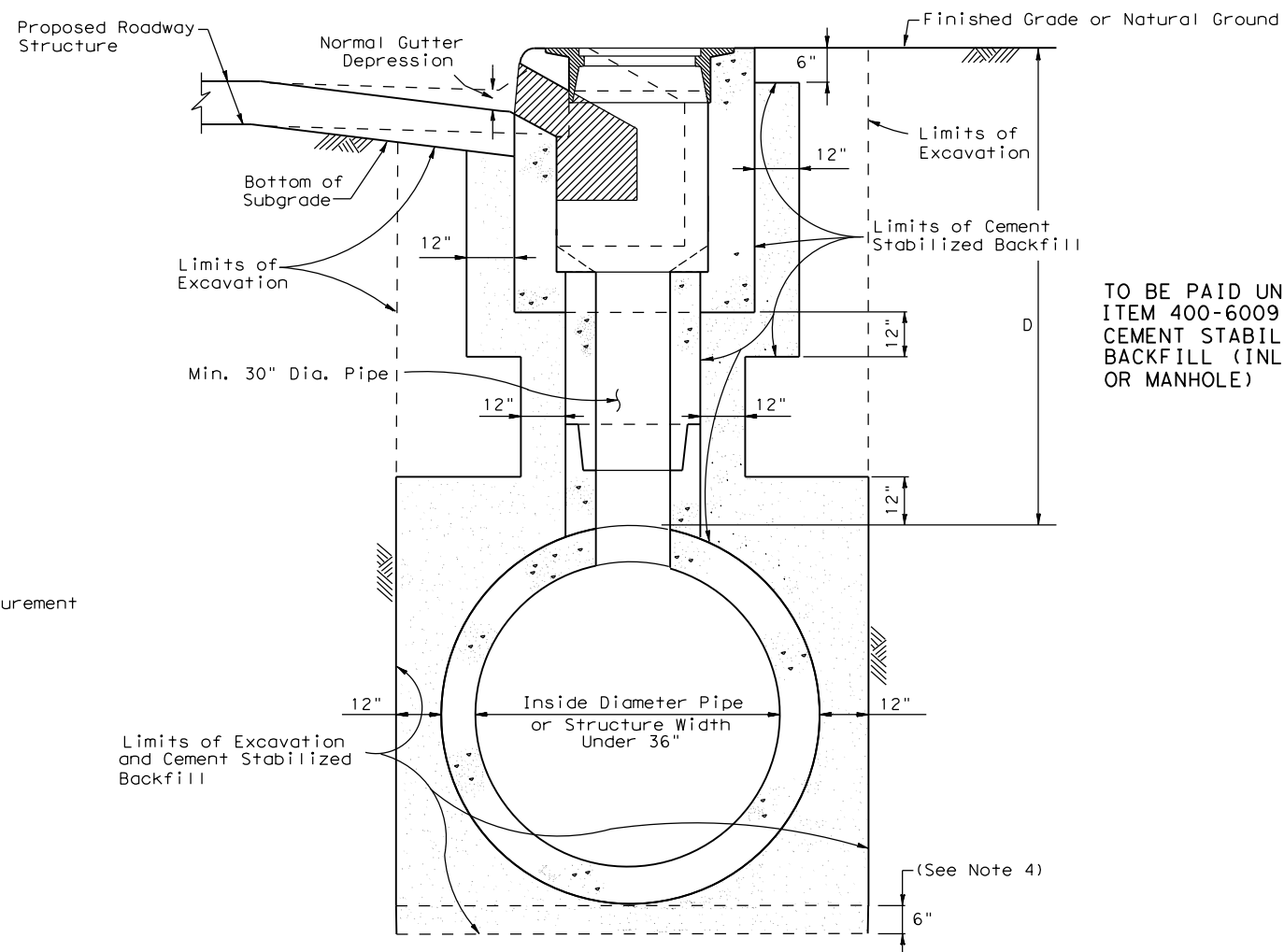
N. T. S.



EXCAVATION AND BACKFILL DETAIL

MANHOLES 36 IN. AND GREATER
IN A PAVED OR GRADED AREA

N. T. S.



EXCAVATION AND BACKFILL DETAIL

CURB INLETS IN A PAVED OR GRADED AREA

N. T. S.

TO BE PAID UNDER
ITEM 400-6009
CEMENT STABILIZED
BACKFILL (INLET
OR MANHOLE)

TABLE I	
SCHEDULE FOR PAY QUANTITIES OF CEMENT STABILIZED BACKFILL (SEE NOTE 1)	
MANHOLE OR INLET DEPTH (D) IN FEET	CEMENT STABILIZED BACKFILL IN CUBIC YARDS
0 through 5	5.75
> 5 through 10	8.25
greater than 10	12.75

NOTES:

1. The Contractor is paid a fixed estimated amount for cement stabilized backfill based on depth (D) and Table. 1.
2. Proposed roadway structure includes pavement, base and any subgrade.
3. For backfill of intersecting pipes and box culverts, see "Excavation and Backfill Diagram for Pipes and Box Culverts."
4. 6" cement stabilized backfill will be required only for precast units.

SHEET 2 OF 2

 Texas Department of Transportation
Houston District

EXCAVATION AND BACKFILL DIAGRAMS

E&BD

FILE: STDE1.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
© TxDOT FEB 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISED 2/2010 Added note to Table 1.	HOUSTON	6		362
REVISED 6/12	COUNTY	CONTROL	SECT	JOB
REVISED 9/14	MONTGOMERY	0912	37	232
REVISED 3/15				CS

D = Depth
H = Height
T = Thickness
R = Radius
Dia = Diameter

DATE: _____
FILE: _____



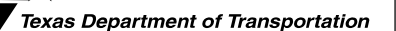
FABRICATION NOTES:

- ### INSTALLATION NOTES:

- GENERAL NOTES:


- Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING



PRECAST JUNCTION BOX

PJB

FILE: prestid09-20.dgn	DN: TxDOT	CK: TxDOT	DWR: TxDOT	CK: TxDOT
 February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
DIST	COUNTY			SHEET NO.
HO	MONTGOMERY			363

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The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

	Size	MAXDEPTH = 15 ft. to top of BASE SLAB										MAXDEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
		X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong			
	ft.	in ² /ft	in ² /ft	in.	in ² /ft	in ² /ft	in.	ft. **	in ² /ft	in ² /ft	in.	in ² /ft	in ² /ft	in.	in ² /ft	in ² /ft	in.	ft. **	in ² /ft	in ² /ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.


FABRICATION NOTES:

- Maximum spacing of reinforcement is 8".
- At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:

- Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
- Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
- Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING



Texas Department of Transportation

Bridge Division Standard

DESIGN DATA FOR
PRECAST BASE AND
JUNCTION BOX

PDD

FILE: prest10-20.dgn

DN: TxDOT

CK: TxDOT

DW: TxDOT

CR: TxDOT

©TxDOT

February 2020

CONTRACT

SECTION

JOB

HIGHWAY

REVISIONS

091237

232

CS

DIST

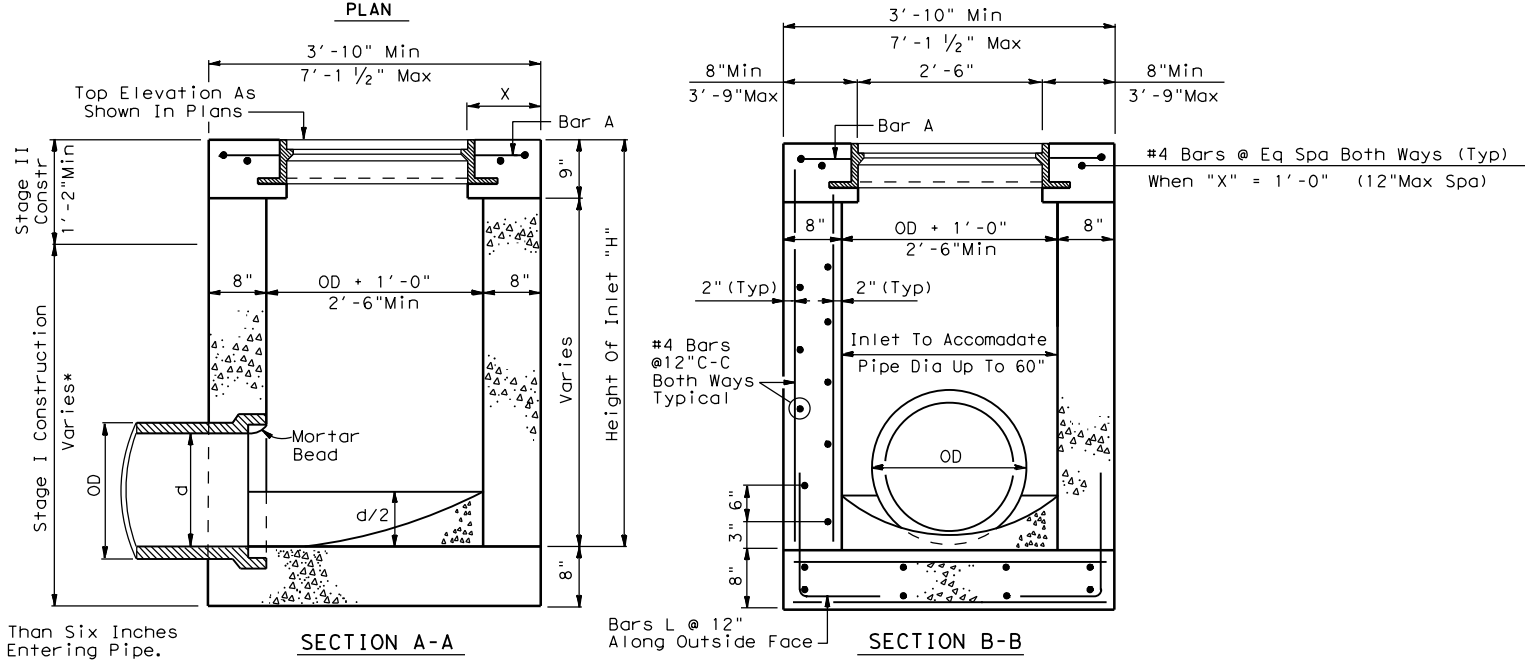
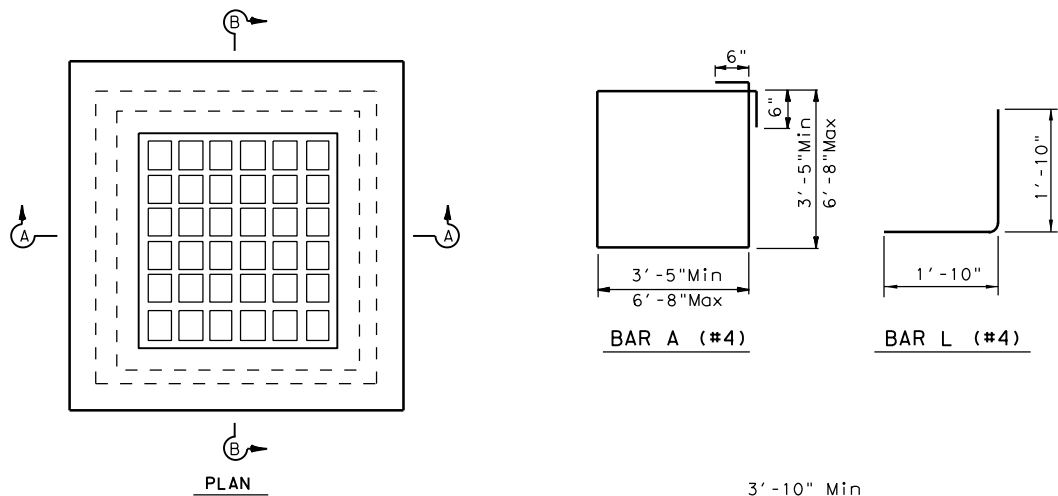
COUNTY

SHEET NO.

HOU

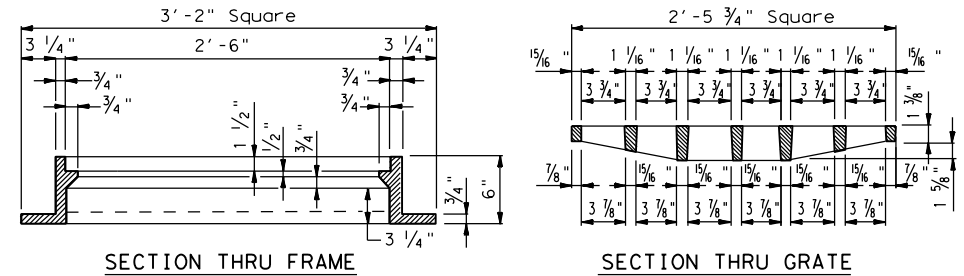
MONTGOMERY

364



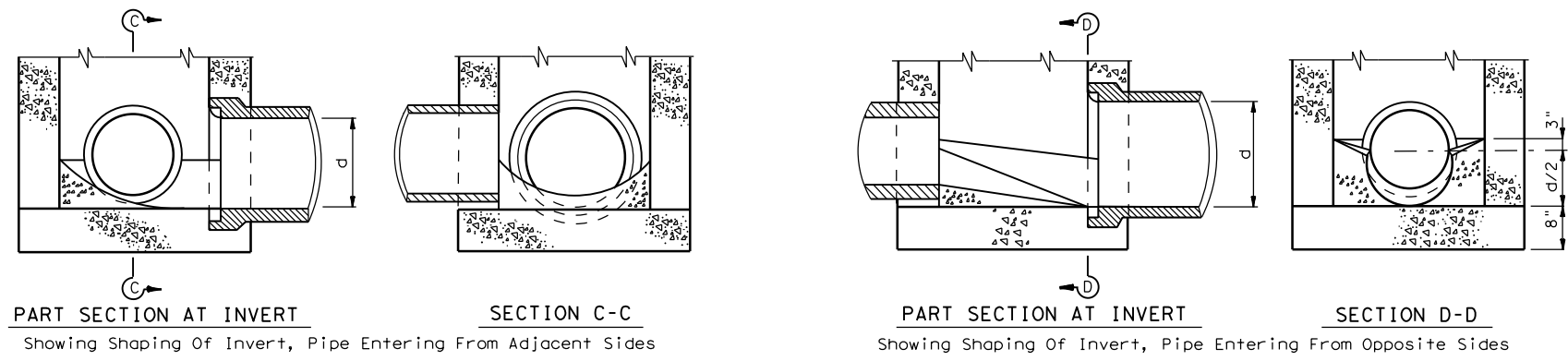
* But Not Less Than Six Inches Over Highest Entering Pipe.

TYPE A INLET



FRAME AND GRATE

Neenah No. R3418-A
EJIW No. V-4880-1



PART SECTION AT INVERT
Showing Shaping Of Invert, Pipe Entering From Adjacent Sides

PART SECTION AT INVERT
Showing Shaping Of Invert, Pipe Entering From Opposite Sides

GENERAL NOTES:

Where Size Of Pipes Passing Thru Inlet Exceeds 30" Increase Inside Width To Outside Diameter Of Pipe Plus 1'-0" (OD + 1'-0").

See Standard or Detail Sheet For Excavation and Backfill Diagrams.

Inlets Shall Be Built To Stage I And Finished After All Grading Operations Are Substantially Completed.

Frames And Grates May Be Gray Cast Iron.

Shop Drawings Will Be Required For Precast Construction Of Inlets.

NOT FOR TRAFFIC LOADS

Texas Department of Transportation
Houston District

INLET TYPE A

HIL-A


FILE:	STDD4.DGN	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT	STD:
© TxDOT	2014	DIST:	HOUS	FED REG:	6	PROJECT NO.:				
REVISIONS		COUNTY		CONTROL	SECT	JOB	HIGHWAY			
9/30/2016: Removed Manhole Steps		MONTGOMERY		0912	37	232	CS			

d = Diameter

STANDARD HCFCD NOTES FOR CONSTRUCTION DRAWINGS

1. LHRA will invite the Harris County Flood Control District (HCFCD) to the preconstruction meeting. An invitation will be sent to the following address at least two weeks prior to the meeting:

Harris County Flood Control District, Property Management Department
Attn: Development Coordination and Inspection Section (DCIS)
9900 Northwest Freeway, Houston, Texas 77092
Fax: 713-684-4212
Email: DCIS@hcfcd.org
2. Obtain and comply with applicable City, County, State, and Federal permits and approvals. Obtain a permit (notification) from Harris County to enter Harris County Flood Control District (HCFCD) Right-of-Way. Deliver to HCFCD's Development Coordination and Inspection Section the completed Pre-Construction Notification Form (See Appendix B of HCFCD site http://www.hcfcd.org/downloads/manuals/HCFCD_PCPM*Dec2010.pdf). Include with this delivery a copy of the approved construction drawings and a copy of any Section 404 Corps of Engineers individual permit(s). The address for delivery is listed above. Submit notifications by regular mail, email, or fax. For minor projects, only the title sheet and any plan sheets showing HCFCD Right-of-Way need to be submitted. Ensure this pre-construction notification is received by the HCFCD at least four calendar days prior to construction.
3. Protect, maintain, and restore existing backslope drainage systems.
4. Before installing outfall(s), verify that the channel and pipe flow line(s) are in accordance with the applicable HCFCD standards in the plans. Resolve any discrepancies before construction in cooperation with the responsible Design Engineer. No water should remain in the facility during normal water surface conditions in the channel/waterway.
5. For wet bottom detention basins, ensure no water is above the design level in the wet bottom during normal water surface conditions in the channel/waterway.
6. Within HCFCD Right-of-Way, perform earthwork in accordance with TxDOT ITEM 110 - EXCAVATION (CHANNEL), ITEM 110 - EXCAVATION (SPECIAL), ITEM 132 - EMBANKMENT (FINAL) (ORD COMP)(TY C). Perform any excavation and backfill for structures in accordance with Item 400.
7. Backslope swale and interceptor structure elevations and locations shown on the plans are approximate. Final elevations and locations will be field verified by the Engineer and HCFCD's Development Coordination and Inspection Section before installation.
8. Maintain flow in channel during construction and restore the channel to original condition.
9. Remove excavated material from HCFCD Right-of-Way. Do not place fill within a designated flood plain area without first obtaining a fill permit from the appropriate jurisdictional authority. With HCFCD's written approval, the Contractor may place embankment material temporarily within HCFCD Right-of-Way for up to two days. The maximum height of this temporary material is 5 ft. and the minimum distance to the edge of the waterway slope is 3 ft.
10. Do not cast or mix any materials within HCFCD Right-of-Way.
11. Establish turf grass on disturbed areas within the channel or detention Right-of-Way, except the channel bottom and where structural erosion measures are used. Minimum acceptance criteria for vegetative cover is 70% with no erosion or rills deeper than 4 in. See Houston District Standard "Fertilizer, Seed, Sod, Straw, Compost, and Water", for seeding requirements. If block sod is called for on channel side slopes, pin each block with four 6-in. by 1-in. by 6-in. 11 gauge steel "U" staples.
12. After the Contractor informs the Engineer that the work performed within HCFCD's Right-of-Way is ready for HCFCD's final inspection, the Engineer will schedule HCFCD's final inspection at least one month before LHRA's acceptance of project from the Contractor.
13. For the final HCFCD inspection request, LHRA will submit the standard certification letter (See Appendix B of HCFCD site http://www.hcfcd.org/downloads/manuals/HCFCD_PCPM*Dec2010.pdf), along with record drawings of work performed within HCFCD's Right-of-Way, to the HCFCD's Development Coordination and Inspection Section requesting final inspection of items constructed in the HCFCD's Right-of-Way. Before requesting inspection, stake and flag Harris County Flood Control's Right-of-Way and/or easements. This flagging will be incidental to the work performed within the HCFCD Right-of-Way.
14. If deficiencies are found by HCFCD inspectors, LHRA will immediately schedule a follow-up inspection and the Contractor will address any HCFCD comments in a timely manner.
15. Before project acceptance by LHRA from the Contractor, LHRA must receive a Letter of Final Acceptance from the HCFCD approving the work performed within their Right-of-Way.

Texas Department of Transportation
Houston District

HARRIS COUNTY FLOOD
CONTROL DISTRICT NOTES
HCFCD-N

FILE: STDG-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CS: TxDOT
© TxDOT DEC, 2012	DIST	FED REG	PROJECT NO.	
REVISIONS 10/2012 Rev. Notes in coord. w/ HCFCD 02/2007 Rev. Notes (minor) 07/2015 2014 SECS	HOU	6	366	
	COUNTY	CONTROL	SECT	JOB
	MONTGOMERY	0912	37	232
	HIGHWAY			
CS				

WATER CONSTRUCTION NOTES

1) WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.

2) ALL 4 THROUGH 12 INCHED WATER LINE TO BE AWWA C-900 PVC DR-18 BLUE PRESSURE RATED WATER MAIN WITH 2 INCHES AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4 THRU 54 INCHES DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8-MIL POLYETHYLENE SHEETS.

3) CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST.

4) ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.

5) ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.

6) ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.

7) ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTMINATION PERSISTS.

8) ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.

9) PROVIDE PVC FITTINGS AND PRESSURE FITTINGS PER ANSI A21.53 AND ANSI A21.10 OR PUSH ON FITTINGS PER MINIMUM STANDARD PRESSURE RATED AT 150 PSIG.

10) HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.

11) ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.

12) CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

SANITARY SEWERS NOTES

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 317, DESIGN CRITERIA FOR SEWERAGE SYSTEMS SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.

2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE 2010 VERSION AS APPLICABLE.

3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.

4. SANITARY SEWER PIPE 6 INCHES AND SMALLER SHALL BE SCHEDULE 40 PVC. SANITARY SEWER PIPE 8 INCHES AND LARGER SHALL BE SDR-26 PVC.

5. ALL SDR-26 PVC PIPE SHALL MEET ASTM SPECIFICATION D3034 AND USE FULL BODIED SDR-26 PVC FITTINGS WITH APPROPRIATE ADAPTERS AND SHALL HAVE A CELL CLASSIFICATION OF 12364-B AS DEFINED IN ASTM D-1784 AND SHALL HAVE DIP SIZE OD AND RUBBER GASKET BELL-AND-SPIGOT TYPE JOINT ENDS, UNLESS OTHERWISE NOTED.

6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP FITTINGS.

7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-03 AS APPLICABLE, WITH 1 SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.

8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18 JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER PROVIDE MINIMUM 2 FOOT SEPARATION.

9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9 FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.

10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3- 6 INCHES ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.

11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317-02 (2002).

12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 317.2 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.

13. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 317.2 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.

A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.

B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36 (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:

6340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398
8454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298
10567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239
15850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159
181020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133

WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.

14. SAN. S. E. INDICATES SANITARY SEWER EASEMENT

15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEXHEAD COARSE THREADED -13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MHS TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MHS EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS.



Eduardo Quiroz

4/1/2021

NO.		REVISIONS		BY DATE	
		5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTHPARK DRIVE					
STANDARD NOTES WATER, WASTEWATER, & SWPPP					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITILE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 378

FILE: PAT\HC\1\B\PA\Hntb\Dr. . Amirahmed\Central\div\0023951\WATER LINE DESIGN NOTES-1.Dgn

SWPPP CONSTRUCTION NOTES

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEEPED BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN(14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
- DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.

◦ AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.

◦ STRUCTURAL CONTROL MEASURES.

◦ LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

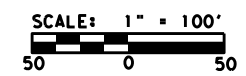
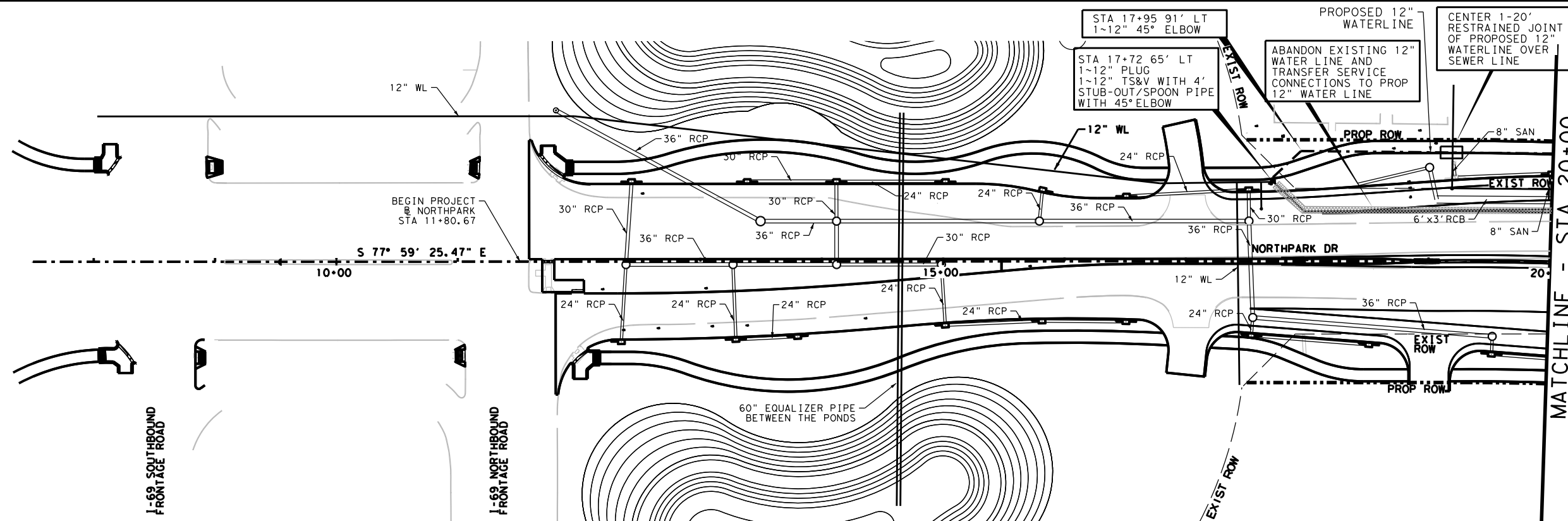
GENERAL NOTES - OUTSIDE CITY LIMITS

- 1.CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES AND STORM DRAINAGE IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY THE CITY OF HOUSTON, HOUSTON PUBLIC WORKS DEPARTMENT.
- 2.UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION.
- 3.CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER AND STORM DRAINAGE LINES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERINGS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING REFERENCED ABOVE, AT NO ADDITIONAL COST.
- 5.ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
- 6.CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.



4/1/2021

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		5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTHPARK DRIVE					
STANDARD NOTES WATER, WASTEWATER, & SWPPP					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
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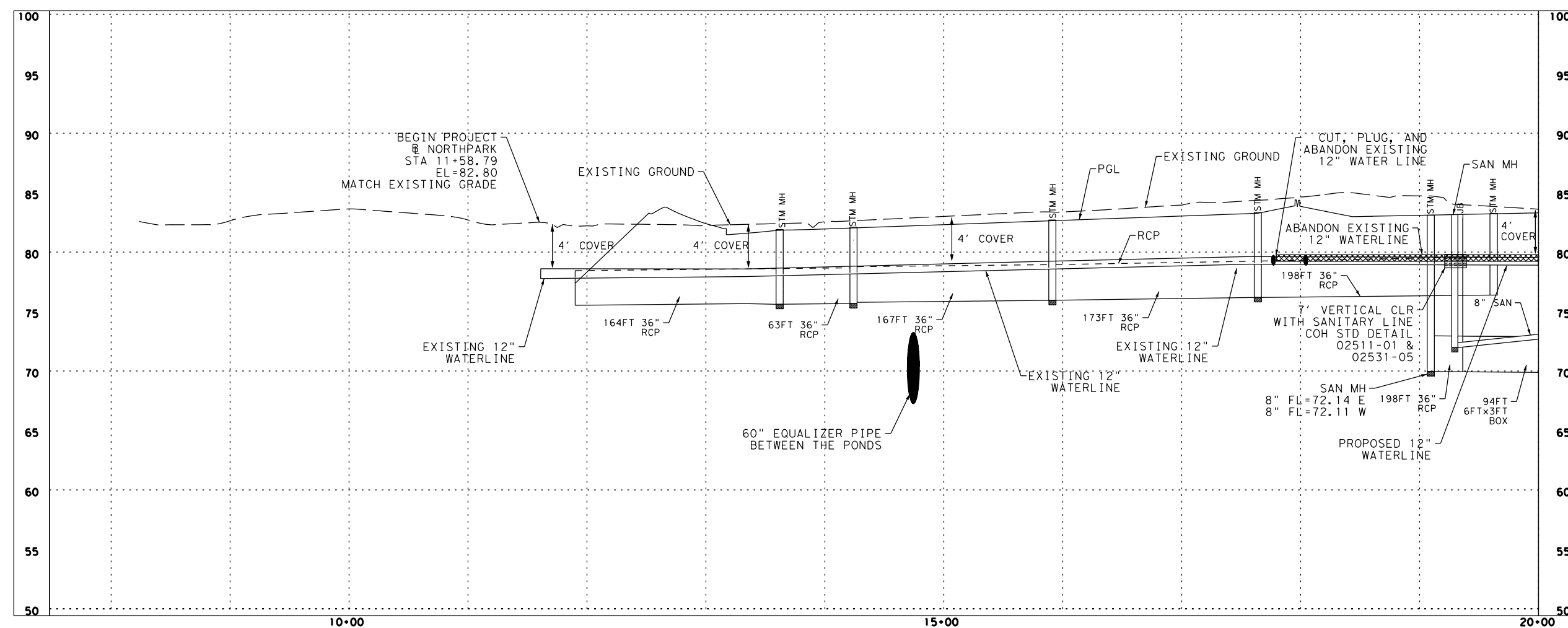





- LEGEND**
- EXIST ROW
 - - - PROP ROW
 - EXIST. WATER LINE
 - - - PROP WATER LINE
 - ▨ EXIST. WATERLINE TO BE REMOVED/ABANDONED

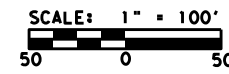
NOTE:

1- EXISTING STORM WATER FEATURES WILL BE REMOVED AND REPLACED.

2- WATERLINE PROFILE BASED ON ASSUMED INSTALLED DEPTH FOR EXISTING WATERLINE. RECORD DRAWINGS OF EXISTING WATERLINES FOR THIS AREA WERE NOT AVAILABLE. CONTRACTOR TO FIELD VERIFIED DEPTH FOR WATERLINE PRIOR TO CONSTRUCTION OF ASSOCIATED IMPROVEMENTS.



NO.		REVISIONS		BY	DATE
<div><div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572</div></div>					
		<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 900 HUNTON ANDREWS KURTH LLP 900 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div>			
NORTH PARK DRIVE					
PROPOSED					
WATERLINE RELOCATION					
PLAN AND PROFILE					
BEGIN TO STA 20+00					
SHEET 1 OF 4					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
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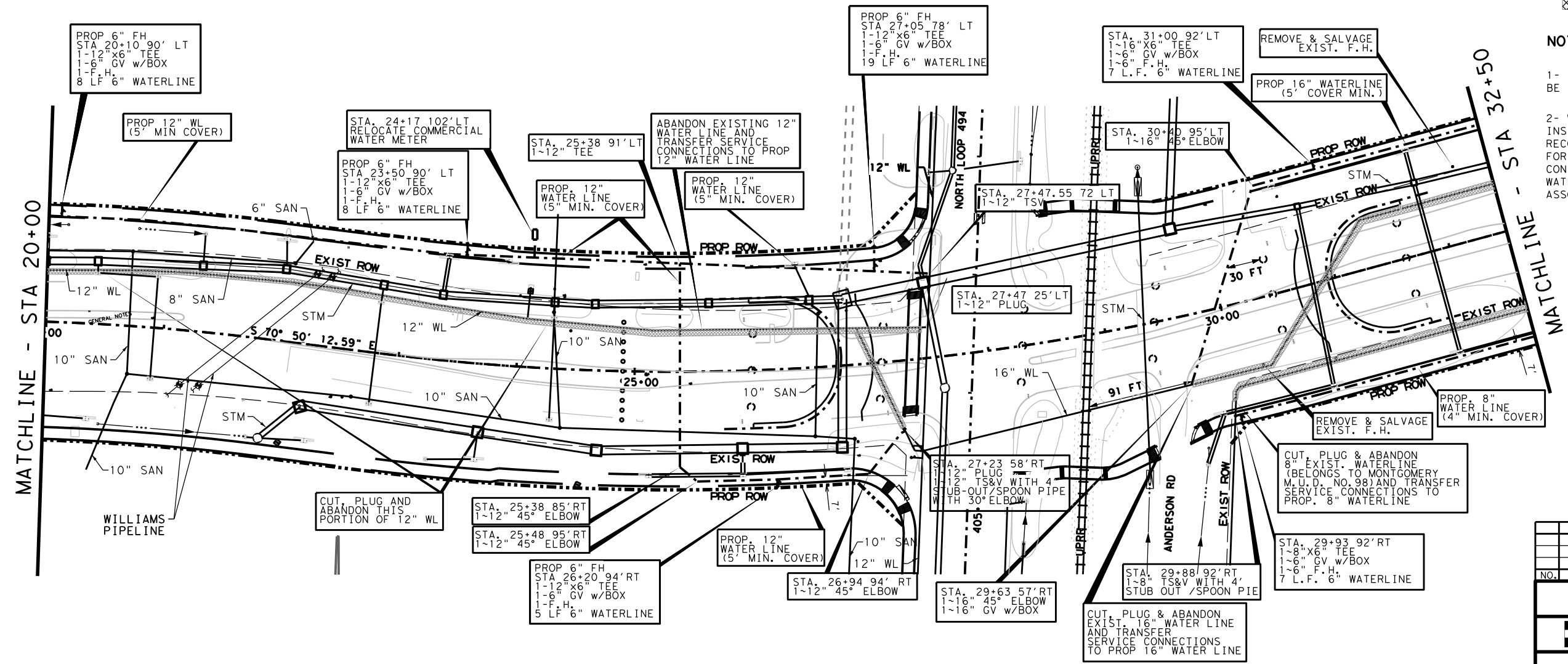


LEGEND

- EXIST ROW
- PROP ROW
- EXIST. WATER LINE
- PROP WATER LINE
- XXXX EXIST. WATERLINE TO BE REMOVED/ABANDONED

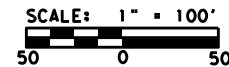
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- 1- EXISTING STORM WATER FEATURES WILL BE REMOVED AND REPLACED.
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NO.		REVISIONS		BY	DATE
<div>HNTB ENGINEERS</div> <div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572</div> <div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>					
CITY OF HOUSTON		<div>HOUSTON PUBLIC WORKS</div>			
<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 205 HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div>					
<div>NORTH PARK DRIVE PROPOSED WATERLINE RELOCATION PLAN STA 20+00 TO STA 32+50 SHEET 2 OF 4</div>					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
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LEGEND

- EXIST ROW
- PROP ROW
- EXIST. WATER LINE
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- EXIST. WATERLINE TO BE REMOVED/ABANDONED

NOTE:




1- EXISTING STORM WATER FEATURES WILL BE REMOVED AND REPLACED.

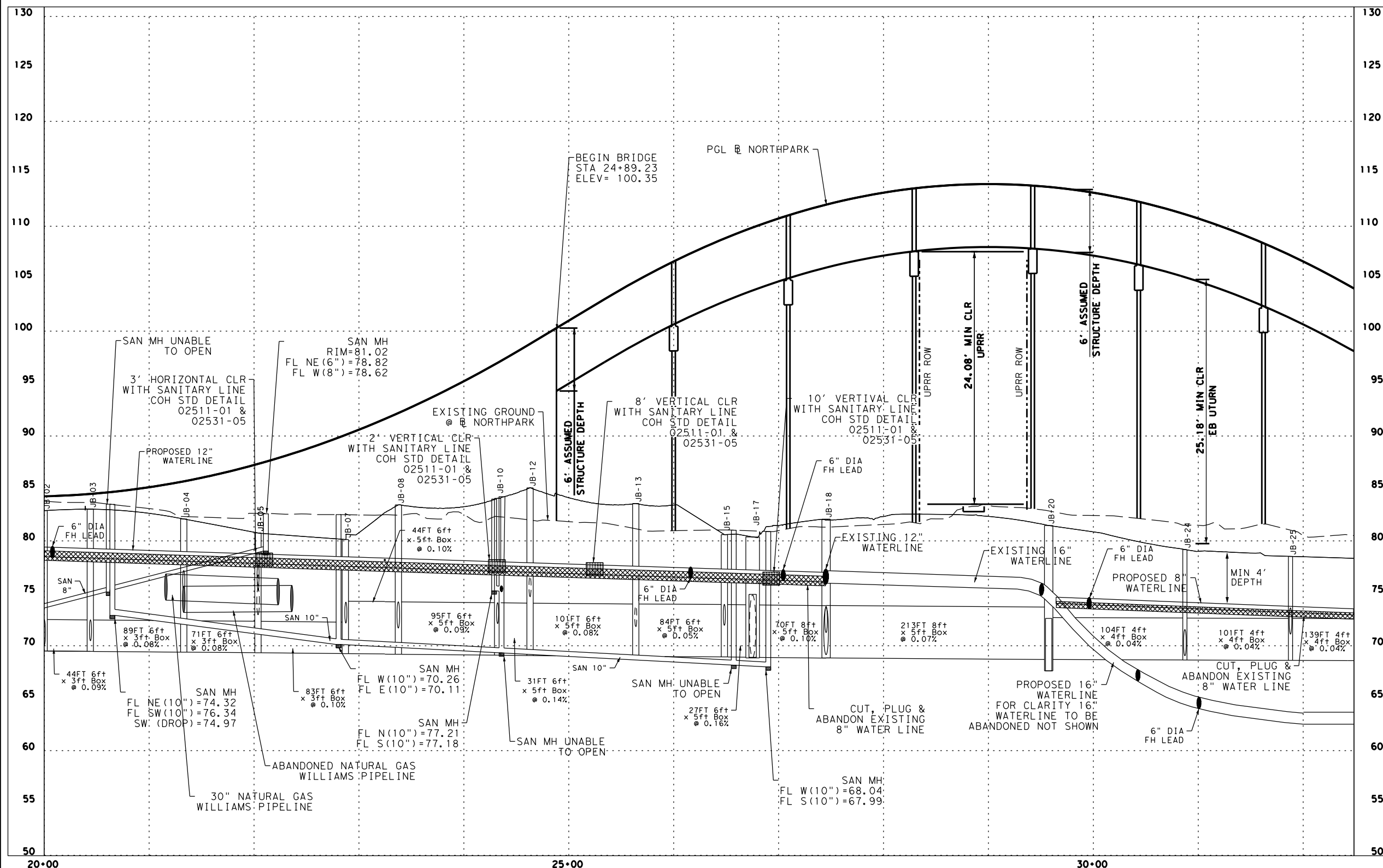
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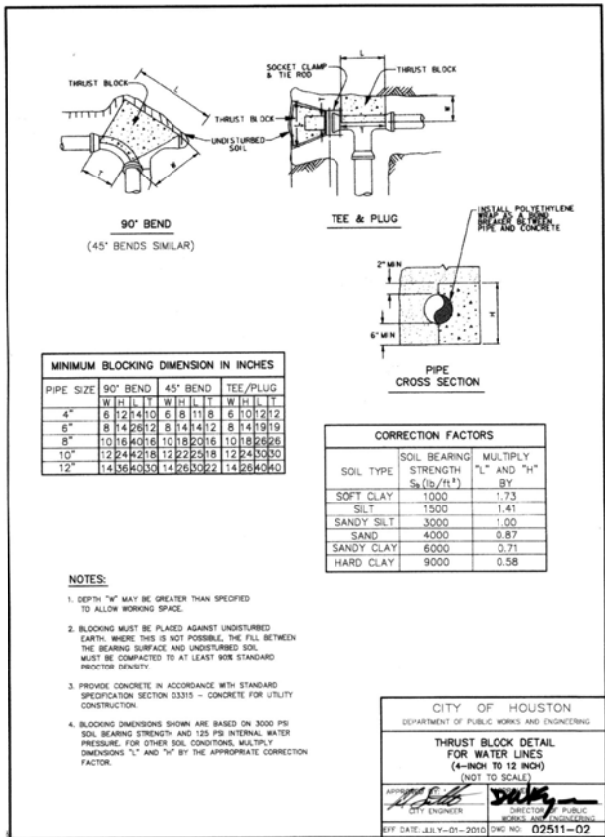
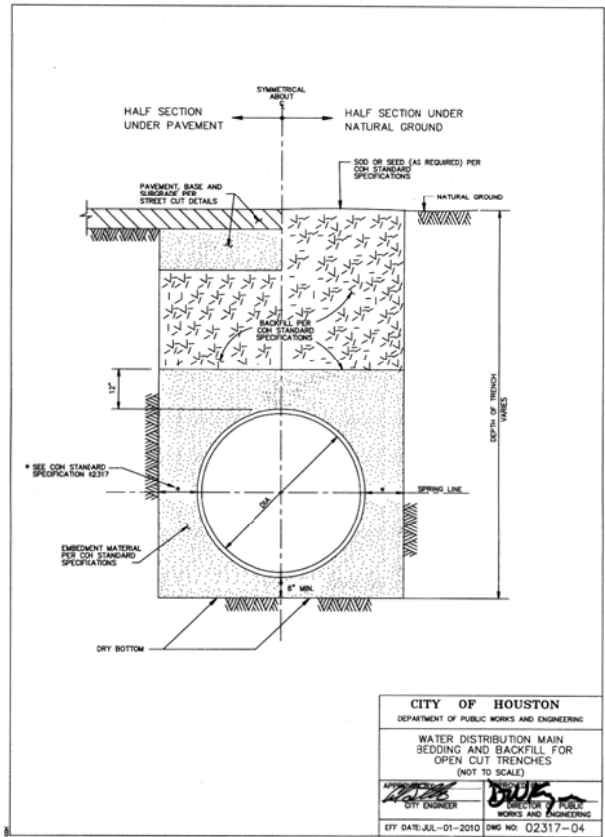
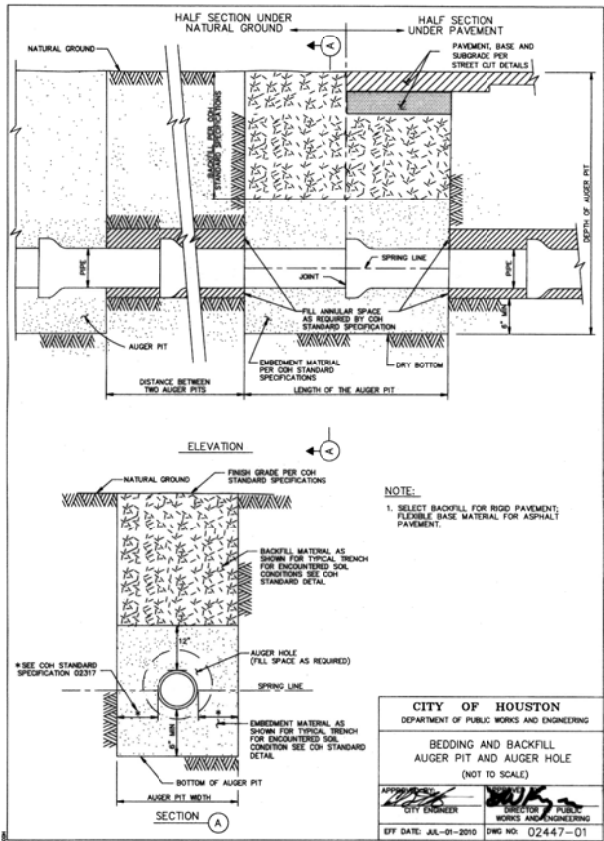
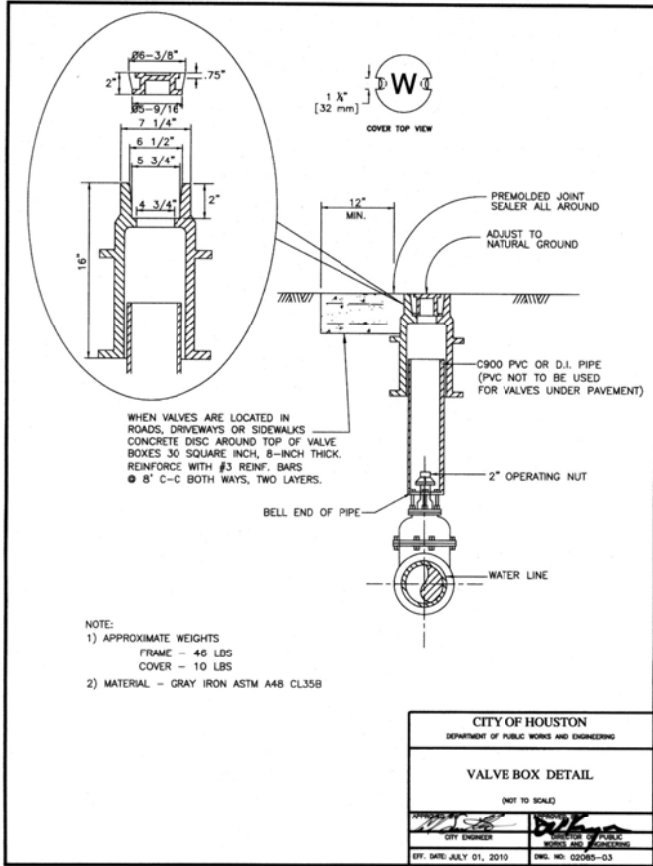
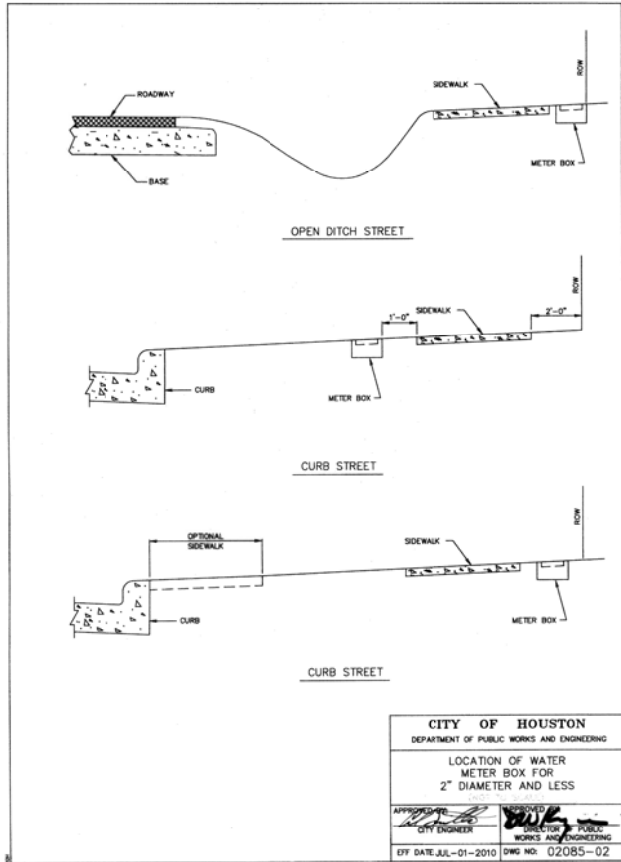
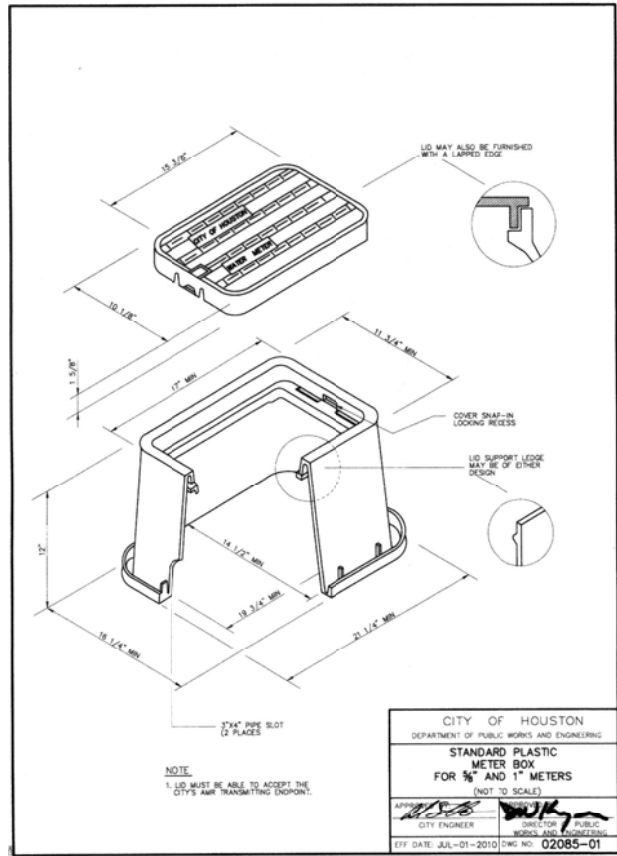
Eduardo Quiroz

4/1/2021

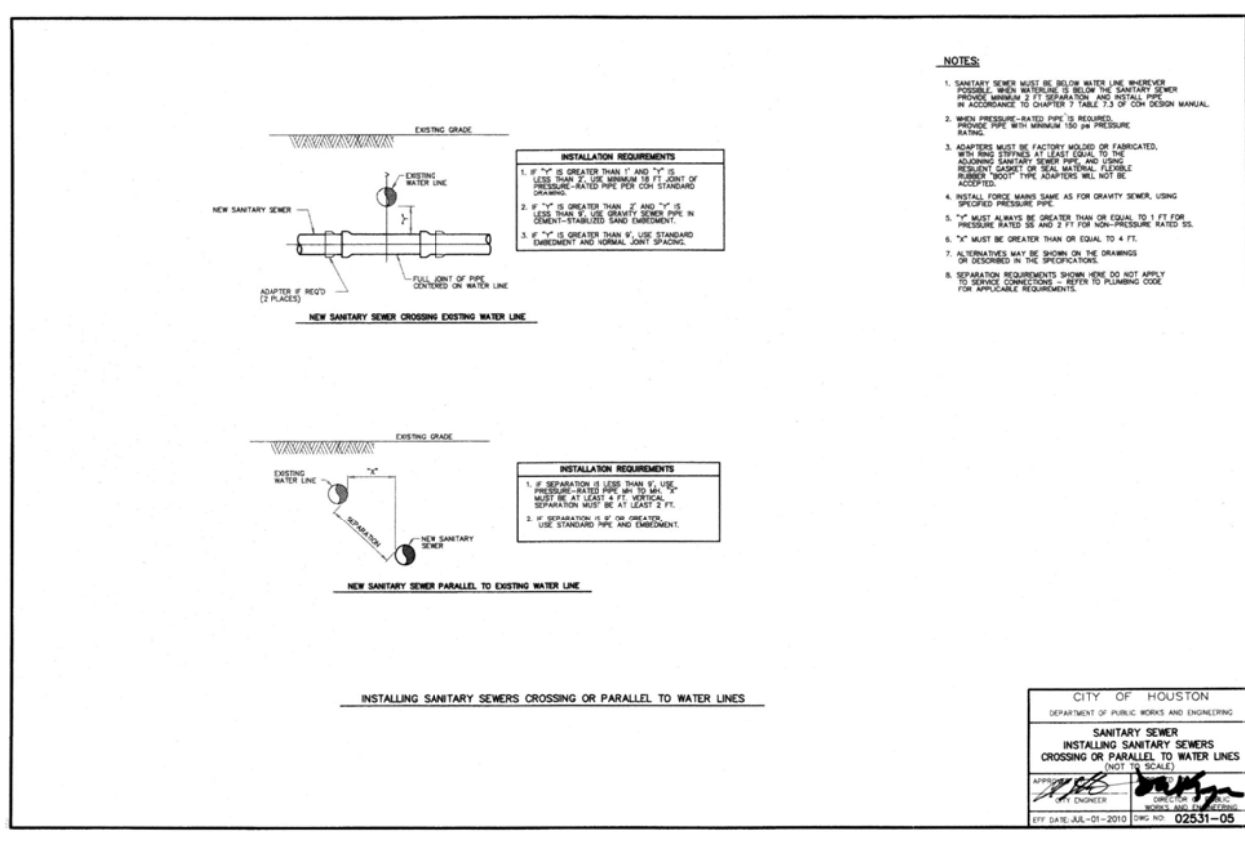
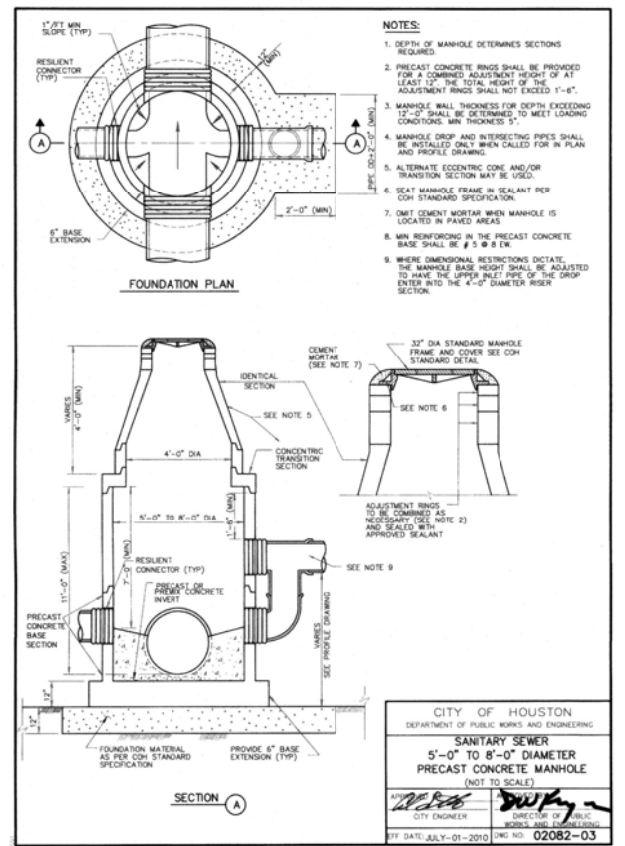
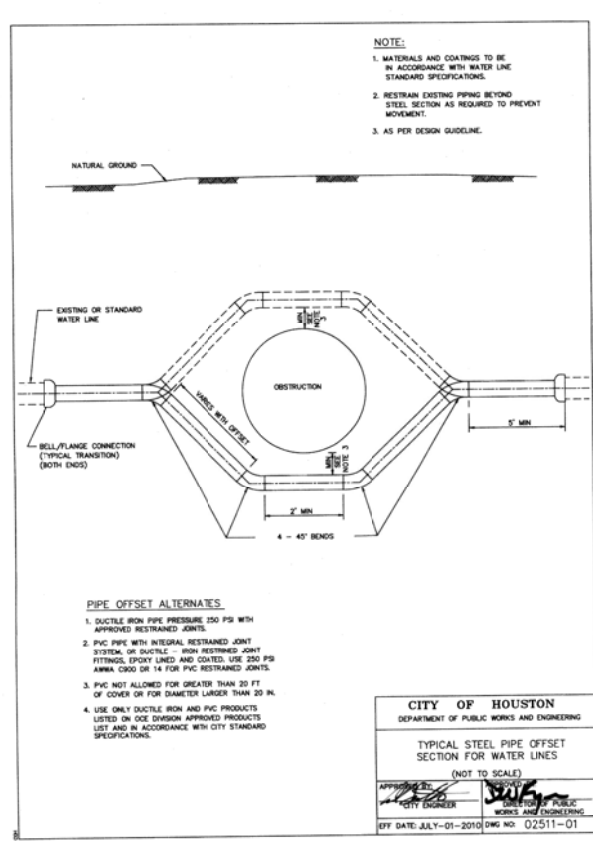
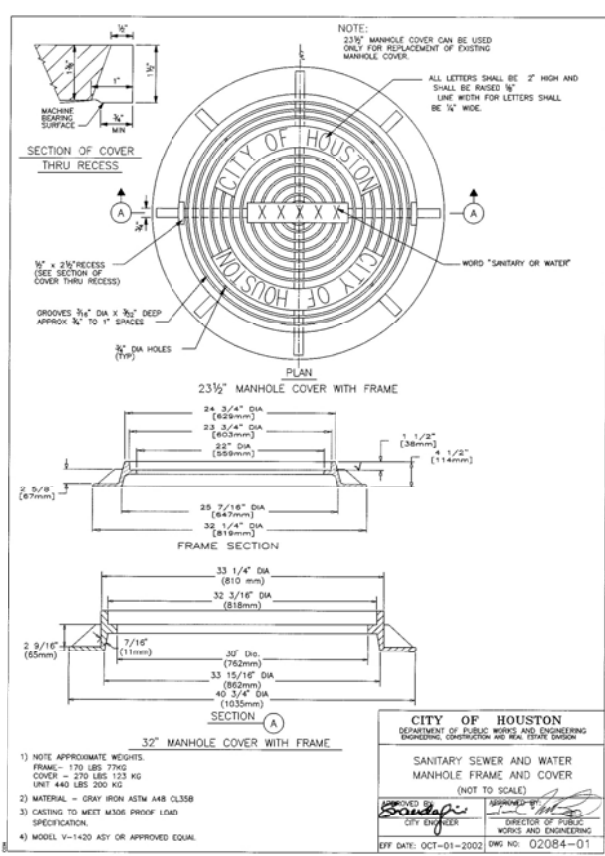
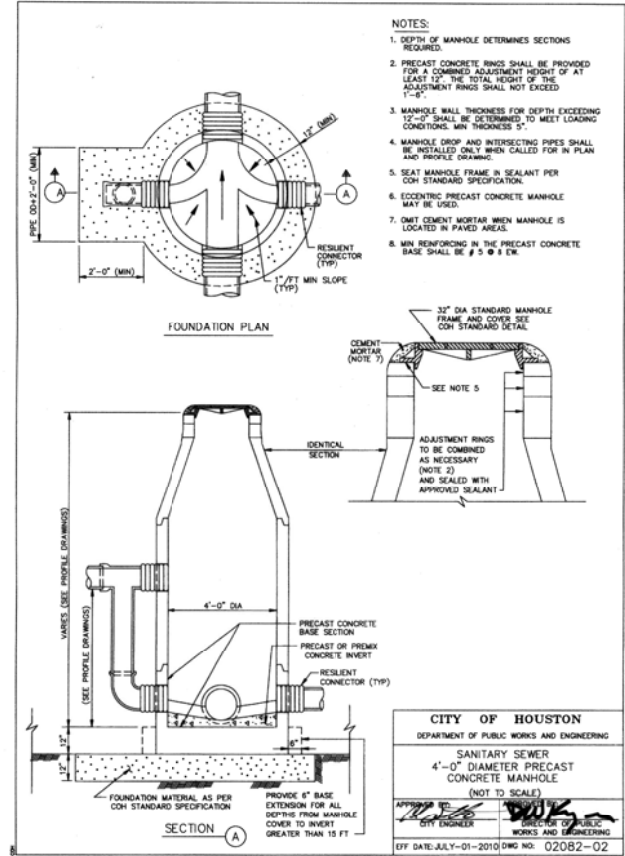
NO.	REVISIONS			BY	DATE
		5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 79-7744 TX FIRM No. 18572			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 GO HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007	
NORTH PARK DRIVE PROPOSED WATERLINE RELOCATION PROFILE STA 20+00 TO STA 32+50 SHEET 3 OF 4					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
				SHEET No.	382



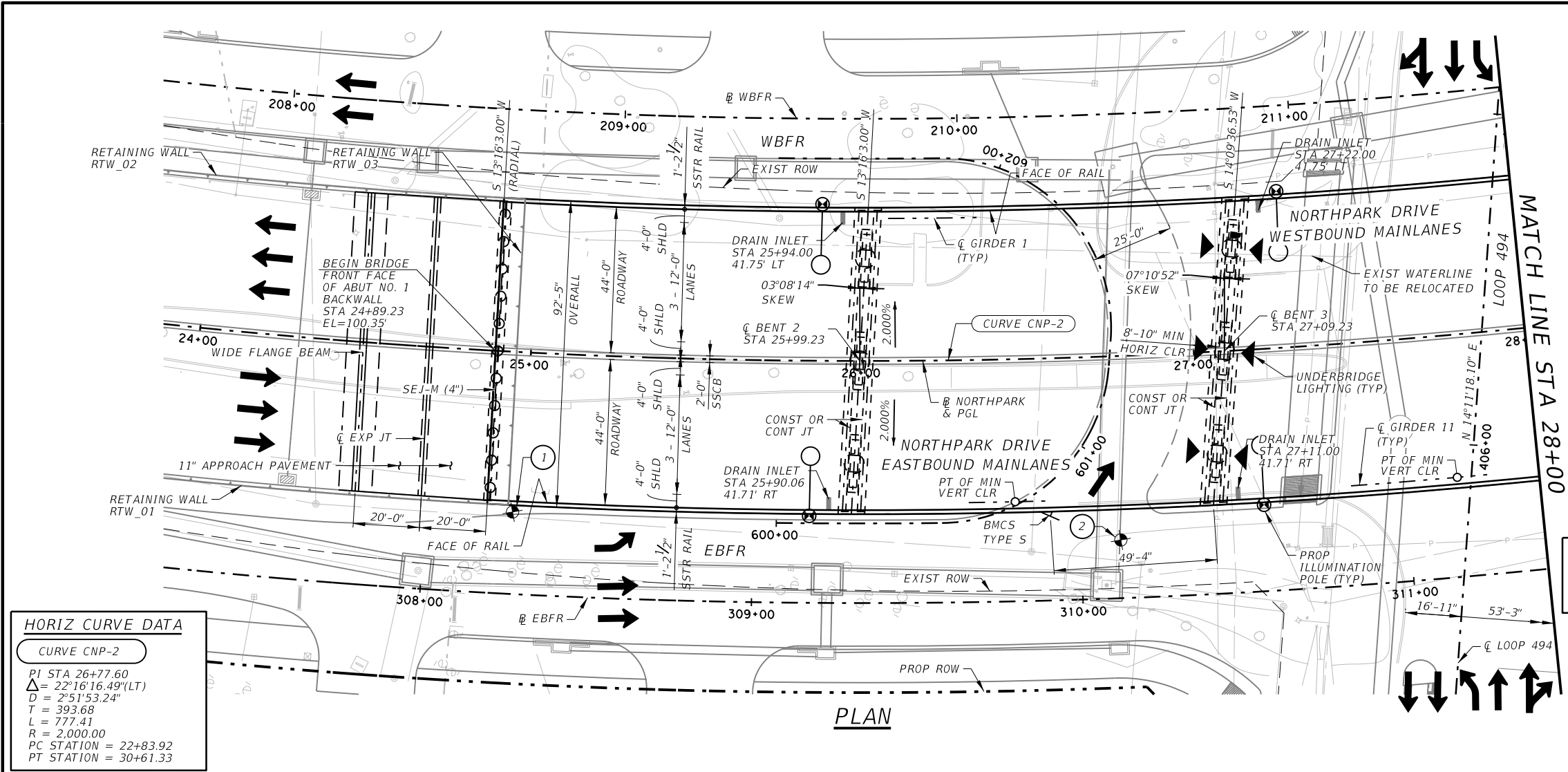
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HNTB ENGINEERS 5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE			
STANDARD DETAILS			
WATER AND WASTEWATER			
SHEET 1 OF 3			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 384



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GENERAL NOTES:

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH ED, 2017 WITH CURRENT INTERIMS.
- CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION.
- SEE BORING LOG SHEETS FOR TEST HOLE DATA.
- GIRDER END CONDITIONS:
D - DENOTES DOWEL AT EXTERIOR GIRDER
BLANK - DENOTES NO DOWEL
- FOR TYPICAL SECTION, SEE TYPICAL SECTION SHEET.
- ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE.
- FOR UTILITY INFORMATION AND NOTES, SEE FOUNDATION LAYOUT SHEETS.
- SEE COLUMN DETAILS FOR COLUMN "H" HEIGHTS.
- COORDINATE WITH RETAINING WALL DRAWINGS FOR LAYOUT AND DETAILS.
- SEE CSBE-RW STANDARD FOR CEMENT STABILIZED BACKFILL EMBANKMENT DETAILS.
- SEE BRIDGE DECK DRAIN DETAILS FOR MORE INFORMATION ON BRIDGE DRAINAGE.
- SEE PROPOSED ILLUMINATION PLANS AND BL STANDARD FOR MORE INFORMATION ON BRIDGE LIGHTING AND UNDERBRIDGE LIGHTING.
- SEE TYPICAL SECTION FOR PROPOSED CONDUIT LOCATION.
- THE CONTRACTOR SHALL COORDINATE WITH CENTERPOINT TO DE-ENERGIZE CONFLICTING OVERHEAD UTILITY LINES DURING ALL PHASES OF CONSTRUCTION

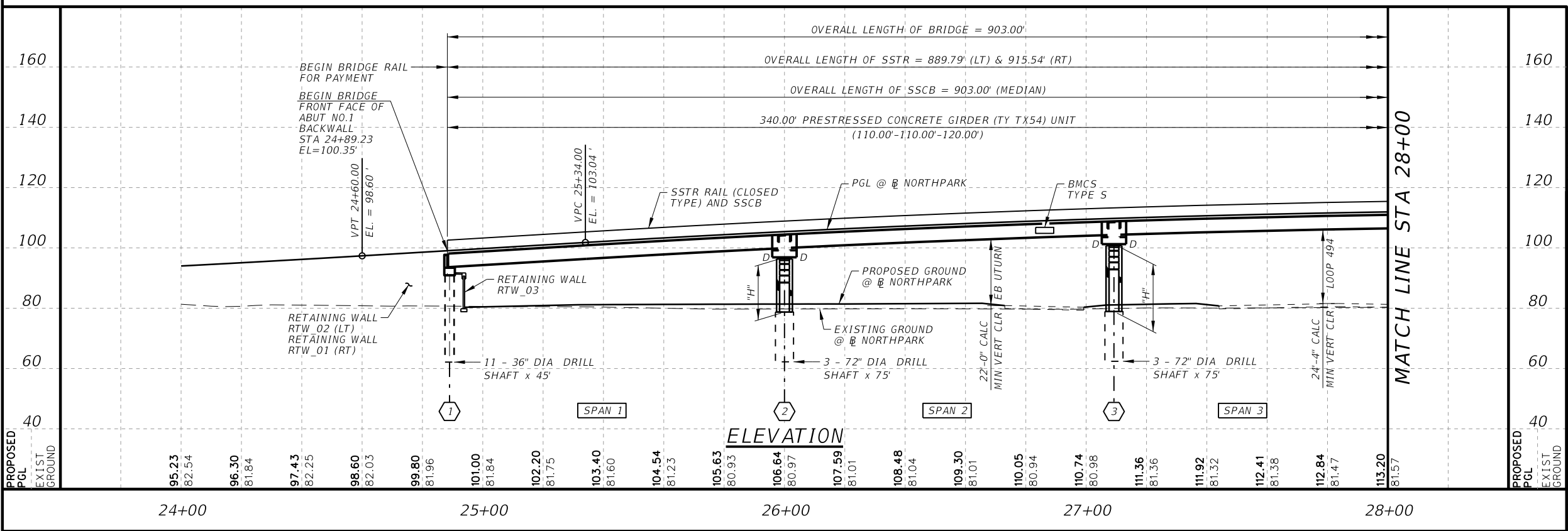
NOTE TO REVIEWER:
AN NBI NUMBER HAS NOT BEEN ASSIGNED.
IT WILL BE ADDED ONCE AVAILABLE.

DESIGN SPEED: 45 MPH
ADT (2020): 50,766
ADT (2040): 54,304
FUNCTIONAL CLASSIFICATION: URBAN ARTERIAL
PROPOSED NBI NUMBER: XX-XXX-X-XXXX-XX-XXX

SOIL BORING B-BRG-01
STA 24+96.95
48.27' RT

SOIL BORING B-BRG-02
STA 26+75.87
55.44' RT

STATE OF TEXAS
JENNIFER E. BOHLANDER
131488
LICENSED PROFESSIONAL ENGINEER
DATE: 4/1/2021
SCALE: 1"=40'



HL-93 LOADING

NO.	REVISIONS	BY	DATE

HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS
NORTH PARK DRIVE

BRIDGE LAYOUT
BEGIN TO STA 28+00

DESIGNED: JEB
CHECKED: AMS
DRAWN: JES
CHECKED: JME

FED. RD. DIST. NO.: 6
STATE: TEXAS
COUNTY: HOU
DISTRICT: MONTGOMERY

CITY OF HOUSTON WBS
SEE TITLE SHEET

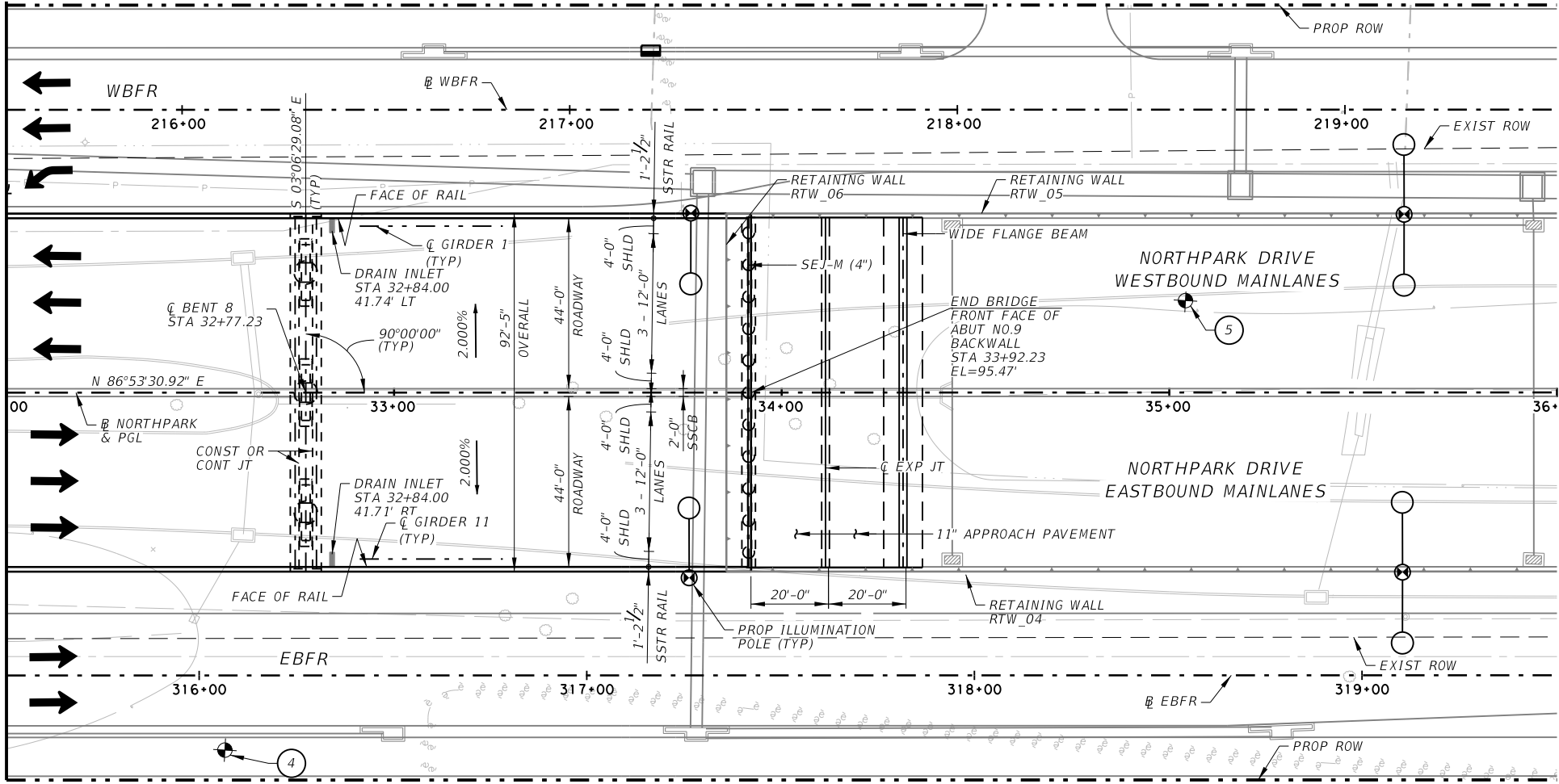
CONTROL NO.: 0912
SECTION NO.: 37

JOB NO.: 232
SHEET NO.: 387

DESIGNED: JEB
CHECKED: AMS
DRAWN: JES
CHECKED: JME

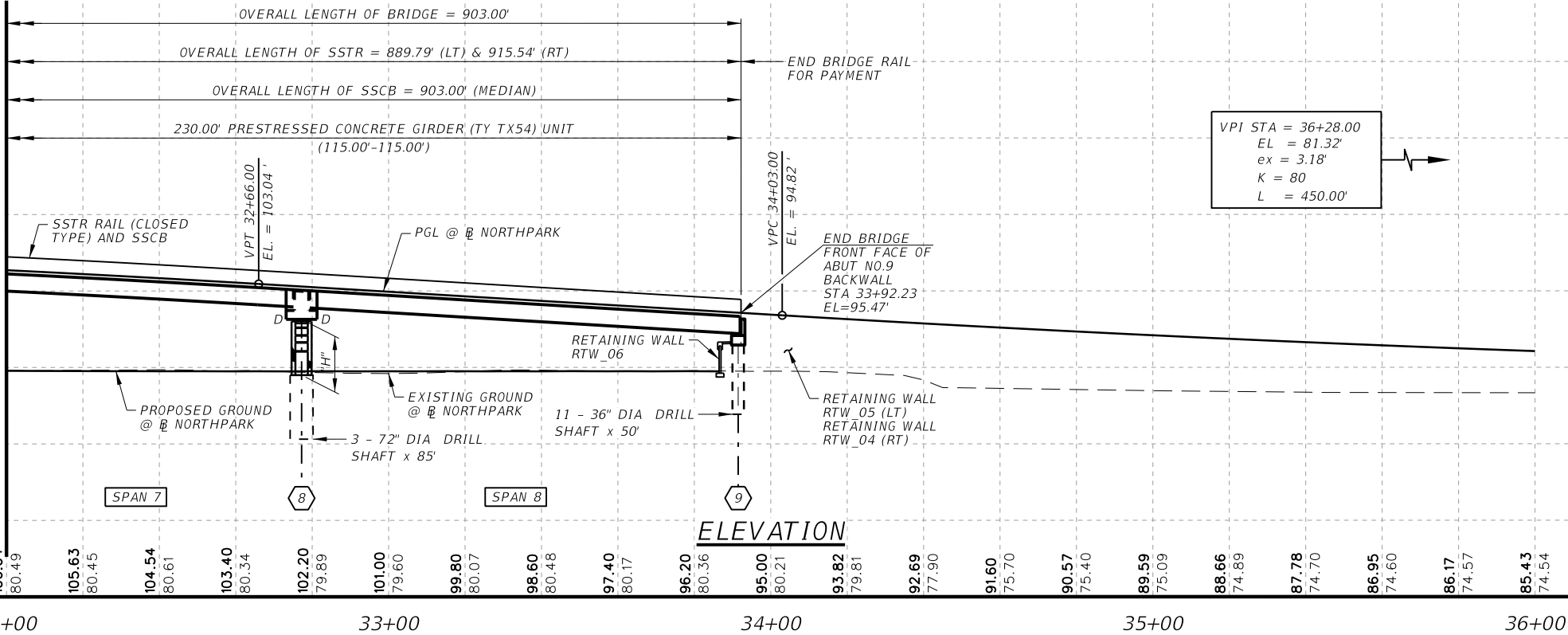
DATE: 4/1/2021
4:48:23 PM

MATCH LINE STA 32+00



PLAN

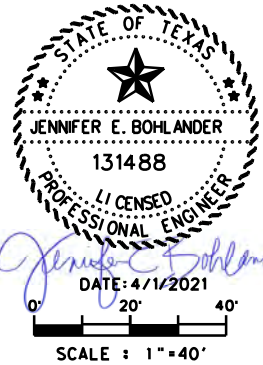
MATCHLINE - STA. 32+00



ELEVATION

NOTES:
1. FOR GENERAL NOTES, SEE SHEET 1 OF 3.

- 4 SOIL BORING B-BRG-04
STA 32+56.35
92.27' RT
- 5 SOIL BORING B-BRG-05
STA 35+04.18
23.72' LT



HL-93 LOADING

NO. REVISIONS BY DATE

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420



CITY OF HOUSTON

HOUSTON PUBLIC WORKS

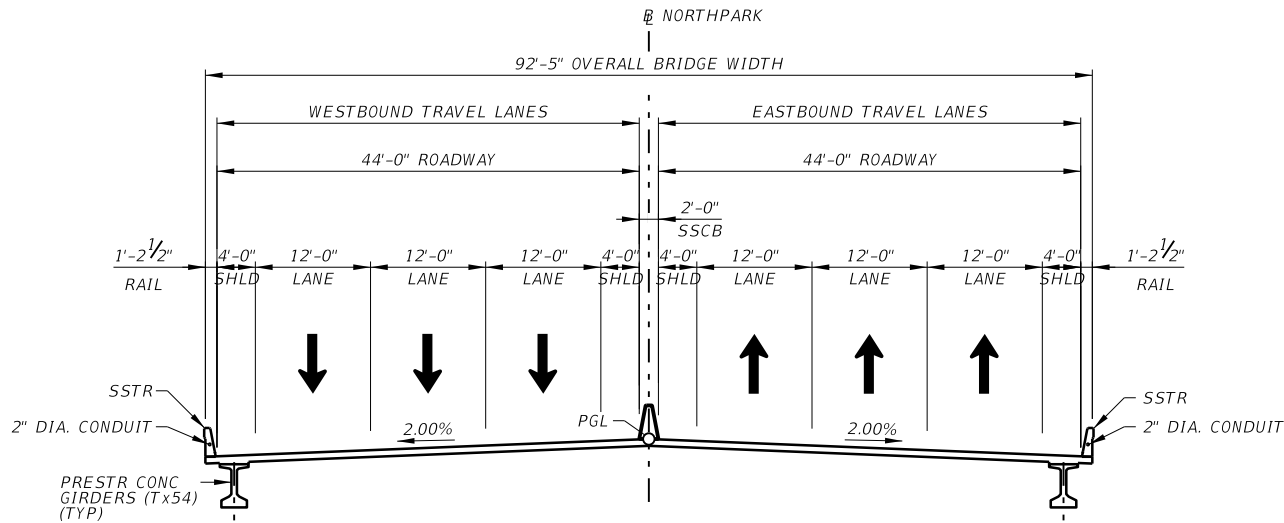
NORTH PARK DRIVE

BRIDGE LAYOUT
STA 32+00 TO END

DESIGNED:				CITY OF HOUSTON WBS				HIGHWAY NO.	
JEB	AMS	6	TEXAS	SEE	TITLE	SHEET	CS		
DRAWN:				CONTROL				JOB	
JES	JME	HOUSTON	MONTGOMERY	0912	37	232	389		
CHECKED:				DATE				SHEET	
JME	JME	HOUSTON	MONTGOMERY	0912	37	232	389		

4/1/2021

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TYPICAL TRANSVERSE SECTION



HL-93 LOADING

NO.	REVISIONS	BY	DATE		
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE					
BRIDGE TYPICAL SECTION					
SHEET 1 OF 1					
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	AMS			SEE TITLE SHEET	CS
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	JME	HOU	MONTGOMERY	0912	37
				232	390

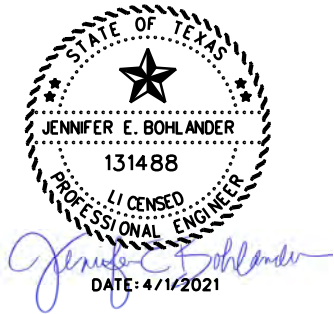
4/1/2021


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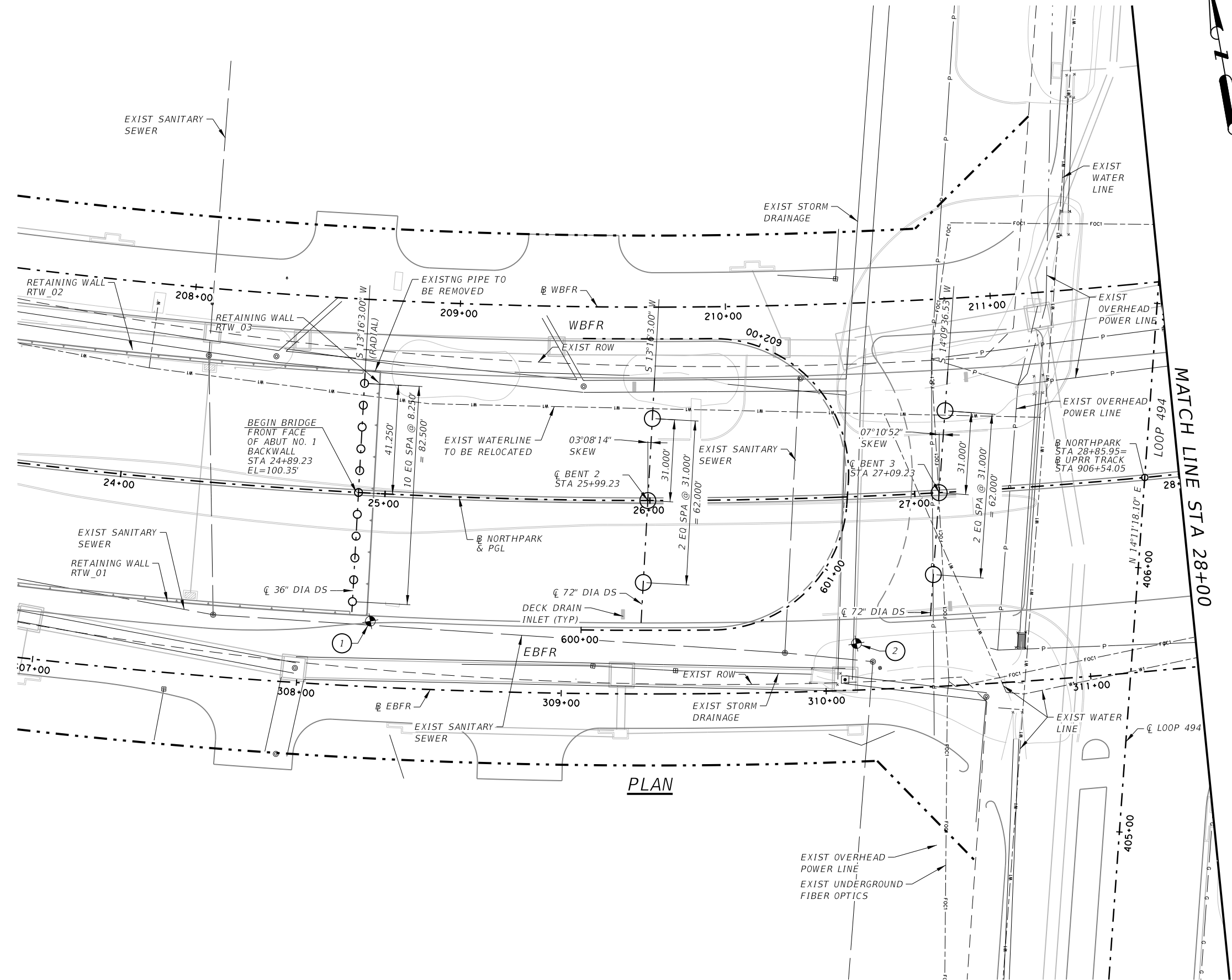
SUMMARY OF ESTIMATED QUANTITIES											
ITEM NUMBER	416	416	420	420	420	422	425	450	454	471	514
DESCRIPTION CODE	6004	6010	6013	6082	6039	6001	6039	6023	6018	6007	6001
BRIDGE ELEMENT	DRILL SHAFT	DRILL SHAFT	CL C CONC	CL F CONC	CL C CONC	REINF CONC SLAB	PRESTR CONC GIRDER	RAIL	SEALED EXPANSION JOINT	GRATE AND FRAME	PERM CTB
	(36 IN)	(72 IN)	(ABUT)	(CAP)	(COLUMN) (MASS)		(TX54)	(TY SSTR)	(4 IN) (SEJ-M)	(BRIDGE DRAIN)	(SGL SLOPE) (TY 1) (42)
	LF	LF	CY	CY	CY	SF	LF	LF	LF	EA	LF
2 ~ ABUTMENTS	1,045		93.0								
7 ~ INTERIOR BENTS		1,740		879.2	423.8						
1 ~ 340.00' PRESTR CONC I-GIRDER UNIT						31,285	3,626.06	678.4	91	4	340
1 ~ 333.00' PRESTR CONC I-GIRDER UNIT						30,653	3,528.80	666.0	93	6	333
1 ~ 230.00' PRESTR CONC I-GIRDER UNIT						21,120	2,461.25	460.0	182	4	230
TOTAL	1,045	1,740	93.0	879.2	423.8	83,058	9,616.11	1,804.4	366	14	903

BEARING SEAT ELEVATIONS

BENT 1	(FWD)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		93.862	94.035	94.208	94.380	94.553	94.726	94.554	94.381	94.208	94.035	93.862
BENT 2	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		100.033	100.182	100.331	100.480	100.630	100.779	100.588	100.393	100.197	100.002	99.807
	(FWD)	100.390	100.539	100.687	100.836	100.986	101.135	100.941	100.744	100.548	100.352	100.155
BENT 3	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		104.654	104.792	104.930	105.068	105.206	105.344	105.141	104.935	104.729	104.523	104.317
	(FWD)	104.821	104.960	105.099	105.238	105.378	105.517	105.313	105.106	104.898	104.691	104.484
BENT 4	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		107.204	107.358	107.511	107.665	107.818	107.970	107.783	107.591	107.399	107.207	107.015
	(FWD)	107.255	107.411	107.568	107.724	107.880	108.035	107.847	107.654	107.462	107.269	107.075
BENT 5	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		107.349	107.538	107.726	107.914	108.100	108.286	108.132	107.973	107.812	107.651	107.489
	(FWD)	107.287	107.481	107.674	107.866	108.057	108.247	108.093	107.933	107.773	107.612	107.450
BENT 6	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		105.896	106.066	106.237	106.409	106.579	106.750	106.578	106.404	106.229	106.054	105.879
	(FWD)	105.764	105.935	106.106	106.278	106.449	106.620	106.447	106.273	106.099	105.924	105.750
BENT 7	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		102.033	102.206	102.378	102.551	102.724	102.897	102.724	102.551	102.378	102.206	102.033
	(FWD)	101.713	101.886	102.059	102.232	102.404	102.577	102.404	102.232	102.059	101.886	101.713
BENT 8	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		95.980	96.152	96.325	96.498	96.671	96.844	96.671	96.498	96.325	96.152	95.980
	(FWD)	95.608	95.781	95.953	96.126	96.299	96.472	96.299	96.126	95.953	95.781	95.608
BENT 9	(BK)	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10	GIRDER 11
		88.933	89.106	89.278	89.451	89.624	89.797	89.624	89.451	89.278	89.106	88.933



NO.	REVISIONS			BY	DATE
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE					
ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS					
SHEET 1 OF 1					
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	JME	HOU	MONTGOMERY	0912	37
				232	391

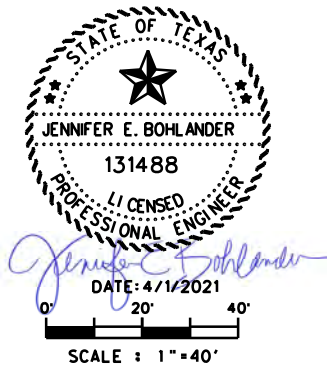


PLAN

NOTES:

1. THE INFORMATION SHOWN ON THE DRAWING CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND PIPELINES, CONDUITS, AND STRUCTURES BY CONTACTING OWNERS OF UNDERGROUND UTILITIES AND BY PROSPECTING IN ADVANCE OF EXCAVATION OPERATIONS.
2. SOIL BORINGS USED FOR FOUNDATION DESIGN ARE SHOWN ON BORING LOGS SHEETS.
3. SEE BRIDGE LAYOUT FOR DRILLED SHAFT LENGTHS AND ADDITIONAL NOTES.
4. DRILLED SHAFT SPACING SHOWN ALONG CENTERLINE OF DRILLED SHAFTS.
5. CONTRACTOR SHALL VERIFY IN THE FIELD THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING STRUCTURES AND FOUNDATIONS PRIOR TO COMMENCING WORK OR ORDERING MATERIALS. IF ANY CONFLICT WITH PROPOSED FOUNDATIONS IS ENCOUNTERED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

- 1 SOIL BORING B-BRG-01
STA 24+96.95
48.27' RT
- 2 SOIL BORING B-BRG-02
STA 26+75.87
55.44' RT

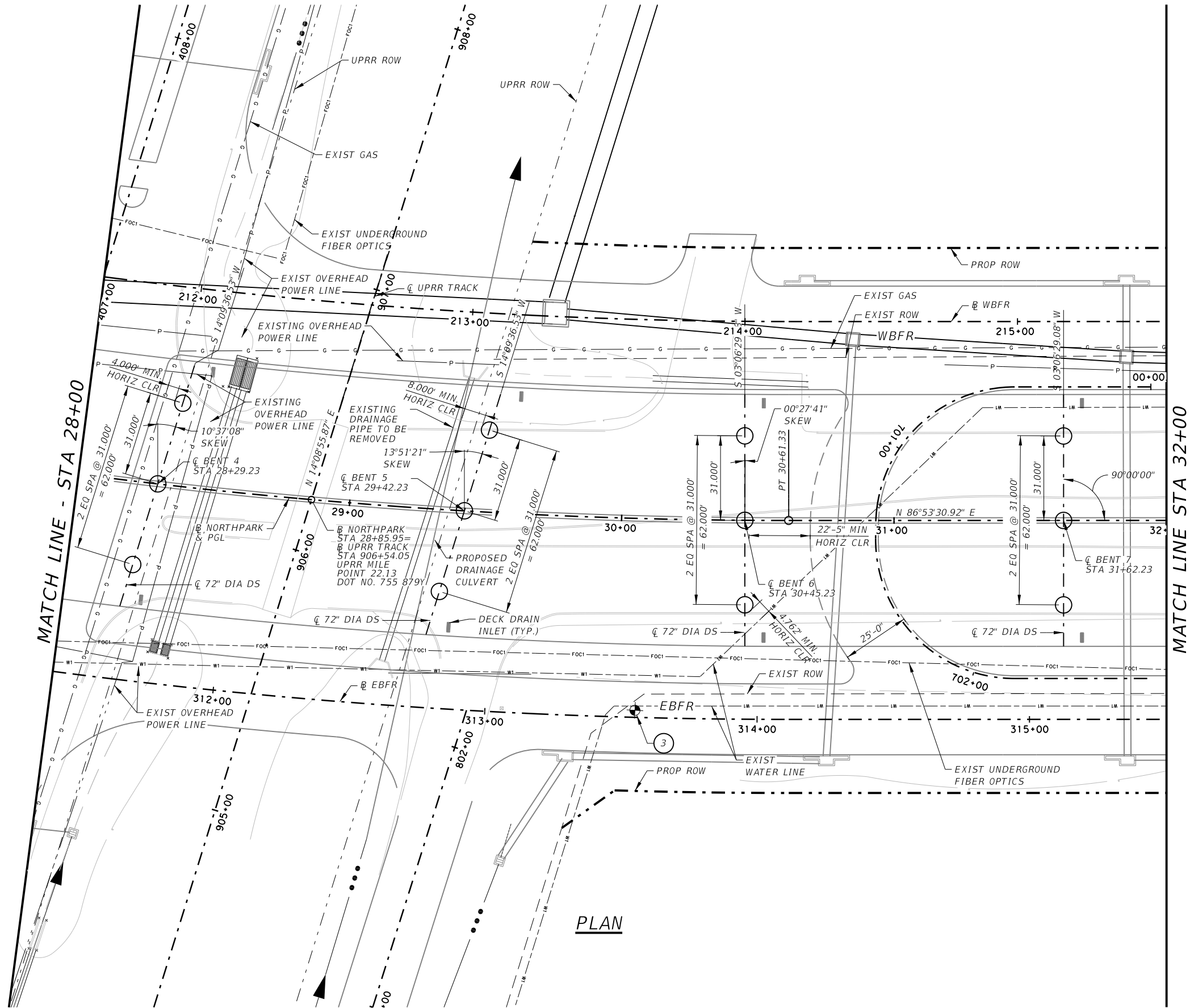


HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
FOUNDATION LAYOUT BEGIN TO STA 28+00			
SHEET 1 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	HIGHWAY NO. CS
DRAWN:	JES	SEE TITLE SHEET	
CHECKED:	JME	STATE DISTRICT COUNTY CONTROL NO. SECTION NO. JOB SHEET NO.	
		HOU MONTGOMERY 0912 37 232 392	

4/1/2021

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NOTE:
1. SEE SHEET 1 OF 3 FOR ADDITIONAL NOTES.

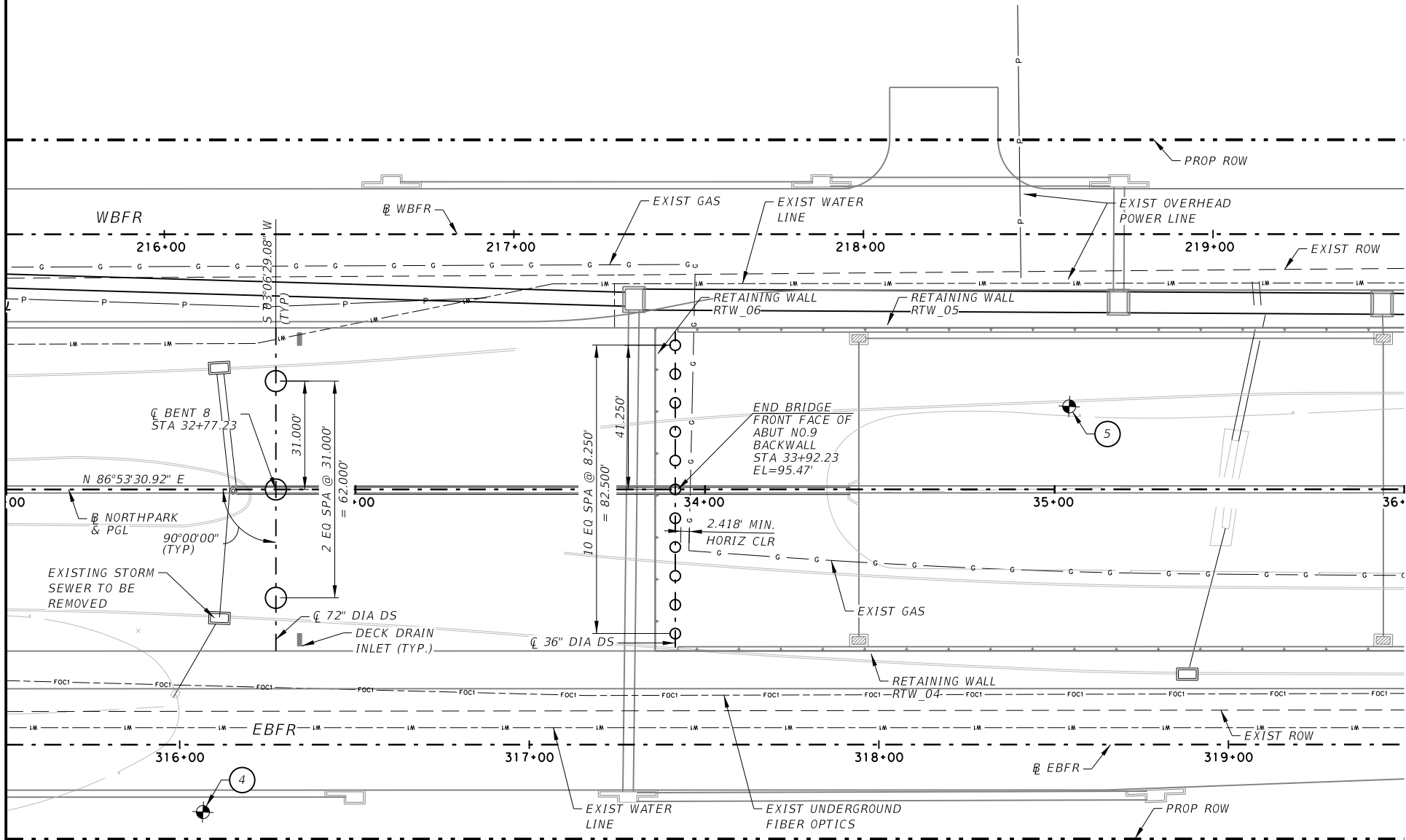
3 SOIL BORING B-BRG-03
STA 30+06.79
70.42' RT



HL-93 LOADING

NO.	REVISIONS						BY	DATE	
<div><div>HNTB</div><div><div><div>LH RA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10</div></div><div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div><div>c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div>									
<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div><div>NORTHPARK DRIVE</div><div>FOUNDATION LAYOUT</div><div>STA 28+00 TO STA 32+00</div></div>									
SHEET 2 OF 3									
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.	
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET No.	
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232		393	

MATCH LINE STA 32+00




PLAN

NOTES:
1. SEE SHEET 1 OF 3 FOR ADDITIONAL NOTES.

- 4 SOIL BORING B-BRG-01
STA 32+56.35
92.72' RT
- 5 SOIL BORING B-BRG-02
STA 35+04.18
23.72' LT

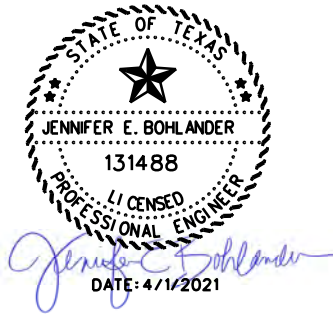


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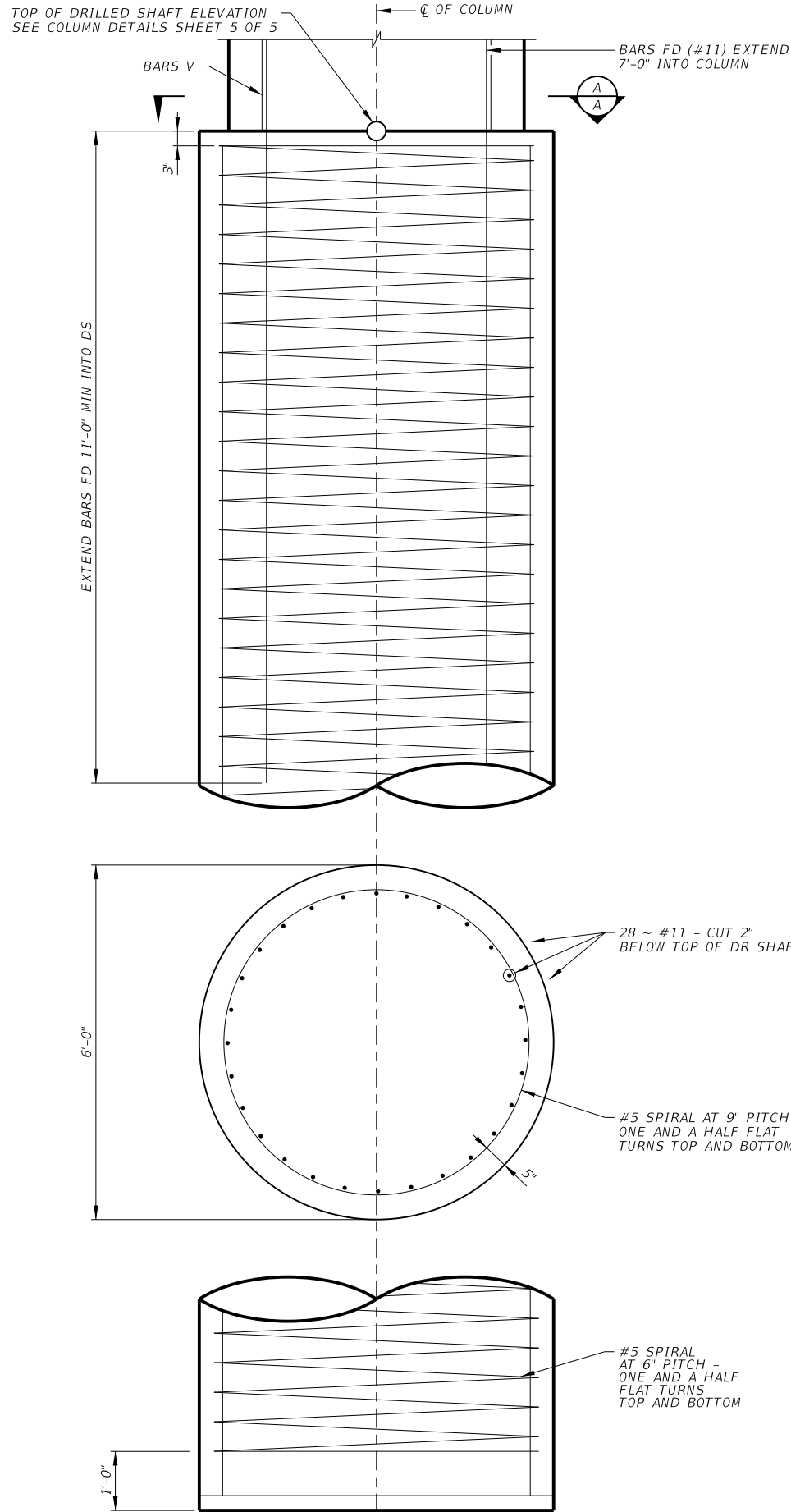
NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
FOUNDATION LAYOUT									
STA 32+00 TO END									
SHEET 3 OF 3									
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	394		
4/1/2021					4: 47: 04 PM				

NOTES:
1. FOR TOP OF DRILLED SHAFT ELEVATIONS, SEE COLUMN DETAILS SHEET 5 OF 5.

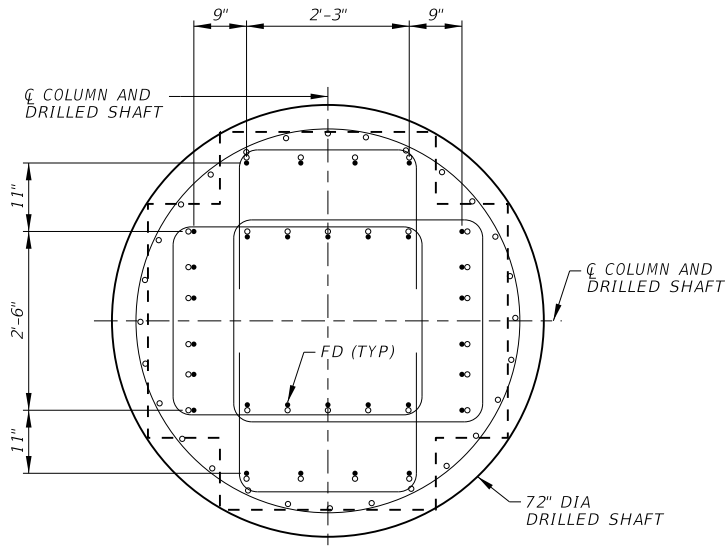
TABLE OF ESTIMATED FOUNDATION QUANTITIES				
ABUT/BENT	DRILLED SHAFT NO.	DRILLED SHAFT SIZE (IN)	DRILLED SHAFT LENGTH (FT)	LOADS (TONS)
ABUT 1	1	36	45	100
	2	36	45	100
	3	36	45	100
	4	36	45	100
	5	36	45	100
	6	36	45	100
	7	36	45	100
	8	36	45	100
	9	36	45	100
	10	36	45	100
	11	36	45	100
BENT 2	1	72	75	770
	2	72	75	770
	3	72	75	770
BENT 3	1	72	75	805
	2	72	75	805
	3	72	75	805
BENT 4	1	72	90	825
	2	72	90	825
	3	72	90	825
BENT 5	1	72	85	810
	2	72	85	810
	3	72	85	810
BENT 6	1	72	85	795
	2	72	85	795
	3	72	85	795
BENT 7	1	72	85	805
	2	72	85	805
	3	72	85	805
BENT 8	1	72	85	735
	2	72	85	735
	3	72	85	735
ABUT 9	1	36	50	105
	2	36	50	105
	3	36	50	105
	4	36	50	105
	5	36	50	105
	6	36	50	105
	7	36	50	105
	8	36	50	105
	9	36	50	105
	10	36	50	105
	11	36	50	105



NO.	REVISIONS			BY	DATE			
<div><div><div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div></div><div><div>LHRA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div></div>								
<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div><div>NORTH PARK DRIVE</div><div>FOUNDATION ESTIMATED QUANTITIES</div></div>								
SHEET 1 OF 1								
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON MBS	HIGHWAY NO.			
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET	CS			
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.			
CHECKED:	JME	HOU	MONTGOMERY	0912	37			
				232	395			



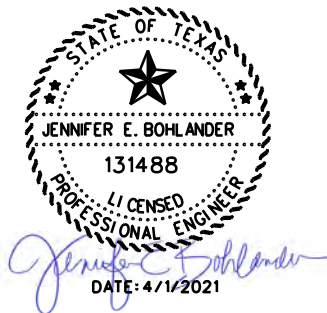
FRONT ELEVATION



SECTION A-A

GENERAL NOTES:

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATION, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
- CLASS "SS", $f'c = 3600$ psi.
- ALL REINFORCING STEEL TO BE GRADE 60.
- SEE ABUTMENT DETAILS SHEETS FOR 36" DRILLED SHAFT DETAILS.

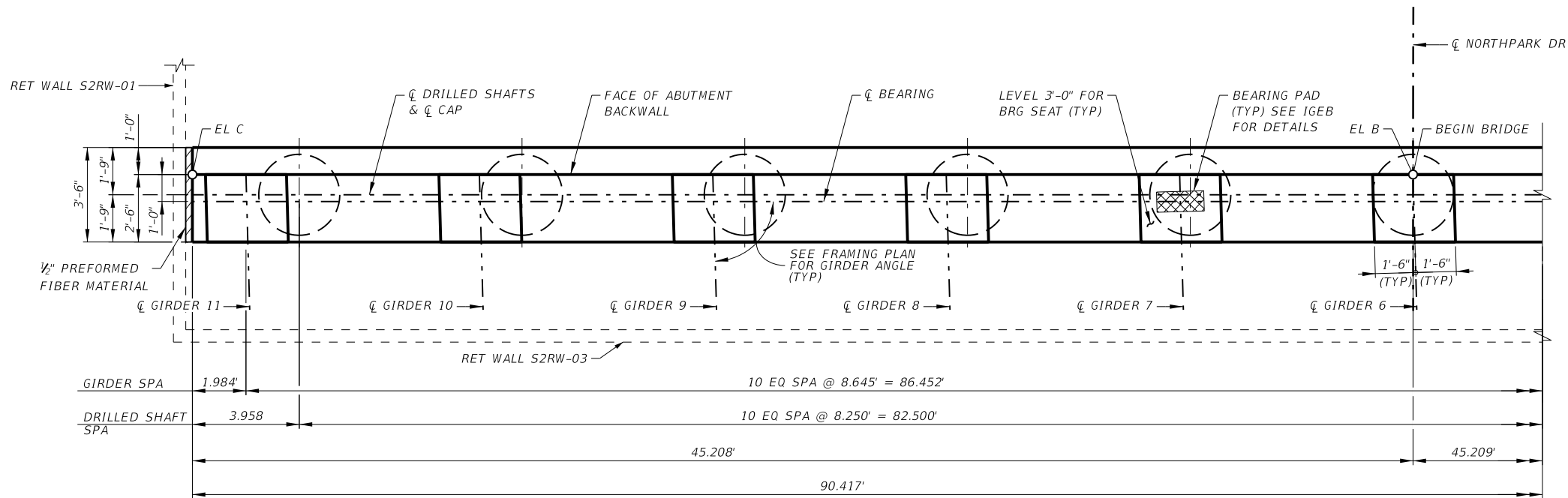


HL-93 LOADING

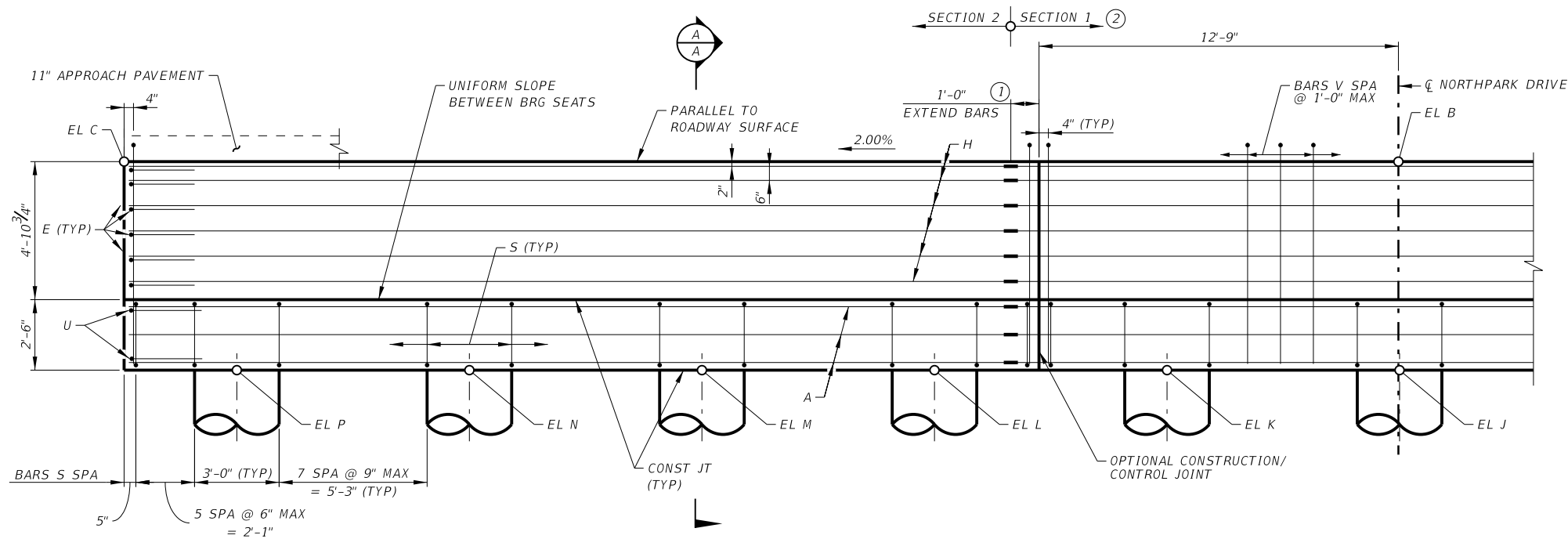
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
FOUNDATION DETAILS			
SHEET 1 OF 1			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	CONTROL NO. 0912
CHECKED:	JME	SECTION NO. 37	JOB NO. 232
			SHEET NO. 396

4/1/2021

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PLAN



ELEVATION
(LOOKING BACKSTATION)

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
2. SEE FOUNDATION LAYOUT SHEET, FOR ADDITIONAL FOUNDATION NOTES.
3. SEE SEALED EXPANSION JOINT STANDARD SHEET. SEJ-A, FOR DETAILS.
4. CHAMFER ALL EXPOSED EDGE 3/4" UNLESS NOTED OTHERWISE.
5. CALCULATED FOUNDATION LOADS: 100 TONS/SHAFT.
6. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS SHOWN OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
7. WATERPROOFING MEMBRANE TYPE 4 IN ACCORDANCE WITH 458.2.2.3 AND SUBSIDIARY TO ITEM 420.
8. FOR BEARING SEAT ELEVATIONS, REFER TO ESTIMATED QUANTITIES AND BEARING SEAT ELEVATION SHEET.

MATERIAL NOTES:

1. PROVIDE CLASS C CONCRETE STRENGTH $f'_c = 3,600$ PSI.
2. ALL REINFORCING STEEL MUST BE GRADE 60.

- ① THE CONTRACTOR WILL SPLICE BARS A & H BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440 "REINFORCING STEEL".
- ② SEE SHEET 3 OF 3 FOR BARS A AND H SECTION ORIENTATION.



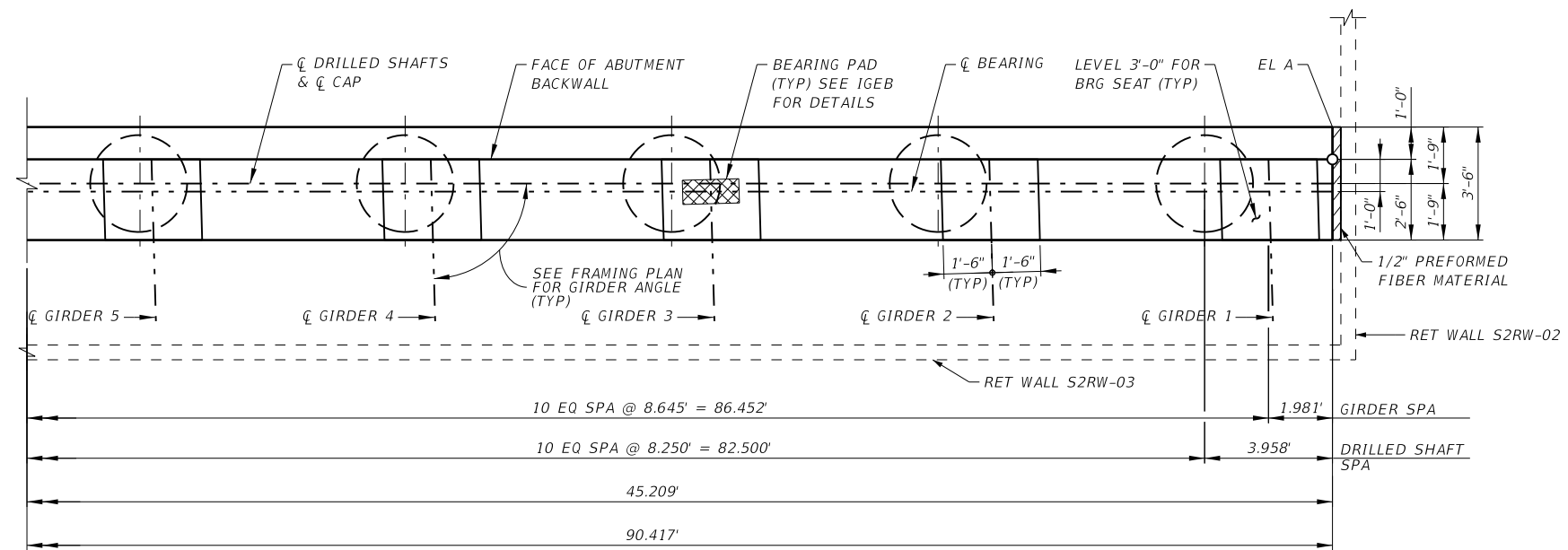
HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
ABUTMENT 1 DETAILS			
SHEET 1 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	CONTROL NO. 0912
CHECKED:	JME	SECTION NO. 37	JOB NO. 232
			SHEET NO. 397

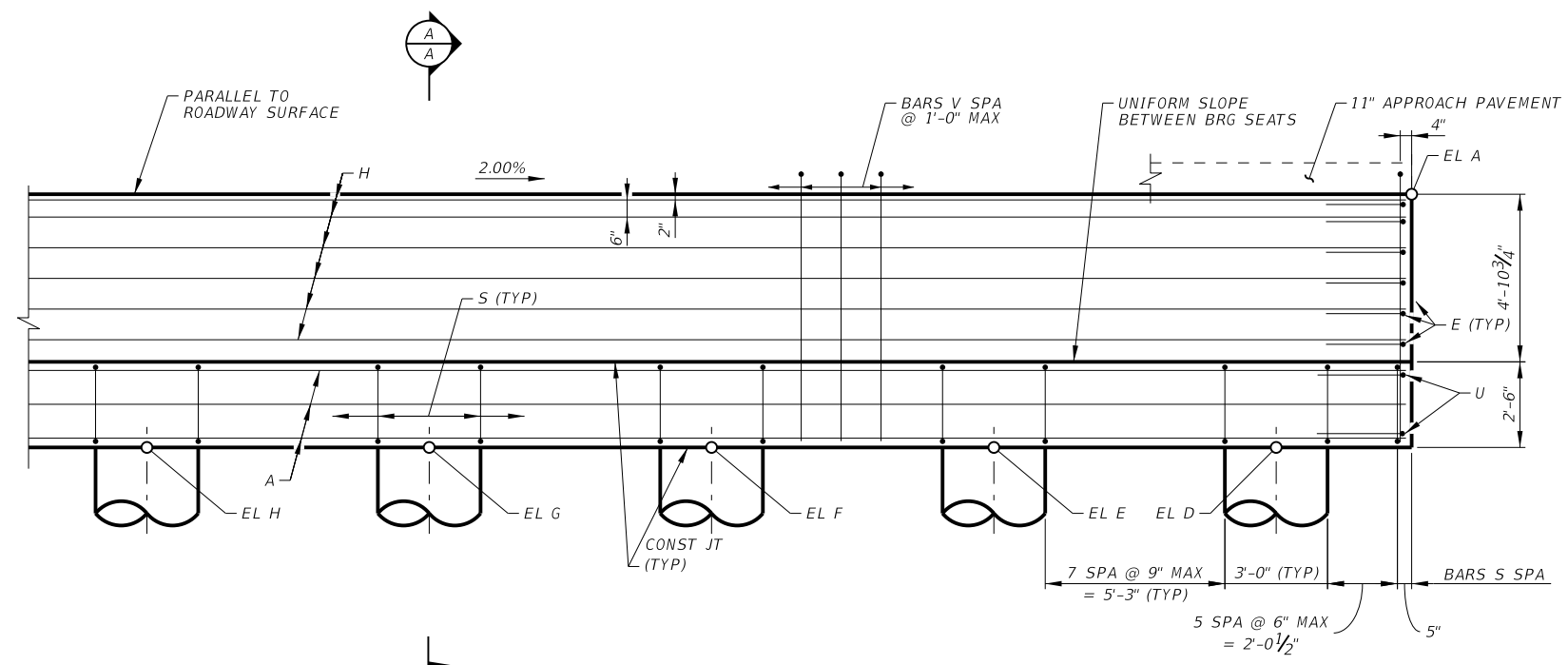
4/1/2021

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NOTES:
1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 3



PLAN



ELEVATION
(LOOKING BACKSTATION)



HL-93 LOADING

NO.	REVISIONS	BY	DATE

HNTB HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LHRA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

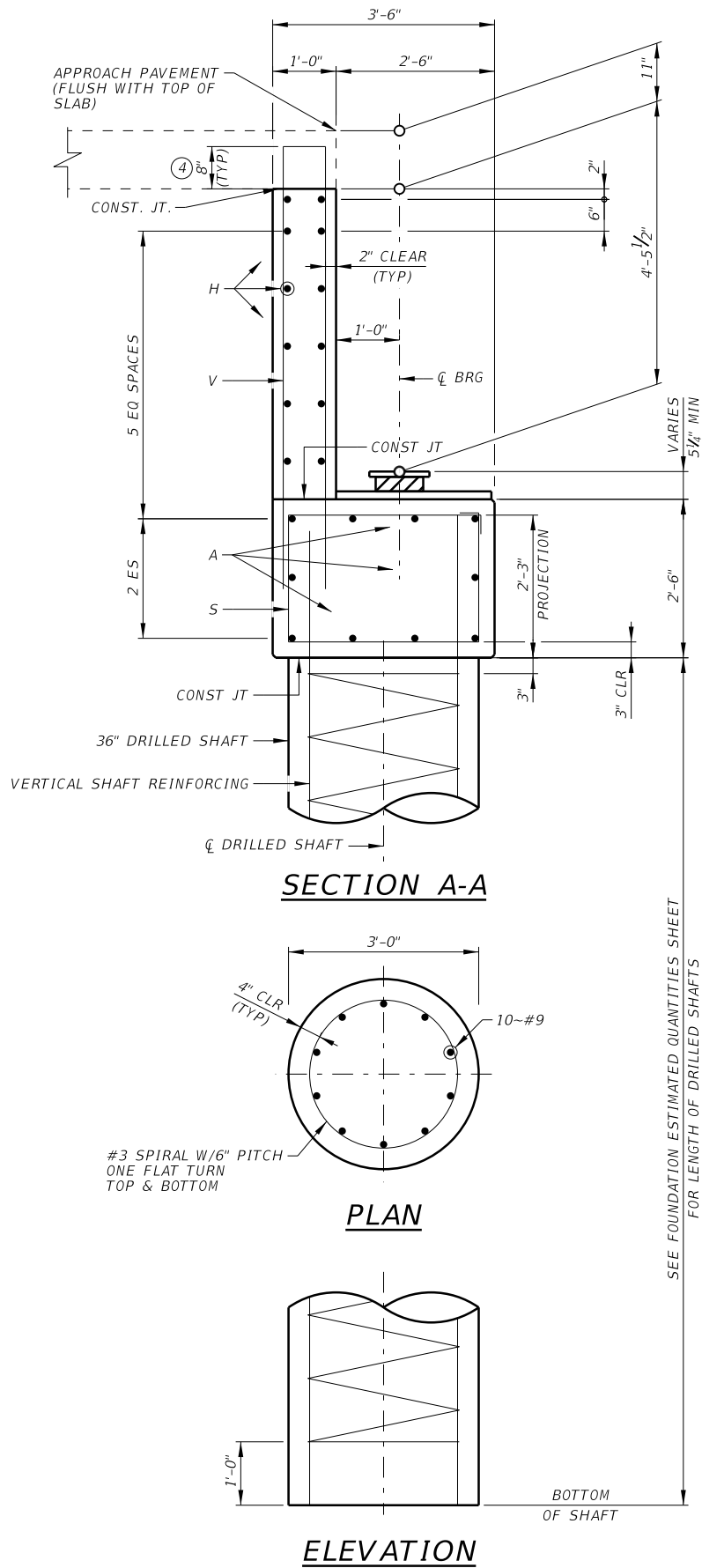
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
NORTH PARK DRIVE

**ABUTMENT 1
DETAILS**

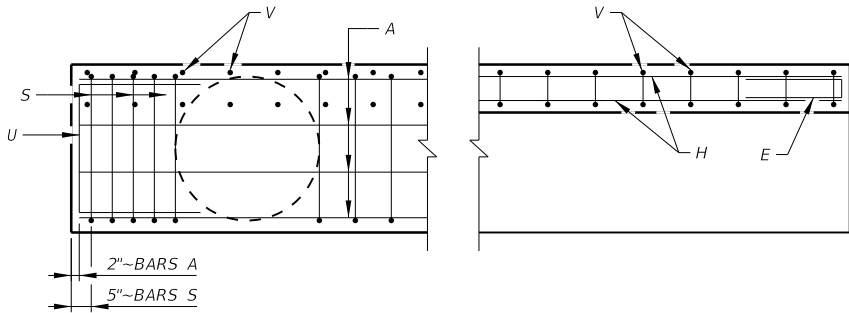
SHEET 2 OF 3

DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	JME	HOU	MONTGOMERY	0912	37

4/1/2021 4:46:59 PM



④ INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



CORNER DETAILS

SCALE: 3/4" = 1'-0"

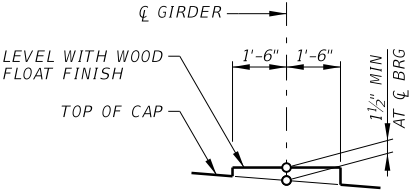
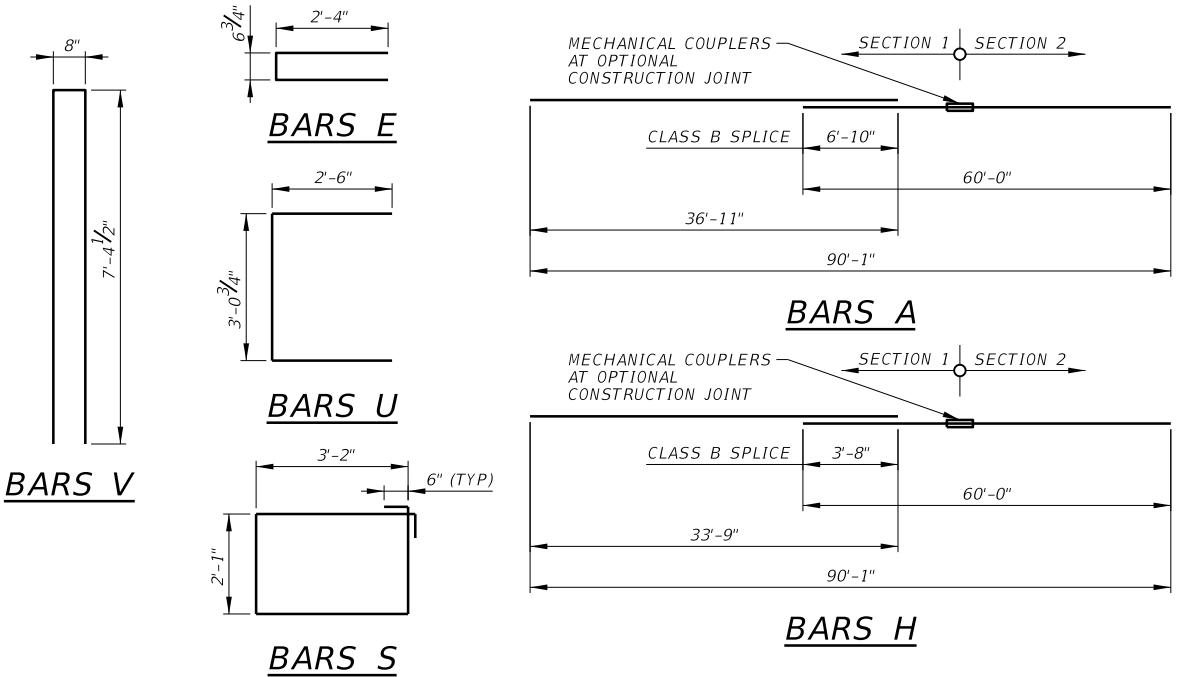
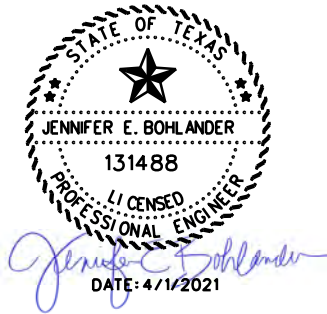


TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	96'-11"	5,149
H	12	#6	93'-9"	1,690
S	82	#5	11'-6"	984
U	4	#6	8'-2"	49
E	12	#5	5'-3"	65
V	91	#5	15'-5"	1,463
REINFORCING STEEL ③			LB	9,400
CL "C" CONC (ABUT)			CY	46.3

- ① INCLUDES 6'-10" MIN LAP
② INCLUDES 3'-8" MIN LAP
③ FOR CONTRACTORS INFORMATION ONLY

NOTES:
1. FOR GENERAL NOTES, SEE SHEET 1 OF 3.



HL-93 LOADING

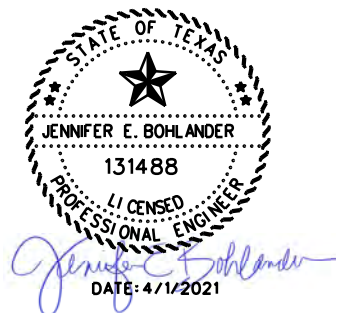
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
ABUTMENT 1 DETAILS			
SHEET 3 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	SEE TITLE SHEET	CITY OF HOUSTON WBS
DRAWN:	JES	STATE DISTRICT NO. 0912	COUNTY MONTGOMERY
CHECKED:	JME	HOU	SECTION NO. 37
		JOB NO. 232	SHEET NO. 399
		4/1/2021	4:47:02 PM


CONTROL ELEVATIONS													
EI A	EI B	EL C	EL D	EL E	EL F	EL G	EL H	EL J	EL K	EL L	EL M	EL N	EL P
98.53	99.44	98.53	91.22	91.38	91.55	91.71	91.88	92.04	91.88	91.71	91.55	91.38	91.22



1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
2. SEE FOUNDATION LAYOUT SHEET, FOR ADDITIONAL FOUNDATION NOTES.
3. SEE SEALED EXPANSION JOINT STANDARD SHEET. SEJ-A, FOR DETAILS.
4. CHAMFER ALL EXPOSED EDGE $\frac{3}{4}$ " UNLESS NOTED OTHERWISE.
5. CALCULATED FOUNDATION LOADS: 105 TONS/SHAFT.
6. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS SHOWN OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
7. WATERPROOFING MEMBRANE TYPE 4 IN ACCORDANCE WITH 458.2.2.3 AND SUBSIDIARY TO ITEM 420.
8. FOR BEARING SEAT ELEVATIONS, REFER TO ESTIMATED QUANTITIES AND BEARING SEAT ELEVATION SHEET.

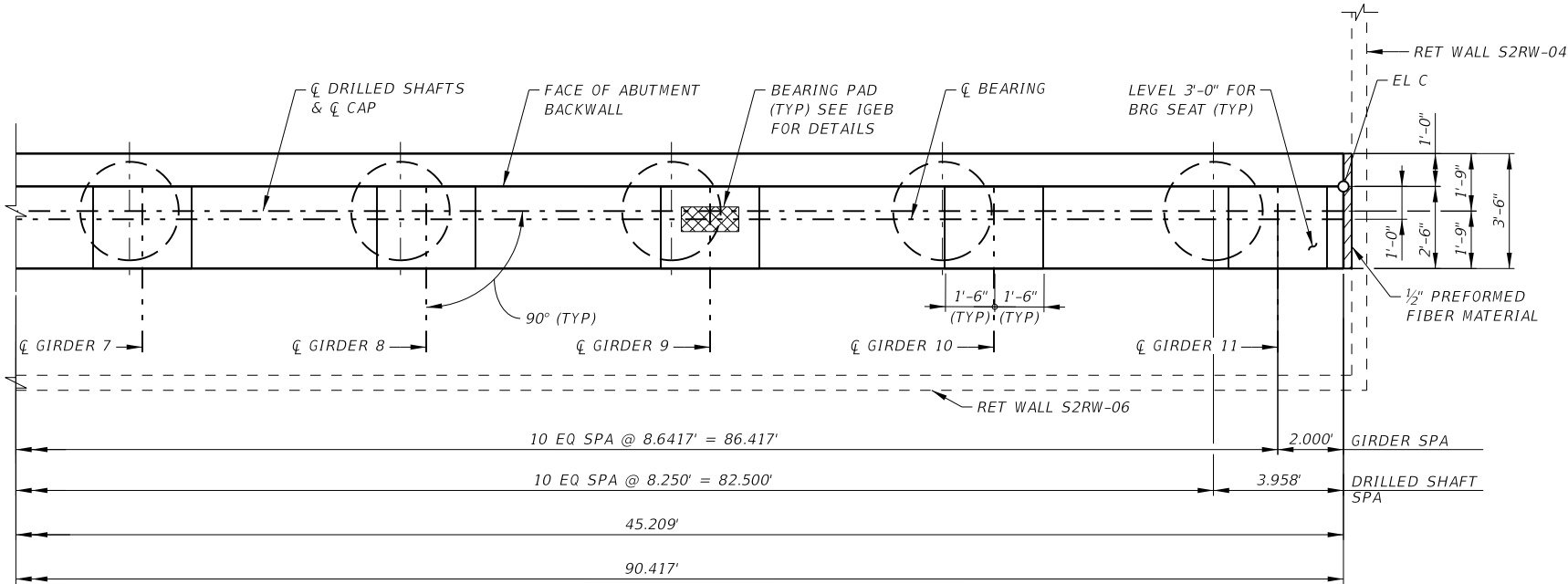
1. PROVIDE CLASS C CONCRETE STRENGTH $f'_c = 3,600$ PSI.
2. ALL REINFORCING STEEL MUST BE GRADE 60.



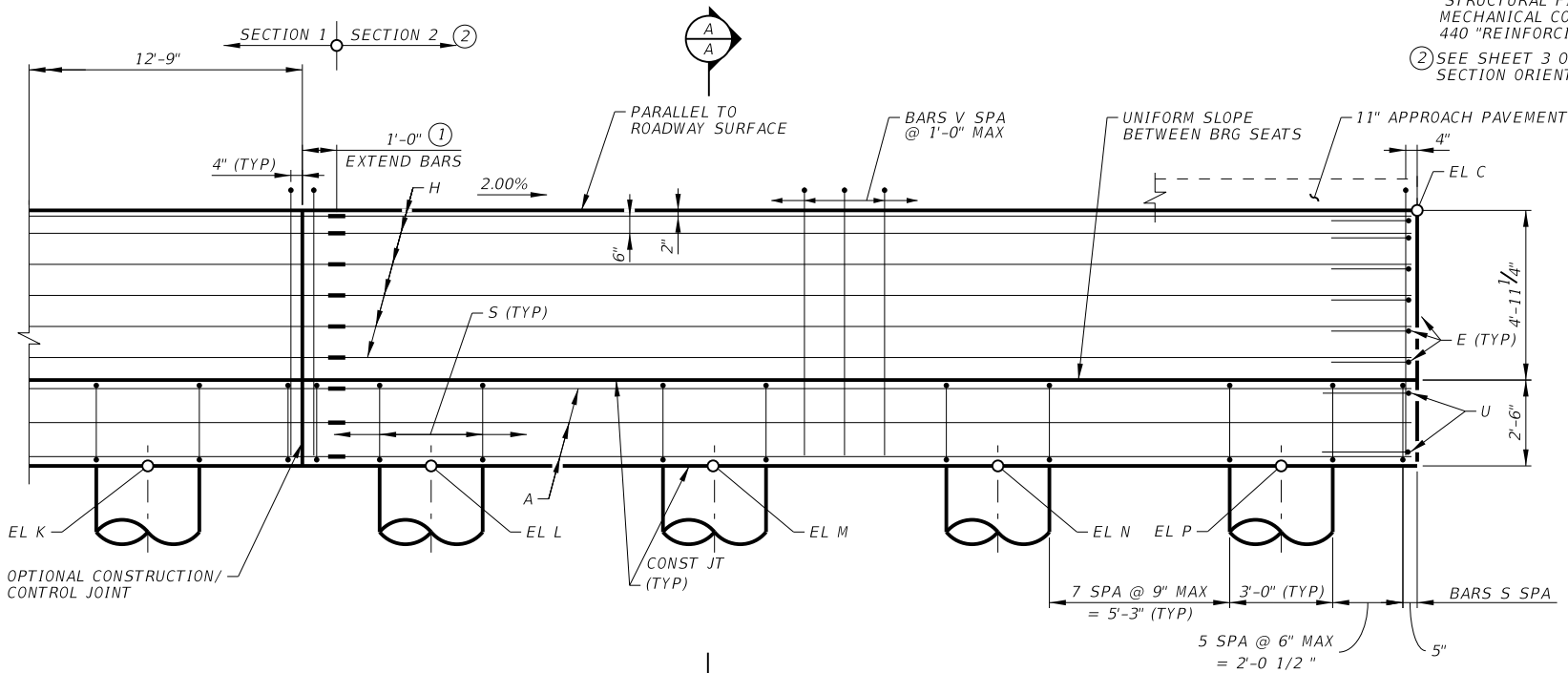
NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o HUNTON ANDREWS KURTH LLP 601 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
ABUTMENT 9 DETAILS									
SHEET 1 OF 3									
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	400		

NOTES:

1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 3

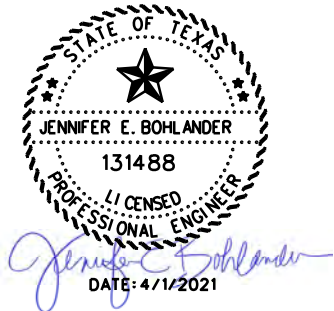


PLAN



ELEVATION
(LOOKING UPSTATION)

- ① THE CONTRACTOR WILL SPLICE BARS A & H BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440 "REINFORCING STEEL".
- ② SEE SHEET 3 OF 3 FOR BARS A AND H SECTION ORIENTATION.

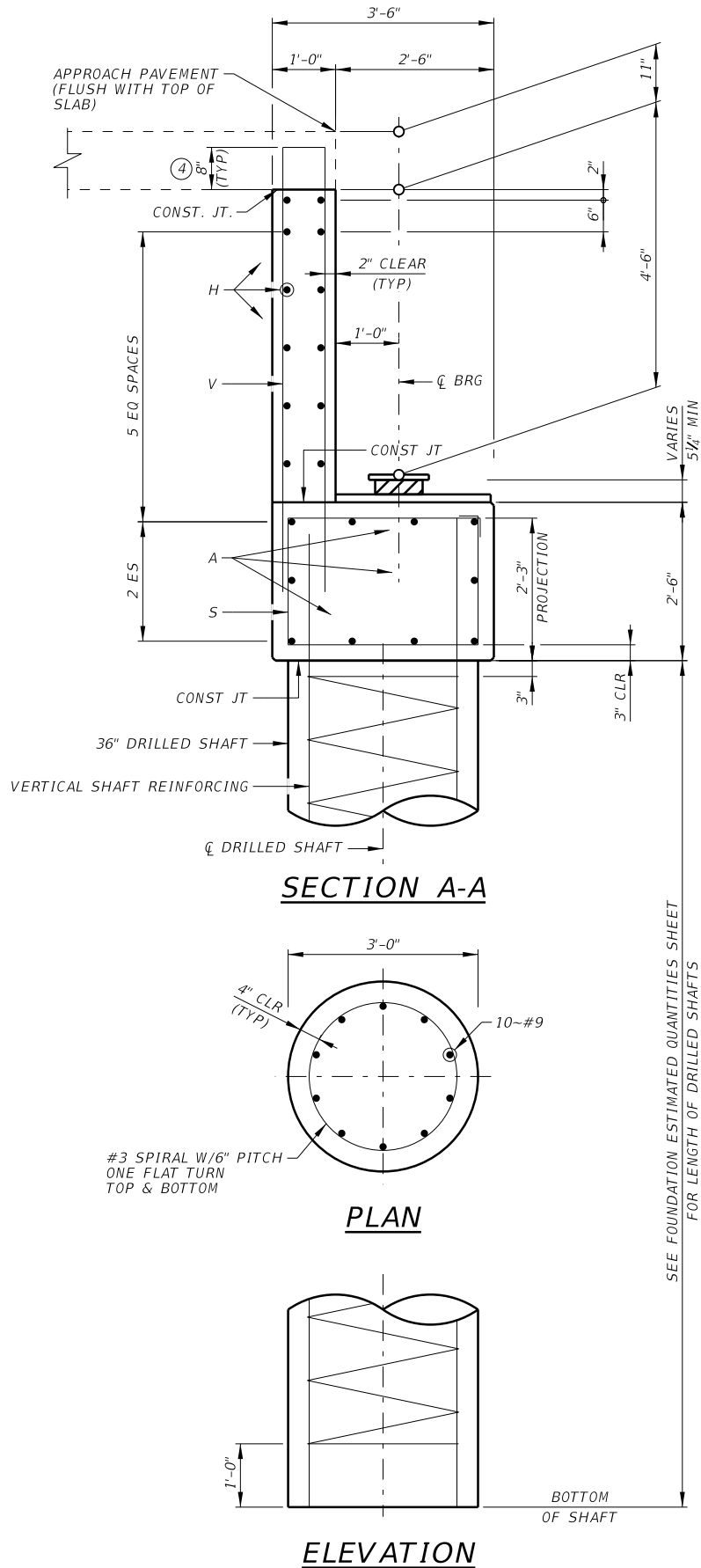


HL-93 LOADING

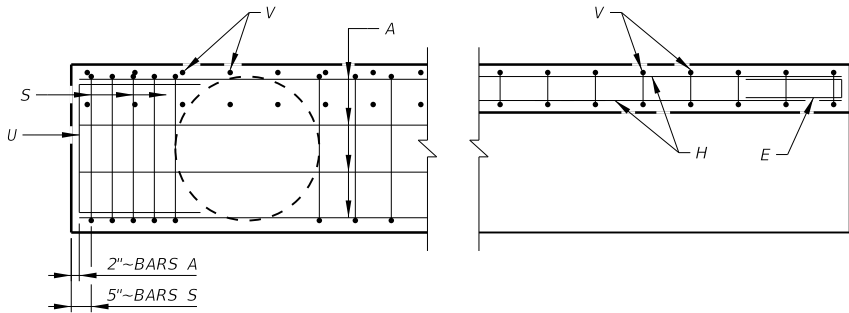
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LHRA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4000 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
ABUTMENT 9 DETAILS			
SHEET 2 OF 3			
DESIGNED:	JEB	FED. RD. DIV. No.	STATE
CHECKED:	AMS	6	TEXAS
DRAWN:	JES	COUNTY	CITY OF HOUSTON WBS
CHECKED:	JME	HOUSTON	SEE TITLE SHEET
CONTRACT No.		SECTION No.	JOB No.
0912		37	232
SHEET No.		401	

4/1/2021

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④ INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE

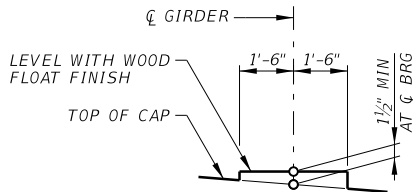
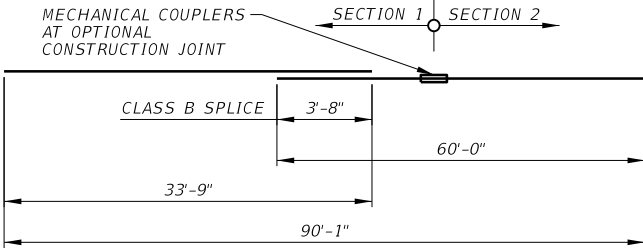
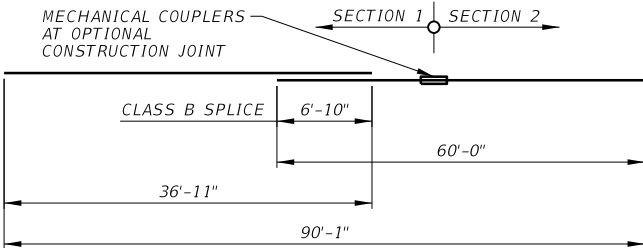
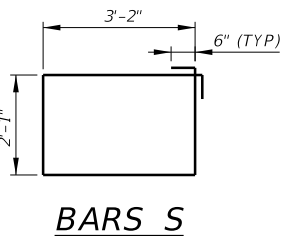
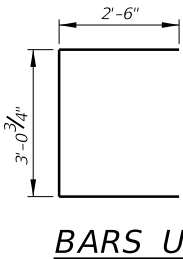
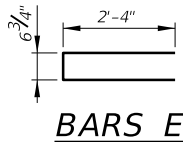
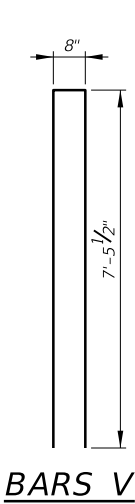


CAP

BACKWALL

CORNER DETAILS

SCALE: 3/4" = 1'-0"



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

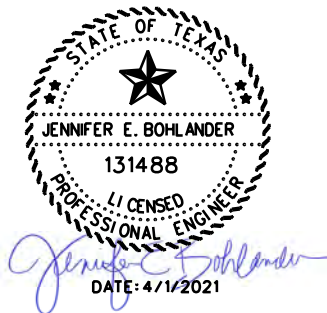
TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	96'-11"	5,149
H	12	#6	93'-9"	1,690
S	82	#5	11'-6"	984
U	4	#6	8'-2"	49
E	12	#5	5'-3"	65
V	91	#5	15'-7"	1,479
REINFORCING STEEL ③			LB	9,416
CL "C" CONC (ABUT)			CY	46.6

- ① INCLUDES 6'-10" MIN LAP
② INCLUDES 3'-8" MIN LAP
③ FOR CONTRACTORS INFORMATION ONLY

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1 OF 3.



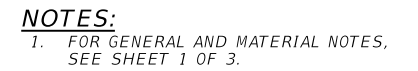
HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
ABUTMENT 9 DETAILS			
SHEET 3 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	SEE TITLE SHEET	CITY OF HOUSTON WBS
DRAWN:	JES	STATE DISTRICT NO. 1	COUNTY MONTGOMERY
CHECKED:	JME	HOU	CONTROL NO. 0912
		SECTION NO. 37	JOB NO. 232
		SHEET NO. 402	

CONTROL ELEVATIONS													
EI A	EI B	EL C	EL D	EL E	EL F	EL G	EL H	EL J	EL K	EL L	EL M	EL N	EL P
93.65	94.55	93.65	86.29	86.45	86.62	86.78	86.95	87.11	86.95	86.78	86.62	86.45	86.29

4/1/2021

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52 SPA @ 6" MAX = 26'-0"

5 SPA @ 12" MAX = 5'-0"

24 SPA @ 6" MAX = 11'-8 1/2"

181 SPA @ 6" MAX = 90'-5"

46 SPA @ 2'-0" MAX = 90'-3"

BARS S SPA - 1'-0"

BARS M & N SPA - 1'-0"

BARS U SPA - 1'-1"

PARALLEL TO ROADWAY SURFACE

2.262%

UNIFORM SLOPE BETWEEN BRG SEATS

EL C

U

S1

N1

M1

VERTICAL END FACE (TYP)

5'-0"

2'-3"

7'-3"

SEE EARWALL DETAIL ON SHEET 3 OF 3 FOR ADDITIONAL BARS NOT SHOWN

EL H

EL J

CL COLUMN 3



STATE OF TEXAS

JENNIFER E. BOHLENDER

131488

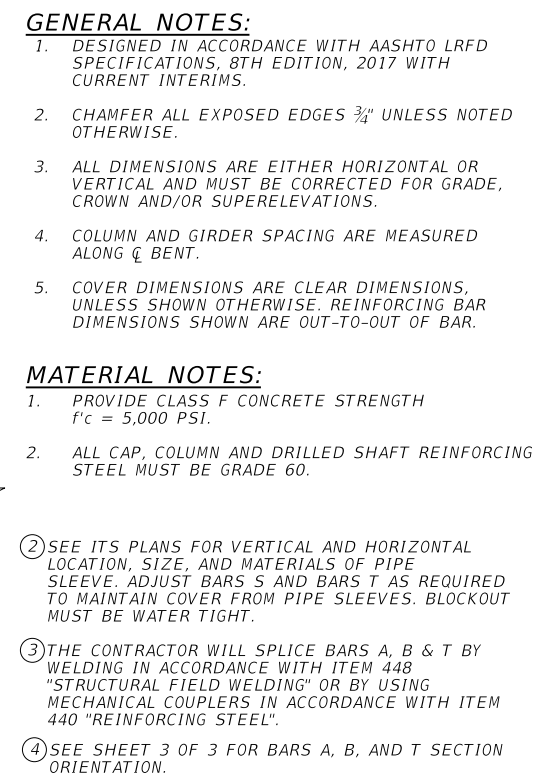
LICENSED PROFESSIONAL ENGINEER

DATE: 4/1/2021

NO.	REVISIONS						BY	DATE									
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<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> <h2 style="margin: 0;">NORTHPARK DRIVE</h2> <h1 style="margin: 20px 0 0 0;">BENT 2</h1> <h1 style="margin: 0 0 20px 0;">DETAILS</h1>																	
SHEET 2 OF 3																	
DESIGNED:	JEB	FED. DIV.	RD. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.									
CHECKED:	AMS	6		TEXAS	SEE TITLE SHEET	CS											
DRAWN:	JES	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.									
CHECKED:	JME	HOU		MONTGOMERY	0912	37	232	404									



SHEET 3 OF 3



REINFORCEMENT DETAILS:

- BARS S SPA - 1'-2 1/2"
- BARS M1 & N1 SPA - 2'-3"
- BARS U SPA - 1'-4"
- 26 SPA @ 6" MAX = 11'-10"
- 5 SPA @ 12" MAX = 5'-0"
- 52 SPA @ 6" MAX = 26'-0"
- 178 SPA @ 6" MAX = 88'-8"
- 46 SPA @ 2'-0" MAX = 90'-6"
- 5 SPA @ 12" MAX = 5'-0"
- 52 SPA @ 6" MAX = 26'-0"

SECTION LINES:

- SECTION 1
- SECTION 2

DETAIL A:

- 7'-0" MAX
- PARALLEL TO ROADWAY SURFACE
- UNIFORM SLOPE BETWEEN BRG SEATS
- 1.590%
- 2.373%
- EL A
- EL B
- EL D
- EL E
- EL F
- EL G

DETAIL A (CROSS SECTION):

- 4" MIN
- 2" TYP.
- BLOCKOUT FOR 4" PIPE SLEEVE
- BAR T
- BAR S TYP.
- BLOCKOUT FOR 5" PIPE SLEEVE

ELEVATION:

- CL COLUMN 1
- CL COLUMN 2
- 12'-9"
- 3" (TYP)
- 1'-0" (3) EXTEND BARS

NOTES:

- SEE END CAP DETAIL ON SHEET 3 OF 3 FOR M2 AND N2 BARS

DESIGNER'S CHECKLIST:

HL-93
NO.
C
DESIGNED



HL-93 LOADING

NO.	REVISIONS						BY	DATE	

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE

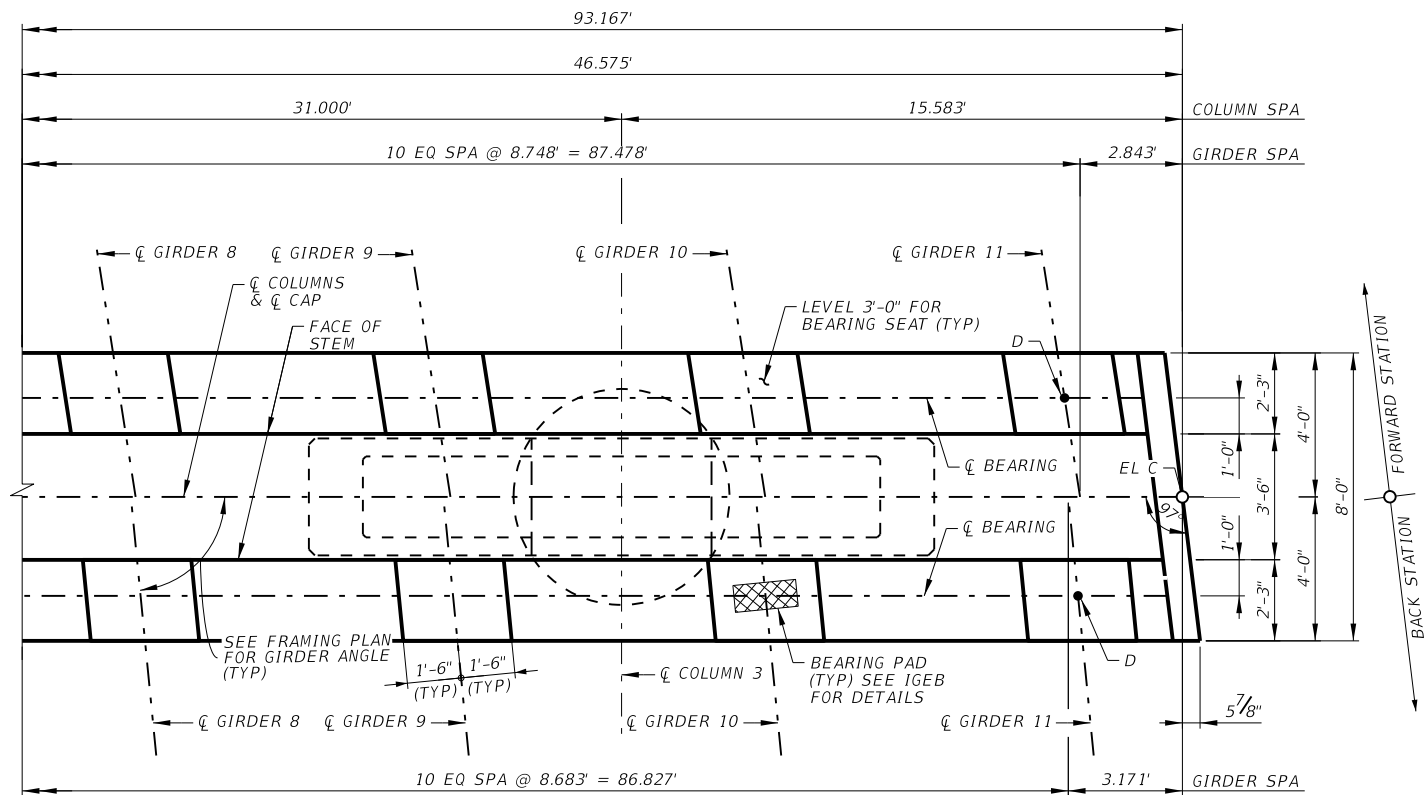
BENT 3

DETAILS

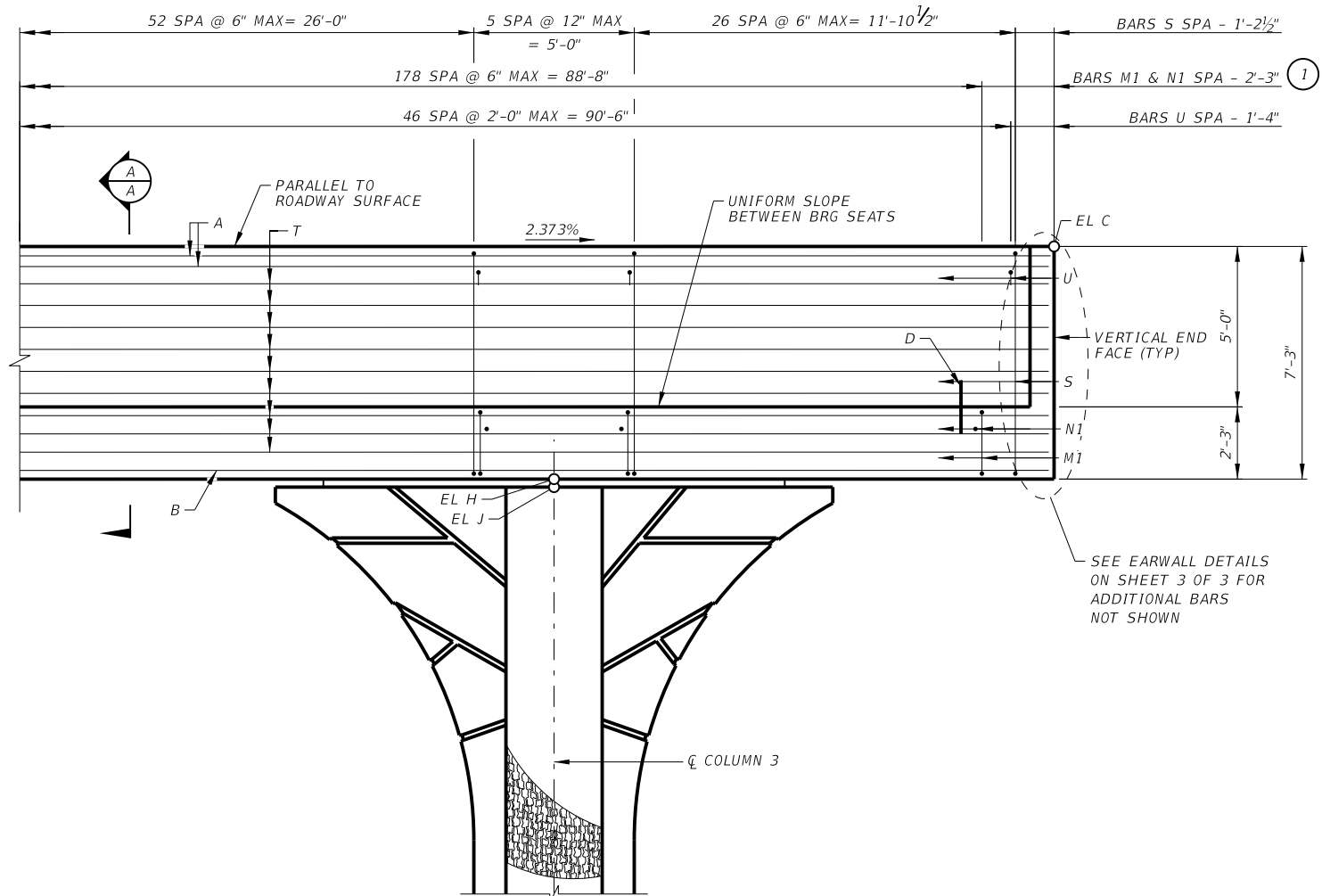
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CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	JME	HOU	MONTGOMERY	0912

SHEET 1 OF 3
HIGHWAY No.
CS
SHEET No.
232
406

4/1/2021
4: 48: 54 PM

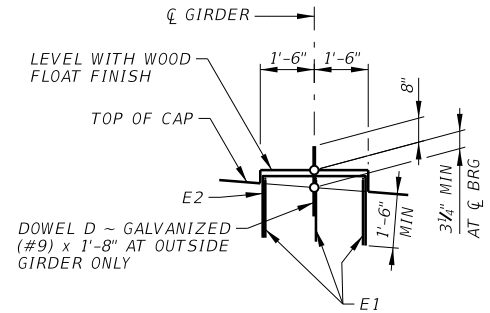


PLAN



ELEVATION

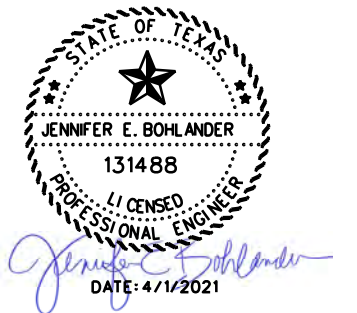
NOTES:
1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 3.



PEDESTAL DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

1 SEE END CAP DETAIL ON SHEET 3 OF 3 FOR M2 AND N2 BARS



HL-93 LOADING

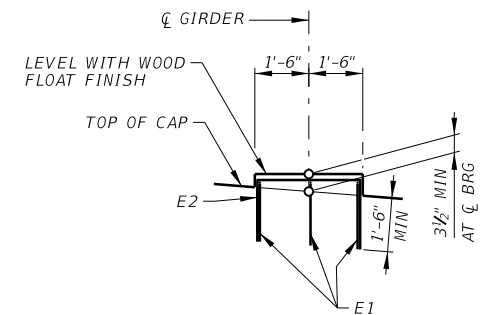
NO.	REVISIONS	BY	DATE
1	SEE END CAP DETAIL ON SHEET 3 OF 3 FOR M2 AND N2 BARS		
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BENT 3 DETAILS			
SHEET 2 OF 3			
DESIGNED:	JEB	FED. RD. DIV. No. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	STATE DISTRICT	COUNTY COUNTY
CHECKED:	JME	HOUSTON	MONTGOMERY
		CONTROL No. 0912	SECTION No. 37
		JOB No. 232	SHEET No. 407

4/1/2021

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(BEARING SURFACE MUST BE CLEAN
AND FREE OF ALL LOOSE MATERIAL
BEFORE PLACING BEARING PAD.)

- PLAN



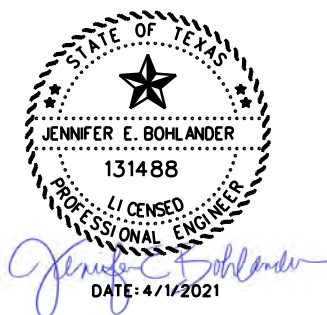
HL-93 LOADING

NO.	REVISIONS						BY	DATE	
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<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div><div>NORTHPARK DRIVE</div><div>BENT 4</div><div>DETAILS</div></div>									
SHEET 2 OF 3									
DESIGNED:	JEB	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.		JOB No.	SHEET No.	
CHECKED:	JME	HOU	MONTGOMERY	0912	37		232	410	

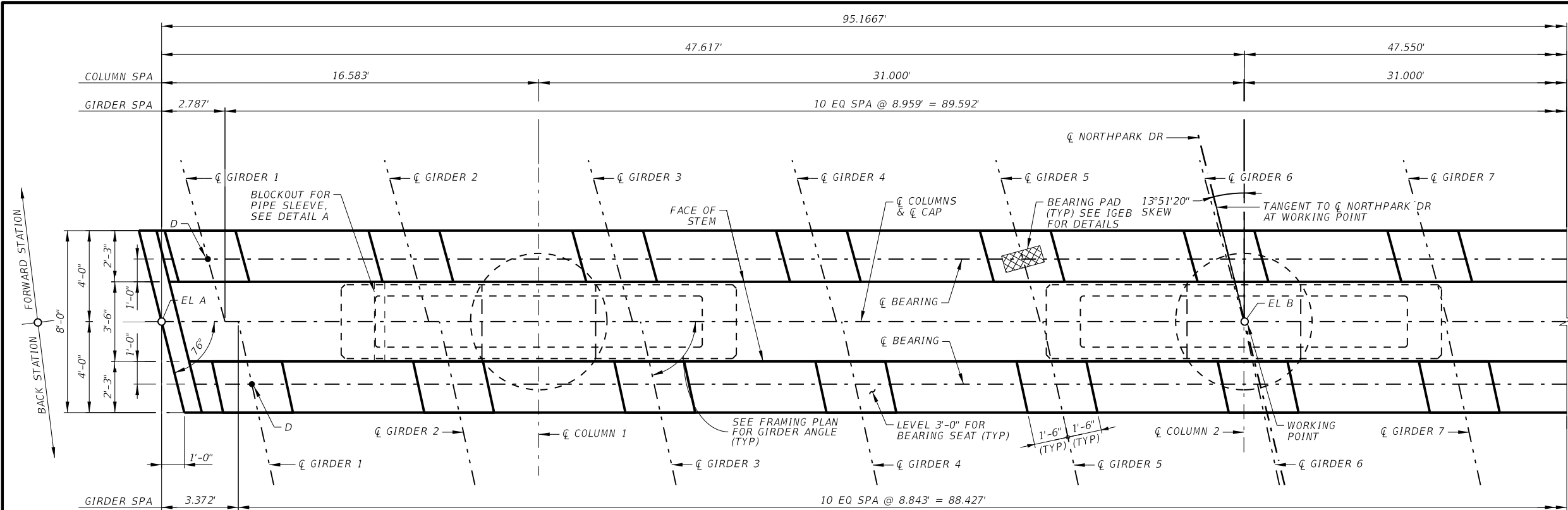


CONTROL ELEVATIONS

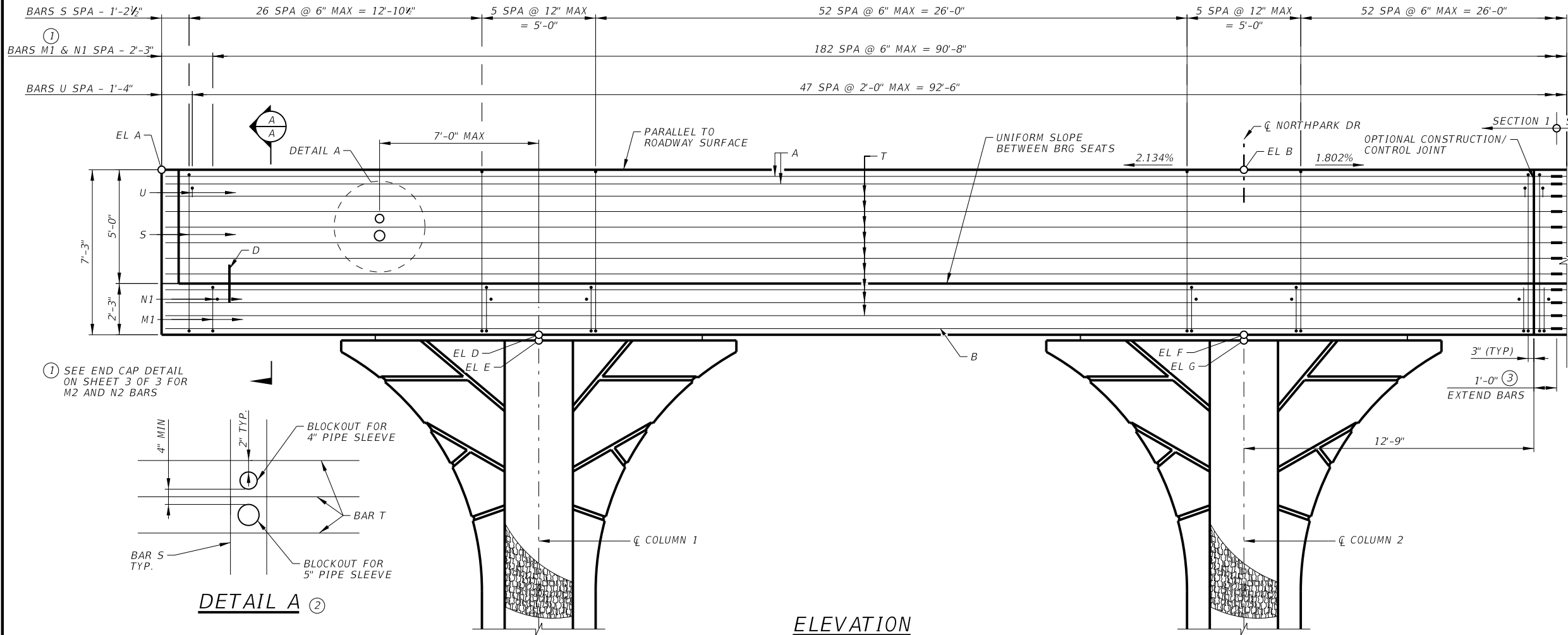
1. FOR GENERAL NOTES, SEE SHEET 1 OF 3.



SHEET 3 OF 3



PLAN



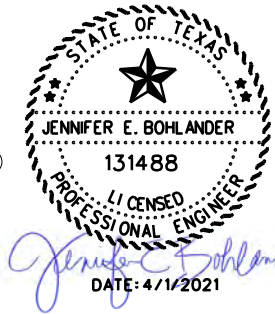
ELEVATION

GENERAL NOTES:

1. DESIGNED IN ACCORDING WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
2. CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATIONS.
4. COLUMN AND GIRDER SPACING ARE MEASURED ALONG C BENT.
5. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS SHOWN OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

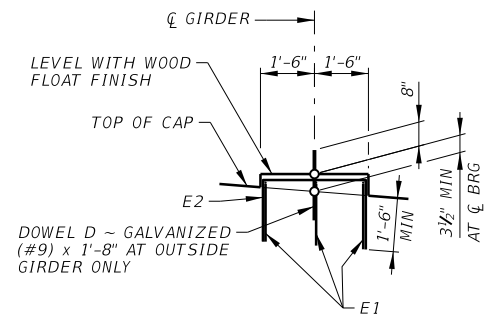
MATERIAL NOTES:

1. PROVIDE CLASS F CONCRETE STRENGTH $f'_c = 5,000$ PSI.
2. ALL CAP, COLUMN AND DRILLED SHAFT REINFORCING STEEL MUST BE GRADE 60.
3. SEE ITS PLANS FOR VERTICAL AND HORIZONTAL LOCATION, SIZE, AND MATERIALS OF PIPE SLEEVE. ADJUST BARS S AND BARS T AS REQUIRED TO MAINTAIN COVER FROM PIPE SLEEVES. BLOCKOUT MUST BE WATER TIGHT.
4. THE CONTRACTOR WILL SPLICE BARS A, B & T BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440 "REINFORCING STEEL".
5. SEE SHEET 3 OF 3 FOR BARS A, B, AND T SECTION ORIENTATION.



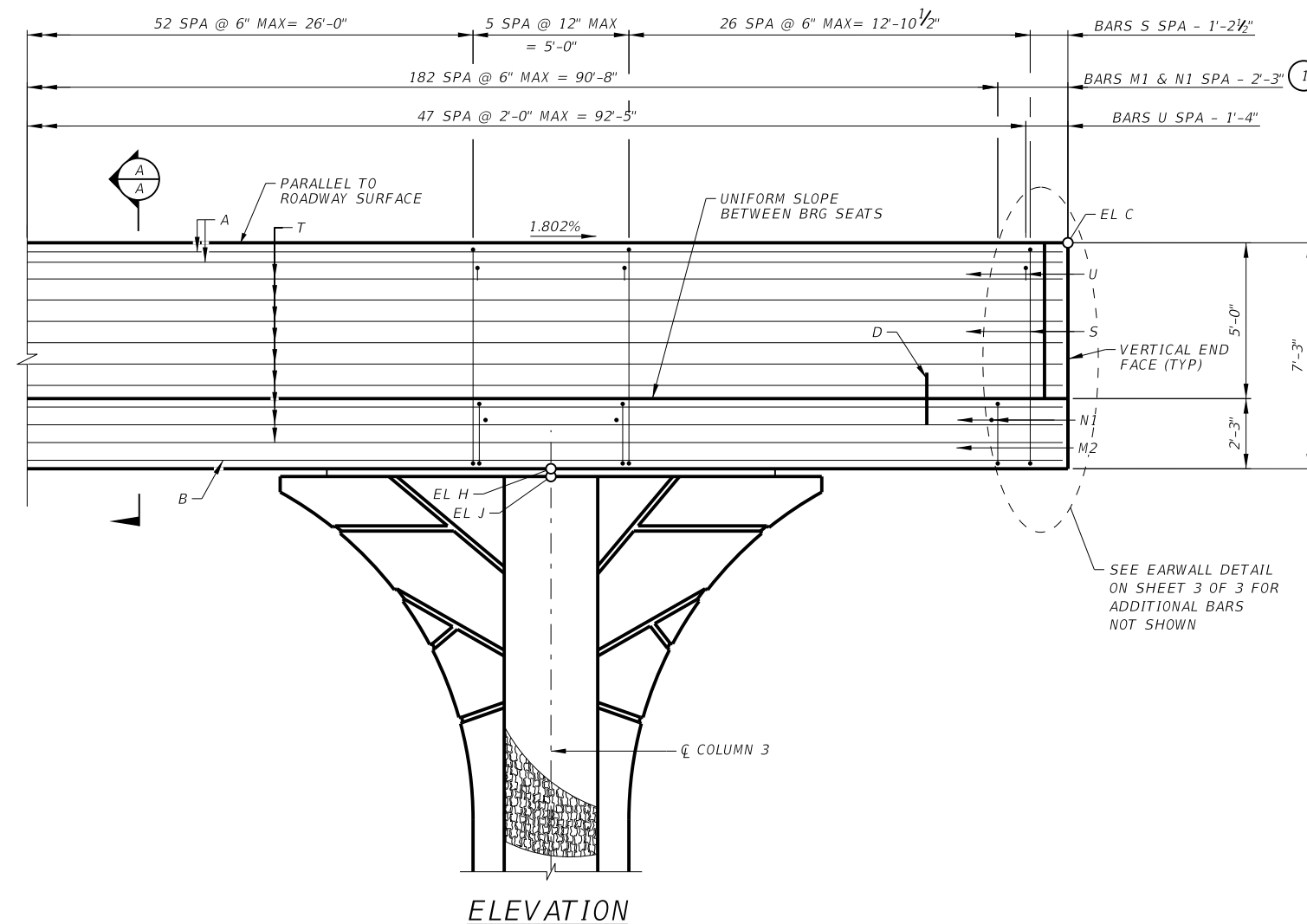
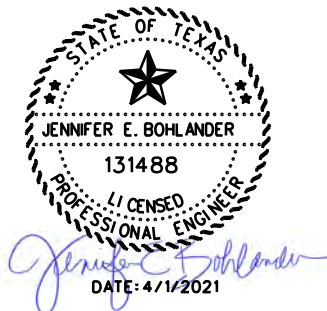
HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BENT 5 DETAILS			
SHEET 1 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE OF TEXAS
CITY OF HOUSTON	WBS	SEE TITLE SHEET	CS
CHECKED:	AMS	STATE DISTRICT	COUNTY
DRAWN:	JES	CONTROL NO. 0912	SECTION NO. 37
CHECKED:	JME	HOUSTON	MONTGOMERY
DATE:	4/1/2021	JOB NO. 232	SHEET NO. 412




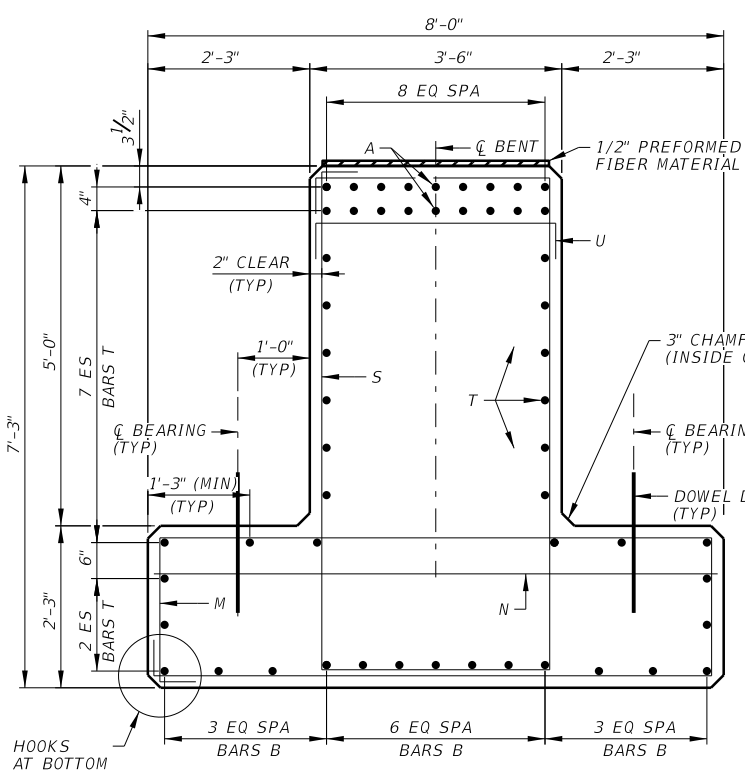
(BEARING SURFACE MUST BE CLEAN
AND FREE OF ALL LOOSE MATERIAL
BEFORE PLACING BEARING PAD.)

- 1 SEE END CAP DETAIL
ON SHEET 3 OF 3 FOR
M2, M3, N1 AND N2 BARS



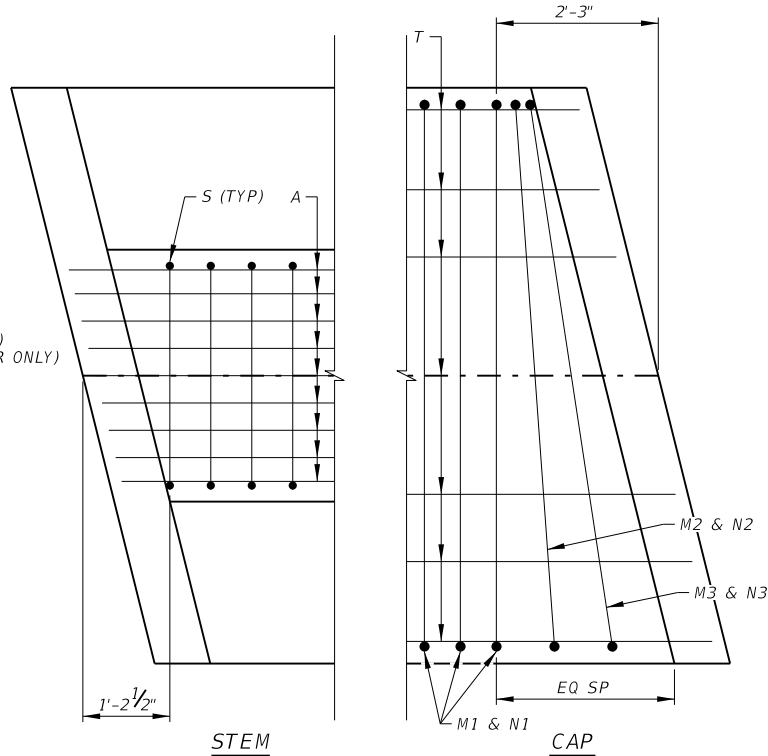
HL-93 LOADING

NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
BENT 5									
DETAILS									
SHEET 2 OF 3									
DESIGNED:	JEB	FED. RO. DIV. NO.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.	
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	413		

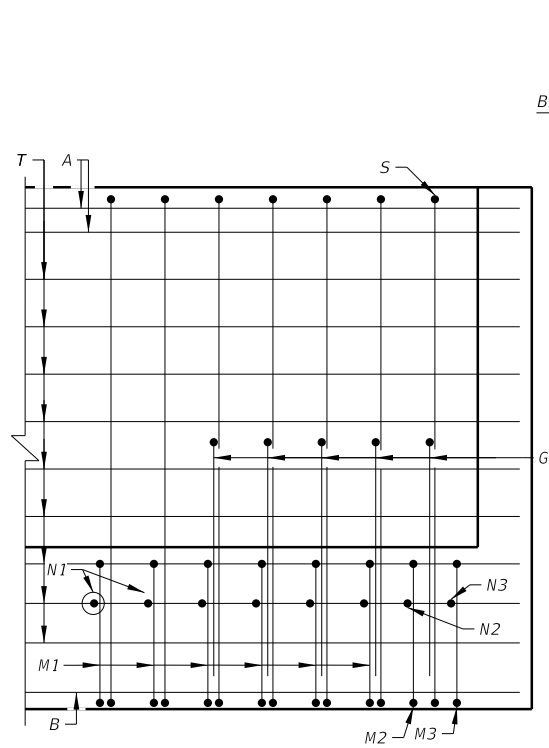


TYPICAL CAP SECTION

NOTE: SEE COLUMN DETAILS SHEET FOR COLUMN BAR PROJECTION

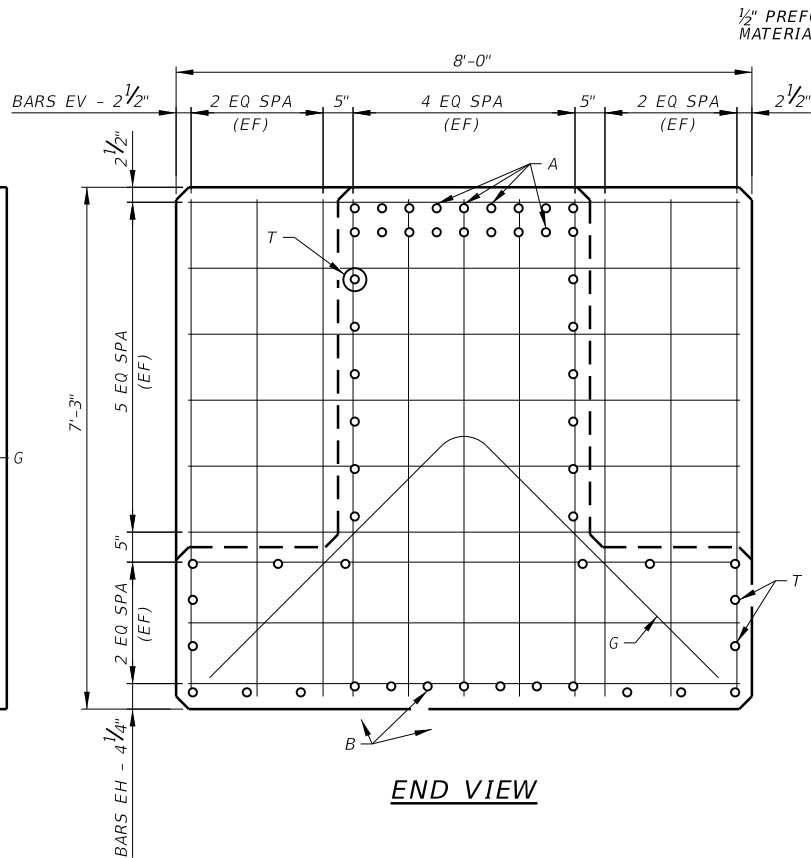


CAP END DETAIL

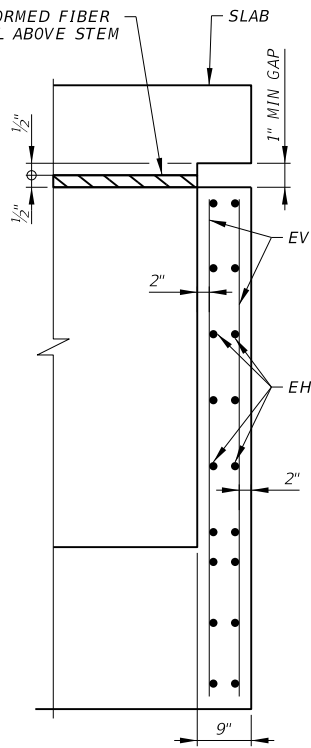


ELEVATION

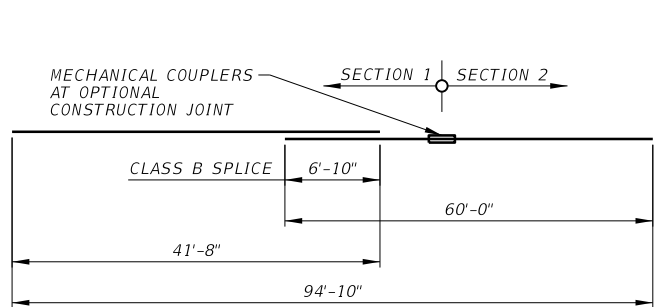
EARWALL REINFORCMTN NOT SHOWN FOR CLARITY



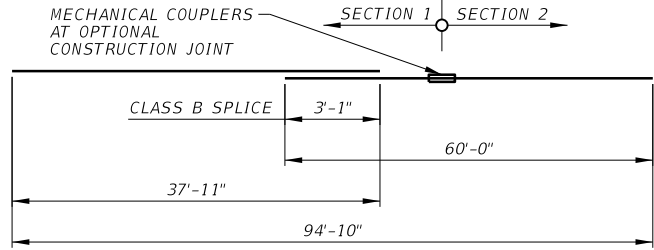
END VIEW



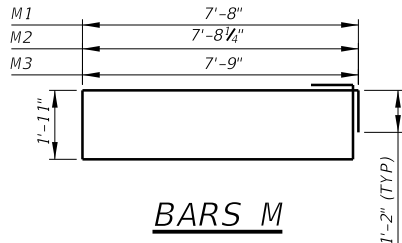
SECTION
(CAP REINFORCEMENT NOT SHOWN FOR CLARITY)



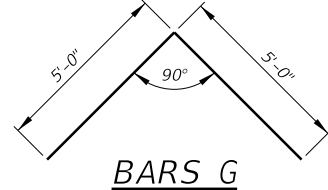
BARS A & B



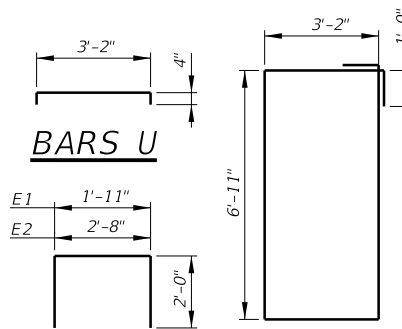
BARS T



BARS M



BARS G



BARS E

BARS S

CONTROL ELEVATIONS									
EL A	EL B	EL C	EL D	EL E	EL F	EL G	EL H	EL J	
111.925	112.941	112.084	105.029	104.626	105.690	105.287	105.133	104.730	

TABLE OF ESTIMATED QUANTITIES

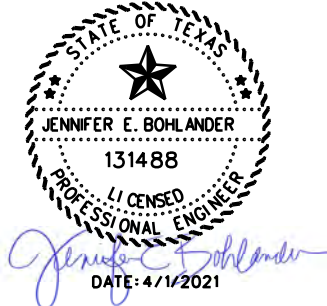
BAR	NO.	SIZE	LENGTH	WEIGHT
A	18	#11	101' -8"	9,723
B	13	#11	101' -8"	7,022
C1	8	#5	13' -3"	111
C2	14	#5	9' -6"	139
C3	8	#5	12' -4"	103
D	0	1 1/4" D	1' -8"	0
E1	66	#5	5' -11"	407
E2	44	#5	6' -8"	306
EH	18	#5	6' -11"	130
EV	22	#5	7' -8"	176
G	10	#7	10' -0"	204
M1	183	#6	21' -6"	5,910
M2	2	#6	21' -6 1/2"	65
M3	2	#6	23' -6"	71
N1	183	#6	7' -8"	2,107
N2	2	#6	7' -8 1/4"	23
N3	2	#6	7' -9"	23
S	341	#6	22' -2"	11,353
T	22	#5	97' -11"	2,247
U	49	#4	3' -10"	125

REINFORCING STEEL (3)		LB	CY
CL "C" CONC (CAP)			128.2

- (1) INCLUDES 6'-10" MIN LAP
(2) INCLUDES 3'-1" MIN LAP
(3) FOR CONTRACTOR'S INFORMATION ONLY

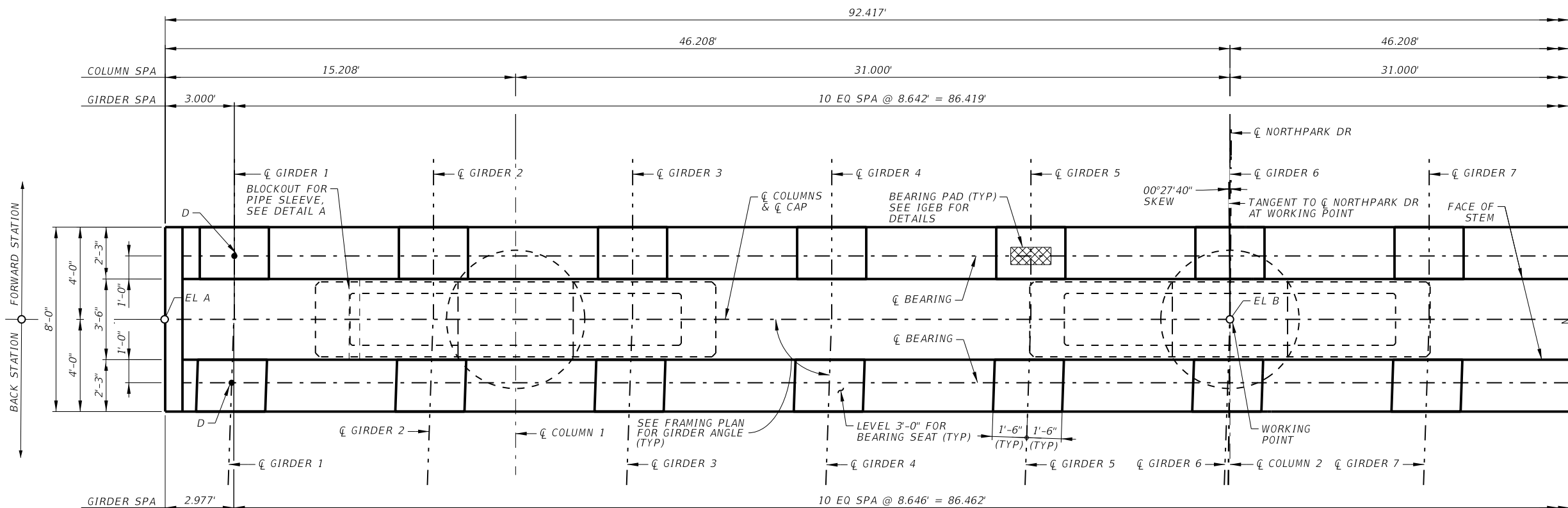
NOTES:

1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 3.

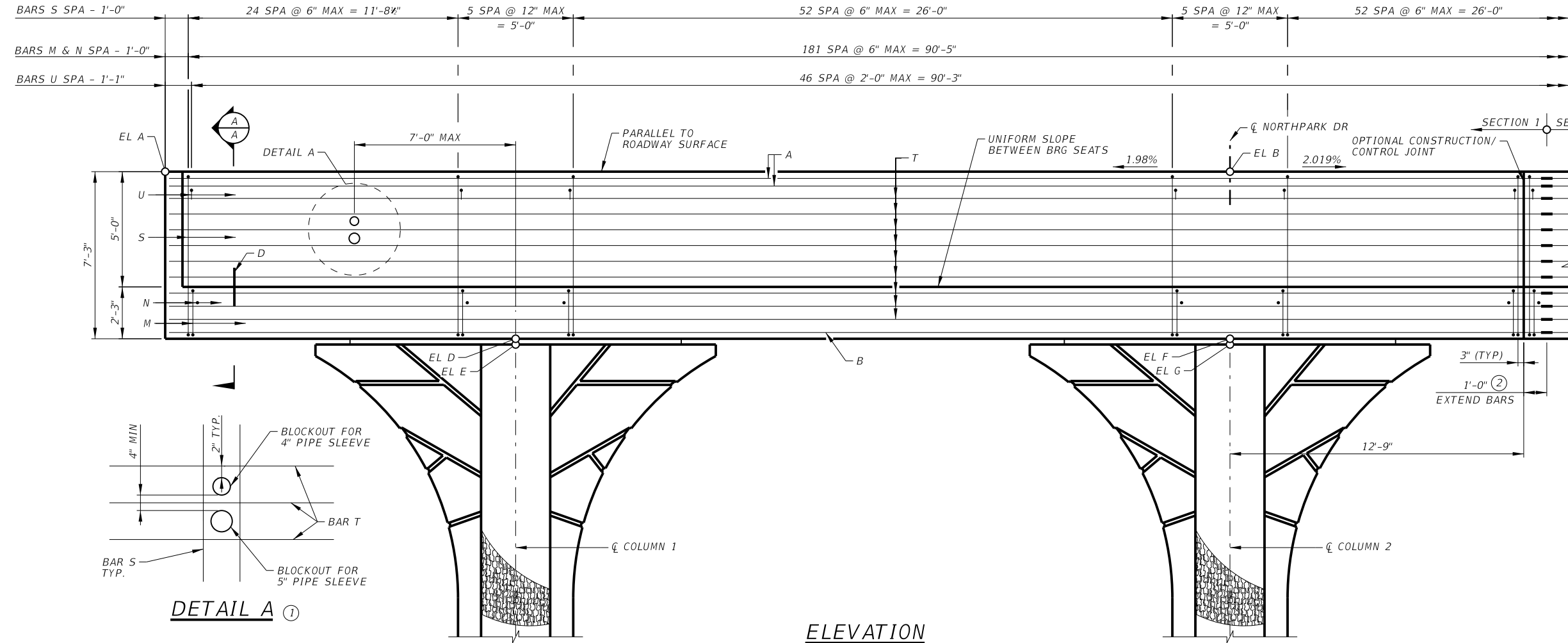


HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BENT 5 DETAILS			
SHEET 3 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	SEE TITLE SHEET	CITY OF HOUSTON MBS
DRAWN:	JES	STATE DISTRICT	COUNTY COUNTY
CHECKED:	JME	HOU	MONTGOMERY
4/1/2021		4:50:49 PM	



PLAN



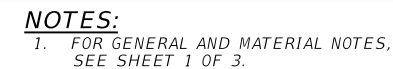
ELEVATION

- GENERAL NOTES:**
1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
 2. CHAMFER ALL EXPOSED EDGES $\frac{3}{4}$ " UNLESS NOTED OTHERWISE.
 3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATIONS.
 4. COLUMN AND GIRDER SPACING ARE MEASURED ALONG C BENT.
 5. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS SHOWN OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

- MATERIAL NOTES:**
1. PROVIDE CLASS F CONCRETE STRENGTH $f'c = 5,000$ PSI.
 2. ALL CAP, COLUMN AND DRILLED SHAFT REINFORCING STEEL MUST BE GRADE 60.
- ① SEE ITS PLANS FOR VERTICAL AND HORIZONTAL LOCATION, SIZE, AND MATERIALS OF PIPE SLEEVE. ADJUST BARS S AND BARS T AS REQUIRED TO MAINTAIN COVER FROM PIPE SLEEVES. BLOCKOUT MUST BE WATER TIGHT.
- ② THE CONTRACTOR WILL SPLICE BARS A, B & T BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440 "REINFORCING STEEL".
- ③ SEE SHEET 3 OF 3 FOR BARS A, B, AND T SECTION ORIENTATION.



NO.				REVISIONS				BY				DATE			
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4000 HOUSTON, TX 77007				CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BENT 6 DETAILS				SHEET 1 OF 3				DESIGNED: JEB				FED. RD. DIV. No. 6			
CHECKED: AMS				STATE TEXAS				CITY OF HOUSTON WBS				HIGHWAY No.			
DRAWN: JES				COUNTY COUNTY				SEE TITLE SHEET				CS			
CHECKED: JME				STATE DISTRICT				CONTROL No. 0912				JOB No. 232			
				COUNTY MONTGOMERY				SECTION No. 37				SHEET No. 415			
								4/1/2021				4: 48: 20 PM			



52 SPA @ 6" MAX = 26'-0"

5 SPA @ 12" MAX = 5'-0"

24 SPA @ 6" MAX = 11'-8 1/2"

181 SPA @ 6" MAX = 90'-5"

46 SPA @ 2'-0" MAX = 90'-3"

BARS S SPA - 1'-0"

BARS M & N SPA - 1'-0"

BARS U SPA - 1'-1"

PARALLEL TO ROADWAY SURFACE

2.019%

UNIFORM SLOPE BETWEEN BRG SEATS

EL C

U

S

N

M

VERTICAL END FACE (TYP)

5'-0"

2'-3"

7'-3"

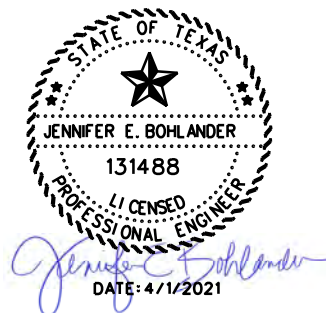
SEE EAWALL DETAILS ON SHEET 3 OF 3 FOR ADDITIONAL BARS NOT SHOWN

EL H


EL J

⊕ COLUMN 3

ELEVATION



HL-93 LOADING

NO.	REVISONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS SUITE 600 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
BENT 6									
DETAILS									
									SHEET 2 OF 3
DESIGNED:	JEB	FED. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.				
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET	CS				
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	416		

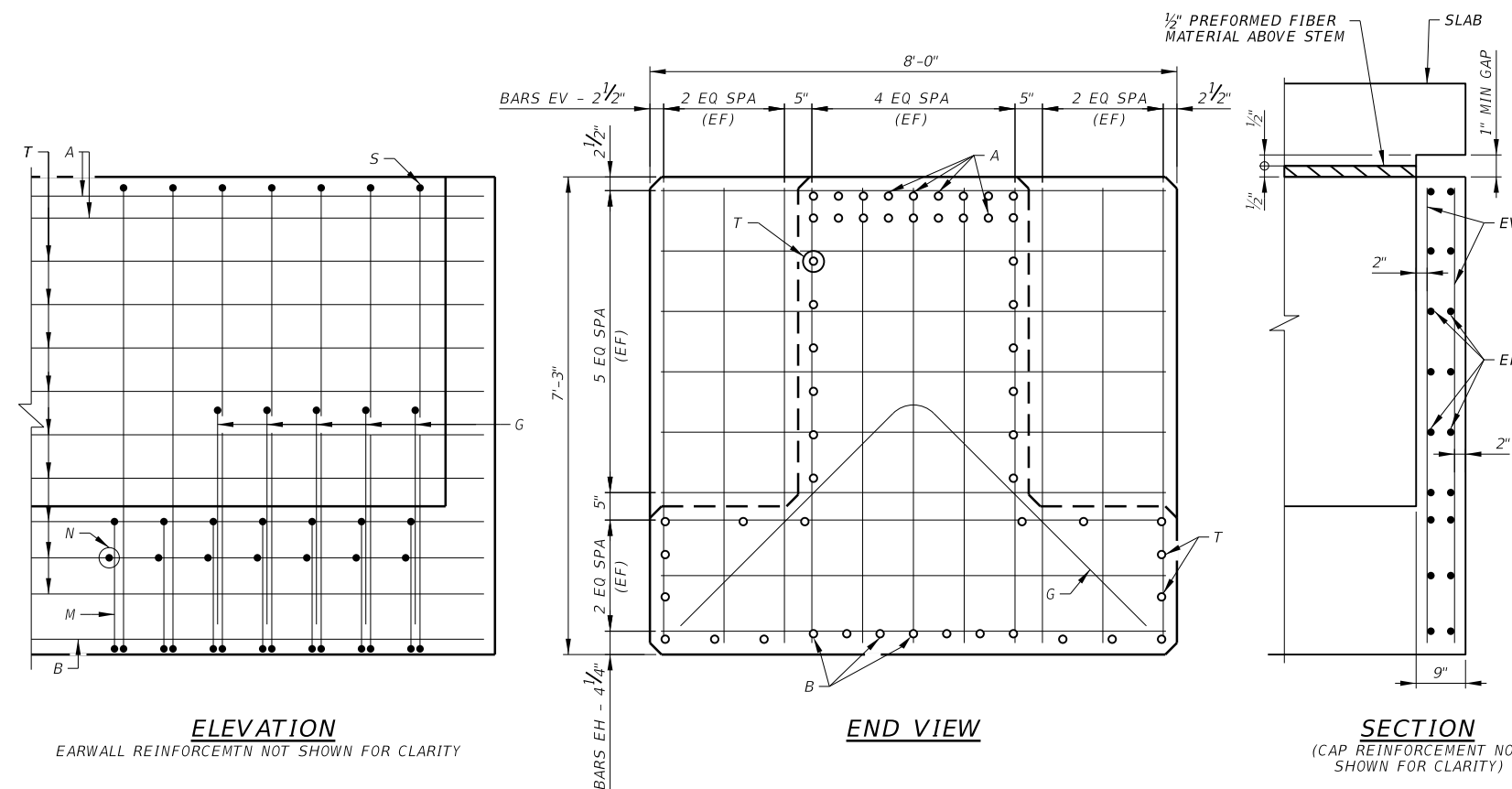
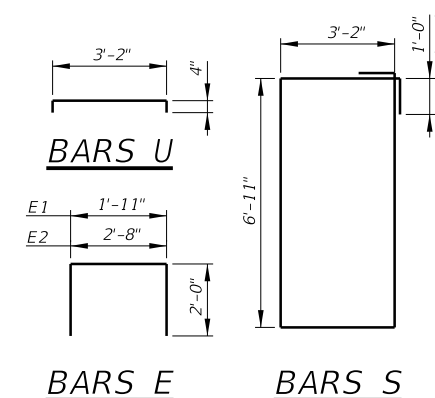
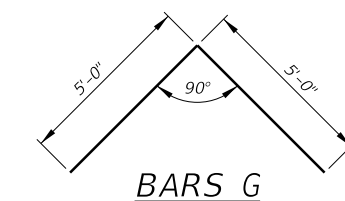
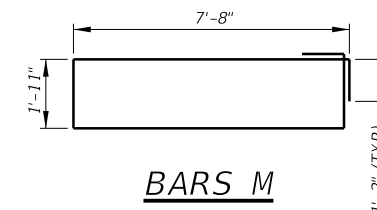
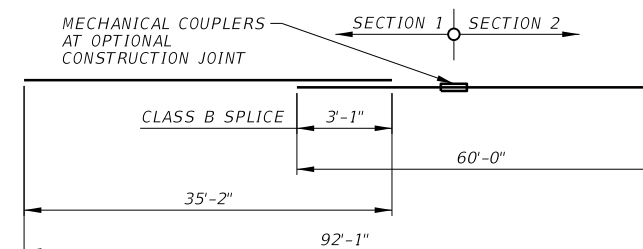
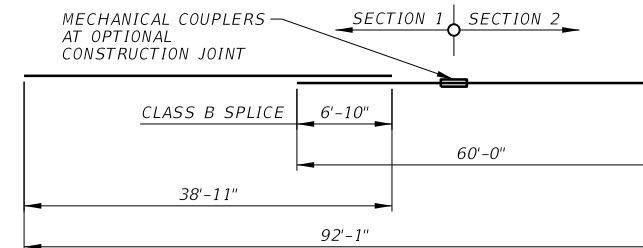
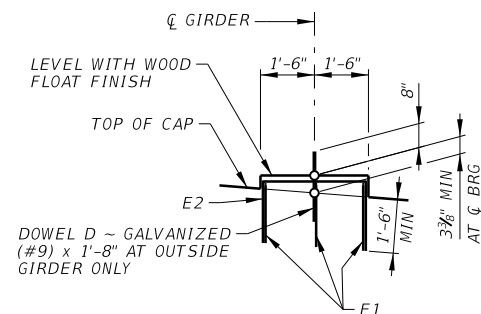
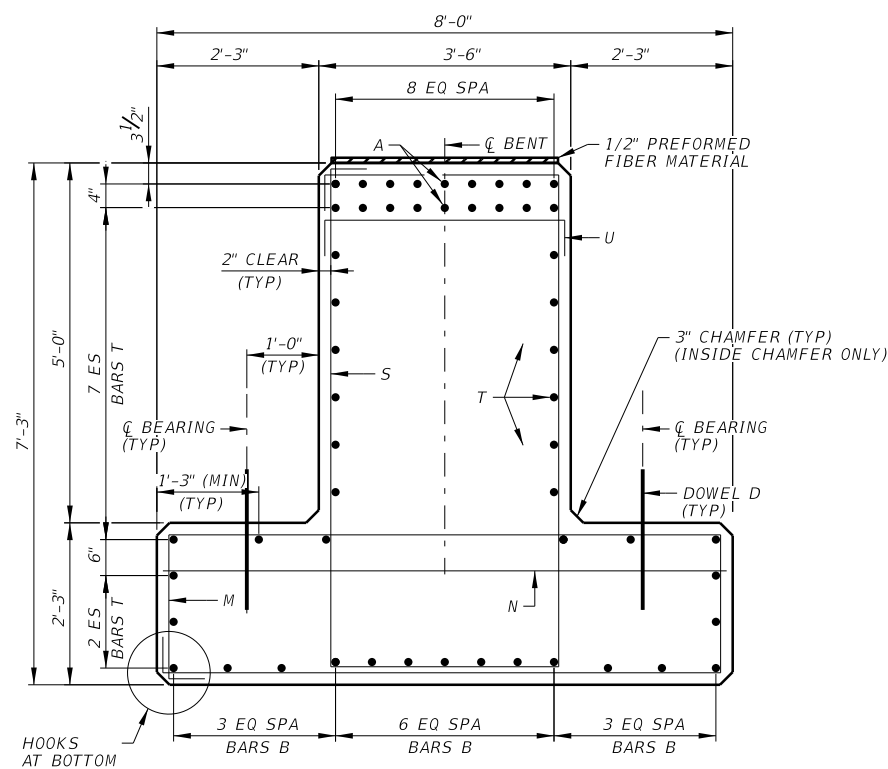


TABLE OF ESTIMATED QUANTITIES	
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5	6
7	8
9	10
11	12
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21	22
23	24
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99	100

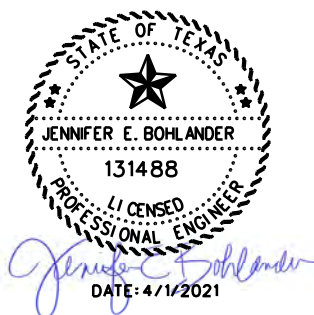
BAR	NO.	SIZE	LENGTH	WEIGHT
A	18	#11	98' -11"	9,460
B	13	#11	98' -11"	6,832
C1	8	#5	13' -3"	111
C2	14	#5	9' -6"	139
C3	8	#5	12' -4"	103
D	4	1 1/4" D	1' -8"	28
E1	66	#5	5' -11"	407
E2	44	#5	6' -8"	306
EH	18	#5	6' -11"	130
EV	22	#5	7' -8"	176
G	10	#7	10' -0"	204
M	182	#6	21' -6"	5,877
N	182	#6	7' -8"	2,096
S	331	#5	22' -2"	7,653
T	22	#5	95' -2"	2,184
U	47	#4	3' -10"	120

REINFORCING STEEL (3)	LB	35,826
CL "C" CONC (CAP)	CY	124.7

- ① INCLUDES 6'-10" MIN LAP
- ② INCLUDES 3'-1" MIN LAP
- ③ FOR CONTRACTOR'S INFORMATION ONLY

NOTES:

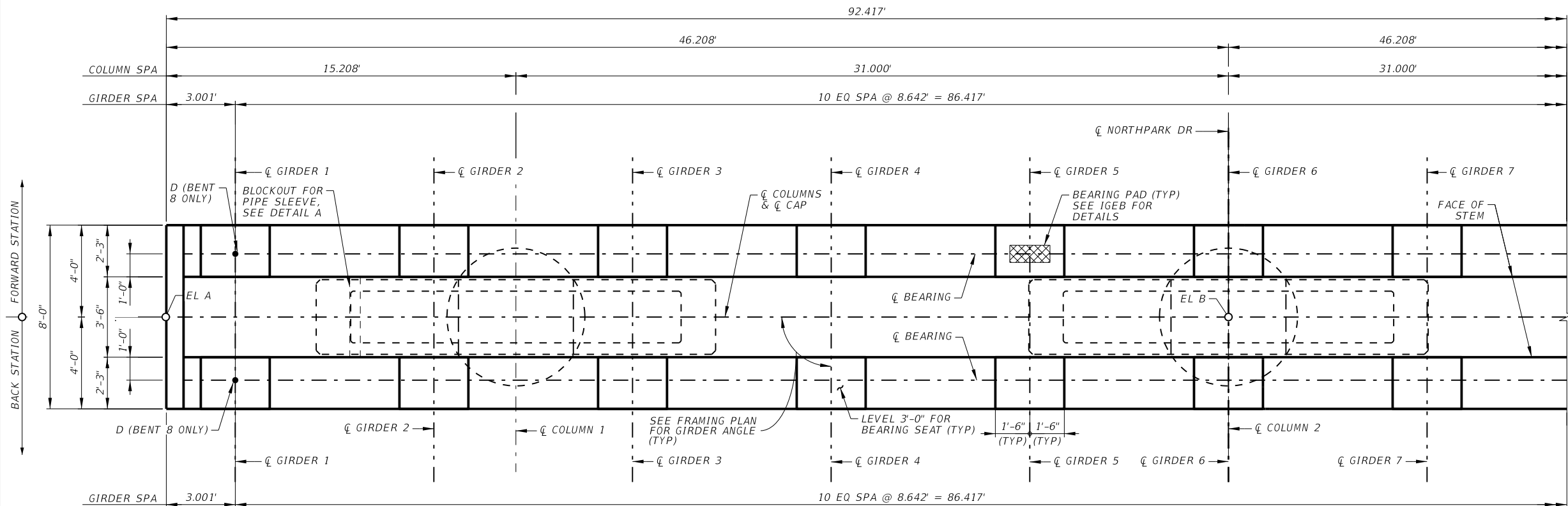
1. FOR GENERAL AND MATERIAL NOTES,
SEE SHEET 1 OF 3.



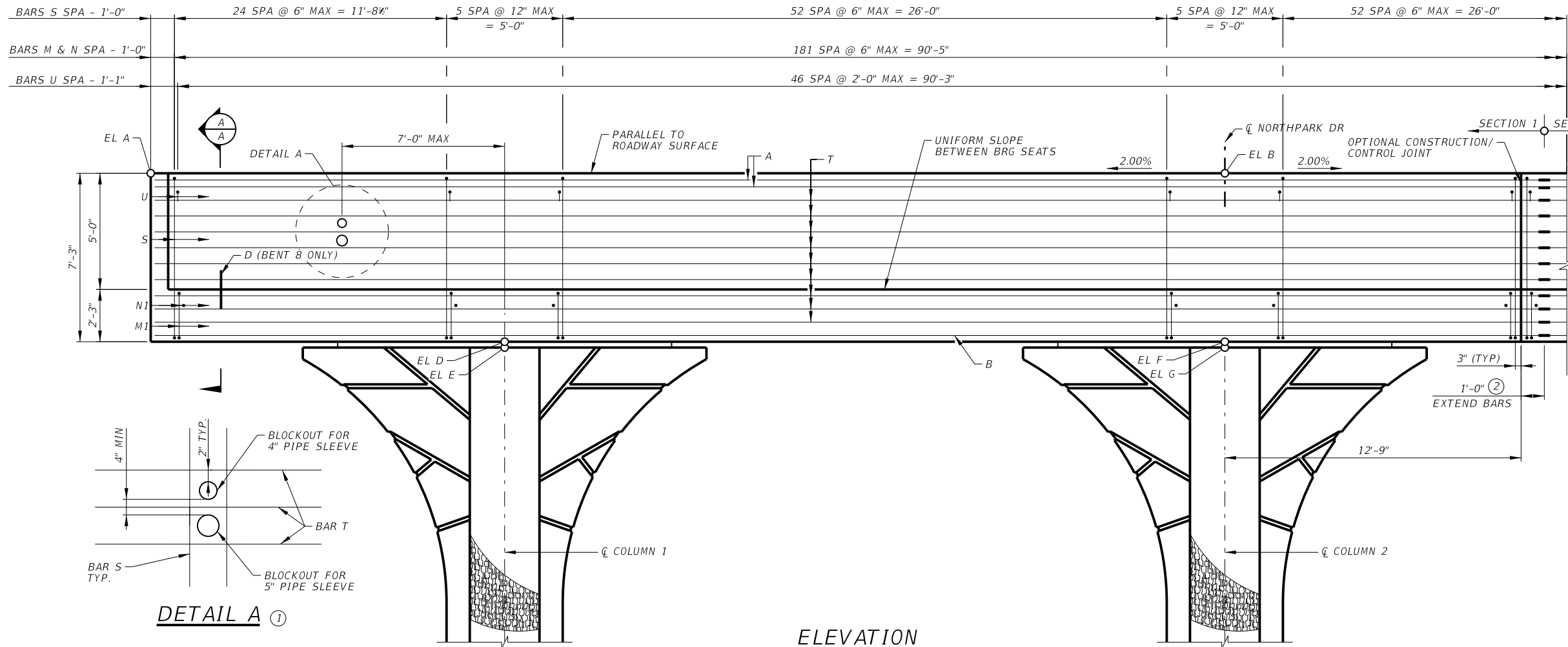
HL-93 LOADING

NO.	REVISIONS						BY	DATE	
<div>HNTB</div>				<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>					
<div><div>LHA</div><div>LAKE HOUSTON AUTHORITY</div></div>				<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 110 c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div>					
<div>CITY OF HOUSTON</div> <div>HOUSTON PUBLIC WORKS</div> <div>NORTH PARK DRIVE</div>									
<div>BENT 6</div> <div>DETAILS</div>									
SHEET 3 OF 3									
DESIGNED:	JEB	FED. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.	
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	417		

CONTROL ELEVATIONS								
EL A	EL B	EL C	EL D	EL E	EL F	EL G	EL H	EL J
110.418	111.333	110.400	103.469	103.074	104.083	103.688	103.457	103.062



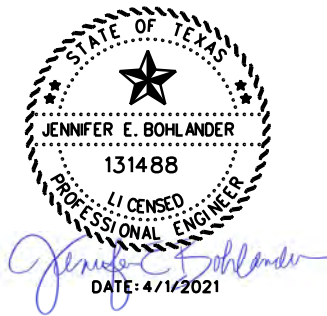
PLAN



ELEVATION

- GENERAL NOTES:**
1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
 2. CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.
 3. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE, CROWN AND/OR SUPERELEVATIONS.
 4. COLUMN AND GIRDER SPACING ARE MEASURED ALONG CL BENT.
 5. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS SHOWN OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.
- MATERIAL NOTES:**
1. PROVIDE CLASS F CONCRETE STRENGTH $f'_c = 5,000$ PSI.
 2. ALL CAP, COLUMN AND DRILLED SHAFT REINFORCING STEEL MUST BE GRADE 60.

- ① SEE ITS PLANS FOR VERTICAL AND HORIZONTAL LOCATION, SIZE, AND MATERIALS OF PIPE SLEEVE. ADJUST BARS S AND BARS T AS REQUIRED TO MAINTAIN COVER FROM PIPE SLEEVES. BLOCKOUT MUST BE WATER TIGHT.
- ② THE CONTRACTOR WILL SPLICE BARS A, B & T BY WELDING IN ACCORDANCE WITH ITEM 448 "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH ITEM 440 "REINFORCING STEEL".
- ③ SEE SHEET 3 OF 3 FOR BARS A, B, AND T SECTION ORIENTATION.

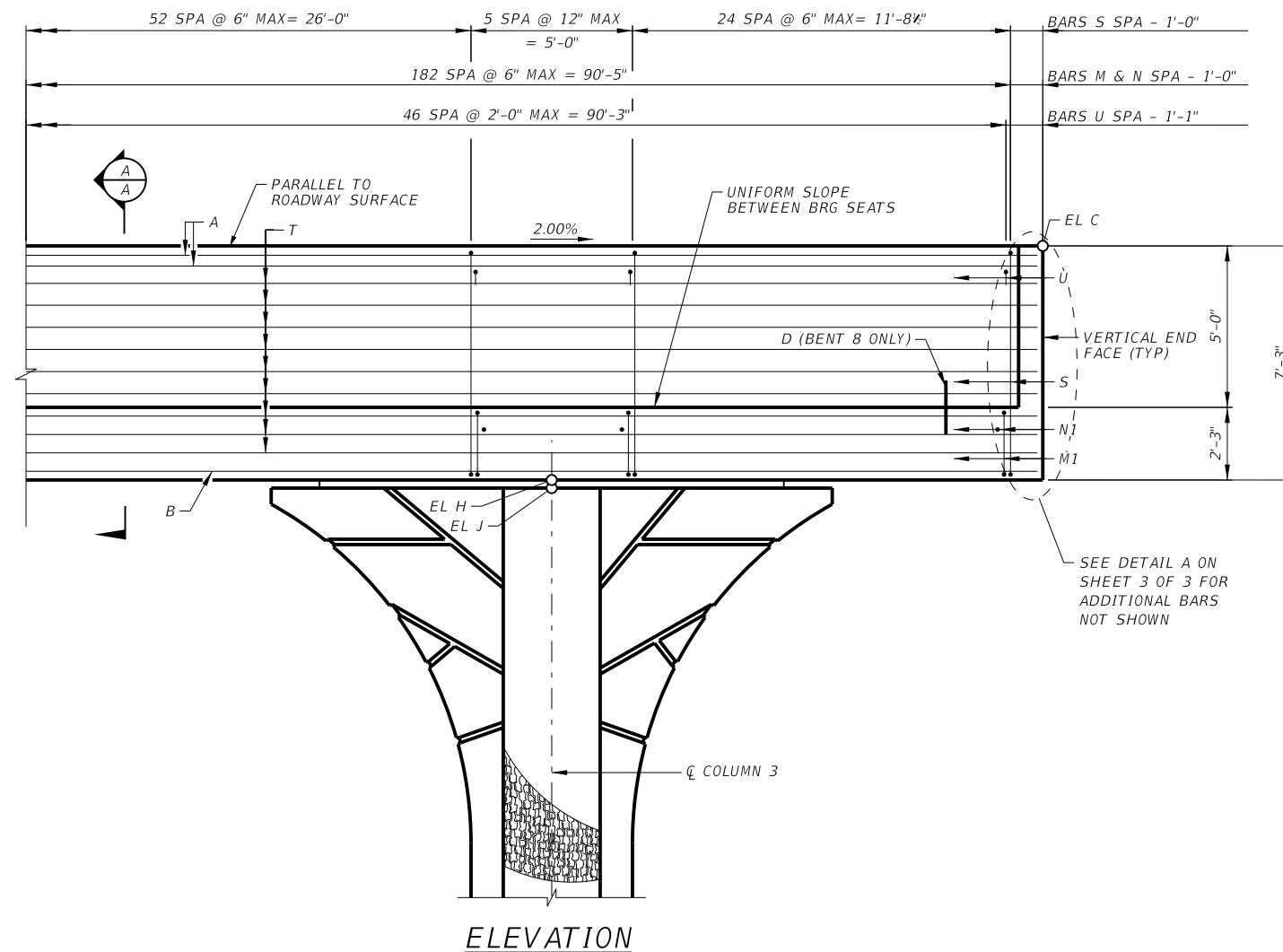
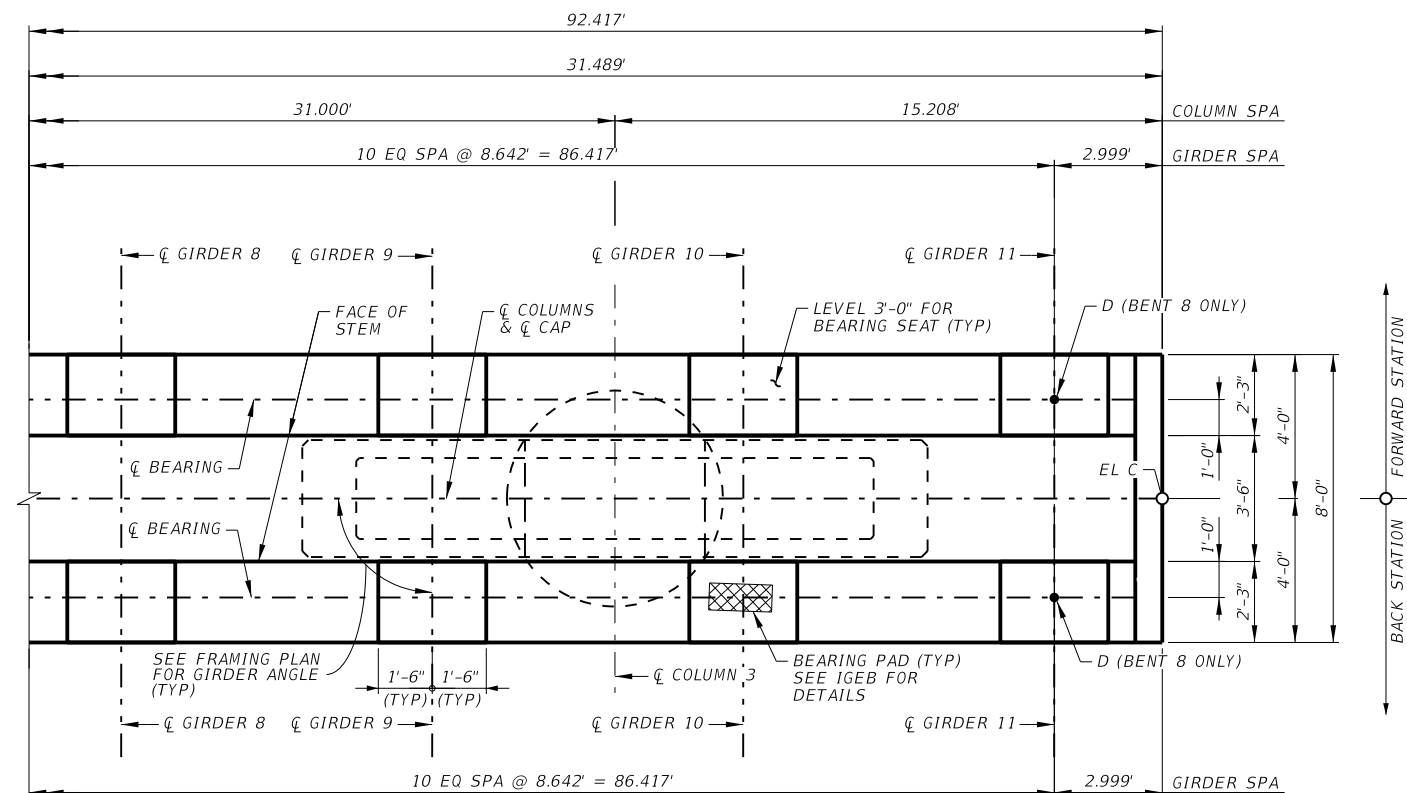


HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BENT 7 & 8 DETAILS			
SHEET 1 OF 3			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE OF TEXAS
CHECKED:	AMS	COUNTY NO. 0912	CITY OF HOUSTON WBS
DRAWN:	JES	SECTION NO. 37	SEE TITLE SHEET
CHECKED:	JME	JOB NO. 232	CS
		SHEET NO. 418	

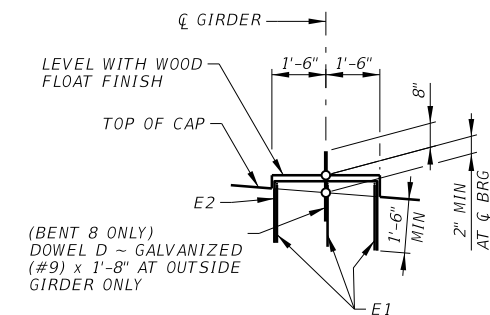
4/1/2021

4:52:10 PM



NOTES:

1. FOR GENERAL AND MATERIAL NOTES,
SEE SHEET 1 OF 3.





PEDESTAL DETAIL

(BEARING SURFACE MUST BE CLEAN
AND FREE OF ALL LOOSE MATERIAL
BEFORE PLACING BEARING PAD.)



HL-93 LOADING

NO.		REVISIONS				BY		DATE	
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
<h1 style="text-align: center;">CITY OF HOUSTON</h1> <h2 style="text-align: center;">HOUSTON PUBLIC WORKS</h2> <h2 style="text-align: center;">NORTH PARK DRIVE</h2> <h2 style="text-align: center;">BENT 7 & 8</h2> <h2 style="text-align: center;">DETAILS</h2>									
SHEET 2 OF 3									
DESIGNED:	JEB	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.				
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET	CS				
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	419		

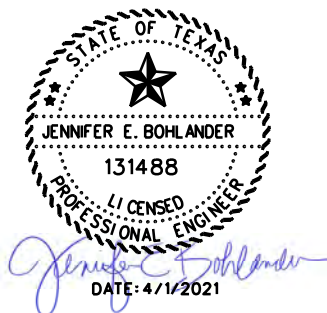


REINFORCING STEEL (3)	LB
CL "C" CONC (CAP)	CY

(1) INCLUDES 6'-10" MIN LAP
 (2) INCLUDES 3'-1" MIN LAP
 (3) FOR CONTRACTOR'S INFORMATION ONLY

②

1. FOR GENERAL AND MATERIAL NOTES,
SEE SHEET 1 OF 3.



No.	REVISIONS						BY	DATE	
<div style="float: left; width: 40%;"> </div> <div style="float: right; width: 60%; padding-left: 20px;"> HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ IO c/o HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TX 77007 </div>									
<h1>CITY OF HOUSTON</h1>									
HOUSTON PUBLIC WORKS									
<h2>NORTHPARK DRIVE</h2>									
<h3>BENT 7 & 8</h3>									
<h3>DETAILS</h3>									
SHEET 3 OF 3									
DESIGNED:	JEB	FED. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	420		

CONTROL ELEVATIONS									
Bent	EL A	EL B	EL C	EL D	EL E	EL F	EL G	EL H	EL J
7	106.467	107.392	106.467	99.522	99.128	100.142	99.748	99.522	99.128
8	100.420	101.345	100.420	93.475	93.081	94.095	93.701	93.475	93.081

Diagram illustrating a rustication joint. The joint is labeled "RUSTICATION" and shows a "1" RECESS" and a depth that "VARIES".

STATE OF TEXAS

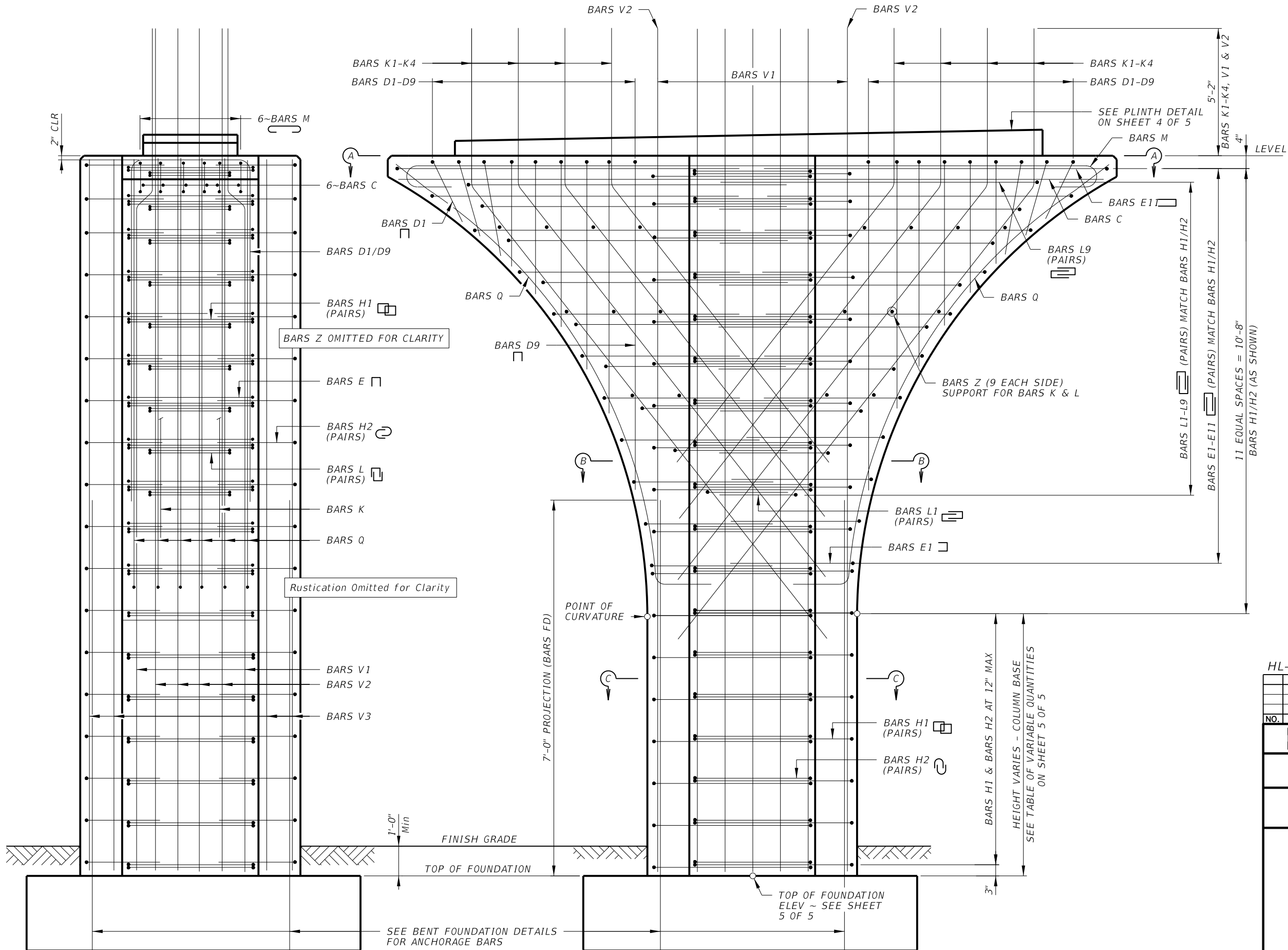
JENNIFER E. BOHLENDER

131488

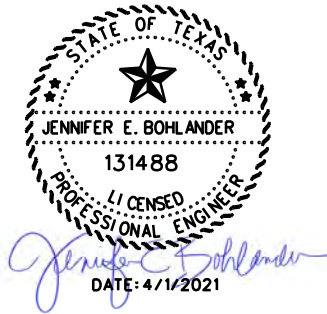
LICENSED PROFESSIONAL ENGINEER

DATE: 4/1/2021


[illegible]



NOTES:
1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 5.



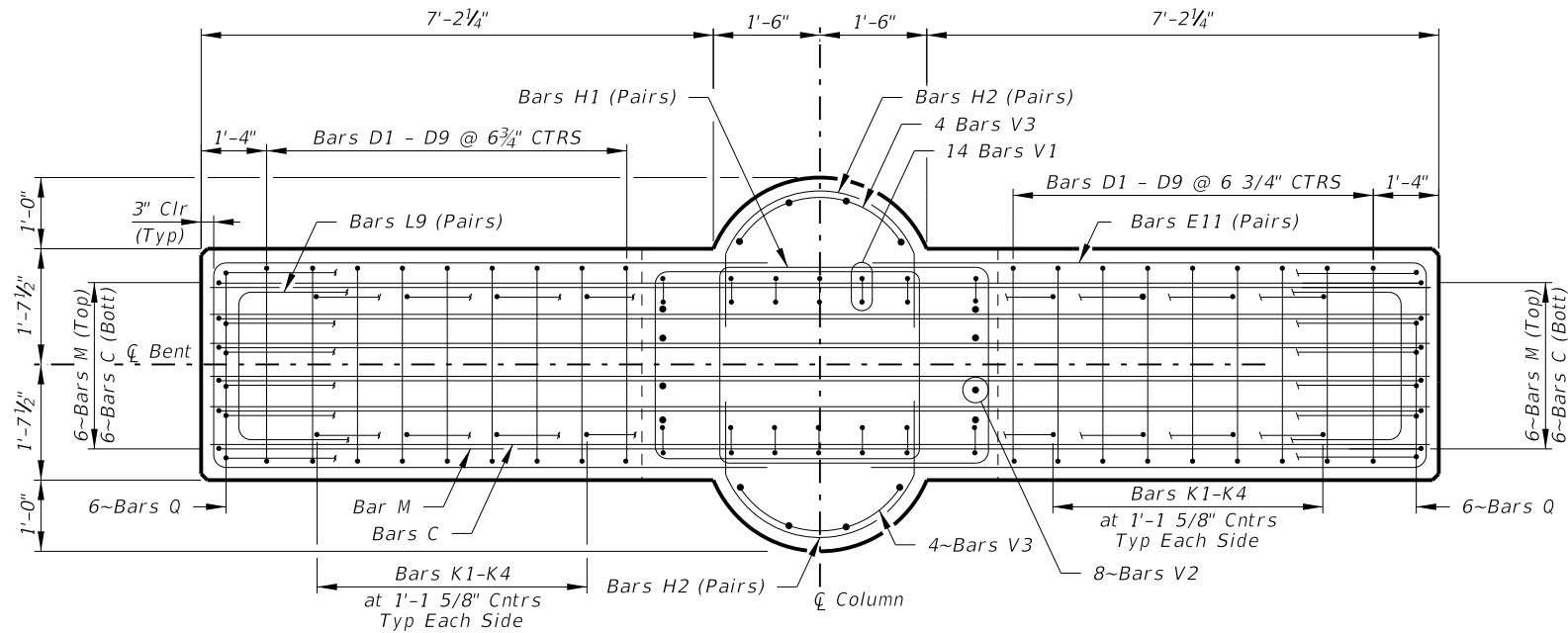
HL-93 LOADING

NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
COLUMN DETAILS									
SHEET 2 OF 5									
DESIGNED:	JEB	FED. RD. DIV. NO.	6	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.	
CHECKED:	AMS			TEXAS	SEE TITLE SHEET			CS	
DRAWN:	JES	STATE DISTRICT		COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
CHECKED:	JME	HOU		MONTGOMERY	0912	37	232	422	

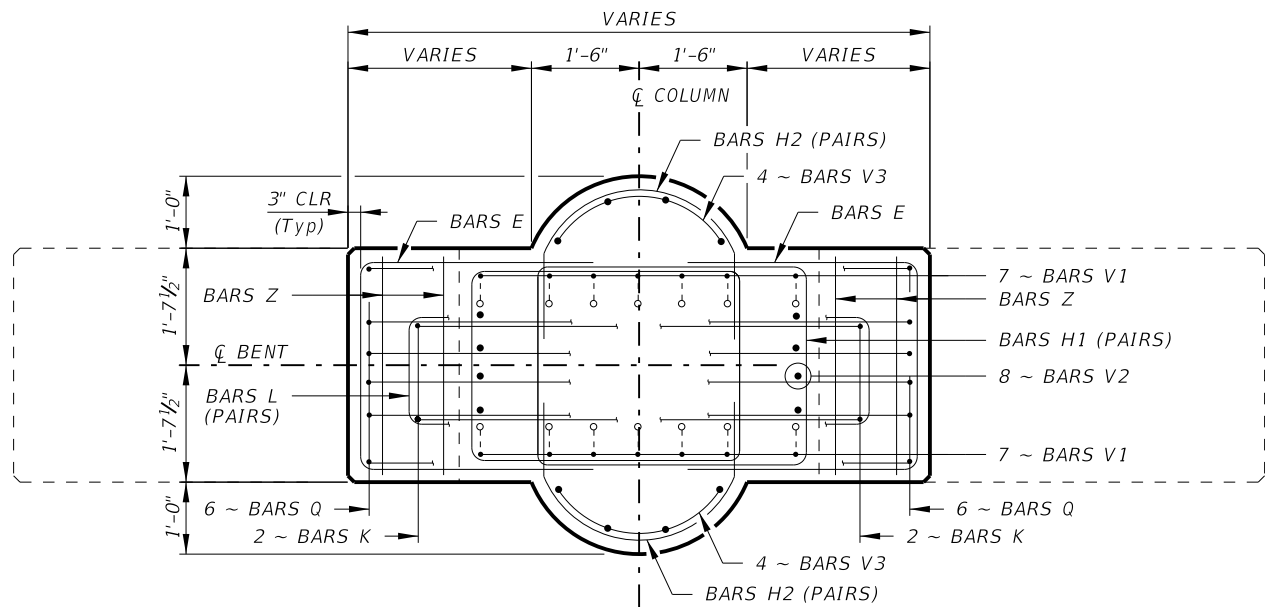
4/1/2021

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NOTES:
1. FOR GENERAL AND MATERIAL NOTES,
SEE SHEET 1 OF 5.

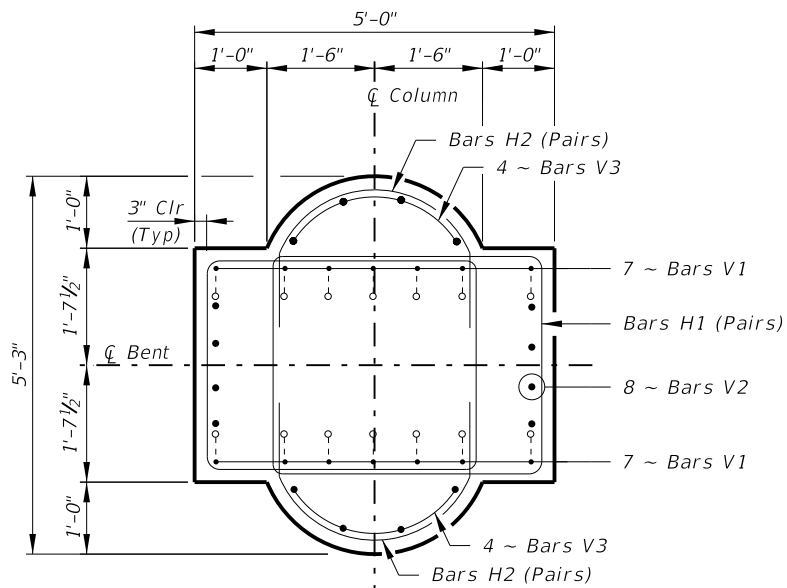


SECTION A-A

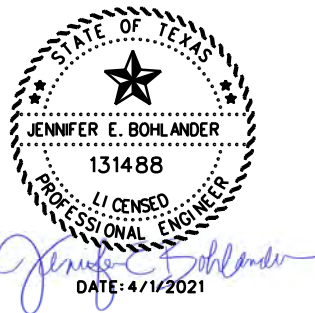


SECTION B-B


SCALE: 3/8" = 1'-0"



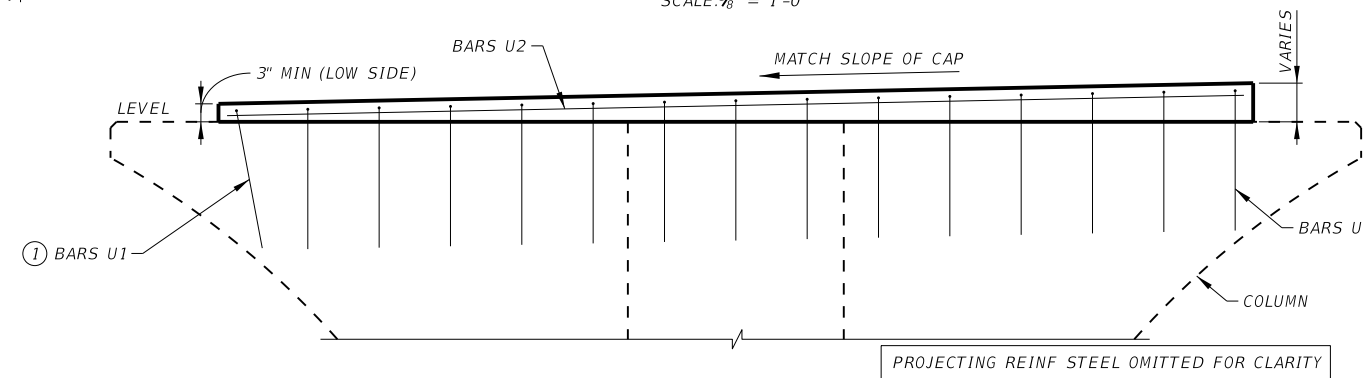
SECTION C-C



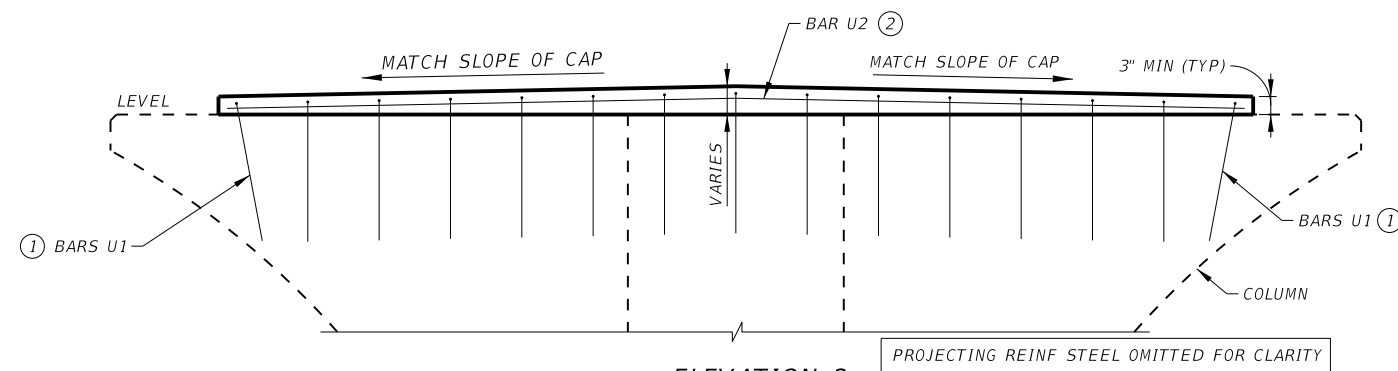
HL-93 LOADING

NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
COLUMN DETAILS									
SHEET 3 OF 5									
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	423		

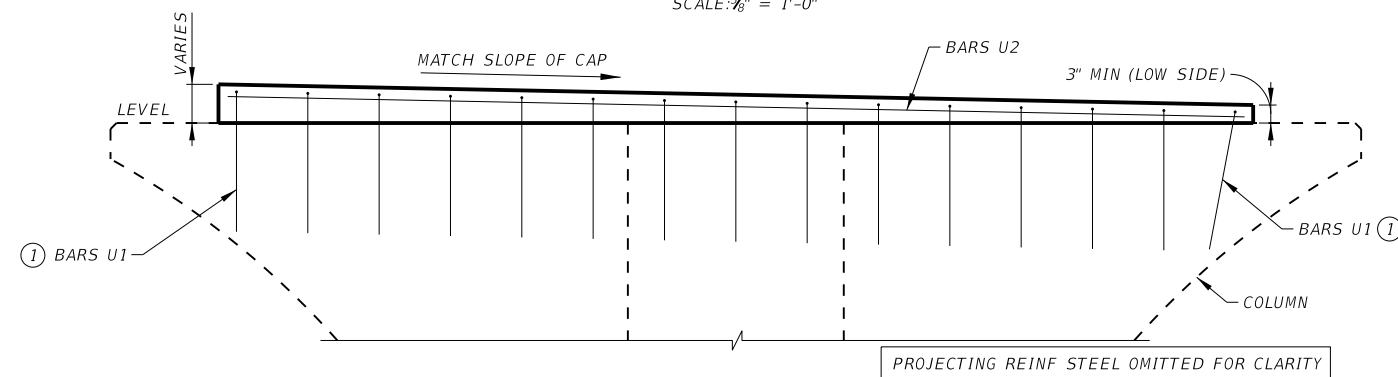
PLAN
SCALE: $\frac{3}{8}" = 1'-0"$



ELEVATION 1
SCALE: $\frac{3}{8}" = 1'-0"$

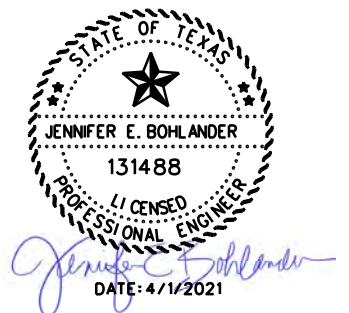


ELEVATION 2
SCALE: $\frac{3}{8}" = 1'-0"$



ELEVATION 3
SCALE: $\frac{3}{8}'' = 1'-0''$
PLINTH DETAIL

- ① TILT END BARS U1 AS NEEDED TO MAINTAIN A 3" CLEAR COVER
- ② FIELD BEND BARS U2 TO MATCH PLINTH SLOPE AND MAINTAIN 3" CLEAR COVER

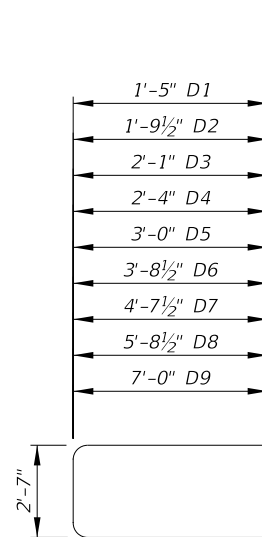


HL-93 LOADING

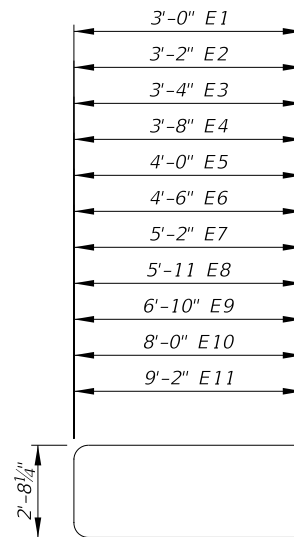
NO.	REVISIONS						BY	DATE	
<div>HNTB</div>				<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>					
<div><div>LHRA</div><div>Lake Houston Redevelopment Authority</div></div>				<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div>					
<div>CITY OF HOUSTON</div> <div>HOUSTON PUBLIC WORKS</div> <div>NORTH PARK DRIVE</div> <div>COLUMN DETAILS</div>									
								SHEET 4 OF 5	
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	424		

TABLE OF CONSTANT QUANTITIES				
BAR	NØ	SIZE	LENGTH	WEIGHT
C	6	#6	17' -1"	154
D1	2	#6	5' -5"	16
D2	2	#6	6' -2"	19
D3	2	#6	6' -9"	20
D4	2	#6	7' -3"	22
D5	2	#6	8' -7"	26
D6	2	#6	10' -0"	30
D7	2	#6	11' -10"	36
D8	2	#6	14' -0"	42
D9	2	#6	16' -7"	50
E1	2	#6	8' -8"	26
E2	2	#6	9' -0"	27
E3	2	#6	9' -4"	28
E4	2	#6	10' -0"	30
E5	2	#6	10' -8"	32
E6	2	#6	11' -8"	35
E7	2	#6	13' -0"	39
E8	2	#6	14' -6"	44
E9	2	#6	16' -4"	49
E10	2	#6	18' -6"	56
E11	2	#6	21' -0"	63
H1	24	#4	13' -4"	214
H2	24	#4	7' -1"	114
K1	4	#11	12' -5"	264
K2	4	#11	14' -8"	312
K3	4	#11	16' -5"	349
K4	4	#11	18' -2"	386
L1	2	#6	4' -7"	14
L2	2	#6	7' -3"	22
L3	2	#6	8' -9"	26
L4	2	#6	10' -3"	31
L5	2	#6	11' -11"	36
L6	2	#6	13' -5"	40
L7	2	#6	15' -3"	46
L8	2	#6	16' -7"	50
L9	2	#6	19' -5"	58
M	6	#8	18' -8"	298
Q	12	#6	15' -3"	275
U1	15	#4	5' -7"	56
U2	3	#6	14' -0"	63
Z	18	#6	3' -0"	81
REIN STEEL SUB-TOTAL (1)(2)			LBS	3,579
CL C CONC (COL) (MASS) (3)			CY	14.1

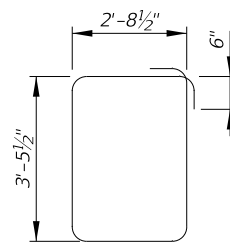
① FOR CONTRACTOR'S INFORMATION ONLY.
② ALL REINFORCING STEEL SHALL BE GRADE 60.
③ INCLUDES PLINTH QUANTITY CALCULATED USING 2.00% CROSS SLOPE.



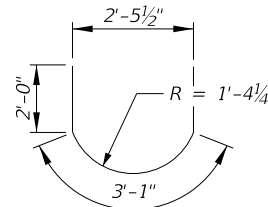
BAR D



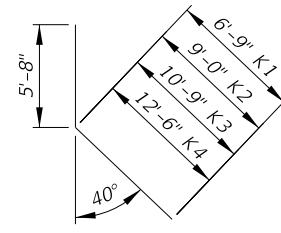
BAR E



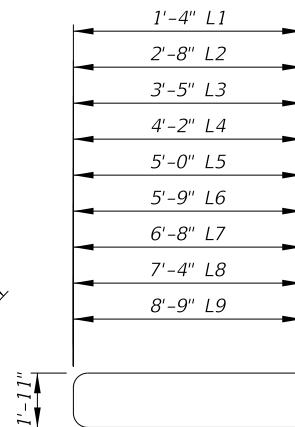
BAR H1



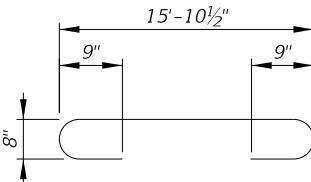
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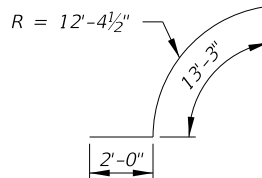
BAR K



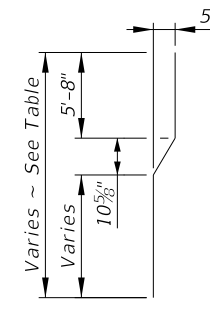
BAR L



BAR M



BAR Q



BAR VI

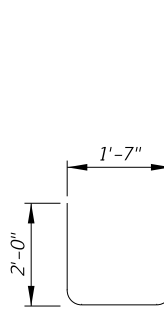
BAR UI

TABLE OF VARIABLE QUANTITIES																		TOTAL EST QUANTITIES			
BENT	COLUMN NO	TOP OF FOUNDATION (ELEV)	TOP OF COLUMN (ELEV)	TOP OF PLINTH (ELEV)	COLUMN HEIGHT "H" (FT)	CL C CONC (COLUMN) (MASS) (CY)	BAR V1 (#11)			BAR V2 (#11)			BAR V3 (#11)			BAR H1 (#4) LENGTH = 13'-4" (EA)		BAR H2 (#4) LENGTH = 7'-1" (EA)		REINFORCING STEEL (LBS)	CL C CONC (COLUMN) (MASS) (CY)
							NO	LENGTH	WEIGHT	NO	LENGTH	WEIGHT	NO	LENGTH	WEIGHT	NO	WEIGHT	NO	WEIGHT		
2	1	81.69	97.41	97.82	16	3.6	14	20' -9"	1,541	8	20' -9"	880	8	15' -5"	654	10	89	10	47	6,790	17.7
	2	82.00	97.94	98.35	16	3.8	14	20' -11"	1,557	8	20' -11"	890	8	15' -7"	663	10	89	10	47	6,825	17.9
	3	81.18	97.24	97.65	17	3.9	14	21' -1"	1,566	8	21' -1"	895	8	15' -9"	668	12	107	12	57	6,872	18.0
3	1	82.10	101.90	102.32	20	6.7	14	24' -10"	1,844	8	24' -10"	1,054	8	19' -6"	827	18	160	18	85	7,549	20.8
	2	82.00	102.39	102.81	21	7.2	14	25' -5"	1,889	8	25' -5"	1,079	8	20' -1"	853	20	178	20	95	7,673	21.3
	3	81.95	101.66	102.08	20	6.6	14	24' -8"	1,838	8	24' -8"	1,050	8	19' -4"	823	18	160	18	85	7,535	20.7
4	1	83.43	104.47	104.87	22	7.7	14	26' -1"	1,937	8	26' -1"	1,107	8	20' -9"	880	22	196	22	104	7,803	21.8
	2	83.33	105.01	105.42	22	8.1	14	26' -8"	1,985	8	26' -8"	1,134	8	21' -4"	908	22	196	22	104	7,906	22.2
	3	83.26	104.34	104.74	22	7.7	14	26' -1"	1,939	8	26' -1"	1,108	8	20' -9"	882	22	196	22	104	7,808	21.8
5	1	83.72	104.63	105.03	21	7.6	14	25' -11"	1,927	8	25' -11"	1,101	8	20' -7"	875	20	178	20	95	7,755	21.7
	2	84.00	105.29	105.69	22	7.8	14	26' -3"	1,955	8	26' -3"	1,117	8	20' -11"	891	22	196	22	104	7,842	21.9
	3	83.64	104.73	105.13	22	7.7	14	26' -1"	1,941	8	26' -1"	1,109	8	20' -9"	882	22	196	22	104	7,811	21.8
6	1	82.04	103.07	103.47	22	7.7	14	26' -0"	1,937	8	26' -0"	1,107	8	20' -8"	880	22	196	22	104	7,803	21.8
	2	82.00	103.69	104.08	22	8.1	14	26' -8"	1,985	8	26' -8"	1,134	8	21' -4"	908	22	196	22	104	7,906	22.2
	3	81.45	103.06	103.46	22	8.1	14	26' -7"	1,980	8	26' -7"	1,131	8	21' -3"	905	22	196	22	104	7,895	22.2
7	1	80.20	99.13	99.52	19	6.0	14	23' -11"	1,780	8	23' -11"	1,017	8	18' -7"	790	16	143	16	76	7,385	20.1
	2	81.00	99.75	100.14	19	5.9	14	23' -9"	1,766	8	23' -9"	1,009	8	18' -5"	783	16	143	16	76	7,356	20.0
	3	80.03	99.13	99.52	20	6.2	14	24' -1"	1,793	8	24' -1"	1,024	8	18' -9"	798	18	160	18	85	7,439	20.3
8	1	79.95	93.08	93.48	14	1.6	14	18' -2"	1,349	8	18' -2"	771	8	12' -10"	544	6	53	6	28	6,324	15.7
	2	81.50	93.70	94.10	13	0.9	14	17' -2"	1,279	8	17' -2"	731	8	11' -10"	504	4	36	4	19	6,148	15.0
	3	79.74	93.08	93.48	14	1.8	14	18' -4"	1,364	8	18' -4"	780	8	13' -0"	553	6	53	6	28	6,357	15.9

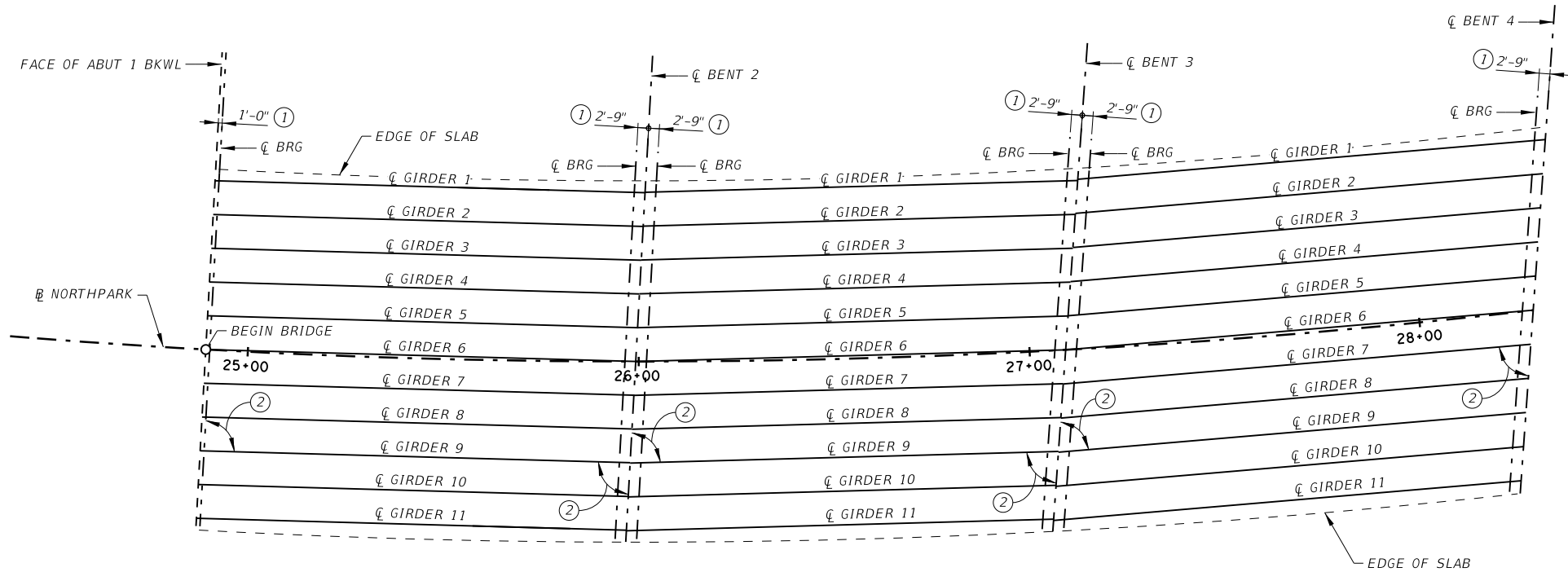
NOTES:

1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 5.
2. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON ACTUAL FIELD CONDITIONS.



HL-93 LOADING

NO.	REVISIONS						BY	DATE	
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> <h2 style="margin: 0;">NORTHPARK DRIVE</h2> <h1 style="margin: 0;">COLUMN DETAILS</h1>									
SHEET 5 OF 5									
DESIGNED:	JEB	FED. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.		
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	425		



UNIT 1

SPAN 1

(TYPE Tx54 GIRDER)

SPAN 2

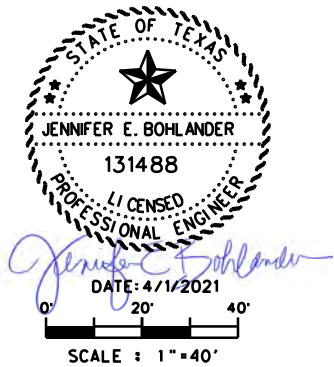
(TYPE Tx54 GIRDER)

SPAN 3

(TYPE Tx54 GIRDER)

TABLE OF ESTIMATED QUANTITIES	
PRESTRESSED CONCRETE GIRDER	
(TX54)	
SPAN NO.	(LF)
1	1185.11
2	1165.66
3	1275.30
TOTAL	3626.06

- ① SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION TO CENTERLINE BEARING.
- ② GIRDER ANGLE (TYP), SEE BENT REPORT.



HL-93 LOADING

NO.	REVISIONS	BY	DATE
<div><div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div><div><div>LHRA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
FRAMING PLAN UNIT 1			
SHEET 1 OF 5			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	HIGHWAY NO. CS
DRAWN:	JES	SEE TITLE SHEET	
CHECKED:	JME	STATE DISTRICT JES	COUNTY COUNTY
		CONTROL No. 0912	SECTION No. 37
		JOB No. 232	SHEET No. 426

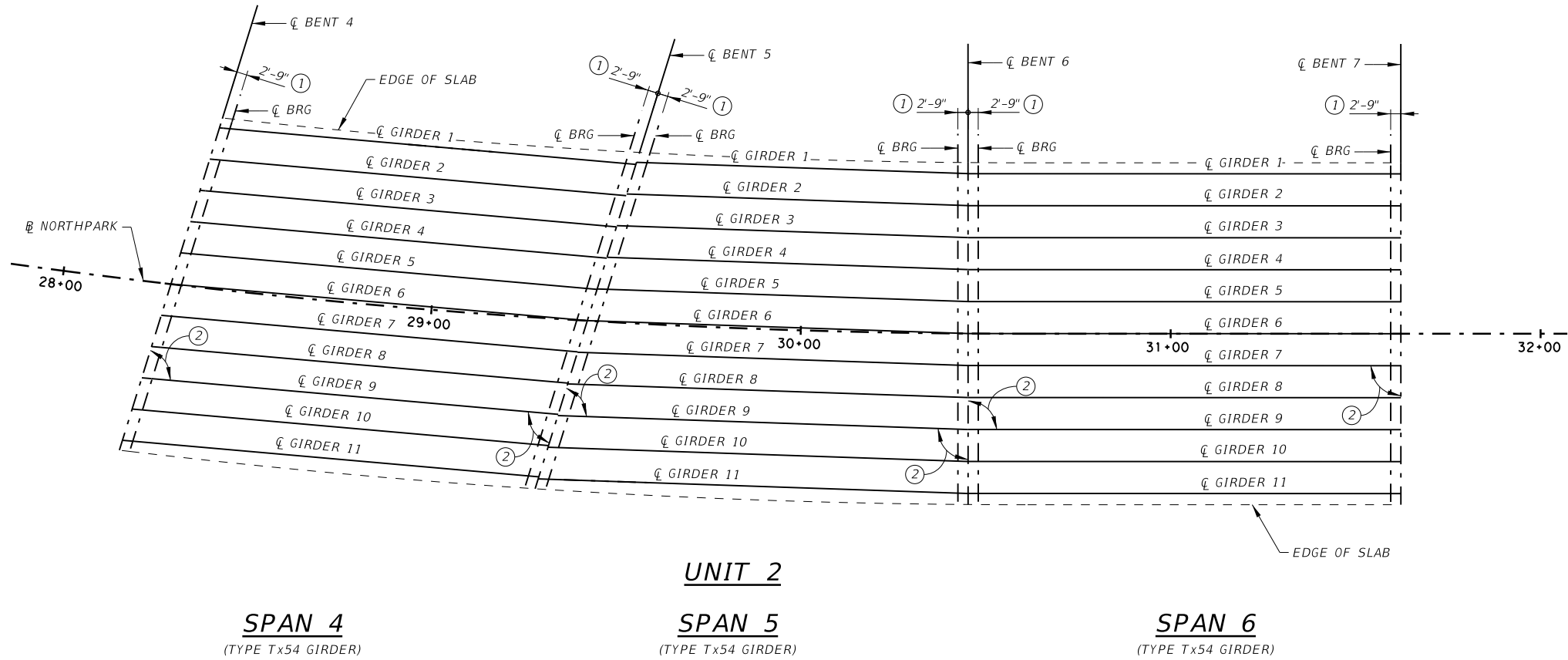
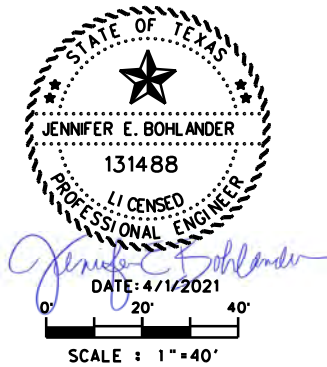


TABLE OF ESTIMATED QUANTITIES	
PRESTRESSED CONCRETE GIRDER	
(TX54)	
SPAN NO.	(LF)
4	1197.85
5	1087.96
6	1243.00
TOTAL	3528.80

- ① SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION TO CENTERLINE BEARING.
- ② GIRDER ANGLE (TYP), SEE BENT REPORT.



HL-93 LOADING

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HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIR2 10 06 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
FRAMING PLAN UNIT 2			
SHEET 2 OF 5			
DESIGNED:	JEB	FED. RD. DIV. No.	STATE
CHECKED:	AMS	6	TEXAS
DRAWN:	JES	STATE DISTRICT	COUNTY
CHECKED:	JME	HOU	MONTGOMERY
CITY OF HOUSTON WBS		HIGHWAY No.	
SEE TITLE SHEET		CS	
CONTROL No.	SECTION No.	JOB No.	SHEET No.
0912	37	232	427
4/1/2021		4: 49: 34 PM	

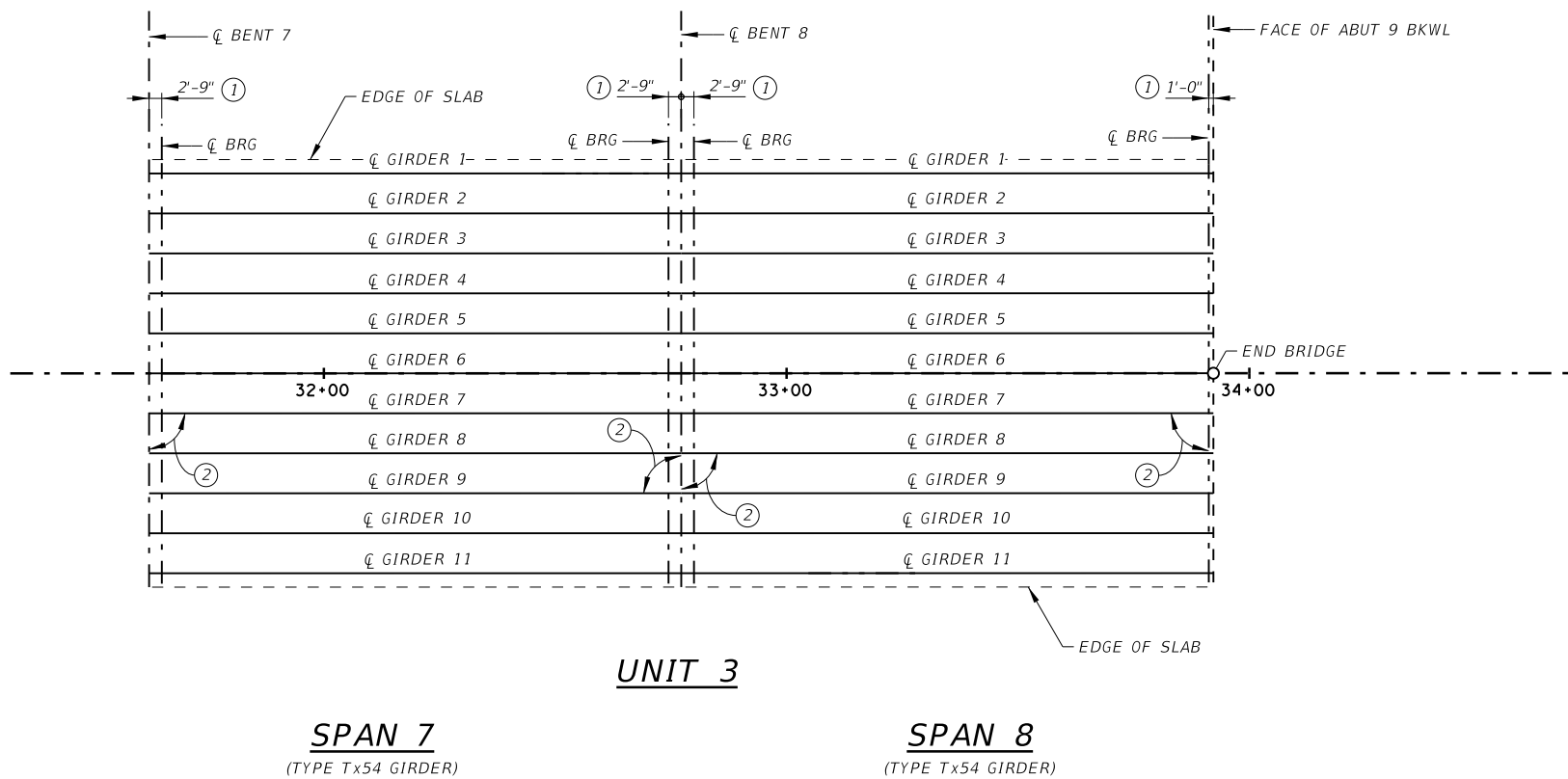
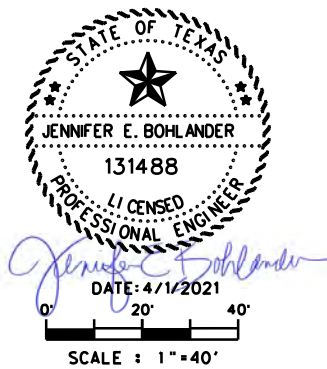


TABLE OF ESTIMATED QUANTITIES	
PRESTRESSED CONCRETE GIRDER	
(TX54)	
SPAN NO.	(LF)
7	1221.00
8	1240.25
TOTAL	2461.25

- (1) SEE STANDARD IGEB FOR ORIENTATION OF DIMENSION TO CENTERLINE BEARING.
- (2) GIRDER ANGLE (TYP), SEE BENT REPORT.

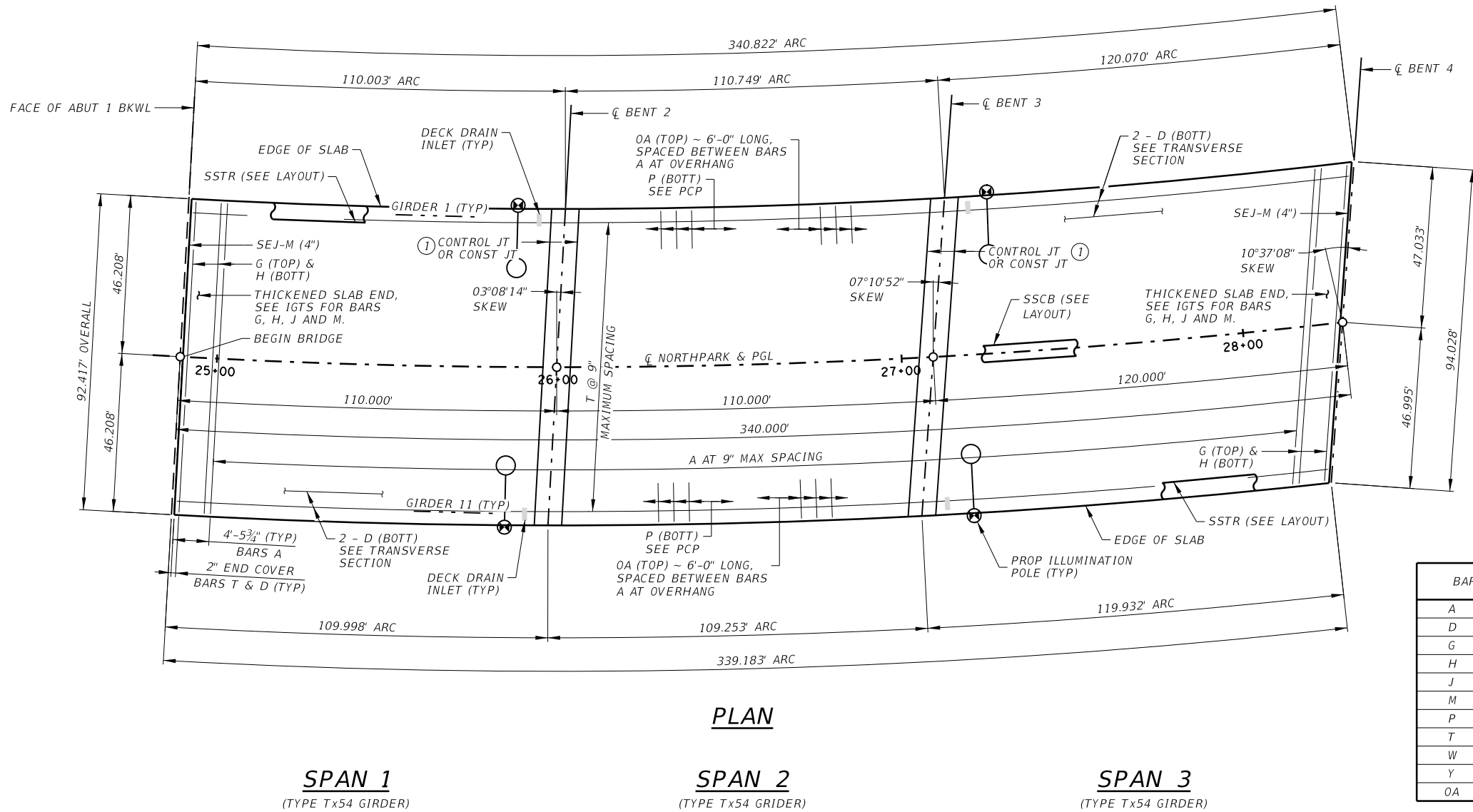


HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
FRAMING PLAN UNIT 3			
SHEET 3 OF 5			
DESIGNED:	JEB	FED. RD. DIV. No.	STATE
CHECKED:	AMS	6	TEXAS
DRAWN:	JES	STATE DISTRICT	COUNTY
CHECKED:	JME	HOU	MONTGOMERY
CITY OF HOUSTON WBS		HIGHWAY No.	
SEE TITLE SHEET		CS	
CONTROL No.	SECTION No.	JOB No.	SHEET No.
0912	37	232	428

4/1/2021

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BAR TABLE	
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
P	#4
T	#4
W	#4
Y	#4
OA	#5

MATERIAL NOTES:

1. PROVIDE CLASS 5 CONCRETE ($f'_c = 4,000$ psi).
2. PROVIDE GRADE 60 REINFORCING STEEL.
3. PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS: UNCOATED ~ #4 = 1'-5"
4. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

① SEE IGMS STANDARD FOR CONTINUOUS SLAB DETAILS OVER INVERTED T-CAP. SEE PCP (MOD) STANDARD FOR OTHER DETAILS.

TABLE OF ESTIMATED QUANTITIES

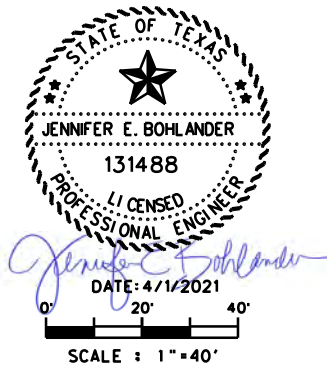
UNIT 1

SPAN	REINF CONC SLAB (CL 5)	REINFORCING STEEL ②
(NO.)	(SF)	(LB)
1	10,091	23,209
2	10,166	23,381
3	11,028	25,365
TOTAL	31,285	71,955

② REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF OF SLAB, FOR CONTRACTOR'S INFORMATION ONLY.

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATIONS, 8TH EDITION, 2017 WITH CURRENT INTERIMS.
2. SEE PCP AND PCP-FAB FOR PANEL DETAILS NOT SHOWN.
3. SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.
4. SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS.
5. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED.
6. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

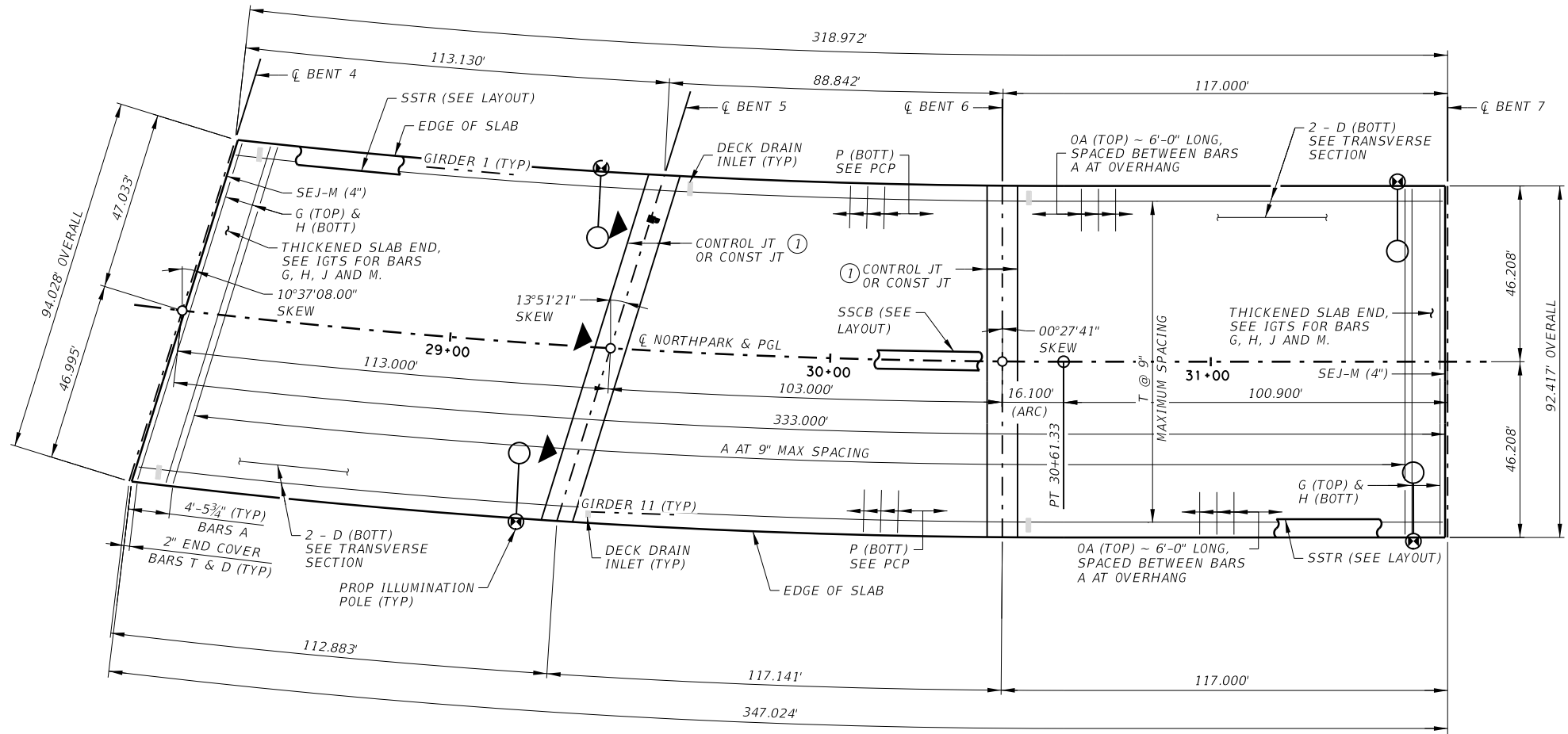


HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
SLAB PLAN UNIT 1			
SHEET 1 OF 5			
DESIGNED:	JEB	FED. RD. DIV. No. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	SECTION No. 0912
CHECKED:	JME	JOB No. 232	SHEET No. 431

4/1/2021

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PLAN

SPAN 4
(TYPE Tx54 GIRDER)

SPAN 5
(TYPE Tx54 GRIDER)

SPAN 6
(TYPE Tx54 GIRDER)

BAR TABLE	
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
P	#4
T	#4
W	#4
Y	#4
OA	#5

TABLE OF ESTIMATED QUANTITIES

UNIT 2

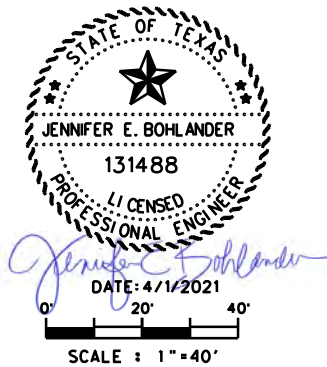
SPAN	REINF CONC SLAB (CL S)	REINFORCING STEEL
(NO.)	(SF)	(LB)
4	10,382	23,878
5	9,519	21,893
6	10,752	24,730
TOTAL	30,653	70,501

② REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF OF SLAB, FOR CONTRACTOR'S INFORMATION ONLY.

NOTES:

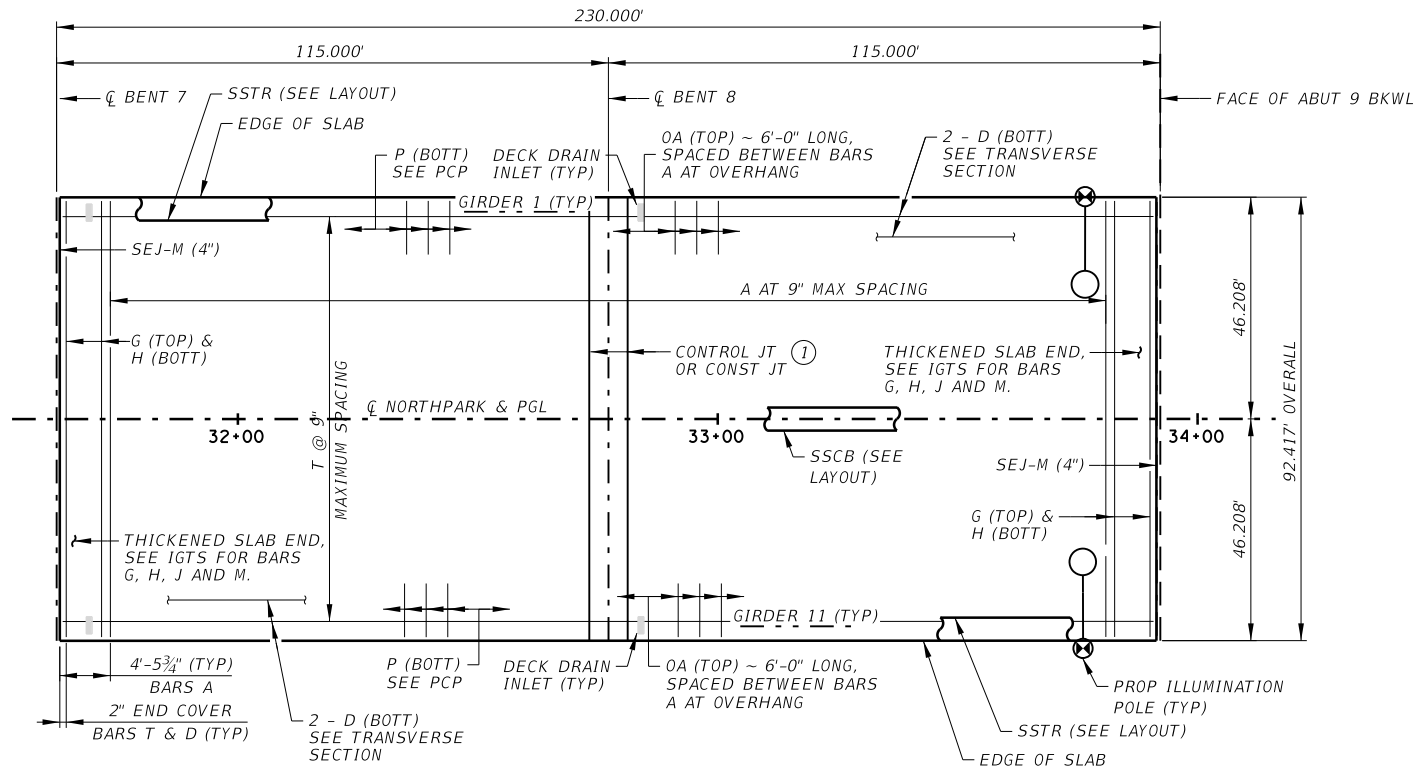
1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 5.

① SEE IGMS STANDARD FOR CONTINUOUS SLAB DETAILS OVER INVERTED T-CAP. SEE PCP (MOD) STANDARD FOR OTHER DETAILS.



HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
SLAB PLAN UNIT 2			
SHEET 2 OF 5			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	HIGHWAY NO. CS
DRAWN:	JES	STATE DISTRICT	COUNTY COUNTY
CHECKED:	JME	HOUSTON	CONTROL SECTION NO. 0912 37



PLAN

SPAN 7
(TYPE Tx54 GRIDER)

SPAN 8
(TYPE Tx54 GIRDER)

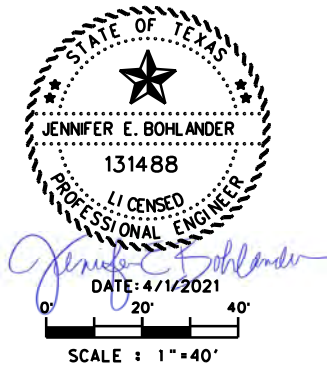
BAR TABLE	
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
P	#4
T	#4
W	#4
Y	#4
OA	#5

TABLE OF ESTIMATED QUANTITIES		
UNIT 3		
SPAN	REINF CONC SLAB (CL S)	REINFORCING STEEL ②
(NO.)	(SF)	(LB)
7	10,567	24,305
8	10,553	24,271
TOTAL	21,120	48,576

② REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF OF SLAB, FOR CONTRACTOR'S INFORMATION ONLY.

NOTES:

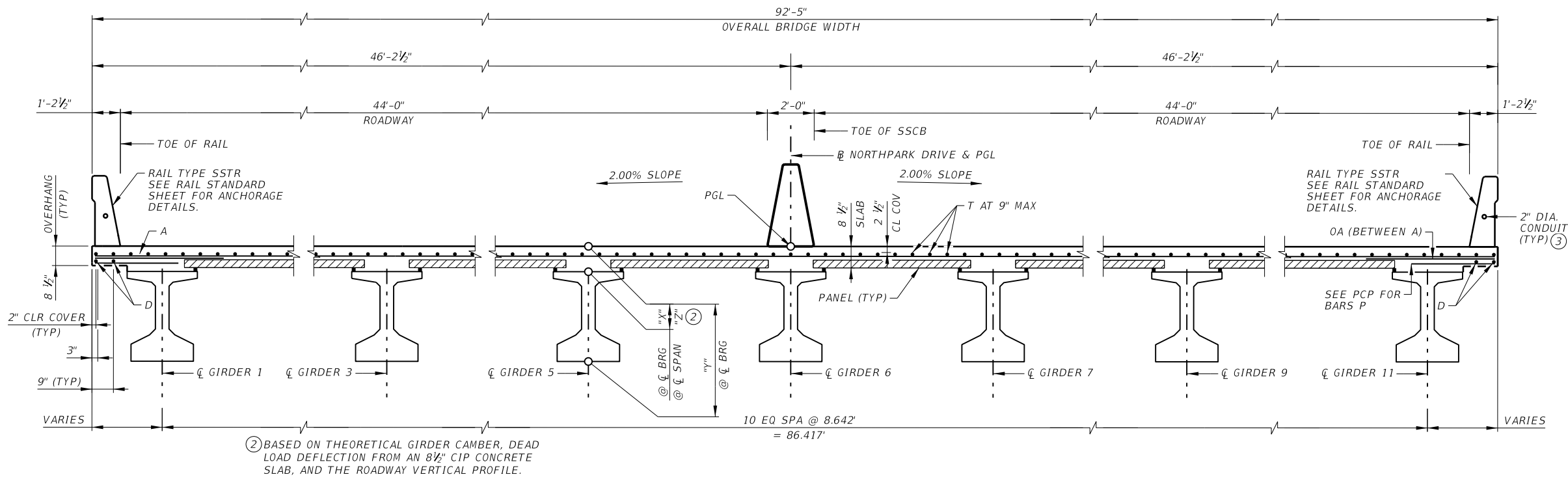
1. FOR GENERAL AND MATERIAL NOTES, SEE SHEET 1 OF 5.
- ① SEE IGMS STANDARD FOR CONTINUOUS SLAB DETAILS OVER INVERTED T-CAP. SEE PCP (MOD) STANDARD FOR OTHER DETAILS.



HL-93 LOADING

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 06 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
SLAB PLAN UNIT 3			
SHEET 3 OF 5			
DESIGNED:	JEB	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	SECTION 0912
CHECKED:	JME	HOUSTON	37
4/1/2021		4:52:17 PM	

NOTES:
1. FOR GENERAL NOTES, SEE SHEET 1 OF 5.



TYPICAL TRANSVERSE SECTION

③ SEE BL STANDARD FOR 2" DIA. CONDUIT AND JUNCTION BOX DETAILS

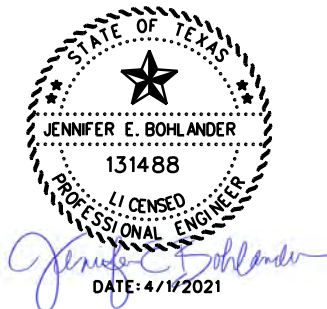


TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	"X" AT CL BRG	"Y" AT CL BRG	② "Z" AT CL SPAN
1	1	10 1/2"	5'- 4 1/2"	10 1/2"
	2	10 1/2"	5'- 4 1/2"	10 3/4"
	3	10 1/2"	5'- 4 1/2"	10 3/4"
	4	10 1/2"	5'- 4 1/2"	10 3/4"
	5	10 1/2"	5'- 4 1/2"	10 3/4"
	6	10 1/2"	5'- 4 1/2"	10 3/4"
	7	10 1/2"	5'- 4 1/2"	11"
	8	10 1/2"	5'- 4 1/2"	11"
	9	10 1/2"	5'- 4 1/2"	11"
	10	10 1/2"	5'- 4 1/2"	11"
	11	10 1/2"	5'- 4 1/2"	10 3/4"
2	1	10 1/2"	5'- 4 1/2"	11 1/4"
	2	10 1/2"	5'- 4 1/2"	11 1/2"
	3	10 1/2"	5'- 4 1/2"	11 1/2"
	4	10 1/2"	5'- 4 1/2"	11 1/2"
	5	10 1/2"	5'- 4 1/2"	11 1/2"
	6	10 1/2"	5'- 4 1/2"	11 1/2"
	7	10 1/2"	5'- 4 1/2"	11 3/4"
	8	10 1/2"	5'- 4 1/2"	11 3/4"
	9	10 1/2"	5'- 4 1/2"	11 3/4"
	10	10 1/2"	5'- 4 1/2"	11 3/4"
	11	10 1/2"	5'- 4 1/2"	11 1/2"

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	CL BRG	CL BRG	② CL SPAN
3	1	10 1/2"	5'- 4 1/2"	10 3/4"
	2	10 1/2"	5'- 4 1/2"	11 1/4"
	3	10 1/2"	5'- 4 1/2"	11 1/4"
	4	10 1/2"	5'- 4 1/2"	11 1/4"
	5	10 1/2"	5'- 4 1/2"	11 1/4"
	6	10 1/2"	5'- 4 1/2"	11 1/4"
	7	10 1/2"	5'- 4 1/2"	11 1/2"
	8	10 1/2"	5'- 4 1/2"	11 1/2"
	9	10 1/2"	5'- 4 1/2"	11 1/2"
	10	10 1/2"	5'- 4 1/2"	11 1/2"
	11	10 1/2"	5'- 4 1/2"	11 1/4"
4	1	10 1/2"	5'- 4 1/2"	11"
	2	10 1/2"	5'- 4 1/2"	11 1/4"
	3	10 1/2"	5'- 4 1/2"	11 1/4"
	4	10 1/2"	5'- 4 1/2"	11 1/4"
	5	10 1/2"	5'- 4 1/2"	11"
	6	10 1/2"	5'- 4 1/2"	11"
	7	10 1/2"	5'- 4 1/2"	11 1/2"
	8	10 1/2"	5'- 4 1/2"	11 1/2"
	9	10 1/2"	5'- 4 1/2"	11 1/4"
	10	10 1/2"	5'- 4 1/2"	11 1/4"
	11	10 1/2"	5'- 4 1/2"	11 1/4"

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	CL BRG	CL BRG	② CL SPAN
5	1	10 1/2"	5'- 4 1/2"	10 1/2"
	2	10 1/2"	5'- 4 1/2"	10 3/4"
	3	10 1/2"	5'- 4 1/2"	11"
	4	10 1/2"	5'- 4 1/2"	11 1/4"
	5	10 1/2"	5'- 4 1/2"	11 1/4"
	6	10 1/2"	5'- 4 1/2"	10 1/4"
	7	10 1/2"	5'- 4 1/2"	11"
	8	10 1/2"	5'- 4 1/2"	11"
	9	10 1/2"	5'- 4 1/2"	11 1/4"
	10	10 1/2"	5'- 4 1/2"	11 1/2"
	11	10 1/2"	5'- 4 1/2"	11 1/2"
6	1	10 1/2"	5'- 4 1/2"	11"
	2	10 1/2"	5'- 4 1/2"	11 1/4"
	3	10 1/2"	5'- 4 1/2"	11 1/4"
	4	10 1/2"	5'- 4 1/2"	11 1/4"
	5	10 1/2"	5'- 4 1/2"	11 1/4"
	6	10 1/2"	5'- 4 1/2"	11 1/4"
	7	10 1/2"	5'- 4 1/2"	11 1/2"
	8	10 1/2"	5'- 4 1/2"	11 1/2"
	9	10 1/2"	5'- 4 1/2"	11 1/2"
	10	10 1/2"	5'- 4 1/2"	11 1/2"
	11	10 1/2"	5'- 4 1/2"	11 1/4"

TABLE OF SECTION DEPTHS				
SPAN NO.	GIRDER NO.	CL BRG	CL BRG	② CL SPAN
7	1	10 1/2"	5'- 4 1/2"	11 1/4"
	2	10 1/2"	5'- 4 1/2"	11 1/2"
	3	10 1/2"	5'- 4 1/2"	11 1/2"
	4	10 1/2"	5'- 4 1/2"	11 1/2"
	5	10 1/2"	5'- 4 1/2"	11 1/2"
	6	10 1/2"	5'- 4 1/2"	11 1/2"
	7	10 1/2"	5'- 4 1/2"	11 1/2"
	8	10 1/2"	5'- 4 1/2"	11 1/2"
	9	10 1/2"	5'- 4 1/2"	11 1/2"
	10	10 1/2"	5'- 4 1/2"	11 1/2"
	11	10 1/2"	5'- 4 1/2"	11 1/4"
8	1	11"	5'- 5"	9 1/4"
	2	11"	5'- 5"	9 3/4"
	3	11"	5'- 5"	9 3/4"
	4	11"	5'- 5"	9 3/4"
	5	11"	5'- 5"	9 3/4"
	6	11"	5'- 5"	9 3/4"
	7	11"	5'- 5"	9 3/4"
	8	11"	5'- 5"	9 3/4"
	9	11"	5'- 5"	9 3/4"
	10	11"	5'- 5"	9 3/4"
	11	11"	5'- 5"	9 1/4"

HL-93 LOADING

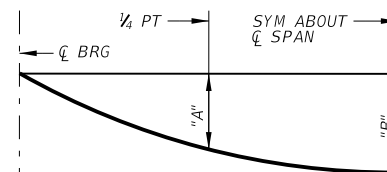
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
SLAB DETAILS TRANSVERSE SECTION			
SHEET 4 OF 5			
DESIGNED:	JEB	FED. RD. DIST. NO. 6	STATE OF TEXAS
CHECKED:	AMS	CITY OF HOUSTON WBS	HIGHWAY NO. CS
DRAWN:	JES	SEE TITLE SHEET	
CHECKED:	JME	CONTROL SECTION	JOB NO. 232
		DATE: 4/1/2021	4:54:06 PM

SPAN	GIRDER	"A"	"B"
NO.	NO.	(FEET)	(FEET)
1	1	0.081	0.114
	2	0.104	0.146
	3	0.104	0.146
	4	0.104	0.146
	5	0.104	0.146
	6	0.104	0.146
	7	0.104	0.146
	8	0.104	0.146
	9	0.104	0.146
	10	0.104	0.146
	11	0.095	0.134
2	1	0.078	0.110
	2	0.100	0.140
	3	0.099	0.139
	4	0.098	0.138
	5	0.098	0.137
	6	0.098	0.137
	7	0.097	0.136
	8	0.096	0.135
	9	0.096	0.135
	10	0.095	0.134
	11	0.086	0.121
3	1	0.107	0.150
	2	0.140	0.197
	3	0.140	0.197
	4	0.140	0.197
	5	0.140	0.197
	6	0.140	0.197
	7	0.140	0.197
	8	0.140	0.197
	9	0.140	0.197
	10	0.140	0.197
	11	0.131	0.184
4	1	0.084	0.118
	2	0.109	0.153
	3	0.109	0.153
	4	0.109	0.153
	5	0.109	0.153
	6	0.109	0.153
	7	0.109	0.153
	8	0.109	0.153
	9	0.109	0.153
	10	0.109	0.153
	11	0.100	0.141

SPAN	GIRDER	"A"	"B"
NO.	NO.	(FEET)	(FEET)
5	1	0.032	0.045
	2	0.046	0.065
	3	0.052	0.073
	4	0.058	0.082
	5	0.066	0.092
	6	0.073	0.103
	7	0.082	0.115
	8	0.091	0.128
	9	0.101	0.142
	10	0.111	0.156
6	1	0.107	0.150
	2	0.127	0.178
	3	0.127	0.178
	4	0.127	0.178
	5	0.127	0.178
	6	0.127	0.178
	7	0.127	0.178
	8	0.127	0.178
	9	0.127	0.178
	10	0.127	0.178
7	1	0.100	0.140
	2	0.118	0.165
	3	0.118	0.165
	4	0.118	0.165
	5	0.118	0.165
	6	0.118	0.165
	7	0.118	0.165
	8	0.118	0.165
	9	0.118	0.165
	10	0.118	0.165
8	1	0.106	0.149
	2	0.125	0.176
	3	0.125	0.176
	4	0.125	0.176
	5	0.125	0.176
	6	0.125	0.176
	7	0.125	0.176
	8	0.125	0.176
	9	0.125	0.176
	10	0.125	0.176
	11	0.106	0.149

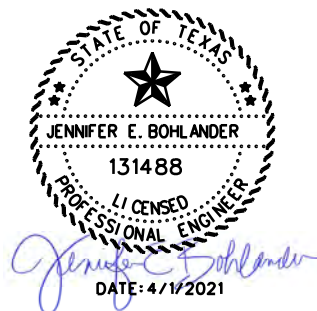
NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1 OF 5.




DEAD LOAD
DEFLECTION DIAGRAM

NOTE: CALCULATED DEFLECTIONS SHOWN ARE DUE TO CONCRETE SLAB ONLY ($E_c = 5000$ ksi). CALCULATED DEFLECTIONS SHOWN ARE THEORETICAL AND ACTUAL DIMENSIONS MAY DIFFER. DEFLECTIONS SHALL BE ADJUSTED BASED ON FIELD OBSERVATIONS.

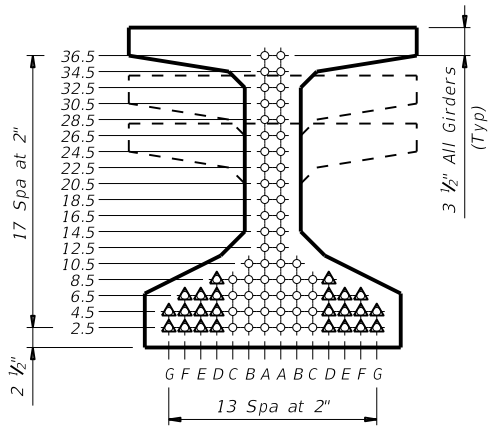


HL-93 LOADING

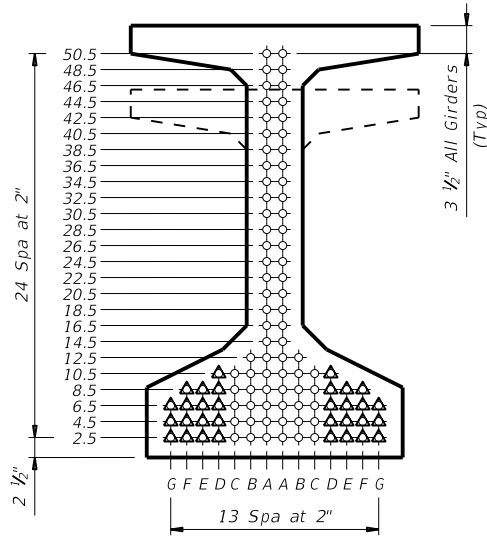
NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
SLAB DETAILS									
SHEET 5 OF 5									
DESIGNED:	JEB	FED. DIV.	R.D. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO. CS	
CHECKED:	AMS	6		TEXAS	SEE TITLE SHEET				
DRAWN:	JES	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	JME	HOU		MONTGOMERY	0912	37	232	435	

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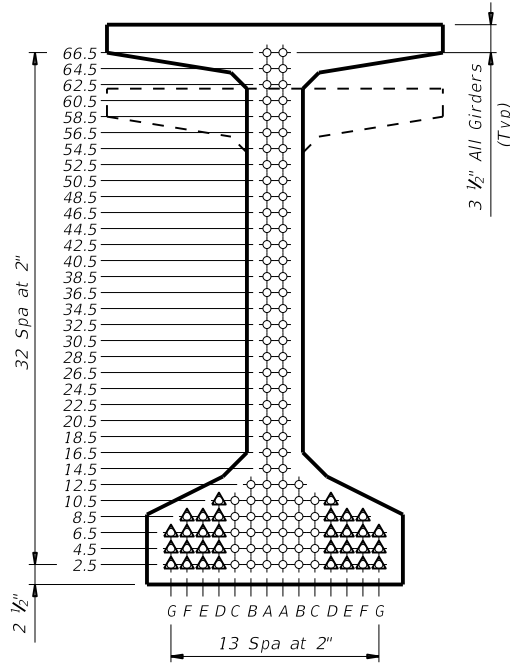
STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN	CONCRETE		OPTIONAL DESIGN					
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS							RELEASE STRGTH ① f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ④) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOT ④) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR ②		
				NON- STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)							Moment	Shear	
NORTHPARK DRIVE OVERPASS	1	1	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.506	-3.444	6,898	0.676	0.863
	1	2	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.737	-3.685	7,262	0.676	0.863
	1	3	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.736	-3.684	7,261	0.676	0.859
	1	4	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.703	-3.576	7,039	0.676	0.859
	1	5	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.113	-3.892	7,459	0.676	0.859
	1	6	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.112	-3.891	7,458	0.676	0.859
	1	7	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.129	-3.904	7,475	0.676	0.859
	1	8	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.716	-3.586	7,052	0.676	0.859
	1	9	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.747	-3.693	7,272	0.676	0.859
	1	10	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.746	-3.692	7,271	0.676	0.863
	1	11	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.685	-3.697	7,482	0.740	0.863
	2	1	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.496	-3.430	6,853	0.678	0.873
	2	2	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.704	-3.648	7,181	0.678	0.873
	2	3	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.693	-3.639	7,164	0.678	0.859
	2	4	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.651	-3.524	6,933	0.679	0.859
	2	5	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.039	-3.822	7,325	0.679	0.859
	2	6	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.027	-3.812	7,309	0.679	0.859
	2	7	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	4.033	-3.815	7,309	0.679	0.859
	2	8	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.626	-3.500	6,888	0.680	0.859
	2	9	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.646	-3.595	7,084	0.680	0.859
	2	10	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.635	-3.585	7,068	0.680	0.872
	2	11	Tx54		36	0.6	270	19.34	12.01	6	50.5	6.000	7.750	3.555	-3.558	7,185	0.732	0.872
	3	1	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.106	-3.972	7,807	0.663	0.883
	3	2	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.397	-4.272	8,257	0.663	0.883
	3	3	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.396	-4.270	8,255	0.663	0.859
	3	4	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.356	-4.144	7,997	0.663	0.859
	3	5	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.831	-4.510	8,483	0.663	0.859
	3	6	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.830	-4.509	8,482	0.663	0.859
	3	7	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.852	-4.526	8,505	0.663	0.859
	3	8	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.374	-4.157	8,015	0.663	0.859
	3	9	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.410	-4.281	8,269	0.663	0.859



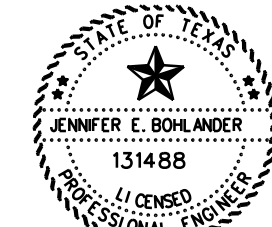
TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70



DATE: 4/1/2021
TSPE REGISTRATION NO. 420

DESIGN NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
Provide Class H concrete.
Provide Grade 60 reinforcing steel bars.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked **Δ**. Double wrap full-length debonded strands in outer most position of each row.
When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

DEBONDED STRAND DESIGNS:
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:
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Do not debond strands in position "G". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

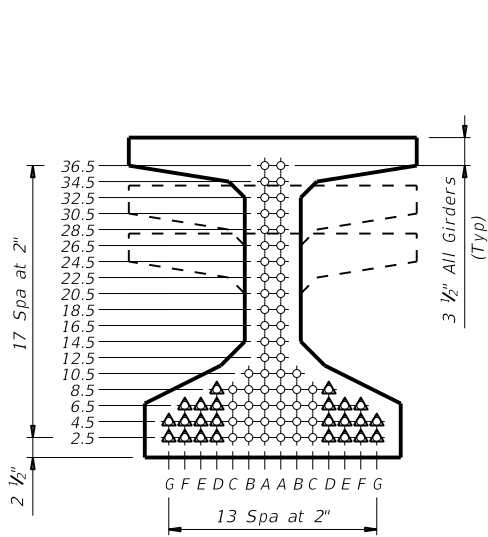
DEPRESSED STRAND DESIGNS:
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

HL93 LOADING					Bridge Division Standard	
PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)						
IGND SHEET 1 OF 3						
FILE: igndsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR		
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REVISIONS		DIST		COUNTY	SHEET NO.	
					436	

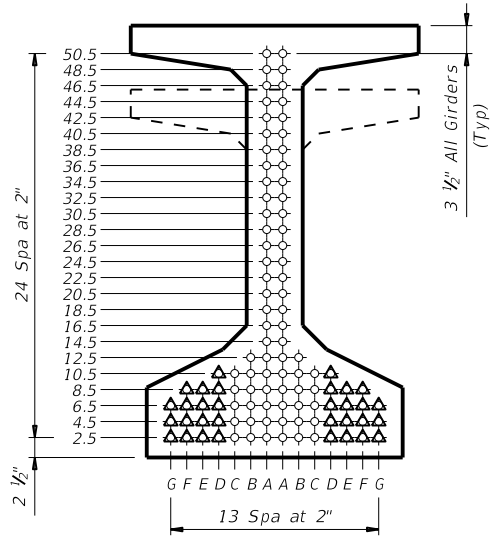
PDF Filename: 0437 - PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS) SHEET 2 OF 3.pdf
DATE:
FILE:

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The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

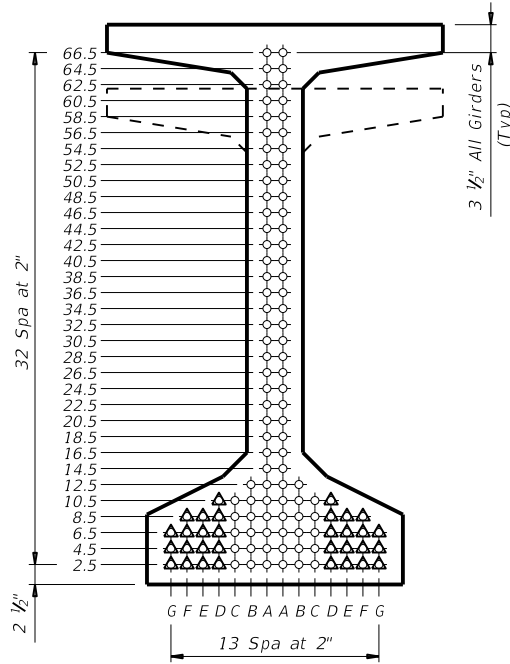
STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN				
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS										DESIGN LOAD COMP STRESS (TOP Ⓢ) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT Ⓢ) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR	
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH f _{pu} (ksi)	"e" Ⓢ (in)	"e" END (in)			Ⓢ	TO END (in)				f' _{ci} (ksi)	MINIMUM 28 DAY COMP STRGTH f' _c (ksi)
	Moment	Shear																
	3	10	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.408	-4.280	8,268	0.663	0.883
	3	11	Tx54		46	0.6	270	18.66	11.36	8	50.5	6.000	7.750	4.371	-4.348	8,701	0.756	0.883
	4	1	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.629	-3.547	7,063	0.674	0.891
	4	2	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.871	-3.799	7,443	0.674	0.891
	4	3	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.870	-3.798	7,441	0.674	0.859
	4	4	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.836	-3.687	7,214	0.674	0.859
	4	5	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.254	-4.009	7,643	0.674	0.859
	4	6	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.253	-4.008	7,641	0.674	0.859
	4	7	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.270	-4.022	7,659	0.674	0.859
	4	8	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.849	-3.697	7,228	0.674	0.859
	4	9	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.881	-3.806	7,452	0.674	0.859
	4	10	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.880	-3.805	7,451	0.674	0.891
	4	11	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.828	-3.828	7,714	0.745	0.891
	5	1	Tx54		30	0.6	270	19.81	12.21	6	44.5	6.000	7.750	2.263	-2.303	5,972	0.720	0.875
	5	2	Tx54		30	0.6	270	19.81	12.21	6	44.5	6.000	7.750	2.542	-2.586	5,987	0.714	0.876
	5	3	Tx54		30	0.6	270	19.81	12.21	6	44.5	6.000	7.750	2.696	-2.729	5,951	0.708	0.859
	5	4	Tx54		30	0.6	270	19.81	12.21	6	44.5	6.000	7.750	2.831	-2.794	5,899	0.703	0.859
	5	5	Tx54		30	0.6	270	19.81	12.21	6	44.5	6.000	7.750	3.319	-3.191	6,245	0.697	0.859
	5	6	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.504	-3.354	6,785	0.692	0.859
	5	7	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.709	-3.533	6,829	0.687	0.859
	5	8	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.523	-3.410	6,822	0.682	0.859
	5	9	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.738	-3.677	7,229	0.678	0.859
	5	10	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.927	-3.848	7,526	0.673	0.877
	5	11	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.043	-4.015	8,028	0.731	0.877
	6	1	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	3.983	-3.884	7,637	0.667	0.859
	6	2	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.177	-4.074	7,917	0.667	0.859
	6	3	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.178	-4.074	7,918	0.667	0.859
	6	4	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.143	-3.956	7,675	0.667	0.859
	6	5	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.596	-4.306	8,139	0.667	0.859
	6	6	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.597	-4.306	8,140	0.667	0.859
	6	7	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.598	-4.307	8,141	0.667	0.859
	6	8	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.146	-3.958	7,678	0.667	0.859
	6	9	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.182	-4.078	7,922	0.667	0.859
	6	10	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	4.183	-4.078	7,923	0.667	0.860
	6	11	Tx54		44	0.6	270	18.83	11.55	8	48.5	6.000	7.750	3.998	-3.898	7,657	0.667	0.860



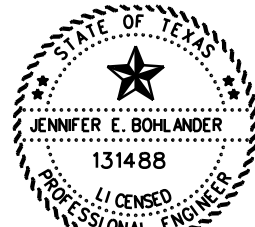
TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70



DATE: 4/1/2021
TSPE REGISTRATION NO. 420

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ④ OF GIRDER
1	2.5(ABCDEFG), 4.5(ABCDEFG), 6.5(ABCD), 8.5(A), 10.5(A)

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = 0.24 √ f'ci

Optional designs must likewise conform.

② Portion of full HL93.


DESIGN NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
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Provide Grade 60 reinforcing steel bars.
Use low relaxation strands, each pretensioned to 75 percent of fpu.
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HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND SHEET 2 OF 3

FILE: igndsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR
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	DIST		COUNTY	SHEET NO.
				437

FILE PATH: F:\Workdirs\ICS\3812\222046.56\NORTH PARK-IGND02.Dgn

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STRUCTURE	DESIGNED GIRDERS								DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS									DESIGN LOAD COMP STRESS (TOP ④) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTTOM ④) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR		
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" ④			"e" END	①				②		
	f'ci (ksi)	f'c (ksi)	fct(ksi)						fcb(ksi)	Moment			Shear					
	7	1	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.847	-3.763	7,424	0.671	0.859
	7	2	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.029	-3.941	7,687	0.671	0.859
	7	3	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.029	-3.941	7,687	0.671	0.859
	7	4	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.995	-3.826	7,452	0.671	0.859
	7	5	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.431	-4.163	7,899	0.671	0.859
	7	6	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.431	-4.163	7,899	0.671	0.859
	7	7	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.431	-4.163	7,899	0.671	0.859
	7	8	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.995	-3.826	7,452	0.671	0.859
	7	9	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.029	-3.941	7,687	0.671	0.859
	7	10	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	4.029	-3.941	7,687	0.671	0.859
	7	11	Tx54		40	0.6	270	19.11	12.51	6	50.5	6.000	7.750	3.847	-3.763	7,424	0.671	0.859
	8	1	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.795	-3.738	7,437	0.668	0.859
	8	2	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.983	-3.922	7,708	0.668	0.859
	8	3	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.983	-3.922	7,708	0.668	0.859
	8	4	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.948	-3.804	7,466	0.668	0.859
	8	5	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	4.398	-4.151	7,928	0.668	0.859
	8	6	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	4.398	-4.151	7,928	0.668	0.859
	8	7	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	4.398	-4.151	7,928	0.668	0.859
	8	8	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.948	-3.804	7,466	0.668	0.859
	8	9	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.983	-3.922	7,708	0.668	0.859
	8	10	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.983	-3.922	7,708	0.668	0.859
	8	11	Tx54	1	40	0.6	270	18.81	8.81	10	50.5	6.000	7.750	3.795	-3.738	7,437	0.668	0.859

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ④ OF GIRDER
1	2.5(ABCDEFG), 4.5(ABCDEFG), 6.5(ABCD), 8.5(A), 10.5(A)

① Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = 0.24 √ f'ci

Optional designs must likewise conform.

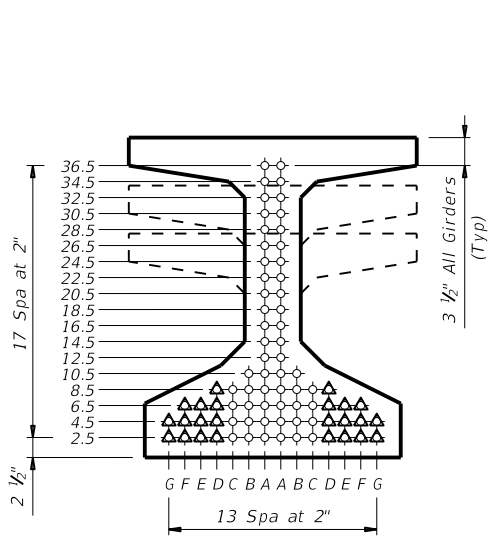
② Portion of full HL93.

DESIGN NOTES:
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Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

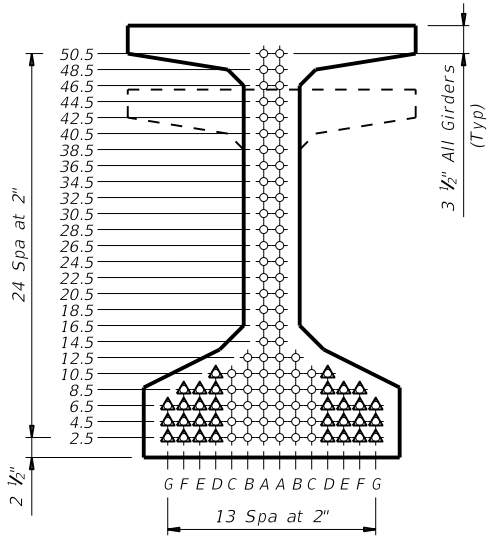
FABRICATION NOTES:
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Provide Grade 60 reinforcing steel bars.
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Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked Δ. Double wrap full-length debonded strands in outer most position of each row.
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Do not debond strands in position "G". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

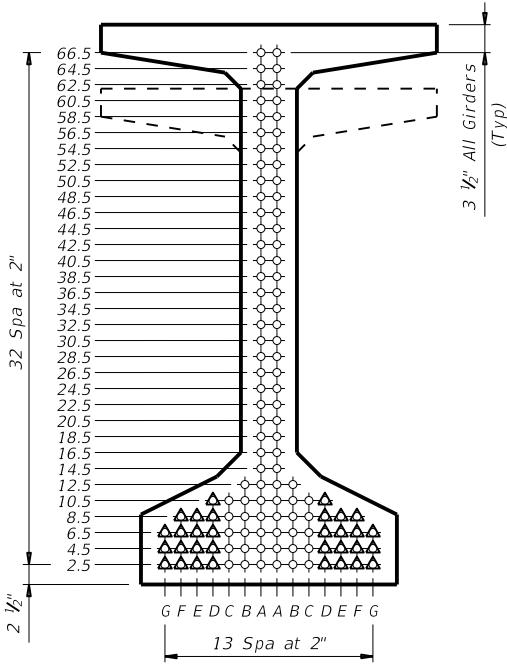
DEPRESSED STRAND DESIGNS:
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



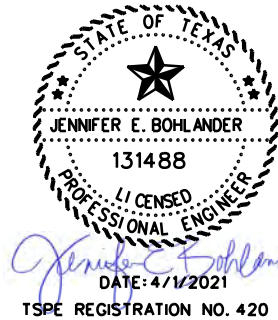
TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70



HL93 LOADING					Bridge Division Standard	
PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)						
IGND SHEET 3 OF 3						
FILE: igndsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR		
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REVISIONS						
DIST		COUNTY		SHEET NO.		
						438



WinCore
Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-01
Structure Bridge
Station 24+96.95
Offset 48.27' RT

District Houston
Date 2-24-20
Grnd. Elev. 82.00 ft
GW Elev. 59.00 ft

DRILLING LOG

1 of 2

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test	Properties				Additional Remarks
				Lateral Deviator Press. Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		16 (6) 11 (6)	SAND, Silty Clayey Sand, Dk. Brown to Brown, Medium Dense, Dry (SC-SM)		16.2	24	5		-200 = 40.2%
72. 10		13 (6) 17 (6)	CLAY, Sandy Lean Clay, Brown to Lt. Brown, Very Stiff, Dryto Moist (CL)		19.2	24	12		-200 = 58.6%
15		18 (6) 19 (6)			16.3	31	17		-200 = 60.9%
62. 20		14 (6) 23 (6)	SAND, Poorly Graded Sand w/ Silt, Lt. Brown, Med. Dense to Dense, Moist to Wet (SP-SM)		23.8				-200 = 8.2%
25		19 (6) 23 (6)			25.1				
52. 30		36 (6) 49 (6)	SAND, Poorly Graded Sand, Lt. Brown, Med. Dense to Very Dense, Wet (SP)		22.4				-200 = 2.0%
35		30 (6) 39 (6)			40.8				
40		17 (6) 33 (6)			16.3				-200 = 0.6%
45		27 (6) 34 (6)			16.9				
50		50 (6) 50 (5.25)			20.2				-200 = 0.5%
55		17 (6) 18 (6)			14.4				
60		23 (6) 23 (6)			22.9				-200 = 2.0%

Remarks: Boring Locate (GPS): 30°04'6.98"N, 95°14'32.81"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

J:\65885_Northpark\TECHPROD\Design and Engineering Tasks\Geotech\Calculations\B-BRG-01 thru 05.CLG



WinCore
Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-01
Structure Bridge
Station 24+96.95
Offset 48.27' RT

District Houston
Date 2-24-20
Grnd. Elev. 82.00 ft
GW Elev. 59.00 ft

DRILLING LOG

2 of 2

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test	Properties				Additional Remarks
				Lateral Deviator Press. Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		33 (6) 42 (6)	SAND, Poorly Graded Sand, Lt. Brown, Med. Dense to Very Dense, Wet (SP)		22.5				
70		7 (6) 7 (6)			20.4				-200 = 2.0%
7. 75		50 (5.5) 50 (4)			20.1				
80									
85									
90									
95									
100									
105									
110									
115									
120									

Remarks: Boring Locate (GPS): 30°04'6.98"N, 95°14'32.81"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

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NO.	REVISIONS	BY	DATE
B2Z ENGINEERING B2Z ENGINEERING 900 S. STEWARD RD., STE. 4 MISSION, TX 78572 FIRM REGISTRATION NUMBER F-11187			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BORING LOG BRG-01			
SHEET 1 OF 5			
DESIGNED:	MM	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	ND	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	SECTION NO. 37
CHECKED:	JEB	HOUSTON	SHEET NO. 439

4/1/2021

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Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-02
Structure Bridge
Station 26+75.87
Offset 55.44' RT

District Houston
Date 2-25-20
Grnd. Elev. 82.00 ft
GW Elev. 63.00 ft

DRILLING LOG

1 of 2

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)	
5		4 (6) 3 (6)	SAND, Silty Sand, Dk. Brown to Brown, Very Loose, Dry (SM)			15.8	0	0		-200 = 37.7%
72.	10	8 (6) 10 (6)				18.3	43	28		
15		15 (6) 17 (6)	CLAY, Sandy Lean Clay, Brown, Stiff to Very Stiff, Dry to Moist (CL)			16.2	37	22		-200 = 55.2%
62.	20	6 (6) 10 (6)				24.0	22	7		
57.	25	34 (6) 33 (6)	CLAY, Sandy Silty Lean Clay, Brown, Stiff, Moist (CL-ML) (CL)			36.8	0	0		-200 = 5.9%
52.	30	33 (6) 30 (6)				24.5	44	30		
47.	35	29 (6) 21 (6)	SAND, Poorly Graded Sand w/ Silt, Lt. Brown, Dense, Moist to Wet (SP-SM)			22.7				-200 = 11.7%
40		26 (6) 27 (6)				14.4				
45		12 (6) 17 (6)	SAND, Poorly Graded Sand w/ Clay, Lt. Brown, Dense, Wet (SP-SC)			17.9				-200 = 2.6%
50		32 (6) 37 (6)				14.8				
27.	55	49 (6) 50 (6)	SAND, Poorly Graded Sand, Lt. Brown, Dense, Wet (SP)			16				-200 = 9.7%
60		36 (6) 40 (6)				16.8				

Remarks: Boring Locate (GPS): 30° 4'6.63"N, 95°14'30.81"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

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WinCore
Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-02
Structure Bridge
Station 26+75.87
Offset 55.44' RT

District Houston
Date 2-25-20
Grnd. Elev. 82.00 ft
GW Elev. 63.00 ft

DRILLING LOG

2 of 2

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)	
65		50 (5.5) 50 (5.25)	SAND, Poorly Graded Sand w/ Silt, Lt. Brown, Dense to Very Dense, Wet (SP-SM)			18.1				-200 = 6.5%
70		50 (3.5) 50 (2.25)				18				
7.	75	50 (4.25) 50 (5.25)	SAND, Poorly Graded Sand, Lt. Brown, Very Dense, Wet (SP)			18.2				-200 = 3.6%
2.	80	50 (2) 50 (3)				19.4	35	21		
85		37 (6) 50 (5.25)	SAND, Clayey Sand, Brown, Very Dense to Dense, Wet (SC)			21.2	43	25		-200 = 14.4%
-8.	90	32 (6) 50 (6)				17.6				
95		50 (3.5) 46 (6)	SAND, Poorly Graded Sand, Lt. Brown, Dense to Very Dense, Wet (SP)			24.5				-200 = 3.1%
-18.	100	50 (2.25) 50 (1.5)				21.6				
105										
110										
115										
120										

Remarks: Boring Locate (GPS): 30° 4'6.63"N, 95°14'30.81"W, Elevation Approximate (from Google Earth)

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Driller: NR Logger: FR Organization: B2Z Engineering

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NO.	REVISIONS	BY	DATE
B2Z ENGINEERING 900 S. STEWARD RD., STE. 4 MISSION, TX 78572 FIRM REGISTRATION NUMBER F-11187			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BORING LOG BRG-02			
SHEET 2 OF 5			
DESIGNED:	MM	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	ND	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	SECTION NO. 37
CHECKED:	JEB	HOUSTON	CONTROL NO. 0912
		JOB NO. 232	SHEET NO. 440

4/1/2021

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County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-03
Structure Bridge
Station 30+06.79
Offset 70.42' RT

District Houston
Date 2-19-20
Grnd. Elev. 80.00 ft
GW Elev. 57.00 ft

DRILLING LOG

1 of 2

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)	
5		6 (6) 7 (6)	CLAY, Sandy Lean Clay, Brown to Lt. Grayish Brown, Medium Stiff to Stiff, Dry to Moist (CL)			16.8	33	18		
10		10 (6) 12 (6)				17.2	38	22		-200 = 61.7%
15		10 (6) 11 (6)				15.7	31	18		
20		7 (6) 9 (6)	CLAY, Lean Clay w/ Sand, Grayish Brown, Stiff, Moist (CL)			17.9	31	15		-200 = 74.2%
25		6 (6) 10 (6)				19.6	37	24		
30		46 (6) 50 (5.5)	SAND, Poorly Graded Sand, Lt, Brown, Dense to Med. Dense, Moist to Wet (SP)			20				-200 = 4.3%
35		31 (6) 33 (6)				19.8				
40		41 (6) 44 (6)				16.8				-200 = 1.3%
45		21 (6) 23 (6)	SAND, Poorly Graded Sand w/ Silt, Lt. Brown, Med. Dense to Very Dense, Wet (SP-SM)			11.9				
50		18 (6) 37 (6)				16.7				-200 = 5.8%
55		50 (5) 50 (5)				20.6				
60		9 (6) 12 (6)				21.3				-200 = 1.8%

Remarks: Boring Locate (GPS): 30°04'5.77"N, 95°14'26.88"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

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Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-03
Structure Bridge
Station 30+06.79
Offset 70.42' RT

District Houston
Date 2-19-20
Grnd. Elev. 80.00 ft
GW Elev. 57.00 ft

DRILLING LOG

2 of 2

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)	
65		12 (6) 15 (6)	SAND, Poorly Graded Sand, Lt. Brown, Medium Dense to Very Dense, Wet (SP)			21.1				
70		44 (6) 33 (6)				17.5				-200 = 4.5%
75		50 (5.5) 50 (3.75)				16.1				
80		50 (2) 50 (1.25)				23.1				-200 = 3.7%
85		50 (5) 50 (3.75)				20.3				
90		27 (6) 30 (6)				14.9				-200 = 2.1%
95		44 (6) 50 (4)				23.2				
100		38 (6) 26 (6)				21.7				-200 = 2.2%

Remarks: Boring Locate (GPS): 30°04'5.77"N, 95°14'26.88"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

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NO.		REVISIONS		BY	DATE
B2Z ENGINEERING 900 S. STEWARD RD., STE. 4 MISSION, TX 78572 FIRM REGISTRATION NUMBER F-11187					
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE					
BORING LOG BRG-03					
SHEET 3 OF 5					
DESIGNED:	MM	FED. RD. DIV. NO.	6	STATE	CITY OF HOUSTON WBS
CHECKED:	ND			TEXAS	SEE TITLE SHEET
DRAWN:	JES	STATE DISTRICT	0912	COUNTY	CONTROL SECTION
CHECKED:	JEB	HOUSTON	0912	MONTGOMERY	232
					JOB SHEET NO.
					441

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Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-04
Structure Bridge
Station 32+56.35
Offset 92.27' RT

District Houston
Date 2-22-20
Grnd. Elev. 78.00 ft
GW Elev. 55.00 ft

DRILLING LOG

1 of 2

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)	
5		12 (6) 11 (6)	CLAY, Sandy Lean Clay, Dk. Brown to Grayish Brown, Stiff to Very Stiff, Dry to Wet (CL)			9.5	26	15		
10		11 (6) 13 (6)				12.2	29	17		-200 = 55.5
15		10 (6) 13 (6)				13.8	42	28		
20		9 (6) 16 (6)				14.7	32	19		-200 = 52.9%
25		22 (6) 27 (6)				22.5				
30	48.	17 (6) 13 (6)				17.2				-200 = 4.9%
35		7 (6) 12 (6)	SAND, Poorly Graded Sand, Lt. Brown to Brown, Loose to Dense, Wet (SP)			14.7				
40		49 (6) 50 (4.5)				21.1				-200 = 1.6%
45		11 (6) 15 (6)				16.1				
50	28.	37 (6) 49 (6)	SAND, Poorly Graded Sand w/ Silt, Brown, Med. Dense to Very Dense, Wet (SP-SM)			19				-200 = 11.7%
55		50 (3.5) 50 (3.5)				18.7				
60		14 (6) 12 (6)				20.1				-200 = 6.7%

Remarks: Boring Locate (GPS): 30°04'5.62"N, 95°14'24.12"W, Elevation Approximate (from Google Earth)

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Driller: NR Logger: FR Organization: B2Z Engineering

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Version 3.3

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-04
Structure Bridge
Station 32+56.35
Offset 92.27' RT

District Houston
Date 2-22-20
Grnd. Elev. 78.00 ft
GW Elev. 55.00 ft

DRILLING LOG

2 of 2

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)	
65		13 (6) 14 (6)	SAND, Poorly Graded Sand w/ Silt, Brown, Med. Dense to Very Dense, Wet (SP-SM)			22.9				
70	8.	49 (6) 50 (5.75)				22.9				-200 = 2.9%
75		50 (4.5) 50 (4)	SAND, Poorly Graded Sand, Brown, Very Dense, Wet (SP)			23.4				
80		49 (6) 50 (5.5)				19.8				-200 = 3.4%
85		50 (2.75) 50 (2.25)				21.2				
90		50 (5.5) 41 (6)				24.8				-200 = 3.0%
95		38 (6) 38 (6)				23.1				
100	-22.	50 (2.25) 50 (1.25)				24.9				-200 = 1.2%
105										
110										
115										
120										

Remarks: Boring Locate (GPS): 30°04'5.62"N, 95°14'24.12"W, Elevation Approximate (from Google Earth)

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: NR Logger: FR Organization: B2Z Engineering

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NO.	REVISIONS	BY	DATE
B2Z ENGINEERING 900 S. STEWARD RD., STE. 4 MISSION, TX 78572 FIRM REGISTRATION NUMBER F-11187			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BORING LOG BRG-04			
SHEET 4 OF 5			
DESIGNED:	MM	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	ND	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	CONTROL No. 0912
CHECKED:	JEB	SECTION No. 37	SHEET No. 442

4/1/2021

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DRILLING LOG

1 of 2

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-05
Structure Bridge
Station 35+04.18
Offset 23.72' LT

District Houston
Date 2-26-20
Grnd. Elev. 80.00 ft
GW Elev. 58.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test	Properties				Additional Remarks
				Lateral Deviator Press. Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		3 (6) 3 (6)	SAND, Silty Sand, Dk. Brown to Brown, Very Loose, Dry (SM)		14.0	0	0		-200 = 41.4%
70.	10	12 (6) 16 (6)			17.7	29	15		
15		12 (6) 12 (6)	CLAY, Lean Clay w/ Sand, Brown, Stiff to Med. Stiff, Dry to Moist (CL)		20.0	48	28		-200 = 87.7%
20		4 (6) 6 (6)			18.3	27	12		
55.	25	7 (6) 11 (6)	SAND, Poorly Graded Sand w/ Clay, Lt. Brown, Loose to Dense, Moist to Wet (SP-SC)		19.9				-200 = 9.3%
30		19 (6) 22 (6)			23.1				
35		21 (6) 25 (6)			22.3				-200 = 8.5%
40		33 (6) 33 (6)			23.1				
35.	45	43 (6) 50 (5.75)	SAND, Poorly Graded Sand, Lt. Brown, Med. Dense to Dense, Wet (SP)		20.2				-200 = 4.9%
50		30 (6) 34 (6)			17.1				
55		39 (6) 37 (6)			21.4				-200 = 4.4%
60		11 (6) 11 (6)			18.2				

Remarks: Boring Locate (GPS): 30°04'6.67"N, 95°14'21.45"W, Elevation Approximate (from Google Earth)

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Driller: NR Logger: FR Organization: B2Z Engineering

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Version 3.3

DRILLING LOG

2 of 2

County Harris
Highway Northpark Drive
CSJ 0912-37-232

Hole BRG-05
Structure Bridge
Station 35+04.18
Offset 23.72' LT

District Houston
Date 2-26-20
Grnd. Elev. 80.00 ft
GW Elev. 58.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test	Properties				Additional Remarks
				Lateral Deviator Press. Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		28 (6) 38 (6)	SAND, Poorly Graded Sand, Lt. Brown, Med. Dense to Dense, Wet (SP)		23.3				
10.	70	36 (6) 50 (4.25)			21.2				-200 = 6.1%
5.	75	50 (3.25) 50 (2.25)	SAND, Poorly Graded Sand w/ Clay, Lt. Brown, Dense, Wet (SP-SM)		22.1				-200 = 13.5%
80		48 (6) 27 (6)			20.6				
-5.	85	50 (2.75) 50 (2.25)	SAND, Clayey Sand, Grayish Brown, Dense to Very Dense, Wet (SC)		22.6				-200 = 3.2%
90		16 (6) 11 (6)			19.9				
-15.	95	50 (2.25) 50 (1.5)	SAND, Poorly Graded Sand, Brown, Med. Dense to Very Dense, Wet (SP)		22.0				-200 = 5.8%
-20.	100	50 (2) 50 (1)			20.4				
105									
110									
115									
120									

Remarks: Boring Locate (GPS): 30°04'6.67"N, 95°14'21.45"W, Elevation Approximate (from Google Earth)

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Driller: NR Logger: FR Organization: B2Z Engineering

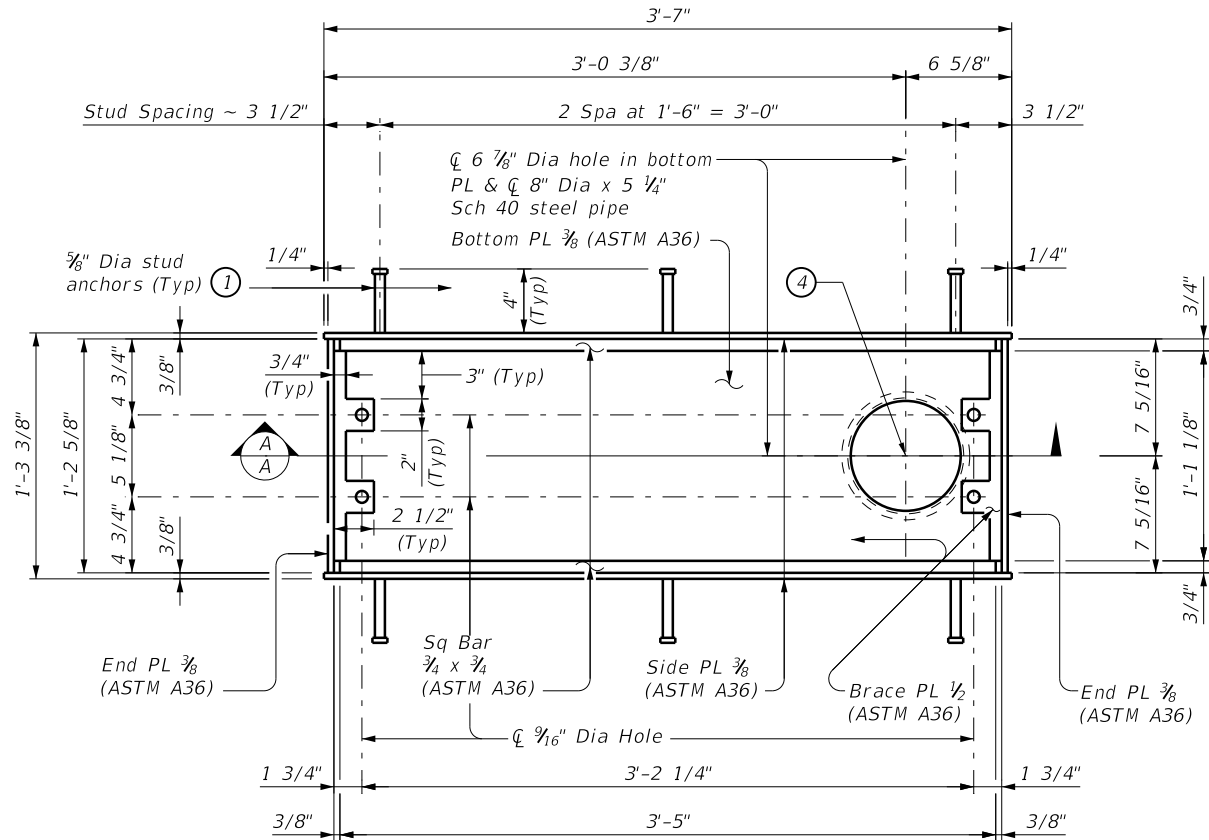
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NO.	REVISIONS	BY	DATE
B2Z ENGINEERING B2Z ENGINEERING 900 S. STEWARD RD., STE. 4 MISSION, TX 78572 FIRM REGISTRATION NUMBER F-11187			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE			
BORING LOG BRG-05			
SHEET 5 OF 5			
DESIGNED:	MM	FED. RD. DIV. NO. 6	STATE TEXAS
CHECKED:	ND	CITY OF HOUSTON WBS	SEE TITLE SHEET
DRAWN:	JES	COUNTY MONTGOMERY	SECTION 0912
CHECKED:	JEB	CONTROL NO. 232	SHEET NO. 443

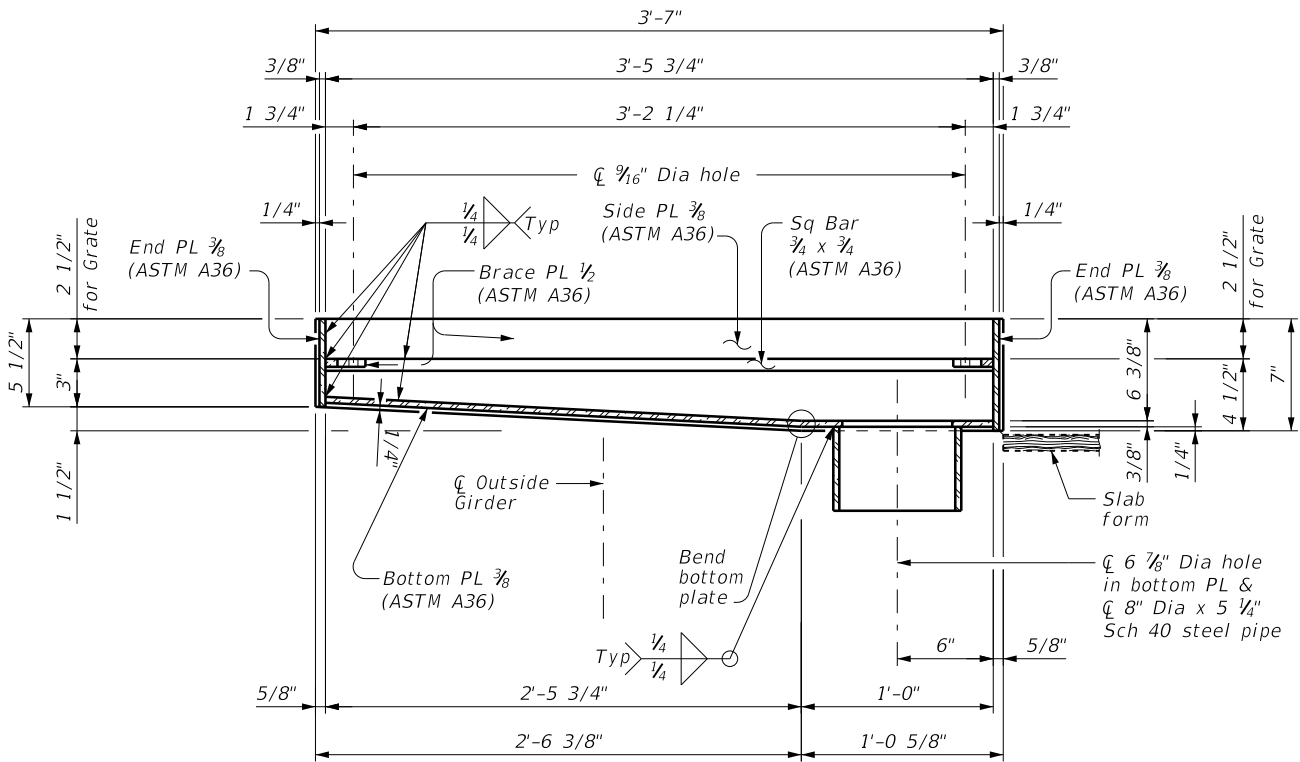
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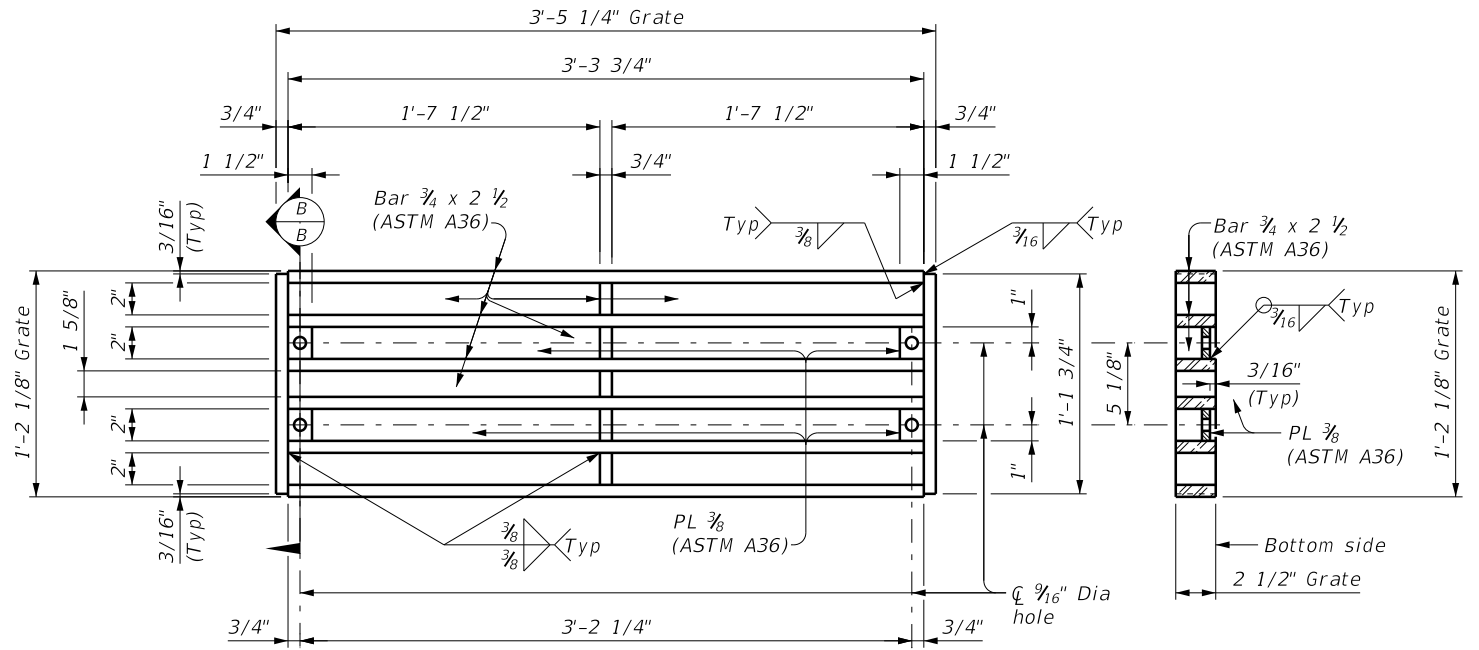
PLAN

(Grate not shown for clarity)



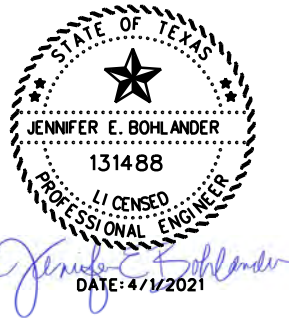
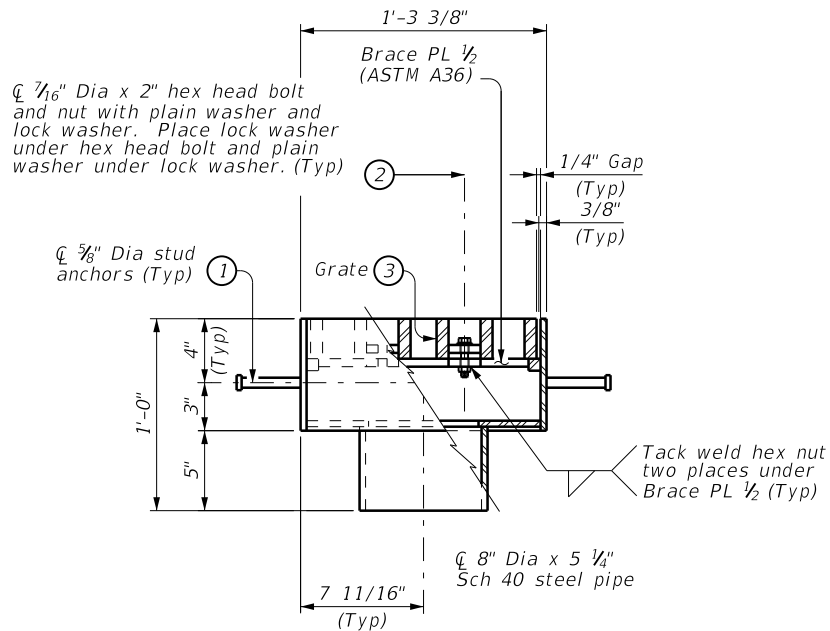
SECTION A-A

(Grate not shown for clarity)

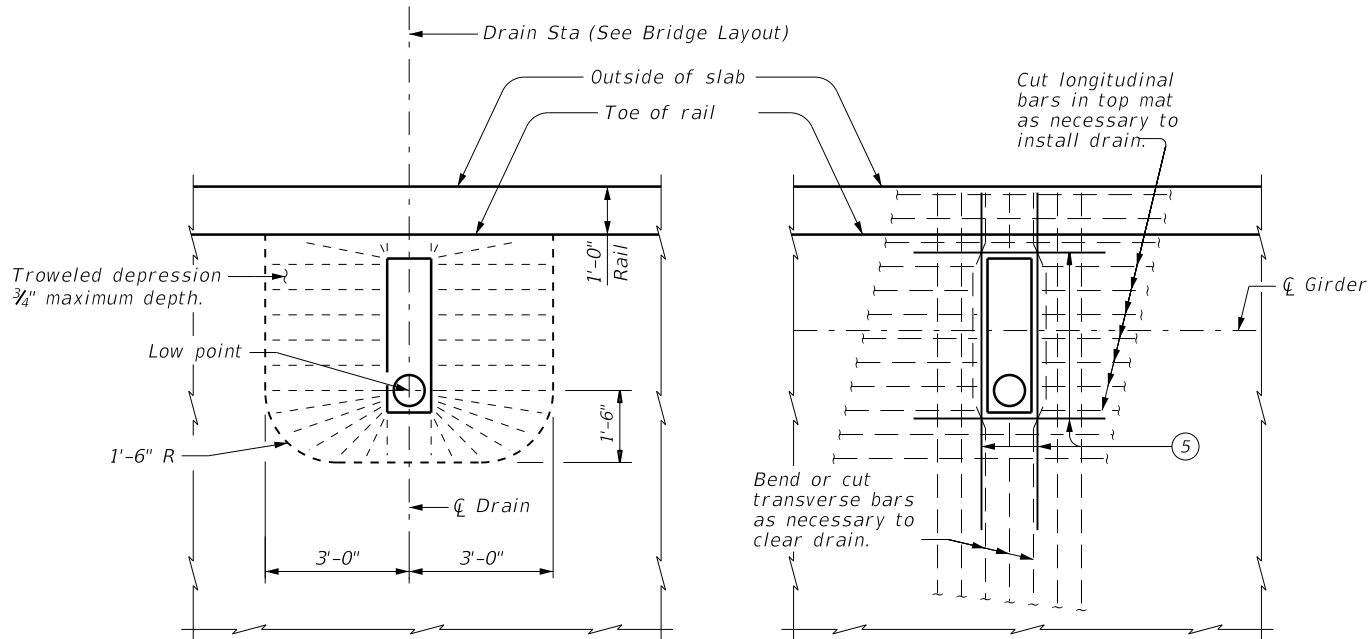


GRATE DETAILS

- ① Electric arc end-weld stud anchors to plates with complete fusion.
- ② After nuts have been tack welded to the frame, test the assembly for fit of frame and grate with hex bolt assembly.
- ③ During fabrication, test fit grate to ensure grate can be rotated 180° to accommodate assembly in the field.
- ④ See Bridge Layout for Bridge Drain Locations



NO.	REVISIONS						BY	DATE	
<div><div>HNTB</div><div><div>LH RA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div>									
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
BRIDGE DECK DRAIN DETAILS									
BD-2 (MOD)									
SHEET 1 OF 2									
DESIGNED:	JEB	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.	
CHECKED:	AMS	6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	JES	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET No.	
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	444		

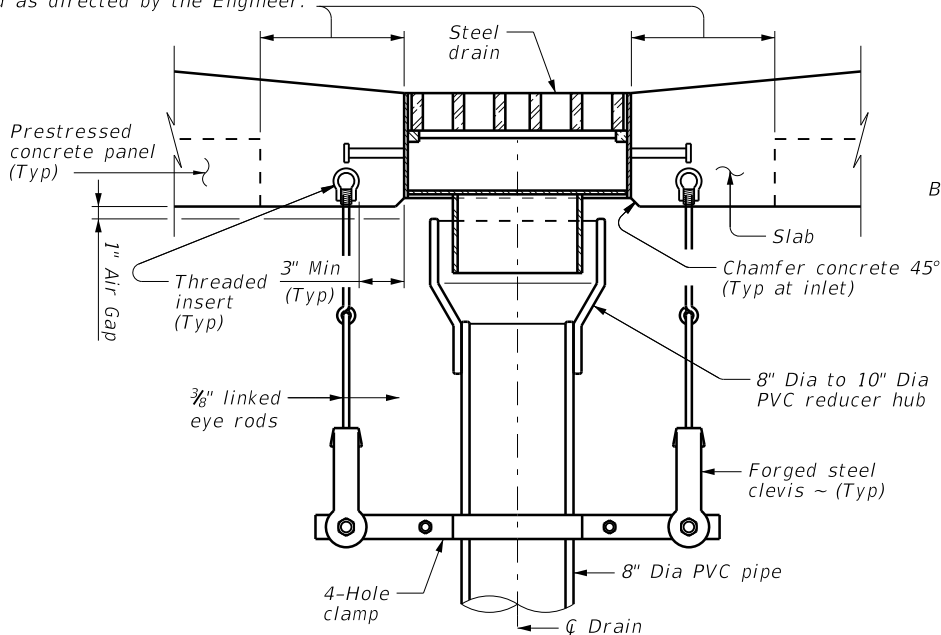


TROWELED DEPRESSION

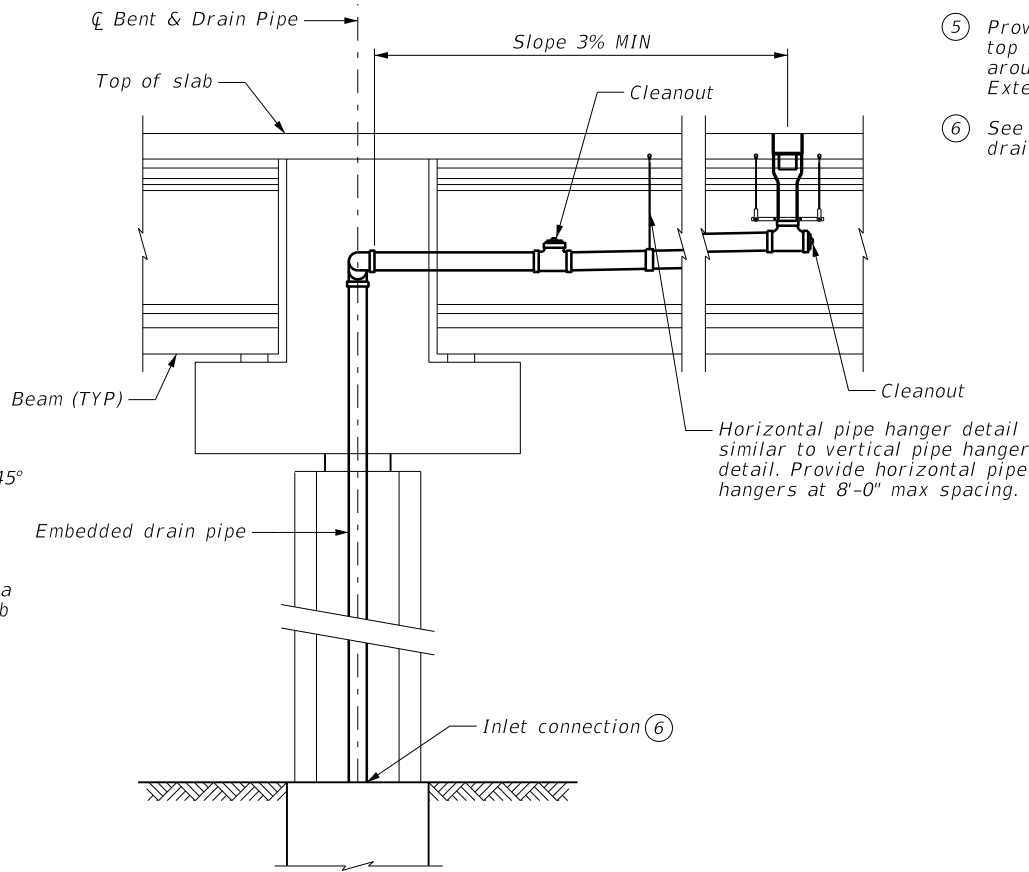
SHOWING TYPICAL SLAB REINFORCING

(Showing top map of reinforcing, bottom mat and panels omitted for clarity.)

If prestressed concrete panels are used, place panels 3' Min from edges of drain. Conventionally reinforce this portion of cast-in-place slab as detailed on the span, unit sheets, or miscellaneous standard details and as directed by the Engineer.



HOOK-UP TO INLET WITH VERTICAL PIPE SUPPORT ④



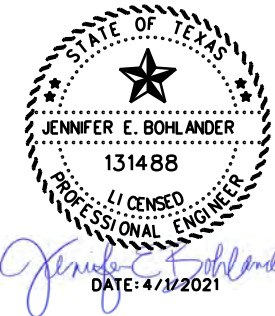
ELEVATION - HARDWARE CAST INTO BENT


GENERAL NOTES:

Galvanize all steel components in accordance with Item 445 "Galvanizing" unless noted otherwise.
Provide 1/16" Dia ASTM A307 Grade A hex bolt with one hex nut, one plain washer and one lock washer.
Round or chamfer exposed edges of Grate and Frame to approximately 1/16" by grinding, unless otherwise noted.
Take care to ensure uniform bearing between contact surfaces of grate and frame.
Alternate bridge drains may be substituted for the bridge drain shown on this sheet provided they are approved by the Engineer prior to fabrication and installation. Alternate drains must have an approximately equal grate opening area (350 sq in) and an 8" diameter outfall. The grate should be of a similar configuration.
Bend slab reinforcing bars to clear drain by 1". When bending is not possible, stop or cut reinforcing bars to clear drain as shown. Additional slab reinforcing is considered subsidiary to "Reinforced Concrete Slab". When placing concrete, take care to prevent honeycombing or air pockets around or beneath the drain.
Provide Schedule 40 DWV PVC pipe conforming to ASTM D2665. Minimum wall thickness: 0.280" ~ 6" Dia, 0.322" ~ 8" Dia. Use fittings as directed by the Engineer. Attach the pipe securely to the superstructure. Provide pipe and supports that accommodate anticipated longitudinal movements of pipe and bridge slab. For long downhill pipe runs, match pipe grade to roadway grade. Galvanize metallic pipe support hardware and fasteners in accordance with Item 445 "Galvanizing". Include cost of attachment devices in the unit price bid for "Grate and Frame".
Payment will be by each Grate and Frame (Bridge Drain).
See Bridge Layout for location of drains.
Deviations from Bridge Drain Details contained herein will not be permitted without prior approval from the Engineer.
Average weight of Grate and Frame:

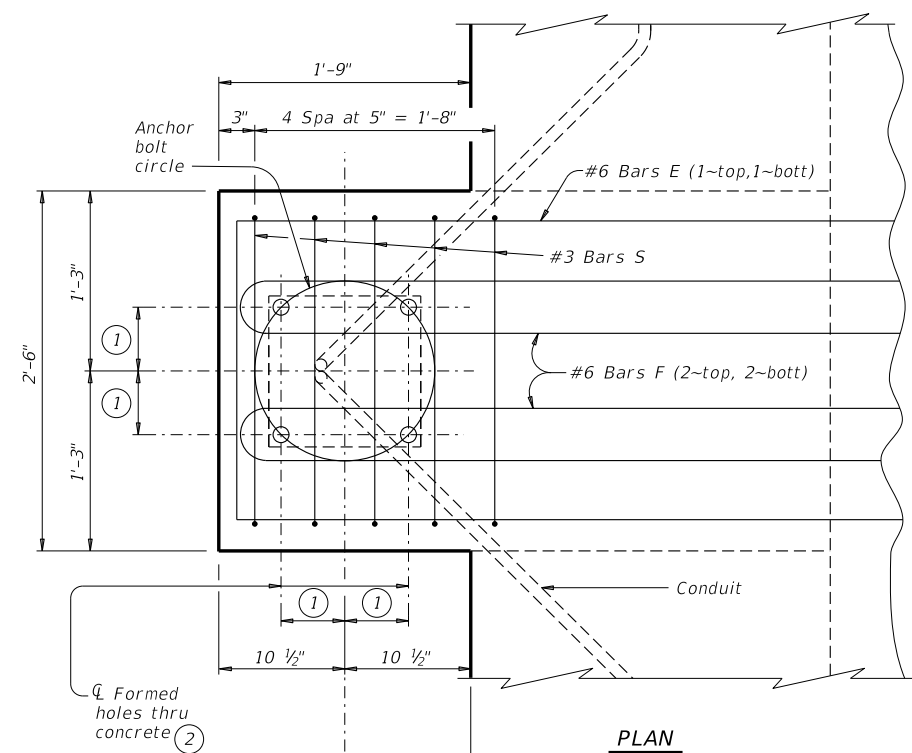
321 Lb total
148 Lb (Grate)
173 Lb (Frame).

- ④ Place edge of bridge drain close to the toe of rail.
- ⑤ Provide 4 additional #5 bars around perimeter in top mat of reinforcing and 4 additional #5 bars around perimeter in bottom mat of reinforcing. Extend bars 1'-6" from edges of drain.
- ⑥ See drainage details for nearest inlet for drain pipe connection.

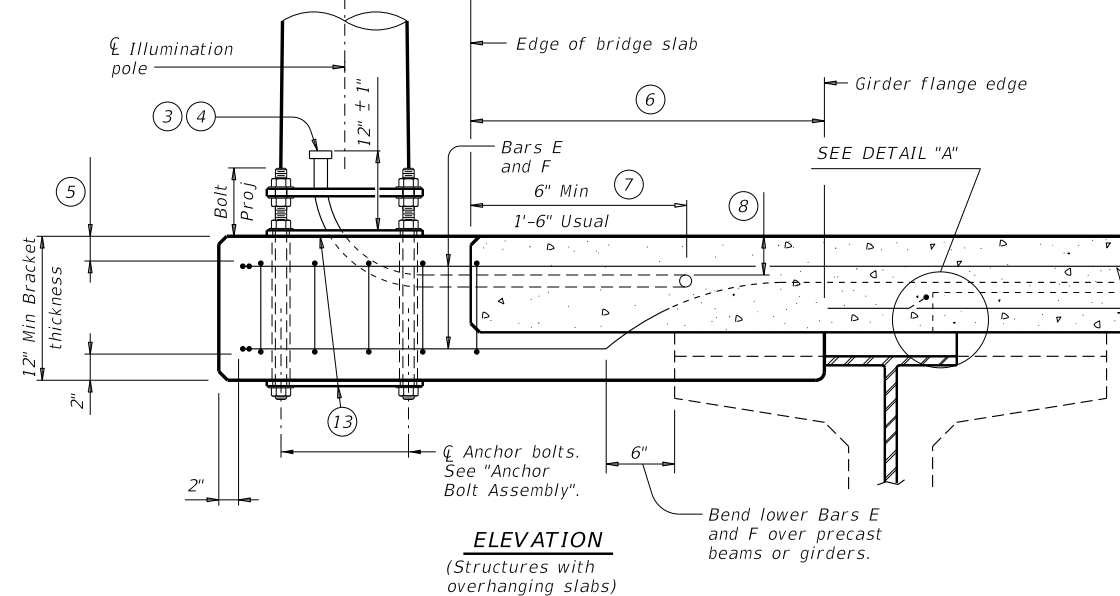


NO.		REVISIONS					BY		DATE
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420							
		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 650 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEX 77007							
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTHPARK DRIVE									
BRIDGE DECK DRAIN DETAILS									
BD-2 (MOD)									
								SHEET 2 OF 2	
DESIGNED:	JEB	FED. RD. DIV. No.	6	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:	AMS	STATE DISTRICT	JES	TEXAS	SEE TITLE SHEET			CS	
DRAWN:	JES	STATE DISTRICT	JME	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	JME	HOU	MONTGOMERY	0912	37	232	445		

DATE: _____
FILE: _____

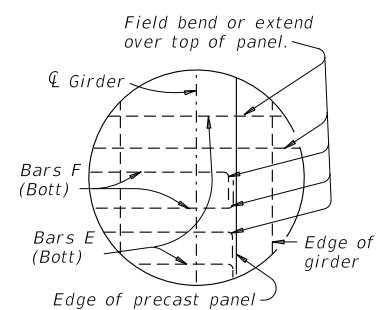


PLAN

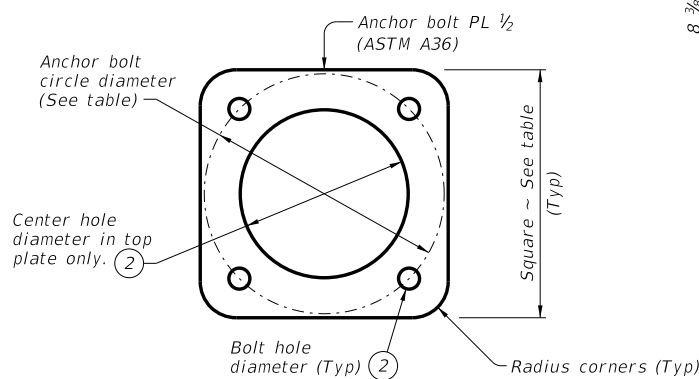


ELEVATION
(Structures with
overhanging slabs)

ILLUMINATION POLE BRACKET LOCATION AND REINFORCING



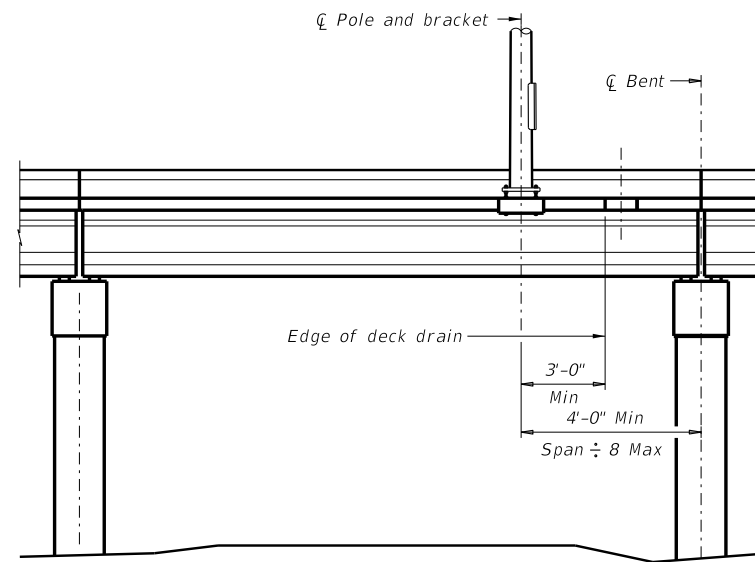
DETAIL "A"



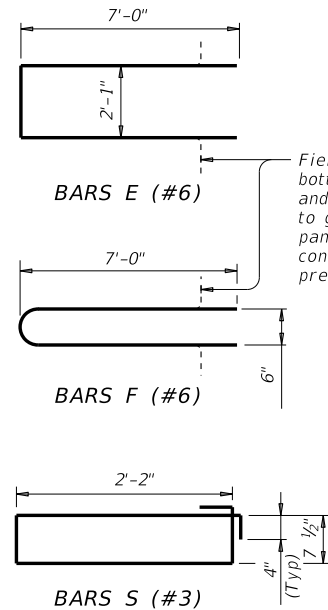
ANCHOR BOLT PLATE

TABLE OF ANCHOR BOLT AND ANCHOR BOLT PLATE INFORMATION						
ANCHOR BOLT CIRCLE DIAMETER	ANCHOR BOLT OFFSET	ANCHOR BOLT DIAMETER	ANCHOR BOLT HOLE SIZE		TOP AND BOTTOM ANCHOR BOLT PLATE SIZE	CENTER HOLE DIAMETER IN TOP ANCHOR BOLT PLATE
			CONCRETE	STEEL		
1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
3/4"	3/8"	3/4"	1 1/4"	1 1/4"	PL 1/2" X 13" X 1'-1"	9 1/2"
1"	5/16"	1 1/4"	1 1/2"	1 1/2"	PL 1/2" X 15 1/2" X 1'-3 1/2"	10 1/2"

ESTIMATED QUANTITIES~ONE BRACKET			
ITEM	UNIT	QUANT	
CONCRETE (9) (10)	CY	0.2	
REINFORCING STEEL (10)	LB	146	
STRUCTURAL STEEL (10) (11)	LB	112	
CONDUIT (12)	LF	4	



TYPICAL BRIDGE ELEVATION



- ① See table for anchor bolt offset dimension.
- ② See table for hole diameter size.
- ③ If lighting is to be placed on future contract, extend conduit only 6" and provide water tight cap.
- ④ Ream burrs and install bell ends or bushings on all conduit ends.
- ⑤ Provide same clear cover required for bridge slab. Place Bars E and F beneath top slab reinforcing only if necessary to provide this cover.
- ⑥ If slab edge to girder flange edge exceeds 3'-11", lengthen Bars E and F proportionally to ensure Bars E and F extend 1'-6" Min beyond girder flange edge.
- ⑦ Clear rail anchors, drains, etc 1 ½" Min.
- ⑧ 1 ½" Min cover and always beneath top layer slab reinforcing.
- ⑨ Variation due to slab thickness is insignificant.
- ⑩ For Contractor's information only.
- ⑪ Anchor bolts, nuts, washers, and 2 plates. Verify anchor bolt lengths prior to ordering.
- ⑫ Additional to main run (size and type as shown elsewhere on the plans).
- ⑬ See "Anchor Bolt Assembly", "Anchor Bolt Plate", and table for anchor bolt, and anchor bolt plate information.

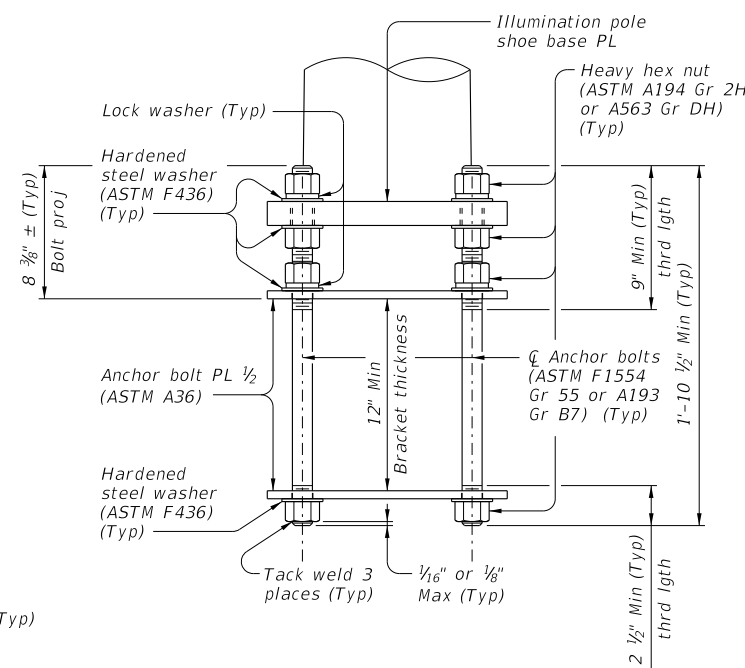
MATERIAL NOTES:

Galvanize anchor bolts, nuts, washers, and anchor bolt plates. Repair galvanizing damage from tack welding per Item 445, "Galvanizing".
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Concrete for Illumination Pole Brackets must be of the same type and placed monolithically with the bridge slab. The bracket quantity is considered subsidiary to the Item "Reinforced Concrete Slab".

GENERAL NOTES:

The type and size of conduit, the anchor bolt circle diameter, and the number and location of brackets is shown elsewhere on the plans. Brackets found to conflict with other components of the bridge may be relocated as necessary.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



ANCHOR BOLT ASSEMBLY

(See table for anchor bolt diameter)

SHEET 1 OF 2




Texas Department of Transportation

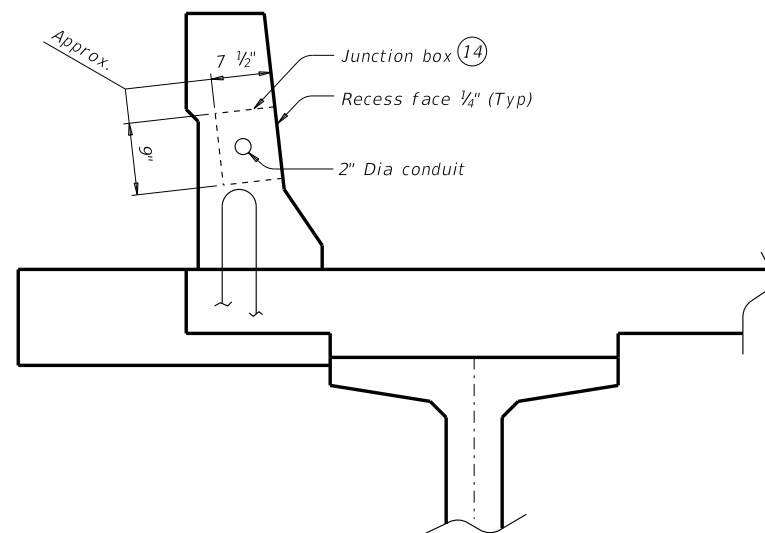
**Bridge
Division
Standard**

BRIDGE LIGHTING DETAILS

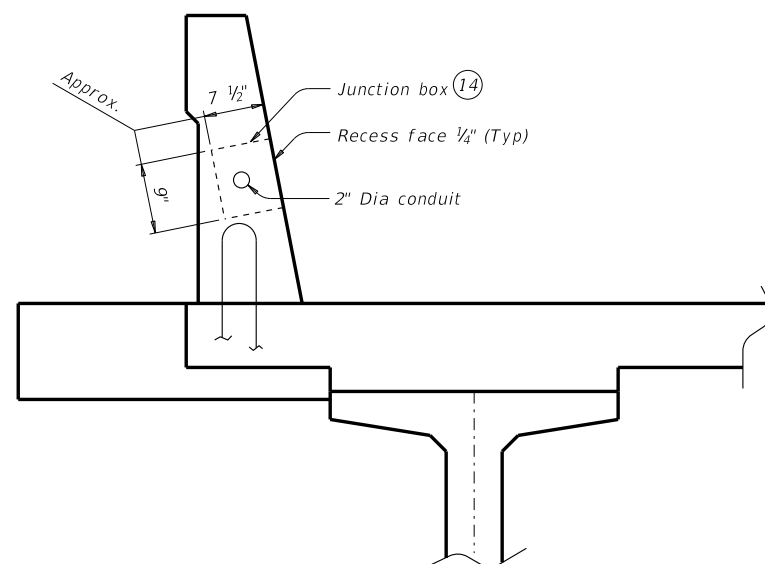
 BL

FILE: blstde01-19.dgn		DW: TxDOT		CK: TxDOT		DW: TxDOT		CK: TxDOT	
 TxDOT April 2019 REVISIONS	CONT	SECT	JOB			HIGHWAY			
	DIST	COUNTY					SHEET NO.		
							446		

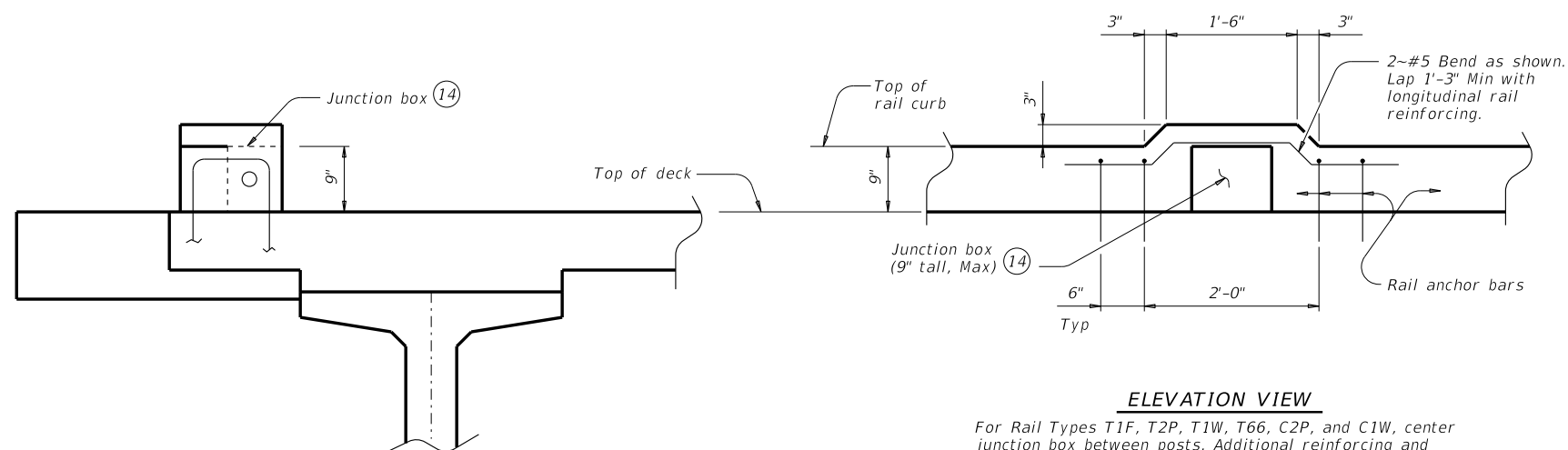
DATE: _____
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SHOWING T551, T552, AND T80HT



SHOWING SSTR AND T80SS



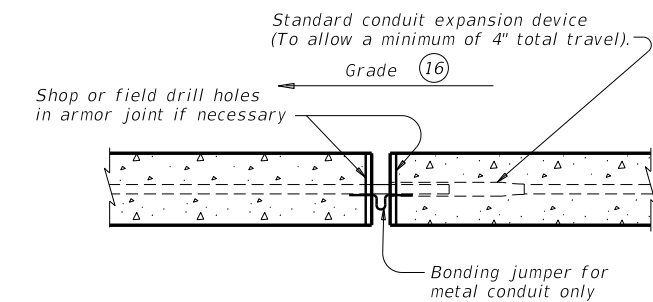
SHOWING T1F, T2P, T1W, T66, C2P, AND C1W CURB

See Elevation View for curb modifications

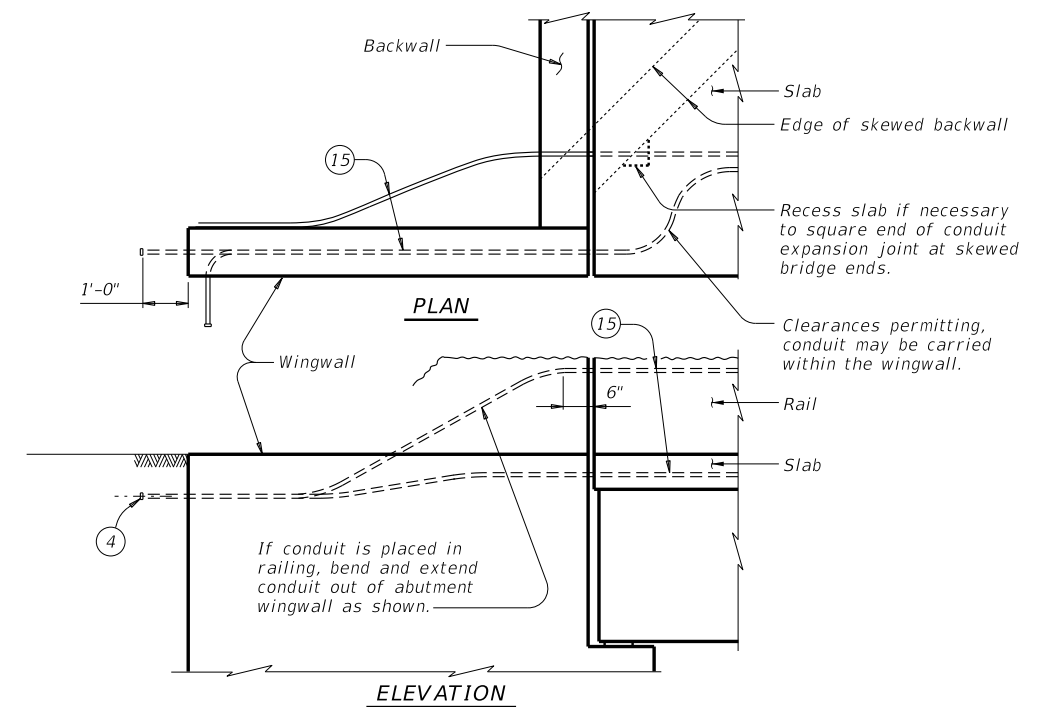
JUNCTION BOX LOCATION

Use these details as a guide in locating junction boxes in rail types not shown.

- ④ Ream burrs and install bell ends or bushings on all conduit ends.
- ⑭ Provide polymer concrete junction boxes meeting the requirements of DMS 11030.
- ⑮ Position of conduit shown elsewhere on the plans or as directed by the Engineer.
- ⑯ Place conduit expansion device on high side of expansion joint.



CONDUIT EXPANSION JOINT



TREATMENT AT END OF BRIDGE

SHEET 2 OF 2




Texas Department of Transportation

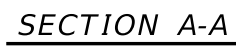
**Bridge
Division
Standard**

BRIDGE LIGHTING DETAILS

 BL

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 TxDOT April 2019 REVISIONS		CONT	SECT	JOB		HIGHWAY			
		DIST		COUNTY			SHEET NO.		
							447		

DATE: _____
FILE: _____



- CONSTRUCTION NOTES:

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 1 anchor per bridge mounted clearance sign installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components after fabrication unless otherwise noted.

GENERAL NOTES:

Average steel weight for one complete Type S Mount
is 233 Lb.

SHEET 1 OF 3



**Bridge
Division
Standard**

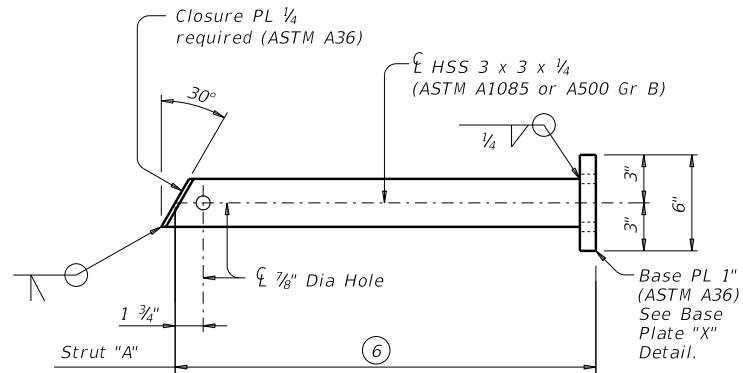
*BRIDGE MOUNTED
CLEARANCE SIGN
ASSEMBLY*

BMCS

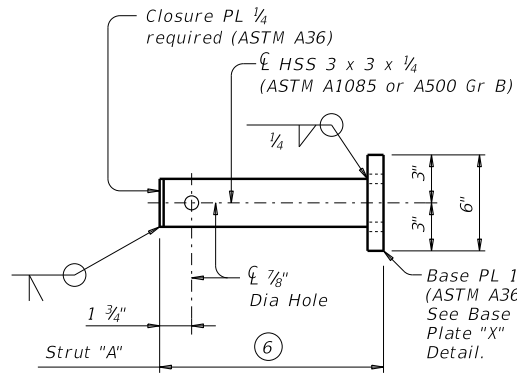
FILE: bmcstel-19.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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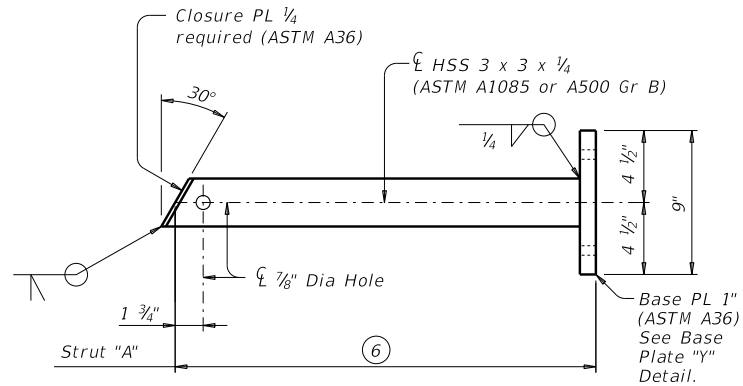
DATE:
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FOR T411 AND
C411 RAIL TYPES



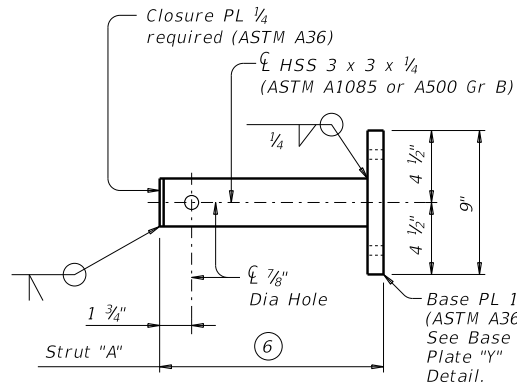
FOR T411 AND
C411 RAIL TYPES



FOR T221, C221, T222, T223, C223,
T401, T402, C402, T551, T552,
T80HT, T80SS AND SSTR RAIL TYPES

UPPER STRUT DETAIL
FOR (TYPE S MOUNT)

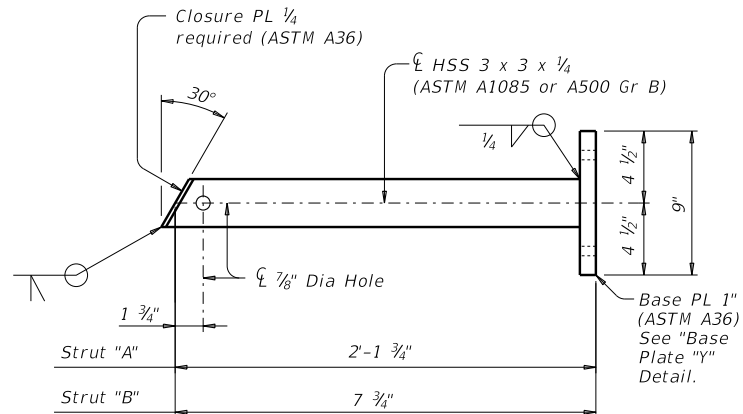
(Used for skews over 30°)



FOR T221, C221, T222, T223, C223,
T401, T402, C402, T551, T552,
T80HT, T80SS AND SSTR RAIL TYPES

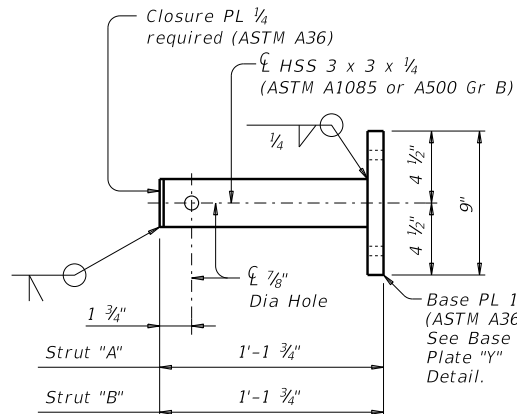
UPPER STRUT DETAIL
FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



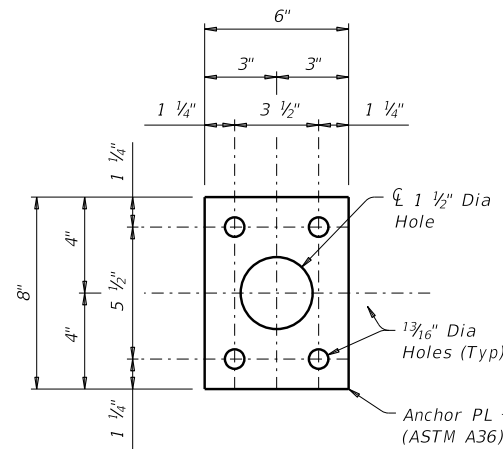
LOWER STRUT DETAILS
FOR (TYPE S MOUNT)

(Used for skews over 30°)

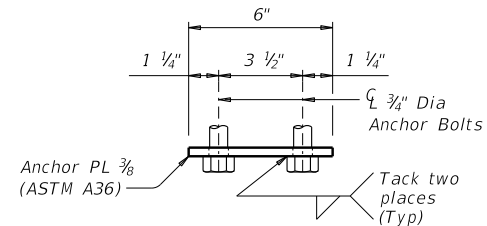


LOWER STRUT DETAILS
FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)

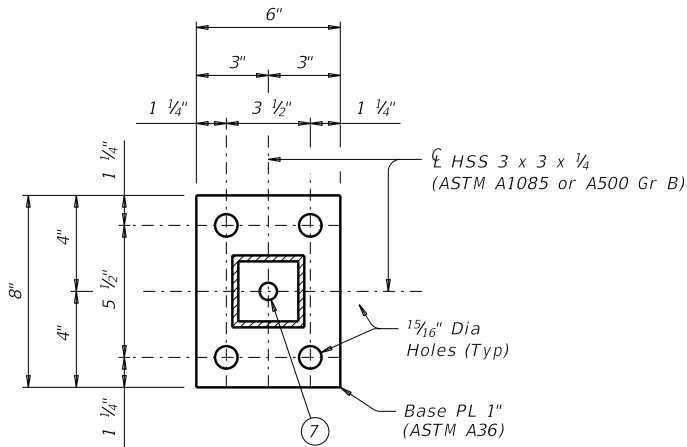


PLAN OF ANCHOR PLATE



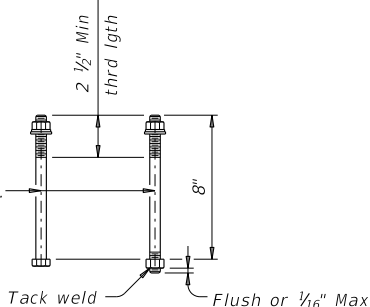
ANCHOR BOLT ASSEMBLY DETAILS ③

(Used on Base Plate "X" with T411 and C411 rail types.)



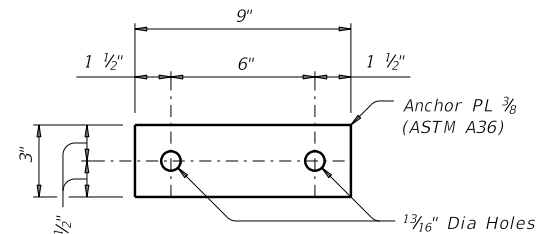
BASE PLATE "X" DETAIL

3/4" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened washer and one regular lock washer placed under heavy hex nut (ASTM A563). Furnish one additional heavy hex nut for each threaded rod.

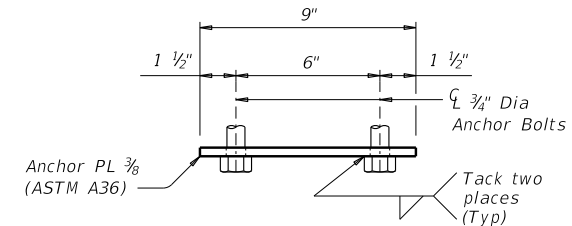


CAST-IN-PLACE
ANCHOR BOLT OPTIONS ③

- ③ At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are 3/4" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ⑥ Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.
- ⑦ Hole required to drain zinc from base plate during galvanizing.

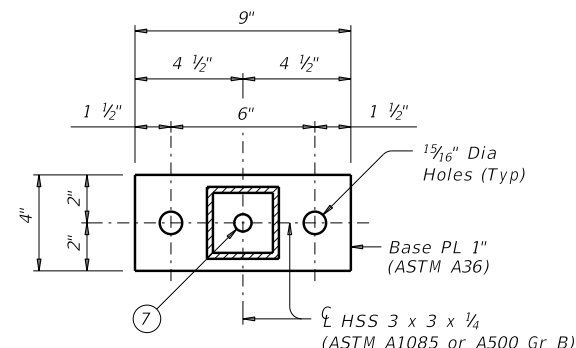


PLAN OF ANCHOR PLATE




ANCHOR BOLT ASSEMBLY DETAILS ③

(Used on Base Plate "Y" and with T1F, T2P, C2P, T1W, C1W, T66 and C66 rail types.)



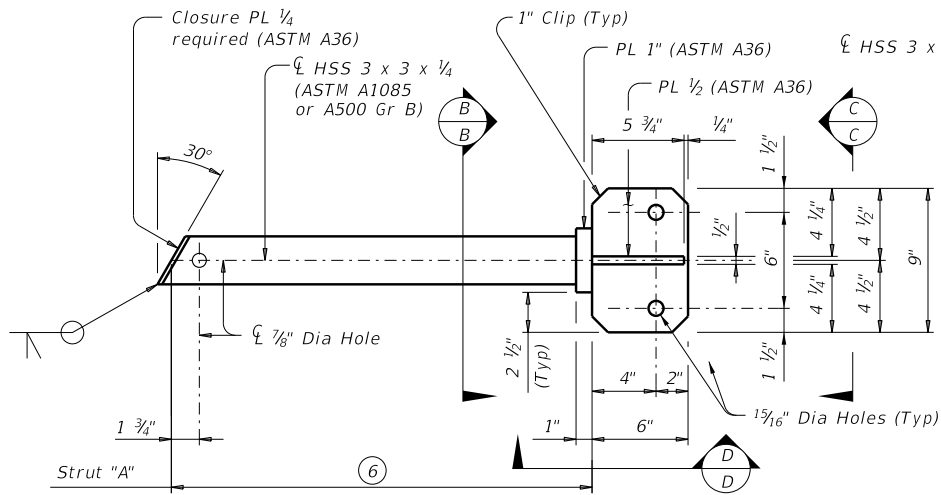
BASE PLATE "Y" DETAIL

SHEET 2 OF 3

 Texas Department of Transportation				Bridge Division Standard	
BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY					
BMCS					
FILE: bmcste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
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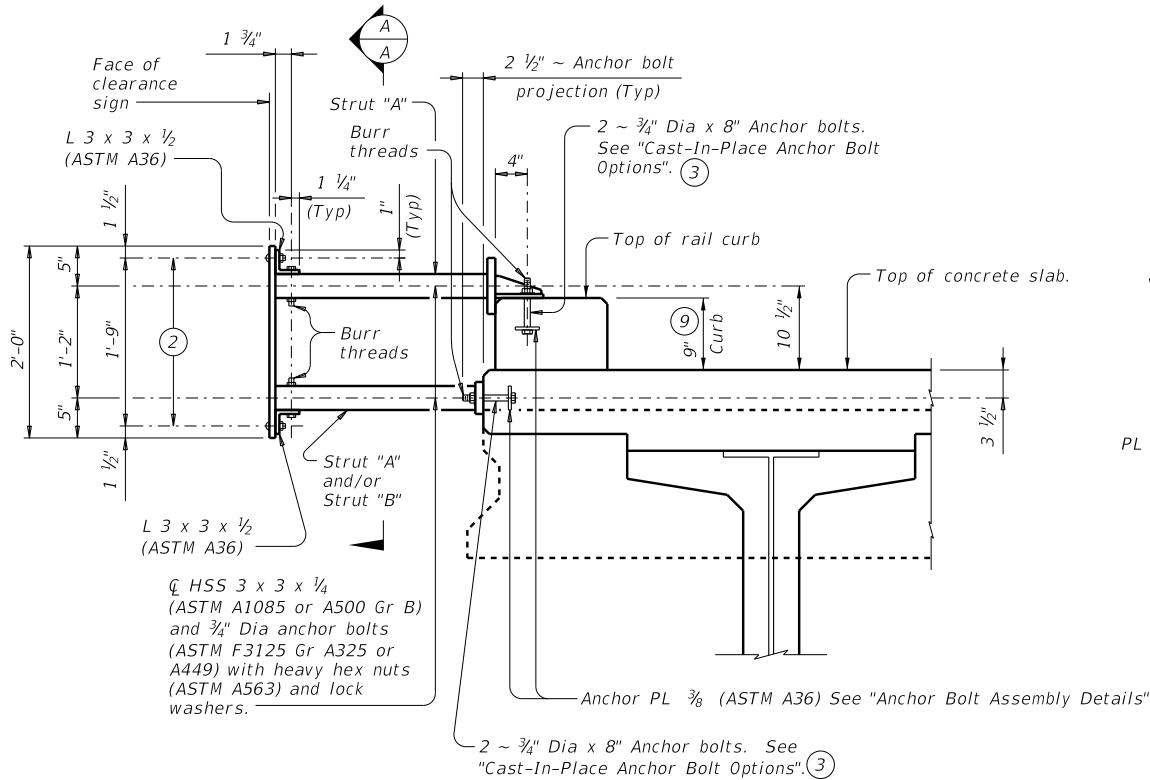


FOR T1F, T2P, C2P, T1W, C1W,
T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

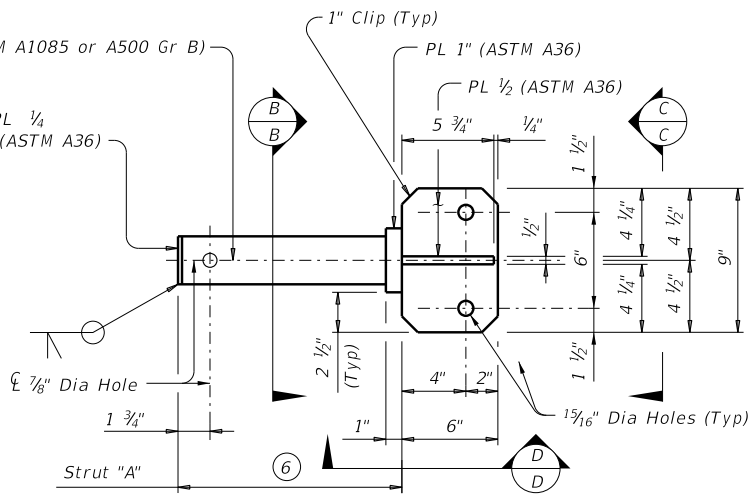
(Used for skews over 30°)

- 2 1/2" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x 1/2 by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.
- At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are 3/4" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".



SECTION THRU T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL CURB

Showing sign mount on a 9" high curb, 11" high curb similar.

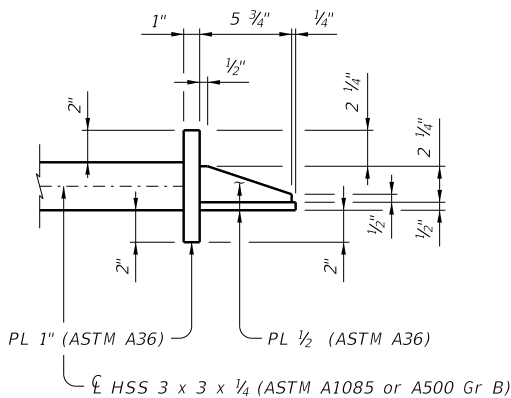


FOR T1F, T2P, C2P, T1W, C1W,
T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE N MOUNT)

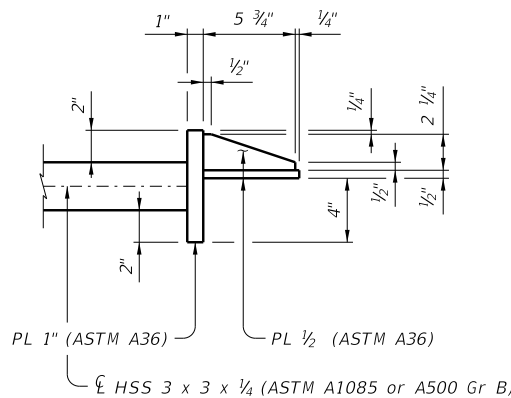
(Used for 0° to 30° skews)

- 4 For decked slab beams topped with a 2 course surface treatment and ACP overlay.
- 6 Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.
- 8 Hole required in bottom of HSS to drain zinc during galvanizing.
- 9 11" curb is for structures with 2" ACP overlay.

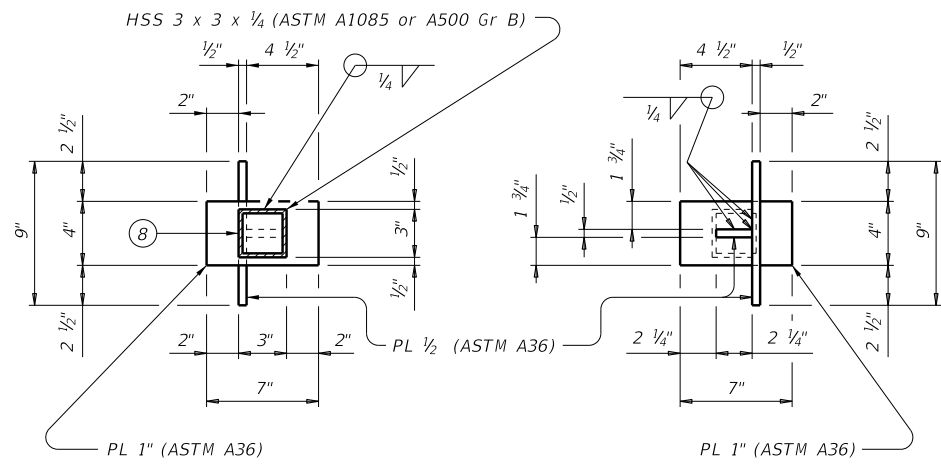


FOR 9" HIGH CURBS

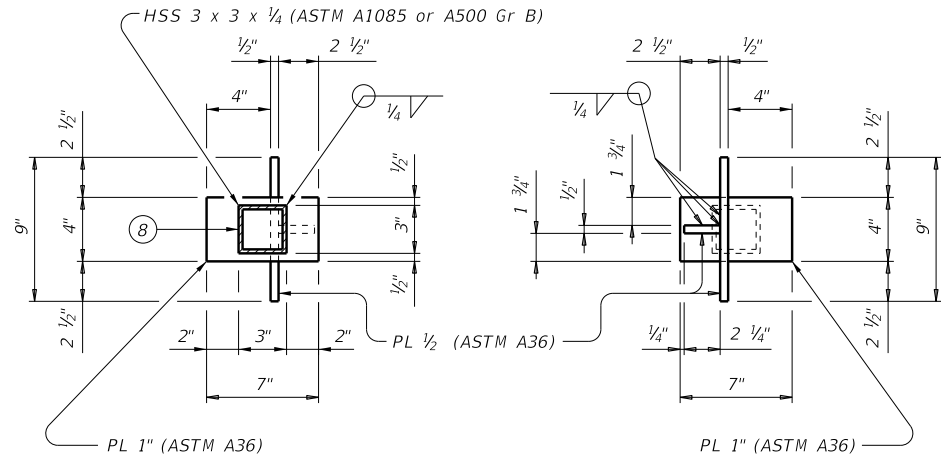
VIEW D-D



FOR 11" HIGH CURBS



FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

SECTION B-B

VIEW C-C

SHEET 3 OF 3



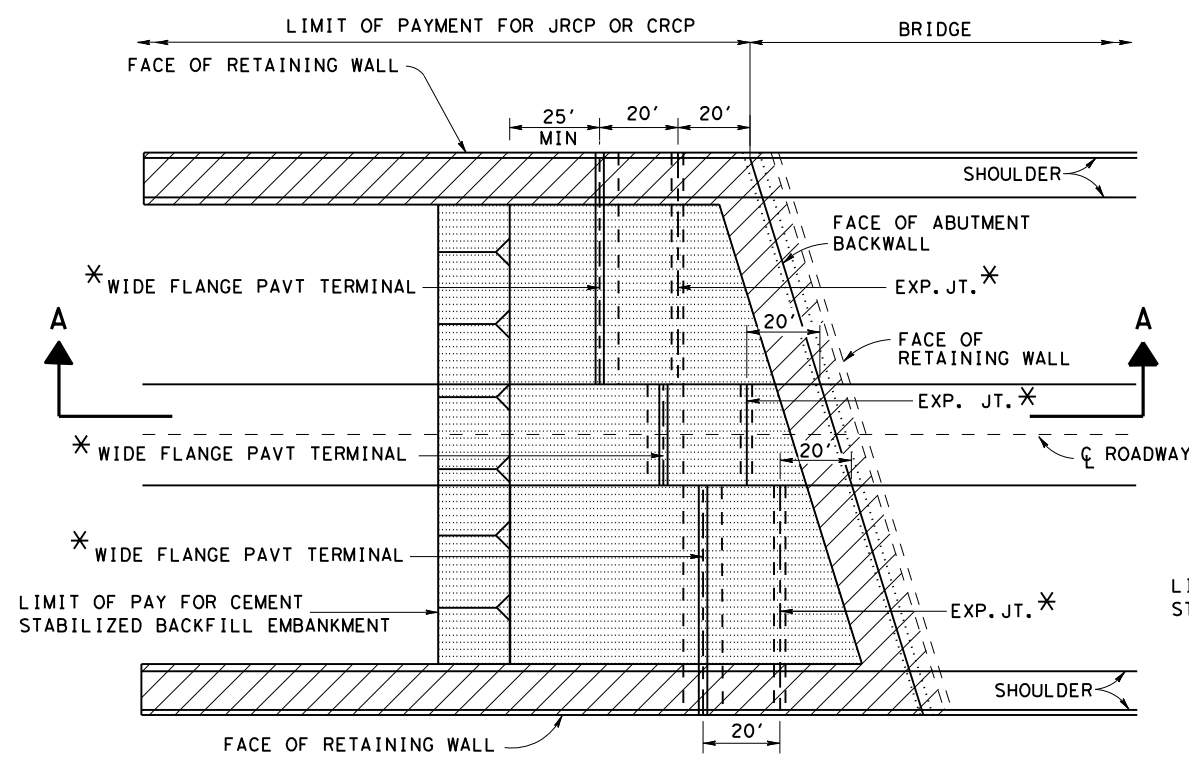
Texas Department of Transportation

Bridge
Division
Standard

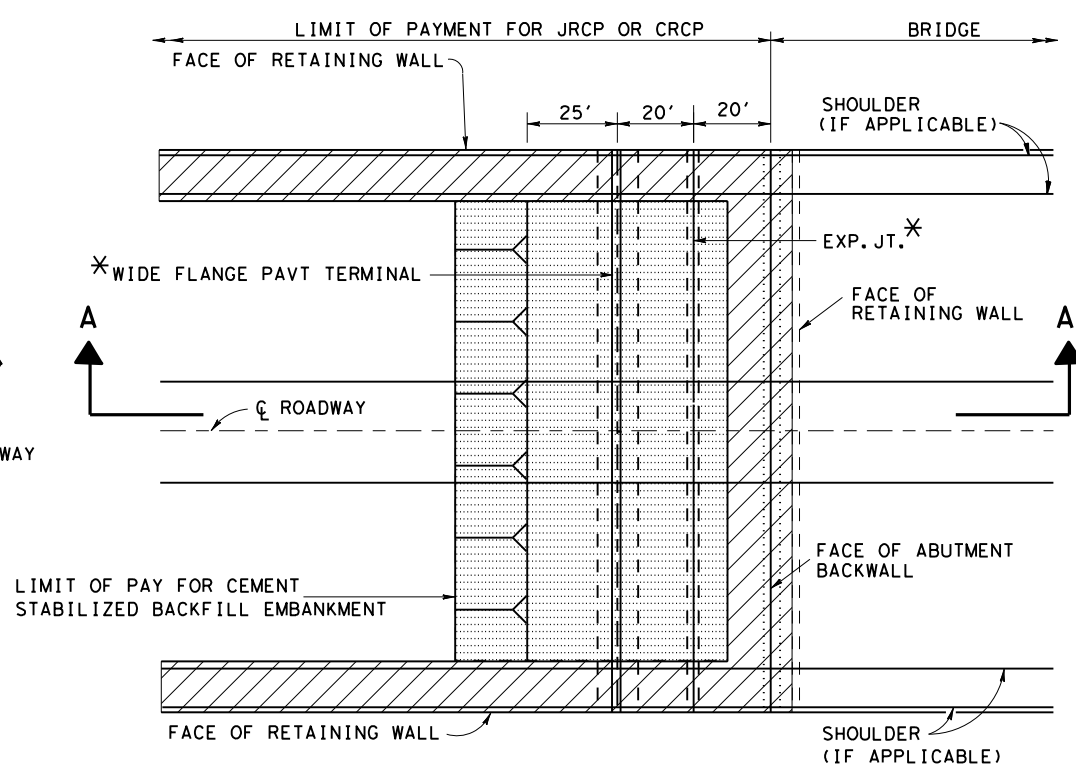
BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

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TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS
(AT SKEWED BRIDGES)



TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS
(AT NON-SKEWED BRIDGES)

NOTES

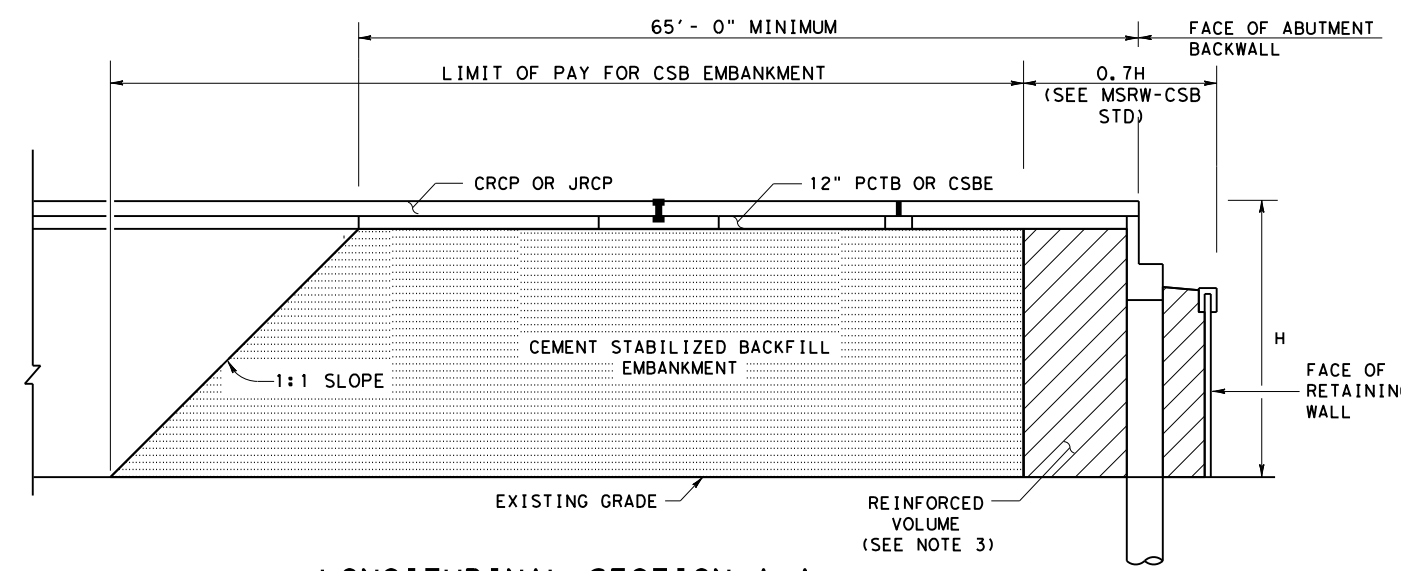
1. USE CEMENT STABILIZED BACKFILL EMBANKMENT IN ACCORDANCE WITH ITEM 132 AND HOUSTON DISTRICT-WIDE SPECIAL PROVISION (132-001).
2. FOR ADDITIONAL DETAILS ON WIDE FLANGE PAVEMENT TERMINALS SEE "WIDE FLANGE PAVEMENT TERMINALS" STANDARD SHEET.
3. FOR ADDITIONAL DETAILS ON RETAINING WALLS SEE "MECHANICALLY STABILIZED RETAINING WALL - CEMENT STABILIZED BACKFILL" MSRW-CSB STANDARD SHEET.

- CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
CSBE - CEMENT STABILIZED BACKFILL EMBANKMENT
EXP JT - EXPANSION JOINT
H - HEIGHT OF RETAINING WALL
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
MSRW - MECHANICALLY STABILIZED RETAINING WALL
PCTB - PORTLAND CEMENT TREATED BASE

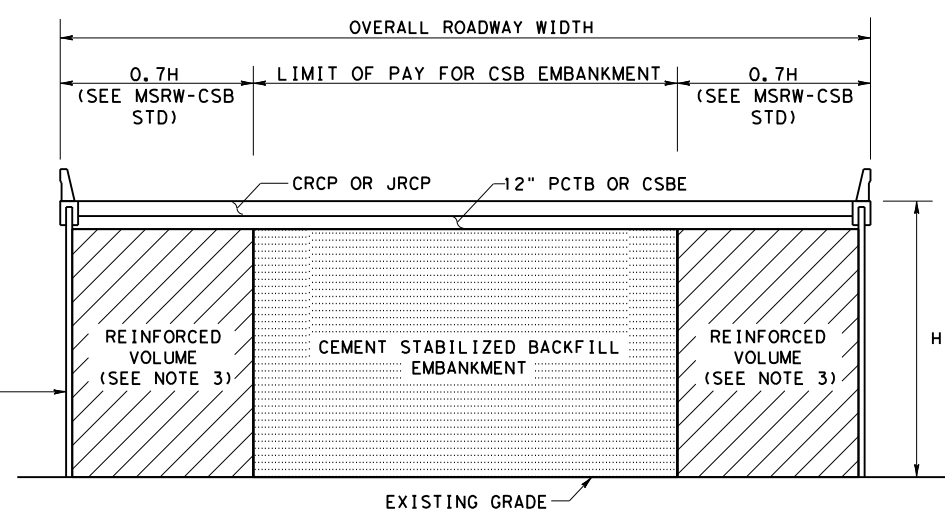
- LIMITS OF REINFORCED VOLUME (CEMENT STABILIZED BACKFILL). THIS VOLUME IS PAID UNDER ITEM 132-6006, EMBANKMENT (FINAL) (DC) (TY C).
- LIMITS OF CEMENT STABILIZED BACKFILL EMBANKMENT. THIS QUANTITY IS PAID UNDER ITEM 132-6035, EMBANKMENT (FINAL) (DENS CONT) (TY E) (CSBE).

LEGEND

* THIS APPLIES ONLY WHEN WIDE FLANGE TERMINALS ARE USED ON APPROACHES TO BRIDGES. IF NOT USING THIS SYSTEM, SEE APPROACH SLAB DETAILS ELSEWHERE IN THE PLANS.



LONGITUDINAL SECTION A-A



TRANSVERSE SECTION

Texas Department of Transportation
Houston District

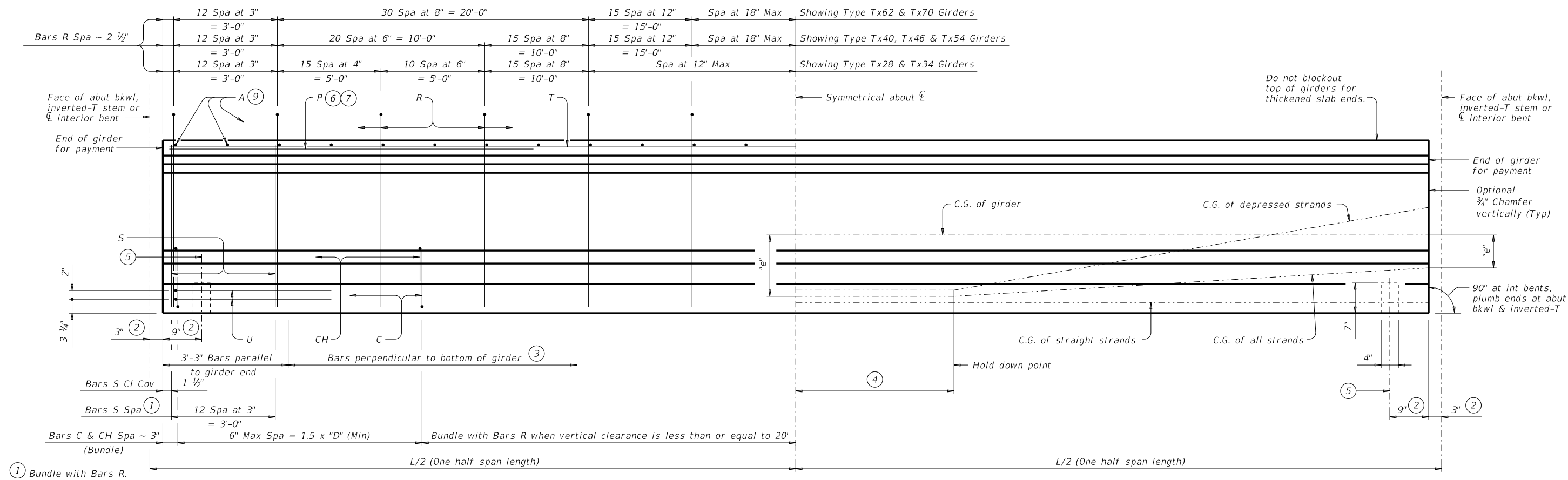
CEMENT STABILIZED BACKFILL EMBANKMENT
(FOR USE WITH RETAINING WALLS AT BRIDGE ABUTMENTS)

CSBE - RW

FILE: STDB-6.dgn	DN:	CK:	DW:	CK:
© TxDOT 2014	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		
	COUNTY	CONTROL	SECT	JOB
				HIGHWAY
				451

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DATE:
FILE:



- 1 Bundle with Bars R.
- 2 Measured along \bar{C} Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.
- 3 The average of the top and bottom spacing of Bars R cannot exceed the required spacing.
- 4 L/20, but not less than 5'-0" (-0,+2').

- 5 4" x 1 1/2" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 3/4" x 1 3/8") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

- 6 Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- 7 Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- 8 1 3/8" Clear Cover to Bars S.
- 9 Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".
- 10 Based on 155 pcf total weight of concrete and reinforcing steel.
- 11 Smooth trowel finish on the slab overhang side of exterior girder.

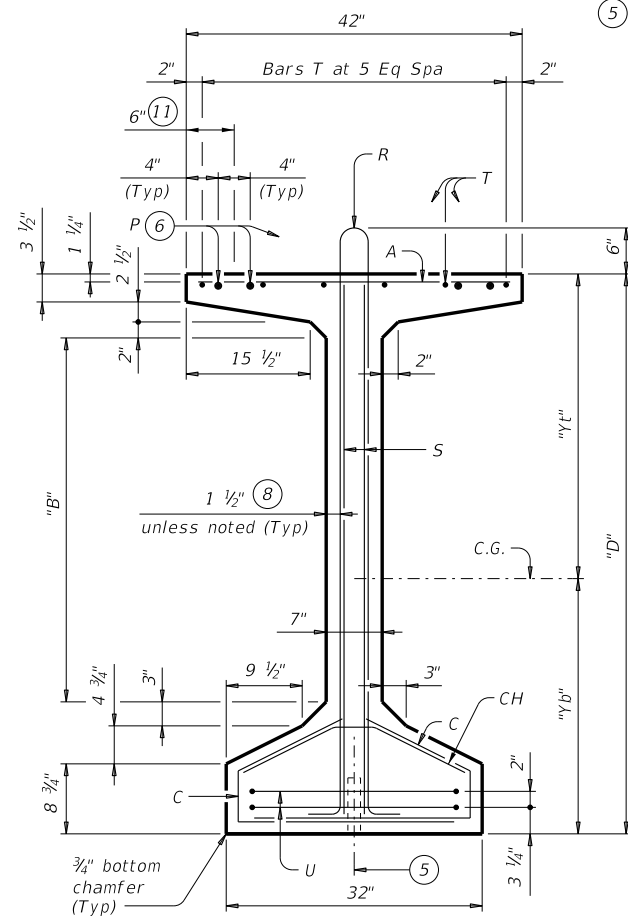
GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in. ²)	"Ix" (in. ⁴)	"Iy" (in. ⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 1/2	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 1/2	38.09	31.91	966	628,747	57,579	1,040

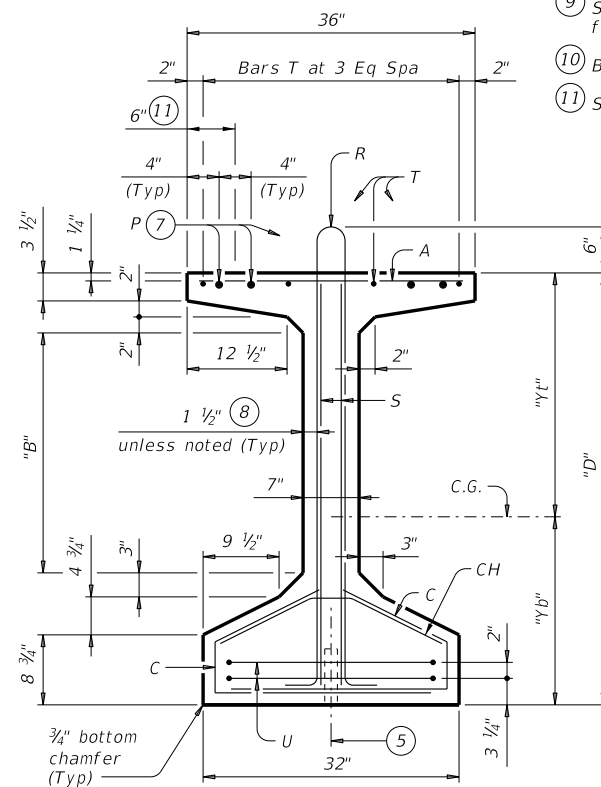
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.

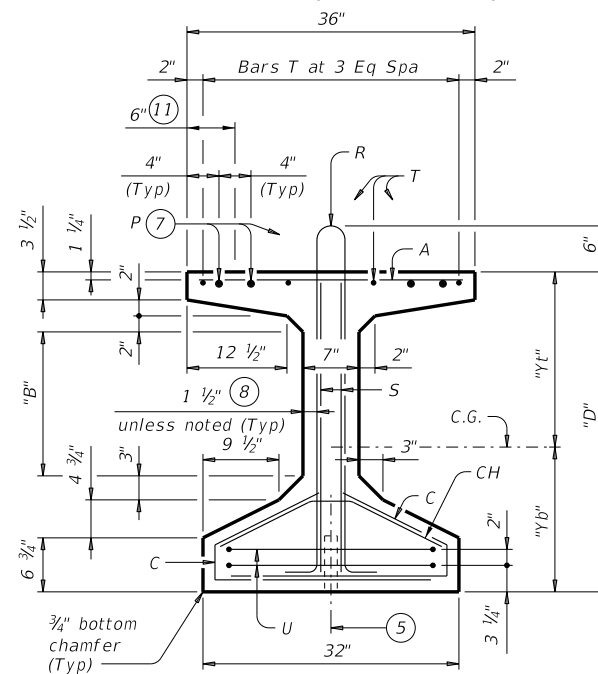
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

HL93 LOADING

SHEET 1 OF 2



Texas Department of Transportation

Bridge Division Standard

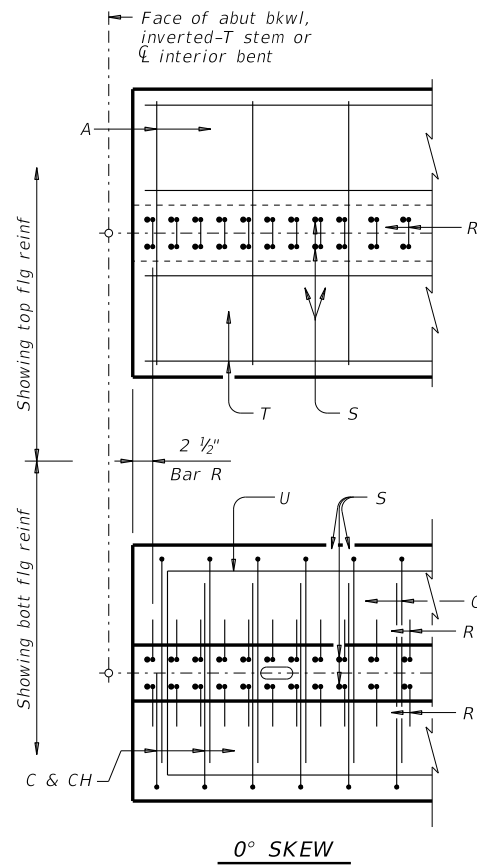
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

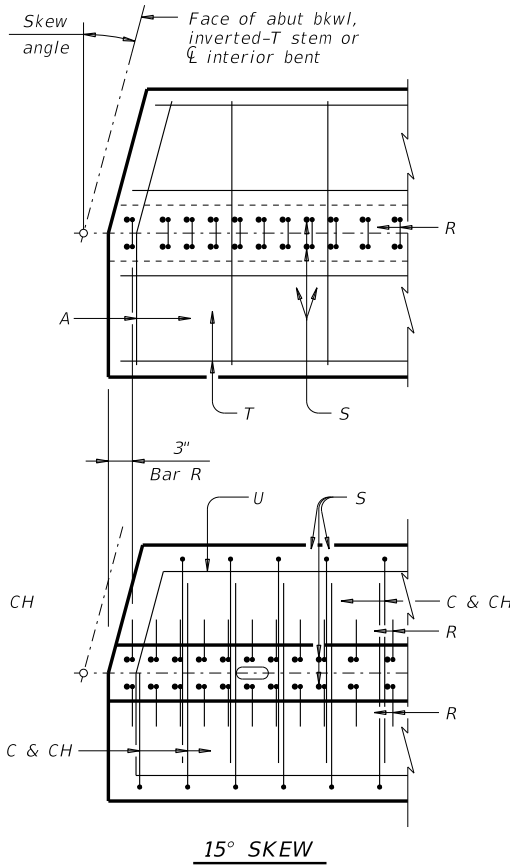
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-19: Added Bars C and CH full length for VC <= 20'	DIST		COUNTY	SHEET NO.
				452

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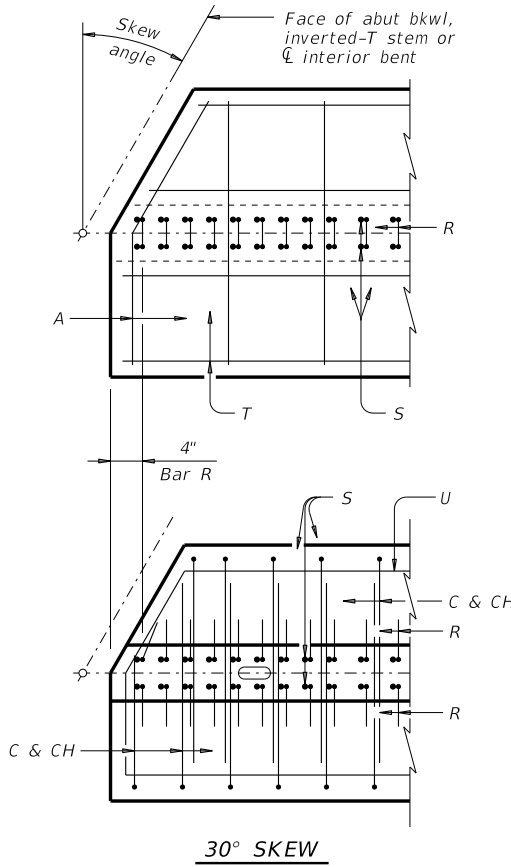
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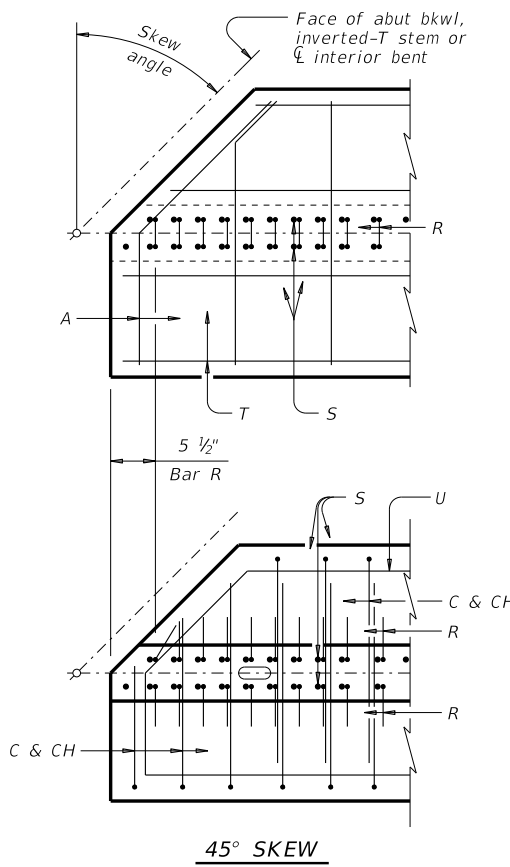
0° SKEW



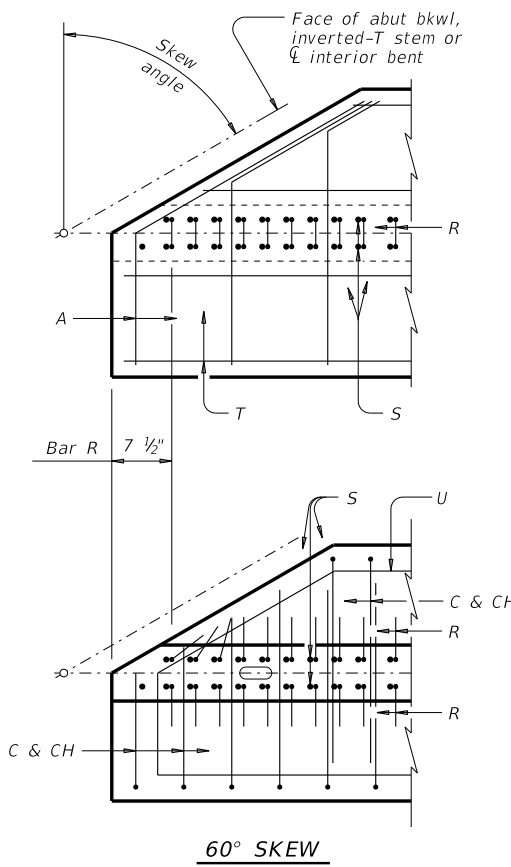
15° SKEW



30° SKEW



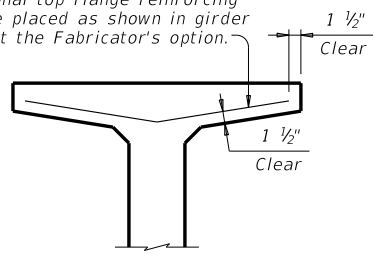
45° SKEW



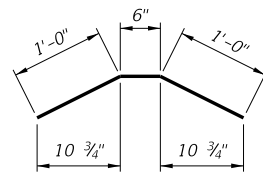
60° SKEW

PLAN OF GIRDER ENDS⁽¹²⁾

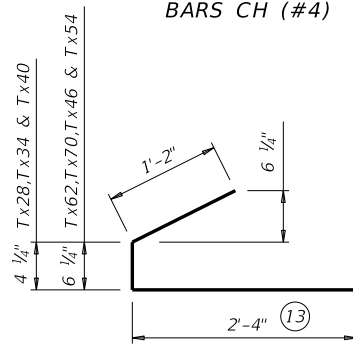
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



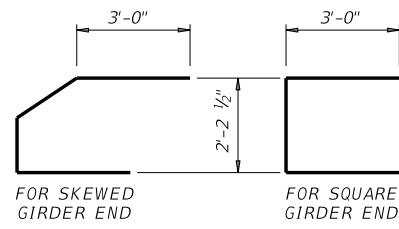
OPTIONAL TOP FLANGE REINFORCING DETAIL



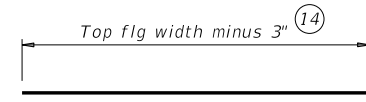
BARS CH (#4)



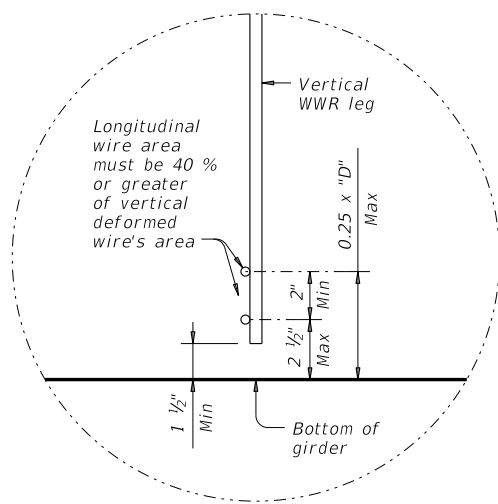
BARS C (#4)



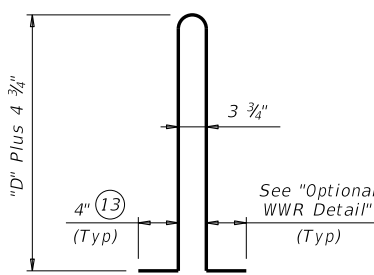
BARS U (#5)



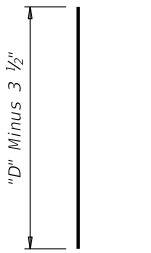
BARS A (#3)



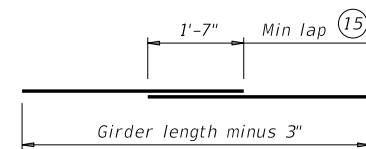
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



BARS R (#4)⁽¹⁶⁾




BARS S (#6)



BARS T (#4)

- ⁽¹²⁾ Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- ⁽¹³⁾ Bars may be cut or bent at skewed end as required.
- ⁽¹⁴⁾ Increase as necessary for bars at skewed end.
- ⁽¹⁵⁾ No portion of bar less than 10 ft.
- ⁽¹⁶⁾ For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.



Texas Department of Transportation

Bridge Division Standard

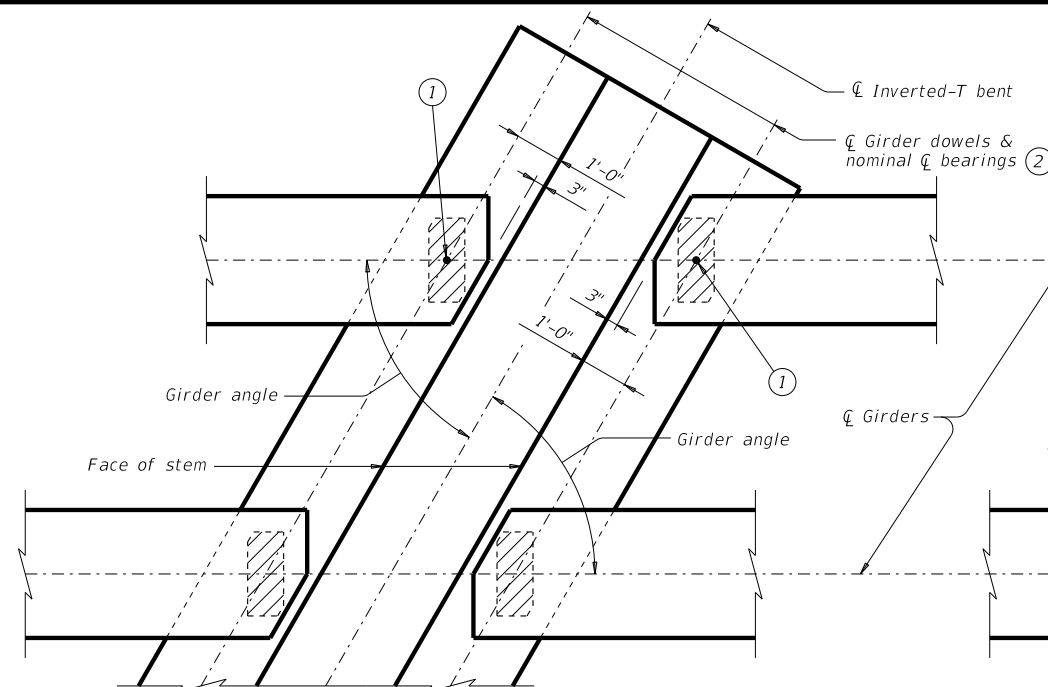
PRESTRESSED CONCRETE

I-GIRDER DETAILS

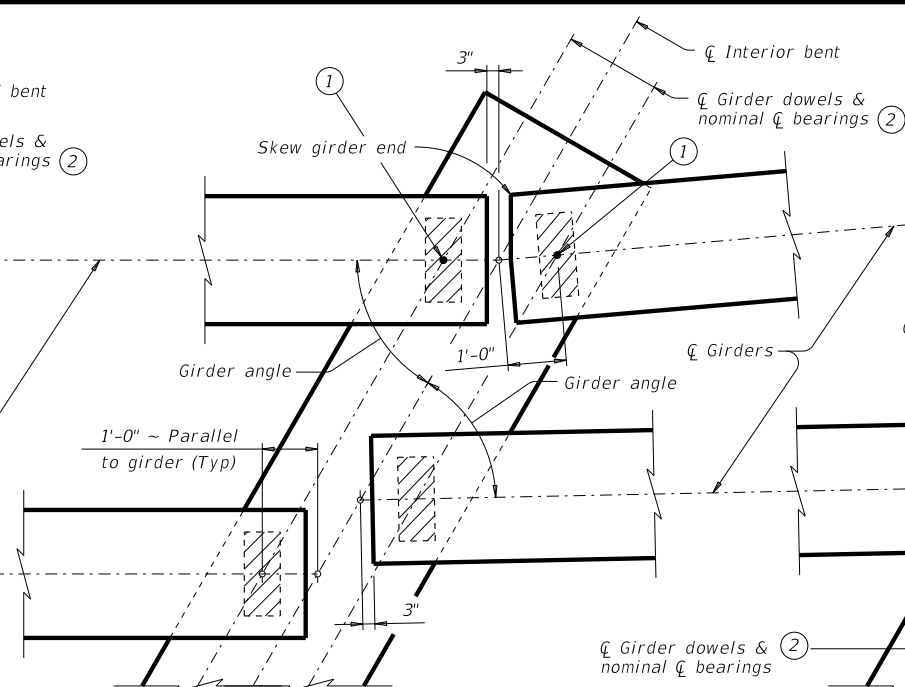
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-19: Added Bars C and CH full length for VC <= 20'	DIST	COUNTY		SHEET NO.
				453

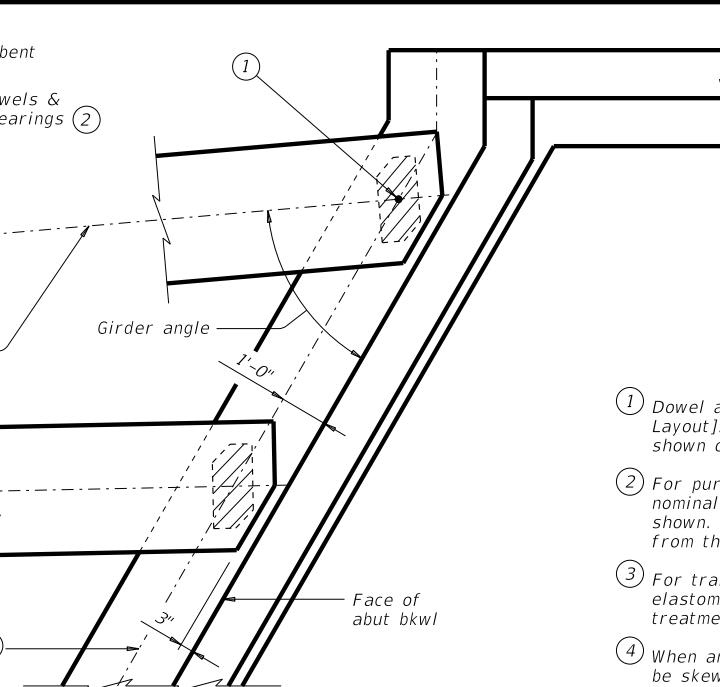
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FILE: _____



AT INVERTED-T BENT W/SKEW

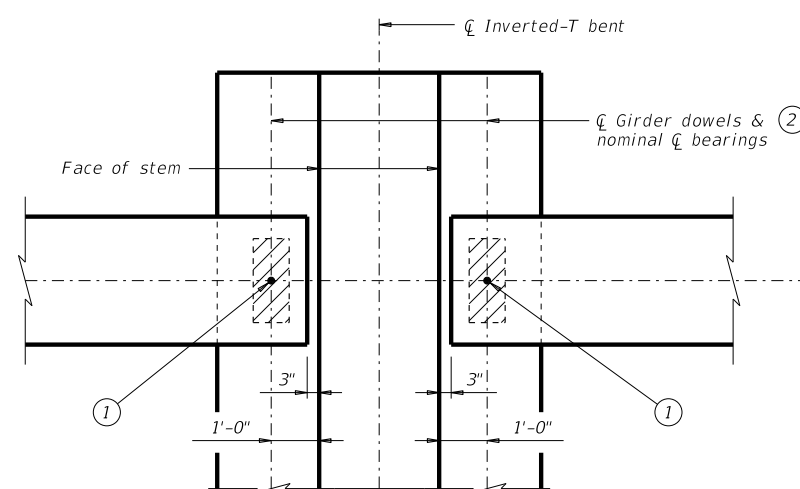


AT CONVENTIONAL INTERIOR BENT W/SKEW

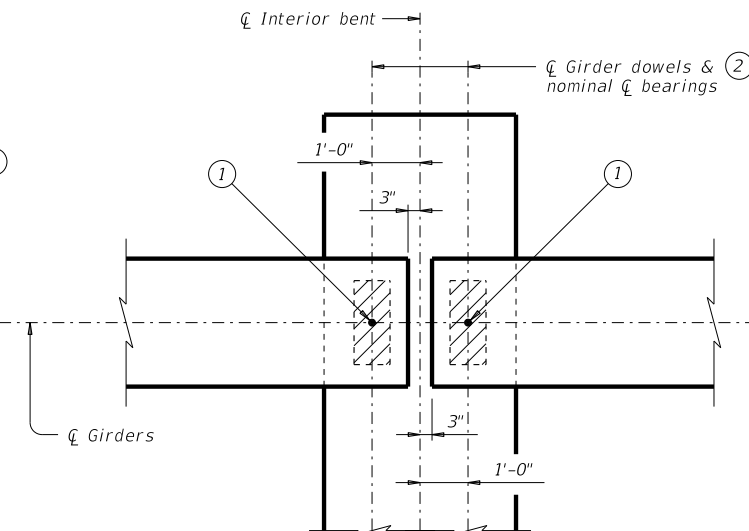


AT ABUTMENT W/SKEW⁽³⁾

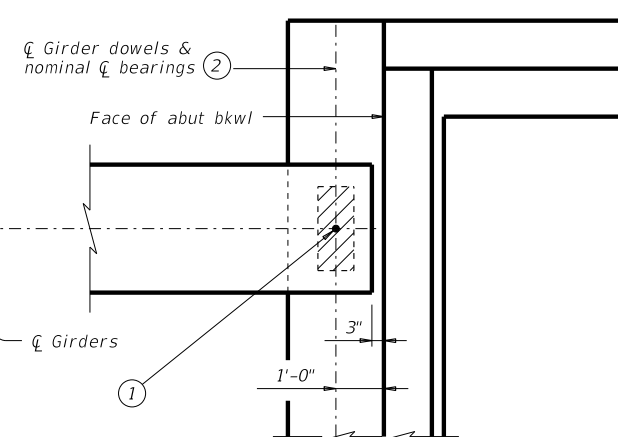
- ① Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- ② For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.
- ④ When angle exceeds 0° , one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.
- ⑤ See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



AT INVERTED-T BENT

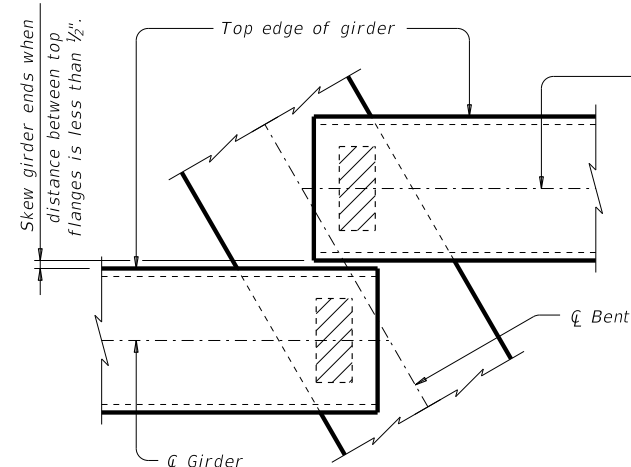
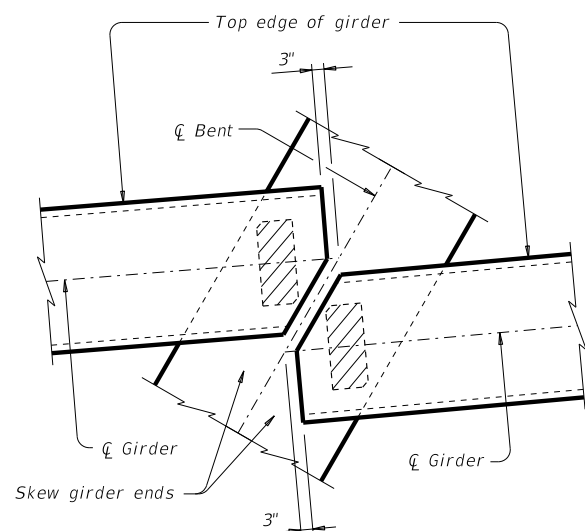


AT CONVENTIONAL INTERIOR BENT

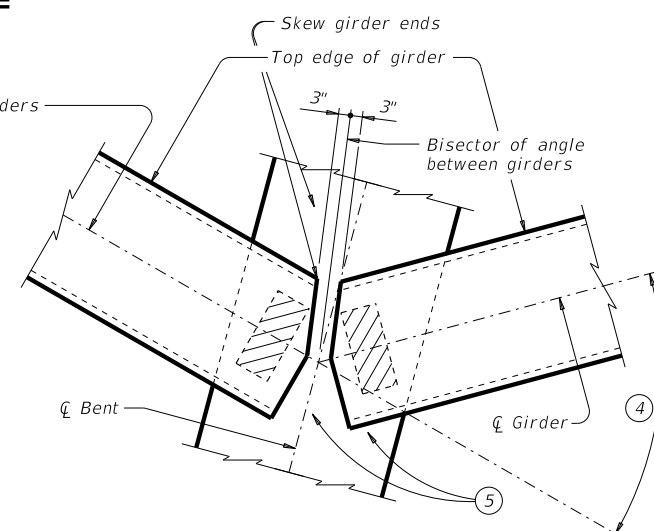


AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT DETAILS



GENERAL NOTES:

GENERAL NOTES:
These details accommodate skew angles up to 60°. Shop drawings for approval are required.
A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.
Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

HL93 LOADING

SHEET 1 OF 3



Texas Department of Transportation

**Bridge
Division
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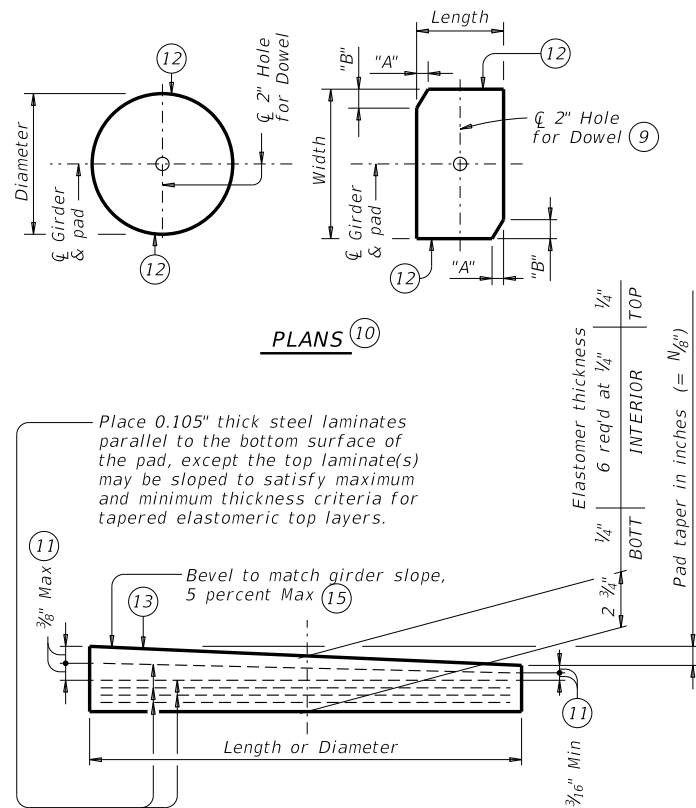
*ELASTOMERIC BEARING
AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS*

IGEB

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REVISIONS							
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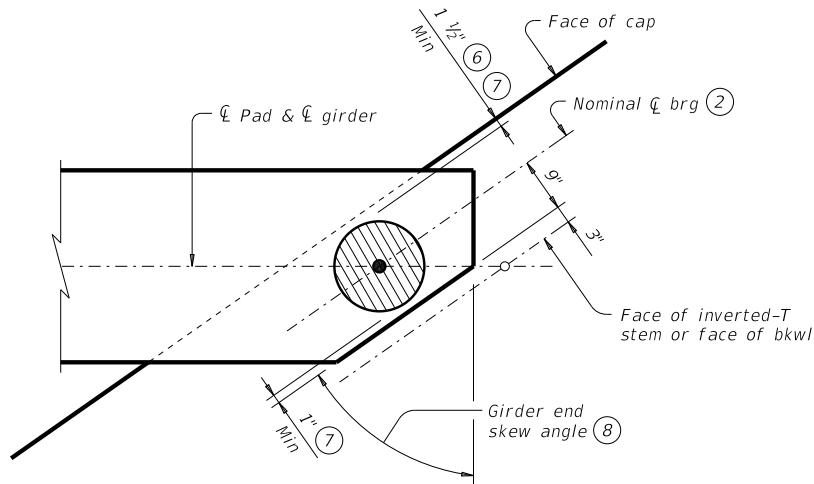
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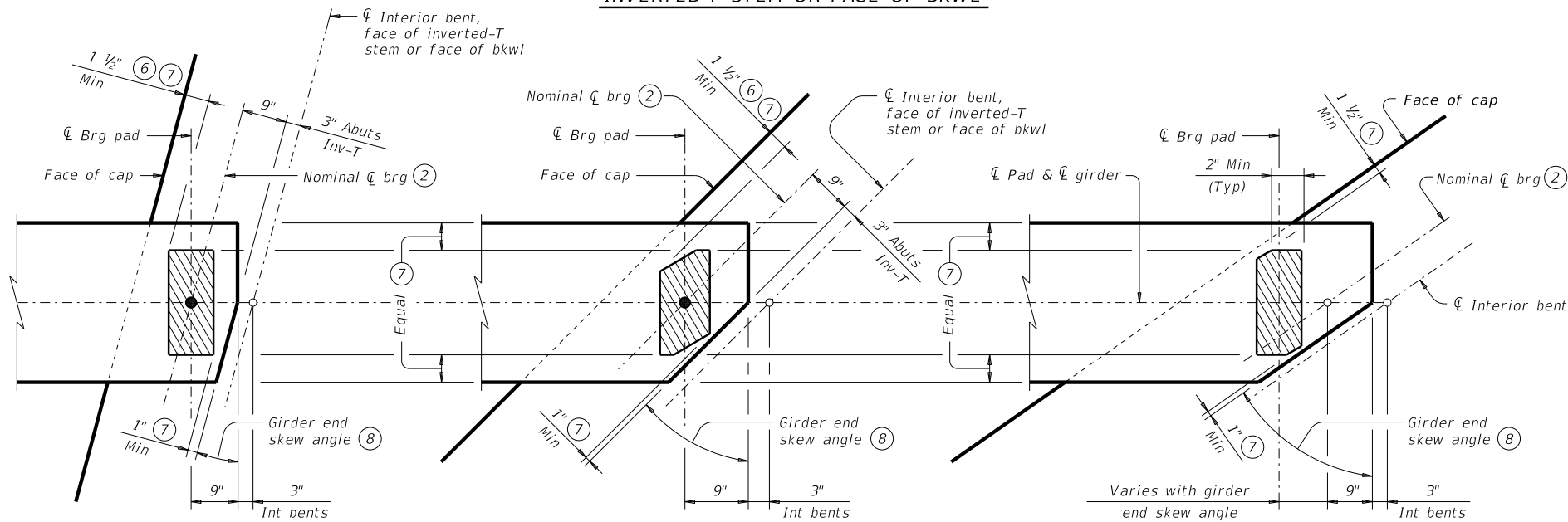


ELEVATION

**LAMINATED
ELASTOMERIC BEARING PAD**
(50 DUROMETER)



**ROUND BEARINGS FOR
SKEWED GIRDER ENDS AT FACE OF
INVERTED-T STEM OR FACE OF BKWL**



**SKEWED GIRDER ENDS
AT INT BENTS, FACE OF
INVERTED-T STEM OR FACE OF BKWL**

**SKEWED GIRDER ENDS
AT CONVENTIONAL
INTERIOR BENTS (16)**
(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS


TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)			
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 1/2"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 1/2"

TABLE OF BEARING PAD DIMENSIONS						
Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 1/2"	4 1/2"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 1/2"	2 1/2"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 1/2"	4 1/2"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 1/4"	4 1/4"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-5-"N"	0° thru 60°	9" x 21"	---	---
		G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
	Tx62 & Tx70	G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 1/2"
		G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 1/2"	1 1/2"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 3/4"

- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- (6) 3" for inverted-T.
- (7) Place centerline pad as near nominal centerline bearing as possible between limits shown.
- (8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- (9) Provide 2" dia hole only at locations required. See Substructure details for location.
- (10) See Table of Bearing Pad Dimensions for dimensions.
- (11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- (12) Locate Permanent Mark here.
- (13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625}{\text{Length or Dia}} \right)$ IN/IN.
- (14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- (15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- (16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING

SHEET 2 OF 3

**Texas Department of Transportation**

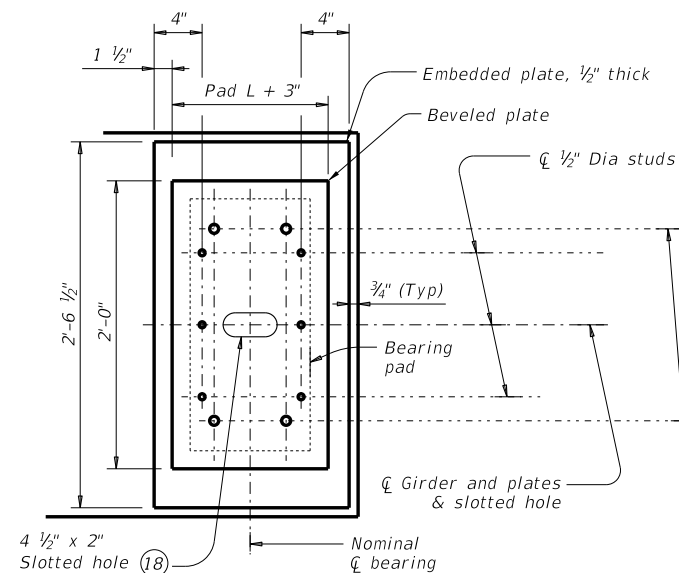
Bridge Division Standard

**ELASTOMERIC BEARING
AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS**

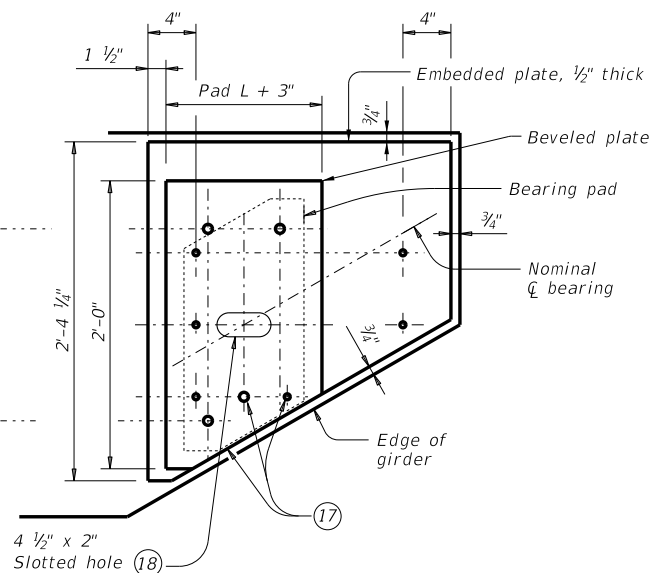
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©TxDOT August 2017	CONT SECT	JOB	HIGHWAY	
REVISIONS	DIST	COUNTY	SHEET NO.	
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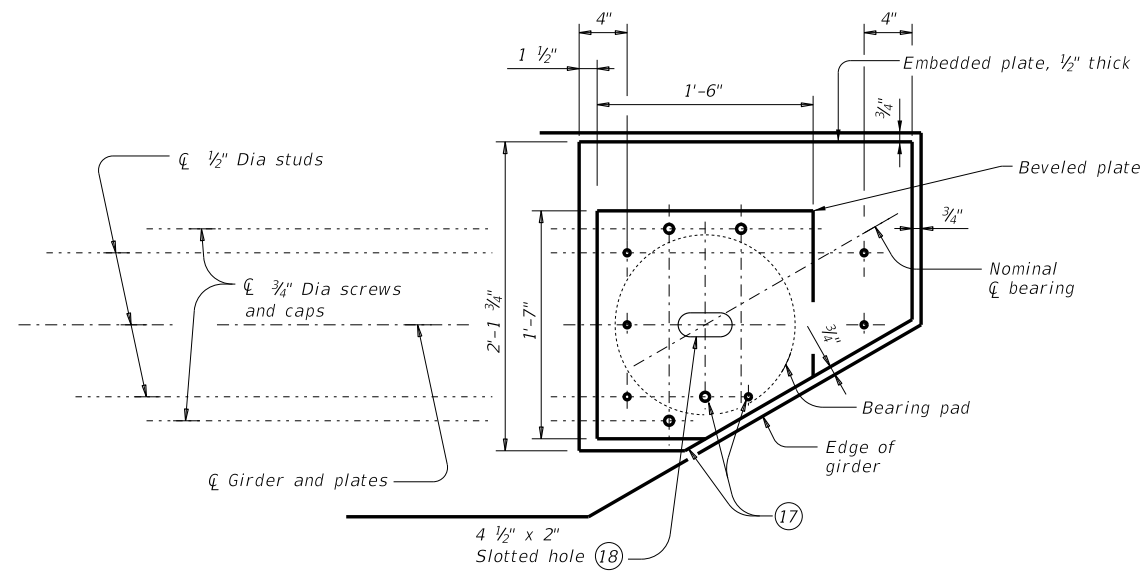
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NORMAL GIRDER END
RECTANGULAR BEARING PAD

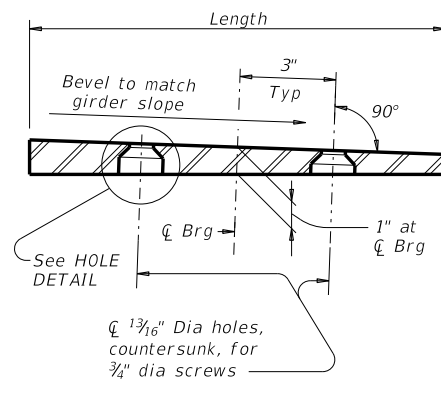


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

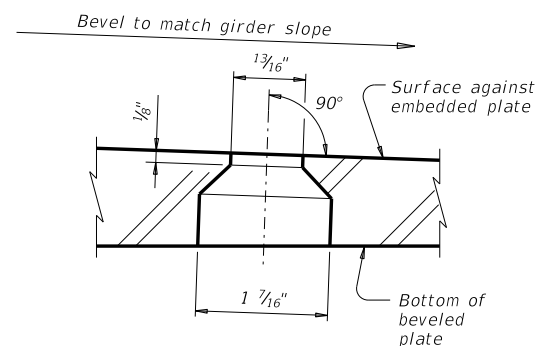


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



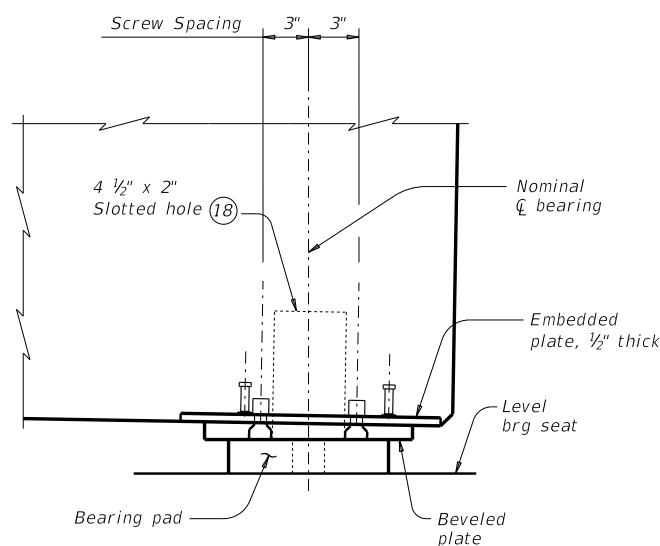
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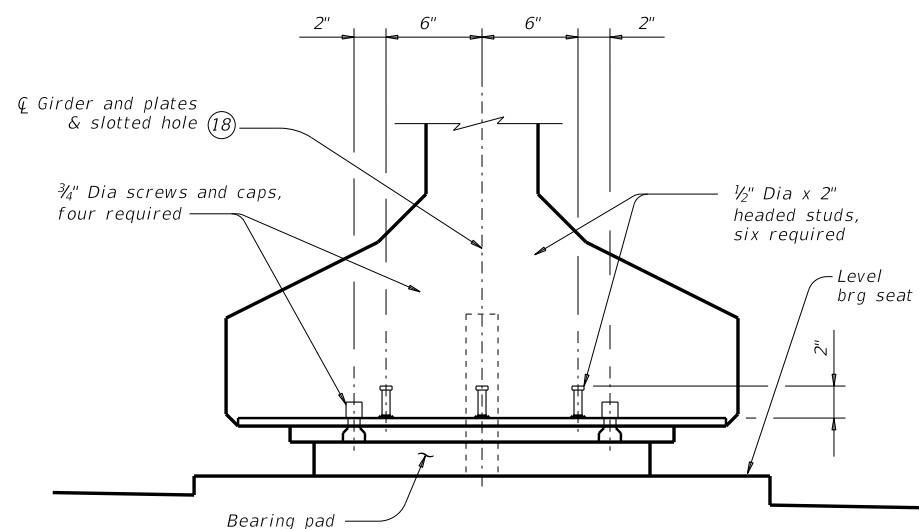
HOLE DETAIL

- (17) *Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.*
- (18) *Slotted hole is required at doweled girder end locations.*

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest $\frac{1}{16}$ " based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is $\frac{1}{16}$ " \pm , except variation from a plane parallel to the theoretical top surface can not exceed $\frac{1}{16}$ " total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

3/4" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a 3/4" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

HL93 LOADING

SHEET 3 OF 3




Texas Department of Transportation

**Bridge
Division
Standard**

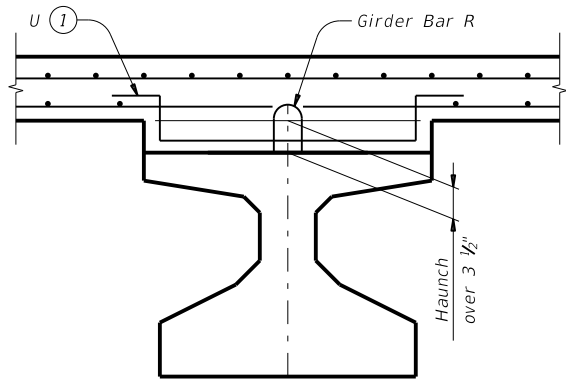
*ELASTOMERIC BEARING
AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS*

IGEB

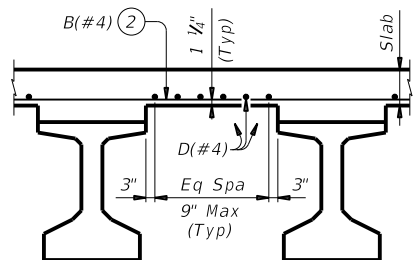
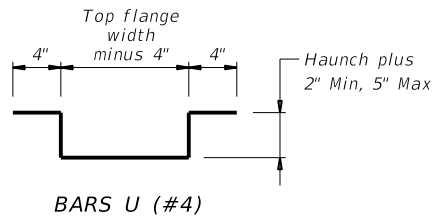
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 TxDOT August 2017 REVISIONS	CONT	SECT	JOB		HIGHWAY	
	DIST	COUNTY				SHEET NO.
						456

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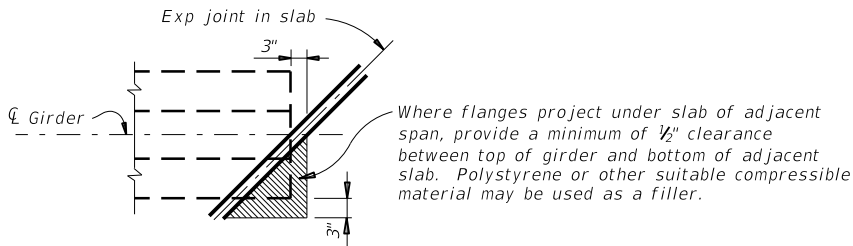
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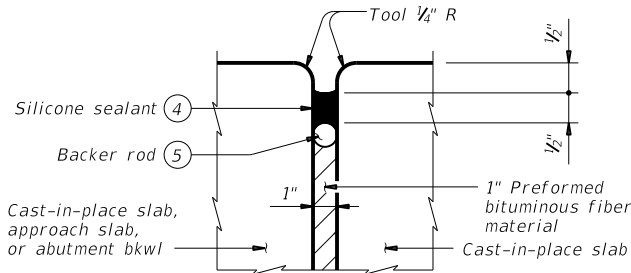
HAUNCH REINFORCING DETAIL



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP
Top reinforcing steel not shown for clarity.



TREATMENT AT GIRDER END FOR SKEWED SPANS



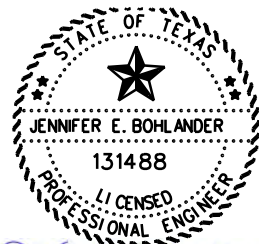
TYPE A JOINT DETAIL

- ① Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 1/2".
- ② Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
- ③ Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"
- ④ Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- ⑤ 1 1/4" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ⑥ The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."
All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.


DECK FORMWORK NOTES:
Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.



Jennifer E. Bohlander
DATE: 4/1/2021

MODIFIED FOR ONE EXPANSION JOINT AT INVERTED TEE CAP

SHEET 1 OF 2



Texas Department of Transportation

Bridge
Division
Standard

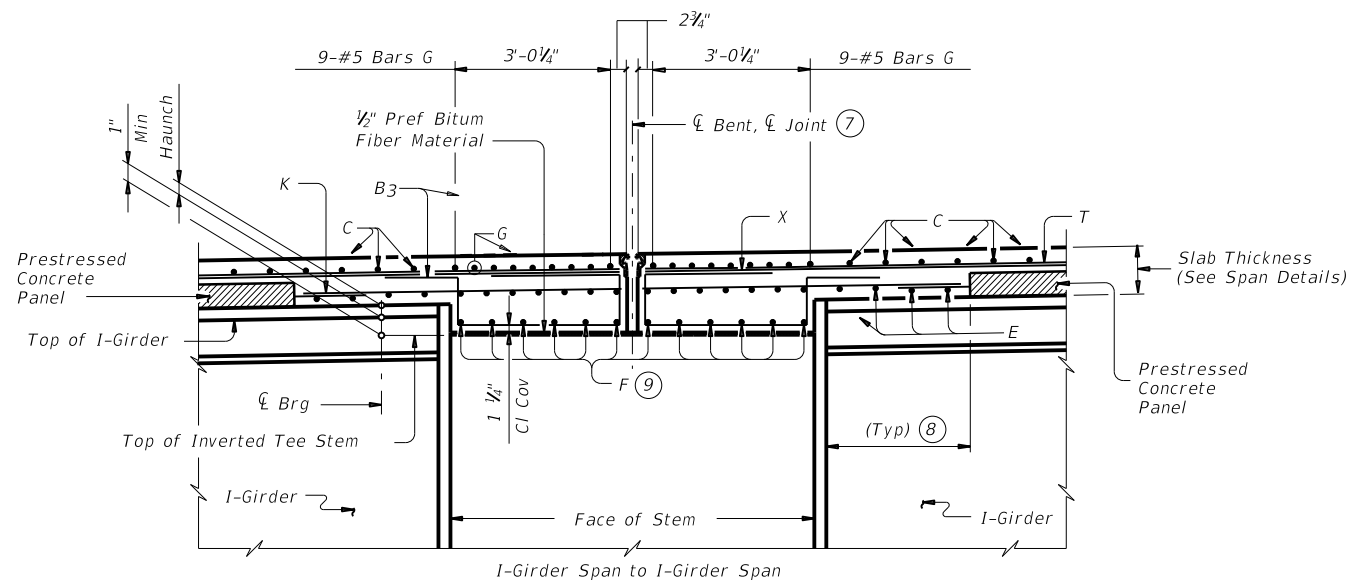
MISCELLANEOUS
SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

IGMS (MOD)

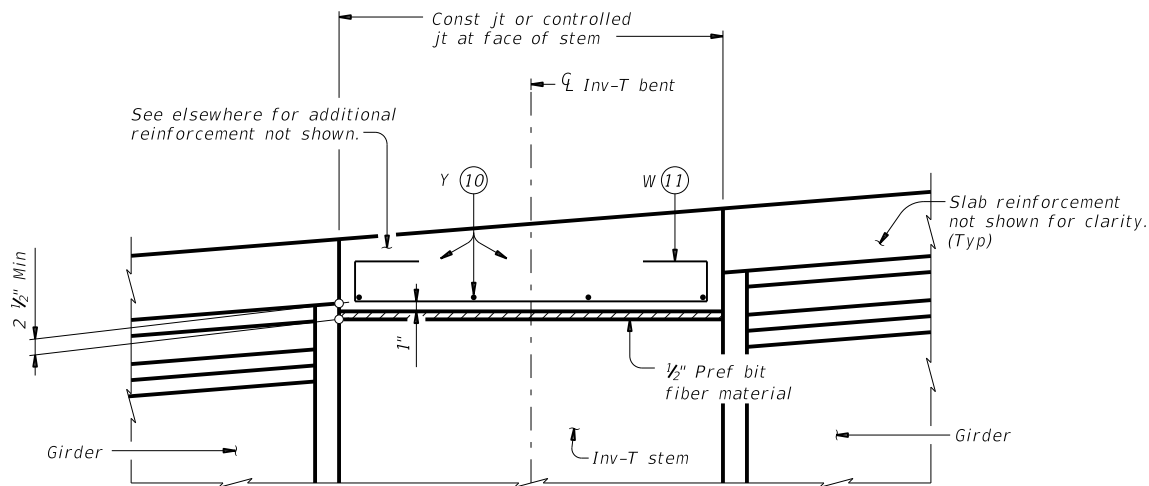
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10-19: Modified Note 7. Type A now a pay item.				
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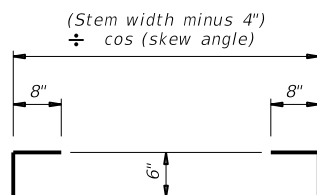
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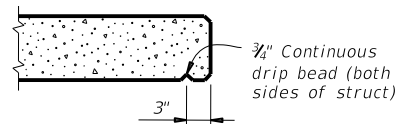
SHOWING EXPANSION JOINTS



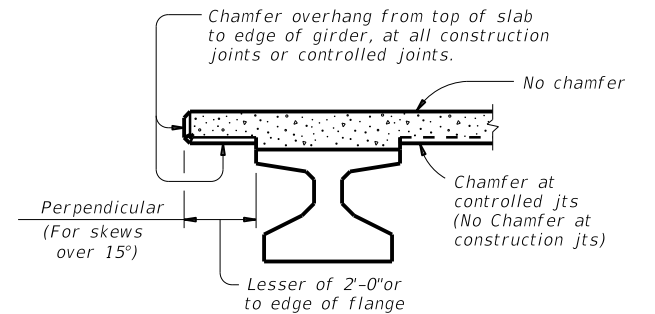
SHOWING CONST JTS OR CONTROLLED JTS
REINFORCEMENT OVER INV-T BENTS



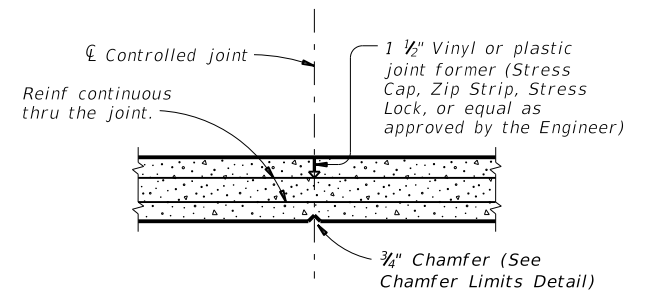
BARS W (#4)



DRIP BEAD DETAIL

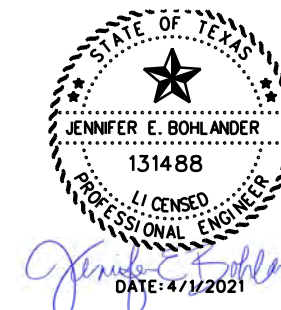


CHAMFER LIMITS DETAIL (12)




CONTROLLED JOINT DETAIL
(Saw-cutting is not allowed)

- (7) See Layout for joint type.
(8) See PCP Standard for panel placement.
(9) Bars F are parallel to CL Bent.
(10) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
(11) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.
(12) See Span details for type of joint and joint locations.



MODIFIED FOR ONE EXPANSION JOINT AT INVERTED TEE CAP

SHEET 2 OF 2



Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS

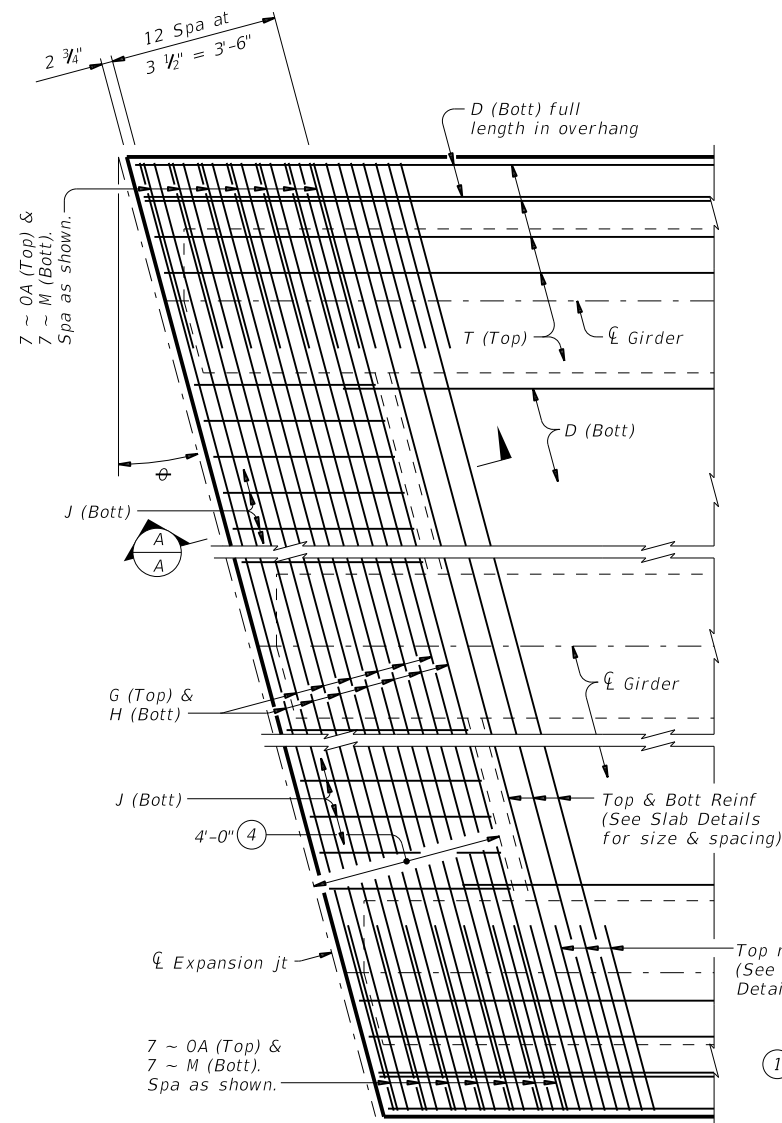
SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS (MOD)

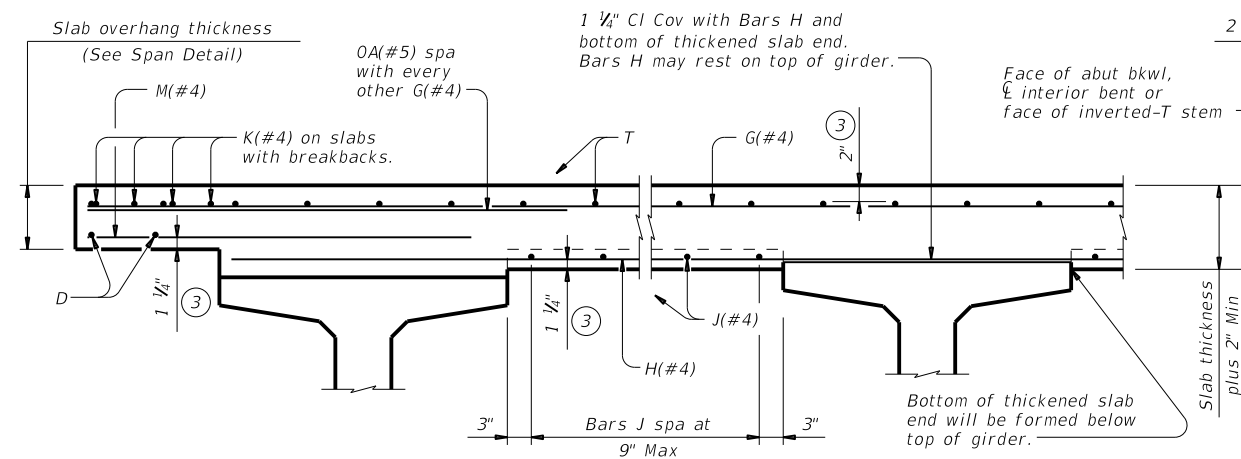
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REVISIONS				
10-19: Modified Note 7, Type A now a pay item.	DIST	COUNTY		SHEET NO.
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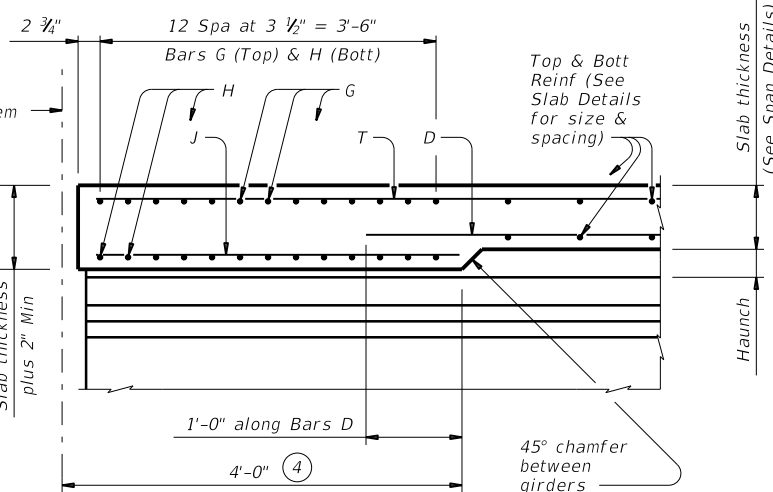
PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK

- End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
- "A" = ("OH" + 2.333' - "B") x Tan θ
- Provide clear cover as indicated unless otherwise shown on Span Details.
- Thickened slab end dimensioned perpendicular to face of bkwf, centerline interior bent or face of inverted-T stem.



TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ϕ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

$$("W" - 0.250') \div \cos \theta$$

BARS G (#4)
(For slabs without breakbacks)

$$["W" - (2 \times "OH") + ("FW" - 0.250')] \div \cos \theta$$

"FW" = girder's top flange width (ft)

BARS H (#4)

$$3.750' \div \cos \theta$$

BARS J (#4)

$$"OH" + 1.000' \\ (4.000' \text{ Min})$$

BARS M (#4)
(For slabs without breakbacks)

$$"OH" + 2.000' \\ (5.000' \text{ Min})$$

BARS OA (#5)

(For slabs without breakbacks)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

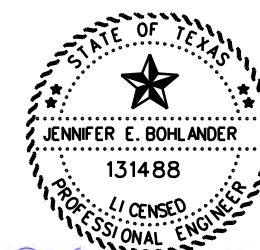
HL93 LOADING



THICKENED SLAB END DETAILS PRESTRESSED CONCRETE I-GIRDER SPANS

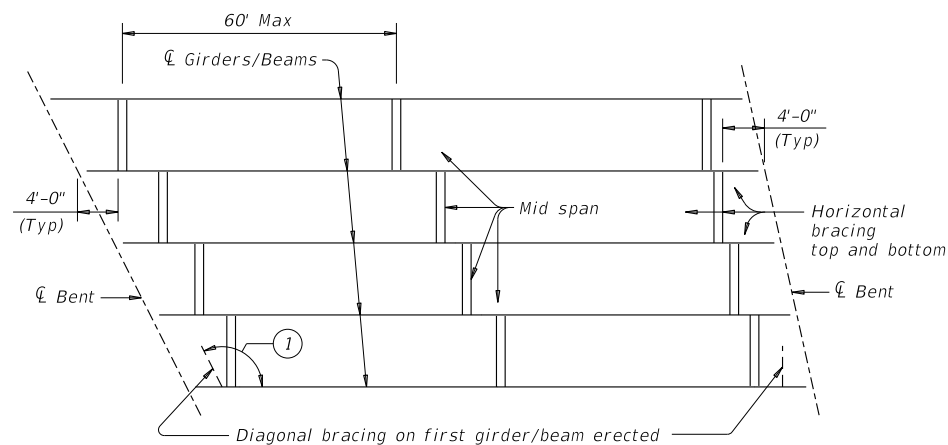
IGTS (MOD)

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REVISIONS	DIST	COUNTY	SHEET NO.	459

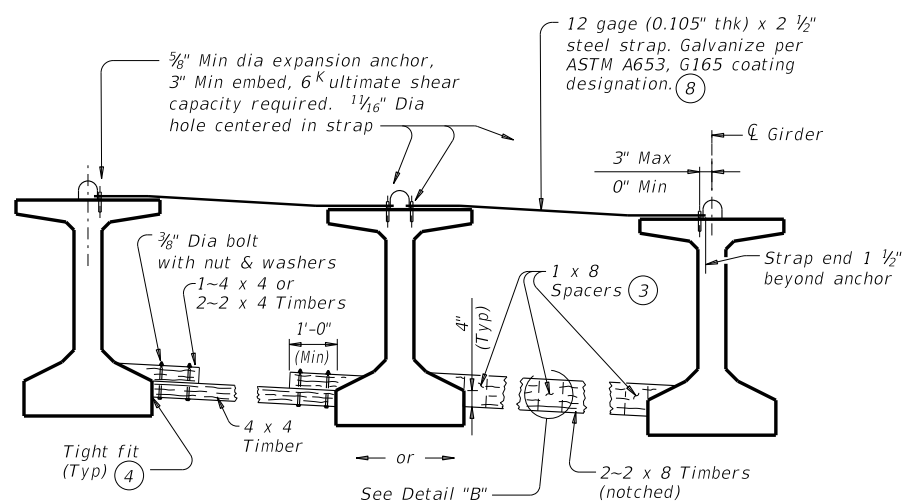


MODIFIED TO REMOVE SLABS
WITH BREAKBACK

DATE: _____
FILE: _____

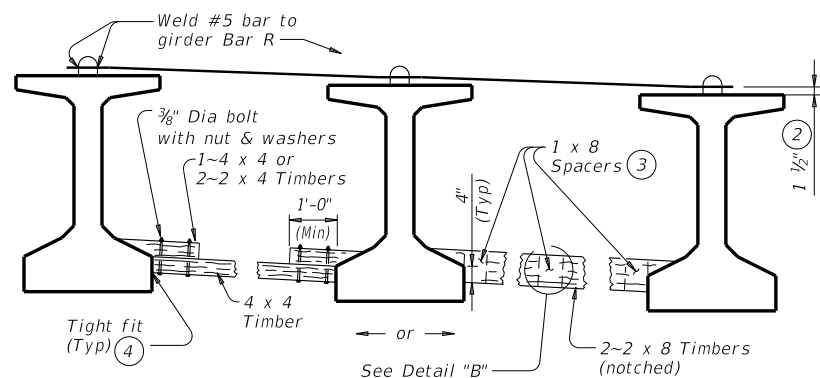


ERECTION BRACING



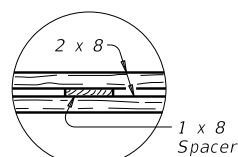
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



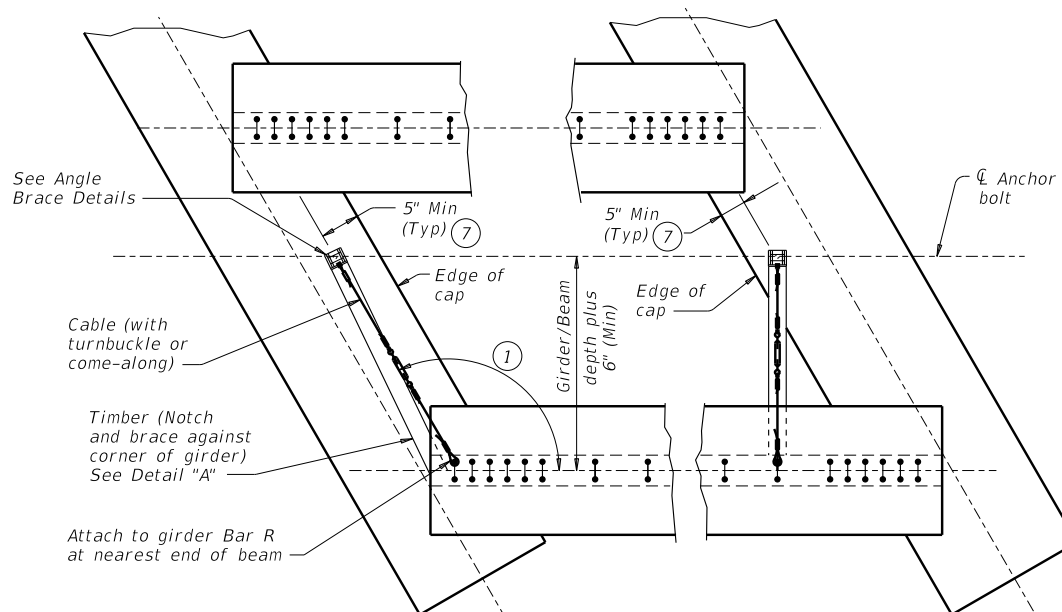
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS⁽⁵⁾

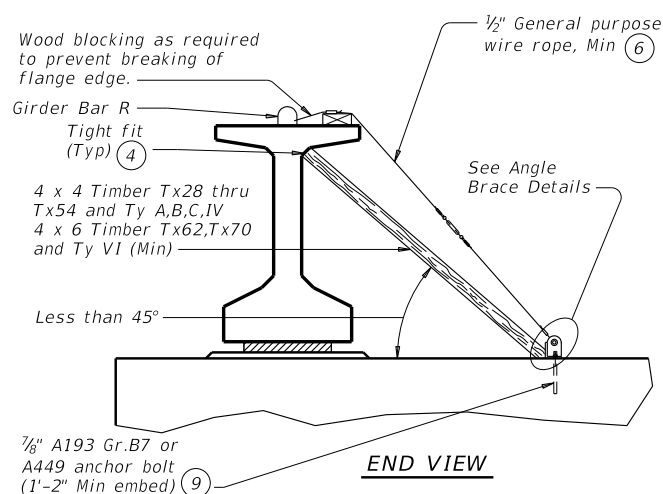


PLAN

DETAIL "B"



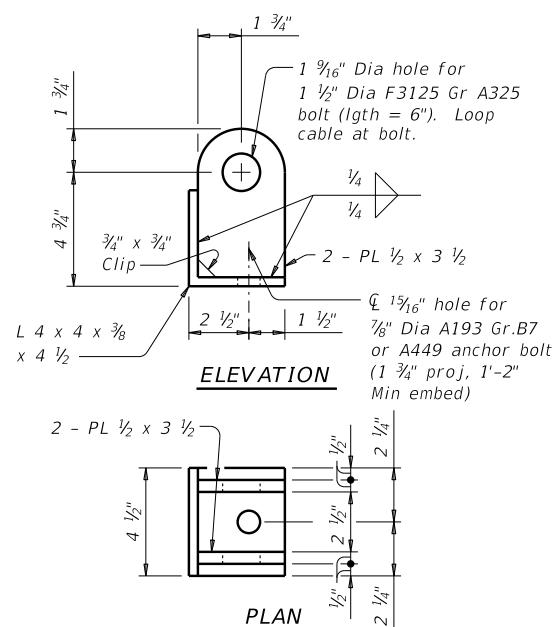
PLAN



END VIEW

DIAGONAL BRACING DETAILS⁽⁵⁾

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION

PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

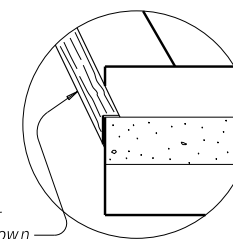
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

PHASED CONSTRUCTION:
Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

- ① If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- ② Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- ③ Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- ④ Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- ⑤ Pressure treated landscape timbers can not be used.
- ⑥ All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing against the dead end.
- ⑦ It is acceptable to tie anchor bolts to cap reinforcement.
- ⑧ Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- ⑨ Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2



Texas Department of Transportation

**Bridge
Division
Standard**

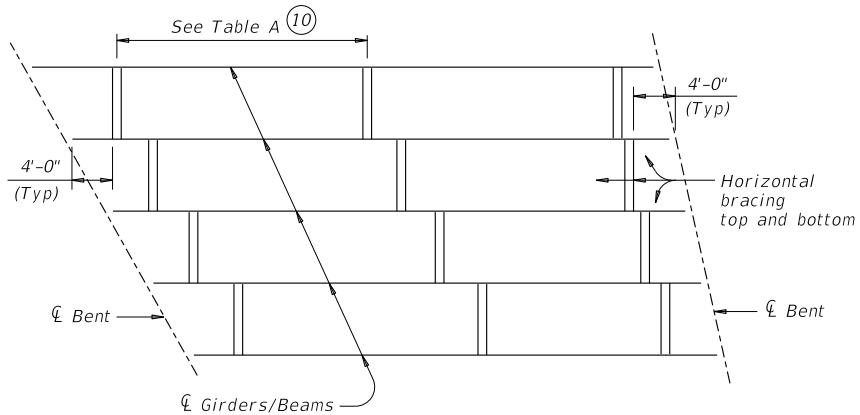
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

 $MEBR(C)$

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		DIST		COUNTY			SHEET NO.		
							460		

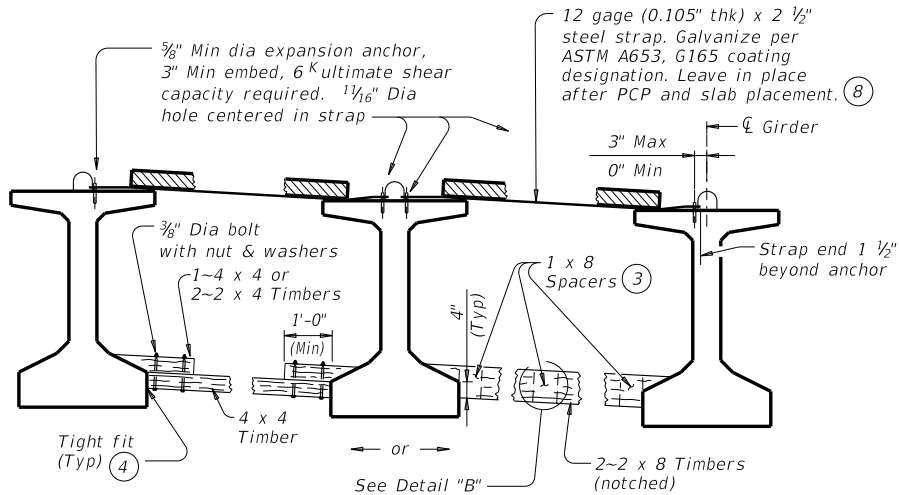
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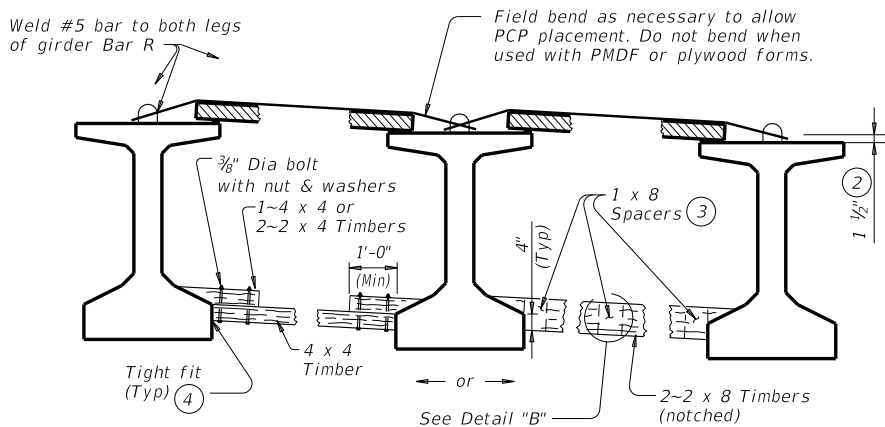
SLAB PLACEMENT BRACING

TABLE A					
OPTION 1-RIGID BRACING (STEEL STRAP)			OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)		
Girder or Beam Type	Maximum Bracing Spacing		Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)		Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	1/4 points	1/4 points	Tx28	1/4 points	1/8 points
Tx34	1/4 points	1/4 points	Tx34	1/4 points	1/8 points
Tx40	1/4 points	1/8 points	Tx40	1/4 points	1/8 points
Tx46	1/4 points	1/8 points	Tx46	1/4 points	1/8 points
Tx54	1/4 points	1/8 points	Tx54	1/4 points	1/8 points
Tx62	1/4 points	1/8 points	Tx62	1/4 points	1/8 points
Tx70	1/4 points	1/8 points	Tx70	1/4 points	1/8 points
A	1/8 points	1/8 points	A	2.0 ft	1.5 ft
B	1/8 points	1/8 points	B	3.0 ft	2.0 ft
C	1/8 points	1/8 points	C	4.5 ft	2.0 ft
IV	1/4 points	1/8 points	IV	1/4 points	4.0 ft
VI	1/4 points	1/8 points	VI	1/4 points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

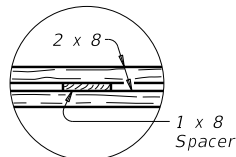
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

- Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.
- Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- Pressure treated landscape timbers can not be used.
- Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- Bracing spacing (1/4 and 1/8 points) measured between first and last typical brace location.
- Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

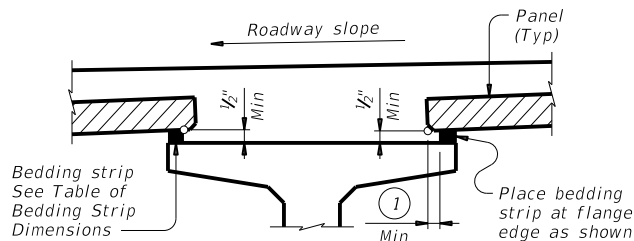
Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure. Removal of bracing for short periods of time to align girders and beams is permissible. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown. Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

SHEET 2 OF 2

Texas Department of Transportation				Bridge Division Standard			
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS							
MEBR(C)							
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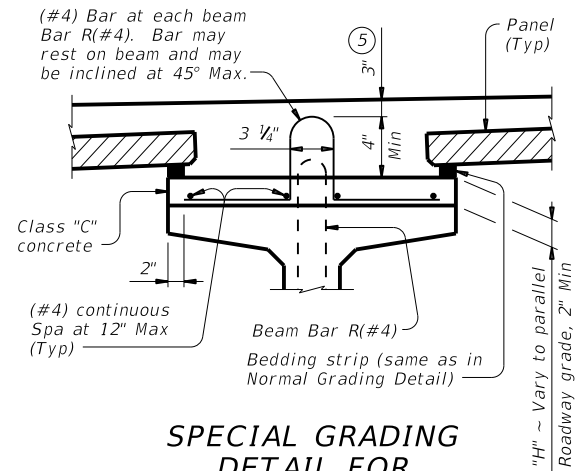
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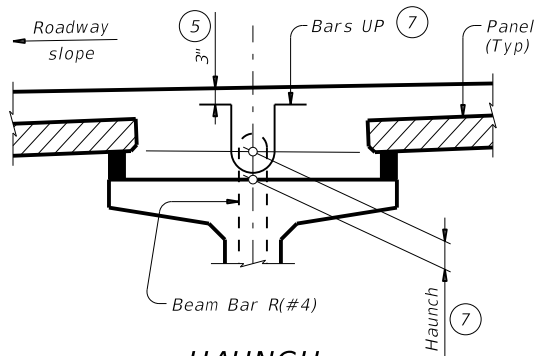
NORMAL GRADING DETAIL ③

Showing prestressed concrete I-girders.
(Other beam types similar)



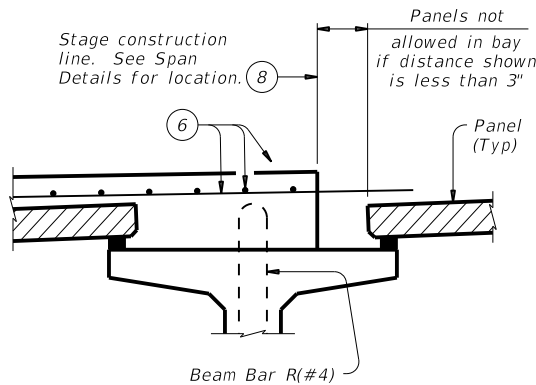
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)

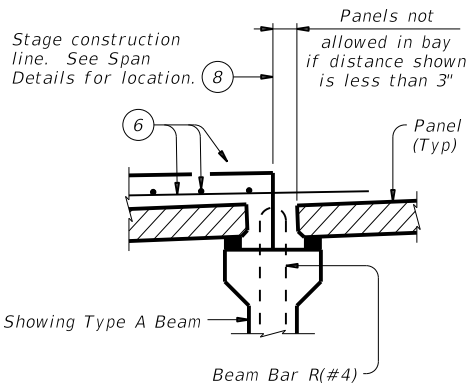


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)



PRESTR CONC I-GIRDERS

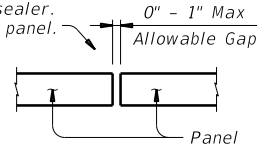


PRESTR CONC I-BEAMS

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT ④	
	Min	Max
1" (Min)	1/2"	2"
1 1/4"	1/2"	2 1/2"
1 1/2"	1/2"	3"
1 3/4"	1/2"	3 1/2"
2"	1/2"	4"
2 1/4"	1/2"	4 1/2" ②
2 1/2"	1/2"	5" ②
2 3/4"	1/2"	5 1/2" ②
3" (Max)	1/2"	6" ②

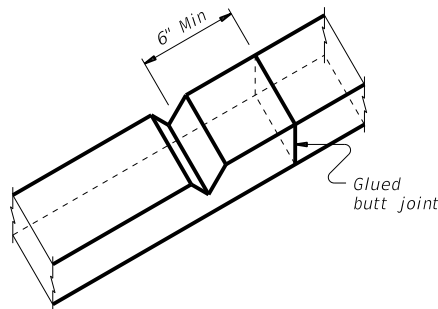
- ① 2" Min for I-girders, 1 1/2" Min for all other beam types.
- ② Allowed for I-girders, not allowed on other beam types.
- ③ To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in 1/4" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is 1/4". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.
- ④ Height must not exceed twice the width.
- ⑤ Provide clear cover as indicated unless otherwise shown on Span Details.
- ⑥ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- ⑦ Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 1/2" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.
- ⑧ Do not locate construction joints on top of a panel.
- ⑨ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..

Seal joint between panels when gap exceeds 1/4" with polyurethane sealant or expanding foam sealer. Make seal flush with top of panel.

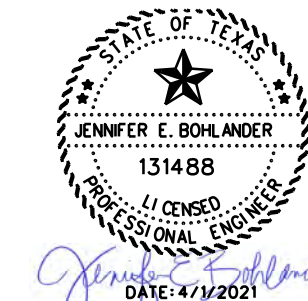


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



BEDDING STRIP DETAIL ⑨



MODIFIED TO REMOVE OPTION 2

CONSTRUCTION NOTES:
Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges. Placing panels to minimize joint openings is recommended. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction. Bars U, shown on PCP-FAB, may be bent over or cut off if necessary. Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 1/2" under the panels as the slab concrete is placed. To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least 1/2". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required. For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated. Provide bar Laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications. Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees. Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use. These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings. When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer. Any additional reinforcing or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

SHEET 1 OF 3

Bridge Division Standard

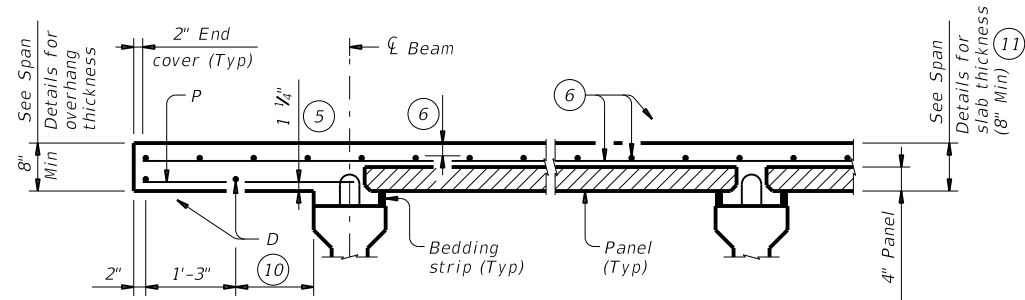
PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP (MOD)

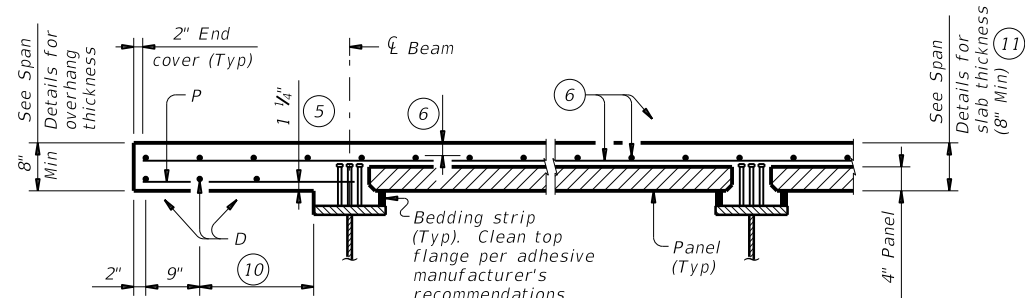
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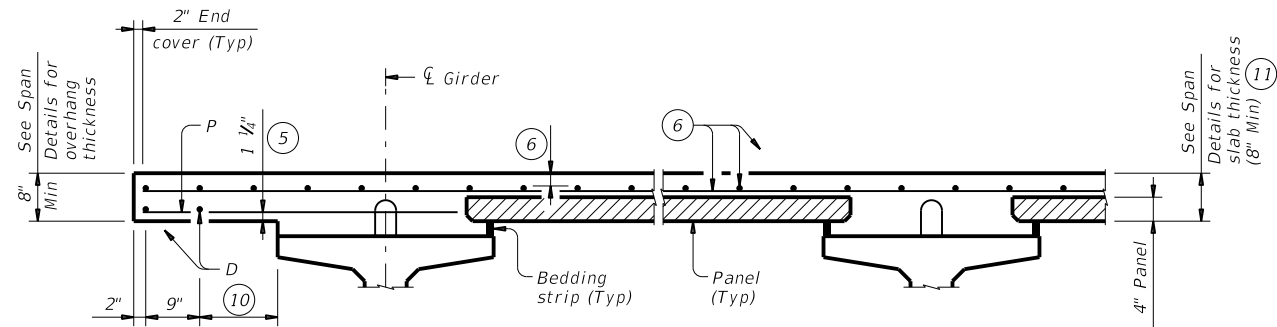
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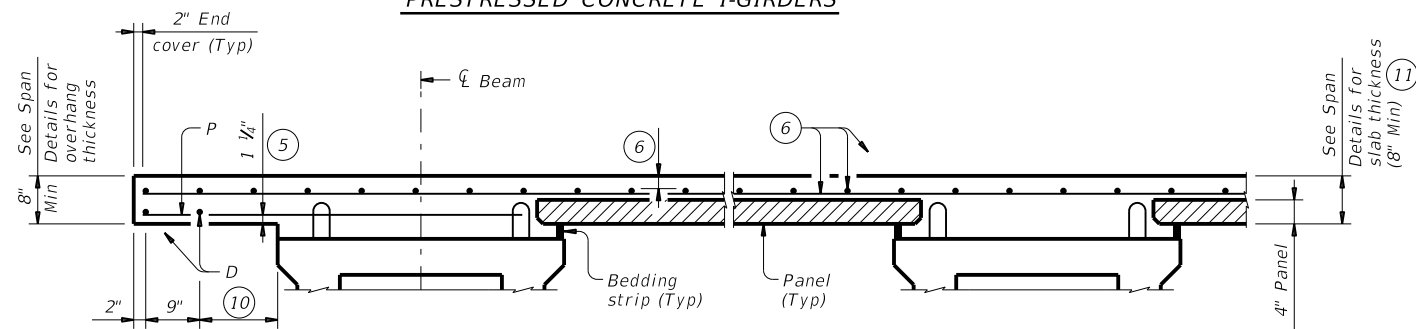
PRESTRESSED CONCRETE I-BEAMS



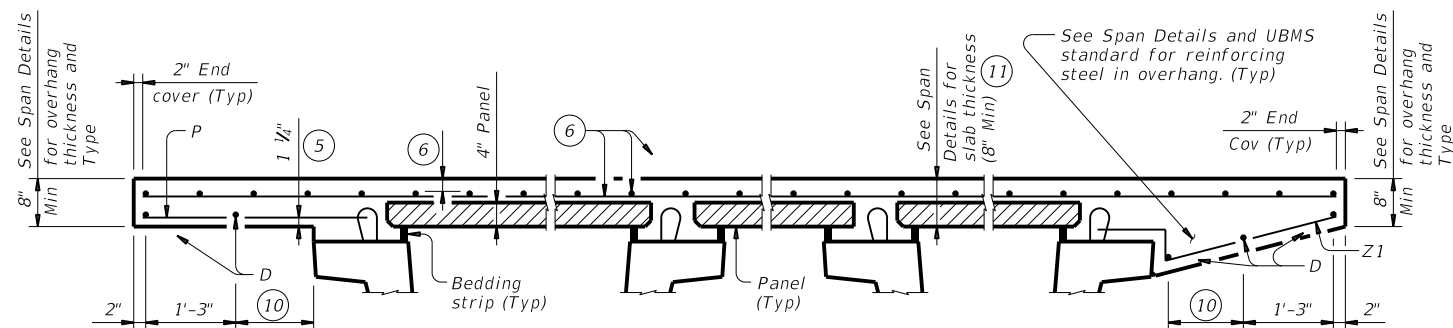
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



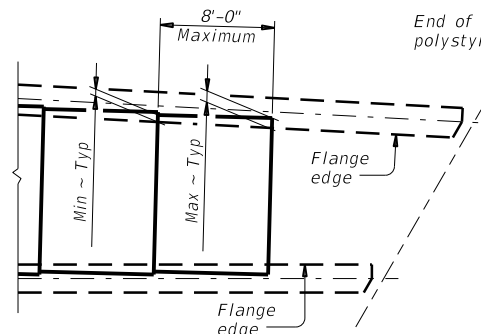
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

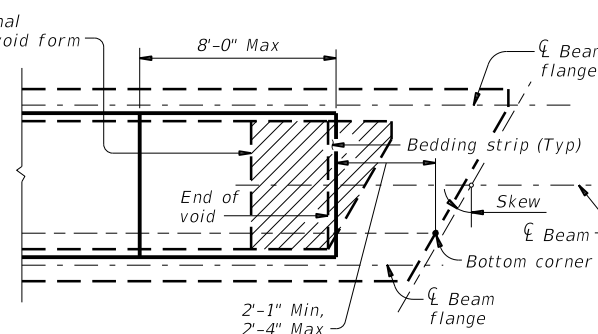
TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

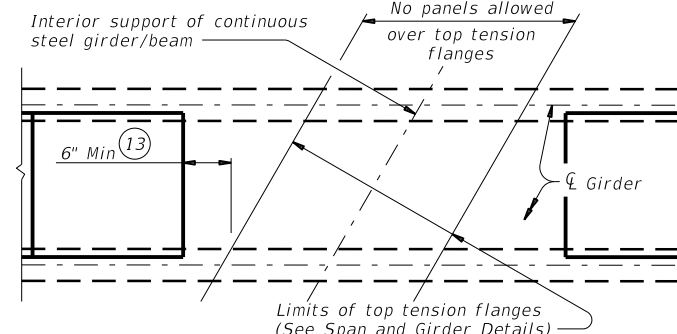


AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



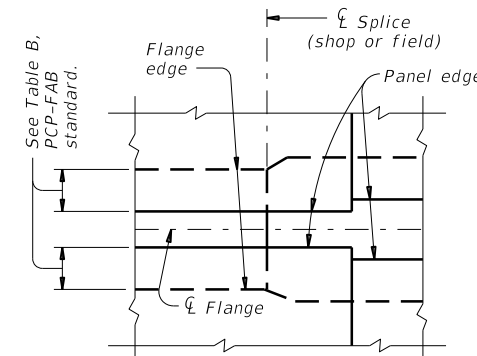
OVER CONC U-BEAMS



AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS

PART PLANS OF PANEL PLACEMENT

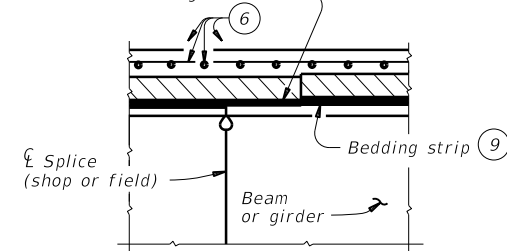
- Provide clear cover as indicated unless otherwise shown on Span Details.
- See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- Butt adjacent bedding strips together with adhesive. Cut v-notches, approx $\frac{1}{4}$ " deep, in the top of the bedding strips at 8' o.c..
- Equally space additional bar if more than 1'-3" Max.
- The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.
- Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.
- Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



PLAN AT SPLICE

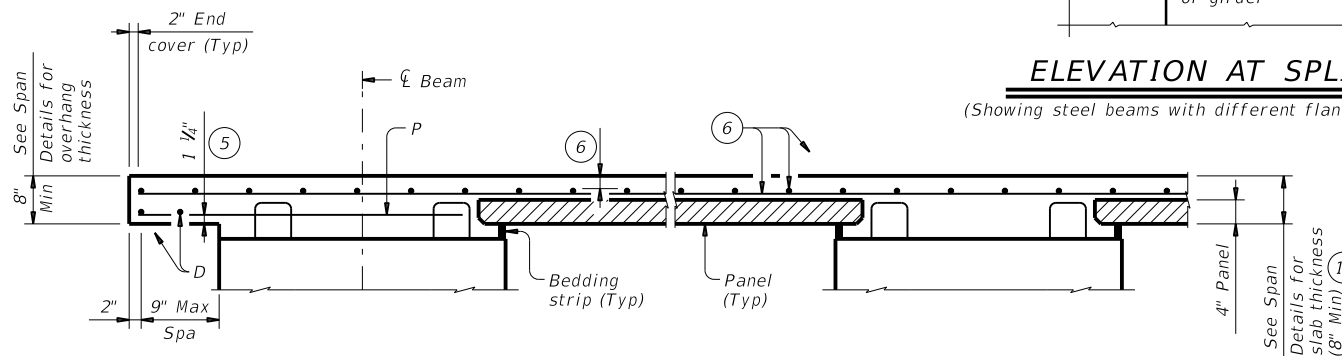
(Showing steel beams with flange width transition)

Cut bedding strip to adjust for difference in flange thickness.



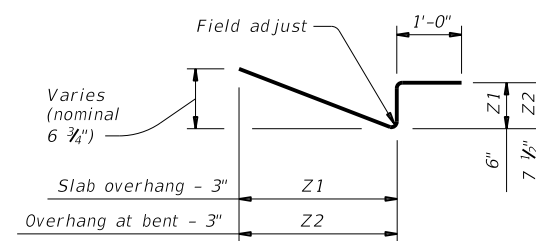
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)

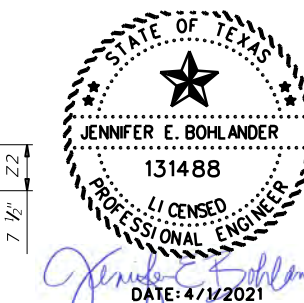


PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4)



MODIFIED TO REMOVE OPTION 2

HL93 LOADING

SHEET 2 OF 3



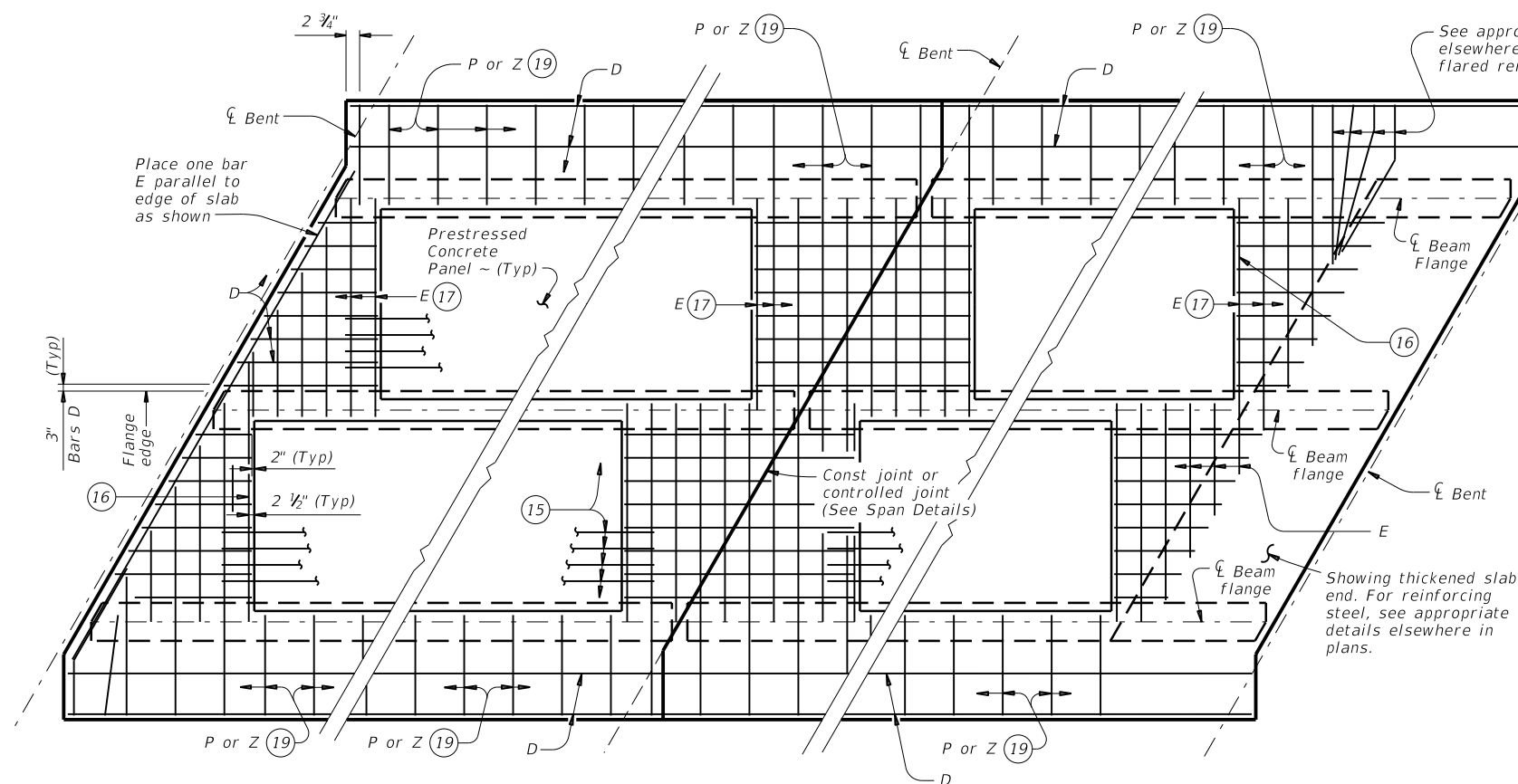
PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP (MOD)

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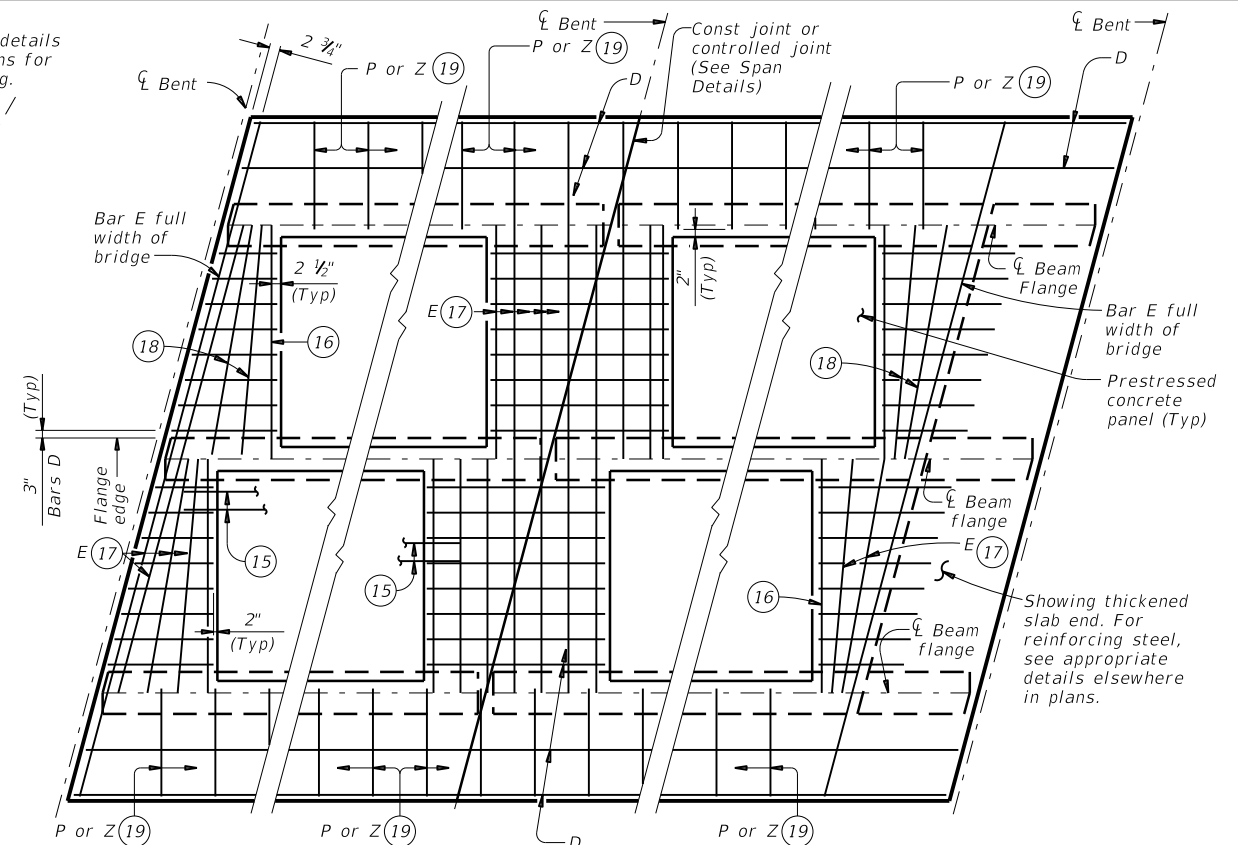


AT ALL SPAN
ENDS UNLESS
NOTED OTHERWISE

AT
INTERIOR
BENTS

AT
THICKENED
END SLABS

PLAN OF SLABS WITH NORMAL REINFORCEMENT

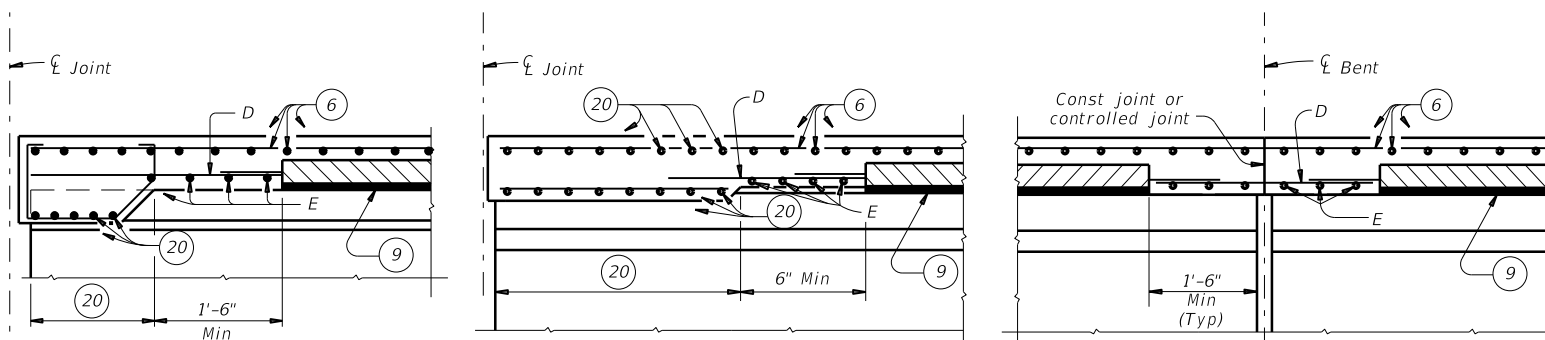


AT ALL SPAN
ENDS UNLESS
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AT
INTERIOR
BENTS

AT
THICKENED
END SLABS

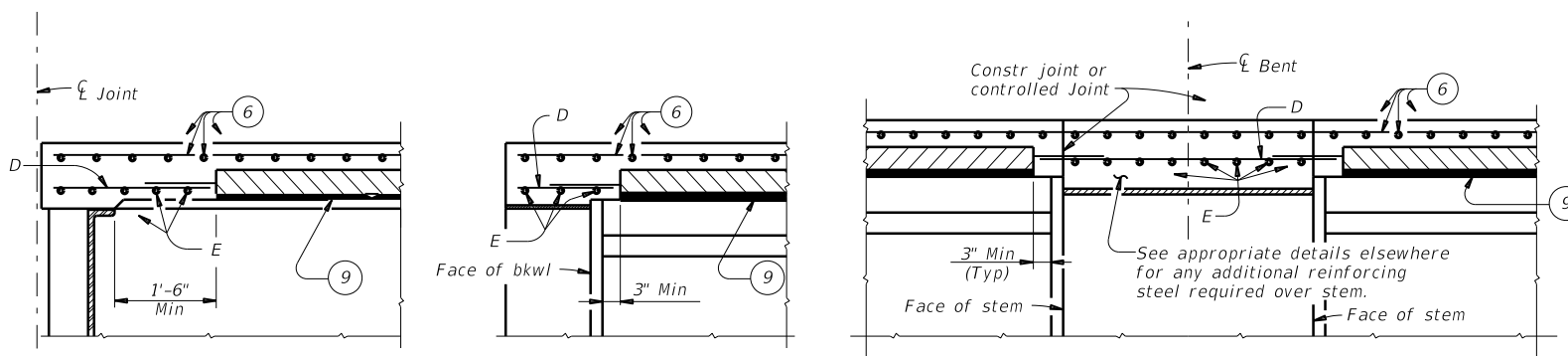
PLAN OF SLABS WITH SKEWED REINFORCEMENT



AT THICKENED SLAB ENDS
FOR PRESTR CONC U-BMS

AT THICKENED SLAB ENDS FOR
PRESTR CONC I-BMS AND STEEL BMS

AT SLAB CONTINUOUS OVER CONVENTIONAL
INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END
DIAPHRAGMS FOR STEEL BMS

AT SLAB OVER ABUTMENT
BACKWALL FOR ALL BMS

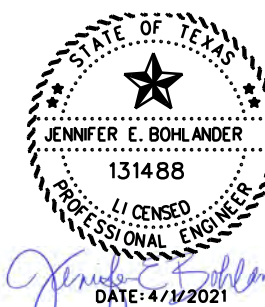
AT SLAB CONTINUOUS OVER
INVERTED-T BENTS FOR ALL BMS

ELEVATIONS AT BEAM ENDS

- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c.
- 14 Max Spacing as listed unless otherwise shown.
- 15 At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
- 16 Maintain one Bar E(#4) parallel to panel ends (Typ).
- 17 Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
- 18 Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
- 19 Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
- 20 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

**TABLE OF
REINFORCING
STEEL 14**

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



MODIFIED TO REMOVE OPTION 2

HL93 LOADING

SHEET 3 OF 3



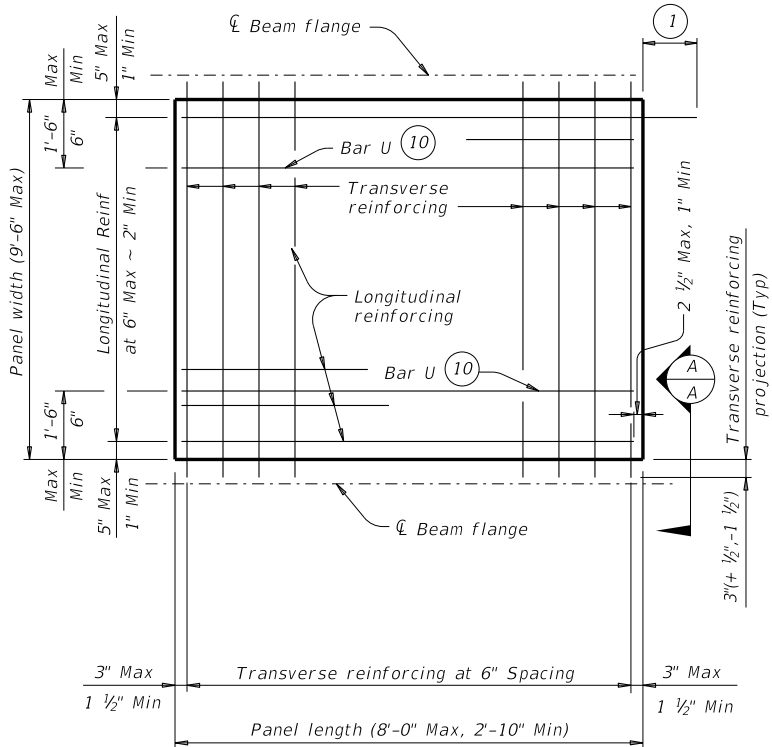
**PRESTRESSED
CONCRETE PANELS
DECK DETAILS**

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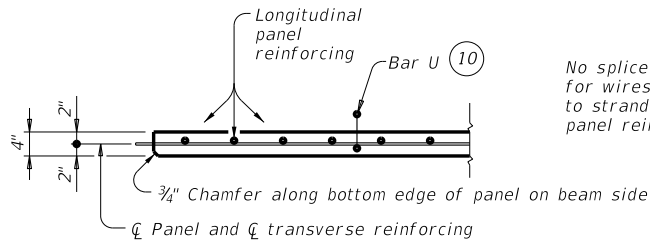
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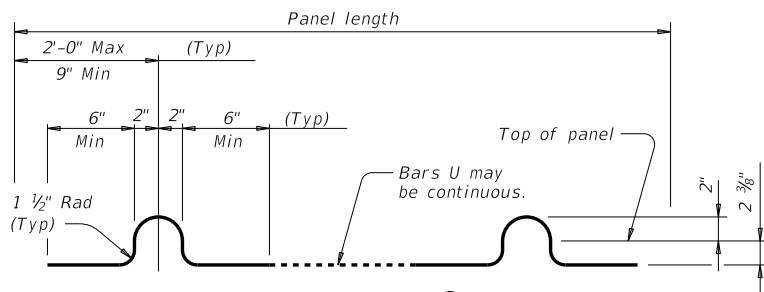


TYPICAL NON-SKEWED PANEL PLAN

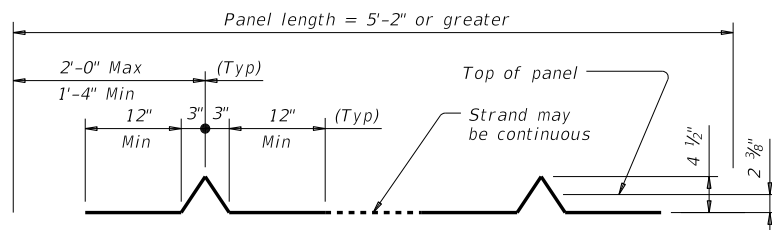


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)



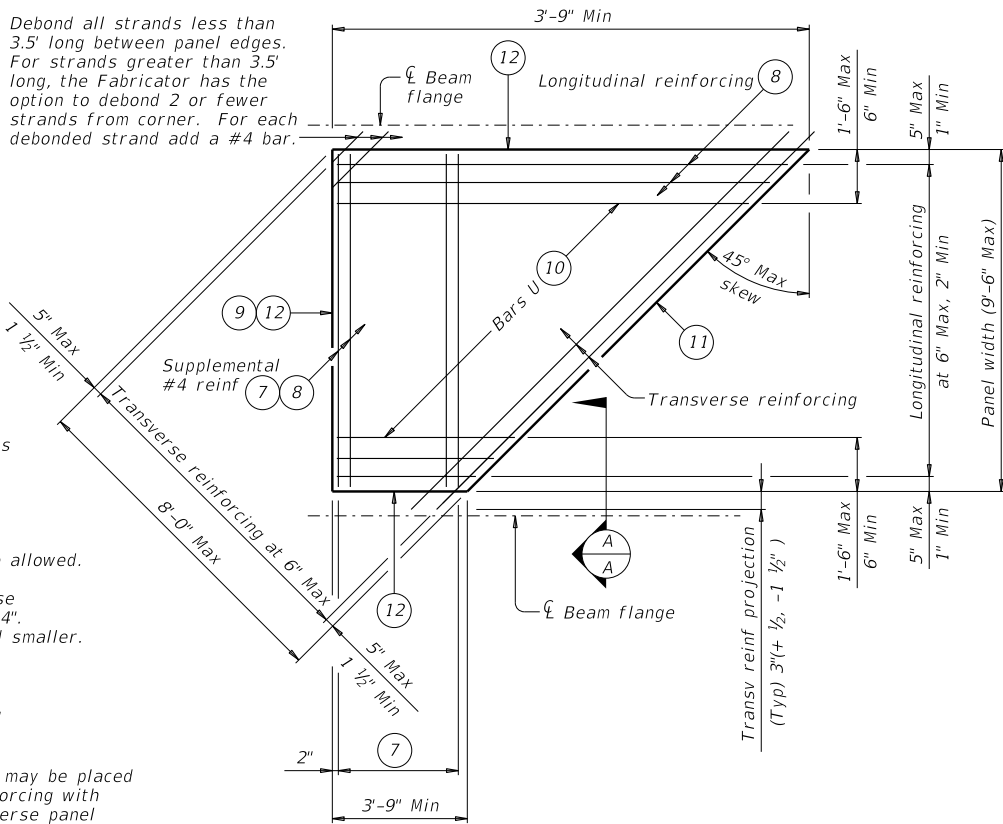
BARS U (#3)



OPTIONAL STRAND FOR BARS U

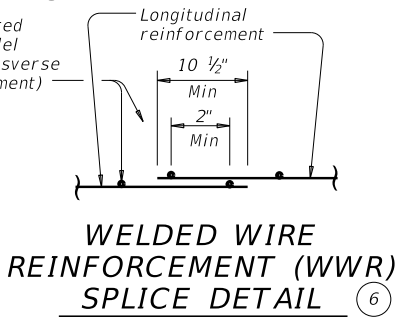
- At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2", -0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
- Four loops required per panel.
- Four loops required per panel. 3/8" or 1/2" strands may be used.
- Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
- See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
- One Splice allowed per panel. No more than two sheets of WWR are allowed.
- Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
- End Cover 2 1/2" Max, 1" Min.
- Recess strands on indicated panel edge in accordance with Item 424.
- At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
- Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
- Timber form work permissible this edge.

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.

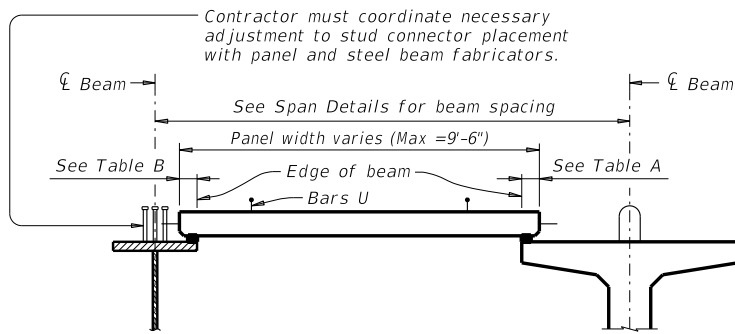


TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

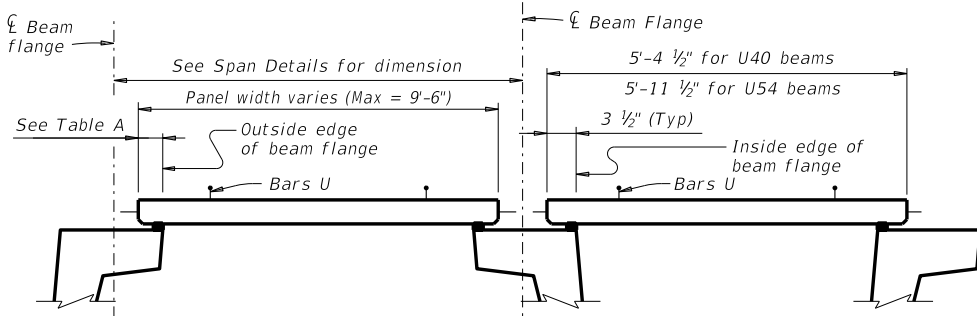


WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL



STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS
Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

TABLE A			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 1/2	3 1/2
B	3	2 1/2	3 1/2
C	4	3	4 1/2
IV	6	4	7 1/2
VI	6 1/2	4 1/2	8 1/2
U40 - 54	5 1/2	5 1/2	7
Tx28-70	6	5	7 1/2
XB20 - 40	4	3	4 1/2
XSB12 - 15	4	3	4 1/2

TABLE B			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 3/4	2 1/2	2 3/4
Over 12" to 15"	3 1/4	3	3 1/4
Over 15" to 18"	4	3	4 3/4
Over 18"	5	3 1/2	6 1/4

GENERAL NOTES:

Provide Class H concrete for panels. Release strength $f'ci=3,500$ psi. Minimum 28 day strength $f'c=5,000$ psi.
Provide 3/4" chamfer along bottom edge of panel on beam side.
Do not use epoxy-coated reinforcing steel bar or strand in panels. Remove laitance from top panel surface.
Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.
A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.


TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.
For panel widths over 3'-6" up to and including 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.
For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).
Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

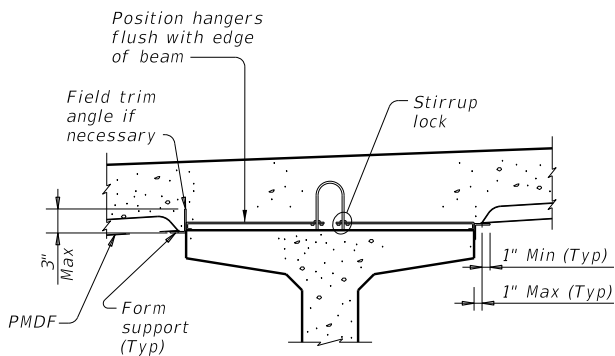
Any of the following options may be used for longitudinal panel reinforcement:
1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. 3/8" Dia prestressing strands at 4 1/2" Max Spacing (unstressed). No splices allowed.
3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.
No combination of longitudinal reinforcement options in a panel is allowed.
Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

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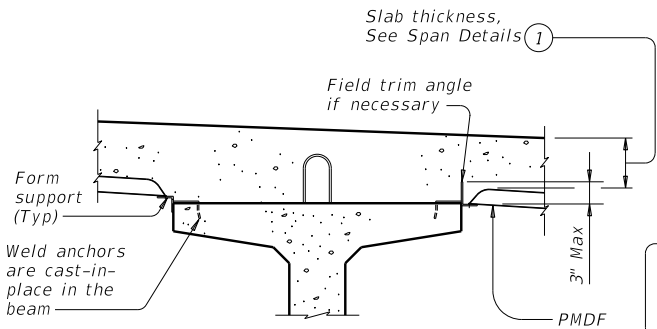
 Texas Department of Transportation		Bridge Division Standard	
PRESTRESSED CONCRETE PANEL FABRICATION DETAILS			
PCP-FAB			
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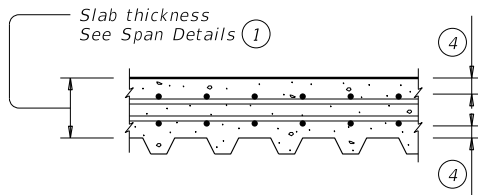
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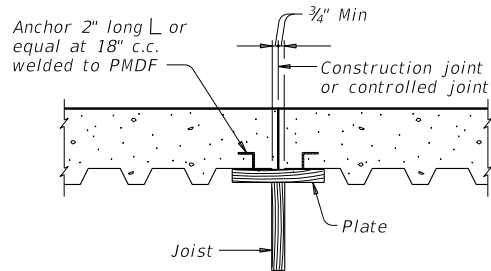
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS



TYP LONGITUDINAL SLAB SECTION



Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

DESIGN NOTES:
As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi. Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:
Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

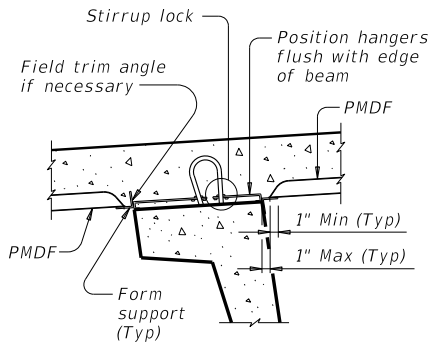
Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

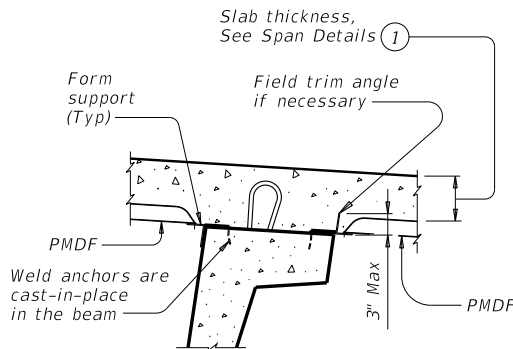
Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

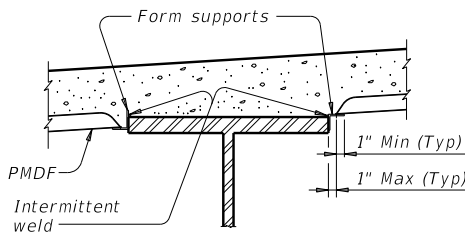
A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.



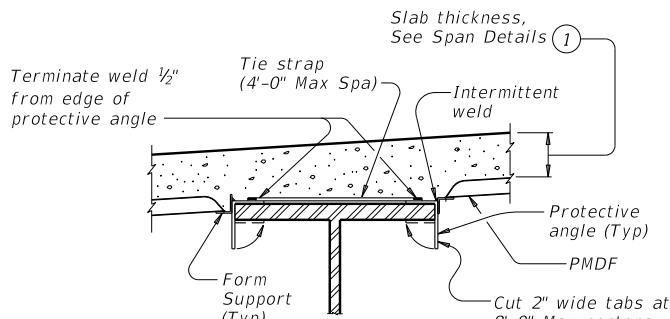
U-BEAMS WITH STIRRUP LOCKS



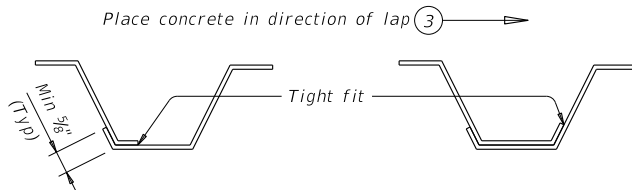
U-BEAMS WITH WELD ANCHORS



STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES 2



SIDE LAP DETAILS

- 1 Slab thickness minus $\frac{5}{8}$ " if corrugations match reinforcing bars.
- 2 Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.
- 3 The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.
- 4 See Span details for cover requirements.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

SHEET 1 OF 2



Texas Department of Transportation

Bridge
Division
Standard

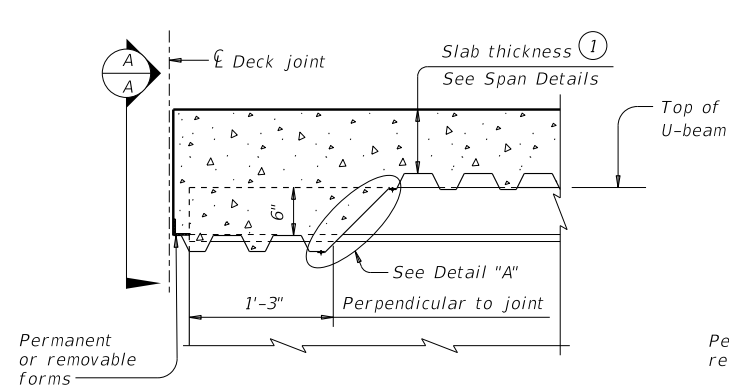
PERMANENT METAL DECK FORMS

PMDF

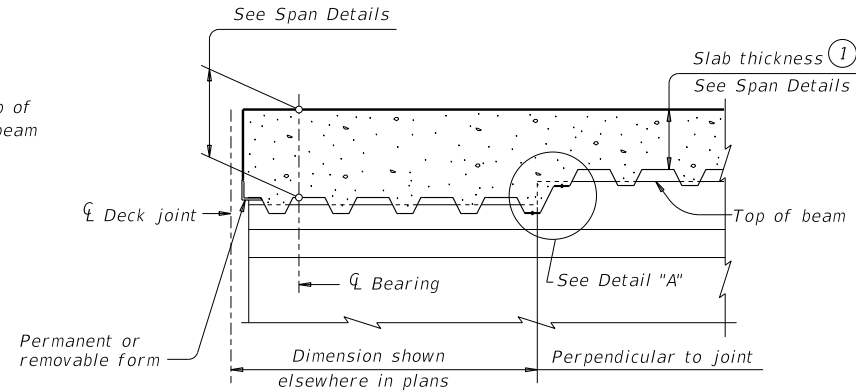
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02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY		SHEET NO.
				466

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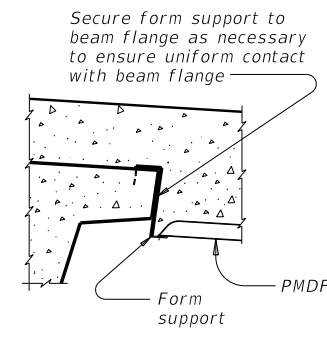
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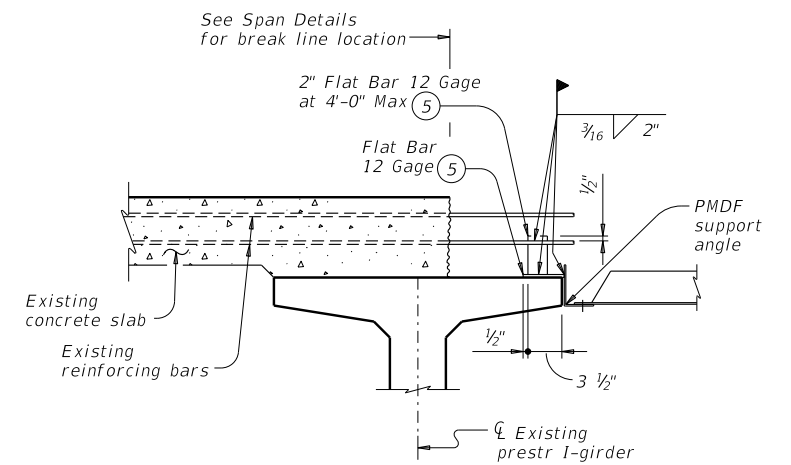
**AT THICKENED SLAB END
FOR U-BEAMS**



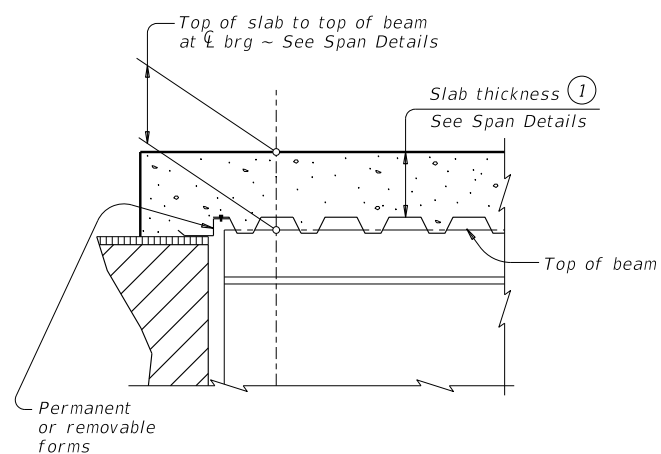
**AT THICKENED SLAB END
FOR PRESTRESSED I-BEAMS,
I-GIRDERS AND STEEL BEAMS**
Showing I-beam block-out. No block-out
for I-girders or steel beams.



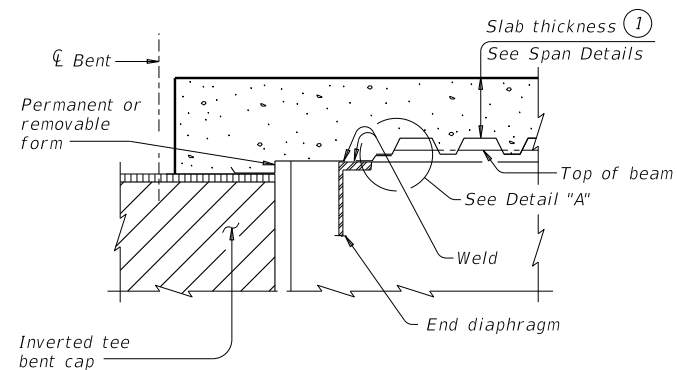
SECTION A-A



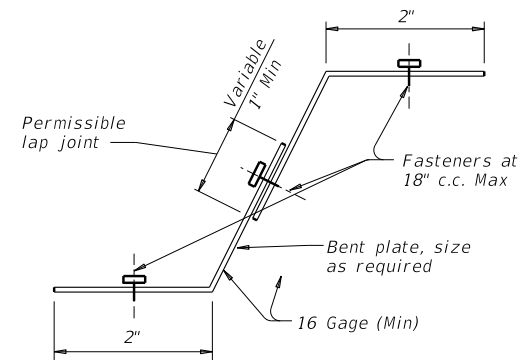
**SHOWING PRESTRESSED CONCRETE
I-BEAMS, I-GIRDERS AND U-BEAMS**



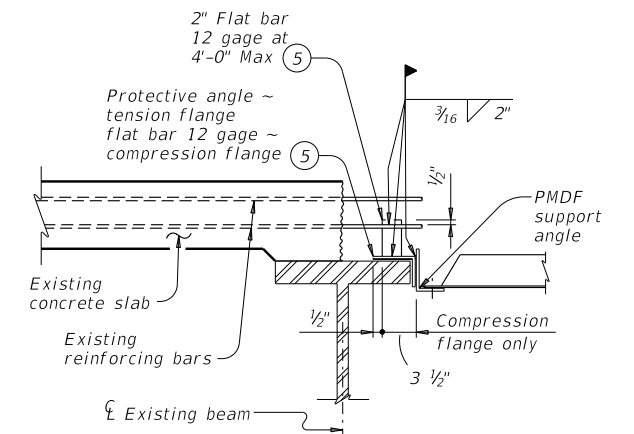
**AT SLAB OVER ABUT BKWL OR
INV TEE STEM FOR CONC BEAMS
WITHOUT THICKENED SLAB END**



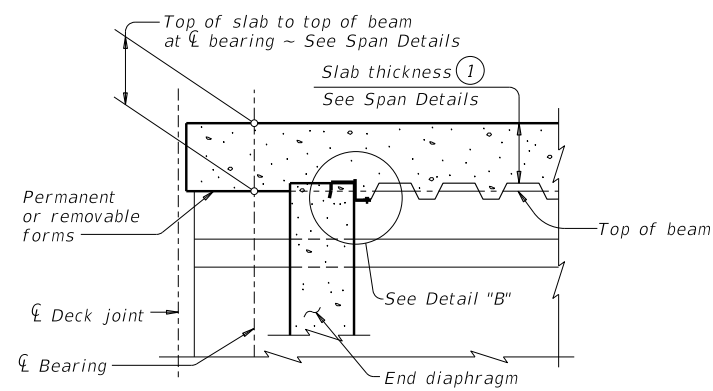
**AT SLAB OVER INV TEE STEM
FOR STEEL BEAMS
WITHOUT THICKENED SLAB END**



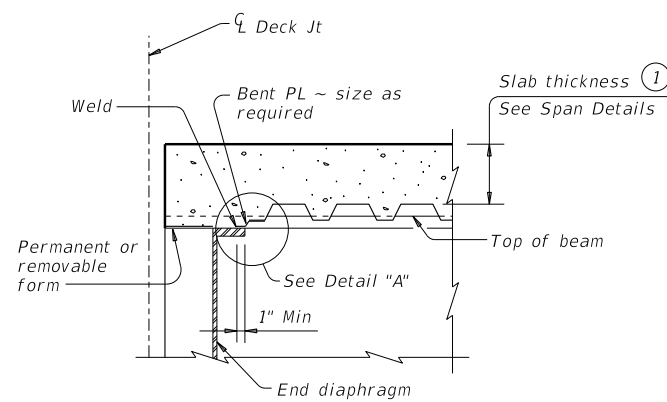
DETAIL "A"



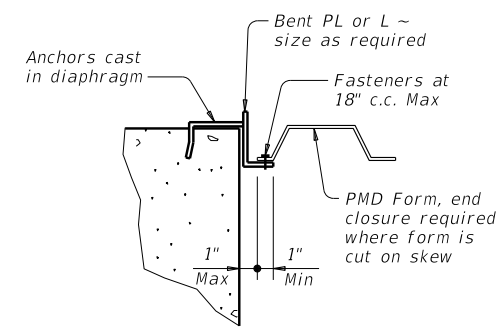
SHOWING STEEL BEAMS



**AT CONC END DIAPHRAGM
FOR PRESTRESSED I-BEAMS
AND STEEL BEAMS**




**AT END DIAPHRAGM
FOR STEEL BEAMS
WITHOUT THICKENED SLAB END**



DETAIL "B"

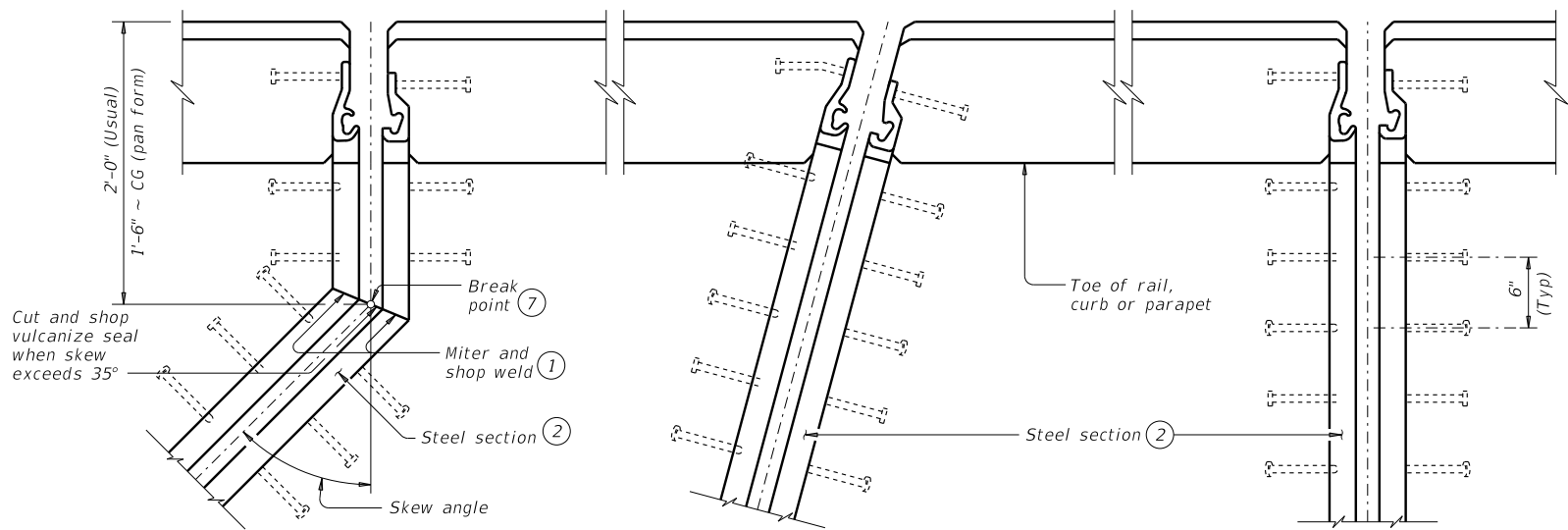
- ① Slab thickness minus $\frac{5}{8}$ " if corrugations match reinforcing bars
⑤ Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2				
 Texas Department of Transportation			Bridge Division Standard	
PERMANENT METAL DECK FORMS				
PMDF				
FILE: pmdfstel-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
02-20: Modified box note by adding steel beams/girders and subsidiary.				
DIST		COUNTY		SHEET NO.
				467

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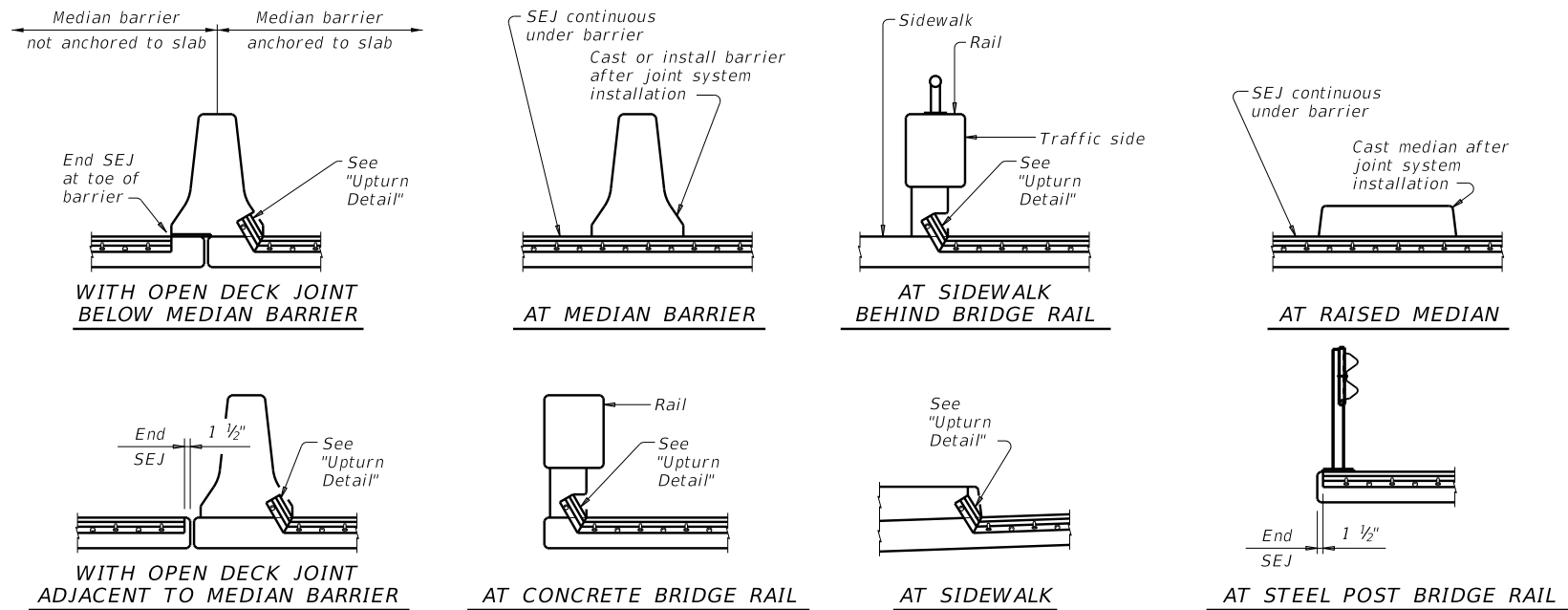


SHOWING SKEWS WITH
SLAB BREAKBACKS

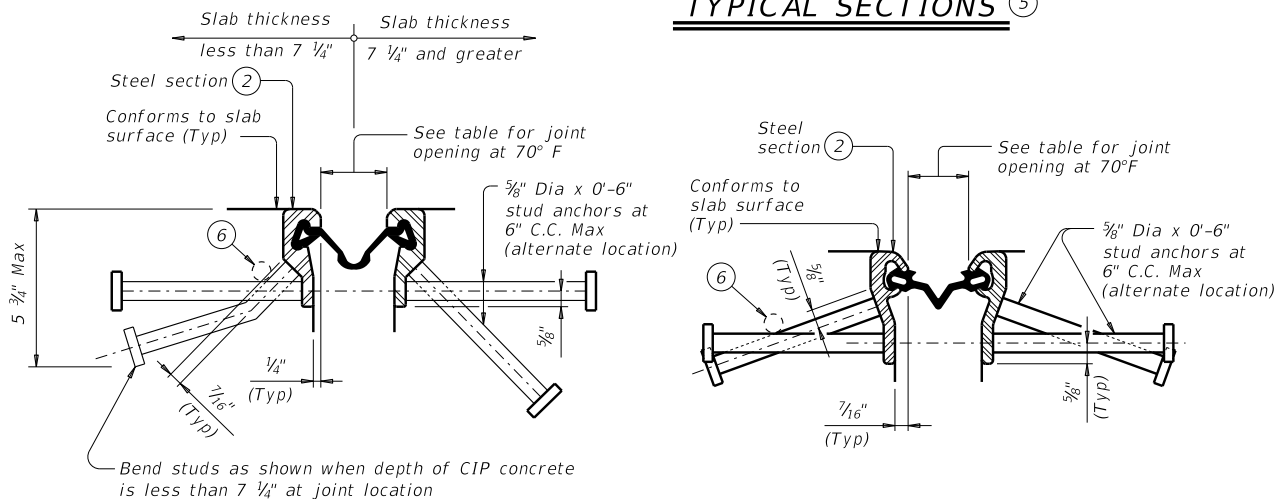
SHOWING SKEWS WITHOUT
SLAB BREAKBACKS

SHOWING WITHOUT SKEWS
AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

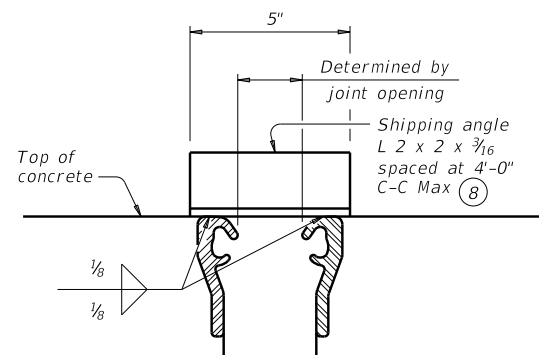


TYPICAL SECTIONS ⑤



SECTION THRU WATSON BOWMAN
ACME (SE-400 OR SE-500) JOINTS

SECTION THRU D.S. BROWN
(A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening ③	Seal Type	Joint Opening ③
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations. For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

- ① Remove all burrs which will be in contact with seal prior to making splice.
- ② Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- ③ These openings are also the recommended minimum installation openings.
- ④ Reduce for sidewalk or parapet heights less than 6".
- ⑤ Other conditions affecting the joint profile should be noted elsewhere.
- ⑥ Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- ⑦ See Span details for location of break point.
- ⑧ Align shipping angle perpendicular to joint.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Feild Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 1/2".

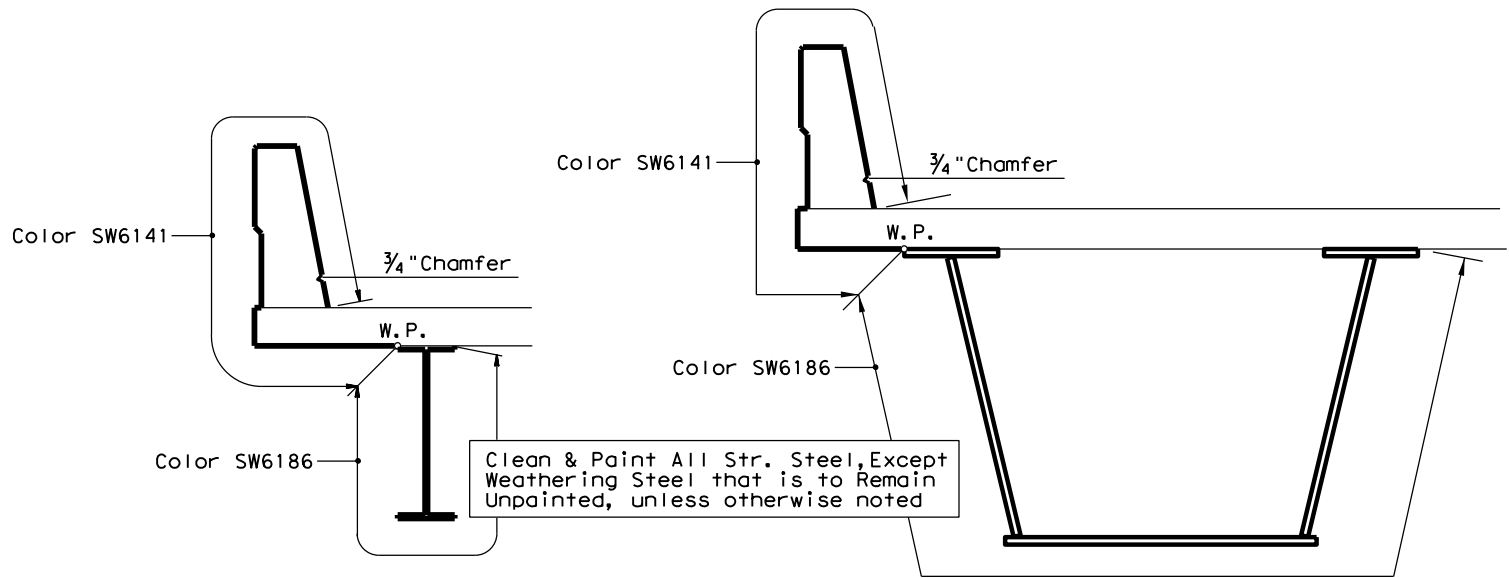


**SEALED EXPANSION JOINT
TYPE M
WITHOUT OVERLAY**

SEJ-M

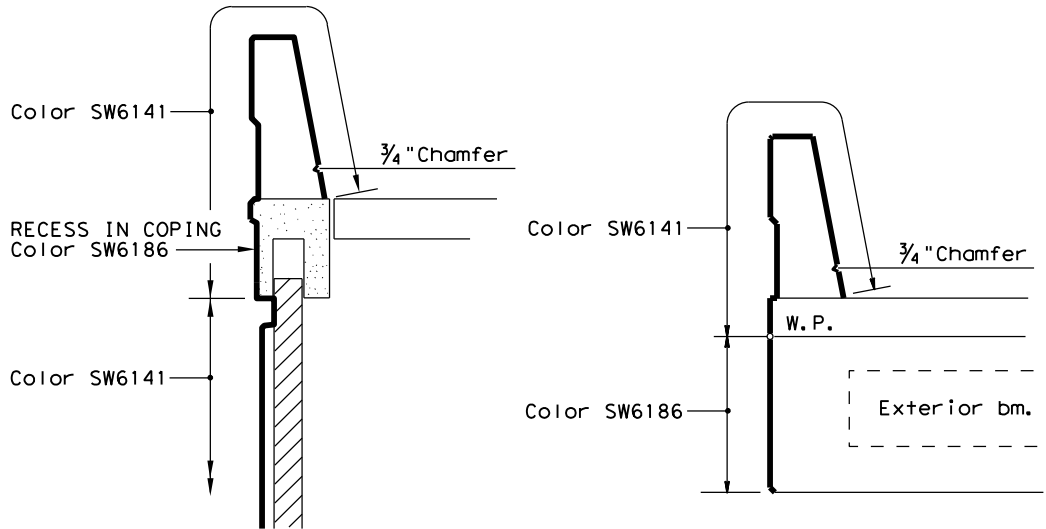
FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST		COUNTY	SHEET NO.
				468

VERTICAL SCHEME		SHERWIN WILLIAMS (SW) COLOR # 6141 OR EQUAL	SHERWIN WILLIAMS (SW) COLOR # 6186 OR EQUAL
MSE WALL	PANEL / COPING	X	
	COPING ACCENT		X
STRUCTURES	COLUMN	X	
	BENT CAP	X	
	BEAM		X
RAIL	MEDIAN LOCATION	X	
	EDGE LOCATION	X	
SOUND WALL	PANEL / COLUMN	X	
	COPING / COLUMN CAP / RECESSED CIRCLE OF END COLUMN		X
OTHER STRUCTURES	SIGN COLUMNS	X	
	NEW RIP RAP	X	



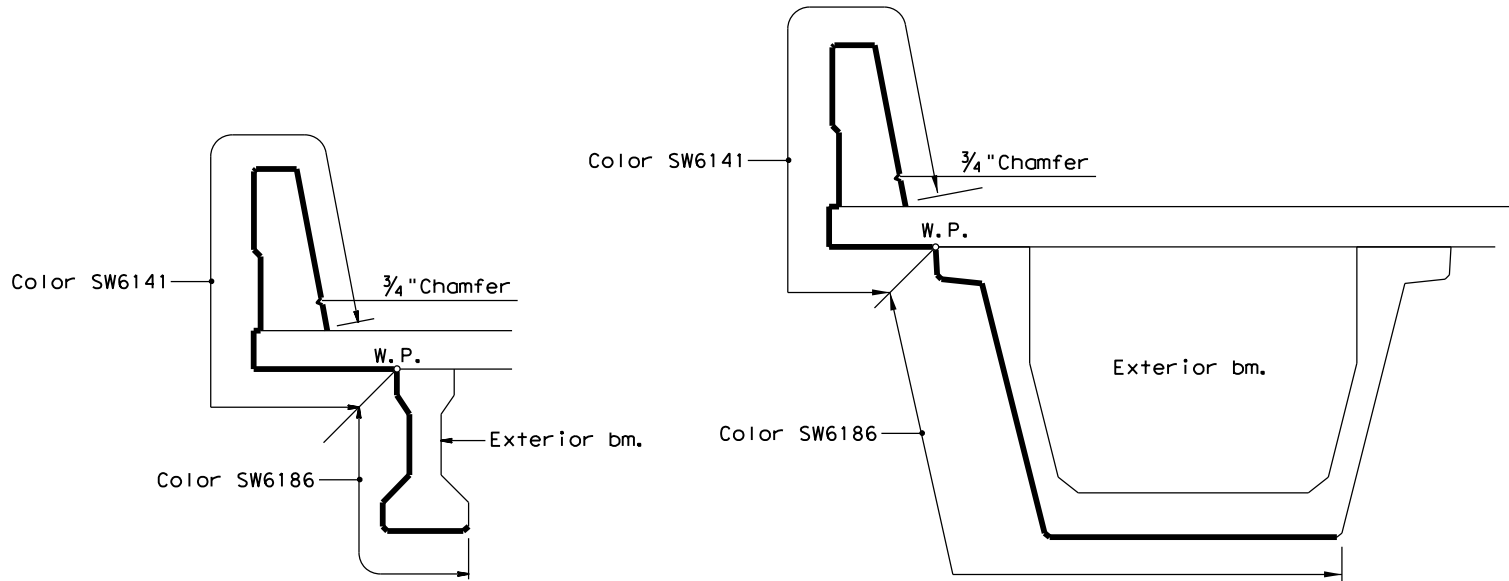
SECTION THRU BRIDGE STEEL I-BEAM
TYPICAL ALL GIRDERS, U.N.O.

SECTION THRU BRIDGE STEEL TUB-GIRDER
TYPICAL ALL GIRDERS, U.N.O.



SECTION THRU RETAINING WALL

SECTION THRU BRIDGE CONC BOX BEAM



SECTION THRU BRIDGE CONC I-BEAM

SECTION THRU BRIDGE CONC U-BEAM

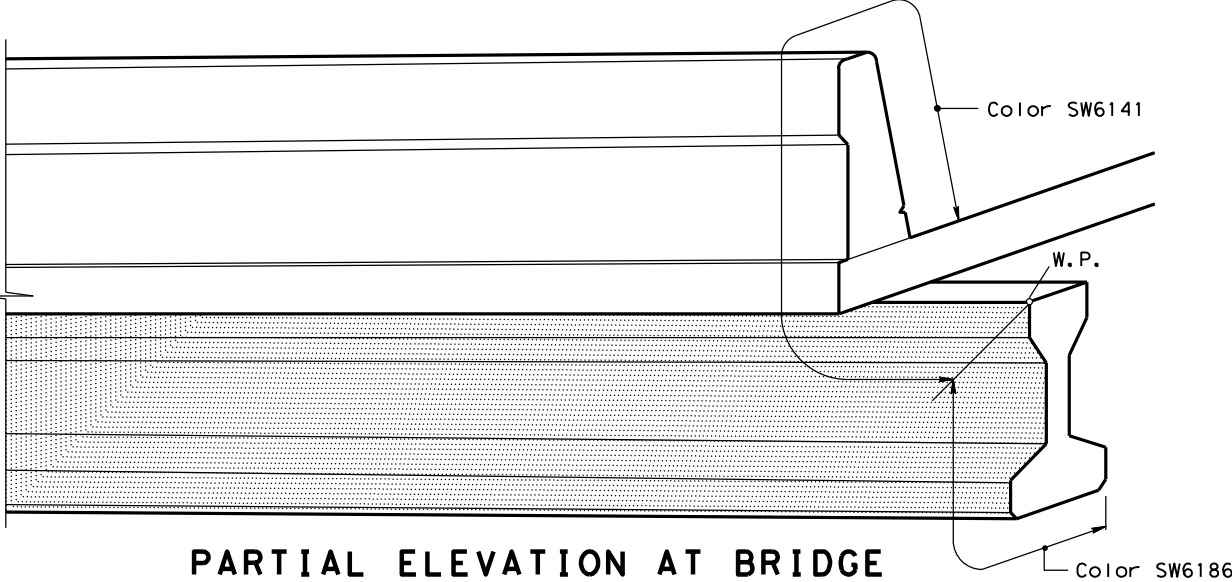
TYPICAL SECTIONS

Showing dual color. All other bridge components are color SW6141 Or equal.

NOTES: Provide a Surface Area I, Concrete Paint Finish, as per the Standard Specifications and these Details

NEW CONCRETE SURFACES
Item 427 "Surface Finishes For Concrete" will NOT be Measured or Paid for on New Concrete Surfaces: Item 427 will be incidental to various bid items on New Concrete Surfaces.

EXISTING CONCRETE SURFACES
Item 427 "Surface Finishes For Concrete" will be Measured and Paid for on Existing Concrete Surfaces.



PARTIAL ELEVATION AT BRIDGE

Texas Department of Transportation
Houston District Bridge
Green Ribbon Project

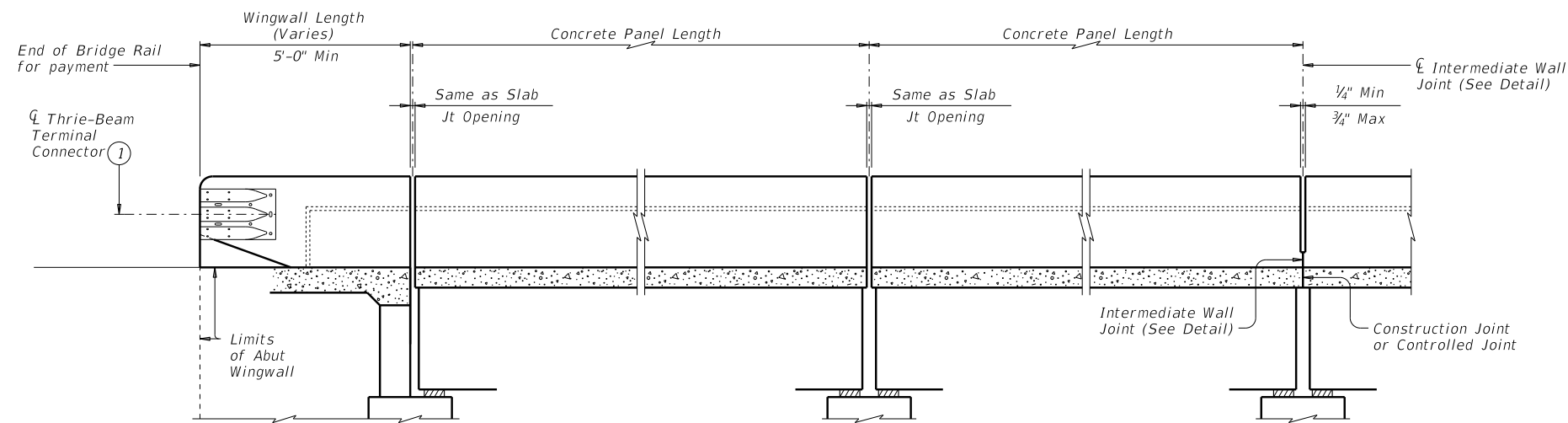
**SURFACE FINISHES
FOR CONCRETE
VERTICAL SCHEME**

SFC-VS

FILE: STDJ9.DGN	DN:	CK:	DW:	CK:
©TXDOT APRIL 2010	DISTRICT	FED REG	PROJECT NO.	SHEET
REVISIONS	HOUSTON	6		
Color revision: #6186 replaces #2243 - 12/5/2016 6/2017 Removed rail patterns.	COUNTY	CONTROL	SECT	JOB
				HIGHWAY
				469

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DATE: FILE:

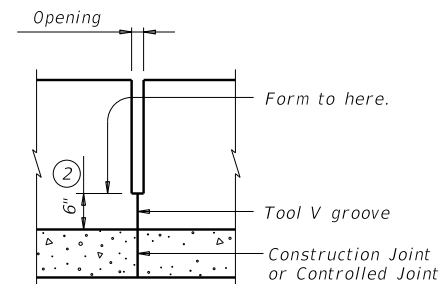


AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

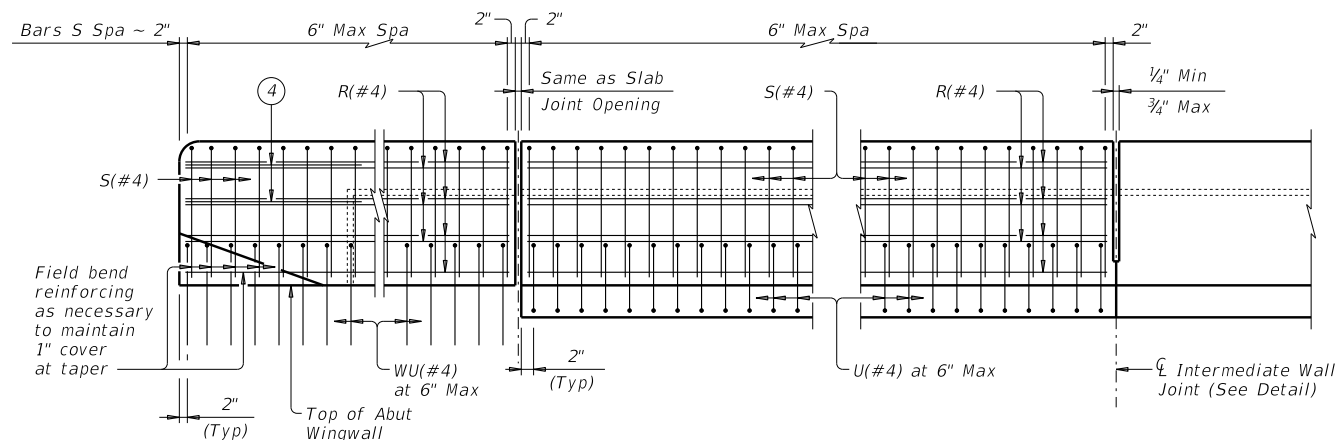
AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

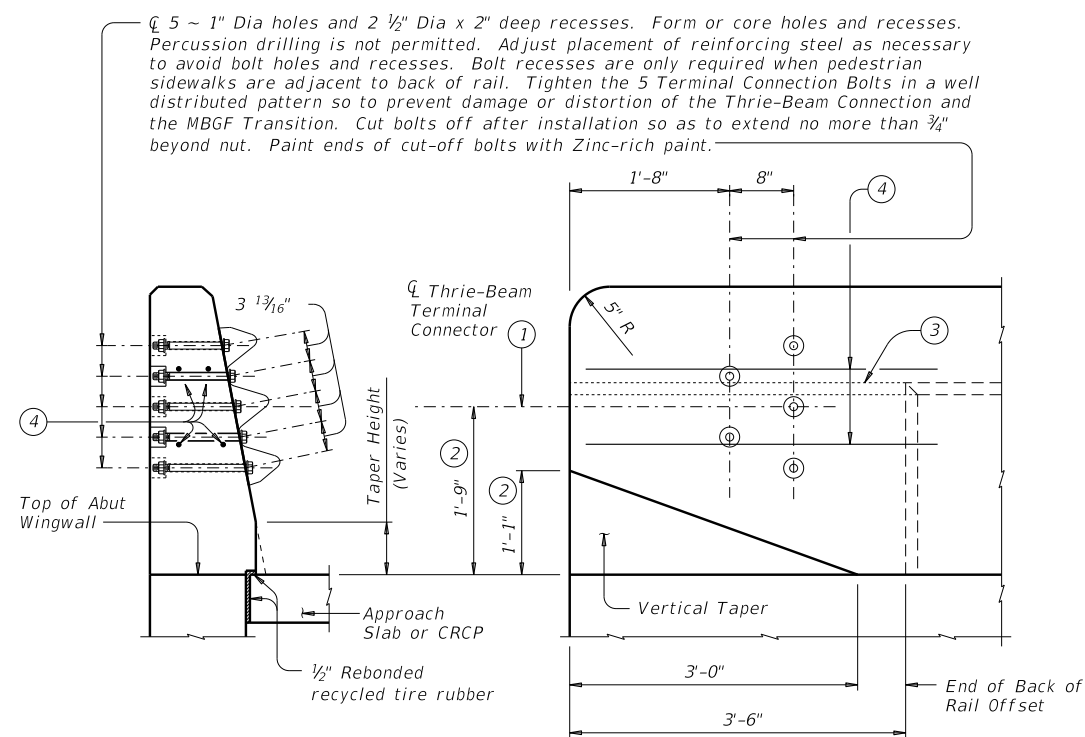


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



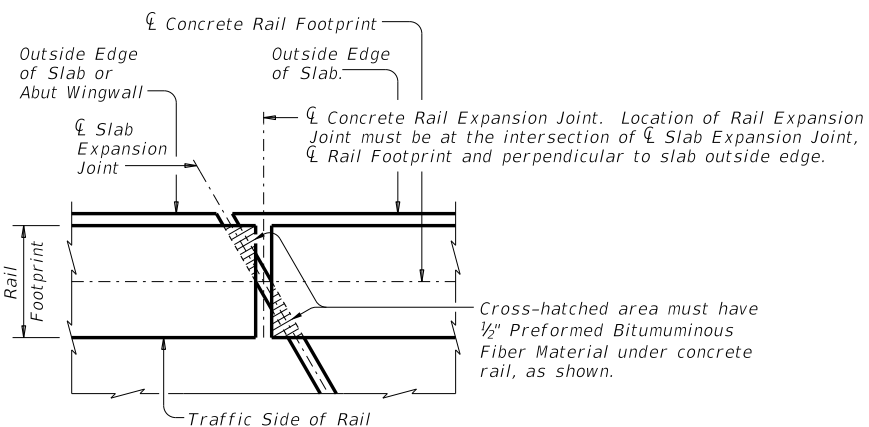
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION

ELEVATION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

- 1 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- 2 Increase 2" for structures with Overlay.
- 3 Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
- 4 Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

SHEET 1 OF 2

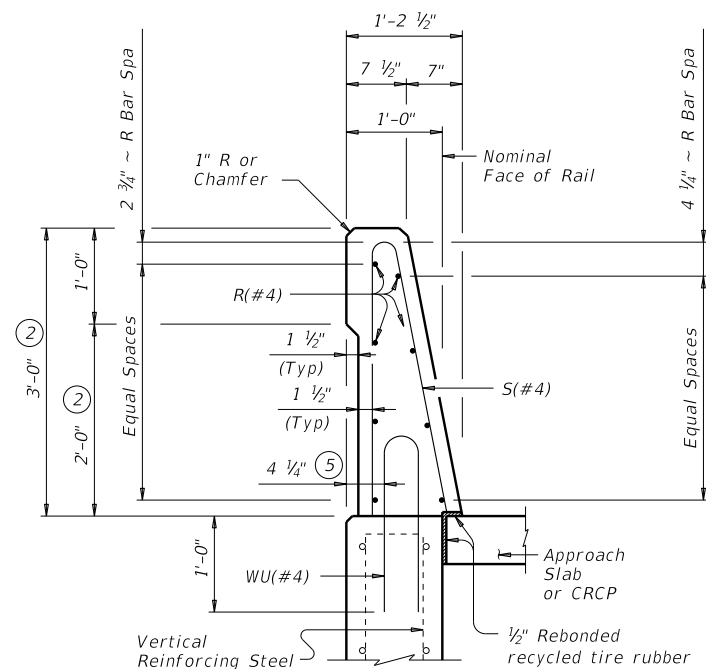


TRAFFIC RAIL SINGLE SLOPE

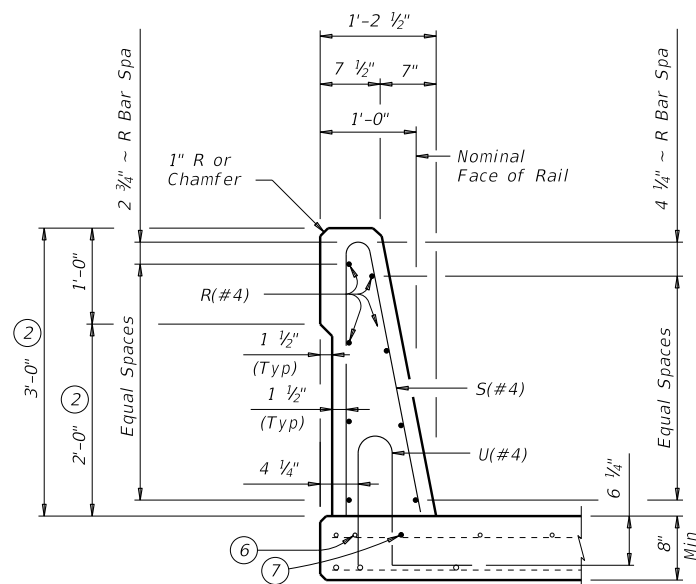
TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	470

DATE: _____
FILE: _____

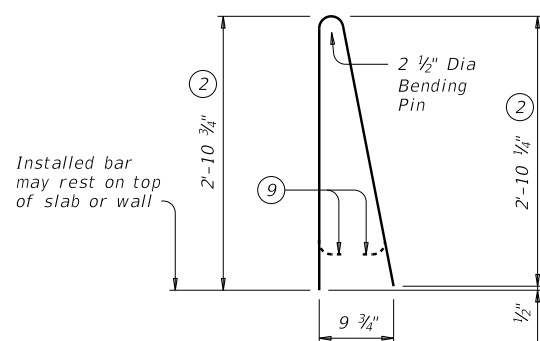


ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

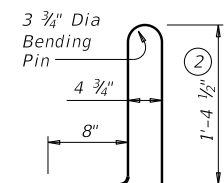


ON BRIDGE SLAB

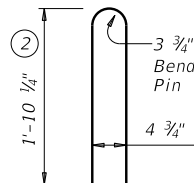
SECTIONS THRU RAIL



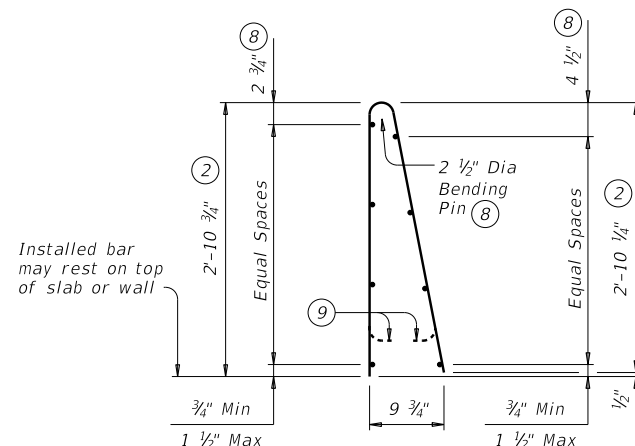
BARS S (#4)



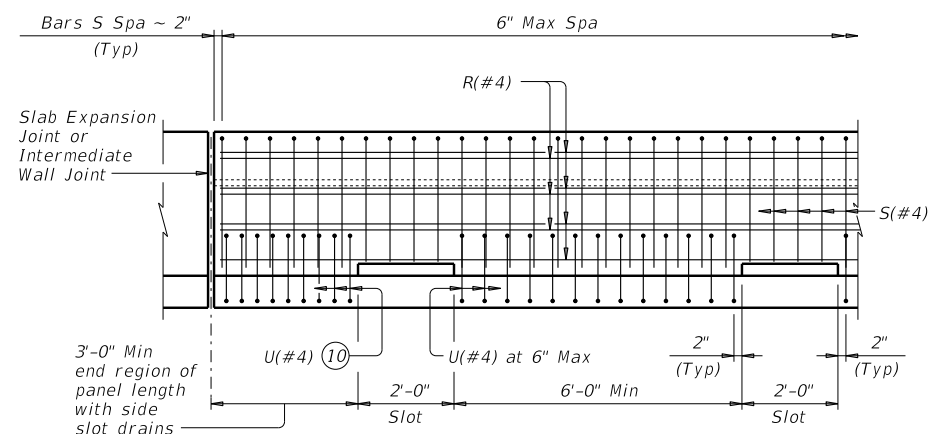
BARS U (#4)



BARS WU (#4)

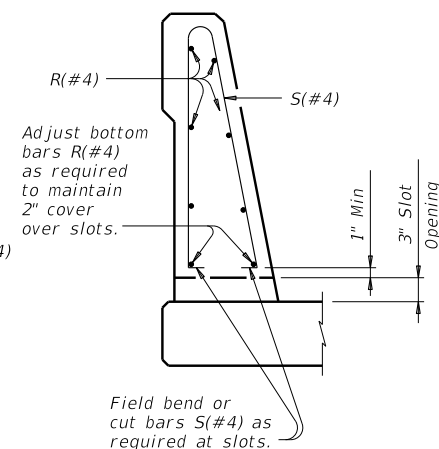


OPTIONAL WELDED WIRE
REINFORCEMENT (WWR)



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU
OPTIONAL SIDE SLOT DRAIN

- (2) Increase 2" for structures with Overlay.
- (5) 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- (6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- (7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- (8) No longitudinal wires may be within upper bend.
- (9) Bend or cut as required to clear drain slots.
- (10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a $\frac{3}{8}$ " width x $\frac{1}{4}$ " tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Wided Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized	~ #4 = 1'-7"
Epoxy coated	~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

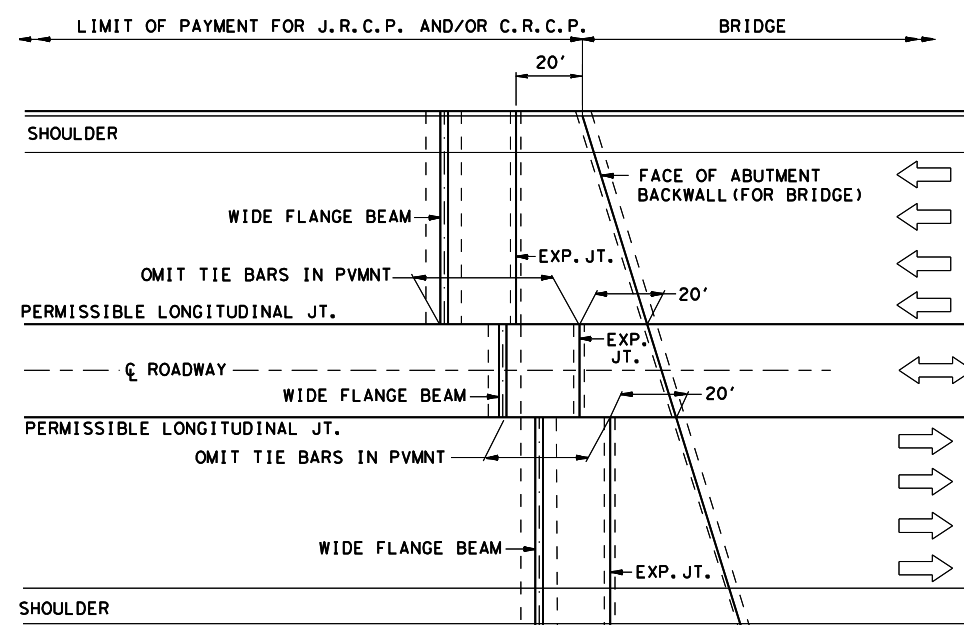
SHEET 2 OF 2



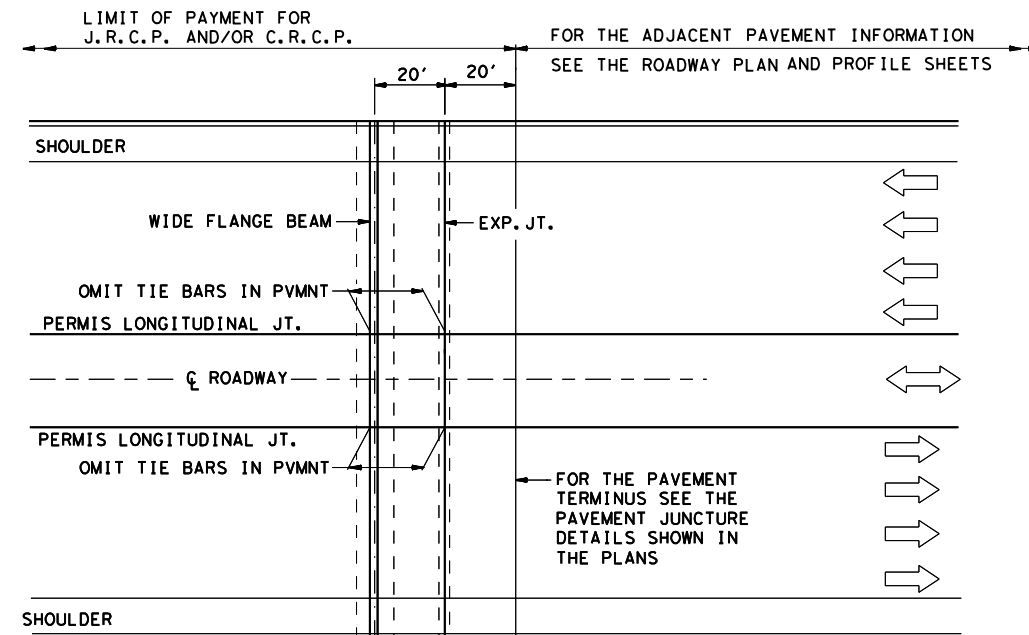
TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE: rlst014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TX
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET
				471

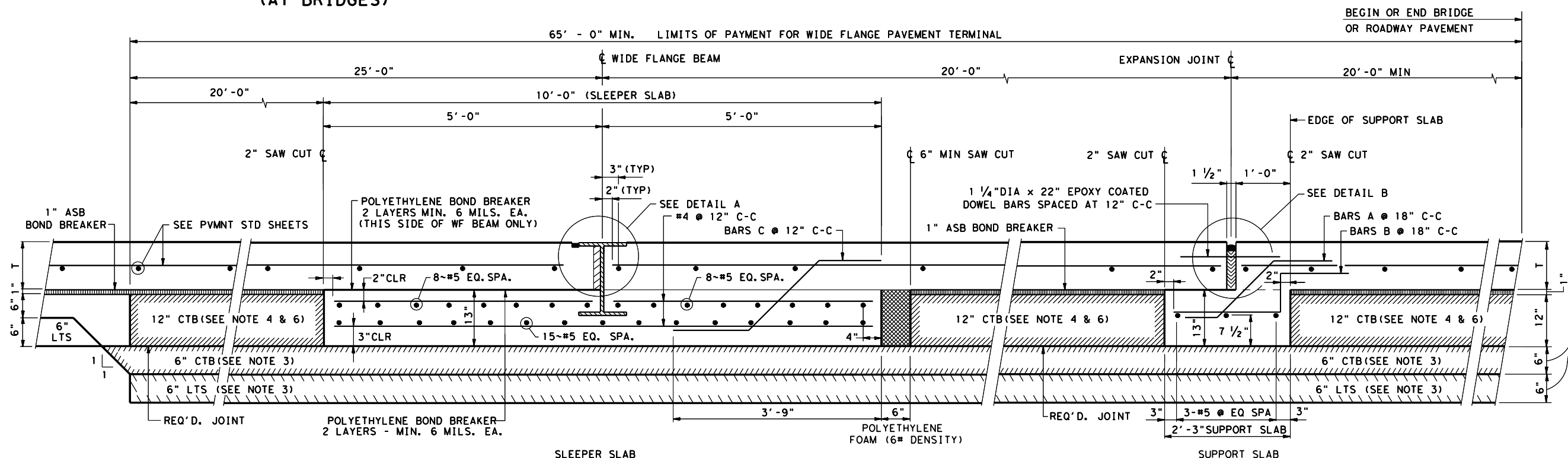


**TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS
(AT BRIDGES)**

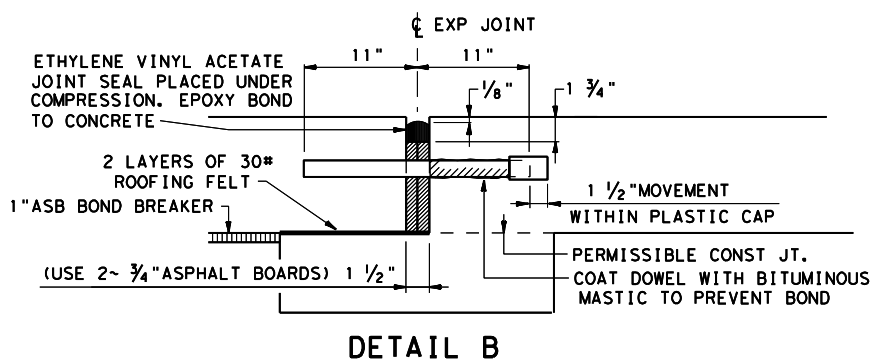
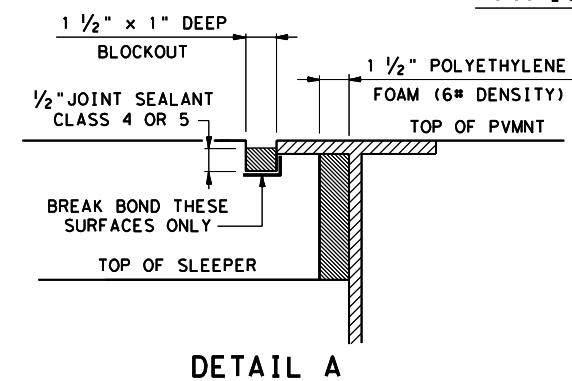


**TYPICAL ROADWAY LAYOUT
CONCRETE MEDIAN AND SHOULDERS**

- NOTES**
1. BLOCK-OUT REQUIRED AT EACH END OF WIDE FLANGE BEAM ADJACENT TO 3/8" END PLATE WHERE BLOCK-OUT IS PLACED ABUTTING CONCRETE PAVEMENT, RIPRAP OR STABILIZED BASE. THE BLOCKED OUT AREA WILL BE FILLED WITH POLYETHYLENE FOAM (6 POUND DENSITY). SEE SHEET 3 OF 3 FOR BLOCK-OUT DETAIL.
 2. FOR ADDITIONAL DETAILS ON REINFORCEMENT MEMBER QUANTITIES AND THE WIDE FLANGE BEAM SEE SHEET 2 OF 3.
 3. REPLACE 6 INCH LIME TREATMENT AND 6 INCH CEMENT TREATMENT WITH CEMENT STABILIZED BACKFILL AT STRUCTURES WITH CEMENT STABILIZED BACKFILL EMBANKMENT. SEE "CEMENT STABILIZED BACKFILL EMBANKMENT" STANDARD SHEET FOR DETAILS.
 4. 12 INCH CEMENT STABILIZED BACKFILL MAY BE SUBSTITUTED FOR 12 INCH CTB, AT CONTRACTOR'S OPTION, ON APPLICABLE STRUCTURES WITH CEMENT STABILIZED BACKFILL EMBANKMENT.
- CTB - CEMENT TREATED BASE
LTS - LIME TREATED SUBGRADE
CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
ASB - ASPHALT STABILIZED BASE
T - PAVEMENT THICKNESS



TYPICAL SECTION THRU TERMINAL ANCHORAGE @ SLEEPER SLAB & SUPPORT SLAB



FOR MORE DETAILS
AND LIMITS OF PAY
FOR CTB & LTS SEE
ABUTMENT BACKFILL
DIAGRAM DETAIL
ON SHEET 2 OF 3
OR THE PAVEMENT
JUNCTURE DETAILS
AS SHOWN IN PLANS.

SHEET 1 OF 3

Texas Department of Transportation
Houston District

**WIDE FLANGE PAVEMENT
TERMINALS**

FOR CONTINUOUSLY & JOINTED
REINFORCED
CONCRETE PAVEMENT DETAILS
(FOR USE AT BRIDGE END OR PAVEMENT TERMINUS)

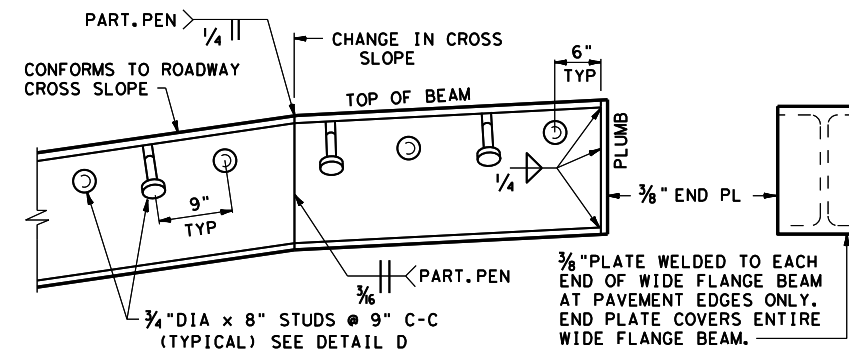
WFPT

FILE#	STDB-3.DGN	DN#	TxDOT	CK#	TxDOT	DW#	TxDOT	CK#	TxDOT
©	TxDOT	2014	DISTRICT	FED REG	PROJECT NO.	SHEET			
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02/15 2014 SPECS		COUNTY	CONTROL	SECT	JOB	HIGHWAY			
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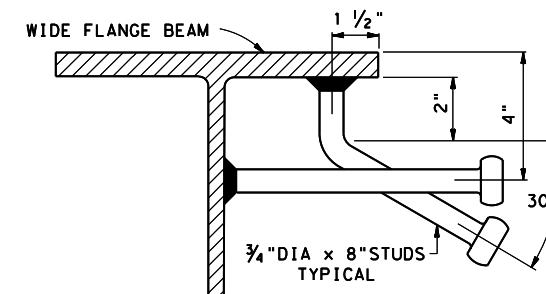
NOTES: (CONT)

- THIS STANDARD WILL BE USED WITH SPECIAL SPECIFICATION "CONCRETE PAVEMENT TERMINALS" THIS ITEM WILL BE MEASURED BY THE LINEAR FOOT OF WIDE FLANGE BEAM COMPLETE IN PLACE.
- WIDE FLANGE BEAM, SUPPORT SLAB, SLEEPER SLAB, 12 INCHES OF CEMENT TREATED BASE, POLYETHYLENE BONDBREAKER AND ANY EXCAVATION NECESSARY WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO SPECIAL SPECIFICATION ITEM, "CONCRETE PAVEMENT WIDE FLANGE TERMINALS".
- POLYETHYLENE FOAM (6 POUND DENSITY), SAW CUTS, EXPANSION JOINTS, EPOXY COATED DOWEL AND EXPANSION JOINT MATERIALS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL TO THE ITEM 360.
- THE CONCRETE PAVEMENT, 1 INCH ASB BONDBREAKER, 6 INCH PORTLAND CEMENT TREATED BASE AND 6 INCH LIME TREATED SUBGRADE WILL BE PAID FOR UNDER THE APPROPRIATE BID ITEMS.
- SHEAR CUTTING OF DOWEL BARS IS PROHIBITED.
- EPOXY COATING OF DOWEL BARS PER SPECIFICATION ITEM 440.
- CEMENT STABILIZED BACKFILL IS REQUIRED AT ALL ABUTMENTS.

CTB - CEMENT TREATED BASE
LTS - LIME TREATED SUBGRADE
CRCP - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
JRCP - JOINTED REINFORCED CONCRETE PAVEMENT
ASB - ASPHALT STABILIZED BASE
T - PAVEMENT THICKNESS

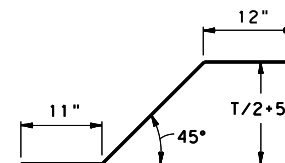


WIDE FLANGE DETAIL

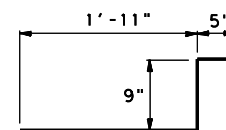


NOTE:
STUDS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION. ANY STUD WHICH IS DISLODGED IN SHIPPING OR CAN BE DISLODGED BY HAMMER SHALL BE REPLACED.

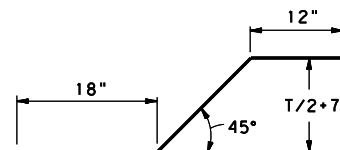
DETAIL D



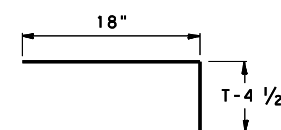
BARS A (#4)



BARS B (#4)

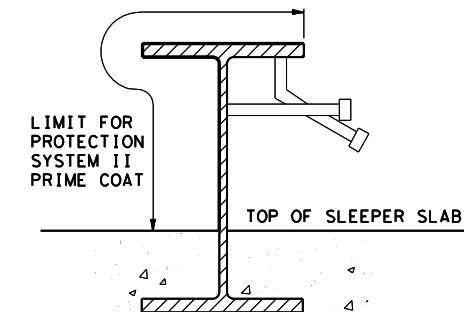


BARS C (#4)



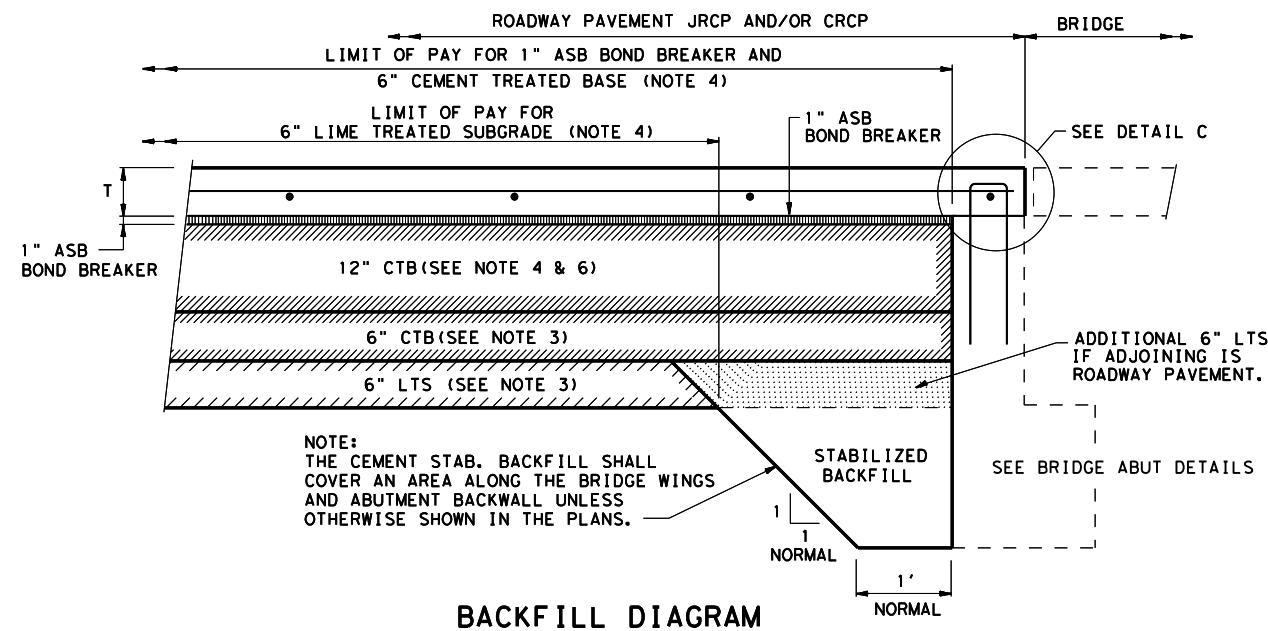
BARS D (#5)

PAVEMENT THICKNESS	WIDE FLANGE BEAM DESIGNATION
8"-9 1/2"	W14 X 68
10"-11 1/2"	W16 X 89
12"-13"	W18 X 97
14" & 15"	W21 X111

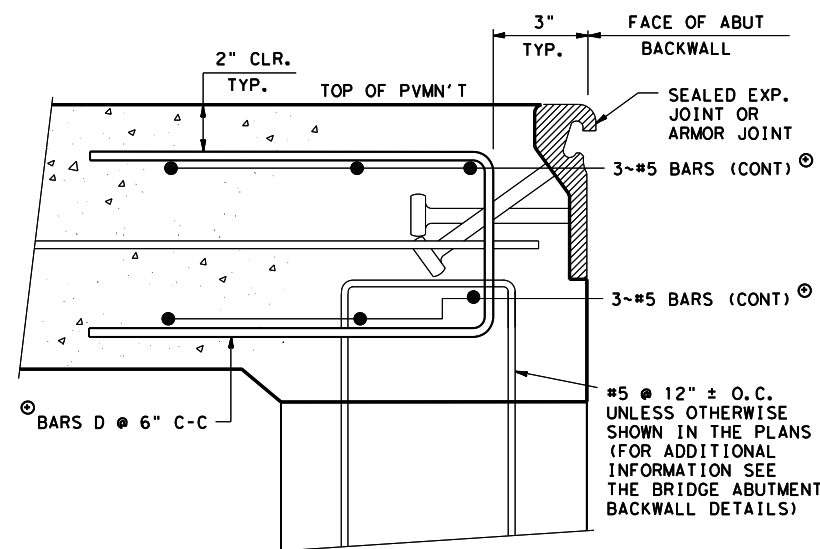


WIDE FLANGE PAINTING DETAIL

SEE "TABLE OF BEAM SIZES"



BACKFILL DIAGRAM



DETAIL C

(SHOWING ADDITIONAL REINFORCEMENT FOR ROADWAY PAVEMENT WITH SEALED EXPANSION JOINTS OR ARMOR JOINTS AT ABUTMENTS.)

⊙ THE ADDITIONAL STEEL REQUIRED BY THE ABOVE DETAIL "C" SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED INCIDENTAL TO THE ITEM, "CONCRETE PAVEMENT".

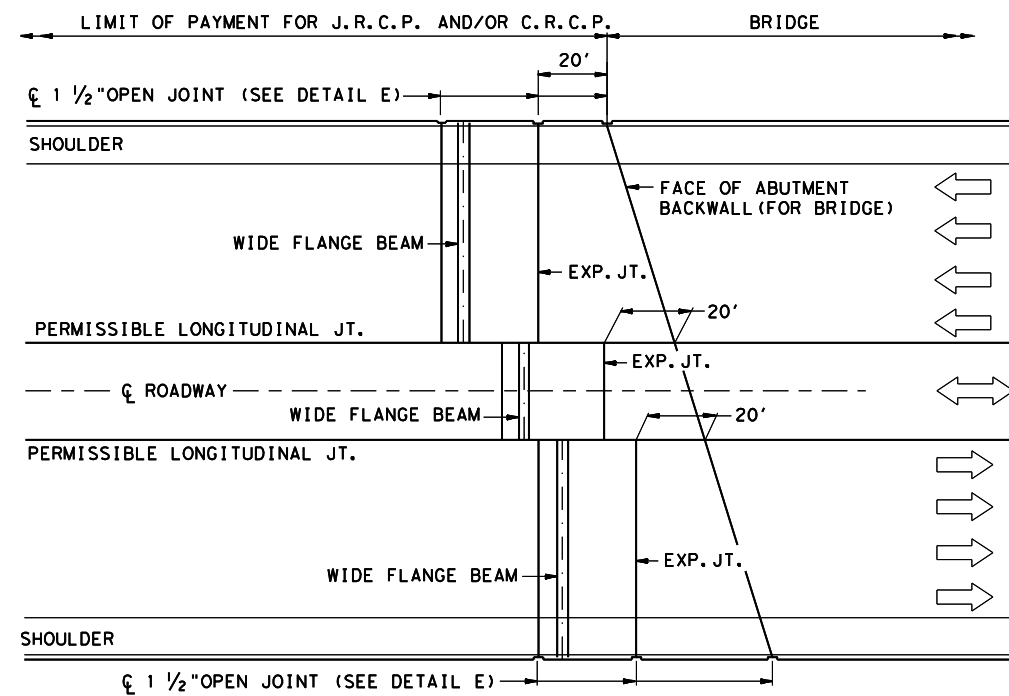
ESTIMATED QUANTITIES		(FOR CONTRACTOR'S INFORMATION ONLY)				
ITEM		PAVEMENT THICKNESS				
		8" THRU 10"	10 1/2" THRU 12"	12 1/2" THRU 13"	14"	15"
SLEEPER SLAB	CONCRETE	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF	0.40 CY/LF
	REINFORCING STEEL	49.1 LBS/LF	49.3 LBS/LF	49.6 LBS/LF	49.7 LBS/LF	49.8 LBS/LF
SUPPORT SLAB	CONCRETE	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF	0.09 CY/LF
	REINFORCING STEEL	6.3 LBS/LF	6.4 LBS/LF	6.5 LBS/LF	6.6 LBS/LF	6.6 LBS/LF
12" CEMENT TREATED BASE		1.95 CY/LF (BASED ON JOINTS BEING NORMAL TO THE PAVEMENT CENTERLINE)				

WIDE FLANGE PAVEMENT TERMINALS

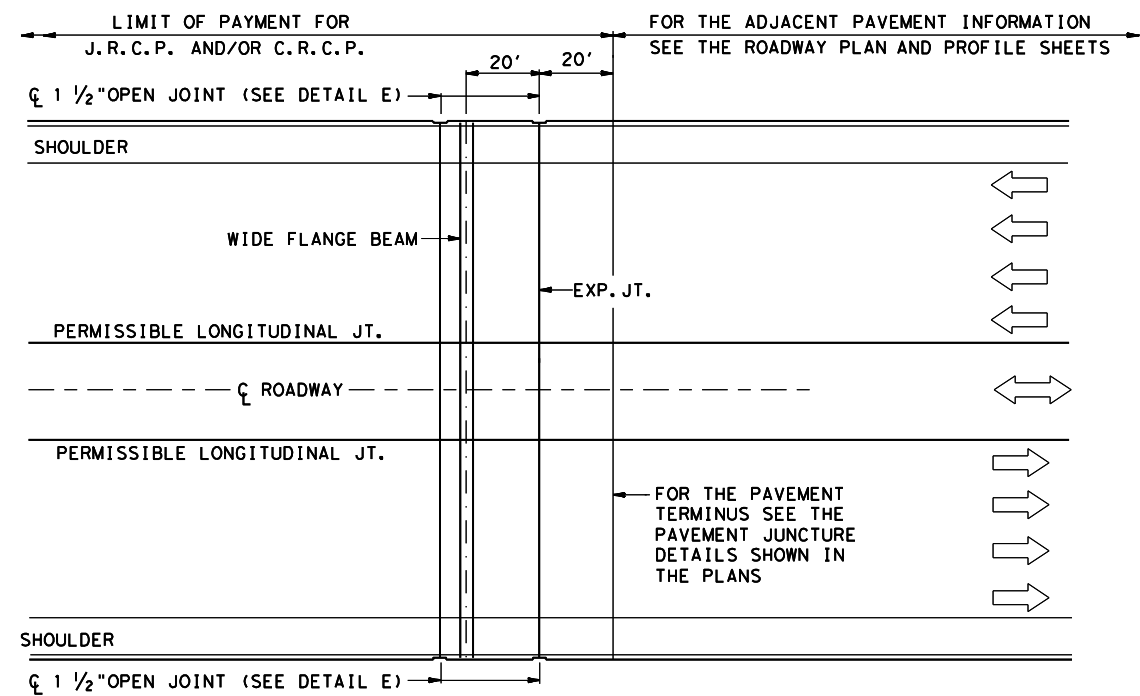
FOR CONTINUOUSLY & JOINTED REINFORCED CONCRETE PAVEMENT DETAILS
(FOR USE AT BRIDGE END OR PAVEMENT TERMINUS)

WFPT

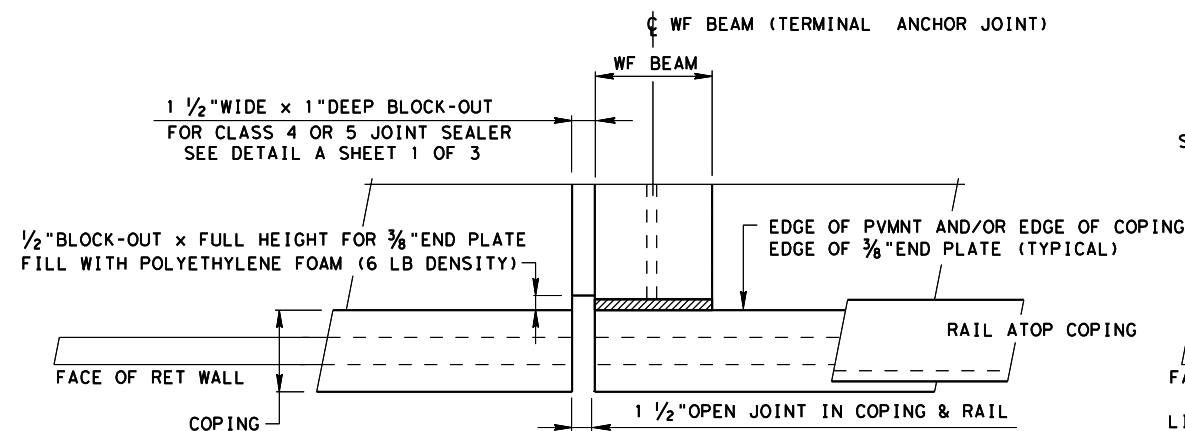
FILE: STDB-3.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT 2014	DISTRICT FED REG	PROJECT NO.	SHEET	
REVISIONS	HOU	6		
02/15 2014 SPECS	COUNTY	CONTROL	SECT	JOB HIGHWAY
				473



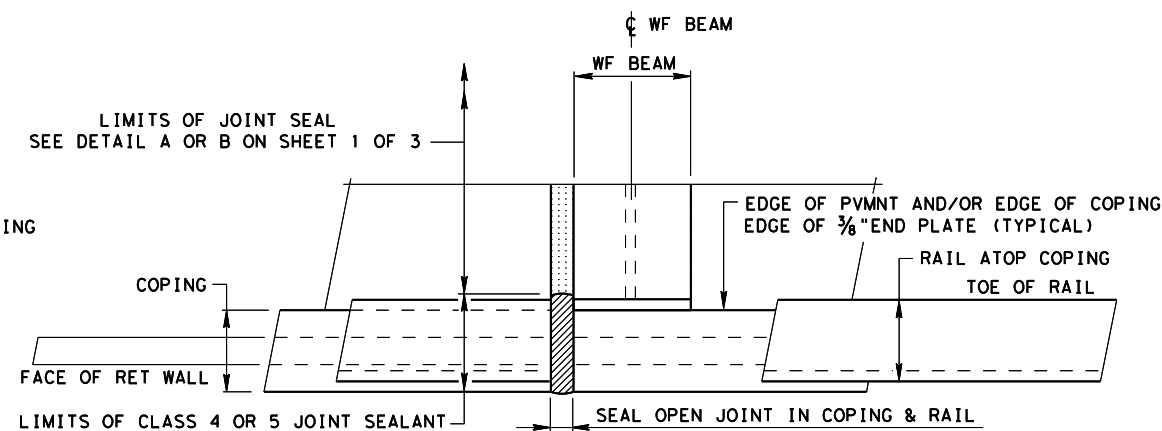
PLAN
SHOWING OPEN JOINT LAYOUT



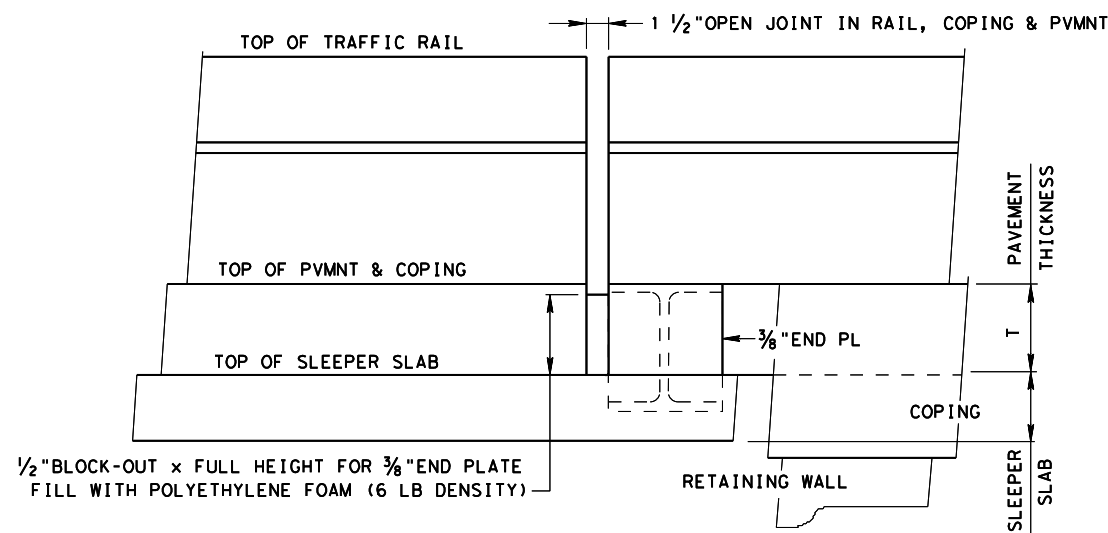
PLAN
SHOWING OPEN JOINT LAYOUT



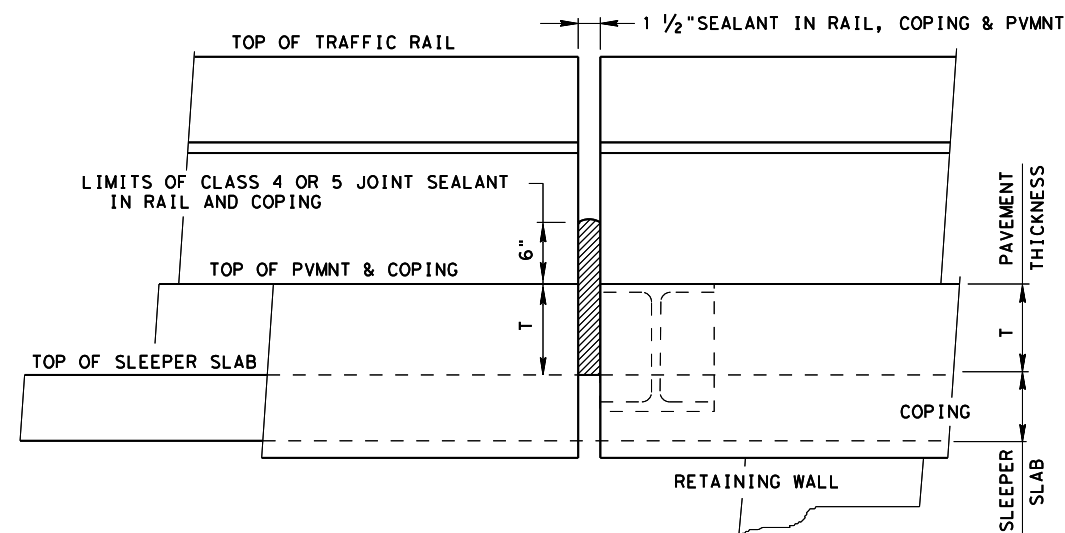
PLAN SHOWING OPEN JOINTS & BLOCK-OUT



PLAN SHOWING JOINT SEALANT



ELEVATION SHOWING OPEN JOINTS & BLOCK-OUT



ELEVATION SHOWING JOINT SEALANT

DETAIL E

SHOWN @ WIDE FLANGE ~ ALL OTHER JOINTS SIMILAR

SHEET 3 OF 3



WIDE FLANGE PAVEMENT TERMINALS




FOR CONTINUOUSLY & JOINED
REINFORCED
CONCRETE PAVEMENT DETAILS
(FOR USE AT RETAINING WALLS)

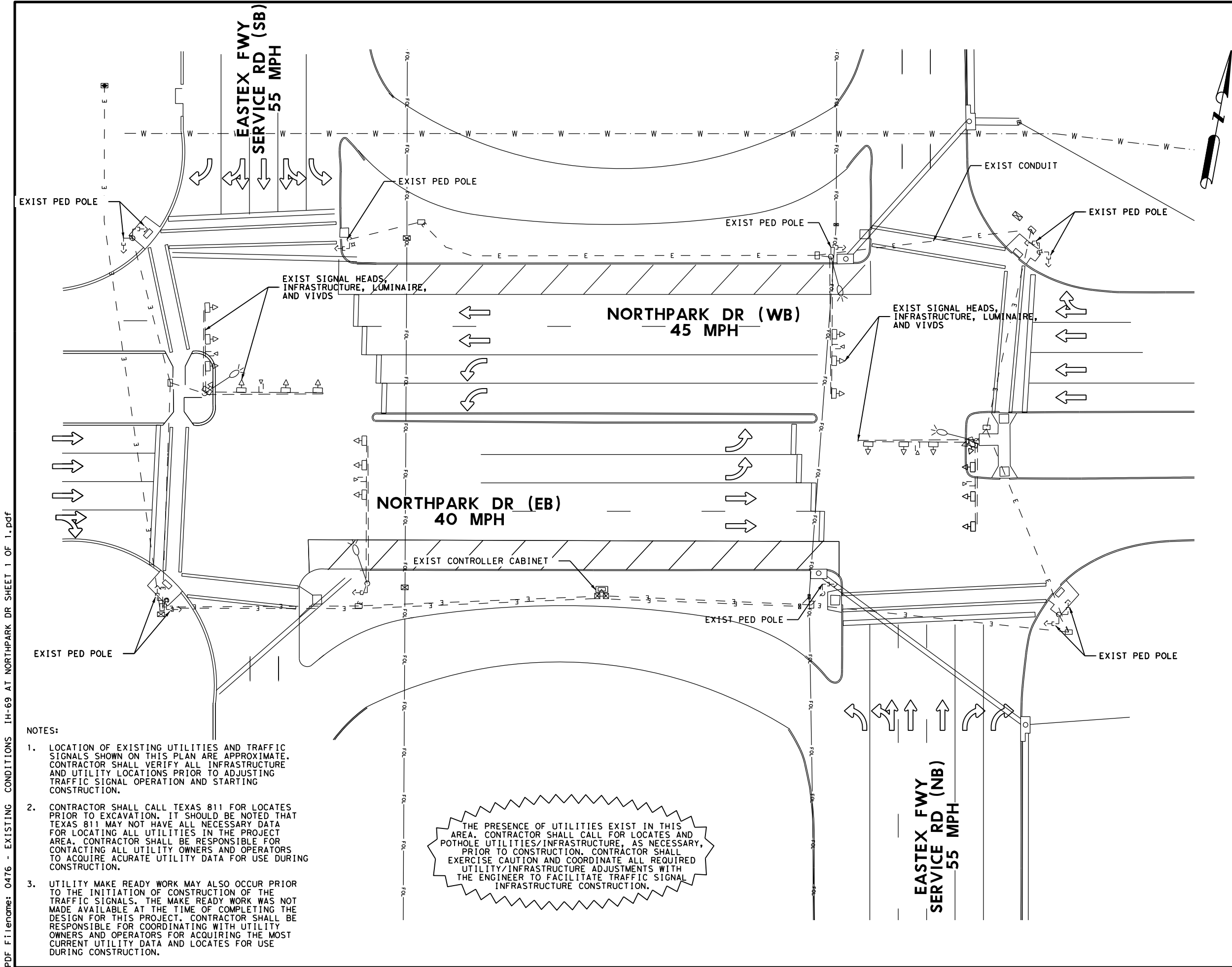
WFPT

FILE: STDB-3.DGN	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TXDOT 2014	DISTRICT FED REG	PROJECT NO.	SHEET	
REVISIONS 02/15 2014 SPECS	HOU 6	COUNTY	CONTROL	SECT
			JOB	HIGHWAY
				474

STDB-3

PDF Filename: 0475 - TRAFFIC SIGNAL PLAN NOTES SHEET 1 OF 1.pdf

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|------------|---------------------|-------------|---------|-------------|--|------|
|  | | | | | | | | | |
| | | | | | | | | | |
| NO. | | REVISIONS | | | | | BY | | DATE |
|  <div style="display: inline-block; vertical-align: top; margin-left: 10px;"> HNTB Corporation
 The HNTB Companies
 Infrastructure Solutions
 Firm Registration Number 420 </div> | | | | | | | | | |
|  <div style="display: inline-block; vertical-align: top; margin-left: 10px;"> LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10
 c/o HUNTON ANDREWS KURTH LLP
 600 TRAVIS, SUITE 4200
 HOUSTON, TX 77007 </div> | | | | | | | | | |
| <h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> | | | | | | | | | |
| <h1 style="margin: 0;">NORTH PARK DRIVE</h1> <h1 style="margin: 0;">TRAFFIC SIGNAL</h1> <h1 style="margin: 0;">PLAN NOTES</h1> | | | | | | | | | |
| SHEET 1 OF 1 | | | | | | | | | |
| DESIGNED: | | FED. RD. NO. | STATE | CITY OF HOUSTON WBS | | | HIGHWAY NO. | | |
| CHECKED: | | 6 | TEXAS | SEE TITLE SHEET | | | CS | | |
| DRAWN: | | STATE DISTRICT | COUNTY | CONTROL No. | SECTION No. | JOB No. | SHEET No. | | |
| CHECKED: | | HOU | MONTGOMERY | 0912 | 37 | 232 | 475 | | |



LEGEND

- SIGNAL POLE AND MAST ARM
- EXIST VIVDS
- EXIST ILLUMINATION
- EXIST GROUND BOX
- EXIST TRAFFIC SIGNAL CONTROLLER
- EXIST STORM DRAINAGE
- EXIST MANHOLE
- EXIST PED POLE
- EXIST DIRECTION OF TRAFFIC FLOW
- EXIST RAILROAD ROW
- EXISTING ROW
- EXIST UNDERGROUND COMM LINE
- EXIST UNDERGROUND WATER LINE
- EXIST UNDERGROUND GAS LINE
- EXIST UNDERGROUND SEWER LINE
- EXIST UNDERGROUND POWER LINE
- EXIST UNDERGROUND FIBER OPTIC
- EXIST OVERHEAD POWER LINE

- NOTES:**
- LOCATION OF EXISTING UTILITIES AND TRAFFIC SIGNALS SHOWN ON THIS PLAN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO ADJUSTING TRAFFIC SIGNAL OPERATION AND STARTING CONSTRUCTION.
 - CONTRACTOR SHALL CALL TEXAS 811 FOR LOCATES PRIOR TO EXCAVATION. IT SHOULD BE NOTED THAT TEXAS 811 MAY NOT HAVE ALL NECESSARY DATA FOR LOCATING ALL UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS AND OPERATORS TO ACQUIRE ACURATE UTILITY DATA FOR USE DURING CONSTRUCTION.
 - UTILITY MAKE READY WORK MAY ALSO OCCUR PRIOR TO THE INITIATION OF CONSTRUCTION OF THE TRAFFIC SIGNALS. THE MAKE READY WORK WAS NOT MADE AVAILABLE AT THE TIME OF COMPLETING THE DESIGN FOR THIS PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS AND OPERATORS FOR ACQUIRING THE MOST CURRENT UTILITY DATA AND LOCATES FOR USE DURING CONSTRUCTION.

THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POT HOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.

NO.	REVISIONS	BY	DATE

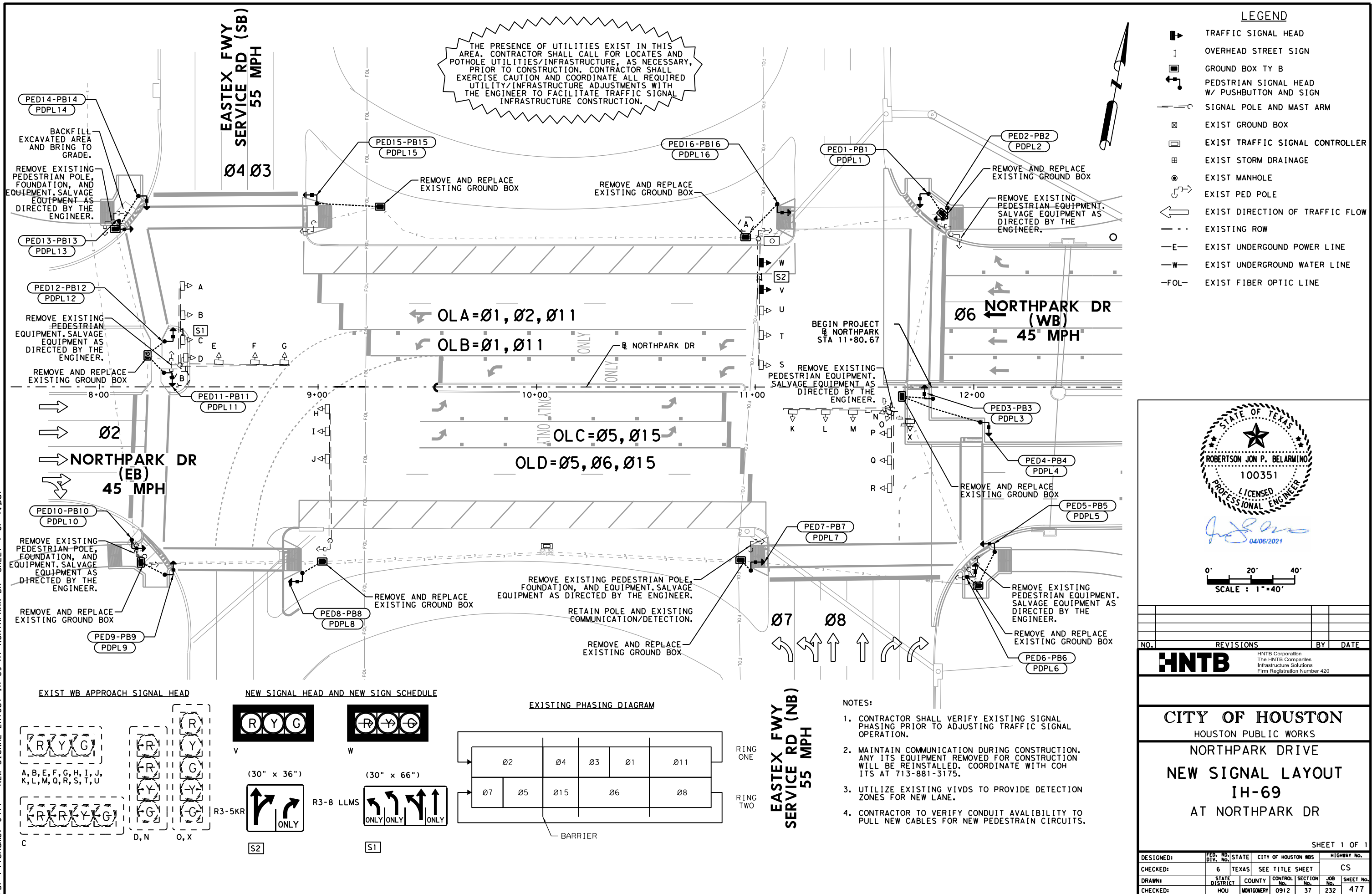
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

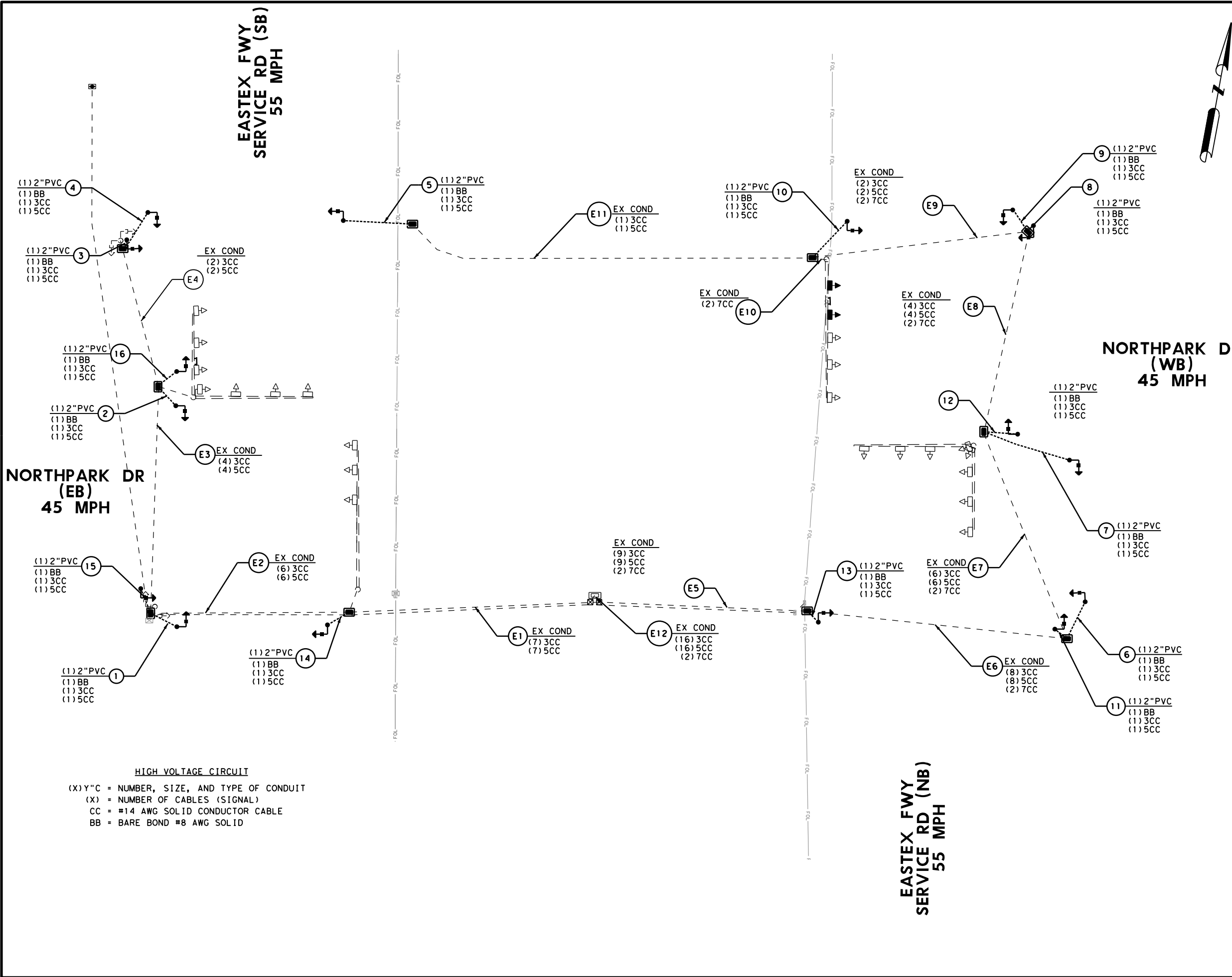
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
NORTH PARK DRIVE
EXISTING CONDITIONS
IH-69
AT NORTH PARK DR

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY NO. CS
CHECKED:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL NO. 0912	SECTION NO. 37
DRAWN:	JOB NO. 232		SHEET NO. 476	
CHECKED:				

4/6/2021 7:44:41 PM





- NOTES:
1. CONTRACTOR TO CUT POWER TO EXISTING PEDESTRIAN SYSTEM FROM THE CONTROLLER PRIOR TO CONSTRUCTION.

0' 20' 40'
SCALE : 1"=40'

NO.	REVISIONS	BY	DATE

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
CABLE SCHEMATIC
IH-69
AT NORTH PARK DR

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

4/6/2021 7:44:50 PM

CONDUIT AND CONDUCTOR RUNS												
RUN NO.	CONDUIT					INDICATION						
	PVC				POWER		PEDESTRIAN				SIGNAL	
	HIGH VOLT LOW VOLT	2" (SCHD 80)		BARE BOND #8 SOLID (BB)		#14/3C		#14/5C		#14/7C		
		NO.	TRENCH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	
												EA
E1	HV					7	105	7	105			
E2	HV					6	85	6	85			
E3	HV					4	100	4	100			
E4	HV					2	65	2	65			
E5	HV					9	95	9	95	2	95	
E6	HV					8	115	8	115	2	115	
E7	HV					6	95	6	95	2	95	
E8	HV					4	90	4	90	2	90	
E9	HV					2	95	2	95	2	95	
E10	HV									2	10	
E11	HV					1	180	1	180			
E12	HV					16	5	16	5			
1	HV	1	15	1	15	1	15	1	15			
2	HV	1	15	1	15	1	15	1	15			
3	HV	1	5	1	5	1	5	1	5			
4	HV	1	20	1	20	1	20	1	20			
5	HV	1	30	1	30	1	30	1	30			
6	HV	1	20	1	20	1	20	1	20			
7	HV	1	40	1	40	1	40	1	40			
8	HV	1	5	1	5	1	5	1	5			
9	HV	1	15	1	15	1	15	1	15			
10	HV	1	25	1	25	1	25	1	25			
11	HV	1	10	1	10	1	10	1	10			
12	HV	1	15	1	15	1	15	1	15			
13	HV	1	10	1	10	1	10	1	10			
14	HV	1	15	1	15	1	15	1	15			
15	HV	1	15	1	15	1	15	1	15			
16	HV	1	15	1	15	1	15	1	15			
POLE A (E)	HV									1	20	
MA (E)	HV									1	25	
PDPL1	HV					1	5	1	10			
PDPL2	HV					1	5	1	10			
PDPL3	HV					1	5	1	10			
PDPL4	HV					1	5	1	10			
PDPL5	HV					1	5	1	10			
PDPL6	HV					1	5	1	10			
PDPL7	HV					1	5	1	10			
PDPL8	HV					1	5	1	10			
PDPL9	HV					1	5	1	10			
PDPL10	HV					1	5	1	10			
PDPL11	HV					1	5	1	10			
PDPL12	HV					1	5	1	10			
PDPL13	HV					1	5	1	10			
PDPL14	HV					1	5	1	10			
PDPL15	HV					1	5	1	10			
PDPL16	HV					1	5	1	10			
TOTAL (LF)			270		270		5280		5360		1045	
EST. TOTAL			300		300		5810		5900		1150	

E# = EXIST CONDUIT

ITEM	DESCRIPTION	UNIT	QTY
	CITY OF HOUSTON BID ITEMS		
16710-201	TYPE "B" PULL BOX WITH GROUND ROD AND APRON	EA	10
16711-205	2" PVC SCH.80 UNDERGROUND, EARTH	LF	300
16715-100	3-SEC SIGNAL HEAD ASSEMBLY COMPLETE	EA	2
16715-SUB01	VEH SIG SEC (12")LED(GRN)	EA	1
16715-SUB02	VEH SIG SEC (12")LED(GRN ARW)	EA	1
16715-SUB03	VEH SIG SEC (12")LED(YEL)	EA	1
16715-SUB04	VEH SIG SEC (12")LED(YEL ARW)	EA	1
16715-SUB05	VEH SIG SEC (12")LED(RED)	EA	1
16715-SUB06	VEH SIG SEC (12")LED(RED ARW)	EA	1
16715-SUB10	BACK PLATE (12") (3 SEC)	EA	2
16716-100	LED PED SIG HEAD ASSEMBLY (SYM) (COUNTDOWN)	EA	16
16720-202	ELEC CONDR (NO.8) BARE	LF	300
16720-204	3/C-#14 AWG SOLID CABLE	LF	5810
16720-505	5/C-#14 AWG SOLID CABLE	LF	5900
16720-705	7/C-#14 AWG SOLID CABLE	LF	1150
16750-100	PED DETECT PUSH BUTTON (APS)	EA	16
16750-SUB01	PED DETECTOR CONTROLLER UNIT	EA	1
2465-100	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	60
2582-200-7	PED POLE ASSEMBLY (15')	EA	16
2893-300	REMOVE AND SALVAGE EXISTING TRAFFIC SIGNAL EQUIPMENT	LS	1
2893-301	INSTALL HWY TRF SIG (UPGRADE)	LS	1
2893-SUB03	GROUND ROD, 5/8" X 10' COPPER	EA	42
2893-SUB13	SIGN R10-3eL (9"X15")	EA	8
2893-SUB14	SIGN R10-3eR (9"X15")	EA	8
2893-SUB19	SIGN R3-8 LLMS (30"X66")	EA	1
2893-SUB20	SIGN R3-5KR (30"X36")	EA	1
2893-SUB23	ALUMINUM SIGNS (TY A)	SF	36.25






SUB # - DESCRIPTION CODE INDICATES SUBSIDIARY TO THE SPECIFIED ITEM AND ARE FOR CONTRACTOR INFORMATION ONLY.

* - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2893

△ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2582

Ψ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16715




○ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16750

  04/06/2021										
NO.		REVISIONS					BY		DATE	
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;">   </div> <div style="text-align: right;"> HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420 </div> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: right;"> LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007 </div> </div>										
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> <h3 style="margin: 0;">NORTH PARK DRIVE</h3> <h3 style="margin: 0;">SIGNAL DETAILS</h3> <h3 style="margin: 0;">IH-69</h3> <h3 style="margin: 0;">AT NORTHPARK DR</h3>										
SHEET 1 OF 1										
DESIGNED:		FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.			
CHECKED:		6	TEXAS	SEE TITLE SHEET			CS			
DRAWN:		STATE DISTRICT	COUNTY	CONTROL NO.	SECTION No.	JOB No.		SHEET No.		
CHECKED:		HOU	MONTGOMERY	0912	37	232		479		

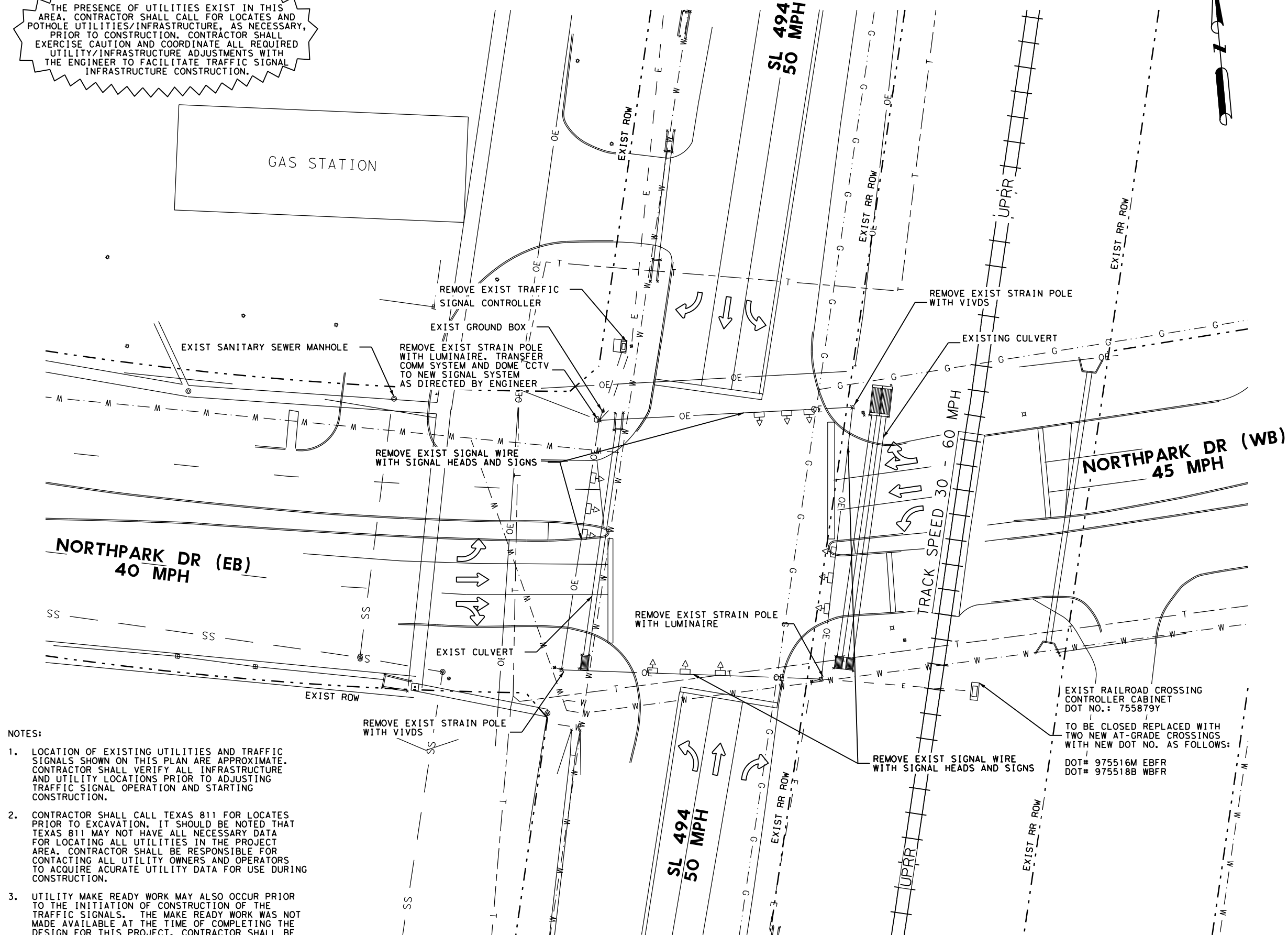
POLE ID	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION AT APPROX	STANDARDS
		SIGNAL (FT)	LUMINAIRE (FT)	MOUNTING	FACE					
A	E	E	E	2 - ASTROBRAC	1 - H3 1 - H3R	E		SIGNS: S2 - R3-5KR (30" X 36")	E	-
B	E	E	E	E	E	E		SIGNS: S1 - R3-8LLMS (30" X 66")	E	-
PDPL 2 PDPL 4 PDPL 6 PDPL 8 PDPL 10 PDPL 11 PDPL 14 PDPL 16	PED POLE 15'	-	-	1 - SIDE POLE	1 - CDP	-	POLARA NAVIGATION R10-3e(R)	-	AT APPROX: PDPL 2: STA 11+88, 82' LT PDPL 4: STA 12+02, 16' RT PDPL 6: STA 11+96, 87' RT PDPL 8: STA 08+93, 85' RT PDPL 10: STA 08+14, 70' RT PDPL 11: STA 08+29, 06' LT PDPL 14: STA 08+18, 87' LT PDPL 16: STA 11+10, 84' LT NORTHPARK DR BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED(1,8)-14
PDPL 1 PDPL 3 PDPL 5 PDPL 7 PDPL 9 PDPL 12 PDPL 13 PDPL 15		-	-		1 - CDP	-	POLARA NAVIGATION R10-3e(L)	-	AT APPROX: PDPL 1: STA 11+79, 88' LT PDPL 3: STA 11+81, 05' RT PDPL 5: STA 12+09, 75' , RT PDPL 7: STA 10+98, 84' , RT PDPL 9: STA 08+30, 86' RT PDPL 12: STA 08+30, 21' LT PDPL 13: STA 08+09, 76' LT PDPL 15: STA 08+99, 84' LT NORTHPARK DR BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED(1,8)-14

NOTE:

1. SEE ROADWAY AND PEDESTRIAN RAMP DETAILS FOR ELEVATION REQUIREMENT AS COORDINATED WITH ENGINEER.

				
NO.	REVISIONS		BY	DATE
 HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420				
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007				
CITY OF HOUSTON HOUSTON PUBLIC WORKS				
NORTHPARK DRIVE TRAFFIC SIGNAL POLE SCHEDULE IH-69 AT NORTHPARK DR				
SHEET 1 OF 1				
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
			232	480

THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POT HOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.

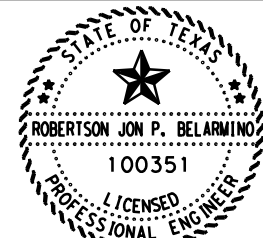


- NOTES:
1. LOCATION OF EXISTING UTILITIES AND TRAFFIC SIGNALS SHOWN ON THIS PLAN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO ADJUSTING TRAFFIC SIGNAL OPERATION AND STARTING CONSTRUCTION.
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- SIGNAL POLE AND MAST ARM
- EXIST VIVDS
- EXIST ILLUMINATION
- EXIST GROUND BOX
- EXIST TRAFFIC SIGNAL CONTROLLER
- EXIST STORM DRAINAGE
- EXIST MANHOLE
- EXIST PED POLE
- EXIST DIRECTION OF TRAFFIC FLOW
- EXIST RAILROAD ROW
- EXISTING ROW
- EXIST UNDERGROUND COMM LINE
- EXIST UNDERGROUND WATER LINE
- EXIST UNDERGROUND GAS LINE
- EXIST UNDERGROUND SEWER LINE
- EXIST UNDERGROUND POWER LINE
- EXIST OVERHEAD POWER LINE

EXHIBIT A

DOT# 975516M EBFR
DOT# 975518B WBFR
RRMP 22.15



0' 20' 40'
SCALE : 1"=40'

NO.	REVISIONS	BY	DATE

HNTB HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

EXISTING
CONDITIONS

SL 494
AT NORTH PARK DR

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION	JOB No. SHEET No.
CHECKED:	HOU	MONTGOMERY	0912 37	232 481

4/6/2021

7:45:00 PM

NEW SIGNAL HEAD AND SIGN SCHEDULE

D3-1G (60" x 24")
SL 494
30200 24500
[S3]

D3-1G (60" x 24")
SL 494
24500 30200
[S8]

D3-1G (90" x 24")
Northpark DR
300
[S2]

D3-1G (90" x 24")
Northpark DR
300
[S4]

D3-1G (90" x 24")
Northpark DR
1000
[S5]

D3-1G (90" x 24")
Northpark DR
1000
[S10]

R10-10L (30" x 36")
LEFT TURN SIGNAL
[S7], [S12]

R3-1a (30" x 36")
NO RIGHT TURN ACROSS TRACKS
[S6]
ACTIVATED BLANK-OUT SIGN

R3-2a (30" x 36")
NO LEFT TURN ACROSS TRACKS
[S9]
ACTIVATED BLANK-OUT SIGN

R10-7 (24" x 30")
DO NOT BLOCK INTERSECTION
[S1]

R

Y

G

E, F, J, K, L

R

Y

G

B, C, N, O, R,
H, I, Q

R

Y

G

A

R

R

Y

G

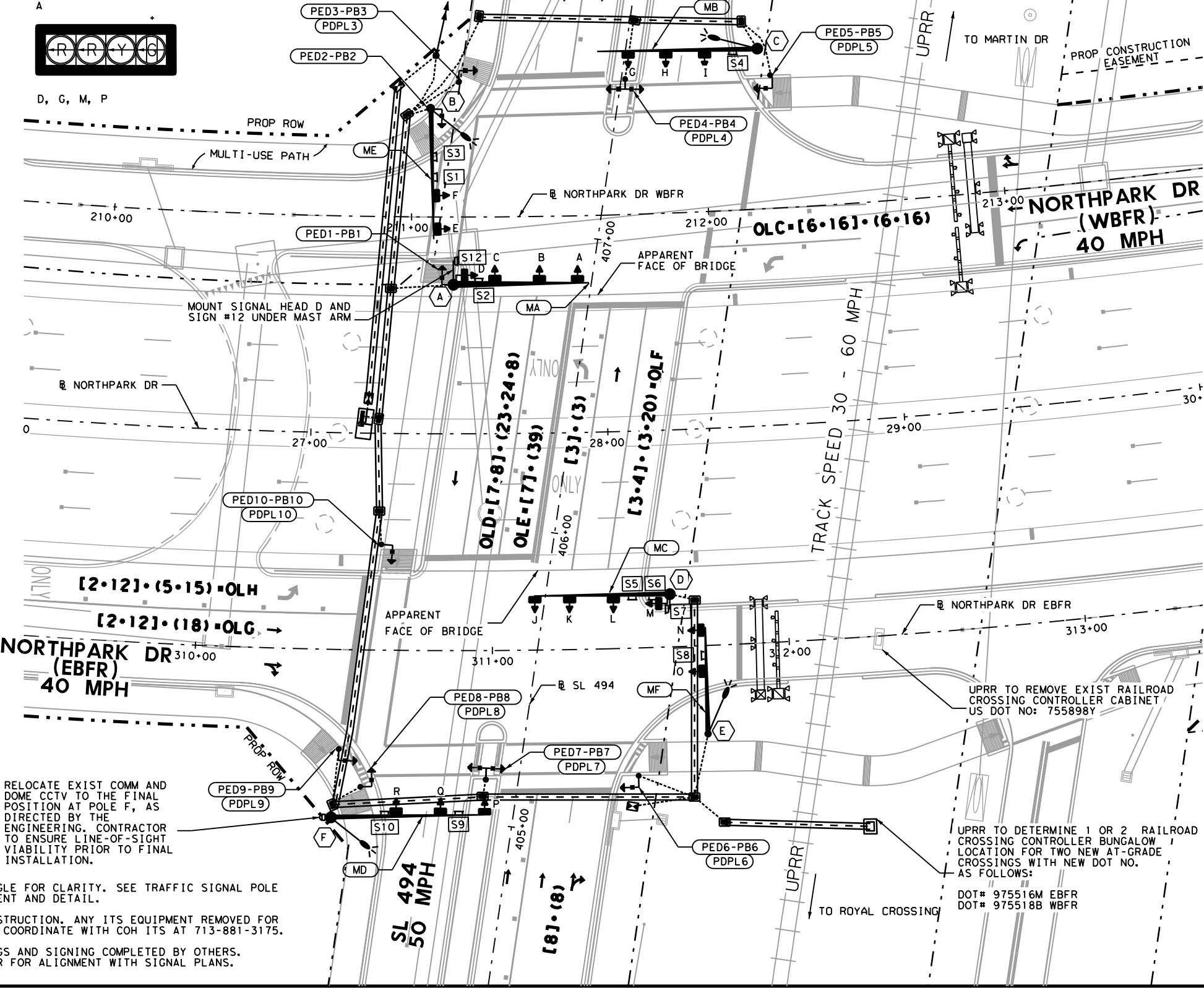
D, G, M, P

R

Y

G

* = LOUVERED SIGNAL INDICATION



LEGEND

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW

EXHIBIT A

DOT# 975516M EBFR
DOT# 975518B WBFR
RRMP 22.15

STATE OF TEXAS

ROBERTSON JON P. BELARMINO

100351

LICENSED PROFESSIONAL ENGINEER

04/06/2021

0' 20' 40'
SCALE : 1"=40'

NO.	REVISIONS	BY	DATE
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HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAH
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

NORTHPARK DRIVE
NEW SIGNAL LAYOUT
SL 494
AT NORTHPARK DR

DESIGNED: []
CHECKED: []
DRAWN: []
CHECKED: []

FED. RD. DIV. NO. 6
STATE TEXAS
COUNTY MONTGOMERY
DISTRICT HOU

CITY OF HOUSTON WBS
SEE TITLE SHEET
CONTROL SECTION No. 0912
JOB No. 37

HIGHWAY No. CS
SHEET No. 232
482

4/6/2021 7:45:05 PM

NOTES:

- LUMINAIRE ARMS ARE SHOWN AT AN ANGLE FOR CLARITY. SEE TRAFFIC SIGNAL POLE STANDARDS FOR INSTALLATION ALIGNMENT AND DETAIL.
- MAINTAIN COMMUNICATION DURING CONSTRUCTION. ANY ITS EQUIPMENT REMOVED FOR CONSTRUCTION WILL BE REINSTALLED. COORDINATE WITH COH ITS AT 713-881-3175.
- PEDESTRIAN RAMPS, PAVEMENT MARKINGS AND SIGNING COMPLETED BY OTHERS. CONTRACTOR TO VERIFY WITH ENGINEER FOR ALIGNMENT WITH SIGNAL PLANS.

RELOCATE EXIST COMM AND DOME CCTV TO THE FINAL POSITION AT POLE F, AS DIRECTED BY THE ENGINEERING. CONTRACTOR TO ENSURE LINE-OF-SIGHT VIABILITY PRIOR TO FINAL INSTALLATION.

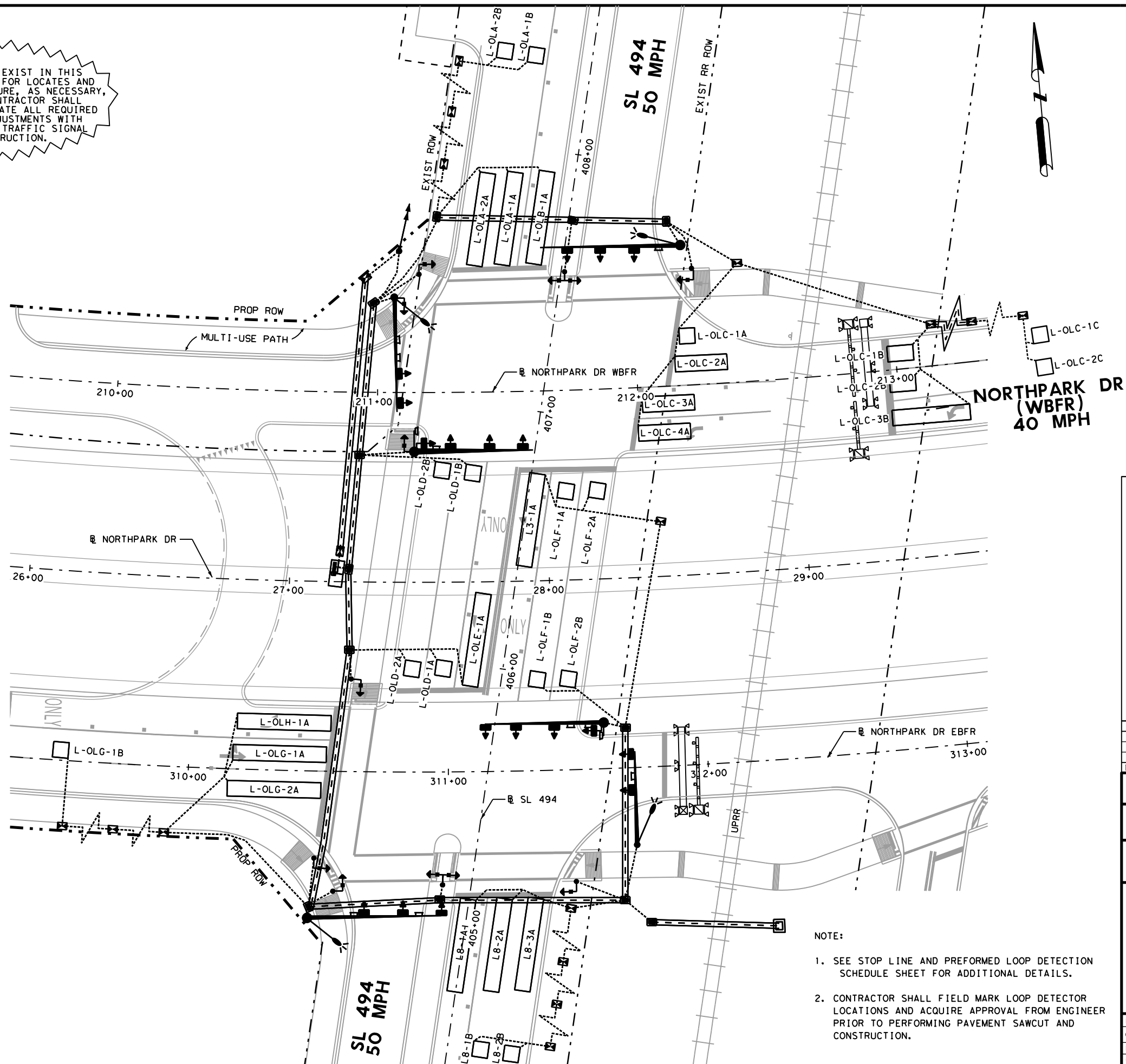
THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POTHOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.














UPRR TO REMOVE EXIST RAILROAD CROSSING CONTROLLER CABINET US DOT NO: 755898Y

UPRR TO DETERMINE 1 OR 2 RAILROAD CROSSING CONTROLLER BUNGALOW LOCATION FOR TWO NEW AT-GRADE CROSSINGS WITH NEW DOT NO. AS FOLLOWS:

DOT# 975516M EBFR
DOT# 975518B WBFR

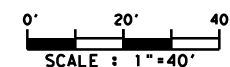
THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POTHOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.



- | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------|
|  | SIGNAL POLE AND MAST ARM |
|  | SERVICE POLE ASSEMBLY |
|  | TRAFFIC SIGNAL HEAD |
|  | PEDESTRIAN SIGNAL HEAD
W/ PUSHBUTTON AND SIGN |
|  | GROUND BOX TY A |
|  | GROUND BOX TY B |
|  | ITS 340 CABINET W/ 2070 LX
CONTROLLER W/ GPS & UPS |
|  | LUMINAIRE (LED) |
|  | CONDUIT (TRENCH) |
|  | CONDUIT (BORE) |
|  | OVERHEAD STREET NAME SIGN |
|  | DIRECTION OF TRAFFIC FLOW |
|  | PRE-FORMED LOOP DETECTOR |

STATE OF TEXAS
ROBERTSON JON P. BELARMINO
100351
LICENSED PROFESSIONAL ENGINEER

[Signature] 04/06/2021



NO.	REVISIONS	BY	DATE
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Firm Registration Number 420



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c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
LOOP DETECTION LAYOUT
SL 494
AT NORTH PARK DR

SHEET 1 OF

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS		HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CHECKED:	HOU	MONTGOMERY	0912	37	232	48

4/6/2021

7:45:09 PM

PDF Filename: 482A - LOOP DETECTION LAYOUT SL 494 AT NORTHPARK DR SHEET 1 OF 1.pdf

Source:	http://www.int-hnib.org:8080/
Project:	Northpark Drive Overpass
Project ID:	65885
Documents:	Documents\Houston
Project Design:	Engineering\04
Drawings:	HNTB\10
Analysis:	Signals\Sheet
Drawings:	DGN\101-S2.dwg

STOP LINE AND PREFORMED LOOPS LOCATION		
ITEM BY DIRECTION	STATION SL 494	OFFSET
NORTHBOUND		
STOP LINE @ GUTTER	405+17	31' RT
STOP LINE @ CENTER	405+14	13' RT
NORTHBOUND (THRU LANES)		
PHASE 8 LOOPS		
L8-1A (6' X 30')	405+10	CENTERED IN LANE
L8-2A (6' X 30')	405+13	
L8-3A (6' X 30')	405+15	
PHASE 8 PULSE LOOPS		
L8-1B LEADING EDGE (6' X 6')	370' FROM STOP BAR	
L8-2B LEADING EDGE (6' X 6')	370' FROM STOP BAR	
SOUTHBOUND		
STOP LINE @ GUTTER	407+49	42' LT
STOP LINE @ CENTER	407+52	24' LT
SOUTHBOUND (THRU LANES)		
PHASE 0LA/0LB LOOPS		
L-0LA-1A (6' X 30')	407+54	CENTERED IN LANE
L-0LA-2A (6' X 30')	407+52	
L-0LB-1A (6' X 30')	407+56	
PHASE 0LA PULSE LOOPS		
L-0LA-1B LEADING EDGE (6' X 6')	370' FROM STOP BAR	
L-0LA-2B LEADING EDGE (6' X 6')	370' FROM STOP BAR	

ITEM BY DIRECTION	STATION NORTH PARK DR FRONTAGE ROAD	OFFSET
EASTBOUND STOP LINE @ GUTTER STOP LINE @ CENTER	310+50 310+53	25' RT -
EASTBOUND (THRU LANES) PHASE OLG CALL (6' X 30') LOOPS L-OLG-1A	310+53	CENTERED IN LANE
PHASE 2 PULSE LOOPS L-OLG-1B LEADING EDGE (6' X 6')	300' FROM STOP BAR	
EASTBOUND (LEFT TURN LANE) PHASE OLH PRESENCE LOOPS L-OLH-1A (6' X 30') LOOP	310+55	CENTERED IN LANE
EASTBOUND (RIGHT TURN LANE) PHASE OLG PRESENCE LOOPS L-OLG-2A (6' X 30') LOOP	310+51	CENTERED IN LANE
WESTBOUND (THRU-RIGHT TURN LANE) STOP LINE @ GUTTER STOP LINE @ CENTER	212+18 212+15	32.7' LT 16.5' LT
WESTBOUND (THRU LANE, LEFT TURN LANE) STOP LINE @ GUTTER STOP LINE @ CENTER	211+97 211+99	24.2' RT 12.1' RT
WESTBOUND (THRU LANES) PHASE OLC CALL LOOPS L-OLC-1A (6' X 6') L-OLC-2A (6' X 20') L-OLC-3A (6' X 20') L-OLC-1B (6' X 10') L-OLC-2B (6' X 10')	212+17 212+15 212+01 212+97 212+96	CENTERED IN LANE
WESTBOUND (LEFT TURN LANE) PHASE OLH PRESENCE LOOPS L-OLC-4A (6' X 20') L-OLC-3B (6' X 30') PHASE OLC PULSE LOOPS L-OLC-1C LEADING EDGE (6' X 6') L-OLC-2C LEADING EDGE (6' X 6')	211+99 212+97 300' FROM STOP BAR 300' FROM STOP BAR	CENTERED IN LANE

ITEM BY DIRECTION	STATION SL 494 (UNDER BRIDGE)	OFFSET
NORTHBOUND STOP LINE @ GUTTER STOP LINE @ CENTER	406+83 406+79	32' RT 13.5' RT
NORTHBOUND (THRU LANES) PHASE OLC CALL LOOPS L-OLF-1A (6' X 6') L-OLF-2A (6' X 6')	406+74 406+76	CENTERED IN LANE
PHASE OLC PULSE LOOPS L-OLF-1B L-OLF-2B	75' FROM STOP BAR 75' FROM STOP BAR	
NORTHBOUND (LEFT TURN LANE) PHASE 3 PRESENCE LOOPS L3-1A (6' X 30')	406+76	
SOUTHBOUND STOP LINE @ GUTTER STOP LINE @ CENTER	405+85 405+88	42' LT 23.8' LT
SOUTHBOUND (THRU LANES) PHASE OLD CALL LOOPS L-OLD-1A (6' X 6') L-OLD-2A (6' X 6')	405+94 405+92	CENTERED IN LANE
PHASE OLD PULSE LOOPS L-OLD-1B L-OLD-2B	75' FROM STOP BAR 75' FROM STOP BAR	
SOUTHBOUND (LEFT TURN LANE) PHASE OLE PRESENCE LOOPS L-OLE-1A (6' X 30')	405+92	

Jon P. Belarmino
04/06/2021

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HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

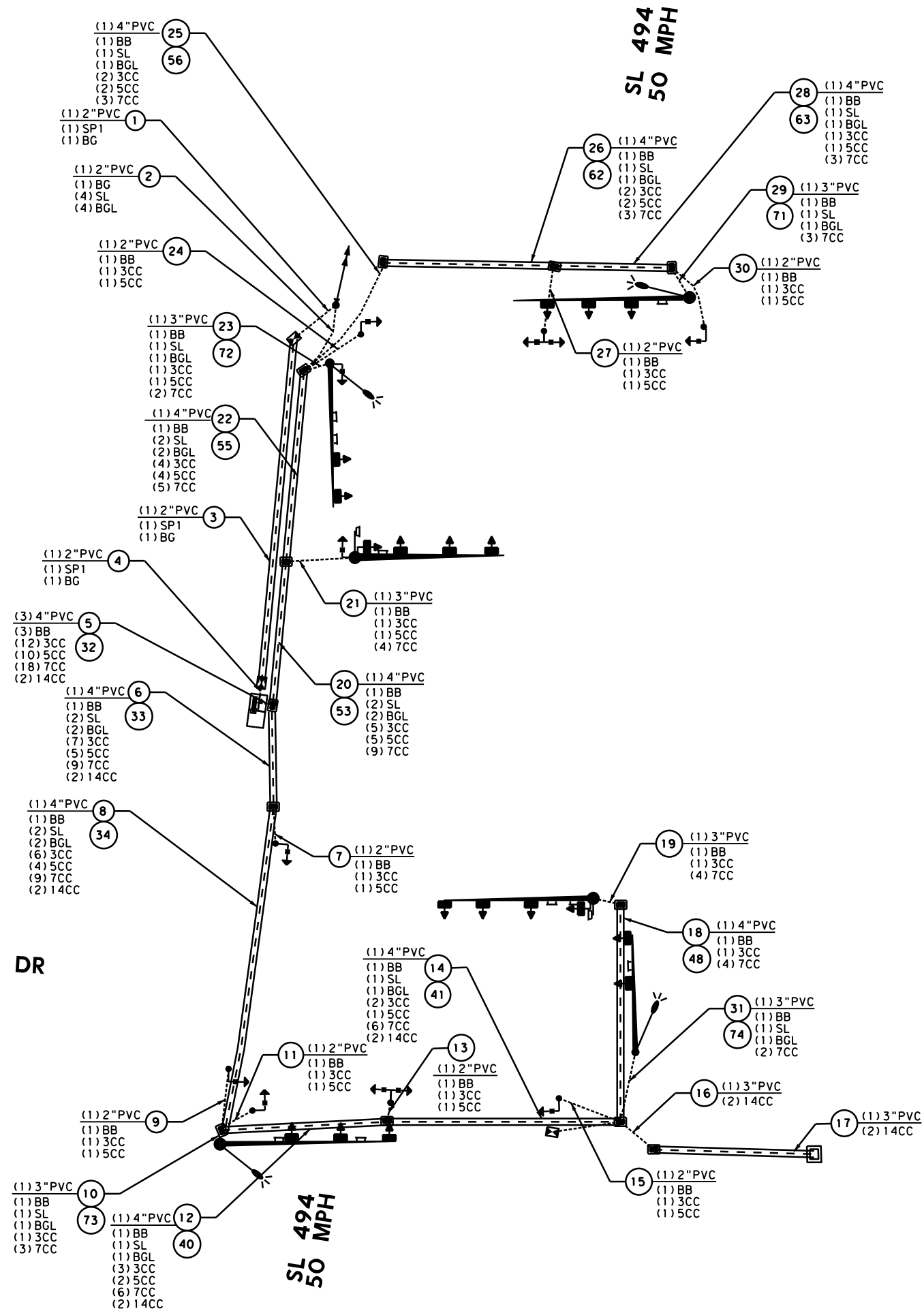
**STOP LINE & PREFORMED
LOOP DETECTION SCH**

SL 494

AT NORTH PARK DR

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					SHEET No.
					4828



NORTHPARK DR
(EBFR)
40 MPH

NORTHPARK DR
(WBFR)
40 MPH

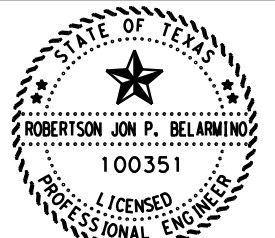
HIGH VOLTAGE CIRCUIT

- (X)Y"C = NUMBER, SIZE, AND TYPE OF CONDUIT
(X) = NUMBER OF CABLES (SIGNAL)
CC = #14 AWG SOLID CONDUCTOR CABLE
BB = BARE BOND #8 AWG SOLID
BG = BARE GROUND #8 AWG SOLID
BGL = BARE GROUND LIGHTING #12 AWG XHHW
SP = SIGNAL POWER (SEE NOTES)
SL = STREET LIGHTING (2-#10 AWG XHHW)

NOTES:
SP1 SHALL CONSIST OF 6-#4 AWG XHHW
2-WHITE
1-BLACK
1-RED
2-GREEN

LEGEND

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX
CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW



04/06/2021

0' 20' 40'
SCALE : 1"=40'

NO.	REVISIONS	BY	DATE
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Infrastructure Solutions
Firm Registration Number 420



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600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE

HIGH VOLTAGE
CABLE SCHEMATIC

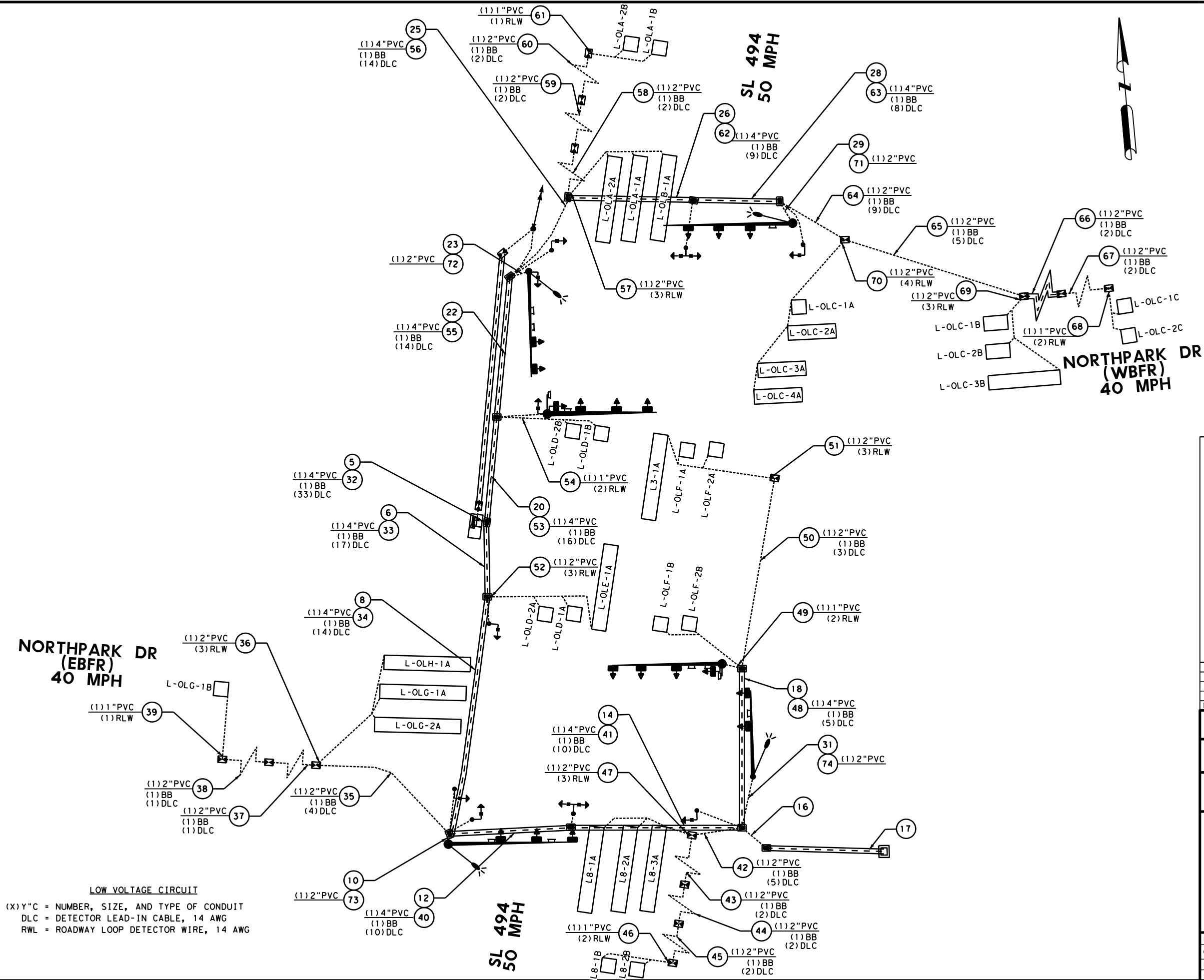
SL 494
AT NORTHPARK DR

SHEET 1 OF 2

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

4/6/2021

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LEGEND

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW
- PRE-FORMED LOOP DETECTOR

STATE OF TEXAS
ROBERTSON JON P. BELARMINO
100351
LICENSED PROFESSIONAL ENGINEER
04/06/2021

0' 20' 40'
SCALE: 1"=40'

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS
NORTH PARK DRIVE
LOW VOLTAGE CABLE SCHEMATIC
SL 494
AT NORTH PARK DR

SHEET 2 OF 2

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	DISTRICT	COUNTY	CONTROL SECTION	JOB NO. SHEET NO.
CHECKED:	HOU	MONTGOMERY	0912 37	232 484

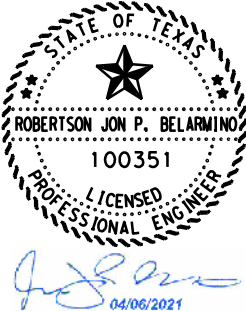
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POLE ID	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION AT APPROX	STANDARDS	
		SIGNAL (FT)	LUMINAIRE (FT)	MOUNTING	FACE						
A	2	45	-	3 - ASTROBRAC 2 - SIDE POLE	3 - H3 1 - H4L 1 - CPD	-	POLARA NAVIGATION R10-3e(L) (EXT OVER HANDHOLE)	S2 = STREET SIGN	AT APPROX: POLE A: STA 211+14, 23' RT NORTH PARK DR (WBFR) BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
B	2	45	15	2 - ASTROBRAC 1 - SIDE POLE	2 - H3 1 - CDP	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	POLARA NAVIGATION R10-3e(L)	SIGNS: S1 = R10-7 (24"x30") S3 = STREET SIGN	AT APPROX: POLE B: STA 211+06, 37' LT NORTH PARK DR (WBFR) BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
C	2	50	15	3 - ASTROBRAC	2 - H3 1 - H4L	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE		SIGNS: S4 = STREET SIGN	AT APPROX: POLE C: STA 212+19, 54' LT NORTH PARK DR (WBFR) BASELINE.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
D	2	45	-	3 - ASTROBRAC 2 - SIDE POLE	3 - H3 1 - H4L 1 - BLANK-OUT	-		SIGNS: S5 = STREET SIGN S6 = R3-1a (30"x36") BLANK-OUT SIGN S7 = R10-L (30"x36")	AT APPROX: POLE D: STA 311+60, 18' LT NORTH PARK DR (EBFR) BASELINE.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
E	1	35	15	2 - ASTROBRAC	2 - H3	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE		SIGNS: S8 = STREET SIGN	AT APPROX: POLE E: STA 311+71, 30' RT NORTH PARK DR (EBFR) BASELINE.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
F	2	50	15	3 - ASTROBRAC 1 - SIDE POLE	2 - H3 1 - H4L 1 - BLANK-OUT	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE		SIGNS: S9 = R3-2a (30"x36") BLANK-OUT SIGN S10 = STREET SIGN	AT APPROX: POLE F: STA 310+47, 56' RT NORTH PARK DR (EBFR) BASELINE.	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
PDPL 3 PDPL 6 PDPL 9	PED POLE 15'	-	-	1 - SIDE POLE	1 - CDP	-	POLARA NAVIGATION R10-3e(R)	-	AT APPROX: PDPL 3: STA 407+45, 54' LT PDPL 6: STA 405+23, 40' RT SL 494 BASELINE PDPL 9: STA 310+49, 33' RT NORTH PARK DR (EBFR) BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED (1,8)-14	
PDPL 5 PDPL 8 PDPL 10		-	-		1 - CDP	-	POLARA NAVIGATION R10-3e(L)	-	AT APPROX: PDPL 5: STA 407+63, 49' RT PDPL 8: STA 405+05, 52' LT SL 494 BASELINE PDPL 10: STA 310+62, 36' LT NORTH PARK DR (EBFR) BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED (1,8)-14	
PDPL 4 PDPL 7		-	-		2 - CDP	-	POLARA NAVIGATION R10-3e(L) (R)	-	AT APPROX: PDPL 4: STA 407+55, 01' RT PDPL 7: STA 405+14, 11' LT SL 494 BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED (1,8)-14	

TYPE	CONTROLLER	REMARKS	LOCATION	STANDARDS
METERED STEEL POLE SERVICE	SEE ELECTRICAL SERVICE DESCRIPTION TABLE FOR DETAILS	SEE COH STANDARDS FOR DETAILS	AT APPROX: STA 407+55, 63' LT SL 494	02893-15 ED(1, 3, 5, 6)-14
TYPE 340 ITS	2070LX CONTROLLER UNIT WITH 2070-1C CPU MODULE W/ GPS AND UPS BATTERY BACK-UP SYSTEM RAILROAD PREEMPT INTERFACE PANEL	STANDARD SPECIFICATION 16730 & 16731 UNINTERRUPTIBLE POWER SUPPLY - STANDARD SPECIFICATION 16732 (x-RPS OR APPROVED EQUAL OR BETTER) GPS SERIAL COMM MODULE, STD SPEC 16785	AT APPROX: STA 406+29, 68' LT (CENTER OF CABINET) SL 494	02893-10A 02893-10B 02893-10C ED(1,8)-14


NOTE:

1. SEE ROADWAY AND PEDESTRIAN RAMP DETAILS FOR ELEVATION REQUIREMENT AS COORDINATED WITH ENGINEER.




04/06/2021

NO.	REVISIONS	BY	DATE



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HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

SIGNAL DETAILS

SL 494

AT NORTH PARK DR

SHEET 1 OF 4

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

JOB No.	SHEET No.
232	485

C	
Δ	
Δ	

* -FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2893
 Δ -FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2582
 Ψ -FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16715
 ○ -FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16750

ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED (5), (6), (7), (8), (11) - 14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY Switch AMPS	MAIN CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
SL 494 AT NORTH PARK DR	ELEC SERV TY D(120/240)060(NS)SS(E)SP(O)	1 1/4"	3/#6	N/A	2P/60	30	100	SIGNAL ITS ILLUM	1P/50 1P/15 2P/20	40 5 5	6.6

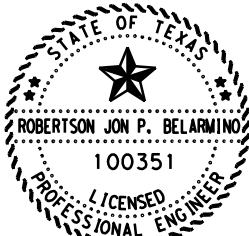
1. CONTRACTOR SHALL BORE THE PVC CONDUITS SHOWN ON THE TRAFFIC SIGNAL LAYOUT PLAN UNDER THE UPRR RAIL LINE OR AS DIRECTED BY THE ENGINEER AND UPRR. THE CONTRACTOR SHALL PROVIDE THE NOTED PREEMPTION CABLE ALL THE WAY TO THE RAILROAD CROSSING CONTROLLER CABIN, LEAVING EXTRA CABLE TO FACILITATE CONNECTION TO REACH THE RAILROAD EQUIPMENT AND RELAY.
2. SEE THE TRAFFIC SIGNAL PLAN FOR SIGNAL DETAILS.
3. CONTRACTOR TO VERIFY ACTUAL EQUIPMENT LOCATION AND ACQUIRE APPROVAL FROM ENGINEER AND UPRR PRIOR TO FIELD INSTALLATION.
4. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
5. CONTRACTOR TO EXERCISE CAUTION WHEN WORKING NEAR UTILITIES.
6. MINIMUM CLEARANCE OF 40" RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY SHALL BE MAINTAINED BETWEEN PROPOSED TRAFFIC SIGNAL/RAILROAD EQUIPMENT AND EXISTING OVERHEAD ELECTRIC LINES.
7. SEE SIGNING AND PAVEMENT MARKING PLAN FOR APPROACH SIGNING AND MARKING LAYOUT.
8. NEATLY CAP OR CAP/COIL ALL SPARE WIRES OR CABLES FOR FUTURE CONNECTIONS IN GROUND BOX OR AT TERMINATION.
9. SIGNAL OPERATION SHALL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY TO FACILITATE SAFE OPERATIONS.
10. CONTRACTOR, UPRR, AND CITY OF HOUSTON SHALL COORDINATE THE DEVELOPMENT AND COMPILATION OF TESTING AND VALIDATION REPORT TO DOCUMENT SUCCESSFUL TEST OF THE TRAFFIC SIGNAL AND RR PREEMPTION SYSTEMS.
11. ALL SIGNAL HEADS SHALL HAVE BACKPLATES AND LOUVERS AS INDICATED ON THE PLAN.
12. ALL PED PUSH BUTTONS AND SIGN ASSEMBLY SHALL BE IN ACCORDANCE WITH THE TMUTCD.
13. AN OFF-DUTY UNIFORMED POLICE OFFICER IS REQUIRED TO CONTROL TRAFFIC PRIOR TO TURNING OFF/ON THE INTERSECTION TRAFFIC SIGNAL CONTROL AND TESTING RAILROAD PREEMPTION UNTIL THE TRAFFIC SIGNAL IS BACK TO SATISFACTORY OPERATION.
14. CONTRACTOR SHALL PROTECT ALL PERMANENT EQUIPMENT AND POLES FOR USE WITH THE SIGNAL THROUGHOUT THE DURATION OF THE PROJECT.
15. ALL SIGNAL HEADS SHALL HAVE A MINIMUM CLEARANCE OF 18'-6" FEET ABOVE GRADE THROUGH THE DURATION OF THE PROJECT.
16. THE CONTRACTOR SHALL RESTORE, AT HIS EXPENSE, EQUIPMENT DISTURBED OR DAMAGED AREAS AS A RESULT OF CONSTRUCTION (AS DETERMINED BY THE ENGINEER) TO A CONDITION AS GOOD AS, OR BETTER THAN THE CONDITIONS AT THE PRESENT PRIOR TO THE BEGINNING OF THIS PROJECT.
17. CONTRACTOR SHALL COVER TRAFFIC SIGNAL HEADS WHEN NOT IN USE.
18. PREEMPTION WORK ON RAILS (SHUNTS, RELAYS, ETC) TO BE COMPLETED BY UPRR OR THEIR APPROVED CONTRACTOR AS PER PREEMPTION AGREEMENT BETWEEN LHRA AND CITY OF HOUSTON.
19. THE PROPOSED TRAFFIC SIGNAL SHALL NOT BE ACTIVATED UNTIL PREEMPTION EQUIPMENT IS OPERATIONAL.
20. CONNECTION BETWEEN UPRR AND TRAFFIC SIGNAL SHALL BE COORDINATED WITH CITY OF HOUSTON TRAFFIC MAINTENANCE OFFICE.
21. CONTRACTOR TO SECURE INSURANCE FOR COMPLETION OF WORK WITHIN THE RAILROAD PROPERTY AND RIGHT OF WAY.





[illegible]

NOTES:

1. SEE NEXT SHEET FOR TOTAL.



[Signature]
04/06/2021

NO.	REVISIONS						BY	DATE		
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ II c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007						
<h1>CITY OF HOUSTON</h1> <h2>HOUSTON PUBLIC WORKS</h2>										
<h1>NORTHPARK DRIVE</h1> <h1>SIGNAL DETAILS</h1> <h1>SL 494</h1> <h1>AT NORTHPARK DR</h1>										
SHEET 3 OF 4										
PED. RD. DIV. NO.		STATE	CITY OF HOUSTON WBS				HIGHWAY No.			
CHECKED:		6	TEXAS	SEE TITLE SHEET				CS		
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:		HOU	MONTGOMERY	0912	37	232	487			

PDF Filename: 487A - SIGNAL DETAILS SL 494 AT NORTH PARK DR SHEET 4 OF 4.pdf

CONDUIT AND CONDUCTOR RUNS																																												
RUN NO.	CONDUIT														POWER						ILLUMINATION				INDICATIONS						SIGN		LOOP			RAILROAD PREEMPT								
	PVC														POWER		GROUND				LIGHTING				PEDESTRIAN				SIGNAL		BLANKOUT		DETECTOR		LEAD-IN		RR RELAY TRAF SIG							
	HIGH VOLT LOW VOLT	1" (SCHD 80)		2" (SCHD 80)				3" (SCHD 80)				4" (SCHD 80)				6-#4 AWG XHHW (SP1)		BARE BOND #8 SOLID (BB)		BARE GRND #8 SOLID (BG)		2-#10 AWG XHHW (SL)		GROUND LIGHTING #12 AWG XHHW (BGL)		#14/3C		#14/5C		#14/7C		#14/3C		#14 INSULATED (RLW)		#14/2C (DLC)		#14/14C						
		NO.	TRENCH	NO.	TRENCH	NO.	BORE	NO.	TRENCH	NO.	BORE	NO.	TRENCH	NO.	BORE	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	NO.	LENGTH	EA	LF	
59	LV						1 120										EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF	EA	LF		
60	LV						1 120											1 120																							2 120			
61	LV	1	5																																						2 802			
62	LV													1 55				1 55																							8 55			
63	LV													1 40				1 40																							8 40			
64	LV				1 35													1 35																							8 35			
65	LV						1 75											1 75																							5 75			
66	LV						1 195											1 195																							2 195			
67	LV						1 130											1 130																							2 130			
68	LV	1	5																																						2 40			
69	LV				1 5																																			3 40				
70	LV				1 30																																			4 120				
71	LV				1 15																																							
72	LV				1 10																																							
73	LV				1 10																																							
74	LV				1 25																																							
POLE A	HV																								1 5	1 10	4 20																	
POLE B	HV																					1 45	1 45	1 5	1 10	2 20																		
POLE C	HV																					1 45	1 45			3 20																		
POLE D	HV																									4 20	1 20																	
POLE E	HV																					1 45	1 45			2 20																		
POLE F	HV																					1 45	1 45			3 20	1 20																	
MA	HV																									4 45																		
MB	HV																									2 45																		
MC	HV																									3 50																		
MD	HV																									4 45	1 45																	
ME	HV																									2 35																		
MF	HV																									3 50	1 50																	
PDPL3	HV																								1 5	1 10																		
PDPL4	HV																								1 5	1 15																		
PDPL5	HV																								1 5	1 10																		
PDPL6	HV																								1 5	1 10																		
PDPL7	HV																								1 5	1 15																		
PDPL8	HV																								1 5	1 10																		
PDPL9	HV																								1 5	1 10																		
TOTAL (LF)			30		1260		750		95		80		110		1090		165		3560		165		1095		1095		2225		1790		5005		155		3959		10380		720					
EST. TOTAL			35		1390		825		105		90		125		1200		1110		3920		185		2410		1205		2450		1970		5510		175		4355		11420		795					


STATE OF TEXAS

★

ROBERTSON JON P. BELARMINO

100351

PROFESSIONAL ENGINEER



04/06/2021

NO.

REVISIONS

BY

DATE

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LHRA

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

SIGNAL DETAILS

SL 494

AT NORTH PARK DR

DESIGNED:

FED. RD. DIV. NO.

STATE

CITY OF HOUSTON WBS

HIGHWAY NO.

CHECKED:

6

TEXAS

SEE TITLE SHEET

CS

DRAWN:

STATE DISTRICT

COUNTY

CONTROL No.

SECTION No.

JOB No.

SHEET No.

CHECKED:

HOU

MONTGOMERY

0912

37

232

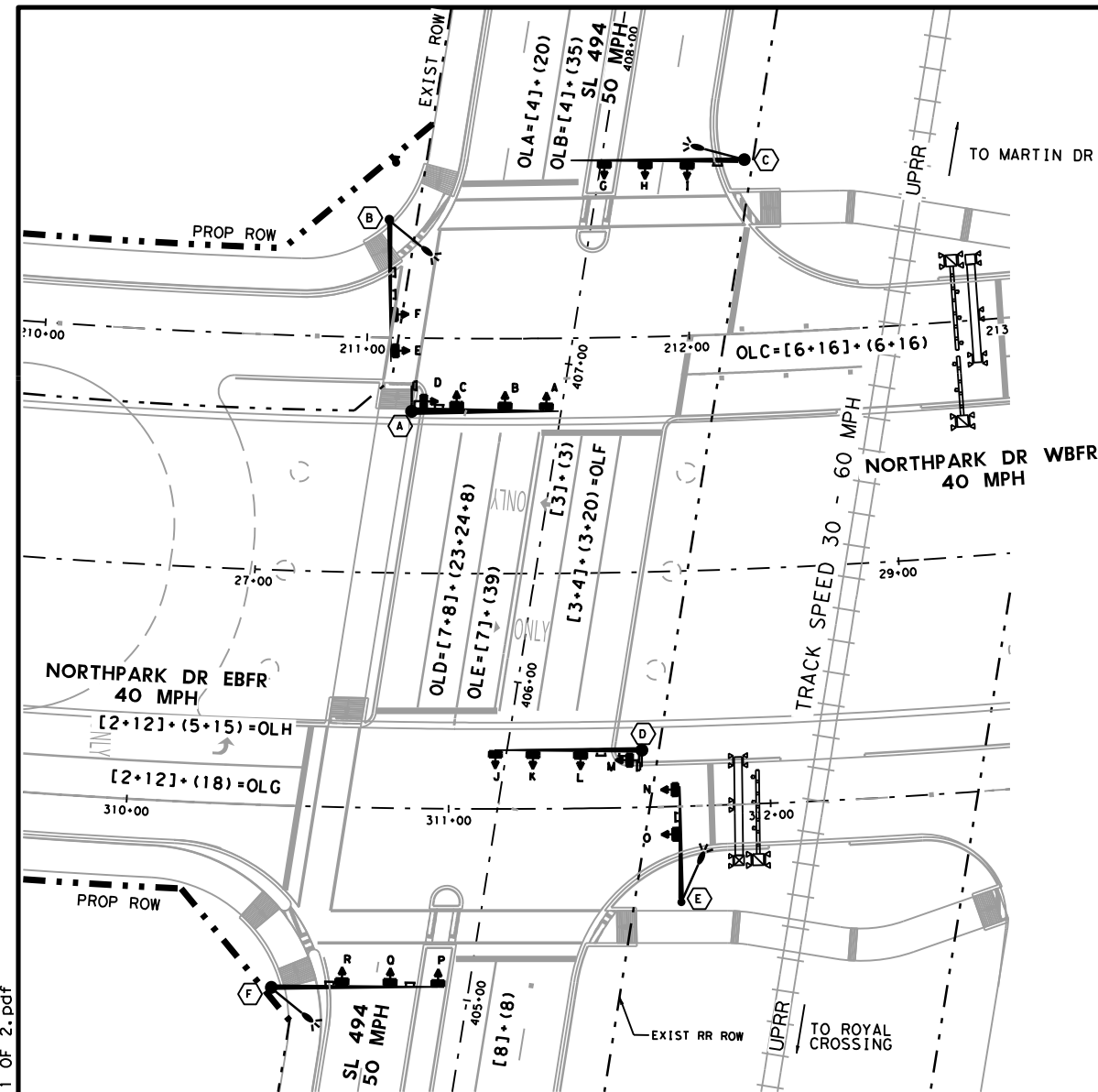
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SHEET 4 OF 4

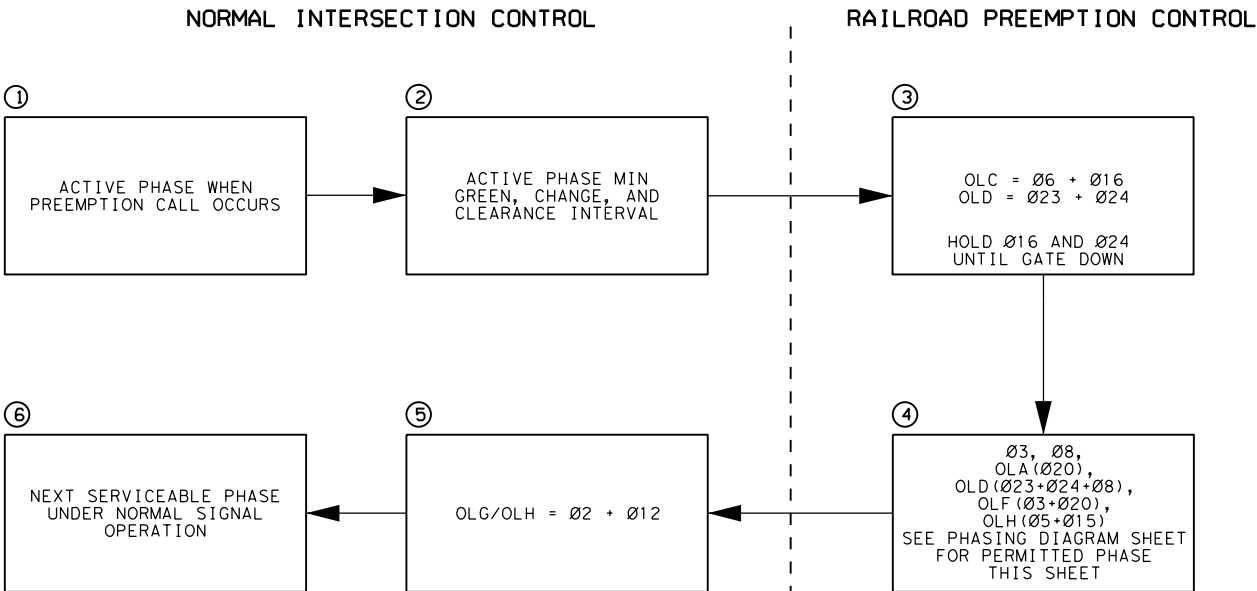
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RAILROAD PREEMPTION SEQUENCE DIAGRAM



OPERATIONAL LEGEND

[#] - NORMAL OPERATION SIGNAL PHASING
(#) - RR PREEMPT SIGNAL PHASING

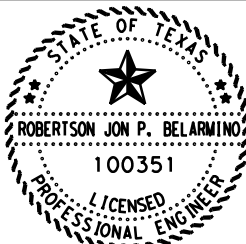
OLA = [Ø4]+(Ø20)
OLB = [Ø4]+(Ø35)
OLC = [Ø6+Ø16]+(Ø6+Ø16)
OLD = [Ø7+Ø8]+(Ø23+Ø24+Ø8)
OLE = [Ø7]+(Ø39)
OLF = [Ø3+Ø4]+(Ø3+Ø20)
OLG = [Ø2+Ø12]+(Ø18)
OLH = [Ø2+Ø12]+(Ø5+Ø15)

PREEMPTION	PHASE	INTERVAL	TIME (SEC)
2	OL C [Ø6+Ø16]	GREEN	5.0
		YELLOW	6.5
		ALL RED	1.6
3	OL C (Ø6+Ø16)	GREEN	0 - 255
		YELLOW	6.5
		ALL RED	1.6
	OL D (Ø23+Ø24)	GREEN	0-255
		YELLOW	4.7
		ALL RED	1.0
4	Ø8	GREEN	0 - 255
		YELLOW	4.7
		ALL RED	1.0
	Ø3	GREEN	0-255
		YELLOW	4.7
		ALL RED	1.6
	OL H (Ø5+Ø15)	GREEN	0 - 255
		YELLOW	5.3
		ALL RED	1.9
	OL A (Ø20)	GREEN	0 - 255
		YELLOW	4.7
		ALL RED	1.0
	OL F (Ø3+Ø20)	GREEN	0-255
		YELLOW	4.7
		ALL RED	1.0
	OL D (Ø23+Ø24+Ø8)	GREEN	0-255
		YELLOW	4.7
		ALL RED	1.0

* - MOVEMENT REQUIRING MOST TIME TO CLEAR Ø6+Ø16

EXHIBIT A

DOT# 975516M EBFR
DOT# 975518B WBFR
RRMP 22.15



NOT TO SCALE

NO.	REVISIONS	BY	DATE
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HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAH
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
RAILROAD PREEMPT
SL 494
AT NORTH PARK DR

SHEET 1 OF 2

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION	JOB NO.
CHECKED:	HOU	MONTGOMERY	0912 37	232 488

4/6/2021

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RAILROAD SIGNAL PREEMPT OPERATION CHART							
STEP 2: CLEAR ACTIVE PHASE			STEP 3: TRACK CLEARANCE			STEP 4: DWELL PHASE	
SIG/PED HEAD ID	MIN VEHICLE GREEN	CLEARANCE INTERVAL	OL C (*6 + *16) GREEN	OL D (*23 + *24) GREEN	OL C (*6 + *16) OL D (*23 + *24) CLEAR TO *3, *8, OL A (*20) OL D (*23 ++*8) OL F (*3+ *20) OL H (*5 + *15)	*3, *8, OL A (*20) OL D (*23+ *8) OL F (*3+ *20) OL H (*5 + *15) PHASE COMBINATIONS AS PER PHASE CALLS	*3, *8, OL A (*20) OL D (*23+ *24 ++*8) OL F (*3+ *20) OL H (*5 + *15) CLEAR TO OL G/OL H (*2 + *12)
			0-255	0-255	OL C (8.1SECS) OL D (5.7 SECS)	0-255	*3 (6.3 SECS) *8 (5.7 SECS) OL A (5.7 SECS) OL D (5.7 SECS) OL F (5.7 SECS) OL H (7.2 SECS)
A	-	-	R	R	R	R	R
B	-	-	R	R	R	G, Y, R	Y, R
C	-	-	R	R	R	G, Y, R	Y, R
D	-	-	<G	<G	<Y, <R, <R	<R,<R	<R,<R
E	-	-	G	G	Y, R	R	R
F	-	-	G	G	Y, R	R	R
G	-	-	<R,<R	<R,<R	<R,<R	<G, <Y, <R,<R	<Y, <R,<R
H	-	-	R	R	R	G, Y, R	Y, R
I	-	-	R	R	R	G, Y, R	Y, R
J	-	-	R	R	R	G, Y, R	Y, R
K	-	-	R	R	R	G, Y, R	Y, R
L	-	-	R	R	R	G, Y, R	Y, R
M	-	-	<R,<R	<R,<R	<R,<R	<G, <Y, <R,<R	<Y, <R,<R
N	-	-	R	R	R	G, Y, R	Y, R
O	-	-	R	R	R	G, Y, R	Y, R
P	-	-	<R, <R	<R, <R	<R, <R	<R, <R	<R, <R
Q	-	-	G	G	Y, R	G, Y, R	Y, R
R	-	-	G	G	Y, R	G, Y, R	Y, R
PED 1	-	-	DW	DW	DW	W, FDW, DW	DW
PED 2	-	-	DW	DW	DW	W, FDW, DW	DW
PED 3	-	-	W, FDW	W, FDW	DW	DW	DW
PED 4	-	-	W, FDW	W, FDW	DW	DW	DW
PED 5	-	-	W, FDW	W, FDW	DW	DW	DW
PED 6	-	-	DW	DW	DW	DW	DW
PED 7	-	-	DW	DW	DW	DW	DW
PED 8	-	-	DW	DW	DW	DW	DW
PED 9	-	-	W, FDW	W, FDW	DW	W, FDW, DW	DW
PED 10	-	-	W, FDW	W, FDW	DW	W, FDW, DW	DW
BLANK-OUT SIGN	-	-	ON	ON	ON	ON	ON, OFF
BLANK-OUT SIGN	-	-	ON	ON	ON	ON	ON, OFF

RAILROAD PREEMPTION TIMING NOTES:

1. SIGNAL PREEMPTION SHALL BE PROGRAMMED TO INCLUDE 20 SECONDS OF MINIMUM WARNING TIME, PLUS 22 SECONDS ADVANCE PREEMPTION TIME FOR A TOTAL OF 42 SECONDS APPROACH TIME PRIOR TO THE ARRIVAL OF THE FASTEST TRAIN AT THE CROSSINGS.

2. UPON RECEIPT OF CALL TO PREEMPT, A MINIMUM GREEN INTERVAL OF 5 SECONDS SHALL BE TIMED TO PREVENT MOMENTARY GREEN SIGNAL DISPLAYS SHOULD A PREEMPT COMMAND BE RECEIVED IMMEDIATELY UPON ENTERING GREEN PHASE.

3. FOLLOWING THE MINIMUM GREEN INTERVAL, A MINIMUM YELLOW CHANGE INTERVAL FOR THE ACTIVE PHASE SHALL BE PROVIDED TO CLEAR ALL INDICATIONS TO RED EXCEPT SIGNAL HEADS D, E, AND F, WHICH WOULD REMAIN GREEN IF INTERSECTION WAS IN OLC (Ø6+Ø16) WHEN PREEMPT CALL IS RECEIVED.

4. HOLD OLC (Ø6+Ø16) GREEN FOR A MINIMUM OF 24 SECONDS AND PROVIDING ADDITIONAL TIME AS NEEDED B IN ONE (1) SECOND INTERVALS TO PROVIDE TRACK CLEARANCE UNTIL THE RAILROAD GATES FULLY DESCEND TO A HORIZONTAL POSITION.

5. CLEAR OLC (Ø6+Ø16) TO EITHER OF THE FOLLOWING ALLOWABLE COMBINATIONS OF PHASE AND OVERLAPS:

- Ø3,

- Ø8,

- OL A (Ø20)

- OL D (Ø23 + Ø8)

- OL F (Ø3 + Ø20)

- OL H (Ø5 + Ø15)

WITH A YELLOW CHANGE INTERVAL OF 6.5 SECONDS AND A RED CLEARANCE INTERVAL OF 1.6 SECONDS.

6. HOLD THE GREEN FOR THE ALLOWABLE COMBINATIONS OF PHASE AND OVERLAPS FOR A MINIMUM TIME (ADJUSTABLE FROM 0-255 SECONDS AT ONE (1) SECOND INTERVALS).

7. AFTER EITHER OF THE ALLOWABLE COMBINATIONS OF PHASE AND OVERLAPS GREEN TIME OUT AND CALL TO PREEMPT HAS BEEN DROPPED, CLEAR TO OL G/OL H (Ø2 + Ø12) WITH A YELLOW CHANGE AND A RED CLEARANCE INTERVAL AS SPECIFIED; WITH TOTALS VARYING BETWEEN 5.7 SECONDS AND 7.2 SECONDS AS SHOWN ON THE INTERNAL PREEMPTION TIMING.

8. RESUME NORMAL INTERSECTION CONTROL BY SERVICING OL G/OL H (Ø2 + Ø12), FOLLOWED BY THE NEXT SERVICEABLE PHASE.

9. A "PREEMPT TEST" INPUT SHALL BE PROVIDED TO CAUSE THE ENTIRE PREEMPT SEQUENCE TO OPERATE UPON ACTIVATION. CONTRACTOR, UPRR, AND CITY OF HOUSTON SHALL DEVELOP ALL TEST REQUIREMENTS PRIOR TO PLACING THE INTERSECTION INTO SERVICE.

10. YELLOW AND ALL RED CLEARANCE INTERVAL DURATIONS FROM NORMAL SIGNAL OPERATION TO REMAIN UNCHANGE DURING PREEMPTION DWELL PHASE SEQUENCE, EXCEPT DURING TRACK CLEARANCE PHASE AS SHOWN IN THE INTERNAL PREEMPTION TIMING.

NOTES FOR UPRR:

1. UPRR AND CITY OF HOUSTON TO DETERMINE RAILROAD CIRCUIT REQUIREMENTS FOR THIS PROJECT, WHICH INCLUDE ADVANCE PREEMPTION, TRAFFIC SIGNAL HEALTH, SUPERVISION, CONSTANT WARNING CONTROL AND GATE-DOWN CIRCUITS.

2. UPRR CONTRACTOR WILL FURNISH AND INSTALL A RELAY TO PROVIDE ADVANCE PREEMPTION TO THE TRAFFIC SIGNAL AT THE INTERSECTION OF SL 494 AND NORTHPARK DRIVE. A CLOSED CIRCUIT IS TYPICALLY REQUIRED BETWEEN THE CONTROL RELAY OF THE GRADE CROSSING WARNING DEVICE AND THE TRAFFIC SIGNALS AS STATED IN THE TEXAS MUTCD.

3. THE PREEMPTION FEATURE SHALL HAVE AN ELECTRICAL CIRCUIT OF THE CLOSED-CIRCUIT PRINCIPLE, OR A SUPERVISED COMMUNICATION CIRCUIT BETWEEN THE CONTROL CIRCUITS OF THE HIGHWAY-RAIL GRADE CROSSING WARNING SYSTEM AND THE TRAFFIC CONTROL SIGNAL CONTROLLER.

4. THE TRAFFIC SIGNAL CONTROLLER PREEMPTOR SHALL BE ACTIVATED VIA THE SUPERVISED COMMUNICATION CIRCUIT OR THE ELECTRICAL CIRCUIT THAT IS NORMALLY ENERGIZED BY THE CONTROL CIRCUITS OF THE HIGHWAY-RAIL GRADE CROSSING WARNING SYSTEM.

5. THE APPROACH OF A TRAIN TO A HIGHWAY-RAIL GRADE CROSSING SHALL DE-ENERGIZE (SHUNT) THE ELECTRICAL CIRCUIT OR ACTIVATE THE SUPERVISED COMMUNICATION CIRCUIT, WHICH IN-TURN SHALL ACTIVATE THE TRAFFIC SIGNAL CONTROLLER PREEMPTOR. THIS SHALL ESTABLISH AND MAINTAIN THE PREEMPTION CONDITION DURING THE TIME THE HIGHWAY-RAIL GRADE CROSSING WARNING SYSTEM IS ACTIVATED. WHEN CROSSING GATES EXITS, THE PREEMPTION CONDITION SHALL BE MAINTAINED UNTIL THE CROSSING GATES ARE ENERGIZED TO BEGIN UPWARD MOVEMENT.

6. WHEN MULTIPLE OR SUCCESSIVE PREEMPTIONS OCCUR, TRAIN ACTIVATION SHALL RECEIVE FIRST PRIORITY.

7. PREEMPTION CONTROL AND INTERSECTION TIMING TO BE COORDINATED WITH THE CITY OF HOUSTON TRAFFIC MAINTENANCE AND OPERATIONS DEPARTMENT.

INTERSECTION CONTROL NOTES:

NORMAL INTERSECTION CONTROL

1. INACTIVATE/OMIT Ø5, Ø15, Ø18, Ø23, Ø24, Ø39, Ø20, & Ø35 DURING NORMAL INTERSECTION CONTROL.
2. ACTIVATE Ø2, Ø3, Ø4, Ø6, Ø7, Ø8, Ø12, & Ø16 PER PHASE LOGIC TO MANAGE INTERSECTION ROW.
3. Ø12 SHALL BE USED TO CLEAR Ø2 UNDER NORMAL INTERSECTION CONTROL.
4. Ø16 SHALL BE USED TO CLEAR Ø6 UNDER NORMAL INTERSECTION CONTROL.

RR PREEMPTION INTERSECTION CONTROL

5. Ø7 SHALL BE PROGRAMMED TO OPERATE THE MIN GREEN DURING ROW TRANSFER PHASE IF Ø4 IS ACTIVE AT THE TIME OF RR PREEMPT CALL. THIS CONDITION SHALL BE PROGRAMMED TO MINIMIZE ENTRY OF VEHICLES ONTO THE EB RAILROAD AT-GRADE CROSSING AND REDUCE ADVANCE PREEMPTION TIME REQUIREMENT.
6. INACTIVATE/OMIT Ø2, Ø4, Ø7, & Ø12 DURING RR PREEMPTION INTERSECTION CONTROL.
7. USE Ø6, Ø16, Ø23, AND Ø24 FOR TRACK CLEARANCE.
8. USE Ø24 TO DELAY START OF Ø8 UNDER RR PREEMPTION CONTROL UNTIL GATE DOWN.
9. ACTIVATE Ø3, Ø5, Ø8, Ø15, Ø20, Ø23 & Ø24 PER PHASE LOGIC TO MANAGE INTERSECTION ROW.
10. HOLD "RED" INTERVAL FOR Ø6, Ø16, Ø18, Ø35, Ø39 FOR THE TOTAL RR PREEMPT DWELL PHASE DURATION TIME.
11. Ø15 SHALL BE USED TO CLEAR Ø5 UNDER RR PREEMPTION CONTROL.

NORMAL/RR PREEMPTION CONTROL

12. CONFLICT AND MAINTENANCE: FLASH "RED" ALL PHASES.

EXHIBIT A			
DOT# 975516M EBFR DOT# 975518B WBFR RRMP 22.15			
<div><div><div>STATE OF TEXAS</div><div><div>ROBERTSON JON P. BELARMINO</div><div>100351</div><div>LICENSED PROFESSIONAL ENGINEER</div></div><div><div>04/06/2021</div></div></div></div>			
NO.	REVISIONS	BY	DATE
<div><div><div>HNTB</div><div><div>HNTB Corporation</div><div>The HNTB Companies</div><div>Infrastructure Solutions</div><div>Firm Registration Number 420</div></div></div><div><div><div>LHRA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10</div><div>ØØ HUNTON ANDREWS KURTH LLP</div><div>ØØØ TRAVIS, SUITE 4200</div><div>HOUSTON, TX 770Ø7</div></div></div></div>			
CITY OF HOUSTON			
HOUSTON PUBLIC WORKS			
NORTHPARK DRIVE			
RAILROAD PREEMPT			
SL 494			
AT NORTHPARK DR			
SHEET 2 OF 2			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	Ø912 37 232 489

PAIR	WIRE	COLOR	FUNCTION	INTERFACE PANEL TERMINAL NUMBER
1	1	BLUE	ADVANCED PREEMPT (APR) POSITIVE	T1 - 1.1
1	2	BLUE/BLACK	ADVANCED PREEMPT (APR) NEGATIVE	T1 - 1.2
2	1	ORANGE	ENERGY NX	T1 - 2.1
2	2	ORANGE/BLACK	ENERGY BX	T1 - 2.2
3	1	GREEN	SIMULTANEOUS PREEMPTION POSITIVE	T1 - 3.1
3	2	GREEN/BLACK	SIMULTANEOUS PREEMPTION NEGATIVE	T1 - 3.2
4	1	RED	GATE DOWN POSITIVE	T1 - 4.1
4	2	RED/BLACK	GATE DOWN NEGATIVE	T1 - 4.2
5	1	BLACK	TRAFFIC SIGNAL HEALTH POSITIVE	T2 - 2.1
5	2	BLACK/WHITE	TRAFFIC SIGNAL HEALTH NEGATIVE	T2 - 2.2
6	1	WHITE	SUPERVISED POSITIVE	T2 - 4.1
6	2	WHITE/BLACK	SUPERVISED NEGATIVE	T2 - 4.2
7	1	RED/WHITE	SPARE	NOT USED
7	2	GREEN/WHITE	SPARE	NOT USED

- NOTES:
- UPRR SHALL PROVIDE RAILROAD CIRCUIT OPTIONS FOR USE WITH THIS PROJECT TO THE CITY OF HOUSTON. SUBSEQUENT CONNECTIONS FOR EACH SELECTED CIRCUIT FUNCTION SHALL BE MADE AS SELECTED AND AS SHOWN ON THE PLAN SCHEMATIC.
 - CONTRACTOR SHALL PERFORM ALL TESTING REQUIREMENT WITH BOTH THE CITY OF HOUSTON AND UPRR TO ENSURE INTERCONNECTION FUNCTIONS OPERATE AS INTENDED FOR BOTH RAILROAD AND TRAFFIC SIDE OF THE INTERSECTION OPERATION.

- LEGEND
- PE1 - ALL RED FLASH
PE2 - SIMULTANEOUS PREEMPTION
PE3 - ADVANCE PREEMPTION
PE4 - DWELL OPERATION/LIMITED SERVICE
PE5 - UNUSED
PE6 - UNUSED
APR - ADVANCE PREEMTION CIRCUIT
XR - SIMULTANEOUS PREEMPTION CIRCUIT
GDR - GATE DOWN CIRCUIT

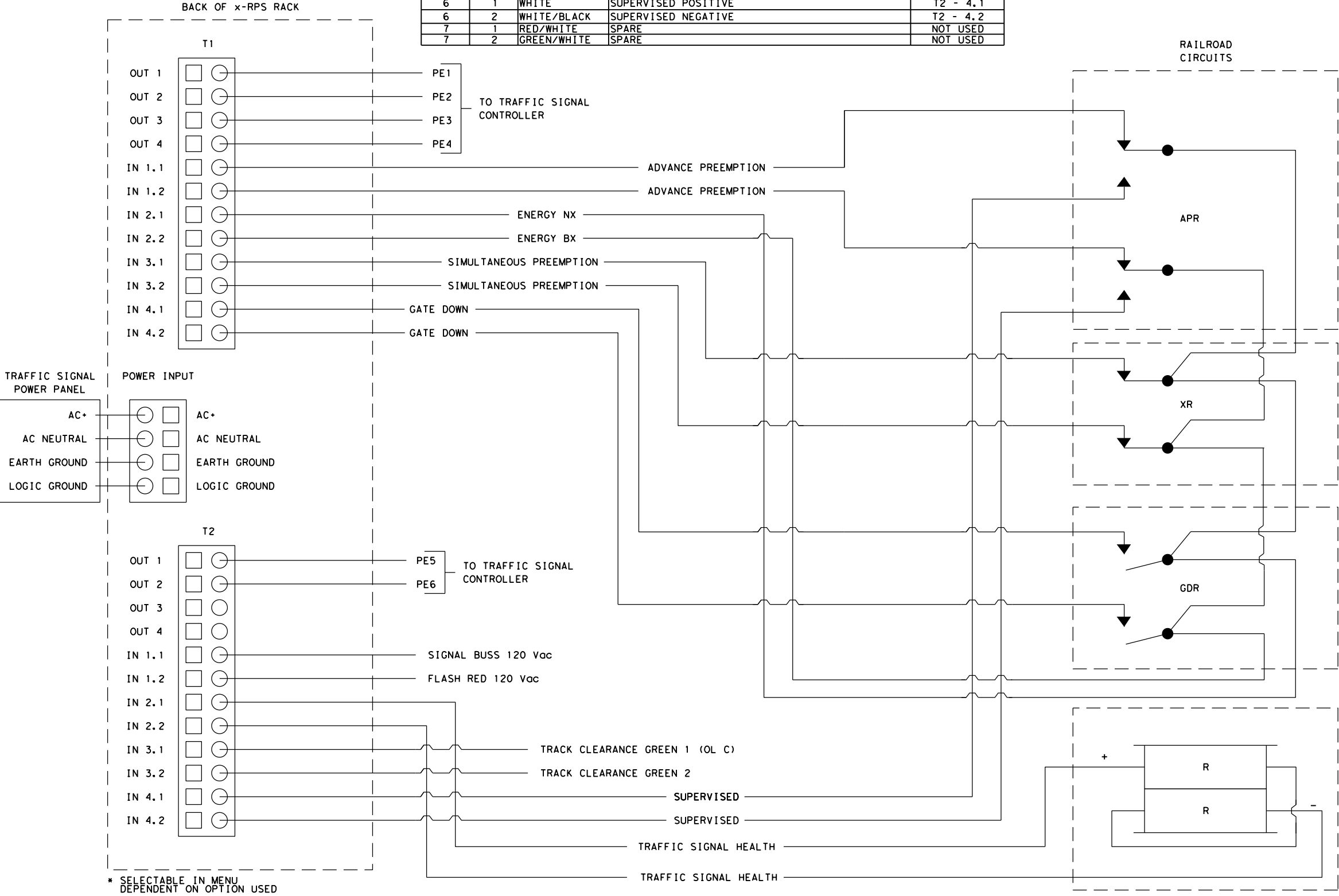


EXHIBIT A

DOT# 975516M EBFR
DOT# 975518B WBFR
RRMP 22.15

STATE OF TEXAS
ROBERTSON JON P. BELARMINO
100351
LICENSED PROFESSIONAL ENGINEER
04/06/2021

NO.	REVISIONS	BY	DATE

HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAH RA
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

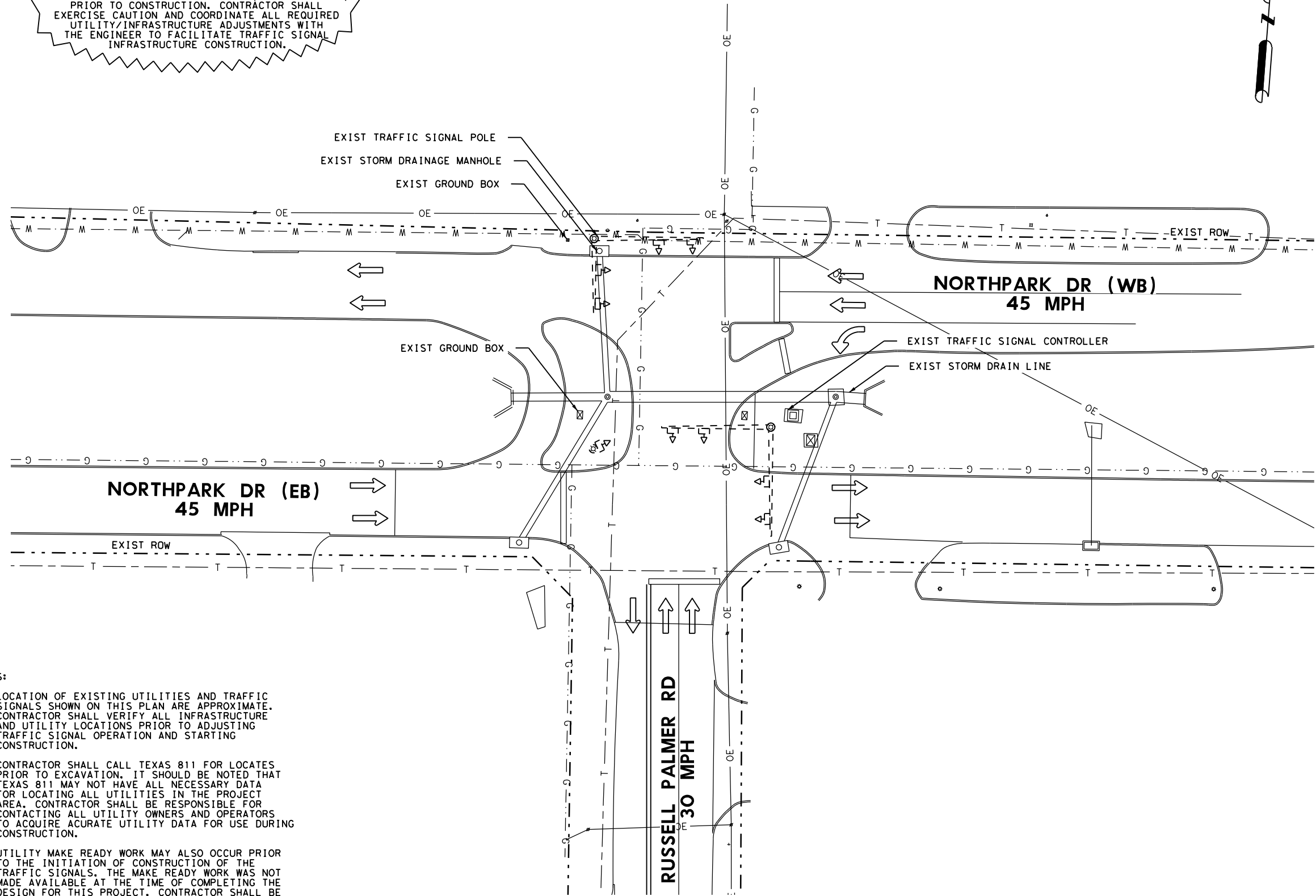
NORTH PARK DRIVE
INTERCONNECTION
DIAGRAM
SL 494
AT NORTH PARK DR

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION No.	JOB SHEET No.
CHECKED:	HOU	MONTGOMERY	0912 37	232 489A

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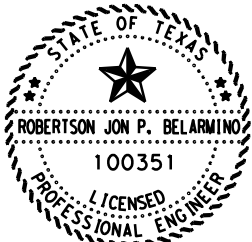
THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POT HOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.



- LEGEND**
- SIGNAL POLE AND MAST ARM
 - EXIST VIVDS
 - EXIST ILLUMINATION
 - EXIST GROUND BOX
 - EXIST TRAFFIC SIGNAL CONTROLLER
 - EXIST STORM DRAINAGE
 - EXIST MANHOLE
 - EXIST PED POLE
 - EXIST DIRECTION OF TRAFFIC FLOW
 - EXIST RAILROAD ROW
 - EXISTING ROW
 - EXIST UNDERGROUND COMM LINE
 - EXIST UNDERGROUND WATER LINE
 - EXIST UNDERGROUND GAS LINE
 - EXIST UNDERGROUND SEWER LINE
 - EXIST UNDERGROUND POWER LINE
 - EXIST UNDERGROUND FIBER OPTIC
 - EXIST OVERHEAD POWER LINE

NOTES:

- LOCATION OF EXISTING UTILITIES AND TRAFFIC SIGNALS SHOWN ON THIS PLAN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL INFRASTRUCTURE AND UTILITY LOCATIONS PRIOR TO ADJUSTING TRAFFIC SIGNAL OPERATION AND STARTING CONSTRUCTION.
- CONTRACTOR SHALL CALL TEXAS 811 FOR LOCATES PRIOR TO EXCAVATION. IT SHOULD BE NOTED THAT TEXAS 811 MAY NOT HAVE ALL NECESSARY DATA FOR LOCATING ALL UTILITIES IN THE PROJECT AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS AND OPERATORS TO ACQUIRE ACURATE UTILITY DATA FOR USE DURING CONSTRUCTION.
- UTILITY MAKE READY WORK MAY ALSO OCCUR PRIOR TO THE INITIATION OF CONSTRUCTION OF THE TRAFFIC SIGNALS. THE MAKE READY WORK WAS NOT MADE AVAILABLE AT THE TIME OF COMPLETING THE DESIGN FOR THIS PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS AND OPERATORS FOR ACQUIRING THE MOST CURRENT UTILITY DATA AND LOCATES FOR USE DURING CONSTRUCTION.



04/06/2021

0' 20' 40'
SCALE : 1"=40'

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600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE

EXISTING
CONDITIONS

RUSSELL PALMER
AT NORTHPARK DR

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
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4/6/2021

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NEW SIGNAL HEAD AND SIGN SCHEDULE

PHASING DIAGRAM

LEGEND

THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POTHOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW
- PRE-FORMED LOOP DETECTOR

(90" x 24")

D3-1G

Northpark DR 1700 1800

S3

(120" x 24")

D3-1G

Russell Palmer RD 700

S2

(120" x 24")

D3-1G

Russell Palmer RD 700

S5

(30" x 36")

R10-17T

LEFT TURN YIELD ON FLASHING YELLOW ARROW

S1

(24" x 24")

R5-2

S4

(30" x 48")

R3-8LcT

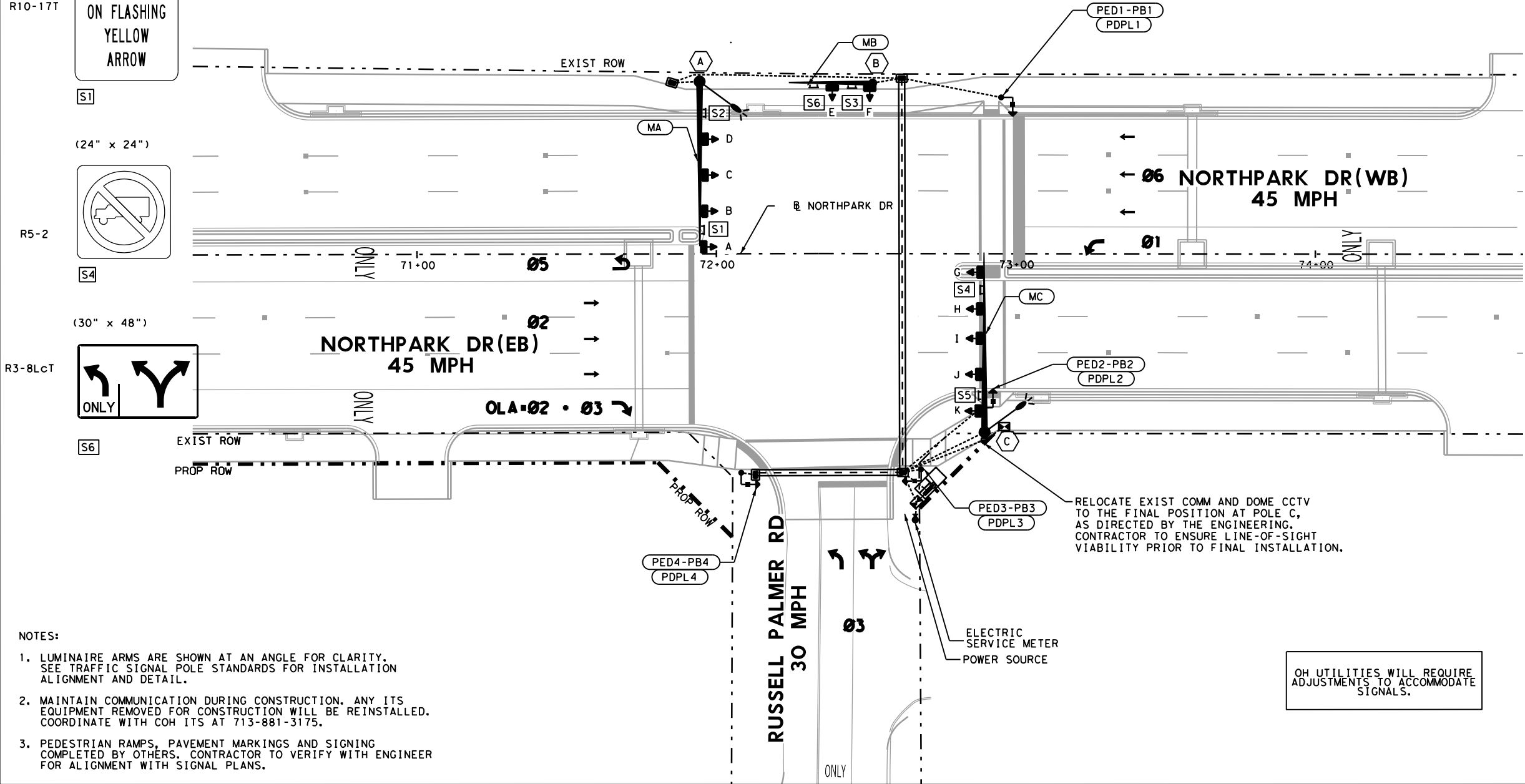
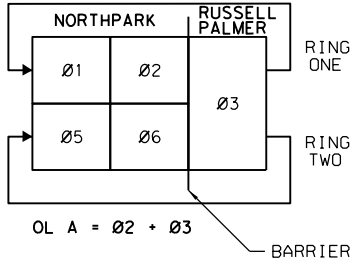
S6

B, C, D, E, F, H, I, J

G

A

K



- NOTES:
- LUMINAIRE ARMS ARE SHOWN AT AN ANGLE FOR CLARITY. SEE TRAFFIC SIGNAL POLE STANDARDS FOR INSTALLATION ALIGNMENT AND DETAIL.
 - MAINTAIN COMMUNICATION DURING CONSTRUCTION. ANY ITS EQUIPMENT REMOVED FOR CONSTRUCTION WILL BE REINSTALLED. COORDINATE WITH COH ITS AT 713-881-3175.
 - PEDESTRIAN RAMPS, PAVEMENT MARKINGS AND SIGNING COMPLETED BY OTHERS. CONTRACTOR TO VERIFY WITH ENGINEER FOR ALIGNMENT WITH SIGNAL PLANS.

STATE OF TEXAS

ROBERTSON JON P. BELARMINO

100351

LICENSED PROFESSIONAL ENGINEER

04/06/2021

0' 20' 40'

SCALE : 1"=40'

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600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

NEW SIGNAL LAYOUT

RUSSELL PALMER

AT NORTH PARK DR

SHEET 1 OF 1

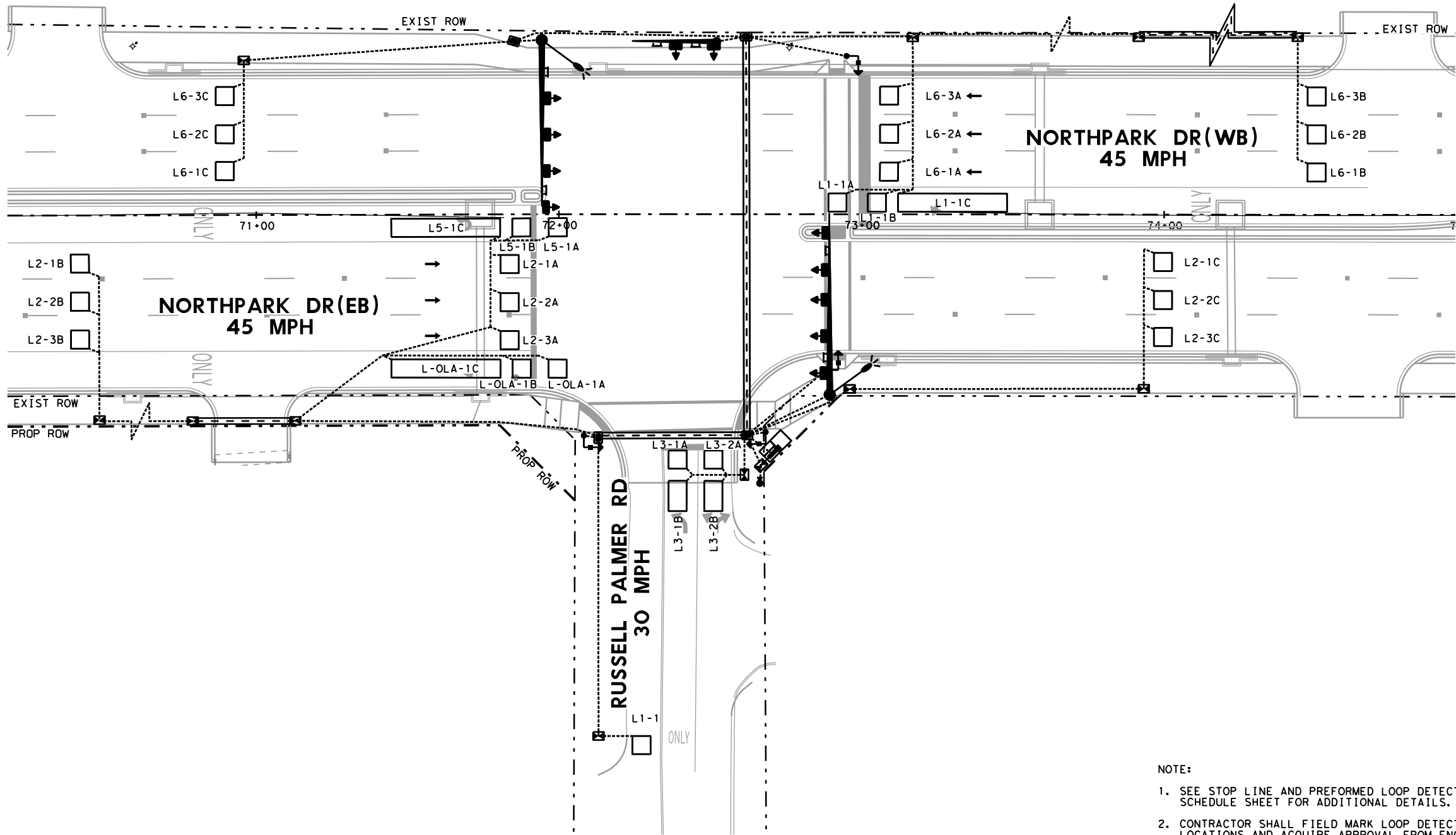
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CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37

232 491

4/6/2021

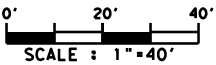
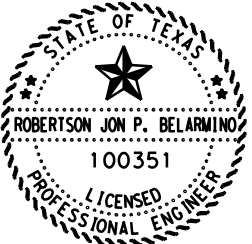
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THE PRESENCE OF UTILITIES EXIST IN THIS AREA. CONTRACTOR SHALL CALL FOR LOCATES AND POT HOLE UTILITIES/INFRASTRUCTURE, AS NECESSARY, PRIOR TO CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION AND COORDINATE ALL REQUIRED UTILITY/INFRASTRUCTURE ADJUSTMENTS WITH THE ENGINEER TO FACILITATE TRAFFIC SIGNAL INFRASTRUCTURE CONSTRUCTION.



LEGEND

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW
- PRE-FORMED LOOP DETECTOR



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**NORTH PARK DRIVE
LOOP DETECTION LAYOUT
RUSSELL PALMER
AT NORTH PARK DR**

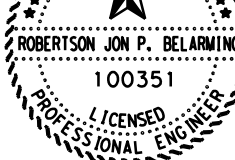




- NOTE:
- SEE STOP LINE AND PREFORMED LOOP DETECTION SCHEDULE SHEET FOR ADDITIONAL DETAILS.
 - CONTRACTOR SHALL FIELD MARK LOOP DETECTOR LOCATIONS AND ACQUIRE APPROVAL FROM ENGINEER PRIOR TO PERFORMING PAVEMENT SAWCUT AND CONSTRUCTION.

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
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4/6/2021

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STOP LINE AND PREFORMED LOOPS LOCATION		
ITEM BY DIRECTION	STATION NORTH PARK DR	OFFSET
NORTHBOUND		
STOP LINE @ GUTTER	72+57	76.9' RT
STOP LINE @ CENTERLINE	72+45	77.1' RT
NORTHBOUND (LEFT, LEFT-RIGHT LANES)		
PHASE 3 LOOPS		
L3-1A (6' X 6')	72+39	CENTERED IN LANE
L3-2A (6' X 6')	72+51	
L3-1B (6' X 10')	72+39	
L3-2B (6' X 10')	72+51	
PHASE 1 DOWNSTREAM LOOPS		
L1-1	72+26	
ITEM BY DIRECTION	STATION NORTH PARK DR	OFFSET
EASTBOUND		
STOP LINE @ GUTTER	71+91	56.8' RT
STOP LINE @ CENTERLINE	71+92	26.9' RT
EASTBOUND (THRU LANES)		
PHASE 2 CALL (6' X 6') LOOPS		
L2-1A, L2-2A, L2-3A	71+87	CENTERED IN LANE
PHASE 2 PULSE LOOPS		
L2-1B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
L2-2B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
L2-3B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
PHASE 2 DOWNSTREAM LOOPS		
L2-1C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
L2-2C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
L2-3C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
EASTBOUND (LEFT TURN LANE)		
PHASE 5 PRESENCE LOOPS		
L5-1A (6' X 6') LOOP	72+03	CENTERED IN LANE
L5-1B (6' X 6') LOOP	71+91	
L5-1C (6' X 30') LOOP	71+81	
EASTBOUND (RIGHT TURN LANE)		
PHASE 0LA PRESENCE LOOPS		
L-OLA-1A (6' X 6') LOOP	72+02	CENTERED IN LANE
L-OLA-1B (6' X 6') LOOP	71+91	
L-OLA-1C (6' X 30') LOOP	71+81	
WESTBOUND		
STOP LINE @ GUTTER	73+00	44.9' LT
STOP LINE @ CENTERLINE	73+01	21.1' LT
WESTBOUND (THRU LANES)		
PHASE 6 CALL (6' X 6') LOOPS		
L6-1A, L6-2A, L6-3A	73+06	CENTERED IN LANE
PHASE 6 PULSE LOOPS		
L6-1B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
L6-2B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
L6-3B LEADING EDGE (6' X 6')	330' FROM STOP BAR	
PHASE 6 DOWNSTREAM LOOPS		
L6-1C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
L2-2C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
L2-3C LEADING EDGE (6' X 6')	215' FROM STOP BAR	
WESTBOUND (LEFT TURN LANE)		
PHASE 1 PRESENCE LOOPS		
L1-1A (6' X 6') LOOP	72+89	CENTERED IN LANE
L1-1B (6' X 6') LOOP	73+02	
L1-1C (6' X 30') LOOP	73+12	

  <p style="margin-left: 40%;">04/06/2021</p>																					
 <p>SCALE : 1" = 40'</p>																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">NO.</th> <th style="width: 60%;">REVISIONS</th> <th style="width: 10%;">BY</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>						NO.	REVISIONS	BY	DATE												
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		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420																			
		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007																			
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2>																					
<h3 style="margin: 0;">NORTHPARK DRIVE</h3>																					
<h1 style="margin: 0;">STOP LINE & PREFORMED LOOP DETECTION SCH</h1>																					
<h2 style="margin: 0;">RUSSELL PALMER</h2>																					
<h2 style="margin: 0;">AT NORTHPARK DR</h2>																					
SHEET 1 OF 1																					
DESIGNED:		FED. DIV. No.	STATE	CITY OF HOUSTON WBS																	
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DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.																
CHECKED:		HOU	MONTGOMERY	0912	37																
				JOB No.	SHEET No.																
				232	491B																

LEGEND

- SIGNAL POLE AND MAST ARM
SERVICE POLE ASSEMBLY
TRAFFIC SIGNAL HEAD
PEDESTRIAN SIGNAL HEAD
W/ PUSHBUTTON AND SIGN
GROUND BOX TY A
GROUND BOX TY B
ITS 340 CABINET W/ 2070 LX
CONTROLLER W/ GPS & UPS
LUMINAIRE (LED)
CONDUIT (TRENCH)
CONDUIT (BORE)
OVERHEAD STREET NAME SIGN
DIRECTION OF TRAFFIC FLOW

- NOTES:
1. CONTACT CITY OF HOUSTON ITS OPERATIONS AND SAFETY SECTION (713-881-3052)
FOR INTEGRATION SCHEDULE AND/OR SALVAGE OF ANY COMMUNICATION EQUIPMENT.
2. ALL COMMUNICATION EQUIPMENT TO BE WIRED TO NEW CABINET.

NORTH PARK DR (EB)
45 MPH

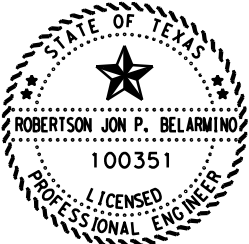
NORTH PARK DR (WB)
45 MPH

RUSSELL PALMER RD
30 MPH

HIGH VOLTAGE CIRCUIT

- (X)Y"C = NUMBER, SIZE, AND TYPE OF CONDUIT
(X) = NUMBER OF CABLES (SIGNAL)
CC = #14 AWG SOLID CONDUCTOR CABLE
BB = BARE BOND #8 AWG SOLID
BG = BARE GROUND #8 AWG SOLID
BGL = BARE GROUND LIGHTING #12 AWG XHHW
SP = SIGNAL POWER (SEE NOTES)
SL = STREET LIGHTING (2-#10 AWG XHHW)

- NOTES:
SP1 SHALL CONSIST OF 6-#4 AWG XHHW
2-WHITE
1-BLACK
1-RED
2-GREEN



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LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

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HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
CABLE SCHEMATIC
RUSSELL PALMER
AT NORTH PARK DR

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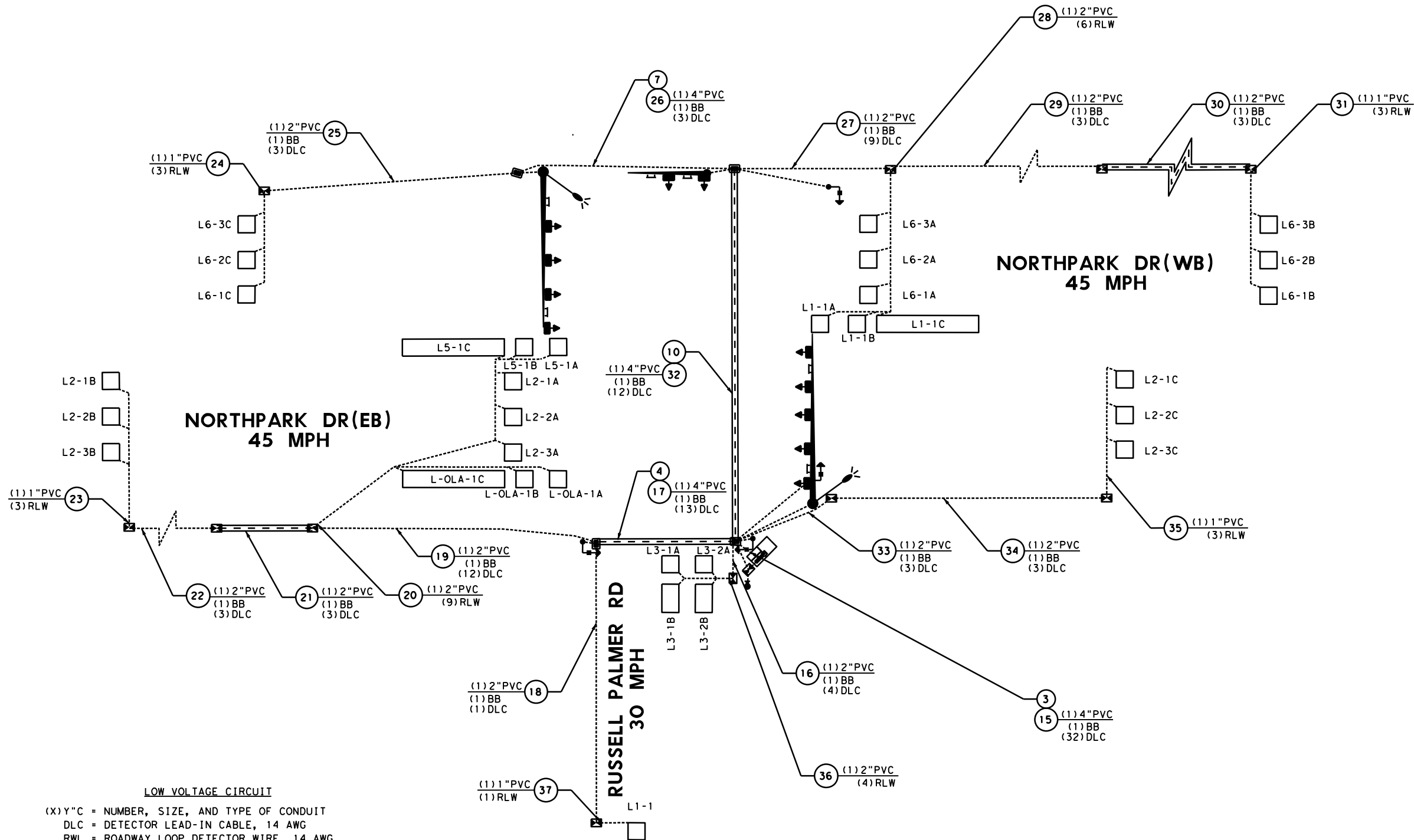
SHEET 1 OF 2

4/6/2021

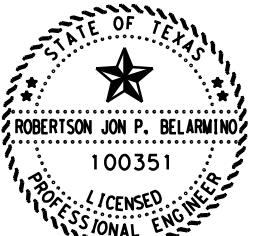
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LEGEND

- SIGNAL POLE AND MAST ARM
- SERVICE POLE ASSEMBLY
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON AND SIGN
- GROUND BOX TY A
- GROUND BOX TY B
- ITS 340 CABINET W/ 2070 LX CONTROLLER W/ GPS & UPS
- LUMINAIRE (LED)
- CONDUIT (TRENCH)
- CONDUIT (BORE)
- OVERHEAD STREET NAME SIGN
- DIRECTION OF TRAFFIC FLOW



LOW VOLTAGE CIRCUIT
(X)Y\"C = NUMBER, SIZE, AND TYPE OF CONDUIT
DLC = DETECTOR LEAD-IN CABLE, 14 AWG
RWL = ROADWAY LOOP DETECTOR WIRE, 14 AWG



0' 20' 40'
SCALE : 1\"=40'

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE

LOW VOLTAGE
CABLE SCHEMATIC

RUSSELL PALMER
AT NORTHPARK DR

SHEET 2 OF 2

DESIGNED:	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:			SEE TITLE SHEET	CS
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CHECKED:	HOU	MONTGOMERY	0912	37

JOB No.	232	SHEET No.	493
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4/6/2021

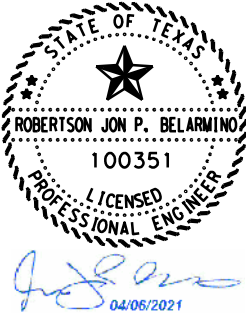
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POLE ID	POLE TYPE	MAST ARM		SIGNALS		LUMINAIRE TYPE	PED PB TYPE/SIGN	REMARKS	LOCATION AT APPROX	STANDARDS	
		SIGNAL (FT)	LUMINAIRE (FT)	MOUNTING	FACE						
A	2	55	15	4 - ASTROBRAC	3 - H3 1 - H4LF	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	-	SIGNS: S1 = R10-17T (30"x36") S2 = STREET SIGN	AT APPROX: POLE A: STA 71+94, 57.5' LT NORTHPARK DR BASELINE	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
B	1	30	-	2 - ASTROBRAC	2 - H3		-	SIGNS: S3 = STREET SIGN S6 = R3-8LcT	AT APPROX: POLE B: STA 72+52, 56.9' LT NORTHPARK DR BASELINE	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
C	2	55	15	5 - ASTROBRAC	3 - H3 1 - H4U 1 - H5R	106-WATT SYSTEM MAX LED COBRA HEAD LUMINAIRE	-	SIGNS: S4 = R5-2 (24"x24") S5 = STREET SIGN	AT APPROX: POLE C: STA 72+89.6, 59.6' RT NORTHPARK DR BASELINE	02893-03 02893-04A 02893-04B 02893-05 02893-09 ED (1,8)-14 MA-DPD-20 TS-BP-20	01509-1 01509-2 01509-3 01509-4
PDPL 1 PDPL 2 PDPL 3	PED POLE 15'	-	-	1 - SIDE POLE	1 - CDP	-	POLARA NAVIGATION R10-3e(R)	-	AT APPROX: PDPL 1: STA 72+95, 52' LT PDPL 2: STA 72+88.5, 51.4' RT PDPL 3: STA 72+68.4, 71.9' RT NORTHPARK DR BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED(1, 8)-14	
PDPL 4		-	-		1 - CDP	-	POLARA NAVIGATION R10-3e(L)	-	AT APPROX: PDPL 4: STA 72+08, 73.1' RT NORTHPARK DR BASELINE. FIELD ADJUST POLE LOCATION TO MEET ADA REQUIREMENT.	02893-03 02893-07 ED(1, 8)-14	

NOTE:

1. SEE ROADWAY AND PEDESTRAIN RAMP DETAILS FOR ELEVATION REQUIREMENT AS COORDINATED WITH ENGINEER.

TYPE	CONTROLLER	REMARKS	LOCATION	STANDARDS
METERED STEEL POLE SERVICE (OVERHEAD) UL TYPE 3R	SEE ELECTRICAL SERVICE DESCRIPTION TABLE FOR DETAILS	SEE COH STANDARDS FOR DETAILS	AT APPROX: STA 72+66, 89' RT NORTH PARK DR	02893-15 ED(1, 3, 5, 6)-14
TYPE 340 ITS	2070LX CONTROLLER UNIT WITH 2070-1C CPU MODULE W/ GPS AND UPS BATTERY BACK-UP SYSTEM	STANDARD SPECIFICATION 16730 & 16731 UNINTERRUPTIBLE POWER SUPPLY - STANDARD SPECIFICATION 16732 GPS SERIAL COMM MODULE, STD SPEC 16785	AT APPROX: STA 72+71, 79' RT (CENTER OF CABINET) NORTH PARK DR	02893-10A 02893-10B 02893-10C ED(1, 8)-14



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CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTHPARK DRIVE									
TRAFFIC SIGNAL									
POLE SCHEDULE									
RUSSELL PALMER									
AT NORTHPARK DR									
SHEET 1 OF 1									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.		
CHECKED:	6	TEXAS	SEE TITLE SHEET				CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	494			

ITEM	DESCRIPTION	UNIT	QTY
CITY OF HOUSTON BID ITEMS			
16710-101	TYPE "A" PULL BOX WITH GROUND ROD AND APRON	EA	11
16710-201	TYPE "B" PULL BOX WITH GROUND ROD AND APRON	EA	4
16711-105	1" PVC SCH.80 UNDERGROUND, EARTH	LF	70
16711-205	2" PVC SCH.80 UNDERGROUND, EARTH	LF	1030
16711-204	2" PVC SCH.80 UNDER PAVEMENT, BORE	LF	205
16711-306	3" PVC SCH.80 UNDERGROUND, EARTH	LF	90
16711-406	4" PVC SCH.80 UNDERGROUND, EARTH	LF	185
16711-405	4" PVC SCH.80 UNDER PAVEMENT, BORE	LF	440
16715-100	3-SEC SIGNAL HEAD ASSEMBLY COMPLETE	EA	8
16715-200	4-SEC SIGNAL HEAD ASSEMBLY COMPLETE	EA	2
16715-300	5-SEC SIGNAL HEAD ASSEMBLY COMPLETE	EA	1
16715-SUB01	VEH SIG SEC (12")LED(GRN)	EA	9
16715-SUB02	VEH SIG SEC (12")LED(GRN ARW)	EA	2
16715-SUB03	VEH SIG SEC (12")LED(YEL)	EA	9
16715-SUB04	VEH SIG SEC (12")LED(YEL ARW)	EA	3
16715-SUB05	VEH SIG SEC (12")LED(RED)	EA	9
16715-SUB06	VEH SIG SEC (12")LED(RED ARW)	EA	1
16715-SUB07	VEH SIG SEC (12")LED(GRN U-TURN ARW)	EA	1
16715-SUB08	VEH SIG SEC (12")LED(YEL U-TURN ARW)	EA	1
16715-SUB09	VEH SIG SEC (12")LED(RED U-TURN ARW)	EA	2
16715-SUB10	BACK PLATE (12") (3 SEC)	EA	8
16715-SUB11	BACK PLATE (12") (4 SEC)	EA	2
16715-SUB12	BACK PLATE (12") (5 SEC)	EA	1
16716-100	LED PED SIG HEAD ASSEMBLY (SYM) (COUNTDOWN)	EA	4
16720-200	ELEC CONDR (NO.12) INSULATED	LF	410
16720-201	ELEC CONDR (NO.10) INSULATED	LF	820
16720-202	ELEC CONDR (NO.8) BARE	LF	1930
16720-203	ELEC CONDR (NO.4) INSULATED	LF	120
16720-206	2/C-#14 AWG SOLID CABLE	LF	7580
16720-204	3/C-#14 AWG SOLID CABLE	LF	385
16720-505	5/C-#14 AWG SOLID CABLE	LF	410
16720-705	7/C-#14 AWG SOLID CABLE	LF	2510
16727-100	LOOP DETECTOR SAWCUT	LF	1805
16730-100	ITS CABINET	EA	1
16731-100	2070 CONTROLLER CABINET	EA	1
16732-100	UNINTERRUPTIBLE POWER SUPPLY (UPS) SYS TRF SIG CAB	EA	1
16750-100	PED DETECT PUSH BUTTON (APS)	EA	4
16750-SUB01	PED DETECTOR CONTROLLER UNIT	EA	1
16785-100	GPS SERIAL COMM	EA	1
2465-100	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	24
2465-200	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	65
2582-200-1	INS TRF SIG PL AM(S)1 ARM(30')	EA	1
2582-200-6	INS TRF SIG PL AM(S)1 ARM(55')LUM	EA	2
2582-200-7	PED POLE ASSEMBLY (15')	EA	4
2590-100	TRAFFIC SIGNAL POLE LUMINAIRE	EA	2
2893-100	ELECTRICAL SERVICE POLE ASSEMBLY	EA	1.0
2893-201	INSTALL HWY TRF SIG (ISOLATED)	LS	1
2893-300	REMOVE AND SALVAGE EXISTING TRAFFIC SIGNAL EQUIPMENT	LS	1
2893-SUB01	TRAFFIC SIGNAL CABINET FOUNDATION	EA	1
2893-SUB03	GROUND ROD, 5/8" X 10' COPPER	EA	24
2893-SUB04	DETECTOR CARD RACK (8 SLOT & 4 SLOT)	EA	1
2893-SUB05	DETECTOR UNIT (DUAL CHANNEL)	EA	12
2893-SUB06	MAST ARM DAMPER	EA	1
2893-SUB08	SIGN "Northpark Dr" (24"X90")	EA	1
2893-SUB10	SIGN "Russell Palmer Rd" (24"X120")	EA	2
2893-SUB11	SIGN R5-2 (24"X24")	EA	1
2893-SUB13	SIGN R10-3eL (9"X15")	EA	3
2893-SUB14	SIGN R10-3eR (9"X15")	EA	1
2893-SUB15	SIGN R10-17T (30"X36")	EA	1
2893-SUB16	SIGN R3-8LCT (30"X48")	EA	1
2893-SUB21	TWO-INCH RETROREFLECTIVE YELLOW BORDER	EA	11
2893-SUB23	ALUMINUM SIGNS (TY A)	SF	80.25

SUB # - DESCRIPTION CODE INDICATES SUBSIDIARY TO THE SPECIFIED ITEM AND ARE FOR CONTRACTOR INFORMATION ONLY.

* - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2893




△ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 2582

Ψ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16715

○ - FOR CONTRACTOR INFORMATION ONLY. SUBSIDIARY TO ITEM 16750

ELECTRICAL SERVICE DESCRIPTION

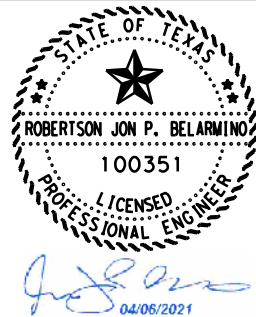
ELEC. SERVICE ID	ELECTRICAL SERVICE DESCRIPTION (SEE ED (5), (6), (7), (8), (11) - 14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY Switch AMPS	MAIN CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
RUSSELL PALMER RD AT NORTHPARK DR	ELEC SERV TY D(120/240)060(NS)SS(E)SP(O)	1 1/4"	3/#6	N/A	2P/60	30	100	SIGNAL	1P/50	40	6.6
								ITS	1P/15	5	
								ILLUM	2P/20	5	



																	
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NO.	REVISIONS	BY	DATE														
					HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420												
					LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007												
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2>																	
<h1 style="margin: 0;">NORTH PARK DRIVE</h1> <h1 style="margin: 0;">SIGNAL DETAILS</h1> <h1 style="margin: 0;">RUSSELL PALMER</h1> <h1 style="margin: 0;">AT NORTH PARK DR</h1>																	
SHEET 1 OF 2																	
DESIGNED:		FED. RD. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.										
CHECKED:		6	TEXAS	SEE TITLE SHEET			CS										
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.										
CHECKED:		HOU	MONTGOMERY	0912	37	232	495										

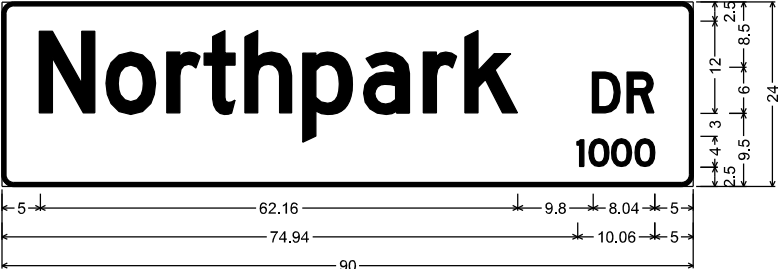
[illegible]

NOTES:

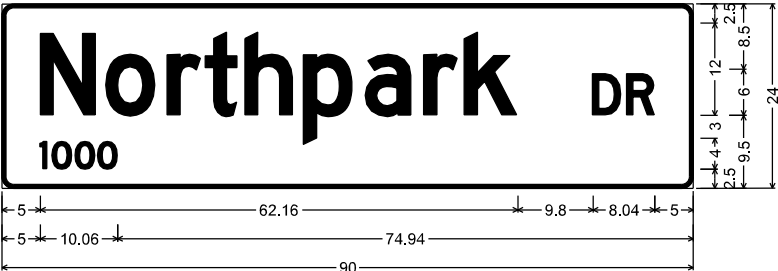
1. PED PUSH BUTTON NEAR HAND HOLE SHALL REQUIRE SPECIAL EXTENSION UNIT TO MEET ADA HEIGHT REQUIREMENTS.
2. CONTRACTOR TO ENSURE PED BUTTON HAS A MAXIMUM SIDE REACH OF 10" PRIOR TO INSTALLATION.



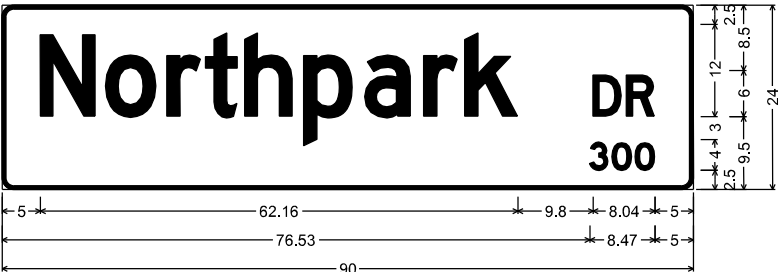
NO.	REVISIONS						BY	DATE	
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> <h3 style="margin: 0;">NORTHPARK DRIVE</h3> <h3 style="margin: 0;">SIGNAL DETAILS</h3> <h3 style="margin: 0;">RUSSELL PALMER</h3> <h3 style="margin: 0;">AT NORTHPARK DR</h3>									
SHEET 2 OF 2									
DESIGNED:	FED. RD. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.					
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS					
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET No.		
CHECKED:	HOU	MONTGOMERY	0912	37	232		496		



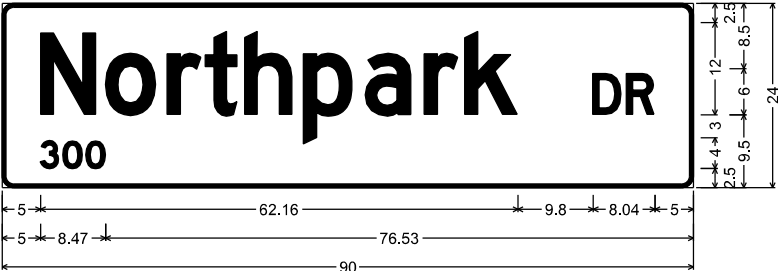
1.50" Radius, 0.50" Border, White on, Green;
"Northpark", Highway Gothic; "DR", Highway Gothic; "1000", Highway Gothic;



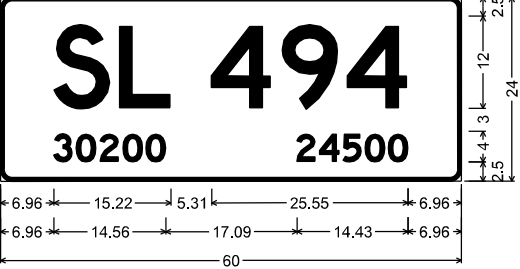
1.50" Radius, 0.50" Border, White on, Green;
"Northpark", Highway Gothic; "DR", Highway Gothic; "1000", Highway Gothic;



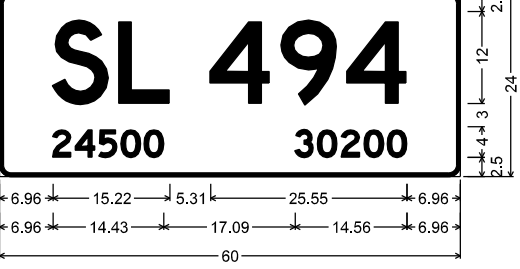
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"Northpark", Highway Gothic; "DR", Highway Gothic; "300", Highway Gothic;



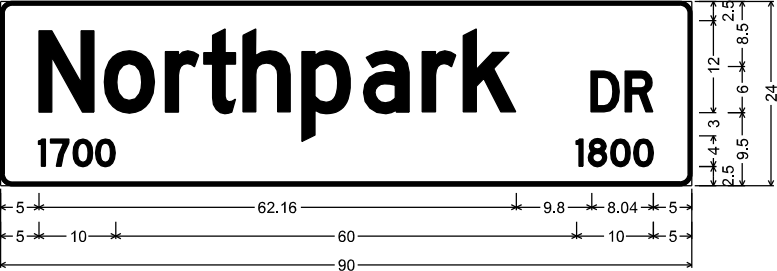
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"Northpark", Highway Gothic; "DR", Highway Gothic; "300", Highway Gothic;



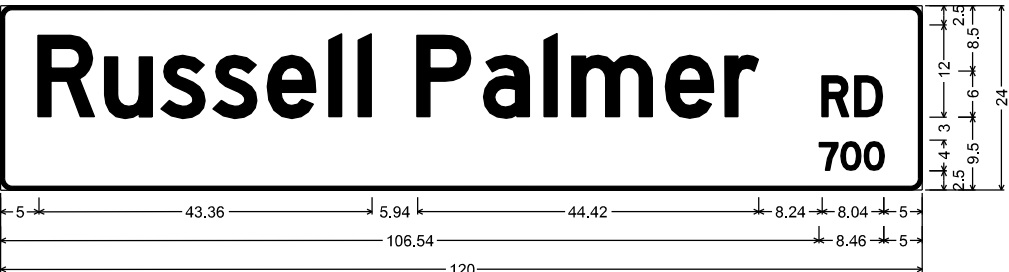
1.50" Radius, 0.50" Border, White on, Green;
"SL 494", Highway Gothic; "30200", Highway Gothic;
"24500", Highway Gothic;



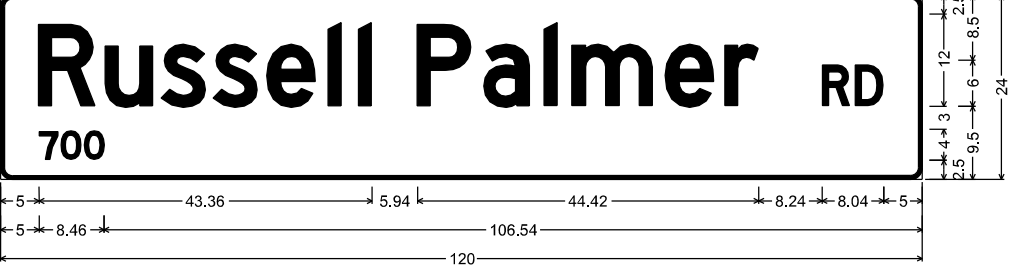
1.50" Radius, 0.50" Border, White on, Green;
"SL 494", Highway Gothic; "24500", Highway Gothic;
"30200", Highway Gothic;



1.50" Radius, 0.50" Border, White on, Green;
"Northpark", Highway Gothic; "DR", Highway Gothic; "1700", Highway Gothic;
"1800", Highway Gothic;




1.50" Radius, 0.50" Border, White on, Green;
"Russell Palmer", Highway Gothic; "RD", Highway Gothic; "700", Highway Gothic;

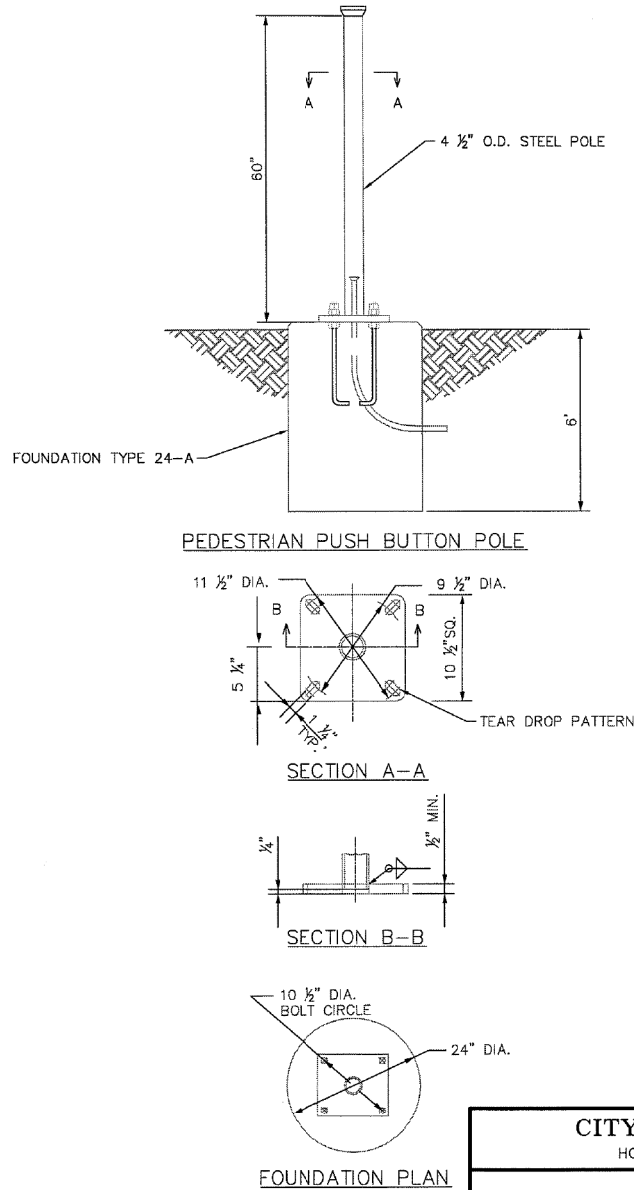
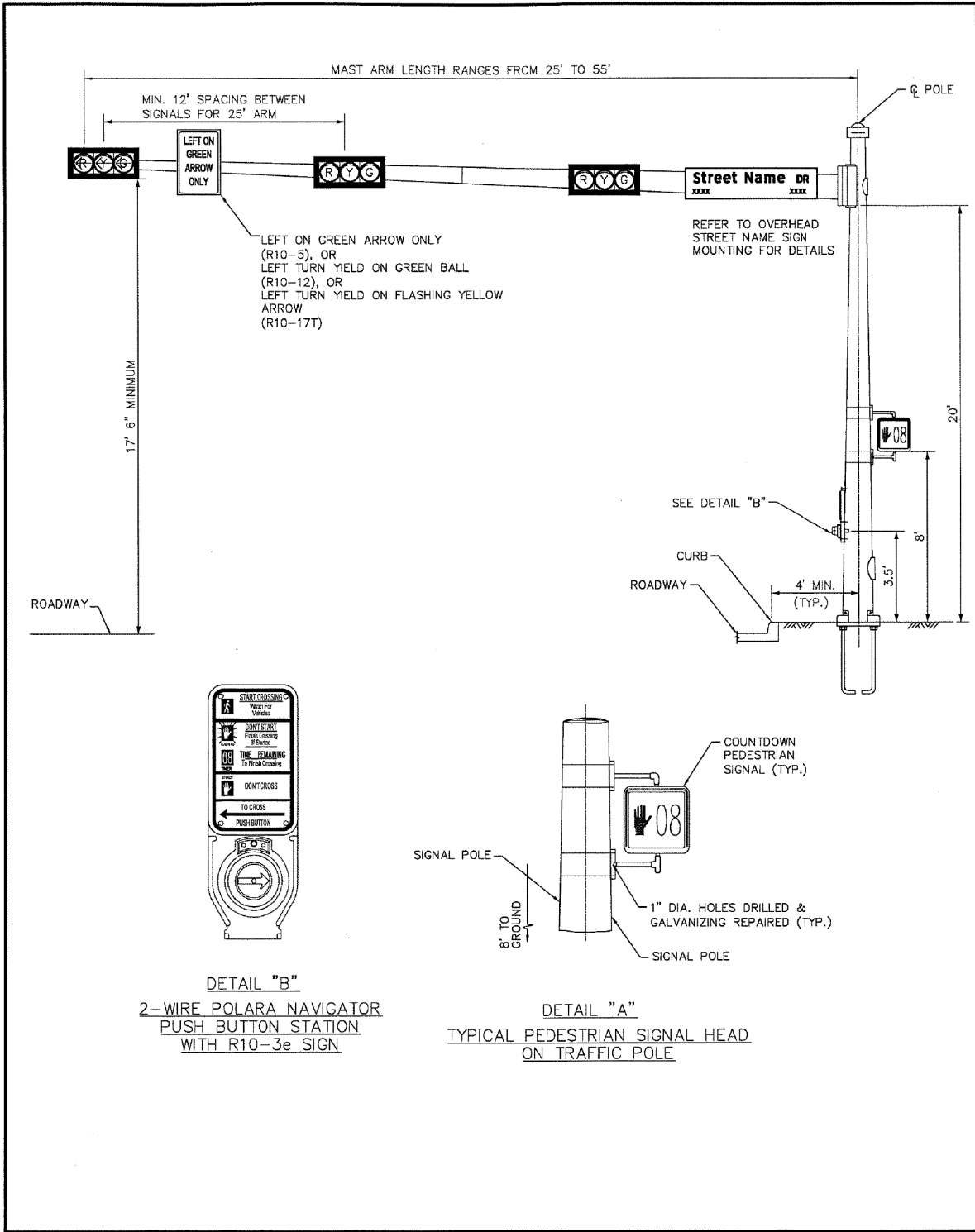


1.50" Radius, 0.50" Border, White on, Green;
"Russell Palmer", Highway Gothic; "RD", Highway Gothic; "700", Highway Gothic;



NOT TO SCALE

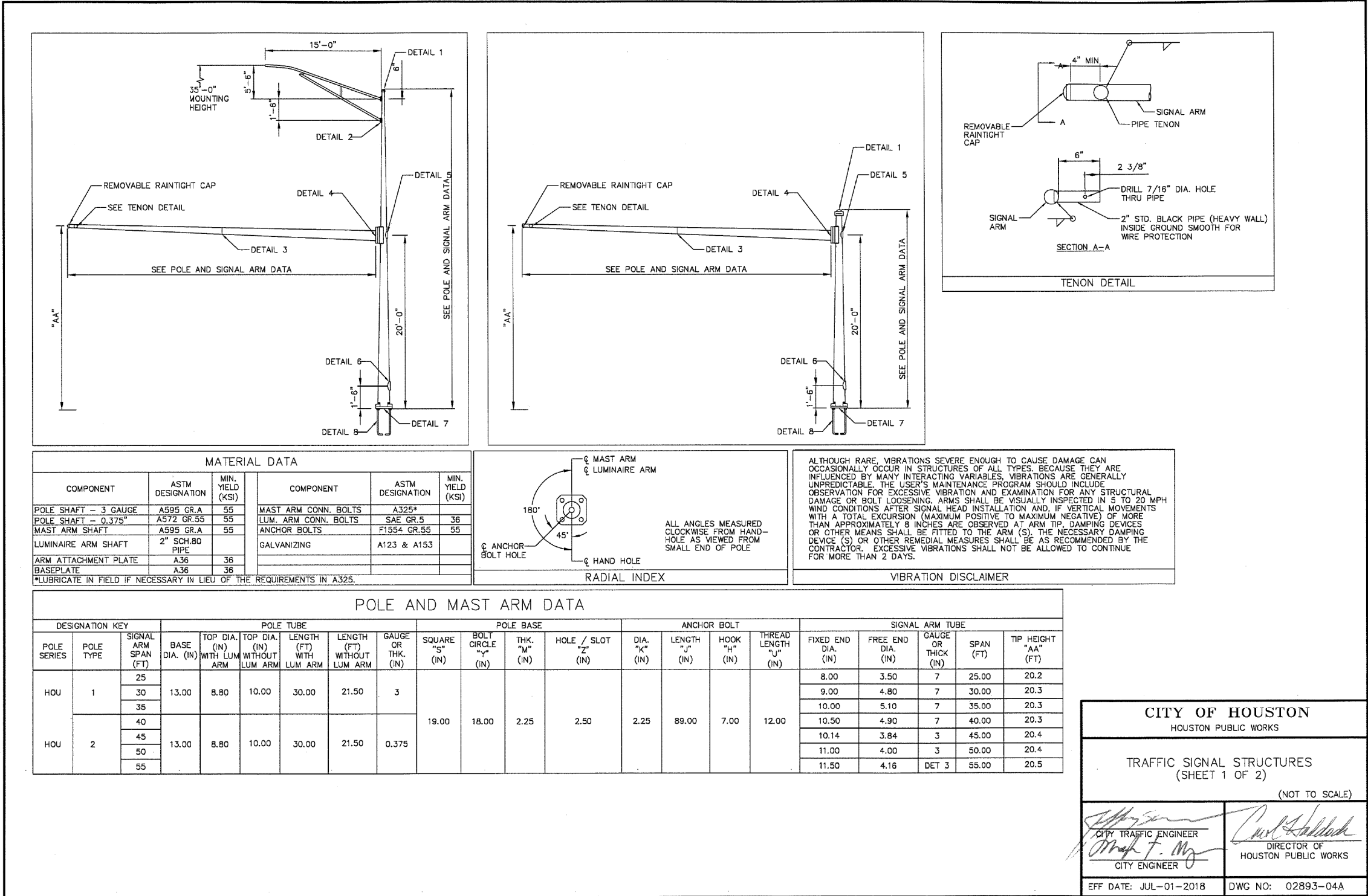
NO.	REVISIONS			BY	DATE
HNTB			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420		
			LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007		
CITY OF HOUSTON HOUSTON PUBLIC WORKS					
NORTHPARK DRIVE SIGN DETAILS					
SHEET 1 OF 1					
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 497



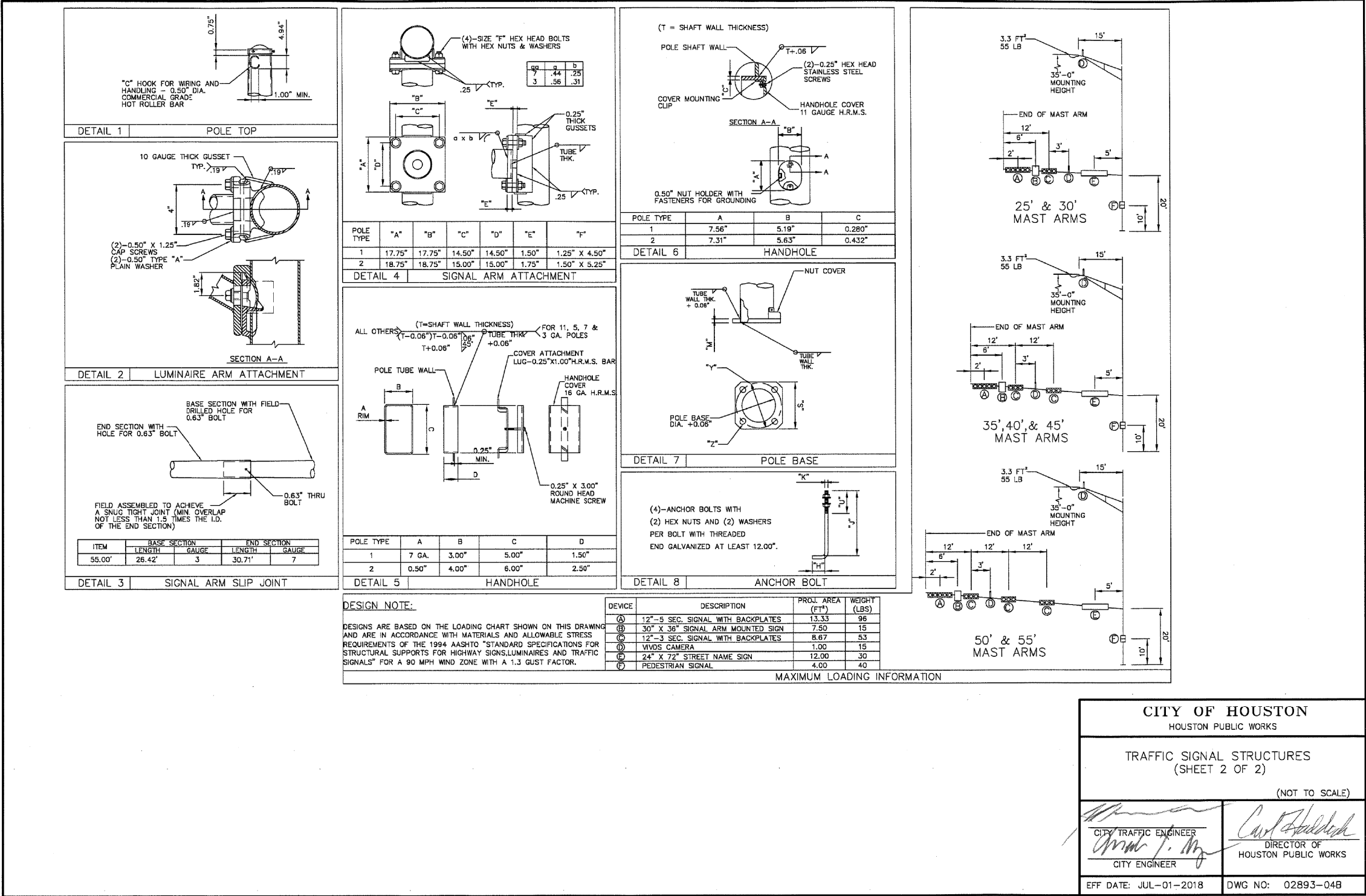
- NOTE:
1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS STATED ON "PEDESTAL POLE WITH DRILLED SHAFT FOUNDATION" STANDARD.
 2. REFER TO "PEDESTAL POLE WITH DRILLED SHAFT FOUNDATION" STANDARD DETAIL FOR ANCHOR BOLT DETAILS.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
TYPICAL MAST ARM / POLE FIXTURE CONFIGURATION (NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 02893-03

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ-10 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE TYPICAL MAST ARM/POLE FIXTURE CONFIGURATION			
COH STANDARDS			
SHEET 1 OF 1			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB NO.	SHEET NO.
		232	498



NO.		REVISIONS		BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE TRAFFIC SIGNAL STRUCTURES					
COH STANDARDS					
SHEET 1 OF 2					
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232 499



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

TRAFFIC SIGNAL STRUCTURES
(SHEET 2 OF 2)

(NOT TO SCALE)

CITY ENGINEER

DIRECTOR OF
HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018

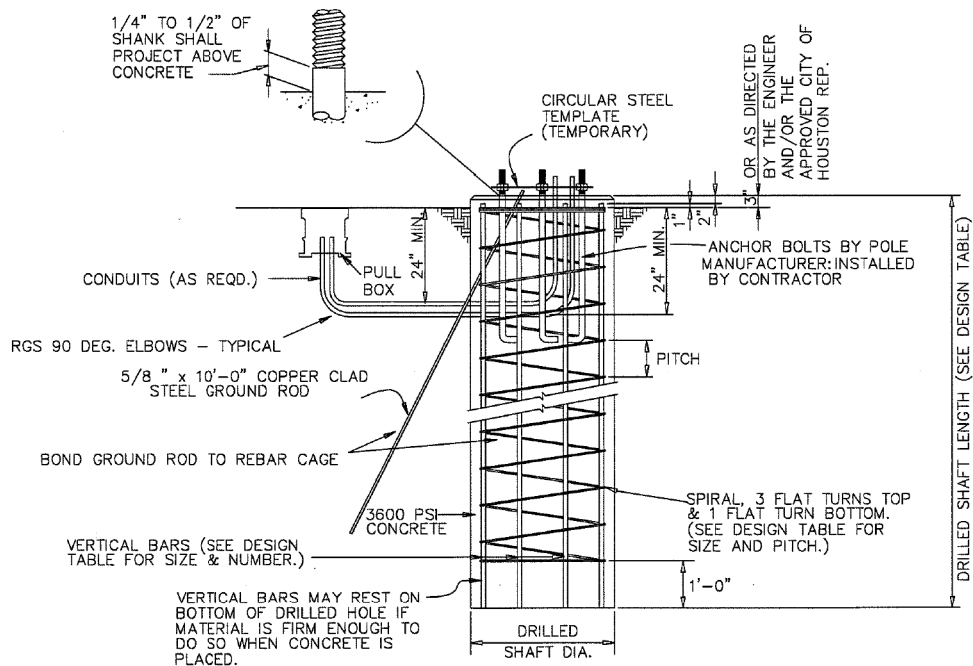
DWG NO: 02893-04B

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LHRA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE TRAFFIC SIGNAL STRUCTURES COH STANDARDS			
SHEET 2 OF 2			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB NO.	SHEET NO.
		232	500

POLE MARK	DRILLED SHAFT DIA.	REINFORCING STEEL		DRILLED SHAFT LENGTH -feet	BOLT CIRCLE DIA.	FOUNDATION DESIGN LOADS (1)			TYPICAL APPLICATION
		VERT. BARS	SPIRAL & PITCH			MOMENT K-ft.	SHEAR KIPS	TORQUE K-ft.	
HOU 1	30"	8-#9	#3 @ 9"	14'-0"	18"	72.2	3.4	51.9	MAST ARM ASSEMBLY (25'-35') IN COHESIVE SOILS
HOU 2	30"	8-#9	#3 @ 9"	18'-0"	18"	89.9	4.0	98.0	MAST ARM ASSEMBLY (40'-55') IN COHESIVE SOILS MAST ARM ASSEMBLY (25'-55') IN NON-COHESIVE SOILS

FOUNDATION DESIGN TABLE NOTES:

- (1) FOUNDATION DESIGN LOADS ARE THE ALLOWABLE MOMENTS, SHEARS AND TORQUES AT THE TOP OF THE FOUNDATION.
- (2) CONSTRUCT IN ACCORDANCE WITH CITY OF HOUSTON SPECIFICATION SECTION 02465, "DRILLED SHAFT FOUNDATIONS".
- (3) FOUNDATION DESIGN IS BASED UPON AN UNDRAINED SHEAR STRENGTH OF 1500 PSF FOR COHESIVE SOILS AND A TEXAS CONE PENETROMETER MINIMUM OF 10 BLOWS/FOOT IN NON-COHESIVE SOILS. WHERE COHESIVE AND NON-COHESIVE LAYERS EXIST WITHIN THE SPECIFIED SHAFT LENGTH, THE NON-COHESIVE SOILS SHALL GOVERN. LOWER SOIL PARAMETERS WILL REQUIRE A SPECIAL DESIGN.



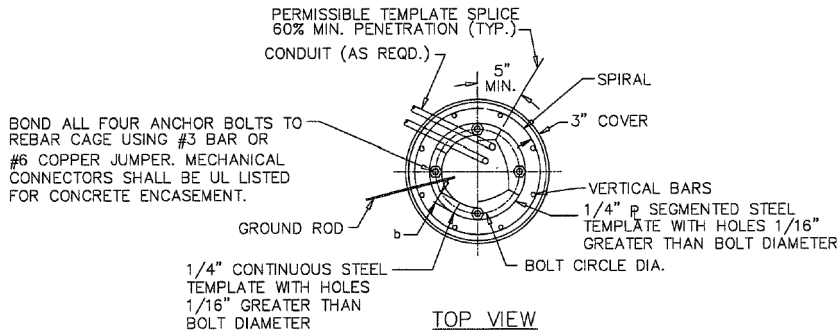
FOUNDATION DETAILS

GENERAL NOTES:

1. DESIGN IS FOR CITY OF HOUSTON STANDARD TRAFFIC SIGNAL MAST ARM SUPPORT STRUCTURES BY VALMONT INDUSTRIES, INC.
2. DESIGN CONFORMS TO 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" AND INTERIM REVISIONS THERETO, FOR A 90 MPH WIND ZONE WITH A 1.3 GUST FACTOR AND ACI "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-02)".
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
4. CONCRETE SHALL BE 6 SACK, 3600 PSI.
5. ALL ANCHOR BOLTS SHALL BE GALVANIZED THE ENTIRE LENGTH OF BOLT. EXPOSED NUTS AND WASHERS SHALL ALSO BE GALVANIZED.

INSTALLATION PROCEDURE

THREADS OF ANCHOR BOLTS SHALL BE COATED WITH PIPE JOINT COMPOUND PRIOR TO INSTALLATION OF UPPER NUTS WHEN ERECTING POLE. AFTER POLE IS PLUMBED AND IN PERMANENT ALIGNMENT, THE EXPOSED THREADS OF PAINTED BOLTS SHALL BE CLEANED AND AN ADDITIONAL COATING OF ZINC-RICH PAINT APPLIED TO SEAL THE BOLT THREAD-NUT JOINT.

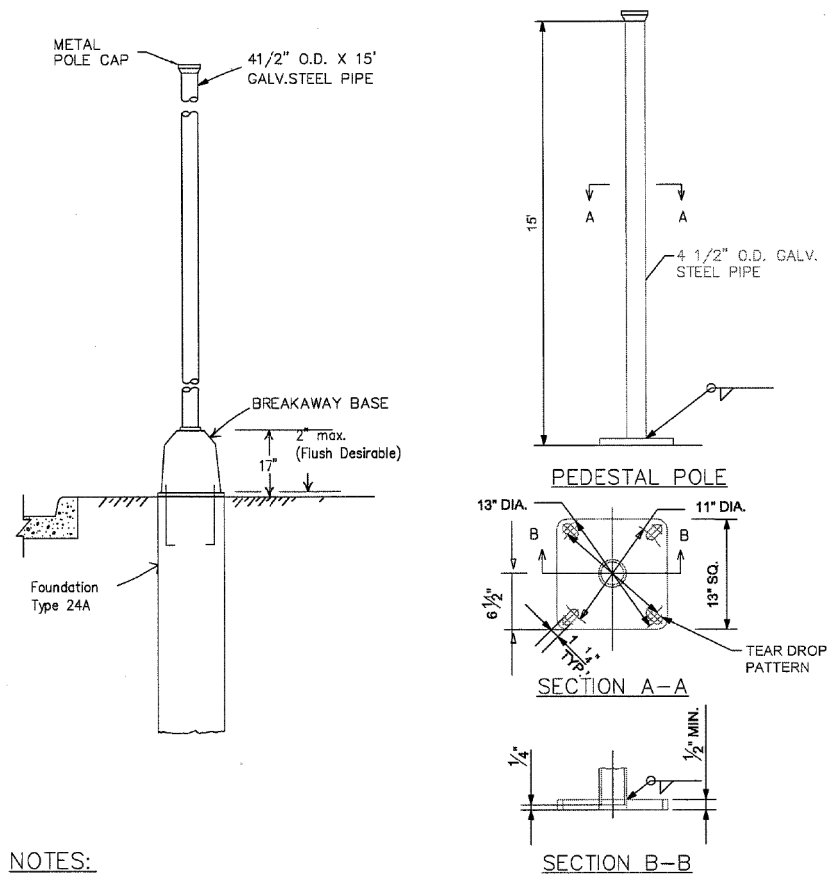


NOTE:

1. b = MINIMUM STEEL TEMPLATE WIDTH EQUAL TO TWO TIMES ANCHOR BOLT DIAMETER.
2. STEEL TEMPLATE MAY BE OF CONTINUOUS WIDTH OR SEGMENTED WIDTH.
3. SEE FOUNDATION DESIGN TABLE FOR BOLT CIRCLE DIAMETER.
4. BOLTS SHOULD BE CHECKED FOR PLUMB AFTER CONCRETE IS POURED AND BEFORE INITIAL SET.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
POLE FOUNDATION DETAILS	
(NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 02893-05

NO.	REVISIONS	BY	DATE
 HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE POLE FOUNDATION DETAILS			
COH STANDARDS			
SHEET 1 OF 1			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 501



NOTES:

1. DETAILS DEPICTED ON THIS SHEET SHOW A TYPICAL PEDESTAL POLE ASSEMBLY WITH A DRILLED SHAFT FOUNDATION.
2. USE 24 IN. DRILLED SHAFT FOUNDATION AS SHOWN.
3. PROVIDE BREAKAWAY FUSE HOLDER WITH DOUBLE-POLE HOUSING. ENSURE FUSE HOLDER IS POLARIZED, WATER-RESISTANT, UL RECOGNIZED, AND RATED FOR 30A MAXIMUM CURRENT CAPACITY AT 600V OR LESS. PROVIDE BREAKAWAY FUSE HOLDER FROM MANUFACTURERS PRE-QUALIFIED BY THE TRAFFIC OPERATIONS DIVISION. SEE [HTTP://WWW.DOT.STATE.TX.US/BUSINESS/PRODUCER_LIST.HTM](http://www.dot.state.tx.us/business/producer_list.htm) FOR LIST OF PRE-QUALIFIED MANUFACTURERS. CATEGORY IS "ROADWAY ILLUMINATION AND ELECTRICAL SUPPLIES." PROVIDE 10 AMP TIME DELAY FUSES.
4. POLE SHAFT SHALL BE ONE PIECE. ALUMINUM CONDUIT WILL NOT DEVELOP THE NECESSARY STRENGTH AND WILL NOT BE ALLOWED. IN HIGH WINDS, USE A POLE AND BASE COLLAR ASSEMBLY TO ADD STRENGTH AND PREVENT LOOSENING ON CONNECTION.
5. PER MANUFACTURER'S RECOMMENDATIONS, ENGAGE ALL THREADS ON THE PEDESTAL POLE BASE AND PIPE UNLESS THE PIPE IS FULLY SEATED INTO BASE.
6. PROVIDE NON-FUSED WATERIGHT BREAKAWAY ELECTRICAL CONNECTORS FOR BREAKAWAY POLES.(BUSSMANN HET, LITTELFUSE LET, FERRAZ-SHAWMUT FEBN, OR APPROVED EQUAL).
7. PROVIDE SIGNAL HEADS AND MOUNTING AS SHOWN ELSEWHERE ON THE PLANS.

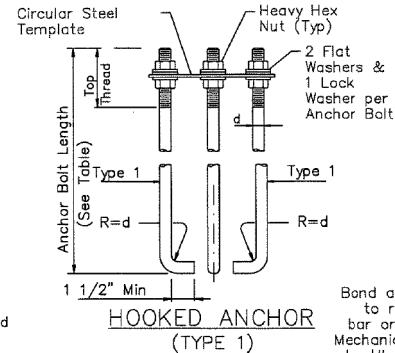
FOUNDATION DESIGN TABLE										
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH	ANCHOR BOLT DESIGN			FOUNDATION LOAD		
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER	ANCHOR BOLT DIA	F _y (ksi)	BOLT CIR DIA	ANCHOR TYPE	WOMEN K-ft	SHEAR Kips
				10 blows/ft						
24-A	24"	4- #5	#2 at 12"	6	3/4"	36	*13"	1	10	1

* 10 1/2" B.C. FOR
PUSH BUTTON POLE

ANCHOR BOLT ASSEMBLY

INSTALLATION PROCEDURE

Threads of anchor bolts shall be coated with pipe joint compound prior to installation of upper nuts when erecting pole. After pole is plumbed and in permanent alignment, the exposed threads of painted bolts shall be cleaned and an additional coating of zinc-rich paint applied to seal the bolt thread-nut joint.



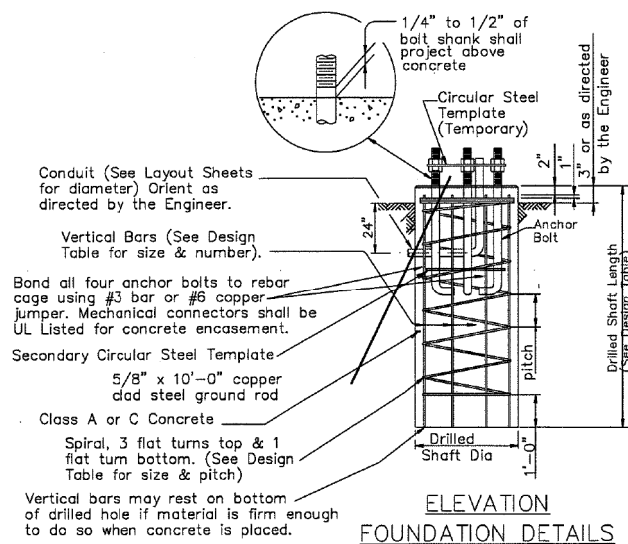
GENERAL NOTES

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interim revisions thereto.

Concrete shall be Class A or C.

Threads for anchor bolts and nuts shall be rolled or cut threads of unified national coarse thread series except for A193B7 bolts which shall have 8 pitch thread series. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be topped after galvanizing.

Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize all anchor bolts unless otherwise noted. Exposed nuts shall be galvanized or coated with zinc-rich paint. Washers shall be galvanized. Templates and embedded nuts need not be galvanized.

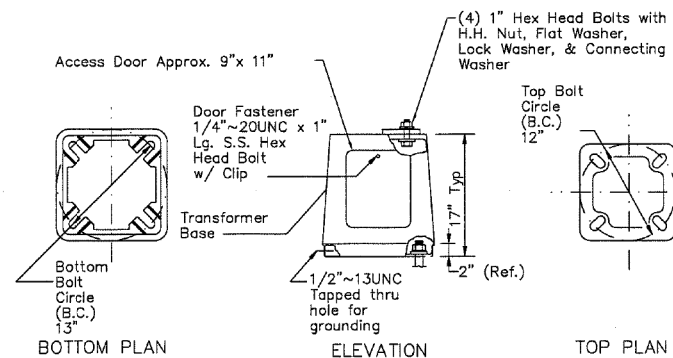
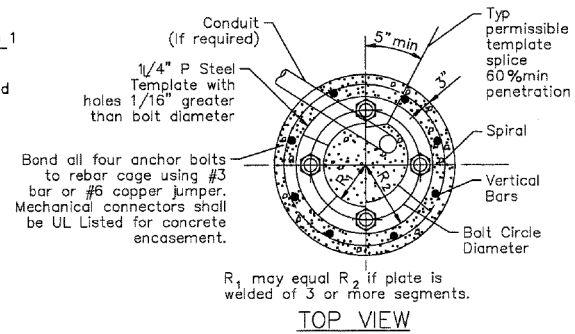


NOTES:



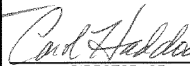
- ① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- ② Foundation Design Loads are the allowable moments and shears at the base of the structure.

ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	③ BOLT LENGTH	TOP THREAD	BOTT THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	—	13"	7 1/8"	5 5/8"


③ Min dimensions given,
longer bolts are acceptable.




BREAKAWAY BASE DETAILS

<p align="center">CITY OF HOUSTON HOUSTON PUBLIC WORKS</p>	
<p align="center">PEDESTAL POLE WITH DRILLED SHAFT FOUNDATION</p>	
<p align="right">(NOT TO SCALE)</p>	
 <hr/> <p>CITY TRAFFIC ENGINEER</p>  <hr/> <p>CITY ENGINEER</p>	 <hr/> <p>DIRECTOR OF HOUSTON PUBLIC WORKS</p>
<p>EFF DATE: JUL-01-2018</p>	<p>DWG NO: 02893-07.</p>

NO.	REVISIONS	BY	DATE



HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420



LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ, IO
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

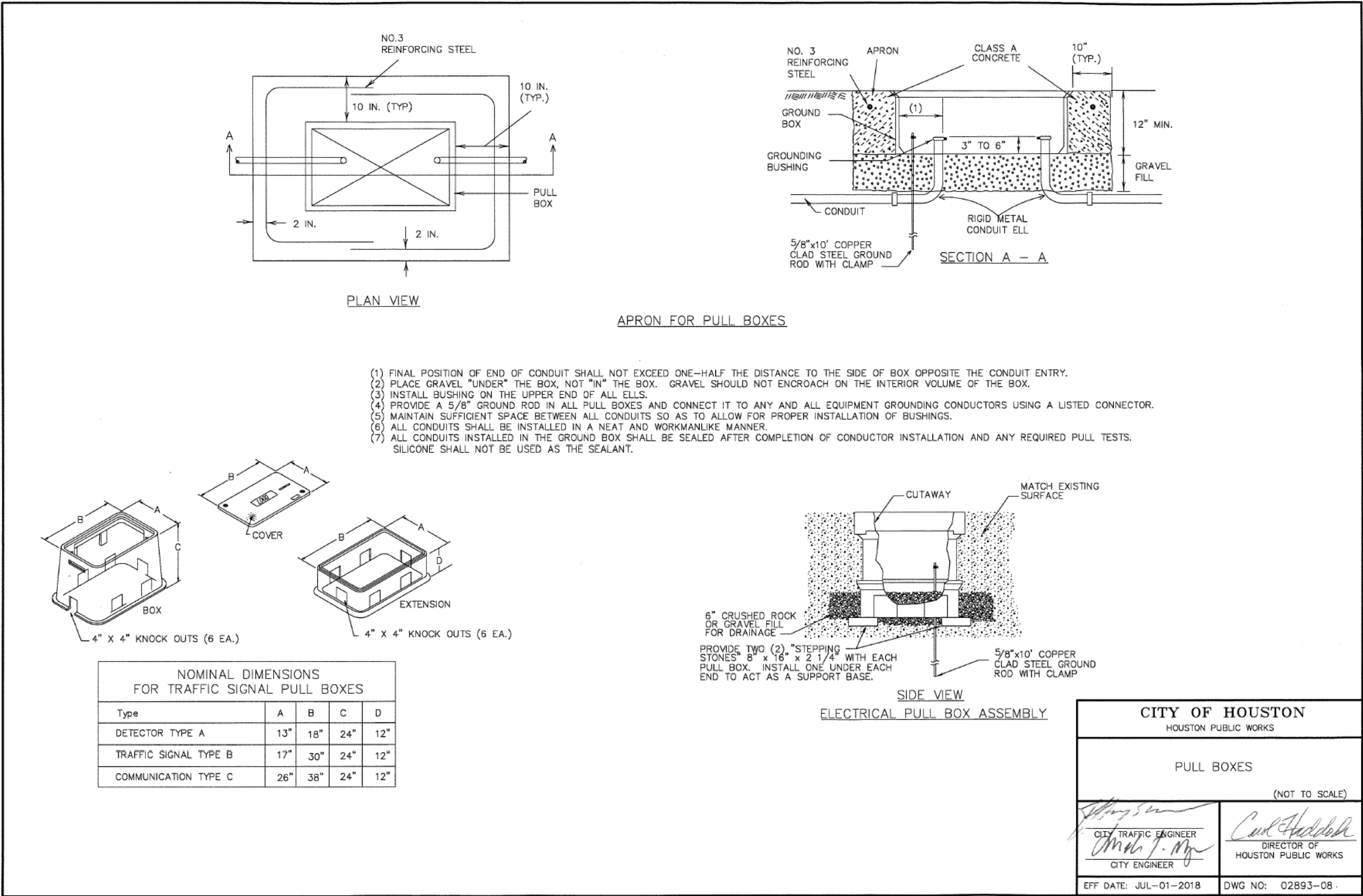
CITY OF HOUSTON
HOUSTON PUBLIC WORKS


NORTH PARK DRIVE

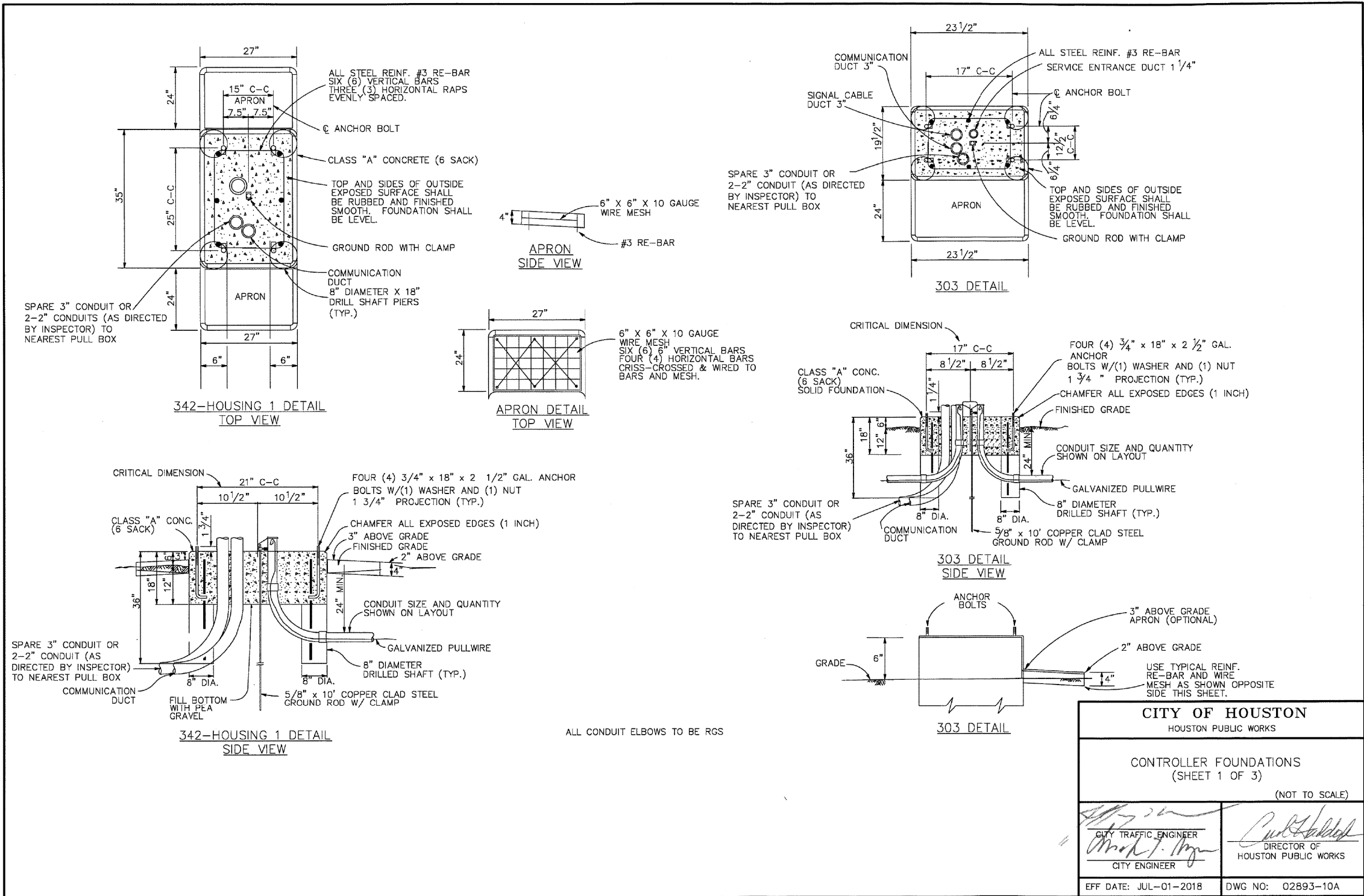
**PEDESTAL POLE WITH
DRILLED SHAFT
FOUNDATION
COH STANDARDS**

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	502

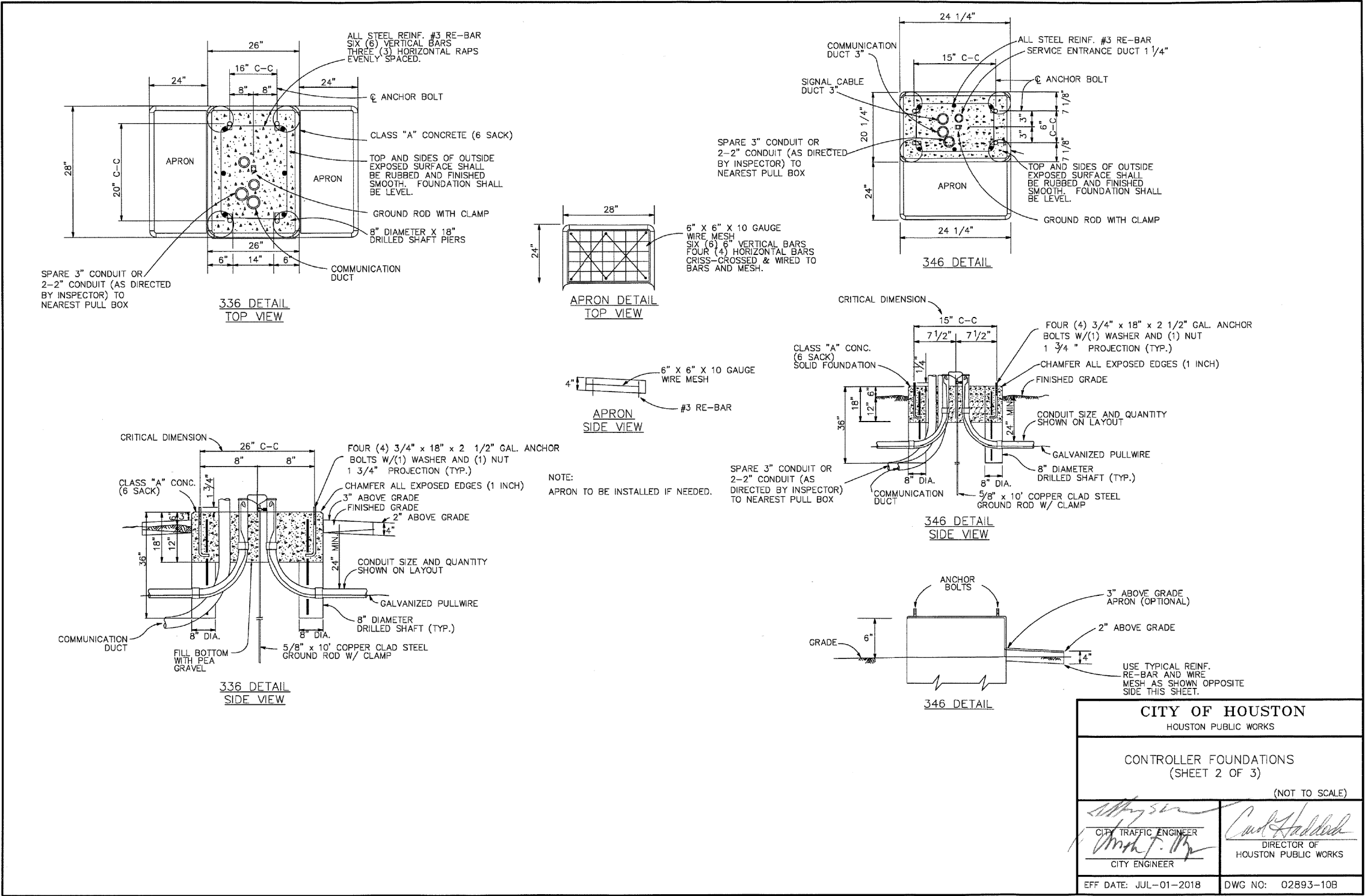


NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HIXSON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTHPARK DRIVE									
PULL BOXES									
COH STANDARDS									
SHEET 1 OF 1									
DESIGNED:		FED. DIV. NO.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.	
CHECKED:		6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.		
CHECKED:		HOU	MONTGOMERY	0912	37	232	502A		



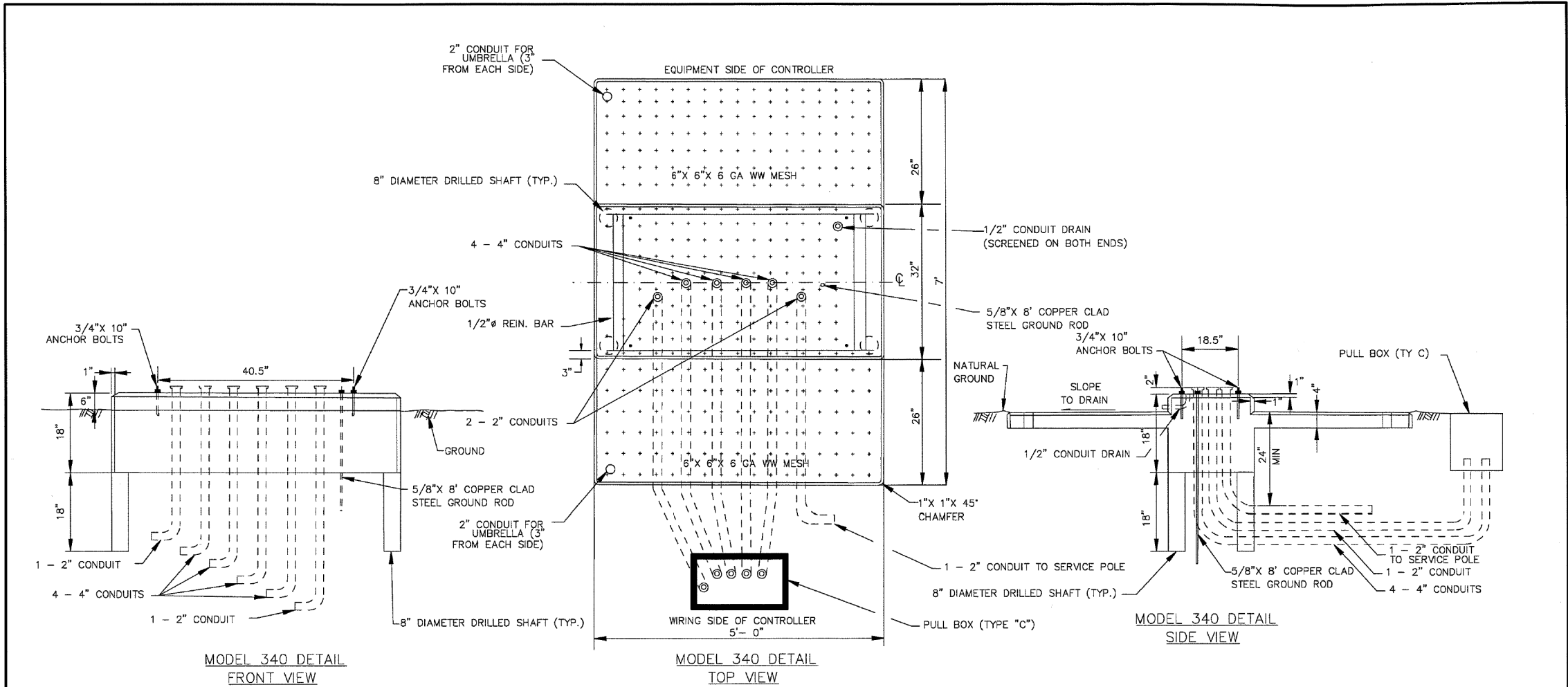
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
CONTROLLER FOUNDATIONS (SHEET 1 OF 3)	
(NOT TO SCALE)	
 CITY TRAFFIC ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 02893-10A

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE CONTROLLER FOUNDATIONS COH STANDARDS			
SHEET 1 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 503



CITY OF HOUSTON HOUSTON PUBLIC WORKS	
CONTROLLER FOUNDATIONS (SHEET 2 OF 3)	
(NOT TO SCALE)	
 CITY TRAFFIC ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 02893-10B

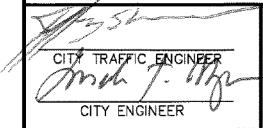
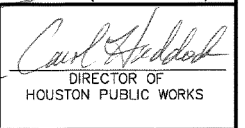
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ-10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE CONTROLLER FOUNDATIONS COH STANDARDS			
SHEET 2 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB NO.	SHEET NO.
		232	504



ALL CONDUIT ELBOWS TO BE RGS

CONTROLLER FOUNDATION NOTES:

1. ALL CONCRETE TO BE IN ACCORDANCE WITH CITY OF HOUSTON SPECIFICATION SECTION 03310.
2. SET THE TOP OF THE STEP OF THE CONTROLLER FOUNDATION NO LOWER THAN THE LEVEL OF THE PAVEMENT SURFACE. ANY NECESSARY ADJUSTMENT SHALL BE APPROVED BY THE ENGINEER.
3. CENTER THE CABINET ON THE FOUNDATION.
4. THE FOUNDATION SHALL BE SUPPORTED BY UNDISTURBED SOIL OR BY SOIL THAT HAS BEEN COMPACTED TO 90% PROCTOR DENSITY IN 6" LIFTS.

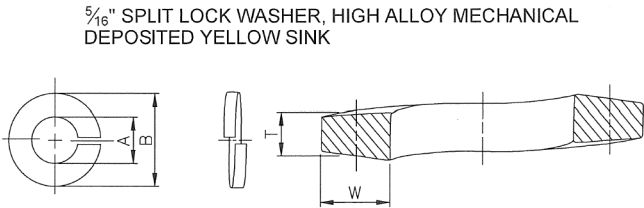
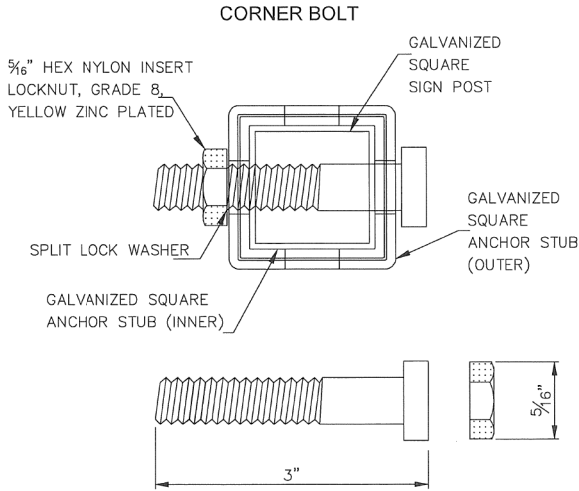
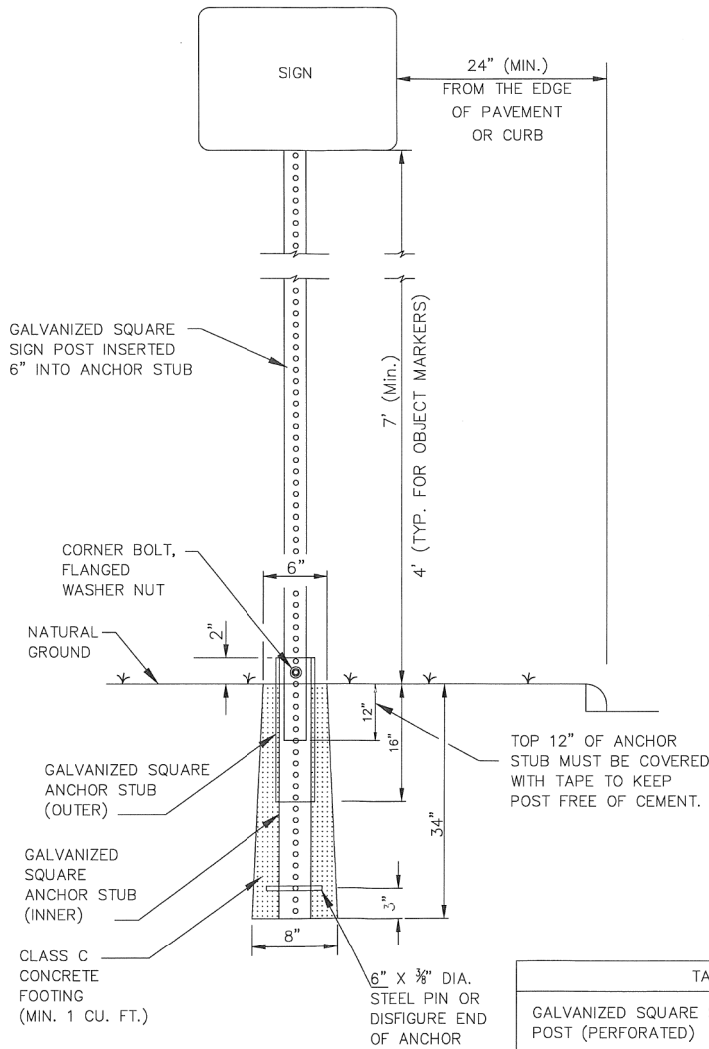
CITY OF HOUSTON	
HOUSTON PUBLIC WORKS	
CONTROLLER FOUNDATIONS	
(SHEET 3 OF 3)	
(NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 02893-10C

REVISIONS			
NO.	REVISIONS	BY	DATE
 HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON			
HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE			
CONTROLLER FOUNDATIONS			
COH STANDARDS			
SHEET 3 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HO	MONTGOMERY	0912 37 232 505

GENERAL NOTES

1. THE EXISTING SIGNS LOCATED ON PUBLIC CONSTRUCTION SITE ARE THE PROPERTY OF THE CITY OF HOUSTON. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO THE TRAFFIC OPERATIONS CENTER (2200 PATTERSON). THE GENERAL TRAFFIC SUPERINTENDENT (832-395-6728/6756) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.
2. AFTER SIGNS ARE REMOVED FROM INSTALLATION AND ARE BEING STORED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS DIVISION OF THE PUBLIC WORKS AND ENGINEERING DEPARTMENT (832-395-6728/6756) AND ARRANGE FOR A CONVENIENT TIME TO DELIVER ONLY CITY SIGNS AND POSTS IDENTIFIED BY TRAFFIC OPERATIONS DIVISION TO 2200 PATTERSON.
3. PRIOR TO THE START OF CONSTRUCTION, ALL EXISTING SIGNS WITHIN THE AREA OF CONSTRUCTION WILL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING THE SIGN TYPE, SIGN SIZE, SIGN CONDITION, SIGN LOCATION, REFLECTIVITY ADEQUACY, ETC. THE CONTRACTOR IS HELD ACCOUNTABLE FOR THESE SIGNS THROUGHOUT THE PROJECT AND AT THE PROJECTS COMPLETION.
4. ALL GROUND MOUNTED STOP SIGNS, WARNING SIGNS, AND OTHER REGULATORY SIGNS SHALL USE AT A MINIMUM HIGH INTENSITY PRISMATIC REFLECTIVE SHEETING.
5. ALL OVERHEAD SIGNS SHALL USE DIAMOND GRADE REFLECTIVE SHEETING.
6. ALL OTHER SIGNS SHALL USE SUPER ENGINEER GRADE SHEETING.
7. ALL BLANKS TO BE INSTALLED SHALL BE OF THE 3000, 5000 OR 6000 SERIES ALUMINUM WITH A YEILD STRENGTH OF 3003-H14 ALLOY.
8. "t" DENOTES THICKNESS OF SIGN BLANKS.
9. ALL HOLES SHALL BE $\frac{3}{8}$ " DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND / OR ROUGH EDGES.
10. SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL ON SHEET 01509-03.
11. ALL SIGN BLANK ARE TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.
12. ALL DETAILS ARE NOT TO SCALE.
13. ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND STANDARD HIGHWAY SIGNS LATEST EDITION.
14. REINSTALLATION OF PREVIOUSLY EXISTING SIGNS, WHERE REQUIRED PER PLANS, SHALL BE AT THE CONTRACTOR'S EXPENSE.

TYPICAL GROUND SIGN INSTALLATION
PERFORATED SQUARE METAL TUBING



NOMNAL WASHER SIZE	A INSIDE DIAMETER		B OUTSIDE DIAMETER		T MEAN SECTION (Thickness)	W SECTION WIDTH
	MAX	MIN	MAX	MAX		
5/16"	0.322"	0.314"	0.583"	0.078"	0.125"	

DIMENSIONS: ASME B18.21.1
MATERIAL: ALLOY STEEL PER ASME B18.211
FINISH: MECHANICAL ZINC PER ASME B695, CLASS 5, TYPE 2 (YELLOW)

TABLE A	
GALVANIZED SQUARE SIGN POST (PERFORATED)	1-3/4" x 1-3/4" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (INNER)	2" x 2" x 36" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (OUTER)	2 1/4" x 2 1/4" x 18" (14 GAUGE)

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
GENERAL NOTES AND GROUND MOUNTING SIGN (NOT TO SCALE)	
 CITY TRAFFIC ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-29-2019	DWG NO: 01509-01




NO.	REVISIONS	BY	DATE
 HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 200 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE METER LOOP COH STANDARDS			
SHEET 1 OF 1			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOUSTON	MONTGOMERY	0912
			37
			232
			508

1. THE EXISTING SIGNS LOCATED ON PUBLIC CONSTRUCTION SITE ARE THE PROPERTY OF THE CITY OF HOUSTON. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO THE TRAFFIC OPERATIONS CENTER (2200 PATTERSON). THE GENERAL TRAFFIC SUPERINTENDENT (832-395-6728/6756) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.
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9. ALL HOLES SHALL BE $\frac{3}{8}$ " DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND / OR ROUGH EDGES.
10. SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL ON SHEET 01509-03.
11. ALL SIGN BLANK ARE TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.
12. ALL DETAILS ARE NOT TO SCALE.
13. ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND STANDARD HIGHWAY SIGNS LATEST EDITION.
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[illegible]

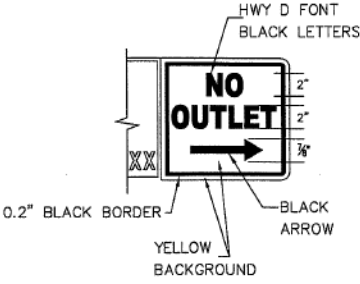
	A		B	T	W
NOMINAL WASHER SIZE	INSIDE DIAMETER		OUTSIDE DIAMETER	MEAN SECTION (Thickness)	SECTION WIDTH
	MAX	MIN	MAX		
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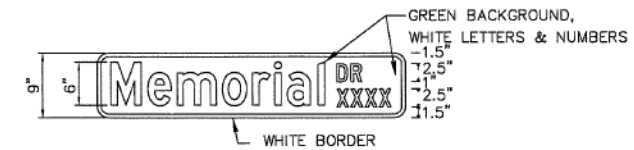
<p align="center">CITY OF HOUSTON HOUSTON PUBLIC WORKS</p>	
<p align="center">GENERAL NOTES AND GROUND MOUNTING SIGN</p>	
<p align="right">(NOT TO SCALE)</p>	
 <hr/> <p>CITY TRAFFIC ENGINEER</p>  <hr/> <p>CITY ENGINEER</p>	 <hr/> <p>DIRECTOR OF HOUSTON PUBLIC WORKS</p>
<p>EFF DATE: JUL--2019</p>	<p>DWG NO: 01509-01</p>

NO.	REVISIONS						BY	DATE	
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIR2 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
<h1 style="margin: 0;">CITY OF HOUSTON</h1> <h2 style="margin: 0;">HOUSTON PUBLIC WORKS</h2> <h3 style="margin: 0;">NORTH PARK DRIVE</h3> <h1 style="margin: 0;">GENERAL NOTES AND</h1> <h1 style="margin: 0;">GROUND MOUNTING SIGN</h1> <h2 style="margin: 0;">COH STANDARDS</h2>									
SHEET 1 OF 1									
DESIGNED:		FED. DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.		
CHECKED:		6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:		STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.		
CHECKED:		HOU	MONTGOMERY	0912	37	232	508A		

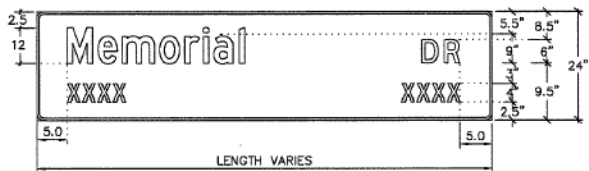
POST MOUNTED STREET NAME SIGN
W/ NO OUTLET SIGN



D3 - POST MOUNTED STREET NAME SIGN



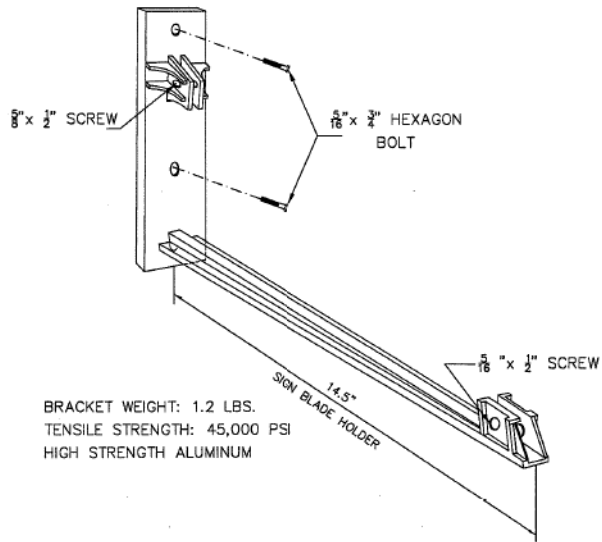
OVERHEAD STREET NAME SIGN DETAIL



D3 - STREET NAME SIGN

	POST-MOUNTED SIGN	OVERHEAD SIGN
HEIGHT	9"	24"
LENGTH	30" MIN. 48" MAX. 6" INCREMENTS OF LENGTH	10' MAX. 2' INCREMENT OF LENGTH
THICKNESS	0.125"	0.080"
SUBSTRATE	ALUMINUM ALLOY, 5052-H38 (ASTM B-209)	
SIGN FACE MATERIALS	GREEN FILM OVER DIAMOND GRADE VIP SHEETING	
LEGENDS AND SYMBOLS	HIGHWAY GOTHIC SERIES D (USUAL) HIGHWAY GOTHIC SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK	
COLOR	LETTERS-WHITE REFLECTIVE BORDER-WHITE REFLECTIVE BACKGROUND-GREEN REFLECTIVE	

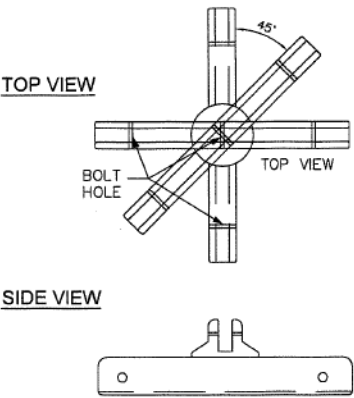
SIGNAL POLE MOUNTING DETAIL



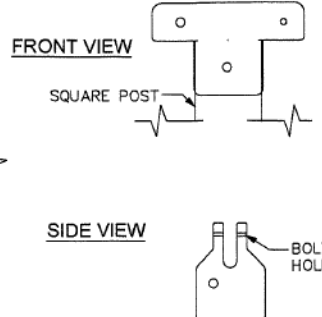
NOTES:

- TYPICAL SIGN PLATE SHOULD BE 30" MAX.
- LONGER SIGN PLATE MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER.

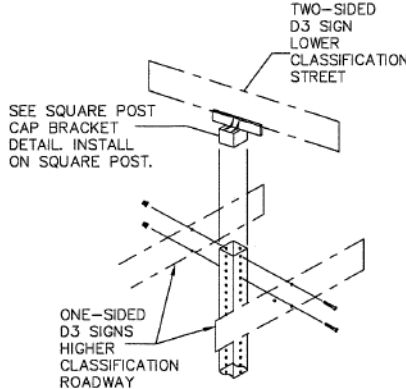
45°/90° CROSS PIECE
SIGN BRACKET



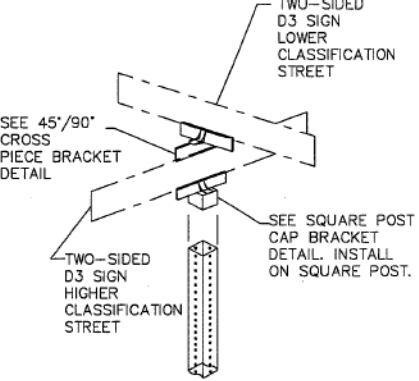
SQUARE POST CAP
BRACKET DETAILS



D3 SIGNS GREATER THAN 42"
PLATES IN LENGTH



D3 SIGNS LESS THAN OR EQUAL TO 42"
PLATES IN LENGTH



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET NAME SIGN
AND SIGN MOUNTING

(NOT TO SCALE)

City Traffic Engineer
City Engineer
Director of
Houston Public Works

EFF DATE: JUL-01-2018

DWG NO: 01509-02

NO.	REVISIONS	BY	DATE

HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10
600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

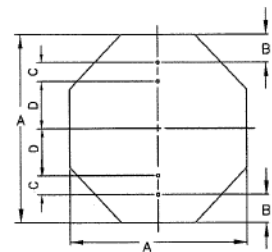
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

NORTH PARK DRIVE
STREET NAME SIGN
AND SIGN MOUNTING

COH STANDARDS

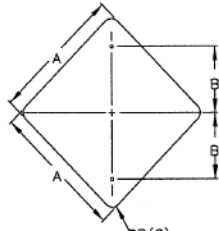
SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HO	MONTGOMERY	0912	37



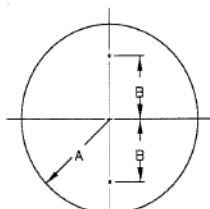
OCTAGONAL

A	B	C	D	T
24	3	3	12	0.080
36	3	3	24	0.080



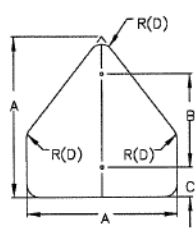
DIAMOND

A	B	C	T
24	12	1 1/2	0.080
30	15	1 1/2	0.080
36	18	1 1/2	0.080



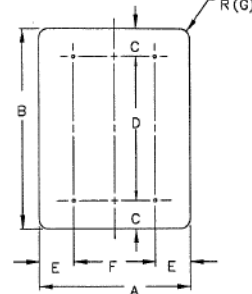
CIRCLE

A	B	T
15	15	0.080
18	12	0.080



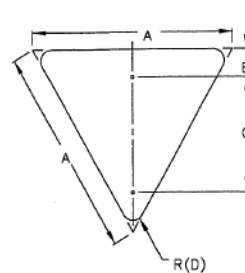
PENTAGON (SCHOOL)

A	B	C	D	T
36	24	3	1 1/2	0.080



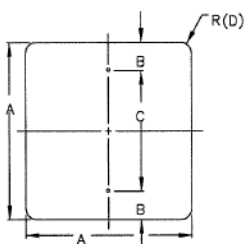
VERTICAL RECTANGLE

A	B	C	D	E	F	G	T
36	48	6	36	6	24	1 1/2	0.080
48	60	6	48	9	30	1 1/2	0.080
18	30	3	24			1 1/2	0.080



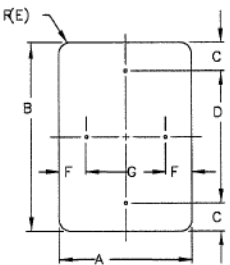
EQUILATERAL TRIANGLE

A	B	C	D	T
36	3	21	1 1/2	0.080



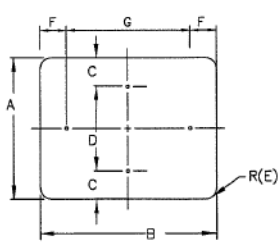
SQUARE (A)

A	B	C	D	T
18	3	12	1 1/2	0.080
24	3	18	1 1/2	0.080
30	3	24	1 1/2	0.080



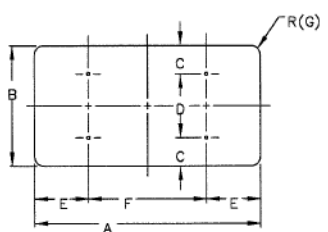
VERTICAL/HORIZONTAL RECTANGLE

A	B	C	D	E	F	G	T
12	18	1 1/2	15	1 1/2	9		0.080
12	36	3	30	1 1/2	9		0.080
18	24	3	18	1 1/2	15		0.080
24	30	3	24	1 1/2	3	18	0.080
24	36	3	30	1 1/2	3	18	0.080
24	48	3	36	1 1/2	3	18	0.080
30	36	3	30	1 1/2	3	24	0.080



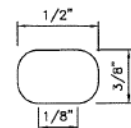
HORIZONTAL/VERTICAL RECTANGLE

A	B	C	D	E	F	G	T
12	6			1 1/2	1	4	0.080
18	6			1 1/2	1	4	0.080
12	9	1	10	1 1/2			0.080
24	12	1 1/2	9	1 1/2	2	8	0.080
24	18	3	12	1 1/2	2	14	0.080
30	24	3	18	1 1/2	3	18	0.080
36	12	1 1/2	9	1 1/2	2	8	0.080



HORIZONTAL RECTANGLE

A	B	C	D	E	F	G	T
36	24	3	18	6	24	1 1/2	0.080
48	24	3	18	9	30	1 1/2	0.080
48	36	6	24	9	30	1 1/2	0.080
60	24	3	18	12	36	1 1/2	0.080
60	36	6	24	12	36	1 1/2	0.080



NOTE:

1. A 30" LONG OR GREATER PLATE SHALL BE USED WHEN A "NO OUTLET" SUPPLEMENT IS REQUIRED.
2. THE CITY OF HOUSTON "STOP" AND "YIELD" SIGNS SHALL BE A MINIMUM 36". SPECIAL PERMISSION FROM THE CITY TRAFFIC ENGINEER IS REQUIRED FOR LESS THAN 36" SIGNS.
3. ALL PUNCHED HOLES ARE 3/8"x 1/2" OVAL.
4. ALL CORNER RADII ARE 1 1/2".

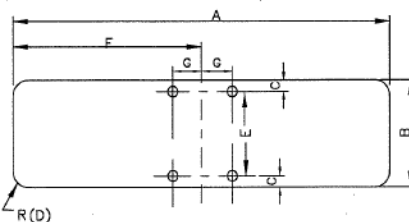


TABLE - D3 SIGNS (BRACKETS)

A	B	C	D	E	F	G	T
30	9	5/8	1 1/2	8 3/4	15	1 1/2	0.125
36	9	5/8	1 1/2	8 3/4	18	1 1/2	0.125
42	9	5/8	1 1/2	8 3/4	21	1 1/2	0.125
48	9	5/8	1 1/2	8 3/4	24	1 1/2	0.125

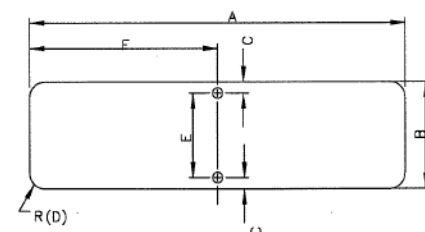


TABLE - D3 SIGNS

A	B	C	D	E	F	T
30	9	1 1/2	1 1/2	6	15	0.125
36	9	1 1/2	1 1/2	6	18	0.125
42	9	1 1/2	1 1/2	6	21	0.125
48	9	1 1/2	1 1/2	6	24	0.125

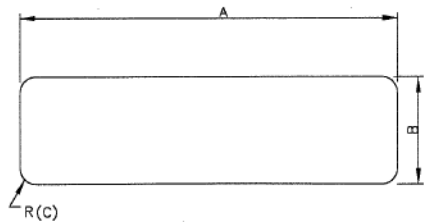


TABLE - D1 SIGNS

A	B	C	T
60	24	1 1/2	0.080
72	24	1 1/2	0.080
84	24	1 1/2	0.080
96	24	1 1/2	0.080

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

GROUND MOUNTED
SIGN SIZES
(NOT TO SCALE)

CITY TRAFFIC ENGINEER

CITY ENGINEER

DIRECTOR OF
HOUSTON PUBLIC WORKS

EFF DATE: JUL-01-2018 DWG NO: 01509-03

NO. REVISIONS BY DATE

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
600 HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

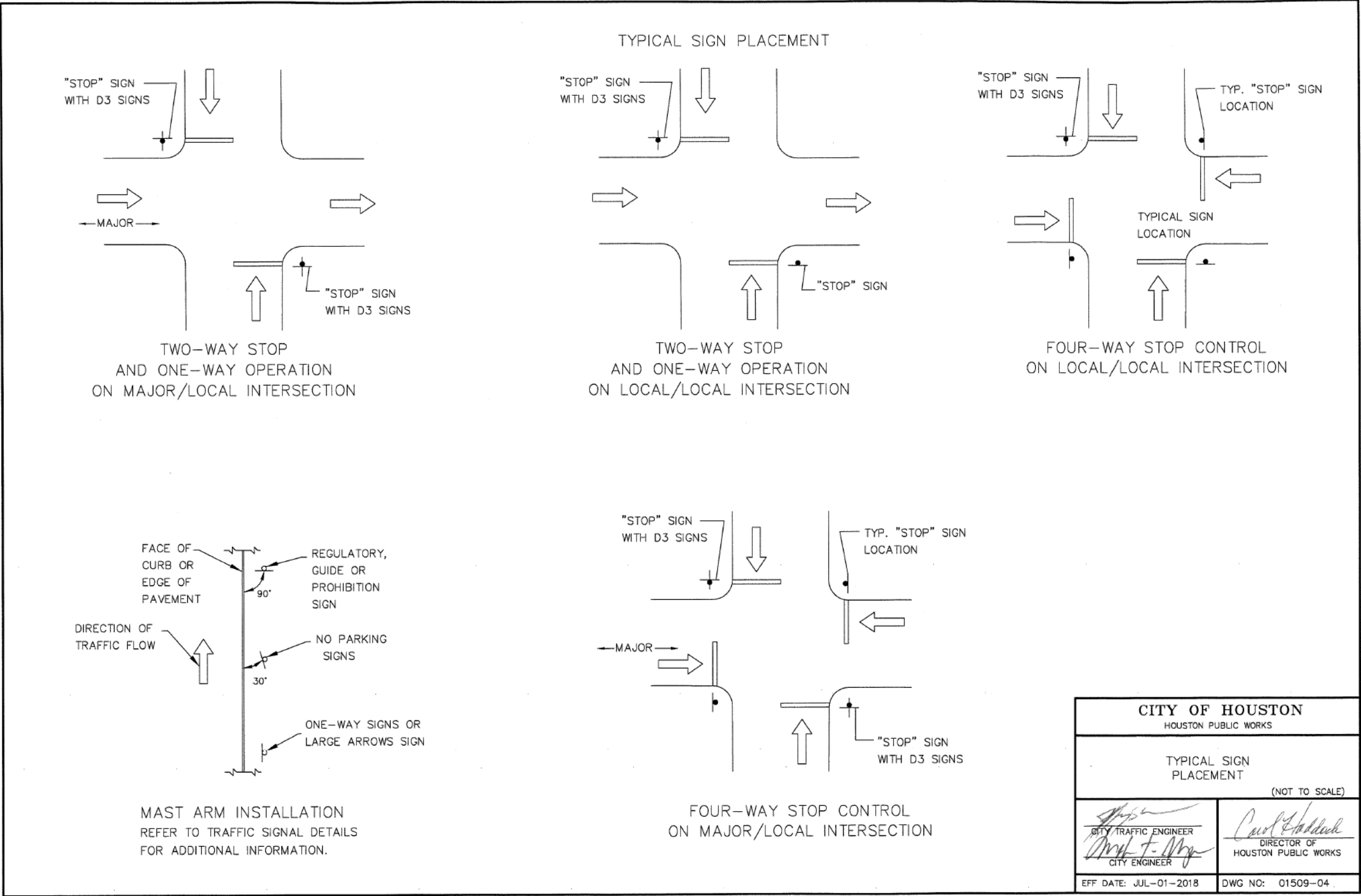
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
NORTH PARK DRIVE
GROUND MOUNTED
SIGN SIZES
COH STANDARDS
SHEET 1 OF 1

DESIGNED: DIV. NO. STATE CITY OF HOUSTON WBS HIGHWAY NO.

CHECKED: 6 TEXAS SEE TITLE SHEET CS

DRAWN: STATE COUNTY CONTROL SECTION JOB SHEET NO.

CHECKED: HOU MONTGOMERY 0912 37 232 508C



NO.	REVISIONS						BY	DATE	
HNTB				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON									
HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
TYPICAL SIGN PLACEMENT									
COH STANDARDS									
SHEET 1 OF 1									
DESIGNED:		FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS				HIGHWAY NO.	
CHECKED:		6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET NO.		
CHECKED:		HOU	MONTGOMERY	0912	37	232	508D		

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUITS & NOTES

ED(1) - 14

FILE: ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		509

71A

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

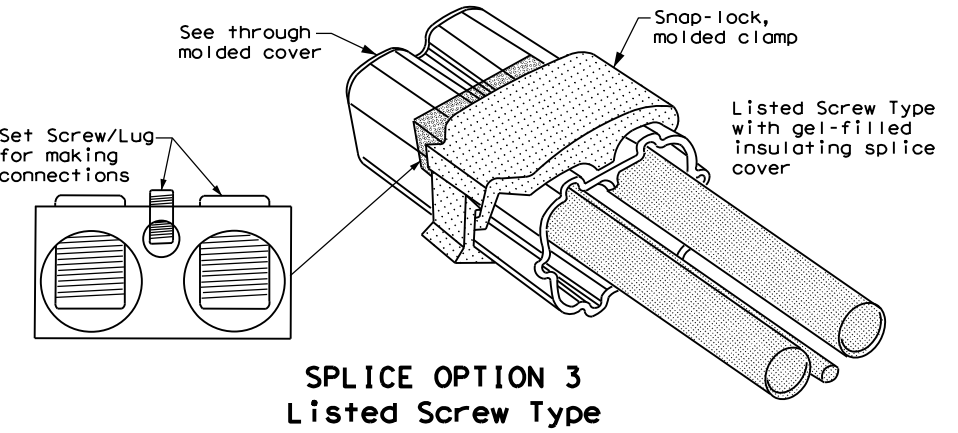
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

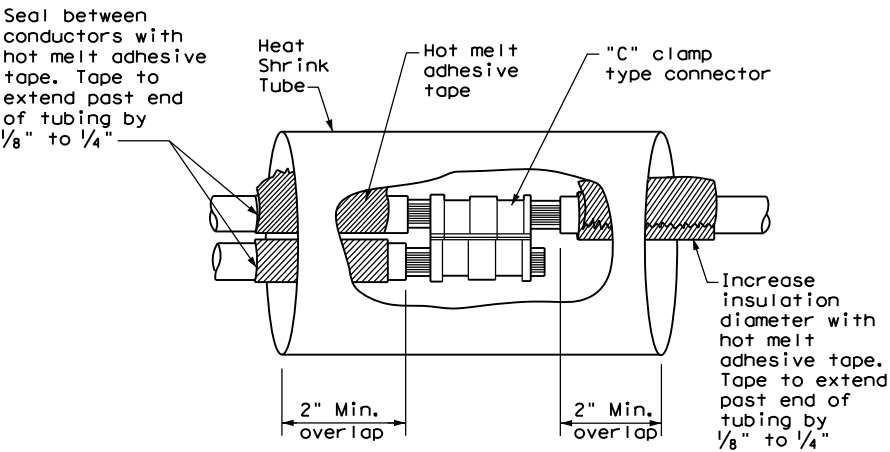
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

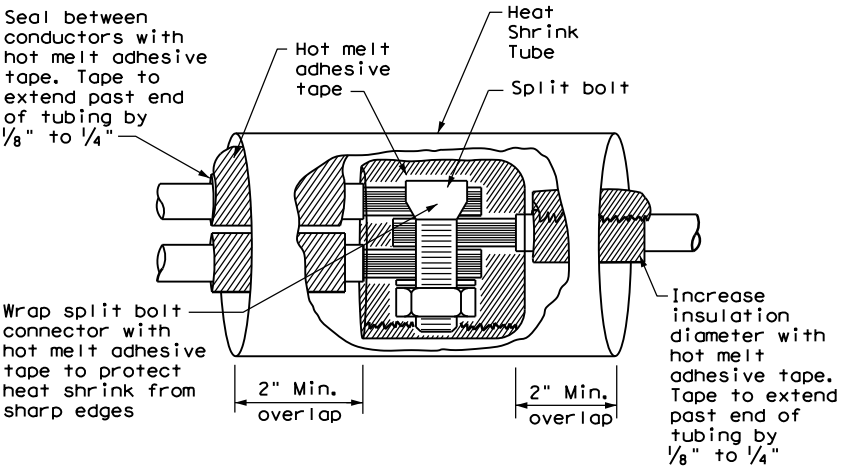
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.




SPLICE OPTION 3
Listed Screw Type



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



Texas Department of Transportation

Traffic
Operations
Division
Standard

ELECTRICAL DETAILS
CONDUCTORS

ED(3) - 14

FILE:	ed3-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT	SECT	JOB		HIGHWAY			
REVISIONS		0912	37	232		CS			
		DIST		COUNTY			SHEET NO.		
		HOU		MONTGOMERY			510		

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

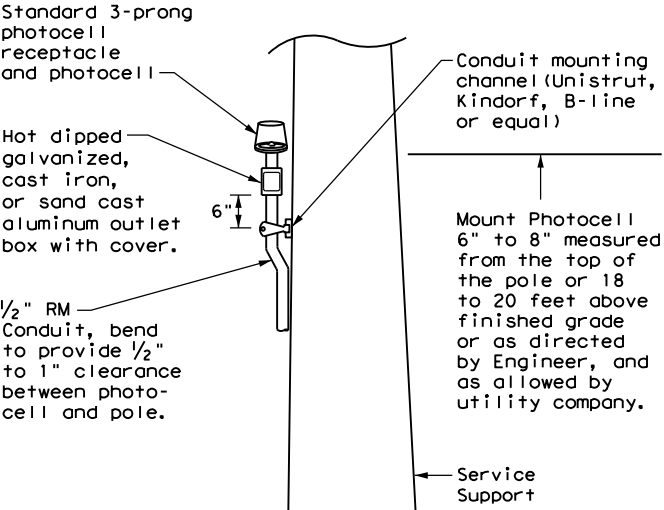
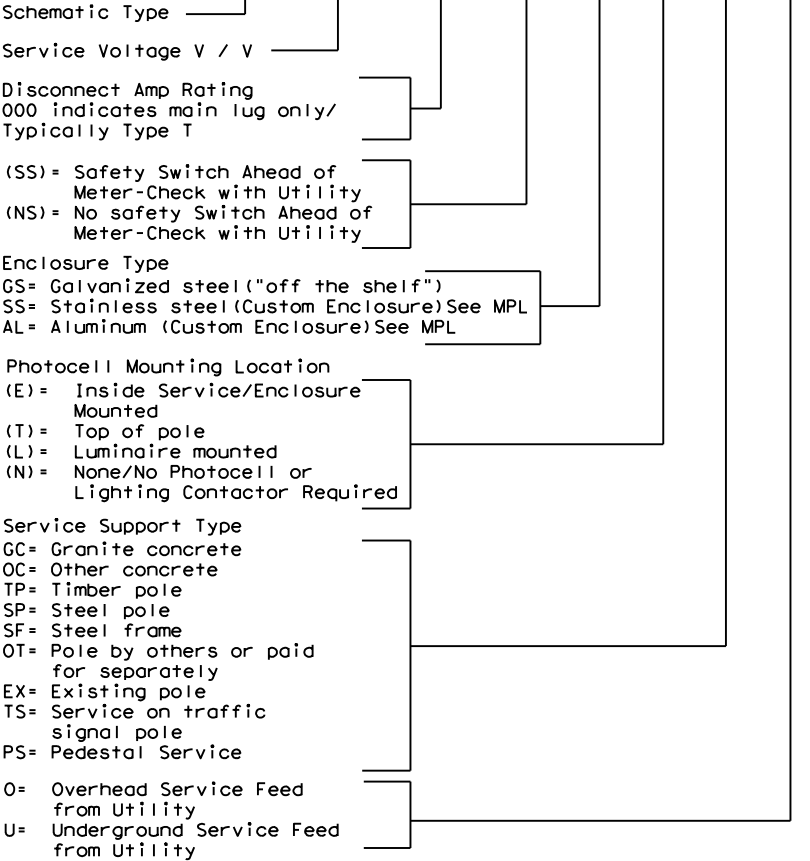
* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbdr/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminares	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Traffic Operations Division Standard

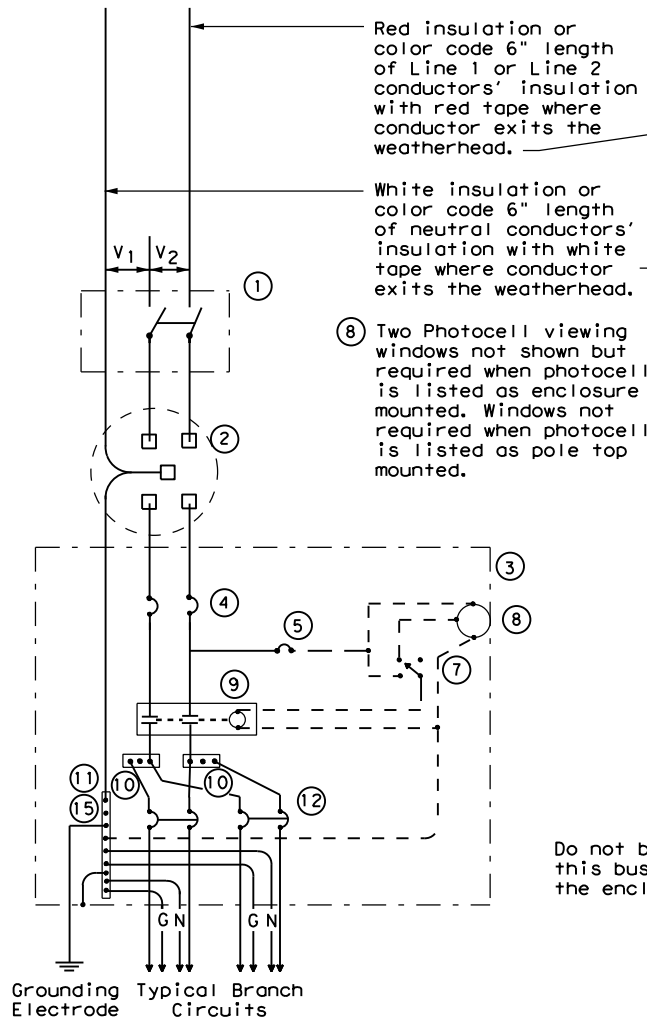
ELECTRICAL DETAILS
SERVICE NOTES & DATA

ED(5) - 14

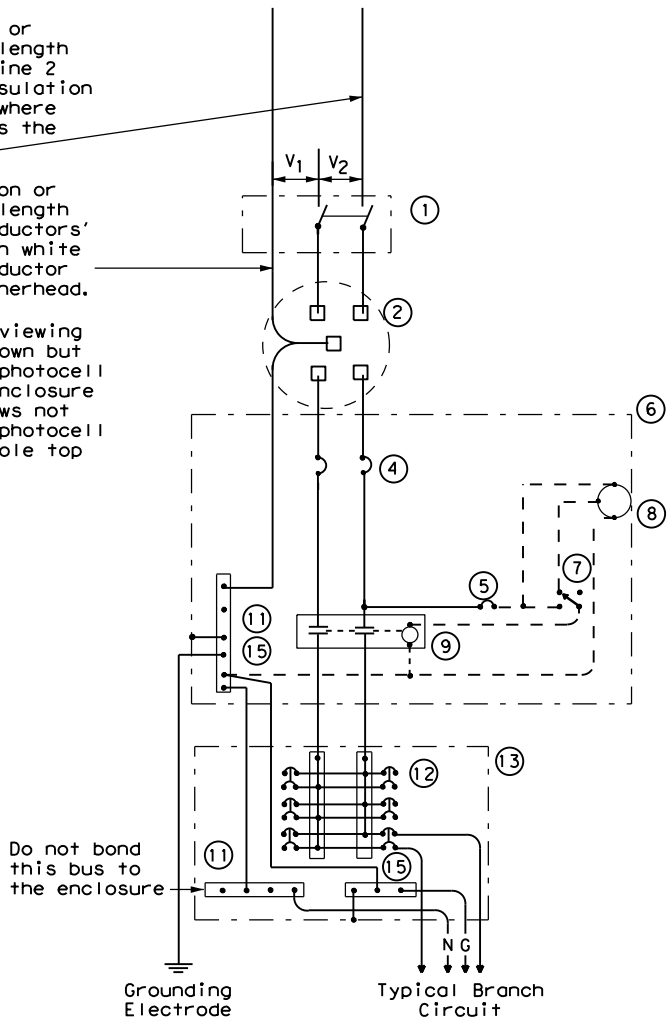
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© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		511

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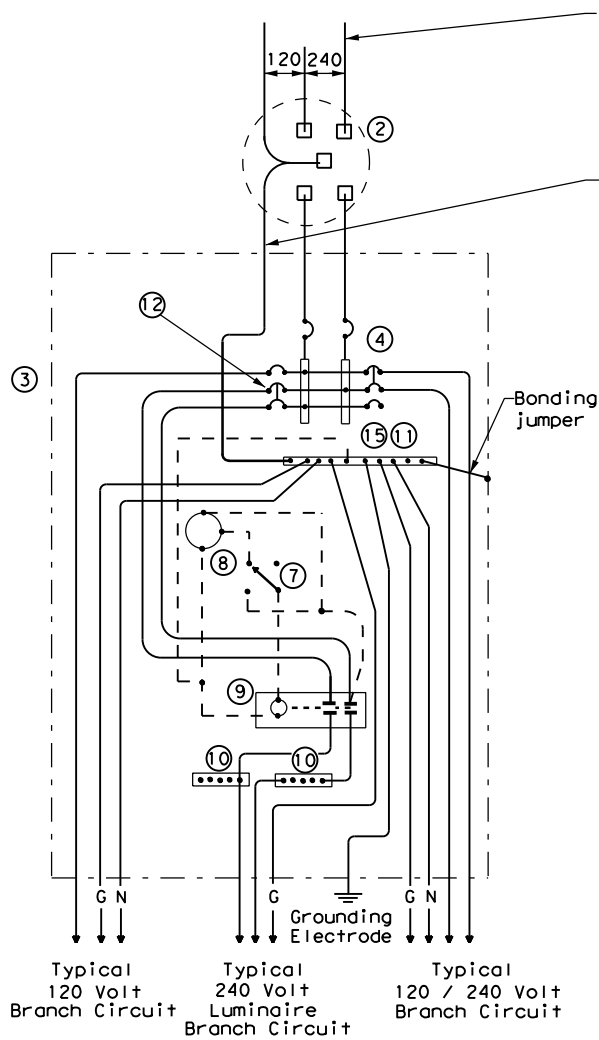
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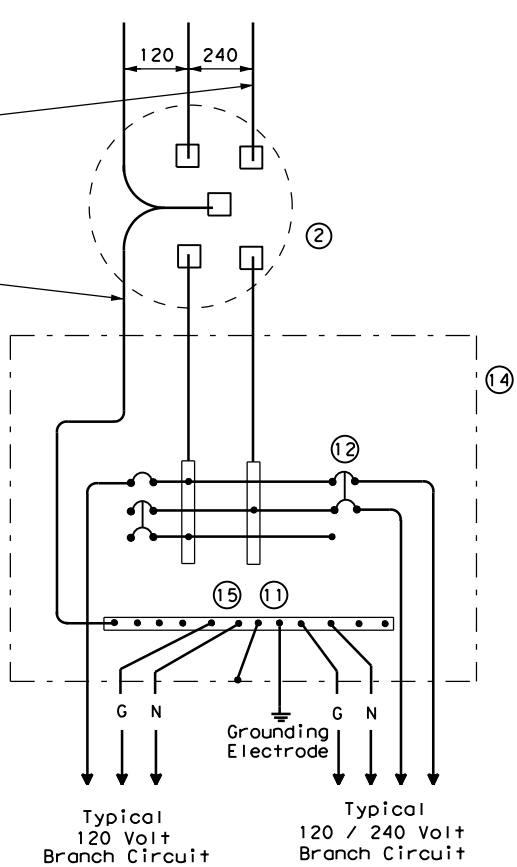
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE




SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE
Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
—	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

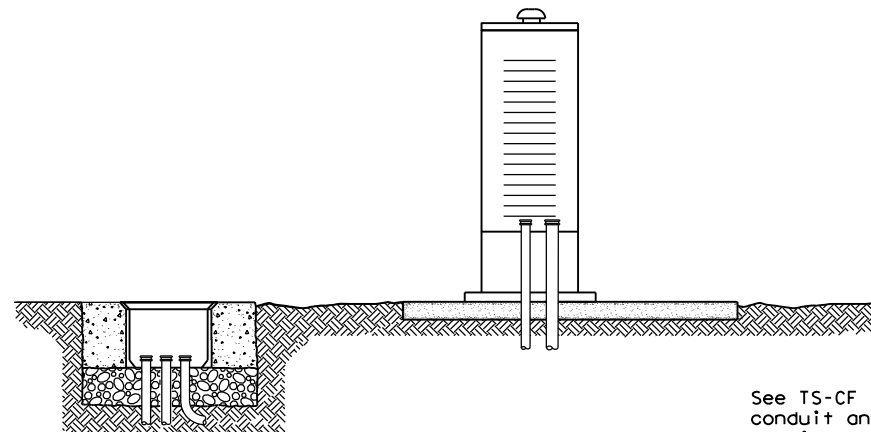
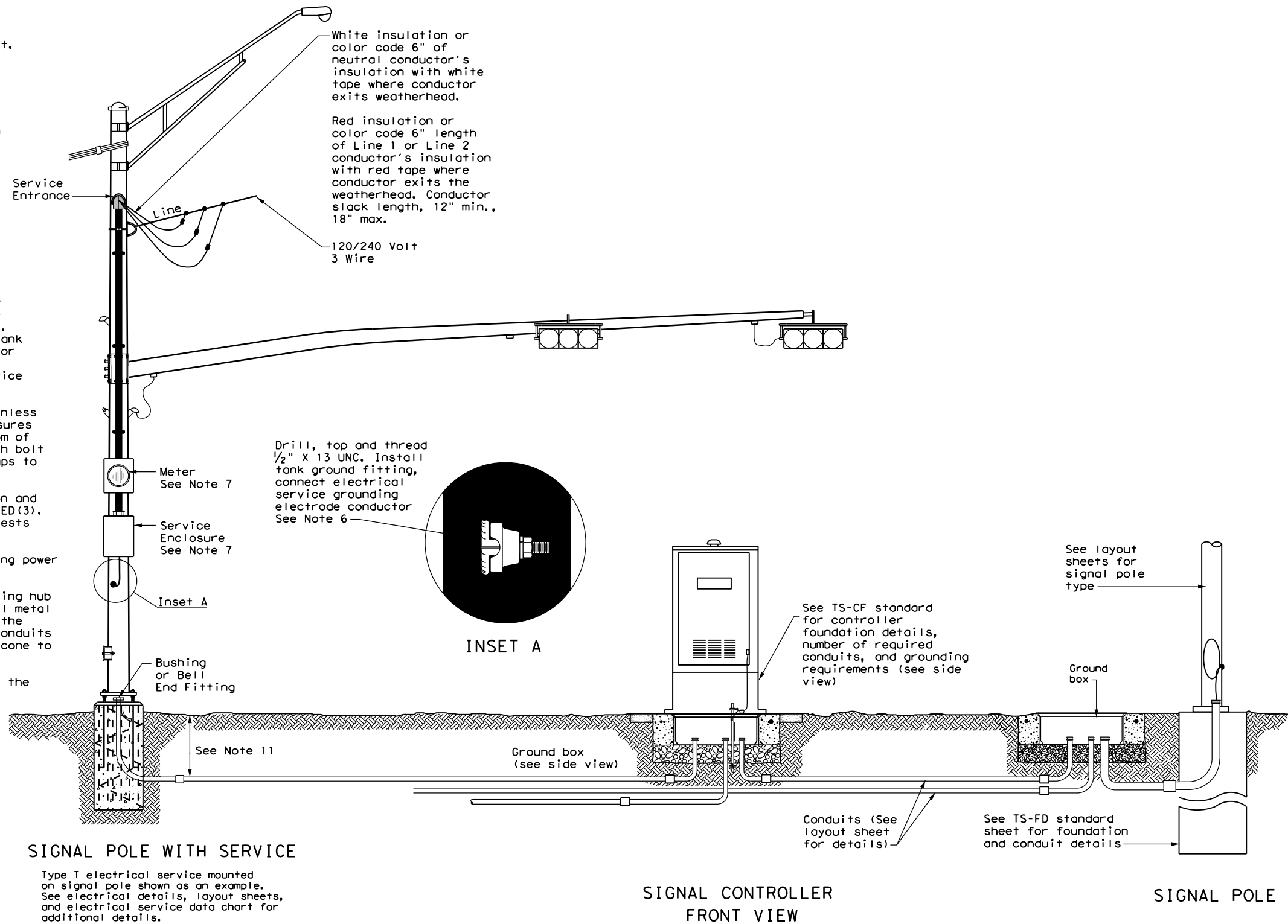
SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus


 Texas Department of Transportation		Traffic Operations Division Standard		
ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES				
ED(6) - 14				
FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		512

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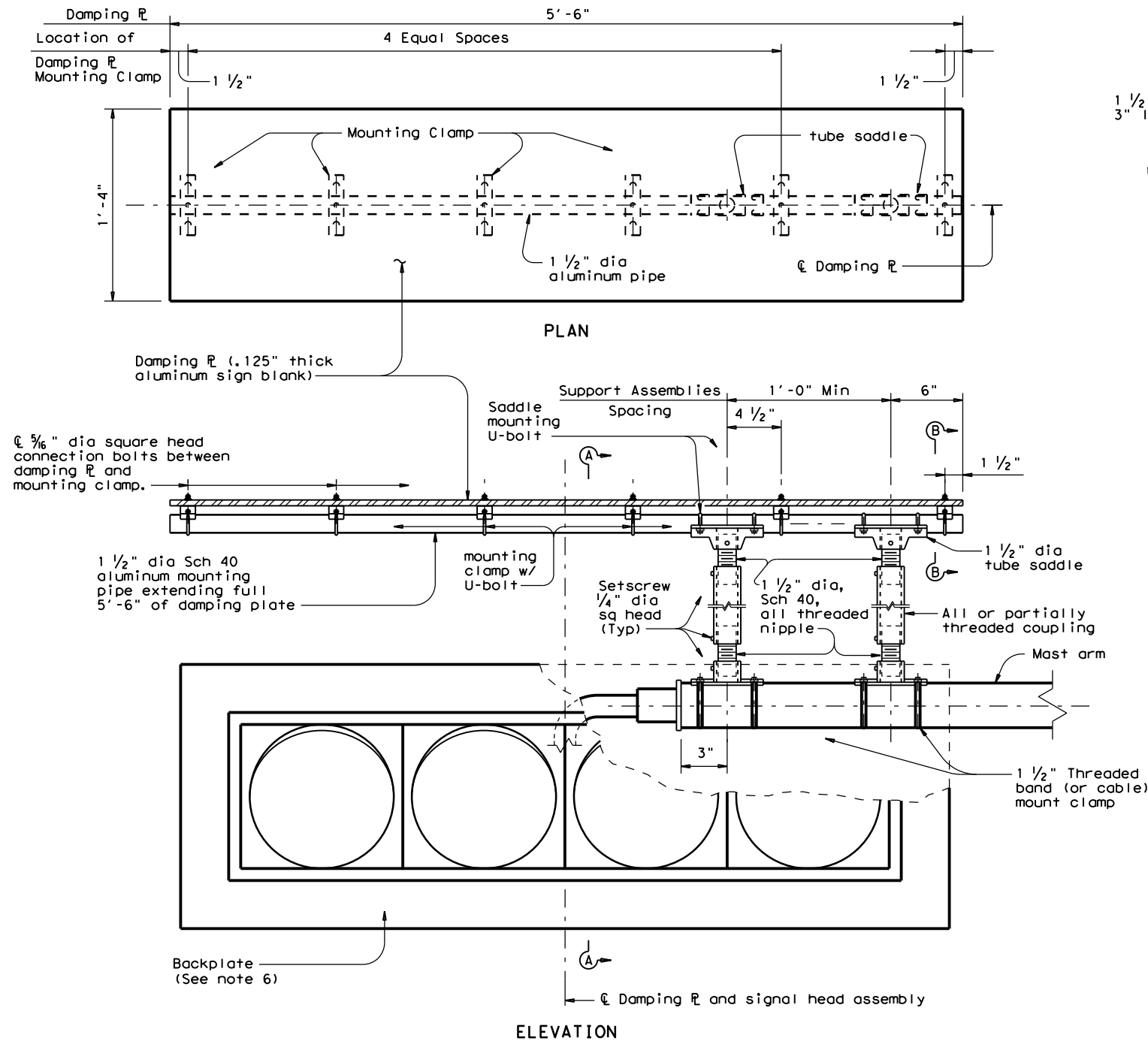
- ### TRAFFIC SIGNAL NOTES
1. Do not pass luminaire conductors through the signal controller cabinet.
 2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
 3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
 4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
 5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TxDOT standard TS-FD for further details.
 6. Drill and tap signal poles for 1/2 in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
 7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of 3/4 in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
 8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
 9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
 10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
 11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



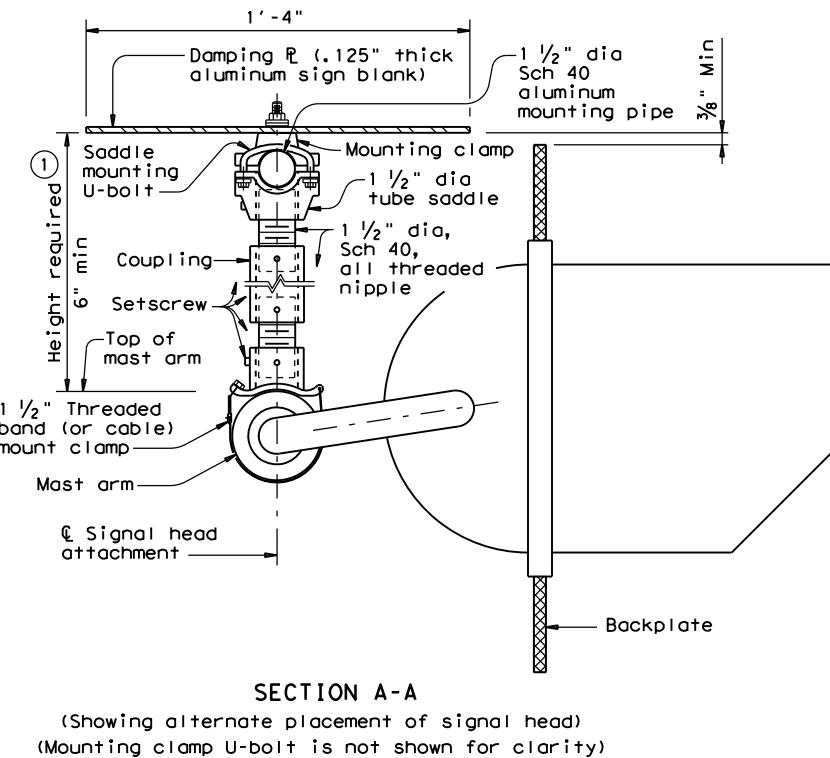
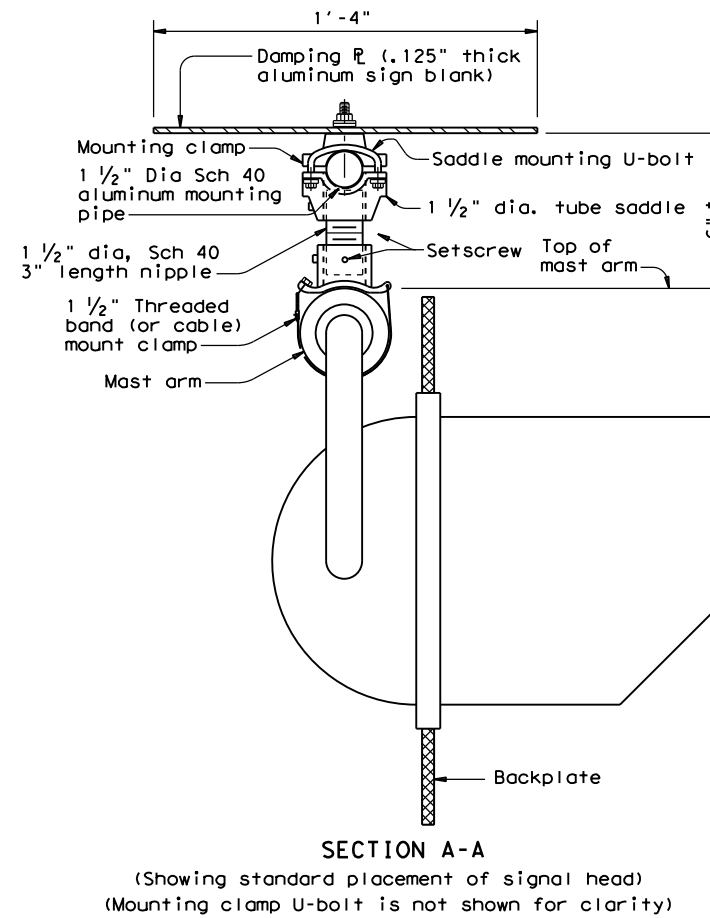
 Texas Department of Transportation				Traffic Operations Division Standard	
ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS ED(8) - 14					
FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
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REVISIONS	0912	37	232		CS
	DIST	COUNTY			SHEET NO.
	HOU	MONTGOMERY			513

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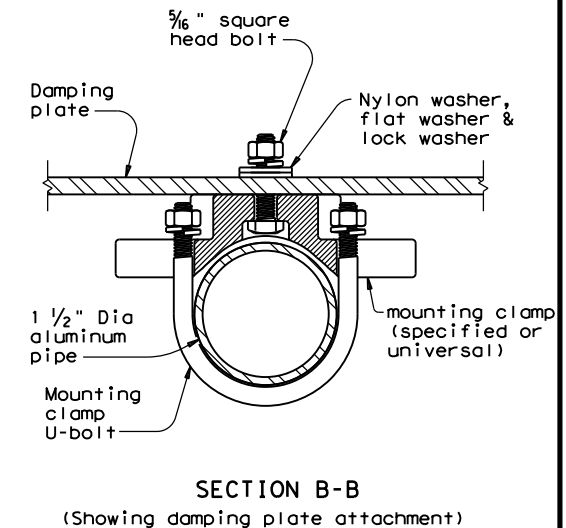
DAMPING PLATE MOUNTING DETAILS
(Showing alternate placement of signal head)




① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 3/4"	3"	-	-
7"-8 1/2"	4"	-	-
9"-10 1/2"	6"	-	-
11"-15 1/2"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and U-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type BFL or CFL retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.



**Texas Department of Transportation**

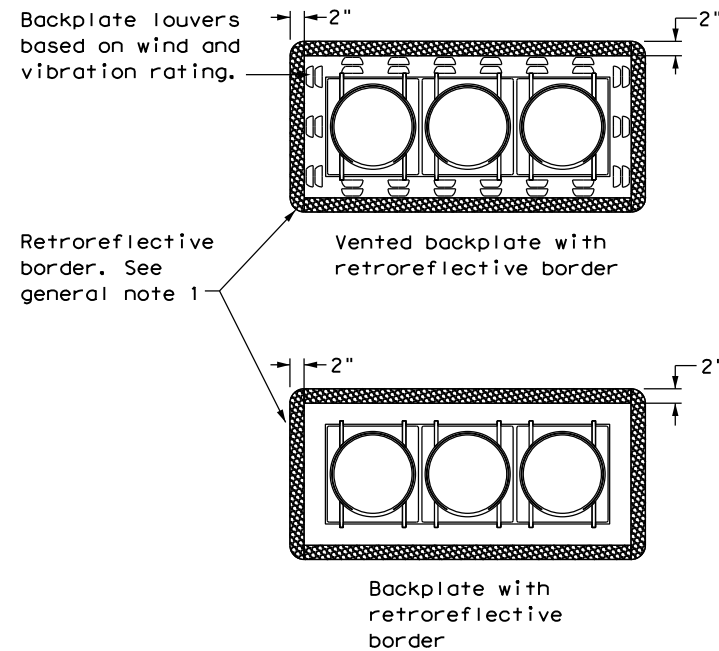
Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS
MA-DPD-20

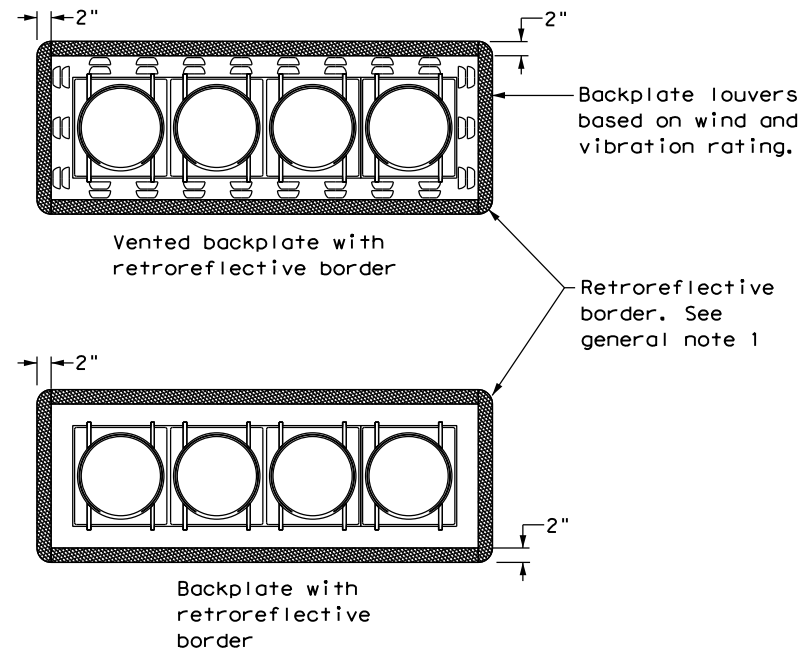
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© TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0912	37	232	CS
6-20	DIST	COUNTY	SHEET NO.	
	HOU	MONTGOMERY	514	

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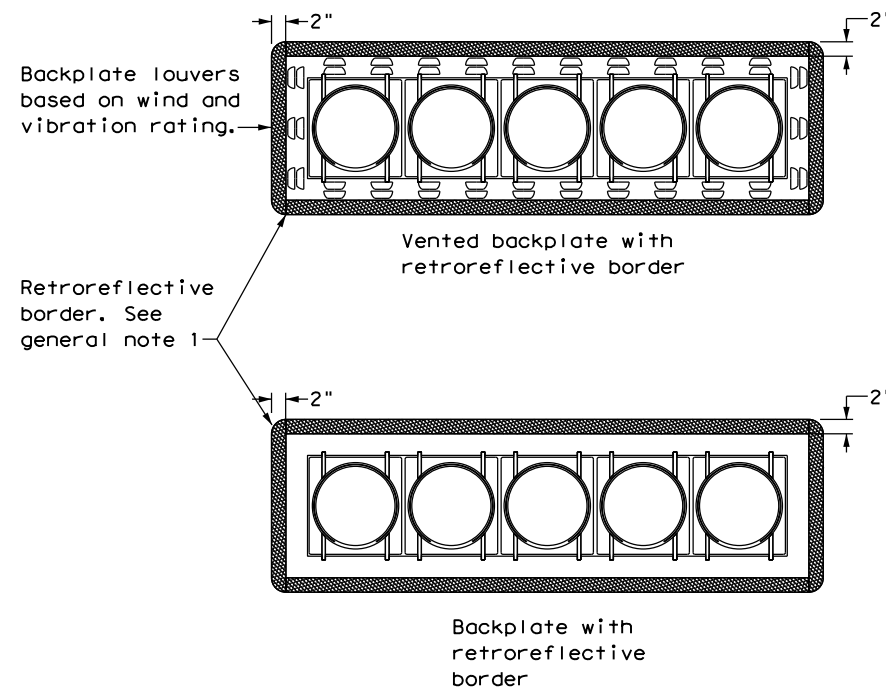
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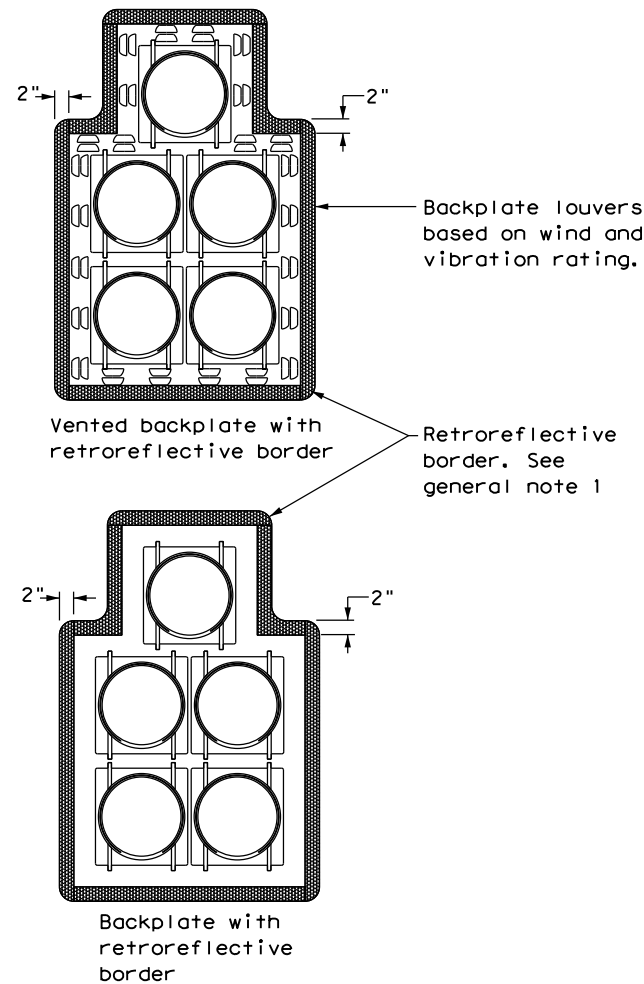
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



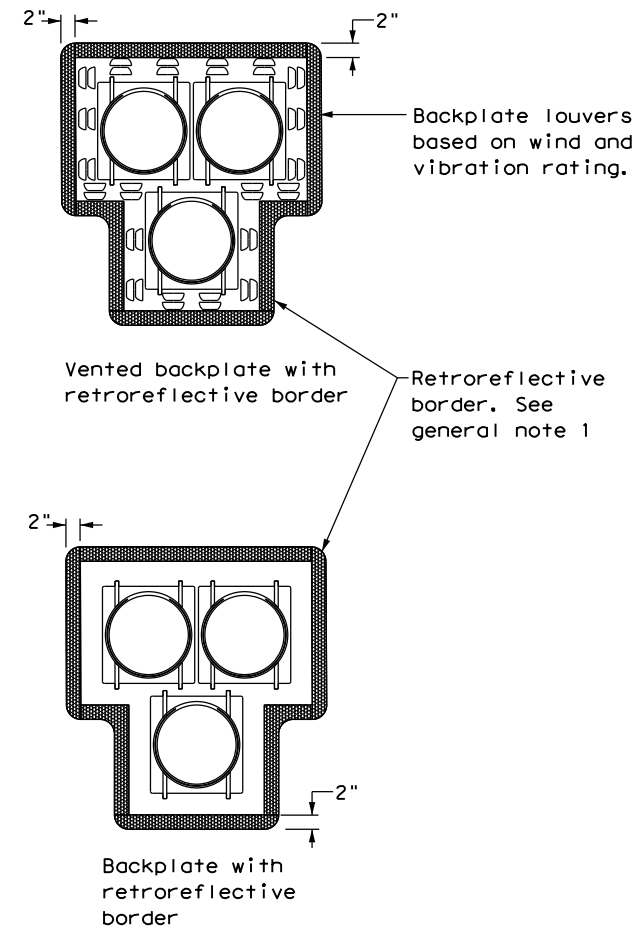
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL




FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

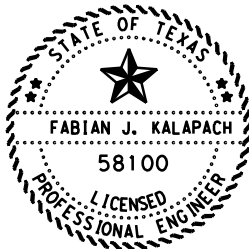
GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatibility must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
 - Pole mounted
 - Overhead mounted
 - Span wire mounted
 - Mast arm mounted
 - Vertical signal heads
 - Horizontal signal heads
 - Clustered signal heads
 - Pedestrian hybrid beacons

 <i>Texas Department of Transportation</i>				<i>Traffic Safety Division Standard</i>					
<div>TRAFFIC SIGNAL</div> <div>HEAD WITH</div> <div>BACKPLATE</div> <div>TS-BP-20</div>									
FILE: ts-bp-20.dgn		DN: TxDOT		CK: TxDOT		DW: TxDOT		CK: TxDOT	
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REVISIONS		0912	37	232			CS		
		DIST	COUNTY					SHEET NO.	
		HOU	MONTGOMERY					515	

ELECTRIC SERVICE SUMMARY									
ITEM & CODE	SERVICE NUMBER	STATION & OFFSET	ELECTRICAL SERVICE DESCRIPTION DATA (SEE ED(5) - 14 AND ED(6) - 14)	SERVICE SUPPORT TYPE	SERVICE FEED	SERVICE CONDUIT SIZE (RMC) *	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP
628 6015	ELECTRIC SERVICE 1	STA 37+62.0, 99.4' LT	ELC SRV TY A 120/240 060(SS)SS(E)SP(O)	STEEL POLE	OVERHEAD	1 1/4"	3/#6	60	2P/60
628 6015	ELECTRIC SERVICE 2	STA 82+29.7, 56.2' LT	ELC SRV TY A 120/240 060(SS)SS(E)SP(O)	STEEL POLE	OVERHEAD	1 1/4"	3/#6	60	2P/60
*VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.									

ELECTRIC SERVICE SUMMARY									
ITEM & CODE	SERVICE NUMBER	PHOTOCELL MOUNTING LOCATION	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	VOLTAGE	KVA LOAD
628 6015	ELECTRIC SERVICE 1	INSIDE SERVICE/ENCLOSURE	60	60	ILLUMINATION 1A	2P/20	5.95	240	1.43
					ILLUMINATION 1B	2P/20	5.95	240	1.43
					ILLUMINATION 1C	2P/20	5.95	240	1.43
					ILLUMINATION 1D	2P/20	7.35	240	1.76
628 6015	ELECTRIC SERVICE 2	INSIDE SERVICE/ENCLOSURE	30	60	ILLUMINATION 2A	2P/20	1.75	240	0.42
*VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.									

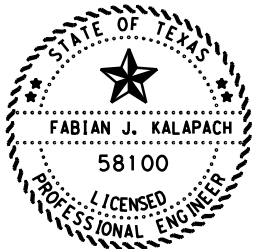


Fabian Kalapach

DATE: 4/1/2021

NO.	REVISIONS						BY	DATE									
<div><div><div>HNTB</div><div><small>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</small></div></div><div><div></div><div><small>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007</small></div></div></div>																	
<div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div><div><div>NORTH PARK DRIVE</div><div>ILLUMINATION</div><div>ELECTRICAL SERVICE</div><div>SUMMARY</div></div></div>																	
SHEET 1 OF 1																	
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.													
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS													
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET NO.											
CHECKED:	HOU	MONTGOMERY	0912	37	232	516											



VOLTAGE DROP CALCULATION SUMMARY											
LAYOUT SHEET	ELECTRIC SERVICE ID AND BRANCH	RUN ID	RUN VOLTAGE (VOLTS)	CURRENT THIS RUN (AMPS)	LENGTH OF RUN (FEET)	ITEM NUMBER	CONDUCTOR DESCRIPTION	WIRE LOOP RESISTANCE 2 X (OHM / 1000 FT)	VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP NOT TO EXCEED 10% DROP
NORTHPARK DR BEGIN TO 14+00	1A-1	1	240	0.35	50	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	11.2678	4.69%
NORTHPARK DR 14+00 TO STA 25+00		1	240	0.35	158	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	11.2449	4.69%
NORTHPARK DR 14+00 TO STA 25+00	1A-2	2	240	0.70	207	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.19	11.1726	4.66%
NORTHPARK DR 14+00 TO STA 25+00	1A-3	3	240	1.05	193	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.27	10.9831	4.58%
NORTHPARK DR 14+00 TO STA 25+00	1A-4	4	240	1.40	207	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.38	10.7180	4.47%
NORTHPARK DR 14+00 TO STA 25+00	1A-5	5	240	1.75	202	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.46	10.3390	4.31%
NORTHPARK DR 14+00 TO STA 25+00	1A-6	6	240	2.45	148	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.47	9.8766	4.12%
NORTHPARK DR 25+00 TO STA 37+00		1	240	2.45	80	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.26	9.4023	3.92%
NORTHPARK DR 25+00 TO STA 37+00	1A-7	2	240	2.80	143	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.52	9.1459	3.81%
NORTHPARK DR 25+00 TO STA 37+00	1A-8	3	240	3.15	209	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.86	8.6222	3.59%
NORTHPARK DR 25+00 TO STA 37+00	1A-9	4	240	3.50	214	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.98	7.7611	3.23%
NORTHPARK DR 25+00 TO STA 37+00	1A-10	5	240	3.85	231	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.16	6.7814	2.83%
NORTHPARK DR 25+00 TO STA 37+00	1A-11	6	240	4.20	188	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.03	5.6181	2.34%
NORTHPARK DR 25+00 TO STA 37+00	1A-12	7	240	4.90	142	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.91	4.5853	1.91%
NORTHPARK DR 37+00 TO STA 49+00		1	240	4.90	44	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.28	3.6752	1.53%
NORTHPARK DR 37+00 TO STA 49+00	1A-13	2	240	5.60	204	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.49	3.3932	1.41%
NORTHPARK DR 37+00 TO STA 49+00	1A-14	3	240	5.95	9	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	1.8990	0.79%
NORTHPARK DR 37+00 TO STA 49+00		18	240	5.95	34	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.26	1.8289	0.76%
NORTHPARK DR 37+00 TO STA 49+00		17	240	5.95	188	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.46	1.5643	0.65%
NORTHPARK DR 37+00 TO STA 49+00		16	240	5.95	13	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.10	0.1012	0.04%
CIRCUIT "1A" START		START	240	5.95	START					0.0000	
NORTHPARK DR BEGIN TO 14+00	1B-1	2	240	0.35	50	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	12.4444	5.19%
NORTHPARK DR 14+00 TO STA 25+00		7	240	0.35	160	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	12.4215	5.18%
NORTHPARK DR 14+00 TO STA 25+00	1B-2	8	240	0.70	184	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.17	12.3482	5.15%
NORTHPARK DR 14+00 TO STA 25+00	1B-3	9	240	1.05	199	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.27	12.1798	5.07%
NORTHPARK DR 14+00 TO STA 25+00	1B-4	10	240	1.40	212	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.39	11.9065	4.96%
NORTHPARK DR 14+00 TO STA 25+00	1B-5	11	240	1.75	204	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.47	11.5182	4.80%
NORTHPARK DR 14+00 TO STA 25+00	1B-6	12	240	2.45	168	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.54	11.0513	4.60%
NORTHPARK DR 25+00 TO STA 37+00		8	240	2.45	81	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.26	10.5129	4.38%
NORTHPARK DR 25+00 TO STA 37+00	1B-7	9	240	2.80	148	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.54	10.2533	4.27%
NORTHPARK DR 25+00 TO STA 37+00	1B-8	10	240	3.15	210	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.87	9.7113	4.05%
NORTHPARK DR 25+00 TO STA 37+00	1B-9	11	240	3.50	240	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.10	8.8461	3.69%
NORTHPARK DR 25+00 TO STA 37+00	1B-10	12	240	3.85	227	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.14	7.7473	3.23%
NORTHPARK DR 25+00 TO STA 37+00	1B-11	13	240	4.20	189	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.04	6.6042	2.75%
NORTHPARK DR 25+00 TO STA 37+00	1B-12	14	240	4.90	142	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.91	5.5659	2.32%
NORTHPARK DR 37+00 TO STA 49+00		4	240	4.90	43	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.28	4.6558	1.94%
NORTHPARK DR 37+00 TO STA 49+00	1B-13	5	240	5.60	207	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.52	4.3802	1.83%
NORTHPARK DR 37+00 TO STA 49+00	1B-14	6	240	5.95	9	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	2.8640	1.19%
NORTHPARK DR 37+00 TO STA 49+00		19	240	5.95	124	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.97	2.7940	1.16%
NORTHPARK DR 37+00 TO STA 49+00		18	240	5.95	34	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.26	1.8289	0.76%
NORTHPARK DR 37+00 TO STA 49+00		17	240	5.95	188	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.46	1.5643	0.65%
NORTHPARK DR 37+00 TO STA 49+00		16	240	5.95	13	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.10	0.1012	0.04%
CIRCUIT "1B" START		START	240	5.95	START					0.0000	



Fabian Kalapach

DATE: 4/1/2021

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRF 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTHPARK DRIVE ILLUMINATION VOLTAGE DROP SUMMARY			
SHEET 1 OF 5			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB No.	SHEET No.
		232	517

NO.	REVISIONS						BY	DATE	
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
				LAKE HOUSTON REDEVELOPMENT AUTHORITY & THIR2 10 20 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
<h1>CITY OF HOUSTON</h1> <h2>HOUSTON PUBLIC WORKS</h2> <h3>NORTHPARK DRIVE</h3> <h3>ILLUMINATION</h3> <h3>VOLTAGE DROP</h3> <h3>SUMMARY</h3>									
SHEET 2 OF 5									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.		
CHECKED:	6	TEXAS	SEE TITLE SHEET				CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	518			

VOLTAGE DROP CALCULATION SUMMARY											
LAYOUT SHEET	ELECTRIC SERVICE ID AND BRANCH	RUN ID	RUN VOLTAGE (VOLTS)	CURRENT THIS RUN (AMPS)	LENGTH OF RUN (FEET)	ITEM NUMBER	CONDUCTOR DESCRIPTION	WIRE LOOP RESISTANCE 2 X (OHM / 1000 FT)	VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP NOT TO EXCEED 10% DROP
UNDER PASS LIGHTING	1D-3	6	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	16.0121	6.67%
UNDER PASS LIGHTING	1D-2	5	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9865	6.66%
UNDER PASS LIGHTING		4	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	15.9793	6.66%
UNDER PASS LIGHTING	1D-1	3	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9352	6.64%
UNDER PASS LIGHTING		2	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9245	6.64%
UNDER PASS LIGHTING	1D-6	11	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	16.0121	6.67%
UNDER PASS LIGHTING	1D-5	10	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9865	6.66%
UNDER PASS LIGHTING		9	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	15.9793	6.66%
UNDER PASS LIGHTING	1D-4	8	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9352	6.64%
UNDER PASS LIGHTING		7	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.9245	6.64%
UNDER PASS LIGHTING		1	240	2.10	20	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.09	15.9138	6.63%
NORTHPARK DR 25+00 TO STA 37+00		21	240	2.10	33	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.14	15.8283	6.60%
NORTHPARK DR 25+00 TO STA 37+00		20	240	2.10	86	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.37	15.6872	6.54%
UNDER PASS LIGHTING	1D-9	17	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	15.5461	6.48%
UNDER PASS LIGHTING	1D-8	16	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.5204	6.47%
UNDER PASS LIGHTING		15	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	15.5133	6.46%
UNDER PASS LIGHTING	1D-7	14	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.4691	6.45%
UNDER PASS LIGHTING		13	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.4584	6.44%
UNDER PASS LIGHTING	1D-12	22	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	15.5568	6.48%
UNDER PASS LIGHTING	1D-11	21	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.5311	6.47%
UNDER PASS LIGHTING		20	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	15.5240	6.47%
UNDER PASS LIGHTING	1D-10	19	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	15.4798	6.45%
UNDER PASS LIGHTING		18	240	2.10	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.02	15.4691	6.45%
UNDER PASS LIGHTING		12	240	3.15	20	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.13	15.4477	6.44%
NORTHPARK DR 25+00 TO STA 37+00		19	240	5.25	113	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	1.21	15.3195	6.38%
UNDER PASS LIGHTING	1D-15	28	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	14.2527	5.94%
UNDER PASS LIGHTING	1D-14	27	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	14.2271	5.93%
UNDER PASS LIGHTING		26	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	14.2199	5.92%
UNDER PASS LIGHTING	1D-13	25	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	14.1758	5.91%
UNDER PASS LIGHTING		24	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	14.1651	5.90%
UNDER PASS LIGHTING		23	240	1.05	20	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	14.1544	5.90%
NORTHPARK DR 25+00 TO STA 37+00		18	240	6.30	91	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	1.17	14.1116	5.88%
UNDER PASS LIGHTING	1D-18	28	240	0.35	36	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.03	13.0855	5.45%
UNDER PASS LIGHTING	1D-17	27	240	0.70	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	13.0598	5.44%
UNDER PASS LIGHTING		26	240	0.70	31	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	13.0527	5.44%
UNDER PASS LIGHTING	1D-16	25	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	13.0085	5.42%
UNDER PASS LIGHTING		24	240	1.05	5	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.01	12.9978	5.42%
UNDER PASS LIGHTING		23	240	1.05	20	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.04	12.9871	5.41%
NORTHPARK DR 25+00 TO STA 37+00		17	240	7.35	52	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.78	12.9444	5.39%
NORTHPARK DR 25+00 TO STA 37+00		16	240	7.35	309	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	4.62	12.1662	5.07%

STATE OF TEXAS

FABIAN J. KALAPACH

58100

LICENSED PROFESSIONAL ENGINEER

Fabian Kalapach

DATE: 4/1/2021

NO.	REVISIONS			BY	DATE			
<div><div><div><div><div></div><div>HNTB</div></div><div><div>HNTB Corporation</div><div>The HNTB Companies</div><div>Infrastructure Solutions</div><div>Firm Registration Number 420</div></div></div><div><div><div>LHRA</div><div>Lake Houston Redevelopment Authority & TIRZ 10</div><div>600 TRAVIS, SUITE 4200</div><div>HOUSTON, TX 77007</div></div></div></div></div>								
<div><div><div><div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div><div>NORTHPARK DRIVE</div><div>ILLUMINATION</div><div>VOLTAGE DROP</div><div>SUMMARY</div></div></div></div></div>								
SHEET 3 OF 5								
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS	HIGHWAY NO.				
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS				
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232 519			

4/2/2021

9:57:51 AM

VOLTAGE DROP CALCULATION SUMMARY											
LAYOUT SHEET	ELECTRIC SERVICE ID AND BRANCH	RUN ID	RUN VOLTAGE (VOLTS)	CURRENT THIS RUN (AMPS)	LENGTH OF RUN (FEET)	ITEM NUMBER	CONDUCTOR DESCRIPTION	WIRE LOOP RESISTANCE 2 X (OHM / 1000 FT)	VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP NOT TO EXCEED 10% DROP
NORTHPARK DR 25+00 TO STA 37+00		15	240	7.35	333	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	4.98	7.5422	3.14%
NORTHPARK DR 37+00 TO STA 49+00		15	240	7.35	62	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	0.93	2.5589	1.07%
NORTHPARK DR 37+00 TO STA 49+00		14	240	7.35	109	620 6006	ELEC CONDR (NO.10) INSULATED	2.036	1.63	1.6311	0.68%
CIRCUIT "1D" START		START	240	7.35	START					0.0000	
NORTHPARK DR 61+00 TO STA 73+00	1E17	18	240	0.35	96	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.04	14.7938	6.16%
NORTHPARK DR 61+00 TO STA 73+00		17	240	0.35	44	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	14.7499	6.15%
NORTHPARK DR 61+00 TO STA 73+00		16	240	0.35	61	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.03	14.7297	6.14%
NORTHPARK DR 61+00 TO STA 73+00	1E16	15	240	0.70	24	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	14.7018	6.13%
NORTHPARK DR 61+00 TO STA 73+00		14	240	0.70	56	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.05	14.6798	6.12%
NORTHPARK DR 61+00 TO STA 73+00		13	240	0.70	58	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.05	14.6285	6.10%
NORTHPARK DR 61+00 TO STA 73+00		12	240	0.70	62	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.06	14.5754	6.07%
NORTHPARK DR 61+00 TO STA 73+00	1E15	11	240	1.05	52	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	14.5187	6.05%
NORTHPARK DR 61+00 TO STA 73+00		10	240	1.05	94	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.13	14.4473	6.02%
NORTHPARK DR 61+00 TO STA 73+00		9	240	1.05	58	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.08	14.3182	5.97%
NORTHPARK DR 61+00 TO STA 73+00	1E14	8	240	1.40	55	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.10	14.2385	5.93%
NORTHPARK DR 61+00 TO STA 73+00		7	240	1.40	41	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.08	14.1378	5.89%
NORTHPARK DR 61+00 TO STA 73+00		6	240	1.40	56	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.10	14.0627	5.86%
NORTHPARK DR 61+00 TO STA 73+00		5	240	1.40	17	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.03	13.9602	5.82%
NORTHPARK DR 61+00 TO STA 73+00	1E13	4	240	1.75	200	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.46	13.9290	5.80%
NORTHPARK DR 61+00 TO STA 73+00	1E12	3	240	2.10	15	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.04	13.4712	5.61%
NORTHPARK DR 61+00 TO STA 73+00		2	240	2.10	56	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.15	13.4300	5.60%
NORTHPARK DR 61+00 TO STA 73+00		1	240	2.10	7	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	13.2762	5.53%
NORTHPARK DR 49+00 TO STA 61+00		16	240	2.10	65	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.18	13.2570	5.52%
NORTHPARK DR 49+00 TO STA 61+00	1E11	15	240	2.45	22	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	13.0784	5.45%
NORTHPARK DR 49+00 TO STA 61+00		14	240	2.45	106	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.34	13.0079	5.42%
NORTHPARK DR 49+00 TO STA 61+00		13	240	2.45	72	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.23	12.6682	5.28%
NORTHPARK DR 49+00 TO STA 61+00	1E10	12	240	2.80	96	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.35	12.4375	5.18%
NORTHPARK DR 49+00 TO STA 61+00		11	240	2.80	104	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.38	12.0859	5.04%
NORTHPARK DR 49+00 TO STA 61+00	1E9	10	240	3.15	67	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.28	11.7050	4.88%
NORTHPARK DR 49+00 TO STA 61+00		9	240	3.15	120	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.49	11.4290	4.76%
NORTHPARK DR 49+00 TO STA 61+00	1E8	8	240	3.50	96	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.44	10.9346	4.56%
NORTHPARK DR 49+00 TO STA 61+00		7	240	3.50	64	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.29	10.4951	4.37%
NORTHPARK DR 49+00 TO STA 61+00	1E7	6	240	3.85	118	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.59	10.2021	4.25%
NORTHPARK DR 49+00 TO STA 61+00		5	240	3.85	62	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.31	9.6078	4.00%
NORTHPARK DR 49+00 TO STA 61+00	1E6	4	240	4.20	72	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.40	9.2956	3.87%
NORTHPARK DR 49+00 TO STA 61+00		3	240	4.20	53	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.29	8.9001	3.71%
NORTHPARK DR 49+00 TO STA 61+00		2	240	4.20	65	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.36	8.6089	3.59%
NORTHPARK DR 49+00 TO STA 61+00	1E5	1	240	4.55	18	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.11	8.2518	3.44%
NORTHPARK DR 37+00 TO STA 49+00		31	240	4.55	22	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.13	8.1447	3.39%
NORTHPARK DR 37+00 TO STA 49+00		30	240	4.55	160	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.95	8.0138	3.34%
NORTHPARK DR 37+00 TO STA 49+00	1E4	29	240	4.90	57	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.37	7.0616	2.94%
NORTHPARK DR 37+00 TO STA 49+00		28	240	4.90	148	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.95	6.6962	2.79%
NORTHPARK DR 37+00 TO STA 49+00	1E3	27	240	5.25	31	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.21	5.7477	2.39%
NORTHPARK DR 37+00 TO STA 49+00		26	240	5.25	49	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.34	5.5348	2.31%

STATE OF TEXAS

FABIAN J. KALAPACH

58100

LICENSED PROFESSIONAL ENGINEER

Fabian Kalapach

DATE: 4/1/2021

NO.	REVISIONS	BY	DATE

HNTB

The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LHRA

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTHPARK DRIVE
ILLUMINATION
VOLTAGE DROP
SUMMARY

DESIGNED:

FED. RD. DIV. NO. STATE CITY OF HOUSTON WBS HIGHWAY NO.

CHECKED:

6 TEXAS SEE TITLE SHEET CS

DRAWN:

STATE DISTRICT COUNTY CONTROL SECTION JOB SHEET NO.

CHECKED:

HOU MONTGOMERY 0912 37 232 520

4/2/2021

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SHEET 4 OF 5

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VOLTAGE DROP CALCULATION SUMMARY											
LAYOUT SHEET	ELECTRIC SERVICE ID AND BRANCH	RUN ID	RUN VOLTAGE (VOLTS)	CURRENT THIS RUN (AMPS)	LENGTH OF RUN (FEET)	ITEM NUMBER	CONDUCTOR DESCRIPTION	WIRE LOOP RESISTANCE 2 X (OHM / 1000 FT)	VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP (VOLTS)	RUNNING TOTAL VOLTAGE DROP NOT TO EXCEED 10% DROP
NORTH PARK DR 37+00 TO STA 49+00		25	240	5.25	76	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.52	5.1983	2.17%
NORTH PARK DR 37+00 TO STA 49+00		24	240	5.25	51	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.35	4.6764	1.95%
NORTH PARK DR 37+00 TO STA 49+00	1E2	23	240	5.60	109	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.80	4.3262	1.80%
NORTH PARK DR 37+00 TO STA 49+00		22	240	5.60	54	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.40	3.5278	1.47%
NORTH PARK DR 37+00 TO STA 49+00		21	240	5.60	26	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.19	3.1323	1.31%
NORTH PARK DR 37+00 TO STA 49+00	1E1	20	240	5.95	177	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.38	2.9418	1.23%
NORTH PARK DR 37+00 TO STA 49+00		17	240	5.95	188	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	1.46	1.5643	0.65%
NORTH PARK DR 37+00 TO STA 49+00		16	240	5.95	13	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.10	0.1012	0.04%
CIRCUIT "1E" START		START	240	5.95	START					0.0000	
NORTH PARK DR 73+00 TO STA 84+00	2A-1	1	240	0.35	103	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.05	1.1184	0.47%
NORTH PARK DR 73+00 TO STA 84+00		2	240	0.35	44	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	1.0713	0.45%
NORTH PARK DR 73+00 TO STA 84+00		3	240	0.35	54	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	1.0511	0.44%
NORTH PARK DR 73+00 TO STA 84+00	2A-2	4	240	0.70	95	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.09	1.0264	0.43%
NORTH PARK DR 73+00 TO STA 84+00		5	240	0.70	48	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.04	0.9394	0.39%
NORTH PARK DR 73+00 TO STA 84+00		6	240	0.70	58	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.05	0.8955	0.37%
NORTH PARK DR 73+00 TO STA 84+00	2A-3	7	240	1.05	200	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.27	0.8424	0.35%
NORTH PARK DR 73+00 TO STA 84+00	2A-4	8	240	1.40	200	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.37	0.5677	0.24%
NORTH PARK DR 73+00 TO STA 84+00	2A-5	9	240	1.75	79	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.18	0.2014	0.08%
NORTH PARK DR 84+00 TO END	2A-7	1	240	0.35	150	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.07	0.2220	0.09%
NORTH PARK DR 73+00 TO STA 84+00		12	240	0.35	50	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	0.1534	0.06%
NORTH PARK DR 73+00 TO STA 84+00	2A-6	11	240	0.70	120	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.11	0.1305	0.05%
NORTH PARK DR 73+00 TO STA 84+00		10	240	1.75	9	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	0.0206	0.01%
CIRCUIT "2A" START		START	240	1.75	START					0.0000	
NORTH PARK DR 73+00 TO STA 84+00	2B-1	13	240	0.35	59	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.03	1.3771	0.57%
NORTH PARK DR 73+00 TO STA 84+00		14	240	0.35	48	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	1.3501	0.56%
NORTH PARK DR 73+00 TO STA 84+00		15	240	0.35	36	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	1.3281	0.55%
NORTH PARK DR 73+00 TO STA 84+00		16	240	0.35	57	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.03	1.3116	0.55%
NORTH PARK DR 73+00 TO STA 84+00	2B-2	17	240	0.70	190	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.17	1.2855	0.54%
NORTH PARK DR 73+00 TO STA 84+00	2B-3	18	240	1.05	55	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.08	1.1115	0.46%
NORTH PARK DR 73+00 TO STA 84+00		19	240	1.05	144	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.20	1.0360	0.43%
NORTH PARK DR 73+00 TO STA 84+00	2B-4	20	240	1.40	200	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.37	0.8382	0.35%
NORTH PARK DR 73+00 TO STA 84+00	2B-5	21	240	1.75	64	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.15	0.4720	0.20%
NORTH PARK DR 84+00 TO END	2B-7	2	240	0.35	165	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.08	0.5416	0.23%
NORTH PARK DR 73+00 TO STA 84+00		23	240	0.35	35	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.02	0.4660	0.19%
NORTH PARK DR 73+00 TO STA 84+00	2B-6	22	240	0.70	136	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.12	0.4500	0.19%
NORTH PARK DR 73+00 TO STA 84+00		24	240	2.10	102	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.28	0.3255	0.14%
NORTH PARK DR 73+00 TO STA 84+00		10	240	3.85	9	620 6008	ELEC CONDR (NO.8) INSULATED	1.308	0.05	0.0453	0.02%
CIRCUIT "2B" START		START	240	3.85	START					0.0000	

STATE OF TEXAS

FABIAN J. KALAPACH

58100

LICENSED

PROFESSIONAL ENGINEER

Fabian Kalapach

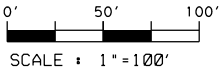
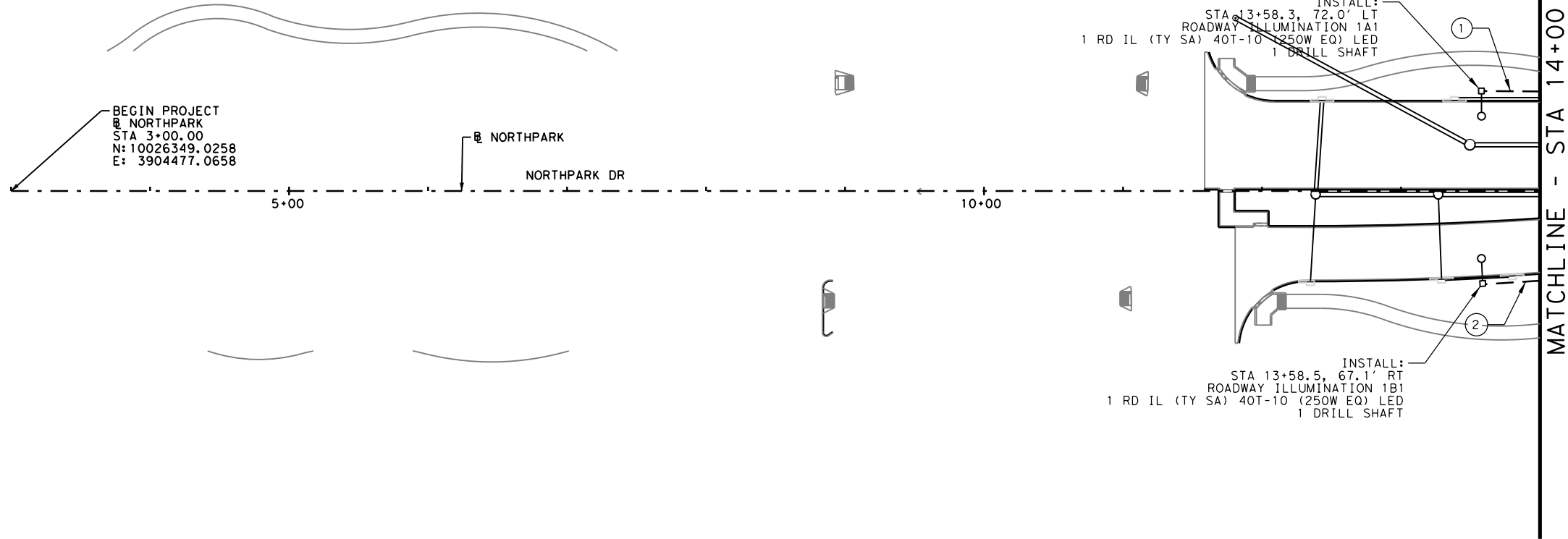
DATE: 4/1/2021

NO.	REVISIONS			BY	DATE			
<div><div><div><div><div></div><div>HNTB</div></div><div><div>HNTB Corporation</div><div>The HNTB Companies</div><div>Infrastructure Solutions</div><div>Firm Registration Number 420</div></div></div><div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRF 10</div><div>66 HUNTON ANDREWS KURTH LLP</div><div>600 TRAVIS, SUITE 4200</div><div>HOUSTON, TX 77007</div></div></div></div></div>								
<div><div><div><div><div></div><div>CITY OF HOUSTON</div></div><div><div>HOUSTON PUBLIC WORKS</div></div><div><div>NORTH PARK DRIVE</div><div>ILLUMINATION</div><div>VOLTAGE DROP</div><div>SUMMARY</div></div></div></div></div>								
SHEET 5 OF 5								
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CHECKED:	6	TEXAS	SEE TITLE SHEET	CS				
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232			
					521			

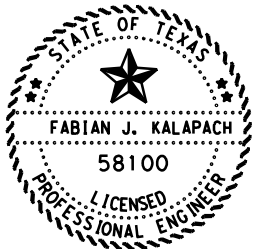
4/2/2021

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- LEGEND
- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
 - PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
 - PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
 - PROPOSED ELECTRICAL SERVICE
 - PROPOSED GROUND BOX TY D (162922) W/APRON
 - DISCONNECT SWITCH
 - PROPOSED CONDUIT RUN - TRENCHED
 - PROPOSED CONDUIT RUN - BORED
 - PROPOSED RUN NUMBER



Fabian Kalapach

DATE: 4/1/2021

NORTH PARK DR BEGIN TO 14+00 CONDUIT & CABLE CHART			
RUN NUMBER	618 6046 CONDT (PVC) (SCH 80) (2")	620 6008 ELEC CONDR (NO.8) INSULATED	RUN LENGTH
			FEET
1	1	3	50
2	1	3	50
WIRE SLACK		6	10
TOTAL	LF	LF	
	100	360	

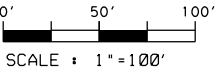
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	2
618 6046	CONDT (PVC) (SCH 80) (2")	LF	100
620 6008	ELEC CONDR (NO.8) INSULATED	LF	360

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ILLUMINATION PLAN BEGIN TO STA. 14+00			
SHEET 1 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 522

4/2/2021

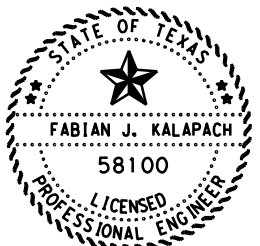
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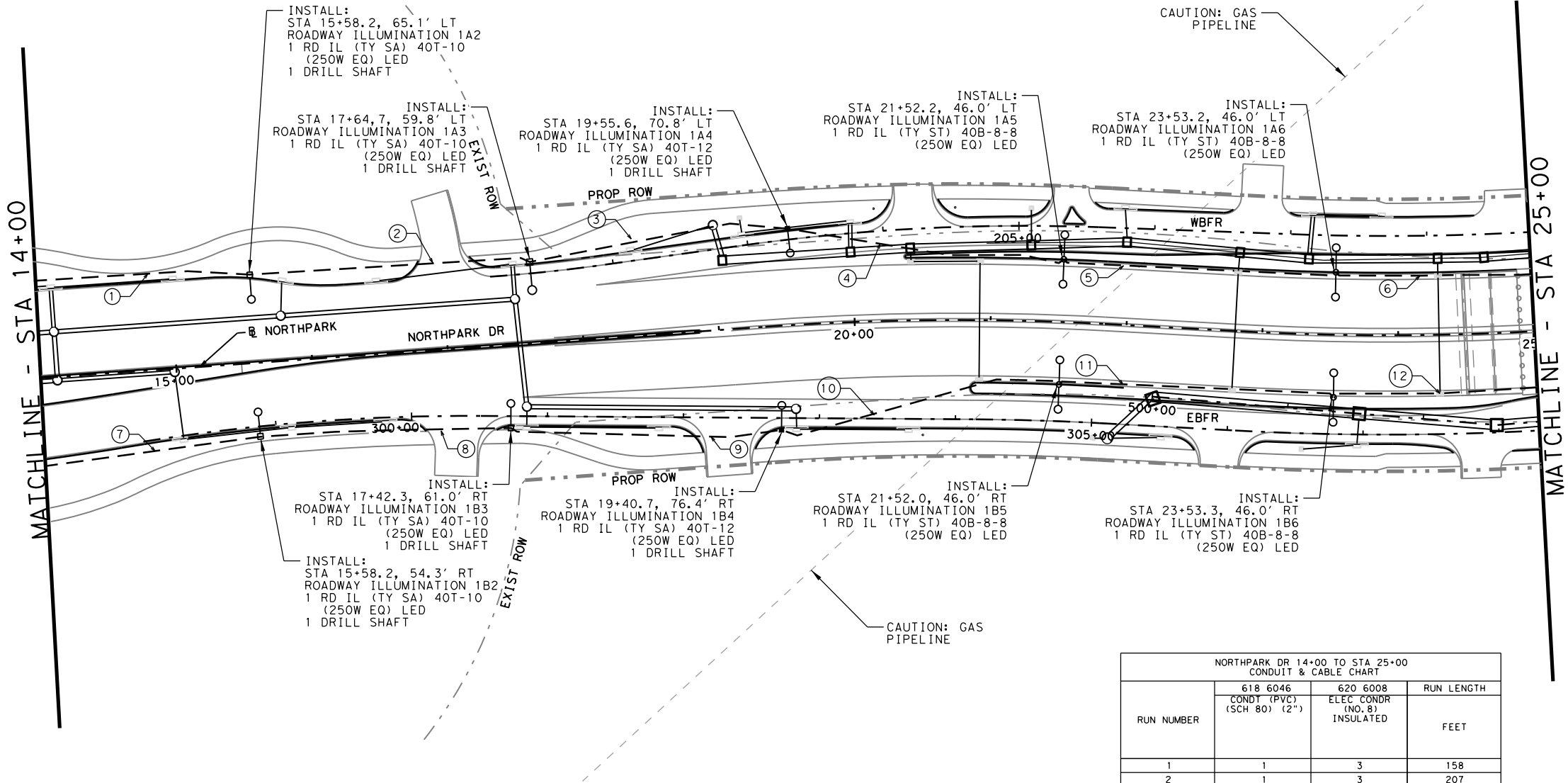
LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



Fabian Kalapach

DATE: 4/1/2021

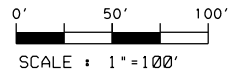
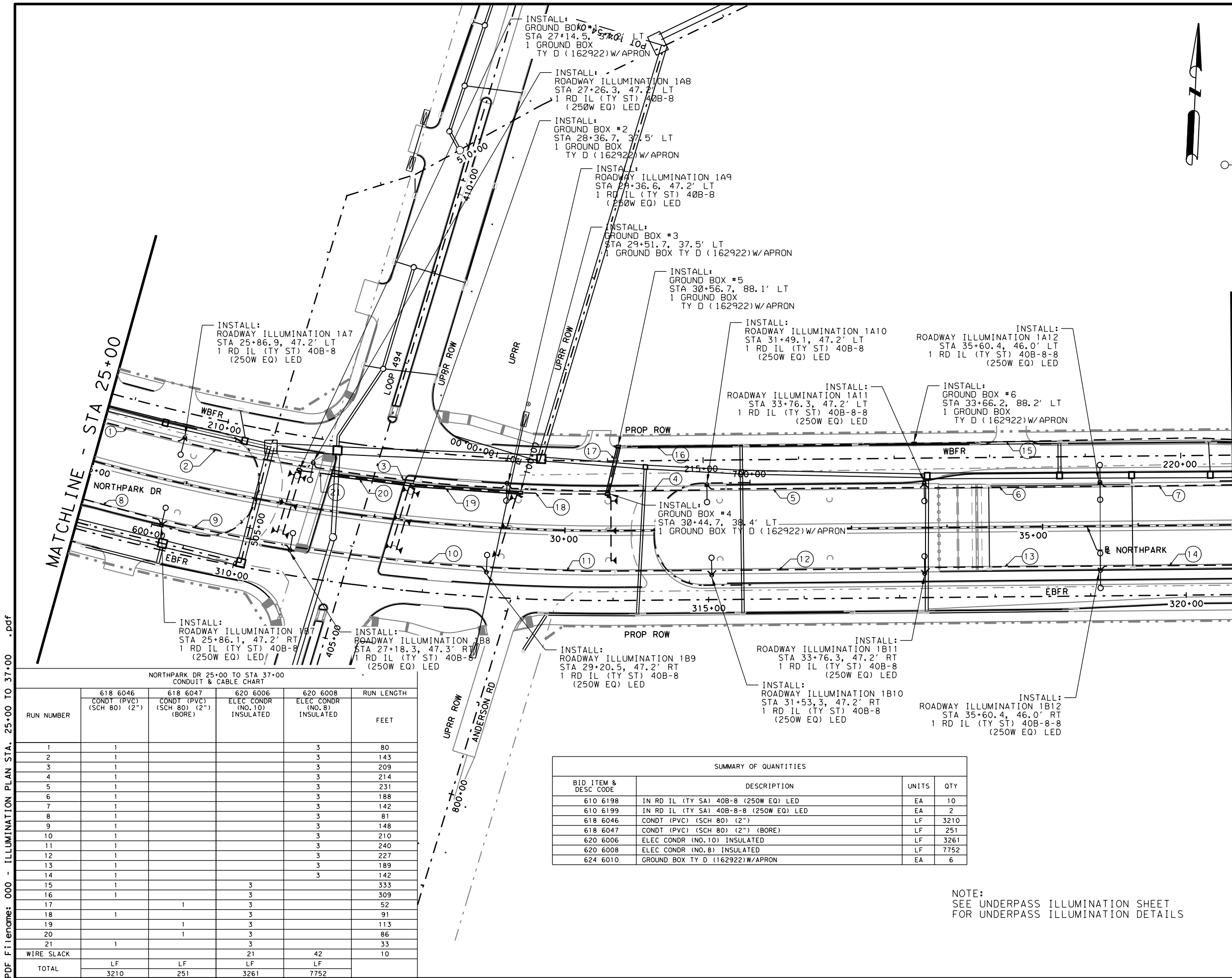


SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	48
610 6199	IN RD IL (TY SA) 40B-8-8 (250W EQ) LED	EA	4
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	4
610 6218	IN RD IL (TY SA) 40T-12 (250W EQ) LED	EA	2
618 6046	CONDT (PVC) (SCH 80) (2")	LF	2242
620 6008	ELEC CONDR (NO. 8) INSULATED	LF	7086

NORTH PARK DR 14+00 TO STA 25+00 CONDUIT & CABLE CHART			
RUN NUMBER	618 6046 CONDT (PVC) (SCH 80) (2")	620 6008 ELEC CONDR (NO. 8) INSULATED	RUN LENGTH FEET
1	1	3	158
2	1	3	207
3	1	3	193
4	1	3	207
5	1	3	202
6	1	3	148
7	1	3	160
8	1	3	184
9	1	3	199
10	1	3	212
11	1	3	204
12	1	3	168
WIRE SLACK		36	10
TOTAL	LF	LF	
	2242	7086	

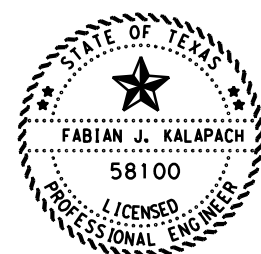
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ILLUMINATION PLAN STA. 14+00 TO 25+00			
SHEET 2 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
			JOB SHEET NO. 232 523

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LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



Fabian Kalapach DATE: 4/1/2021

NORTH PARK DR 25+00 TO STA 37+00 CONDUIT & CABLE CHART					
RUN NUMBER	618 6046 CONDIT (PVC) (SCH 80) (2")	618 6047 CONDIT (PVC) (SCH 80) (2") (BORE)	620 6006 ELEC CONDR (NO.10) INSULATED	620 6008 ELEC CONDR (NO.8) INSULATED	RUN LENGTH FEET
1	1			3	80
2	1			3	143
3	1			3	209
4	1			3	214
5	1			3	231
6	1			3	188
7	1			3	142
8	1			3	81
9	1			3	148
10	1			3	210
11	1			3	240
12	1			3	227
13	1			3	189
14	1			3	142
15	1		3		333
16	1		3		309
17		1	3		52
18	1		3		91
19		1	3		113
20		1	3		86
21	1		3		33
WIRE SLACK			21	42	10
TOTAL	3210	251	3261	7752	

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
610 6198	IN RD IL (TY SA) 40B-8 (250W EQ) LED	EA	10
610 6199	IN RD IL (TY SA) 40B-8-8 (250W EQ) LED	EA	2
618 6046	CONDIT (PVC) (SCH 80) (2")	LF	3210
618 6047	CONDIT (PVC) (SCH 80) (2") (BORE)	LF	251
620 6006	ELEC CONDR (NO.10) INSULATED	LF	3261
620 6008	ELEC CONDR (NO.8) INSULATED	LF	7752
624 6010	GROUND BOX TY D (162922) W/APRON	EA	6

NOTE:
SEE UNDERPASS ILLUMINATION SHEET
FOR UNDERPASS ILLUMINATION DETAILS

NO.

REVISIONS

BY

DATE

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAHRA

LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10
c/o HUNTON ANDREWS KURTH LLP
600 TRAVIS, SUITE 4200
HOUSTON, TX 77007

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

ILLUMINATION PLAN

STA. 25+00 TO 37+00

DESIGNED:

FED. RD. DIV. NO.

STATE

CITY OF HOUSTON WBS

HIGHWAY NO.

CHECKED:

6

TEXAS

SEE TITLE SHEET

CS

DRAWN:

STATE DISTRICT

COUNTY

CONTROL No.

SECTION No.

JOB No.

SHEET No.

CHECKED:

HOU

MONTGOMERY

0912

37

232

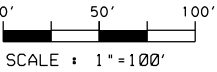
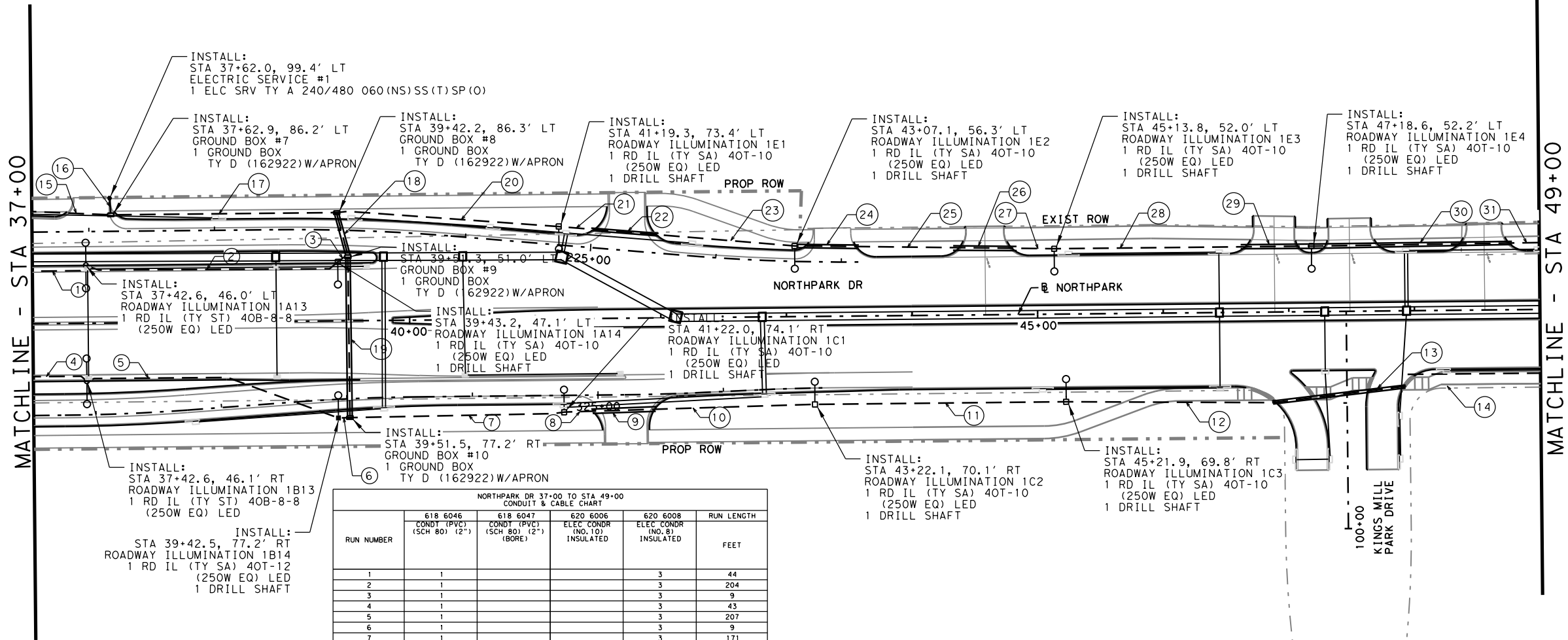
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SHEET 3 OF 8

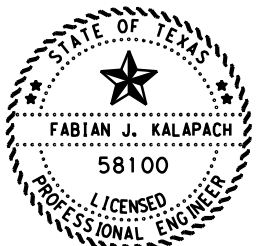
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- LEGEND**
- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
 - PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
 - PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
 - PROPOSED ELECTRICAL SERVICE
 - PROPOSED GROUND BOX TY D (162922) W/APRON
 - DISCONNECT SWITCH
 - PROPOSED CONDUIT RUN - TRENCHED
 - PROPOSED CONDUIT RUN - BORED
 - PROPOSED RUN NUMBER



Fabian Kalapach

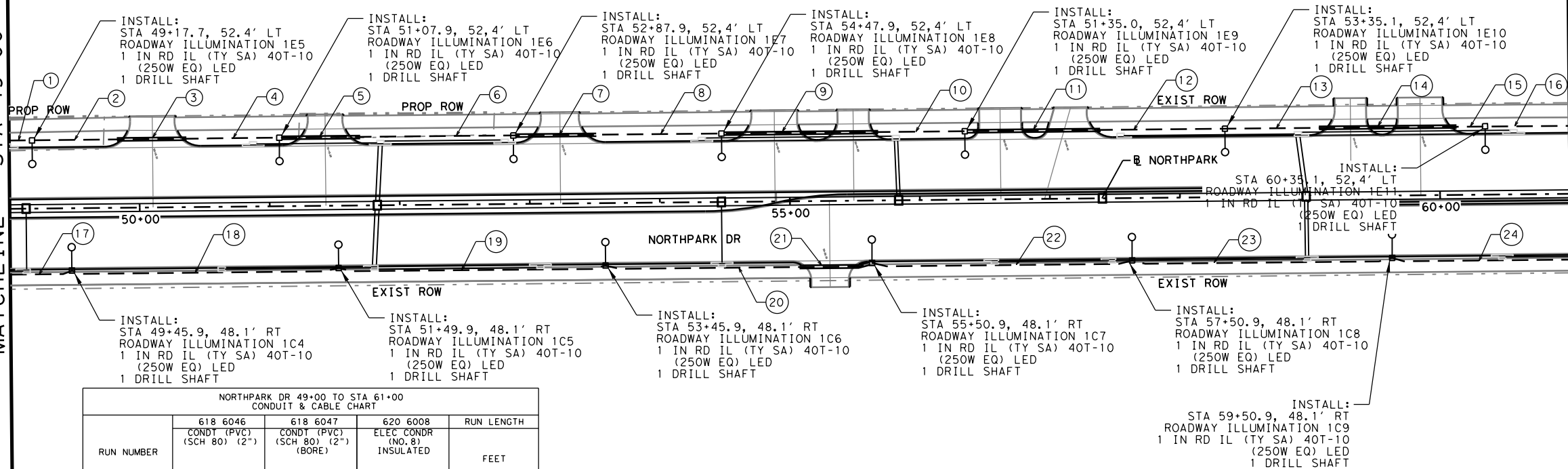
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NORTH PARK DR 37+00 TO STA 49+00 CONDUIT & CABLE CHART					RUN LENGTH FEET
RUN NUMBER	618 6046 COND (PVC) (SCH 80) (2")	618 6047 COND (PVC) (SCH 80) (2") (BORE)	620 6006 ELEC CONDR (NO. 10) INSULATED	620 6008 ELEC CONDR (NO. 8) INSULATED	
1	1			3	44
2	1			3	204
3	1			3	9
4	1			3	43
5	1			3	207
6	1			3	9
7	1			3	171
8	1			3	23
9		1		3	50
10	1			3	127
11	1			3	200
12	1			3	167
13		1		3	103
14	1			3	109
15	1		3		62
16	1		3	9	13
17	1		3	6	188
18	1		3	6	34
19	1		3	3	124
20	1			3	177
21	1			3	26
22		1		3	54
23	1			3	109
24		1		3	51
25	1			3	76
26		1		3	49
27	1			3	31
28	1			3	148
29		1		3	57
30		1		3	160
31	1			3	22
WIRE SLACK					10
TOTAL					2323
					524
					1413
					9939

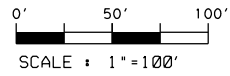
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	80
610 6199	IN RD IL (TY SA) 40B-8-8 (250W EQ) LED	EA	2
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	9
610 6218	IN RD IL (TY SA) 40T-12 (250W EQ) LED	EA	1
618 6046	COND (PVC) (SCH 80) (2")	LF	2323
618 6047	COND (PVC) (SCH 80) (2") (BORE)	LF	524
620 6006	ELEC CONDR (NO. 10) INSULATED	LF	1413
620 6008	ELEC CONDR (NO. 8) INSULATED	LF	9939
624 6010	GROUND BOX TY D (162922) W/APRON	EA	4
628 6015	ELC SRV TY A 120/240 060(SS)(E)SP(O)	EA	1

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ILLUMINATION PLAN STA. 37+00 TO 49+00			
SHEET 4 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
		JOB NO.	232
		SHEET NO.	525

MATCHLINE - STA 49+00

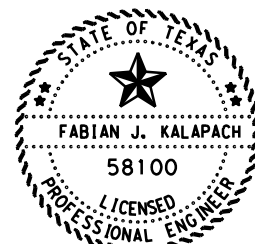


MATCHLINE - STA 61+00



LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



Fabian Kalapach

DATE: 4/1/2021

NORTH PARK DR 49+00 TO STA 61+00 CONDUIT & CABLE CHART				
RUN NUMBER	618 6046	618 6047	620 6008	RUN LENGTH FEET
	COND'T (PVC) (SCH 80) (2")	COND'T (PVC) (SCH 80) (2") (BORE)	ELEC COND'R (NO. 8) INSULATED	
1	1		3	18
2	1		3	65
3		1	3	53
4	1		3	72
5		1	3	62
6	1		3	118
7		1	3	64
8	1		3	96
9		1	3	120
10	1		3	67
11		1	3	104
12	1		3	96
13	1		3	72
14		1	3	106
15	1		3	22
16	1		3	65
17	1		3	45
18	1		3	200
19	1		3	200
20	1		3	169
21		1	3	36
22	1		3	200
23	1		3	200
24	1		3	154
WIRE SLACK			72	10
TOTAL	LF 1859	LF 545	7932	

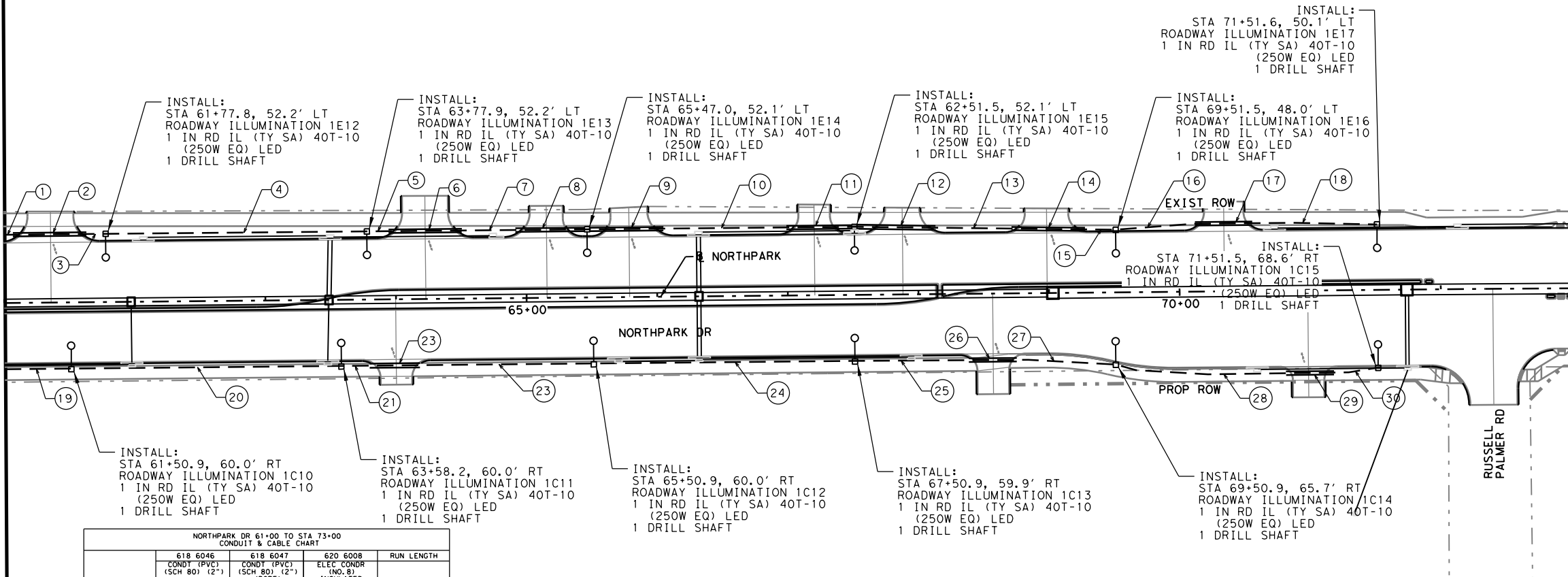
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	104
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	13
618 6046	COND'T (PVC) (SCH 80) (2")	LF	1859
618 6047	COND'T (PVC) (SCH 80) (2") (BORE)	LF	545
620 6008	ELEC COND'R (NO. 8) INSULATED	LF	7932

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ILLUMINATION PLAN STA. 49+00 TO 61+00			
SHEET 5 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 526

4/2/2021

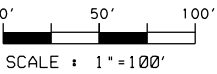
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MATCHLINE - STA 61+00



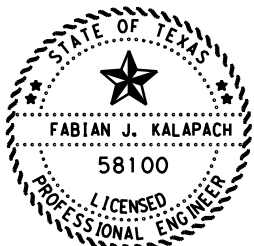
NORTH PARK DR 61+00 TO STA 73+00 CONDUIT & CABLE CHART				
RUN NUMBER	618 6046 CONDIT (PVC) (SCH 80) (2")	618 6047 CONDIT (PVC) (SCH 80) (2") (BORE)	620 6008 ELEC CONDR (NO. 8) INSULATED	RUN LENGTH FEET
1	1		3	7
2		1	3	56
3	1		3	15
4	1		3	200
5	1		3	17
6		1	3	56
7	1		3	41
8		1	3	55
9		1	3	58
10	1		3	94
11		1	3	52
12		1	3	62
13	1		3	58
14		1	3	56
15	1		3	24
16	1		3	61
17		1	3	44
18	1		3	96
19	1		3	51
20	1		3	207
21	1		3	22
22		1	3	38
23	1		3	133
24	1		3	200
25	1		3	87
26		1	3	37
27	1		3	76
28	1		3	131
29		1	3	37
30	1		3	34
WIRE SLACK			75	10
TOTAL	1554	551	7065	

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	96
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	12
618 6046	CONDIT (PVC) (SCH 80) (2")	LF	1554
618 6047	CONDIT (PVC) (SCH 80) (2") (BORE)	LF	551
620 6008	ELEC CONDR (NO. 8) INSULATED	LF	7065



LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



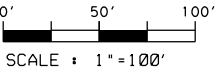
Fabian Kalapach

DATE: 4/1/2021

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ILLUMINATION PLAN STA. 61+00 TO 73+00			
SHEET 6 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 527

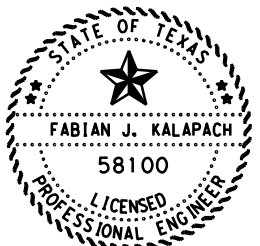
4/2/2021

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LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



Fabian Kalapach

DATE: 4/1/2021

MATCHLINE - STA 73+00

MATCHLINE - STA 84+00

NORTH PARK DR 73+00 TO STA 84+00 CONDUIT & CABLE CHART				
RUN NUMBER	618 6046 COND'T (PVC) (SCH 80) (2")	618 6047 COND'T (PVC) (SCH 80) (2") (BORE)	620 6008 ELEC CONDR (NO. 8) INSULATED	RUN LENGTH FEET
1	1		3	103
2		1	3	44
3	1		3	54
4	1		3	95
5		1	3	48
6	1		3	58
7	1		3	200
8	1		3	200
9	1		3	79
10	1		6	9
11	1		3	120
12	1		3	50
13	1		3	59
14		1	3	48
15	1		3	36
16		1	3	57
17	1		3	190
18		1	3	55
19	1		3	144
20	1		3	200
21	1		3	64
22	1		3	136
23	1		3	35
24		1	3	102
WIRE SLACK			75	10
TOTAL	LF 1832	LF 354	LF 7335	

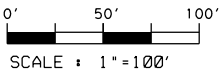
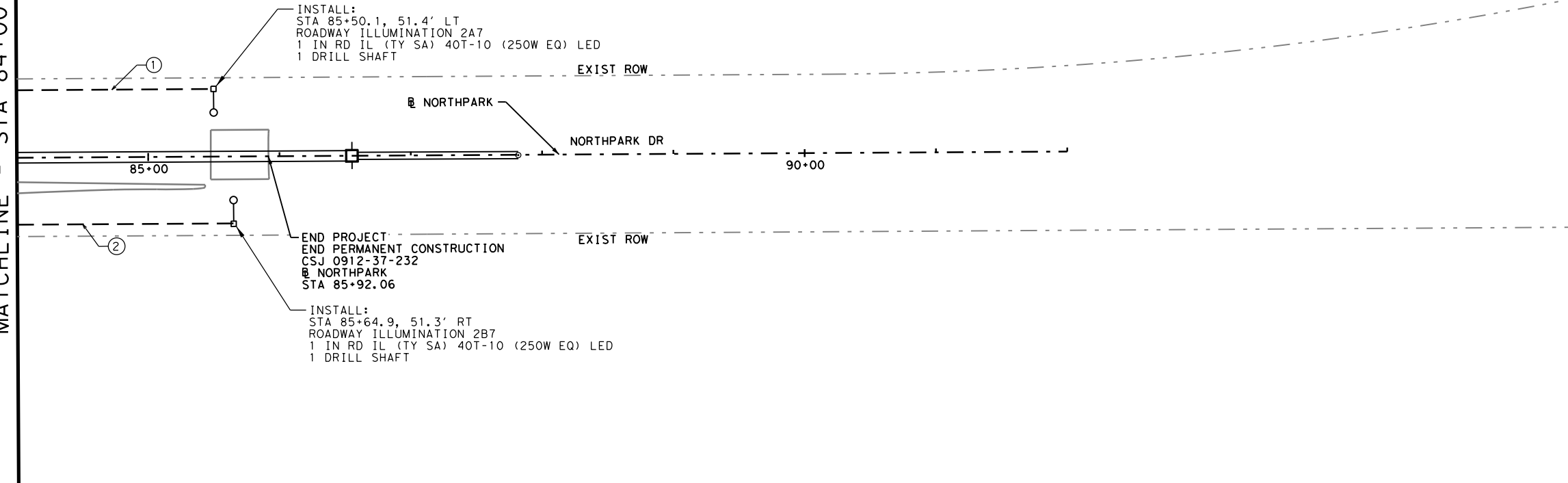
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	96
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	12
618 6046	COND'T (PVC) (SCH 80) (2")	LF	1832
618 6047	COND'T (PVC) (SCH 80) (2") (BORE)	LF	354
620 6008	ELEC CONDR (NO. 8) INSULATED	LF	7335
624 6010	GROUND BOX TY D (162922) W/APRON	EA	2
628 6015	ELC SRV TY A 120/240 060(SS)SS(E)SP(O)	EA	1

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ILLUMINATION PLAN STA. 73+00 TO 84+00			
SHEET 7 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 528

4/2/2021

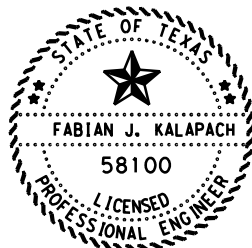
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MATCHLINE - STA 84+00



LEGEND

- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
- PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
- PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
- PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY D (162922) W/APRON
- DISCONNECT SWITCH
- PROPOSED CONDUIT RUN - TRENCHED
- PROPOSED CONDUIT RUN - BORED
- PROPOSED RUN NUMBER



Fabian Kalapach

DATE: 4/1/2021

NORTH PARK DR 84+00 TO END CONDUIT & CABLE CHART			
RUN NUMBER	618 6046 CONDY (PVC) (SCH 80) (2")	620 6008 ELEC CONDR (NO.8) INSULATED	FEET
	CONDY (PVC) (SCH 80) (2")	ELEC CONDR (NO.8) INSULATED	
1	1	3	150
2	1	3	165
WIRE SLACK		6	10
TOTAL	LF	LF	
	315	1005	

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16
610 6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	2
618 6046	CONDY (PVC) (SCH 80) (2")	LF	315
620 6008	ELEC CONDR (NO.8) INSULATED	LF	1005

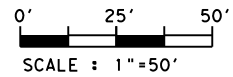
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ILLUMINATION PLAN STA. 84+00 TO END			
SHEET 8 OF 8			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 529

4/2/2021

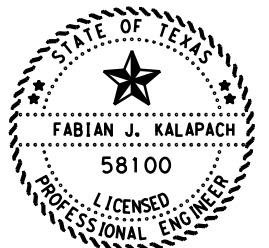
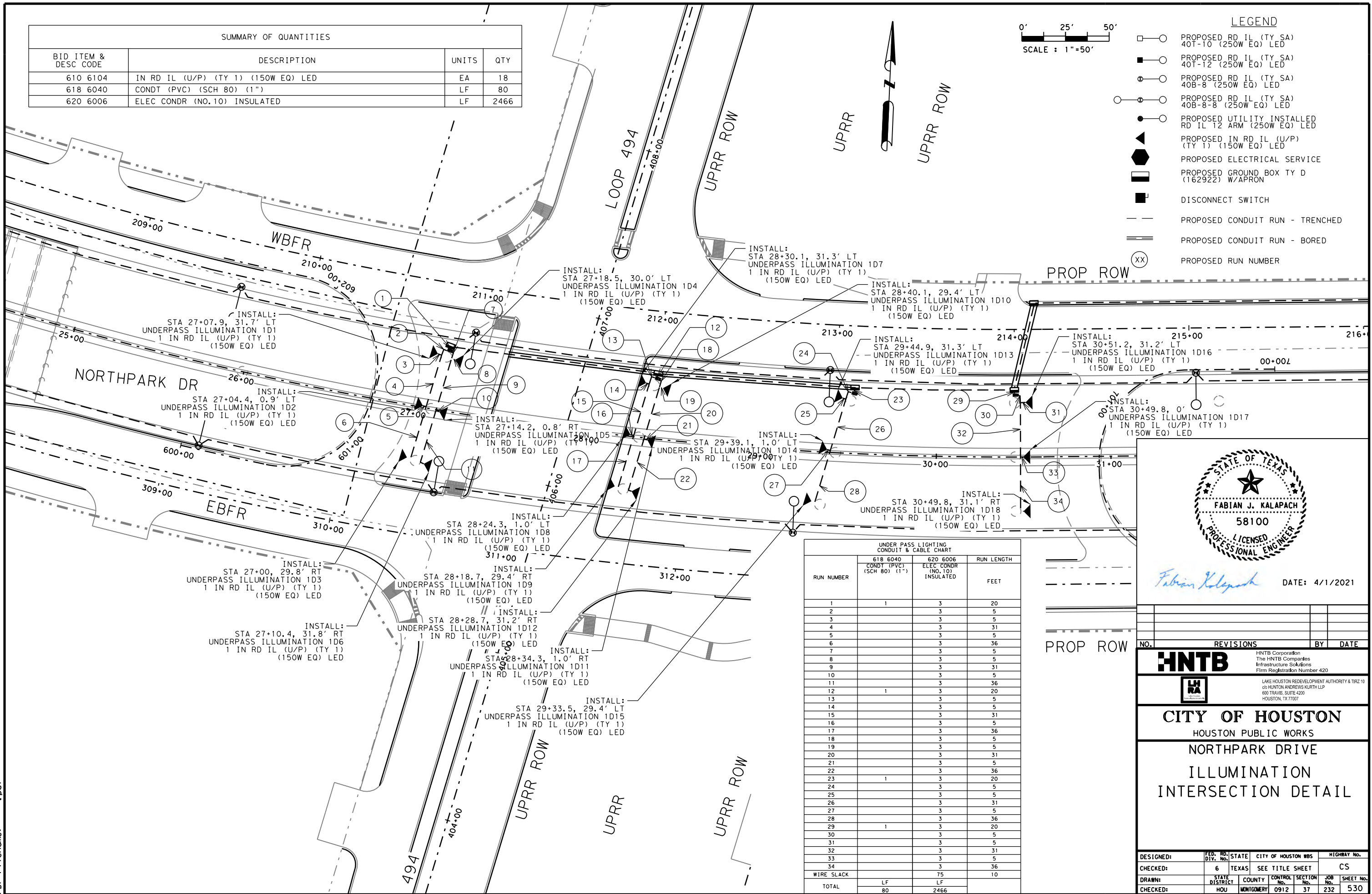
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SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
610 6104	IN RD IL (U/P) (TY 1) (150W EQ) LED	EA	18
618 6040	CONDT (PVC) (SCH 80) (1")	LF	80
620 6006	ELEC CONDR (NO.10) INSULATED	LF	2466



LEGEND	
	PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
	PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
	PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
	PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
	PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
	PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
	PROPOSED ELECTRICAL SERVICE
	PROPOSED GROUND BOX TY D (162922) W/APRON
	DISCONNECT SWITCH
	PROPOSED CONDUIT RUN - TRENCHED
	PROPOSED CONDUIT RUN - BORED
	PROPOSED RUN NUMBER



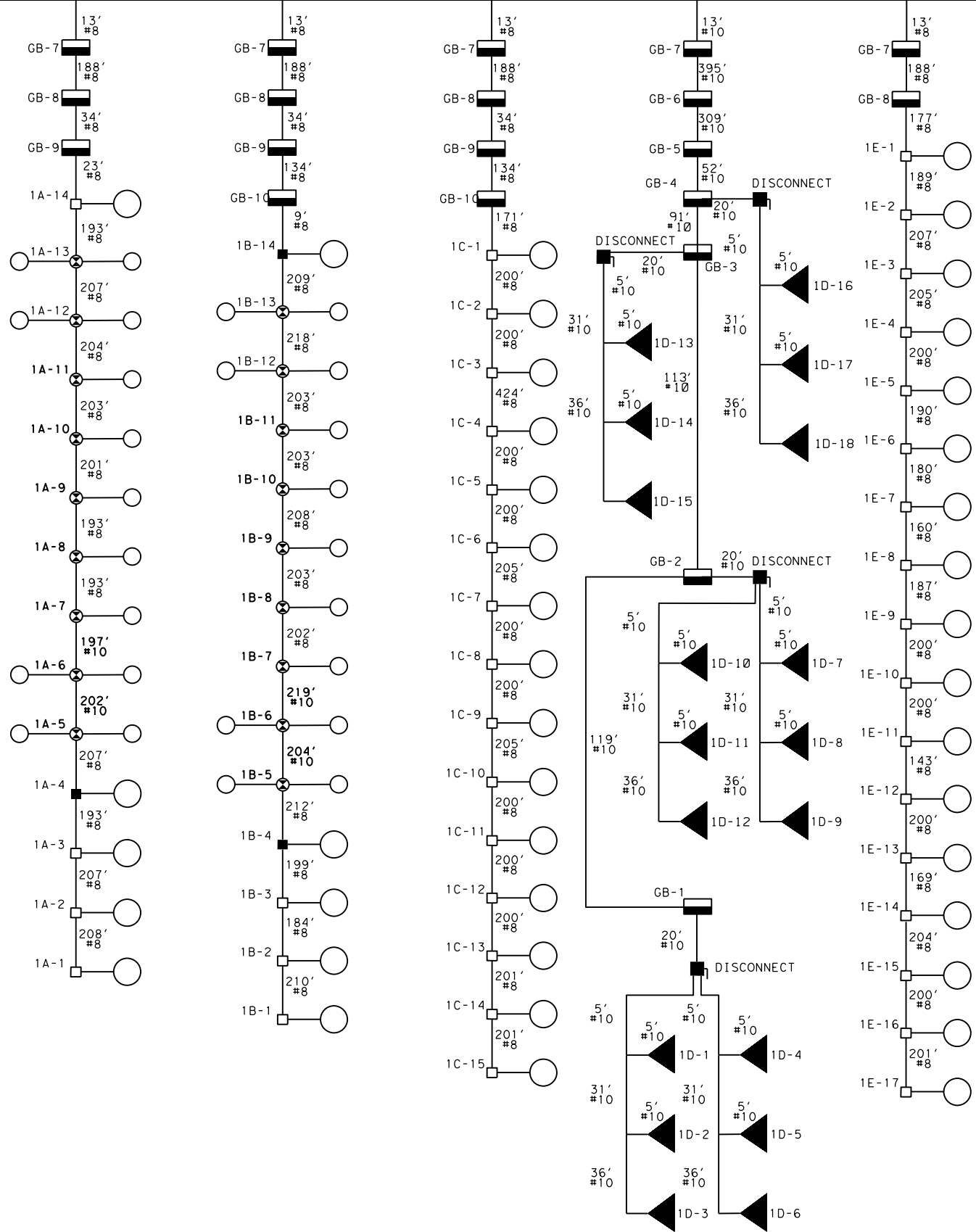
Fabian Kalapach DATE: 4/1/2021

UNDER PASS LIGHTING CONDUIT & CABLE CHART			
RUN NUMBER	618 6040 CONDT (PVC) (SCH 80) (1")	620 6006 ELEC CONDR (NO.10) INSULATED	RUN LENGTH FEET
1	1	3	20
2		3	5
3		3	5
4		3	31
5		3	5
6		3	36
7		3	5
8		3	5
9		3	31
10		3	5
11		3	36
12	1	3	20
13		3	5
14		3	5
15		3	31
16		3	5
17		3	36
18		3	5
19		3	5
20		3	31
21		3	5
22		3	36
23	1	3	20
24		3	5
25		3	5
26		3	31
27		3	5
28		3	36
29	1	3	20
30		3	5
31		3	5
32		3	31
33		3	5
34		3	36
WIRE SLACK		75	10
TOTAL	80	2466	

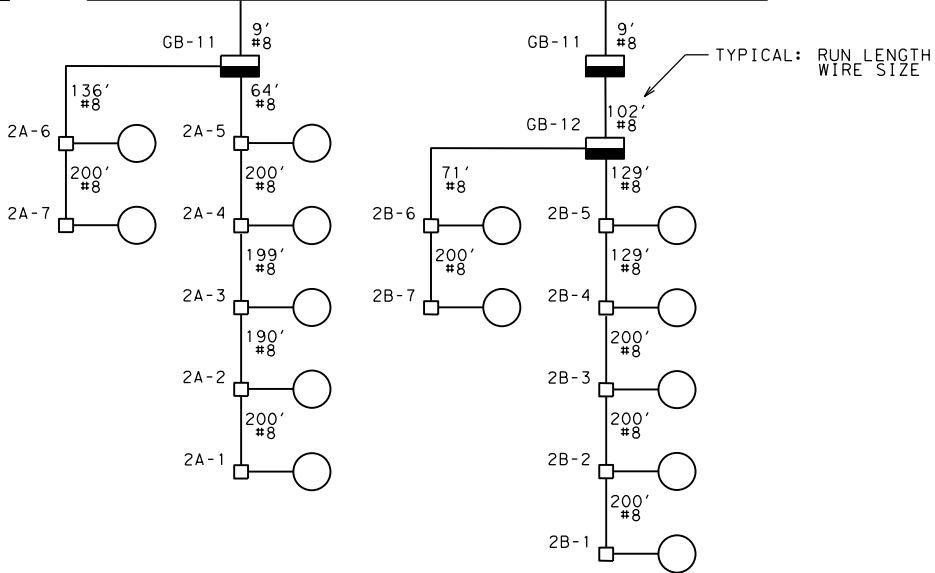
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ILLUMINATION INTERSECTION DETAIL			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
JOB No.		SHEET No.	
232		530	

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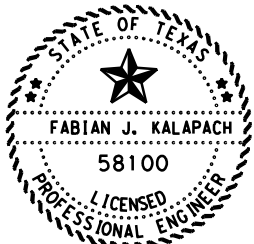
ELECTRIC SERVICE #1 TY A 120/240 060(SS)SS(E)SP(O)				
ILLUMINATION 1A 2P/20 240 VAC	ILLUMINATION 1B 2P/20 240 VAC	ILLUMINATION 1C 2P/20 240 VAC	ILLUMINATION 1D 2P/20 240 VAC	ILLUMINATION 1E 2P/20 240 VAC



ELECTRIC SERVICE #2 TY A 120/240 060(SS)SS(E)SP(O)	
ILLUMINATION 2A 2P/20 240 VAC	ILLUMINATION 2B 2P/20 240 VAC



- LEGEND
- PROPOSED RD IL (TY SA) 40T-10 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40T-12 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8 (250W EQ) LED
 - PROPOSED RD IL (TY SA) 40B-8-8 (250W EQ) LED
 - PROPOSED UTILITY INSTALLED RD IL 12 ARM (250W EQ) LED
 - PROPOSED IN RD IL (U/P) (TY 1) (150W EQ) LED
 - PROPOSED GROUND BOX TY D (162922) W/APRON
 - DISCONNECT SWITCH



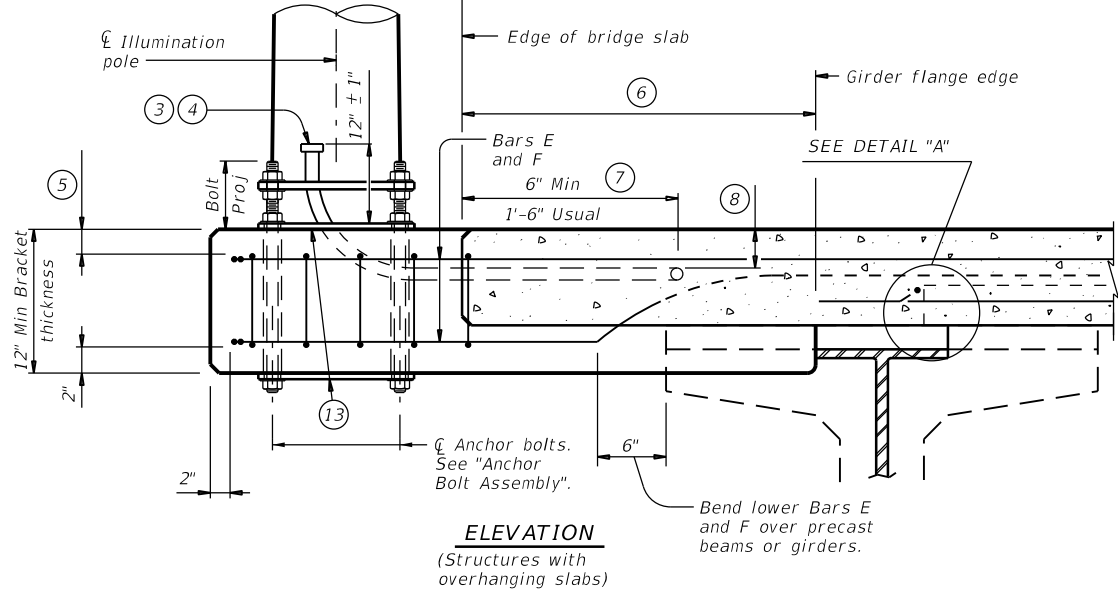
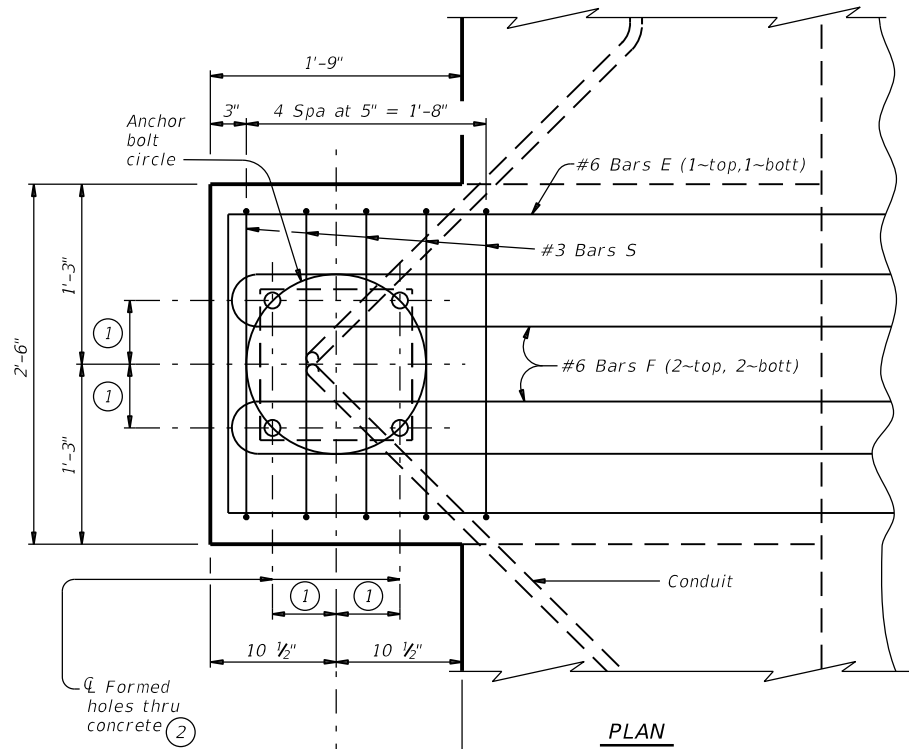
Fabian Kalapach

DATE: 4/1/2021

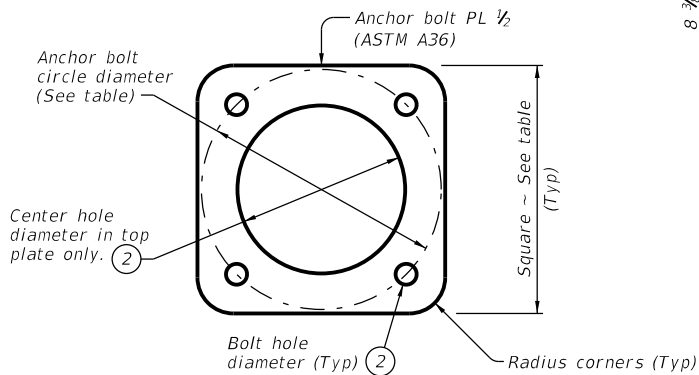
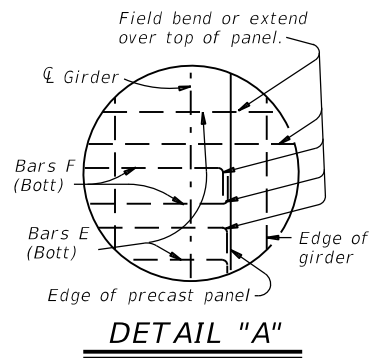
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ILLUMINATION CIRCUIT DIAGRAM			
DESIGNED:	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 531

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DATE:
FILE:

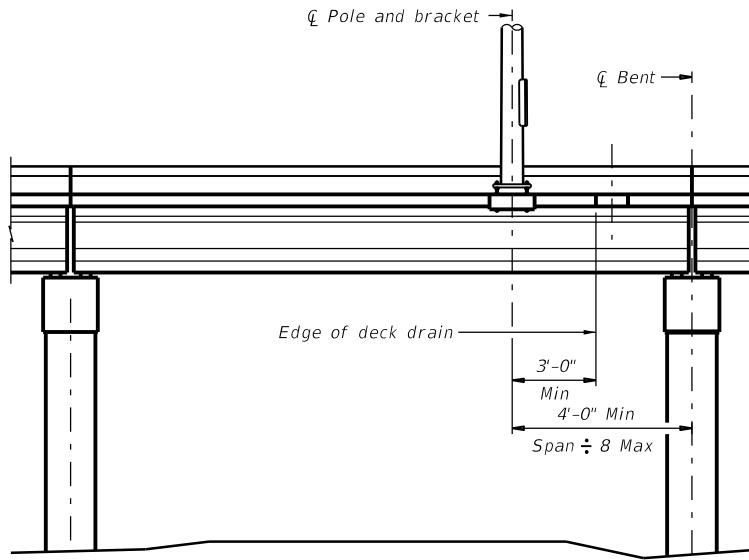


ILLUMINATION POLE BRACKET LOCATION AND REINFORCING

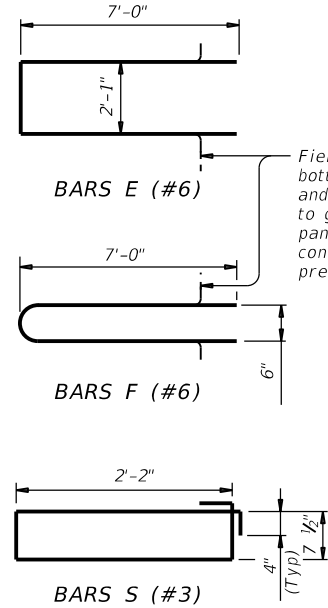


ANCHOR BOLT PLATE

TABLE OF ANCHOR BOLT AND ANCHOR BOLT PLATE INFORMATION						
ANCHOR BOLT CIRCLE DIAMETER	ANCHOR BOLT OFFSET	ANCHOR BOLT DIAMETER	ANCHOR BOLT HOLE SIZE		TOP AND BOTTOM ANCHOR BOLT PLATE SIZE	CENTER HOLE DIAMETER IN TOP ANCHOR BOLT PLATE
			CONCRETE	STEEL		
1N	1N	1N	1N	1N	1N	1N
13	4 5/8	1	1 1/4	1 1/4	PL 1/2 X 13 X 1'-1"	9 1/2
15	5 5/16	1 1/4	1 1/2	1 1/2	PL 1/2 X 15 1/2 X 1'-3 1/2"	10 1/2



TYPICAL BRIDGE ELEVATION

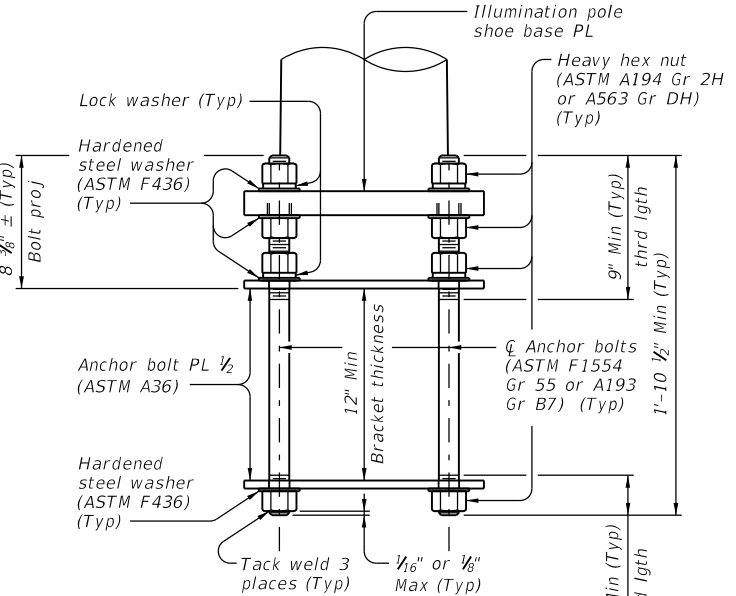


- See table for anchor bolt offset dimension.
- See table for hole diameter size.
- If lighting is to be placed on future contract, extend conduit only 6" and provide water tight cap.
- Ream burrs and install bell ends or bushings on all conduit ends.
- Provide same clear cover required for bridge slab. Place Bars E and F beneath top slab reinforcing only if necessary to provide this cover.
- If slab edge to girder flange edge exceeds 3'-11", lengthen Bars E and F proportionally to ensure Bars E and F extend 1'-6" Min beyond girder flange edge.
- Clear rail anchors, drains, etc 1 1/2" Min.
- 1 1/2" Min cover and always beneath top layer slab reinforcing.
- Variation due to slab thickness is insignificant.
- For Contractor's information only.
- Anchor bolts, nuts, washers, and 2 plates. Verify anchor bolt lengths prior to ordering.
- Additional to main run (size and type as shown elsewhere on the plans).
- See "Anchor Bolt Assembly", "Anchor Bolt Plate", and table for anchor bolt, and anchor bolt plate information.

MATERIAL NOTES:
Galvanize anchor bolts, nuts, washers, and anchor bolt plates. Repair galvanizing damage from tack welding per Item 445, "Galvanizing".
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Concrete for Illumination Pole Brackets must be of the same type and placed monolithically with the bridge slab. The bracket quantity is considered subsidiary to the Item "Reinforced Concrete Slab".

GENERAL NOTES:
Designed for up to 50 ft light pole with one 12 ft arm, 60 lb luminaire with 1.6 sq ft EPA at maximum design wind speed of 110 mph (3 second gusts). A special design is required if luminaire mounting height exceeds 100 ft above average surrounding terrain.
The anchor bolts, nuts, washers, and anchor bolt plates are subsidiary to the Item "Roadway Illumination Assemblies".
The type and size of conduit, the anchor bolt circle diameter, and the number and location of brackets is shown elsewhere on the plans. Brackets found to conflict with other components of the bridge may be relocated as necessary.
See Roadway Illumination Poles standard for details and notes not shown.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



ANCHOR BOLT ASSEMBLY

(See table for anchor bolt diameter)

SHEET 1 OF 2

		Bridge Division Standard	
BRIDGE LIGHTING DETAILS			
BL			
FILE: blstd01-19.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
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REVISIONS			HIGHWAY
	DIST	COUNTY	SHEET NO.
		MONTGOMERY	532

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUITS & NOTES

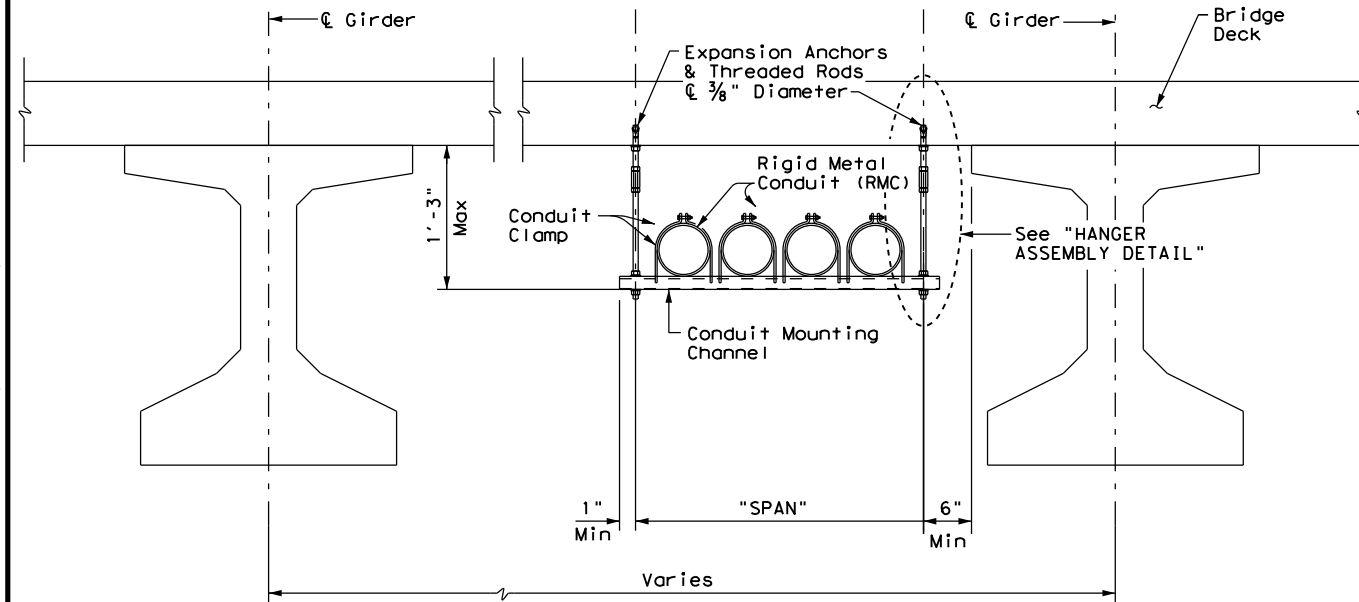
ED(1) - 14

FILE:	ed1-14.dgn	DN:		CK:		DW:		CK:	
© TxDOT	October 2014	CONT	SECT	JOB		HIGHWAY			
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71A

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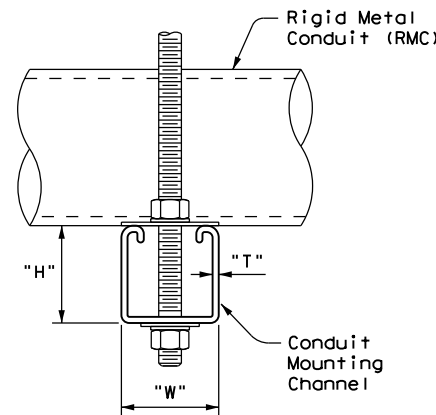
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CONDUIT HANGING DETAIL

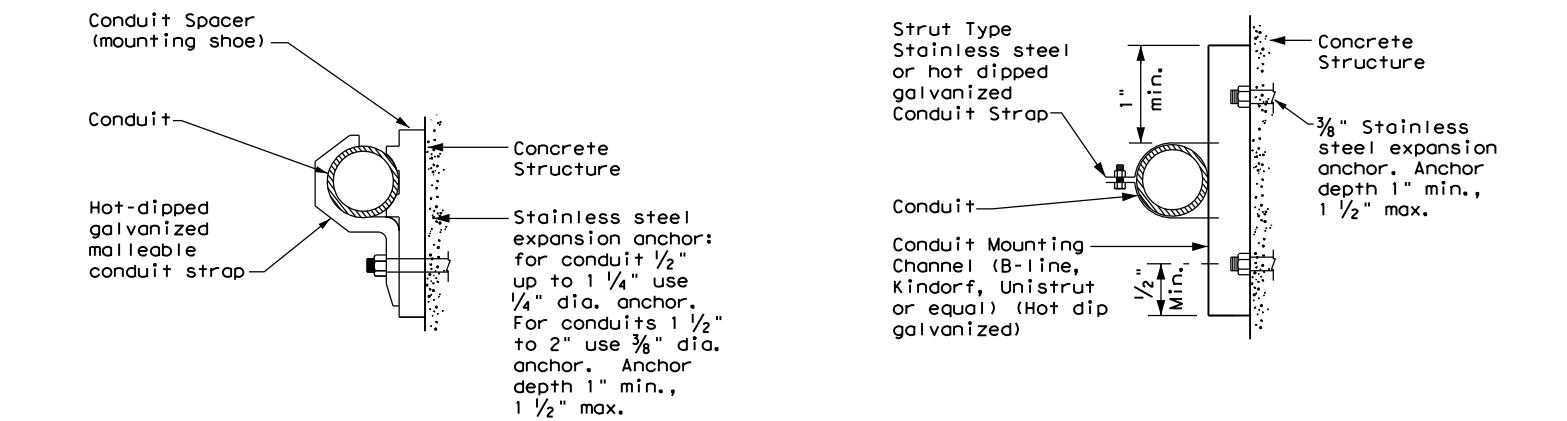
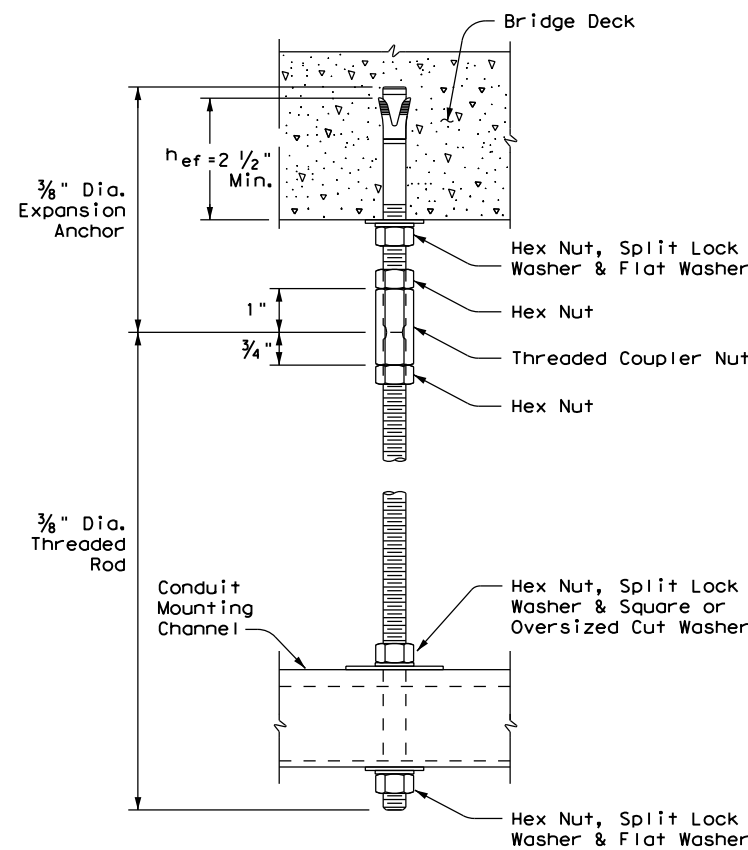
CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



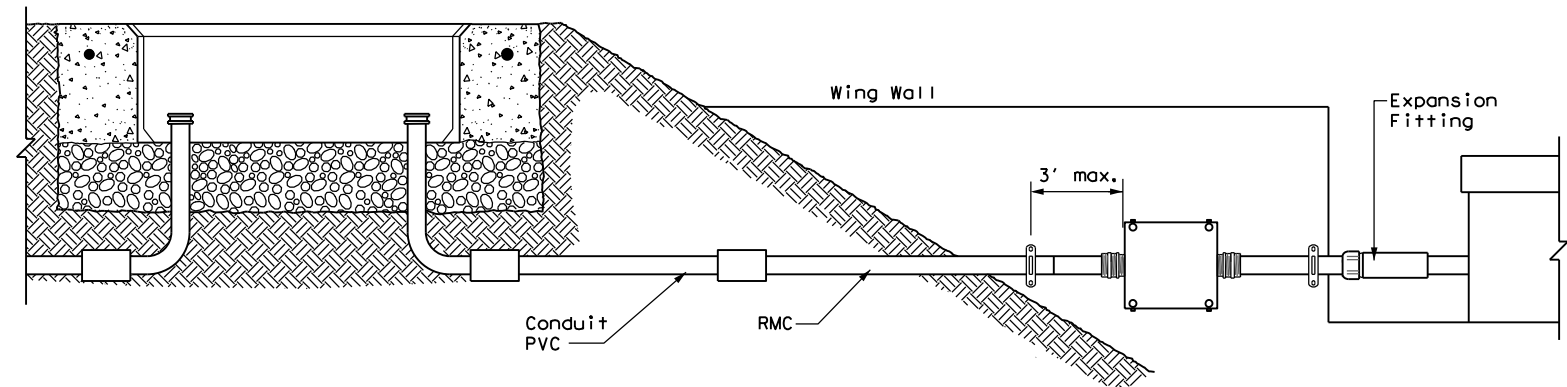
HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef}) as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

		Traffic Operations Division Standard	
ELECTRICAL DETAILS CONDUIT SUPPORTS			
ED(2) - 14			
FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS	DIST	COUNTY	SHEET NO.
		MONTGOMERY	534

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

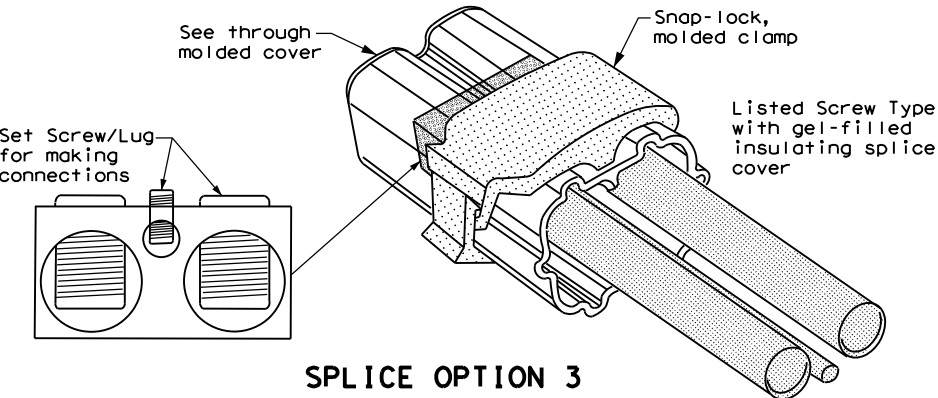
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

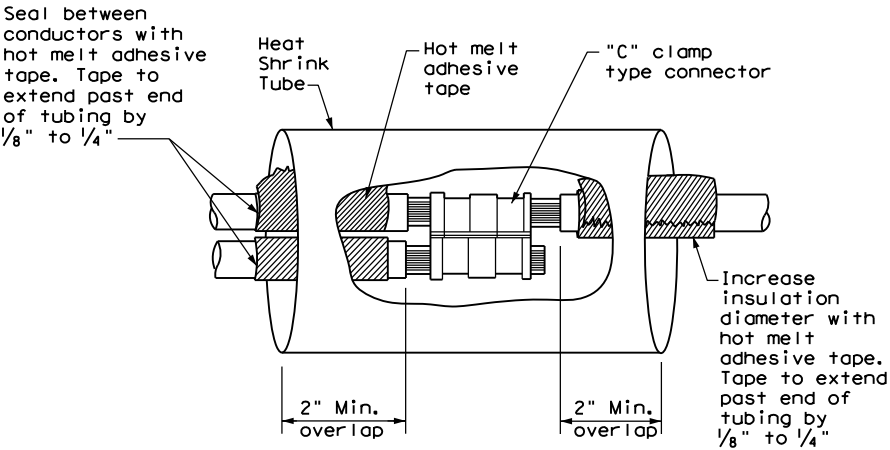
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

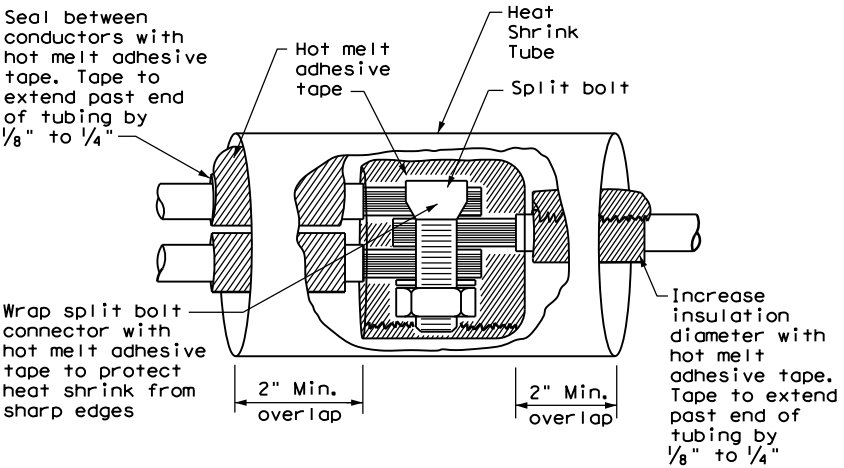
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.




SPLICE OPTION 3
Listed Screw Type



SPLICE OPTION 1
Compression Type

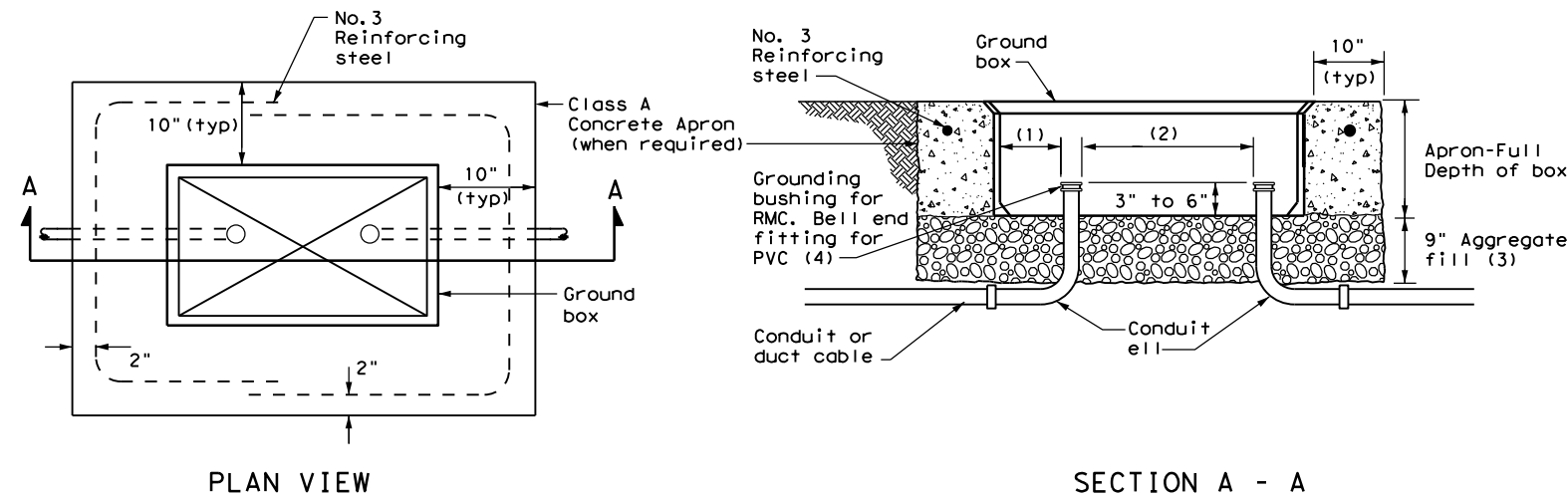


SPLICE OPTION 2
Split Bolt Type

 Texas Department of Transportation				Traffic Operations Division Standard	
<div>ELECTRICAL DETAILS CONDUCTORS</div> <div>ED(3) - 14</div>					
FILE: ed3-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS					
		DIST	COUNTY		SHEET NO.
		MONTGOMERY		535	

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APRON FOR GROUND BOX

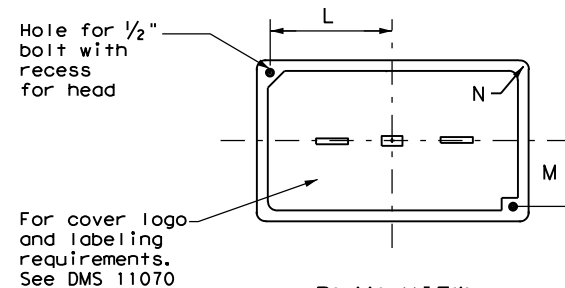
- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS

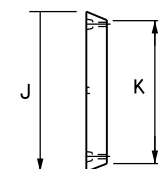
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS

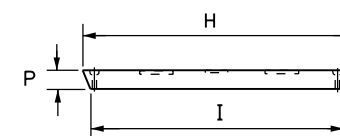
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

				Traffic Operations Division Standard	
ELECTRICAL DETAILS GROUND BOXES					
ED(4) - 14					
FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS		DIST		COUNTY	SHEET NO.
				MONTGOMERY	536

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DATE: FILE:

ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

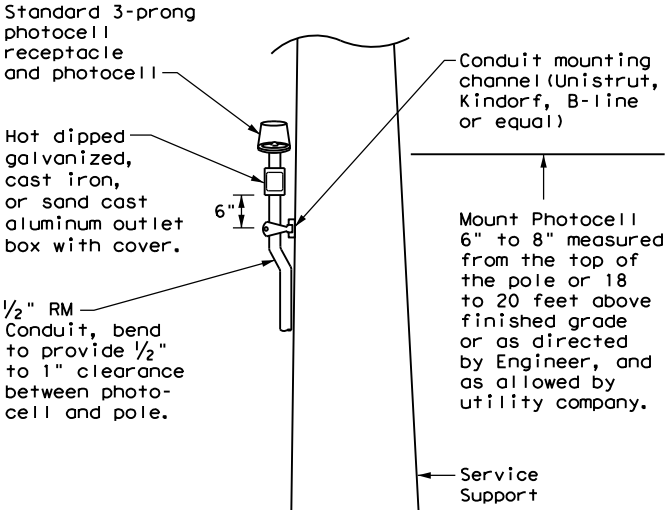
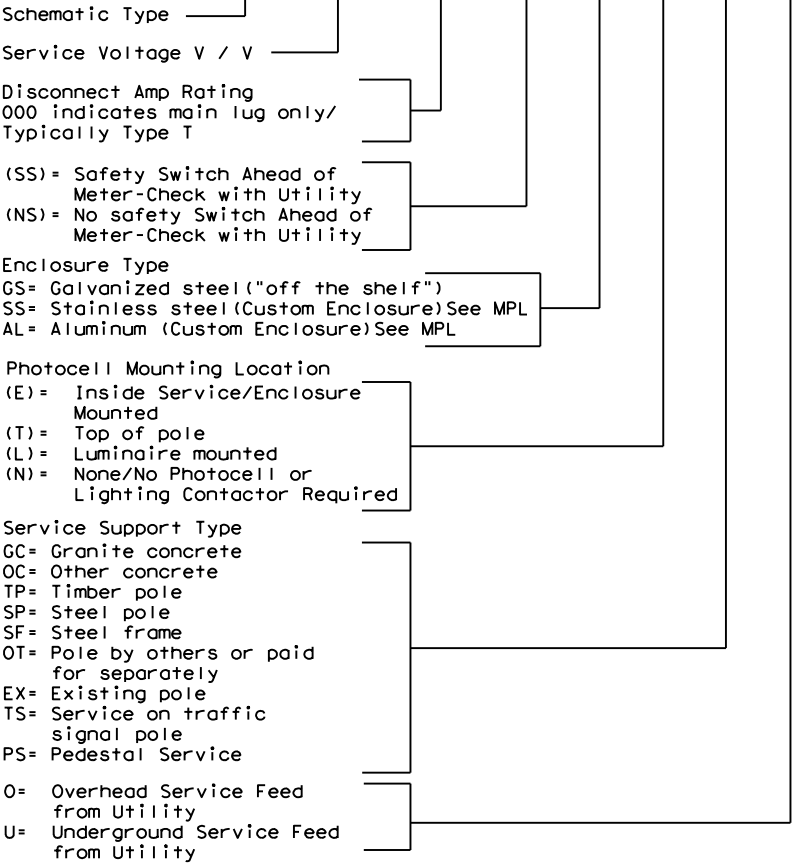
* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbdr/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminares	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

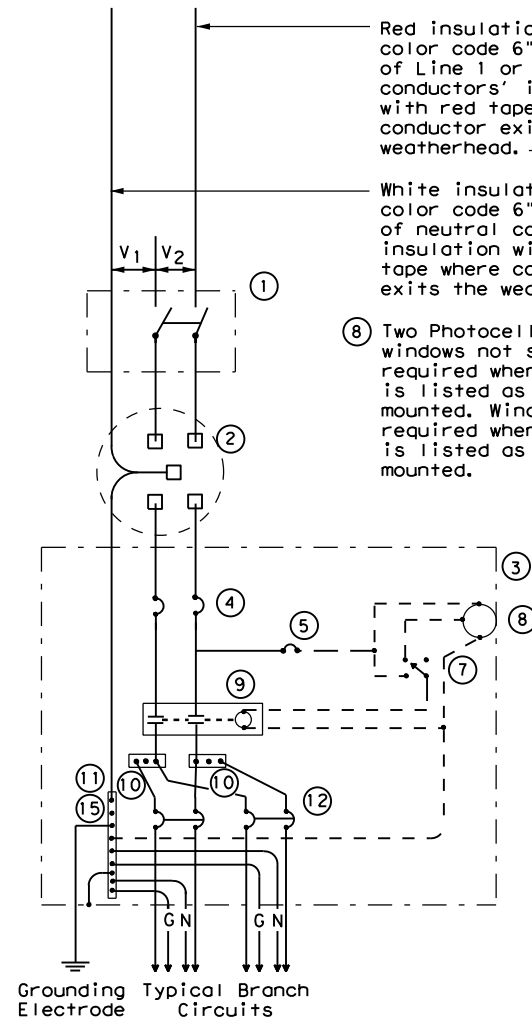
Traffic Operations Division Standard

ELECTRICAL DETAILS
SERVICE NOTES & DATA

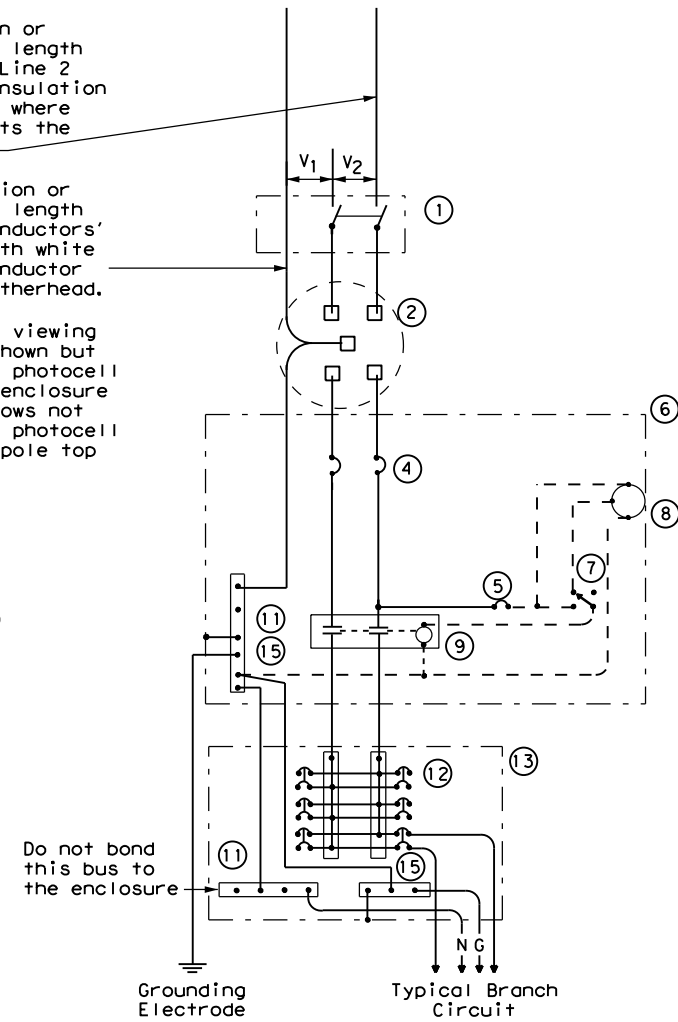
ED(5) - 14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST		COUNTY	SHEET NO.
			MONTGOMERY	537

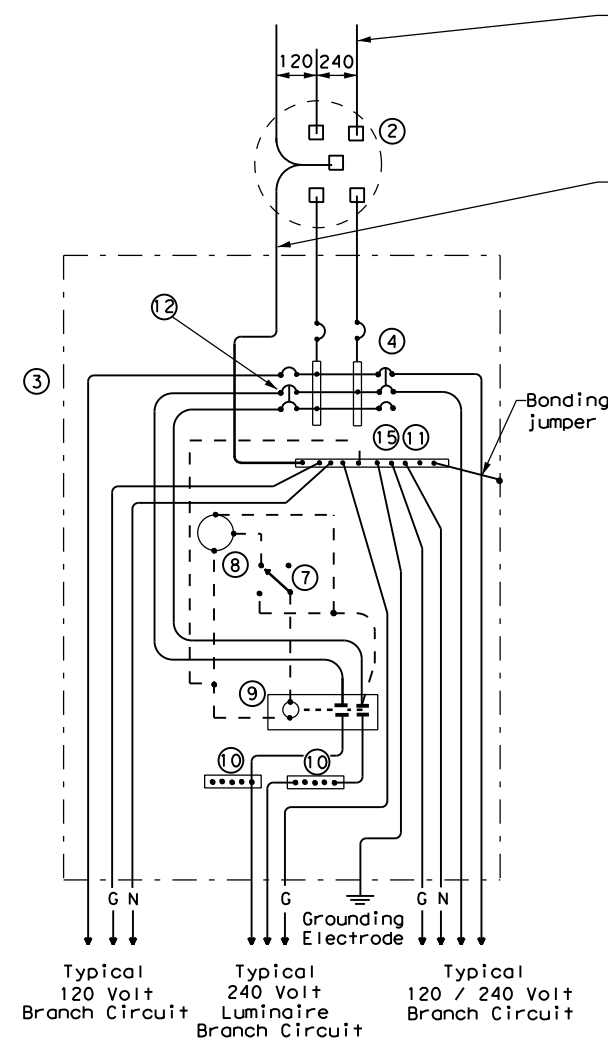
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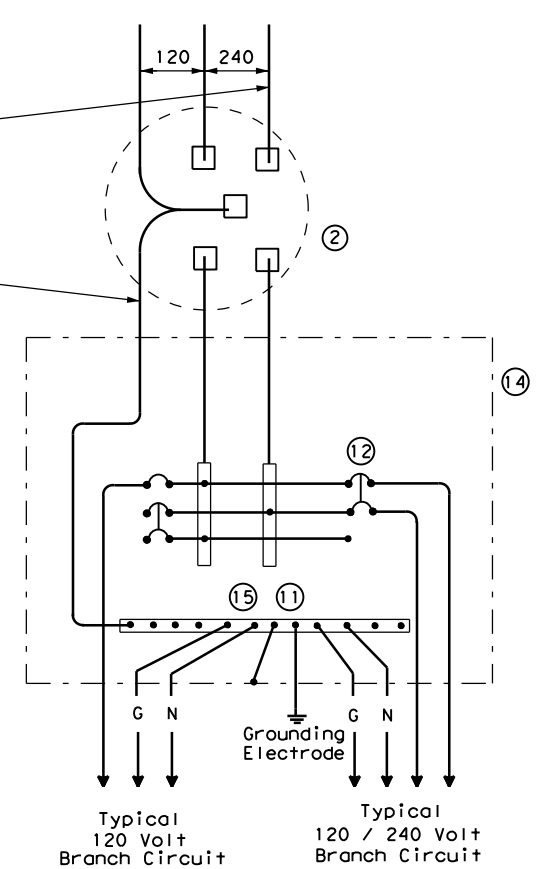
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE




SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE
Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
—	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
SERVICE ENCLOSURE
AND NOTES

ED(6) - 14

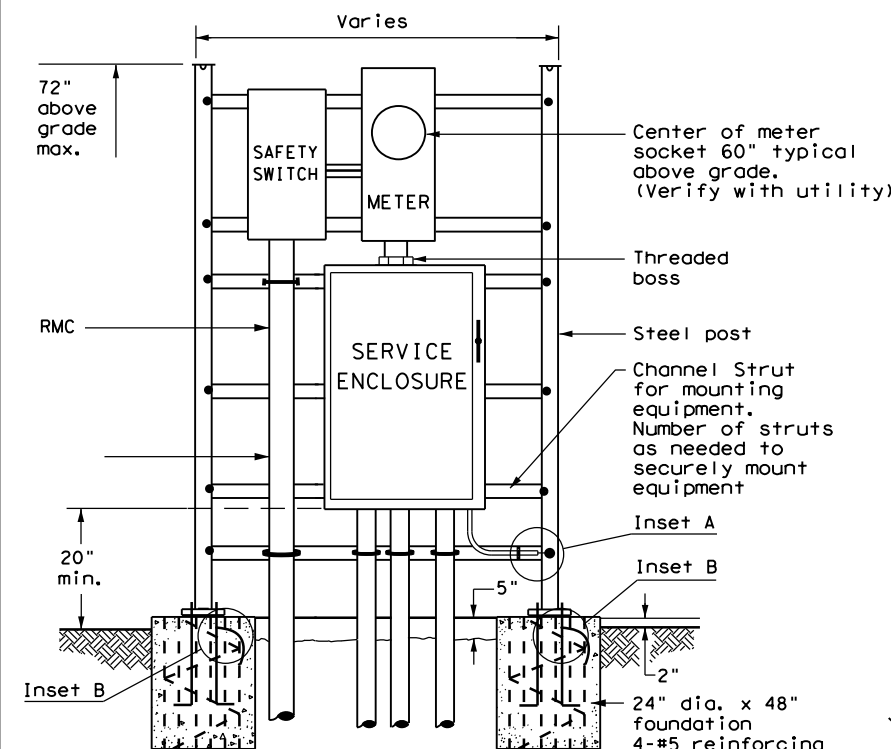
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REVISIONS	DIST	COUNTY	SHEET NO.	
		MONTGOMERY	538	

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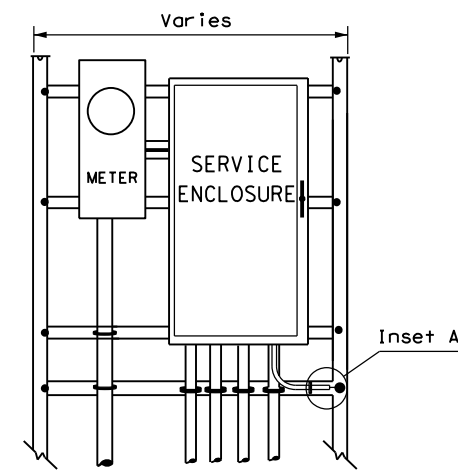
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS) 11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in. of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic ellis in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

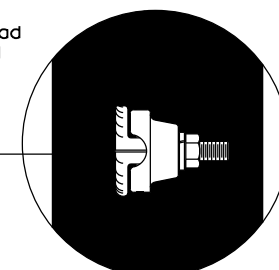


WITH SAFETY SWITCH
FRONT VIEW
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE

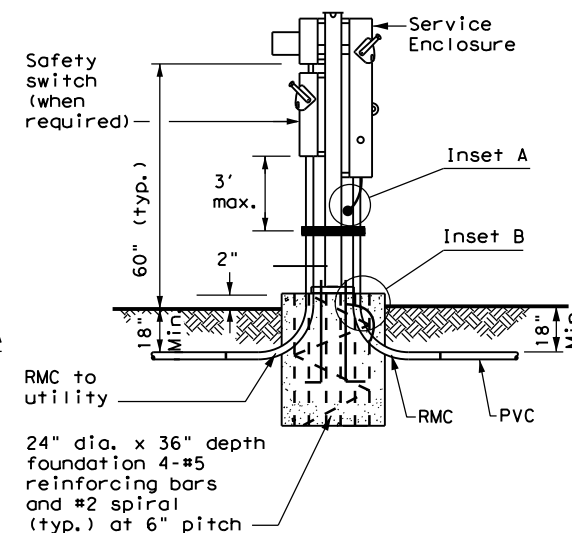


WITHOUT SAFETY SWITCH

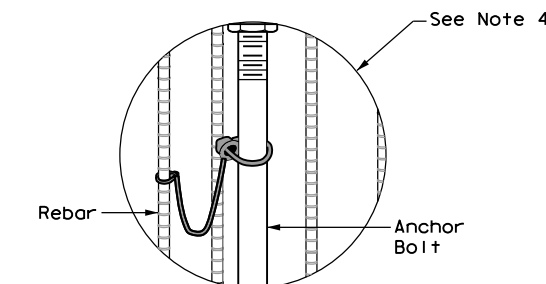
Drill, tap, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



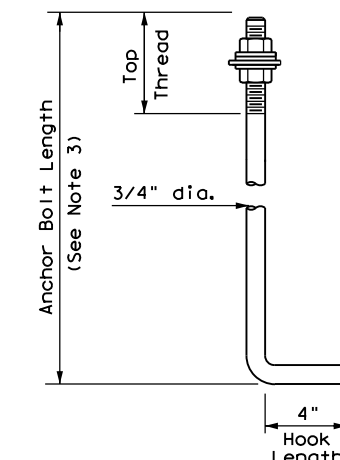
FRONT VIEW
INSET A



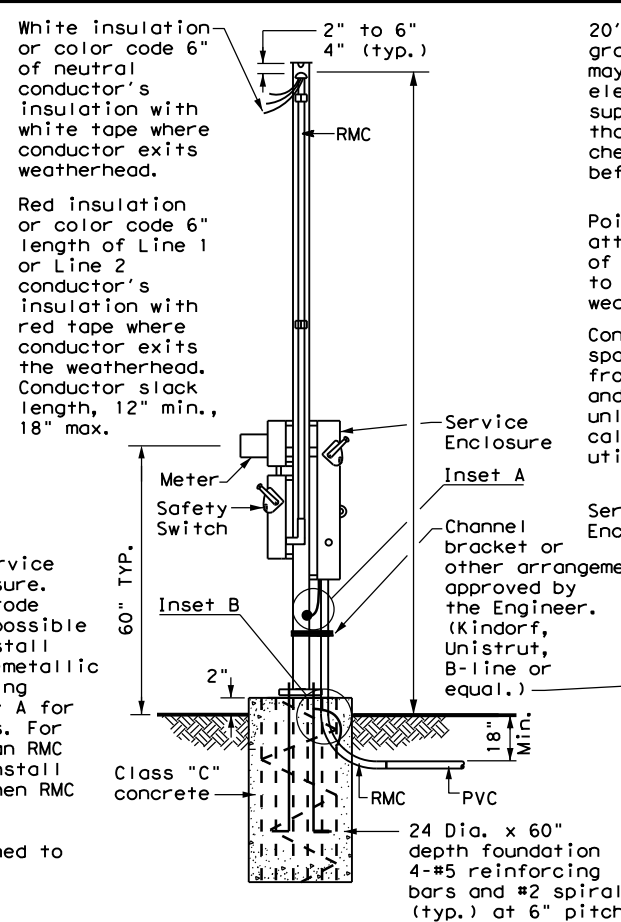
WITH SAFETY SWITCH
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



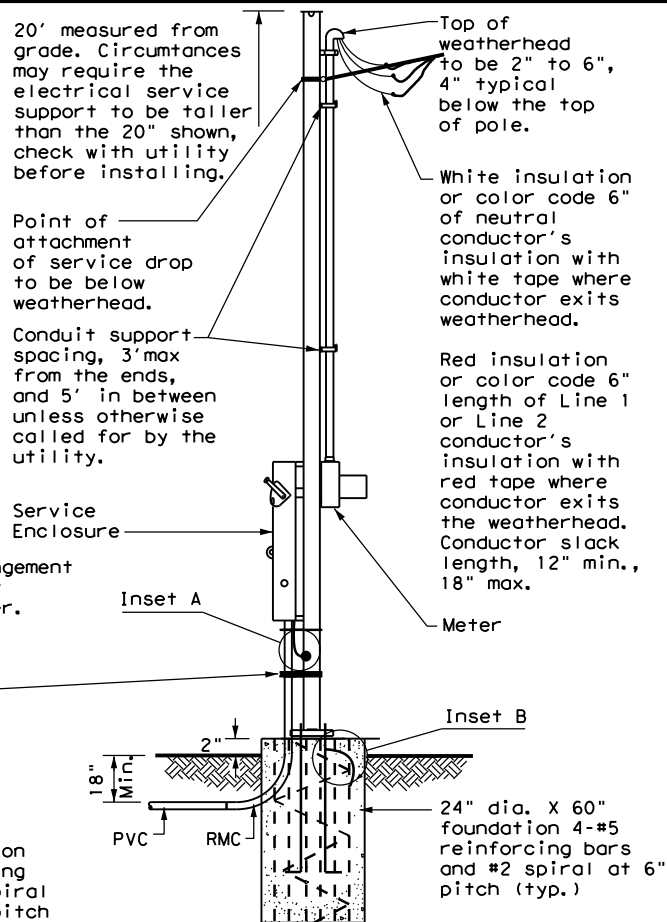
INSET B



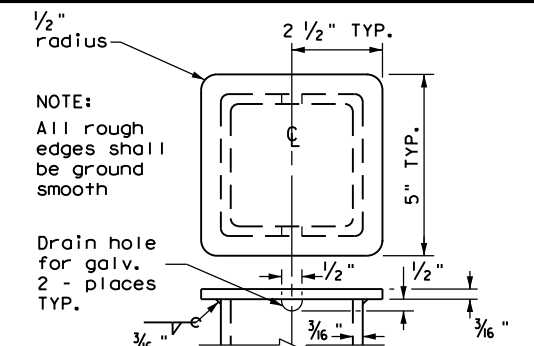
HOOKED ANCHOR DETAIL



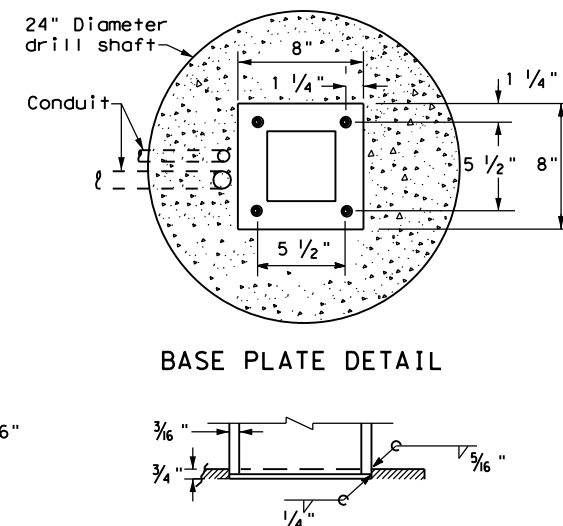
WITH SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



WITHOUT SAFETY SWITCH



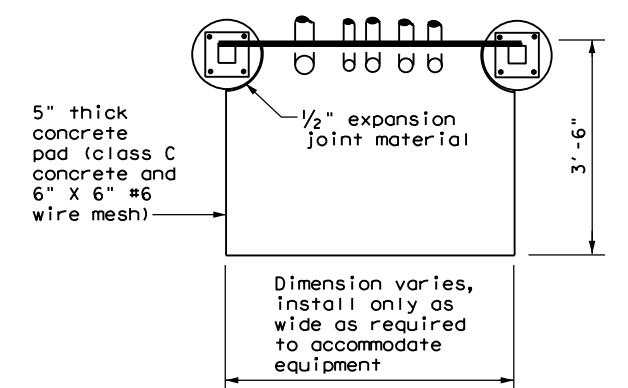
POLE TOP PLATE



BASE PLATE DETAIL


BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

SERVICE SUPPORT

TYPES SF & SP

ED(7) - 14

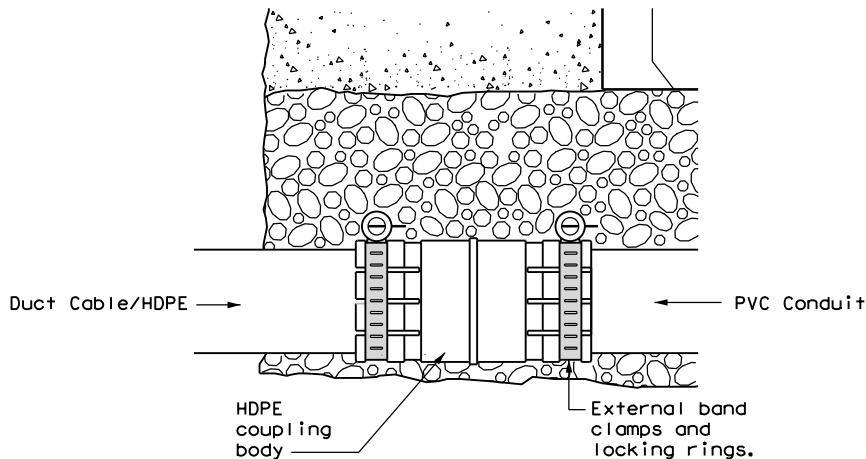
FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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		MONTGOMERY	539	

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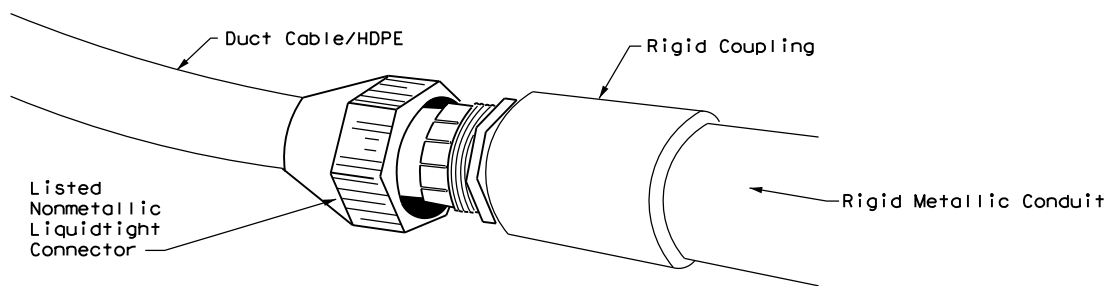
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DUCT CABLE & HDPE CONDUIT NOTES

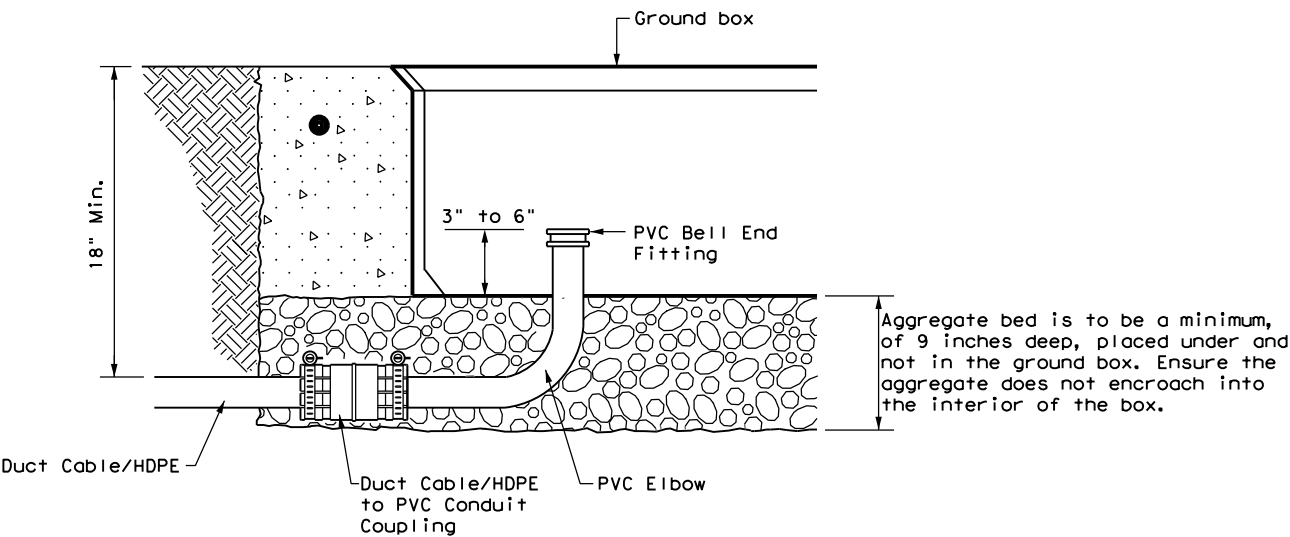
1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.



DUCT CABLE/HDPE TO PVC

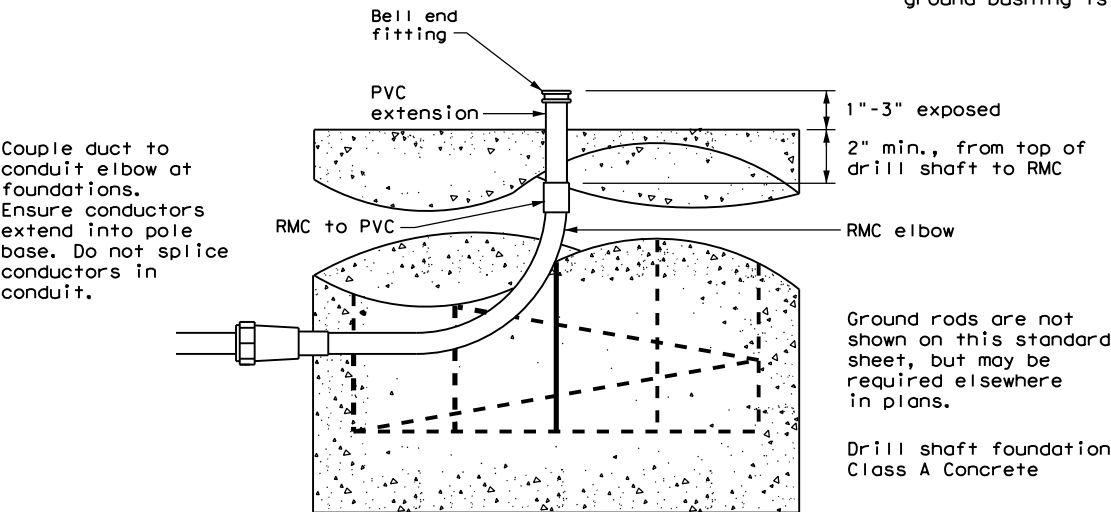


DUCT CABLE/HDPE TO RMC

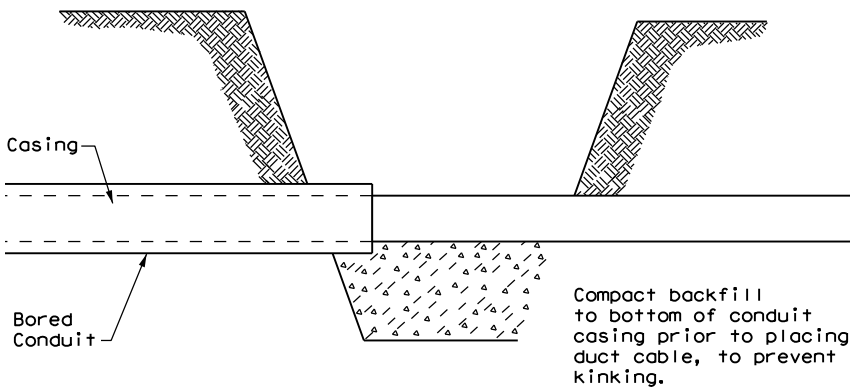


DUCT CABLE/HDPE AT GROUND BOX


When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



DUCT CABLE / HDPE AT FOUNDATION



BORE PIT DETAIL

 Texas Department of Transportation				Traffic Operations Division Standard					
ELECTRICAL DETAILS									
DUCT CABLE/ HDPE CONDUIT									
ED(11) - 14									
FILE: ed11-14.dgn		DN: TxDOT		CK: TxDOT		DW: TxDOT		CR: TxDOT	
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				MONTGOMERY				540	

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FILE:

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:

i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:

a. Anchor Bolt Tightening.

i. Coat the threads of the anchor bolts with electrically conductive lubricant.

ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

iii.Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

v. Check top of T-base for level. If not level then foundation must be leveled.

b. Top Bolt Procedure

i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
- iii.Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb

i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
11. Mount luminaires on arms level as shown by the luminaire level indicator.
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

- ① Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

a. Provide NEMA 3R outdoor enclosure or as approved.

b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

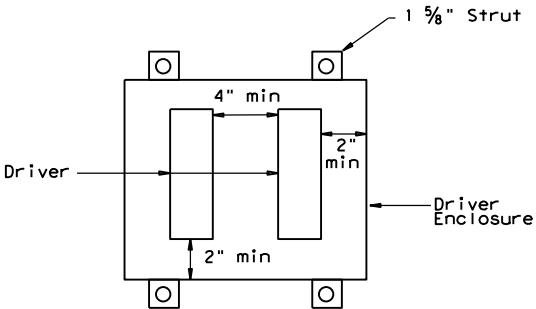
c. Install drivers with at least 2 inches of space from enclosure walls.

d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

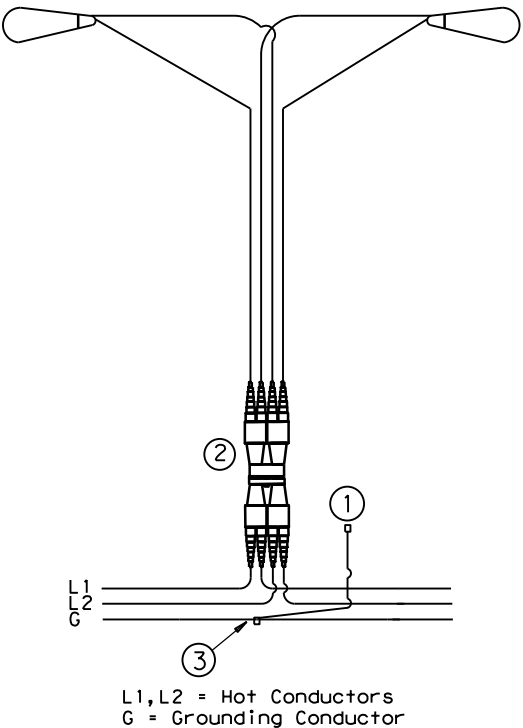
e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

f. Provide remote drivers with a maximum of 100 watts

g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.




Driver Spacing In Remote Enclosure



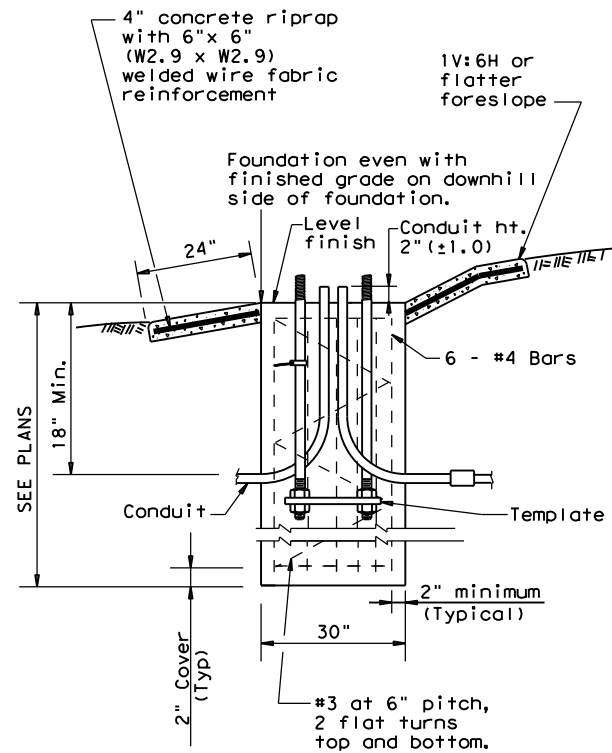
TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

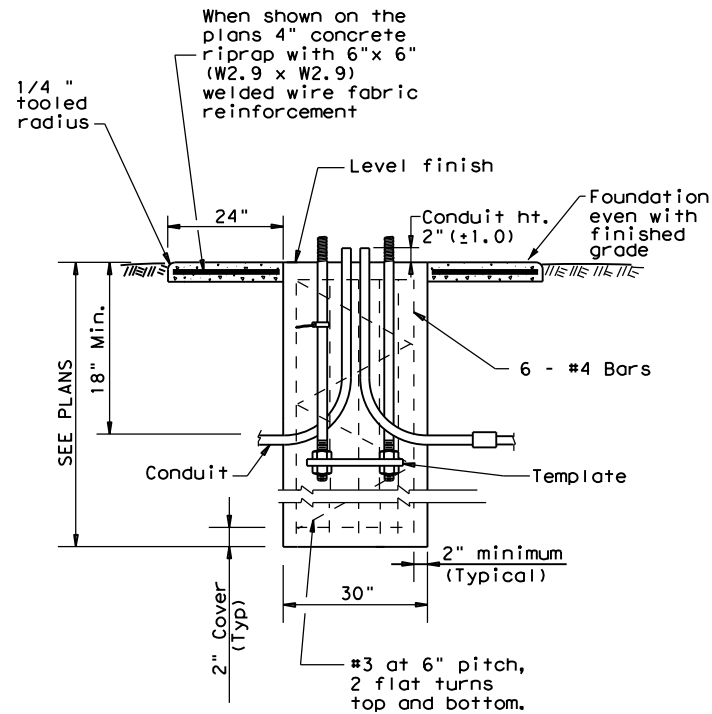
 Texas Department of Transportation				Traffic Safety Division Standard	
ROADWAY ILLUMINATION DETAILS					
RID(1) - 20					
FILE: rid1-20.dgn	DN: TxDOT		CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2007	CONT	SECT	JOB		HIGHWAY
REVISIONS 7-17 12-20					
	DIST		COUNTY		SHEET NO.
			MONTGOMERY		541

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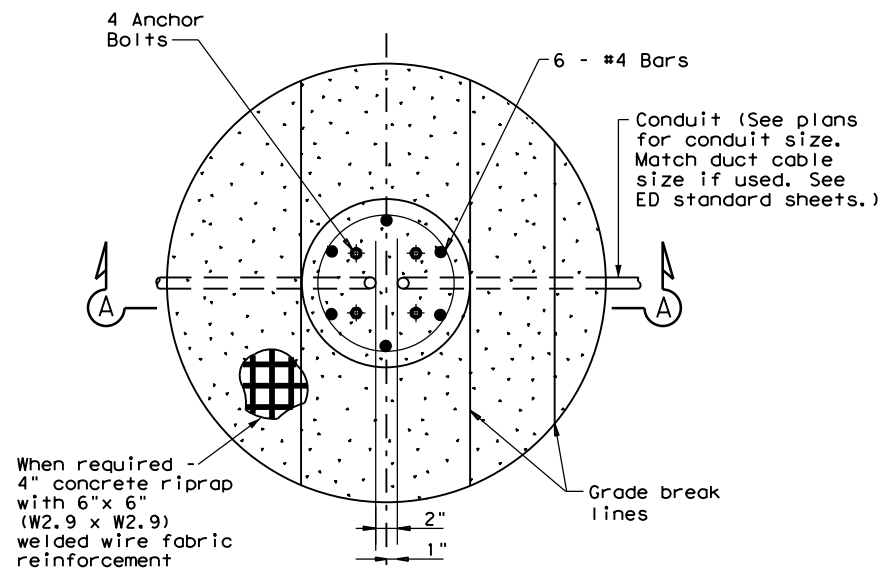
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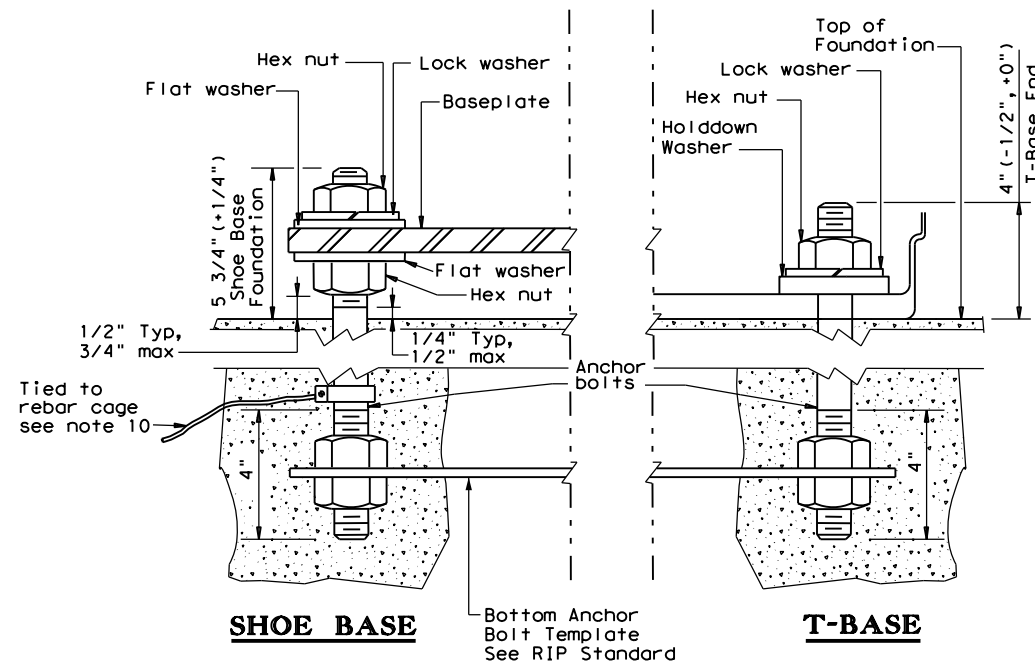
SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 1/4 in.	1 1/4 in. x 30 in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS
(See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6'	6'	6'
>20 ft. to 30 ft.	8'	6'	6'
>30 ft. to 40 ft.	8'	8'	6'
>40 ft. to 50 ft.	10'	8'	6'

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION
(Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

- "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
- Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
- Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
- Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
- Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
- Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
- Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
- Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
- Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
- Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
- Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

 **Texas Department of Transportation**

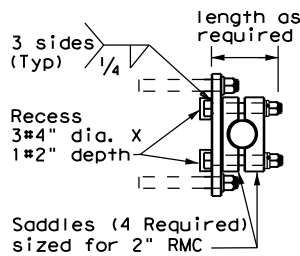
Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(2)-20

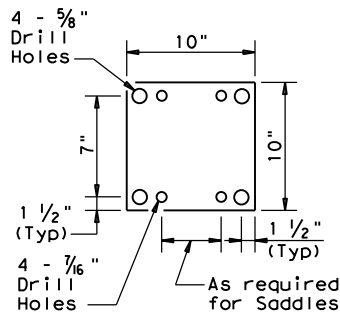
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© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
1-11	REVISIONS			
7-17				
12-20				
	DIST	COUNTY	SHEET NO.	
		MONTGOMERY	542	

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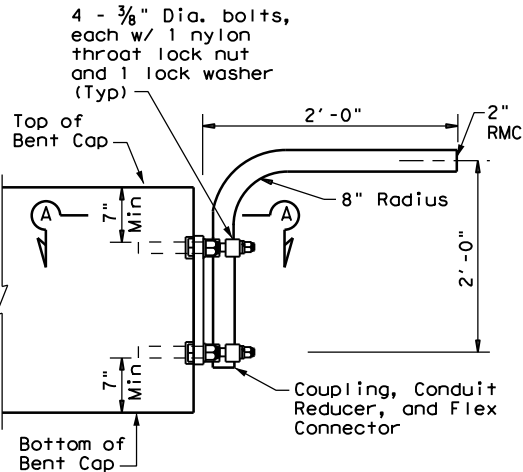
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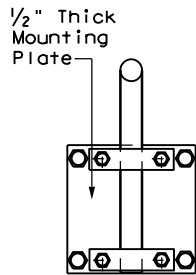
SECTION A-A



MOUNTING PLATE
(ASTM A-36 or better)

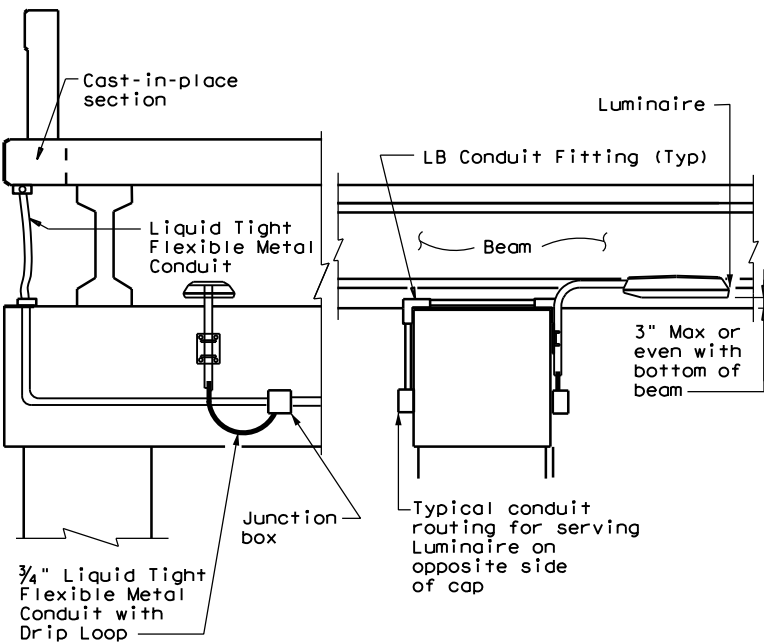


PROFILE VIEW
Or as Required
(See Note A.3)



END VIEW

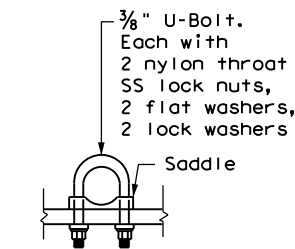
UNDERPASS LIGHTING ARM



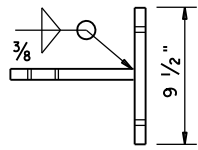
IN RD IL AM (U/P) (TY 1)

If bridge has pre-cast panels under deck, run circuit under deck edge.

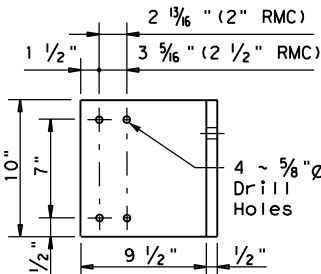
UNDERPASS LIGHTING TYPE 1



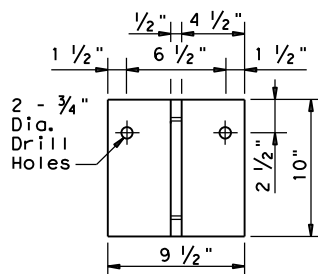
CLAMP DETAIL
(2 Req'd)



PLAN VIEW



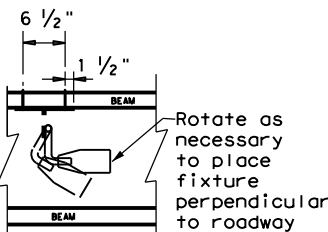
FRONT



SIDE

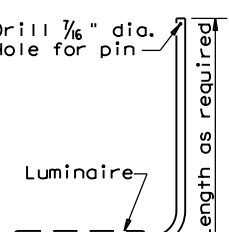
BRACKET DETAIL

Make from 1/2 inch plate (ASTM A-36 or better)

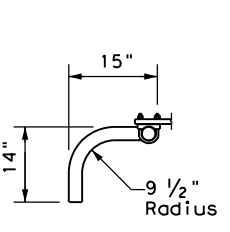


PLAN VIEW

FIXTURE ORIENTATION

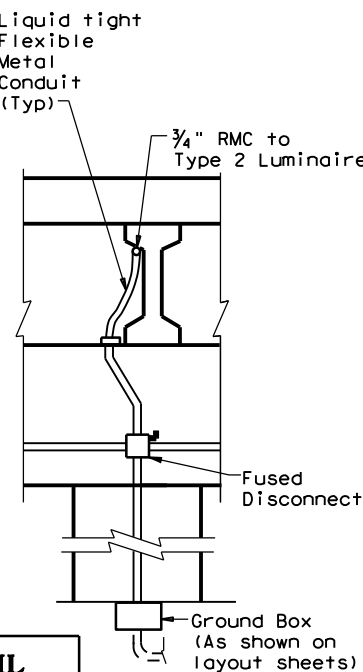


SIDE



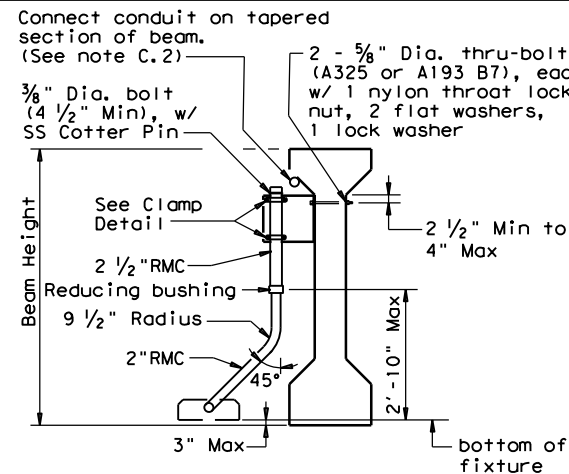
PLAN VIEW

ARM DETAIL



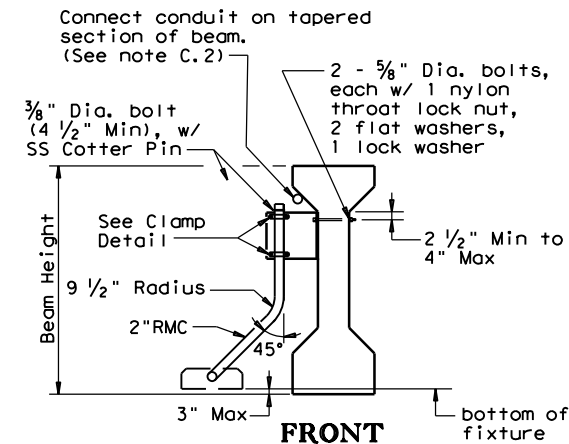
CONDUIT DETAIL

3 - No. 12 XHHW in 3/4 inch RMC for Branch Circuit runs from fused disconnect to underpass luminaires



FRONT

(Beam height greater than 54")

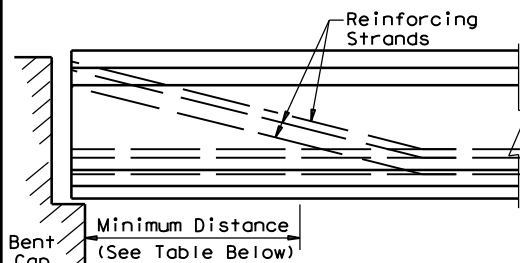


FRONT

(Beam height equal to or less than 54")

IN RD IL AM (U/P) (TY 2)

UNDERPASS LIGHTING TYPE 2



CONDUIT CONNECTION PROFILE

GENERAL NOTES:

A. ALL 150 watt HPS and 150 watt equivalent LED Luminaires

- Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
- Conduit will be paid for under Item 618, "Conduit" and conductors will be paid for under Item 620, "Electrical Conductors," unless otherwise shown on the plans.
- Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and plans. Where practicable, place luminaires so the bottom of luminaire is above the bottom of the beam, maximum of 3 in. (See detail UNDERPASS LIGHTING ARM TYPE 2)
- Except as noted, galvanize all structural steel and exposed bolts, nuts, and washers in accordance with Item 445 "Galvanizing".
- Fabrication of brackets and support arms will not be paid for directly but is subsidiary to Item 610, "Roadway Illumination Assemblies."
- Install a heavy duty NEMA 3R fused disconnect or breaker enclosure rated at 30 amps and 480 volts to switch underpass luminaires as shown on plans, with at least one per bridge circuit. Install 20 amp time-delay fuses or inverse-time circuit breakers. Mount disconnect or breaker enclosure 10 ft. (min) above grade on columns or bent caps as approved by the Department. Modify disconnect to allow padlocking in the "ON" and "OFF" positions. Padlocks and disconnect switches or circuit breakers for underpass fixtures will not be paid for directly but are subsidiary to the various bid items of the contract.
- Conduit on columns, caps, and slab is shown surface mounted. For new columns and caps, embed PVC conduit in concrete. Bond and ground metal junction boxes and conduit.

B. TYPE 1

- Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) for Type 1 arm shaft.
- Use 3/8 in. stainless steel bolt or stud non-epoxy type expansion anchors for concrete for Type 1 mounting. Except as noted, provide an allowable 2650 lbs minimum pull-out force (after consideration of adjustment factors for edge distance and bolt spacing) for each anchor. Install each anchor to the embedment depth recommended by the manufacturer.
- Attach conduit to plate with 4 saddles, four - 3/8 in. diameter bolts, nylon throat lock nuts, and lock washers.

C. TYPE 2

- Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) or provide a combination of 2 1/2 in. (2.875" O.D., 0.193" wall) and 2 in. (2.375" O.D., 0.146" wall) rigid metal conduits with a reducing bushing as beam height stipulated for Type 2 arm shaft. Field cutting and threading will be permitted. Paint cut and threaded areas with zinc rich paint after conduit is connected to adjacent fitting.
- Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 in.
- Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Use drilling location and method as directed by the Engineer. See Location of Underpass Lighting Mounting Bracket detail. The locations shown in the table are such that reinforcing strands will not be damaged.

TABLE 5

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET TABLE

SPAN LENGTH	MINIMUM DISTANCE
≤ 50'	10'-0"
50' - 70'	15'-0"
70' - 90'	20'-0"
> 90'	25'-0"

Minimum Distance
(See Table Below)

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET



ROADWAY ILLUMINATION DETAILS (UNDERPASS LIGHT FIXTURES)

RID(3)-20

FILE: rid3-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
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REVISIONS				
2-14				
7-17				
12-20				
	DIST	COUNTY	SHEET NO.	
		MONTGOMERY	543	

DATE:
FILE:

SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS																		
Nominal Mounting Ht. (ft)	Shoe Base					Quantity	T-Base					Quantity	CSB/SSCB Mounted					Quantity
	Designation				Pole		Designation				Pole		Designation				Pole	
	Pole	A1	A2	Luminaire			Pole	A1	A2	Luminaire			Pole	A1	A2	Luminaire		
20	(Type SA 20 S - 4)				(150W EQ) LED		(Type SA 20 T - 4)				(150W EQ) LED							
	(Type SA 20 S - 4 - 4)				(150W EQ) LED		(Type SA 20 T - 4 - 4)				(150W EQ) LED							
30	(Type SA 30 S - 4)				(250W EQ) LED		(Type SA 30 T - 4)				(250W EQ) LED		(Type SP 28 S - 4)				(250W EQ) LED	
	(Type SA 30 S - 4 - 4)				(250W EQ) LED		(Type SA 30 T - 4 - 4)				(250W EQ) LED		(Type SP 28 S - 4 - 4)				(250W EQ) LED	
	(Type SA 30 S - 8)				(250W EQ) LED		(Type SA 30 T - 8)				(250W EQ) LED		(Type SP 28 S - 8)				(250W EQ) LED	
	(Type SA 30 S - 8 - 8)				(250W EQ) LED		(Type SA 30 T - 8 - 8)				(250W EQ) LED		(Type SP 28 S - 8 - 8)				(250W EQ) LED	
40	(Type SA 40 S - 4)				(250W EQ) LED		(Type SA 40 T - 4)				(250W EQ) LED		(Type SP 38 S - 4)				(250W EQ) LED	
	(Type SA 40 S - 4 - 4)				(250W EQ) LED		(Type SA 40 T - 4 - 4)				(250W EQ) LED		(Type SP 38 S - 4 - 4)				(250W EQ) LED	
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	(Type SA 40 S - 12)				(250W EQ) LED		(Type SA 40 T - 12)				(250W EQ) LED		(Type SP 38 S - 12)				(250W EQ) LED	
	(Type SA 40 S - 12 - 12)				(250W EQ) LED		(Type SA 40 T - 12 - 12)				(250W EQ) LED		(Type SP 38 S - 12 - 12)				(250W EQ) LED	
	(Type SA 50 S - 4)				(400W EQ) LED		(Type SA 50 T - 4)				(400W EQ) LED		(Type SP 48 S - 4)				(400W EQ) LED	
	(Type SA 50 S - 4 - 4)				(400W EQ) LED		(Type SA 50 T - 4 - 4)				(400W EQ) LED		(Type SP 48 S - 4 - 4)				(400W EQ) LED	
	(Type SA 50 S - 8)				(400W EQ) LED		(Type SA 50 T - 8)				(400W EQ) LED		(Type SP 48 S - 8)				(400W EQ) LED	
	(Type SA 50 S - 8 - 8)				(400W EQ) LED		(Type SA 50 T - 8 - 8)				(400W EQ) LED		(Type SP 48 S - 8 - 8)				(400W EQ) LED	
	(Type SA 50 S - 10)				(400W EQ) LED		(Type SA 50 T - 10)				(400W EQ) LED		(Type SP 48 S - 10)				(400W EQ) LED	
	(Type SA 50 S - 10 - 10)				(400W EQ) LED		(Type SA 50 T - 10 - 10)				(400W EQ) LED		(Type SP 48 S - 10 - 10)				(400W EQ) LED	
	(Type SA 50 S - 12)				(400W EQ) LED		(Type SA 50 T - 12)				(400W EQ) LED		(Type SP 48 S - 12)				(400W EQ) LED	
	(Type SA 50 S - 12 - 12)				(400W EQ) LED		(Type SA 50 T - 12 - 12)				(400W EQ) LED		(Type SP 48 S - 12 - 12)				(400W EQ) LED	

[illegible]

GENERAL NOTES:

1. All work, materials and services not shown on the plans may be necessary for complete and proper construction. shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.
2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.
4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.
 - a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
 - b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, I_r, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, I_r, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
 - c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
 - d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.
5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.
 - a. Meet all of the requirements stated above for optional steel pole designs and the following:
 1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
 2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
 3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
 4. Pole components shall be constructed using the following material:
 - Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
 - Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
 - Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
 - Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
 - Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
 - Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.
6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.
7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

SA: Pole and mast arm may be steel or _____
aluminum.

ST: Pole and mast arm must be steel.

AL: Pole and mast arm must be aluminum.

SP: Special (ovalized) steel or aluminum pole
for installing on CSB or SSCB. See standard
sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal _____
mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, _____
T-Transformer Base, or B-Bridge/Ret. Wall Mount)

First number denotes length of mast arm _____
in feet.

Use of second mast arm is indicated by second _____
dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent
wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure
Sodium; LED - LED luminaire)

SHEET 1 OF 4



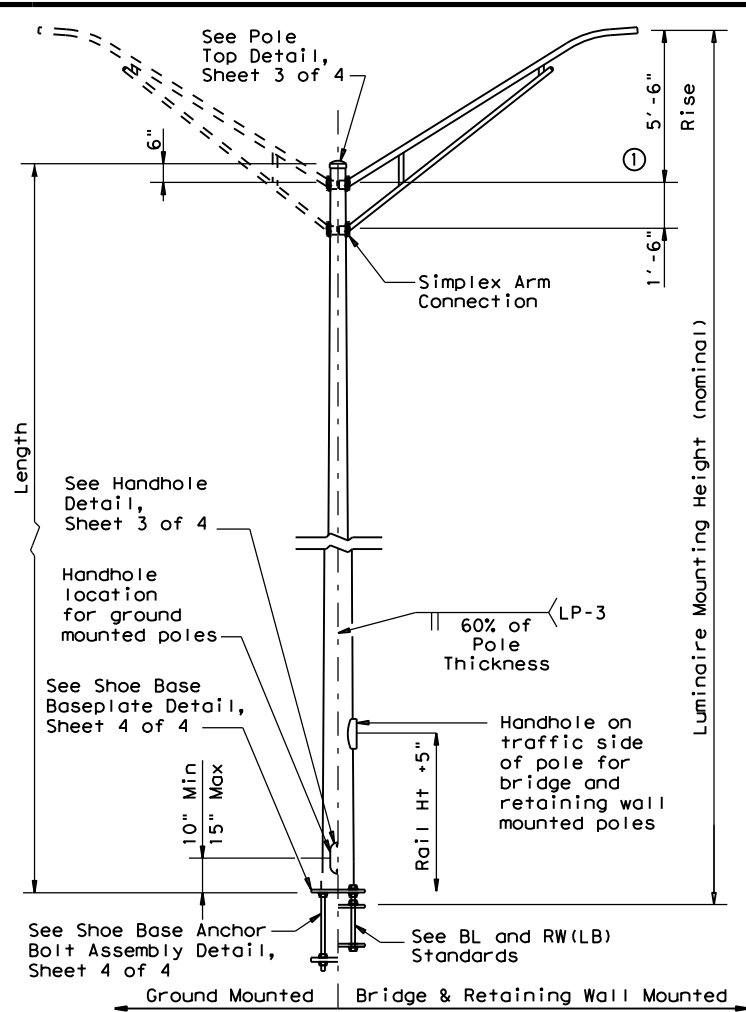
ROADWAY ILLUMINATION POLES

RIP (1) - 19

FILE# rip-19.dgn		DN#		CK#		DW#		CK#	
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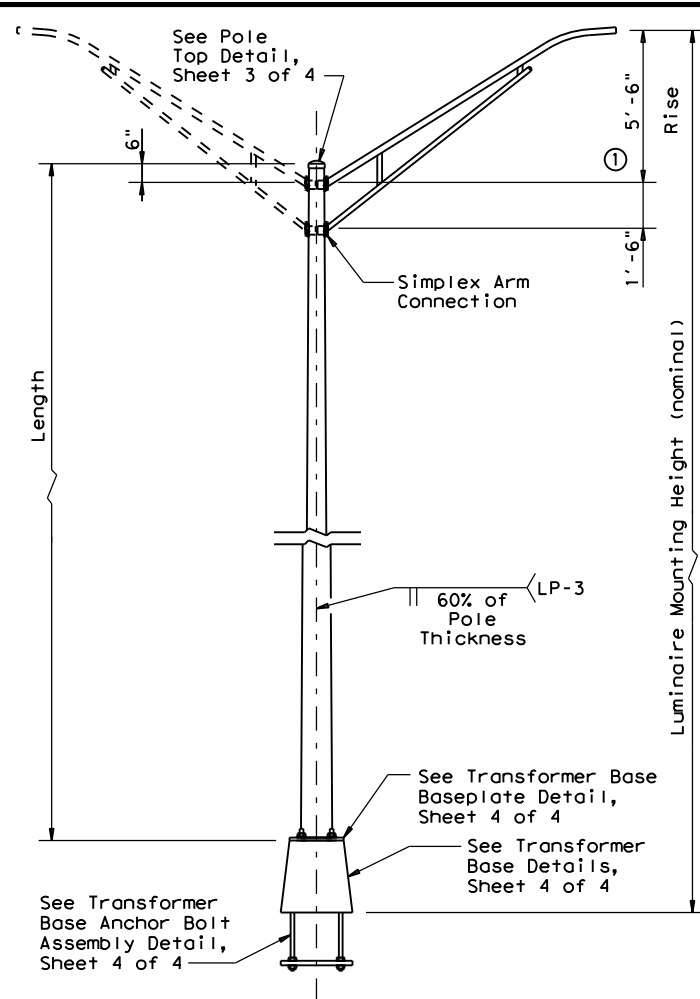
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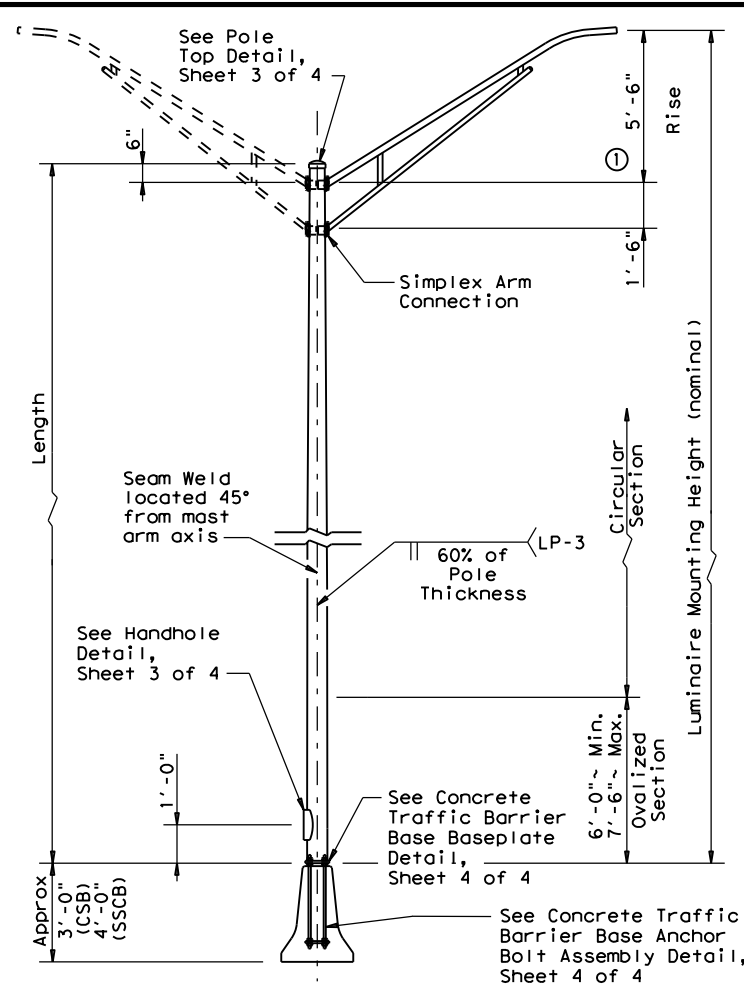
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

GENERAL NOTES:

- Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
- Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
- Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
- For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
- Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
- Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
- Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
- Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
- Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
- All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
- The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
- Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
- Erect transformer base poles in accordance with sheet RID(1).

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

- 2'-6" rise for 4 ft. luminaire arms.
- Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.
- A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

SHEET 2 OF 4



Texas Department of Transportation

Traffic Safety Division Standard

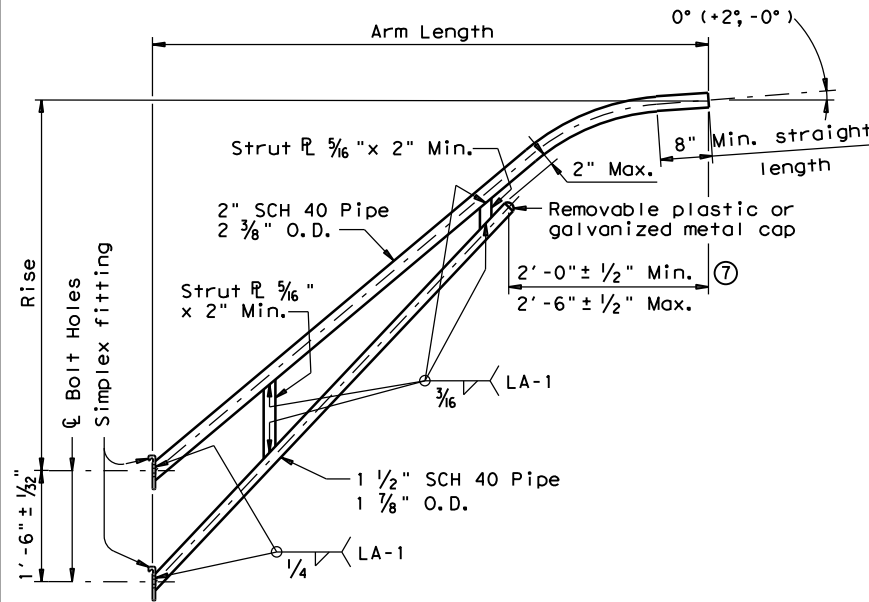
ROADWAY ILLUMINATION POLES

RIP(2) - 19

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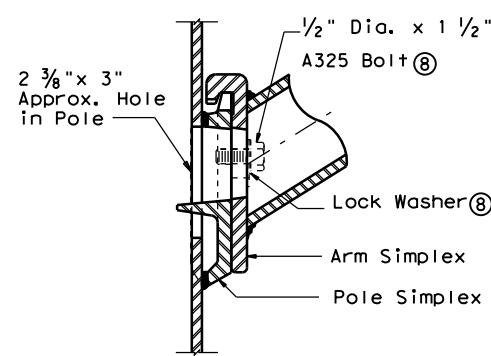
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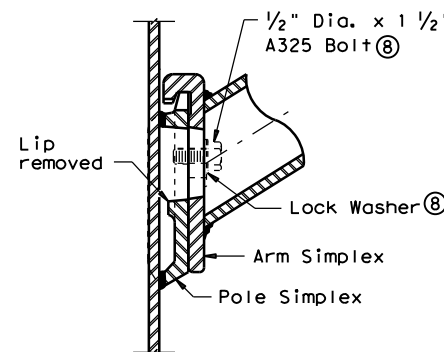
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"

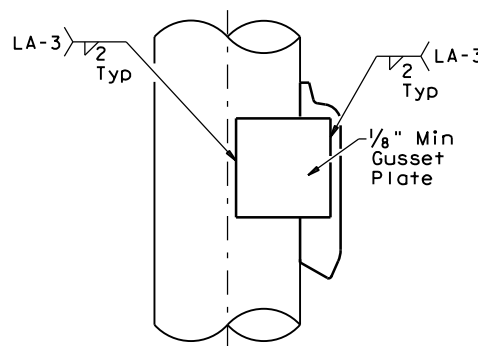


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

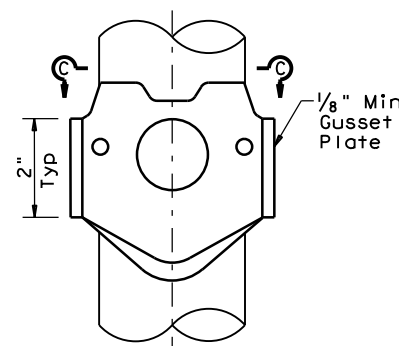


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

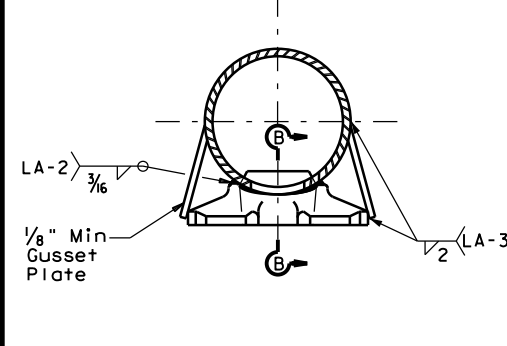
SECTION B-B



SIDE

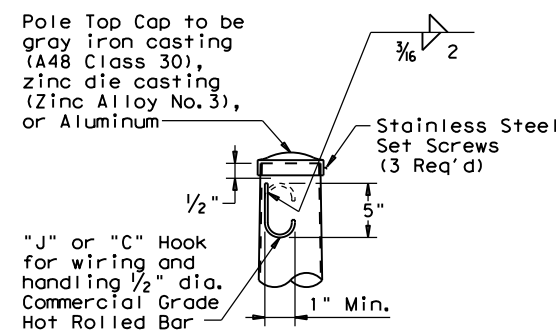


ELEVATION

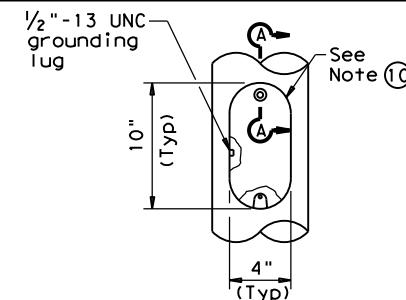


SECTION C-C

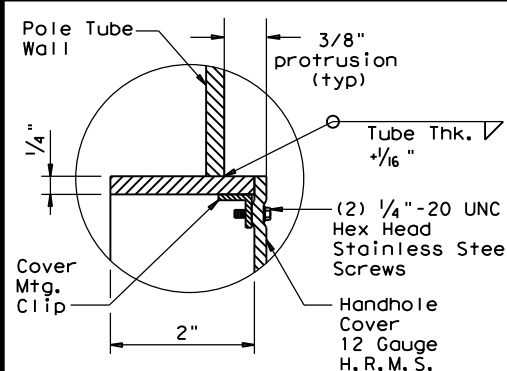
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

NOTES:

- Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.
- Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.
- Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.
- A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS

Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted

SHEET 3 OF 4



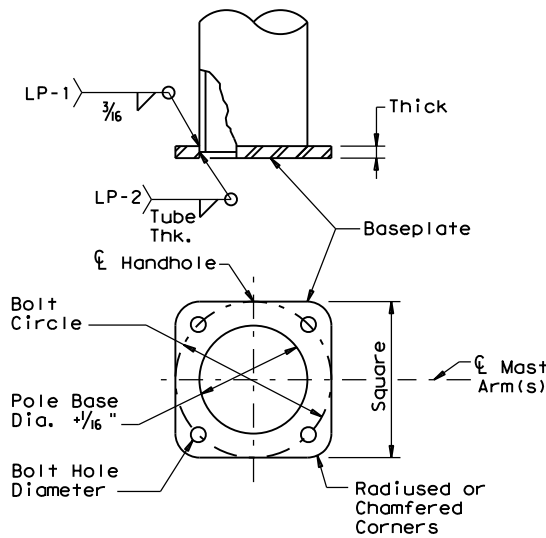
ROADWAY ILLUMINATION POLES

RIP(3) - 19

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		MONTGOMERY	546	

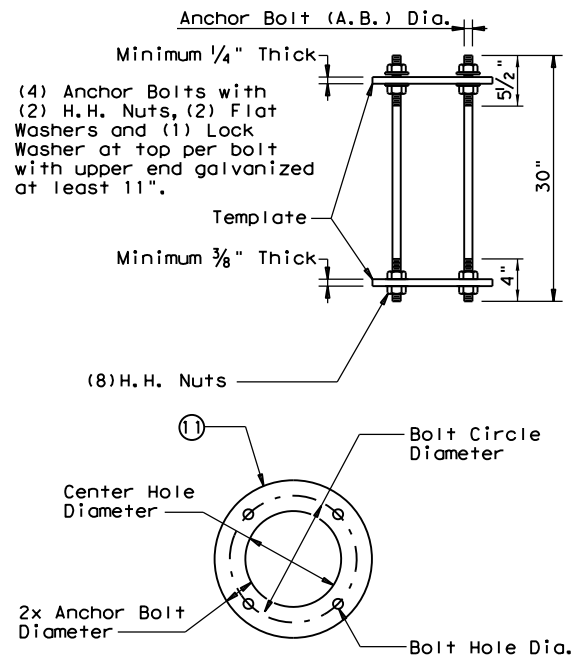
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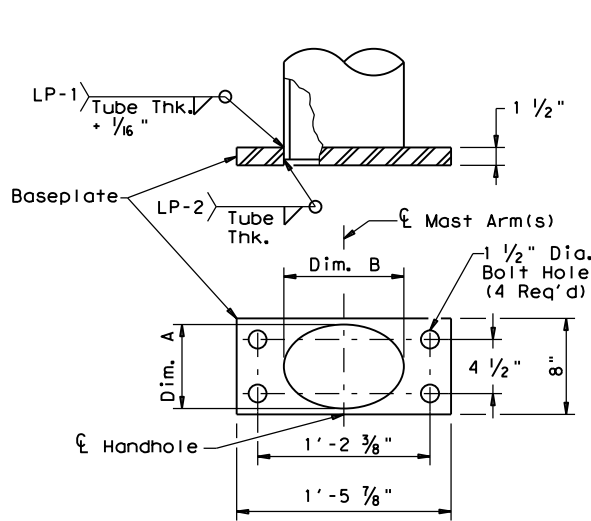
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



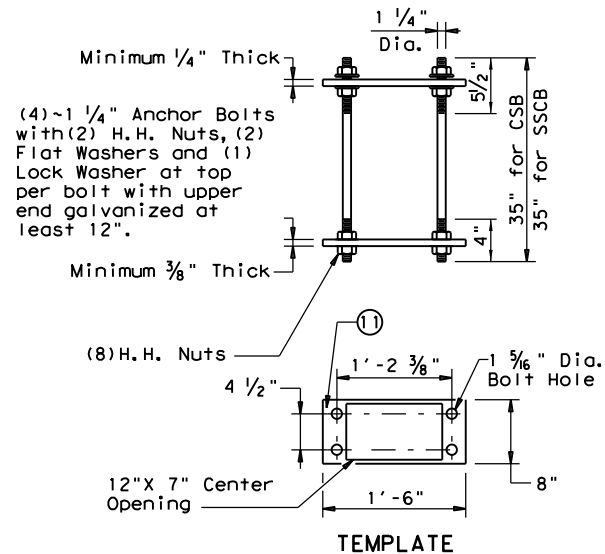
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	13"	11"	1 1/16"
40' - 50'	1 1/4"	15"	12 1/2"	1 5/16"



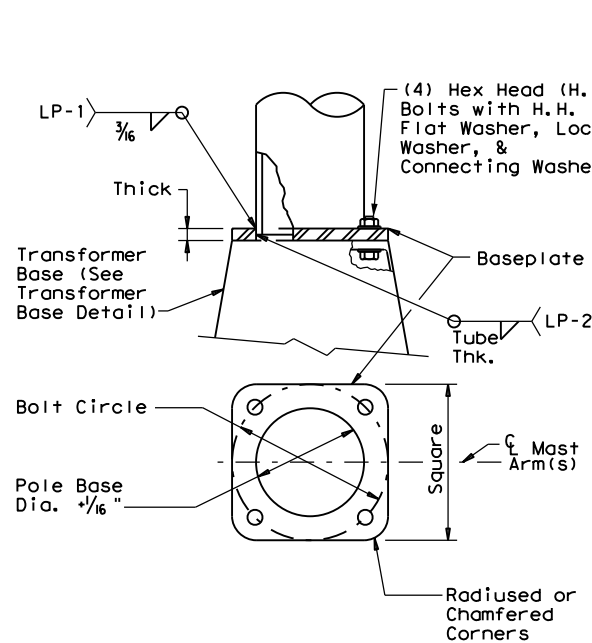
CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA. (12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



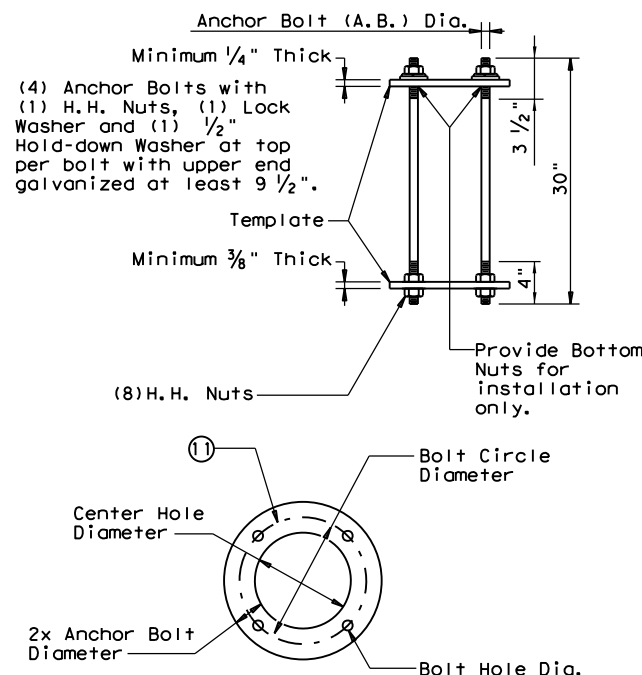
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



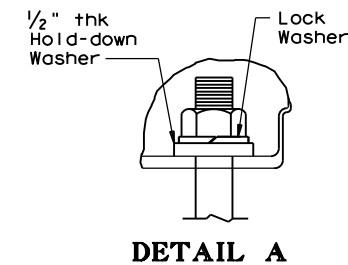
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFORMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

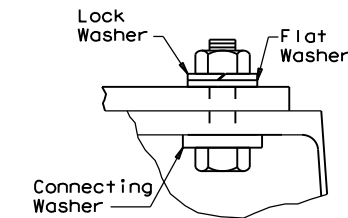


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

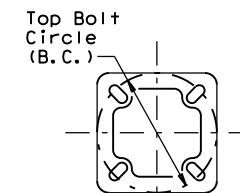
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



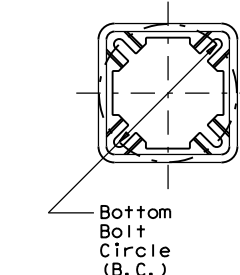
DETAIL A



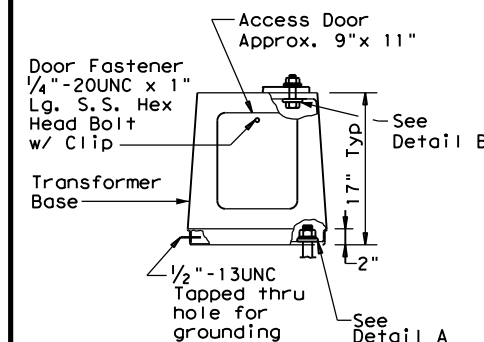
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

- For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
- All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
- Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
- Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
- Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

- Anchor Bolt Templates do not need to be galvanized.
- Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE

DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

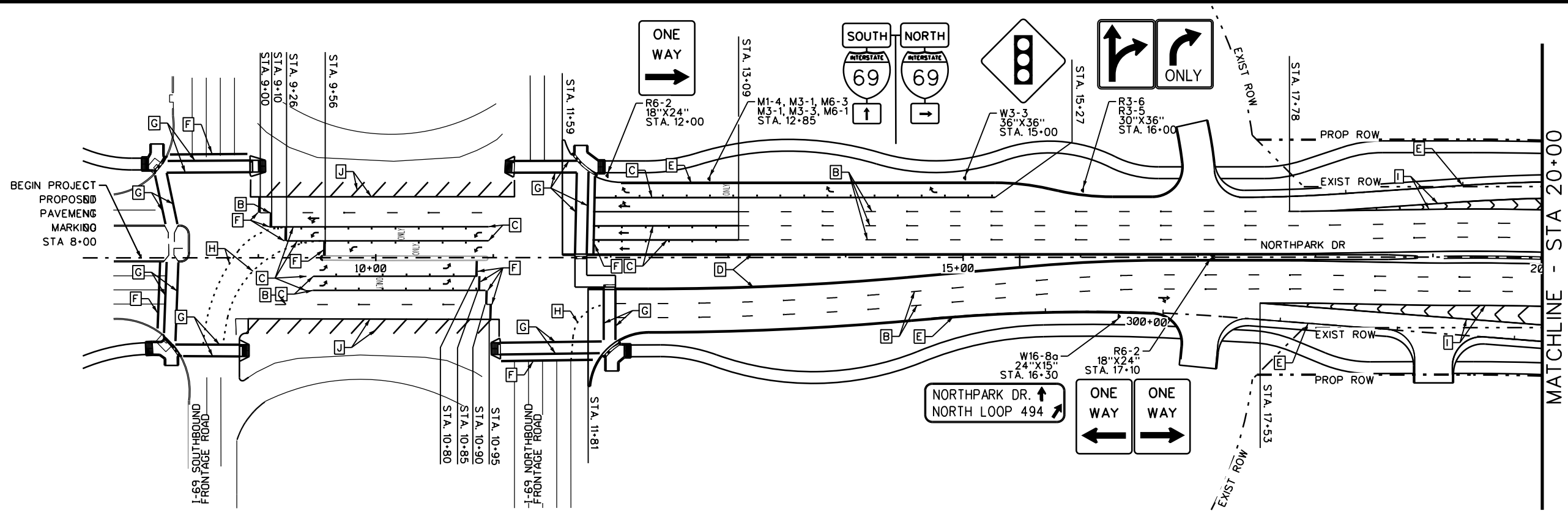
SHEET 4 OF 4



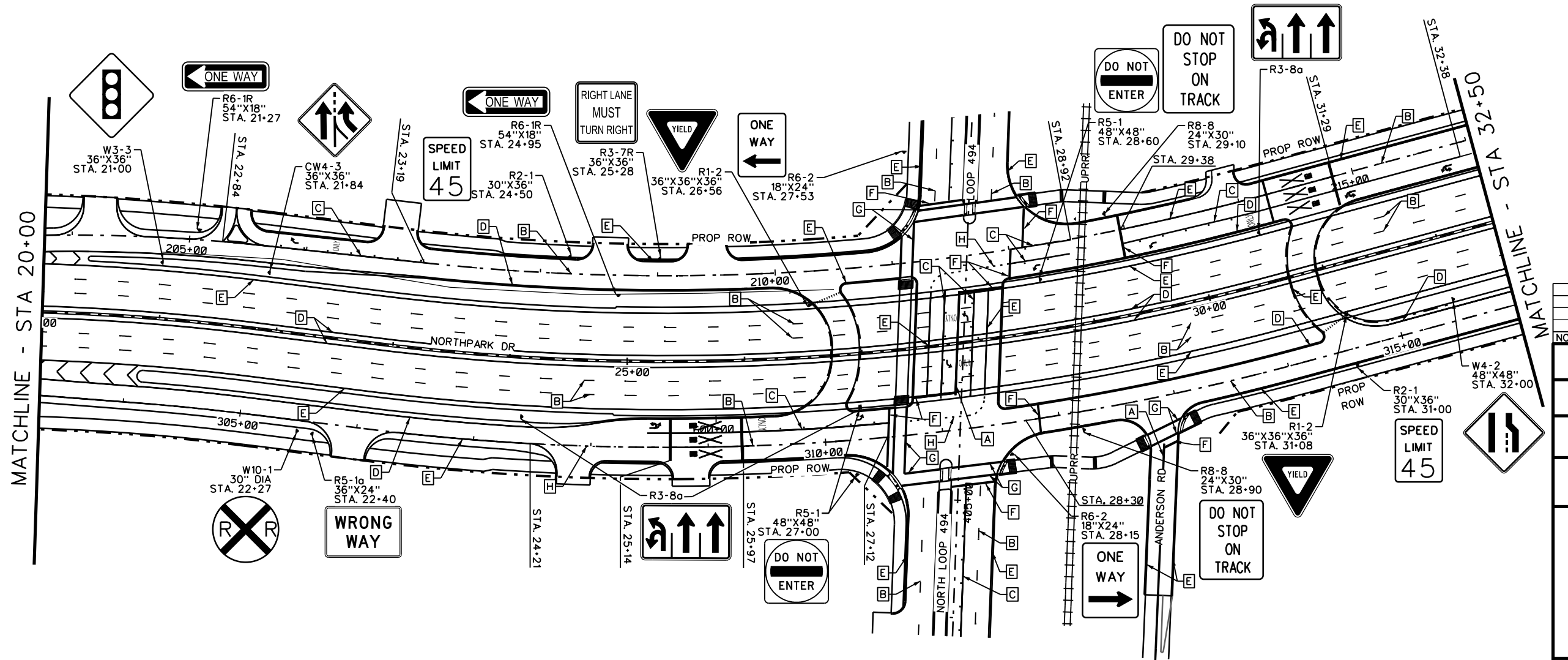
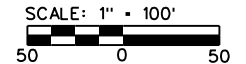
ROADWAY ILLUMINATION POLES

RIP(4) - 19

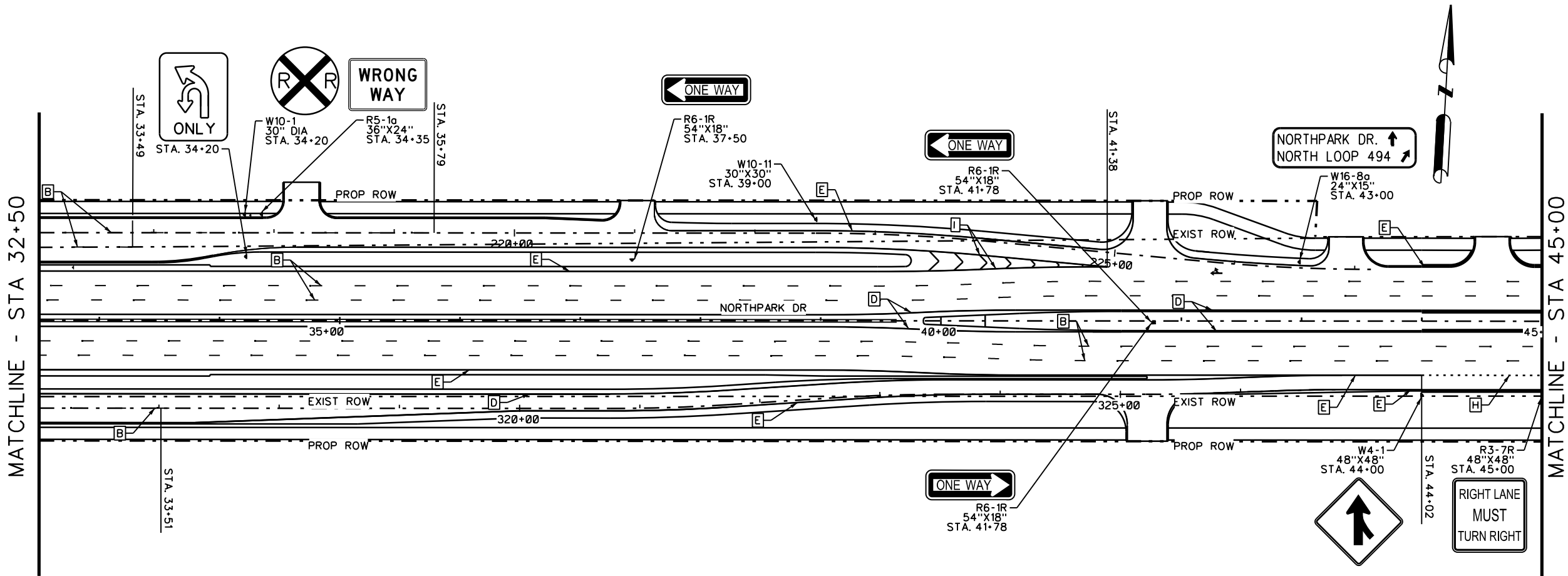
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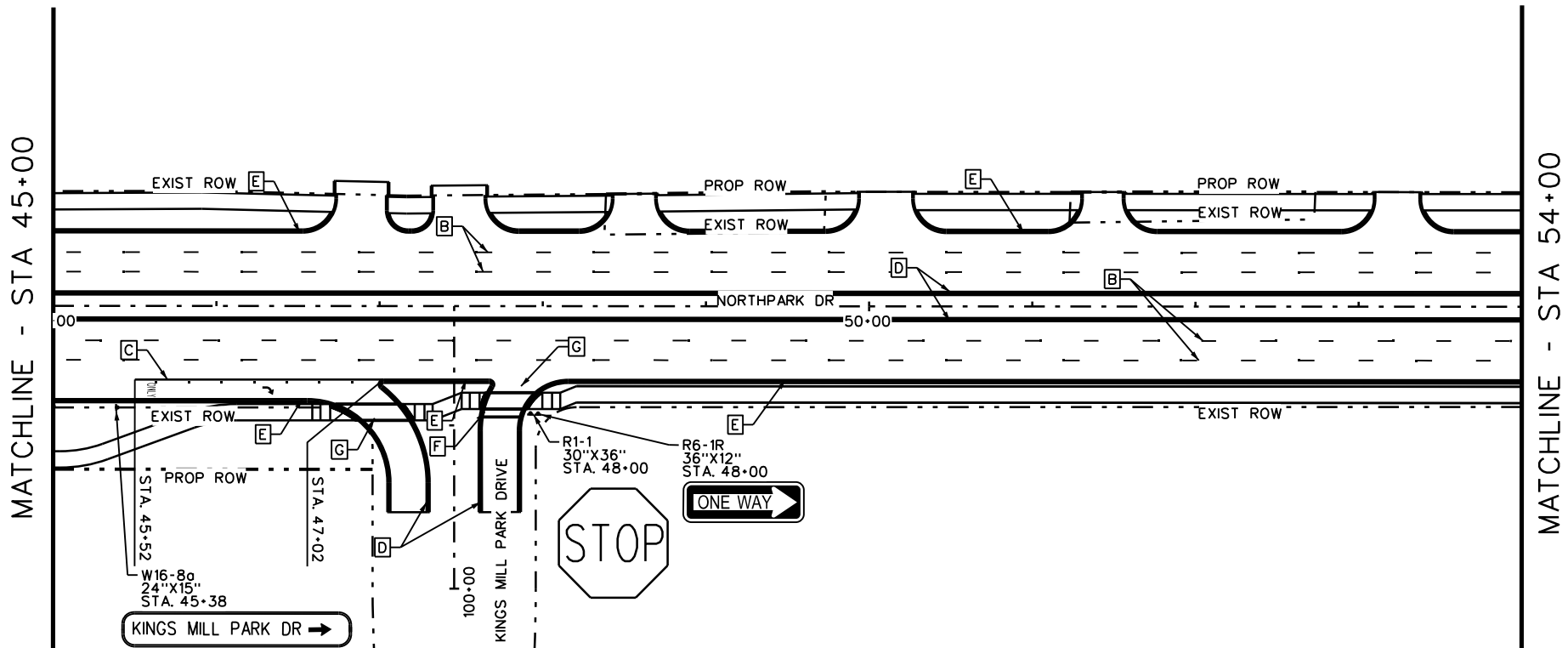
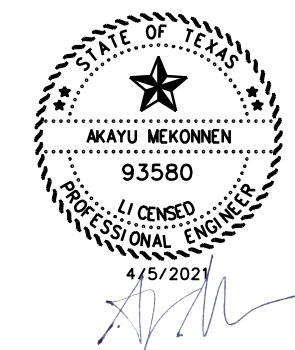
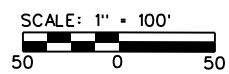
- LEGEND**
- A REFL. MULTIPOLY. PAV. MRK. (DBL)(Y)(6") (SLD) W/ RAIS. PAV. MRKR. TY II-A-A
 - B REFL. MULTIPOLY. PAV. MRK. (W)(4")(BRK) W/ RAIS. PAV. MRKR. TY II-C-R AT 40'
 - C REFL. MULTIPOLY. PAV. MRK. (W)(6")(SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
 - D REFL. MULTIPOLY. PAV. MRK. (Y)(4")(SLD) TY II-A-A AT 20'
 - E REFL. MULTIPOLY. PAV. MRK. (W)(4")(SLD)
 - F REFL. MULTIPOLY. PAV. MRK. (W) (24") (SLD)
 - G REFL. MULTIPOLY. PAV. MRK. (W)(12")(SLD)
 - H REFL. MULTIPOLY. PAV. MRK. (W)(6")(DOT)
 - I REFL. MULTIPOLY. PAV. MRK. (W)(8")(GORE)
 - J REFL. MULTIPOLY. PAV. MRK. (W)(8")(SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
 - PROPOSED SIGN
 - LEFT TURN LANE ARROW
 - RIGHT TURN LANE ARROW
 - DUAL LEFT TURN & THROUGH LANE ARROW
 - DUAL LEFT & U-TURN LANE ARROW
 - U-TURN ARROW






NO.	REVISIONS					BY	DATE		
<div><div><div><div><div><div></div><div>ime</div></div></div><div><div><div></div><div>ENGINEERS</div></div></div></div></div><div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713)739-7744 TX FIRM NO. 18572</div></div>									
<div><div><div><div><div><div></div><div>HNTB</div></div></div><div><div><div></div><div>ENGINEERS</div></div></div></div></div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>									
<div><div><div><div><div><div></div><div>LA</div></div></div><div><div><div></div><div>RA</div></div></div></div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY c/o ALLEN BOONE HUMPHRIES ROBINSON LLP 3009 SOUTHWEST FREEWAY, SUITE 2800 HOUSTON, TX 77027</div></div>									
<div><div><div><div><div><div></div><div>CITY OF HOUSTON</div></div></div><div><div><div></div><div>HOUSTON PUBLIC WORKS</div></div></div></div></div><div><div><div><div><div><div></div><div>NORTH PARK DRIVE</div></div></div><div><div><div></div><div>BEGIN TO STA 32+50</div></div></div></div></div><div><div><div><div><div><div></div><div>PAVEMENT MARKING</div></div></div><div><div><div></div><div>AND SIGNAGE</div></div></div></div></div></div></div></div>									
<div><div><div><div><div><div></div><div>DESIGNED:</div></div><div><div></div><div>CHECKED:</div></div><div><div></div><div>DRAWN:</div></div><div><div></div><div>CHECKED:</div></div></div><div><div><div></div><div>FED. DIV.</div></div><div><div></div><div>RD. NO.</div></div><div><div></div><div>STATE</div></div><div><div></div><div>CITY OF HOUSTON WBS</div></div><div><div></div><div>HIGHWAY No.</div></div></div><div><div><div></div><div>6</div></div><div><div></div><div>TEXAS</div></div><div><div></div><div>SEE TITLE SHEET</div></div><div><div></div><div>CS</div></div></div><div><div><div></div><div>STATE DISTRICT</div></div><div><div></div><div>COUNTY</div></div><div><div></div><div>CONTROL No.</div></div><div><div></div><div>SECTION No.</div></div><div><div></div><div>JOB No.</div></div><div><div></div><div>SHEET No.</div></div></div><div><div><div></div><div>HOU</div></div><div><div></div><div>MONTGOMERY</div></div><div><div></div><div>0912</div></div><div><div></div><div>37</div></div><div><div></div><div>232</div></div><div><div></div><div>549</div></div></div></div></div></div>									
4/5/2021 11:00:18 AM									



- LEGEND**
- [A] REFL. MULTIPOLY. PAV. MKR. (DBL)(Y)(6") (SLD) W/ RAIS. PAV. MKR. TY II-A-A
 - [B] REFL. MULTIPOLY. PAV. MKR. (W)(4") (BRK) W/ RAIS. PAV. MKR. TY II-C-R AT 40'
 - [C] REFL. MULTIPOLY. PAV. MKR. (W)(6") (SLD) W/ RAIS. PAV. MKR. TY I-C AT 20'
 - [D] REFL. MULTIPOLY. PAV. MKR. (Y)(4") (SLD) TY II-A-A AT 20'
 - [E] REFL. MULTIPOLY. PAV. MKR. (W)(4") (SLD) (SLD)
 - [F] REFL. MULTIPOLY. PAV. MKR. (W) (24") (SLD)
 - [G] REFL. MULTIPOLY. PAV. MKR. (W)(12") (SLD)
 - [H] REFL. MULTIPOLY. PAV. MKR. (W)(6") (DOT)
 - [I] REFL. MULTIPOLY. PAV. MKR. (W)(8") (GORE)
 - [J] REFL. MULTIPOLY. PAV. MKR. (W)(8") (SLD) W/ RAIS. PAV. MKR. TY I-C AT 20'
 - PROPOSED SIGN
 - ↶ LEFT TURN LANE ARROW
 - ↷ RIGHT TURN LANE ARROW
 - ↶↷ DUAL LEFT TURN & THROUGH LANE ARROW
 - ↶↷ DUAL LEFT & U-TURN LANE ARROW
 - ↶ U-TURN ARROW



NO.	REVISIONS			BY	DATE

	5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572
	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420
	LAKE HOUSTON REDEVELOPMENT AUTHORITY c/o ALLEN BOONE HUMPHRIES ROBINSON LLP 3200 SOUTHWEST FREEWAY, SUITE 2600 HOUSTON, TX 77027

CITY OF HOUSTON					
HOUSTON PUBLIC WORKS					
NORTHPARK DRIVE					
STA 32+50 TO STA 54+00					
PAVEMENT MARKING					
AND STRIPING					

DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	550	

MATCHLINE - STA 54+00



30"x12"
STA. 55+00

NORTH PARK DR

55+00

STA. 56+03

EXIST ROW

STA. 58+78

STA. 59+60

STA. 62+35



30"x12"
STA. 63+35

HIDDEN PINES

MATCHLINE - STA 66+50

MATCHLINE - STA 66+50



30"x12"
STA. 68+30

NORTH PARK DR

70+00

STA. 69+18

STA. 69+97

EXIST ROW
PROP ROW

STA. 71+93

STA. 73+00

STA. 74+71

STA. 78+50

EXIST ROW

75+00

N 87° 05' 54.50" E

RUSSELL PALMER RD →

W16-8a
24"x8"
STA. 68+80



R3-5
30"x12"
STA. 75+15

W4-2
48"x48"
STA. 77+00



R3-8
STA. 72+50

MATCHLINE - STA 79+00

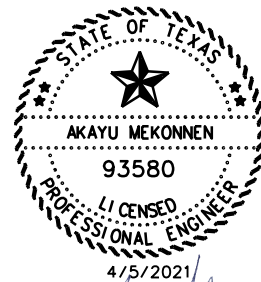
LEGEND




- A REFL. MULTIPOLY. PAV. MKR. (DBL)(Y)(6") (SLD) W/ RAIS. PAV. MKR. TY II-A-A
- B REFL. MULTIPOLY. PAV. MKR. (W)(4") (BRK) W/ RAIS. PAV. MKR. TY II-C-R AT 40'
- C REFL. MULTIPOLY. PAV. MKR. (W)(6") (SLD) W/ RAIS. PAV. MKR. TY I-C AT 20'
- D REFL. MULTIPOLY. PAV. MKR. (Y)(4") (SLD) TY II-A-A AT 20'
- E REFL. MULTIPOLY. PAV. MKR. (W)(4") (SLD) (SLD)
- F REFL. MULTIPOLY. PAV. MKR. (W) (24") (SLD)
- G REFL. MULTIPOLY. PAV. MKR. (W)(12") (SLD)
- H REFL. MULTIPOLY. PAV. MKR. (W)(6") (DOT)
- I REFL. MULTIPOLY. PAV. MKR. (W)(8") (GORE)
- J REFL. MULTIPOLY. PAV. MKR. (W)(8") (SLD) W/ RAIS. PAV. MKR. TY I-C AT 20'

PROPOSED SIGN

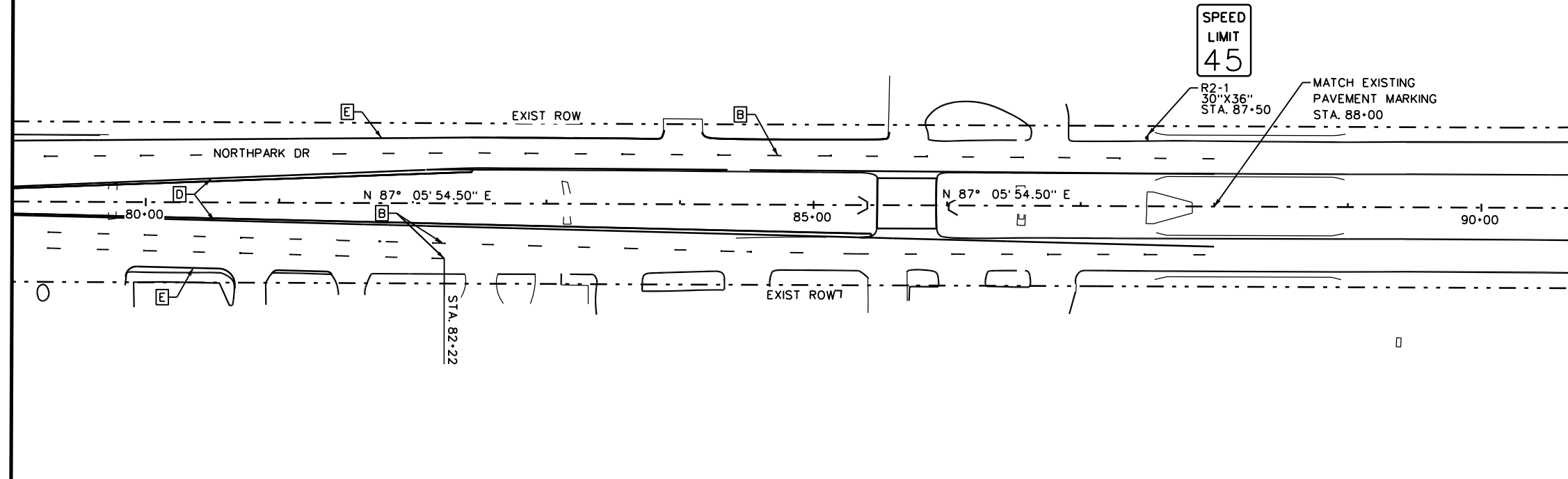
- LEFT TURN LANE ARROW
- RIGHT TURN LANE ARROW
- DUAL LEFT TURN & THROUGH LANE ARROW
- DUAL LEFT & U-TURN LANE ARROW
- U-TURN ARROW

SCALE: 1" = 100'



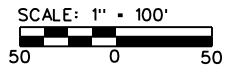
NO.	REVISIONS			BY	DATE
<div><div></div><div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713)739-7744 TX FIRM No. 18572</div></div> <div><div></div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div> <div><div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY c/o ALLEN BOONE HUMPHRIES ROBINSON LLP 3200 SOUTHWEST FREEWAY, SUITE 2800 HOUSTON, TX 77027</div></div>					
CITY OF HOUSTON					
HOUSTON PUBLIC WORKS					
NORTHPARK DRIVE					
STA 54+00 TO STA 79+00					
PAVEMENT MARKING					
AND SIGNAGE					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					SHEET No.
					551

MATCHLINE - STA 79+00



LEGEND

- A REFL. MULTIPOLY. PAV. MRK. (DBL)(Y)(6") (SLD) W/ RAIS. PAV. MRKR. TY II-A-A
- B REFL. MULTIPOLY. PAV. MRK. (W)(4") (BRK) W/ RAIS. PAV. MRKR. TY II-C-R AT 40'
- C REFL. MULTIPOLY. PAV. MRK. (W)(6") (SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
- D REFL. MULTIPOLY. PAV. MRK. (Y)(4") (SLD) TY II-A-A AT 20'
- E REFL. MULTIPOLY. PAV. MRK. (W)(4") (SLD) (SLD)
- F REFL. MULTIPOLY. PAV. MRK. (W) (24") (SLD)
- G REFL. MULTIPOLY. PAV. MRK. (W)(12") (SLD)
- H REFL. MULTIPOLY. PAV. MRK. (W)(6") (DOT)
- I REFL. MULTIPOLY. PAV. MRK. (W)(8") (GORE)
- J REFL. MULTIPOLY. PAV. MRK. (W)(8") (SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
- PROPOSED SIGN
 - LEFT TURN LANE ARROW
 - RIGHT TURN LANE ARROW
 - DUAL LEFT TURN & THROUGH LANE ARROW
 - DUAL LEFT & U-TURN LANE ARROW
 - U-TURN ARROW



NO.		REVISIONS		BY	DATE
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:		6	TEXAS	SEE TITLE SHEET	CS
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:		HOU	MONTGOMERY	0912	37
				JOB No.	SHEET No.
				232	552

IMS ENGINEERS

5821 SOUTHWEST FRWY STE. 500
HOUSTON, TEXAS 77057
(713)738-7744
TX FIRM No. 18572

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LH RA

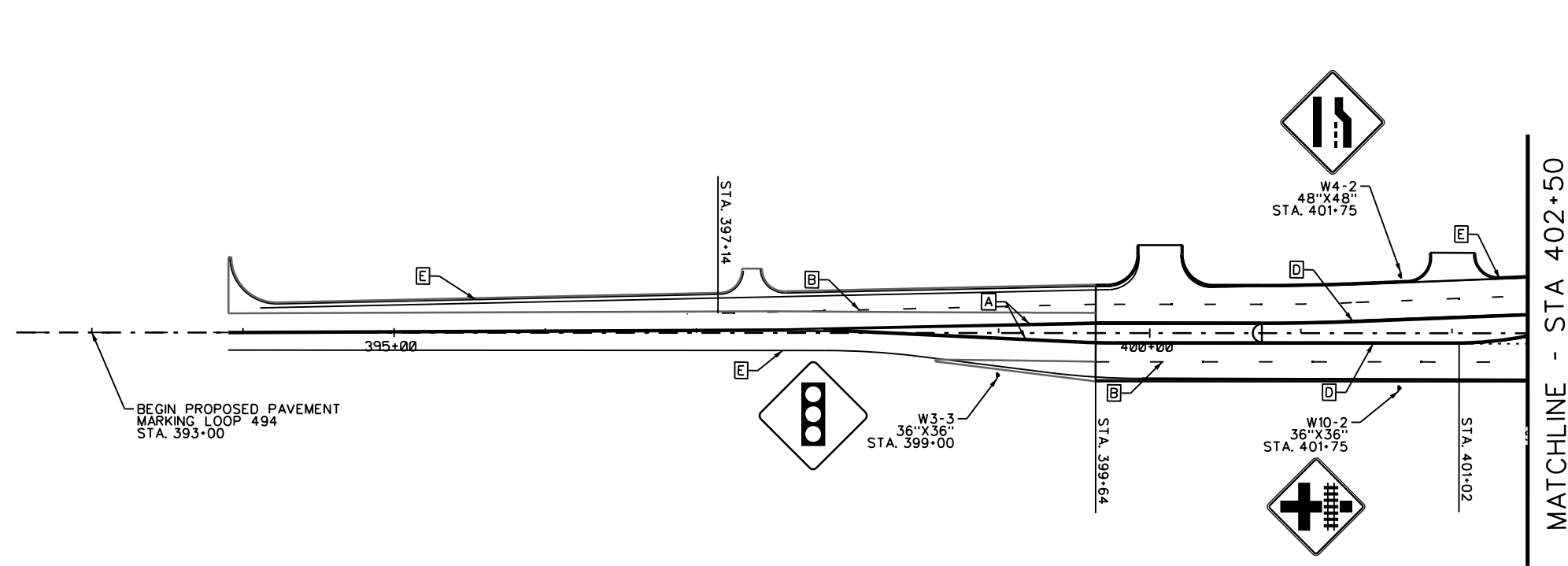
LAKE HOUSTON REDEVELOPMENT AUTHORITY
c/o ALLEN BOONE HUMPHRIES ROBINSON LLP
3200 SOUTHWEST FREEWAY, SUITE 2800
HOUSTON, TX 77027

CITY OF HOUSTON

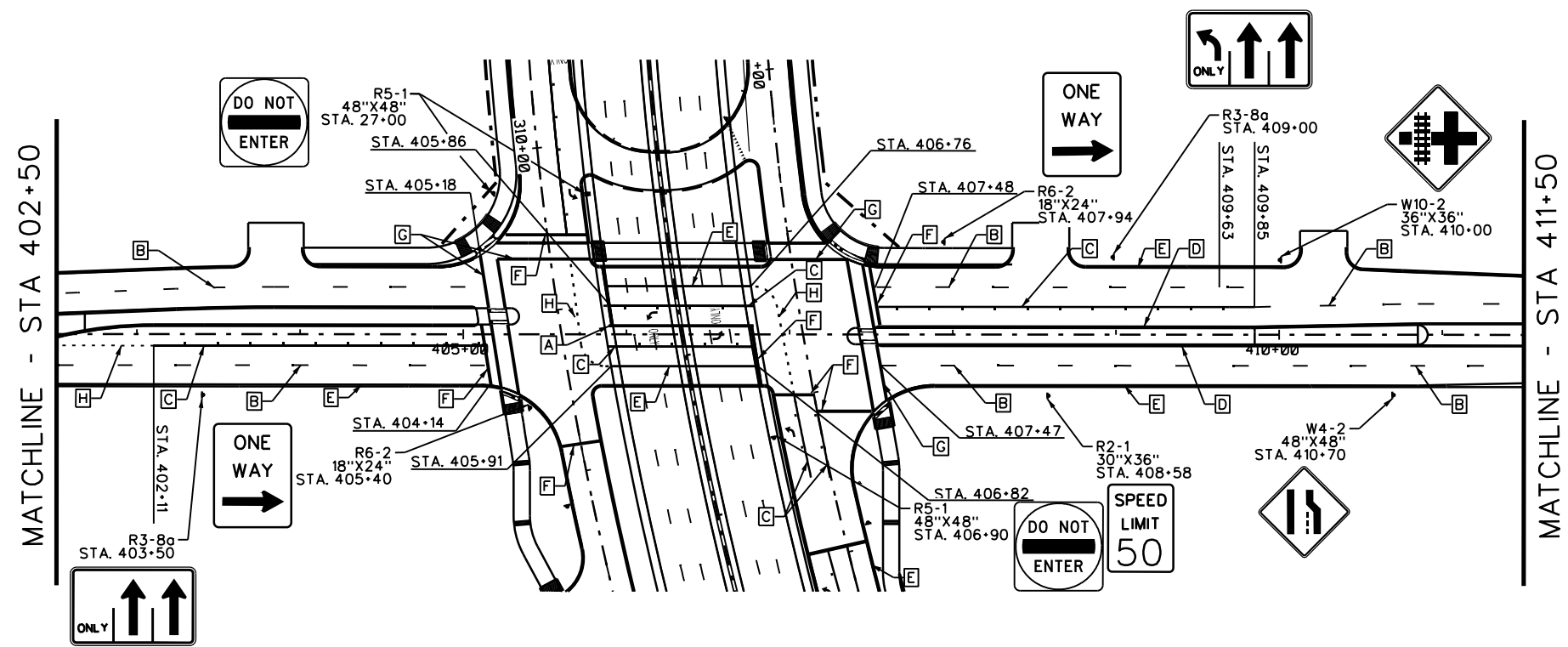
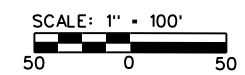
HOUSTON PUBLIC WORKS




NORTH PARK DRIVE

STA 79+00 TO END
PAVEMENT MARKING
AND SIGNAGE

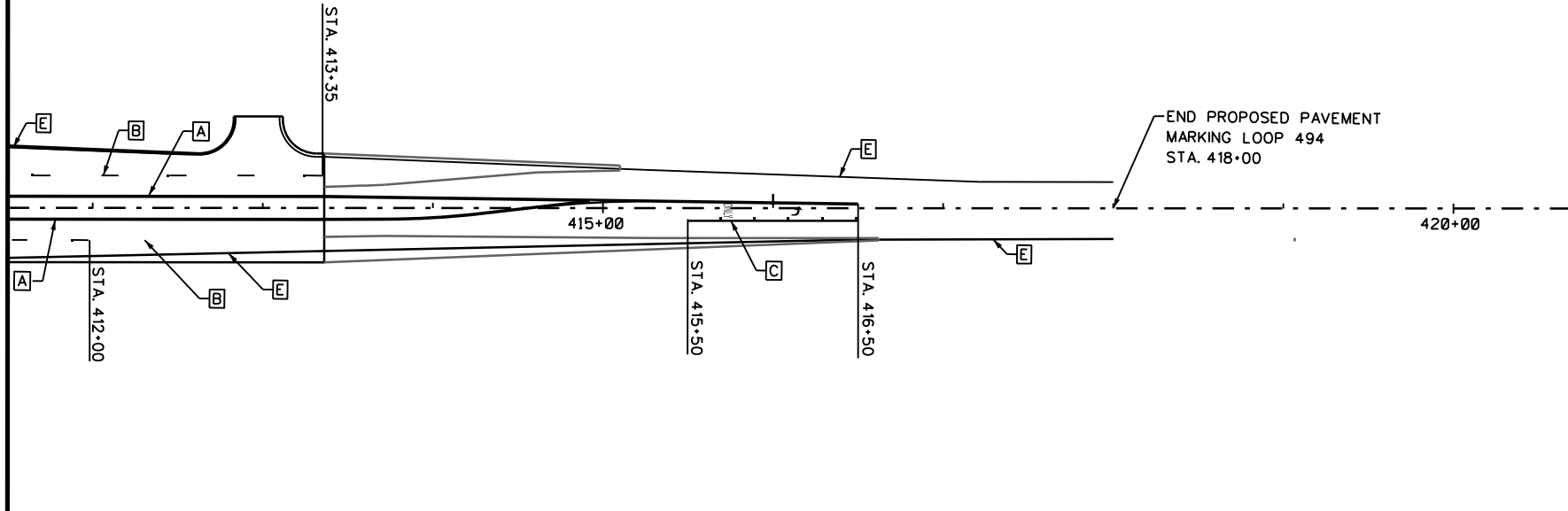


- LEGEND**
- [A] REFL. MULTIPOLY. PAV. MRK. (DBL)(Y)(6") (SLD) W/ RAIS. PAV. MRKR. TY II-A-A
 - [B] REFL. MULTIPOLY. PAV. MRK. (W)(4")(BRK) W/ RAIS. PAV. MRKR. TY II-C-R AT 40'
 - [C] REFL. MULTIPOLY. PAV. MRK. (W)(6")(SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
 - [D] REFL. MULTIPOLY. PAV. MRK. (Y)(4")(SLD) TY II-A-A AT 20'
 - [E] REFL. MULTIPOLY. PAV. MRK. (W)(4")(SLD)
 - [F] REFL. MULTIPOLY. PAV. MRK. (W) (24") (SLD)
 - [G] REFL. MULTIPOLY. PAV. MRK. (W)(12")(SLD)
 - [H] REFL. MULTIPOLY. PAV. MRK. (W)(6")(DOT)
 - [I] REFL. MULTIPOLY. PAV. MRK. (W)(8")(GORE)
 - [J] REFL. MULTIPOLY. PAV. MRK. (W)(8")(SLD) W/ RAIS. PAV. MRKR. TY I-C AT 20'
- PROPOSED SIGN**
- LEFT TURN LANE ARROW
 - RIGHT TURN LANE ARROW
 - DUAL LEFT TURN & THROUGH LANE ARROW
 - DUAL LEFT & U-TURN LANE ARROW
 - U-TURN ARROW



NO.	REVISIONS						BY	DATE	
			5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713)739-7744 TX FIRM No. 18572						
			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
			LAKE HOUSTON REDEVELOPMENT AUTHORITY c/o ALLEN BOONE HUMPHRIES ROBINSON LLP 3200 SOUTHWEST FREEWAY, SUITE 2600 HOUSTON, TX 77027						
<div>CITY OF HOUSTON</div> <div>HOUSTON PUBLIC WORKS</div> <div>NORTHPARK DRIVE</div> <div>LOOP 494</div> <div>BEGINNING TO 412+50</div> <div>PAVEMENT MARKING</div> <div>AND SIGNAGE</div>									
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.		
CHECKED:	6	TEXAS	SEE TITLE SHEET				CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	553			

MATCHLINE - STA 411+50



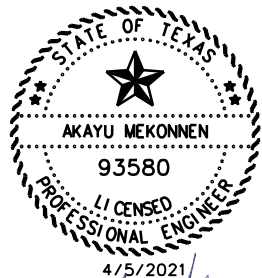
END PROPOSED PAVEMENT
MARKING LOOP 494
STA. 418+00

LEGEND

- [A] REFL. MULTIPOLY. PAV. MRK. (DBL)(Y)(6")
(SLD) W/ RAIS. PAV. MRKR. TY II-A-A
- [B] REFL. MULTIPOLY. PAV. MRK. (W)(4") (BRK)
W/ RAIS. PAV. MRKR. TY II-C-R AT 40'
- [C] REFL. MULTIPOLY. PAV. MRK. (W)(6") (SLD)
W/ RAIS. PAV. MRKR. TY I-C AT 20'
- [D] REFL. MULTIPOLY. PAV. MRK. (Y)(4") (SLD)
TY II-A-A AT 20'
- [E] REFL. MULTIPOLY. PAV. MRK. (W)(4") (SLD)
(SLD)
- [F] REFL. MULTIPOLY. PAV. MRK. (W) (24")
(SLD)
- [G] REFL. MULTIPOLY. PAV. MRK. (W)(12") (SLD)
- [H] REFL. MULTIPOLY. PAV. MRK. (W)(6") (DOT)
- [I] REFL. MULTIPOLY. PAV. MRK. (W)(8") (GORE)
- [J] REFL. MULTIPOLY. PAV. MRK. (W)(8") (SLD)
W/ RAIS. PAV. MRKR. TY I-C AT 20'

- PROPOSED SIGN
- ↶ LEFT TURN LANE ARROW
- ↷ RIGHT TURN LANE ARROW
- ↶↷ DUAL LEFT TURN & THROUGH
LANE ARROW
- ↶↷ DUAL LEFT & U-TURN LANE ARROW
- ↶ U-TURN ARROW

SCALE: 1" = 100'



NO.	REVISIONS	BY	DATE
IMS ENGINEERS 5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572			
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LHA LAKE HOUSTON REDEVELOPMENT AUTHORITY c/o ALLEN BOONE HUMPHRIES ROBINSON LLP 3200 SOUTHWEST FREEWAY, SUITE 2600 HOUSTON, TX 77027			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE LOOP 494 STA 412+00 TO END PAVEMENT MARKING AND SIGNAGE			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
			JOB No. 232
			SHEET No. 554

GENERAL PAVEMENT MARKING NOTES:

1. PRIOR TO START OF CONSTRUCTION, ALL EXISTING PAVEMENT MARKINGS WITHIN THE AREA OF CONSTRUCTION SHALL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING ALL EXISTING PAVEMENT MARKINGS AND LANE CONFIGURATIONS WILL BE DUPLICATED AGAIN. THIS REVIEW CAN BE DONE IN CONJUNCTION WITH SIGN INVENTORY. THE CONTRACTOR IS HELD ACCOUNTABLE FOR EXISTING AND TEMPORARY CONSTRUCTION PAVEMENT MARKINGS THROUGHOUT THE PROJECT AND AT THE PROJECT'S COMPLETION.
2. ALL PAVEMENT MARKINGS SHALL CONFORM TO CITY OF HOUSTON STANDARDS AND SPECIFICATIONS AND GENERAL GUIDELINES OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. THE PERMANENT PAVEMENT MARKINGS MAY BE MODIFIED AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
4. THE DESIGN SPEED FOR THE ROAD IS: _____. THE POSTED SPEED LIMIT IS: _____.
5. ALL LANE DIMENSIONS ARE FROM CENTER OF LANE LINE, CENTER OF DOUBLE LANE LINE, FACE OF CURB, OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
6. THE PAVEMENT MARKING DRAWINGS ARE SCHEMATIC ONLY. THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, DETAILS, AND STANDARDS WHEN INSTALLING PAVEMENT MARKINGS AND SYMBOLS.
7. THE FINAL LONGITUDINAL STRIPINGS SHALL BE 60 MIL (0.060") THICK HOT-SPRAYED THERMOPLASTIC PLACED OVER THE TEMPORARY STRIPING WITHIN 14 TO 30 CALENDAR DAYS AFTER COMPLETION OF THE FINAL PAVEMENT SURFACE, OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER. ALL OTHER PAVEMENT MARKINGS SHALL BE APPLIED AT THE SAME TIME. TEMPORARY STRIPING SHALL BE WATER BASED PAINT.
8. ALL FINAL TRANSVERSE MARKINGS SHALL BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. ALL PAVEMENT ARROWS AND LEGENDS SHALL ALSO BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. PREFORMED THERMOPLASTIC APPLICATIONS MAY BE USED IF ONLY APPROVED BY THE CITY TRAFFIC ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT AND INSTALLATION OF PAVEMENT MARKINGS OF FINAL SURFACE COURSE FOLLOWING CONTROL POINTS THAT HAVE BEEN SET NO MORE THAN 50 FEET APART ALONG THE LINES TO BE IMPLEMENTED. IN TANGENT SECTIONS OF A ROAD WHERE THE PAVEMENT MARKING PATTERN DOES NOT CHANGE, CONTROL POINTS CAN BE SET AT 200 FEET SPACING. THE LAYOUT AND INSPECTION OF ALL PAVEMENT MARKINGS SHALL BE APPROVED BY CITY OF HOUSTON REPRESENTATIVE PRIOR TO THE APPLICATION OF MATERIALS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE FINAL SURFACE COURSE IS PLACED SO THAT THE STRIPING IS OFFSET NO MORE THAN ONE FOOT CLEAR OF THE CONSTRUCTION JOINT, UNLESS OTHERWISE DIRECTED BY THE CITY TRAFFIC ENGINEER.
11. ALL RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED SO THAT THE REFLECTIVE FACE OF EACH MARKER IS FACING THE DIRECTION OF TRAFFIC AND IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW. TYPE C PAVEMENT MARKERS SHALL BE INSTALLED SO THAT THE CLEAR FACE OF EACH MARKER IS FACING THE APPROACHING TRAFFIC FLOW AND PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.
12. ALL REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED IN ACCORDANCE TO CITY OF HOUSTON STANDARD SPECIFICATION 02762. APPLYING OVER EXISTING PAVEMENT MARKINGS DOES NOT CONSTITUTE AS APPROVED OBLITERATION METHOD.
13. THE ENGINEER OF RECORD SHALL BE REQUIRED TO PRODUCE AS-BUILT OF PAVEMENT MARKING PLANS WITHIN 30 DAYS AFTER COMPLETION OF PAVEMENT MARKING IMPLEMENTATION.
14. BLUE RPMS MAY BE PLACED ADJACENT TO FIRE HYDRANTS WITH THE APPROVAL OF THE CITY TRAFFIC ENGINEER.
15. FOR ALL CONSTRUCTION, ALL PAVEMENT MARKINGS AND SIGNING SHALL BE INSTALLED AND SHALL BE PAID BY THE PROJECT OWNER/DEVELOPER.
16. FINAL INSPECTION AND ACCEPTANCE OF PAVEMENT MARKINGS SHALL BE PERFORMED BY TRANSPORTATION & DRAINAGE OPERATION REPRESENTATIVE (713-803-3054).

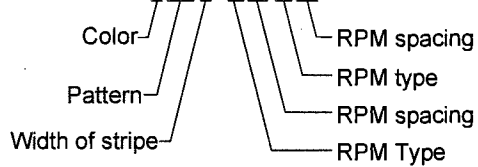
Description and Application of Pavement Marking Lines

Line Series	Color	Description	Width Inches	Typical Applications
WB	White	Broken (10' stripe w/ 30' gap)	4"	- Lane lines between travel lanes in the same direction where changing of lanes is permitted.
WS	White	Solid	4"	- Edge lines to delineate the right edge of the roadway.
			6"	- Left edge of bicycle lane and lane lines between travel lanes in the same direction where changing of lanes is discouraged.
			12"	- Perpendicular crosswalk lines.
			24"	- Stop bars at intersections (signalized and unsignalized).
			12", 24"	- Hatching at high visibility crosswalks.
WG	White	Guide (2' stripe w/6' gap)	6"	- Guide lines through intersections. - Taper lines for turn lanes. - Guide lines for bicycle lanes.
YS	Yellow	Solid	4"	- Edge lines to delineate the left edge of a divided roadway, a one-way road, or ramp.
			12", 24"	- Diagonal hatching used in gores between opposing direction of travel lanes.
YDS	Yellow	Double Solid	4" - (4") - 4" (gap)	- Centerline that separates opposing travel lanes and delineation of median islands.
YDB	Yellow	Double Broken	4" - (4") - 4" (gap)	- Defines the edges of center reversible lanes that are used as TWLTLs during intermittent periods.
YB	Yellow	Broken (10' stripe w/ 30' gap)	4"	- Separates travel lanes in opposite directions where passing is permitted in both directions of travel.
YB (BIKE)	Yellow	Broken (3' stripe w/ 9' gap)	4"	- Separates bicycle travel lanes in opposite directions where passing is permitted in both directions of travel.
YSB	Yellow	Solid & Broken Broken (10' stripe w/ 30' gap)	4" - (4") - 4" (gap)	- Separates travel lanes in opposite directions where passing is permitted in one direction and prohibited in the opposite direction. - Used for edge of two-way left-turn lanes (TWLTL).
BICYCLE GREEN	Green	Solid Colored Pavement	Varies	- Ped/Bike crossing - Vehicle / Bike/ Conflict Area
YIELD LINE	White	Triangle	16" x 24"	- Mid-Block crossing.

Description and Application of Reflective Raised Pavement Markers (RPM)

RRPM Types	Color	COH Spec. Sec. 02764 Equivalent	Description
C	Clear	Type I-C	- Approach face that reflects white light, and the other side does not reflect.
R	Clear & Red	Type II-C-R	- Approach face that reflects white light, and the other side reflects red light.
A	Amber & Amber	Type II-A-A	- Approach face and the other side both reflect amber light.

Line Style Designation : YSB4 - A40/A40



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

GENERAL NOTES
AND LEGENDS

(NOT TO SCALE)

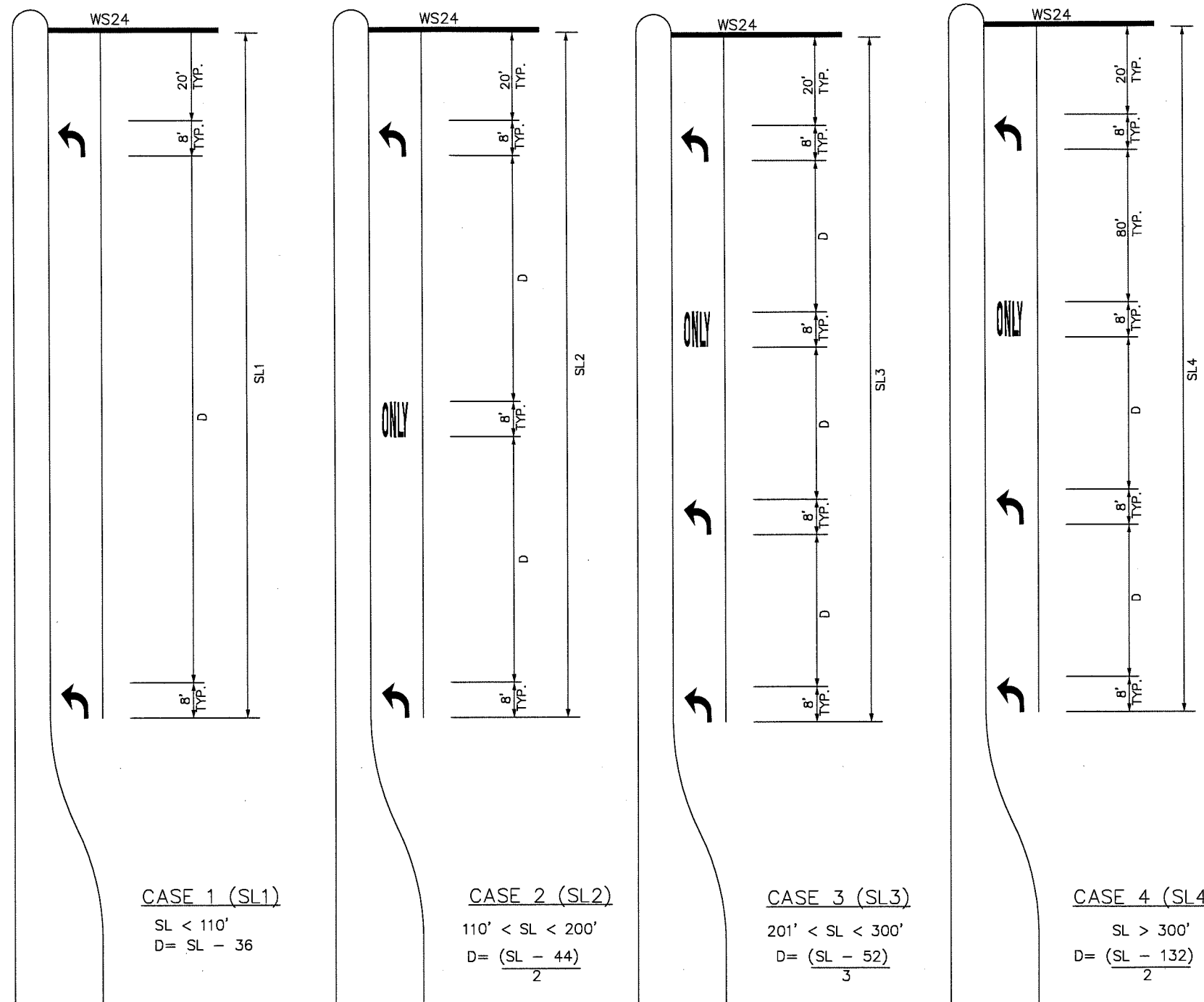
[Signature]
CITY TRAFFIC ENGINEER
[Signature]
CITY ENGINEER

[Signature]
DIRECTOR OF
HOUSTON PUBLIC WORKS

555

EFF DATE: JUL-01-2018

DWG NO: 01510-01



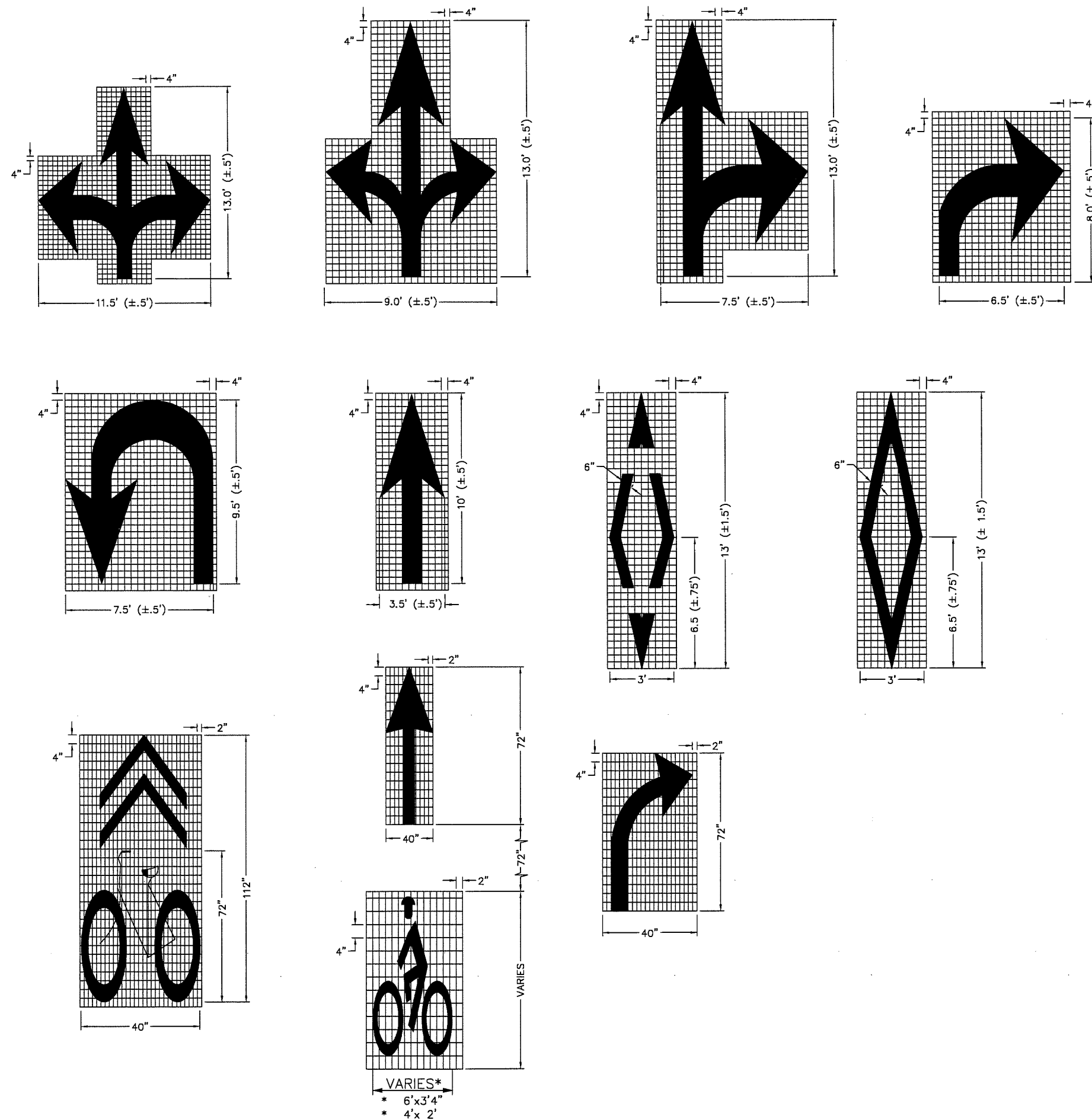
KEY (FOR TURN LANES ONLY):
 SL - STORAGE LENGTH (FEET)
 D - DISTANCE BETWEEN ARROWS AND/OR WORDS (FEET)

- GENERAL NOTES:
1. ALL CASES AND DETAILS ALSO APPLY TO RIGHT-TURN LANES.
 2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
 3. SL DIMENSION IS FROM BACK OF STOP LINE TO END OF TURN LANE.
NOTE: DO NOT INCLUDE TAPER LENGTH.
 4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT ALL SIGNALIZED INTERSECTIONS AND AT ALL UNSIGNALIZED INTERSECTIONS THAT HAVE TURN LANES.
 5. MINIMUM SL= 100'. SL MAY BE LESS THAN 100 FEET ONLY BY APPROVAL OF THE CITY TRAFFIC ENGINEER.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
LEFT/RIGHT-TURN "ONLY" AND ARROW SPACING (NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-02



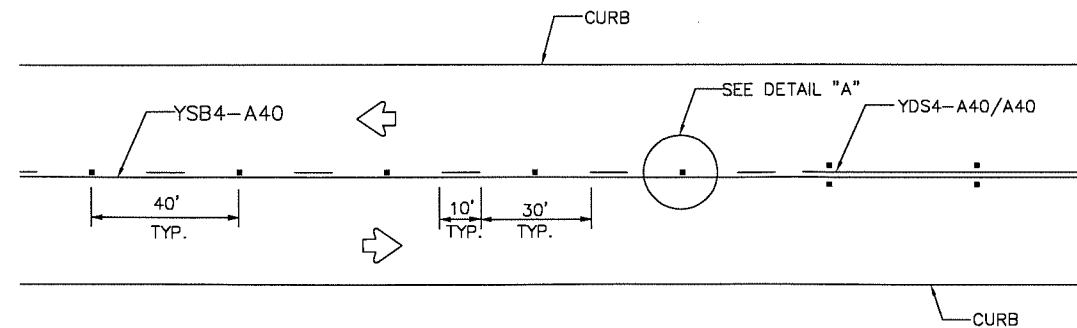
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD PAVEMENT MARKING — (WORDS)	
(NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-03



- NOTES FOR PAVEMENT MARKINGS "SYMBOLS" AND "ARROWS":
1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.
 2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS. SPECIAL PERMISSION NEEDED BY CITY TRAFFIC ENGINEER FOR REDUCTION BELOW ONE-THIRD OF STANDARD SIZES.
 3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET, OR AS INDICATED ON THE PLANS.
 4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:
 - A. REGULATORY
 - STOP
 - RIGHT (LEFT) TURN ONLY, SYMBOL ARROWS.
 - B. WARNING
 - STOP AHEAD
 - SIGNAL AHEAD
 - SCHOOL
 - SCHOOL X-ING
 - PED X-ING
 - R X R (SEE SHEET 01510-08 DETAILS)
 5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.
 6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES (ALL-WAY STOP).
 7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
 8. SPACING BETWEEN STANDARD SIZE LETTERS SHOULD BE 4 INCHES (MIN). THE WIDTH OF NON-STANDARD SIZE LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES. APPROVAL BY CITY TRAFFIC ENGINEER. SPECIAL PERMISSION NEEDED FOR NON-STANDARD SIZE "LETTER" AND/OR "ARROWS".
 9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. SINGLE TURN ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".
 10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED IN THE DESIGN PLANS.

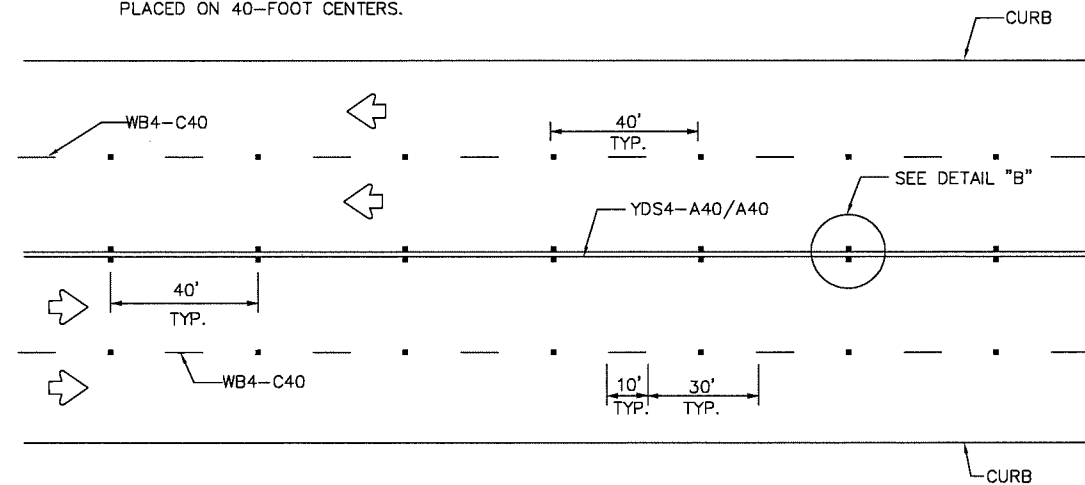
CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD PAVEMENT MARKING - SYMBOLS (NOT TO SCALE)	
 CITY TRAFFIC ENGINEER CITY ENGINEER	 DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01510-04

CENTERLINE & FOR ALL TWO LANE STREETS WITH PASSING ZONE

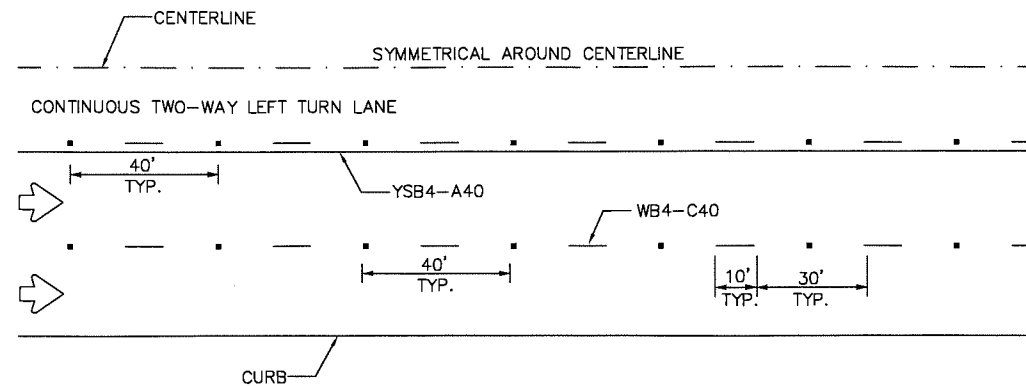


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY STREETS

RRPM TYPE C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.

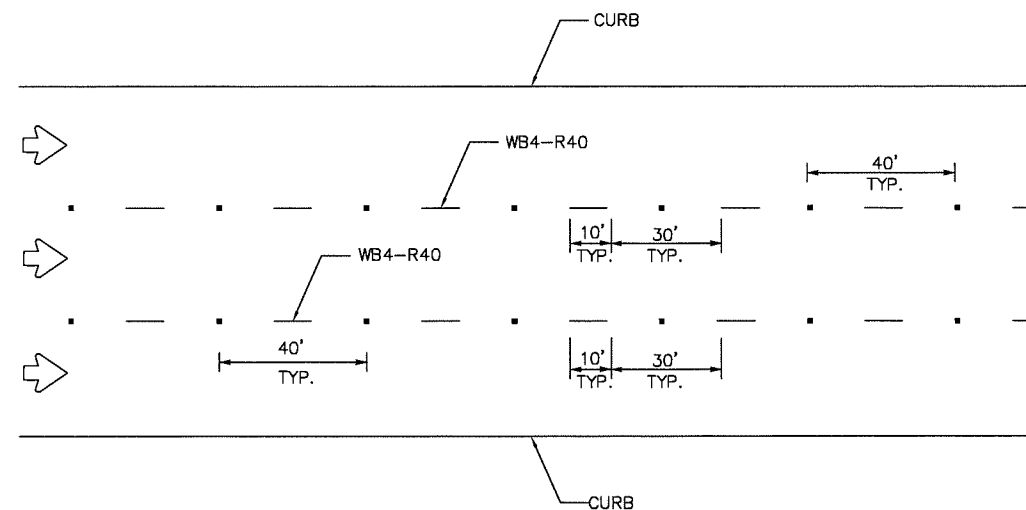


CENTERLINE & LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY MULTILANE STREET

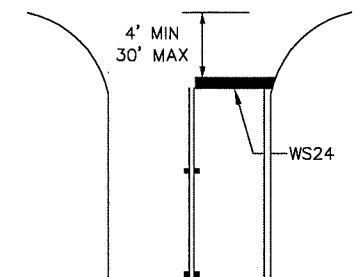
RRPM TYPE R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.



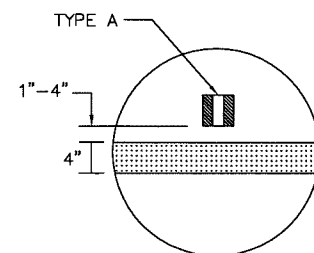
GENERAL NOTES:

1. EDGE LINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGE LINE TO INSIDE OF EDGE LINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF HOUSTON STANDARD SPECIFICATIONS.

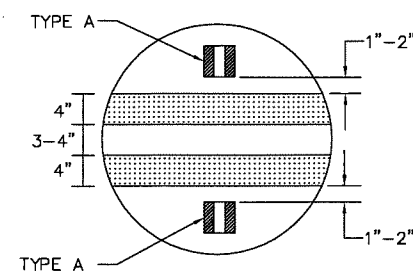
GUIDE FOR PLACEMENT OF STOP LINES & CENTERLINE



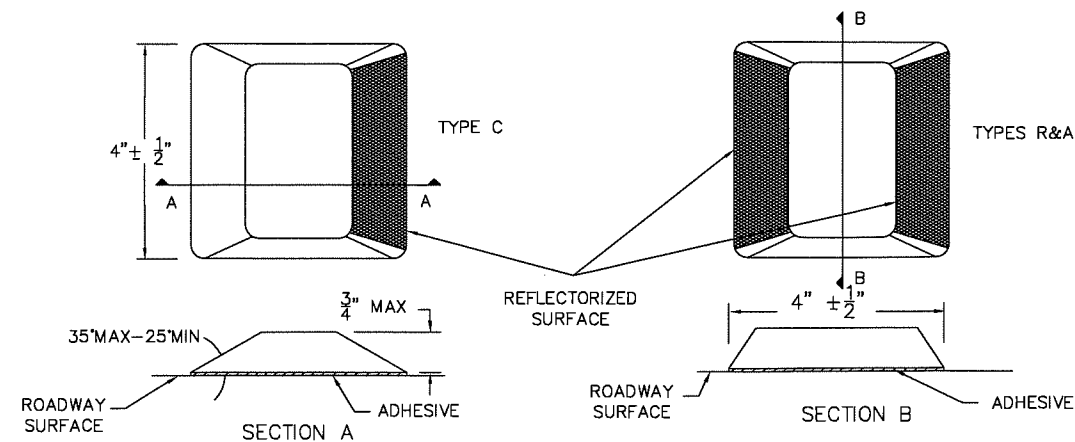
DETAIL "A"



DETAIL "B"



REFLECTIVE RAISED PAVEMENT MARKERS



CITY OF HOUSTON HOUSTON PUBLIC WORKS

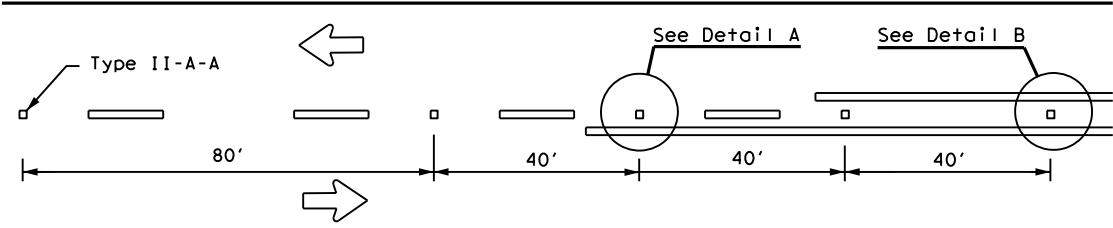
STANDARD PAVEMENT MARKINGS WITH
REFLECTIVE RAISED PAVEMENT MARKERS
FOR POSITION GUIDANCE
(NOT TO SCALE)

John T. Myer
CITY TRAFFIC ENGINEER
CITY ENGINEER

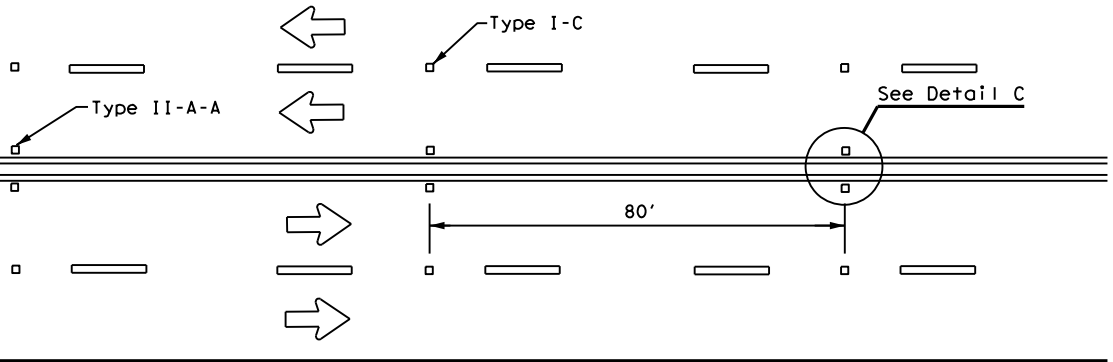
Carol Haddad
DIRECTOR OF
HOUSTON PUBLIC WORKS

REFLECTIVE RAISED PAVEMENT MARKERS
FOR VEHICLE POSITIONING GUIDANCE

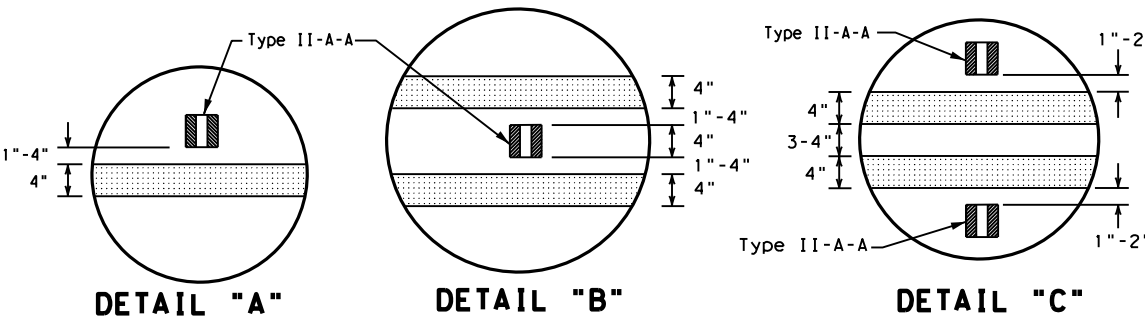
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



CENTERLINE FOR ALL TWO LANE ROADWAYS



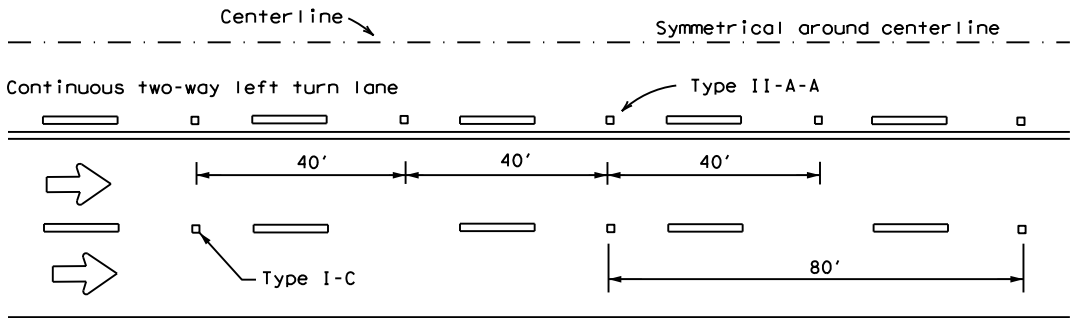
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS



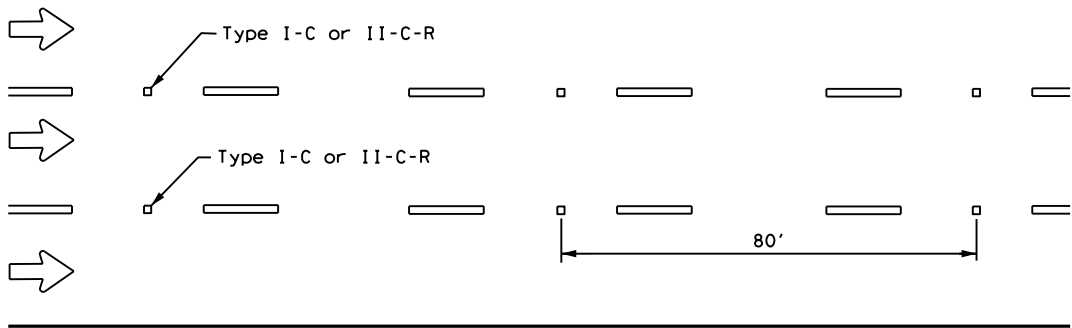
DETAIL "A"

DETAIL "B"

DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

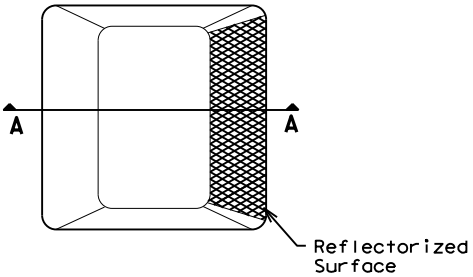


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

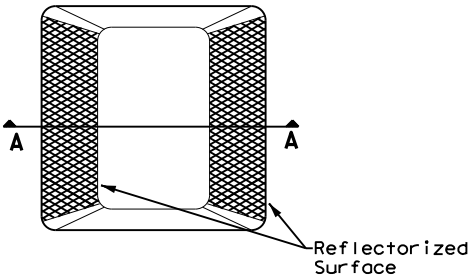
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

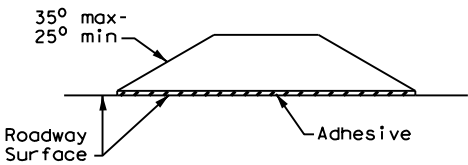
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

GENERAL NOTES

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

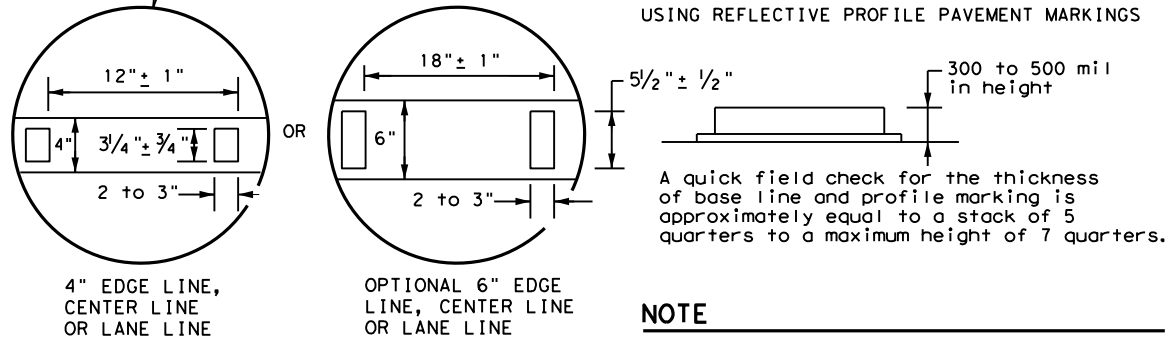


POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10	REVISIONS			
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20				

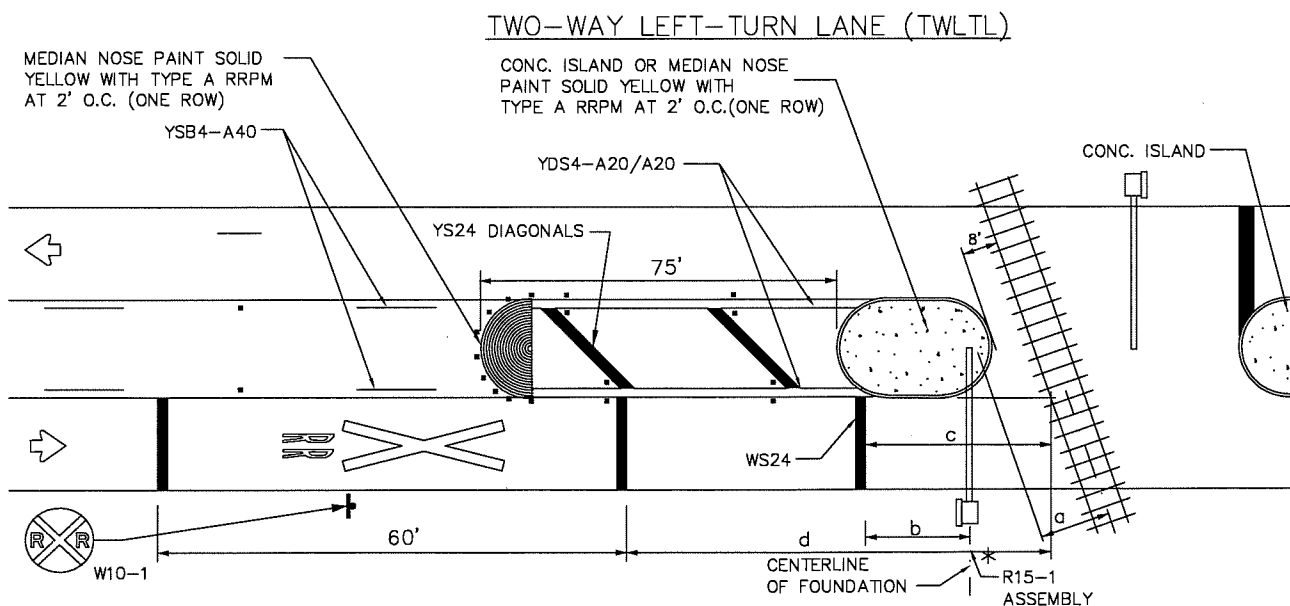
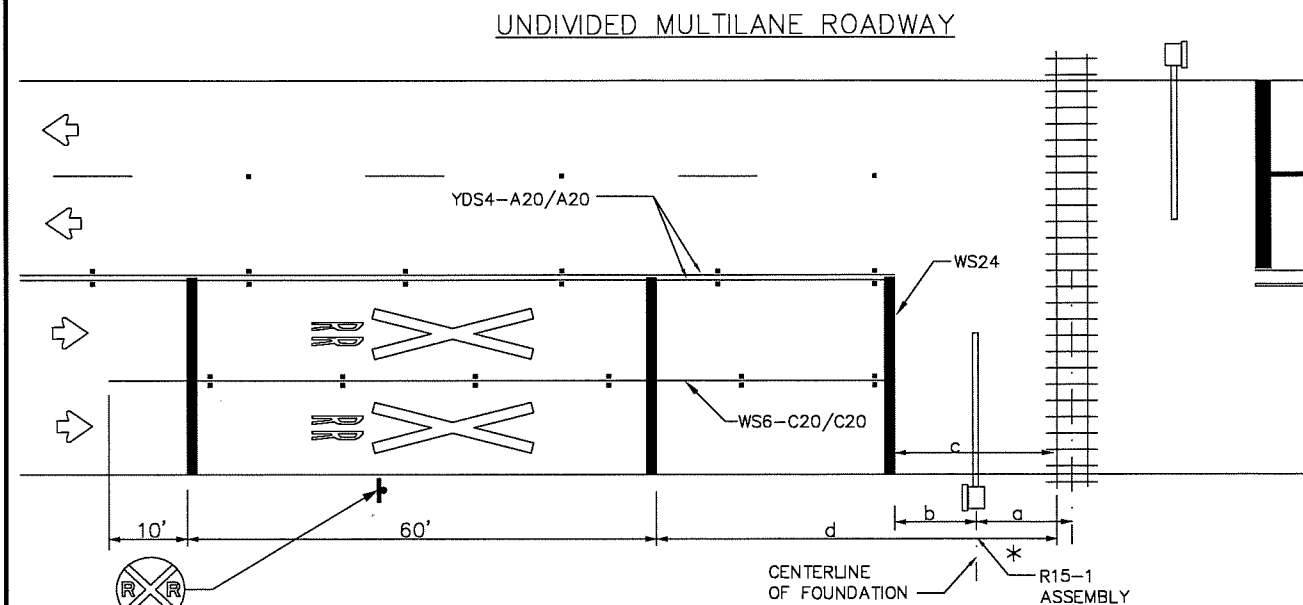
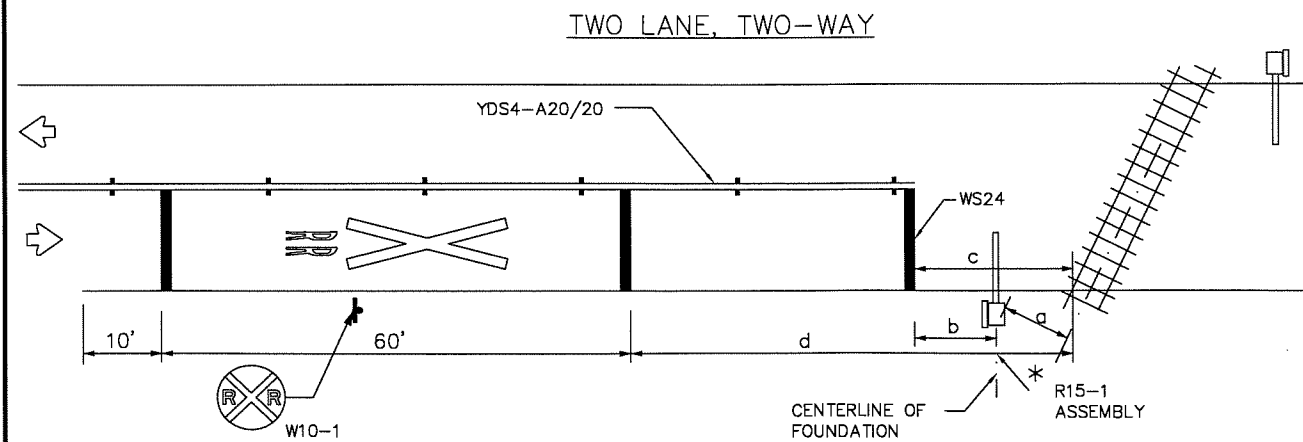
REFLECTORIZED PROFILE
PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.



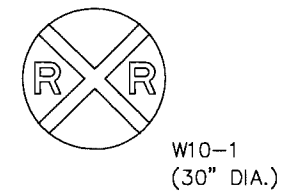
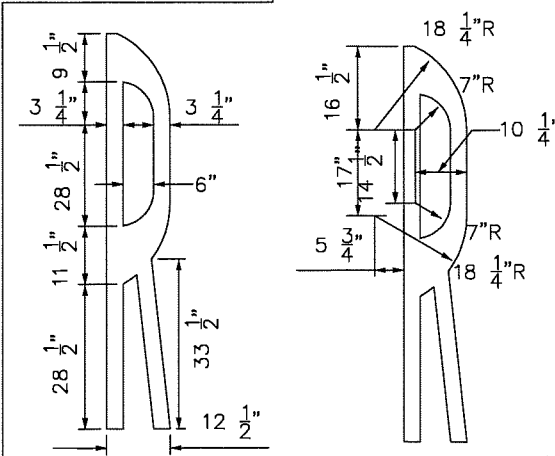
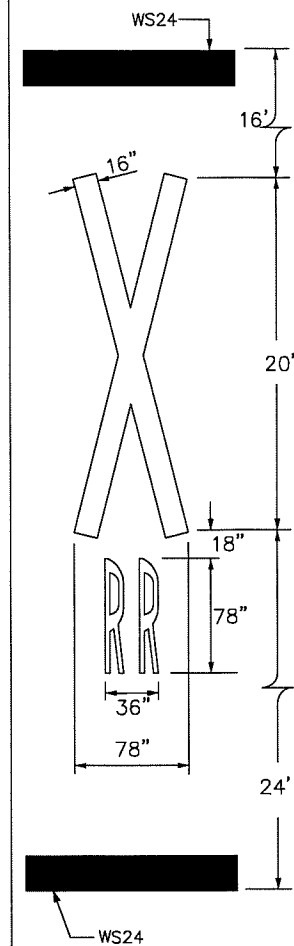
a = 12 FEET MINIMUM, 15 FEET USUAL, IF ACTIVE WARNING DEVICES ARE PRESENT. DISTANCE "a" SHOULD BE MEASURED FROM THE CENTERLINE OF * R15-1 ASSEMBLY TO THE CENTERLINE OF NEAREST TRACK.

b = STOP LINES SHOULD BE APPROXIMATELY 8 FEET IN ADVANCE OF ACTIVE WARNING DEVICES (TYPE A, E OR F). STOP LINE SHOULD BE APPROXIMATELY 15 FEET FROM NEAR RAIL IF ONLY PASSIVE DEVICES (R15-1, PLUS R15-2 WHEN APPLICABLE) ARE PRESENT.

c = 15 FEET DESIRABLE MINIMUM IF NO GATE OR SIGNAL IS PRESENT. R15-1 SHOULD BE PLACED BETWEEN STOP LINE AND RAILS WITH ADEQUATE DISTANCE PROVIDED FOR "a".

APPROACH SPEED (MPH)	DESIRABLE PLACEMENT (FEET)
20	145
25	220
30	295
35	370
40	445
45	520
50	595
55	670
60	745
65	820
70	900

* LOCAL CONDITIONS MAY REQUIRE ALTERNATE PLACEMENT LOCATIONS.



SIGN W10-1 TO BE PLACED AS SHOWN IN TYPICAL DETAILS WHEN PAVEMENT MARKINGS ARE INSTALLED.

* R15-1 ASSEMBLY MAY CONSIST OF ONE OR MORE OF THE FOLLOWING:

- R15-1 CROSSBUCK SIGN
- R15-2 MULTIPLE TRACK SIGN
- TYPE A MAST FLASHERS
- TYPE E CANTILEVERS
- TYPE F GATES

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RAILROAD CROSSING PAVEMENT
MARKINGS DETAILS
(NOT TO SCALE)

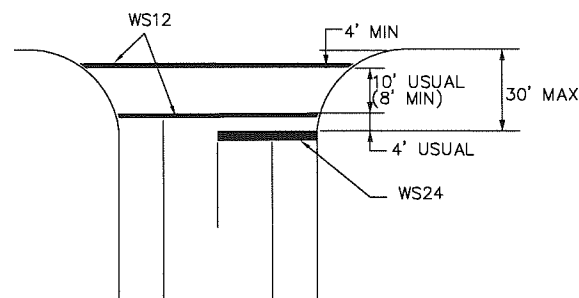
CITY TRAFFIC ENGINEER
CITY ENGINEER

DIRECTOR OF
HOUSTON PUBLIC WORKS

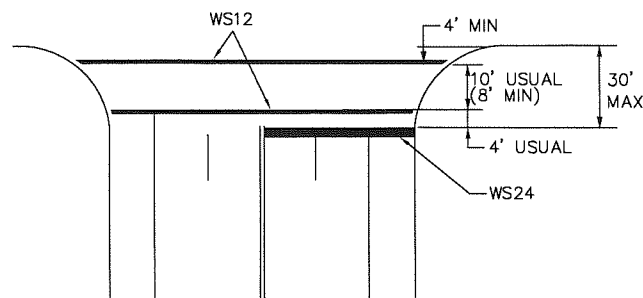
EFF DATE: JUL-01-2018

DWG NO: 01510-08

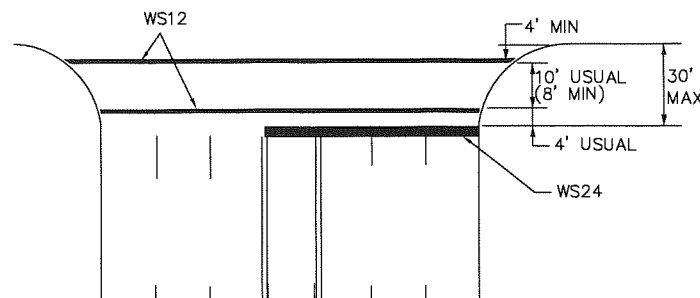
TWO LANES WITH SHOULDERS



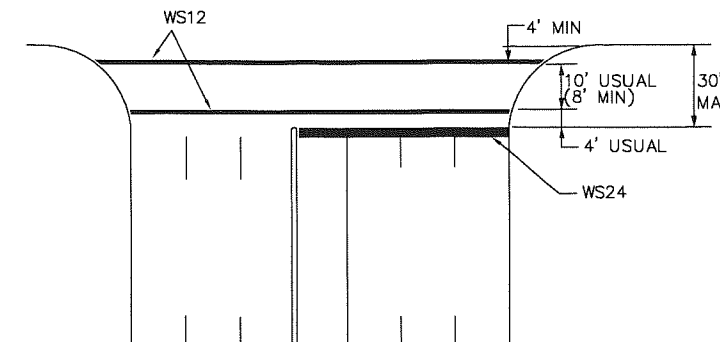
FOUR LANES WITH SHOULDERS



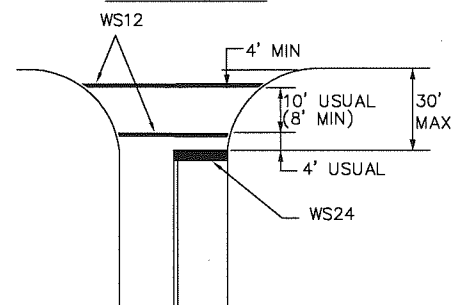
MULTI - LANES



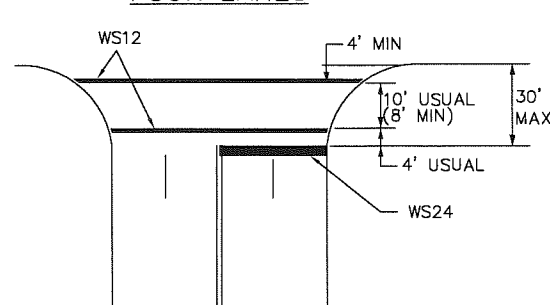
MULTI - LANE WITH MEDIAN



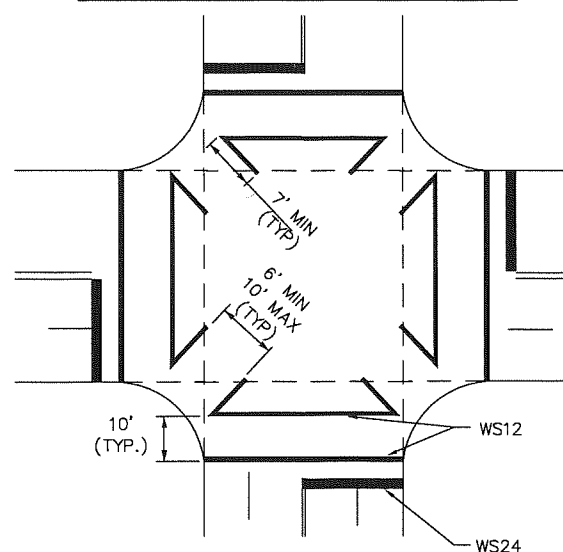
TWO LANES



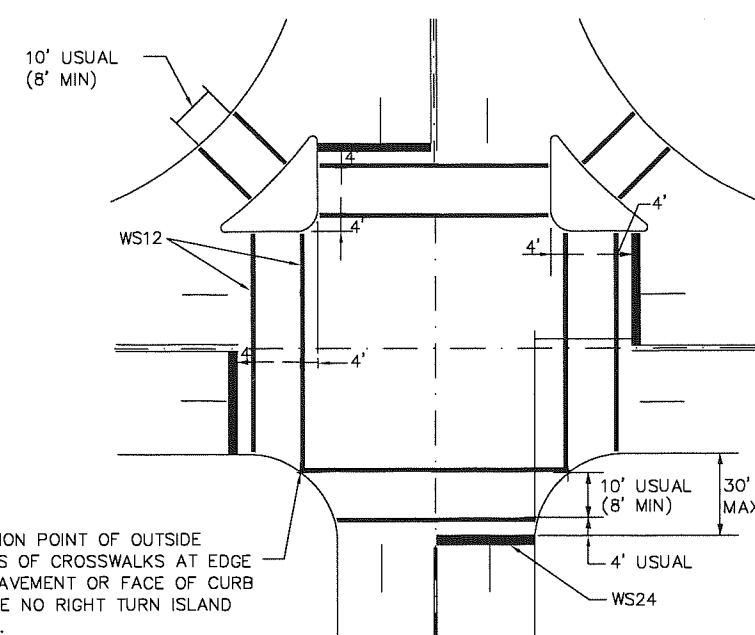
FOUR LANES



EXCLUSIVE PEDESTRIAN PHASE

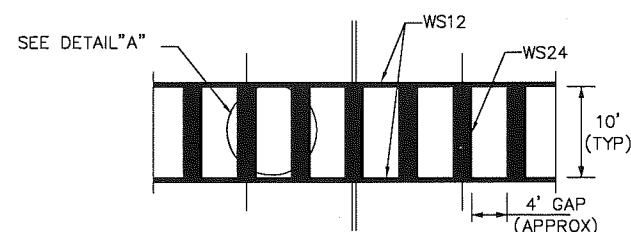


INTERSECTION WITH RIGHT - TURN ISLANDS



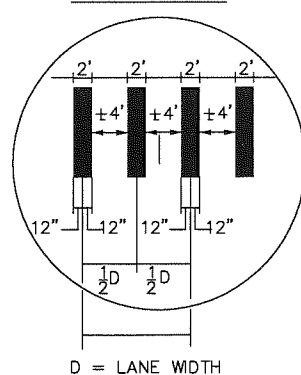
COMMON POINT OF OUTSIDE EDGES OF CROSSWALKS AT EDGE OF PAVEMENT OR FACE OF CURB WHERE NO RIGHT TURN ISLAND EXIST.

HIGH VISIBILITY CROSSWALK DETAIL



TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED CROSSINGS ON COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.

DETAIL "A"



D = LANE WIDTH

NOTES:

- CROSSWALKS AND STOP LINES SHALL BE WHITE.
- "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

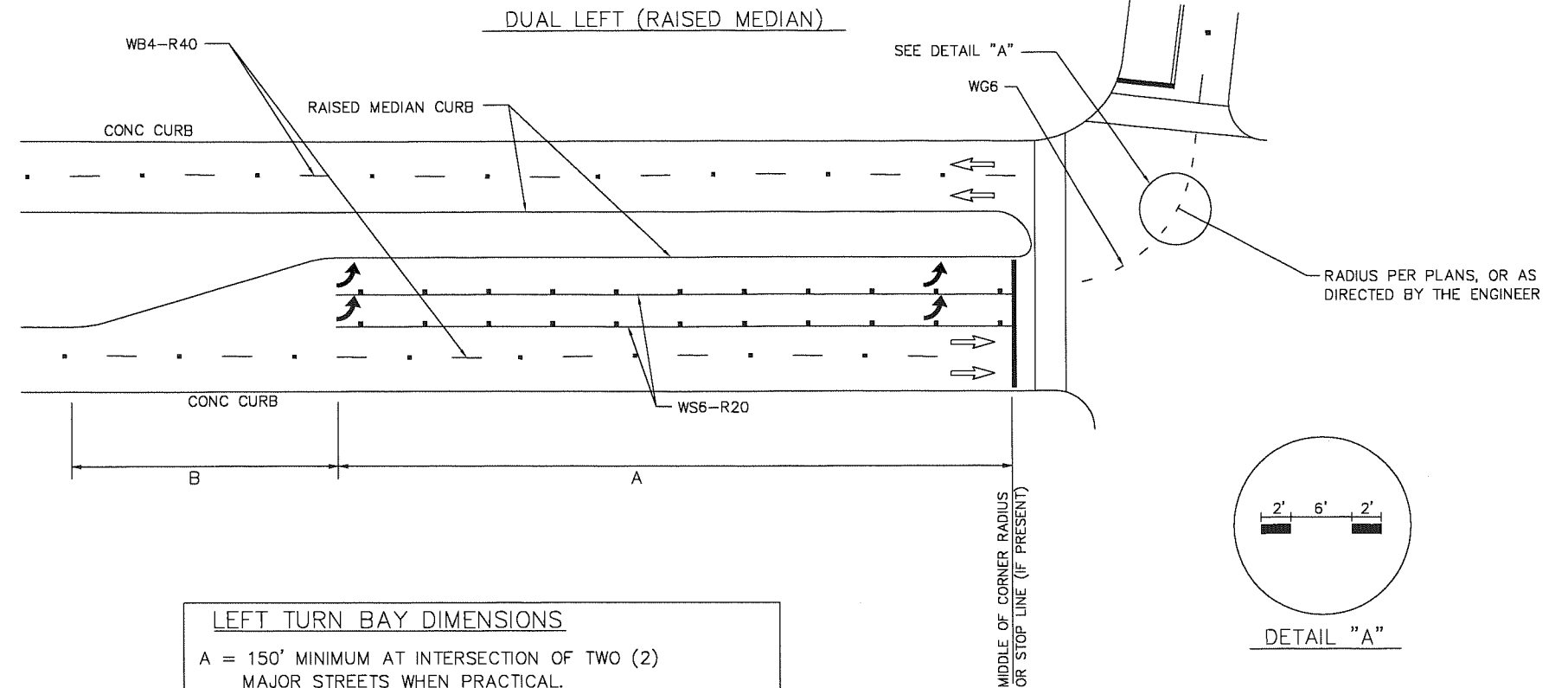
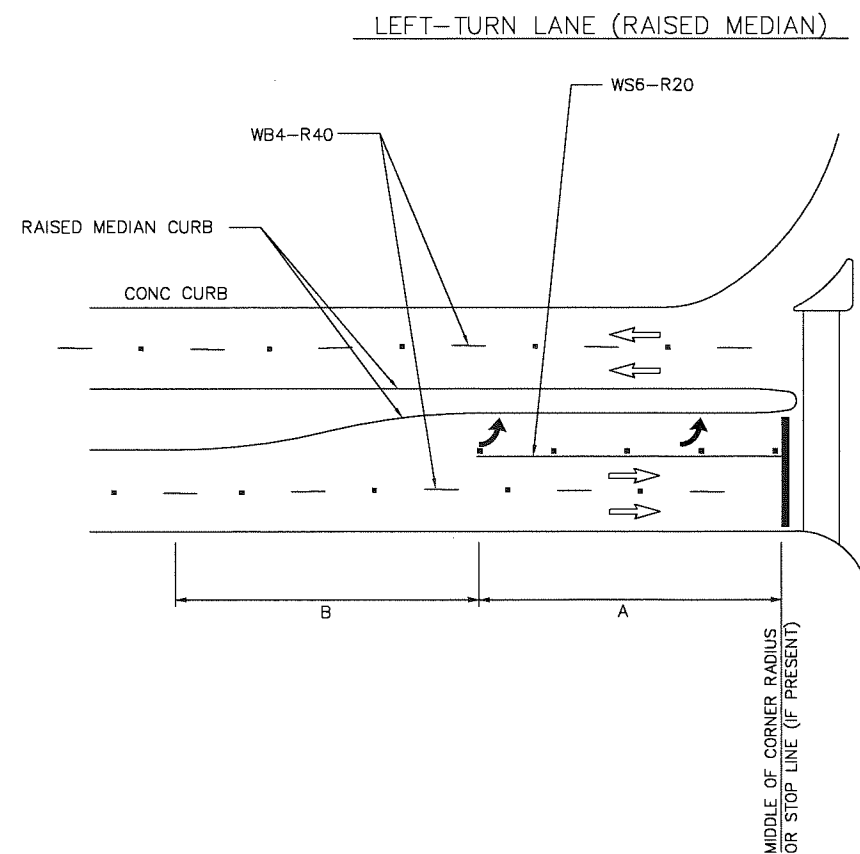
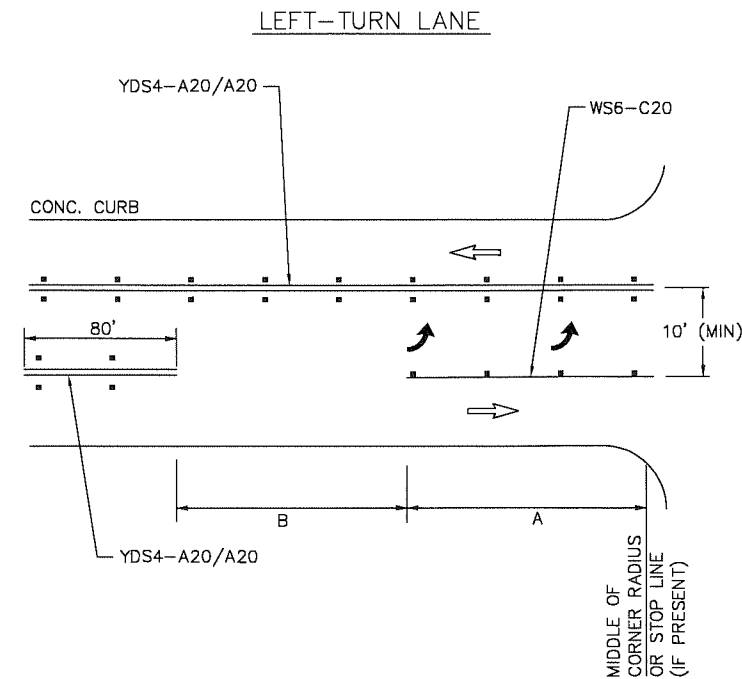
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

TYPICAL CROSSWALK
DETAILS

(NOT TO SCALE)

[Signature]
CITY TRAFFIC ENGINEER
[Signature]
CITY ENGINEER

[Signature]
DIRECTOR OF
HOUSTON PUBLIC WORKS



LEFT TURN BAY DIMENSIONS

A = 150' MINIMUM AT INTERSECTION OF TWO (2) MAJOR STREETS WHEN PRACTICAL.
= 100' MINIMUM AT ALL OTHER INTERSECTIONS.

B = 100' MINIMUM ON STRAIGHT ROADWAYS.
*TAPER LENGTH MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT.
*TAPER LENGTH MAY BE LONGER IF CURVE IS TO THE RIGHT.

NOTE:
1. DIMENSIONS SHALL BE ADJUSTED AS DETERMINED BY CITY OF HOUSTON TRAFFIC ENGINEER.
2. REFER TO CITY OF HOUSTON DESIGN MANUAL (DWG No. 10.06-07) FOR DETAILS.

NOTES:

1. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
2. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS.
3. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
4. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
5. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LEFT-TURN LANE & RIGHT-TURN LANE
DESIGN WORKSHEET 1

(NOT TO SCALE)

[Signature]
CITY TRAFFIC ENGINEER
CITY ENGINEER

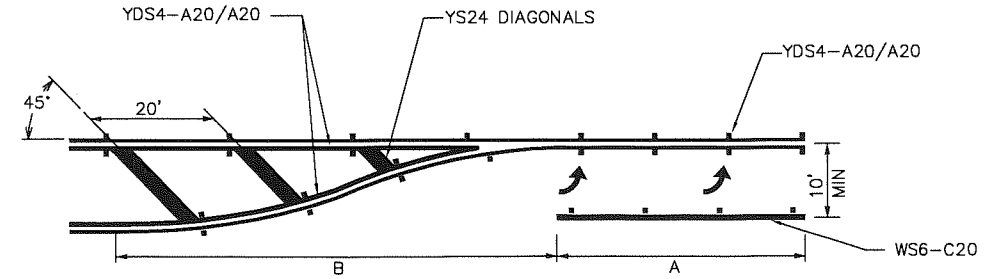
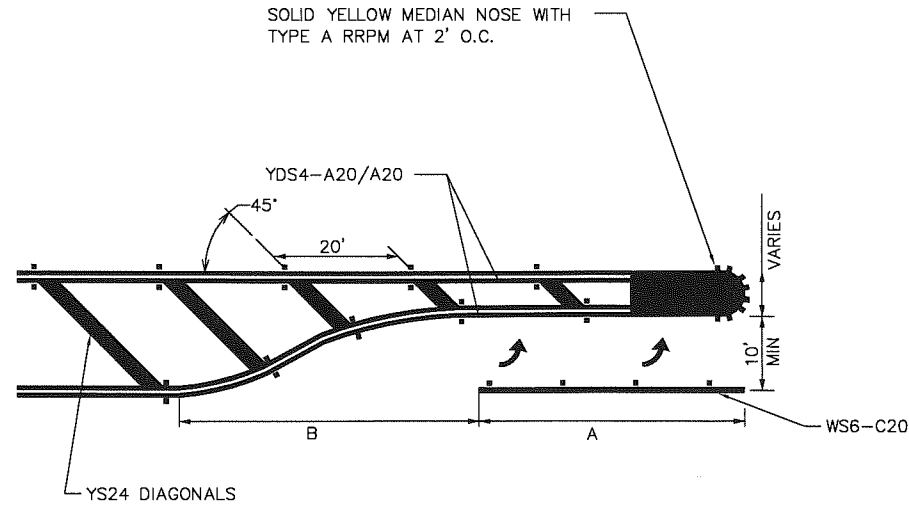
[Signature]
DIRECTOR OF
HOUSTON PUBLIC WORKS

563

EFF DATE: JUL-01-2018

DWG NO: 01510-11

PAINTED MEDIAN LEFT TURN BAY DETAILS



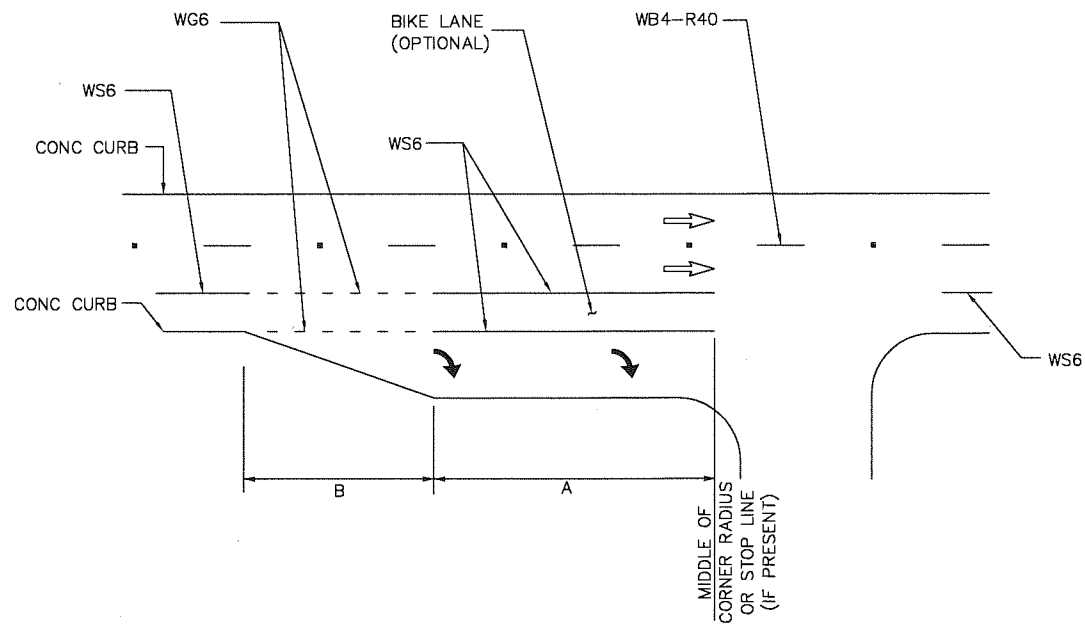
LEFT TURN BAY DIMENSIONS

A = 150' MINIMUM AT INTERSECTION OF TWO (2) MAJOR STREETS WHEN PRACTICAL.
= 100' MINIMUM AT ALL OTHER INTERSECTIONS.

B = 100' MINIMUM ON STRAIGHT ROADWAYS.
*TAPER LENGTH MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT.
*TAPER LENGTH MAY BE LONGER IF CURVE IS TO THE RIGHT.

NOTE:
1. DIMENSIONS SHALL BE ADJUSTED AS DETERMINED BY CITY OF HOUSTON TRAFFIC ENGINEER.
2. REFER TO CITY OF HOUSTON DESIGN MANUAL (DWG No. 10.06-07) FOR DETAILS.

UNSIGNALIZED RIGHT-TURN LANE



NOTES:

1. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
2. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
3. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
4. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

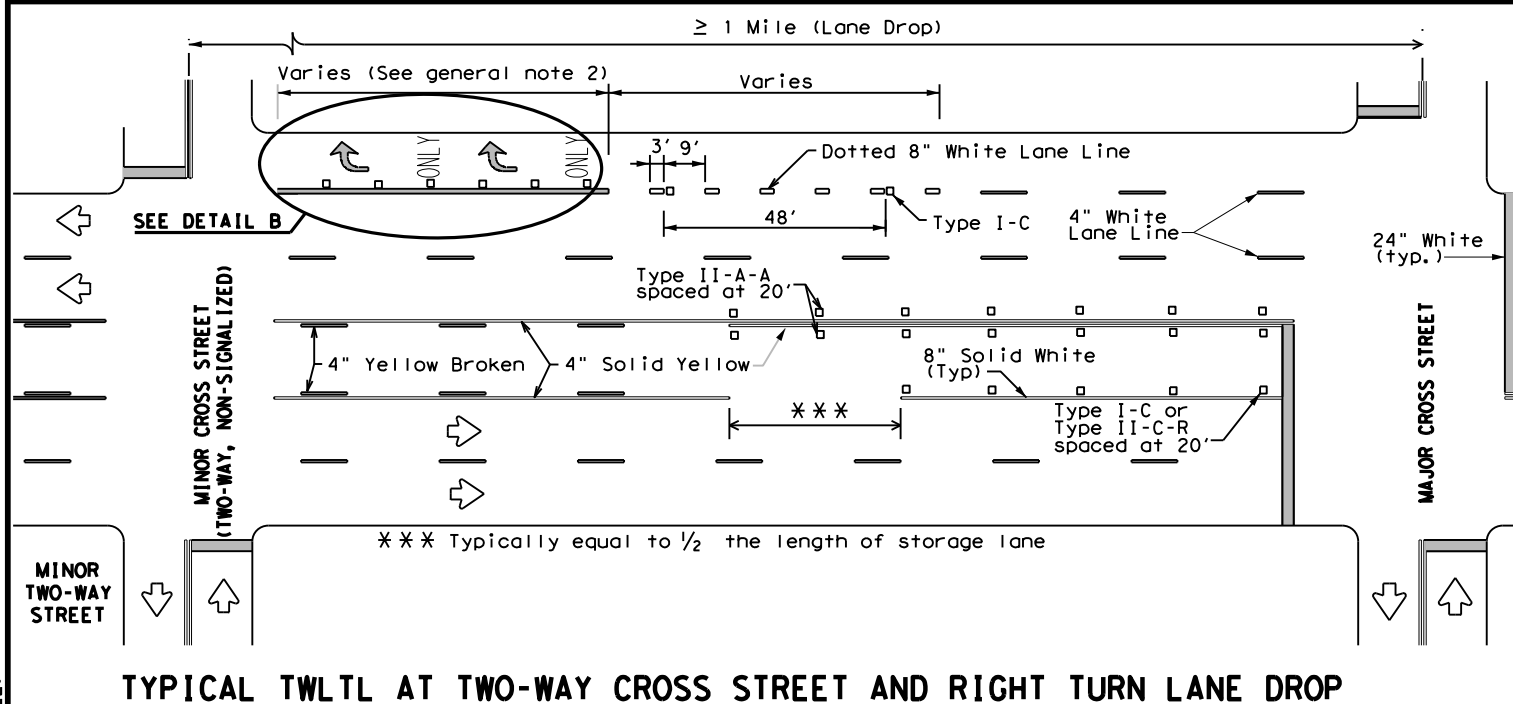
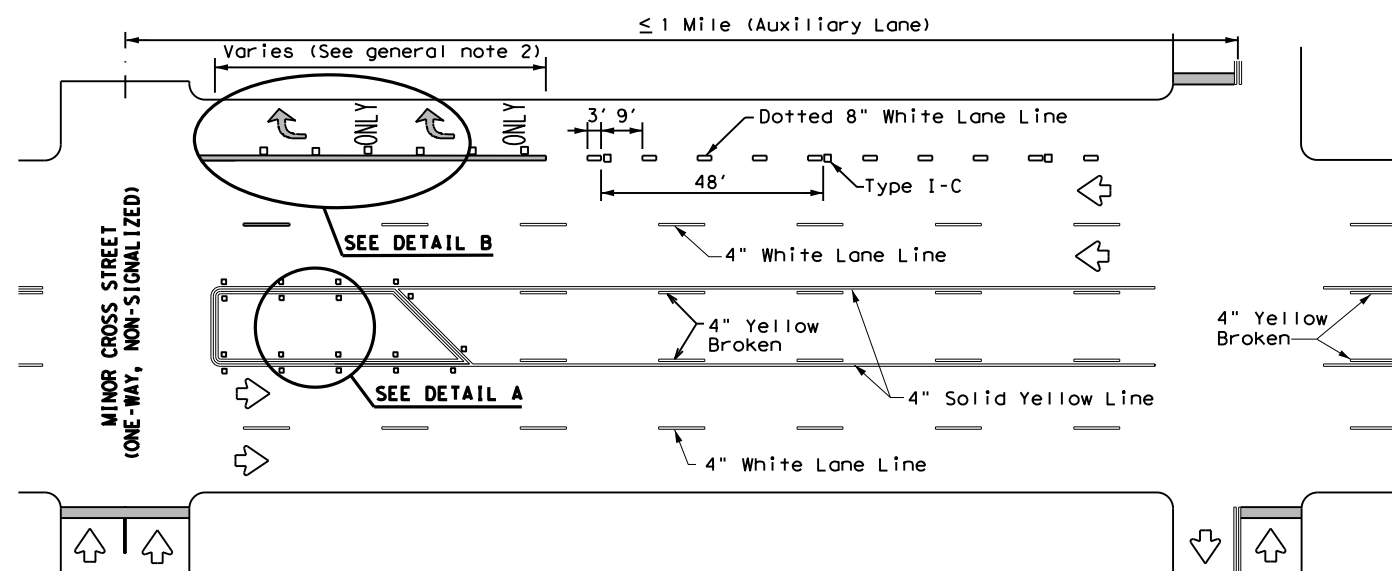
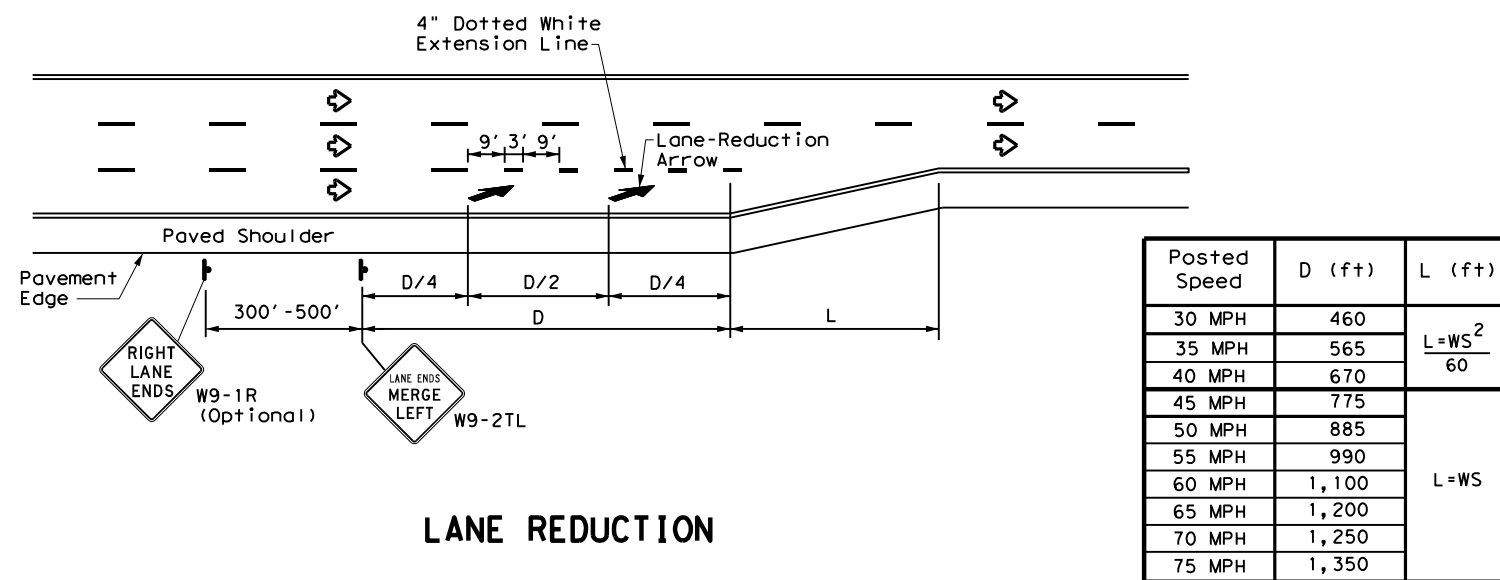
LEFT-TURN LANE & RIGHT-TURN LANE
DESIGN WORKSHEET 2

(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER

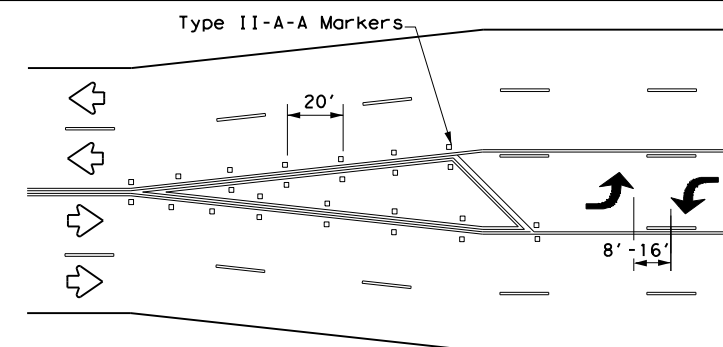
DIRECTOR OF
HOUSTON PUBLIC WORKS

DATE: _____
FILE: _____



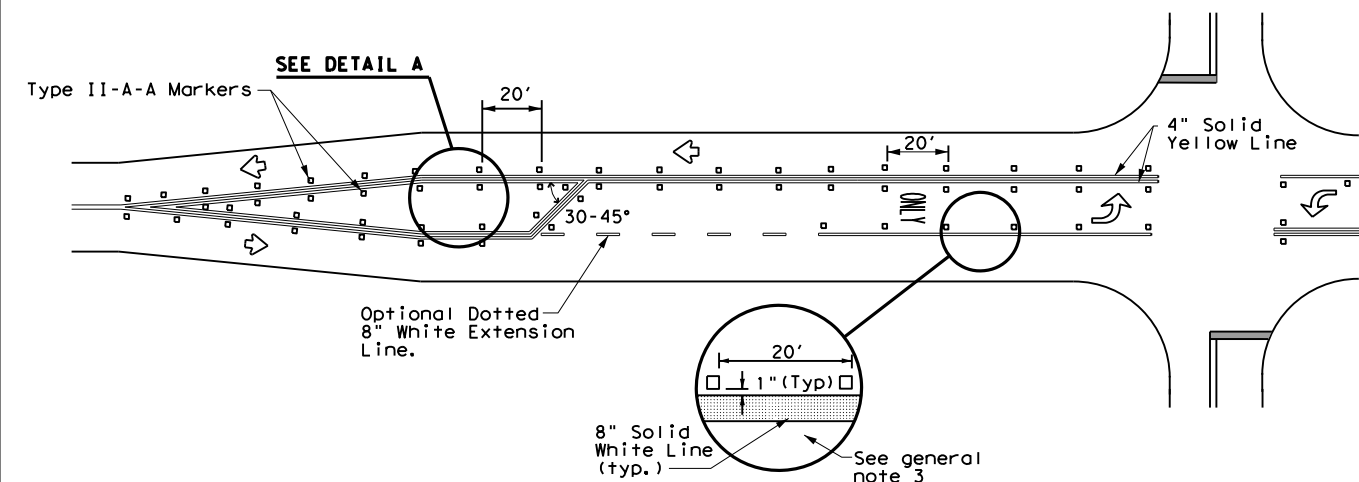
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

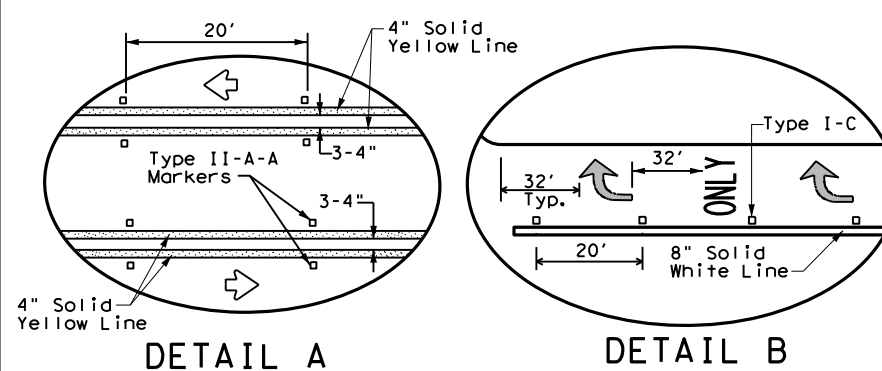


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



564A

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS

PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



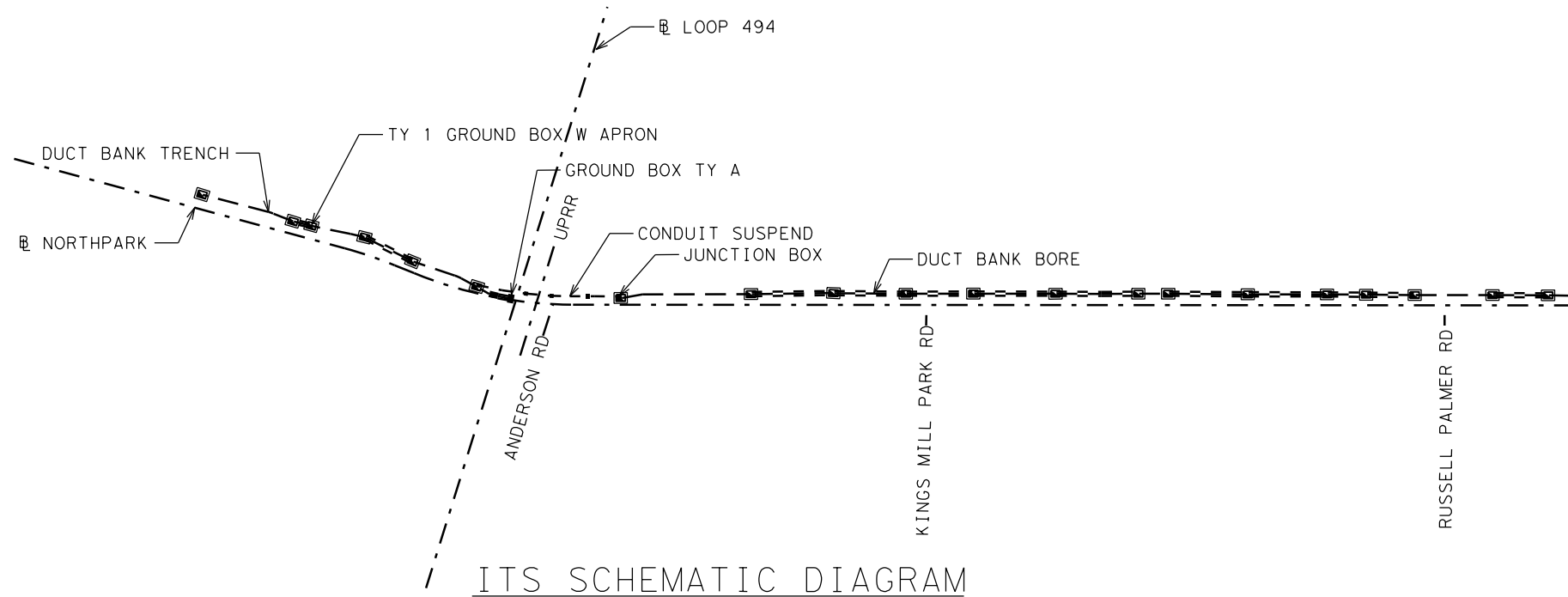
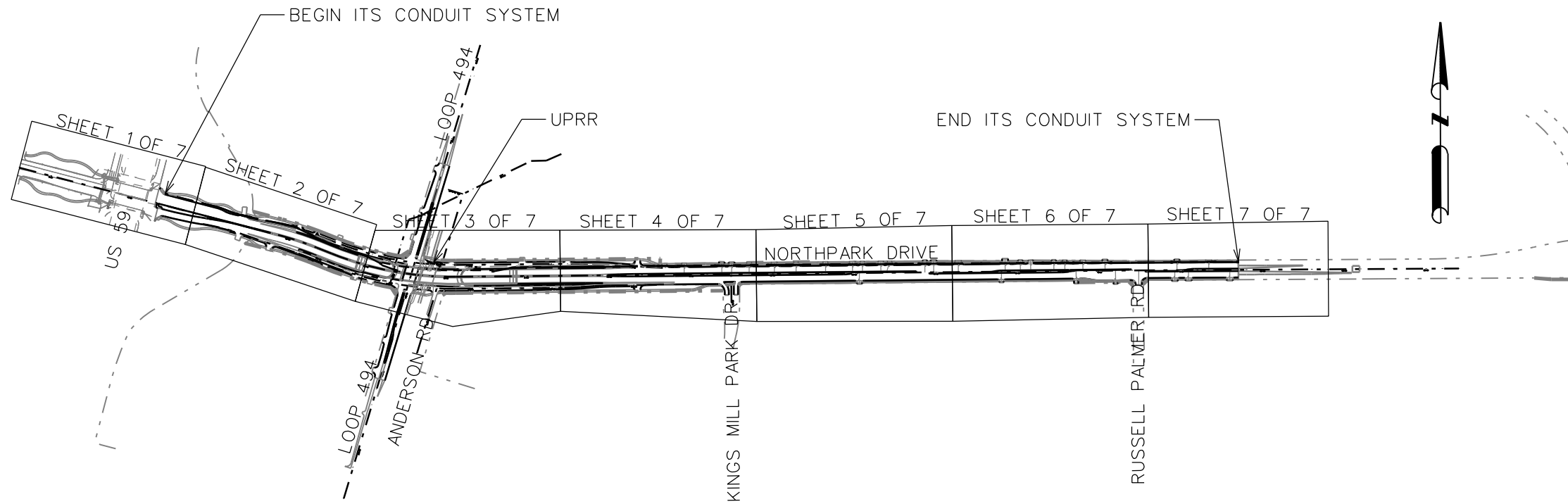
Texas Department of Transportation

**Traffic
Safety
Division
Standard**

**TWO-WAY LEFT TURN LANES,
RURAL LEFT TURN BAYS,
AND LANE REDUCTION
PAVEMENT MARKINGS**

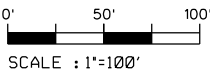
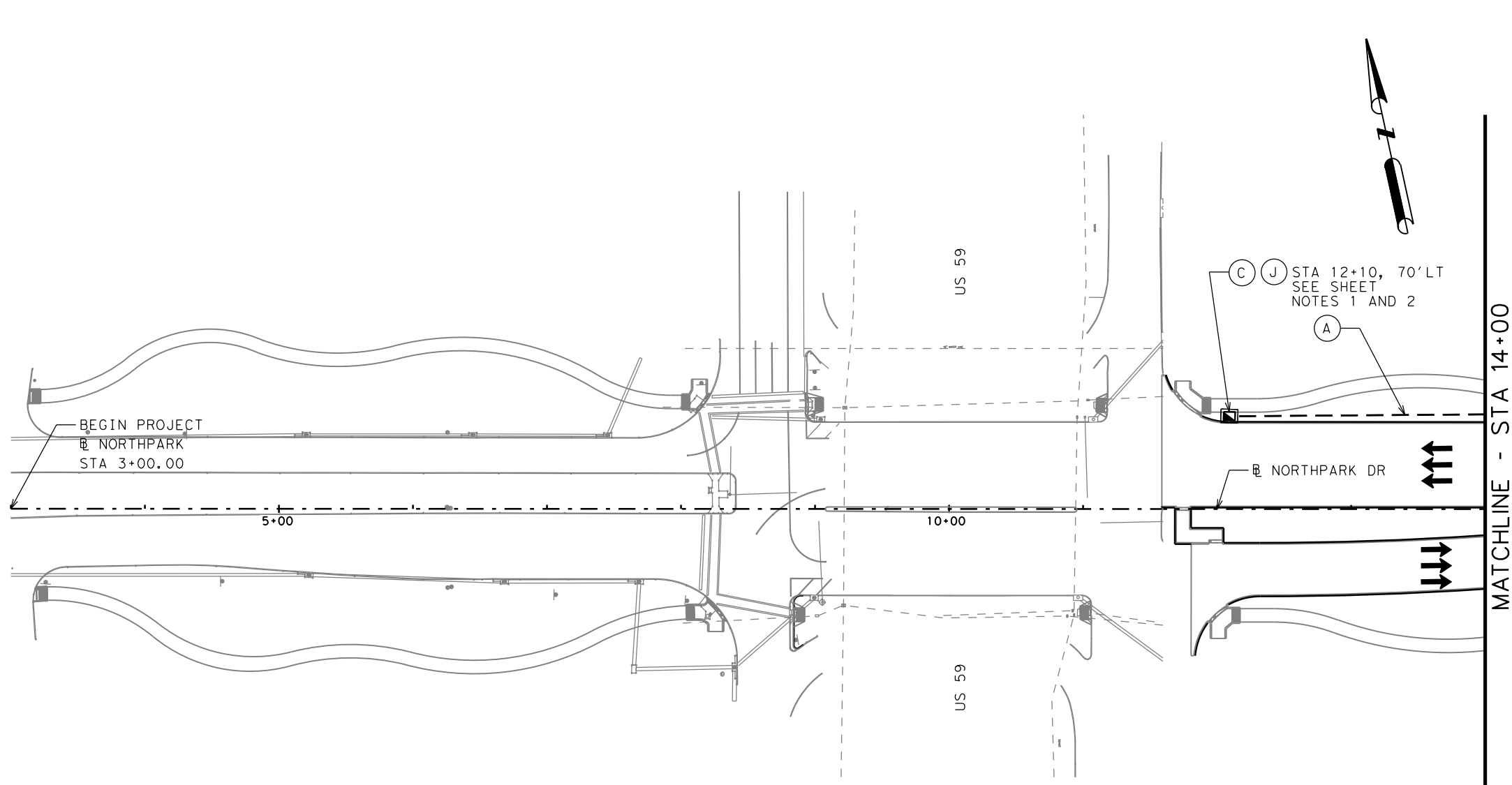
PM(3)-20

FILE:	pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
5-00 2-10					
8-00 2-12	DIST	COUNTY			SHEET N
3-03 6-20					



Fabian Kalapach

NO.		REVISIONS		BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
LHRA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007					
CITY OF HOUSTON HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE ITS PROJECT LAYOUT					
SHEET 1 OF 1					
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY NO. CS	
CHECKED: FK	DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB SHEET NO.
DRAWN: FK	HO	MONTGOMERY	0912	37	232
CHECKED: FK					565



LEGEND:

- PROP ITS GROUND BOX TY 1 W/ APRON
- PROP DUCT BANK (TRENCH)
- PROP DUCT BANK (BORE)
- PROP ELECTRICAL SERVICE
- PROP ELECTRICAL GROUND BOX TY A
- INSTALLATION NOTE

SHEET NOTES:

1. TERMINATE 144 STRAND FIBER OPTIC CABLE INSIDE TYPE 1 SPLICE ENCLOSURE.
2. COIL MINIMUM 100 LF SLACK FIBER OPTIC CABLE INSIDE GROUND BOX.

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	190
620 6002	ELEC CONDR (NO.14) INSULATED	LF	195
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	240
6007 6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	190
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	1

INSTALLATION NOTES:

- (A)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C)** INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK
- (J)** INSTALL:
1-FO SPLICE ENCLOSURE (TYPE 1)
IN GROUND BOX



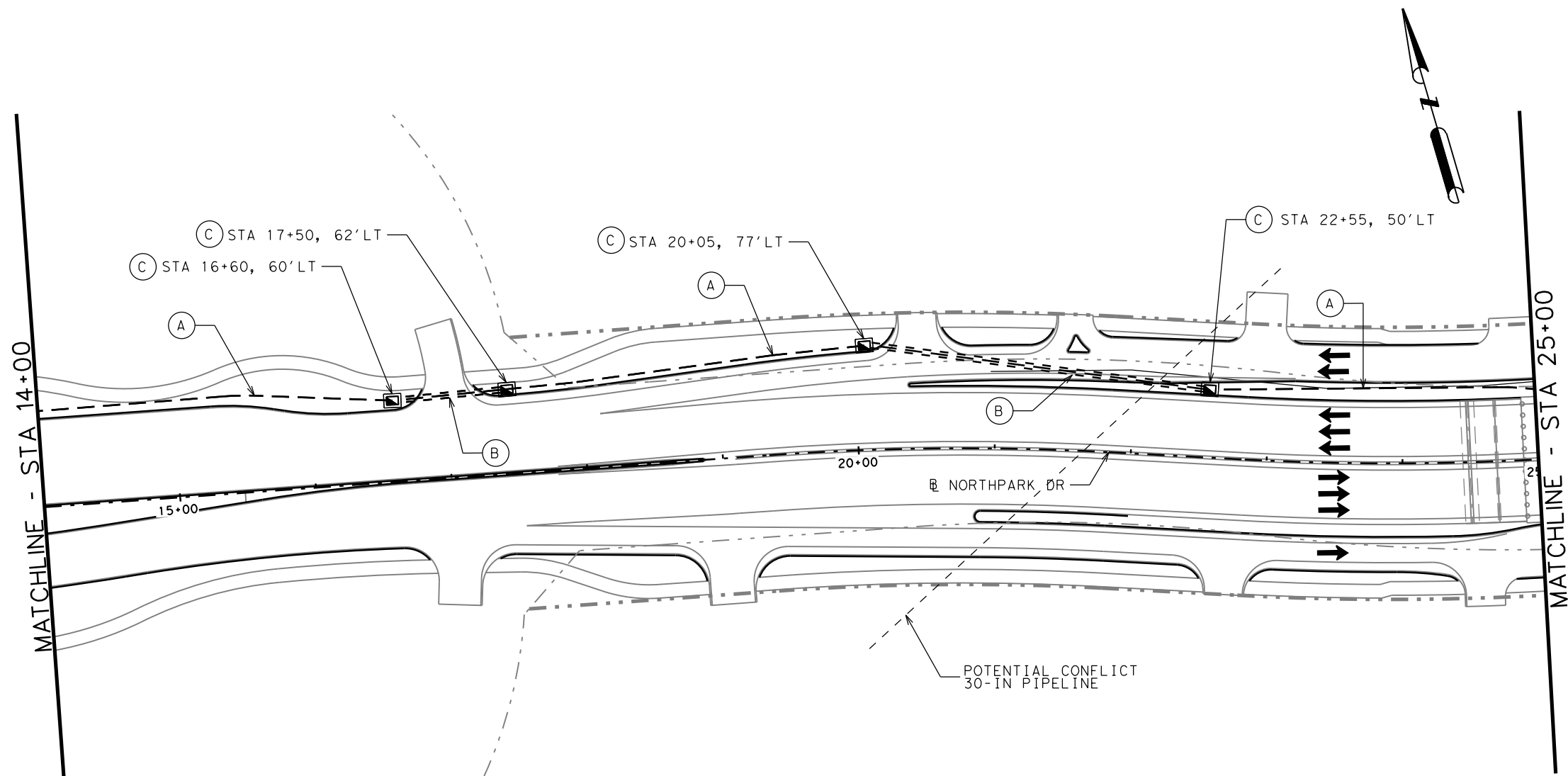
4/5/2021

Fabian Kalapach

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ITS PLAN BEGIN TO STA. 14+00			
SHEET 1 OF 7			
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED: FK	6	TEXAS	SEE TITLE SHEET
DRAWN: FK	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED: FK	HOU	MONTGOMERY	0912 37
		JOB NO. 232	SHEET NO. 566

4/5/2021

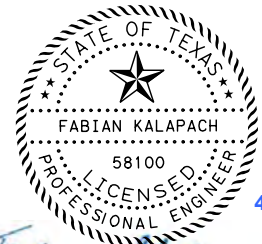
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SCALE : 1"=100'

LEGEND:

- PROP ITS GROUND BOX TY 1 W/ APRN
- PROP DUCT BANK (TRENCH)
- PROP DUCT BANK (BORE)
- SP ■ PROP ELECTRICAL SERVICE
- PROP ELECTRICAL GROUND BOX TY A
- Ⓢ INSTALLATION NOTE



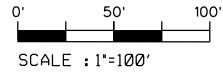
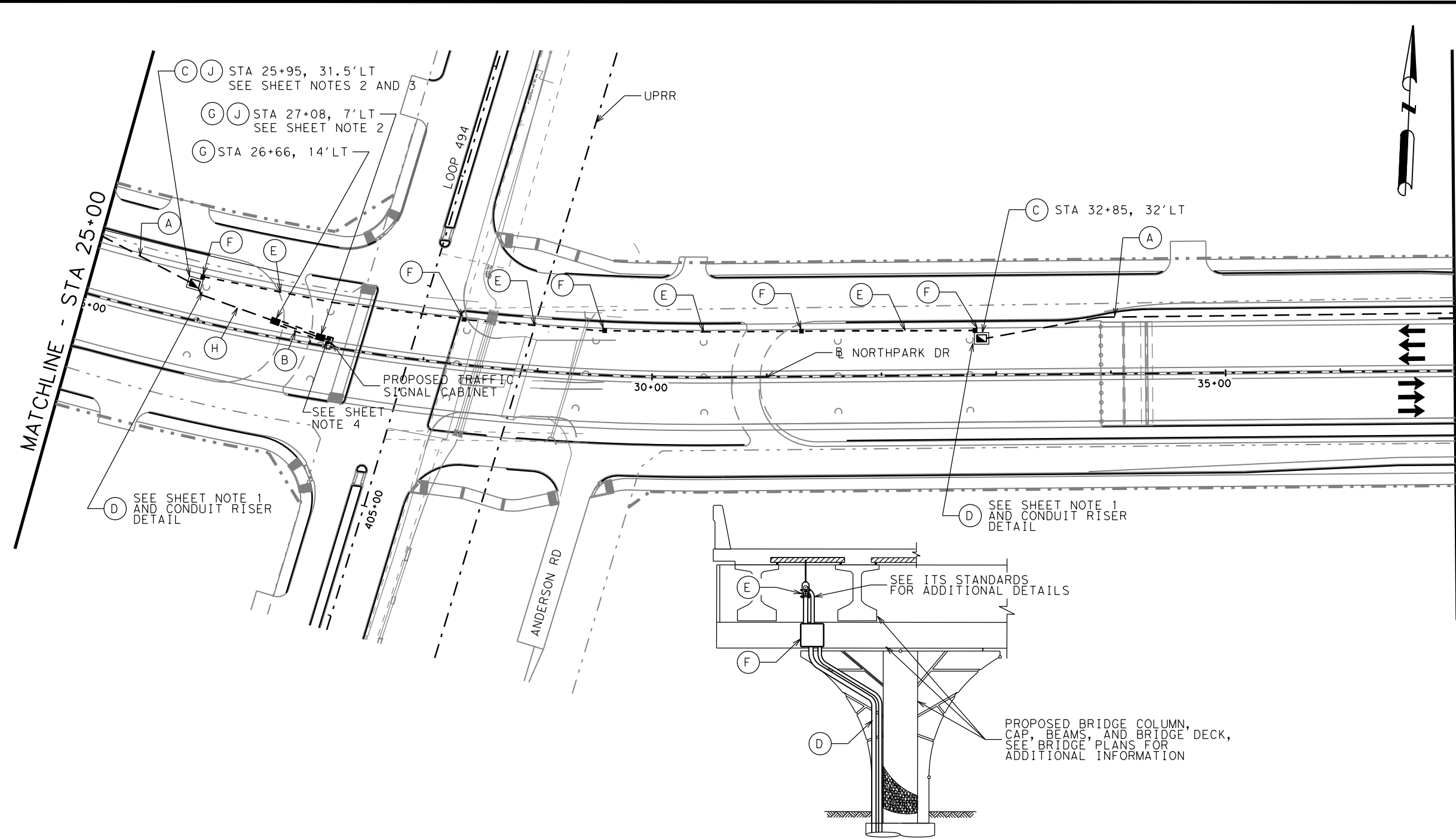
Fabian Kalapach

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	765
618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	342
620 6002	ELEC CONDR (NO.14) INSULATED	LF	1132
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	1307
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	765
6016 6011	ITS MULTI-DUCT CND (PVC-80) (BORE)	LF	342
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	4

INSTALLATION NOTES:

- (A) INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B) INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C) INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 200 HUNTON ANDREWS NORTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ITS PLAN STA. 14+00 TO 25+00			
SHEET 2 OF 7			
DESIGNED: FK	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED: FK			HIGHWAY No. CS
DRAWN: FK	STATE DISTRICT	COUNTY COUNTY	CONTROL No. SECTION No.
CHECKED: FK	HOU	MONTGOMERY	0912 37 232 567



LEGEND:

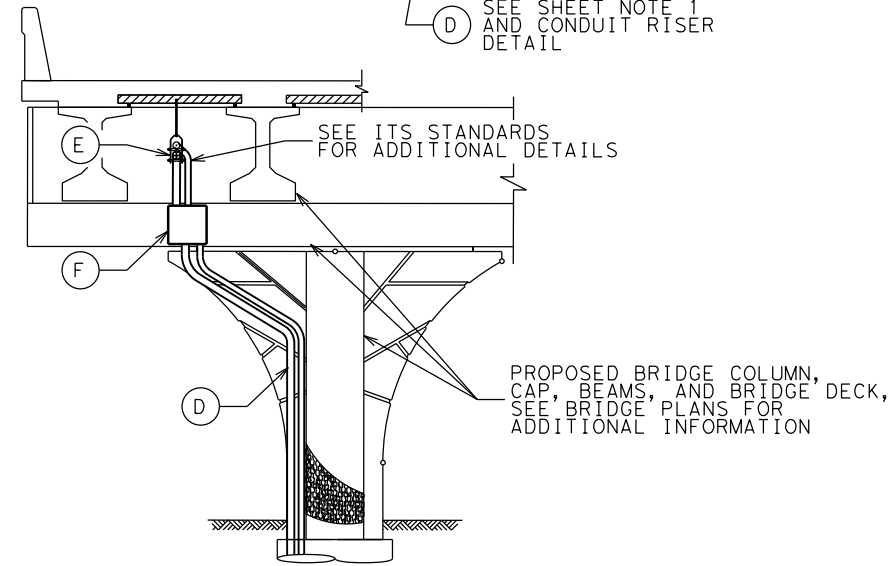
- PROP ITS GROUND BOX TY 1 W/ APRON
- PROP DUCT BANK (TRENCH)
- PROP DUCT BANK (BORE)
- PROP ELECTRICAL SERVICE
- PROP ELECTRICAL GROUND BOX TY A
- INSTALLATION NOTE

SHEET NOTES:

1. ATTACH RM CONDUIT TO FACE OF COLUMN IN ACCORDANCE WITH ITS STANDARD 'ITS(34)-16'.
2. TERMINATE 6 STRAND FIBER OPTIC CABLE INSIDE TYPE 1 SPLICE ENCLOSURE.
3. COIL MINIMUM 100 LF SLACK FIBER OPTIC CABLE IN GROUND BOX.
4. INSTALL 2" (SCH 80) PVC STUB-UP INSIDE CABINET FOR FUTURE USE, COORDINATE FINAL LOCATION WITH TRAFFIC SIGNAL INSTALLER.



Fabian Kalapach



CONDUIT RISER DETAIL
N. T. S.

INSTALLATION NOTES:

- (A)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C)** INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK
- (D)** INSTALL:
1-3" RMC, 1-4" RM MULTIDUCT ATTACHED
TO THE BRIDGE COLUMN
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (E)** INSTALL:
1-3" RMC, 1-4" RM MULTIDUCT SUSPENDED
BENEATH THE BRIDGE DECK
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (F)** INSTALL:
JUNCTION BOX
- (G)** INSTALL:
GROUND BOX (TY-A)
50' COILED FIBER SLACK
- (H)** INSTALL:
1-CONDT (PVC) (SCH 80) (2")
1-FIBER OPTIC CBL (SNGLE-MODE) (6 FIBER)
- (I)** INSTALL:
1-CONDT (PVC) (SCH 80) (2") (BORE)
1-FIBER OPTIC CBL (SNGLE-MODE) (6 FIBER)
- (J)** INSTALL:
1-FO SPLICE ENCLOSURE (TYPE 1)
IN GROUND BOX

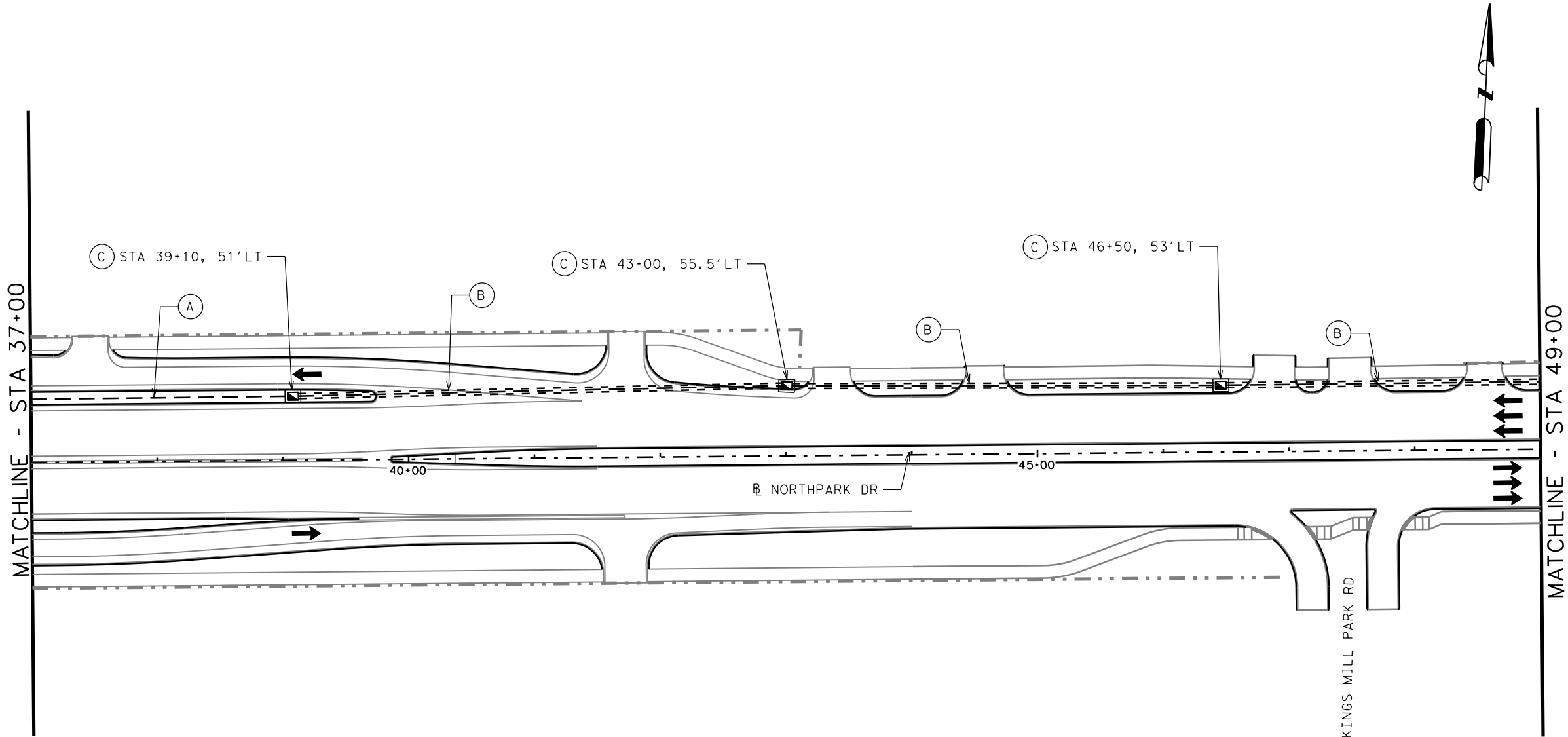
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	504
618 6046	CONDT (PVC) (SCH 80) (2")	LF	89
618 6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	42
618 6074	CONDT (RM) (3")	LF	727
620 6002	ELEC CONDR (NO.14) INSULATED	LF	1417
624 6002	GROUND BOX TY A (122311)W/APRON	EA	2
6007 6010	FIBER OPTIC CBL (SNGLE-MODE) (6 FIBER)	LF	231
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	1331
6007 6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	2
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	504
6016 6013	ITS MULTI-DUCT CND (RMC)	LF	727
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	2

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
 CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ITS PLAN STA. 25+00 TO 37+00			
SHEET 3 OF 7			
DESIGNED: FK	ED. RD. NO.	STATE	CITY OF HOUSTON WBS
CHECKED: FK	6	TEXAS	SEE TITLE SHEET
DRAWN: FK	STATE	COUNTY	CONTROL SECTION
CHECKED: FK	HOU	MONTGOMERY	0912 37 232 568

4/5/2021

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0' 50' 100'
SCALE : 1"=100'

LEGEND:

- PROF ITS GROUND BOX TY 1 W/ APRN
- PROF DUCT BANK (TRENCH)
- PROF DUCT BANK (BORE)
- SP PROF ELECTRICAL SERVICE
- PROF ELECTRICAL GROUND BOX TY A
- INSTALLATION NOTE

STATE OF TEXAS
FABIAN KALAPACH
58100
LICENSED PROFESSIONAL ENGINEER
4/5/2021
Fabian Kalapach

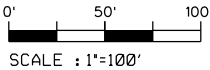
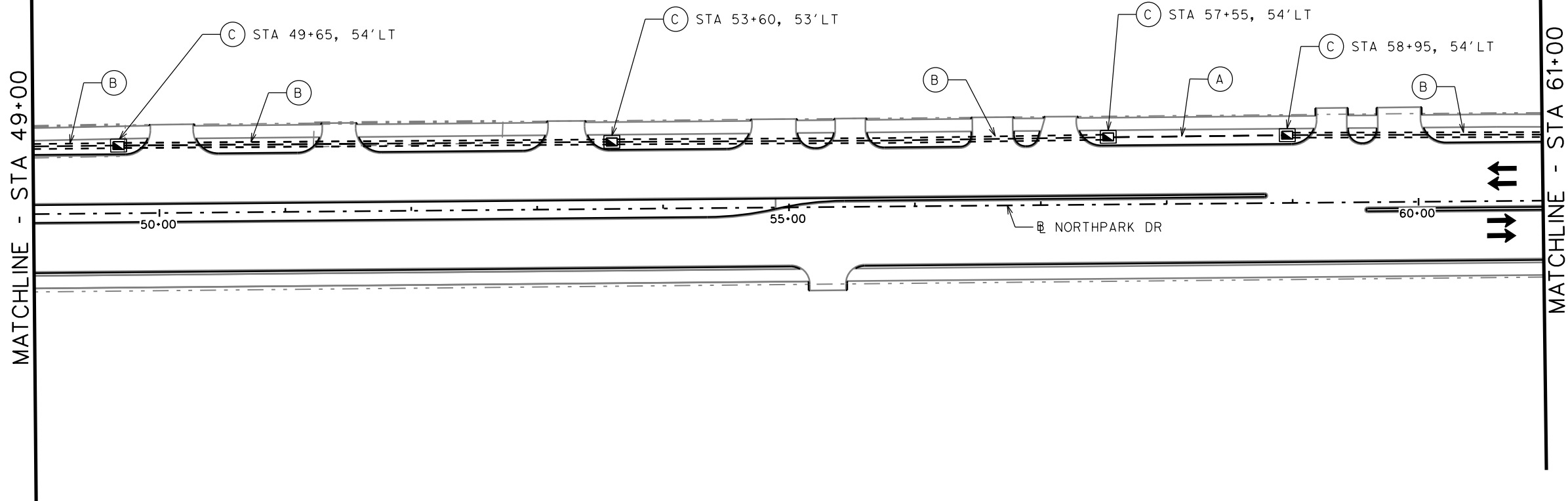
SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	209
618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	993
620 6002	ELEC CONDR (NO.14) INSULATED	LF	1222
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	1352
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	209
6016 6011	ITS MULTI-DUCT CND (PVC-80) (BORE)	LF	993
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	3

INSTALLATION NOTES:

- (A) INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B) INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C) INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE			
ITS PLAN			
STA. 37+00 TO 49+00			
SHEET 4 OF 7			
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED: FK	6	TEXAS	SEE TITLE SHEET
DRAWN: FK	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED: FK	HOU	MONTGOMERY	0912 37 232 569

PDF Filename: 0484 - STA. 49+00 TO 61+00 SHEET 5 OF 7.pdf



- LEGEND:
- PROP ITS GROUND BOX TY 1 W/ APRN
 - PROP DUCT BANK (TRENCH)
 - PROP DUCT BANK (BORE)
 - SP PROP ELECTRICAL SERVICE
 - PROP ELECTRICAL GROUND BOX TY A
 - INSTALLATION NOTE



Fabian Kalapach

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	142
618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	1059
620 6002	ELEC CONDR (NO.14) INSULATED	LF	1226
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	1401
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	142
6016 6011	ITS MULTI-DUCT CND (PVC-80) (BORE)	LF	1059
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	4

INSTALLATION NOTES:

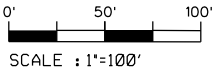
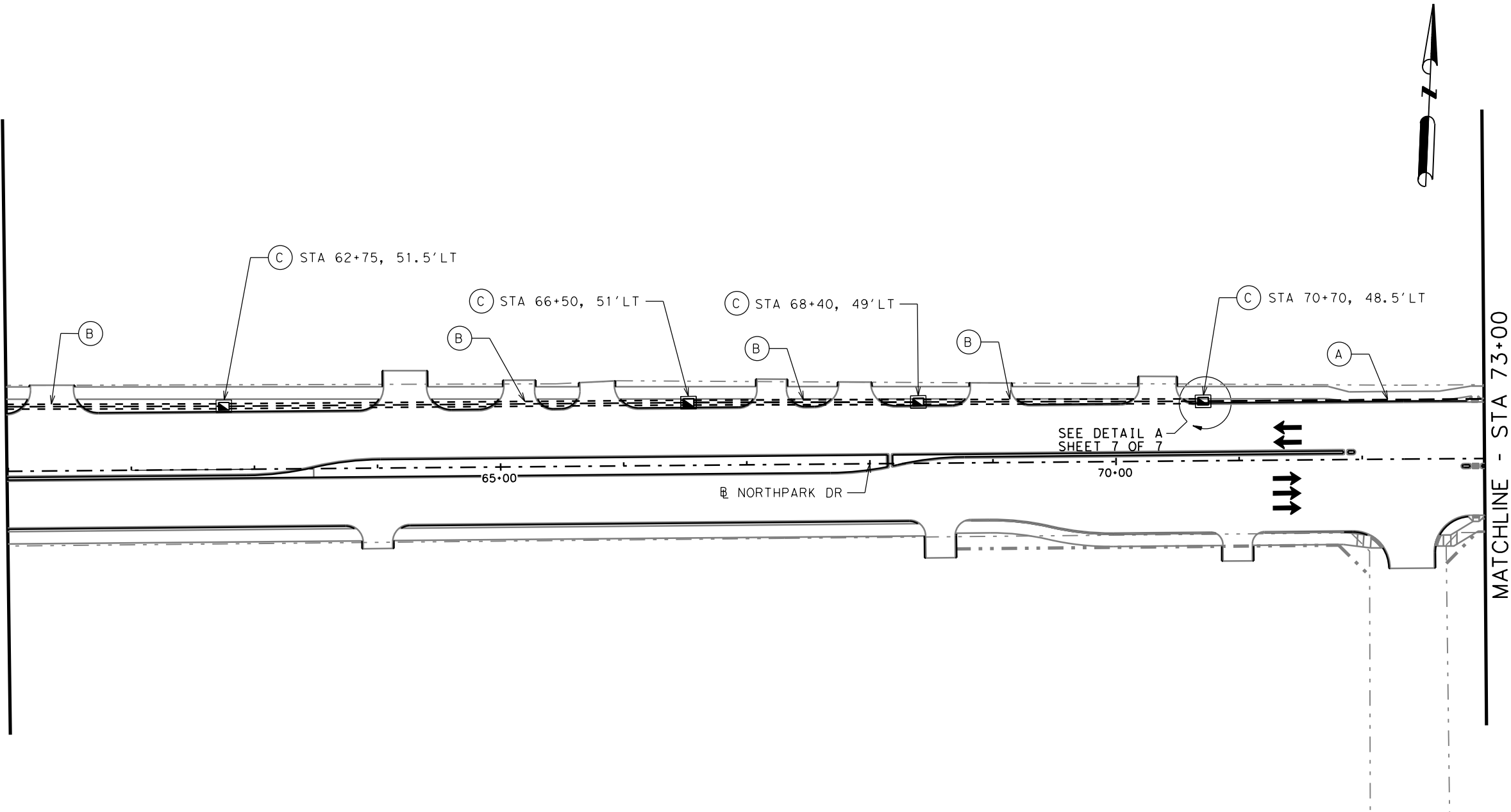
- (A) INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B) INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C) INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE			
ITS PLAN			
STA. 49+00 TO 61+00			
SHEET 5 OF 7			
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED: FK			SEE TITLE SHEET
DRAWN: FK	STATE DISTRICT NO.	COUNTY COUNTY	CONTROL SECTION NO.
CHECKED: FK	HOU	MONTGOMERY	0912 37 232 570

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MATCHLINE - STA 61+00



LEGEND:

- PROP ITS GROUND BOX TY 1 W/ APRON
- PROP DUCT BANK (TRENCH)
- PROP DUCT BANK (BORE)
- PROP ELECTRICAL SERVICE
- PROP ELECTRICAL GROUND BOX TY A
- INSTALLATION NOTE



Fabian Kalapach

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	229
618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	912
620 6002	ELEC CONDR (NO.14) INSULATED	LF	1166
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	1341
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	229
6016 6011	ITS MULTI-DUCT CND (PVC-80) (BORE)	LF	912
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	4

INSTALLATION NOTES:

- (A)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C)** INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK

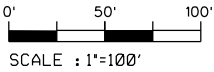
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE ITS PLAN STA. 61+00 TO 73+00			
SHEET 6 OF 7			
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED: FK	COUNTY MONTGOMERY	CONTROL NO. 0912	SECTION 37
DRAWN: FK	JOB NO. 232	SHEET NO. 571	
CHECKED: FK			

4/5/2021

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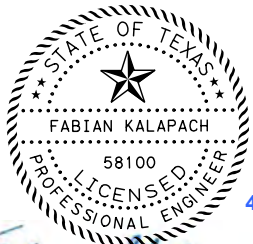
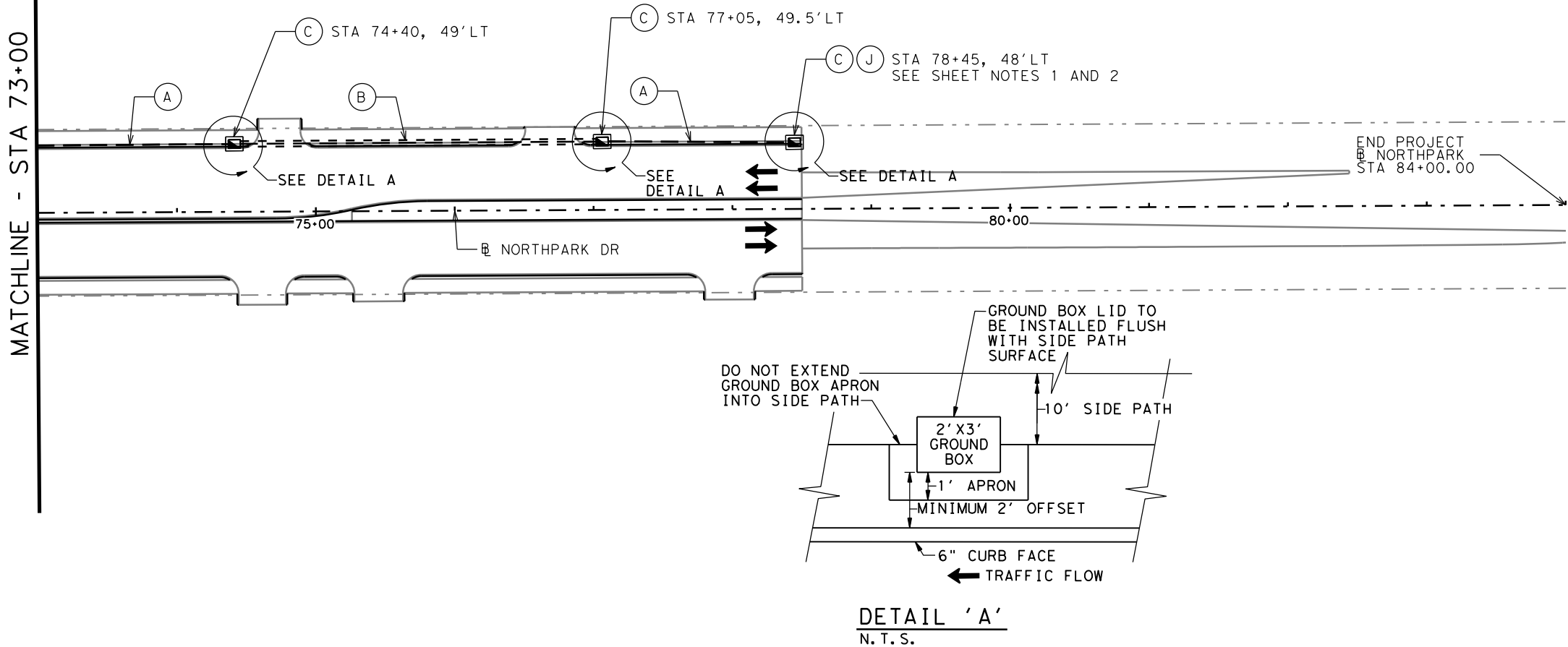


LEGEND:

- PROP ITS GROUND BOX TY 1 W/ APRON
- PROP DUCT BANK (TRENCH)
- PROP DUCT BANK (BORE)
- PROP ELECTRICAL SERVICE
- PROP ELECTRICAL GROUND BOX TY A
- INSTALLATION NOTE

SHEET NOTES:

1. TERMINATE 144 STRAND FIBER OPTIC CABLE INSIDE TYPE 1 SPLICE ENCLOSURE.
2. COIL MINIMUM 100 LF SLACK FIBER OPTIC CABLE INSIDE GROUND BOX.



Fabian Kalapach

SUMMARY OF QUANTITIES			
BID ITEM & DESC CODE	DESCRIPTION	UNITS	QTY
618 6031	CONDT (PVC) (SCH 40) (3") (CONC ENCSE)	LF	281
618 6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	255
620 6002	ELEC CONDR (NO.14) INSULATED	LF	551
6007 6017	FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)	LF	686
6007 6087	FO SPLICE ENCLOSURE (TYPE 1)	EA	1
6016 6008	ITS MULTI-DUCT CND (PVC-40) (CONC ENCSE)	LF	281
6016 6011	ITS MULTI-DUCT CND (PVC-80) (BORE)	LF	255
6186 6002	ITS GND BOX(PCAST) TY 1 (243636)W/APRN	EA	3

INSTALLATION NOTES:

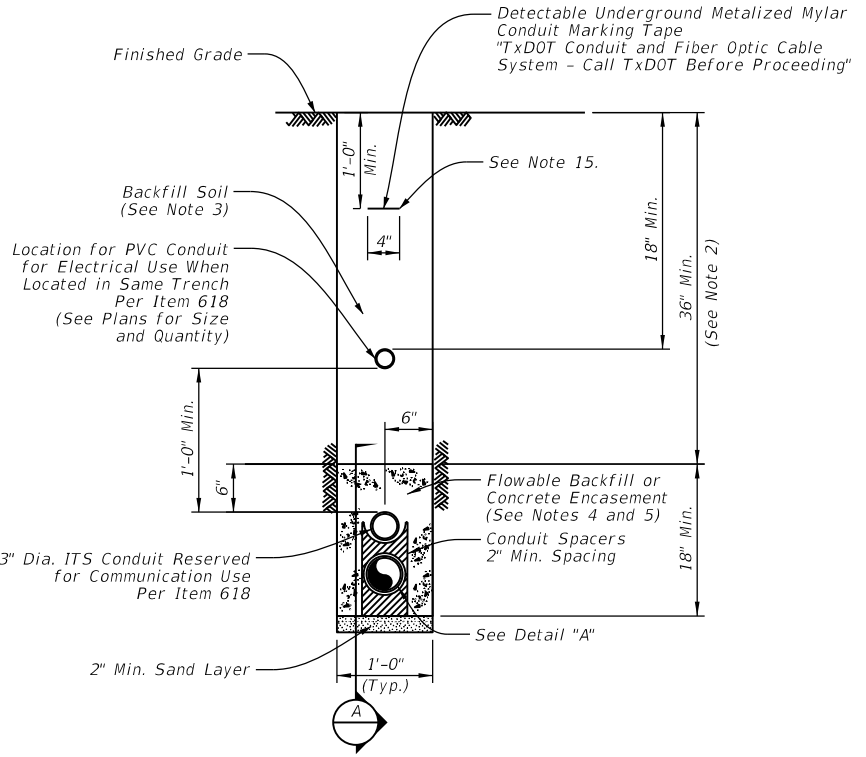
- (A)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT CONCRETE ENCASED
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (B)** INSTALL:
1-3" PVC, 1-4" MULTIDUCT BORED IN STEEL CASING
1-FIBER OPTIC CBL (SNGLE-MODE) (144 FIBER)
IN MULTIDUCT
1-ELEC CONDR (NO.14) INSULATED
- (C)** INSTALL:
ITS GND BOX(PCAST) TY 1 (243636)W/APRN
50' COILED FIBER SLACK
- (J)** INSTALL:
1-FO SPLICE ENCLOSURE (TYPE 1)
IN GROUND BOX

NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE ITS PLAN STA. 73+00 TO 84+00			
SHEET 7 OF 7			
DESIGNED: FK	FED. RD. DIV. NO. 6	STATE: TEXAS	CITY OF HOUSTON WBS
CHECKED: FK			SEE TITLE SHEET
DRAWN: FK	STATE DISTRICT NO.	COUNTY NO.	CONTROL SECTION NO.
CHECKED: FK	HOU	MONTGOMERY	0912 37 232 572

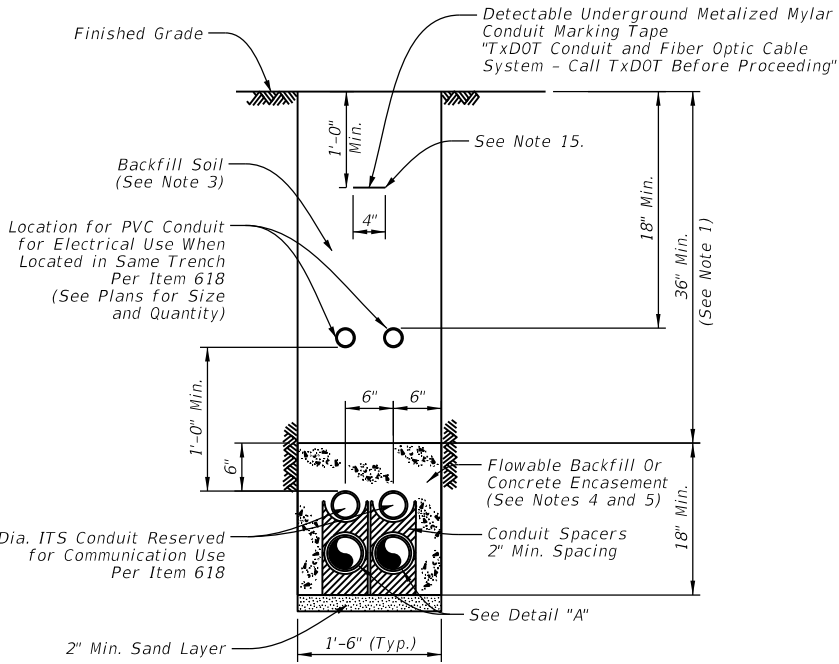
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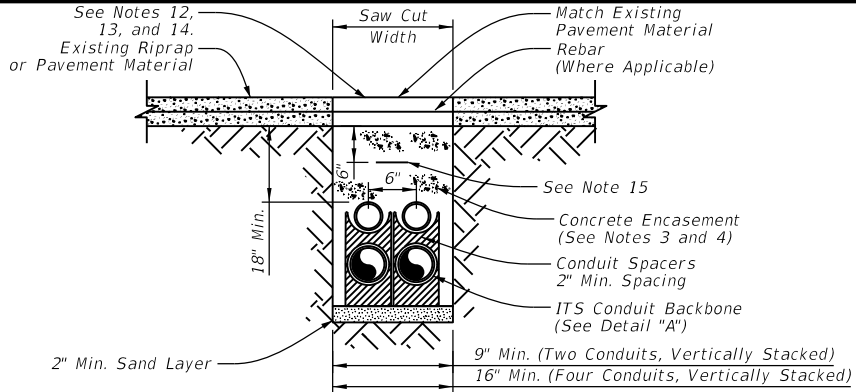
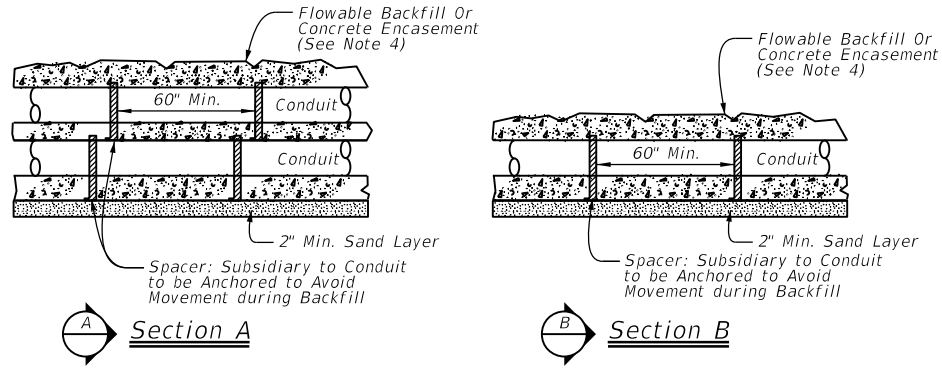
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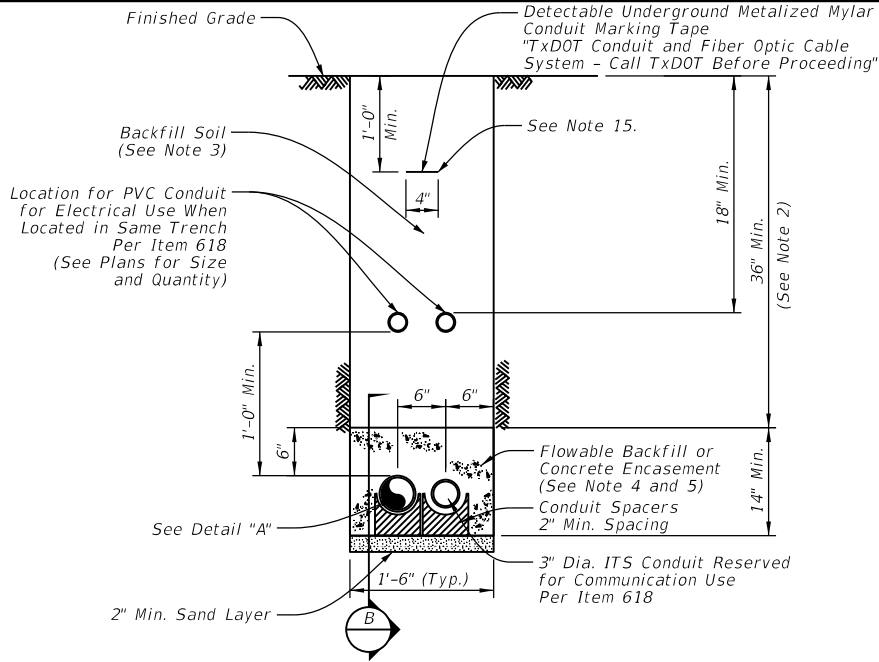
ITS Conduit Backbone Trench Vertical Spacing
Two Conduit System



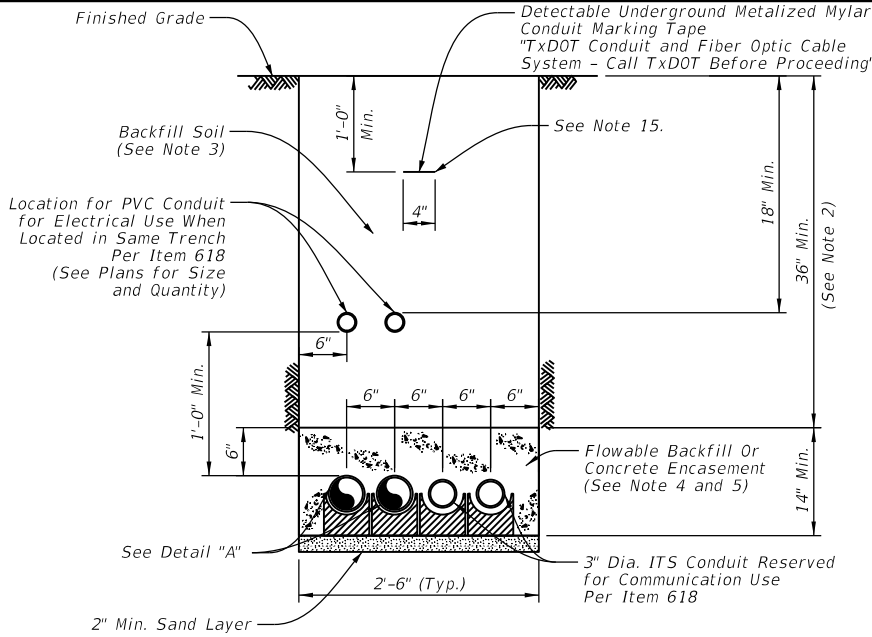
ITS Conduit Backbone Trench Vertical Spacing
Four Conduit System



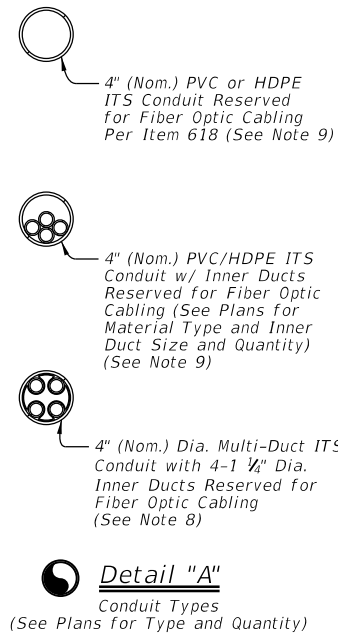
Open Cut Trenching Details



ITS Conduit Backbone Trench Horizontal Spacing (Alternative)
Two Conduit System

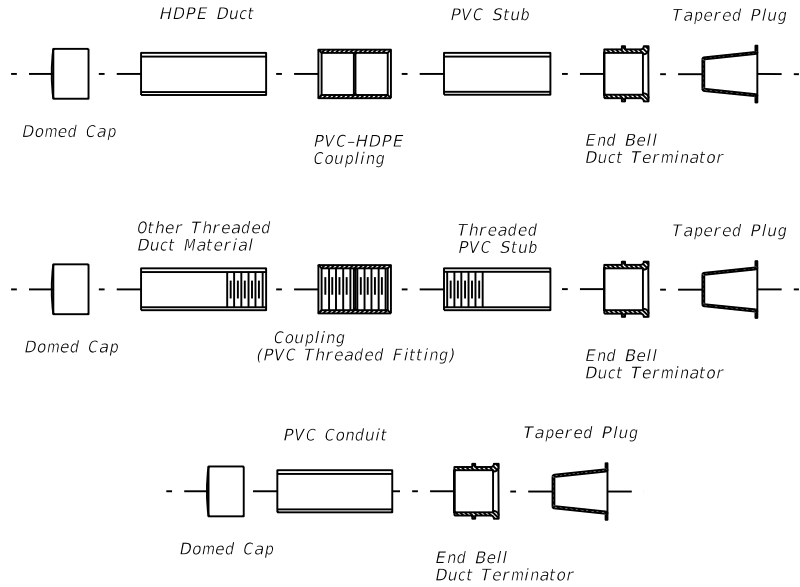


ITS Conduit Backbone Trench Horizontal Spacing (Alternative)
Four Conduit System



Detail "A"

Conduit Types
(See Plans for Type and Quantity)




Typical Conduit Fitting Combinations
2 Conduit and Single Conduit Configuration

General Notes:

- Construct the ITS conduit backbone system by vertically spacing conduit, unless field constraints, obstructions, or utility conflicts require horizontal spacing of conduits. Both vertical and horizontal spacing configurations have been detailed for contractor information for construction.
- Install ITS conduit backbone system a minimum of 42 inches from finished grade to the top of the conduit unless otherwise directed or to avoid conflicts or field conditions such as utilities or obstructions. Vary depth of the trench in order to pass over/under any existing utilities. Refer to ITS Conduit Obstruction Crossing Standard ITS(35) for further detail.
- Perform trench excavation and backfilling in accordance with Item 400, "Excavation and Backfill for Structures."
- When a trench depth greater than 24 inches can be achieved from the finished grade to the top of ITS conduit, encase the conduits with flowable backfill in accordance with Item 401, "Flowable Backfill." Use Class B concrete as a substitute in accordance with Item 421, "Hydraulic Cement Concrete" at the discretion of the Engineer.
- When a trench depth of less than 24 inches is required due to field conditions, encase the conduits in Class B concrete in accordance with Item 421, "Hydraulic Cement Concrete."
- Concrete encasement will be paid for under Special Specification "ITS Multi-Duct Conduit" or as shown on the plans.
- Provide ITS PVC conduit identified for electrical and communication use in accordance with Item 618, "Conduit."
- Provide ITS multi-duct conduit identified for fiber optic communication use in accordance with Special Specification "ITS Multi-Duct Conduit."

- Conduit per Item 618, "Conduit" (See Plans for Material Type and Quantity).
- Provide a single 1/2 inch #14 insulated wire in conduit runs which have been identified in the plans to carry fiber optic cable. Provide UL listed solid copper wire with orange color low density polyethylene insulation suitable for conduit installation rated for temperature range -20 C to 60 C and a voltage rating of 600V. This wire will serve as a tracer, or locate, wire for locating underground conduit containing fiber optic cabling and will be paid for under Item 620, "Electrical Conductors."
- Provide a flat pull cord in all empty conduits and innerducts. Provide a pull cord with a tensile strength of 1,250 Lbs. minimum and have foot markings to determine length installed. Pull cord and installation to be subsidiary to various bid items.
- Remove saw cut width to accommodate conduit installation.
- Replace rebar as necessary, lapped and tied a minimum of 3 inches to existing rebar.
- Replace broken pavement materials with similar materials to exact shape, and thickness of existing.
- Place marking tape a minimum of 1 foot - 0 inches below grade when no other electrical marking tape required, or 8 inches below electrical marking tape when provisioned under Item 618.
- Provide a 1/2 inch #8 insulated grounding conductor within one inner duct of a pre-assembled multi-duct when no other grounding conductor is provisioned for in the plans.

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Texas Department of Transportation

Traffic Operations Division Standard

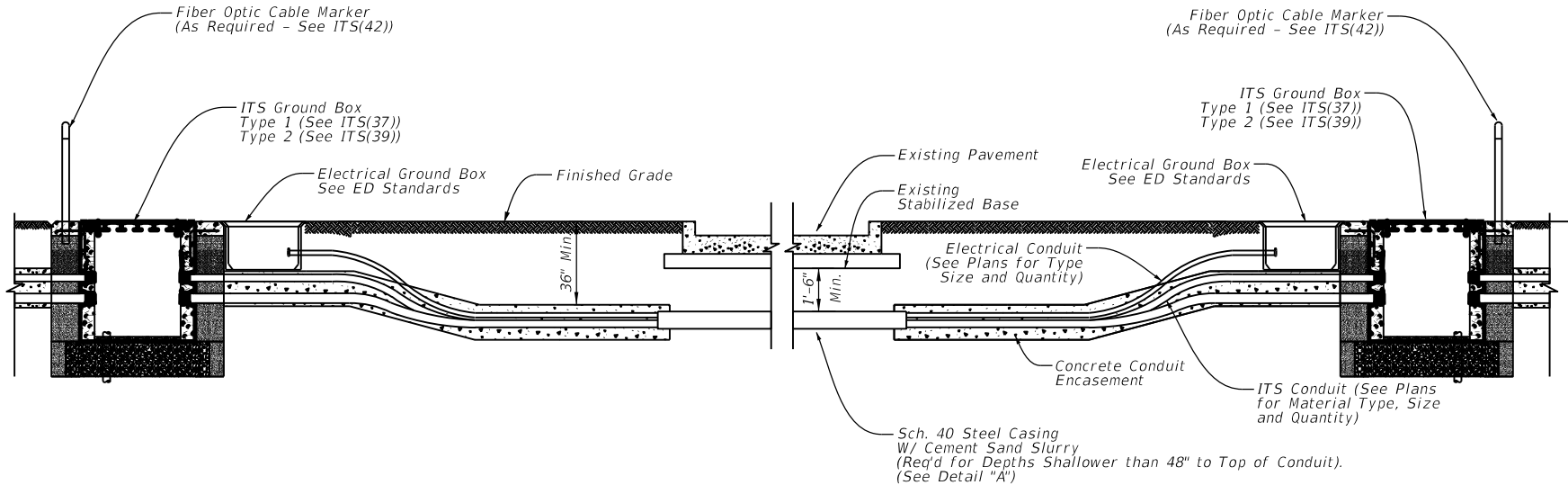
ITS CONDUIT TRENCH DETAILS

ITS(27)-16

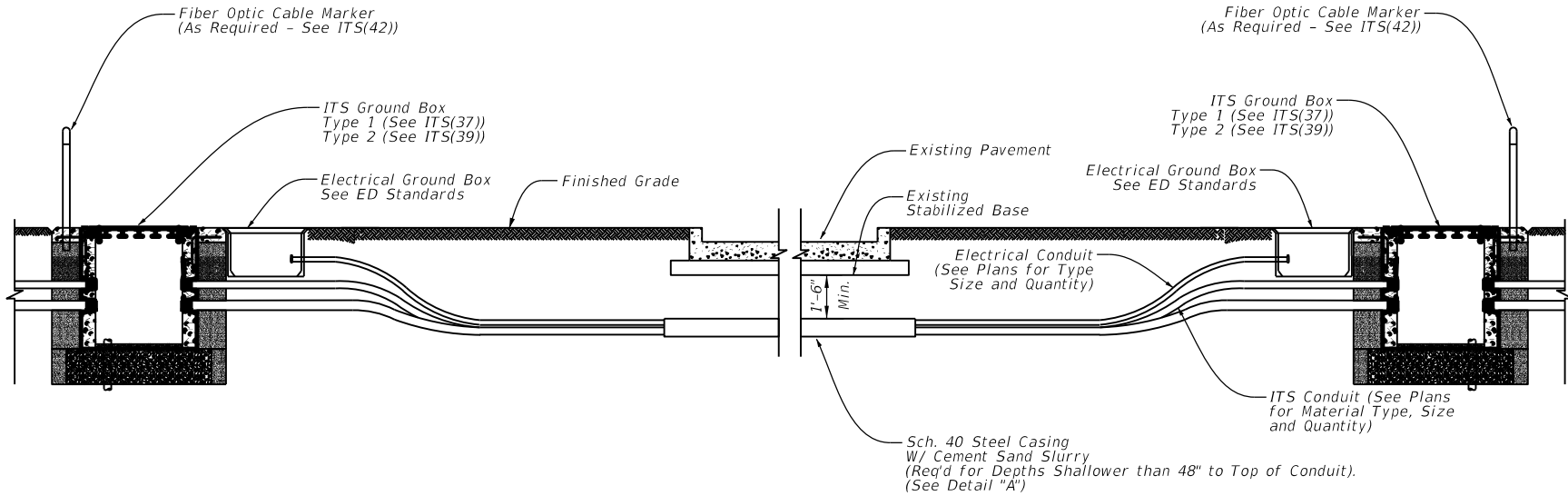
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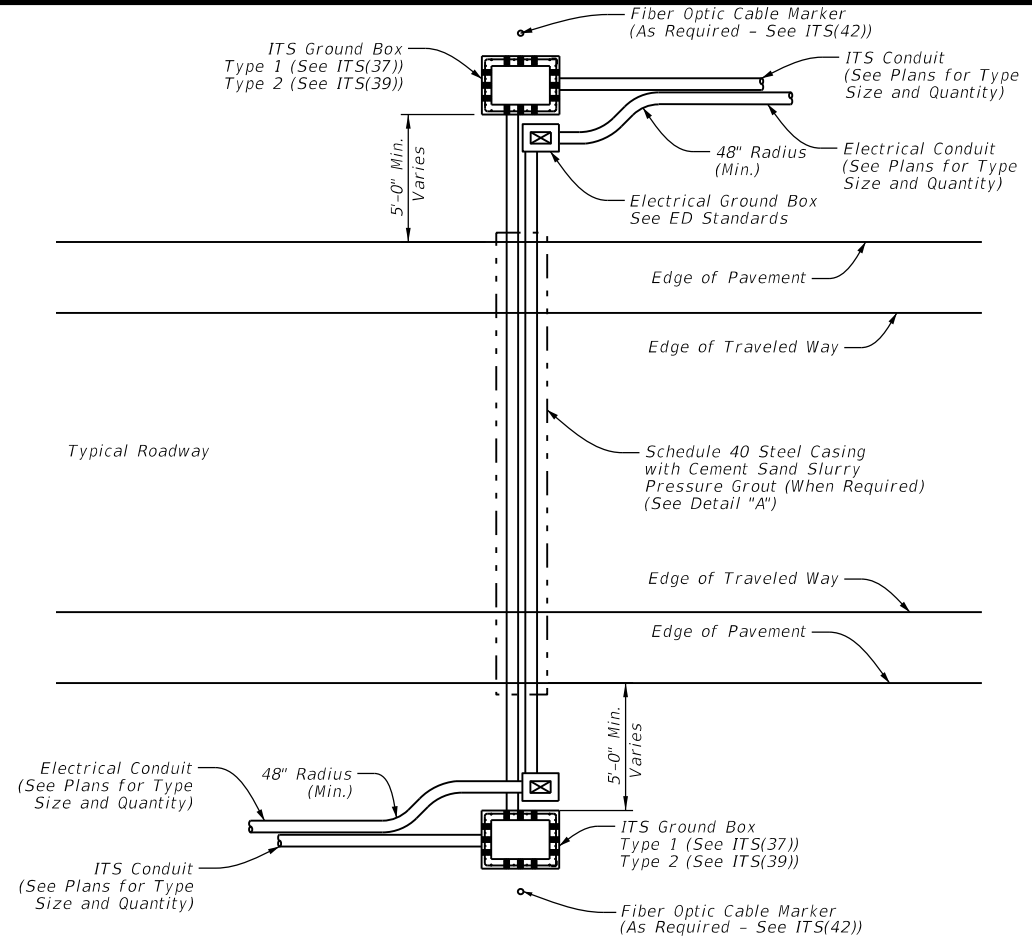
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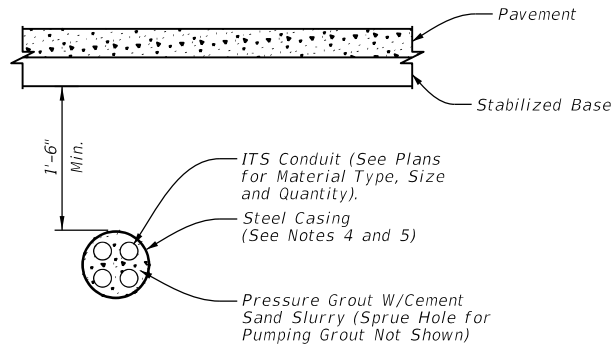
Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway



Typical Conduit Installation Jacking
or Boring Beneath Existing Roadway
(Where Concrete Encasement Not Required)



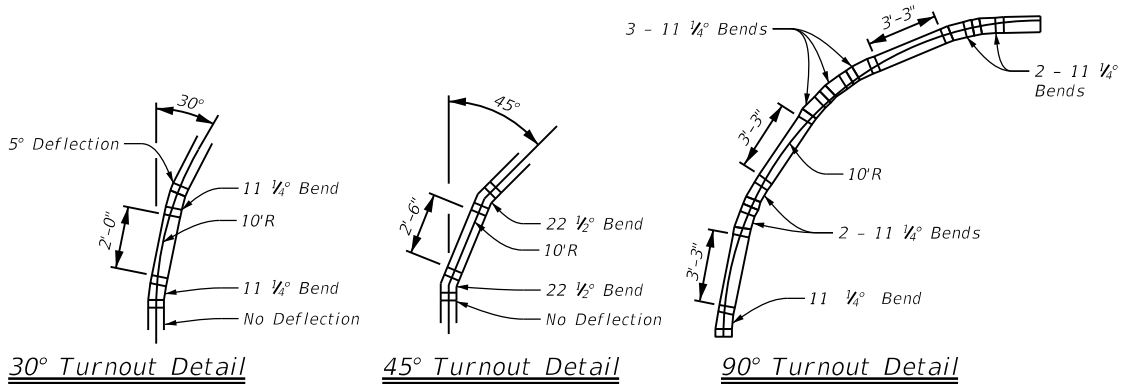
Bore Under Pavement



Steel Casing Detail "A"

General Notes:

1. Typical conduit installation details for jacking or boring beneath existing roadway is diagrammatic in nature. Roadway cross-slopes may vary for each crossing.
2. Jack or bore in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box" except for measurement and payment.
3. Furnishing and installation of pressure grouting will not be paid for directly but considered incidental to Special Specification "ITS Multi-Duct Conduit" or Item 618, "Conduit."
4. When boring under pavement shallower than 48 inches from finished grade to top of conduit, provide Schedule 40 steel casing under pavement to encase the conduit system. Provide steel casing of a size to accommodate ITS conduit and electrical conduit as shown in the plans. Provide a minimum 20 percent void space around all conduits. Steel casing will not be paid for directly but considered incidental to Special Specification, "ITS Multi-Duct Conduit" or Item 618, "Conduit."
5. When a depth greater than 48 inches can be achieved from finished grade to top of conduit, provide Schedule 80 PVC. No steel casing required unless otherwise directed.
6. Ensure all conduit bends are in conformance with the latest edition of the National Electrical Code.
7. Provide GPS coordinate points to the District for all ground boxes installed, and shifts or deviations of the conduit alignment from the plans required to avoid obstructions or utilities. Take GPS coordinate points at the start of the transition, at the point of curvature, and at the end of the transition at the point of tangency. Document the turnout radius and installed depth. Provide GPS coordinate points in NAD83 coordinate system and be accurate to 5 feet.




30° Turnout Detail

45° Turnout Detail

90° Turnout Detail

Provide this arrangement of conduit and fittings or approved equal at all 30°, 45°, and 90° bends, horizontal and vertical, to achieve a nominal 10' conduit radius for pre-assembled multi-duct conduit. See Note 7.

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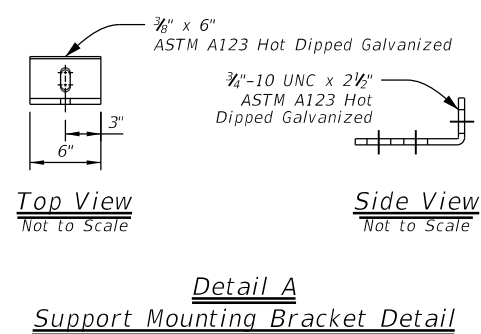
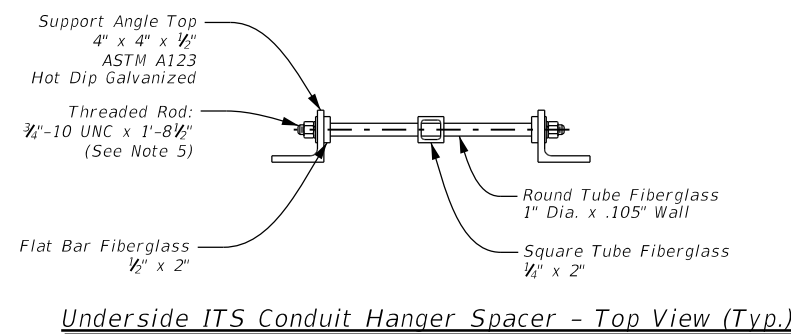
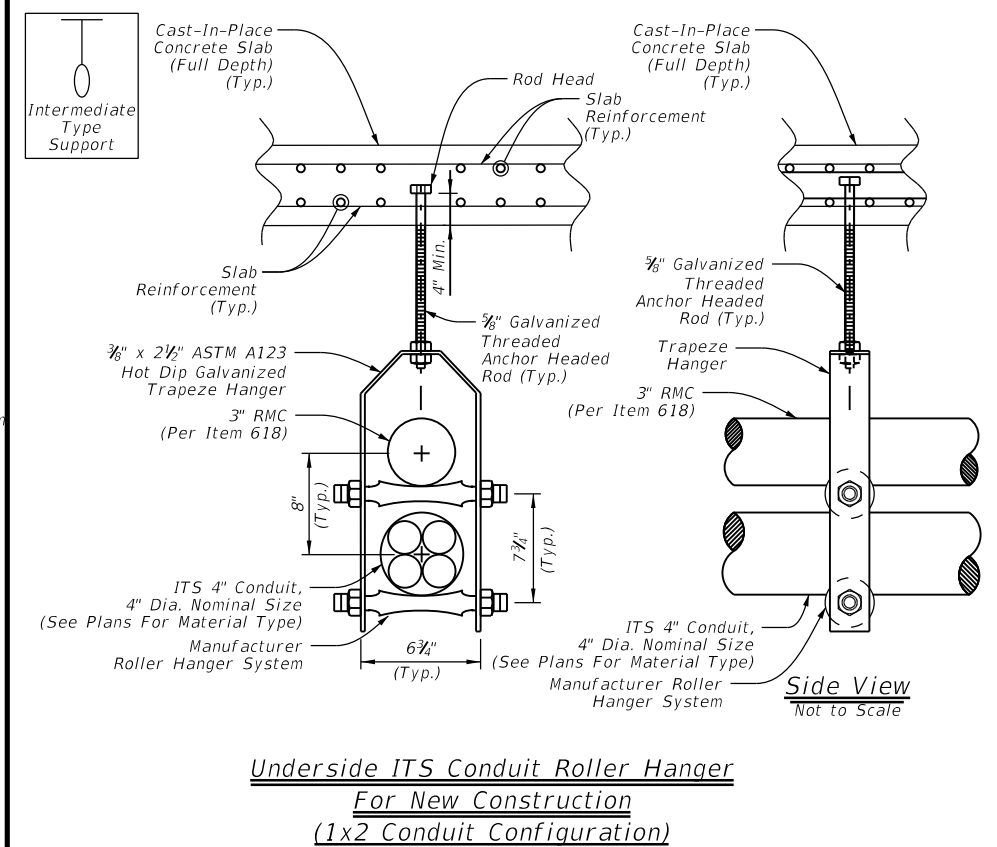
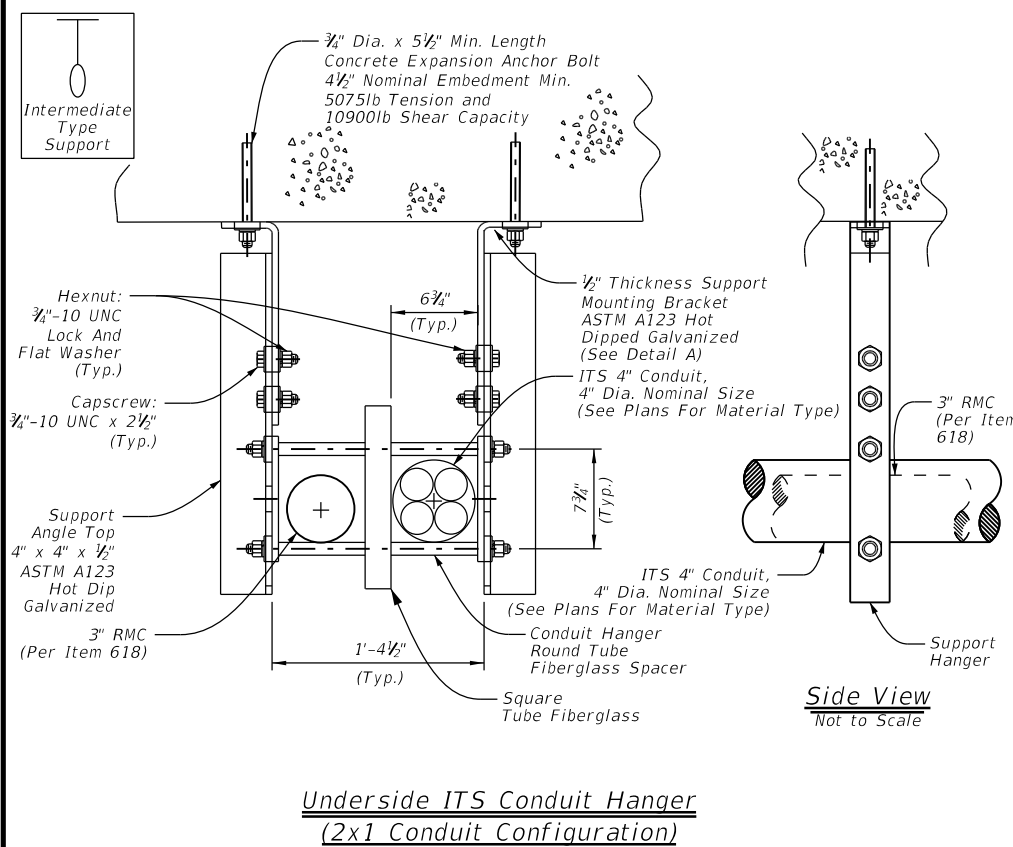
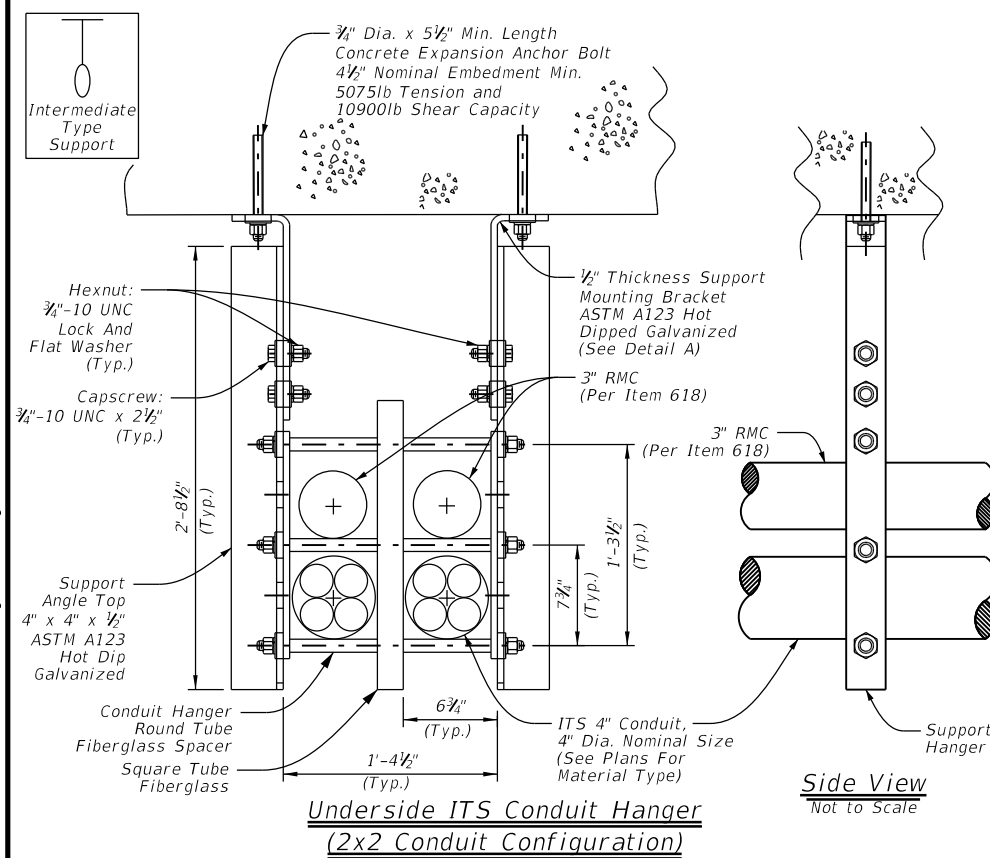
Traffic Operations Division Standard

ITS CONDUIT
BORE AND STEEL CASING
DETAILS

ITS(28)-16

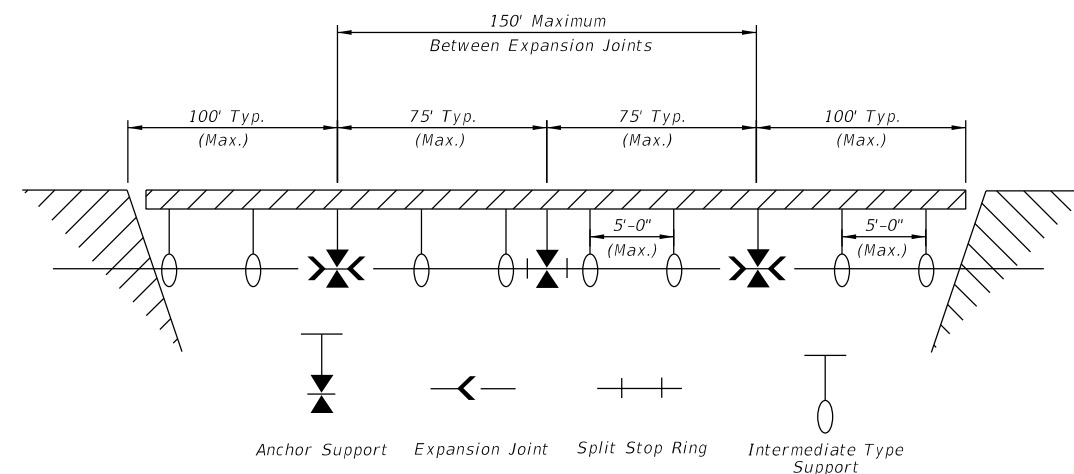
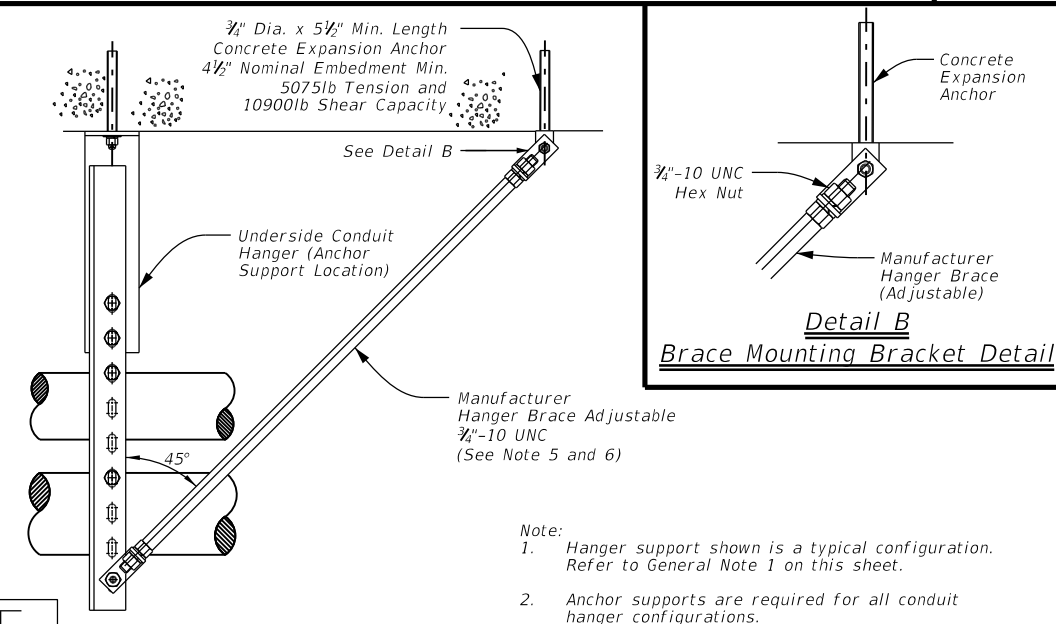
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General Notes:

1. Use commercially designed multiple conduit support hangers as an alternative to the hanger details on this sheet. Submit hanger details and specifications to the Engineer for approval prior to using on project.
2. Refer to the contract plans for conduit design and hanger configuration requirements. For two (2) conduit configurations, use the typical underside hanger or roller hanger system.
3. Maximum spacing of intermediate conduit hangers is 5'-0" C-C.
4. Hangers vary in length, but do not allow conduit to hang below bridge beams. Refer to ITS(30) for minimum clearance requirement below bridge deck.
5. Ensure all conduit hanger steel shapes conform to ASTM A36 and expansion anchors conform to ASTM A307 and are supplied with minimum of one nut and washer per bolt. Galvanize all steel plate, shapes, and hardware per Item 445, "Galvanizing".
6. Use angle bracing on both sides of conduit support for conduit anchor point hangers.
7. Refer to ITS(32) for expansion-deflection joint details.
8. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
9. Select conduit lengths so that couplings do not coincide with conduit hanger locations.
10. Allowable types of outer duct material for above ground ITS conduit include rigid metallic conduit (RMC) and fiberglass.
11. Ground all galvanized rigid metallic conduit (RMC) hangers per manufacturer recommendations when electrical conductors present.
12. Refer to ITS(30) for anchor details through pre-stressed concrete panels.
13. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).




- Notes:
1. *Install conduit supports within 3'-0" of all enclosures and conduit terminations.*
 2. *The number of intermediate supports varies based upon the distance between anchor supports.*

*Underside Anchor Hanger Support Spacing (Typ.) **

* Refer To BICSI Outside Plant Design Reference Manual (OSPDRM) For Conduit Hanger Expansion Joint Placement

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 <p style="font-size: 24pt; margin: 0;">ITS CONDUIT HANGER DETAILS</p> <p style="font-size: 36pt; margin: 20px 0 0 0;">ITS(29)-16</p>	<p style="font-size: 14pt; margin: 0;">Traffic Operations Division Standard</p>
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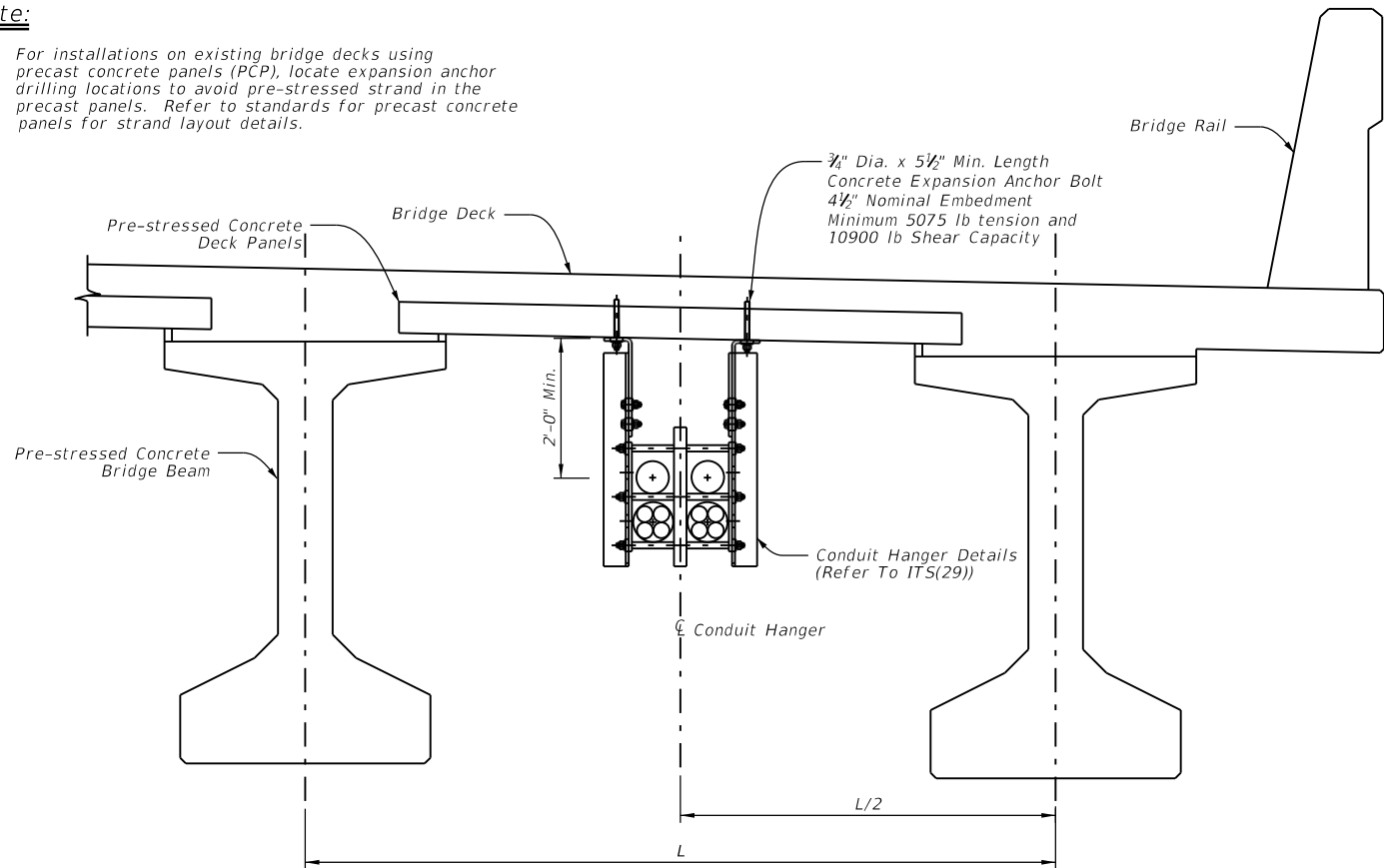
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Note:

- For installations on existing bridge decks using precast concrete panels (PCP), locate expansion anchor drilling locations to avoid pre-stressed strand in the precast panels. Refer to standards for precast concrete panels for strand layout details.

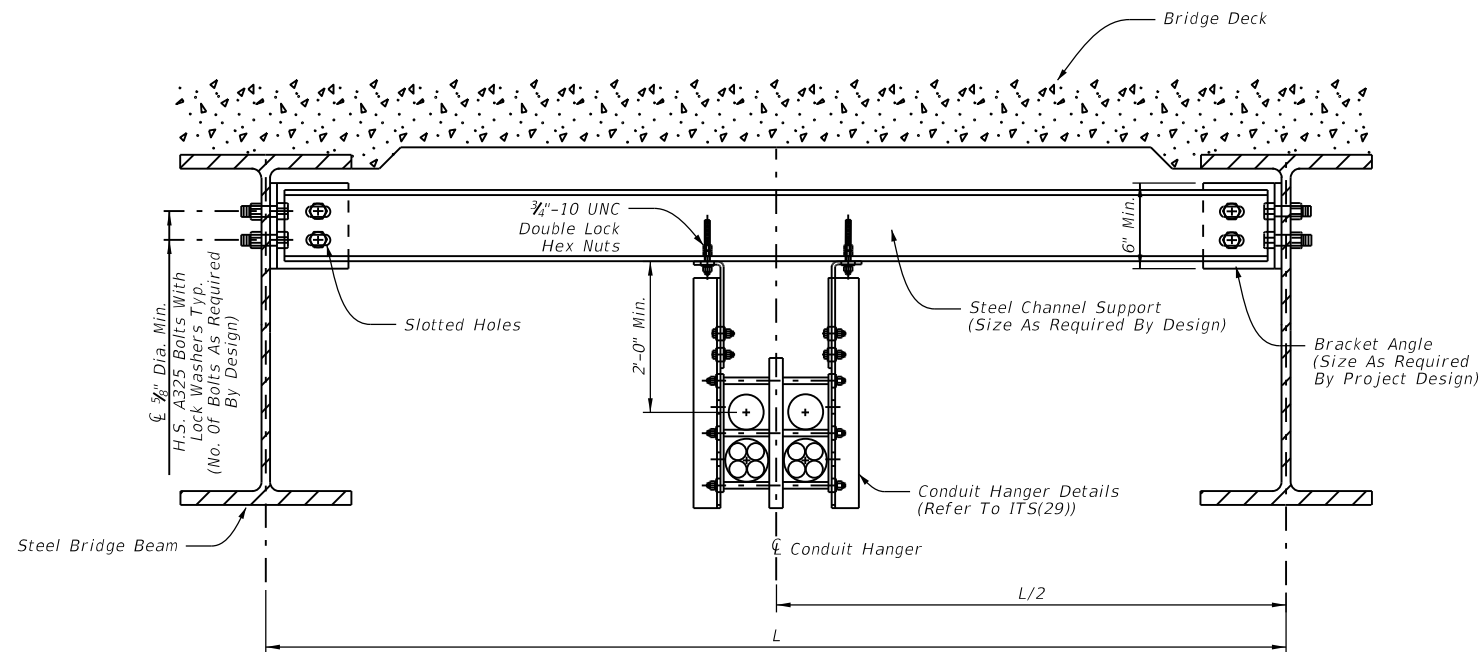


Structure Mounted ITS Conduit - Concrete Bridge Deck With Precast Panels

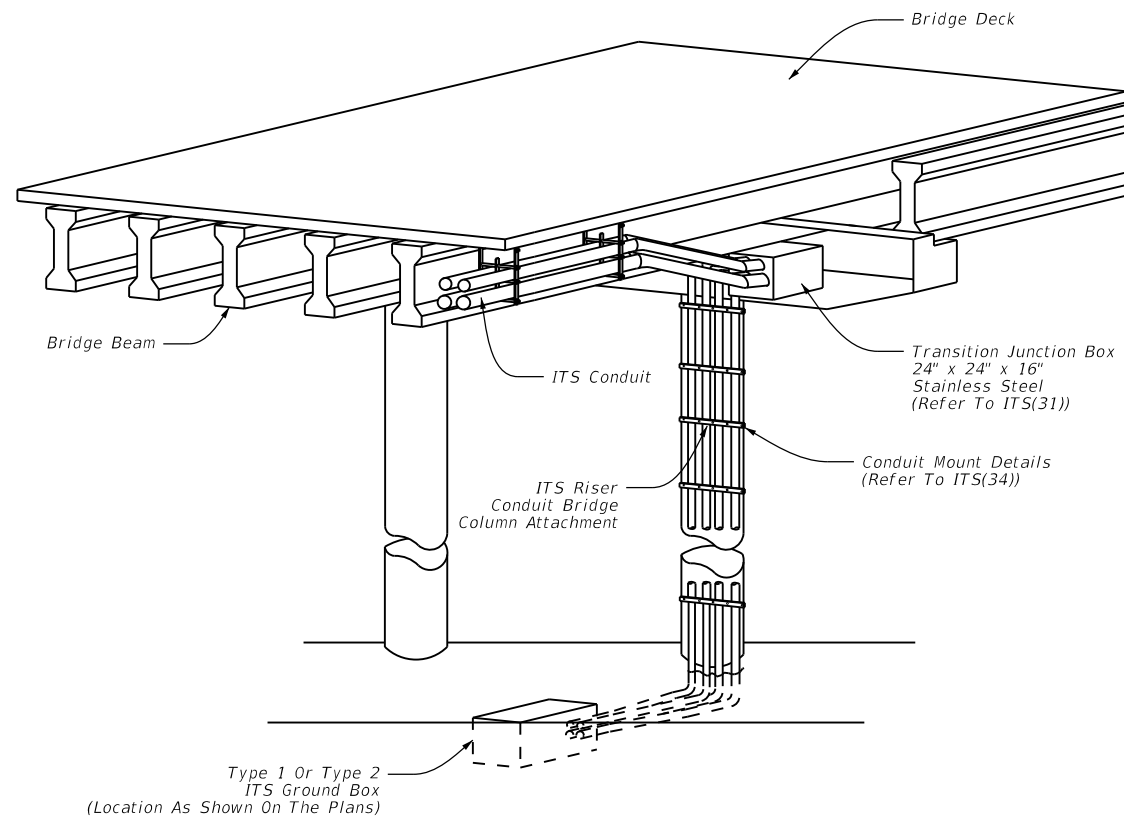
Refer To ITS(29) For General Notes

Note:

- Position conduit hanger height to avoid conflicts with diaphragms in the conduit runs.




Typical Alternate Conduit Hanger Support (Steel I-Beam Mount)



Underside Conduit Hanger Transition Detail

General Notes:

- The alternative mounting conduit hanger support mounting detail for steel I-Beam structures as shown is a suggested detail for steel structures. Submit details for the configuration shown on this sheet via shop drawings and include structural load analysis, support member and connection design. Seal all calculations and shop drawings by a Texas P.E.
- Conduit hanger support mounting details for concrete bridge deck with precast panels as shown are a suggested method for pre-stressed concrete beam structures. Submit any deviation from these details via shop drawing and include structural load analysis, support member, and connection design. Seal all calculations and shop drawings by a Texas P.E.
- Locate auxiliary conduit hanger supports for steel structures at a maximum 5'-0" spacing.
- For conduit loads located between beams exceeding 5 lbs per ft, furnish structural load analysis calculations for adjacent beams in the shop drawing submission.
- Submit design details for structure with cathodic protection in the shop drawing submission.
- Do not extend conduit hangers below the bottom of the bridge beams (any exceptions at end spans are subject to approval).
- Drilling in pre-stressed beams or field welding of steel beams is not permitted. Submit any exceptions on a case by case basis for evaluation and approval by the Engineer.
- Ensure all conduit hanger assemblies are furnished and supplied by the conduit hanger manufacturer.
- Galvanize all hardware and structural steel that is not stainless steel. Ensure all bolt hardware used to secure hangers to steel structures conforms to A325 for high strength. Ensure all expansion anchors conform to ASTM A307. Separate dissimilar materials for use of galvanized hardware with weathering steel girders.
- Select conduit lengths so that couplings do not coincide with conduit hanger locations.
- Refer to Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit", for details on conduit mandreling and other testing required upon conduit installation.
- Provide a flat pull cord in each conduit and inner duct to allow for installation of future cables to match 1250 lbs-ft tension. Refer to ITS(27) for additional conduit details.
- Provide a transition junction box for conduit access located outside the abutments for bridge spans < 800 ft. For bridge spans > 800 ft., locate an additional junction box for conduit access near the mid-span/pier.
- Provide ITS conduit of the type and configuration shown on the plans in accordance with Special Specification, "ITS Multi-Duct Conduit" or Item 618 "Conduit". Ensure all other conduit is in accordance with Item 618 "Conduit" and as shown on the plans.
- Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).



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Traffic Operations Division Standard

STRUCTURE MOUNTED ITS CONDUIT

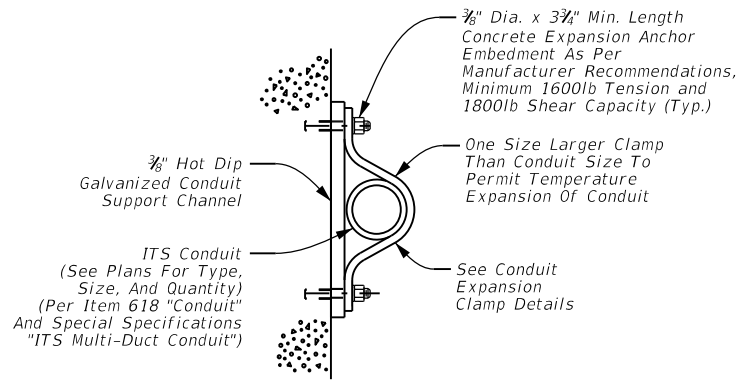
ITS(30)-16

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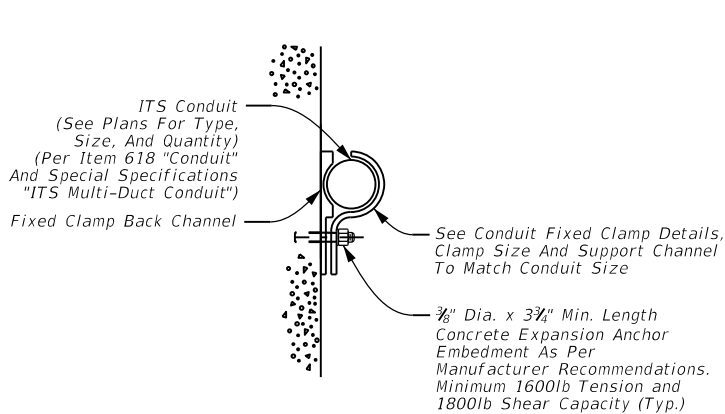
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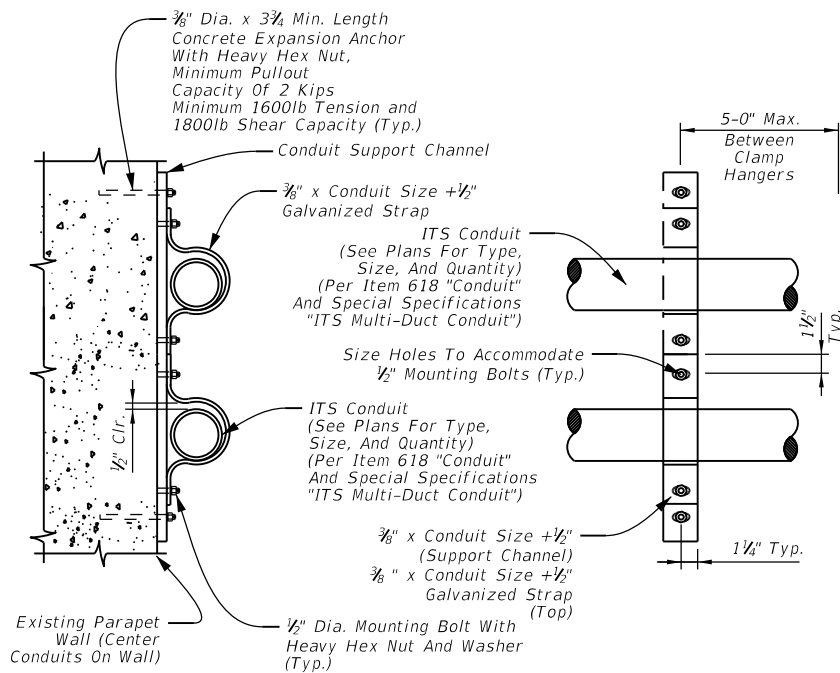


Conduit Expansion Clamp



Conduit Fixed Clamp

Conduit Clamp Details (Typ.)

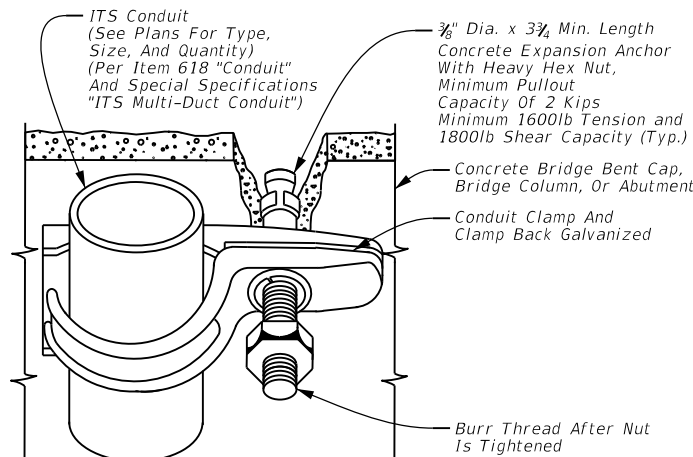


Side View

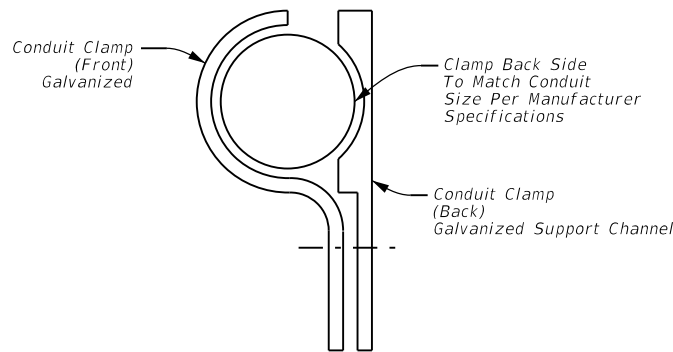
Top View

Elevation View

Conduit Expansion Clamp Details

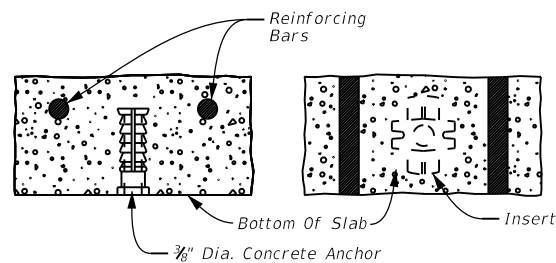


Conduit Fixed Clamp Back Channel

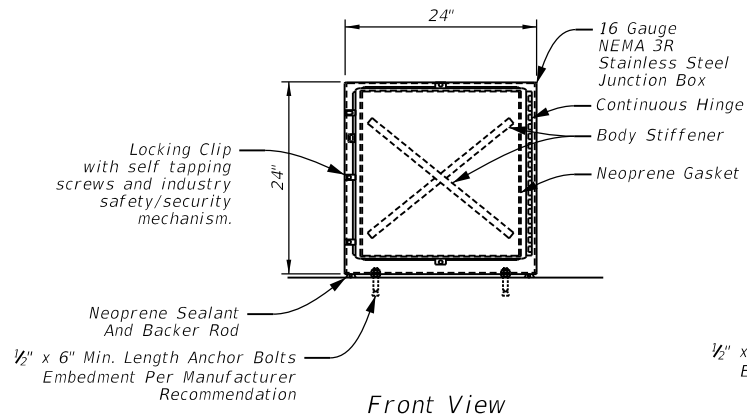


Conduit Fixed Clamp Details

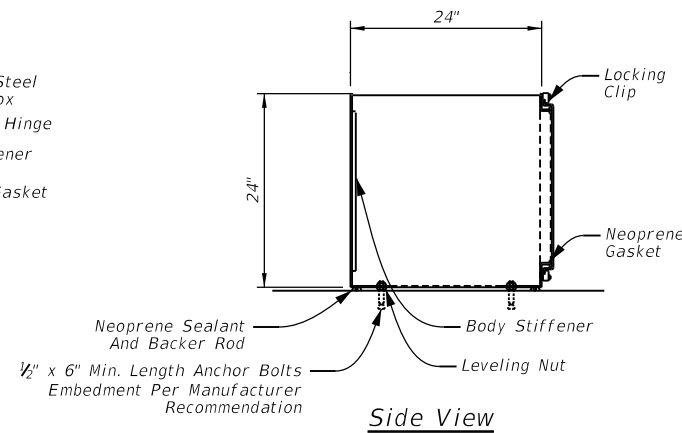
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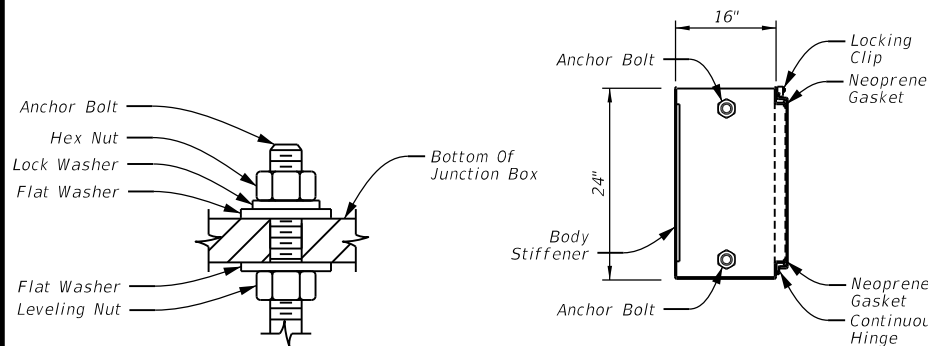
Conduit Fixed Clamp Concrete Insert Detail



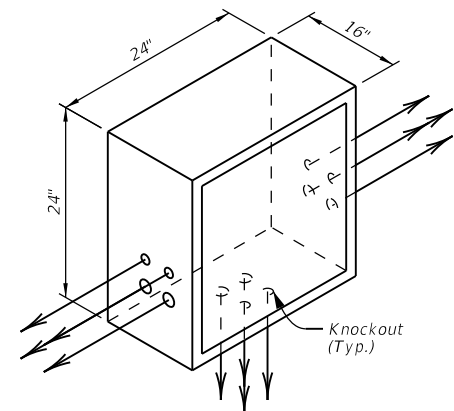
Front View



Side View



Top View



Isometric View

Anchor Bolt Detail

(May Vary On Mounting Scenario)

24" X 24" X 16" Stainless Steel Transition Junction Box Detail


Notes:

1. Transition box as depicted is top mount. Actual anchor fasteners and knockout location will vary based upon mount location and manufacturer recommendations.
2. Secure the transition box cover using self tapping screws with industry safety/security mechanism.
3. Typical knockout locations shown are for diagrammatic purposes only. The number of transition boxes required at a given location will vary depending on the number of conduits and cable storage requirements for cabling run(s).

General Notes:

1. Ensure all duct/conduit bends are in accordance with the latest version of the NFPA 70, National Electrical Code and as recommended by the manufacturer.
2. Utilize separate transition junction boxes for communications and electrical conduit runs.
3. Maintain constant slope in all duct/conduit runs.
4. Ensure maximum spacing of conduit clamps is 5'-0" C-C.
5. Galvanize all hardware, including anchor bolts, nuts, and washers per TxDOT Item 445, "Galvanizing". Ensure all expansion anchors conform to ASTM A307.
6. Provide a minimum NEMA 3R junction boxes. Construct all junction boxes in accordance with manufacturer specifications. Install junction boxes in accordance with the latest edition of NFPA 70, National Electrical Code.
7. Junction boxes and associated appurtenances are incidental to ITS conduit.
8. Install all conduit sweeps into junction boxes in accordance with allowable bend radius of the installed cable.
9. Install conduit support within 3'-0" of all enclosures and conduit terminations.
10. Refer to ED standard sheets for additional details on parapet mounted conduit.

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Traffic Operations Division Standard

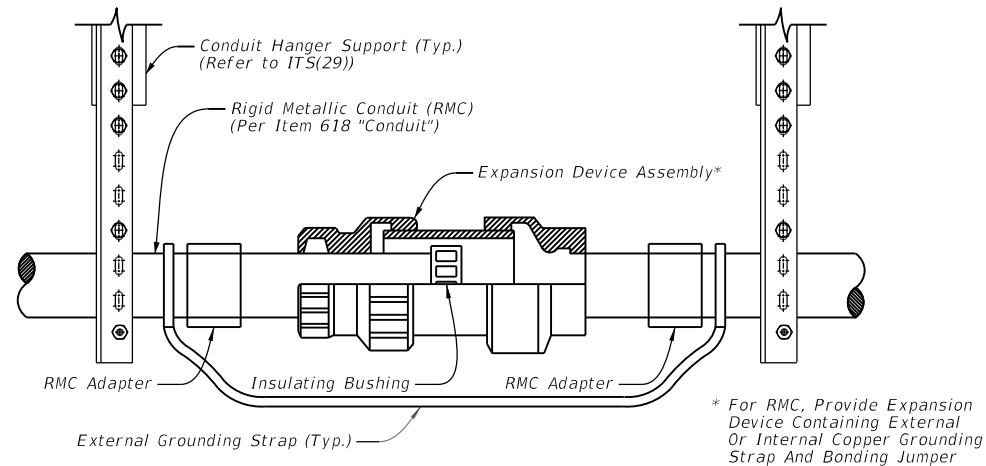
PARAPET MOUNTED ITS CONDUIT AND TRANSITION BOX DETAIL

ITS(31)-16

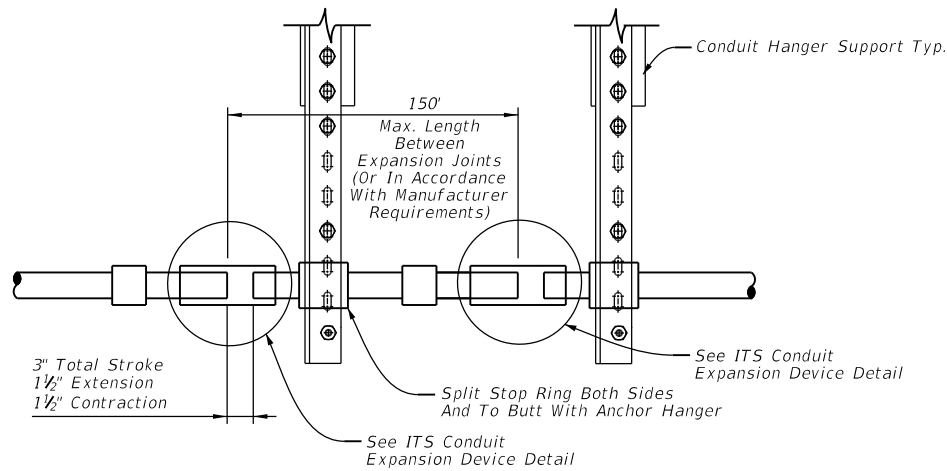
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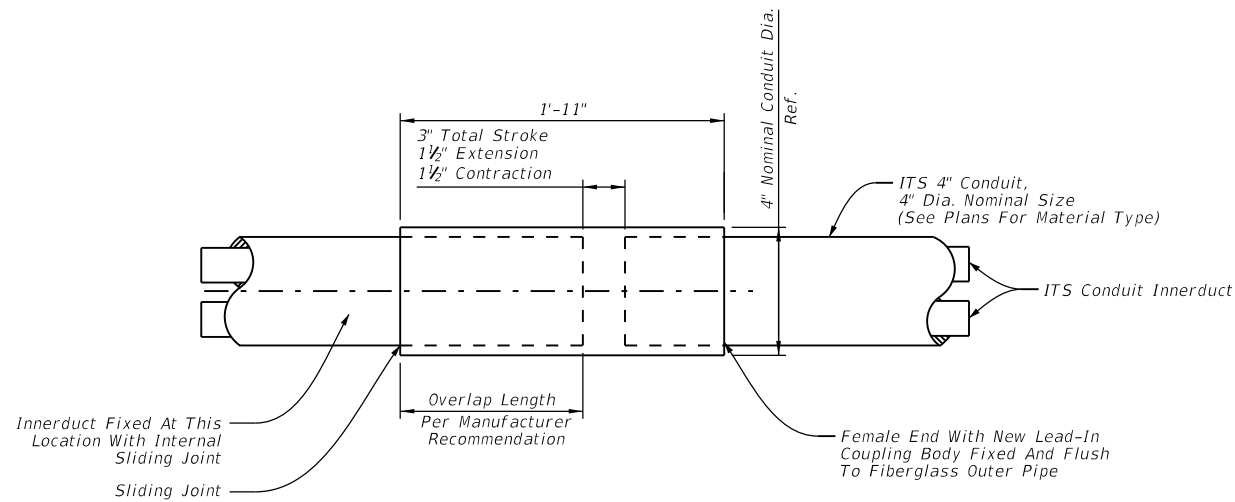
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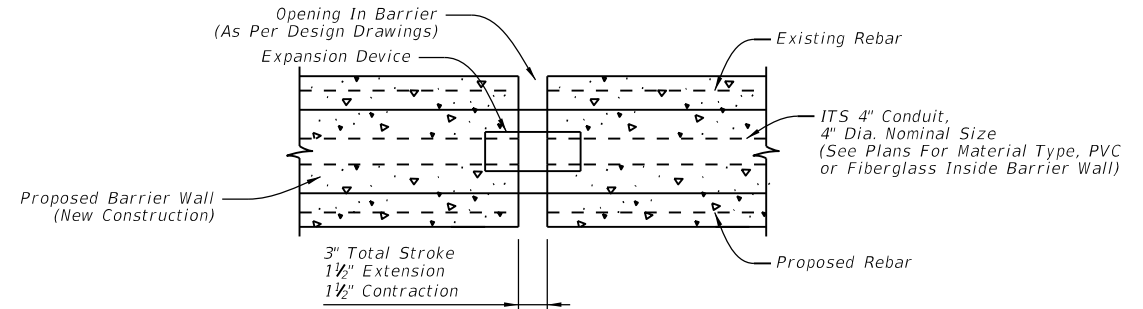
RMC Conduit Expansion Device Detail (Typ.)



ITS Conduit Expansion Device Placement (Typ.)




ITS Conduit Expansion Device Detail



ITS Conduit In New Construction Barrier Wall Expansion And Deflection Joint Fitting (Typ.)

General Notes:

1. Install expansion device at all open joints, at each end of bridge abutments and between bridge bents, allowing for 3" movement.
2. Provide a minimum of two (2) expansion joints at all bridges. Ensure expansion joint spacing does not exceed manufacturer recommendations.
3. Ensure conduit lengths are selected so that couplings do not coincide with hanger locations.
4. Ensure all rigid metallic conduit (RMC) expansion devices are constructed per manufacturer specifications.
5. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).



Texas Department of Transportation

Traffic
Operations
Division
Standard

EXPANSION /
DEFLECTION JOINT

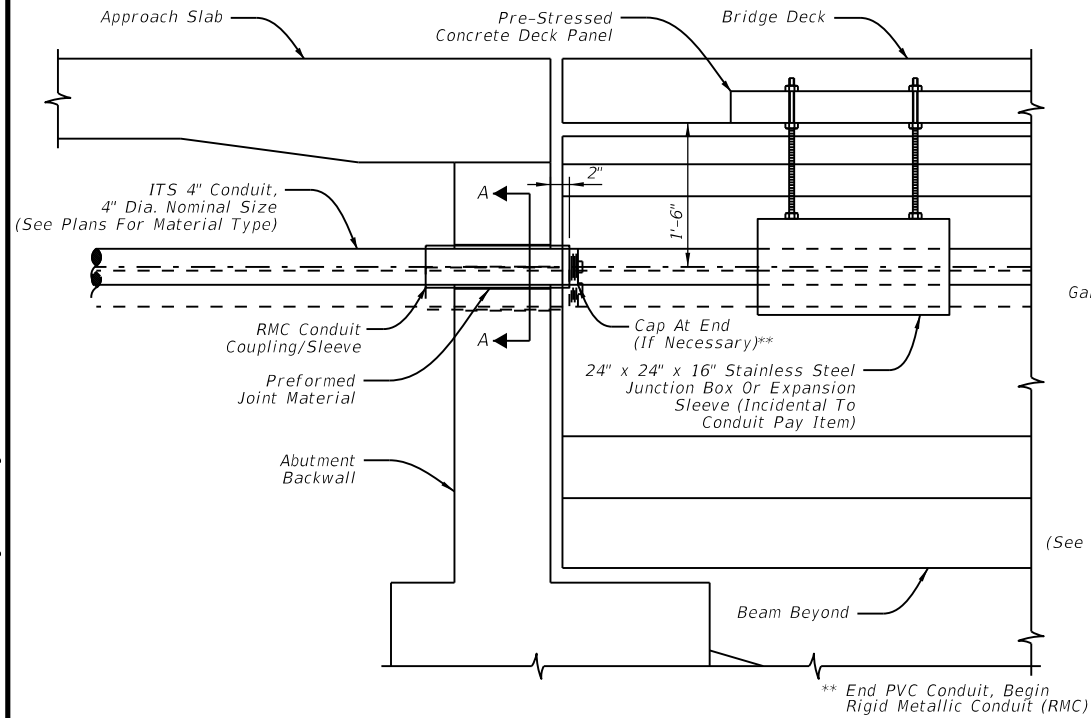
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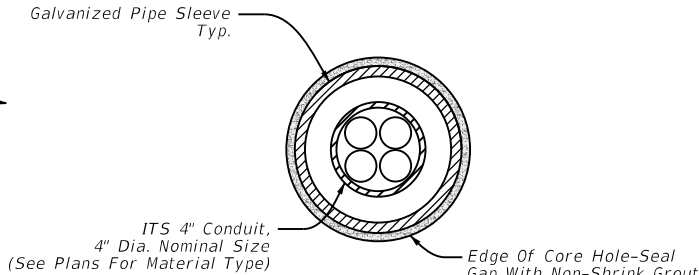
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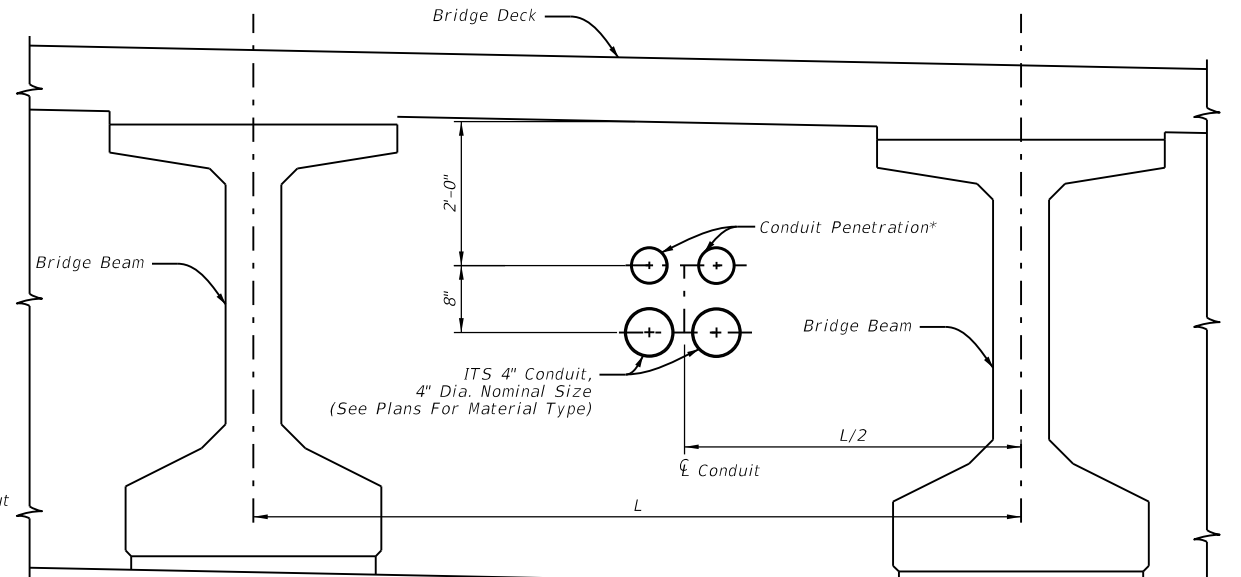
Section Through New Construction Abutment Backwall

Standard Notes:

1. If constant conduit elevation is maintained from the abutment backwall to the underside conduit hangers, provide an expansion joint sleeve (same size as conduit) with one travel overlap. If conduit elevation varies from the abutment backwall to the underside conduit hangers, provide an abutment wall mounted transition junction box (NEMA 3R rated).
2. Provide separate pipe sleeve for each conduit through abutment backwall. Size sleeve per manufacturer recommendations.

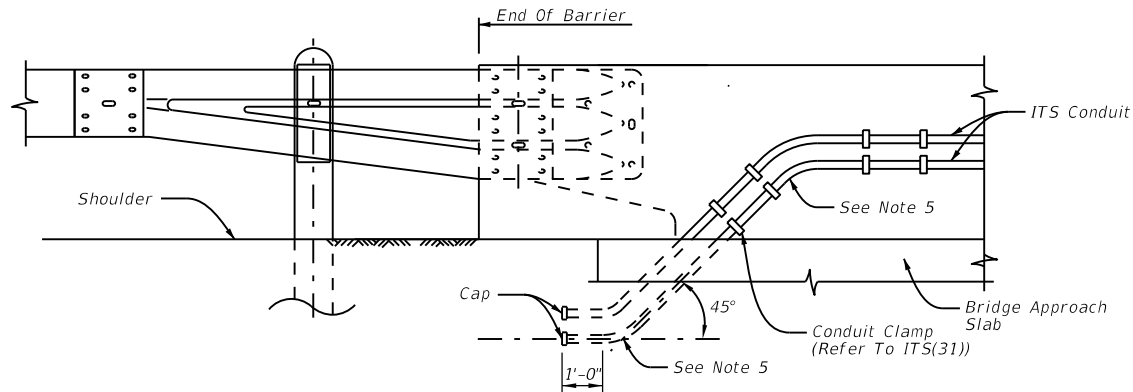


Section A-A (Typical Pipe Sleeve)

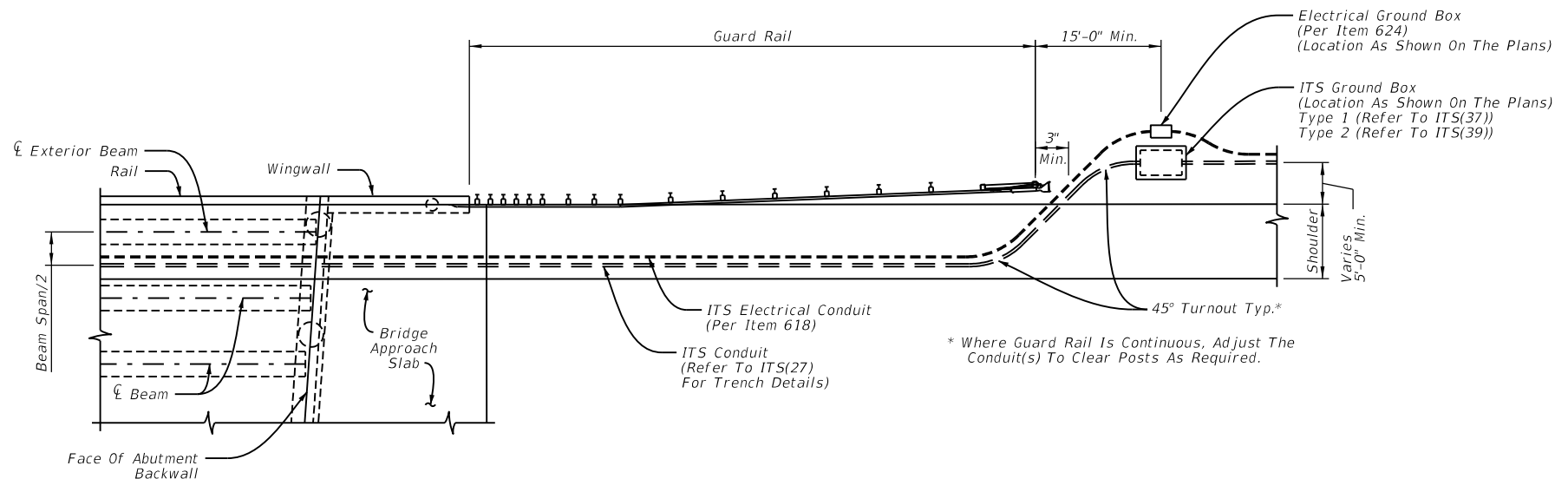


Abutment Elevation

ITS Conduit Transition At Bridge Abutment Detail




Parapet Mounted Conduit Transition To Ground Detail



Conduit Through Abutment Backwall Transition To Ground Box Detail

General Notes:

1. An alternative option to conduit mountings shown is conduit encased within parapet or bridge structure at crossings. Submit shop drawings and specifications to the engineer for approval.
2. Install expansion sleeves at bridge expansion joints and per manufacturer recommendations.
3. For conduit crossings over bridges, provide ITS communications junction boxes at 1000' maximum spacing and electrical junction boxes at 450' maximum spacing.
4. Keep all junction boxes sufficiently clear of guard rail or other obstructions to maintain clear access.
5. Install conduit sweep at an angle that accommodates cable bend radius. Do not exceed 45 degrees to the shoulder line. Refer to ITS(28) for conduit turn-out details.
6. Do not install junction boxes within paved shoulder area.
7. Ensure all work is in compliance with the latest edition of NFPA 70, National Electrical Code.
8. Junction boxes and associated appurtenances are incidental to ITS conduit.
9. For installation requiring ITS conduit transition within mechanically stabilized earth (MSE) walls with select fill, locate conduit to avoid reinforced straps. Refer to retaining wall standards for further details.
10. Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).

**Texas Department of Transportation**

Traffic Operations Division Standard

ITS CONDUIT TRANSITION AT ABUTMENT

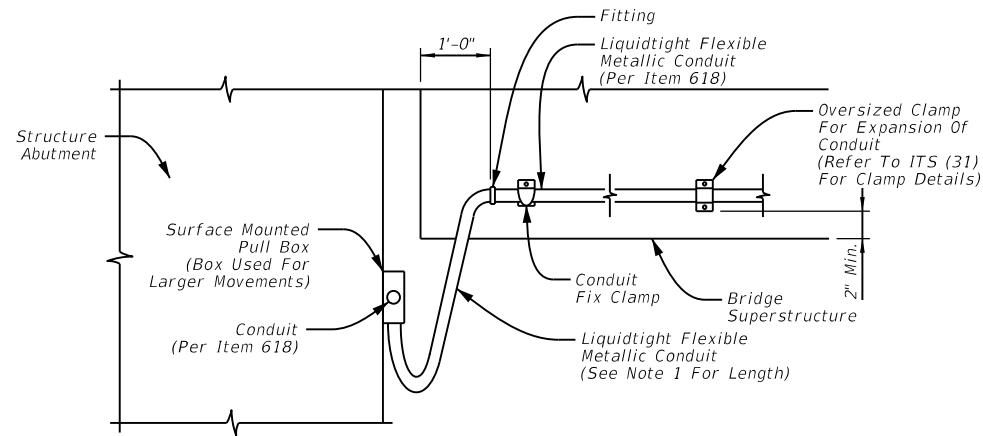
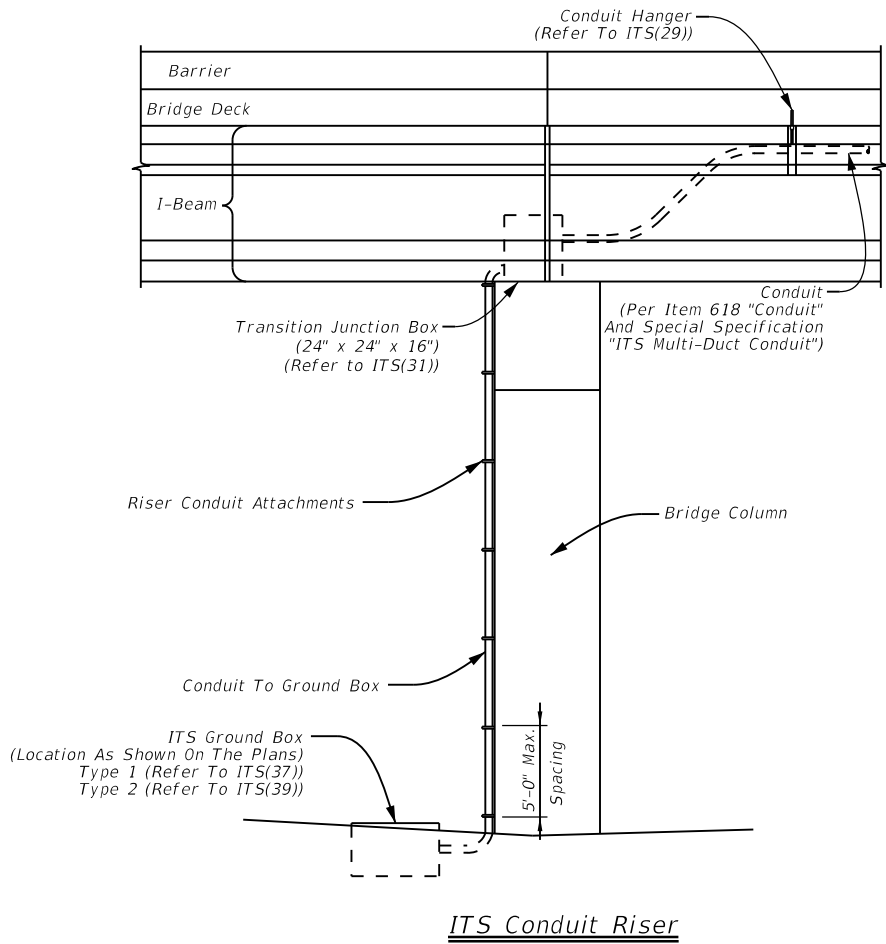
ITS(33)-16

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	DIST	COUNTY	SHEET NO.	
	HOU	MONTGOMERY	579	

Sheet Details
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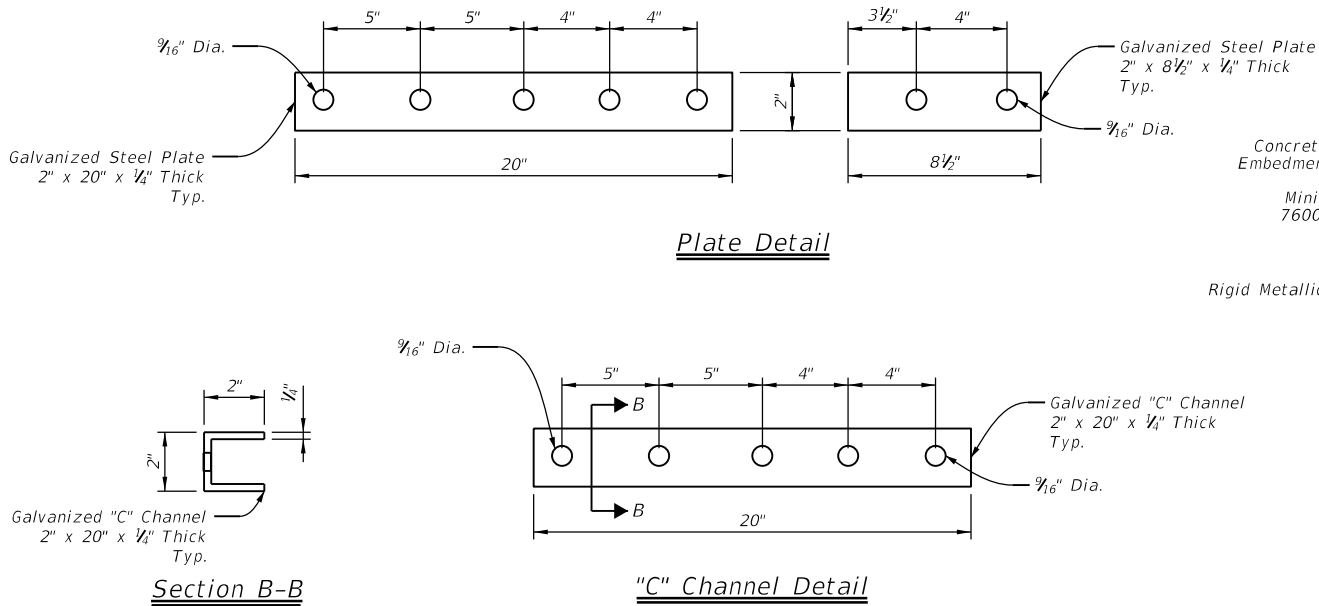
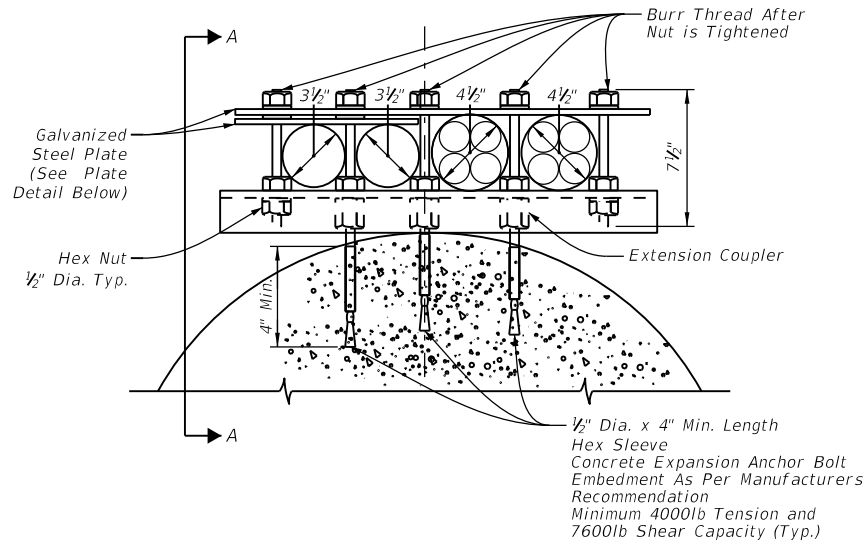
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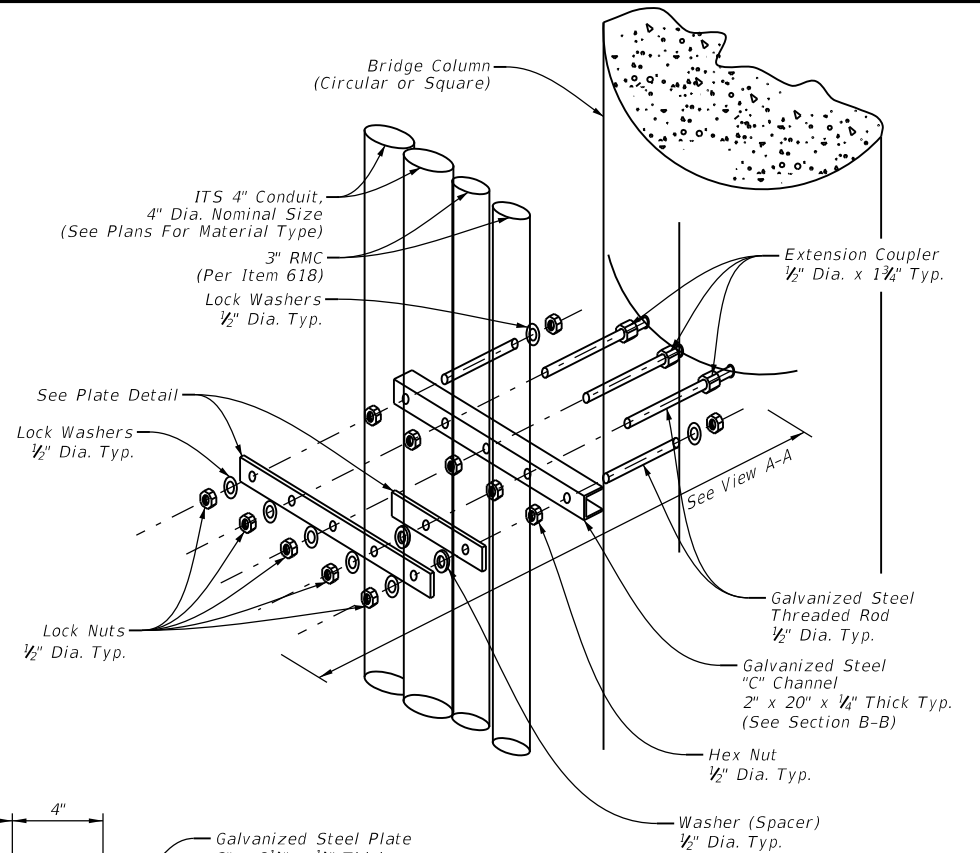


Notes:

- Bond all external structure mounted conduit throughout entire length of run and ground the run at ground box locations according to ITS(37) and ITS(39).
- The detail shown applies to conduit connections for conduit per Item 618 and is not intended for conduit for fiber optic cable applications.




ITS Riser Conduit Bridge Column Attachment



General Notes:

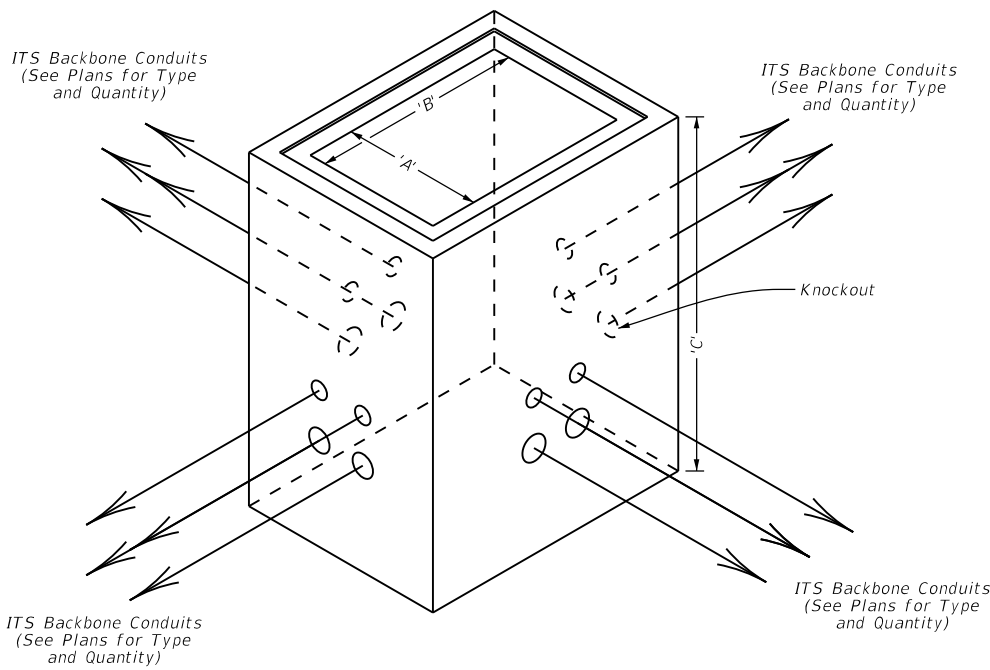
- Utilize an approximate length of flexible conduit at exposed connections of 2 times anticipated movement or 4'-0" minimum.
- Size all transition boxes and surface mounted pull boxes per National Electrical Code Article 314 boxes and fittings.
- For under bridge locations, ensure all junction boxes are kept inaccessible from general public and placed a minimum 10'-0" above surrounding ground.
- Refer to ED standard sheets for additional notes and attachment details for riser conduit.
- See plan sheets for number and size of conduit(s) to be installed.
- Refer to ITS(33) for details involving conduit passing through the abutment.
- Ensure maximum spacing between ITS riser conduit attachments is 5'-0" C-C.
- Install conduit supports within 3'-0" of all enclosures and conduit terminations.
- Ground all rigid metallic conduit (RMC) hangers per manufacturer recommendations when electrical conductors present.
- Ensure all expansion anchors conform to ASTM A307.
- Allowable types of outer duct material for above ground ITS conduit include rigid metallic conduit (RMC) and fiberglass.

Sheet Details
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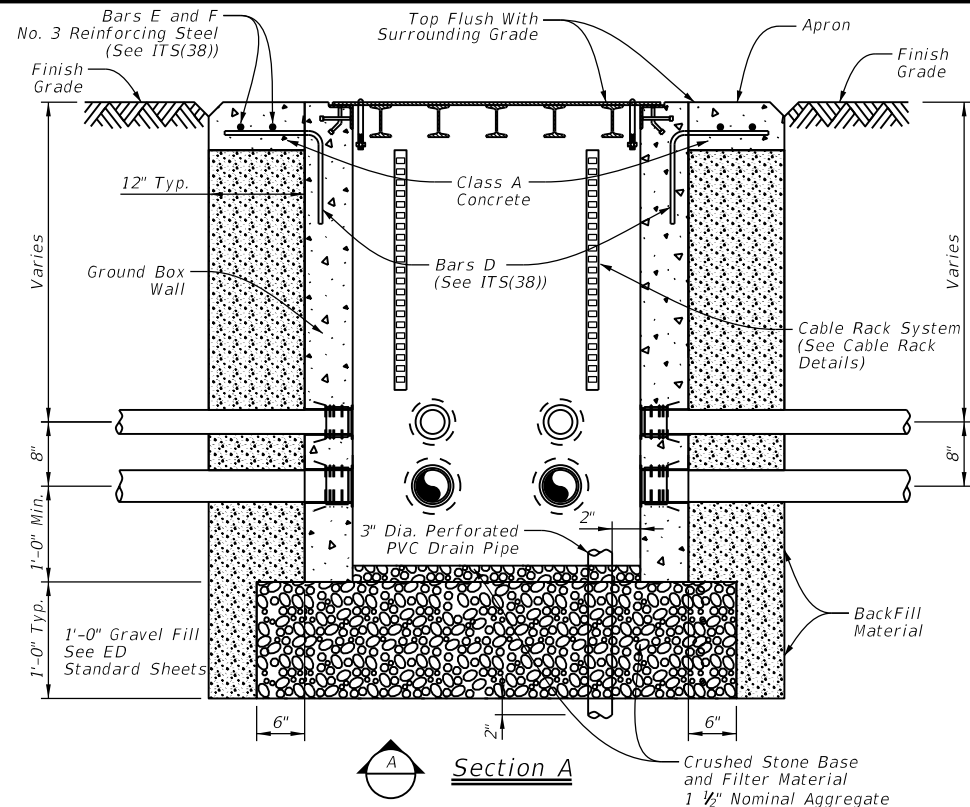
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© TxDOT FEBRUARY 2016		CONT SECT		JOB		HIGHWAY			
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		HOU		MONTGOMERY			580		

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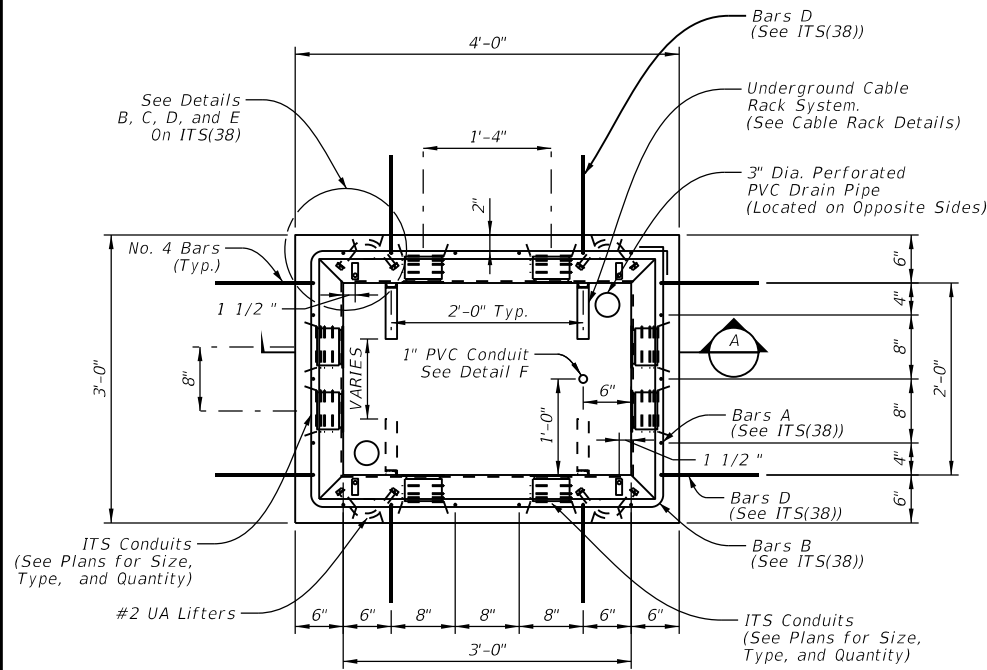
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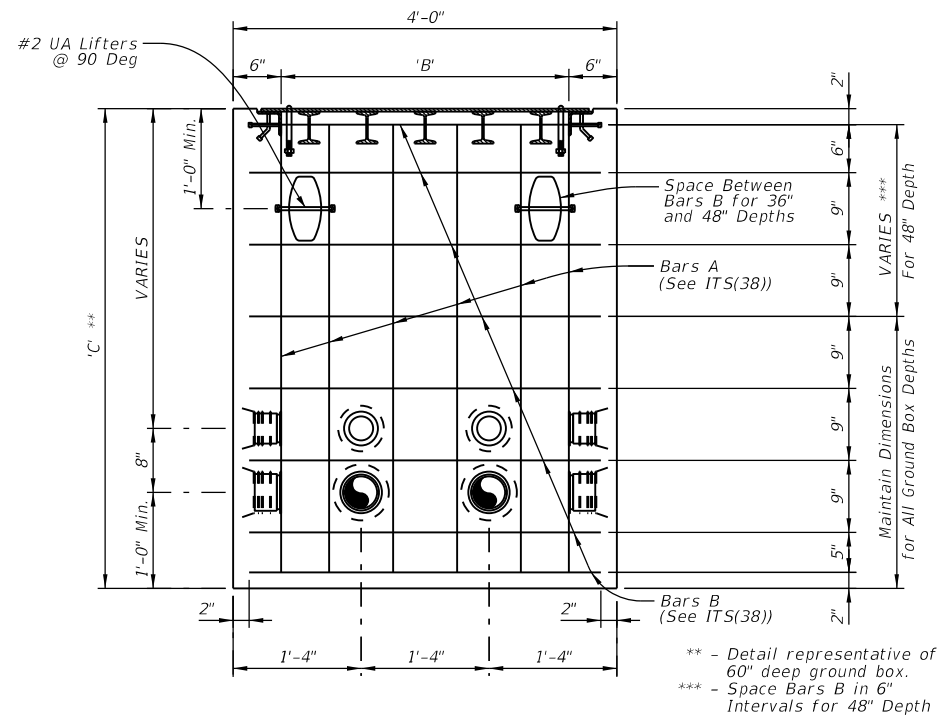
See Ground Box Schedule for A, B, and C Dimensions
Type 1 Ground Box Isometric View



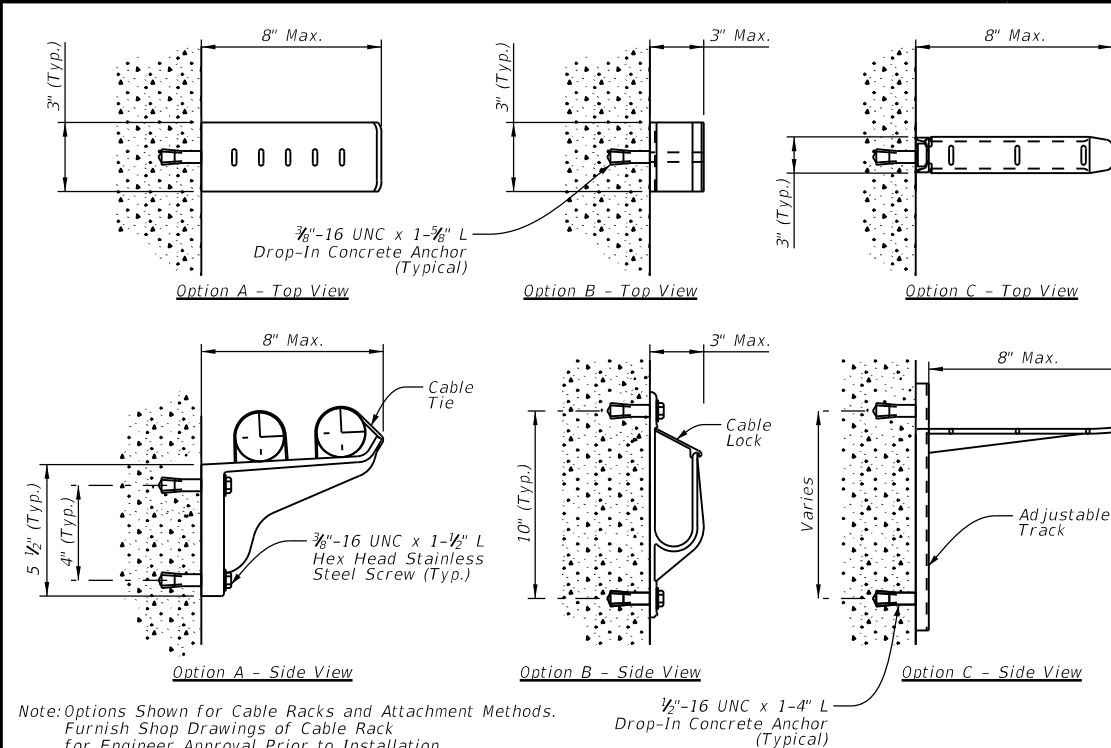
Section A



Note: Bar Spacing is The Same on Opposing Sides.
Type 1 Ground Box Plan View

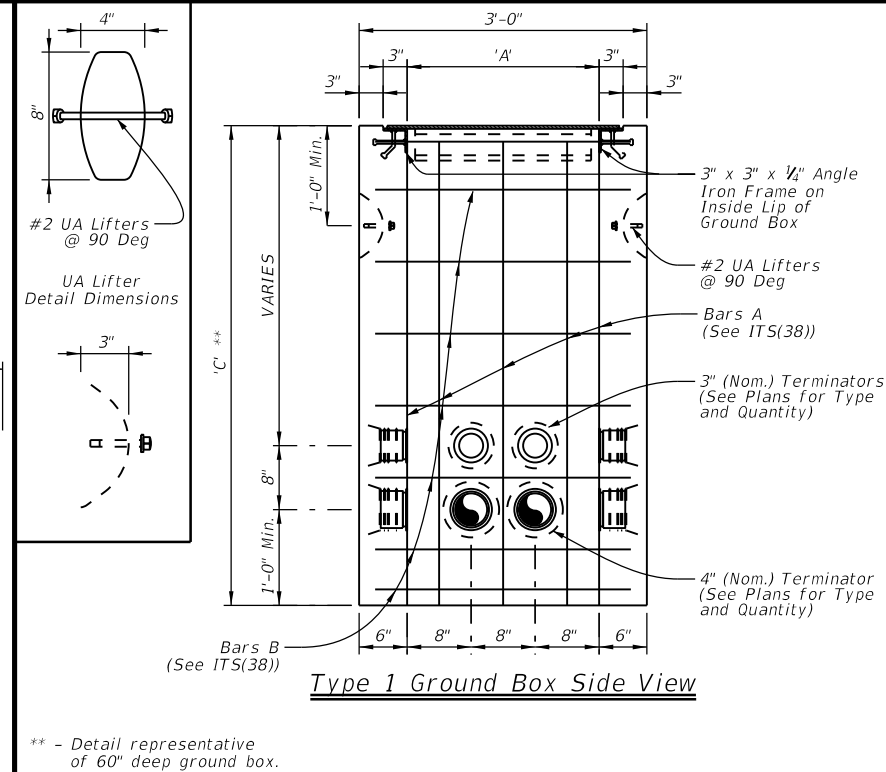


Type 1 Ground Box Elevation View



Note: Options Shown for Cable Racks and Attachment Methods. Furnish Shop Drawings of Cable Rack for Engineer Approval Prior to Installation.

Type 1 Cable Rack Details



Type 1 Ground Box Side View

General Notes:

- Conduit entry points shown represent the standard configuration for backbone conduit as detailed on ITS(27). Additional conduits may be required as shown on the plans.
- Provide Class A concrete for Type "1" ground boxes.
- Provide terminators for the PVC conduit cast in the walls and placed symmetrically about the centerline of the box at the depths shown, unless otherwise noted, for the number of conduits identified on the plans to enter the box.
- Provide terminators appropriately sized for the conduits indicated on the plans. Provide terminators with an air tight and water tight connection.
- Closed bottom Type "1" ground boxes are acceptable in lieu of open bottom boxes. Provide two 3" Dia. perforated PVC drain pipes on opposite corners to optimize water drainage. Provide 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box for closed bottom boxes. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
- Install all open bottom Type "1" ground boxes on a 12-inch base of crushed stone which extends 6 inches in all directions from the perimeter of the box. Crushed stone will be subsidiary to Special Specification, "ITS Ground Box."
- Cap and seal terminators that do not have conduits attached.
- When additional conduit entry points are needed to accommodate existing conduit, core drill conduit knockouts in the field of the appropriate number and size of conduit at each location, as directed by the Engineer.
- Provide a bell fitting on the end of each conduit to ensure a flush fit inside the ground box.
- Concrete grout around the knockout (inside and out) and around the conduit and bell fitting to ensure a neat watertight fit after the conduit and bell fitting have been placed in a knockout. Ensure all openings in the ground box are sealed prior to grouting operations.
- Install a nylon string and plug all unused conduits with tug-plugs sized for the particular conduits. Provide split innerduct plugs in conduits or innerducts with cables to seal the innerduct around the cables to prevent water and dirt from entering.
- Provide steel (ASTM A-153), glass reinforced nylon, or equivalent cable rack assemblies designed to support the amount of cable storage slack identified in the plans. Locate cable rack system on one side only (longer length side) to allow access to the inside of the ground box. Cable racks may be installed at the factory or in the field. When mounting cable racks in the field, seal all penetrations to the concrete side wall to prevent moisture penetration. Ground metallic cable rack systems to grounding system inside ground box in accordance with the National Electrical Code.

Ground Box Schedule

Ground Box Type	'A' Width Inside (Inches)	'B' Length Inside (Inches)	'C' Depth Inside (Inches)
Type 1	24	36	36, 48, 60

Sheet Details
Not to Scale

SHEET 1 OF 2 SHEET 1 OF 2

Texas Department of Transportation

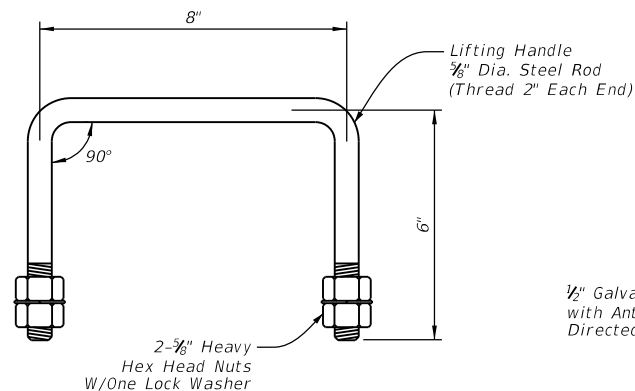
Traffic Operations Division Standard

ITS GROUND BOX DETAILS
TYPE "1" WITH STEEL COVER

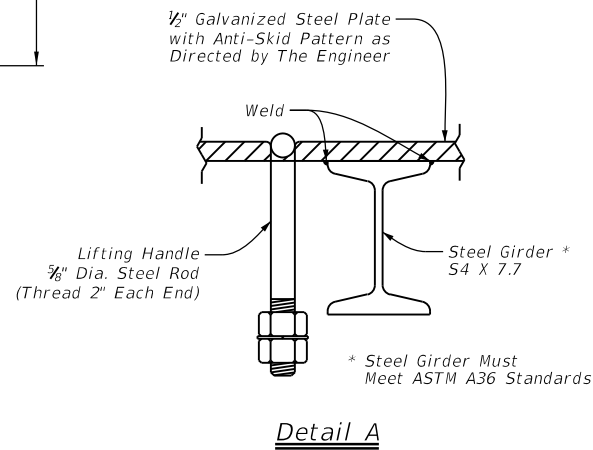
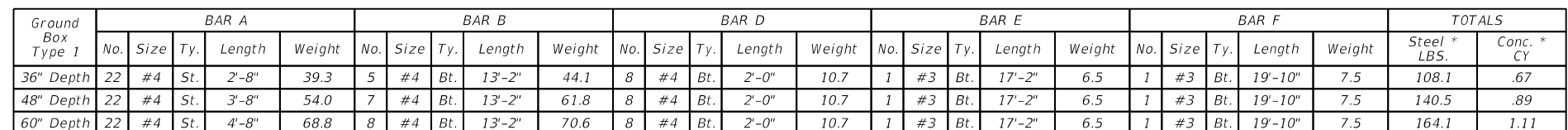
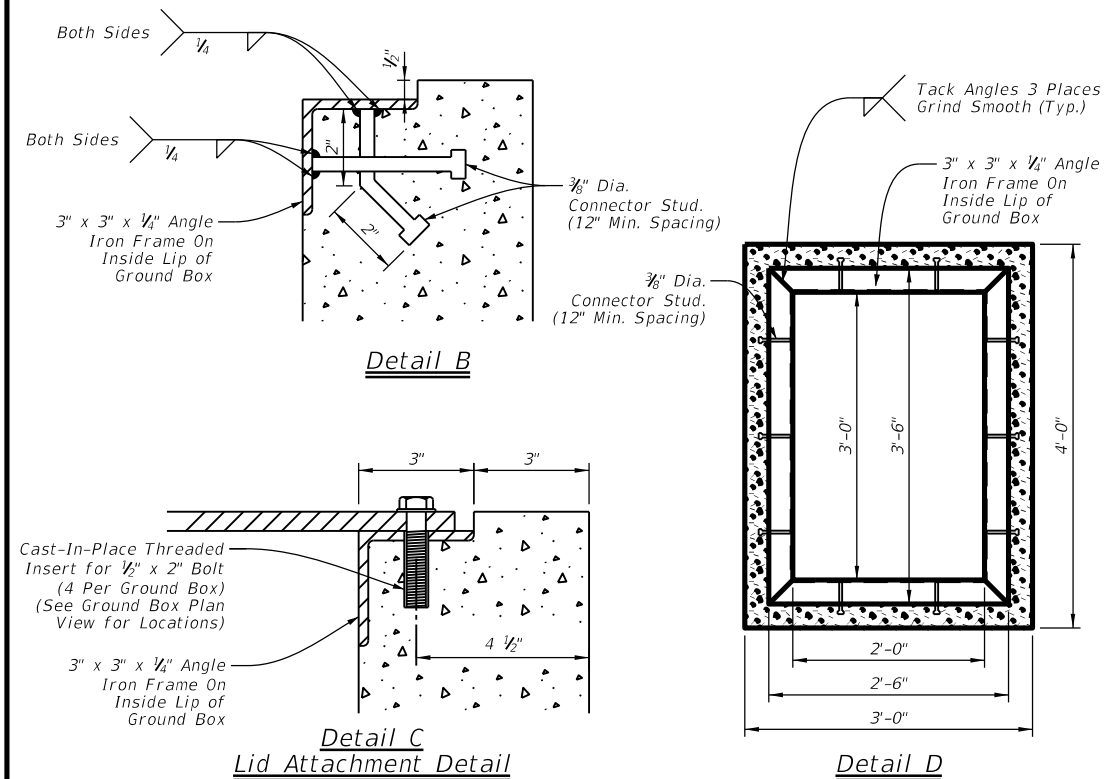
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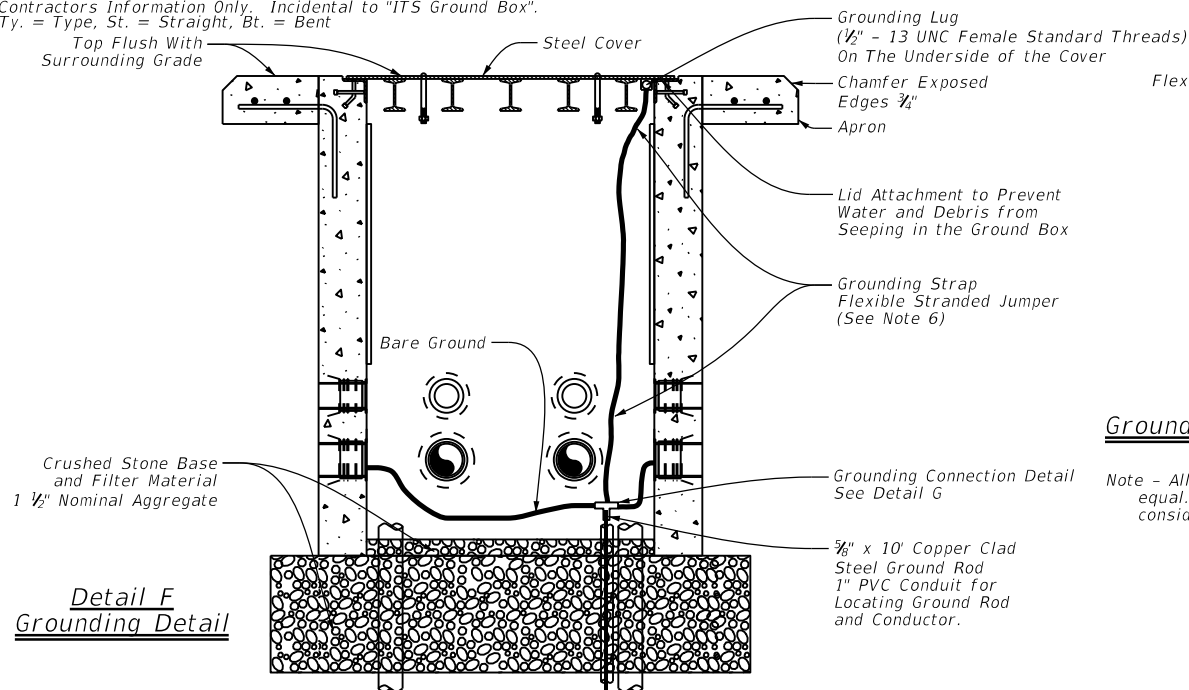
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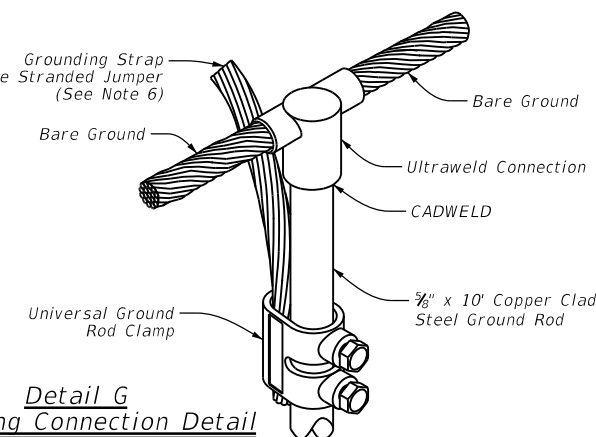
Drop Handle Detail

Detail A

Top Flush With
Surrounding Grade



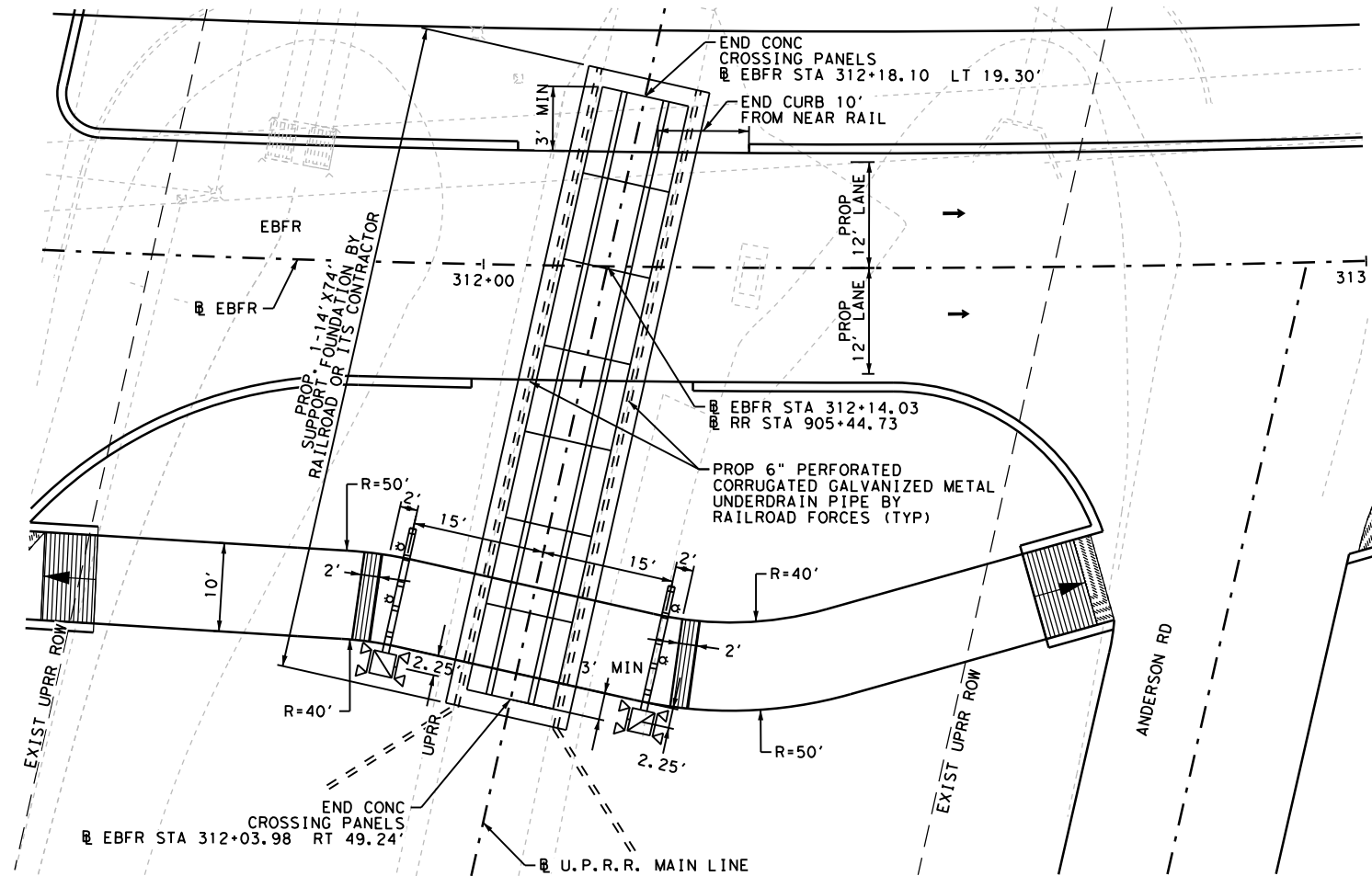
Note - All grounding connections to be CADWELD or approved equal. This work will not be paid for directly, but is considered incidental to ITS ground box.



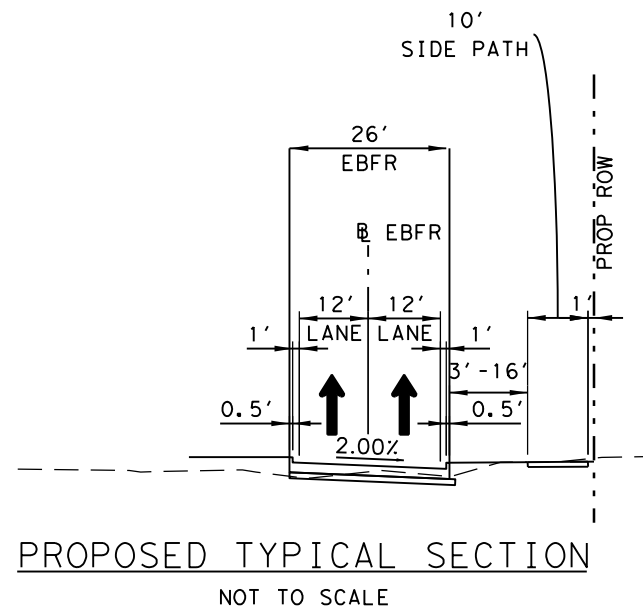
1. See ITS(37) for additional Type "1" ground box details.
2. Hot-dip galvanized steel covers after all welds are made.
3. Label top of cover with the words "DANGER HIGH VOLTAGE TRAFFIC MANAGEMENT" using template-guided, hand-welded lettering at a height of 2 inches to ensure neatness.
4. Provide all Type "1" ground boxes with a securable, tamper-proof cover equipped with a bolting system that positively secures the cover in place.
5. Ground steel covers in accordance with the National Electrical Code.
6. Ground covers to the grounding cable using a split-bolt kearney clamp, and a minimum 8-foot long flexible stranded jumper the same size as the grounding conductor. Terminate to metal ground box cover with a tank ground type lug as approved and directed by the Engineer.

7. Provide Type "1" ground box and cover designed for heavy duty loading in accordance with AASHTO H20 loading when located where the box may experience deliberate, continuous vehicular traffic, such as near the shoulder or an auxiliary lane, or immediately adjacent to the unprotected edge of pavement.
8. Provide a Type "1" ground box and cover tested by a laboratory independent of the manufacturer certifying loading requirements are met. Provide certification of such tests to the Engineer for approval.
9. Provide a steel or cast iron cover in accordance with Item 471, Article 471.2, "Frames, Grates, Rings, and Covers." Provide covers with the number of drop handles shown. Provide Class "A" concrete for ground box construction and aprons.
10. Fabricate cover so it fits properly on the ground box, and no undue noise results when traffic contacts the cover.

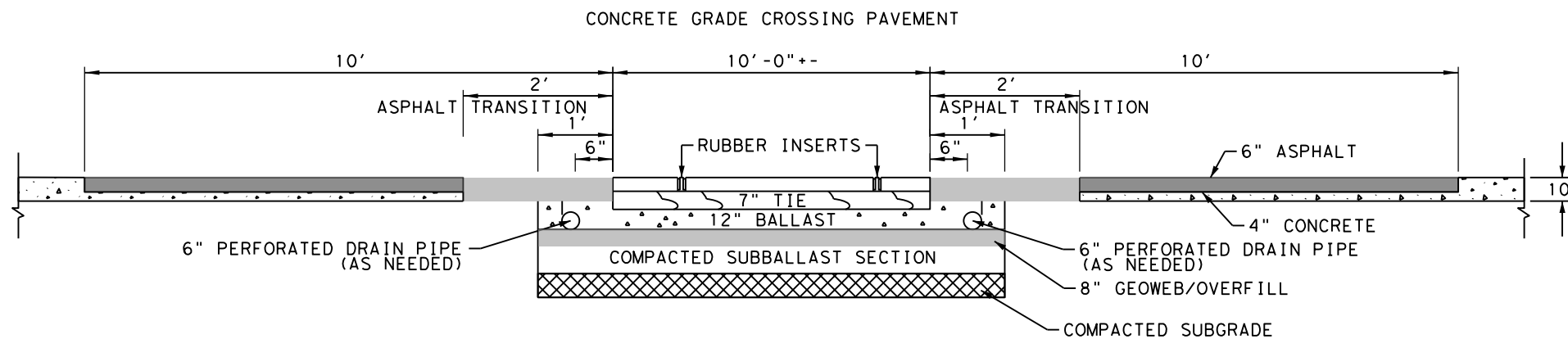
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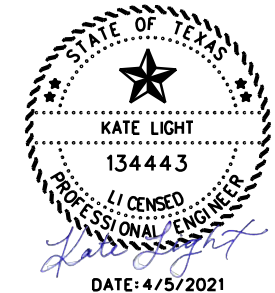
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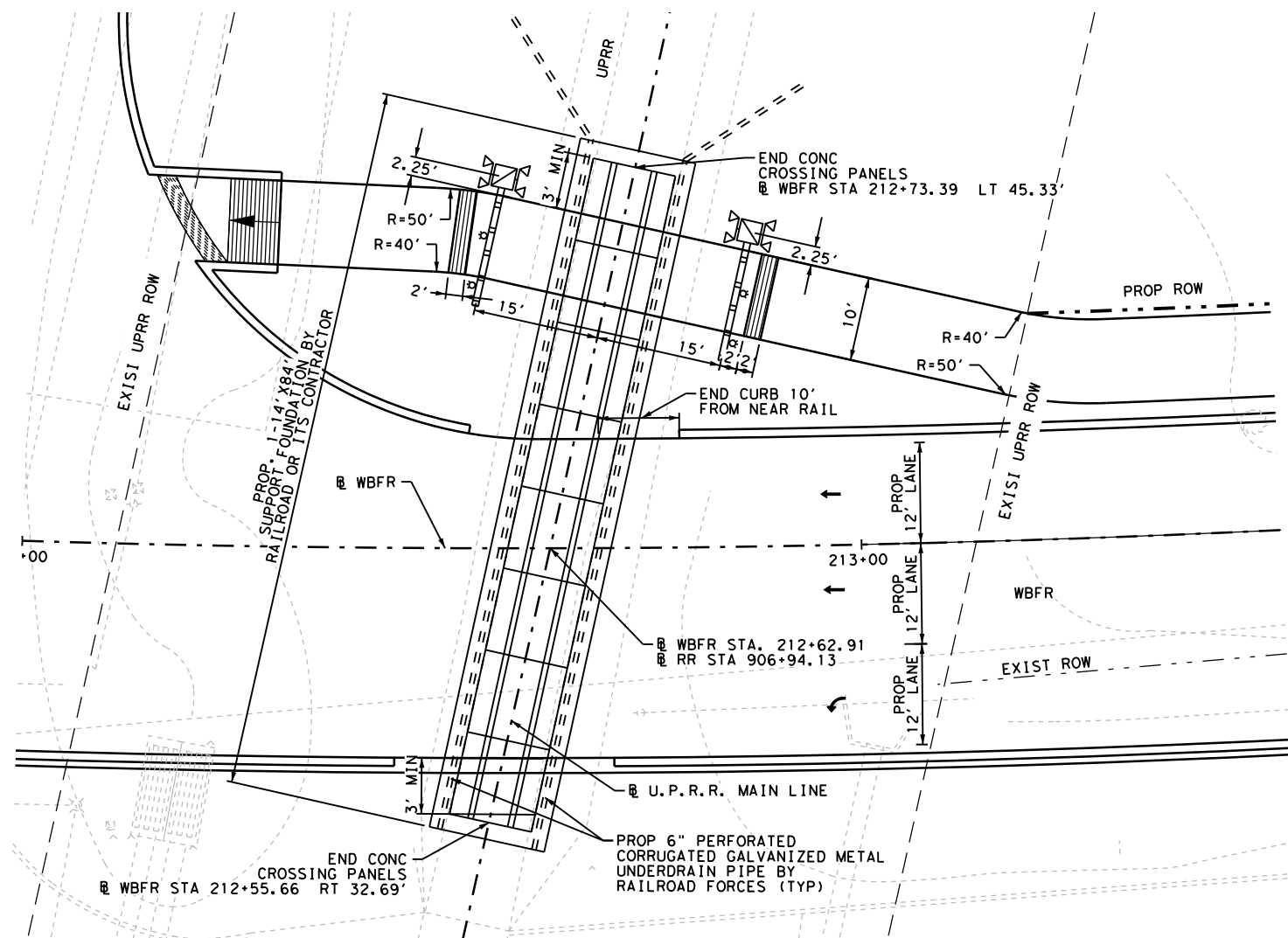
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HIGH DENSITY CONCRETE TIE TRACKS



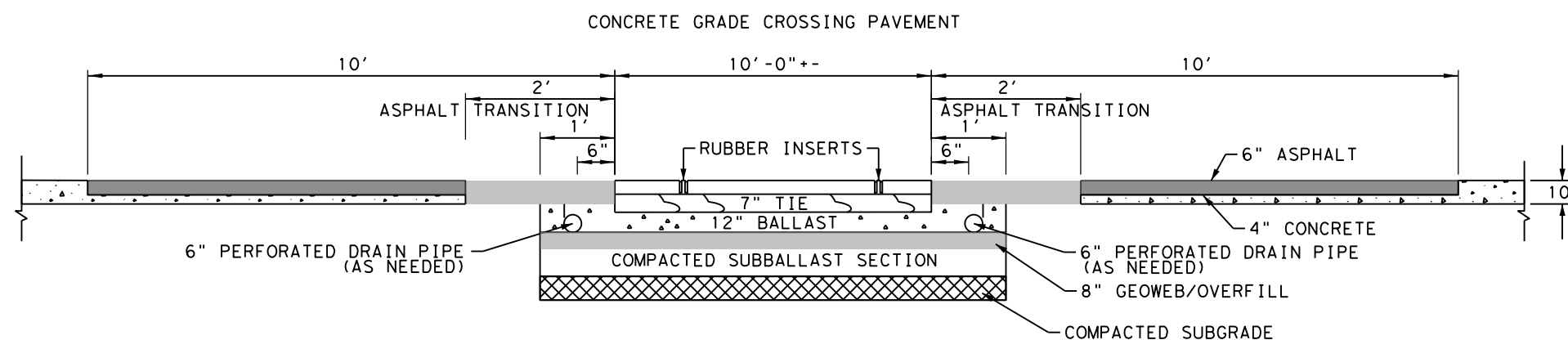
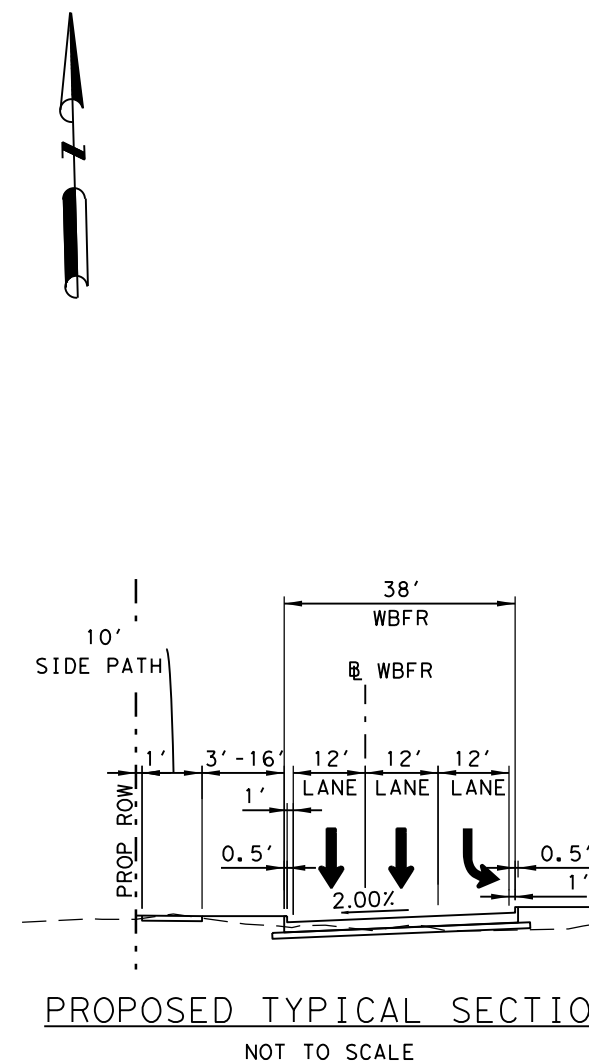
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HOUSTON PUBLIC WORKS									
NORTH PARK DRIVE									
CONCRETE PANEL									
CROSSING LAYOUT EBFR									
UPRR DOT NO. 755879Y									
RRMP 22.13									
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4/5/2021

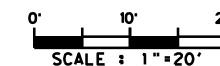
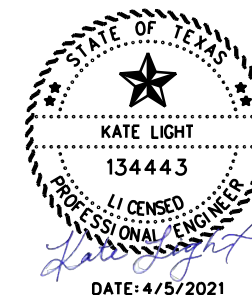
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LAYOUT
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TYPICAL SECTION UNION PACIFIC RAILROAD
NOT TO SCALE
HIGH DENSITY CONCRETE TIE TRACKS



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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

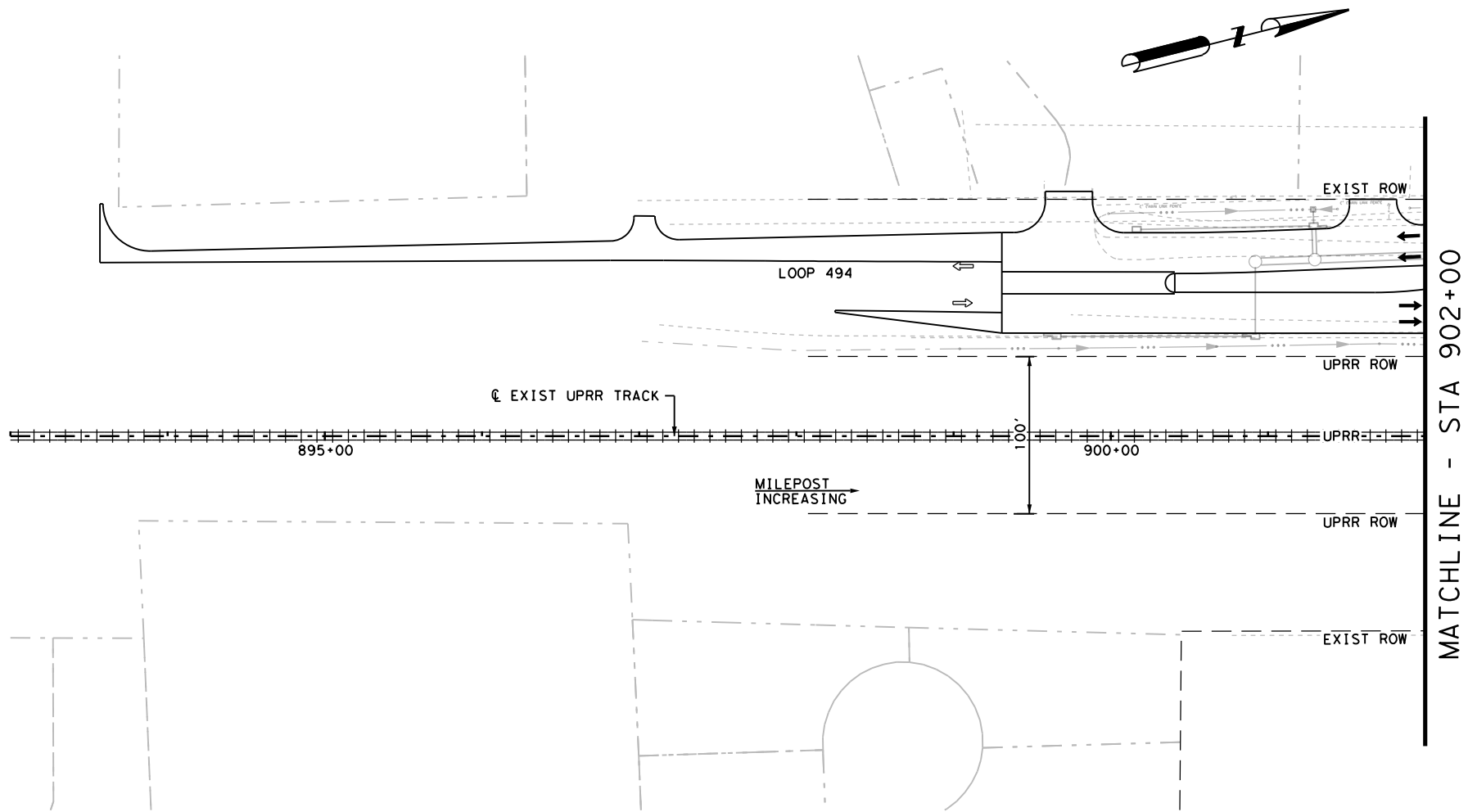
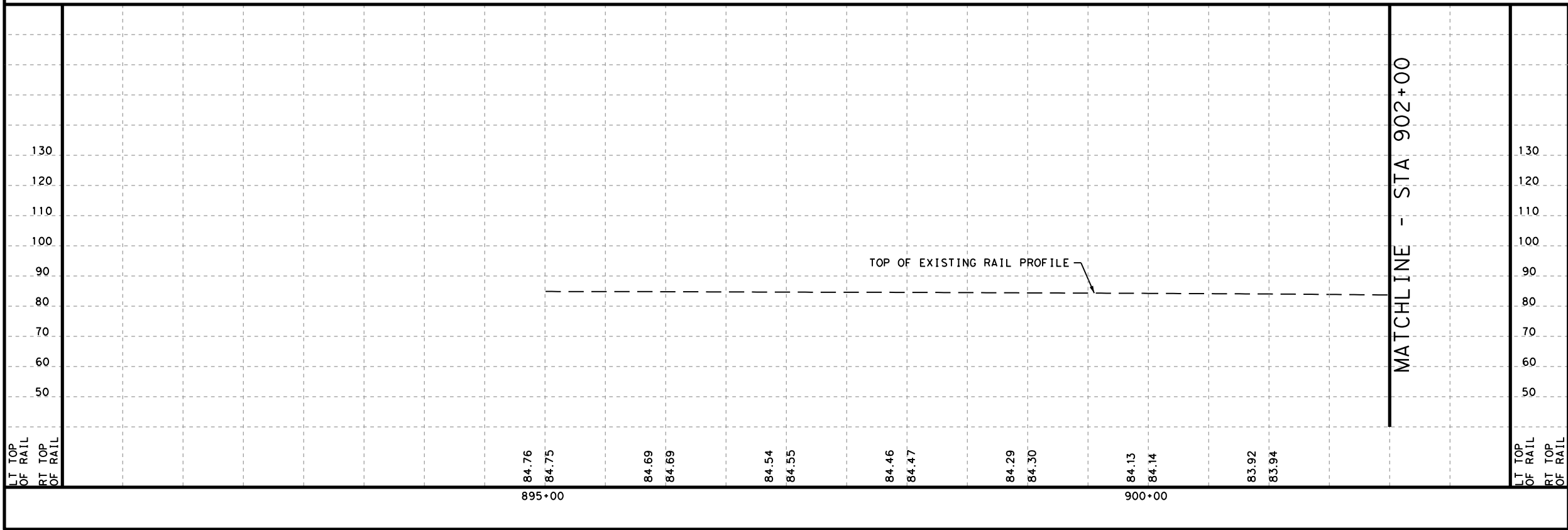
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CROSSING LAYOUT WBFR

UPRR DOT NO. 755879Y

RRMP 22.13







SHEET 1 OF

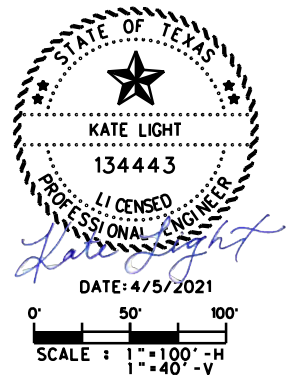




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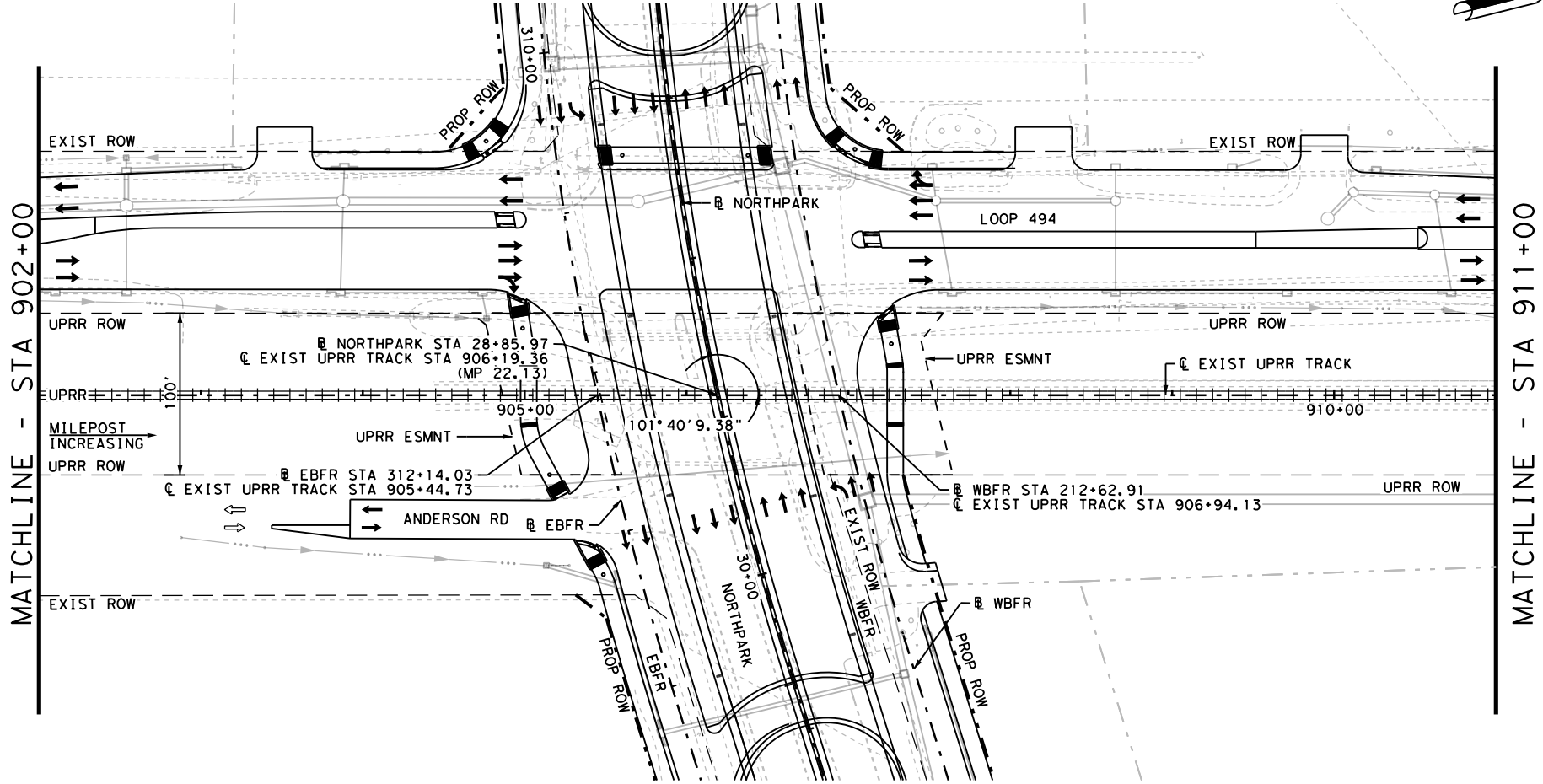
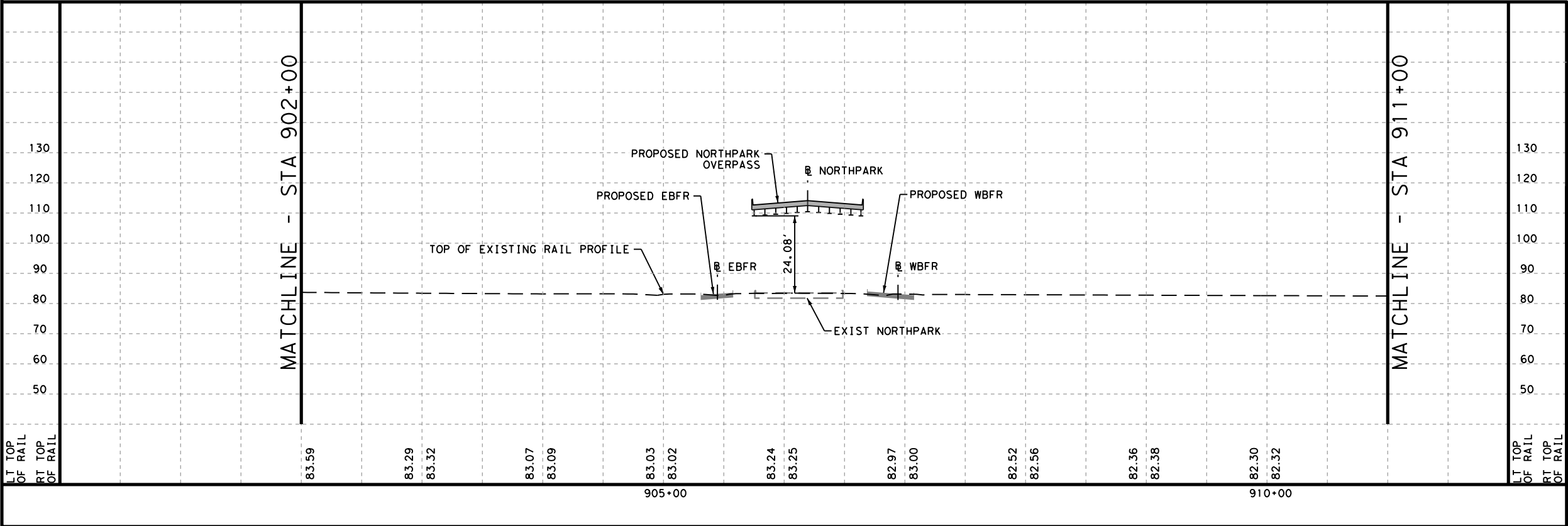
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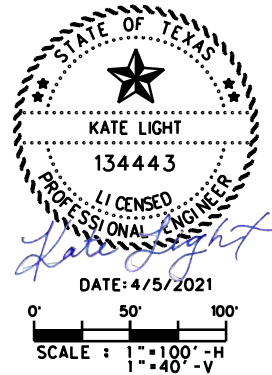
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 EXIST/UPRR ROW
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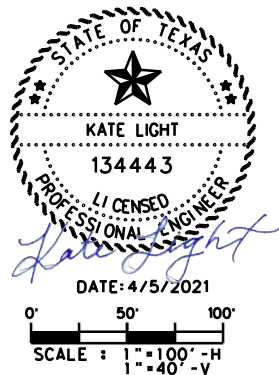
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- LEGEND**
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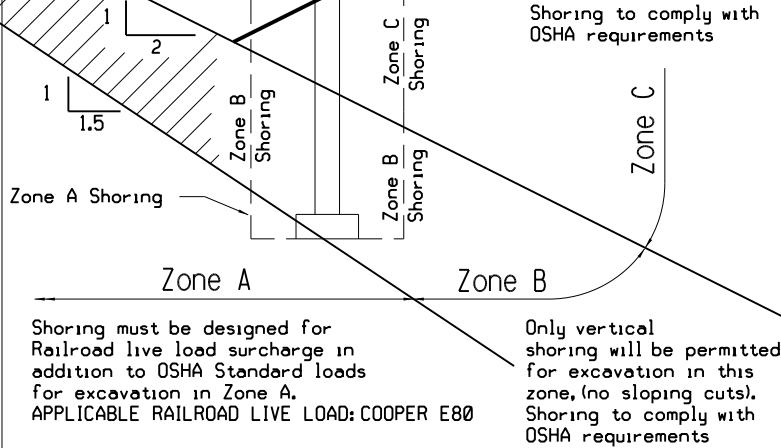


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CHECKED:	HOU	MONTGOMERY	0912	37	586



	PROP TRAVEL LANE
	EXIST TRAVEL LANE
	PROPOSED ROW
	EXIST/UPRR ROW
	UPRR EASEMENT
	EXISTING UPRR TRACK

- GENERAL SHORING NOTES:**
1. All dimensions are measured perpendicular to \bar{C} of Track.
 2. Prior to commencing any work, submit for approval by the Railroad detailed plans indicating the nature and extent of the track protection shoring proposed. Install the temporary shoring system per the approved plans. Comply with design requirements in the BNSF/UPRR GUIDELINES FOR TEMPORARY SHORING.
 3. For excavations which encroach into Zone A or B, provide shoring plans and design calculations. Plans and calculations must be signed and sealed by a Professional Engineer registered in the State of Texas.



GENERAL SHORING REQUIREMENTS

OVERHEAD STRUCTURE CONSTRUCTION NOTES:

1. The proposed grade separation project shall not increase the quantity and/or characteristics of the flow in the Railroad's ditches and/or drainage structures.
2. The elevation of the existing top-of-rail profile shall be verified before beginning construction. All discrepancies shall be brought to the attention of the Railroad prior to construction.
3. The contractor must submit a proposed method of erosion and sediment control and have the method approved by the Railroad.
4. All shoring systems that impact the Railroad's operations and/or supports the Railroad's embankment shall be designed and constructed per current Railroad Guidelines for Temporary Shoring.
5. All demolitions within the Railroad's right-of-way and/or demolition that may impact the Railroad's tracks or operations shall be in compliance with the Railroad's Demolition Guidelines.
6. Erection over the Railroad's right-of-way shall be designed to cause no interruption to the Railroad's operation, enabling the track(s) to remain open to traffic per the Railroad's requirements.
7. Railroad requirements do not allow work within 50 feet of track centerline when a train passes the work site and all personnel must clear the area within 25 feet of the track centerline and secure all equipment.
8. False-work clearances shall comply with minimum construction clearances.
9. All permanent clearances shall be verified before project closing.

For shoring/excavations in Zone A or B, TxDOT requires a predesigned and approved shoring design in the PS&E. If this is the case no Contractor submittal is required.

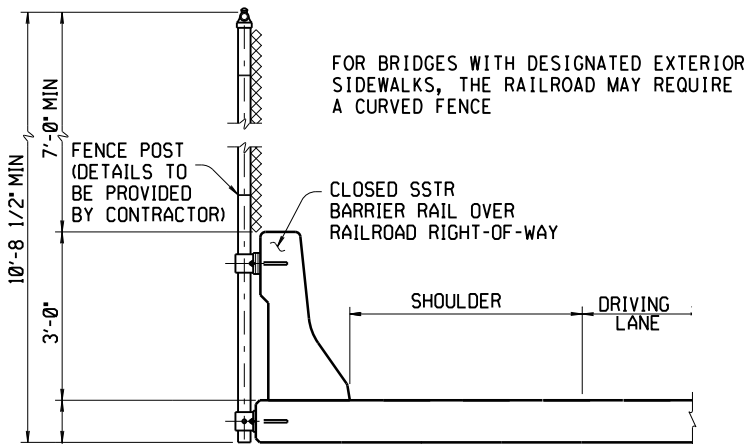
FOR THE FOLLOWING INFORMATION PLEASE REFER TO THE PLAN AND ELEVATION DRAWINGS OF THE BRIDGE PLANS. THE PLAN AND ELEVATION DRAWINGS SHALL SHOW ALL REQUIRED INFORMATION PER BNSF/UPRR GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECT PLAN NO. 711100 SHEET 2.

1. Centerline of bridge and/or centerline of project.
2. Track layout and limits of Railroad right-of-way with respect to centerline of main lines.
3. Future tracks, access roadways and existing tracks as main line, siding, spur, etc.
4. Point of minimum vertical clearance and distance, measured perpendicular, from the centerline of nearest track.
5. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of obstruction such as substructure above grade.
6. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of nearest foundation below grade.
7. Horizontal spacing at right angle between centerlines of existing and/or future tracks.
8. Limits of shoring and minimum distance at right angle from centerline of nearest track.
9. All existing facilities and utilities and their proposed relocation, if required.
10. Toe of riprap or earth slope and/or limits of retaining wall.
11. Existing and proposed contours, (not required if the existing groundlines or drainage characteristics in Railroad ROW will not be altered).
12. Railroad Milepost and direction of increasing Milepost.
13. Direction of flow for all drainage systems within project limits.
14. Limits of barrier rail and fence with respect to centerline of track.
15. Depth of foundation below bottom of tie. (for footings only)
16. Top and bottom of pier protection wall elevation relative to top of rail elevation.
17. Controlling dimensions of drainage ditches and/or drainage structures.
18. Top of rail elevations for all tracks.
19. Minimum permanent vertical clearance above top of high rail to the lowest point under the bridge.
20. Existing and proposed groundline & roadway profile.
21. Type of riprap slope paving.
22. Location of deck drains.
23. Total width of superstructure.
24. Width of shoulder and/or sidewalk.

† This table is primarily required for overpass projects. This table is not required for underpass projects if the provided Plan and Profile sheets indicate this information at a minimum of every 100 ft and within bounds including 1500 ft before and after the limits of trackwork.

TABLE OF TOP OF RAIL PROFILE † (STATIONS INCREASE WITH MILEPOST INCREASE)				
	MAIN LINE			
	ALIGNMENT: LEFT RAIL	ELEVATION	ALIGNMENT: RIGHT RAIL	ELEVATION
100' STATIONS	100' STATIONS		100' STATIONS	
895+00	84.76		895+00	84.75
896+00	84.69		896+00	84.69
897+00	84.54		897+00	84.55
898+00	84.46		898+00	84.47
899+00	84.29		899+00	84.30
900+00	84.13		900+00	84.14
901+00	83.92		901+00	83.94
902+00	83.60		902+00	83.59
903+00	83.29		903+00	83.32
904+00	83.07		904+00	83.09
905+00	83.03		905+00	83.02
906+00	83.24		906+00	83.25
906+19.36	83.21		906+19.36	83.24
907+00	82.97		907+00	83.00
908+00	82.52		908+00	82.56
909+00	82.36		909+00	82.38
910+00	82.30		910+00	82.32
911+00	82.22		911+00	82.25
912+00	82.20		912+00	82.21
913+00	82.26		913+00	82.27
914+00	82.29		914+00	82.33
915+00	82.29		915+00	82.29
916+00	82.26		916+00	82.26
917+00	82.16		917+00	82.17

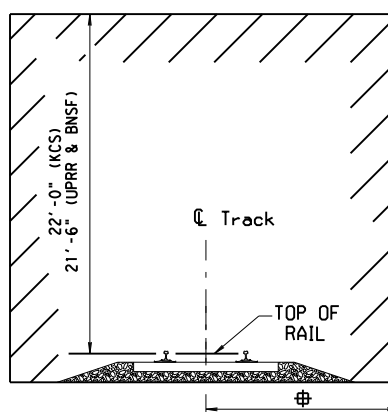
± EXISTING TRACK STA. 906+19.36
± CONSTRUCTION STA. 28+85.97



TYPICAL FENCE ON BARRIER DETAIL

ONLY REQUIRED ON OVERPASSES IF SHOWN ON BRIDGE LAYOUT.

NO CONSTRUCTION ACTIVITIES OR OTHER OBSTRUCTION SHALL BE PLACED WITHIN THESE LIMITS



MINIMUM CONSTRUCTION CLEARANCE ENVELOPE

(NORMAL TO RAILROAD)
15'-0" (UPRR), (BNSF) and 14'-0" (KCS)

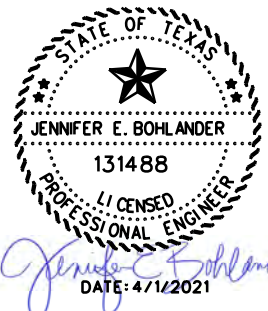
GENERAL NOTES:

Design and Construction for Railroad Projects shall be in accordance with the AREMA Manual for Railway Engineering and BNSF/UPRR Guidelines for Railroad Grade Separation Projects or Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses, or DART Light Rail Project Design Criteria Manual, and the TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges AS APPLICABLE TO THE RAILROAD COMPANY INVOLVED.

See BNSF/UPRR Guidelines for Grade Separation Projects Plan No. 711100 and TxDOT Railroad Fence Details Sheet for additional information. A curved top fence extending 8'-0" above top of sidewalk is acceptable only where there is a traffic rail between roadway and sidewalk.

See Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses for corresponding BNSF/UPRR sheets referenced.

SHEET 1 OF 3



RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

Texas Department of Transportation		Rail Division	
RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION			
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS	DIST: HOU	COUNTY: MONTGOMERY	SHEET NO.: 590

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PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the Right-of-Way and/or properties of the Railroad Company and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right-of-Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right-Of-Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right-Of-Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

- A. Perform all work in compliance with all applicable Railroad, FRA (Federal Railway Administration) and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of Railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.
- B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 12 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haulroad crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

3.02 RAILROAD OPERATIONS

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
 - B. All railroad tracks within and adjacent to the Contract Site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
 - C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
 - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a Railroad flag person will be required. At the direction of the Railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
 - 2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.
- 3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES
- A. Do not perform any work within Railroad Right-of-Way without a valid executed Right of Entry Agreement if required on this project.
 - B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right-of-Way and observe the Railroad's rules and regulations with respect thereto.
 - C. Perform all work upon Railroad Right-of-Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.18 for railroad flagging requirements.
 - D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
 - 1. Exactly what the work entails.
 - 2. The days and hours that work will be performed.
 - 3. The exact location of work, and proximity to the tracks.
 - 4. The type of window requested and the amount of time requested.
 - 5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.
 - E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right-of-Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right-of-Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

- A. Complete the Railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on Railroad property. This orientation is available at www.contractororientation.com. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."
- B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right-of-Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES


Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR), and 14' - 0" (KCS) horizontal from centerline of track
B. 22' - 0" (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

- A. Maintain minimum track clearances during construction as specified in Section 3.07.
- B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.
- C. Do not commence work involving an approved infringement until receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

SHEET 2 OF 3

 Texas Department of Transportation				Rail Division	
RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION					
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REVISIONS		0912	37	232	NORTH PARK
		DIST	COUNTY		SHEET NO.
		HOU	MONTGOMERY		591

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3.09 CONSTRUCTION AND AS-BUILT SUBMITTALS

- A. Provide TxDOT submittals for construction materials and procedures as outlined below and indicated in TxDOT Standard Specifications. A summary of most TxDOT submittal requirements can be found at: [www.dot.state.tx.us/publications/bridge/items reviewed.pdf](http://www.dot.state.tx.us/publications/bridge/items%20reviewed.pdf)
- B. The tables below provide the Railroad's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The review times indicated below represent the total time, including the Railroad's required four (4) weeks.
- C. TxDOT will forward relevant submittals to the Railroad Manager of Industry and Public Projects unless otherwise directed by the Railroad. TxDOT and the Engineer of Record will review and include comments prior to forwarding to the Railroad. Submit items in Table 1 for both railroad overpass and underpass projects, as applicable. Submit items in Table 2 for railroad underpass projects only.

TABLE 1 - RAILROAD SUBMITTAL REQUIREMENTS FOR OVERPASS & UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	REVIEW TIME
1	Shoring design and details	6	6 weeks
2	Falsework design and details	6	6 weeks
3	Drainage design provisions	6	6 weeks
4	Erection diagrams and sequence	6	6 weeks
5	Demolition diagram and sequence	6	6 weeks

TABLE 2 - RAILROAD SUBMITTAL REQUIREMENTS FOR UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	NOTES	REVIEW TIME
1	Shop drawings	6	Steel and Concrete members	6 weeks
2	Bearings	6	For all structures	6 weeks
3	Concrete Mix Designs	6	For all structures	6 weeks
4	Rebar & Strand certifications	6	For superstructure only	6 weeks
5	28 day concrete strength	6	For superstructure only	6 weeks
6	Waterproofing material certifications and installation procedure	6	Waterproofing & protective boards	6 weeks
7	Structural steel certifications	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
8	Fabrication and Test reports	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
9	Welding Procedures and Welder Certification	6	AWS requirements	6 weeks
10	Foundation Construction Reports or Notes	6	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings	6 weeks
11	Compaction testing reports for backfill at abutments	6	Must meet 95% maximum dry density, Modified Procter ASTM D1557	6 weeks

- D. TxDOT shall submit As-Built Records to the Railroad when TxDOT has processed the final project plans. These records shall consist of the following items:

Overpass Projects

- Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation J or Acrobat .PDF format.
- Hard copies of all structure design drawings with as-constructed modifications shown.

Underpass Projects

- Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation J or Acrobat .PDF format.
- Hard copies of all structure design drawings with as-constructed modifications shown.
- Final approved copies of shop drawings for concrete and steel members.
- Foundation Construction Reports
- Compaction testing reports for backfill at abutments

3.10 APPROVAL OF DETAILS

Submit details of the construction affecting Railroad tracks and property not already included in the Contract Plans to the Railroad Designated Representative through TxDOT for the Railroad's review and written approval before such work is undertaken. Allow a total six (6) weeks for review and approval of these submittals, which includes the Railroad's four (4) week review time.

3.11 MAINTENANCE OF RAILROAD FACILITIES

- A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right-of-Way and repair any other damage to the property of the Railroad, or its tenants.
- B. Perform all such maintenance and repair of damages due to the Contractor's operations at Contractor's expense.
- C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the Project Site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.12 SITE INSPECTIONS BY RAILROAD'S DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
- Pre-construction meetings.
 - Pile driving/drilling of caissons or drilled shafts.
 - Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
 - Erection of precast concrete or steel bridge superstructure.
 - Placement of waterproofing (prior to placing ballast on bridge deck).
 - Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.13 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other Railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to Railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger Railroad facilities or operations.
- D. During any contractor's operations when, in the opinion of the Railroad Designated Representative, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.14 WALKWAYS REQUIRED

Maintain along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from centerline of track. Remove any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours before the close of each work day. Construct walkways with railings over open excavation areas when in close proximity of track. Do not violate allowable clearances of these railings to centerline of track: 8' - 6" horizontally for tangent track or 9' - 6" horizontally for curved track.

3.15 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.16 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around Railroad facilities with the Railroad Designated Representative.

3.17 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near Railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near Railroad property. Refer to the project General Notes for additional information.

- C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4" vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.


3.18 RAILROAD FLAGGING

Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail.

3.19 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right-of-Way and leave the Right-of-Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

SHEET 3 OF 3

				Rail Division			
RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION							
FILE:		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
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		DIST	COUNTY		SHEET NO.		
		HOU	MONTGOMERY		592		
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PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

- A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.
- B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.
- F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.
- G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
- B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
- C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
 - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
 - 2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

- A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.
- B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.
- C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.
- D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
 - 1. Exactly what the work entails.
 - 2. The days and hours that work will be performed.
 - 3. The exact location of work, and proximity to the tracks.
 - 4. The type of window requested and the amount of time requested.
 - 5. The designated contact person.Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.
- E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

- A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."
- B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.


3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR) and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

- A. Maintain minimum track clearances during construction as specified in Section 3.07.
- B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.
- C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.



Texas Department of Transportation

Rail Division

RAILROAD REQUIREMENTS
FOR NON-BRIDGE
CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	912	37	232	CS
	DIST	COUNTY		SHEET NO.
	HOU	MONTGOMERY		593

3.09 MAINTENANCE OF RAILROAD FACILITIES

- A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.
- B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.
- C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
 - 1. Pre-construction meetings.
 - 2. Pile driving/drilling of caissons or drilled shafts.
 - 3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
 - 4. Erection of precast concrete or steelbridge superstructure.
 - 5. Placement of waterproofing (prior to placing ballast on bridge deck).
 - 6. Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.
- D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

- C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.



RAILROAD REQUIREMENTS
FOR NON-BRIDGE
CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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March 2020	DIST	COUNTY		SHEET NO.
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DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: _____
Crossing Type: ** _____
RR Company Owning Track at Crossing: _____
Operating RR Company at Track: _____
RR MP: _____
RR Subdivision: _____
City: _____
County: _____
CSJ at this Crossing: _____
Highway/Roadway name crossing the railroad: _____
▪ of regularly scheduled trains per day at this crossing: _____
▪ of switching movements per day at this crossing: _____
% of estimated contract cost of work within railroad ROW: _____

Scope of Work at this Crossing to Be Performed by State Contractor:

Scope of Work at this Crossing to Be Performed by Railroad Company:

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

III. FLAGGING & INSPECTION

▪ of Days of Railroad Flagging Expected: _____

On this project, night or weekend flagging is:

☐ Expected
☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☐ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select *1 for flagging
☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select *1 for flagging
☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select *1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☐ Not Required
☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☐ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	\$500,000 / \$500,000 / \$500,000
Commercial General Liability	\$2,000,000 / \$4,000,000
Business Automobile	\$2,000,000 combined single limit
Railroad Protective Liability	
<input type="checkbox"/> Not Required	
<input type="checkbox"/> Non - Bridge Projects	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Projects	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required
☐ Required: TxDOT CST to assist in obtaining _____ with the UPRR (see Item 5, Article 8.3)
☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

<http://www.txdot.gov/inside-txdot/division/rail/samples.html>

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☐ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

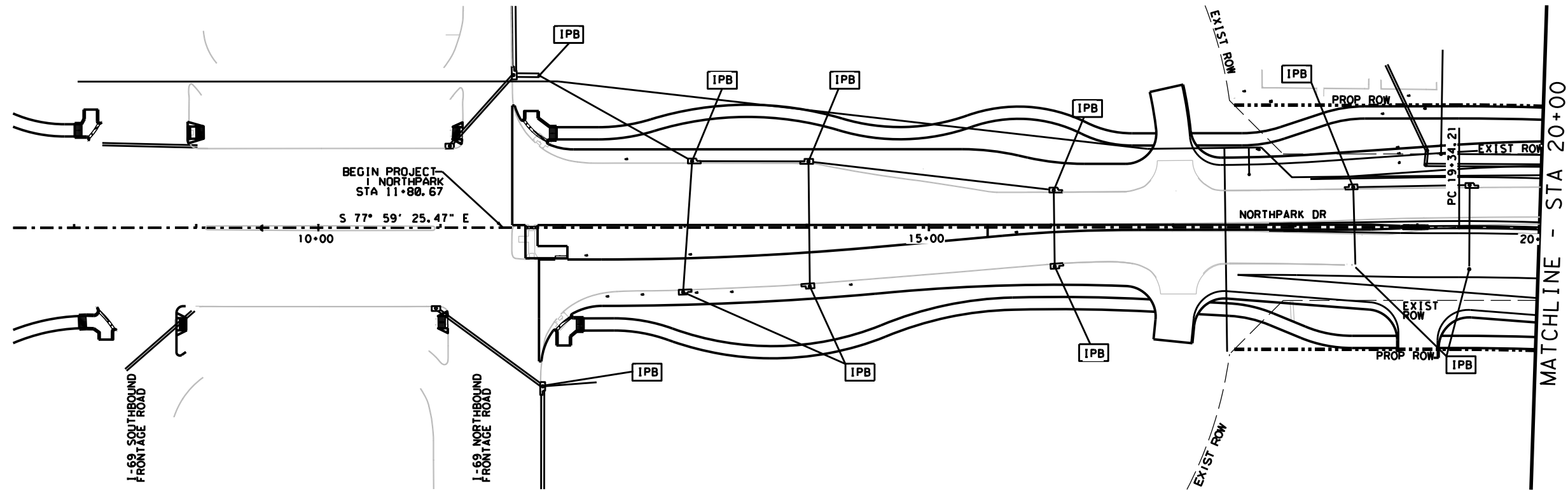
In Case of Railroad Emergency
Call _____
Railroad Emergency Line at XXX-XXX-XXXX
Location: DOT _____
RR Milepost _____
Subdivision _____



Rail
Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
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REVISIONS	912	37	232	CS
3/2020	DIST	COUNTY	SHEET NO.	
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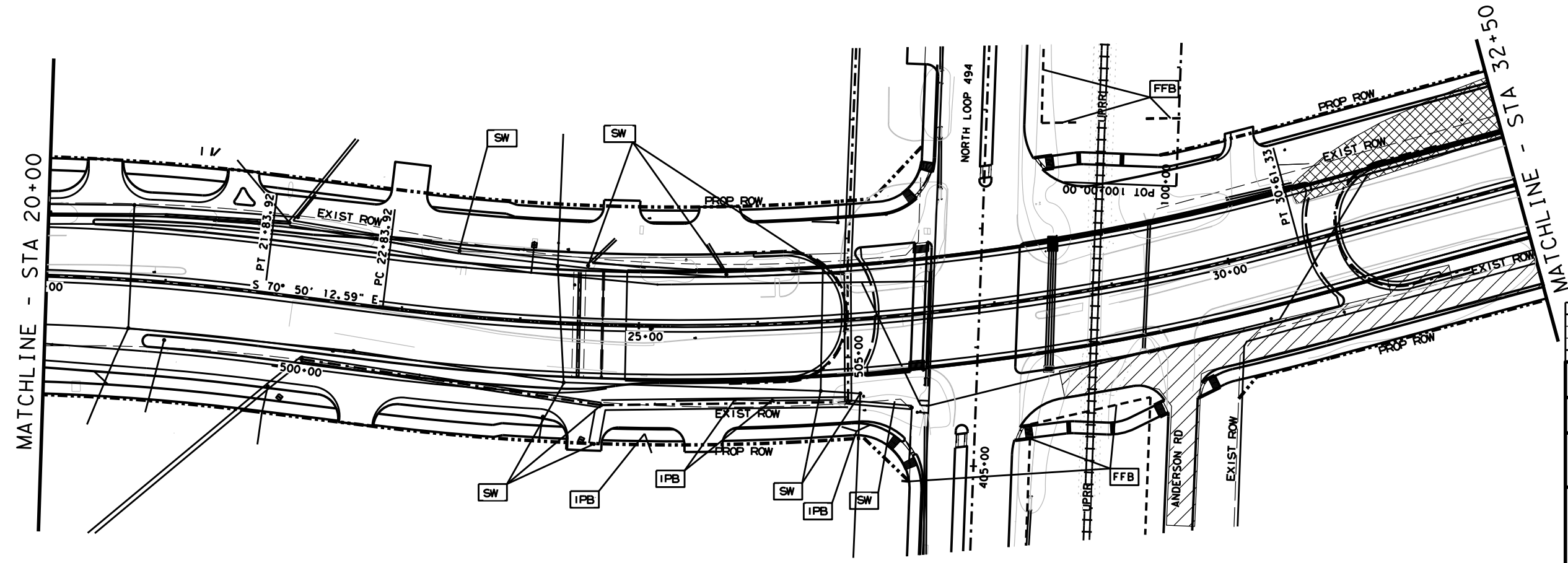
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 - EXISTING TRAVEL LANE
 - IPB INLET PROTECTION BARRIER
 - SW SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
 - FFB FILTER FABRIC BARRIER
 - PERMANENT CONSTRUCTION THIS STEP
 - TEMP CONSTRUCTION THIS STEP
 - SIDEPATH CONSTRUCTION THIS STEP
 - PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED
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SCALE: 1" = 100'

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4/1/2021

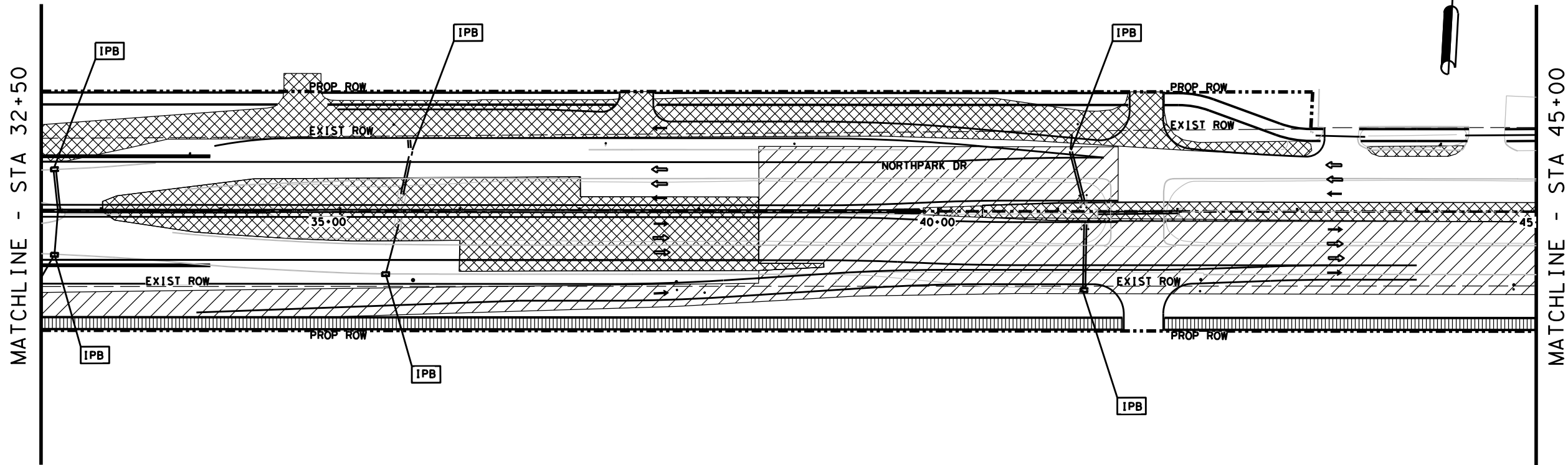


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HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE BEGIN TO STA 32+50 PHASE 1					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232

595

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PLOTTED ON: 4/5/2021



LEGEND

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- IPB INLET PROTECTION BARRIER
- SW SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
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- TEMP CONSTRUCTION PREVIOUSLY COMPLETED
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SCALE: 1" = 100'



Eduardo Quiroz

4/1/2021

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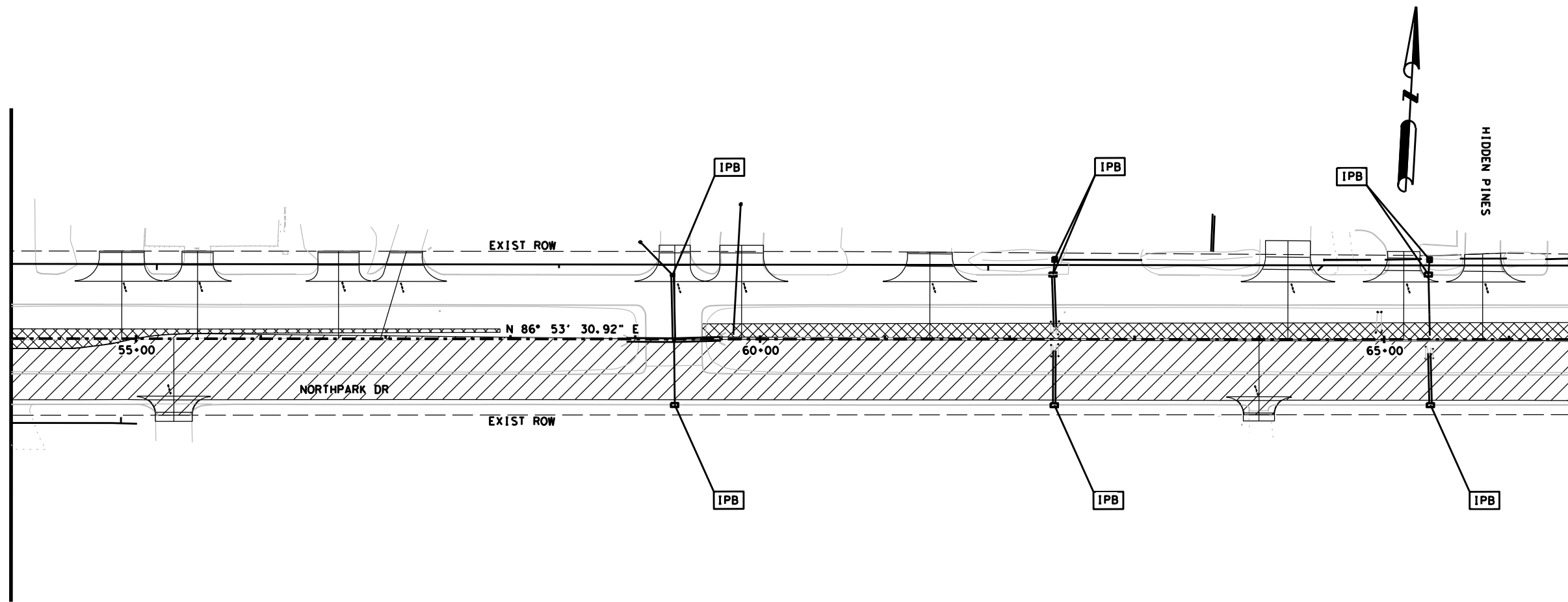
ENGINEERS	5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572
HNTB	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420
CITY OF HOUSTON HOUSTON PUBLIC WORKS	LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 205 HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007

NORTH PARK DRIVE
STORM WATER POLLUTION
PREVENTION PLAN
CONSTRUCTION PHASE
STA 32+50 TO STA 54+00
PHASE 1

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JOB No.	SHEET No.
232	596

MATCHLINE - STA 54+00



MATCHLINE - STA 66+50

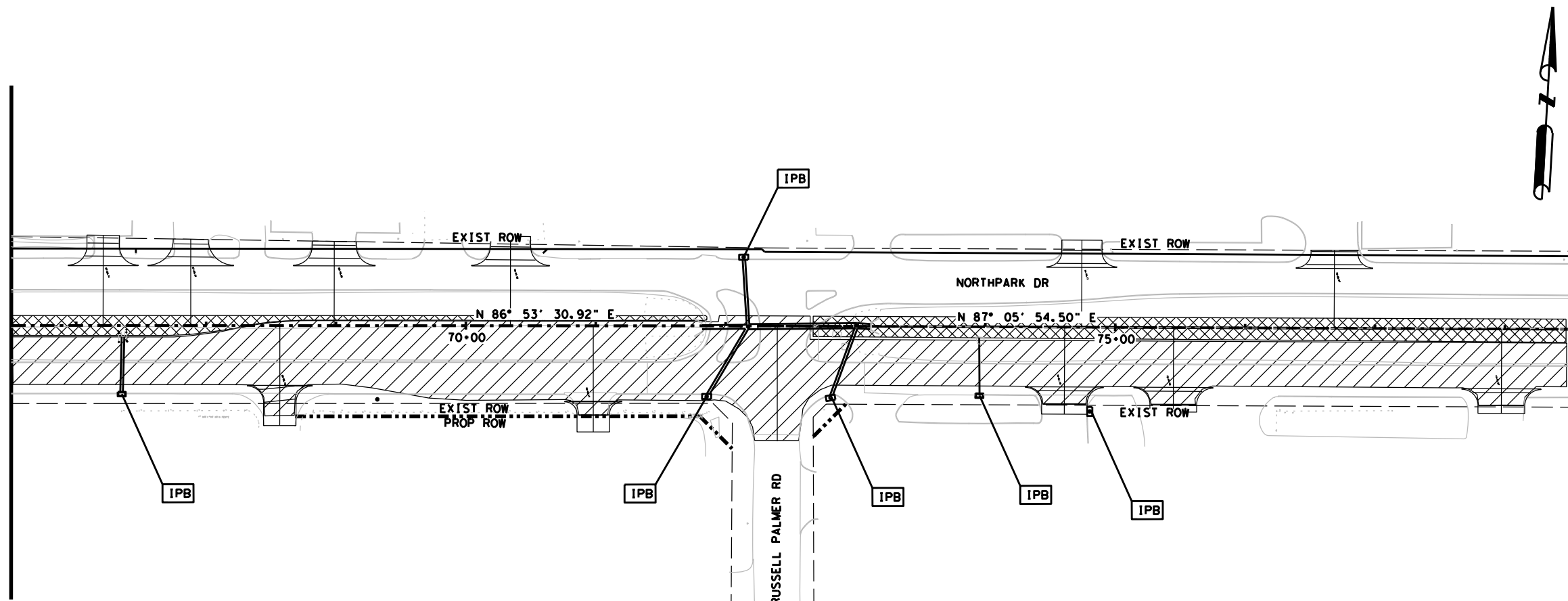
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- PROPOSED TRAVEL LANE
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- IPB INLET PROTECTION BARRIER
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SCALE: 1" = 100'




MATCHLINE - STA 66+50



MATCHLINE - STA 79+00



4/1/2021

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NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE STA 54+00 TO STA 79+00 PHASE 1					
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CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
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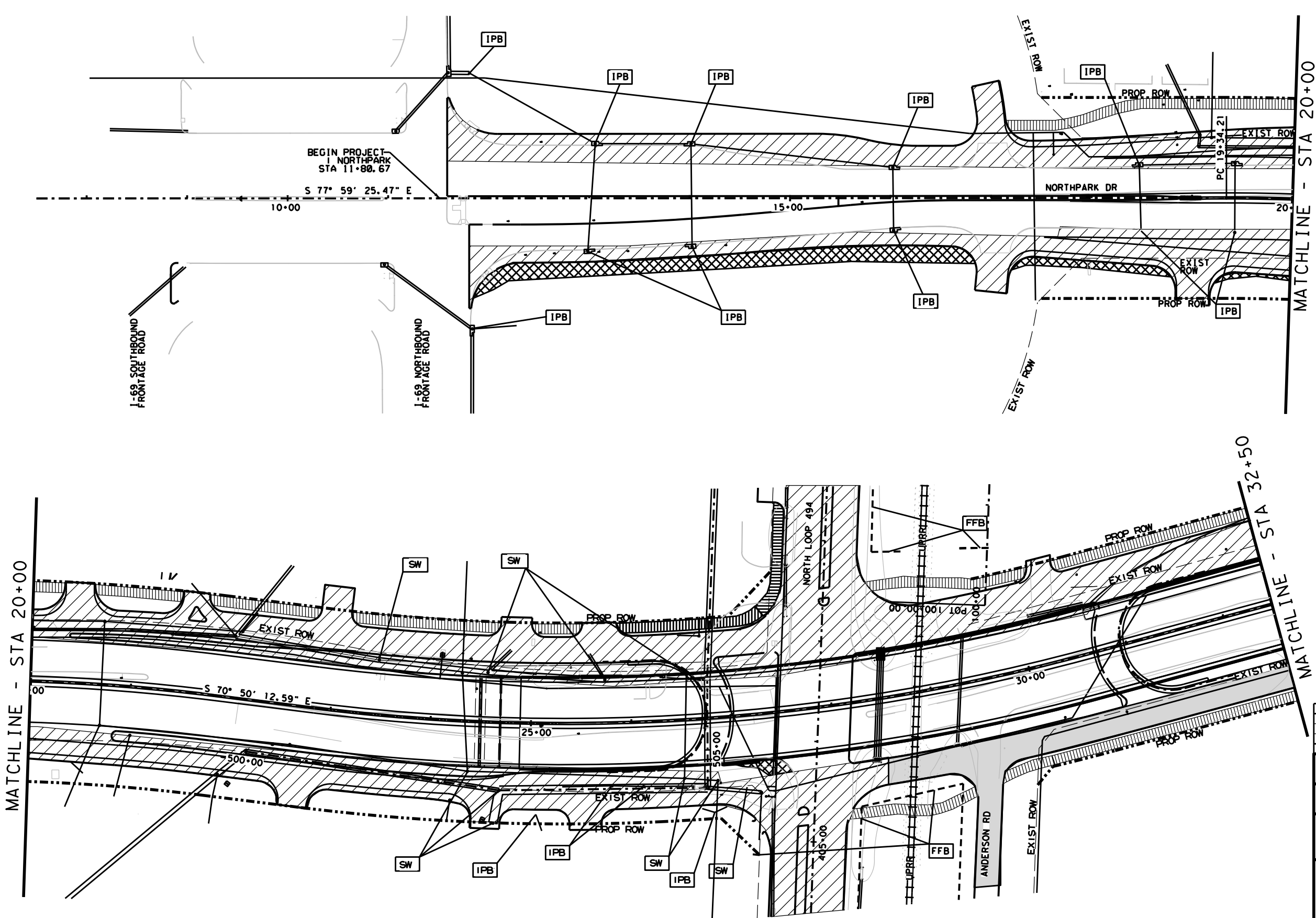
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SCALE: 1" = 100'
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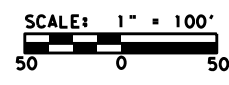
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CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div></div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10</div><div>05 HUNTON ANDREWS KURTH LLP</div><div>500 TRAVIS, SUITE 4200</div><div>HOUSTON, TX 77007</div></div></div>			
NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE STA 79+00 TO END PHASE 1					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
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DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
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					SHEET No. 598



LEGEND

- PROPOSED TRAVEL LANE
- ⇨ EXISTING TRAVEL LANE
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Eduardo Quiroz

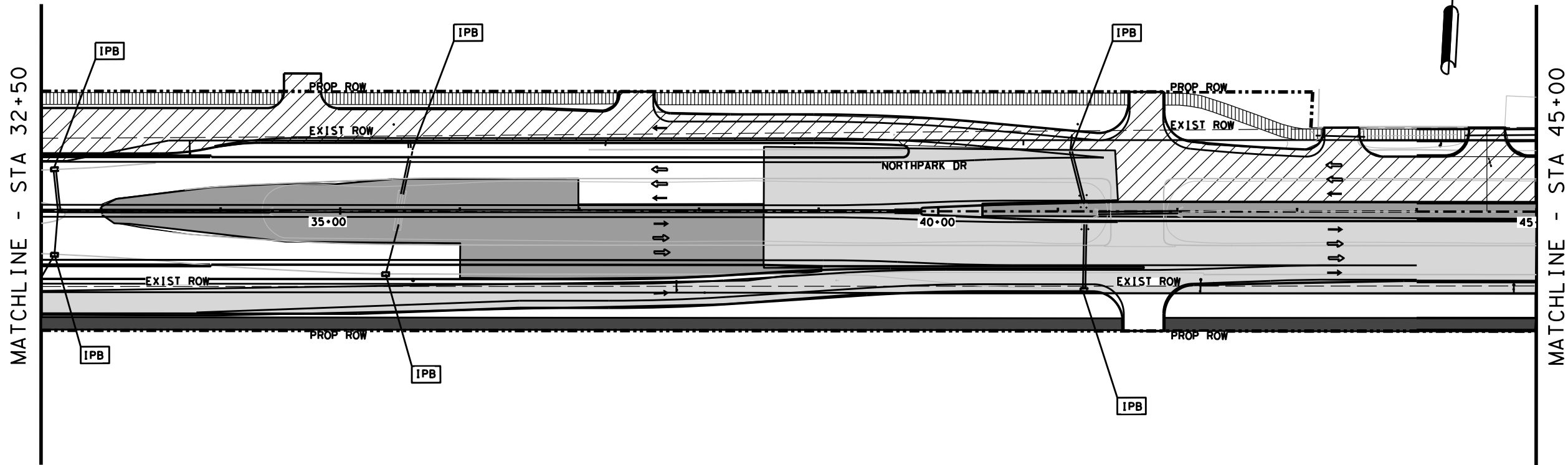
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CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE BEGIN TO STA 32+50 PHASE 2					
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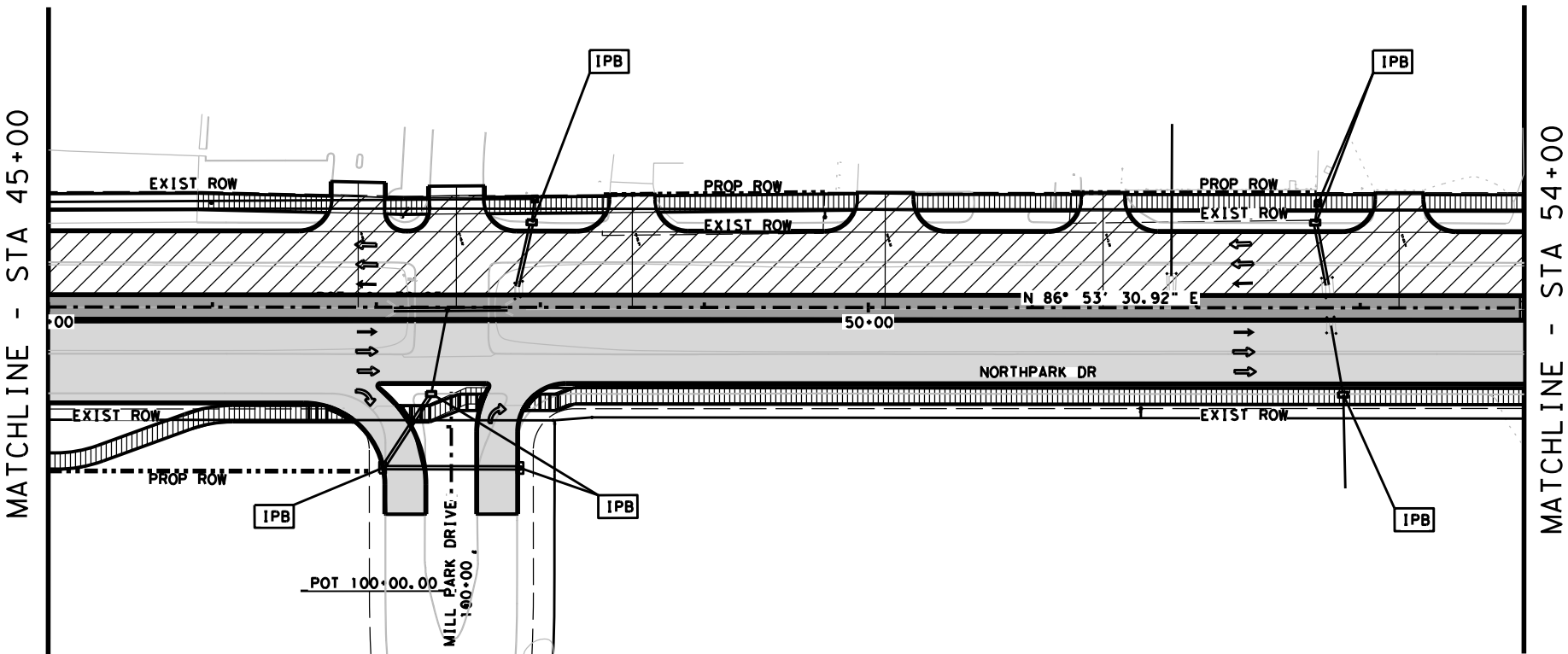
LEGEND

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SCALE: 1" = 100'



4/1/2021



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HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE STA 32+50 TO STA 54+00 PHASE 2			
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		JOB No.	SHEET No.
		232	600

LEGEND

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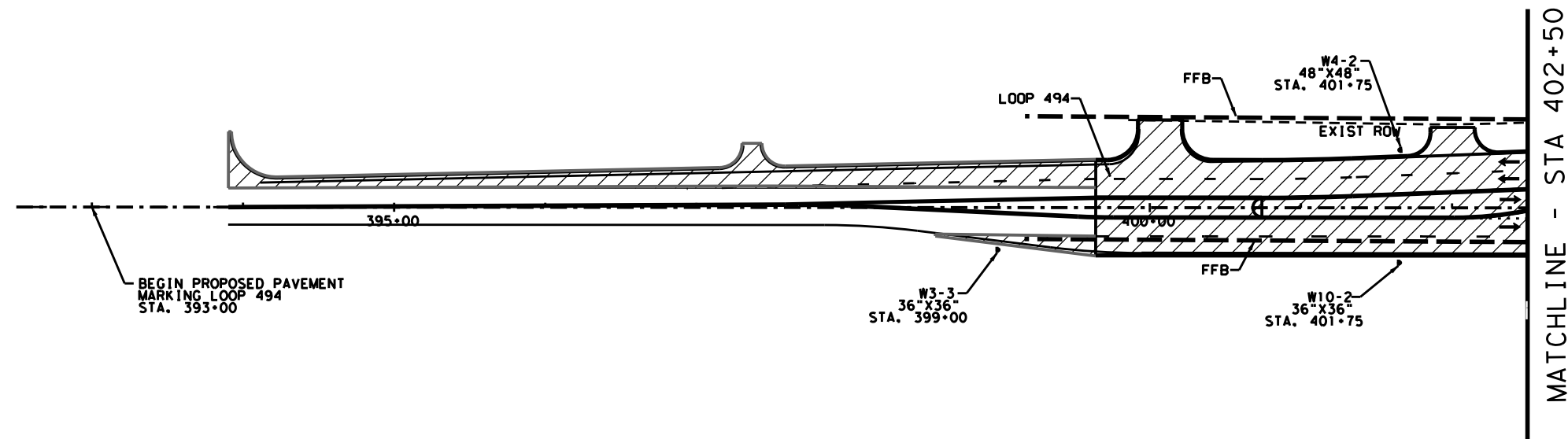
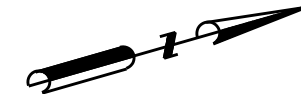
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4/1/2021

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NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE STA 79+00 TO END PHASE 2			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
			37
			232
			602



LEGEND

- PROPOSED TRAVEL LANE
- EXISTING TRAVEL LANE
- INLET PROTECTION BARRIER
- SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
- FILTER FABRIC BARRIER
- PERMANENT CONSTRUCTION THIS STEP
- TEMP CONSTRUCTION THIS STEP
- SIDEPATH CONSTRUCTION THIS STEP
- PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED
- TEMP CONSTRUCTION PREVIOUSLY COMPLETED
- SIDEPATH CONSTRUCTION PREVIOUSLY COMPLETED

SCALE: 1" = 100'

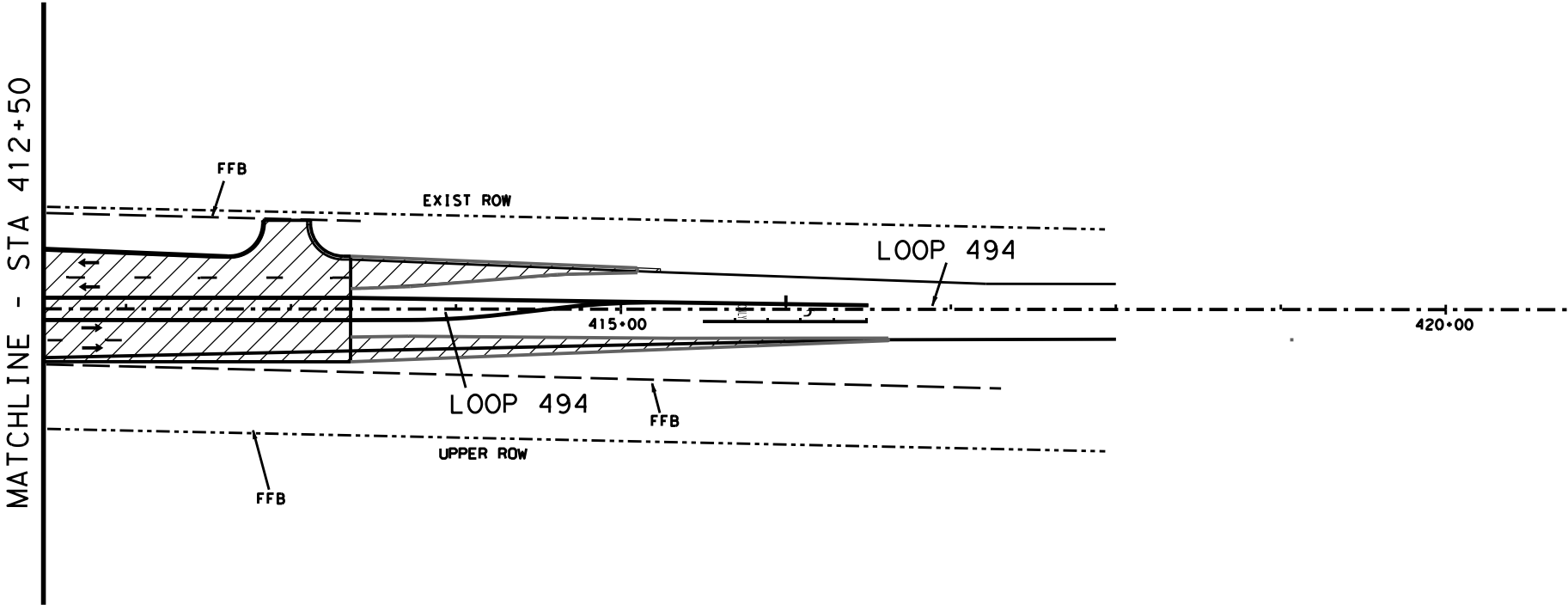
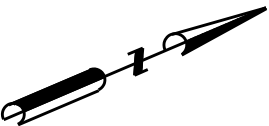
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Eduardo Quiroz

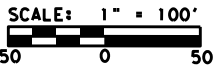
4/1/2021

NO.		REVISIONS		BY		DATE	
ENGINEERS		<small>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572</small>					
HNTB		<small>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</small>					
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<small>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 205 HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007</small>					
LOOP 494 STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE PHASE 2							
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.			
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS			
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	603	



LEGEND

- PROPOSED TRAVEL LANE
- ⇨ EXISTING TRAVEL LANE
- IPB INLET PROTECTION BARRIER
- SW SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
- FFB FILTER FABRIC BARRIER
- PERMANENT CONSTRUCTION THIS STEP
- TEMP CONSTRUCTION THIS STEP
- SIDEPATH CONSTRUCTION THIS STEP
- PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED
- TEMP CONSTRUCTION PREVIOUSLY COMPLETED
- SIDEPATH CONSTRUCTION PREVIOUSLY COMPLETED



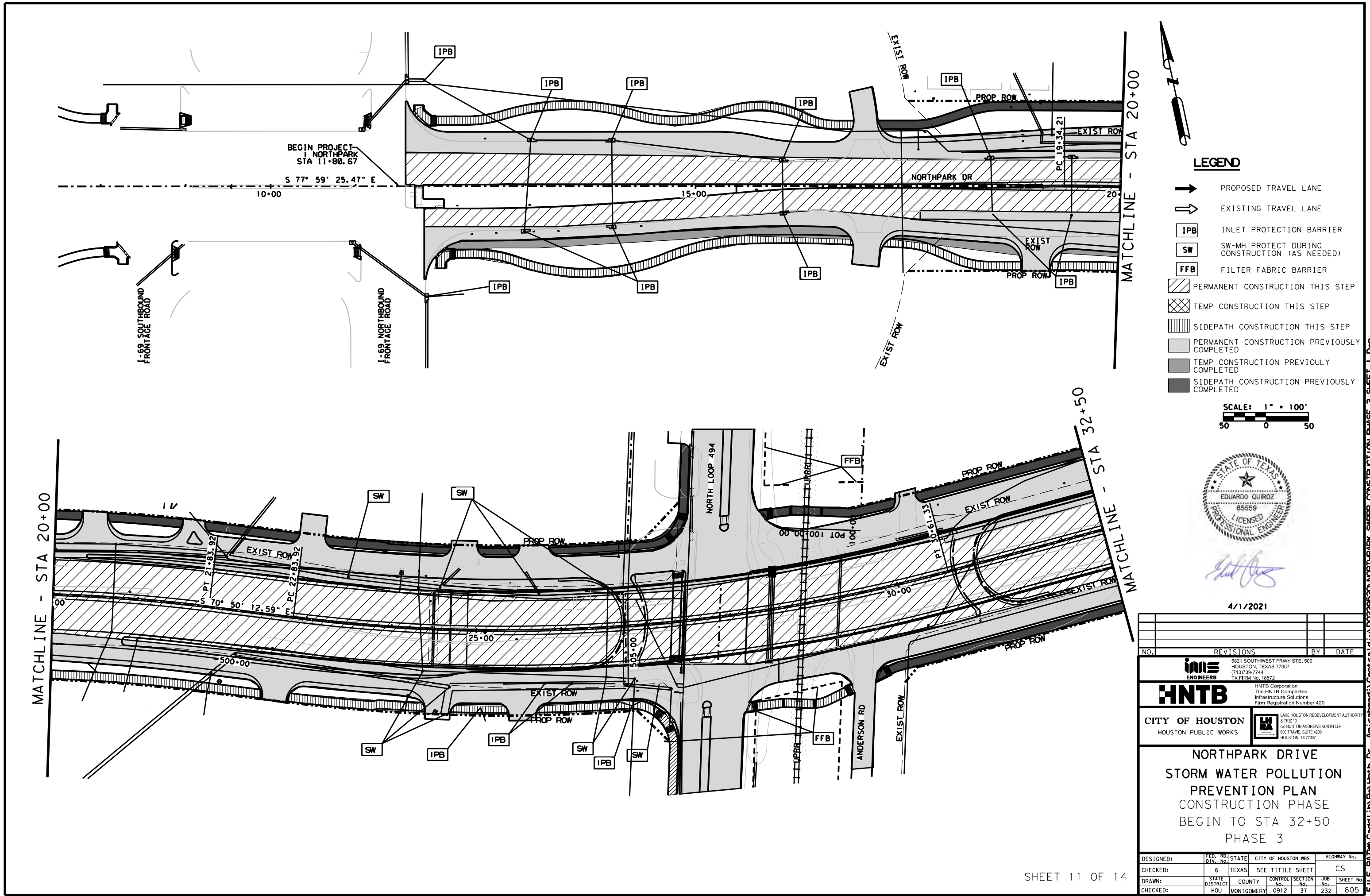
Eduardo Quiroz

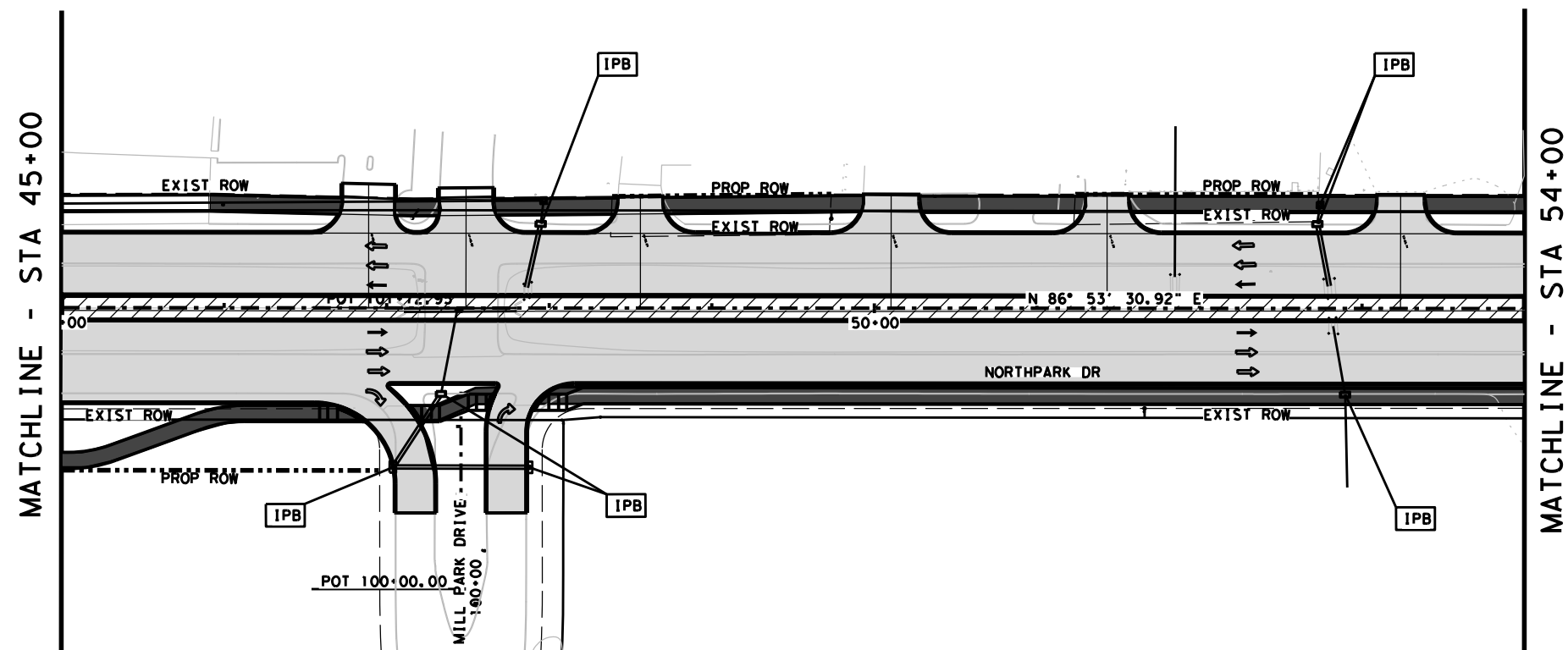
4/1/2021

NO.	REVISIONS	BY	DATE
<div><div></div><div><div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572</div><div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div></div><div><div><div>CITY OF HOUSTON HOUSTON PUBLIC WORKS</div><div></div></div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div></div><div>LOOP 494 STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE PHASE 2</div></div>			

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	232

SHEET No.	604
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LEGEND



EXISTING TRAVEL LANE

198

INLET PROTECTION BARRIER

SW

SW-MH PROTECT DURING
CONSTRUCTION (AS NEEDED)

FFB

FILTER FABRIC BARRIER



☒ PERMANENT CONSTRUCTION THIS STEP



TEMP CONSTRUCTION THIS STEP



☐ SIDEPATH CONSTRUCTION THIS STEP

☐ PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED☐ COMPLETED
☒ TEMP CONSTRUCTION PREVIOUSLY


COMPLETED

SIDEPATH CONSTRUCTION PREVIOUSLY



COMPLETED




SCALE: 1" = 100'



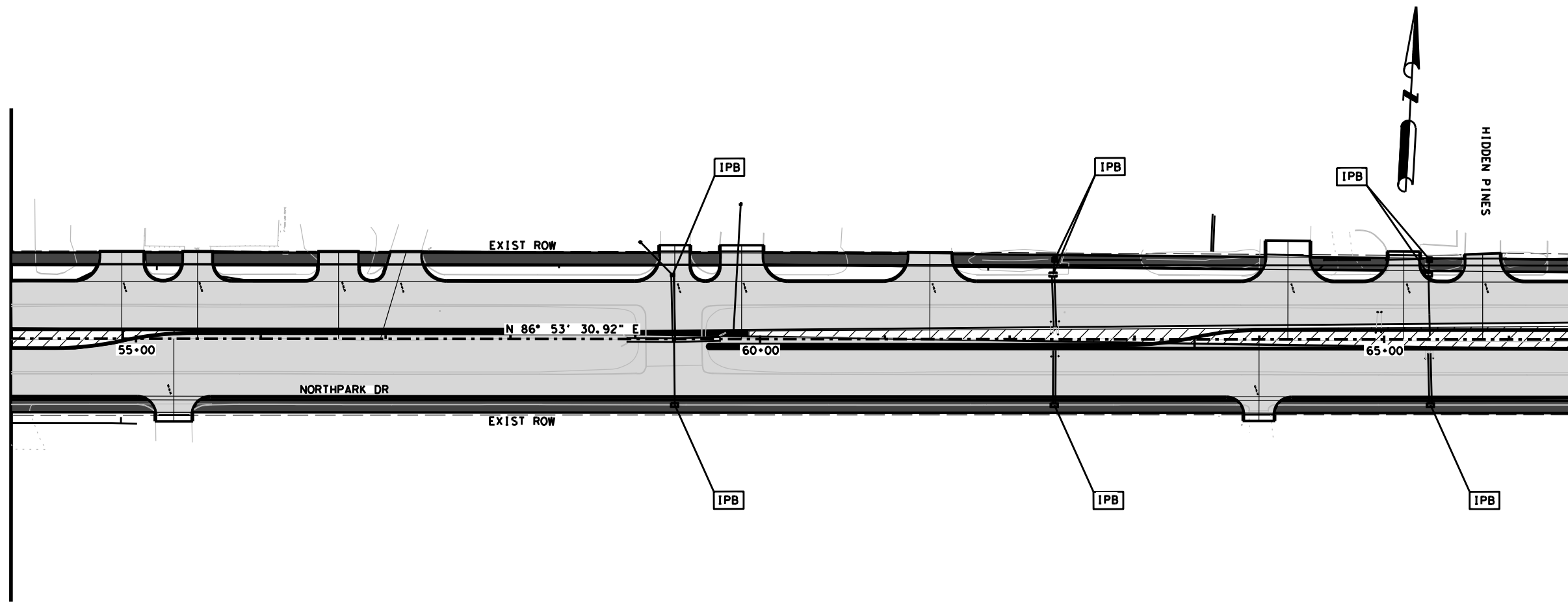
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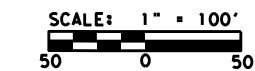
4/1/2021

NO.	REVISIONS					BY	DATE		
			5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713)739-7744 TX FIRM NO. 18572						
			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
CITY OF HOUSTON HOUSTON PUBLIC WORKS			 <small>HARRIS COUNTY TEXAS</small>		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007				
<h1 style="margin: 0;">NORTH PARK DRIVE</h1> <h2 style="margin: 0;">STORM WATER POLLUTION PREVENTION PLAN</h2> <h3 style="margin: 0;">CONSTRUCTION PHASE</h3> <h2 style="margin: 0;">STA 32+50 TO STA 54+00</h2> <h2 style="margin: 0;">PHASE 3</h2>									
DESIGNED:	FED. ROAD DIV. NO.	STATE	CITY OF HOUSTON WBS			HIGHWAY NO.			
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS			
DRAWN:	STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.			
CHECKED:	HOU	MONTGOMERY	0912	37	232	606			

MATCHLINE - STA 54+00



MATCHLINE - STA 66+50

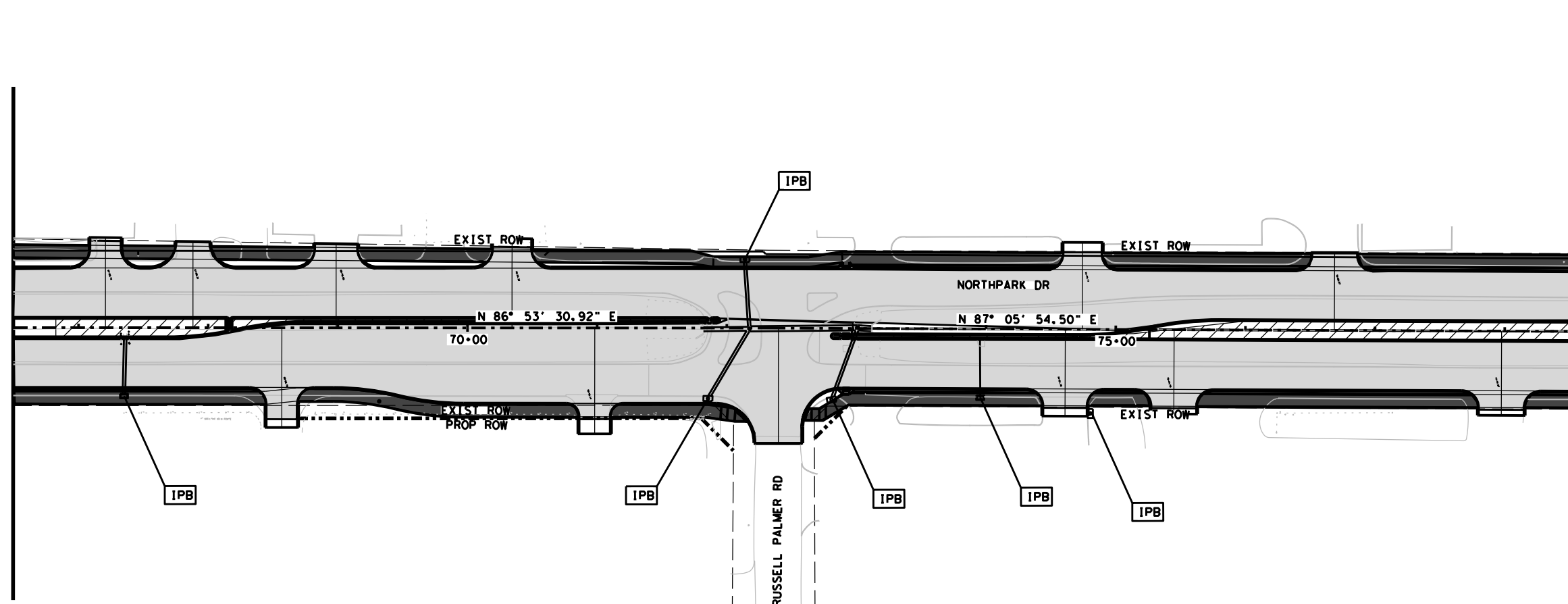


LEGEND

- PROPOSED TRAVEL LANE
- ⇨ EXISTING TRAVEL LANE
- IPB INLET PROTECTION BARRIER
- SW SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
- FFB FILTER FABRIC BARRIER
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- TEMP CONSTRUCTION THIS STEP
- SIDEPATH CONSTRUCTION THIS STEP
- PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED
- TEMP CONSTRUCTION PREVIOUSLY COMPLETED
- SIDEPATH CONSTRUCTION PREVIOUSLY COMPLETED

HIDDEN PINES

MATCHLINE - STA 66+50



MATCHLINE - STA 79+00



4/1/2021

NO.	REVISIONS	BY	DATE
ENGINEERS 5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572			
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
NORTH PARK DRIVE STORM WATER POLLUTION PREVENTION PLAN CONSTRUCTION PHASE STA 54+00 TO STA 79+00 PHASE 3			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
		SECTION No.	JOB No.
		37	232
		SHEET No.	607

LEGEND



- PROPOSED TRAVEL LANE
- EXISTING TRAVEL LANE
- IPB INLET PROTECTION BARRIER
- SW SW-MH PROTECT DURING CONSTRUCTION (AS NEEDED)
- FFB FILTER FABRIC BARRIER
- PERMANENT CONSTRUCTION THIS STEP
- TEMP CONSTRUCTION THIS STEP
- SIDEPATH CONSTRUCTION THIS STEP
- PERMANENT CONSTRUCTION PREVIOUSLY COMPLETED
- TEMP CONSTRUCTION PREVIOUSLY COMPLETED
- SIDEPATH CONSTRUCTION PREVIOUSLY COMPLETED

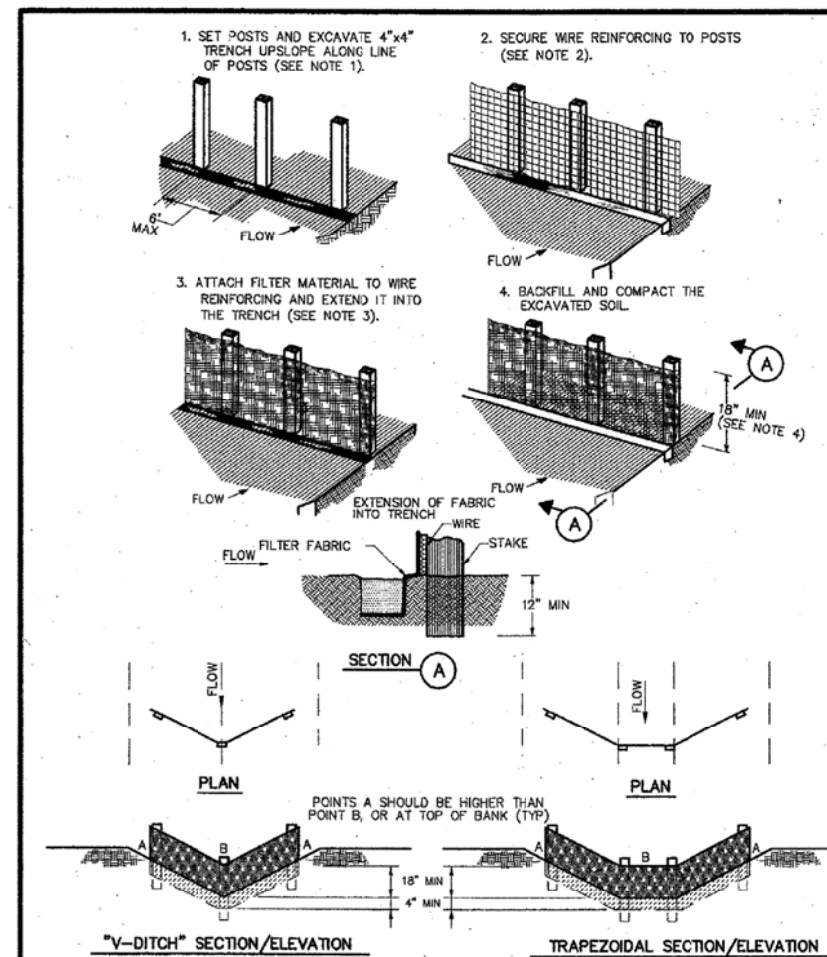
SCALE: 1" = 100'



Eduardo Quiroz

4/1/2021

NO.	REVISIONS	BY	DATE
<div><div>HNTB</div><div><div>ENGINEERS</div><div>5821 SOUTHWEST FRWY STE. 500 HOUSTON, TEXAS 77057 (713) 739-7744 TX FIRM No. 18572</div></div></div>			
<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div>		<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY</div><div>8121 205 HUNTON ANDREWS KURTH LLP 500 TRAVIS, SUITE 4200 HOUSTON, TX 77007</div></div>	
<div><div>NORTH PARK DRIVE</div><div>STORM WATER POLLUTION PREVENTION PLAN</div><div>CONSTRUCTION PHASE</div><div>STA 79+00 TO END</div><div>PHASE 3</div></div>			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
			37
			232
			608

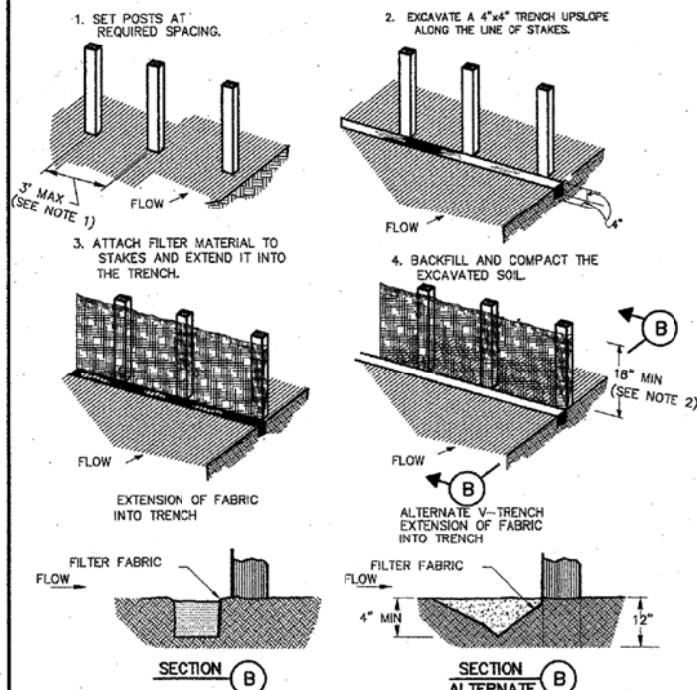
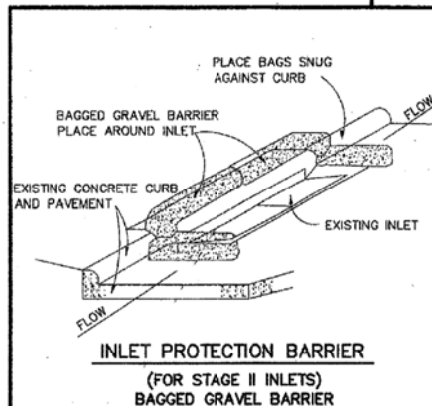


CONSTRUCTION NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
6. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.



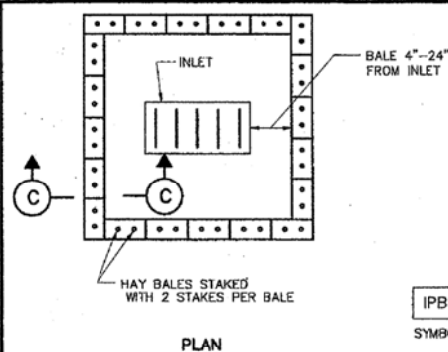
REINFORCED FILTER FABRIC BARRIER



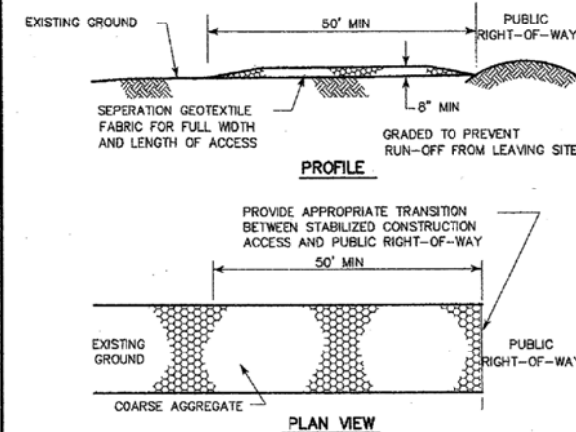
CONSTRUCTION NOTES:

1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

FILTER FABRIC BARRIER



HAY BALE INLET PROTECTION BARRIER

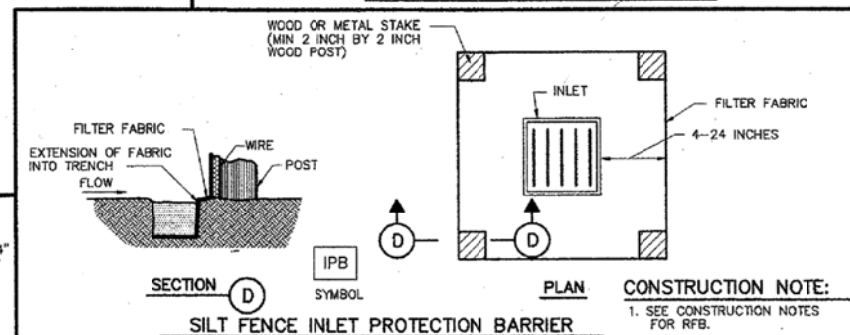


CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
6. COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
7. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.



STABILIZED CONSTRUCTION ACCESS



SILT FENCE INLET PROTECTION BARRIER

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS

(NOT TO SCALE)

APPROVED: *[Signature]* CITY ENGINEER
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010 DWG NO: 01571-01



4/1/2021

NO.	REVISIONS	BY	DATE
HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			

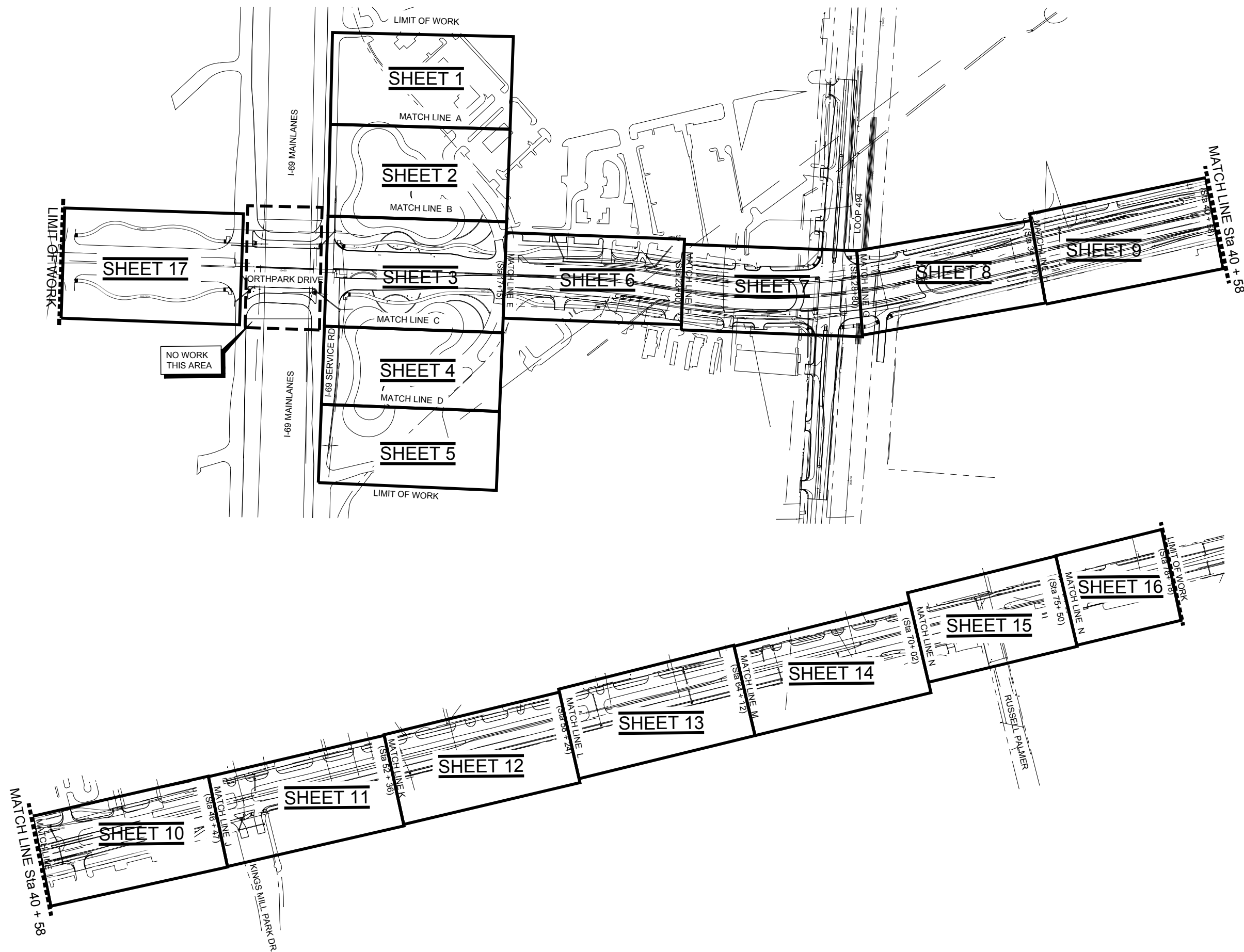
NORTH PARK DRIVE

STORM WATER POLLUTION PREVENTION PLAN DETAILS

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
			JOB No.	SHEET No.
			232	609



0 30 60 120
SCALE: 1"=120'



NO.		REVISIONS		BY	DATE
M2L		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420	
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002		NORTH PARK DRIVE SHEET ORIENTATION SHEET 1 OF 1	
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					610

SUMMARY OF LANDSCAPE QUANTITIES																								
SHEET NO.	ITEM NO.	0161-6012	0162-2002	0164-6023	0192-6012	0192-6013	0166-6001	0192-6002	0192-6003	0192-6007	0192-6008	0192-6063	0192-6064	0192-6065	0192-6066	0192-6084	1006-6001	1006-6002	1006-6003	1006-6004	0166-6001	0166-6003	0192-6001	0192-6015
	DESC CODE											TREES	SOD	SHRB/GC	TURF		TREES	TURF	TREES	SHRB/GC				
		GENERAL	BLOCK	CELL FBR	MULCH	MULCH	FERTILIZER	PLANT	PLANT	PLANT	PLANT	PLANT PREP	PLANT PREP	PLANT PREP	PLANT PREP	200 GAL	SOIL AMEN.	SOIL AMEN.	SOIL AMEN	SOIL AMEN	VEGATATVE WATER	VEGATATVE WATER	PLANT MATERIAL	LANDSCAPE
	STATION LIMITS	COMPOST	SODDING	MULCH	BARK	PINE	TURF/SOD	1 GAL	3 GAL	45 GAL	100 GAL	TYPE I	TYPE II	TYPE III	TYPE IV	TREE	TYPE I	TYPE II	TYPE III	TYPE IV		(TREES)(BAG)	4" CONT	EDGE
SOFTSCAPE		CY	SY	SY	CY	CY	AC	EA	EA	EA	EA	SY	SY	SY	SY	EA	EA	SY	SY	SY	MG	MG	EA	LF
SHEET 1 OF 17		115.0	344	34,317	0	557	1.6	0	0	0	3	4	344	0.0	34,317.0	0	3	34,661	24.0	0.0	716	0	0	0
SHEET 2 OF 17		201.0	1,877	48,374	1	162	20.8	862	30	19	22	46	1,877	89.0	48,374	3	41	50,251	328.0	20.0	1,038	0	0	172
SHEET 3 OF 17		179.0	4,944	13,487	75	0	76.0	6,698	547	15	23	44	4,944	6,094.0	13,487	13	38	18,431	304.0	1,354.0	380	0	1,715	28
SHEET 4 OF 17		124.0	2,581	17,049	0	99	8.1	1,021	44	10	16	30	2,851	0.0	17,049	6	26	19,630	208.0	0.0	4,061	0	0	131
SHEET 5 OF 17		92.0	1,509	16,240	0	87	7.3	5	25	6	3	9	1,509	0.0	16,240	4	9	17,749	72.0	0.0	3,672	0	0	0
SHEET 6 OF 17		60.0	486	15,215	0	0	6.5	0	0	0	20	28	486	0.0	15,215	0	20	15,701	160.0	0.0	324	0	0	0
SHEET 7 OF 17		23.0	383	3,978	0	0	1.8	0	0	0	4	6	383	0.0	3,978	0	1	4,361	8.0	0.0	90	12	0	0
SHEET 8 OF 17		27.0	526	4,081	0	0	1.9	0	0	0	0	0	526	0.0	4,081	0	0	4,607	0.0	0.0	95	0	0	0
SHEET 9 OF 17		37.0	656	6,165	0	0	2.8	0	0	0	23	32	656	0.0	6,165	0	23	6,821	184.0	0.0	141	72	0	0
SHEET 10 OF 17		107.0	636	28,901	0	0	12.1	0	0	0	27	38	636	0.0	28,901	0	27	29,537	216.0	0.0	610	84	0	0
SHEET 11 OF 17		63.0	668	14,555	0	0	6.2	0	0	0	8	11	668	0.0	14,555	0	8	15,223	64.0	0.0	314	25	0	0
SHEET 12 OF 17		38.0	599	7,023	0	0	3.1	0	0	0	8	11	599	0.0	7,023	0	8	7,622	64.0	0.0	157	25	0	0
SHEET 13 OF 17		76.0	2,210	4,826	0	0	2.9	0	0	0	11	15	2,210	0.0	4,826	0	11	7,036	88.0	0.0	145	34	0	0
SHEET 14 OF 17		41.0	796	6,071	0	0	2.8	0	0	0	8	11	796	0.0	6,071	0	8	6,867	64.0	0.0	142	25	0	0
SHEET 15 OF 17		13.0	469	0	0	0	0.2	0	0	0	0	0	469	0.0	0	0	0	469	0.0	0.0	10	0	0	0
SHEET 16 OF 17		22.0	324	4,234	0	0	1.9	0	0	0	0	0	324	0.0	4,234	0	0	4,558	0.0	0.0	94	0	0	0
SHEET 17 OF 17		0.0	610	0	0	0	0.2	0	0	0	0	0	610	0.0	0	0	0	610	0.0	0.0	0	0	0	0
SOFTSCAPE TOTAL:		1,218.0	19,618	224,516	76	905	156.2	8,586	646	50	176	285	19,888	6,183.0	224,516.0	26	223	244,134	1,784.0	1,374.0	11,989.0	278	1,715	331

SHEET NO.	ITEM NO.	0529-6033	5009-6001	5009-6002	5009-6003
	DESC CODE				
		CONCRETE LANDSCAPE BAND	STONE MASONRY WALL (FREE)	STONE MASONRY WALL (RED)	STONE MASONRY WALL (CAP) (ALL WIDTH)
	STATION LIMITS	LF	LF	LF	LF
SHEET 1 OF 17		0	0	0	0
SHEET 2 OF 17		60	22	214	214
SHEET 3 OF 17		162	727	318	573
SHEET 4 OF 17		0	0	217	0
SHEET 5 OF 17		0	0	0	0
SHEET 6 OF 17		0	0	0	0
SHEET 7 OF 17		0	0	0	0
SHEET 8 OF 17		0	0	0	0
SHEET 9 OF 17		0	0	0	0
SHEET 10 OF 17		0	0	0	0
SHEET 11 OF 17		0	0	0	0
SHEET 12 OF 17		0	0	0	0
SHEET 13 OF 17		0	0	0	0
SHEET 14 OF 17		0	0	0	0
SHEET 15 OF 17		0	0	0	0
SHEET 16 OF 17		0	0	0	0
SHEET 17 OF 17		0	0	0	0
	HARDSCAPE TOTAL:	222	749	749	787

SHEET 1 OF 1	ITEM NO.	0624-2014	0618-2012	0618-2024	1014-2003	1014-2004	1014-2005	1014-2006	1014-2007	1014-2008	1014-2009	1014-2010	1014-2011	0620-2012
	DESC CODE													
		GROUND BOX (162922 W / APRON (TY0)	CONDUIT (PVC) (SCH-40)(1")	CONDUIT (PVC) (SCH-40) (4" BORE)	AERATION LANDSCAPE AMENITY (TY1)	TREE UPLIGHT LANDSCAPE AMENITY (TY2)	TREE UPLIGHT LANDSCAPE AMENITY (TY3)	WASHER LANDSCAPE AMENITY (TY4)	SEASON LITGHT LANDSCAPE AMENITY (TY5)	WELL PUMP LANDSCAPE AMENITY (TY6)	ELCT. SERVICE LANDSCAPE AMENITY (TY7)	IRR. PUMP LANDSCAPE AMENITY (TY8)	E.S.P LANDSCAPE AMENITY (TY9)	OUTLETS
	STATION LIMITS	W / APRON (TY0)	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
		20	1,500	40	2	24	22	35	10	1	1	1	2	10
	LIGHTING TOTAL	20	1,500	40	2	24	22	35	10	1	1	1	2	10

SHEET 1 OF 2 SHEET 2 OF 2	ITEM NO.	0110-6003	0400-6005
	DESC CODE		
		EXCAVATION	STABILIZATION SHELF
	STATION LIMITS	CY	CY
		30,608	602
		28,807	564
	POND TOTAL:	59,415	1,166

TREE PRESERVATION	ITEM NO.	1003-6002	1003-6003	1003-6004	1003-6005	1004-6002	1003-6006
	DESC CODE						
		TRANSPLANT PLANT MTL. (2-1/2"-4")	TRANSPLANT PLANT MTL. (4"-8")	TRANSPLANT PLANT MTL. (8"-10")	TRANSPLANT PLANT MTL. (11"-13")	TREE PROTECTION	TRANSPLANT PLAN MATERIAL (11"-13")
	STATION LIMITS	EA	EA	EA	EA	AC	EA
SHEET 1 OF 2		18	0	18	28	1	6
SHEET 2 OF 2		0	2	4	3	0	6
	TREE PRES TTL:	18	2	22	31	1	12

CLEARING AND GRUBBING	ITEM NO.	0100-6001	0100-6015	0100-6002
	DESC CODE			
		TYPE 1 PREPARING ROW (TY 1)	TYPE 2 PREPARING ROW (TY 2)	TYPE 3 PREPARING ROW (TY 3)
	STATION LIMITS	AC	AC	AC
SHEET 1 OF 1		8.1	0.9	1.3
	CLEARING/GRUB TOTAL	8.1	0.9	1.3

IRRIGATION	ITEM NO.	0170-6002	0193-6001	0193-6007
	DESC CODE			
		IRRIGATION SYSTEM (TY 1)	LANDSCAPE MAINTANCE	IRRIGATION (MAINT)
	STATION LIMITS	LS	MO	MO
SHEETS 1 - 16		1	3	3
	IRRIGATION TOTAL:	1	3	3



NO.	REVISIONS	BY	DATE
<div>M2L</div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024	
<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420	
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10</div> <div>KURTH LLP</div> <div>600 TRAVIS, SUITE 4200</div> <div>HOUSTON, TEXAS 77002</div>	
NORTHPARK DRIVE			
SUMMARY OF LANDSCAPE QUANTITIES			
SHEET 1 OF 1			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
			SECTION No.
			37
			JOB No.
			232
			SHEET No.
			611

LANDSCAPE GRADING AND FILL:

- A. CONTRACTOR TO VERIFY THE LOCATION AND CONDITIONS OF ALL UNDERGROUND UTILITIES IN THE FIELD.
- B. ALL LANDSCAPE BERMS SHALL BE GRADED IN A SMOOTH AND CONTINUOUS MANNER WITH NO ABRUPT GRADING TRANSITIONS TO EXISTING GRADE.
- C. LANDSCAPE BERM ROUGH GRADING ELEVATIONS SHALL BE WITHIN ± 1" OF FINISHED GRADE TO ALLOW FOR INSTALLATION OF FINISH MATERIALS AND TURF. FILL SOIL TO BE IMPORTED UNLESS OTHERWISE NOTED ON THE DRAWINGS **(INCIDENTAL AND NOT PAID FOR SEPARATELY)**
- D. CONTRACTOR TO VERIFY EXISTING PROPERTY SPOT ELEVATIONS IN THE FIELD AND MAKE ADJUSTMENTS IN THE FINISHED GRADING ELEVATIONS AND SPOTS IN ORDER TO MAINTAIN POSITIVE DRAINAGE IN ALL CONDITIONS.
- E. CONTRACTOR SURVEYING COST TO VERIFY EXISTING AND PROPOSED GRADES IS INCIDENTAL.
- F. CONSTRUCTED PAVEMENT AREAS SHALL NOT HAVE MORE THAN 1/16" HIGH STANDING WATER IN A TEN FOOT DIRECTION.
- G. CONTRACTOR TO PROTECT AND PRESERVE THE EXISTING TREES AND/OR SHRUBS DURING CONSTRUCTION RELATED ACTIVITIES AND NOT DISTURB THE GROUND BELOW THE DRIP LINES OF EXISTING PLANT MATERIAL TO BE PRESERVED AS SHOWN ON TREE PRESERVATION PLANS. CONTRACTOR SHALL INSTALL TREE PROTECTION FENCING OR OTHER APPROVED FENCING AS NEEDED PER **TREE PROTECTION DETAILS SHEET 1 OF 1**.
- H. REMOVE EXISTING VEGETATION, SOD, SHRUBS, AND GROUNDCOVERS PRIOR TO CONDUCTING EARTH WORK AS NOTED ON THE CLERAING AND GRUBBING PLANS.
- I. EXCAVATED SOIL FROM PROJECT SITE MAY BE USED FOR ROUGH AND FINE GRADING ACTIVITIES IF APPROVED BY LANDSCAPE ARCHITECT. CONTRACTOR TO PROVIDE SOIL ANALYSIS FOR REVIEW BY LANDSCAPE ARCHITECT. **(SOIL TESTING AND STOCKPILING IS INCIDENTAL AND NOT PAID FOR SEPARATELY)**
- J. TOPSOIL SHALL BE FERTILE, FRIABLE, NATURAL, SANDY LOAM SURFACE SOIL OBTAINED FROM EXCAVATION OR BORROW ACTIVITIES HAVING THE FOLLOWING CHARACTERISTICS:(INCIDENTAL AND NOT PAID FOR SEPARATELY)

- PH VALUE OF BETWEEN 6.0 AND 7.0, AND INCLUDE A MIN. OF 4% ORGANICS
 - LIQUID LIMIT: 50 OR LESS
 - PLASTICITY INDEX: 20 OR LESS.
 - GRADATION: MAXIMUM OF 10 PERCENT PASSING THE NO. 200 SIEVE.
1. TOPSOIL SHALL BE REASONABLY FREE OF SUBSOIL, CLAY LUMPS, WEEDS, NON-SOIL MATERIALS, AND OTHER LITTER OR CONTAMINATION. TOPSOIL SHALL NOT CONTAIN ROOTS, STUMPS, AND STONES LARGER THAN 2 INCHES.
2. OBTAIN TOPSOIL FROM NATURALLY WELL-DRAINED AREAS WHERE TOPSOIL OCCURS AT A MINIMUM DEPTH OF 4 INCHES AND HAS SIMILAR CHARACTERISTICS TO THAT FOUND AT THE PLACEMENT SITE. DO NOT OBTAIN TOPSOIL FROM AREAS INFECTED WITH A GROWTH OF, OR REPRODUCTIVE PARTS OF NUT GRASS OR OTHER NOXIOUS WEEDS.
3. TOP SOIL MAY BE STRIPPED FROM THE SITE THROUGH SITE GRADING ACTIVITIES IF APPROVED BY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE IN ADVANCE. TOPSOIL USED FROM ONSITE SHALL COME FROM THE TOP 6"-8" OF THE SOIL. THE CONTRACTOR WILL BE REQUIRED TO CONDUCT A SOIL TEST, AT NO ADDITIONAL COST TO THE OWNER, FROM ON SITE FOR USE BY THE LANDSCAPE ARCHITECT AND/OR OWNER'S REPRESENTATIVE IN DETERMINING IF THE ON SITE TOPSOIL IS SUITABLE FOR THE PROPOSED LANDSCAPE WORK.

LANDSCAPE GRADING AREAS MINIMUM SLOPE DRAINAGE TABLE		
SLOPE	DRAINAGE AREAS	NOTES
1% - 2%	CONCENTRATED SWALES	(AS NOTED ON THE DWG'S)
1% - 5%	HARDSCAPE AREAS	(AS NOTED ON THE DWG'S)
2% MAX	CROSS SLOPES FOR SIDEWALKS	(AS NOTED ON THE DWG'S)
0.5% MIN	LANDSCAPE DRAINS	(AS NOTED ON THE DWG'S)

PLANTING MIX REQUIREMENT:

- A. PLANTING MIX SHALL BE PROVIDED BY ONE OF THE FOLLOWING SUPPLIERS OR AN APPROVED EQUAL (ALL TESTING IS INCIDENTAL)
1. Ground up, 1261 Brittmoore Rd, Houston, TX 77043, (281) 970-0003
2. Landscape Depot, 8901 FM 1960 Rd W Houston, TX 77070. (281) 890-0365
- B. CONTRACTOR WILL BE REQUIRED TO PROVIDE SOIL TESTING OF PROPOSED PLANTER MIXES AND EXISTING SOILS. SOILS TESTING SHALL BE A COMPREHENSIVE MACRO AND MICRONUTRIENT SOIL TEST, INCLUDING ORGANIC MATTER, MICROBIAL ACTION, AND CEC, AND SHALL BE PERFORMED BY THE FOLLOWIONG SOILS LABORATORY.
1. **Soil and Plant Laboratory Inc.(or approved equal)**
Texas Soil and Plant Lab, 5115 W. Monte Cristo, Edinburg, Texas 78539
Tel: (956)383-0739 www.txplant-soillab.com

- C. SOIL TESTS SHALL BE CURRENT AND CONDUCTED WITHIN THE PREVIOUS 60 DAYS OF THE SUBMITTAL.
- D. EXCAVATED MATERIAL FROM TREE OR SHRUB BEDS CAN BE USED FOR PREPARED OF BACKFILL MIX IF APPROVED BY SOILS TESTS.
- E. THE CONTRACTOR SHALL PROVIDE A PLANTER MIX THAT ADHERES TO THE RECOMMENDATIONS OF THE SOILS TESTS AND WILL MODIFY AS NEEDED.
- E. MULCH MATERIALS;
1. General : Organic mulch free from deleterious materials and suitable for top dressing of trees pits and planting beds. Mulch shall be composed of well-rotted shredded hardwood mulch, black or dark brown in color. Mulch shall be the product of standard stripping of bark from trees for fiber or pulp manufacturing. Bark shall be shredded in a manner where large pieces are at a minimum. The mulch shall be free of debris **No Dyed mulch is permissible.**
2. Top Dressing and Backfill Mix: Organic hardwood bark mulch free from deleterious materials and suitable for top dressing of trees pits and planting beds. Mulch shall be composed of well-rotted shredded hardwood mulch, black or dark brown in color.
- a. Enriched Hardwood bark mulch. Three(3) parts hardwood bark mulch and one (1) part general use compost(Section 02905)
- b. Mulch shall be of a high quality and shall contain less than 10% wood particles
- c. Mulch shall have particle sizes ranging from 3/8" to a maximum of 1".
3. Manufacturer production requirements.
- a. Raw Materials & feedstock: Virgin yard trimmings and vegetation - includes grass clippings, leaves, branches, trees, pine needles, native woods.
- b. Pallets, Treated lumber, Plastics, Decomposable plastics, dry wall, roof shingles, metal, fencing & construction debris shall not be used in production.
- c. Raw materials aged for a minimum of 3 to 6 months in a WINDROW configuration.
- d. First Grind: Aged raw materials goes through a 1st grind with a 6"x9" screen then aged in a Windrow for minimum of 3 months - internal windrow temperatures shall range from 150 to 170 degrees.
- e. Second Grind: Aged 1st grind material shall pass through a 2nd grind process with a 1.5" screen.
- E. SUBMITTALS
- a) One (1) appropriately size container of all mulches.
- b) Supplier and/or vendor cut-sheets of all ammendments

LANDSCAPE PLANTING MATERIALS REQUIREMENTS

- A. CONTRACTOR TO LAYOUT ALL PLANTING BED LIMITS AND LOCATIONS OF ALL PROPOSED IMPROVEMENTS IN THE FIELD FOR APPROVAL OF LANDSCAPE ARCHITECT.
- B. CONTRACTOR SHALL FINE GRADE ALL LANDSCAPE AREAS.
- C. WHERE INDICATED ON THE DRAWINGS AS SOD, THIS SHALL MEAN SOLID SOD COVERAGE PER THE PLANTING DETAILS.
- D. CONTRACTOR TO PROVIDE METAL PLANTING BED EDGING WHERE NOTED ON DRAWING SEE PLANTING DETAILS.
- E. **SEE PLANTING DETAILS** FOR PLANTING LEGEND, DETAILS, AND NOTES.
- F. **CONTRACTOR TO PROVIDE MATERIAL SUBMITTALS TO THE OWNER AND, LANDSCAPE ARCHITECT CONSULTANT, AND CONSTRUCTION MANAGER PRIOR TO INSTALLATION OF ALL LANDSCAPE MATERIAL.**
- G. PROVIDE HARDWOOD BARK OR PINE STRAW MULCH ON ALL EXISTING AND PROPOSED PLANTING BED AREAS AND REAPPLY AS SPECIFIED **SEE PLANTING PLANS AND PLANTING ESTABLISHMENT DETAILS** (PAY UNDER ITEM: 192-6012: MULCH (BARK), 192-6013 (PINE))
- H. REMOVE ALL WEEDS IN EXISTING AND NEW PLANTING AREAS AND MAINTENANCE PATHS. **SEE PLANTING ESTABLISHMENT DETAILS AND SCHEDULE.** (INCIDENTAL AND NOT PAID FOR SEPARATELY)
- I. **LANDSCAPE SUBMITTALS.** CONTRACTOR TO PROVIDE LANDSCAPE ARCHITECT WITH THE FOLLOWING LANDSCAPE SUBMITTALS (COSTS TO PREAPARE SUBMITTALS IS INCIDENTAL AND NOT PAID FOR SEPARATELY)

1. Certifications: Submit for approval by Landscape Architect and/or Owner's Representative, State or Federal certification stating that the plants are free from disease and insect infestation.
2. Fertilizer Certification: Fertilizer certification shall be submitted for review and approval by the Landscape Architect and/or Owner's representative. The certification shall include a chemical analysis of the fertilizer and a listing of the elements container therein and their percentages.
3. Maintenance Instructions: Submit typewritten instructions, including manufacturer's recommendations and instructions recommending procedures to be established by the Landscape Architect and/or Owner's Representative for maintenance of trees, palms, shrubs, ground covers, and annual/perennial plantings. Submit instructions prior to the expiration of the Contractor's maintenance period.
4. Plant life nursery sources: Landscape Architect shall be notified prior to shipping of plant material so that critical inspections can occur at the nursery (if applicable)
5. Submittals - Contractor to provide the following landscape material submittals for review and approval by Landscape Architect and/or Owner's Representative. This shall be supplied at the expense of the contractor.
- a).One (1) appropriately sized container of all prepared planter mixes and or top soils. Submit laboratory analysis of prepared planter mixes and top soils. Laboratory analysis' shall be current and must have been prepared within the thirty(30) days of the submittal.
- b).One (1) appropriately size container of all mulches.
- c).One(1) of each shrub, groundcover, perennial, and annual plant material in suppliers original container.
- d)Trees: Unless otherwise required by Landscape Architect and/or Owner's Representative, provide a photograph with representative scale of each tree material proposed.
- e)Palms: Unless otherwise required by Landscape Architect and/or Owner's Representative, provide a photograph with representative scale of each palm material proposed.
- f).Other landscape supplies or components that is deemed necessary for work in this section.
6. Nursery Inspections - All plants inspected at the nursery by the Landscape Architect shall be tagged with serialized self-locking tags. Trees delivered to the site without these tags or with broken tags may be sufficient reason for rejection.
7. All submittal data shall be forwarded in a single package to the Landscape Architect within ten (10) days of award of Contract.
- J TREES, PLANTS, AND GROUND COVER QUALITY CONTROL
1. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to those of project for at least 12 (twelve) months unless specifically otherwise authorized by Landscape Architect or Owner's Representative in writing.
2. Plants shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs, or larvae, and shall have healthy, well developed root systems. They shall be free from physical damage or adverse conditions that would prevent future thriving growth.
3. Plants shall be true to species and variety indicated on the planting plan legend and shall conform to measurements specified.
4. Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Caliper measurement shall be taken at a point on the trunk six inches (6") above natural ground four inches (4") in caliper and at a point twelve inches (12") above the natural ground line for trees over four inches (4") in caliper. If a range of size is given, no plant shall be less than the minimum size and not less than 40% of the plants shall be as large as the maximum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between height and spread shall be rejected.



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		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420							
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002							
NORTH PARK DRIVE									
LANDSCAPE GENERAL NOTES									
SHEET 1 OF 3									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.				
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS				
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.				
CHECKED:	HOU	MONTGOMERY	0912	37	232				
					612				

TREE PRESERVATION AND TRANSPLANTING:

- A. CONTRACTOR SHALL SEEK PRIOR APPROVAL FROM THE LANDSCAPE ARCHITECT, PROJECT ARBORIST, CITY URBAN FORESTOR, AND CITY'S REPRESENTATIVE PRIOR TO INITIATION OF TREE REMOVAL AND/OR TREE PROTECTION ACTIVITIES WITHIN THE PROJECT SCOPE OF WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY ALL APPLICABLE REGULATORY AGENCIES HAVING JURISDICTION OVER THE PROJECT..
- B. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THAT NO DAMAGE TO EXISTING TREES TO BE PROTECTED AND/OR THOSE THAT HAVE THEIR TRUNKS OUTSIDE OF THE PROJECT LIMITS BUT HAVE SIGNIFICANT BRANCH OVERHANG INTO THE PROJECT LIMITS.
- C. THE CONTRACTOR SHALL NOT, AT ANY TIME, PARK CONSTRUCTION VEHICLES, MATERIALS, OR EQUIPMENT INSIDE OF THE TREE PROTECTION ZONE (TPZ) OF TREES TO BE PROTECTED.
- D. **SEE TREE PRESERVATION DETAILS AND SPECIFICATIONS** FOR DISPOSITION AND CONDITIONAL TREATMENT OF TREES NOTED ON THE DRAWINGS.
- E. **SEE TREE TRANSPLANTING PLANS AND DETAILS** FOR THE RELOCATION OF EXISTING TREES ON-SITE OR TO DESIGNATED HOLDING AREAS.
- F. TRANSPLANTED TREES;
- Contractor to locate existing trees to be transplanted on-site and verify tag numbers, species, and conditions prior to transplanting.
 - For trees to be transplanted to a holding area and then to their final location, establish holding area and temporary irrigation prior to transplanting trees for up to twelve (12) months.
- F. CONTRACTOR TO PROVIDE WATER, TREATMENT FOR BORERS AND OTHER INSECTICIDE TREATMENTS FOR TREES TO BE PRESERVED AS NEEDED PER ARBORISTS RECOMMENDATION. **(INCIDENTAL AND NOT PAID FOR SEPARATELY.)**
- G. PROPOSED TREES SHALL BE PLANTED A MINIMUM OF 5'-0" FROM BACK OF CURB AND NO CLOSER THAN 20' O.C. FROM EACH OTHER. TREE MITIGATION PLACEMENT DISTANCES FROM MEDIAN TIP ENDS SHALL BE:
- 50' AT MEDIAN BREAKS
- 75' AT NON-SIGNALIZED INTERSECTIONS
- 100' AT SIGNALIZED INTERSECTIONS
- H. ALL TREE MITIGATION MATERIALS AND LABOR REQUIRED TO PROVIDE AND INSTALL THE PROPOSED TREES SHALL BE INCIDENTAL TO TREE PRESERVATION.
- I. CONTRACTOR TO SUBMIT MEANS AND METHODS OF WATERING PROCEDURES FOR NEWLY PLANTED TREES TO ARBORIST FOR REVIEW AND APPROVAL NOT COVERED BY AN AUTOMATED IRRIGATION SYSTEM.
- J. CONTRACTOR TO WARRANT, PROVIDE WATER, AND MAINTENANCE FOR ALL NEWLY PLANTED TREES FOR A PERIOD OF ONE (1) YEARS FROM DATE OF SUBSTANTIAL COMPLETION TO SUSTAIN HEALTH OF TREE. (INCIDENTAL TO TREE TRANSPLANTING.)
- K. CONTRACTOR TO EXERCISE CAUTION WHEN WORKING AROUND ALL EXISTING TREES REGARDLESS OF SPECIFIC MEASURES THAT ARE NOTED ON THESE PLANS AND DETAILS AT ALL TIMES
- L. PROJECT CONDITIONS
- Preserve and protect existing trees and plants to remain from foliage, branch, trunk, or root damage that could result from construction operations.
 - Prevent the following types of damage:
 - Compaction of root zone by foot or vehicular traffic, or material storage.
 - Trunk damage from equipment operations, material storage, or from nailing or bolting.
 - Trunk and branch damage caused by ropes or guy wires.
 - Root or soil contamination from spilled solvents, gasoline, paint, lime slurry, and other noxious materials.
 - Branch damage due to improper pruning or trimming.
 - Damage from lack of water due to:
 - Cutting or altering natural water migration patterns near root zones.
 - Failure to provide adequate watering
 - Damage from alteration of soil pH factor caused by depositing lime, concrete, plaster, or other base materials near roots zones.
 - Cutting of roots larger than one inch in diameter.

M. TREE REMOVAL

- Trees scheduled for removal shall be sawed down and debris hauled from the site the same day. The stump shall be ground to twelve (12) inches below grade and excess grindings shall be hauled from the site the same day, so that a pile of grindings is not left where the stump was ground. Enough grindings should be left so that an open hole does not remain.
- Only those trees called out for removal in the Tree Treatment Schedule shall be removed, or otherwise damaged. Should it be determined that any additional trees must be removed, a permit must be applied for and approved from the Owner of Houston Urban Forestry Division prior to removal. Contractor shall contact Urban Forestry at 832-395-8459.
- The Contractor shall notify the Project arborist or Owner Engineer immediately if the Contractor has identified a dead and damaged tree(s) that was not previously identified on the Drawings. The Contractor shall provide a station and offset dimension, or other appropriate means of locating the tree(s) location and the reason for the proposed removal. The Project Arborist shall make a determination as to the potential of restoration of the tree(s) to normal growth pattern shall be removed. The Contractor shall not remove any tree without written permission from the Project Arborist and Owner Urban Forester.

N. GRADING AND FILLING AROUND TREES

- Maintain existing grade within the dripline of trees, unless otherwise indicated.
- Where existing grade around trees is above new finish grade, under supervision of project urban forester, carefully hand excavate within the dripline to make transition to new finish grade.
- Where existing grade is below new finish grade, place clean bank sand in a single layer to make the transition to new grade. Do not compact; hand grade to required elevation. Specifically to areas where proposed curb is higher than existing and backfill will be required.

O. ARBORIST AND URBAN FORESTER QUALIFICATIONS.

- Arborist - Employ qualified arborist acceptable to Landscape Architect and Owner's Representative to complete all tree treatments. Arborist shall be normally engaged in the field and have a minimum of five (5) years experience. Qualifications of the selected arborist shall be submitted for review and approval by the Landscape Architect and Owner.
- Urban Forester - An Urban forester shall be hired to monitor and assist with field aout (exact locations of fencing, root pruning, and zero curb cutback) of the tree preservation program during demolition and construction to ensure tree protection procedures and techniques are practiced as specified to address concerns and conditions which occur in the field. At a minimum, the individual responsible for monitoring and field layout of the tree protection shall have a minimum of five (5) years of experience as a consultant, and shall not be affiliated with a tree care contractor in the Houston area. Qualifications of the selected arborist shall be submitted for review and approval by the Landscape Architect and Owner.

SITE PREPARATION:

- A. CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED LANDSCAPE WALLS, CURBING, AND MISCELLANEOUS LANDSCAPE ELEMENTS. ANY AND ALL SURVEYING COSTS FOR THE PROPOSED HARDSCAPE ELEMENTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND **WILL NOT BE PAID FOR SEPARATELY.**
- B. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE OF ANY LACK OF SURVEYING POINTS, OR DISCREPANCIES PRIOR TO INITIATING CONSTRUCTION.
- C. THE CONTRACTOR SHALL LAYOUT ALL PROPOSED LANDSCAPE ELEMENTS IN THE FIELD FOR APPROVAL BY LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO INITIATING CONSTRUCTION.
- D. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS AND CONDITIONS OF EXISTING UTILITIES.
- E. EXCAVATION, DISPOSAL OF CONSTRUCTION WASTES, AND TOPSOIL BACKFILL, UNLESS OTHERWISE PROVIDED FOR ON THE LANDSCAPE DRAWINGS SHALL NOT BE PAID FOR SEPARATELY.
- F. SEE SITE CLEARING AND GRUBBING PLANS FOR DISPOSITION OF EXISTING VEGETATION AND LANDSCAPE FEATURES. OWNER HAS THE RIGHT OF FIRST REFUSAL OF ALL STONE MATERIALS. CONTRACTOR SHALL STACK EXISTING STONE MATERIAL FOR REVIEW BY OWNER AND POTENTIAL RE-USE BY THE OWNER. ANY USED MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST.

- G. ESTABLISH TREE PRESERVATION FENCING, IDENTIFY TREES TO BE TRANSPLANTED PRIOR TO CONDUCTING SITE CLEARING AN GRUBBING ACTIVITIES.

LANDSCAPE GRADING:

A. SITE PREPARATION

- All work shall be performed under the direct supervision of the Contractor's designated superintendent. The above shall apply to all work, whether performed by the Contractor's own forces or sub-contractors.
- Install tree preservation devices.
- Relocate or adjust grades of existing trees noted to be relocated.

B. SITE INSPECTION

- The drawings do not purport to show all objects existing on the site.
- Before commencing the work of this Section, verify with the OWNER's Representative all objects to be removed and all objects to be preserved.
- Locate all existing utility lines and determine all requirements for disconnecting, abandonment, and capping. Assistance in the location of all existing utilities can be obtained from the local utility companies.
- Locate all existing active utility lines traversing or adjacent to the site, and determine the requirements for their protection.
- Contractor shall protect all of existing utilities and for reporting utilities not shown in plan

C. ROUGH GRADING AND SITE WORK

- All areas covered by the project, including excavated and filled areas and adjacent transition areas shall be uniformly grades so that subgrade surfaces are at the elevations noted. The subgrade surface shall be below finished grade, as specified herein.
- Prior to commencing compaction, fills shall be brought to water content that will permit proper compaction, by either aerating the material, if it is too wet, or spraying the material with water, if it is too dry. Thoroughly mix each lift before compaction, to assure uniform distribution of water content. Bring all fills to suitable elevations above grade, to provide for anticipated settlement and shrinkage thereof.
- Remove top 6" of existing soil and stockpile for use in rough grading activities.
- Uniformly smooth grading for all areas, including excavated and fill sections and adjacent transition areas shall be accomplished. The subgrade surface shall be reasonably smooth, compacted and free from irregular surface changes.
- Install drainage piping and inlets.
- The Contractor shall raise or lower all rims of existing utility structures where there is a grade change and construct them flush with the new finished grade or in accordance with applicable government agencies.
- Ditches and swales shall be finished to permit proper surface drainage.
- Treat soil materials as per **Landscape Details**
- Excavated fill material from on-site shall be spread in uniform lifts of not more than six inches (6") in non-compacted thickness.
- Disc the first lift deposited into existing soil, to provide a transition horizon.
- Take precautionary methods to reduce soil erosion onto public streets and, where necessary, remove immediately.
- Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Provide subgrade surfaces free from irregular surface changes and as follows:
 - Provide compaction control for all fill and backfill.
 - Water settling, puddling, and jetting of fill and backfill materials as a compaction method are not acceptable.

D. COMPACTION

- Compact each layer of fill and scarify subgrade for all pavement areas, to not less than ninety-five percent (95%) maximum density. Compaction shall extend not less than five feet (5') beyond construction limit and pavement edges.
- Where fill is required for planting areas, compact each layer of fill and scarify subgrade to not less than eighty-five percent (85%) maximum density. unless the grading activity occurs in a Tree Preservation Zone in which grading activities are limited. See **Tree Preservation Details**.
- All excavation, filling and compaction shall be subject to the approval of the Landscape Architect.
- Where fill, backfill, or in-place materials are required to be compacted to a specified density, the maximum density for control shall be determined by using ASTM D1557 or ASSHO T180 methods. The results of these tests shall be the basis upon which satisfactory completion of work will be judged. Any area or portion thereof that does not meet minimum density requirements shall be re-worked and re-compacted until it meets the project density requirements.

- No extra compensation will be made for suitable materials removed, manipulated and replaced, in order to obtain density. Any removal, manipulation, aeration, replacement, and re-compaction of suitable materials necessary to obtain the required density shall be considered as incidental to the excavation and embankment operations, and shall be performed by the Contractor at no additional cost to the Owner.

E. LANDSCAPE AREA FINISH GRADING

- Uniformly distribute and spread stockpiled topsoil or excavated material to be used as finish grade backfill material. Do not use frozen or muddy material. Place during dry weather.
- The contractor may used on-site stripped topsoil provided that the Contractor has conducted a landscape soils analysis test to determine what, if any, amendments are needed for a uniform growth of turf.\
- Topsoil to be imported from off-site for use as a topsoil shall be an enriched top soil.
- Maintenance:
 - Protect finish-graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and damaged areas.
 - Where construction operations or adverse weather disturbs completed areas, scarify, re-shape, and compact to required density.




F. DISPOSAL OF WASTE MATERIALS

- Stockpile, haul from site, and legally dispose of waste materials, including excess excavated materials, rock, trash, and debris.
- Maintain disposal route clear, clean, and free of debris.

G. CLEANING

- Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment.
- Provide site clear, clean, free of debris, and suitable for site work operations.



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CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002							
NORTH PARK DRIVE									
LANDSCAPE GENERAL NOTES									
SHEET 2 OF 3									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.				
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS				
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.				
CHECKED:	HOU	MONTGOMERY	0912	37	232				
					613				

GENERAL IRRIGATION NOTES:

- A. ALL PIPE LOCATIONS AND IRRIGATION EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. IT IS INTENDED THAT THE EQUIPMENT BE PLACED IN THE LANDSCAPE AREA OR AREAS DESIGNATED FOR SLEEVE AND BORE. CONTRACTOR SHALL MODIFY THE LAYOUT AS NECESSARY TO REFLECT THE ACTUAL SITE CONDITIONS.

B. COMPLETE IRRIGATION SYSTEM INCLUDING TRENCHING AND BACKFILLING FOR ALL PIPES, VALVES AND DRAIN PITS, PROVIDING MAINS, LATERALS, RISERS, FITTINGS, SPRINKLER HEADS, VALVES, CONTROLLERS, CONTROLLER ENCLOSURES, BACKFLOW PREVENTERS, METERS, ELECTRIC WIRING, AND ANY AND ALL NECESSARY SPECIALTIES AND ACCESSORIES TO PROVIDE A FULLY FUNCTIONING IRRIGATION SYSTEM.

C. HEADS MARKED WITH AN 'F' ARE FIXED RISER HEADS

D. IRRIGATION HEADS TO BE LOCATED 1'-0" FROM B.O.C. UNLESS OTHERWISE NOTED

E. IRRIGATION CONTRACTOR TO VERIFY THE CONDITIONS AND LOCATIONS OF WATER LINES TO BE TAPPED.

F. CONTRACTOR SHALL PLACE NEW METER(S) IN THEIR NAME FOR DURATION OF CONSTRUCTION CONTRACT UP THROUGH SUBSTANTIAL COMPLETION.

G. CONTRACTOR SHALL PAY FOR ALL WATER & ASSOCIATED COSTS TO PROVIDE METERS, COORDINATE SERVICE & TAPS WITH CITY OF HOUSTON (INCIDENTAL AND NOT PAID FOR SEPARATELY).

H. SEE IRRIGATION DETAILS FOR ADDITIONAL INFORMATION.

I. COVERAGE INDICATED ON DRAWINGS AND SPECIFIED HEREIN. LAYOUT PORTIONS OF IRRIGATION SYSTEM NOT INDICATED ON DRAWINGS TO MEET SPECIFIED COVERAGE IN COMPLIANCE WITH LOCAL CODES AND REGULATIONS.

J. SUBMITTALS:

1. Product Data: Submit manufacturer's technical product data, shop drawings, specifications, and installation instructions for irrigation system materials, including, but not limited to irrigation heads, pop-up bodies, risers, automatic and manual valves, controllers, backflow preventers, pipe and fittings, air relief valves, line flush valves, flow regulators, filters, irrigation boxes, details, and all other related items. and products. Contractor to submit three (3) copies of manufacturer's catalog cuts for review and approval by the Landscape Architect or Owner's Representative.

2. Record Drawings: At project close-out, submit record drawings of installed irrigation system piping and products, in accordance with requirements of Division 1 Specifications.

3. Maintenance Data: Submit maintenance data and parts lists for irrigation system materials and products. Include these data, product data, shop drawings and record drawings in maintenance manual, in accordance with the specifications and drawings.

4. Water: Contractor shall secure water permits and be responsible for all fees associated with water service connections required including, but not limited to taps and meters.

K. COORDINATE THE INSTALLATION OF IRRIGATION SLEEVES UNDER ROADWAYS AND PAVEMENT AREAS WITH GENERAL CONTRACTOR PRIOR TO ROADWAY INSTALLATION.

L. THE CONTRACTOR SHALL COORDINATE ALL ACTIVITIES WITH THE INSTALLATION OF RELATED ELECTRICAL EQUIPMENT AND PRIMARY POWER WIRING BY THE ELECTRICAL SUBCONTRACTOR.

M. REVIEWS AND TESTS:

1. The Contractor shall provide access at all times for inspection of trenches and backfilling by the Landscape Architect or Owner's Representative during all phases of construction. At the request of Landscape Architect, if necessary, contractor shall uncover portions of line and wire during hydrostatic testing and final inspection.

2. The Contractor shall be responsible for making all repairs required to the irrigation system until the issuance of the Certificate of Substantial Completion. Upon the issuance of the Certificate, the Owner shall assume responsibility for the repair and maintenance of the irrigation system.

3. All required testing shall be performed at the expense of the contractor.

N. PROJECT CLOSEOUT;

1. As Built: Drawings of the completed irrigation system noting all approved field modifications.

2. Landscape Architect or owner's representative will provide full- sized prints or reproduibles of the Contract Drawings for the contractor's use.

3. The record set shall be turned over to the Landscape Architect or owner's representative at or before the Final Acceptance of the project.
- GENERAL SITE LIGHTING AND ELECTRICAL NOTES:
- A. CONTRACTOR TO COORDINATE WITH LOCAL UTILITY COMPANY FOR PROPOSED SERVICE PANEL UPGRADE AND PROPOSED SUB-PANELS.

B. CONTRACTOR SHALL PAY FOR ALL MISCELLANEOUS FEES, EQUIPMENT, AND/OR LABOR FOR PROVIDING AND INSTALLING LIGHTING FIXTURES, ELECTRICAL SERVICES, INCLUDING BUT NOT LIMITED TO SERVICE POLE, CONDUIT/CONDUCTORS, FOUNDATIONS, FITTINGS, METERS, RACKS, POWER PANELS, DISCONNECT, PHOTO CELLS, SLEEVES/BORES, PERMITS, INSTALLATION, AND FEES.
- C. ALL LABOR, MATERIALS, AND FEES REQUIRED TO INSTALL A FULLY FUNCTIONING LIGHTING SYSTEM ARE INCIDENTAL TO THE APPLICABLE PAY ITEM.

D. FURNISH AND INSTALL ALL LIGHT FIXTURES AS SHOWN COMPLETE WITH ALL LAMPS, COMPLETELY WIRED, CONTROLLED, AND SECURELY ATTACHED TO SUPPORTS

E. LAYOUT ALL PROPOSED ELECTRICAL EQUIPMENT AND FIXTURES IN THE FIELD FOR REVIEW AND APPROVAL BY LANDSCAPE ARCHITECTS. LIGHTING FIXTURES SHOWN ON THE ELECTRICAL DRAWINGS REPRESENT GENERAL ARRANGEMENTS ONLY AND MAY BE RELOCATED AT DISCRETION OF THE OWNERS REPRESENTATIVE.

F. REFER TO THE ARCHITECTURAL DRAWINGS AND TO THE ARCHITECT ON THE JOBSITE FOR EXACT LOCATIONS. COORDINATE LOCATIONS WITH ALL OTHER TRADES BEFORE INSTALLATION

G. PROVIDE INTERMEDIATE PULL BOX PER DETAIL SHEETS FOR UNDERGROUND CONDUIT RUNS OVER 150 FT. OR AS REQUIRED BY LOCAL REGULATORY AGENCIES.

H. UNDERGROUND BOXES SHALL BE OUAZLITE JUNCTION BOXES "NO CONCRETE WITH METAL COVERS.

I. ALL PANELS SHALL BE MARKED FOR ARC FLASH HAZARD PER NEC 110.16.

J. ALL ELECTRICAL WORK TO BE PER NEC 2011 OR AS REQUIRED BY CITY HOUSTON AND/OR MONTGOMERY COUNTY, TEXAS.

K. SUBMITTALS;

1. Shop drawings shall include descriptive sheets of each type of fixture. If the submitted fixture is different in any manner from that scheduled, indicate exact difference with the notation "exception", otherwise it is assumed that the proposed fixture is the same in all respects as that scheduled. Show complete data for ballasts. Show certification that all pertinent drawings have been checked and that fixtures submitted have trim compatible with the ceiling being installed.

2. Submit in the same format as the schedule shown on the Drawings.

3. Submit manufacturer's installation instructions. Indicate application conditions and limitations of use.

4. Contractor to provide shop drawings showing circuiting diagrams, power connects, transformers, disconnect, panels and any other fixtures, meter, equipment, or wiring necessary to install the lighting in place.

K. TESTING;

1. Pre-Test Check - Prior to energizing the system, check all cable and wires for continuity of circuitry and for short circuits. Tests shall be made with an ohmmeter reading between all phases and the neutral and all phases and ground in each conduit run, panel board, fixtures, or enclosure. Correct all malfunctions and retest to ensure continuity and elimination of malfunctions.

2. Post Hook-up Test - Subsequent to wire and cable hook-ups, energize circuitry and demonstrate compliance with the specified requirements.

3. Operate each luminary after installation and connection. Inspect for improper connections and operations.

4. Aim and adjust luminaries to provide the desired light source coverage and distribution.

WATER WELL, FOUNTAIN, AND IRRIGATION PUMP STATION

A. CONTRACTOR TO COORDINATE WITH APPLICABLE TRADES ON THE INSTALLATION OF WATER WELL, FLOATING FOUNTAINS, AND PUMPING STATIONS.

B. CONTRACTOR SHALL UTILIZE A SUB-CONTRACTOR WITH A MINIMUM OF TEN (10) YEARS OF CONTINUOUS WORK WITH THE INSTALLATION AND MAINTENANCE OF SIMILAR SYSTEMS.

1. Subcontractor must have experience with similar work in the area of Kingwood, Texas.

2. Subcontractor must demonstrate local knowledge of similar systems and with the Kingwood Service Association.

3. All Work for the installation of the water well, floating fountains, and irrigation pump stations must come from a single sub-contractor or managed by that subcontractor.

4. Approved subcontractor for work contained within this section shall be;

a. Lake Pro, Inc.

Attention: Steve Arrington, Operations Manager Office

281-391-3688, Mobile 713-817-0737

Email steve@lakepro.com, Website www.lakepro.com

5. Provide design/build shop drawings for well, irrigation pump station, and floating fountains for review and approval of landscape architect. ALL WORK REQUIRED TO PROVIDE A FULLY FUNCTIONING WELL, IRRIGATION PUMP STATION, AND FLOATING FOUNTAIN ARE INCIDENTAL TO THE SPECIFIC PAY ITEM FOR EACH FEATURE.

b. Approved well supplier and installer, or as approved by sub-contractor .

J&S Water Wells, Attention: Monte Richardson

1056 East First, Bellville, TX 77418

Office: (979) 865-2393, (800) 833-5538, Fax: (979) 865-8322

E-mail: monterichardson@me.com

C. SUBMITTALS;

1. Submit shop drawings and/or catalog cuts for the following items furnished under this Section:

a.Pumps, filters, water treatment devices, manual and electrical float devices, floating fountains, and miscellaneous equipment.

b.Pipe fittings, screens anchors, thrust blocks and miscellaneous.

c.Floating fountain electrical and lighting fixtures including controllers, fittings, junction boxes, utility connections, and miscellaneous.

d.Floating fountain including electrical hookups, controllers, wiring, installation, and anchoring devices.

e.Miscellaneous items required for a complete and operational floating fountain, water well, and irrigation pump station.

f. Irrigation pump, pressure, tank, controls, filters, fittings, pads, and miscellaneous equipment.

g.Water well drilling depth, casing, geotechnical testing, and miscellaneous equipment.

h. Manufacturer's installation instructions and procedures for each specific piece of equipment.

i. Identify each piece of equipment by specification article numb

D. FEES AND REGULATOR APPROVALS.

1. Apply for and pay all required fees for installation of water well for pond makeup and irrigation purposes through the Lone Star Groundwater Conservation District("LSGCD"). Assist landscape architect in preparing application to LSGCD. **Incidental and not paid for separately.**

E. TESTING(Water Well, Irrigation Pump Station, Floating Fountains);

1. Pre-Test Check

Prior to energizing the system, check all cable and wires for continuity of circuitry and for short circuits. All plumbing is to be pressure tested for 24 hours. Correct all malfunctions and retest to ensure continuity, leak free and elimination of malfunctions.

2. Post Hook-up Test

Subsequent to wire, cable hook-ups and plumbing, energize circuitry and demonstrate compliance with the specified requirements.

3. Operate well pump after installation and connection. Inspect for improper connections and operations.

4. Adjust pump to provide the desired flow rate (GPM) and pressure (PSI)

L. PROPOSED WATER WELL PERFORMANCE SPECIFICATIONS

Contractor to provide all labor, materials, and applicable regulatory fees to provide and a fully functioning water well as describe herein and in the Drawings complete and in place. **incidental to specific pay item for water well.**

1. PROPOSEDWATER WELL PERFORMANCE SPECIFICATIONS

a. 60 gallons per minute at 60 psi.

2. PROPOSED 4" PVC LAKE FILL WATER WELL

a. Mobilize Drilling Equipment & Backhoe:

b. Drilling 7" bore hole 500'(estimated{

c. 4" SCH-40 PVC Casing Estimated Depth 400'

d. 4" PVC Mill Slotted Screen Estimated Length 100'

3. OPEN FLOW PUMP PACKAGE:

a. 5 HP 230 Volt 1 Phase Motor

b. 5 HP SS Grundfos Pump End

c. 5 HP panel with HOA

d. Warrick level probes

e. 2" sch 80 PVC column pipe with SS collars

f. Jacketed Pump Cable & Ground

g. 2" SS Check Valve

h. 4"x 2" Aluminum Well Seal Assembly & Vent

i. Labor Installed in New Water Well

4. TRENCHING & PLUMBING:

a. 100' x 2" Schedule 40 PVC Trenching & Plumbing to Lake

5. MISCELLANEOUS:

a. Applicable Federal, State or Local Sales Taxes

b. All required Permits or Fees.

c. Drilling Mud & Cuttings to be disposed of off-Site

d. Electrical hookup to sub-panel and power service.

e. All control panels and service connections.

L. PROPOSED FLOATING FOUNTAIN PERFORMANCE SPECIFICATIONS.

Contractor to provide all labor, materials, and applicable regulatory fees to provide and a fully functioning floating fountain as describe herein and in the Drawings complete and in place. **incidental to specific pay item for floating fountain specified.**

1. FLOATING FOUNTAIN MANUFACTURER

a. Aqua Control Titan Series Lily Nozzle Spec Sheet. The Fountains at Kingwood Drive 7 Hwy 59 are 15 HP 230 Volt three Phase

M. PROPOSED IRRIGATION PUMP STATION.

Contractor to provide all labor, materials, and applicable regulatory fees to provide and a fully functioning irrigation pump station to utilize on-site pond water for irrigation purposes as describe herein and in the Drawings complete and in place. **incidental to specific pay item for irrigation pump station**

1. SEE IRRIGATION DETAILS SHEET 6/7 OF 7

2. IRRIGATION PUMP STATION MANUFACTURER

Rain Bird Corporation




Garrett Dean , Area Specification Manager

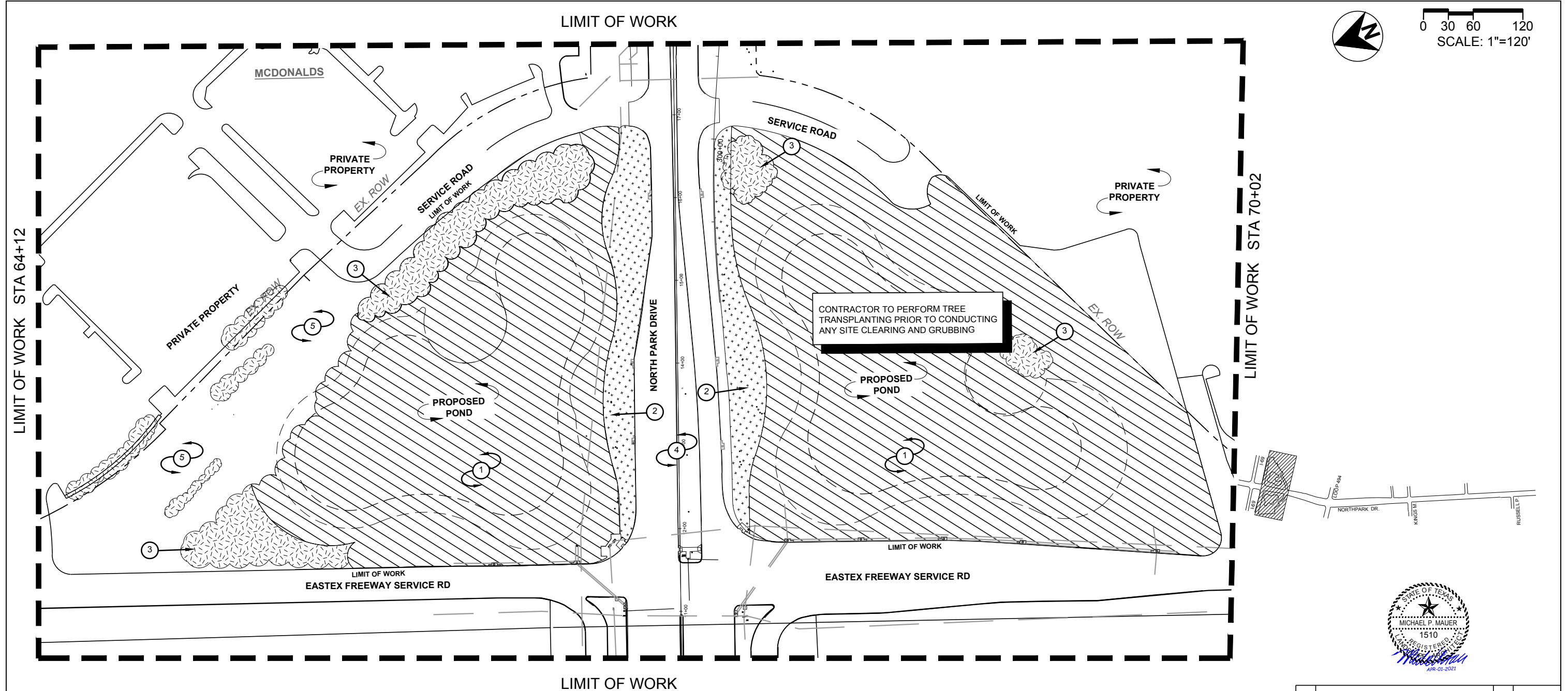
(281)-830-3940, gdean@rainbird.com

www.rainbird.com

3. IRRIGATION PUMP STATION PERFORMANCE REQUIREMENTS.

a. 100 gallons per minute at 100 psi.

NO.	REVISIONS			BY	DATE				
		M&L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024							
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420							
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002							
NORTH PARK DRIVE									
LANDSCAPE GENERAL NOTES SHEET 3 OF 3									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.				
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS				
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.				
CHECKED:	HOU	MONTGOMERY	0912	37	232				
					614				

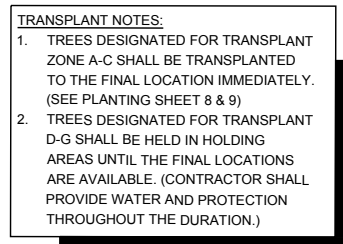
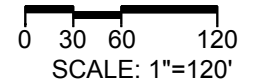


SHEET QUANTITIES - CLEARING AND GRUBBING				
SYMBOL	ITEM	DESCRIPTION	UNIT	QTY.
	0100-6001	PREPARING R.O.W (TYPE 1)	AC	7.8
	0100-6015	TYPE 2 PREPARING ROW (HAND CLEARING)	AC	0.5
	0100-6002	PREPARING ROW (TYPE 3)	AC	0.9

- GENERAL NOTES:**
- COORDINATE CLEARING AND GRUBBING ACTIVITIES WITH TREE PRESERVATION & TRANSPLANTING ACTIVITIES.
 - SEE SITE CIVIL DRAWING FOR ROADWAY REMOVAL, GRADING AND RIGHT OF WAY PREPARATION.
 - GENERAL OUTLINE OF TREE PRESERVATIONS AREAS IS APPROXIMATE. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECTURE PRIOR TO STAKE LIMITS OF TREE PRESERVATION.
 - SEE TREE PRESERVATION AND TRANSPLANTING PLANS.

- PLAN NOTES**
- PREPARING ROW (TYPE 1)** - REMOVE ALL VEGETATION & STUMPS TO 2'-0" BELOW FINISH GRADE & DISPOSE OF OFF SITE.
 - PREPARING ROW (TYPE 2)** ALL ACTIVITIES OF TYPE 1, IN ADDITION TO IRRIGATION EQUIPMENT, LIGHTING, EDGING & STONE WALLS. (CONTRACTOR TO NOTIFY OWNER PRIOR TO DEMOLITION . IF OWNER WANTS MATERIALS, CONTRACTOR SHALL STOCKPILE ON SITE FOR OWNER PICKUP.
 - PREPARING ROW (TYPE 3)** (HAND CLEARING) NO MECHANICAL EQUIPMENT ALLOWED. REMOVE ALL STUMPS, DEBRIS & FALLEN DEAD MATERIAL & DISPOSE OF OFF SITE.
 - SEE CIVIL DRAWINGS FOR ROADWAY ROW PREP AERATION.
 - MOW & MAINTAIN FIELDS (INCIDENTAL TO 0192 & 0100) SEE LANDSCAPE DRAWINGS

NO.	REVISIONS	BY	DATE
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			
<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>		<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div>	
<div><div>NORTH PARK DRIVE</div><div>CLEARING AND GRUBBING</div><div>SHEET 1 OF 1</div></div>			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
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CHECKED:	HOU	MONTGOMERY	0912 37 232
			HIGHWAY No. CS
			JOB No. 615
			SHEET No.



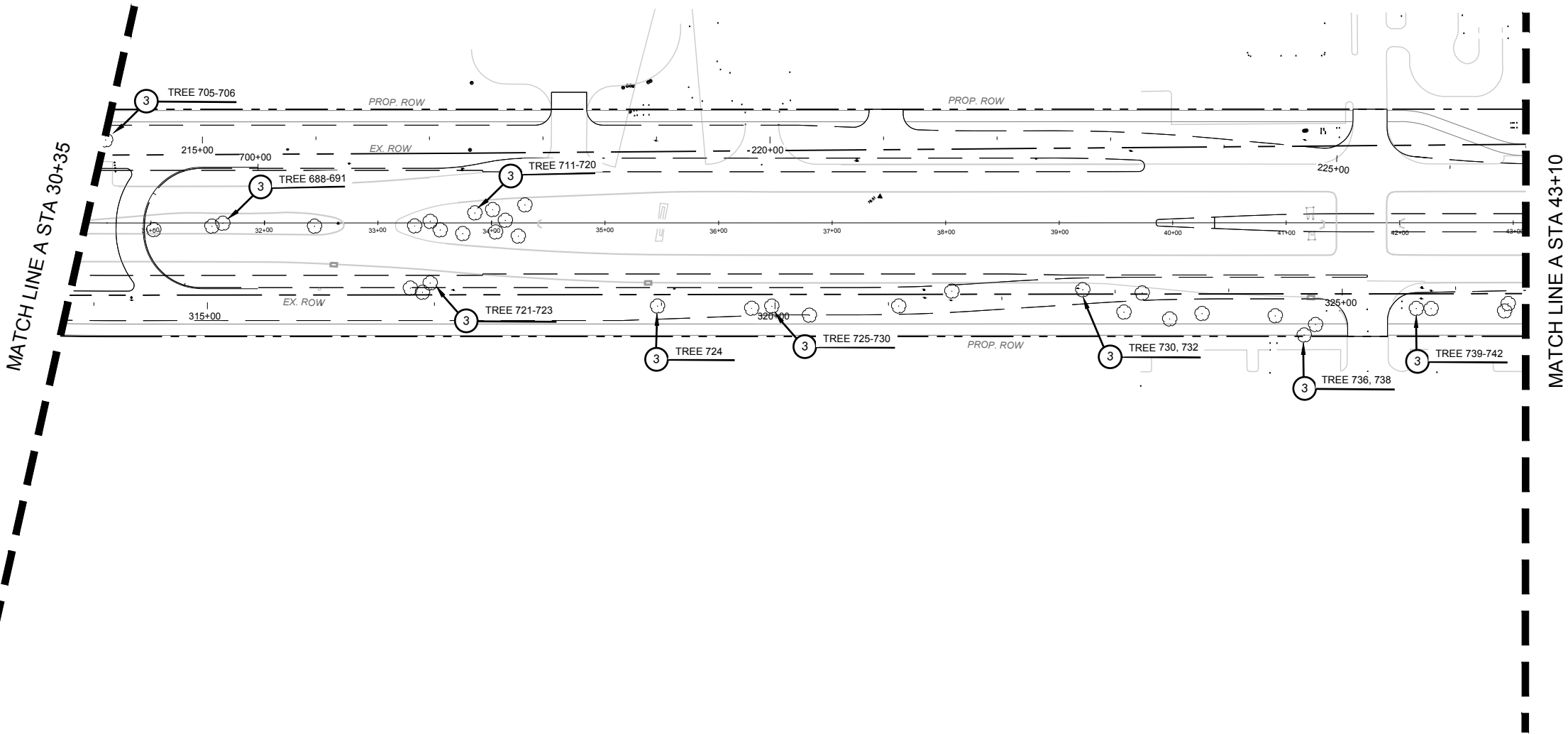
1. TREE PROTECTION FENCING, TYPICAL **SEE TREE PRESERVATION DETAILS**
2. TREE TO BE TRANSPLANTED, **SEE TREE PRESERVATION DETAILS**
3. EXISTING TREES TO BE REMOVED TYPICAL
4. EXISTING TREES TO BE PRESERVED IN PLACE, **SEE TREE PRESERVATION DETAILS , GENERAL NOTES**
5. TRANSPLANT TREE LOCATION **ZONE A- G**
6. HOLDING AREAS FOR TRANSPLANTED TREES, FINAL LOCATION TO BE DETERMINED.

TREE PROTECTION FENCING

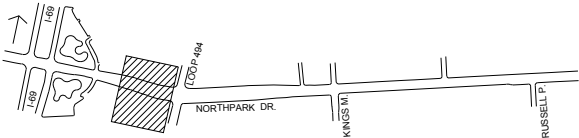
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<div>HNTB</div>				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				<div><div>LRA</div></div>		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 C/O ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE									
(TXDOT R.O.W)									
TREE PRESERVATION									
SHEET 2 OF 2									
DESIGNED:		FED. DIV. No.	RD. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:		6	TEXAS		SEE TITLE SHEET			CS	
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CHECKED:		HOU	MONTGOMERY	0912	37	232		617	



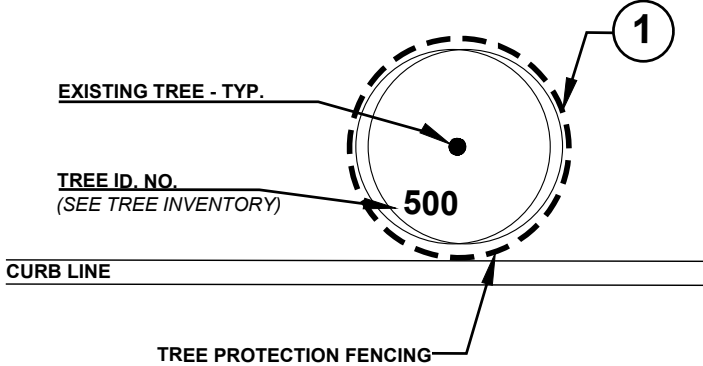
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TRANSPLANT NOTES:
1. TREES DESIGNATED FOR TRANSPLANT ZONE A-C SHALL BE TRANSPLANTED TO THE FINAL LOCATION IMMEDIATELY. (SEE PLANTING SHEET 8 & 9)
2. TREES DESIGNATED FOR TRANSPLANT D-G SHALL BE HELD IN HOLDING AREAS UNTIL THE FINAL LOCATIONS ARE AVAILABLE. (CONTRACTOR SHALL PROVIDE WATER AND PROTECTION THROUGHOUT THE DURATION.)



PRESERVATION LEGEND:



GENERAL NOTES:

- LOCATIONS OF TREE PRESERVATION FENCING IS APPROXIMATE. COORDINATE WITH LANDSCAPE ARCHITECT PRIOR TO CONTACTING ARCHITECTS.
- CONTRACTOR SHALL SEEK PRIOR APPROVAL FROM THE CONTRACTORS ARBORIST, CITY URBAN FORESTER, AND LANDSCAPE ARCHITECT PRIOR TO INITIATION OF TREE REMOVAL AND/OR TREE PROTECTION ACTIVITIES WITHIN THE PROJECT SCOPE OF WORK.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THAT NO DAMAGE TO EXISTING TREE TO BE PROTECTED AND/OR THOSE THAT HAVE THEIR TRUNKS OUTSIDE OF THE PROJECT LIMITS BUT HAVE SIGNIFICANT BRANCH OVERHANG INTO THE PROJECT LIMITS.
- THE CONTRACTOR SHALL NOT, AT ANY TIME, PARK CONSTRUCTION VEHICLES, MATERIALS, OR EQUIPMENT INSIDE OF THE TREE PROTECTION ZONE (TPZ) OF TREES TO BE PROTECTED.
- SEE TREE PRESERVATION DETAILS AND SPECIFICATIONS FOR DISPOSITION AND CONDITIONAL TREATMENT OF TREES NOTED ON THE DRAWINGS
- ALL NOTED TREES ON DRAWINGS MAY REQUIRE ADDITIONAL CONDITIONAL TREATMENT OTHER THAN NOTED ON THE PLANS. SEE TREE INVENTORY AND TREE PRESERVATION DETAILS.
- CONTRACTOR TO PROVIDE WATER, TREATMENT FOR BORERS AND OTHER INSECTICIDE TREATMENTS FOR TREES TO BE PRESERVED AS NEEDED PER ARBORISTS RECOMMENDATIONS
- CONTRACTOR TO EXERCISE CAUTION WHEN WORKING AROUND ALL EXISTING TREES REGARDLESS OF SPECIFIC MEASURES THAT ARE NOTED ON THESE PLANS AND DETAILS AT ALL TIMES AND TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS.
- CONTRACTOR TO PROVIDE FOR ALL COSTS TO SUPPLY TEMPORARY WATERING AND PROTECTION OF TREES LOCATED IN THE TREE HOLDING AREAS TO BE TRANSPLANTED

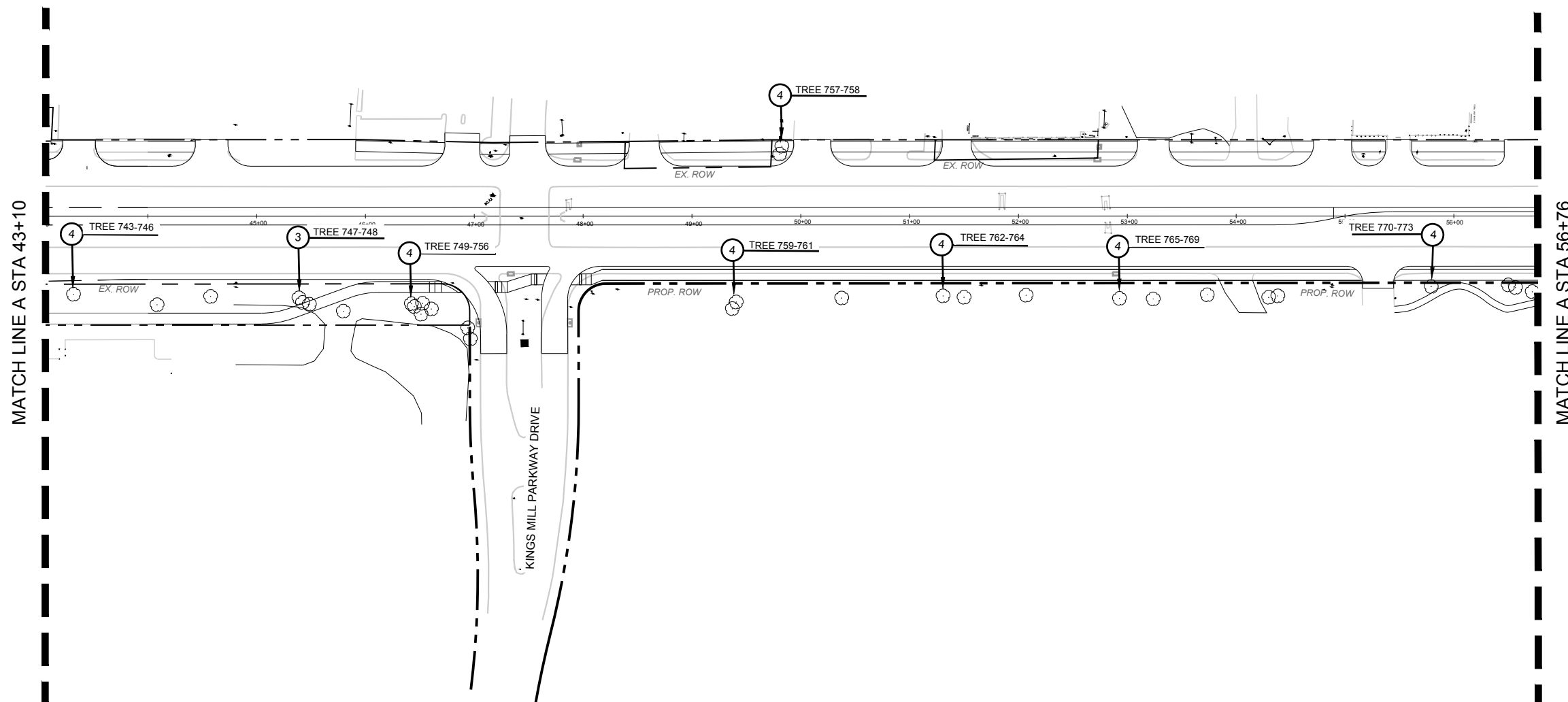
PLAN NOTES / LEGEND:

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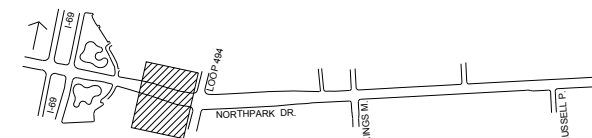
NO.		REVISIONS		BY	DATE
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HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
		NORTH PARK DRIVE			
		CITY OF HOUSTON TREE PRESERVATION			
		SHEET 1 OF 3			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
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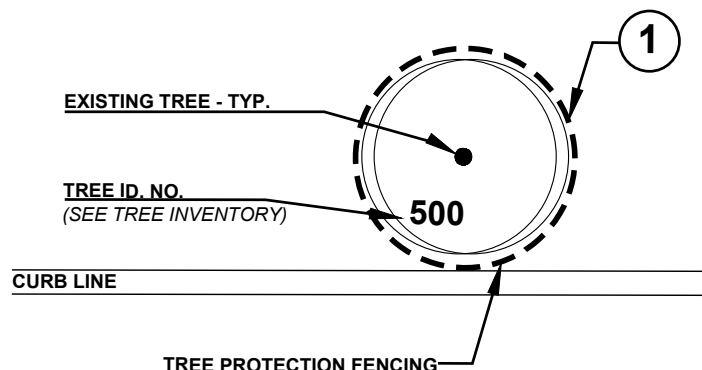
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PRESERVATION LEGEND:



GENERAL NOTES:

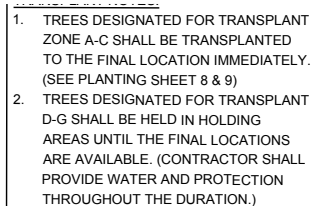
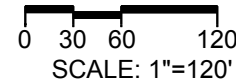
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PLAN NOTES / LEGEND:

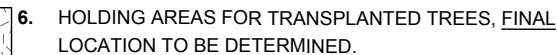
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- HOLDING AREAS FOR TRANSPLANTED TREES, FINAL LOCATION TO BE DETERMINED.




NO.	REVISIONS			BY	DATE
<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON		<div><div>LAH</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>			
HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE					
CITY OF HOUSTON TREE PRESERVATION SHEET 2 OF 3					

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					619



6. HOLDING AREAS FOR TRANSPLANTED TREES, FINAL
LOCATION TO BE DETERMINED.



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HOUSTON PUBLIC WORKS									
<h1 style="margin: 0;">NORTH PARK DRIVE</h1>									
<h2 style="margin: 0;">CITY OF HOUSTON</h2>									
<h2 style="margin: 0;">TREE PRESERVATION</h2>									
<h2 style="margin: 0;">SHEET 3 OF 3</h2>									

1. CRITICAL ROOT ZONE (CRZ)= 1 FOOT RADIUS PER 1 CALIPER INCH OF TRUNK DIAMETER.
2. PLACE PROTECTIVE FENCE AT THE EDGE OF THE CRITICAL ROOT ZONE OF TREES TO BE PROTECTED. USE 4 FEET HIGH ORANGE PLASTIC MESH OR APPROVED EQUIVALENT SUPPORTED ON STEEL T-POSTS. USE STEEL T-POSTS MINIMUM OF 6 FEET LONG, SPACED AT INTERVALS SUFFICIENT TO KEEP FENCE PULLED TIGHT. STRETCH SMOOTH GALVANIZED WIRE FROM POST TO POST ACROSS THE TOP OF FENCE AND DRAW TIGHT. ATTACH PLASTIC MESH TO POSTS AND TOP WIRE WITH ALUMINUM TIE WIRE OR NYLON TIES.
3. NO EXCAVATION, GRADING, FILLING, SOIL COMPACTION, PARKING, OR EQUIPMENT STORAGE IS ALLOWED WITHIN THE FENCED AREA.
4. WHEN A CONSTRUCTION ZONE OVERLAPS THE ROOT ZONE DUE TO LACK OF SPACE, PLACE FENCE WITHIN 2 FEET OF CONSTRUCTION ZONE.
5. INSTALL PROTECTIVE COMPOST FILTER BERM AT BASE OF PROTECTIVE FENCE AS SHOWN IN DETAIL AND DESCRIBED IN THESE NOTES UNDER "ROOT ZONE PROTECTION". COMPOST FILTER BERM FUNCTIONS AS A PROTECTIVE FILTER FROM RUNOFF ASSOCIATED WITH CONSTRUCTION ACTIVITIES SUCH AS: CONCRETE WASH, EROSION, FILL, CHEMICALS, CEMENT AND LIME WORK AND OTHER ACTIVITIES.
6. VEHICULAR TRAFFIC, STOCKPILING OR STORAGE OF MATERIALS, PARKING OF EQUIPMENT AND REFUELING EQUIPMENT IS PROHIBITED IN PROTECTED AREAS.

1. WHERE SHOWN IN PLANS, UNDERGROUND UTILITIES CROSSING UNDER PROTECTED AREAS WILL BE BORED BENEATH CRITICAL ROOT ZONES. AVOID BORING DIRECTLY BENEATH ROOT FLARE. BORE DEPTH IS 4 FEET BELOW EXISTING GRADE.
2. NO TRENCHING, EXCAVATING, FILLING, OR COMPACTION IS ALLOWED WITHIN THE CRITICAL ROOT ZONE EXCEPT AS SPECIFICALLY IDENTIFIED IN THE PLANS AND APPROVED BY THE ENGINEER.
3. WHEN EXISTING GRADE MUST BE CUT WITHIN THE CRITICAL ROOT ZONE, CONTACT THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING WORK. BEFORE GRADING OR EXCAVATION WORK, SAW CUT ROOTS TO THE DEPTH OF THE PROPOSED DISTURBANCE ALONG THE EDGE OF THE PROPOSED DISTURBANCE BEFORE EXCAVATION IS BEGUN.
4. PRUNE FLUSH WITH SOIL ANY ROOTS EXPOSED BY CONSTRUCTION. BACKFILL ROOT AREAS WITH GOOD QUALITY TOPSOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT TO BE BACKFILLED WITHIN TWO DAYS, THEN COVER WITH A MINIMUM OF SIX INCHES OF EROSION CONTROL COMPOST. GENERAL USE COMPOST IS INCIDENTAL AND NOT PAID FOR SEPARATELY.
5. WHEN GRADING WITHIN THE CRITICAL ROOT ZONE, USE HAND OR SMALL EQUIPMENT AND ALTER GRADE NO MORE THAN TWO INCHES. NO SOIL DISTURBANCE IS ALLOWED ON THE ROOT FLARE UNDER ANY CIRCUMSTANCES.
6. PERFORM ANY PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND CONSTRUCTION EQUIPMENT BEFORE CONSTRUCTION DAMAGE MIGHT OCCUR. PRUNE ANY LIMB DAMAGE WITHIN TWO HOURS OF OCCURRENCE AND ACCORDING WITH ANSI A300-1995 STANDARD.

1. MAINTAIN ALL TREE PROTECTION MATERIALS THROUGHOUT ENTIRE LENGTH OF PROJECT. REPAIR DAMAGED OR AFFECTED TREE PROTECTION MATERIALS. ADDITIONAL EROSION CONTROL COMPOST MAY BE REQUIRED DURING THE PROJECT AND WILL BE PAID FOR SEPARATELY.




1. REMOVE AND DISPOSE OF ALL PROTECTIVE FENCING AND TRUNK PROTECTION AT END OF PROJECT.

- Item 1004-6002 Tree Protection AC
- Item 168-6001 Vegetative Watering MG

The diagram illustrates a tree with its trunk and canopy. A vertical line marks the 'DRIPLINE' at the 'outer edge of tree limbs'. A horizontal line at the base of the trunk indicates the 'CRITICAL ROOT ZONE', with a dimension line below it stating '(1 FOOT RADIUS PER CALIPER INCH OF TRUNK DIAMETER)'. A 'PROTECTIVE FILTER BERM' is shown as a shaded area around the trunk. A 'PREFERRED FENCE LOCATION' is indicated by a vertical line with an arrow pointing to it, with text stating 'PROTECTIVE FENCE AND POSTS LOCATED AT THE EDGE OF THE CRITICAL ROOT ZONE. SEE NOTES THIS SHEET.' The ground is shown as a wavy line, with a note 'UNDISTURBED GRADE TO PROTECTIVE FENCE. SEE NOTES THIS SHEET' pointing to the ground level.

TYPICAL TREE PROTECTION



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NORTH PARK DRIVE TREE PROTECTION <i>DETAILS NOT TO SCALE</i> SHEET 1 OF 1			
DESIGNED:	FED. DIV. No.	RD. No.	STATE
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CHECKED:	HOU	MONTGOMERY	CONTROL No. 0912
		SECTION No. 37	JOB No. 232
		SHEET No. 621	

GENERAL TREE TRANSPLANTING NOTES:

PROTECT AND ENSURE THE CONTINUED GOOD HEALTH OF EXISTING TREES IDENTIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER. PROTECTIVE MEASURES INCLUDE PROVIDING, INSTALLING, MAINTAINING AND REMOVING PROTECTIVE FENCES, BOUND WOOD PLANKING, COMPOST, BERM PRUNING, BORING, AND WATERING. INSTALL TREE PROTECTION BEFORE ANY HEAVY EQUIPMENT ARRIVES ON THE SITE AND REMAINS IN PLACE FOR THE DURATION OF THE PROJECT.

LANDSCAPE CONTRACTOR QUALIFICATIONS

1. CONTRACTOR SPECIALIZING IN THE MECHANICAL TRANSPLANTING OF TREES (CONTRACTOR SHALL UTILIZE ENVIRONMENTAL DESIGN / DAVEY TREE - ATTENTION DAVID MARKS 281-802-0662.
2. CONTRACTOR SHALL SHOW EVIDENCE OF HAVING SUCCESSFULLY COMPLETED SIMILAR WORK OF THIS SIZE AND SCOPE WITHIN THE PAST TWO (2) YEARS.
3. THE CONTRACTOR SHALL BE LICENSED BY THE TEXAS ASSOCIATION OF NURSERYMEN, SHALL POSSESS A CURRENT AGRICULTURAL CERTIFICATE, AND SHALL BE A LICENSED PESTICIDE APPLICATOR.

SUBMITTALS

1. MULCH: 10 POUNDS.
2. AGRICULTURAL SAND: 1 CU. FT.
3. BACKFILL MIX
4. ONE (1) EACH PROPOSED CONTAINERS/WIRE BASKETS.
5. ALL SUBMITTAL DATA SHALL BE FORWARDED IN A SINGLE PACKAGE TO THE LANDSCAPE ARCHITECT WITHIN TEN (10) DAYS OF AWARD OF CONTRACT.

VEGETATIVE WATERING FOR TREE TRANSPLANTING

1. POTABLE, FROM MUNICIPAL SUPPLIES APPROVED THE STATE OR CITY HEALTH DEPARTMENTS.
2. CONTRACTOR TO PROVIDE TEMPORARY WATER METER, AND/OR TRUCK WATERING FOR MACHINE TRANSPLANTS IF APPLICABLE.
3. ALL WATER COSTS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, FOR TRANSPLANTS TO TEMPORARY AND/OR PERMANENT LOCATIONS.

PLANT MATERIAL DELIVERY, STORAGE, AND HOLDING

1. SUBMIT A PLAN FOR MECHANICAL TRANSPLANTING AND TRANSPORTING MACHINE DUG TREE MATERIAL FROM ON-SITE, OWNER PROVIDED MATERIAL, TO THE PROPOSED LOCATION TO THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR APPROVAL. SUCH A PLAN SHOULD INCLUDE:
 - a. MOBILIZATION PLAN.
 - b. MANUFACTURER OF TRANSPLANT MACHINE.
 - c. PROJECTED SCHEDULE FOR INSTALLATION.
2. THE FOLLOWING CONSIDERATIONS FOR PRODUCT HANDLING SHALL BE EVALUATED.
 - a. PROTECT TRUNKS, STEMS, BRANCHES AND ROOT BALLS FROM ALL DAMAGE DURING TREE TYING, WRAP-PING AND DIGGING OPERATIONS.
 - b. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE SAFE TRANSPORTATION OF PLANTS ON THE SITE AND THEIR CONDITION UPON ARRIVAL. TREES DAMAGED, DEHYDRATED OR ABUSED DURING TRANSIT AND STORAGE WILL BE REJECTED AND PAYMENT DELAYED.
3. THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE MAY INSPECT ANY PHASE OF THIS OPERATION AND MAY REJECT ANY PLANT MATERIAL IMPROPERLY HANDLED DURING ANY POINT OF THIS OPERATION.

DAMAGED MATERIALS SHALL BE REPLACED WITH MATERIAL OF EQUAL SIZE AND QUALITY AT NO COST TO THE OWNER.

MATERIALS

1. SHREDDED HARDWOOD BARK MULCH; SHALL BE THE PRODUCT OF STANDARD STRIP-PING OF BARK FROM PINE TREES FOR IMER OR PULP MANUFACTURING. BARK SHALL BE SHREDDED IN A MANNER WHERE LARGE PIECES ARE AT A MINIMUM. THE MULCH SHALL BE FREE OF DEBRIS.
2. TREES: ALL TREE MATERIAL BE MECHANICALLY TRANSPLANTED ON-SITE TO BE PROVIDED BY OWNER FROM ON-SITE SOURCES.
3. AGRICULTURAL SAND
4. INSECTICIDES: LAWN AND GARDEN SPRAY WITH SPINOSAD AS MANUFACTURE BY GREEN LIGHTS PRODUCTS CO.,
5. FERTILIZER: "DOGGETT'S" INJECTOFEED 32-10-10 FERTILIZER AS MANUFACTURED BY A.L. DOGGETT, LEBANON, NEW JERSEY., MIX THE FOLLOWING QUANTITIES IN 100 GALLONS OF WATER: INJECTOFEED 20 LBS
 - a. APPLY FERTILIZER 30 - 45 DAYS AFTER INSTALLATION.
 - b. INJECT MATERIAL SPECIFIED IN SECTION 2.0 WITH A HIGH PRESSURE INJECTOR INTO SOIL AT DEPTH AND DIAMETER SHOWN BELOW:
 - c. RATES PER TREE SIZES

CALIPER	APPL PTS	DEPTH	RADIUS	APPL RATE PER TREE
2" - 4"	3	48"-72"	19"-24"	2 GALLONS
4" - 5"	4	48"-72"	25"-36"	2-1/2 GALLONS
5" - 6"	5	48"-72"	37"-48"	3 GALLONS
ABOVE 6"	3' O.C.	48"-72"	DRIP LINE	5 GAL./100 S.F.

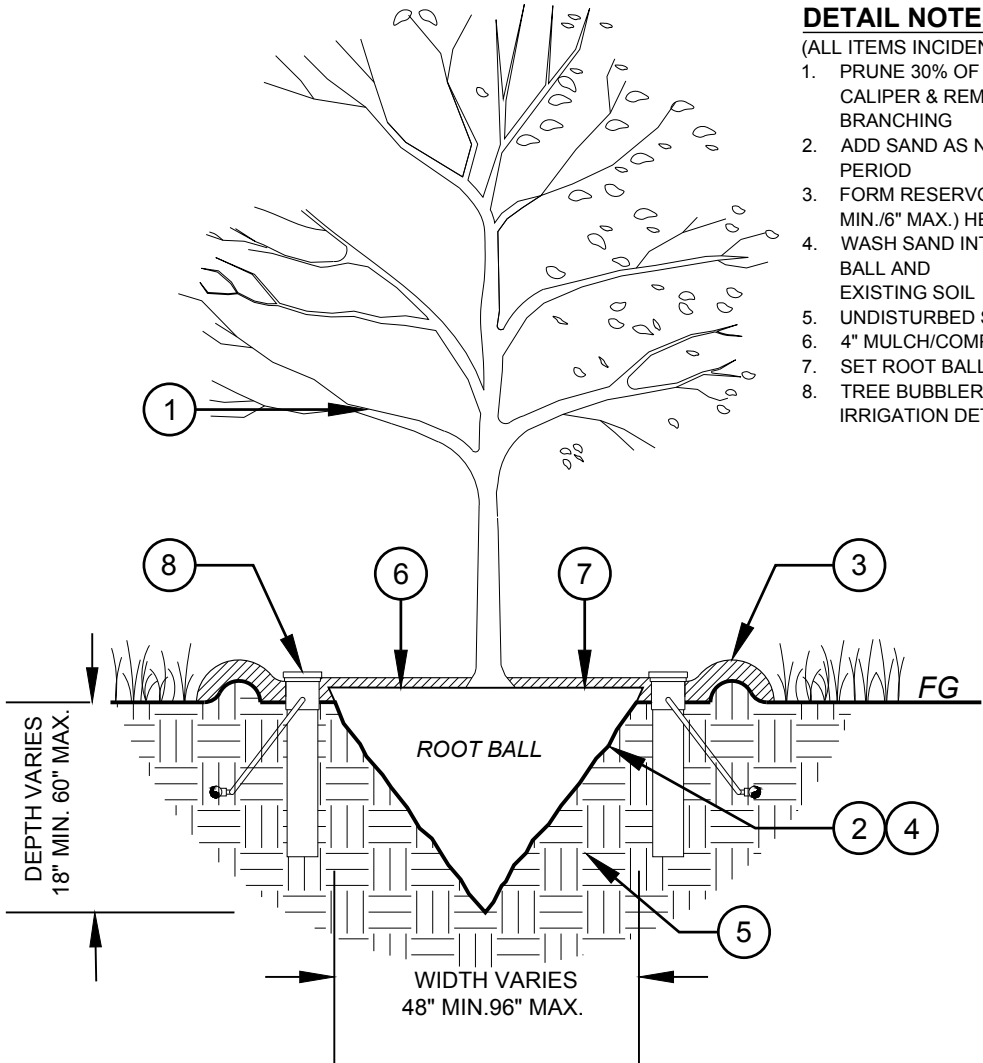
LAYOUT AND EXECUTION

1. THE CONTRACTOR SHALL STAKE PLANT ON-SITE TRANSPLANTS FOR APPROVAL PRIOR TO TRANSPLANT-ING TO THE SITE.
2. IF UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED, NOTIFY THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE AS TO WHETHER AN ADJUSTMENT OR CHANGE OF LOCATION IS POSSIBLE WITHIN THE DESIGN INTENT.
3. DO NOT EXCAVATE TREE PITS MORE THAN 24 HOURS IN ADVANCE OF PLANTING OPERATION.
4. COORDINATE MACHINERY AND LAYOUT USED FOR FINAL REPLANTING SO AS TO NOT CUT NEWLY FORMED ROOTS. DO NOT USE SMALLER MACHINERY FOR FINAL TRANSPLANTING THAN MACHINE ORIGINALLY USED FOR MOVING FROM EXISTING SITE
5. MACHINE TRANSPLANT TREES IN ACCORDANCE WITH THE FOLLOWING CRITERIA:

CALIPER	MACHINE SIZE	MANUFACTURER
UNDER 2-1/2"	44" SPADE	VERMEER, DAVEY, OR EQUIVALENT
2-1/2" - 4"	60" SPADE	VERMEER, DAVEY, OR EQUIVALENT
4" - 8"	90" SPADE	VERMEER, BIG JOHN, OR EQUIVALENT
8" - 10"	100"-105" SPADE	VERMEER, BIG JOHN, OR EQUIVALENT
11" - 13"	120"-125" SPADE	VERMEER, BIG JOHN, OR EQUIVALENT
14" - 16"	168" SPADE	VERMEER, BIG JOHN, OR EQUIVALENT
12" - 24"	12:1 RATIO DIA.	ARBORLIFT, ENVIRONMENTAL DESIGN

MECHANICAL TRANSPLANTING

1. USE MACHINERY IN GOOD CONDITION WITH MINIMUM TOLERANCES (MAX. 2") BETWEEN CUTTING BLADES. ALL BLADES SHALL BE TRUE TO THEIR DESIGNED SHAPE AND FREE OF BENDS WHICH COULD INTERFERE WITH THEIR OPERATION. THE TREE SPADE SHALL BE MOUNTED ON A SUITABLE STABLE MACHINE CAPABLE OF SUPPORTING THE WEIGHT OF ALL DUG MATERIAL AND HEAVY ENOUGH TO FORCE ALL BLADES INTO THE SOIL.
2. CUT AND REMOVE ALL VINES AND UNDERBRUSH FROM THE TRUNK AND BRANCHES OF TREE TO FACILITATE ACCESS BY MACHINE.
3. PRUNE AND THIN THE TREE BY REMOVING INTERIOR BRANCHING AND ENTANGLED LIMBS, AS DIRECTED BY LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE.
4. LEAVE ALL FOLIAGE ON THE TREE DURING THE DIGGING OPERATION. THE CONTRACTOR SHALL HAVE THE CAPABILITY OF MISTING THE FOLIAGE DURING THE DIGGING AND TRANSPORTATION PERIODS
5. HOLES TO RECEIVE MACHINE TRANSPLANTED TREES SHALL BE DUG WITH MACHINES OF LIKE MANUFACTURE TO THAT USED TO DIG THE INTENDED TREE.
6. PROTECT ALL FOLIAGE DURING THE TRANSPORTATION PERIOD FROM SUN, WIND AND PROLONGED EXPOSURE. CONSIDER MISTING FOLIAGE AND ROOT BALLS AT INTERVALS DURING TRANSIT.
7. IMMEDIATELY AFTER THE TREE IS PLACED IN THE HOLE, FILL IN ALL CREVICES WITH SAND AND WATER TO FILL ALL VOIDS. APPLY 3" MULCH.
8. PROVIDE PERIODIC WATERING AND FOLIAGE MISTING AS REQUIRED TO MAINTAIN FOLIAGE VIABILITY. MIST IN LATE EVENING TO PREVENT FOLIAGE DAMAGE.



DETAIL NOTES:

(ALL ITEMS INCIDENTAL TO 1004)

1. PRUNE 30% OF ALL BRANCHING UNDER 1/2" CALIPER & REMOVE ALL DEAD & CROSS BRANCHING
2. ADD SAND AS NEEDED DURING MAINTENANCE PERIOD
3. FORM RESERVOIR OF CLAY LOAM SOIL (3" MIN./6" MAX.) HEIGHT
4. WASH SAND INTO ALL VOIDS BETWEEN ROOT BALL AND EXISTING SOIL
5. UNDISTURBED SOIL
6. 4" MULCH/COMPOST TOP DRESSING
7. SET ROOT BALL ±3" ABOVE FINISHED GRADE
8. TREE BUBBLER SET ABOVE MULCH. SEE IRRIGATION DETAILS.

MAINTENANCE

1. ONCE TREES AND SHRUBS REQUIRED FOR REMOVAL HAVE BEEN TRANSPLANTED OR CONTAINERIZED, SANDED IN AND MULCHED. CONTRACTOR SHALL MAINTAIN PLANT MATERIAL THROUGH THE 90 DAY MAINTENANCE PERIOD AFTER SUBSTANTIAL COMPLETION.
2. CONTRACTOR SHALL MAINTAIN TREES TO BE PLANTED IN TEMPORARY HOLDING AREA UNTIL RELOCATION TO FINAL POSITION ON SITE FOR UP TO 12 MONTHS.

WARRANTY

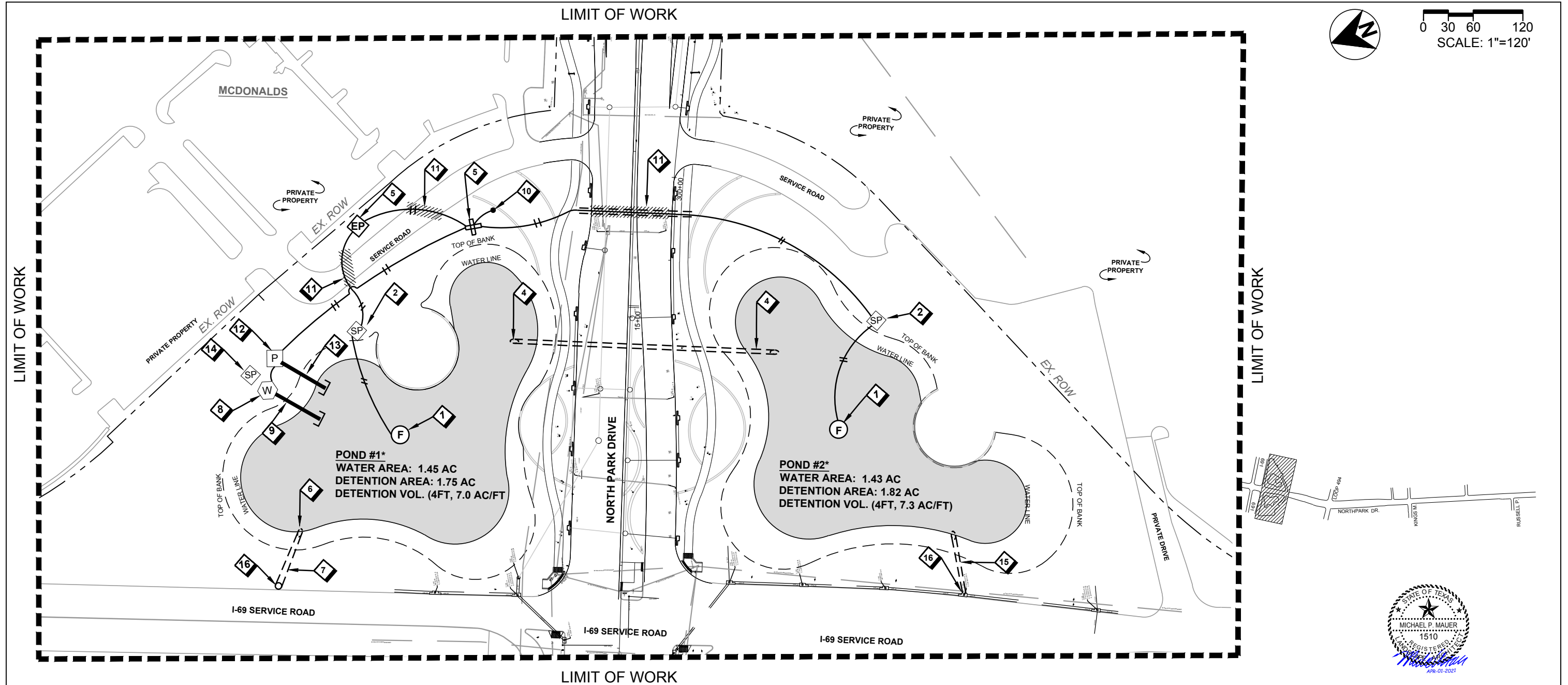
1. THE CONTRACTOR SHALL GUARANTEE ALL MACHINE-TRANSPLANTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUBSTANTIAL COMPLETION.
2. MECHANICALLY TRANSPLANTED TREE MATERIAL SHALL BE WARRANTED BY THE CONTRACTOR TO REMAIN ALIVE AND HEALTHY FOR A PERIOD OF TWELVE (12) MONTHS AFTER THE DATE OF SUBSTANTIAL COMPLETION. PLANTS IN AN IMPAIRED, DEAD OR DYING CONDITION AFTER INITIAL ACCEPTANCE OR WITHIN 12 MONTHS SHALL BE REMOVED AND REPLACED WITH AN EQUIVALENT SPECIES, CALIPER, HEIGHT, AND WITCH. NEW PLANTING AND METHOD OF PLACING SHALL COMPLY WITH THE REQUIREMENTS OF THE SPECIFICATIONS. PLANTS REPLACING THOSE REMOVED DURING THE GUARANTEE PERIOD SHALL ALSO BE GUARANTEED TO RE-MAIN ALIVE AND HEALTHY FOR AN ADDITIONAL 12 MONTHS AFTER INSTALLATION AND ACCEPTANCE.
3. CONTRACTOR SHALL NOT BE HELD RESPONSIBLE FOR FAILURE DUE TO NEGLECT BY OWNER, VANDALISM, ACTS OF GOD, DURING WARRANTY PERIOD. REPORT SUCH CONDITIONS TO THE LANDSCAPE ARCHITECT IN WRITING WHEN DISCOVERED.

REQUIRED ITEMS: (ALL ITEMS ON THIS PAGE ARE INCIDENTAL TO 1003)

- Item 1003-6002 Tree Transplanting (2-1/2" - 4")
- Item 1003-6003 Tree Transplanting (4" - 8")
- Item 1003-6004 Tree Transplanting (8" - 10")
- Item 1003-6005 Tree Transplanting (11" - 13)
- Item 1003-6006 Tree Transplanting (11" - 13) (HOLD-REPLANT)



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NORTH PARK DRIVE			
TREE TRANSPLANTING DETAIL SHEET 1 of 1			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
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			37
			232
			622



PLAN KEY NOTES:

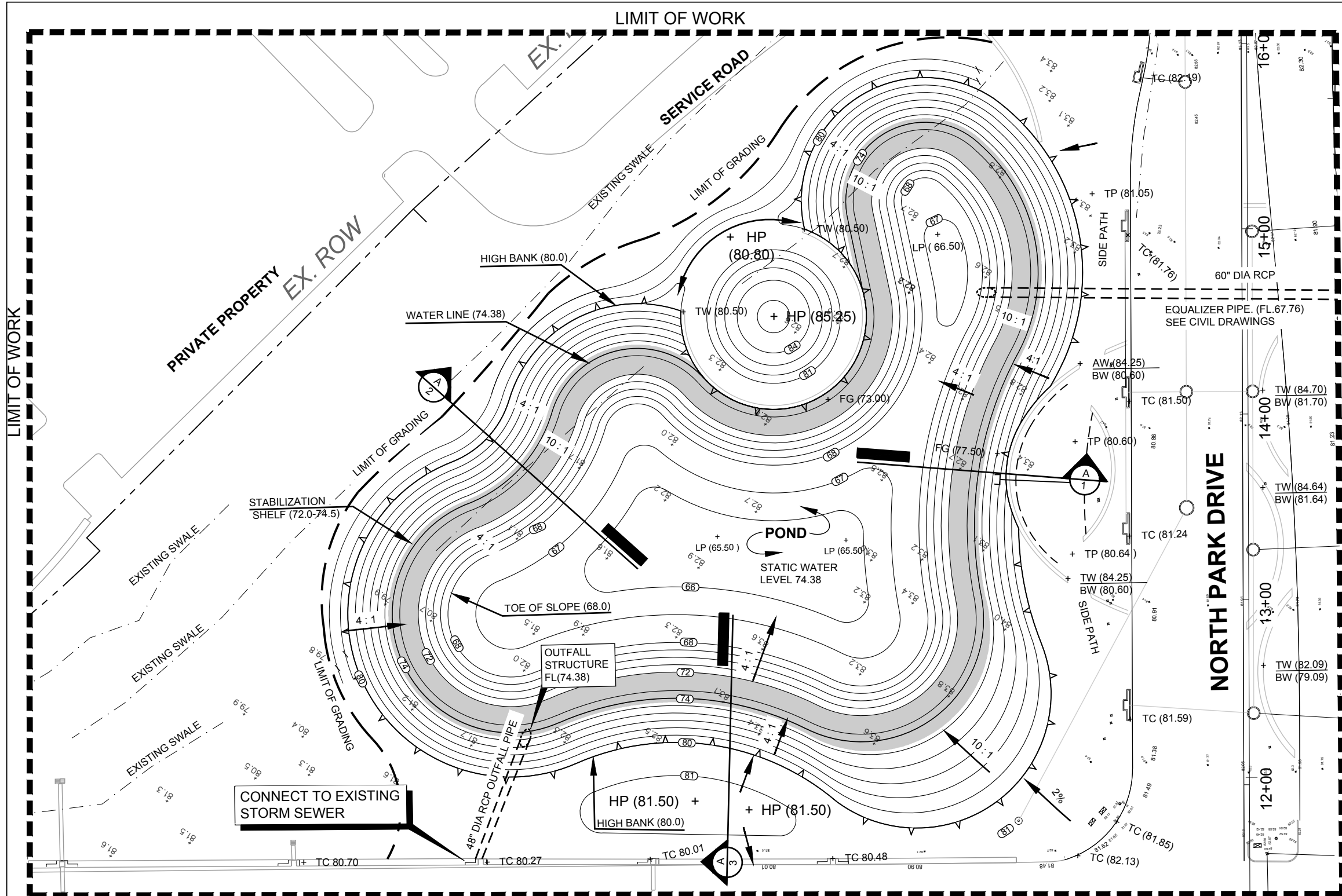
1. FLOATING AERATION FOUNTAIN WITH INTEGRATED LIGHTING. **SEE POND AERATION DETAIL SHEET 1 OF 1**
2. PROPOSED AERATION ELECTRICAL SUB-PANEL. **SEE SITE MEP DRAWINGS**
3. FUTURE POND EXPANSION AREA.
4. POND EQUALIZATION PIPE, **SEE CIVIL DRAWINGS**
5. PROPOSED ELECTRICAL SERVICE IN NEMA 3P ENCLOSURE, UPGRADE TO EXISTING POWER DROP, **SEE SITE MEP DRAWINGS**
6. POND OVERFLOW STRUCTURE, **SEE CIVIL DRAWINGS.**
7. 48" RCP POND OUTFALL PIPE, **SEE CIVIL DRAWINGS**
8. POND MAKEUP WATER WELL, PROPOSED 50 AMP 120/240 V. SINGLE PHASE PUMP WITH 5 HP UNIT PRESSURE TANK. WELL SIZE T.B.D **SEE MEP DRAWINGS**
9. 4" Ø MAKE UP WATER FILL LINE FROM WELL TO POND.
10. PROPOSED ELECTRICAL SOURCE POLE AND DISCONNECT.
11. PROPOSED BORE AND ELECTRICAL CONDUIT.BELOW ROADWAY **SEE MEP DRAWINGS.**
12. IRRIGATION PUMP
13. WATER SUCTION PUMP PIPE FROM POND TO IRRIGATION PUMP. (SIZE TBD)
14. WELL SERVICE ELECTRICAL SUB-PANEL.
15. 48" DIA RCP. INFLOW PIPE. **SEE CIVIL DRAWINGS.**
16. EXISTING IH-69 DRAINAGE SYSTEM.

GENERAL NOTE

- A. LOCATION OF PROPOSED FOUNTAIN, ELECTRICAL, AND POND FEATURES & ARE PRELIMINARY IN NATURE.
- B. LOCATION OF POWER SOURCE TO BE DETERMINED
- C. SEE MEP DRAWINGS FOR FINAL LOCATIONS OF SERVICE CONTROL PANELS, CONDUIT & CONDUCTORS.
- D. SITE LIGHTING DRAWINGS

CALCULATION ARE ESTIMATES. SEE POND CIVIL DRAWINGS FOR TRUE CALCULATION

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NORTH PARK DRIVE			
POND DEVELOPMENT PLAN POND-01			
SHEET 1 OF 8			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
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DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232
			623



GRADING NOTES

- A. CONTRACTOR TO VERIFY THE LOCATION AND CONDITIONS OF ALL UNDERGROUND UTILITIES IN THE FIELD.
- B. ALL LANDSCAPE BERMS SHALL BE GRADED IN A SMOOTH AND CONTINUOUS MANNER WITH NO ABRUPT GRADE TRANSITIONS.
- C. LANDSCAPE BERM ROUGH GRADING ELEVATIONS SHALL BE $\pm 2"$ BELOW FINISHED GRADE TO ALLOW FOR INSTALLATION OF TOPSOIL DRESSING AND TURF SODDING/HYDROSEEDING.
- D. CONTRACTOR TO VERIFY EXISTING PROPERTY CORNER ELEVATIONS AND SITE BENCH MARKS SPOT ELEVATIONS IN THE FIELD. NOTIFY LANDSCAPE ARCHITECT IF DISCREPANCIES ARE PRESENT THAT WOULD OTHERWISE AFFECT THE PROPOSED LANDSCAPE GRADING DESIGN.
- E. LANDSCAPE AREAS SHALL DRAIN AT A MINIMUM SLOPE OF 2%, 1% FOR CONCENTRATED SWALES OR AS NOTED ON THE DRAWINGS. HARDSCAPE AREAS SHALL DRAIN AT A MINIMUM SLOPE OF 1% TO A MAXIMUM OF 5%. CROSS SLOPES FOR SIDEWALKS SHALL NOT EXCEED 2%.
- F. CONSTRUCTED PAVEMENT AREAS SHALL NOT HAVE MORE THAN 1/8" HIGH STANDING WATER IN A 10'-0" AREA.
- G. CONTRACTOR TO PROTECT EXISTING TREES THAT FALL WITHIN OR ADJACENT TO SITE GRADING ACTIVITIES. TREE PRESERVATION DEVICES SHALL BE INSTALLED AND MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PERIOD.
- H. ALL RIGHTS-OF-WAY SHALL DRAIN TO PUBLIC STREET, ALL OTHERS AREAS TO DRAIN INTERNALLY UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- I. CONTRACTOR SHALL IMPORT OFF-SITE FILL MATERIAL AS NECESSARY TO CREATE LANDSCAPE BERMS OR STOCKPILE FROM ON-SITE SOURCES IF PROVIDED FOR BY THE DRAWINGS AND/OR SEE SPECIFICATIONS.
- J. REFER TO CIVIL ENGINEERING DRAWINGS FOR SITE INLETS, PIPING, AND CONVEYANCE TO THE REQUIRED PUBLIC STORM WATER SYSTEM.
- K. REFER TO GEOTECH REPORT FOR POND LINER SUB-BASE TREATMENT AND FILL REQUIREMENTS TO LINE POND IN ACCORDANCE WITH TXDOT STANDARDS.

LIMIT OF WORK

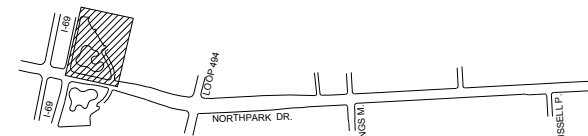
GENERAL NOTES:

- A. COORDINATE BENTONITE POND LINER WITH GEOTECHNICAL REPORT AND SITE CIVIL DRAWING
- B. SEE LANDSCAPE GENERAL NOTES SHEET 2 OF 2 FOR ADDITIONAL EXCAVATION, GRADING, AND POND LINING INFORMATION
- C. WASTE DISPOSAL IS INCIDENTAL AND NOT PAID FOR SEPARATE.

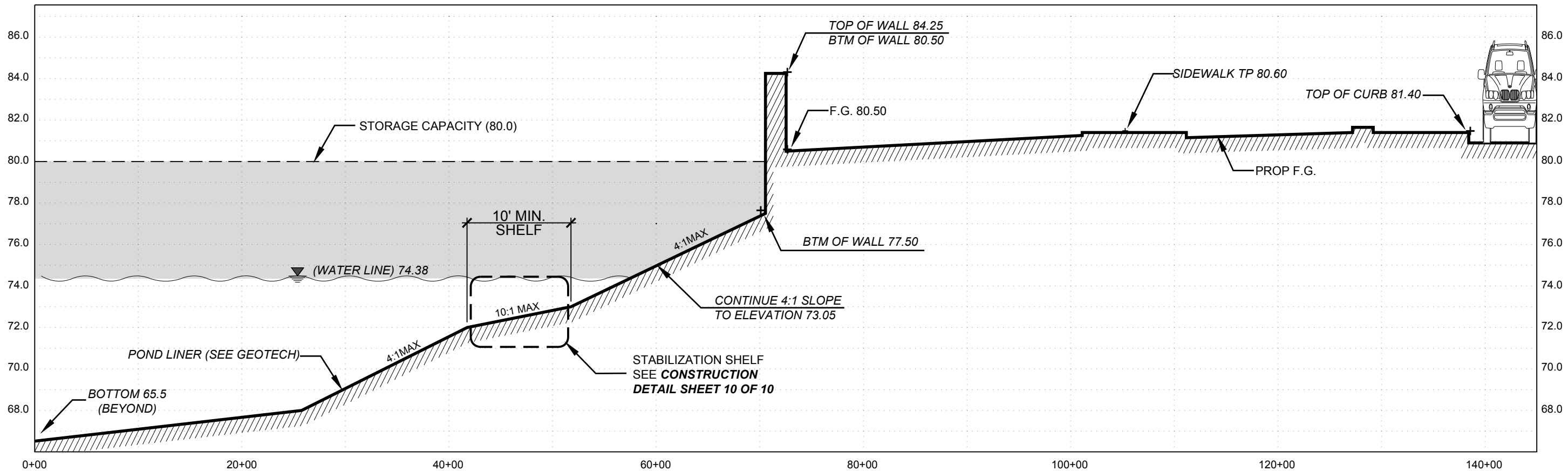


0 15 30 60
SCALE: 1"=60'

GRADING LEGEND		
+ TW	TOP OF WALL	○ MANHOLE
+ TC	TOP OF CURB	PP□ POWER POLE
+ BC	BOTTOM OF CURB	+ TB TOP OF BANK
+ TP	TOP OF PAVEMENT	+ BB BOTTOM OF BANK
+ FG	FINISH GRADE	+ 75.60 EXISTING ELEVATION
+ TG	TOP OF GRATE/RIM	+ (75.60) PROPOSED ELEVATION
+ HP	HIGH POINT	— TRENCH DRAIN
— SWALE		— SURFACE FLOW
— HIGH BANK		(BA) EXISTING CONTOUR LINE
□ PROP. INLET DRAIN, (SEE CIVIL DRAWINGS)		— PROPOSED STORM SEWER (SEE CIVIL DRAWINGS)
□ EXIST. INLET DRAIN		— PROPOSED CONTOURS
□ JUNCTION BOX (SEE CIVIL DRAWINGS)		6"Ø SCH-80 PERFORATED PVC DRAIN PIPE (1% MIN. DRAIN SLOPE)
▲ SECTION MARKERS WITH SHEET NO.		



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M2L		M2L ASSOCIATES, INC.		8955 KATY FWY, SUITE 300 HOUSTON, TX 77024	
HNTB		HNTB Corporation		The HNTB Companies Infrastructure Solutions Firm Registration Number 420	
CITY OF HOUSTON		LAKE HOUSTON REDEVELOPMENT		AUTHORITY & TBZ 10 610 ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002	
HOUSTON PUBLIC WORKS		NORTH PARK DRIVE			
		GRADING & EXCAVATION			
		POND-02			
		SHEET 2 OF 8			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					624



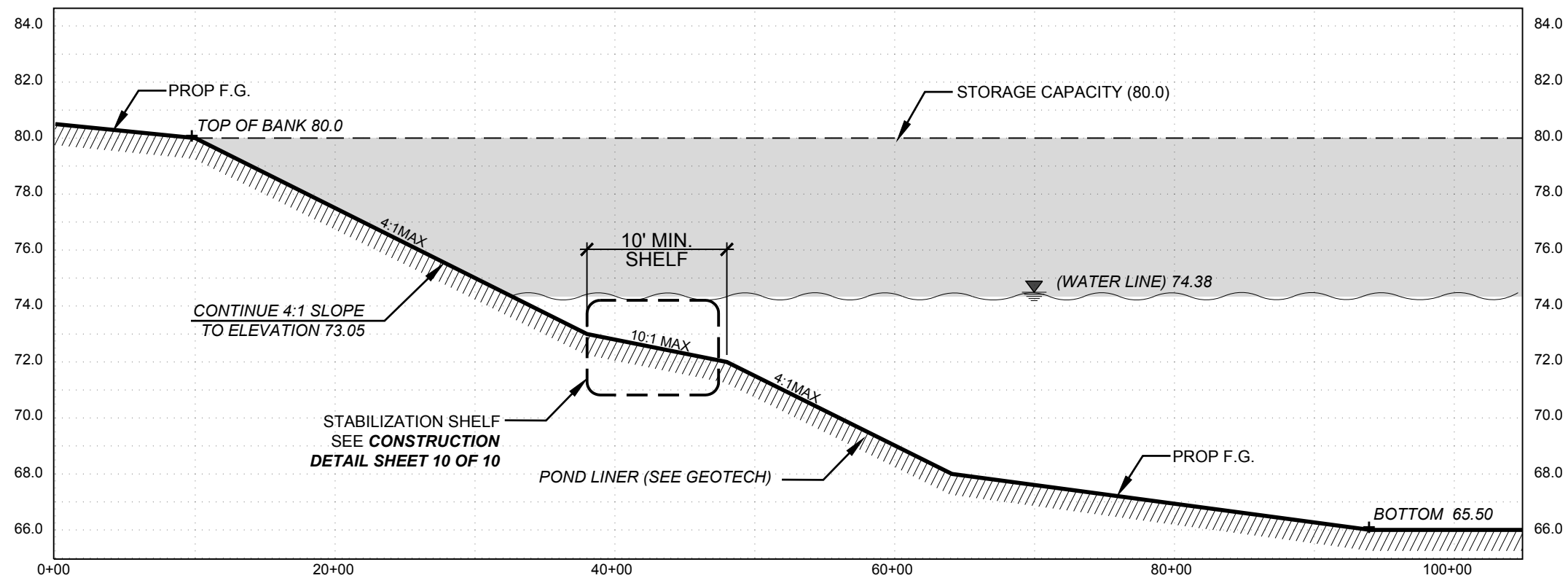
- GENERAL NOTES:**
- A. COORDINATE BENTONITE POND LINER WITH GEOTECHNICAL REPORT AND SITE CIVIL DRAWING
 - B. SEE GEOTECH AND SITE GENERAL NOTES FOR ADDITIONAL EXCAVATION, GRADING, AND POND LINING INFORMATION AND DESIGN TO TXDOT STANDARD.

SCALE: HORZ. 1" = 10'
VERT. 1" = 5'

ALL POND SECTIONS REPRESENTED
IN LANDSCAPE DRAWINGS ARE FOR
REFERENCE ONLY PENDING FINAL
H&H RECOMMENDATIONS



NO.	REVISIONS			BY	DATE
<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LH</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>			
NORTHPARK DRIVE					
POND SECTIONS A-1					
SHEET 4 OF 8					






GENERAL NOTES:

- A. COORDINATE BENTONITE POND LINER WITH GEOTECHNICAL REPORT AND SITE CIVIL DRAWING
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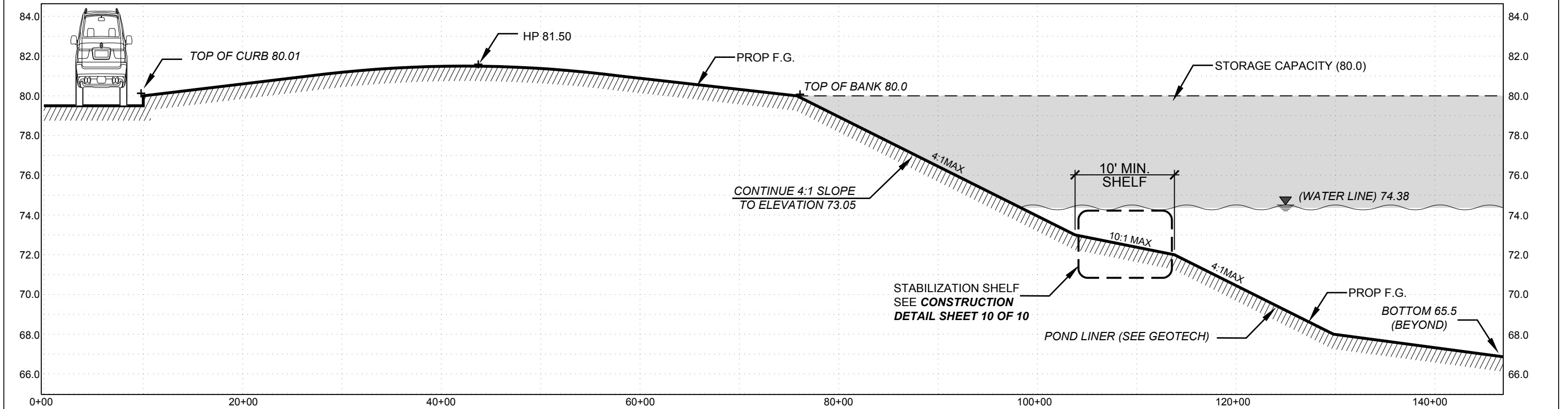
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H&H RECOMMENDATIONS



NO.	REVISIONS			BY	DATE
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE					
POND SECTIONS A-2 SHEET 5 OF 8					

DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232	627

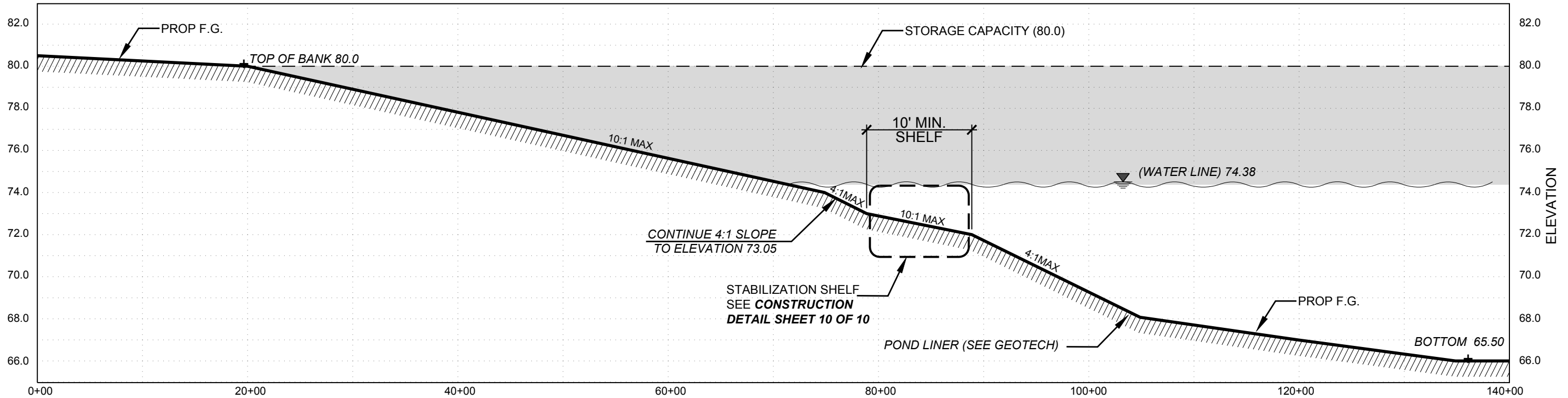


- GENERAL NOTES:**
- A. COORDINATE BENTONITE POND LINER WITH GEOTECHNICAL REPORT AND SITE CIVIL DRAWING
 - B. SEE GEOTECH AND SITE GENERAL NOTES FOR ADDITIONAL EXCAVATION, GRADING, AND POND LINING INFORMATION AND DESIGN TO TXDOT STANDARD.

SCALE: HORZ. 1" = 10'
VERT. 1" = 5'

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H&H RECOMMENDATIONS

NO.	REVISIONS			BY	DATE
<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div><div>HNTB</div></div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LH</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>			
NORTHPARK DRIVE					
POND SECTIONS A-3 SHEET 6 OF 8					
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:		6	TEXAS	SEE TITLE SHEET	CS
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:		HOU	MONTGOMERY	0912	37
					SHEET No.
					628



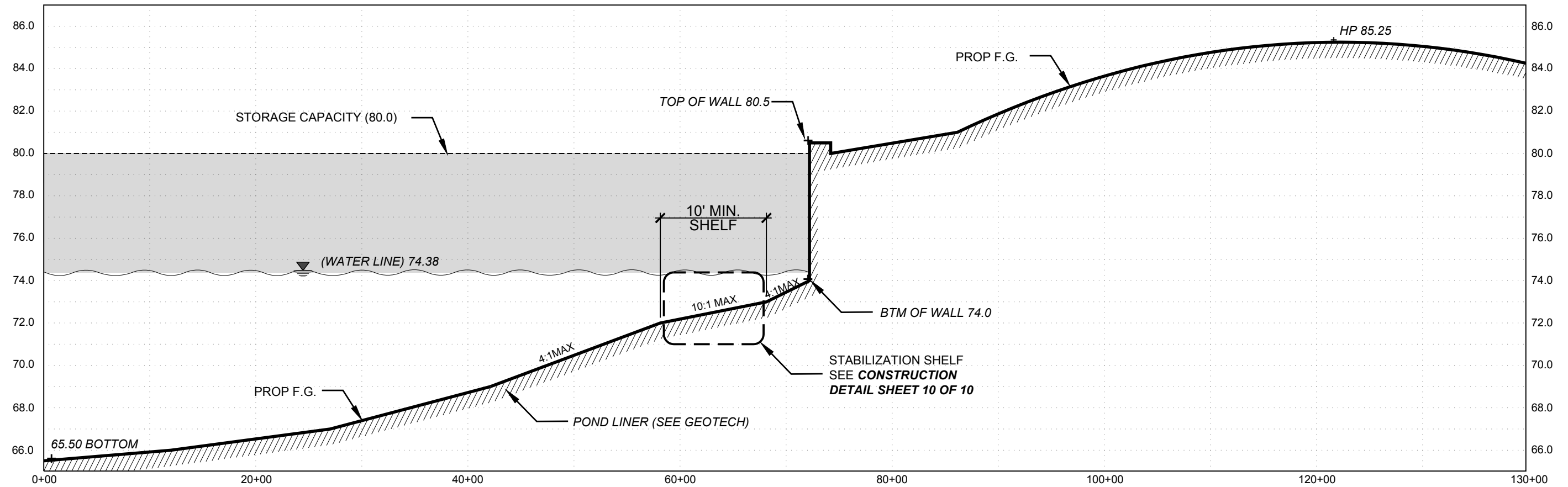
GENERAL NOTES:

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H&H RECOMMENDATIONS

NO.	REVISIONS	BY	DATE
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			
<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>	
NORTHPARK DRIVE			
POND SECTIONS B-1 SHEET 7 OF 8			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION No.
CHECKED:	HOU	MONTGOMERY	0912 37 232
			HIGHWAY No. CS
			SHEET No. 629



GENERAL NOTES:

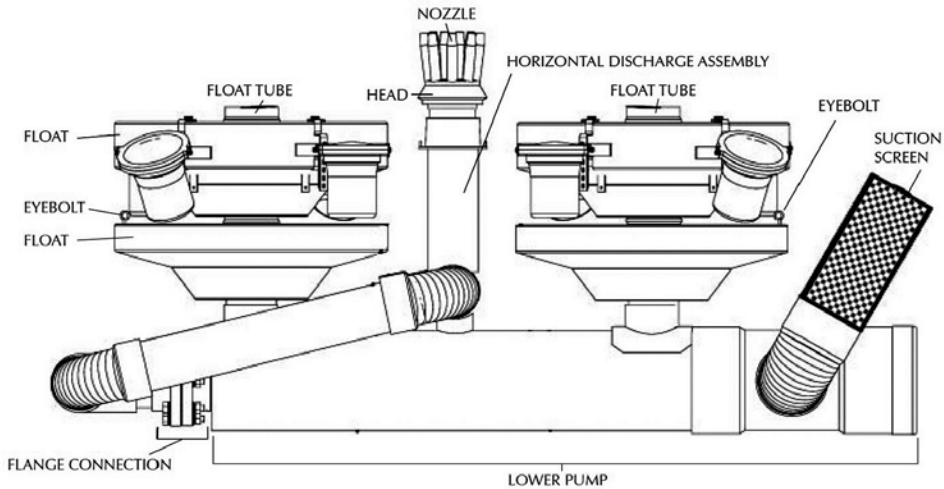
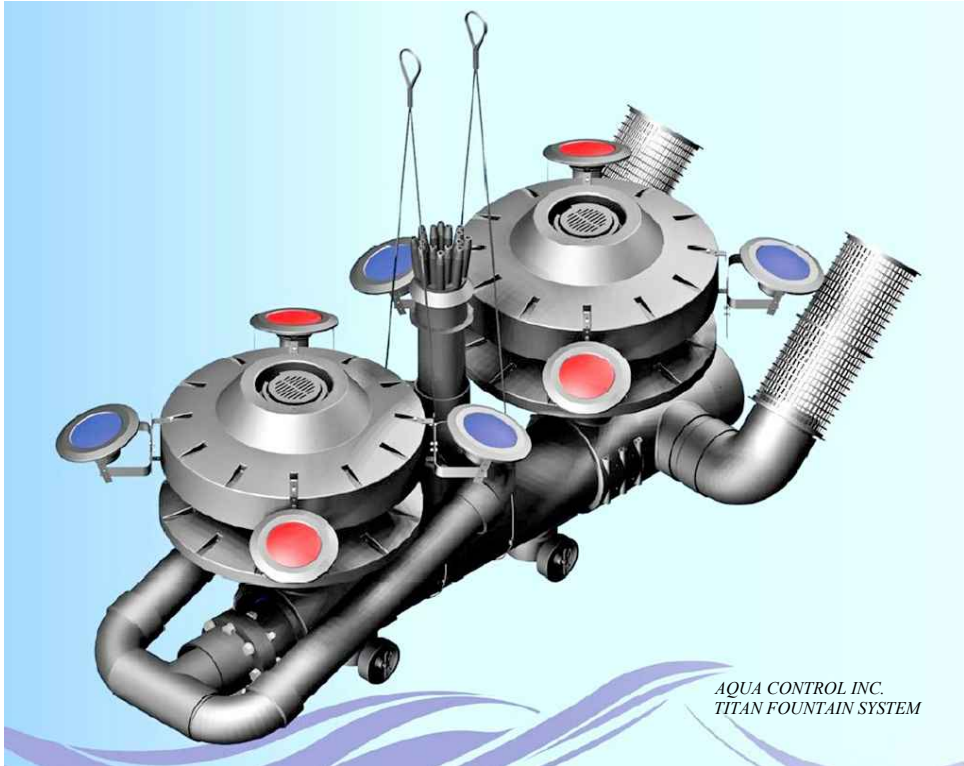
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<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON		<div><div><div>LA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div></div>			
HOUSTON PUBLIC WORKS					
NORTHPARK DRIVE					
POND SECTIONS					
B-2					
SHEET 8 OF 8					
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	
CHECKED:		6	TEXAS	SEE TITLE SHEET	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:		HOU	MONTGOMERY	0912	37
		</			



AQUA CONTROL INC.
TITAN FOUNTAIN SYSTEM

P.O. Box 9
Katy, TX 77492
www.lakepro.com
steve@lakepro.com

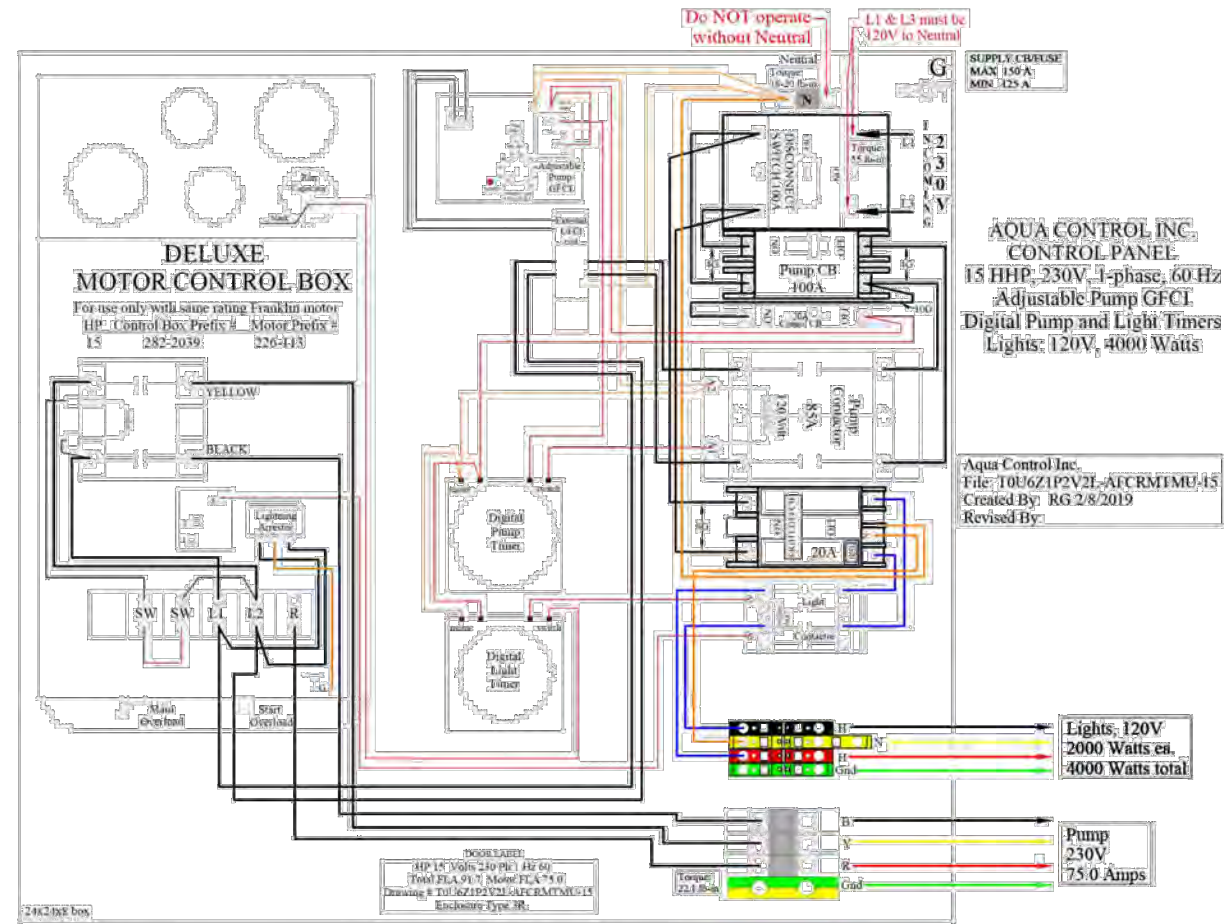
Office (281) 391-3688
Mobile (713) 817-0737
Fax (281) 391-5022

LAKE PRO, INC.
Pond & Lake
Management Services

Steve Arrington
Operations Manager / Aquatic Biologist
• Urban Lake Maintenance • Aerator Fountains
• Fishery Surveys • Vegetation Control • Fish Stocking

4 FLOATING AERATION SYSTEM TYPICAL 3D DIAGRAM (PAY ITEM 1014-2003) NOT TO SCALE

2 FLOATING AERATION SYSTEM TYPICAL SECTION DIAGRAM (PAY ITEM 1014-2003) NOT TO SCALE



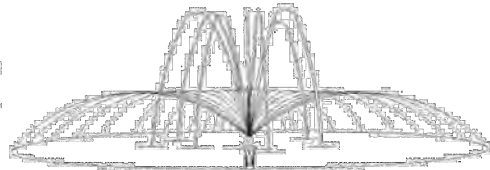
3 AERATOR PUMP CONTROL SYSTEM (PAY ITEM 1014-2003) NOT TO SCALE

TITAN FOUNTAIN SYSTEM REQUIREMENTS - LILY

The Fountain must be a Lily that must have a 2 tier pattern which will consist of a wide and low fan and 7' thick, high coherent arching streams. The Lily nozzle must be interchangeable with all other Aqua Control Fountain spray patterns of the same horse power.

SPRAY PATTERN SPECIFICATIONS

Dimensions for water display must be For 15 HP performance height must be 15 feet Diameter must be 60 feet The pumping rate must be 800 GPM.



Aqua Control Titan Series Fountain - Lily

Aqua Control
6A WOLFER INDUSTRIAL DRIVE
SPRING VALLEY, IL 61362
1-800-377-0019
WWW.AQUACONTROL.COM



60 Hz									
HP	PERFORMANCE			DEPTH		AMPS			
	HT. (Feet)	DIA. (Feet)	GPM	MIN. WATER DEPTH		SINGLE PHASE		THREE PHASE	
				VERT.	HORIZ.	230V	208V	230V	460V
7.5	25	.50	500	120"	48"	42	28	26	13
10	27	.53	650	120"	48"	51	33	31	17
15	30	.60	800	120"	48"	75	49	49	25
20	35	.70	900	120"	48"	87	57	56	33
25	40	.80	1000	120"	48"	95	62	62	41
30	45	.90	1100	120"	48"	104	69	69	47
40	50	1.0	1200	120"	48"	118	78	78	54

SPRAY NOZZLE ASSEMBLY

The nozzle must attach to the head which attaches to the upper tube assembly. The upper tube assembly shall be made from 6" SDR-25 engineered plastic tubing for toughness and corrosion resistance. The 6" size closely matches the pump tube assembly and/or wishbone to reduce pressure losses from transitions.

MOTOR SPECIFICATIONS

The Titan Fountain must have a 15 HP SINGLE phase motor using 230 volts and drawing 75 amps. The motor must be an industry standard submersible motor with mechanical seals and heavy duty bearings designed to operate under water. All external components must be stainless steel & corrosion resistant. * Motor must be 3 wire plus a ground.

FLOAT

All floats must be one piece and molded of high strength impact, UV and chemical resistant polyethylene. The float color must be black for minimum visibility in water. Stainless steel inserts must be molded into the float for light attachment and for mooring eyebolts. The float must have molded hand holds for easy handling. The float must be designed for maximum stability and for easy height adjustability to achieve minimum visibility with as little as 1/2" or a 15" diameter portion of the float visible during operation. The float must be filled with closed cell urethane foam.

1 POND AERATION FOUNTAINS (PAY ITEM 1014-2003) NOT TO SCALE

NO.	REVISIONS	BY	DATE

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

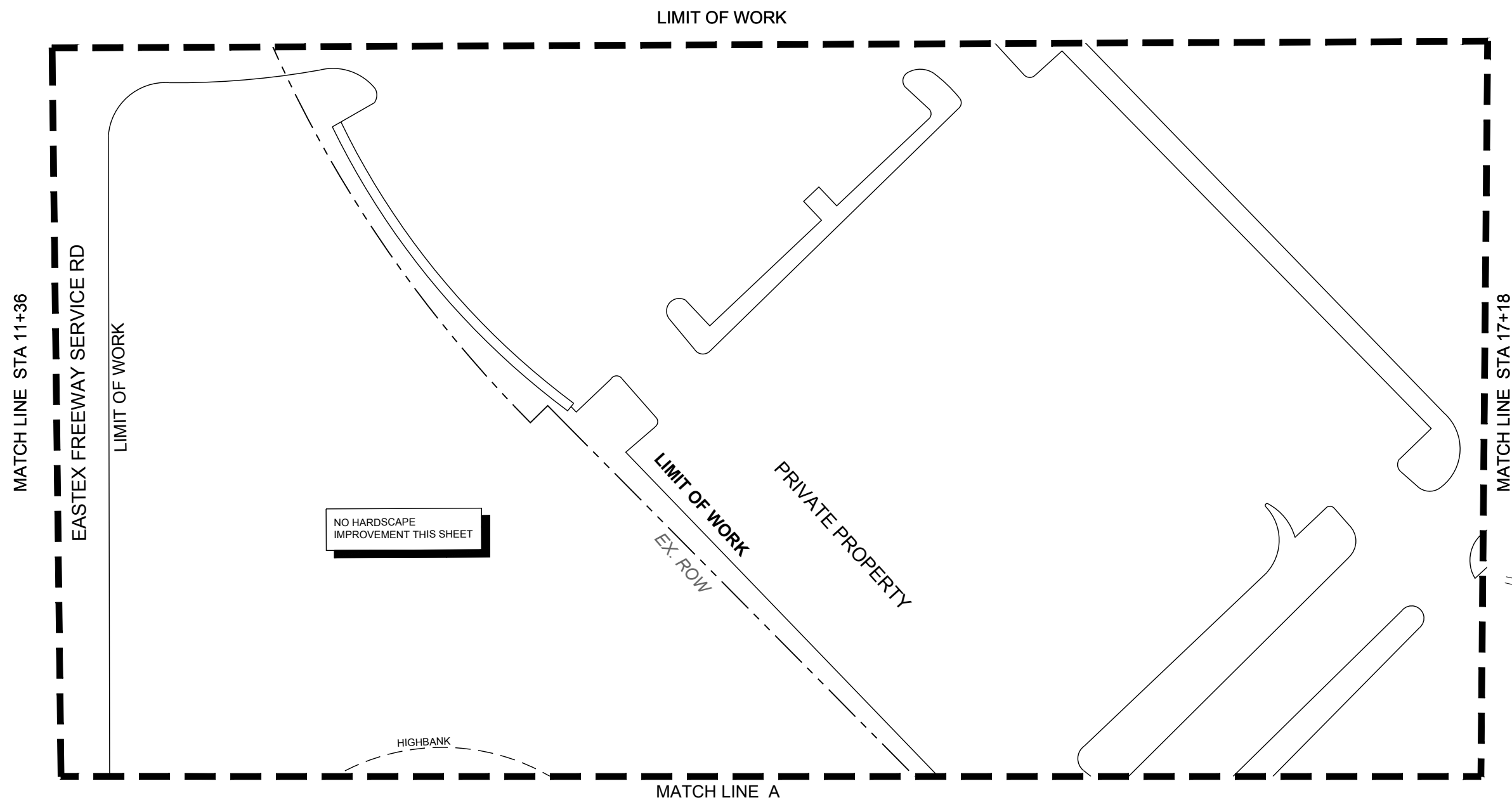
LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TRZ 10
c/o ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002

NORTH PARK DRIVE

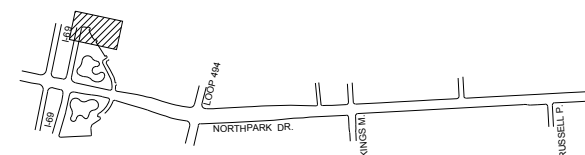
POND AERATION

SHEET 1 OF 1

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
				JOB No. 232
				SHEET No. 631



0 12.5 25 50
SCALE: 1"=50'



GENERAL NOTES:

A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION

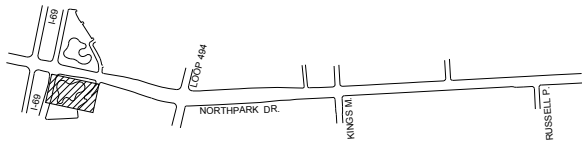
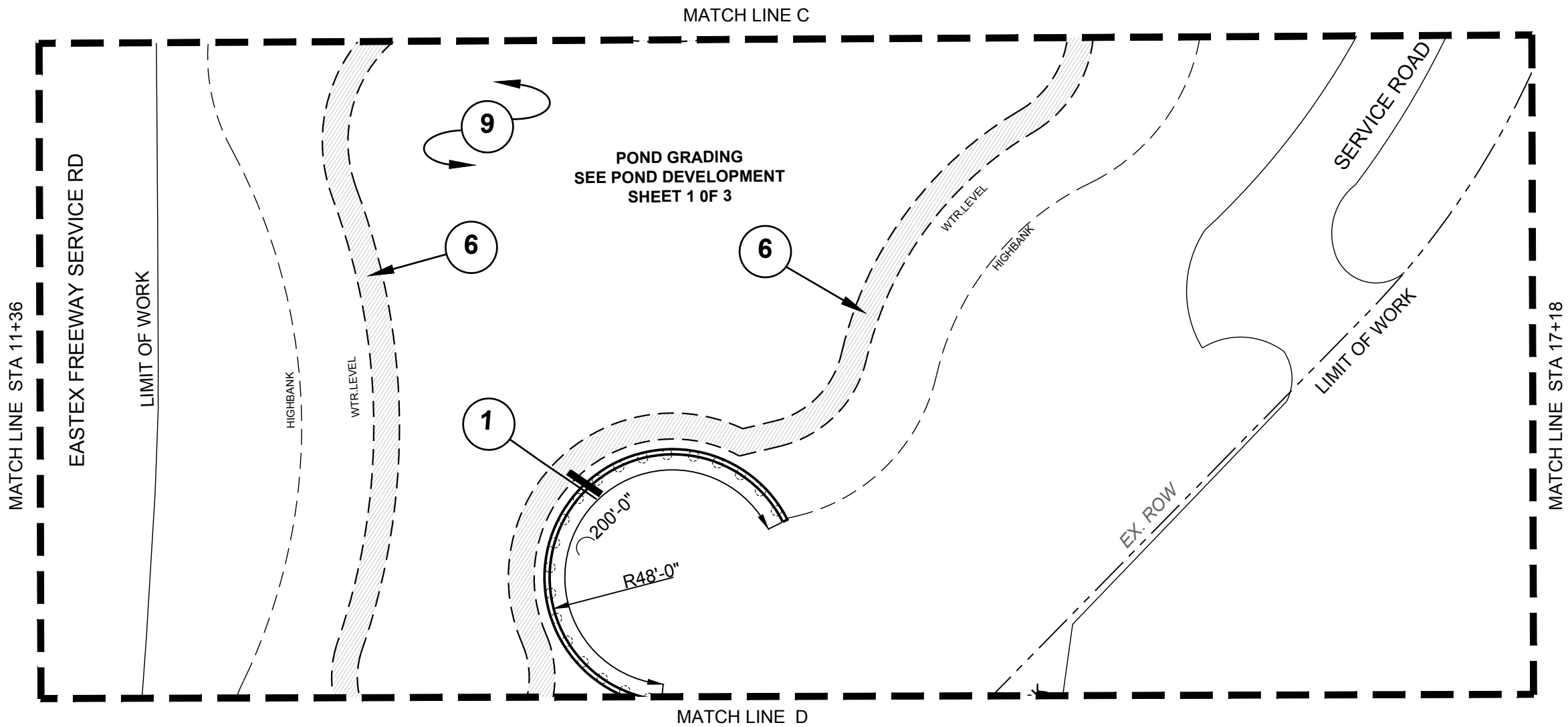
LAYOUT PLAN NOTES:

1. STACKED STONE WALL @ POND EDGE, **SEE DETAIL #1, HARDSCAPE DETAILS SHEET 1 OF 4**
2. STACKED STONE MASONRY WALL - FREESTANDING, **SEE DETAIL #2, HARDSCAPE DETAILS SHEET 1 OF 4**
3. STACKED STONE MASONRY WALL WITH CAP, **SEE DETAIL #3, HARDSCAPE DETAILS SHEET 1 OF 4.**
4. CONCRETE SIDE PATH, **SEE CIVIL ENGINEERING DRAWINGS**
5. CONCRETE LANDSCAPE BAND, **SEE DETAIL #5, HARDSCAPE DETAILS SHEET 1 OF 4**
6. POND EDGE STABILIZATION, **SEE DETAIL POND GRADING PLAN**
7. ACCESS RAMP, **SEE CIVIL ENGINEERING DRAWINGS.**
8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

NO.					REVISIONS			BY DATE	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> M2L </div>					M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024				
<div style="font-size: 48pt; font-weight: bold; letter-spacing: -2px;">HNTB</div>					HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420				
CITY OF HOUSTON HOUSTON PUBLIC WORKS					<div style="border: 1px solid black; padding: 5px; display: inline-block; text-align: center;"> <small>HARRIS COUNTY TEXAS</small> </div> LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002				
<h1 style="margin: 0;">NORTHPARK DRIVE</h1>									
<h1 style="margin: 0;">HARDSCAPE LAYOUT</h1>									
<h1 style="margin: 0;">SHEET 1 OF 17</h1>									
DESIGNED:	FED. DIV.	RD. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.	
CHECKED:		6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET No.	
CHECKED:	HOU		MONTGOMERY	0912	37	232		633	



0 12.5 25 50
SCALE: 1"=50'



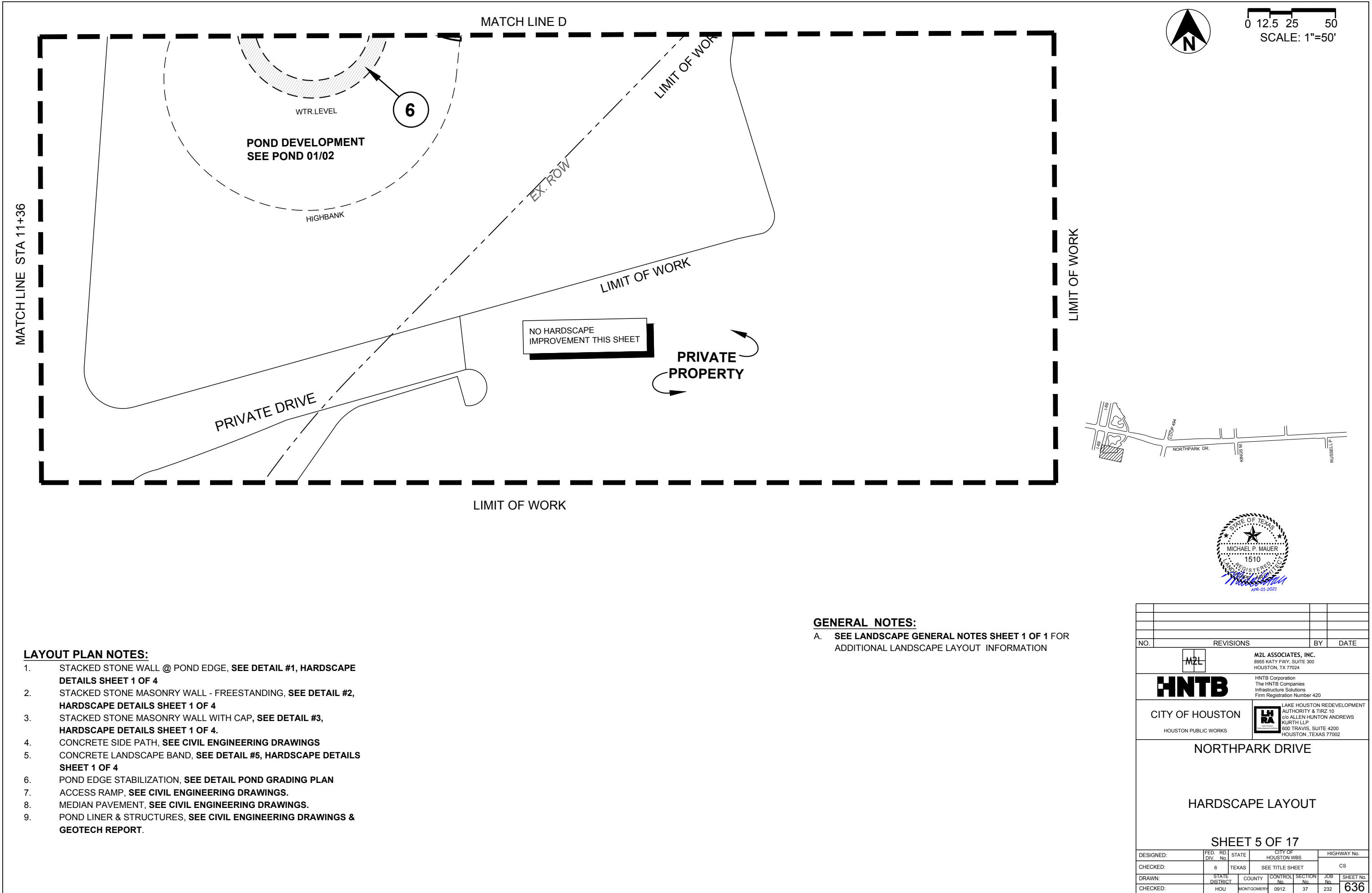
LAYOUT PLAN NOTES:

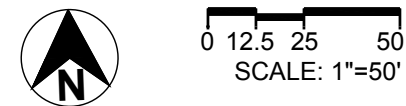
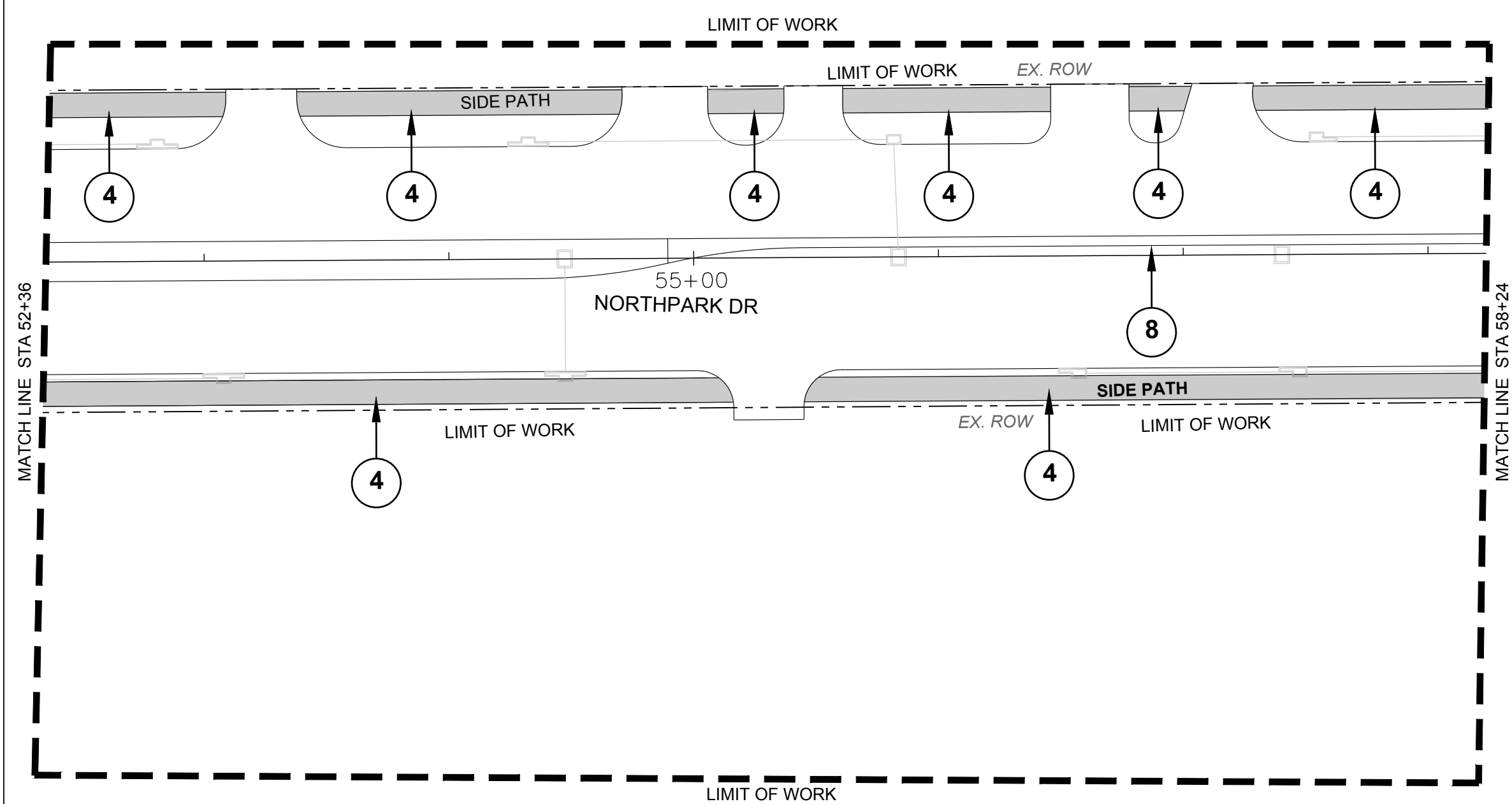
1. STACKED STONE WALL @ POND EDGE, **SEE DETAIL #1, HARDSCAPE DETAILS SHEET 1 OF 4**
2. STACKED STONE MASONRY WALL - FREESTANDING, **SEE DETAIL #2, HARDSCAPE DETAILS SHEET 1 OF 4**
3. STACKED STONE MASONRY WALL WITH CAP, **SEE DETAIL #3, HARDSCAPE DETAILS SHEET 1 OF 4.**
4. CONCRETE SIDE PATH, **SEE CIVIL ENGINEERING DRAWINGS**
5. CONCRETE LANDSCAPE BAND, **SEE DETAIL #5, HARDSCAPE DETAILS SHEET 1 OF 4**
6. POND EDGE STABILIZATION, **SEE DETAIL POND GRADING PLAN**
7. ACCESS RAMP, **SEE CIVIL ENGINEERING DRAWINGS.**
8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

GENERAL NOTES:

- A. **SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION**

NO.	REVISIONS			BY	DATE		
<div><div><div>M2L</div></div></div>			<div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div>				
<div><div>HNTB</div></div>			<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>				
<div>CITY OF HOUSTON</div> <div>HOUSTON PUBLIC WORKS</div>			<div><div><div>LA RA</div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>				
<div>NORTH PARK DRIVE</div>							
<div>HARDSCAPE LAYOUT</div>							
<div>SHEET 4 OF 17</div>							
DESIGNED:	FED. DIV. No.	RD. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:	6		TEXAS	SEE TITLE SHEET		CS	
DRAWN:	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU		MONTGOMERY	0912	37	232	635





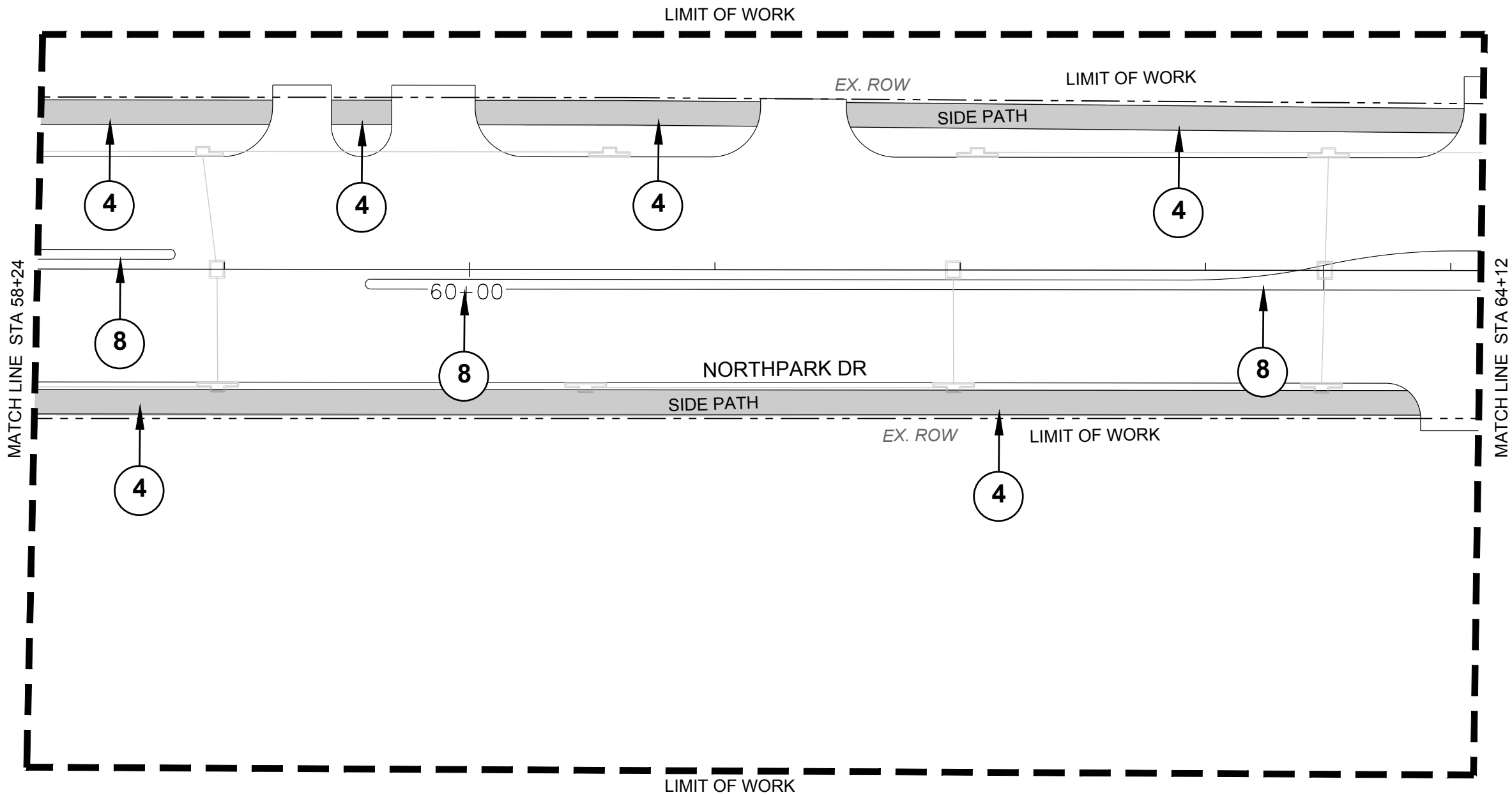
LAYOUT PLAN NOTES:

1. STACKED STONE WALL @ POND EDGE, **SEE DETAIL #1, HARDSCAPE DETAILS SHEET 1 OF 4**
2. STACKED STONE MASONRY WALL - FREESTANDING, **SEE DETAIL #2, HARDSCAPE DETAILS SHEET 1 OF 4**
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5. CONCRETE LANDSCAPE BAND, **SEE DETAIL #5, HARDSCAPE DETAILS SHEET 1 OF 4**
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8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

GENERAL NOTES:

- A. **SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION**

NO.	REVISIONS			BY	DATE
<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div><div>HNTB</div></div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div><div><div>LA Lake Houston Authority & TIRZ 10</div></div></div>			
NORTH PARK DRIVE					
HARDSCAPE LAYOUT					
SHEET 12 OF 17					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					642



0 12.5 25 50
SCALE: 1"=50'



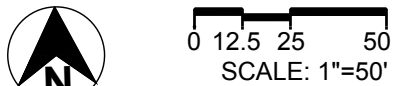
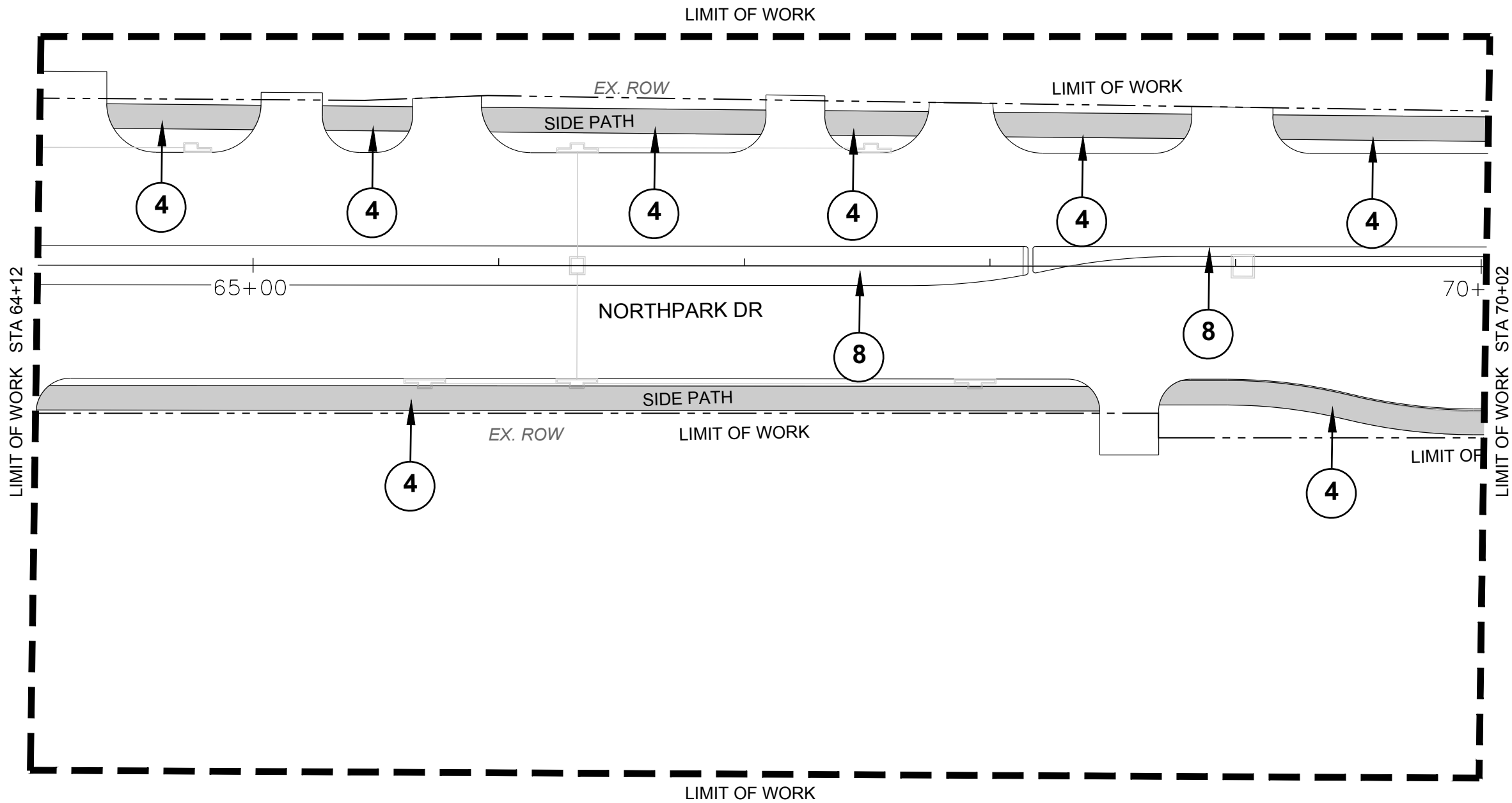
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8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

GENERAL NOTES:

- A. **SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION**

NO.			REVISIONS		BY	DATE	
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>				
CITY OF HOUSTON							
HOUSTON PUBLIC WORKS							
<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>							
NORTHPARK DRIVE							
HARDSCAPE LAYOUT							
SHEET 13 OF 17							
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:		6	TEXAS	SEE TITLE SHEET		CS	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.
CHECKED:		HOU	MONTGOMERY	0912	37	232	643



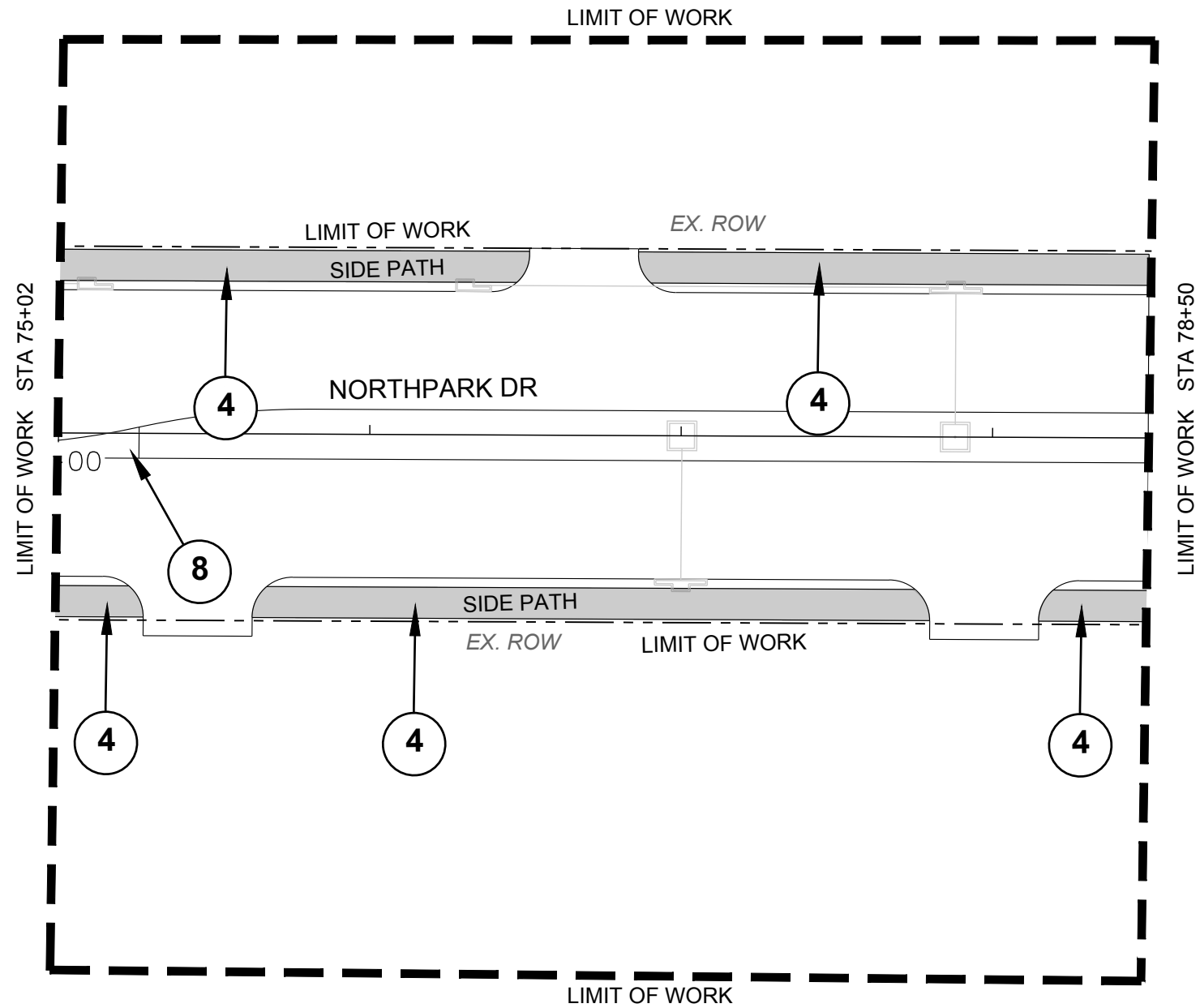
LAYOUT PLAN NOTES:

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4. CONCRETE SIDE PATH, **SEE CIVIL ENGINEERING DRAWINGS**
5. CONCRETE LANDSCAPE BAND, **SEE DETAIL #5, HARDSCAPE DETAILS SHEET 1 OF 4**
6. POND EDGE STABILIZATION, **SEE DETAIL POND GRADING PLAN**
7. ACCESS RAMP, **SEE CIVIL ENGINEERING DRAWINGS.**
8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

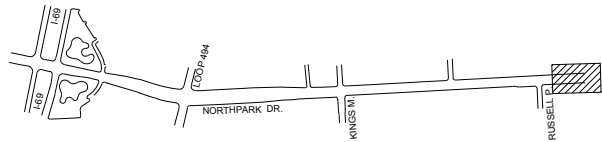
GENERAL NOTES:

- A. **SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION**

NO.	REVISIONS					BY	DATE
<div><div>M2L</div></div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024					
<div><div>HNTB</div></div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON		<div><div>LA</div></div>		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
HOUSTON PUBLIC WORKS							
NORTHPARK DRIVE							
HARDSCAPE LAYOUT							
SHEET 14 OF 17							
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET			CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	644	



0 12.5 25 50
SCALE: 1"=50'



LAYOUT PLAN NOTES:

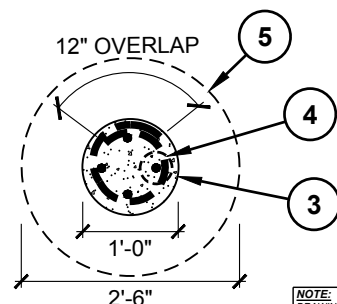
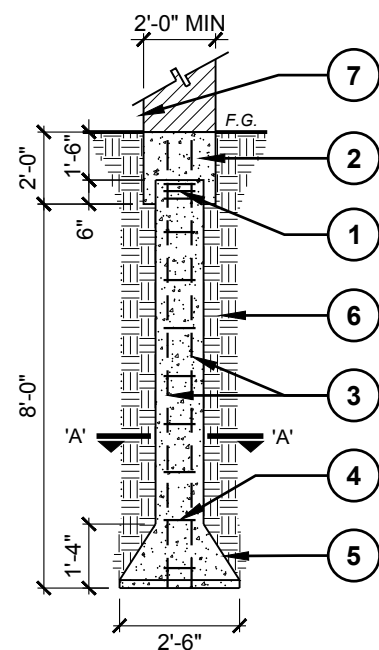
1. STACKED STONE WALL @ POND EDGE, **SEE DETAIL #1, HARDSCAPE DETAILS SHEET 1 OF 4**
2. STACKED STONE MASONRY WALL - FREESTANDING, **SEE DETAIL #2, HARDSCAPE DETAILS SHEET 1 OF 4**
3. STACKED STONE MASONRY WALL WITH CAP, **SEE DETAIL #3, HARDSCAPE DETAILS SHEET 1 OF 4.**
4. CONCRETE SIDE PATH, **SEE CIVIL ENGINEERING DRAWINGS**
5. CONCRETE LANDSCAPE BAND, **SEE DETAIL #5, HARDSCAPE DETAILS SHEET 1 OF 4**
6. POND EDGE STABILIZATION, **SEE DETAIL POND GRADING PLAN**
7. ACCESS RAMP, **SEE CIVIL ENGINEERING DRAWINGS.**
8. MEDIAN PAVEMENT, **SEE CIVIL ENGINEERING DRAWINGS.**
9. POND LINER & STRUCTURES, **SEE CIVIL ENGINEERING DRAWINGS & GEOTECH REPORT.**

GENERAL NOTES:

- A. **SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL LANDSCAPE LAYOUT INFORMATION**

NO.			REVISIONS		BY DATE
<div><div>M2L</div></div>			M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		
<div>HNTB</div>			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420		
CITY OF HOUSTON			<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>		
HOUSTON PUBLIC WORKS					
NORTH PARK DRIVE					
HARDSCAPE LAYOUT					
SHEET 16 OF 17					
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	
CHECKED:		6	TEXAS	SEE TITLE SHEET	
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:		HOU	MONTGOMERY	0912	37
					JOB No. SHEET No.
					232 646

NO.	REVISIONS						BY	DATE	
				M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024					
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 520 ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002					
<h1 style="margin: 0;">NORTHPARK DRIVE</h1> <h2 style="margin: 20px 0 0 0;">HARDSCAPE DETAILS</h2> <h3 style="margin: 20px 0 0 0;">SHEET 1 OF 4</h3>									
DESIGNED:		FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.		
CHECKED:		6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:		STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:		HOU	MONTGOMERY	0912	37	232	649		



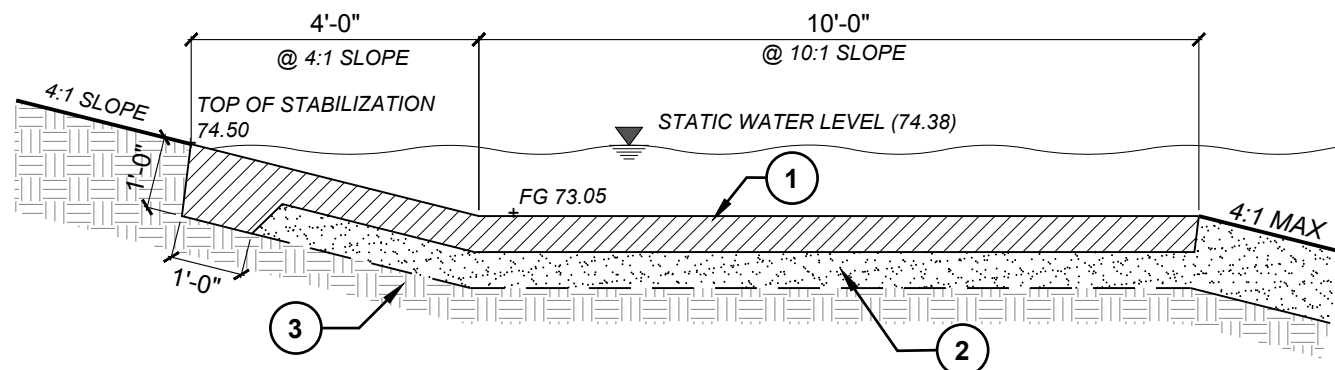
DETAIL NOTES:

- (3) - #3 HORIZONTAL TIES ADDITIONAL
- REINFORCED CONCRETE GRADE BEAM, SEE INDIVIDUAL DETAILS FOR REINFORCING INFORMATION
- (4) - #5'S VERTICAL, EXTEND INTO GRADE BEAM
- # 3 HORIZONTAL TIES @ 10" O.C.
- CONCRETE BELL
- UNDISTURBED SOIL
- WALL ABOVE, **SEE DETAIL #1, THIS SHEET.**

BASED ON THE REQUIREMENTS OF THE CITY OF HOUSTON BUILDING CODE, "2000 INTERNATIONAL BUILDING CODE", WITH CITY OF HOUSTON AMENDMENT. THE COLUMN IS DESIGNED TO WITHSTAND WIND LOAD OF 110MPH @ 3 SECOND GUST WIND SPEED.

3 CONCRETE PIER (INCIDENTAL TO ITEM 5009-6002)

SCALE: 1/4"=1'-0"



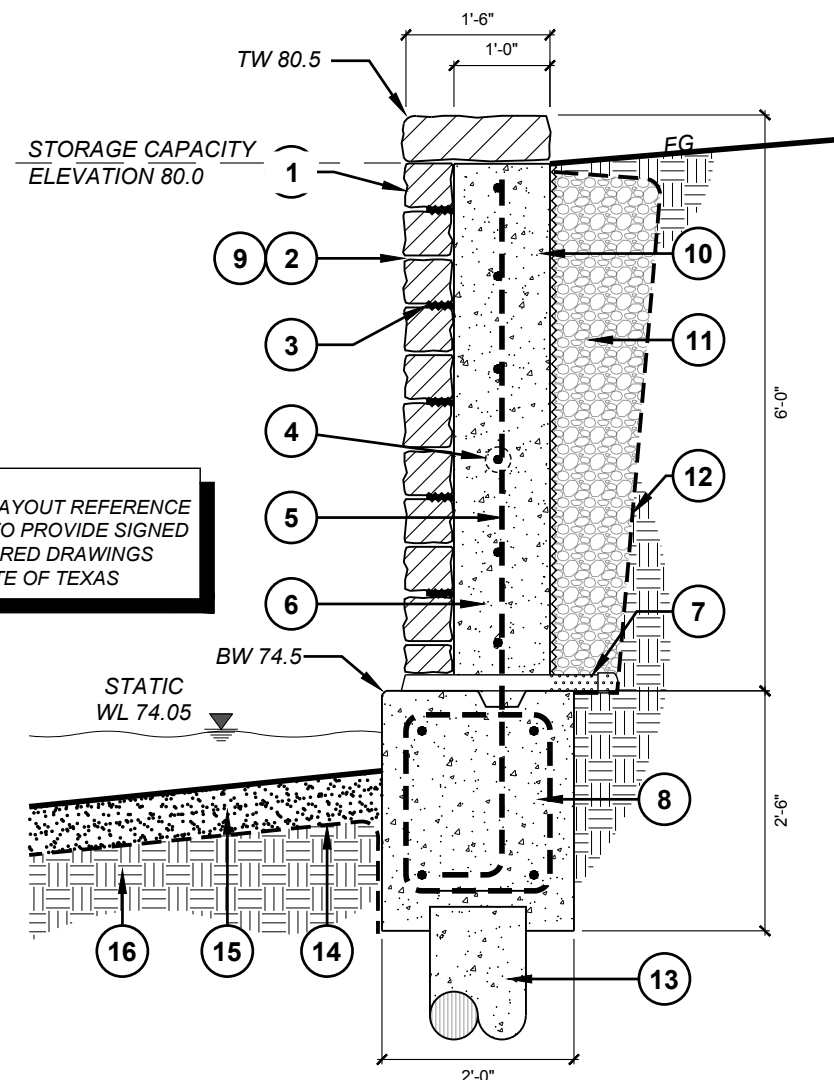
DETAIL NOTES:

- 6" CEMENT STABILIZED SAND (12" DEEP @ POND EDGE)
- POND LINER - SEE CIVIL ENGINEER NOTES AND GEO TECH.
- NATURAL SOIL / 95% COMPACTED SUB-GRADE

GENERAL NOTES
EXCAVATION & DISPOSAL OF EMBANKMENT IS INCIDENTAL TO 0401-6005

2 POND EDGE STABLIZATION (PAY ITEM 0400-6005)

SCALE: 3/8"=1'-0"



NOTE:

DRAWINGS ARE FOR LAYOUT REFERENCE ONLY. CONTRACTOR TO PROVIDE SIGNED AND SEALED ENGINEERED DRAWINGS LICENSED IN THE STATE OF TEXAS

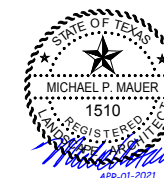
DETAIL NOTES:

- TEXAS 'MOSS' ROCK STACKED STONE ±8" H X ±1'-6"L X ±6"W
- MORTAR FILL BETWEEN STACKED STONE. (ALL LAYERS - USE DRY-BLOCK MORTAR ADDITIVE OR APPROVED EQUAL FOR EFFLORESCENCE CONTROL)
- MASONRY TIES EVERY OTHER ROW @ ±24" O.C.
- #4 HORIZONTAL CONTINUOUS @ 12" O.C.
- #5 VERTICAL @ 15" O.C., HOOK INTO GRADE BEAM (ALTERNATE DIRECTION).
- 3000 PSI @ 28 DAY CONCRETE WALL
- 2" Ø SCH-40 PVC WEEP HOLE @ 48" O.C. EXTEND INTO GRAVEL BACKFILL 6" MIN., CAP AND DRILL 1/4"Ø HOLES AT 1" O.C.
- 3000 PSI @ 28 DAY CONCRETE GRADE BEAM CONTINUOUS WITH (4) #5 HORIZONTAL CONTINUOUS AND #4 HOOPS @ 18" O.C.
- HIDDEN JOINT (HOLD MORTAR BACK 1" FROM FACE OF STONE, ALL JOINTS)
- HYDROSTATIC RELIEF MATERIAL (DIMPLE SHEET) ALONG ENTIRE WALL FACE.
- #57 ANGULAR GRAVEL, MOLINE STONE BACKFILL
- MIRIFI 140N NON-WOVEN FILTER FABRIC, OR APPROVED EQUAL
- CONCRETE PIER 12"Ø X 8' DEEP (MIN) @ 10' O.C., **SEE DETAIL #3 THIS SHEET**
- HDPE POND LINER AND DRAINAGE LAYER, **SEE CIVIL ENGINEERING NOTES.**
- POND BOTTOM, **SEE CIVIL ENGINEERING GENERAL NOTES.**
- UNDISTURBED GRADE.

GENERAL NOTE: ALL ITEMS NOTED ARE INCIDENTAL TO 5009-6002

1 STONE MASONRY WALL AT POND(PAY ITEM 5009-6002)

SCALE: 1/2"=1'-0"

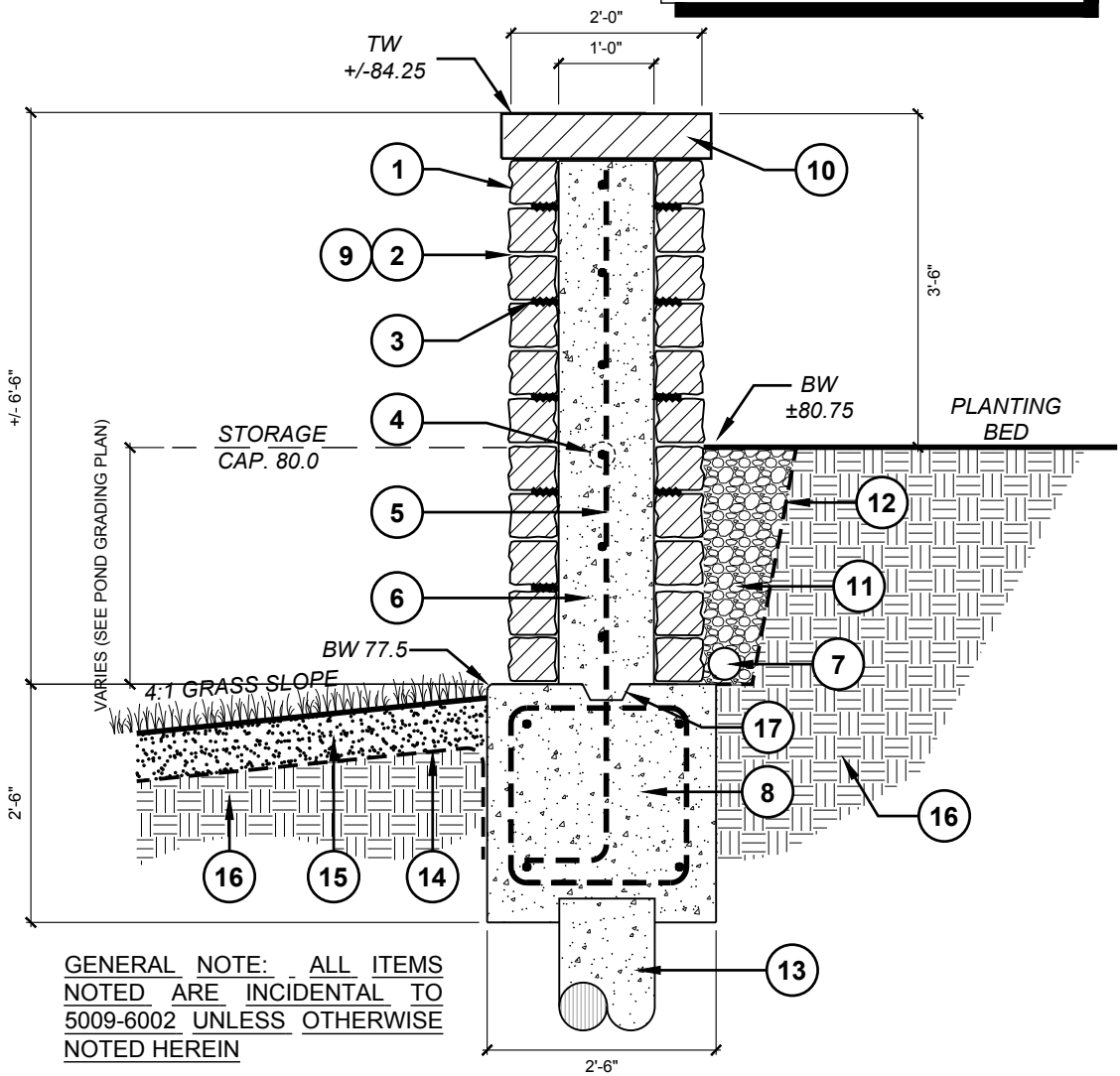


NO.	REVISIONS	BY	DATE
1	M2L		
M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS			
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE			
HARDSCAPE DETAILS			
SHEET 2 OF 4			
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:			SEE TITLE SHEET
DRAWN:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL No. 0912
CHECKED:			SECTION No. 37
			JOB No. 232
			SHEET No. 650
			HIGHWAY No. CS

DETAIL NOTES:

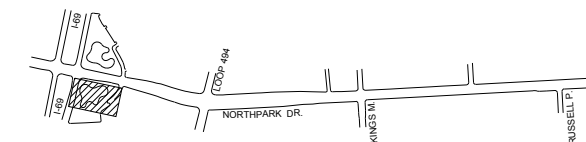
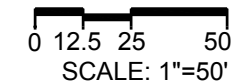
1. TEXAS 'MOSS' ROCK STACKED STONE $\pm 8"$ H X $\pm 1'-6"$ L X $\pm 6"$ W
2. MORTAR FILL BETWEEN STACKED STONE. (ALL LAYERS - USE DRY-BLOCK MORTAR ADDITIVE OR APPROVED EQUAL FOR EFFLORESCENCE CONTROL)
3. MASONRY TIES EVERY OTHER ROW @ $\pm 24"$ O.C.
4. #4 HORIZONTAL CONTINUOUS @ 12" O.C.
5. #5 VERTICAL @ 15" O.C., HOOK INTO GRADE BEAM (ALTERNATE DIRECTION).
6. 3000 PSI @ 28 DAY CONCRETE WALL
7. 6" DIA. PERFORATED SCH 80 PVC PIPE ALONG WALL BASE, DAYLIGHT TO DRAIN ON EITHER END OF WALL
8. 3000 PSI @ 28 DAY CONCRETE GRADE BEAM CONTINUOUS WITH (4) #5 HORIZONTAL CONTINUOUS AND #4 HOOPS @ 18" O.C.
9. HIDDEN JOINT (HOLD MORTAR BACK 1" FROM FACE OF STONE, ALL JOINTS)
10. CAST STONE CAP (PAY ITEM 5009-6003), **SEE DETAIL #4, HARDSCAPE DETAILS 1 OF 4**
11. #57 ANGULAR GRAVEL, MOLINE STONE BACKFILL
12. MIRIFI 140N NON-WOVEN FILTER FABRIC, OR APPROVED EQUAL
13. CONCRETE PIER 12" \varnothing X 8' DEEP (MIN) @ 10' O.C., **SEE DETAIL #3 HARDSCAPE DETAILS SHEET 2 OF 4**
14. HDPE POND LINER AND DRAINAGE LAYER, **SEE GEOTECHNICAL REPORT AND CIVIL ENGINEERING NOTES.**
15. POND BOTTOM, **SEE GEOTECH REPORT AND CIVIL ENGINEERING GENERAL NOTES.**
16. UNDISTURBED GRADE OR 95% SPD COMPACTED SOIL
17. 2 X 4 KEYWAY

NOTE:
DRAWINGS ARE FOR LAYOUT REFERENCE ONLY. CONTRACTOR TO PROVIDE SIGNED AND SEALED ENGINEERED DRAWINGS LICENSED IN THE STATE OF TEXAS






NO.	REVISIONS			BY	DATE
<div>M2L</div>		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div><div><div>LA H</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10</div></div></div>			
NORTHPARK DRIVE					
HARDSCAPE DETAILS					
SHEET 3 OF 4					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					SHEET No. 651a

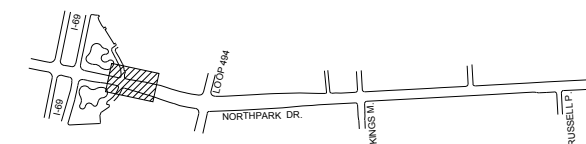
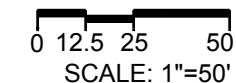
SCALE: 1/2"=1'-0"






The diagram shows a hexagonal plant tag divided into three horizontal sections. The top section is labeled 'T8' and has an arrow pointing to the text 'PLANT TYPE'. The middle section is labeled '3' and has an arrow pointing to the text 'PLANT QUANTITY'. The bottom section is labeled 'E' and has an arrow pointing to the text 'TRANSPLANT ZONE'.

A ZONE A **D** ZONE D **G** ZONE G
B ZONE B **E** ZONE E
C ZONE C **F** ZONE F

NO.	REVISIONS						BY	DATE	
				M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024					
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002					
<h1>NORTHPARK DRIVE</h1> <h2>PLANTING PLAN</h2> <h2>SHEET 4 OF 17</h2>									
DESIGNED:	FED. DIV. No.	RD. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.	
CHECKED:	6		TEXAS	SEE TITLE SHEET				CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET		
CHECKED:	HOU	MONTGOMERY	0912	37	232		65		

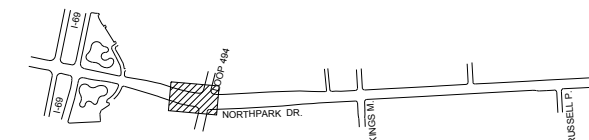
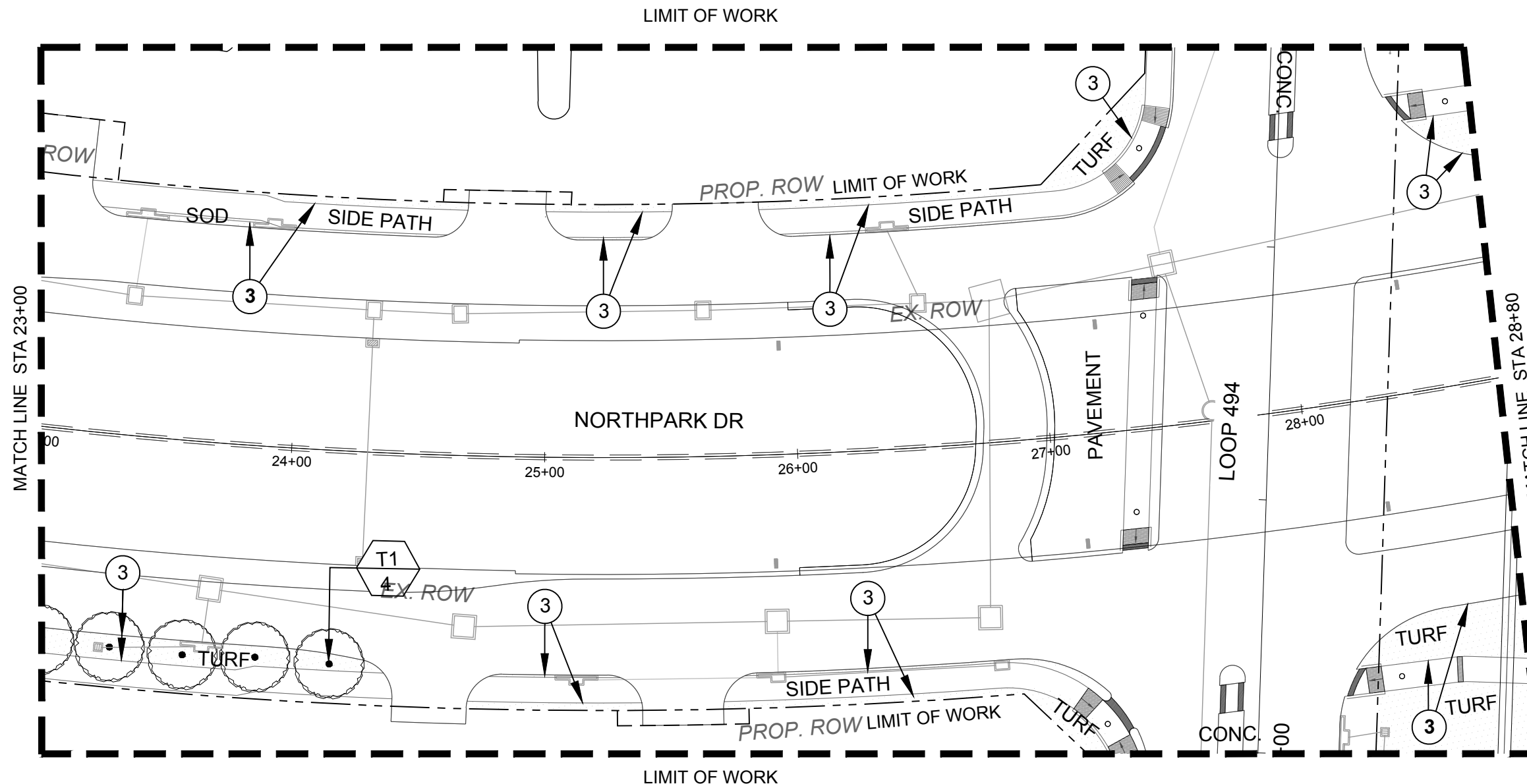


A ZONE A **D** ZONE D **G** ZONE G
B ZONE B **E** ZONE E
C ZONE C **F** ZONE F

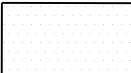


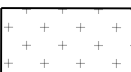

NO.	REVISIONS						BY	DATE	
				M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024					
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS				 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002					
<h1 style="margin: 0;">NORTH PARK DRIVE</h1> <h2 style="margin: 20px 0 0 0;">PLANTING PLAN</h2> <h2 style="margin: 0 0 0 0;">SHEET 6 OF 17</h2>									
DESIGNED:	FED. DIV.	RD. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.	
CHECKED:	6		TEXAS	SEE TITLE SHEET				CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET			
CHECKED:	HOU	MONTGOMERY	0912	37	232	65			



0 12.5 25 50
SCALE: 1"=50'



DRAWING LEGEND:

-  **(TURF) TYPE A SEEDING** - CELLULOSE FIBER MULCH SEEDING GENERAL PURPOSE SEEDING (0164-6023)
-  **(SOD) BLOCK SODDING** - SOLID SODDING (0162-2002)
-  **TYPE A MULCH** - HARDWOOD BARK MULCH (0192-6012)
-  **TYPE B MULCH** - PINE STRAW MULCH (0192-6013)
-  PLANT TYPE
PLANT QUANTITY
TRANSPLANT ZONE

PLAN NOTES:

- SHOVEL CUT PLANTER EDGE WITH ONE (1) ROW OF SOLID SOD CONTINUOUS. **SEE PLANTING & ESTABLISHMENT SHEET 2 OF 10**
- 4" PINE STRAW MULCH BED CONTINUOUS
- ONE (1) ROW OF SOLID SOD CONTINUOUS ALONG ALL PAVEMENT EDGES.
- 6'-0" WIDE STRIP OF PINE STRAW MULCH INSIDE CANOPY DRIP LINE (FIELD VERIFY)
- NATIVE UNDERSTORY. **SEE TREE PRESERVATION AND TRANSPLANTING PLAN**
- METAL EDGING. **SEE PLANTING AND ESTABLISHMENT SHEET 2 OF 9**
- CELLULOSE FIBER MULCH SEEDING (0164-6023)
- EXISTING TREES TO BE PRESERVED.
- SCALP MOW EXISTING GRASS AS NEEDED THEN OVER SEED WITH ALL TYPE A SEEDING.
- CONTINUOUS 4" THICK HARDWOOD BARK MULCH.
- PROVIDE 6'-0" (MIN) DIAMETER 4" THICK BARK MULCH TREE RING WITH SHOVEL EDGE.

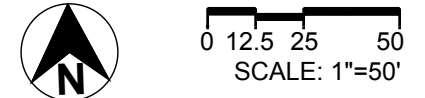
GENERAL NOTES:

- SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 2 FOR ADDITIONAL PLANTING INFORMATION
- SEE PLANTING & ESTABLISHMENT SHEET 3 OF 10 FOR PLANT LIST.
- SEE FERTILIZER, SEED, SOD, STRAW COMPOST, AND WATER FOR REQUIREMENT OF TURF INSTALLATION FOR CONSTRUCTED SURFACES.

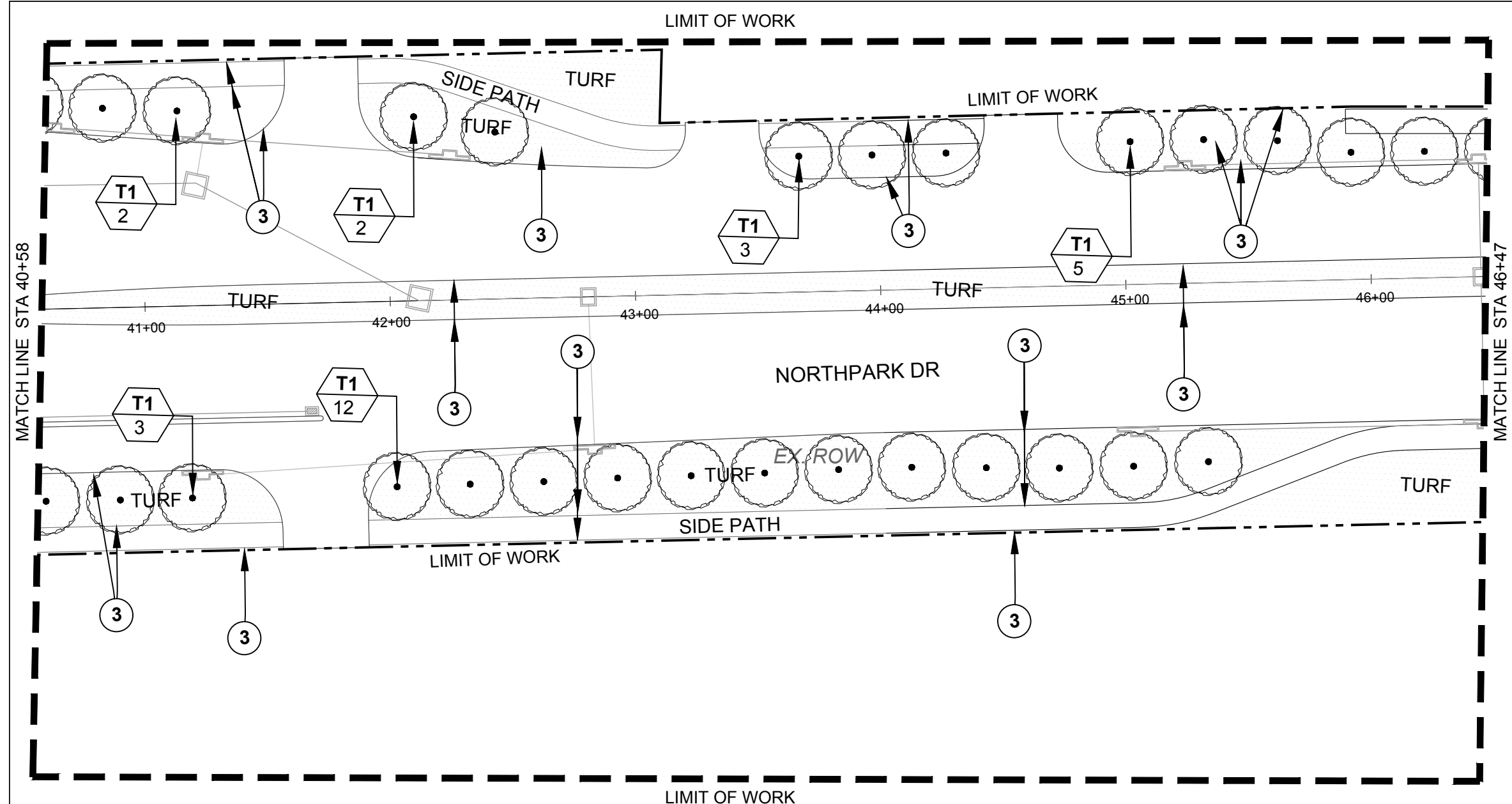
TREE TRANSPLANT KEY:

- | | | |
|-----------------|-----------------|-----------------|
| A ZONE A | D ZONE D | G ZONE G |
| B ZONE B | E ZONE E | |
| C ZONE C | F ZONE F | |

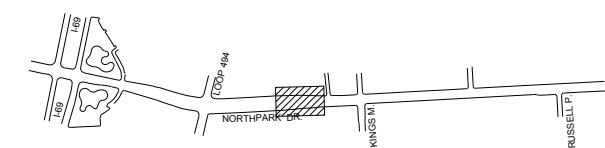
NO.		REVISIONS	BY	DATE
M2L		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420		
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002		
NORTH PARK DRIVE				
PLANTING PLAN				
SHEET 7 OF 17				
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
				JOB No.
				232
				SHEET No.
				658



NO.	REVISIONS					BY	DATE		
<div><div>M2L</div></div>			M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024						
<div>HNTB</div>			HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
CITY OF HOUSTON HOUSTON PUBLIC WORKS			<div><div><div>LAH</div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 C/O ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>						
NORTHPARK DRIVE									
PLANTING PLAN									
SHEET 8 OF 17									



0 12.5 25 50
SCALE: 1"=50'



DRAWING LEGEND:

- (TURF) TYPE A SEEDING** - CELLULOSE FIBER MULCH SEEDING GENERAL PURPOSE SEEDING (0164-6023)
- (SOD) BLOCK SODDING** - SOLID SODDING (0162-2002)
- TYPE A MULCH** - HARDWOOD BARK MULCH (0192-6012)
- TYPE B MULCH** - PINE STRAW MULCH (0192-6013)
- PLANT TYPE**
PLANT QUANTITY
TRANSPLANT ZONE

PLAN NOTES:

- SHOVEL CUT PLANTER EDGE WITH ONE (1) ROW OF SOLID SOD CONTINUOUS. **SEE PLANTING & ESTABLISHMENT SHEET 2 OF 10**
- 4" PINE STRAW MULCH BED CONTINUOUS
- ONE (1) ROW OF SOLID SOD CONTINUOUS ALONG ALL PAVEMENT EDGES.
- 6'-0" WIDE STRIP OF PINE STRAW MULCH INSIDE CANOPY DRIP LINE (FIELD VERIFY)
- NATIVE UNDERSTORY. **SEE TREE PRESERVATION AND TRANSPLANTING PLAN**
- METAL EDGING. **SEE PLANTING AND ESTABLISHMENT SHEET 2 OF 9**
- CELLULAR FIBER MULCH SEEDING (0164-6023)
- EXISTING TREES TO BE PRESERVED.
- SCALP MOW EXISTING GRASS AS NEEDED THEN OVER SEED WITH ALL TYPE A SEEDING.
- CONTINUOUS 4" THICK HARDWOOD BARK MULCH.
- PROVIDE 6'-0" (MIN) DIAMETER 4" THICK BARK MULCH TREE RING WITH SHOVEL EDGE.

GENERAL NOTES:

- SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 2 FOR ADDITIONAL PLANTING INFORMATION
- SEE PLANTING & ESTABLISHMENT SHEET 3 OF 10 FOR PLANT LIST.
- SEE FERTILIZER, SEED, SOD, STRAW COMPOST, AND WATER FOR REQUIREMENT OF TURF INSTALLATION FOR CONSTRUCTED SURFACES.

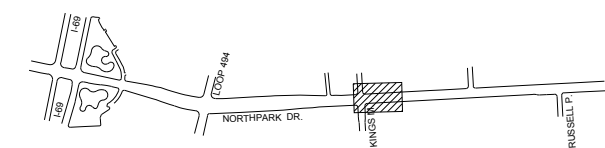
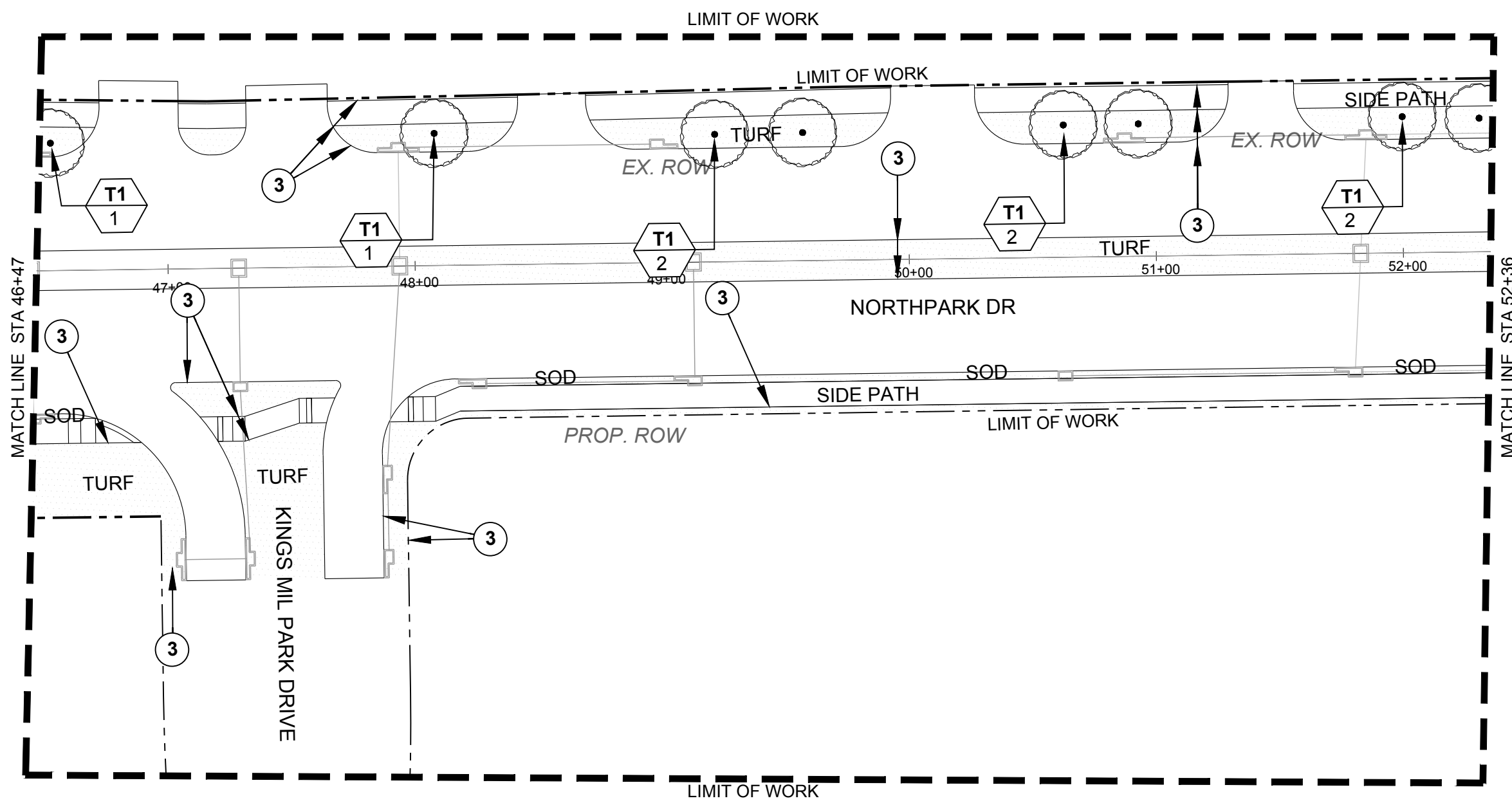
TREE TRANSPLANT KEY:

- | | | |
|-----------------|-----------------|-----------------|
| A ZONE A | D ZONE D | G ZONE G |
| B ZONE B | E ZONE E | |
| C ZONE C | F ZONE F | |

NO.		REVISIONS		BY	DATE
M2L		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 C/O ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE					
PLANTING PLAN					
SHEET 10 OF 17					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					661



0 12.5 25 50
SCALE: 1"=50'



DRAWING LEGEND:

- (TURF) TYPE A SEEDING** - CELLULOSE FIBER MULCH SEEDING GENERAL PURPOSE SEEDING (0164-6023)
- (SOD) BLOCK SODDING** - SOLID SODDING (0162-2002)
- TYPE A MULCH** - HARDWOOD BARK MULCH (0192-6012)
- TYPE B MULCH** - PINE STRAW MULCH (0192-6013)
- PLANT TYPE**
PLANT QUANTITY
TRANSPLANT ZONE

PLAN NOTES:

- SHOVEL CUT PLANTER EDGE WITH ONE (1) ROW OF SOLID SOD CONTINUOUS. **SEE PLANTING & ESTABLISHMENT SHEET 2 OF 10**
- 4" PINE STRAW MULCH BED CONTINUOUS
- ONE (1) ROW OF SOLID SOD CONTINUOUS ALONG ALL PAVEMENT EDGES.
- 6'-0" WIDE STRIP OF PINE STRAW MULCH INSIDE CANOPY DRIP LINE (FIELD VERIFY)
- NATIVE UNDERSTORY. **SEE TREE PRESERVATION AND TRANSPLANTING PLAN**
- METAL EDGING. **SEE PLANTING AND ESTABLISHMENT SHEET 2 OF 9**
- CELLULAR FIBER MULCH SEEDING (0164-6023)
- EXISTING TREES TO BE PRESERVED.
- SCALP MOW EXISTING GRASS AS NEEDED THEN OVER SEED WITH ALL TYPE A SEEDING.
- CONTINUOUS 4" THICK HARDWOOD BARK MULCH.
- PROVIDE 6'-0" (MIN) DIAMETER 4" THICK BARK MULCH TREE RING WITH SHOVEL EDGE.

GENERAL NOTES:

- SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 2 FOR ADDITIONAL PLANTING INFORMATION
- SEE PLANTING & ESTABLISHMENT SHEET 3 OF 10 FOR PLANT LIST.
- SEE FERTILIZER, SEED, SOD, STRAW COMPOST, AND WATER FOR REQUIREMENT OF TURF INSTALLATION FOR CONSTRUCTED SURFACES.

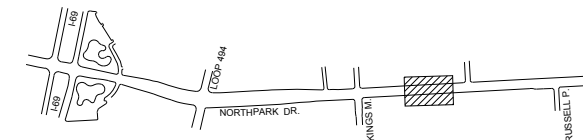
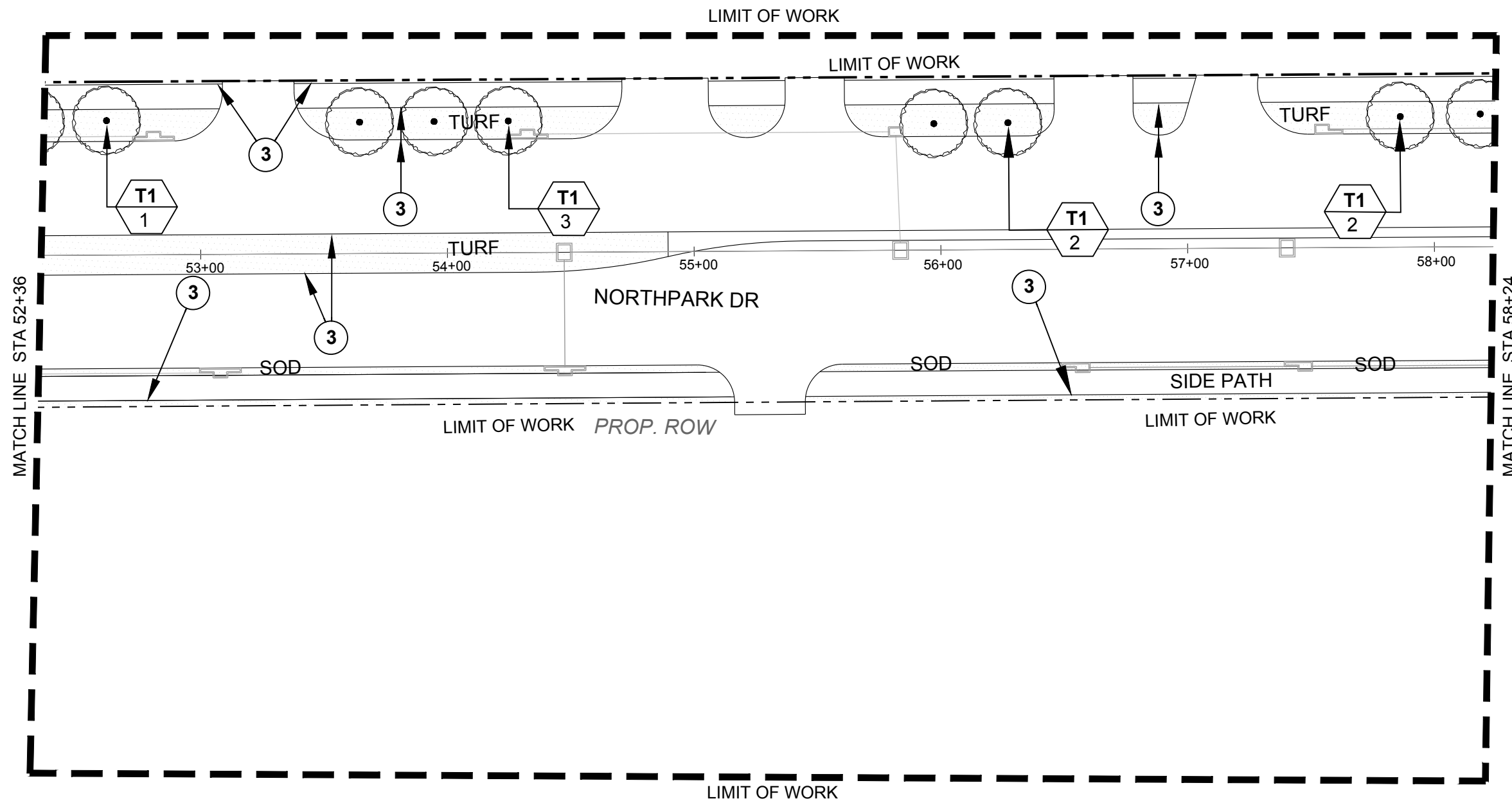
TREE TRANSPLANT KEY:

- | | | |
|-----------------|-----------------|-----------------|
| A ZONE A | D ZONE D | G ZONE G |
| B ZONE B | E ZONE E | |
| C ZONE C | F ZONE F | |

NO.		REVISIONS		BY	DATE
M2L		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE					
PLANTING PLAN SHEET 11 OF 17					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					662



0 12.5 25 50
SCALE: 1"=50'



DRAWING LEGEND:

- (TURF) TYPE A SEEDING** - CELLULOSE FIBER MULCH SEEDING GENERAL PURPOSE SEEDING (0164-6023)
- (SOD) BLOCK SODDING** - SOLID SODDING (0162-2002)
- TYPE A MULCH** - HARDWOOD BARK MULCH (0192-6012)
- TYPE B MULCH** - PINE STRAW MULCH (0192-6013)
- PLANT TYPE**
PLANT QUANTITY
TRANSPLANT ZONE

PLAN NOTES:

- SHOVEL CUT PLANTER EDGE WITH ONE (1) ROW OF SOLID SOD CONTINUOUS. **SEE PLANTING & ESTABLISHMENT SHEET 2 OF 10**
- 4" PINE STRAW MULCH BED CONTINUOUS
- ONE (1) ROW OF SOLID SOD CONTINUOUS ALONG ALL PAVEMENT EDGES.
- 6'-0" WIDE STRIP OF PINE STRAW MULCH INSIDE CANOPY DRIP LINE (FIELD VERIFY)
- NATIVE UNDERSTORY. **SEE TREE PRESERVATION AND TRANSPLANTING PLAN**
- METAL EDGING. **SEE PLANTING AND ESTABLISHMENT SHEET 2 OF 9**
- CELLULAR FIBER MULCH SEEDING (0164-6023)
- EXISTING TREES TO BE PRESERVED.
- SCALP MOW EXISTING GRASS AS NEEDED THEN OVER SEED WITH ALL TYPE A SEEDING.
- CONTINUOUS 4" THICK HARDWOOD BARK MULCH.
- PROVIDE 6'-0" (MIN) DIAMETER 4" THICK BARK MULCH TREE RING WITH SHOVEL EDGE.

GENERAL NOTES:

- SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 2 FOR ADDITIONAL PLANTING INFORMATION
- SEE PLANTING & ESTABLISHMENT SHEET 3 OF 10 FOR PLANT LIST.
- SEE FERTILIZER, SEED, SOD, STRAW COMPOST, AND WATER FOR REQUIREMENT OF TURF INSTALLATION FOR CONSTRUCTED SURFACES.

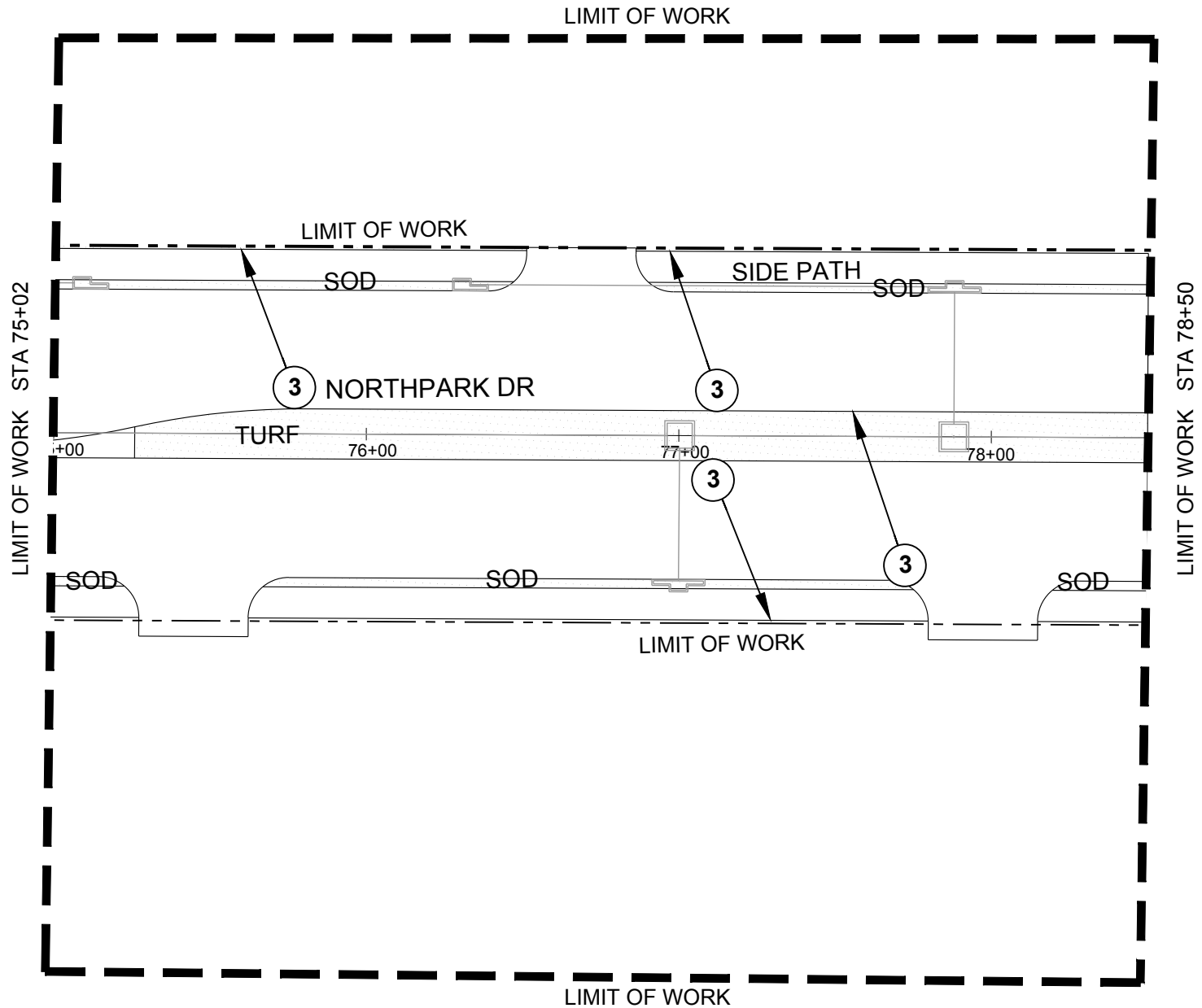
TREE TRANSPLANT KEY:

- | | | |
|-----------------|-----------------|-----------------|
| A ZONE A | D ZONE D | G ZONE G |
| B ZONE B | E ZONE E | |
| C ZONE C | F ZONE F | |

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
JOB No.				SHEET No.
663				663



0 12.5 25 50
SCALE: 1"=50'



DRAWING LEGEND:



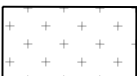
(TURF) TYPE A SEEDING - CELLULOSE FIBER MULCH SEEDING GENERAL PURPOSE SEEDING (0164-6023)



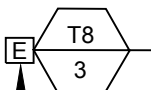
(SOD) BLOCK SODDING - SOLID SODDING (0162-2002)



TYPE A MULCH - HARDWOOD BARK MULCH (0192-6012)



TYPE B MULCH - PINE STRAW MULCH (0192-6013)



PLANT TYPE
PLANT QUANTITY
TRANSPLANT ZONE

PLAN NOTES:

1. SHOVEL CUT PLANTER EDGE WITH ONE (1) ROW OF SOLID SOD CONTINUOUS. **SEE PLANTING & ESTABLISHMENT SHEET 2 OF 10**
2. 4" PINE STRAW MULCH BED CONTINUOUS
3. ONE (1) ROW OF SOLID SOD CONTINUOUS ALONG ALL PAVEMENT EDGES.
4. 6'-0" WIDE STRIP OF PINE STRAW MULCH INSIDE CANOPY DRIP LINE (FIELD VERIFY)
5. NATIVE UNDERSTORY. **SEE TREE PRESERVATION AND TRANSPLANTING PLAN**
6. METAL EDGING. **SEE PLANTING AND ESTABLISHMENT SHEET 2 OF 9**
7. CELLULAR FIBER MULCH SEEDING (0164-6023)
8. EXISTING TREES TO BE PRESERVED.
9. SCALP MOW EXISTING GRASS AS NEEDED THEN OVER SEED WITH ALL TYPE A SEEDING.
10. CONTINUOUS 4" THICK HARDWOOD BARK MULCH.
11. PROVIDE 6'-0" (MIN) DIAMETER 4" THICK BARK MULCH TREE RING WITH SHOVEL EDGE.

GENERAL NOTES:

- A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 2 FOR ADDITIONAL PLANTING INFORMATION
- B. SEE PLANTING & ESTABLISHMENT SHEET 3 OF 10 FOR PLANT LIST.
- C. SEE FERTILIZER, SEED, SOD, STRAW COMPOST, AND WATER FOR REQUIREMENT OF TURF INSTALLATION FOR CONSTRUCTED SURFACES.

TREE TRANSPLANT KEY:

- | | | |
|-----------------|-----------------|-----------------|
| A ZONE A | D ZONE D | G ZONE G |
| B ZONE B | E ZONE E | |
| C ZONE C | F ZONE F | |

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
NORTH PARK DRIVE				JOB No.
PLANTING PLAN				SHEET No.
SHEET 16 OF 17				667

TOP VIEW

7 1/4" Dia. (184mm)

3 1/16" Dia (78mm)

Side View Dimensions:

- 1" (25mm)
- 14 1/2" (368mm)
- 1/2" (12mm)
- 10 1/8" Dia (257mm)
- 4" Dia (102mm)
- 2 1/8" (54mm)

Labels:

- Patented Stability Flange
- Patented Hydro-lock® Barrier Plate Assembly (ACV™)

BOTTOM VIEW

NOT TO SCALE

"A/D" CAP

10" (254mm)

3" Dia. (76mm)

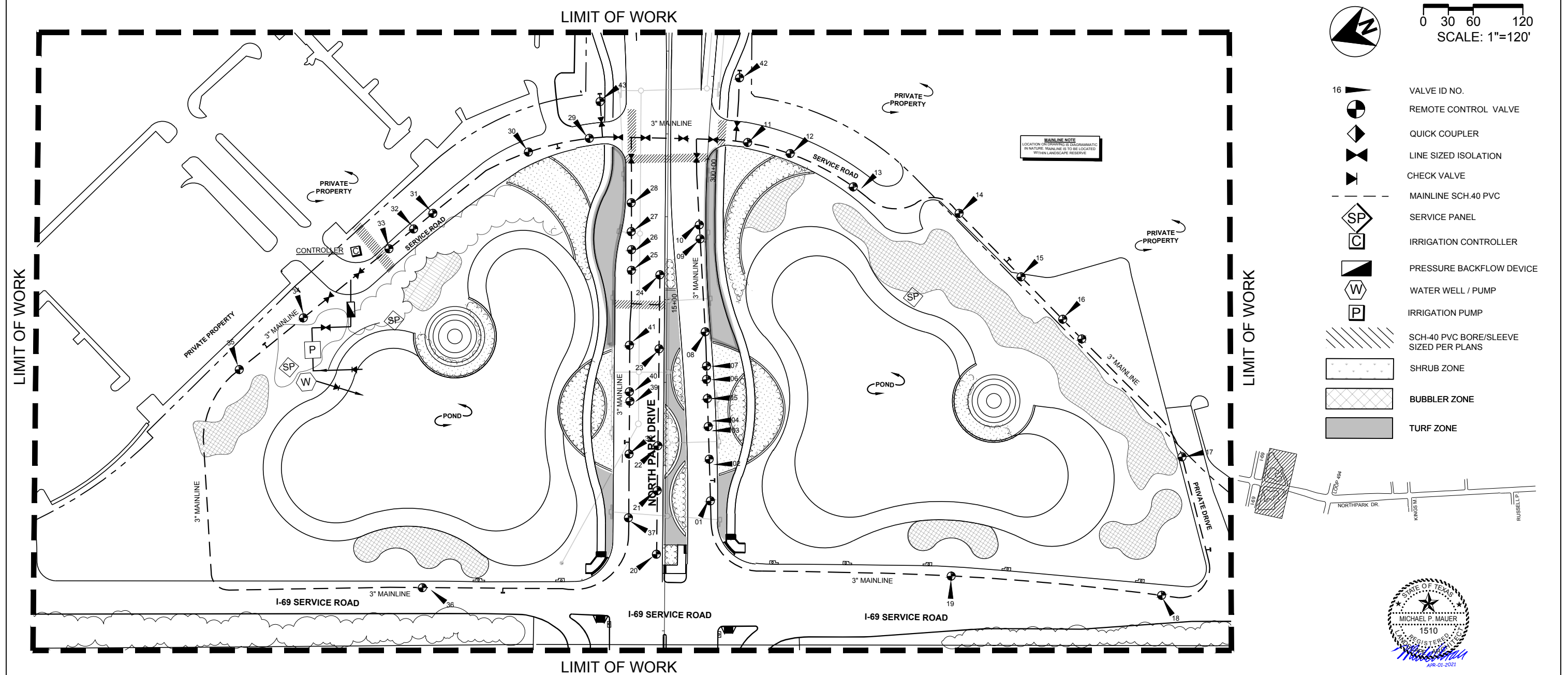
2 11/16" (68mm)

Power Pipe

NOT TO SCALE



NO.	REVISONS						BY	DATE	
<div>M2L</div>				<div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div>					
<div>HNTB</div>				<div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>					
CITY OF HOUSTON				<div>LAH Landscape Architecture Houston, Texas</div>		<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 650 ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON ,TEXAS 77002</div>			
HOUSTON PUBLIC WORKS									
NORTHPARK DRIVE									
LANDSCAPE LIGHTING DETAILS									
SHEET 1 OF 2									
DESIGNED:			FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.	
CHECKED:			6	TEXAS	SEE TITLE SHEET			CS	
DRAWN:			STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:			HOU	MONTGOMERY	0912	37	232	669	



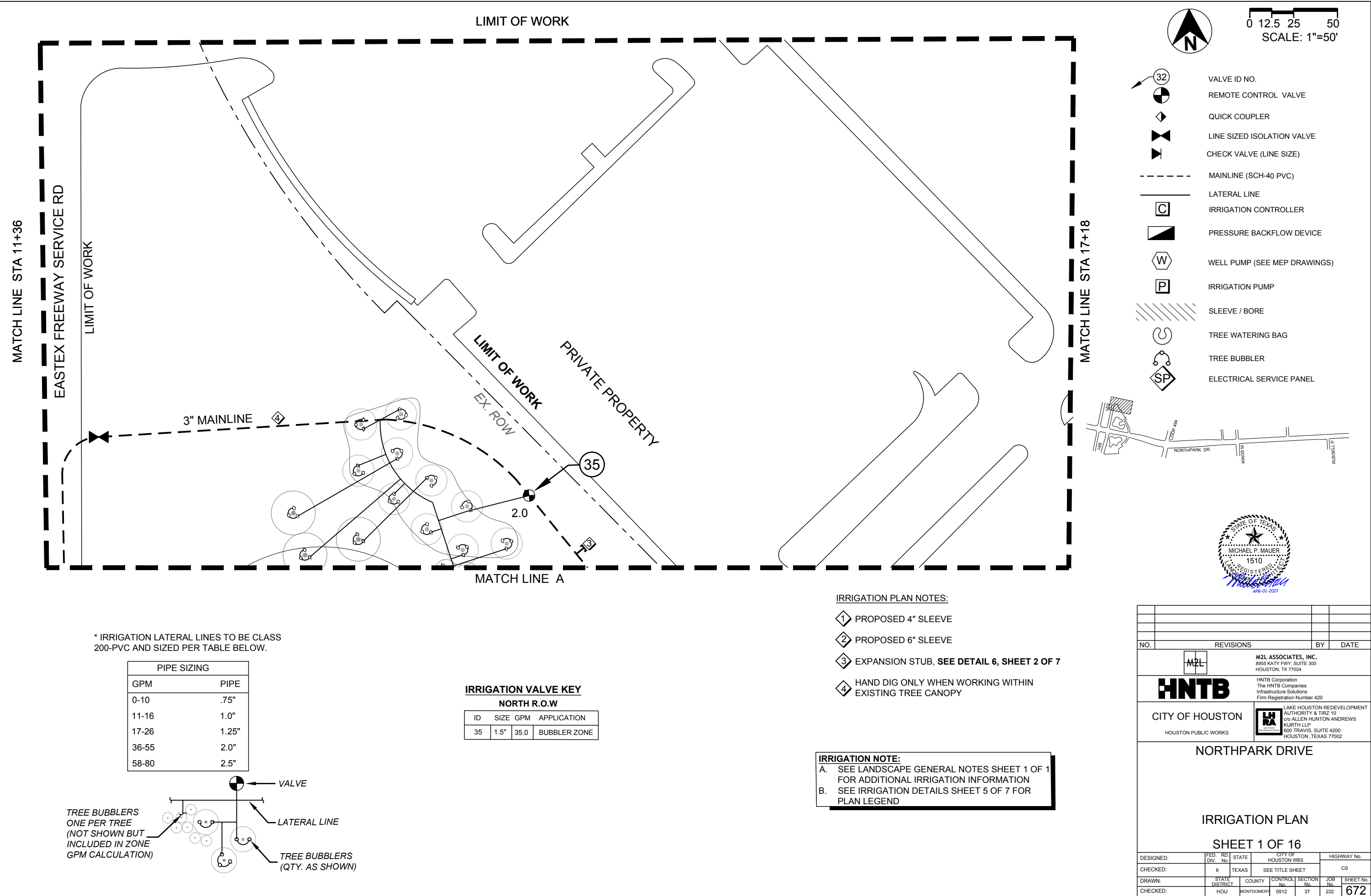
IRRIGATION ZONE LEGEND

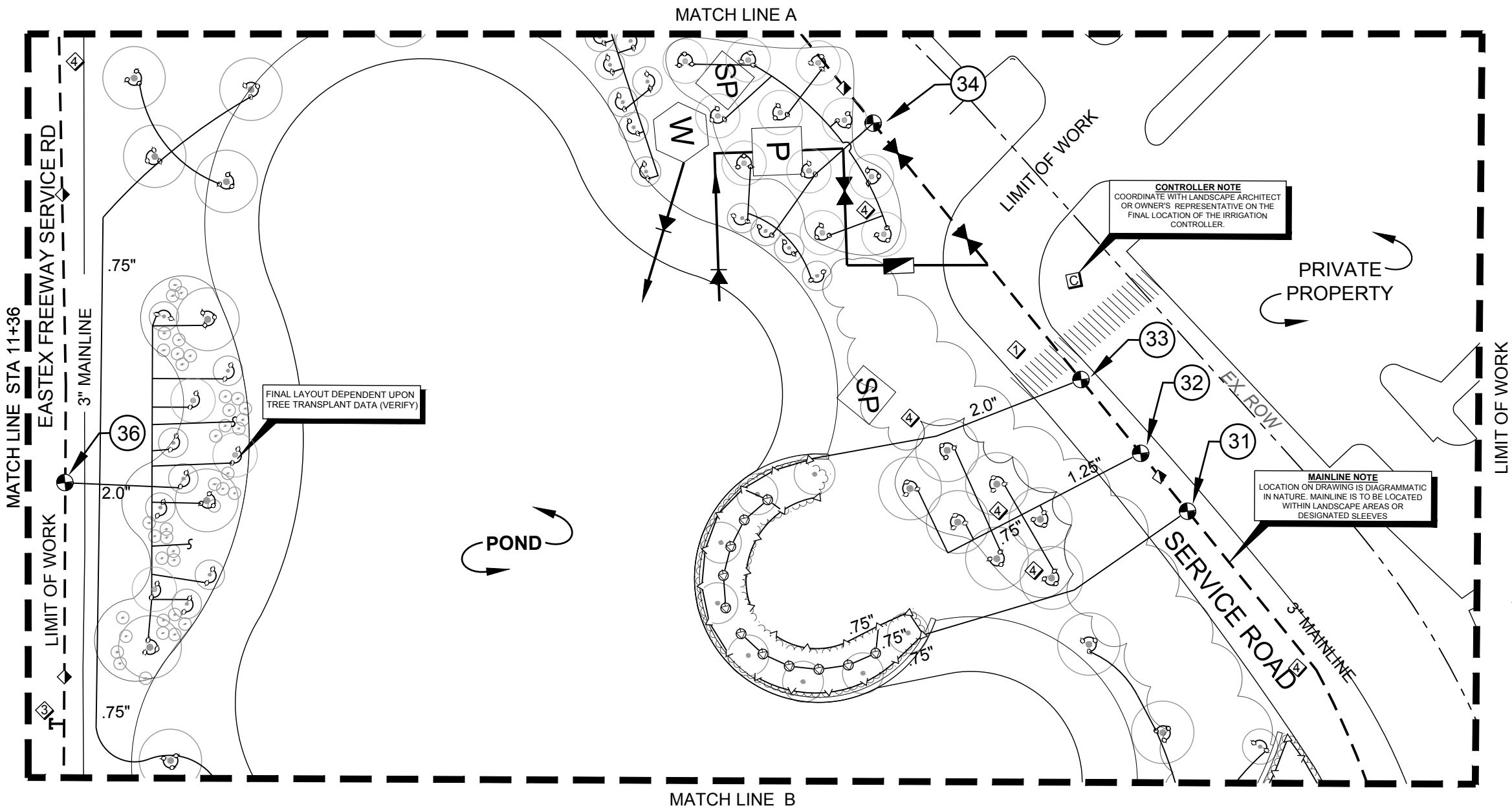
STA	DESCRIPTION	SIZE
01	TURF ZONE	1.5
02	SHRUB ZONE	1.0
03	SHRUB ZONE	1.5
04	SHRUB ZONE	1.5
05	SHRUB ZONE	1.5
06	BUBBLER ZONE	1.5
07	BUBBLER ZONE	1.5
08	TURF ZONE	1.5
09	SHRUB ZONE	1.5
10	TURF ZONE	1.5
11	SHRUB ZONE	1.5
12	BUBBLER ZONE	1.5
13	BUBBLER ZONE	1.5
14	SHRUB ZONE	1.5

STA	DESCRIPTION	SIZE
15	BUBBLER ZONE	1.5
16	BUBBLER ZONE	1.5
17	BUBBLER ZONE	1.5
18	BUBBLER ZONE	1.5
19	BUBBLER ZONE	1.5
20	SHRUB ZONE	1.0
21	TURF ZONE	1.5
22	SHRUB ZONE	1.5
23	TURF ZONE	1.0
24	SHRUB ZONE	1.5
25	BUBBLER ZONE	1.5
26	TURF ZONE	1.5
27	SHRUB ZONE	1.5
28	TURF ZONE	1.5

STA	DESCRIPTION	SIZE
29	TURF ZONE	1.5
30	SHRUB ZONE	1.5
31	SHRUB ZONE	1.5
32	BUBBLER ZONE	1.5
33	SHRUB ZONE	1.5
34	BUBBLER ZONE	1.5
35	BUBBLER ZONE	1.5
36	TURF ZONE	1.5
37	TURF ZONE	1.5
38	SHRUB ZONE	1.5
39	SHURB ZONE	1.0
40	SHRUB ZONE	1.5
41	SHRUB ZONE	1.0
42	BUBBLER ZONE	1.5
43	BUBBLER ZONE	1.5

NO.	REVISIONS	BY	DATE
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			
<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>	
NORTH PARK DRIVE			
IRRIGATION MAINLINE DIAGRAM			
SHEET 1 OF 1			
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:	STATE DISTRICT	COUNTY MONTGOMERY	SECTION No. 0912
DRAWN:	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOUSTON	0912	37
			232
			671





0 12.5 25 50
SCALE: 1"=50'

32

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

IRRIGATION PUMP

SLEEVE / BORE

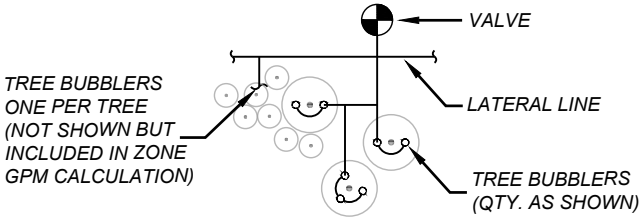
TREE WATERING BAG

TREE BUBBLER

ELECTRICAL SERVICE PANEL

* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



IRRIGATION VALVE KEY
NORTH R.O.W

ID	SIZE	GPM	APPLICATION
31	1.5"	34.1	SHRUB ZONE
32	1.5"	21.0	SHURB ZONE
33	1.5"	35.3	SHRUB ZONE
34	1.5"	41.0	BUBBLER ZONE
36	1.5"	35.0	BUBBLER ZONE

IRRIGATION PLAN NOTES:

- 1 PROPOSED 4" SLEEVE
- 2 PROPOSED 6" SLEEVE
- 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND




NO.	REVISIONS	BY	DATE
<div><div>M2L ASSOCIATES, INC. 8855 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div> <div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div>	
NORTH PARK DRIVE			
IRRIGATION PLAN			
SHEET 2 OF 16			
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
		SECTION No.	JOB No.
		37	232
		SHEET No.	673



IRRIGATION NOTE:

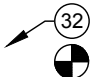
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION

B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.		REVISIONS			BY		DATE
				M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON				 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE							
IRRIGATION PLAN							
SHEET 3 OF 16							
DESIGNED:	FED. DIV.	R.D. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.		
CHECKED:		6	TEXAS	SEE TITLE SHEET	CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	674	



0 12.5 25 50
SCALE: 1"=50'



VALVE ID NO.
REMOTE CONTROL VALVE



QUICK COUPLER



LINE SIZED ISOLATION VALVE



CHECK VALVE (LINE SIZE)



MAINLINE (SCH-40 PVC)



LATERAL LINE



IRRIGATION CONTROLLER



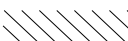
PRESSURE BACKFLOW DEVICE



WELL PUMP (SEE MEP DRAWINGS)



IRRIGATION PUMP



SLEEVE / BORE



TREE WATERING BAG



TREE BUBBLER

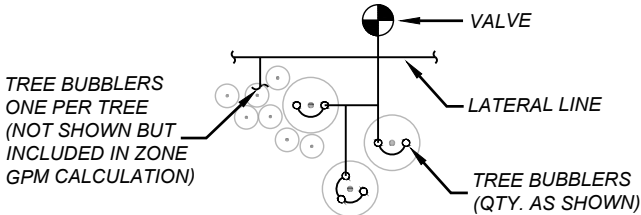


ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



IRRIGATION VALVE KEY

ID	SIZE	GPM	APPLICATION
12	2.0"	39.0	BUBBLER ZONE
13	2.0"	39.0	BUBBLER ZONE
14	2.0"	38.9	SHRUB ZONE
19	1.5"	32.0	BUBBLER ZONE

IRRIGATION PLAN NOTES:

- PROPOSED 4" SLEEVE
- PROPOSED 6" SLEEVE
- EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

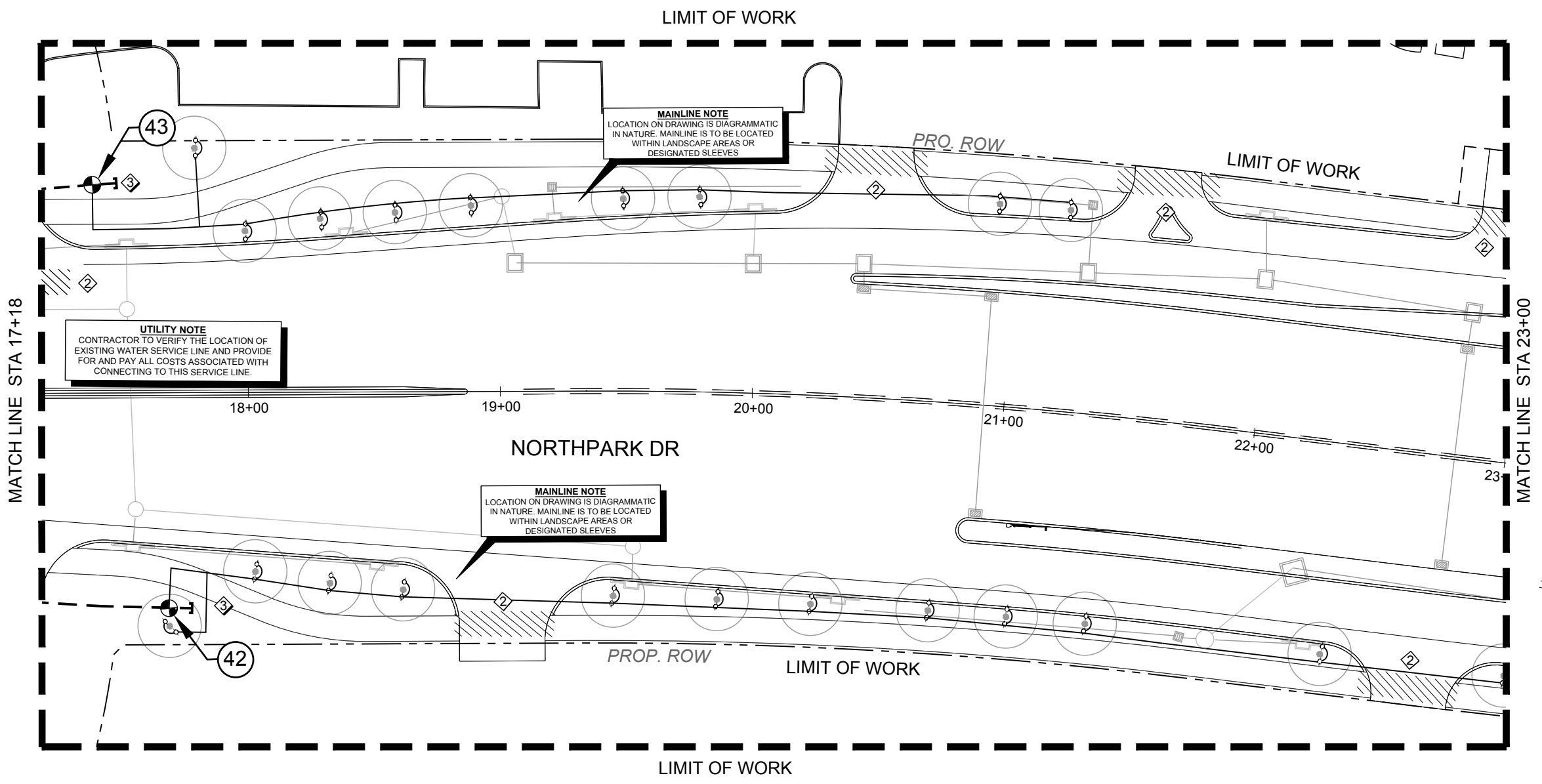
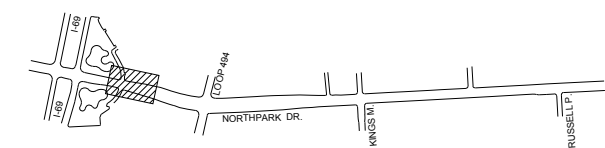
IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
				JOB No.
				232
				SHEET No.
				675



0 12.5 25 50
SCALE: 1"=50'

- 32 VALVE ID NO.
- REMOTE CONTROL VALVE
- QUICK COUPLER
- LINE SIZED ISOLATION VALVE
- CHECK VALVE (LINE SIZE)
- MAINLINE (SCH-40 PVC)
- LATERAL LINE
- C IRRIGATION CONTROLLER
- PRESSURE BACKFLOW DEVICE
- W WELL PUMP (SEE MEP DRAWINGS)
- P IRRIGATION PUMP
- SLEEVE / BORE
- TREE WATERING BAG
- TREE BUBBLER
- SP ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

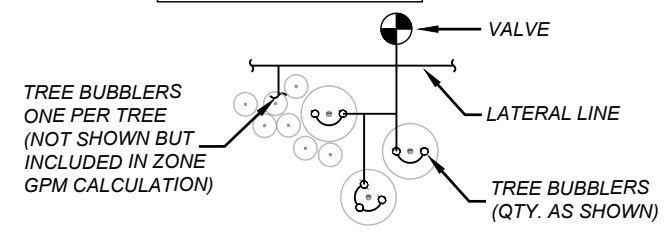
PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"

IRRIGATION VALVE KEY STREET SCAPE				
ID	SIZE	GPM	APPLICATION	
42	1.0"	24.0	BUBBLER ZONE	
43	1.5"	18.0	BUBBLER ZONE	




IRRIGATION PLAN NOTES:

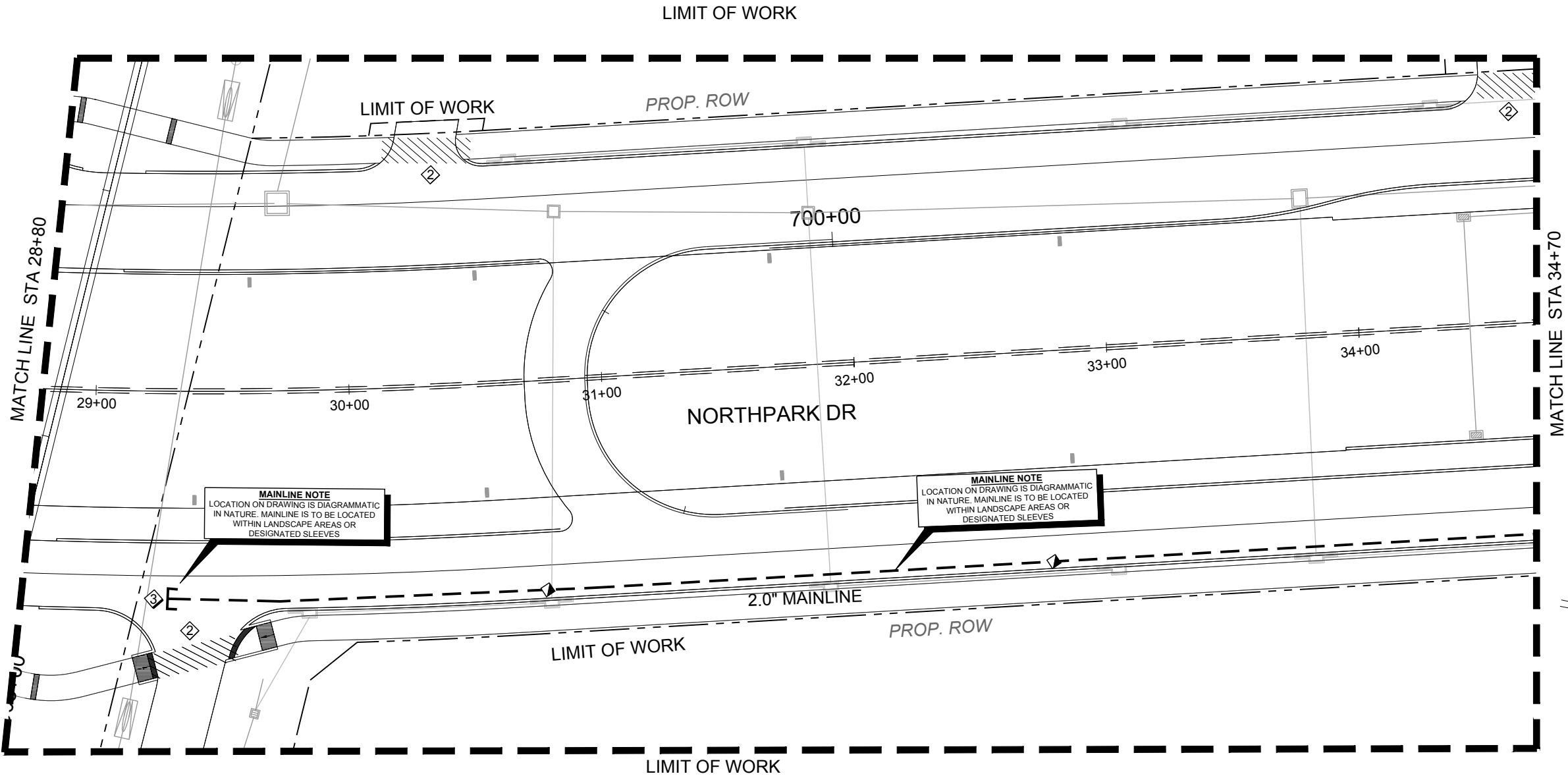
- 1 PROPOSED 4" SLEEVE
- 2 PROPOSED 6" SLEEVE
- 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND



NO.	REVISIONS	BY	DATE
<div>M2L</div> <div>HNTB</div> <div>CITY OF HOUSTON HOUSTON PUBLIC WORKS</div>			
<div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div> <div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div> <div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div>			
NORTH PARK DRIVE			
IRRIGATION PLAN			
SHEET 6 OF 16			
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232
			HIGHWAY No. CS
			JOB No. 677
			SHEET No. 677

NO.	REVISIONS						BY	DATE	
				M2L ASSOCIATES, INC. 8855 KATY FWY, SUITE 300 HOUSTON, TX 77024					
				HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON						LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE									
IRRIGATION PLAN									
SHEET 7 OF 16									
DESIGNED:	FED. DIV.	RD. No.	STATE	CITY OF HOUSTON WBS			HIGHWAY No.		
CHECKED:		6	TEXAS	SEE TITLE SHEET			CS		
DRAWN:	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.		
CHECKED:	HOU		MONTGOMERY	0912	37	232	678		



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

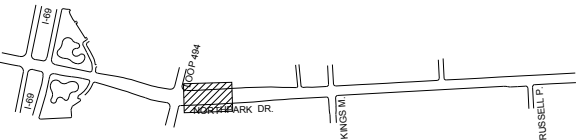
IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

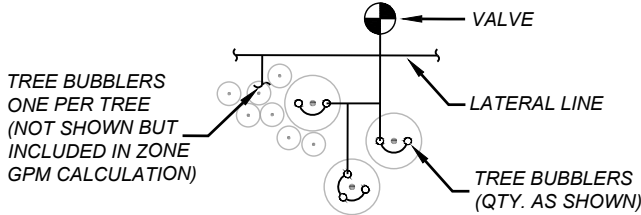
TREE BUBBLER

ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"

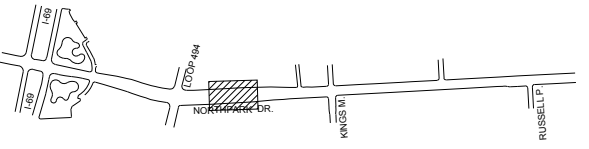
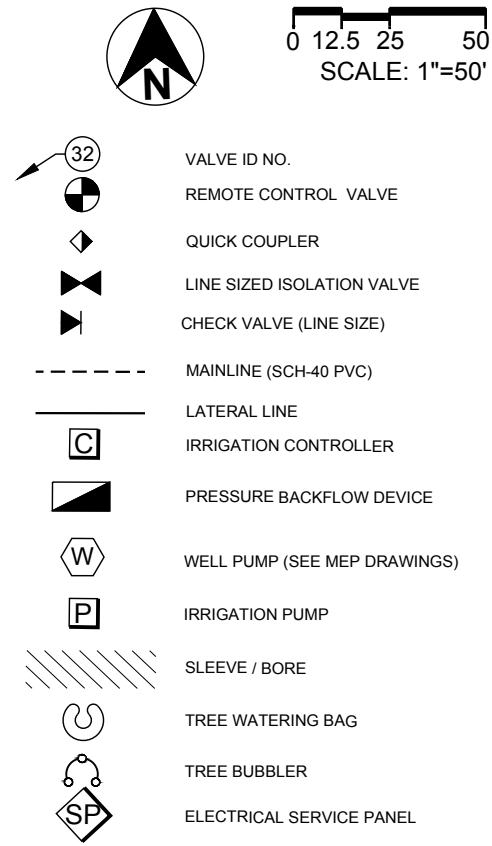
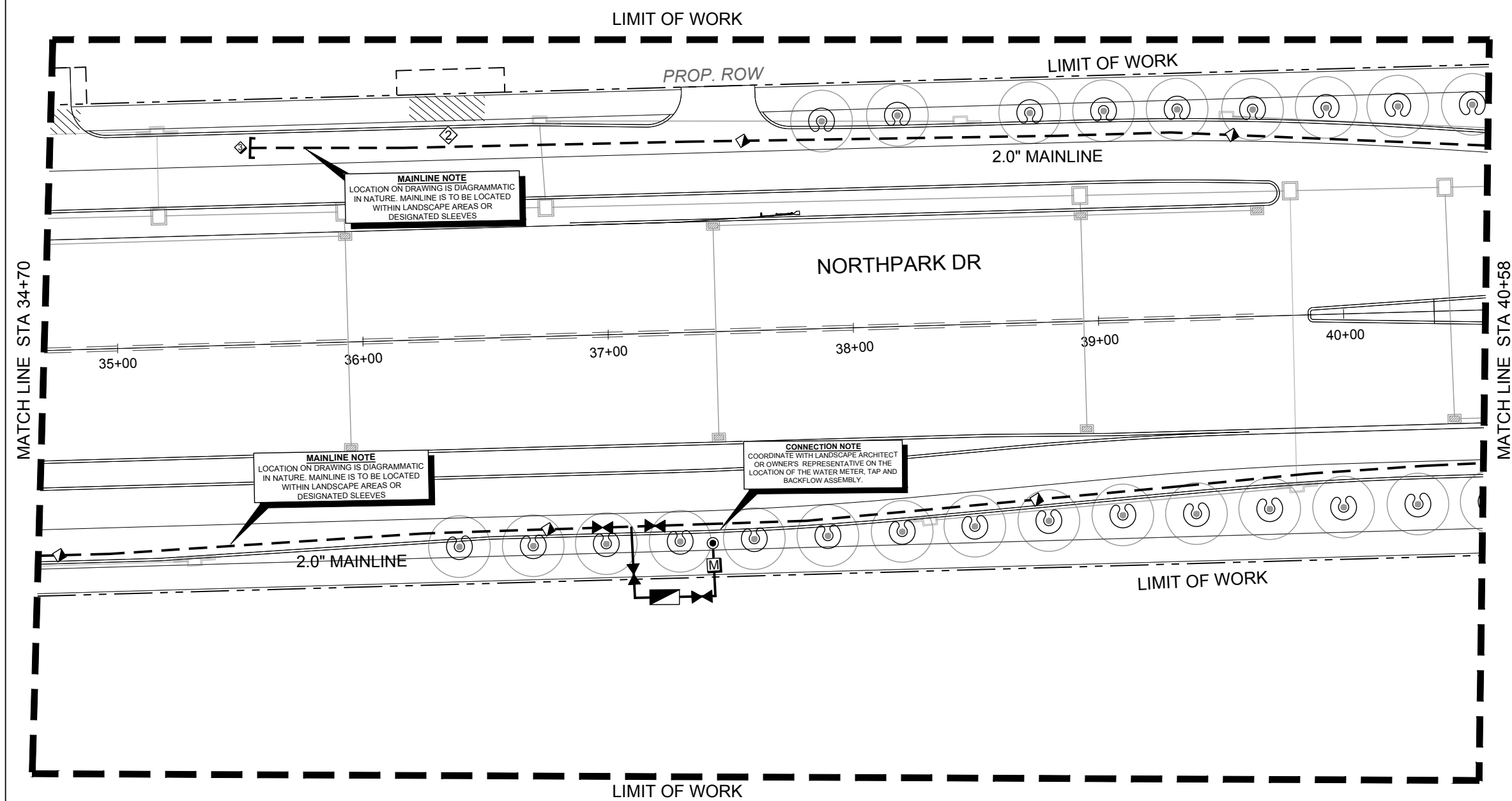


IRRIGATION PLAN NOTES:

- 1 PROPOSED 4" SLEEVE
- 2 PROPOSED 6" SLEEVE
- 3 EXPANSION STUB, **SEE DETAIL 6, SHEET 2 OF 7**
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

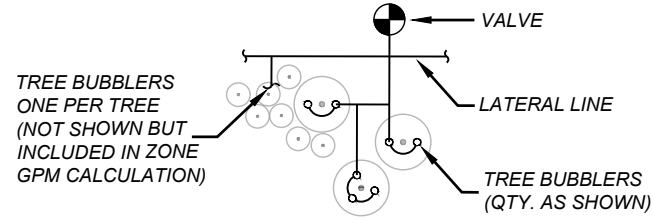
IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.	REVISIONS	BY	DATE
<div> M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div>		<div> HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div>	
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div> LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div>	
NORTH PARK DRIVE			
IRRIGATION PLAN			
SHEET 8 OF 16			
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL No. 0912
CHECKED:	SECTION No. 37		JOB No. 232
			SHEET No. 679



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



IRRIGATION PLAN NOTES:

- 1 PROPOSED 4" SLEEVE
- 2 PROPOSED 6" SLEEVE
- 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY No. CS
CHECKED:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL No. 0912	SECTION No. 37
DRAWN:			JOB No. 232	SHEET No. 680
CHECKED:				

REVISIONS

NO.	REVISIONS	BY	DATE

PROJECT INFORMATION

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

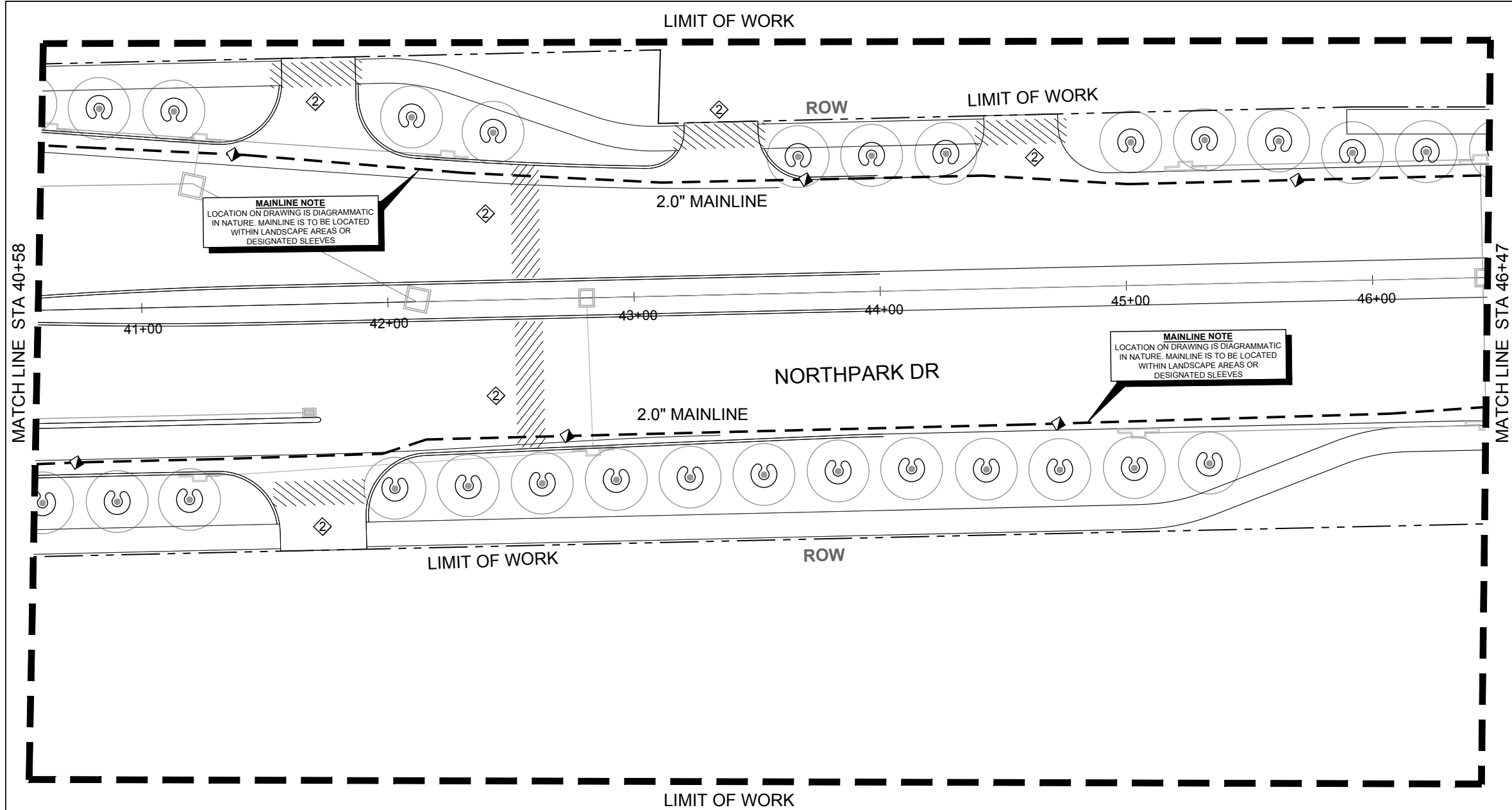
HNTB
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

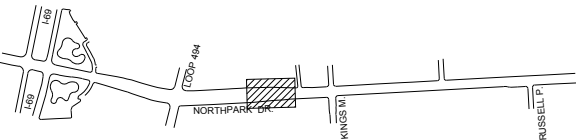
LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TRZ 10
c/o ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002

NORTH PARK DRIVE

IRRIGATION PLAN
SHEET 9 OF 16

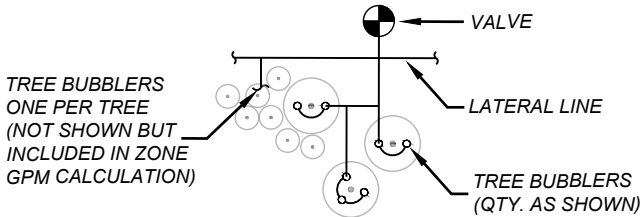


- N
- 0 12.5 25 50
SCALE: 1"=50'
- VALVE ID NO.
-
- REMOTE CONTROL VALVE



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



IRRIGATION PLAN NOTES:

-
- PROPOSED 4" SLEEVE

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY No. CS
CHECKED:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL No. 0912	SECTION No. 37
DRAWN:			JOB No. 232	SHEET No. 681
CHECKED:				

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

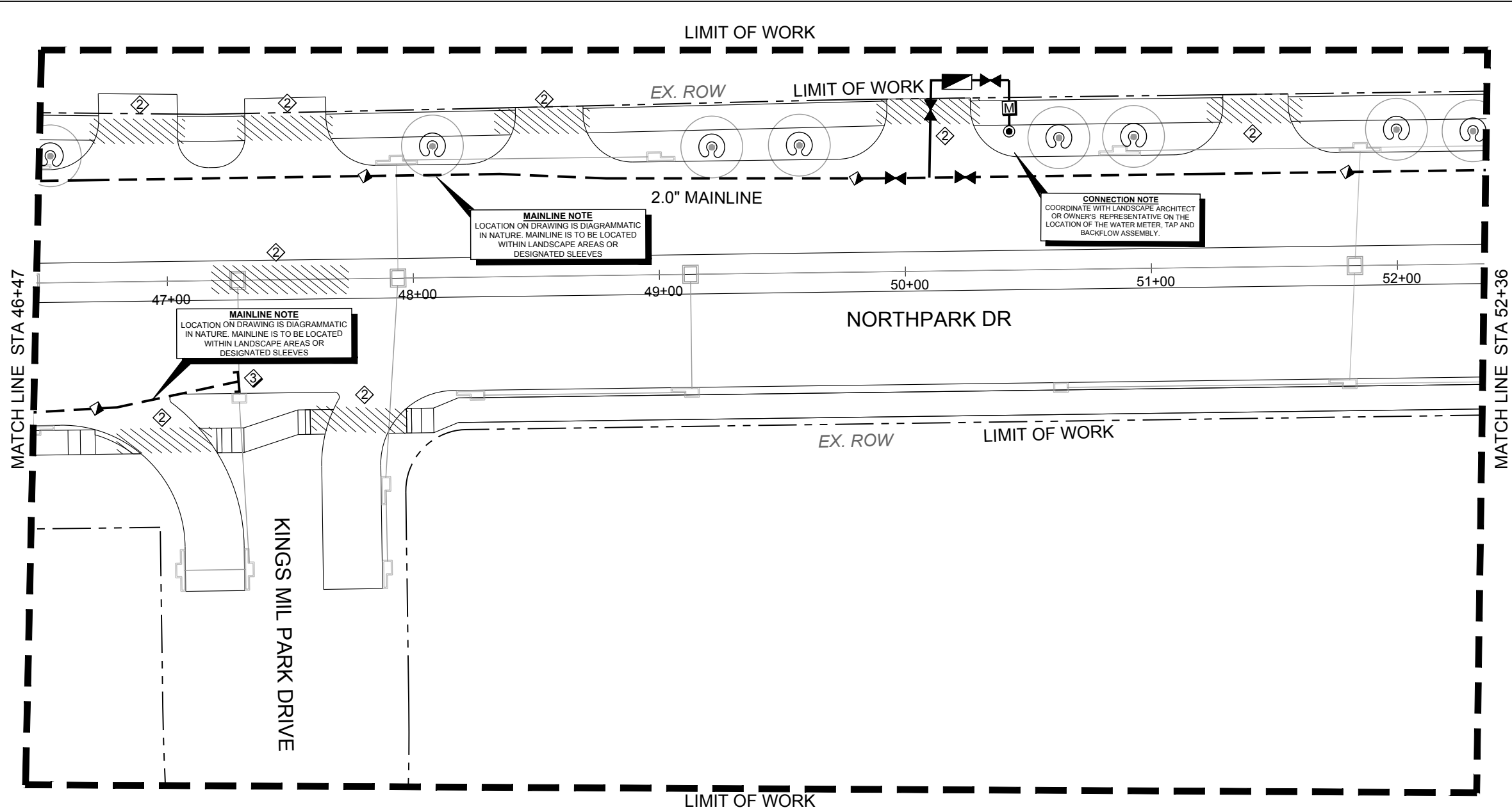
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TRIZ 10
c/o ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002

NORTH PARK DRIVE

IRRIGATION PLAN

SHEET 10 OF 16



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

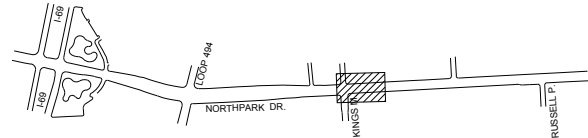
IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

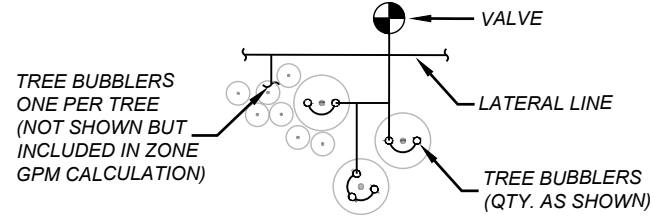
TREE BUBBLER

ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

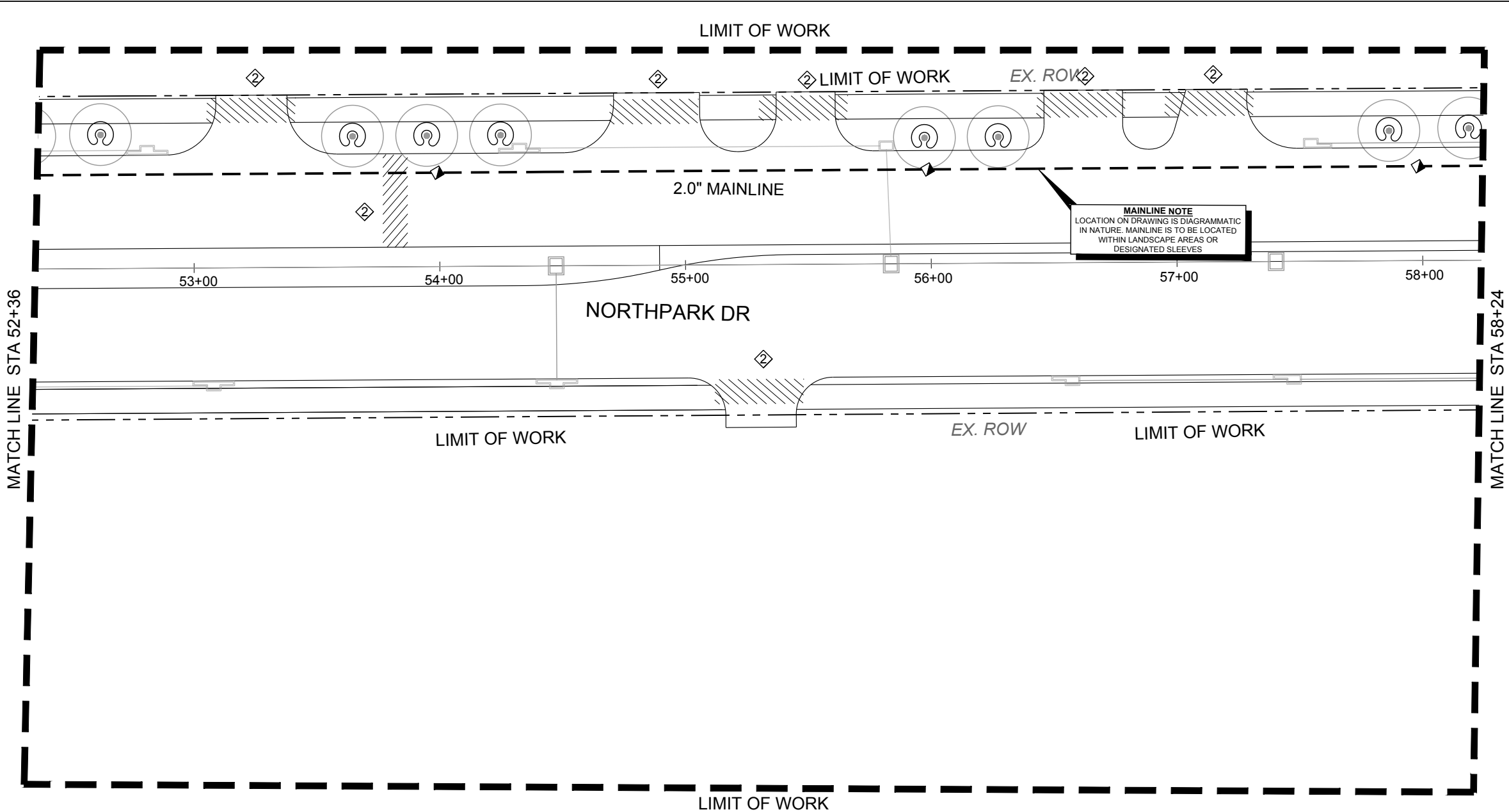
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0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



- IRRIGATION PLAN NOTES:
- 1 PROPOSED 4" SLEEVE
 - 2 PROPOSED 6" SLEEVE
 - 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
 - 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.	REVISIONS	BY	DATE
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			
<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div></div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>	
NORTH PARK DRIVE			
IRRIGATION PLAN			
SHEET 11 OF 16			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232
			HIGHWAY No. CS
			JOB No. 682
			SHEET No.



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

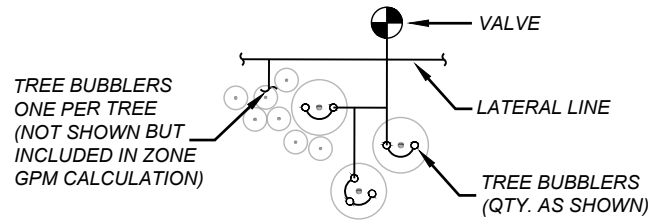
TREE BUBBLER

ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

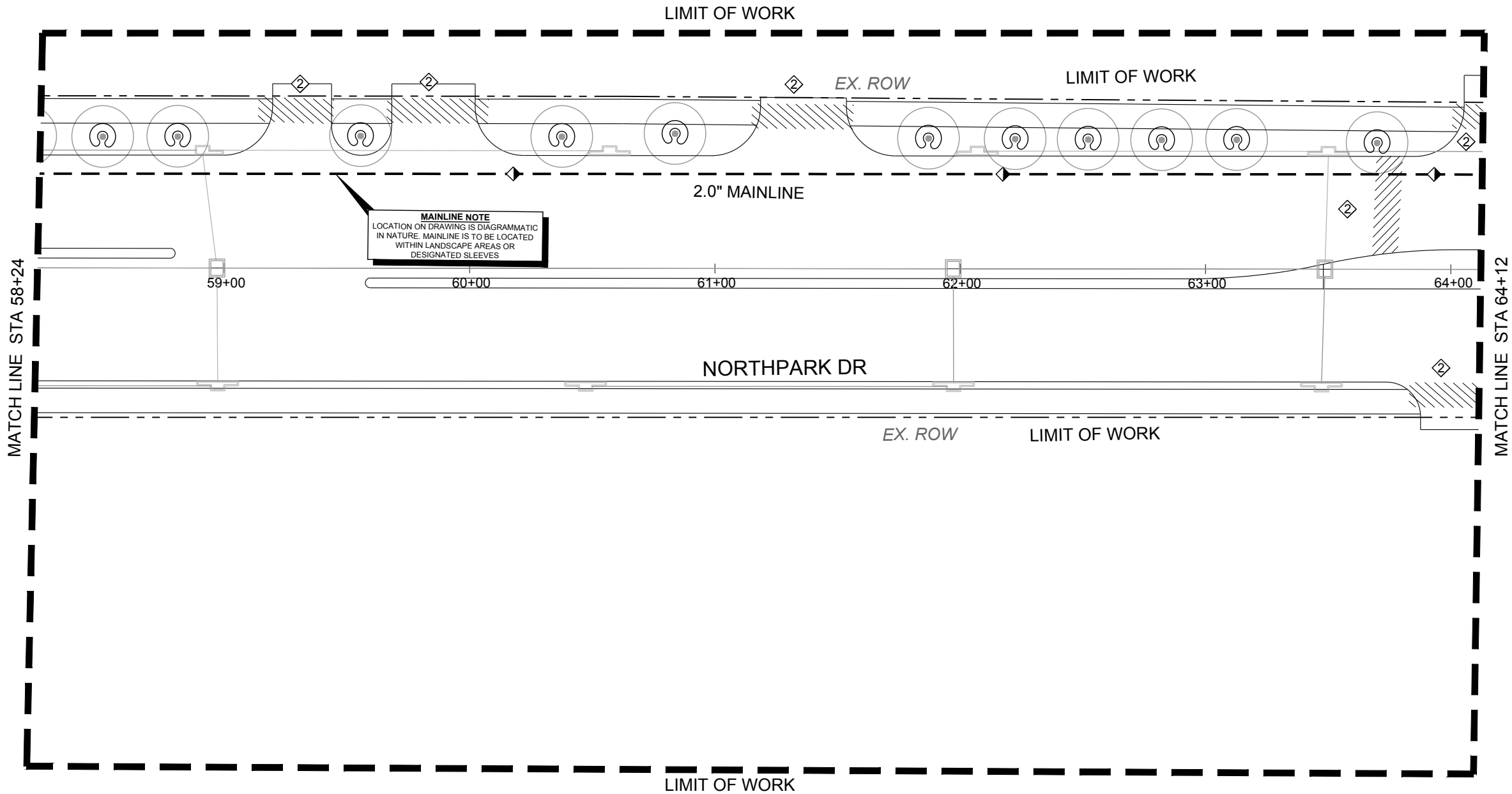
PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
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58-80	2.5"



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IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.	REVISIONS	BY	DATE
<div><div>M2L</div><div>M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024</div></div>			
<div><div>HNTB</div><div>HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420</div></div>			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		<div><div>LH</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002</div></div>	
NORTHPARK DRIVE			
IRRIGATION PLAN			
SHEET 12 OF 16			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232
			HIGHWAY No. CS
			JOB No. 683
			SHEET No.



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

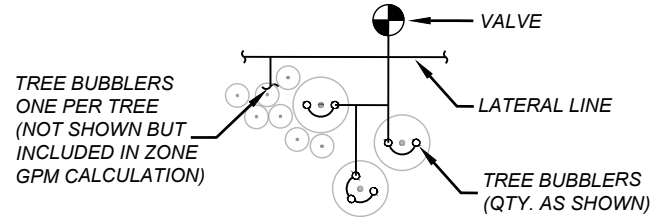
TREE BUBBLER

ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

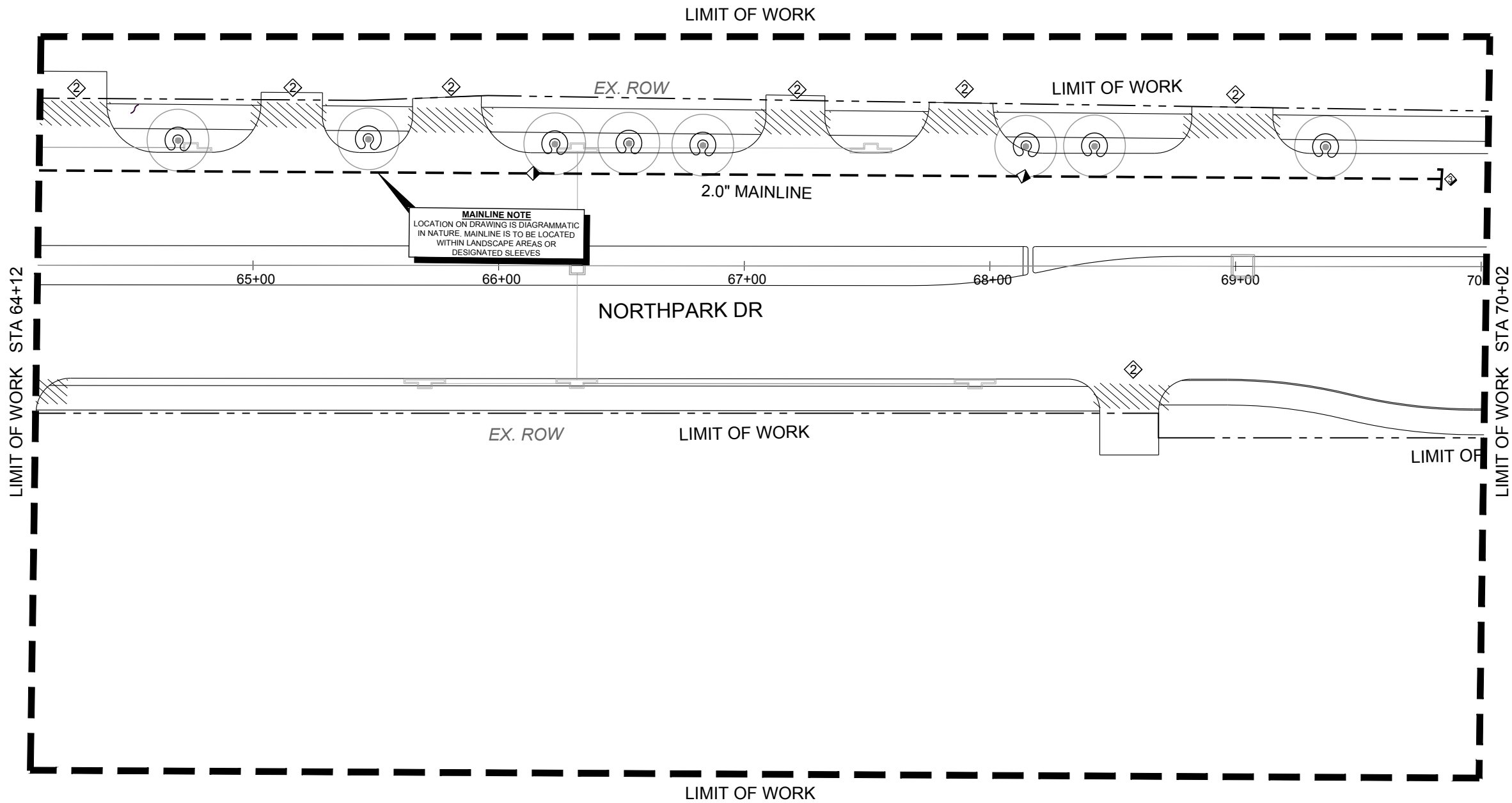
PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



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B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.	REVISIONS			BY	DATE				
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024							
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420							
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002							
NORTH PARK DRIVE									
IRRIGATION PLAN									
SHEET 13 OF 16									
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.					
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS					
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.				
CHECKED:	HOU	MONTGOMERY	0912	37	232				
					684				



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

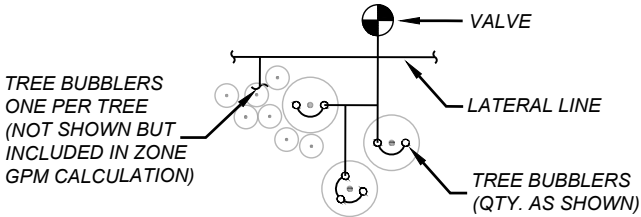
TREE BUBBLER

ELECTRICAL SERVICE PANEL



* IRRIGATION LATERAL LINES TO BE CLASS 200-PVC AND SIZED PER TABLE BELOW.

PIPE SIZING	
GPM	PIPE
0-10	.75"
11-16	1.0"
17-26	1.25"
36-55	2.0"
58-80	2.5"



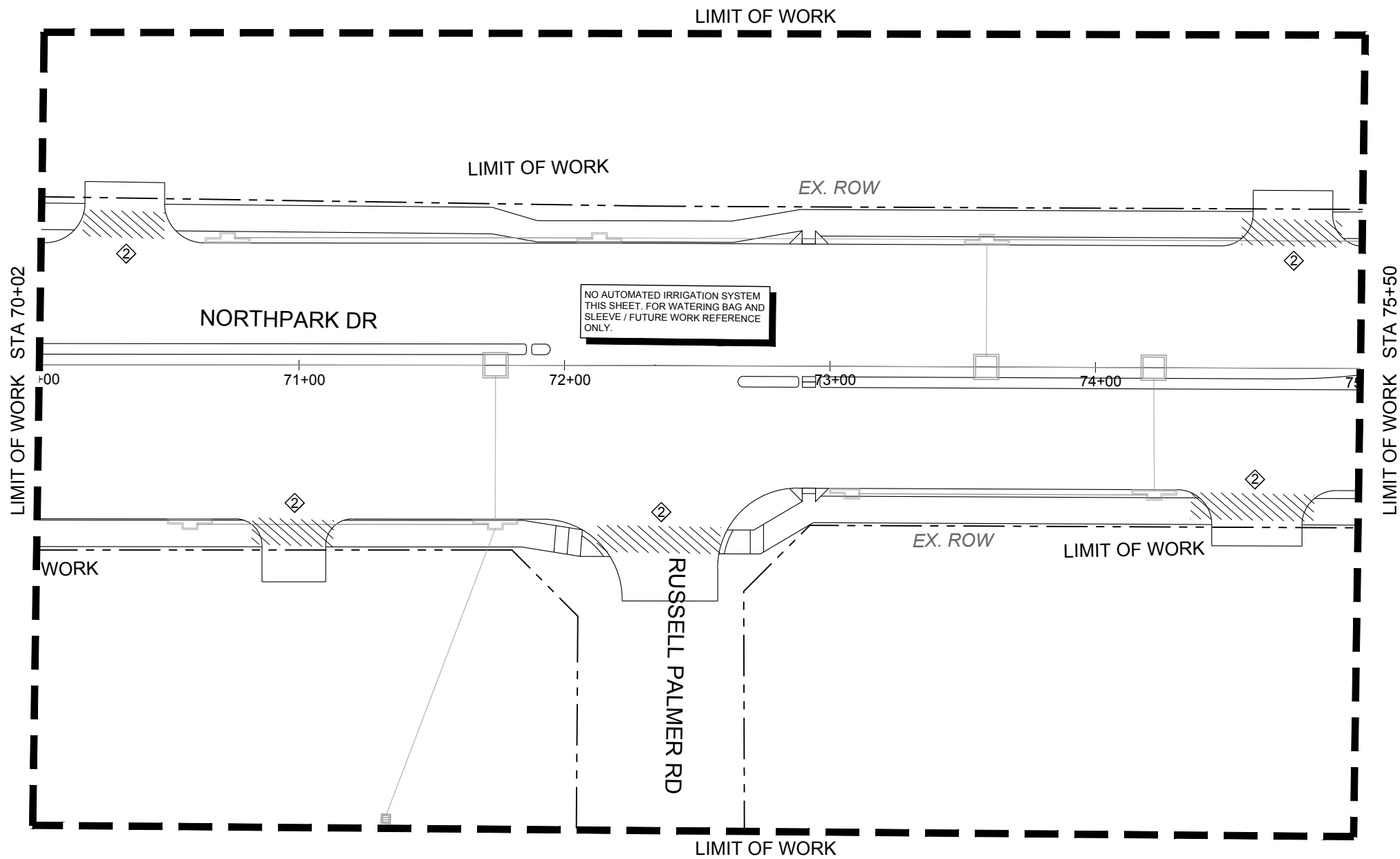
IRRIGATION PLAN NOTES:

-
- PROPOSED 4" SLEEVE

PROPOSED 6" SLEEVEEXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.		REVISIONS		BY	DATE			
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024						
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
	CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002					
NORTH PARK DRIVE								
IRRIGATION PLAN								
SHEET 14 OF 16								
DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY No. CS				
CHECKED:			SEE TITLE SHEET					
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.			
CHECKED:	HOU	MONTGOMERY	0912	37	232			
					685			



0 12.5 25 50
SCALE: 1"=50'

32

VALVE ID NO.

REMOTE CONTROL VALVE

QUICK COUPLER

LINE SIZED ISOLATION VALVE

CHECK VALVE (LINE SIZE)

MAINLINE (SCH-40 PVC)

LATERAL LINE

IRRIGATION CONTROLLER

PRESSURE BACKFLOW DEVICE

WELL PUMP (SEE MEP DRAWINGS)

IRRIGATION PUMP

SLEEVE / BORE

TREE WATERING BAG

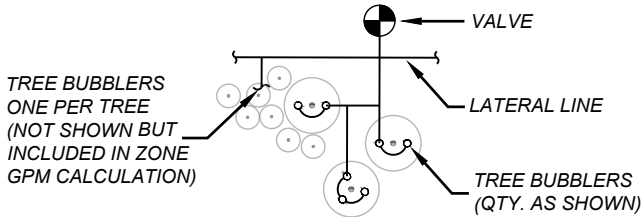
TREE BUBBLER

ELECTRICAL SERVICE PANEL



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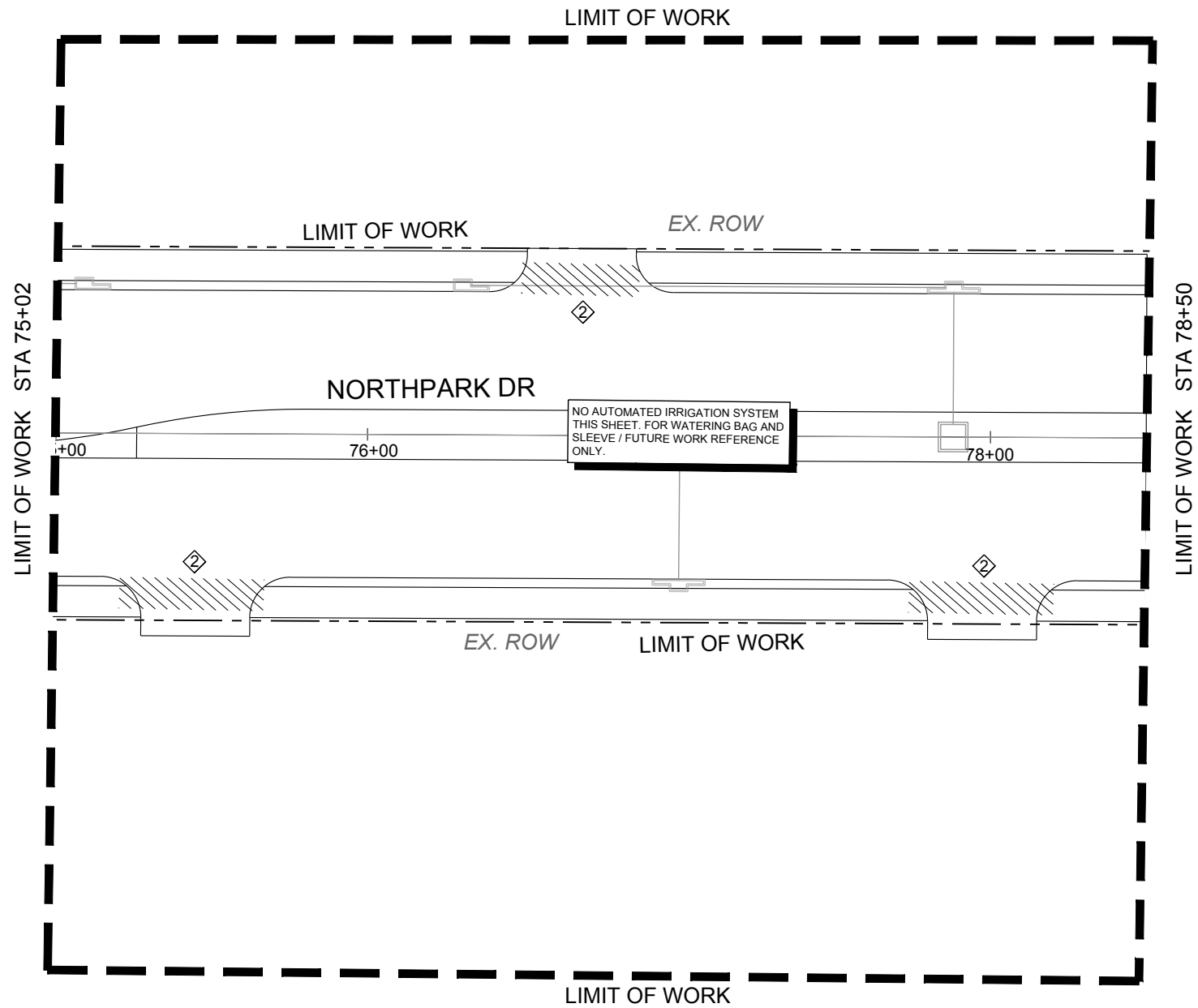


IRRIGATION PLAN NOTES:

- 1 PROPOSED 4" SLEEVE
- 2 PROPOSED 6" SLEEVE
- 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
A. SEE LANDSCAPE GENERAL NOTES SHEET 1 OF 1 FOR ADDITIONAL IRRIGATION INFORMATION
B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

NO.	REVISIONS	BY	DATE		
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 600 ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE					
IRRIGATION PLAN					
SHEET 15 OF 16					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					686



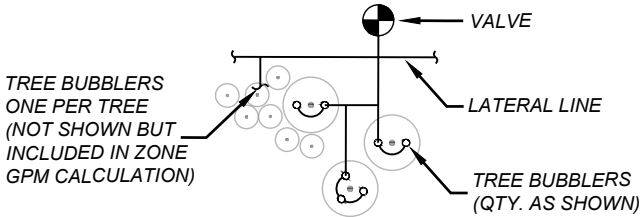
0 12.5 25 50
SCALE: 1"=50'

- 32 VALVE ID NO.
- REMOTE CONTROL VALVE
- QUICK COUPLER
- LINE SIZED ISOLATION VALVE
- CHECK VALVE (LINE SIZE)
- MAINLINE (SCH-40 PVC)
- LATERAL LINE
- IRRIGATION CONTROLLER
- PRESSURE BACKFLOW DEVICE
- WELL PUMP (SEE MEP DRAWINGS)
- IRRIGATION PUMP
- SLEEVE / BORE
- TREE WATERING BAG
- TREE BUBBLER
- ELECTRICAL SERVICE PANEL



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IRRIGATION PLAN NOTES:

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- 3 EXPANSION STUB, SEE DETAIL 6, SHEET 2 OF 7
- 4 HAND DIG ONLY WHEN WORKING WITHIN EXISTING TREE CANOPY

IRRIGATION NOTE:
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B. SEE IRRIGATION DETAILS SHEET 5 OF 7 FOR PLAN LEGEND

DESIGNED:	FED. RD. DIV. No. 6	STATE TEXAS	CITY OF HOUSTON WBS	HIGHWAY No. CS
CHECKED:	STATE DISTRICT HOU	COUNTY MONTGOMERY	CONTROL No. 0912	SECTION No. 37
DRAWN:	JOB No. 232			SHEET No. 687
CHECKED:				

M2L

HNTB

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

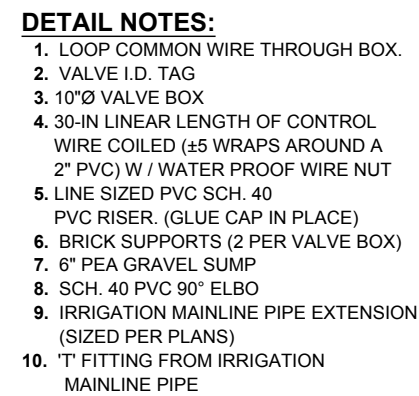
HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TRIZ 10
c/o ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002

NORTH PARK DRIVE

IRRIGATION PLAN

SHEET 16 OF 16



A detailed cross-section diagram of a raised garden bed. The diagram shows a central planting area with a central support structure. The bed is constructed with multiple layers and materials. Labels 1 through 8 point to specific components: 1. Top layer of mulch or soil on the left side. 2. Top layer of mulch or soil in the center. 3. Top layer of mulch or soil on the right side. 4. Top layer of mulch or soil on the far right. 5. A central support structure, possibly a stake or post. 6. A layer of material, likely PVC or plastic, lining the sides of the bed. 7. A layer of material, likely PVC or plastic, lining the bottom of the bed. 8. A layer of material, likely PVC or plastic, lining the bottom of the bed.

DETAIL

1. FINISH
2. LINE S
3. 9" Ø VA
(ADD 1
BRIN
AS SP
4. FINISH
5. PVC S
6. PVC M
ELEV
8" OF
7. 3/8" Ø
(6 INC
8. BRICK

TYPICAL PLAN
N.T.S.

DETAIL NOTES:

1. FINISH GRADE/ TOP OF MULCH
2. HUNTER INST-02 POP-UP SPRAY BODY BUBBLER. LOCATE LEVEL WITH TOP C
3. PVC SCH-80 NIPPLE
4. PRE-MANUFACTURED POLY SWING JO
5. PVC LATERAL (SIZED PER PLANS)
6. PVC SCH-80 TEE OR ELL

[illegible]

DETAIL NOTES:

1. FINISH GRADE (SHRUB/G.C.)
2. 12"X17" VALVE BOX WITH PURPLE COVER (ADD RISERS TO BOX AS NECESSARY TO BRING COVER TO FINISH GRADE AS SPECIFIED IN #1 AND #3)
3. FINISH GRADE (TURF)
4. QUICK-COUPLING VALVE ONE-PIECE BODY WITH 1" INLET AND 1-1/4" KEY OUTLET. MUST HAVE PURPLE CAP STATING: *"NON POTABLE WATER, DO NOT DRINK"*
5. 1"Ø PVC SCH 80 NIPPLE (LENGTH AS REQUIRED)
6. SCH 80 KBI SWING JOINT
7. 1" MECHANICAL ISOLATION VALVE
8. 1" PVC (TEE OFF MAINLINE)
9. BRICK BASE (1 OF 2)
10. PVC SCH 40 TEE W/CAP OR ELL
11. 3/8" Ø WASHED PEA GRAVEL (6 INCHES MIN.)
12. 24" #4 REBAR STAKE WITH S.S. GEAR CLAMPS OR EQUIVALENT SUPPORT SYSTEM.

NOTE:
FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL
TO NOMINAL QUICK COUPLING VALVE INLET SIZE.




DETAIL NOTES:

1. FINISH GRADE/TOP OF MULCH
2. POP-UP SPRAYBODY: SEE PLAN AND LEGEND FOR SPECIFIC MODELS
3. SWING JOINT ASSEMBLY,
SEE LEGEND FOR SPECIFIC TYPE
4. LATERAL TEE OR ELL
5. PVC LATERAL PIPE (SIZE PER PLANS)
6. USE SIDE INLET WHEN WORKING BELOW TREE CANOPIES OR ANYWHERE SHALLOW LATERAL PIPE TRENCHING IS REQUIRED.
7. WALK, CURB, WALL, ETC.

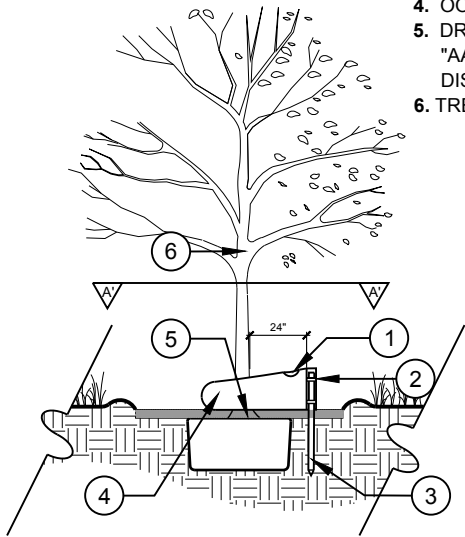
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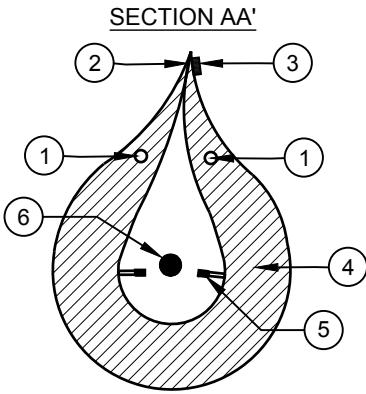
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		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420	
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTZ ANDREWS KURTH LLP 600 TEXAS, SUITE 4200 HOUSTON, TEXAS 77002	
NORTH PARK DRIVE (T-1013)			
IRRIGATION DETAILS SHEET 2 OF 7			
DESIGNED:	FED. DIV. No.	RD. No.	STATE
CHECKED:	6	TEXAS	CITY OF HOUSTON WBS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOLI	MONTGOMERY	0812 37 232
			HIGHWAY No. CS
			SHEET No. 680

MANUFACTURER NOTE:
Engineered Watering Solutions
800-951-8123
WWW.TREECAMEL.COM

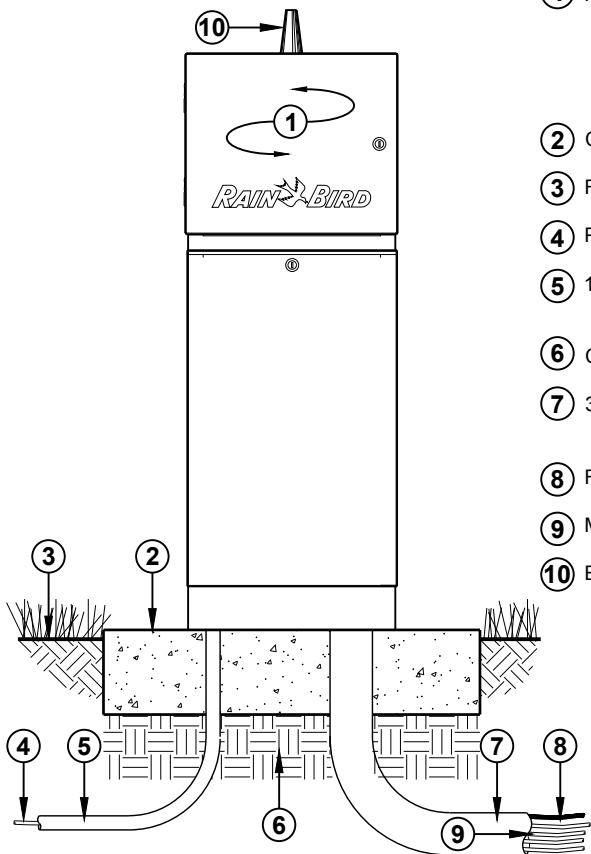


DETAIL NOTES:

1. FILL / VENT HOLES (TYP. BOTH ENDS)
2. STAKE HOLDING SLOTS (TYP. BOTH ENDS)
3. 30" SURVEYOR STAKE (SUPPLIED WITH OOZE TUBE.)
NOTE: INSTALL AT HIGHEST POINT OF ELEVATION.
4. OOZE TUBE - 45 GALLON CAPACITY
5. DRIP EMITTER PLACEMENT (SEE TOP VIEW-SECTION "AA" INSTALL AT OR NEAR BOTTOM OF BAG WITH DISCHARGE PARALLEL TO GROUND
6. TREE TRUNK



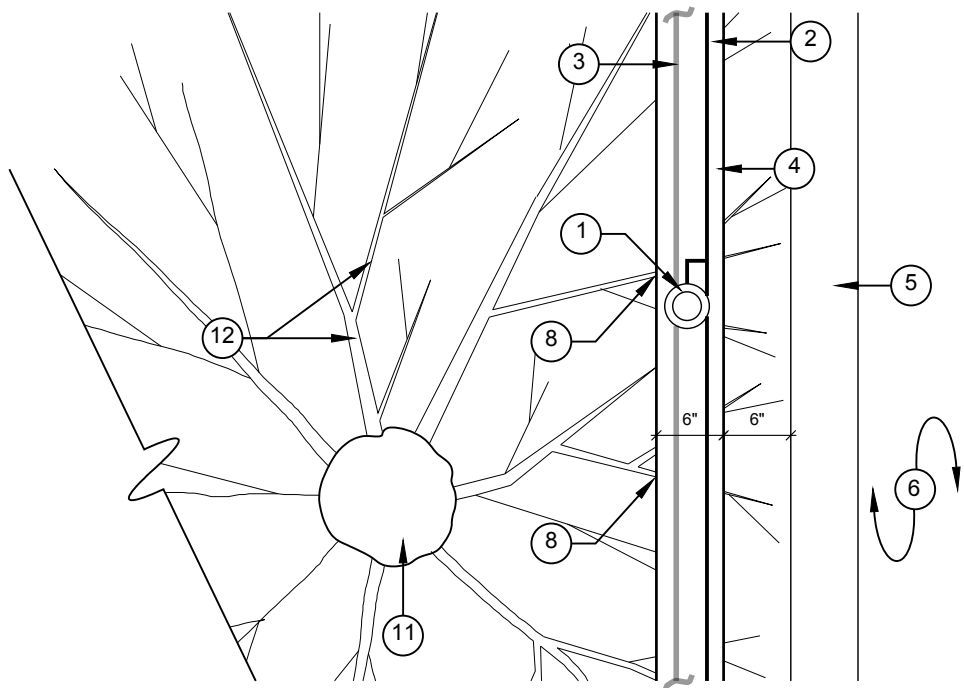
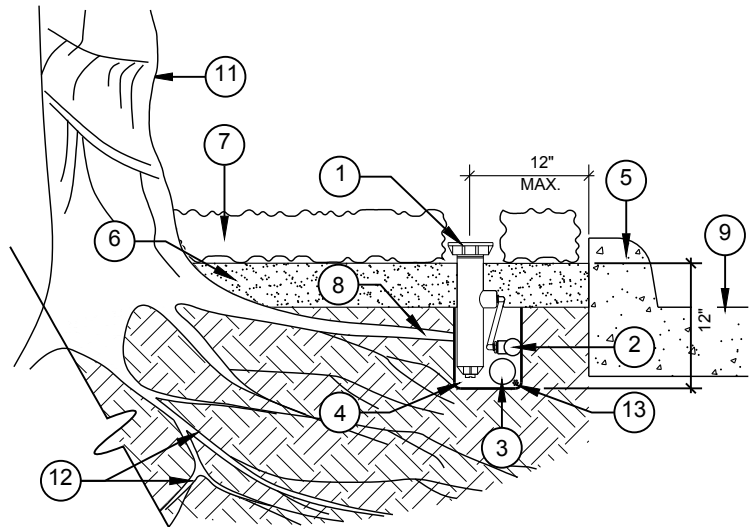
3 TREE WATERING BAG (Incidental to 0166)



- 1 IRRIGATION CONTROLLER:
RAIN BIRD ESP-LXMEF CONTROLLER WITH FLOW SMART
MODULE IN LXMM METAL CABINET AND LXMPED METAL
PEDESTAL. INSTALL CONTROLLER, CABINET AND PEDESTAL
PER MANUFACTURER'S RECOMMENDATIONS.
- 2 CONCRETE PAD: 6-INCH MINIMUM THICKNESS
- 3 FINISH GRADE
- 4 POWER SUPPLY WIRE
- 5 1-INCH SCH 40 PVC CONDUIT, FITTINGS AND SWEEP ELL FOR
POWER SUPPLY
- 6 COMPACTED SUBGRADE
- 7 3-INCH SCH 40 PVC CONDUIT, FITTINGS AND SWEEP ELL FOR
STATION WIRES
- 8 FLOW SENSOR WIRE (PE 39, 89 OR 54) TO FLOW SENSOR
- 9 MASTER VALVE AND REMOTE CONTROL VALVE WIRES
- 10 EXTERNAL 3GUSA ANTENNAE.

NOTES:
A. ESP-LXMEF CONTROLLER IS AVAILABLE IN 8- OR 12-STATION BASE
MODELS. ADDITIONAL MODULES IN 4-, 8- AND 12-STATION VERSIONS
MAY BE ADDED TO BRING THE CONTROLLER UP TO 48 STATIONS
MAXIMUM.
B. FOR EASE OF INSTALLATION INTO A CONTROLLER WITH MORE THAN 24
STATIONS, INSTALL A JUNCTION BOX AT THE BASE OF CONTROLLER
AND TRANSITION LARGER VALVE AND COMMON WIRES FROM FIELD TO
18 AWG MULTI CONDUCTOR WIRE TO BE USED IN CONTROLLER.
C. PROVIDE PROPER GROUNDING COMPONENTS TO ACHIEVE GROUND
RESISTANCE OF 10 OHMS OR LESS.

2 RAINBIRD ESP-LX MEF CONTROLLER



DETAIL NOTES:

1. IRRIGATION HEAD USING SIDE INLET
2. IRRIGATION LATERAL
3. IRRIGATION MAINLINE
4. 6"x12" DEEP TRENCH
5. EXISTING CURB
6. PLANTING BED PREP
7. GROUND COVER/ PLANTING
8. ANVIL CUT ROOTS 3/4"Ø AND LARGER AT TRENCH EDGE
9. EXISTING ROADWAY SURFACE
10. UNDISTURBED SOIL (EXCEPT FOR AERATION)
11. EXISTING TREE MAIN TRUNK
12. EXISTING TREE ROOTS
13. IRRIGATION CONTROLLER WIRING

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CHECKED:	STATE DISTRICT	COUNTY	CONTROL SECTION No. 37	JOB No. 232
DRAWN:	HOU	MONTGOMERY	0912	37
CHECKED:				690

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BY

DATE

M2L

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

HNTB

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TRIZ 10
610 ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002

NORTH PARK DRIVE
(T-1013)

IRRIGATION DETAILS
SHEET 3 OF 7

IRRIGATION MATERIALS SPECIFICATIONS

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	REMARKS
WELL PUMP - SEE MEP DRAWINGS	PER MEP SPECIFICATION	DISCHARGE PIPE Ø PER AS REQUIRED '00 PSI AND 100 GPM FLOW CAPACITY	LOCAL CODE MAY REQUIRE LARGER METER CONTRACTOR TO BE RESPONSIBLE FOR LOCATING WATER SERVICE LINES AND ALL COSTS ASSOCIATED WITH TAPS, METERS AND IMPACT FEES AS PART OF THE IRRIGATION SCOPE OF WORK
IRRIGATION PUMP STATION - SEE IRRIGATION DETAILS SHEET 6 & 7	RAINBIRD QUOTE 1286878 SEE IRRIGATION DETAIL SHEET 6 & 7	2.5 INCH MIN. DISCHARGE PIPE @ 100 PSI AND 100 GPM FLOW	CONTRACTOR TO BE RESPONSIBLE FOR LOCATING UTILITY SERVICE LINES AND ALL COSTS ASSOCIATED WITH TAPS, METERS, IMPACT FEES AND UTILITY DAMAGE / REPAIR AS PART OF THE IRRIGATION SCOPE OF WORK
BACKFLOW PREVENTER	RPZ AS APPROVED BY LOCAL CODE	2 inch minimum	LOCATION WILL REQUIRE RPZ DUE TO ELEVATION CHANGES AND UTILIZATION OF PUMP
BACKFLOW PREVENTER ENCLOSURE REQUIRED FOR THE FOLLOWING IRRIGATION SYSTEM TYPES: TYPE I TYPE II Enclosure will be approved by the Engineer. Enclosure will be manufactured specifically for purpose of protecting backflow preventor. Enclosure will be vandal-resistant, lockable with the ability to be anchored to the ground. Enclosure will be completely anchored to the ground. Enclosure will be completely removable. Enclosure size will provide access and clearance on all sides of backflow preventer. Locking clearmace on all sides of backflow preventer. Locking mechanism will be approved by the Engineer. Provide locks and keys. All locks will use same keys unless otherwise directed by the Engineer. Keys will match master key provided by Engineer or Landscape Architect. Locks may be integrated into enclosure.	HOT BOX Fiberglass Valve Enclosure, Unheated Model # LF013027023	27 in x 13 in x 23 in	HOT BOX ENGINEERED ENCLOSURES 780 W. GRANADA BLVD. SUITE 300 ORMOND BEACH , FL 32714 (904) 786-0204
VALVE APPURTENANCES: INCLUDES: RAINBIRD PESB-R-PRS-D SERIES SPRAY/ROTOR REMOTE CONTROL VALVE W / SCRUBBER, PRESSURE REGULATOR AND PURPLE RECLAIMED WATER INDICATOR (SIZED PER PLANS)	100-PESBR-PRS-D 150-PESBR-PRS-D 200-PESBR-PRS-D	1 inch TO 2 inch (SEE PLANS FOR SPECIFIC SIZE)	
RAINBIRD ESP-LX MEF CONTROLLER WIT MODULES TO EXPAND TO NEEDED CAPACITY, IQ NCC 3G CARTRIDGE	ESP-LX MEF W / MODULES AS NEEDED, IQ NCC 3G CARTRIDGE, SS PEDESTAL & CABINET (LXMMSSPED & LXMMSS)	40+ ZONES	COORDINATE WITH LANDSCAPE ARCHITECT ON FINAL LOCATION OF CONTROLLER PRIOR TO INSTALLATION OF IRRIGATION SYSTEM.
RAINBIRD SPRAY BODY WITH CHECK VALVE, PRESSURE REGULATION AND PURPLE RECLAIMED WATER INDICATOR.	1806-SAM-PRS (TURF) 1812-SAM-PRS (SHRUB)	6" POPUP 12" POPUP	6" FOR TURF AREAS, 12" FOR SHRUB/GROUND COVER AREAS AS INDICATED ON PLANS
RAINBIRD 5006 ROTOR WITH CHECK VALVE, PRESSURE REGULATION AND PURPLE RECLAIMED WATER INDICATOR.	5006-SAM-R	6" POPUP ROTOR WITH MPR NOZZLES	FOR TURF AREAS AS INDICATED ON PLANS
OOZE TUBE TREE WATERING SYSTEM	OOZE TUBE 45 GALLON	TREE WATERING SYSTEM	FOR TEMPORARY WATERING OF TREES WITHOUT AN AUTOMOATED RRIGATION SYSTEM.
RAINBIRD ROOT WATERING SYSTEM WITH CHECK VALVE AND PURPLE RECLAIMED WATER INDICATOR.	RWS-M-B-C-1402	SUB-SURFACE TREE ROOT WATERING SYSTEM	FOR TREE IRRIGATION IN AREAS NOT COVERED BY ROTORS OR SPRAYS.
BORING/SLEEVES		4 inch OR 6 inch (SEE PLANS FOR SPECIFIC SIZE)	OVERCUTTING WILL NOT BE ALLOWED
PVC SCH-40 ENCASEMENT PIPE FOR SLEEVES AND BORES Pressure rated with slip type solvent welded joints		4 inch OR 6 inch (SEE PLANS FOR SPECIFIC SIZE)	REFERENCE ITEM 170.2.C
PVC SCH-80 above ground at backflow device		2 inch	PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE AND PURPLE PER TCEQ.
PVC SCH-40 (PURPLE) MAINLINE Pressure rated with twin gasket couplings and fittings or slip type solvent welded joints		2 inch	PURPLE PER TCEQ.
PVC CLASS 200 (PURPLE) LATERALS AND HEADERS		1 inch TO 1-1/2" (SEE PLANS FOR SPECIFIC SIZE)	PURPLE PER TCEQ.
PVC SCH-80 (PURPLE) ABOVE GROUND PIPE			PIPE RATED FOR DIRECT SUNLIGHT EXPOSURE AND PURPLE PER TCEQ.
BURIED RISERS AND SWING-JOINT COMPONENTS SCH-80			
PVC FITTINGS All fittings incorporated into system will be of the same type, size and class material as the pipe			
CONTROL WIRE All low voltage control wire will be color coded. Wire sizes will conform to the controller manufacturer specifications for maximum distances for specific wire sizes. All wire will be specifically manufactured for direct burial. All wire connections and splices for direct All wire connections and splices will be made in ground boxes. The splice will be completely waterproof and will be completely encapsulated within a King Safety Sealed Irrigation Connector/Splice enclosure or an approved equal			
SOLVENT CEMENT Solvent cement will be the type recommended by the			
VALVE BOXES Boxes for section valves, below-ground backflow preventers, and quick coupling valves will be as shown on detail sheet			PURPLE LIDS PER TCEQ.
VALVE BOX RISERS			

SEE IRRIGATION LEGEND SHEET 5 OF
5 FOR ADDITIONAL INFORMATION
AND PLAN SYMBOLOGY KEY.

1. ALL ITEMS ILLUSTRATED OR REFERENCED TO ON THIS SHEET,
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BOX LIDS, QUICK COUPLER CAPS, AND ALL EMITTER DEVICES.



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		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 60 ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE (T-1013)					
IRRIGATION DETAILS SHEET 4 OF 7					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					691

IRRIGATION SYSTEM NOTES:

1. Reference IRRIGATION DETAILS AND MATERIALS sheets 1,2 and 3 for details and requirements.
2. Reference to manufacturer's trade name or catalog number is for the purpose of identification only. Contractor is permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

SYMBOL	MFR.	MODEL NO/DESCRIPTION	PSI	RADIUS	GPM
	RAINBIRD	1806-MPR-PRS-5 PLASTIC NOZZLE TURF SPRAY HEAD (F, H, Q)	30	5'	0.41, 0.20, 0.10
	RAINBIRD	1806-MPR-PRS-8 PLASTIC NOZZLE TURF SPRAY HEAD (F, H, Q)	30	8'	1.05, 0.52, 0.26
	RAINBIRD	1806-MPR-PRS-10 PLASTIC NOZZLE TURF SPRAY HEAD (F, H, Q)	30	10'	1.58, 0.79, 0.39
	RAINBIRD	1806-MPR-PRS-12 PLASTIC NOZZLE TURF SPRAY HEAD (F, H, Q)	30	12'	2.60, 1.30, 0.65
	RAINBIRD	1806-MPR-PRS-15 PLASTIC NOZZLE TURF SPRAY HEAD (F, H, Q)	30	15'	3.70, 1.85, 0.92
	RAINBIRD	1806-MPR-PRS-15 PLASTIC NOZZLE SHRUB SPRAY HEAD EST, CST, SST	30 30	4' X 15' 4' X 30'	0.62 1.21
	RAINBIRD	1806-MPR-PRS-15 PLASTIC NOZZLE RCS, LCS	30 30	4' X 15'	0.49
	RAINBIRD	1812-MPR-PRS-5 PLASTIC NOZZLE SHRUB SPRAY HEAD (F, H, Q)	30	5'	0.41, 0.20, 0.10
	RAINBIRD	1812-MPR-PRS-8 PLASTIC NOZZLE SHRUB SPRAY HEAD (F, H, Q)	30	8'	1.05, 0.52, 0.26
	RAINBIRD	1812-MPR-PRS-10 PLASTIC NOZZLE SHRUB SPRAY HEAD (F, H, Q)	30	10'	1.58, 0.79, 0.39
	RAINBIRD	1812-MPR-PRS-12 PLASTIC NOZZLE SHRUB SPRAY HEAD (F, H, Q)	30	12'	2.60, 1.30, 0.65
	RAINBIRD	1812-MPR-PRS-15 PLASTIC NOZZLE SHRUB SPRAY HEAD (F, H, Q)	30	15'	3.70, 1.85, 0.92
	RAINBIRD	1812-MPR-PRS-15 PLASTIC NOZZLE SHRUB SPRAY HEAD EST, CST, SST	30 30	4' X 15' 4' X 30'	0.62 1.21
	RAINBIRD	1812-MPR-PRS-15 PLASTIC NOZZLE RCS, LCS	30 30	4' X 15'	0.49
	RAINBIRD	5006-MPR-25 TURF ROTOR (F, H, Q)	45	25'	3.82, 1.98, 1.00
	RAINBIRD	5006-MPR-30 TURF ROTOR (F, H, Q)	45	30'	5.78, 2.96, 1.40
	RAINBIRD	5006-MPR-35 TURF ROTOR (F, H, Q)	45	35'	7.58, 3.81, 1.92
	RAINBIRD	ROOT WATERING SYSTEM RWS-M-B-C-1402	30	--	0.5 GPM EACH 1, 2 OR 3 PER TREE)

SYMBOL	MFR.	MODEL NO/DESCRIPTION
	OOZE TUBE	TREE WATERING SYSTEM 45 GALLON CAPACITY
	RAINBIRD	PESB-R-PRS-D SERIES REMOTE CONTROL VALVE SIZED PER PLANS REMOTE CONTROL VALVE WITH SCRUBBER AND PRESSURE REGULATOR
	RAINBIRD	PESBR-PRS-D SERIES REMOTE CONTROL VALVE SIZED PER PLANS WITH SCRUBBER, PRESSURE REGULATOR & RECLAIMED WATER INDICATOR
	RAINBIRD	QUICK COUPLING VALVE W / RECLAIMED WATER INDICATOR
	RED & WHITE	LINE SIZED BRASS GATE VALVE
	APPROVED	MAINLINE TO BE SCH-40 PVC (PURPLE) SIZED PER PLANS
	APPROVED	LATERAL LINE TO BE CLASS 200 PVC (PURPLE) PURPLE SIZED PER PLANS
	APPROVED	SCH. 40 PVC SLEEVE SIZED PER PLANS
	RAINBIRD	RAINBIRD ESP-LX MEF CONTROLLER
	FEBCO	PRESSURE BACKFLOW DEVICE
	APPROVED	WELL PUMP - SEE MEP DRAWINGS
	RAINBIRD	IRRIGATION PUMP PACKAGE - SEE IRRIGATION PLANS FOR LOCATION AND IRRIGATION DETAIL SHEETS 6-7 FOR SPECIFICATION
	APPROVED	POINT OF CONNECTION
		VALVE STATION NUMBER

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NORTH PARK DRIVE (T-1013)								
IRRIGATION DETAILS SHEET 5 OF 7								
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.				
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS				
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CHECKED:	HOU	MONTGOMERY	0912	37	232			
					692			

1

IRRIGATION PLAN LEGEND



Customer Reference : M2L Associate

Customer Technical Offer

Rain Bird Selection System 20.4.2

Item number	North Park Dr	Size / Stages	22BF1J9A0 / 1	Quote number	1286878	Pump speed	3191 rpm
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Configuration

Qty	Description	
1	ACLP05FAC6-GL - 22BF1J9A0 - 1x230	<p>Filter: HT-G-03-LE: Rain Bird G-Series Vertical Suction Scanning Filter with 300 micron 316 L sintered woven mesh screen, 304 SS body, bypass manifold, and SS electric ball rinse valve. Requires 60-80GPM at 40PSI minimum for back flush with 150PSI maximum operating pressure. (Drain pipe, fittings and labor to be performed by others)</p> <p>Filter: 4" Flanged Zee Pipe for filter flush line (must discharge to atmosphere). Dimensional requirements must be provided.</p> <p>Gauge: Liquid filled discharge pressure gauge</p> <p>Gauge: Liquid filled suction pressure gauge</p> <p>Intake: 3" Passive Intake Screen and Foot Valve assembly with 1/8" perforated aluminum screen, stainless steel hardware, and aluminum foot valve for horizontal installation. Includes rubber gasket and flapper valve, stainless steel hardware, and 125# companion flange. Must be installed in a horizontal orientation or up to 45 degrees from horizontal with the valve hinge mounted at the very top. Components are shipped loose, pipe, fittings and labor to be performed by others.</p> <p>Motor: Horizontal close-coupled motor, 3450RPM, TEFC, NEMA B, Class F insulation, 1.15 SF, Cont. duty rated - Motor is VFD Started.</p> <p>Pipe: Horizontal inlet and discharge piping configuration for field connection through station enclosure.</p> <p>Pipe: 2" Flanged Inlet Zee Pipe (includes 3, 3/4 in. FNPT ports and 1 in. blow port): dimensional requirements must be provided.</p> <p>Pipe: 2" Flanged Discharge Zee Pipe (includes 3, 3/4 in. FNPT ports and 1 in. blow port): dimensional requirements must be provided.</p> <p>Pump: Horizontal single stage end-suction pump with cast iron discharge head and bronze impeller, includes silent check valve and isolation valve.</p> <p>Valve: ANSI flanged inlet and discharge station isolation valves</p> <p>Warranty: *3 Year Warranty</p> <p>Electrical</p> <p>Alarm Light: Alarm indicator light. Externally mounted 22mm red light.</p> <p>Controls: Auto-Off-Manual switch.</p> <p>Controls: Multi-line LCD display with simple pushbutton operator interface. Human Machine Interface [HMI] (Manufactured by Mitsubishi).</p> <p>Controls: PLC emergency bypass - Manual mode.</p> <p>Controls: Service entrance surge protector.</p> <p>Controls: Stainless steel pressure transducer.</p> <p>Controls: Variable Frequency Drive [VFD] (Manufactured by Mitsubishi).</p> <p>Dry-Run Protection: Low level safety float switch. Shuts down pump station to protect pumps from low level. Switch is shipped loose with 100 ft. cable and installed by others.</p> <p>Feature: Pipe Fill: automatic mainline pressurization. Used to slowly bring the system up to design pressure while mitigating pipe breakage after a low pressure event.</p> <p>Feature: Automatic system diagnostic utility.</p> <p>Feature: Deadhead fault alarm.</p> <p>Feature: Electrical overload shutdown safety with automatic restart.</p> <p>Feature: Individual motor overload/thermal protection safeties.</p> <p>Feature: External NEMA 3R fused main power disconnect.</p> <p>Feature: High pressure alarm to protect mainline and system components with automatic restart.</p> <p>Feature: Low pressure discharge alarm. Protects pump from dry run and excessively high flow rates. Also, prevents continuous operation in the event of a large mainline break.</p> <p>Feature: Low voltage, high voltage, and phase loss protection safeties (phase loss protection only for 3 phase power)</p> <p>Feature: Pipe break / High flow alarm. No automatic restart.</p> <p>Feature: Pressure transducer alarm.</p> <p>Feature: VFD fault shutdown with automatic restart.</p> <p>Flow Sensor: Flow switch: Stainless steel solid-state switch with quick disconnect electrical connection.</p> <p>ASP Startup is NOT Included</p> <p>Freight Included</p>
	<p>Station Details</p> <p>Lift Height (ft): 10</p> <p>Discharge Pressure: 50</p> <p>Max Flow Rate (GPM): 50</p> <p>Estimated Station FLA (A): 31.66</p> <p>Platform Options</p> <p>FLOW SENSOR: Flow Switch</p> <p>FILTER: G-Series Suction-Scanning Filter</p> <p>FILTER UPGRADE: HT-G-03-LE</p> <p>FILTER ADD-ONS</p> <p>FILTER ADD-ONS: Filter Flush Zee Pipe</p> <p>FILTER FLUSH TYPE: 4" Flanged Zee Pipe</p> <p>HMI: LCD Display</p> <p>PUMP START LOGIC: Pump Start Signal</p> <p>Platform</p> <p>ACLP</p> <p>Additional Options</p> <p>ENVIRONMENTAL ENCLOSURE: Marine-Grade Aluminum</p> <p>ENVIRONMENTAL PROTECTION: INSULATION ONLY</p> <p>DRY RUN: Low Level Safety Float Switch</p> <p>DRY RUN UPGRADE: 100 ft Cable</p> <p>ALARM LIGHT: 22mm Indicator</p> <p>BLADDER TANK: 4-Gallon</p> <p>INTAKE SCREEN: Strainer</p> <p>STRAINER UPGRADE: 3" Strainer</p> <p>FOOT VALVE: 45 Degree Adapter</p> <p>PIPING: Horizontal Through Enclosure</p> <p>PLC: VFD Only</p> <p>PUMP START RELAY: 24VAC/DC</p> <p>SURGE ARRESTOR: Service Entrance</p> <p>Zee Pipe Options</p> <p>INLET ZEE PIPE: Flanged-End Zee Pipe</p> <p>INLET ZEE PIPE SIZE: 2" FE</p> <p>DISCHARGE ZEE PIPE: Flanged End Zee Pipe</p> <p>DISCHARGE ZEE PIPE SIZE: 2" FE</p> <p>Mechanical</p> <p>Corrosion Prevention: All piping is steel grit blasted to white metal condition, fusion-bonded polyester powder coated for corrosion resistance and extended equipment life.</p> <p>Corrosion Prevention: Marine-grade aluminum deck.</p> <p>Environmental Enclosure: Ventilated marine-grade aluminum enclosure with lockable lid and removable front panel.</p> <p>Environmental Protection: Environmental protection with insulation for freeze mitigation and sound dampening.</p>	

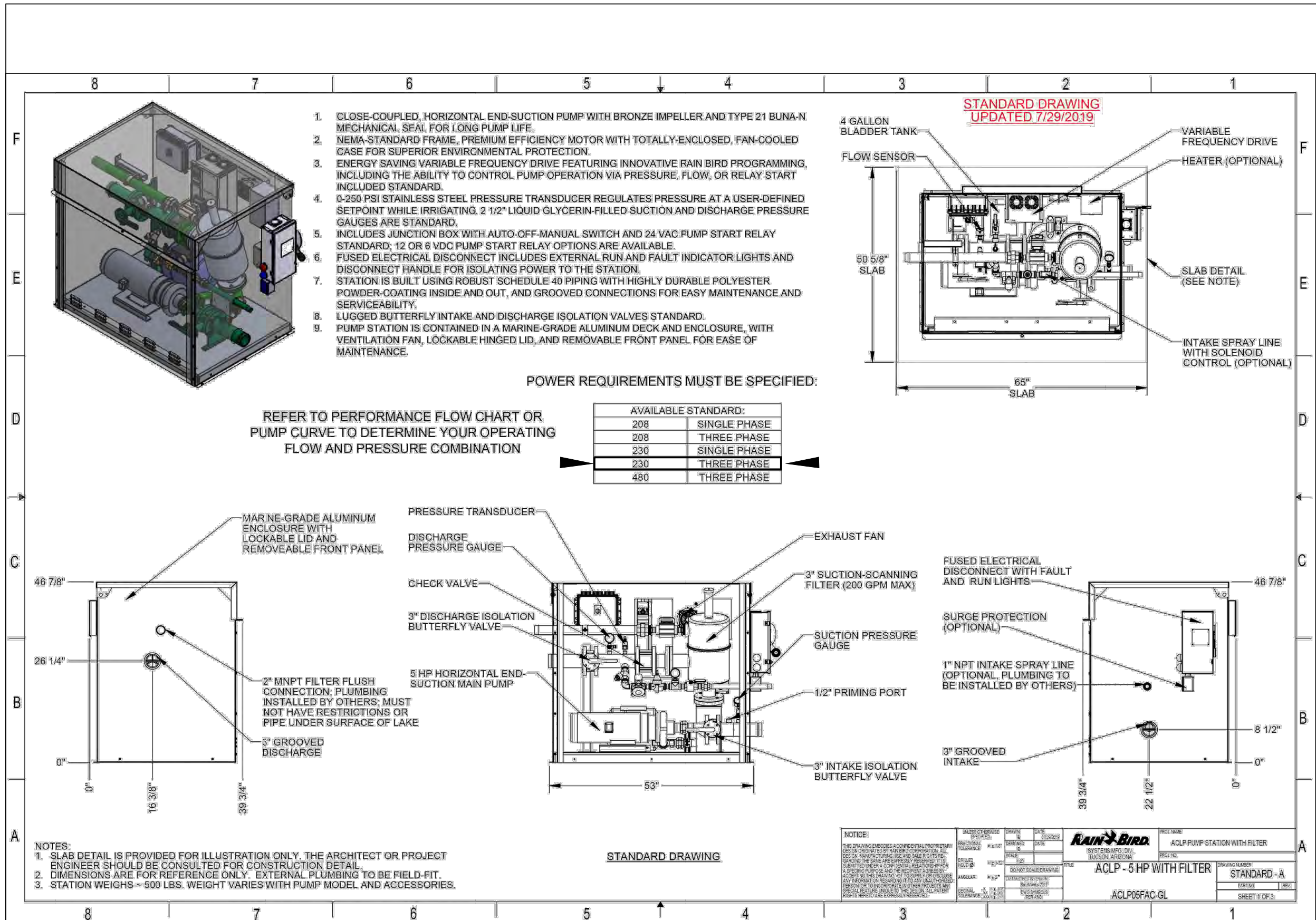
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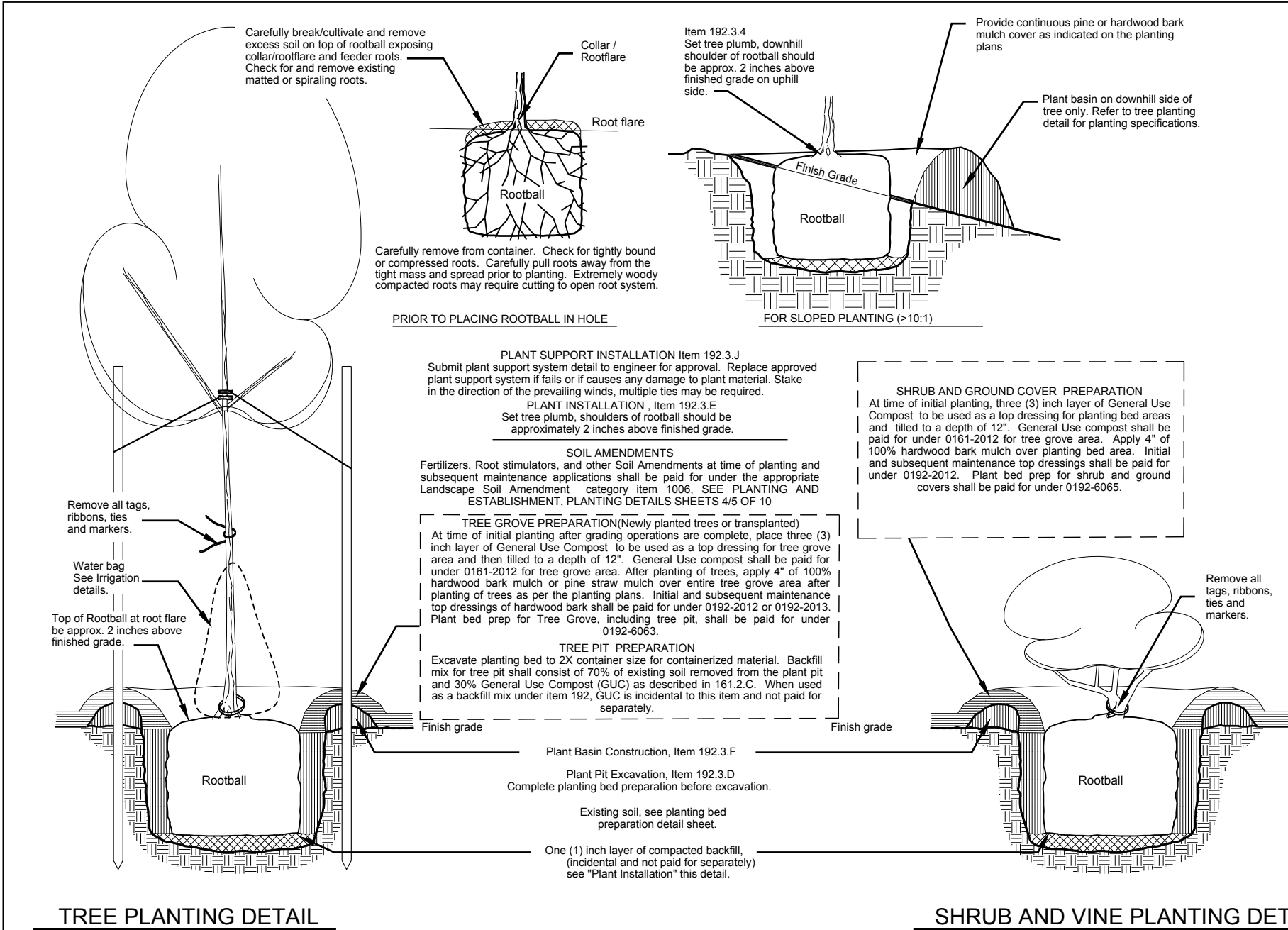


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	HNTB	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
	CITY OF HOUSTON				LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ 10 610 ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002
	HOUSTON PUBLIC WORKS				
	NORTH PARK DRIVE (T-1013)				
	IRRIGATION DETAILS SHEET 6 OF 7				
DESIGNED:	FED. DIV. No.	RD. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6		TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					693

NOTE: All labor and materials necessary to install a fully functioning irrigaton pump station incidental to Pay item 1014-2011)

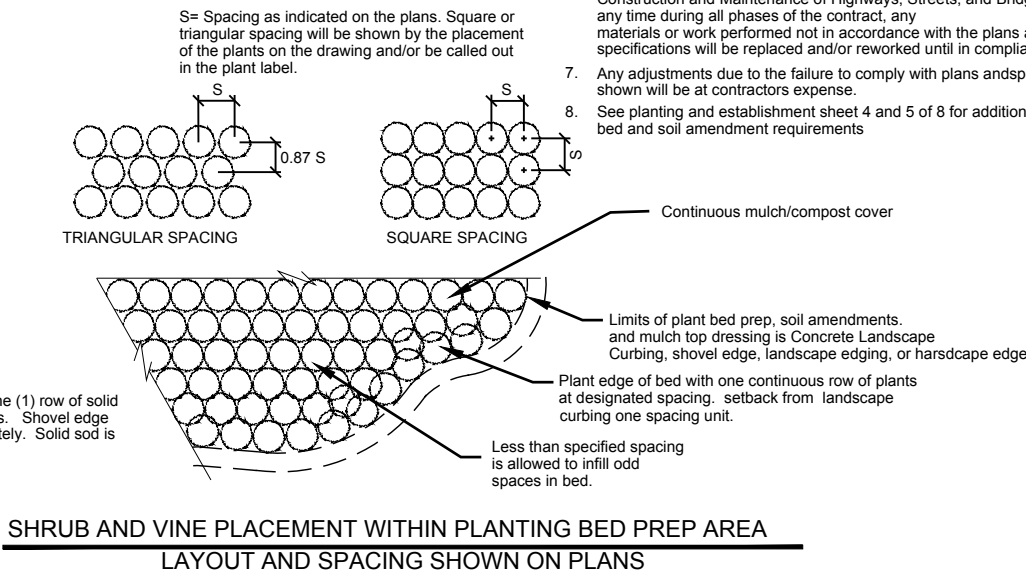
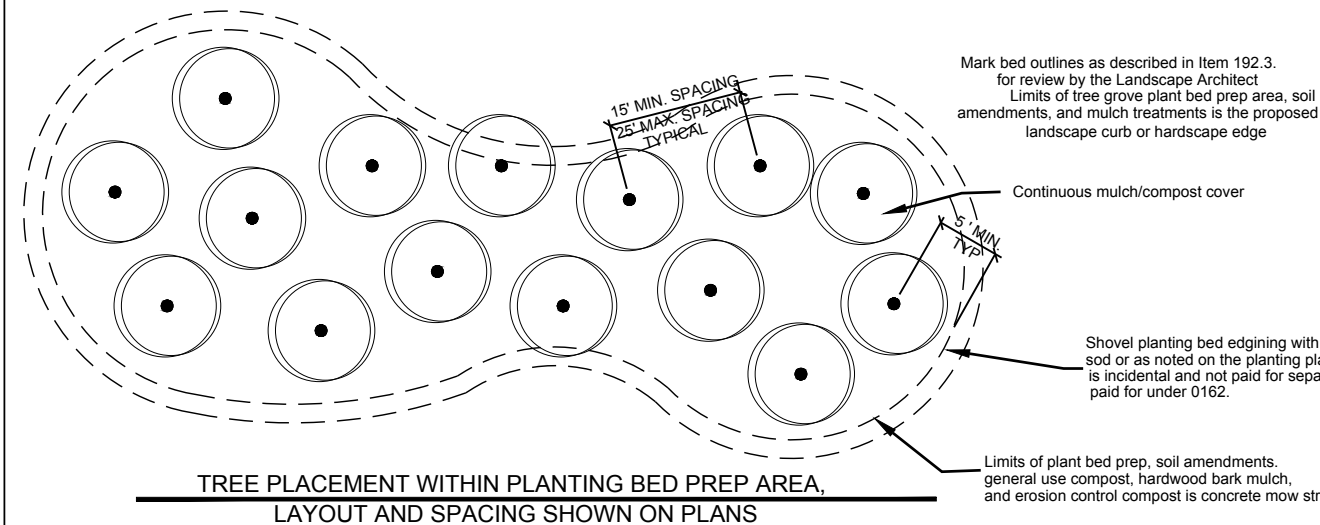
1 IRRIGATION PUMP STATION (Pay item 1014-2011)





TREE PLANTING DETAIL

SHRUB AND VINE PLANTING DETAIL



VEGETATIVE WATERING SCHEDULE FOR TREES (not covered by automated irrigation)

PHASE	ITEM DESCRIPTION	FREQUENCY	RATE / PLANT / WEEKLY	
Item 192.3 Construction	Item 192.3.G. Watering is incidental to Item 0192 and is not paid for separately	Begin same day as planting then: 3 times per week with 1 day minimum between waterings	CNTR SIZE	WATER QTY
	See Initial Watering note		200 GAL =	35 gallons
Item 192.3.O Maintenance (90 day maintenance period after substantial completion)	Item 192.3.O. Watering for trees is paid for under 0166-6003 at the rates indicated	Begin same day as planting then: 3 times per week with 1 day minimum between waterings	100 GAL =	30 gallons
			65 GAL =	25 gallons
			45 GAL =	20 gallons
			30 GAL =	16 gallons
Item 193 Landscape Establishment (Remainder of 2 year watering period)	Item 193.3.C Watering for trees is paid for under 0166-6003 at the rates indicated	2 times per week with 2 days minimum between waterings	15 GAL =	10 gallons
			See Initial Watering Note	

NOTES:
Apply water in the contractor provided watering bag within the tree well(watering back is incidental to item 0166. Adjust rate and frequency to meet site conditions and weather as approved or directed by engineer.

Plant material in poor condition due to the failure to apply the specified amount of water within the time allowed or overwatering will be replaced at contractor's expense. Contractor shall be responsible for coordinating and paying for all fees and costs associated with manual watering of trees.

PROVIDE MONTHLY METER READINGS OF WATER APPLIED.
Prior to arrival at project or storage area, provide watering plan(s) of plants to be installed or stored. Watering plan(s) must be approved by engineer prior to delivery to project or storage area.

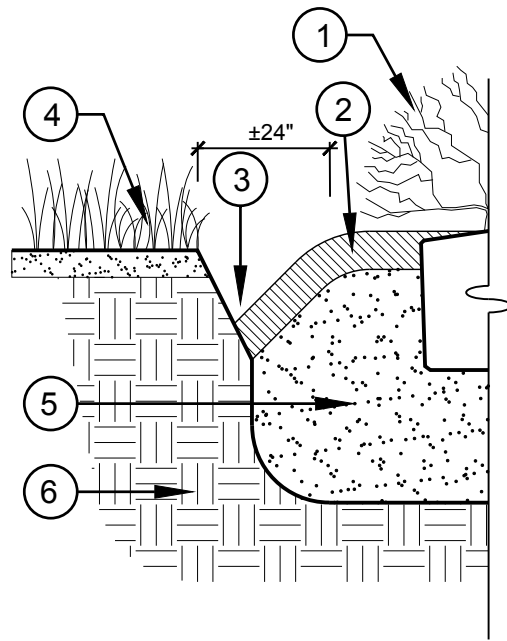
INITIAL WATERING AND ROOT STIMULATOR REQUIREMENTS

PHASE	Item 192.3 Construction. Initial watering.
ITEM DESCRIPTION	Item 192.3.E. Plant Installation. Root stimulator material is incidental to Item 192 and is not paid for separately.
MATERIALS and SOLUTION	Two (2) ounces of root stimulator concentrate per one (1) gallon water. Root stimulator must be commercially available and labeled as an all organic/non-chemical liquid concentrate Bio-Stimulant and Root Stimulator. Use the following product or an approved equal: Super Seaweed, San Jacinto Environmental Supplies, 713-957-0909. (Incidental and not paid for separately)
FREQUENCY and RATE	At the time of planting, provide initial watering at rate shown in Vegetative Watering Schedule this sheet. Use root stimulator solution for initial watering. (Incidental and not paid for separately)

- GENERAL PLANTING NOTES:**
- Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements not shown.
 - Reference Item 192.3, mark plant locations and bed outlines.
 - Verify that all planting meets the following clear zone minimum distance requirements from the edge of the travel lane:
 - * Trees: 30' from edge of pavement, curb, and/or barrier,
 - * Shrubs: 15' from edge of pavement, curb, and/or barrier,
 - * Groundcovers and vines: from edge of pavement, curb, and/or barrier,Engineer has final authority over all clear zone related issues.
 - Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
 - Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the contract. Remove stakes when directed by engineer.
 - Reference Item 5.10 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
 - Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
 - See planting and establishment sheet 4 and 5 of 8 for additional planting bed and soil amendment requirements

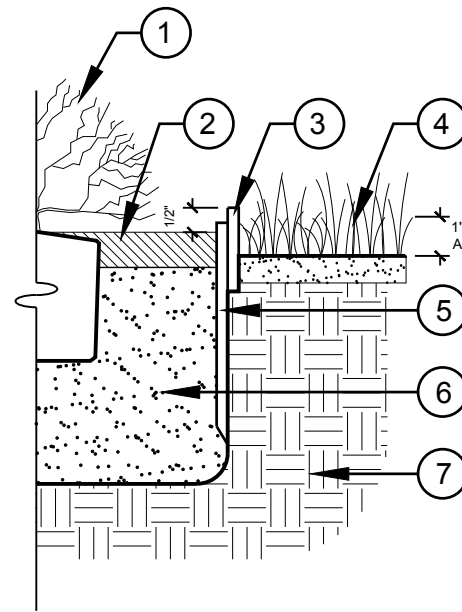


NO.	REVISIONS	BY	DATE
M2L ASSOCIATES, INC. 8955 KATY FWY., SUITE 300 HOUSTON, TX 77024			
HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002	
NORTH PARK DRIVE			
PLANTING AND ESTABLISHMENT (MOD) TREE & SHRUB SHEET 1 of 13 (P 103)			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION No.
CHECKED:	HOU	MONTGOMERY	0912 37 232
			695



- DETAIL NOTES:**
1. PLANT MATERIAL
 2. 4" (MIN) HARDWOOD BARK MULCH
 3. SHOVEL CUT BED EDGE AT 45°-90° ANGLE, 6" DEEP
 4. FINISH GRADE AT SOD (1 ROW MINIMUM)
 5. PLANTING BED MEDIA
 6. UNDISTURBED SUB-GRADE

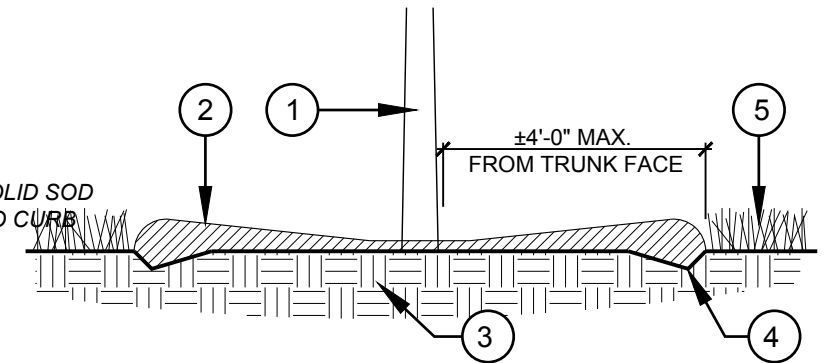
4 SHOVEL CUT EDGE (INCIDENTAL)



- DETAIL NOTES:**
1. PLANT MATERIAL
 2. 4" HARDWOOD MULCH
 3. PERMALOCK ALUMINUM EDGING (CLEANLINE - BLACK ANODIZED OR EQUAL)
 4. SOD (1 ROW MINIMUM)
 5. STAKE PER MFR. RECOMMENDATION
 6. PLANTING BED MEDIA
 7. UNDISTURBED SUB-GRADE

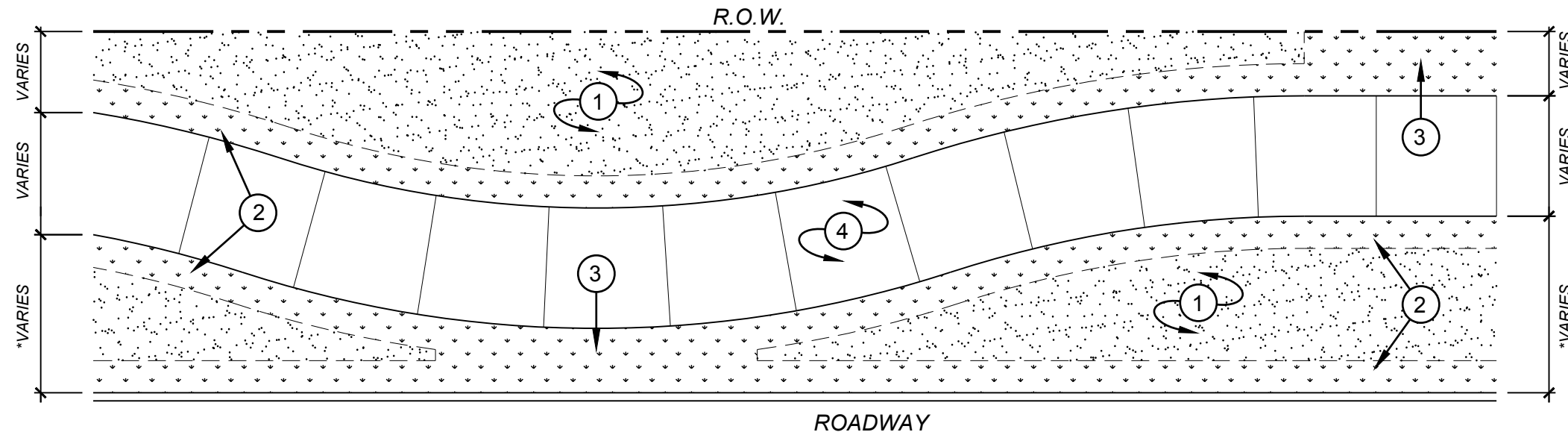
3 LANDSCAPE EDGING (PAY ITEM 0192-6015)

*IF LESS THAN 6'-0" SOLID SOD FROM PAVEMENT TO CURB



- DETAIL NOTES:**
1. EXISTING TREE
 2. 4" (MIN) HARDWOOD BARK MULCH OR PINE STRAW MULCH TOP DRESSING, **SEE PLANTING DETAILS.** (REMOVE ALL EXISTING VEGETATION PRIOR TO MULCH INSTALLATION)
 3. EXISTING/UNDISTURBED SUB-GRADE
 4. SHOVEL CUT EDGE
 5. EXISTING OR PROPOSED SOD/TURF

2 NATIVE UNDERSTORY (INCIDENTAL TO 0192)



- DETAIL NOTES:**
1. CELLULAR FIBER MULCH SEEDED AREA, DIMENSIONS VARY.
 2. ONE (1) ROW SOLID SOD ALONG ALL PAVED SURFACES, CURBS, WALLS, LANDSCAPE BEDS, ETC.
 3. SOLID SOD IN ALL AREAS 72" OR LESS BETWEEN PAVED SURFACES, CURBS, WALLS, LANDSCAPE BEDS, ETC.
 4. CONCRETE SIDE PATH. SEE ENGINEERING DRAWINGS
 5. CURB.

1 SOD CONFIGURATION AGAINST PAVEMENT EDGE (SEE APPLICABLE PAY ITEMS)



NO.		REVISIONS		BY	DATE
M2L		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
HNTB		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ 10 600 ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE PLANTING AND ESTABLISHMENT (MOD) LANDSCAPE DETAILS SHEET 2 of 13 (P 104)					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION No.	JOB No.	SHEET No.
CHECKED:	HOU	MONTGOMERY	0912	37	696



SYMB	BOTANICAL NAME	COMMON NAME	COLOR	ROOT CONDITION	CALIPER	HEIGHT	SPREAD	REMARKS	QTY
LARGE TREES									
T1	QUERCUS VIRGINIANA	SOUTHERN LIVE OAK		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		109
T2	QUERCUS FALCATA	SOUTHERN RED OAK		200 GAL, CONTAINER	6" Cal.	18'-20'	8' - 10'		20
T3	QUERCUS SHUMARDII	SHUMARD OAK		200 GAL, CONTAINER	6" Cal.	18'-20'	8' - 10'		13
T4	ACER RUBRUM VAR. DRUMMONDII	DRUMMOND'S MAPLE		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		0
T5	QUERCUS PALUSTRIS	PIN OAK		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		10
T6	ULMUS PARVIFOLIA	LACEBARK ELM		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		9
T7	NOT USED								
T8	TAXODIUM DISTICHUM	BALD CYPRESS		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		21
T9	PLATANUS OCCIDENTALIS 'MEXICANA'	MEXICAN SYCAMORE		100 GAL, CONTAINER	4" Cal.	14'-16'	6' - 8'		9
TR	TRANSPLANTED TREES	VARIES		MACHINE TRANSPLANT	6"-14" Cal.	TBD	TBD		83
ORNAMENTAL TREES									
A1	LAGERSTROEMIA INDICA	CREPE MYRTLE	PINK	100 GAL. CONTAINER	VARIES	14'-16'	4'-6'	MULTI-TRUNK	16
A2	MYRICA CERIFERA	SOUTHERN WAX MYRTLE		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	TREE FORM	0
A3	VITEX AGNUS CASTUS	VITEX		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	TREE FORM	0
A4	ILEX DECIDUA	POSSUMHAW HOLLY		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	TREE FORM	16
A5	CERCIS CANADENSIS TEXENSIS	TEXAS REDBUD		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	TREE FORM	18
A6	CRATAEGUS MARSHALLII	PARSLEY HAWTHORN		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	MULTI-TRUNK	9
A7	PRUNUS MEXICANA	MEXICAN PLUM		45 GAL. CONTAINER	VARIES	8'-10'	4'-6'	TREE FORM	12
SHRUBS									
S1	MYRICA CERIFERA	SOUTHERN WAX MYRTLE		3 GAL. CONTAINER				SPACING 36" O.C.	0
S2	ILEX VOMITORIA 'NANA'	DWARF YAUPON		3 GAL. CONTAINER				SPACING 36" O.C.	43
S3	RHAPHIOLEPIS INDICA CLARA	CLARA INDIAN HAWTHORN		3 GAL. CONTAINER				SPACING 36" O.C.	0
S4	BERBERIS THUNBERGII	JAPANESE BARBERRRY		3 GAL. CONTAINER				SPACING 36" O.C.	94
S6	AZALEAS ENCORE	ENCORE AZALEAS	PINK	3 GAL. CONTAINER				SPACING 36" O.C.	65
S7	LOROPETALUM CHINENSE 'RUBRUM'	DWARF LOROPETALUM	PINK	3 GAL. CONTAINER				SPACING 36" O.C.	160
GROUND COVERS / GRASSES / PERENNIALS									
G1	DIANELLA TASMANICA 'VARIEGATA'	JAPANESE FLAX LILLY		1 GAL. CONTAINER				SPACING 18" O.C.	431
G2	IRIS X. LOUISIANA	LOUISIANA IRIS	WHITE	3 GAL. CONTAINER				SPACING 24" O.C.	71
G3	PLUMBAGO AURICULATA	PLUMBAGO	PINK	3 GAL. CONTAINER				SPACING 18" O.C.	14
G4	MISCANTHUS SINENSIS 'ADAGIO'	DWARF MAIDEN GRASS		3 GAL. CONTAINER				SPACING 36" O.C.	196
G5	BOUTELOUA GRACILIS	BLUE GRAMA		1 GAL. CONTAINER				SPACING 24" O.C.	2,753
G6	AGAPANTHUS AFRICANUS	AFRICAN LILY	PURPLE	3 GAL. CONTAINER				SPACING 36" O.C.	35
G7	LONICERA JAPONICA 'HALLIANA'	HALLS HONEYSUCKLE		1 GAL. CONTAINER				SPACING 24" O.C.	2,566
G8	LANTANA MONTEVIDENSIS	TRAILING LANTANA		1 GAL. CONTAINER				SPACING 18" O.C.	984
G9	ARDISIA JAPONICA	JAPANESE ARDESIA		1 GAL. CONTAINER				SPACING 18" O.C.	3,535
G10	MUHLENBERGIA CAPILLARIS	GULF COAST MUHLY GRASS		3 GAL. CONTAINER				SPACING 36" O.C.	0
SE	SEASONAL PLANTING	VARIES		4" POT				SPACING 9" O.C.	1,715
LAWN / GRASS									
SOD	CYNODON DACTYLON	CELEBRATION BERMUDA						SOLID SOD	*
TURF	CYNODON DACTYLON	CELEBRATION BERMUDA						HYDROMULCH	*

*QTY AS PER PLANTING PLANS

PLANT SPECIFICATION NOTES:

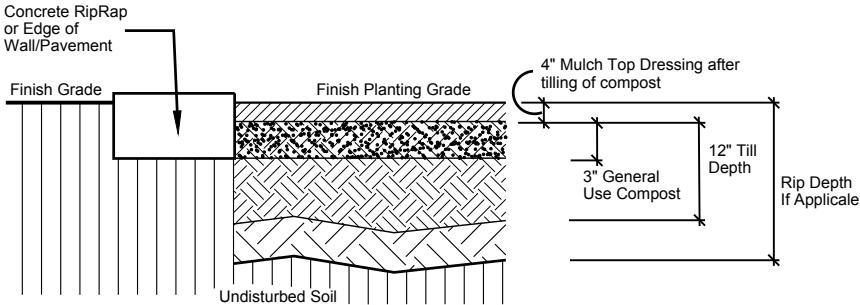
1. REFERENCE ITEM 192 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES 2014 FOR SPECIFICATIONS, DIMENSIONS, VOLUMES AND MEASUREMENTS THAT ARE NOT SHOWN.
2. ALL PLANTS MUST BE NURSERY GROWN IN CONTAINERS UNLESS OTHERWISE SHOWN ON PLANS.
3. PROVIDE PHOTOGRAPHS OF PLANT MATERIAL WHEN REQUESTED BY ENGINEER AND LANDSCAPE ARCHITECT.
4. PROPERLY HANDLE AND MAINTAIN PLANTS DURING DELIVERY, HANDLING, STORAGE, AND PLANTING. THE ENGINEER AND LANDSCAPE ARCHITECT MAY INSPECT ANY PHASE OF WORK AND MAY REJECT ANY PLANT MATERIAL IMPROPERLY HANDLED AND/OR MAINTAINED.
5. DELIVERY NOTICE. REFERENCE ITEM 192.3.2 PLANT DELIVERY. PROVIDE 48 HOUR NOTICE OF PROPOSED PLANT MATERIAL DELIVERY PRIOR TO ARRIVAL AT PROJECT OR STORAGE AREA.
6. DELIVERY TICKETS. FOR EACH PLANT MATERIAL SHIPMENT, PROVIDE INVOICE SHOWING THE NUMBER, SIZE, AND NAME (COMMON AND BOTANICAL) OF EACH OF THE SPECIES OF PLANT MATERIAL.
7. WATERING PLAN(S). PRIOR TO ARRIVAL AT PROJECT OR STORAGE AREA, PROVIDE WATERING PLAN(S) OF PLANTS TO BE INSTALLED OR STORED. WATERING PLAN(S) MUST BE APPROVED BY ENGINEER AND LANDSCAPE ARCHITECT PRIOR TO DELIVERY TO PROJECT OR STORAGE AREA.
8. QUANTITIES SHOWN ARE FOR REFERENCE PURPOSES ONLY, CONTRACTOR TO VERIFY DRAWINGS.



NO.	REVISIONS				BY	DATE															
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024																			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420																			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 800 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002																			
NORTHPARK DRIVE																					
PLANTING AND ESTABLISHMENT (MOD)																					
PLANT SPECIFICATIONS																					
SHEET 3 of 13																					
(P 105)																					
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.																
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS																
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.															
CHECKED:	HOU	MONTGOMERY	0912	37	232	697															

TYPE OF WORK				ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK		
TREES 192-2063 PLANT BED PREP (TYPE I) SY	BLOCK SOD 192-2064 PLANT BED PREP (TYPE II) SY	SHRUBS/GC 192-2065 PLANT BED PREP (TYPE III) SY	FBR MULCH 192-2066 PLANT BED PREP (TYPE IV) SY	Reference Item 161, 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Reference Special Specification Item 1009.		
✓		✓		161 - 2012 GENERAL USE COMPOST CY	APPLICATION RATE Item 161.2.C. General Use Compost. Apply 1" uniform layer over TYPE II & IV planting bed prior to rip trenching Apply 3" uniform layer over TYPE I & III planting bed prior to tilling in.	Item 161.2. Materials. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.
✓				1009-2002 LANDSCAPE SOIL AMENDMENT (TYPE I) EA Trees Only at Time of Installation	APPLICATION RATE Apply three (3) packets(3 ounces each) into backfill mix at time of initial installation for each tree.	USE A NON-CHEMICAL FERTILIZER WITH THE FOLLOWING REQUIREMENTS; (1) Includes bio-stimulant additives of Kelp, Humates, Yucca, Amino Acids, Plant Hormones, natural sugars, as well as beneficial bacteria. (2) Derived from the following natural, biological sources. (3) Includes slow release water absorbing polymer (4) Use the following product or approved equal: JRM Mycorrhizal Innoculants with polymer additive, Distributed by San Jacinto Environmental Supplies, 713-957-0909.
	✓		✓	1009-2003 LANDSCAPE SOIL AMENDMENT (TYPE II) SY Turf/Sod Only	APPLICATION RATE (ONCE AT TIME OF PLANTING) Apply 0.20 lbs/SY. (20 lbs per 1,000 Square Feet) at time of initial installation, prior to seeding or sodding activities.	All organic biological fertilizer 100% slow release, 1.7% Iron, 2.5% Sulfure Non-burning. Pelletized humate without added binders and pass #16 mesh. Use the following product or an approved equal: San Jacinto Humates Plus 0-0-4, San Jacinto Environmental Supplies, 713-957-0909.
✓				1009-2004 LANDSCAPE SOIL AMENDMENT (TYPE III) SY Trees Only	See PLANTING AND ESTABLISHMENT SHEET 5 of 10 For Requirements	
		✓		1009-2005 LANDSCAPE SOIL AMENDMENT (TYPE IV) SY Shrub/ G.C Only	See PLANTING AND ESTABLISHMENT SHEET 5 of 10 For Requirements	
	✓		✓	0166-6001 FERTILIZER AC Turf/Sod Only	APPLICATION RATE Apply 0.20 lbs/SY. (20 lbs per 1,000 Square Feet) Each application is paid for separately. See timeline for multiple applications. (Once at time of planting and once at 60 days)	USE A NON-CHEMICAL FERTILIZER WITH THE FOLLOWING REQUIREMENTS; (1) Is registered with a Texas State Chemist as a commercial fertilizer (2) Meets USPEA guidelines for unrestricted use. (3) Derived from the following biological source: process bat guano or as approved. (4) 100% slow release, 2% Iron, that will not burn and is animal safe (5) Pelletized (6) Use the following product or approved equal Microlife Ultimate 6-2-4 manufactured by San Jacinto Environmental Supplies, 713-957-0909.
				RIPPING/TRENCHING Incidental to Item 192 Plant Bed Preparation.	RIP/TRENCH DEPTH Rip/Trench to a depth of 18 inches (+/- 2") distance between each rip/trench is 24 inches.	
✓		✓		ROTOR TILLING Incidental to Item 192 Plant Bed Preparation.	ROTOR TILL DEPTH After application of compost and amendments and rip/trench (when required), rotor till to a depth of ±12 inches.	
✓	✓	✓	✓	Pre-planting HERBICIDE and MOWING Incidental to Item 192 Plant Bed Preparation. Scalp mow 15 days after final herbicide treatment.	APPLICATION RATE Prior to all other work, apply two applications of an approved herbicide with 15 days between the applications. Apply herbicide during weather conditions and at a rate per manufacturer's recommendations.	

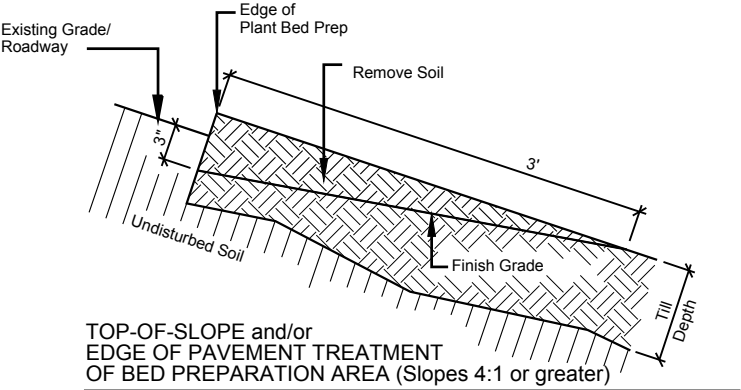
- GENERAL BED PREPARATION NOTES:
- Reference Item 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements not shown.
 - Locate and stake all underground conduits and utilities associated with but not limited to: CTMS, CTMS power supply, lighting, signal wires and detectors, gas, electric, telephone, fiber optics, etc.
 - Locate and stake existing ground boxes, inlets, culverts, manholes, etc. within the project area with a 4' wooden stake painted orange. Maintain the stakes in place for duration of the project. Remove stakes when directed by engineer.
 - Repair any damage within right of way (ROW) caused by contractor at no additional expense to the project.
 - Provide a 1000 SF "mock up" of soil amendment, general use compost, and bed preparation complete and in place within an approved area for approval by engineer.
 - Pick-up litter prior to scalp mow and bed preparation.
 - All concrete, steel, trash, and other debris uncovered during bed preparation work which the engineer determines as detrimental to the project will become the responsibility of the contractor and disposed of in an approved manner. Debris removal will occur daily and will be incidental to bed preparation and will not be paid for separately.
 - Reference Item 5.7 Inspection of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2004. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance.
 - Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.



SHRUB GROUND COVER PLANTING BED PREPARATION

SEE ITEMS AND REQUIREMENTS THIS SHEET FOR DIMENSIONS, RATES, AND SPECIFICATIONS

(See Top-of-Slope detail this sheet when applicable)



TOP-OF-SLOPE and/or
EDGE OF PAVEMENT TREATMENT
OF BED PREPARATION AREA (Slopes 4:1 or greater)

Install at all areas with the following conditions:

Within the bed preparation areas at top-of-slope (adjacent to shoulder sections and areas with slotted barrier/curb) and/or at edge of roadway, remove tilled or untilled (TYPE III) soil as shown. Evenly distribute removed soil in a thin layer over adjacent existing tilled or untilled (TYPE III) soil being careful not to create a mound. This work is incidental to Item 192 Plant Bed Prep Preparation.



DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.
CHECKED:	HOU	MONTGOMERY	0912	37
				SHEET No. 698

NO. REVISIONS BY DATE

M2L ASSOCIATES, INC.
8955 KATY FWY, SUITE 300
HOUSTON, TX 77024

HNTB Corporation
The HNTB Companies
Infrastructure Solutions
Firm Registration Number 420

LAKE HOUSTON REDEVELOPMENT
AUTHORITY & TIRZ-10
c/o ALLEN HUNTON ANDREWS
KURTH LLP
800 TRAVIS, SUITE 4200
HOUSTON, TEXAS 77002




CITY OF HOUSTON
HOUSTON PUBLIC WORKS

NORTH PARK DRIVE

PLANTING AND ESTABLISHMENT (MOD)
BED PREPARATION
SHEET 4 of 13
(P 106)

FERTILIZERS AND SOIL AMENDMENTS FOR TREES	FERTILIZERS AND SOIL AMENDMENTS FOR SHRUBS AND GROUNDCOVER
<div>ITEM 1009-2004 LANDSCAPE SOIL AMMENDMENT (TYPE III) (Each application is paid for separately. See timeline for multiple applications)</div> <div>MATERIALS REQUIREMENTS</div> <div>NON-CHEMICAL FERTILIZER WITH THE FOLLOWING REQUIREMENTS;<ol style="list-style-type: none">Is registered with a Texas State Chemist as a commercial fertilizerMeets USEPA guidelines for unrestricted use.Derived from the following biological source: process bat guano or as approved.Contains a minimum of 8.0% nitrogen (4.0% being water insoluble, 6.0% phosphate)Mix into top 6"-8" of backfill mix for each tree, shrub, and ground cover at time of installation, subsequent treatments shall be applied to entire planting area.Use the following product or approved equal<ul style="list-style-type: none">* Microlife Ultimate 8-4-6 manufactured by San Jacinto Environmental Supplies, 713-957-0909. At a rate of 2 ounces per 5 gallons container increments (i.e 30 gallon Container would require 12 oz of Granular Fertilizer)ROOT STIMULATOR/FOLIAR SPRAY;<ol style="list-style-type: none">Meets USEPA guidelines for unrestricted use.ComprehensiveApply at a rate of 2 ounces per gallon of water for ±8 ounces per 1,000 square foot.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.Use the following product or approved equal<ul style="list-style-type: none">* Ocean Harvest 4-2-3 distributed by San Jacinto Environmental Supplies, 713-957-0909.EQUIPMENT REQUIREMENTS FOR LIQUID INGREDIENTS<p>For each batch use a delivery tank verified for overall cleanliness, to be free of residue soil, compost, or stains. Tank shall then be rinsed with clean, non-chlorinated, or non-chloramines treated well water before filling with required ingredients. All equipment used for application of liquid ingredients must never been used or will not be used with any non-organic conventional inorganic fertilizers or chemical herbicides or pesticides. Contractor must submit written verification to this condition.</p><p>Tank shall be equipped with two, 2-inch quick coupler type fittings capable of coupling, without leaks. All lines and fittings should have quick couplers at every junction. Ninety (90) degree bend fittings should be avoided for quick clean-out and verification of cleanliness.</p><div>TRANSPORT, STORAGE AND APPLICATION REQUIREMENTS</div><p>Delivery tank must be equipped with an operating circulation pump of a low velocity / high volume pump or diaphragm or centrifugal design.</p><p>Injectors capable of penetrating four (4) inches into soil and/or root-balls as manufactured by LESCO Deeprout Feeder or approved equal.</p><p>Delivery tank must be equipped with an operating aeration system.</p><p>Dissolved oxygen meter.</p><p>Liquid ingredients with additive solution must be circulated for five (5) minutes per five hundred (500) gallons of material every three (3) hours. Liquid additives solution must be continuously aerated from the time of manufacture through complete application. All solutions must be applied within 24 hours, or new material must be sourced. Solutions not applied within 24 hours after mixing shall not be allowed and must be discarded.</p><div>CONSTRUCTION METHODS AND APPLICATION RATES</div><div>TREES ONLY AT TIME OF INSTALLATION;<ol style="list-style-type: none">Contractor shall layout all planting beds and prepare planting pits for trees as per the requirements of Planting Bed Preparation, Planting and Establishment Sheet 7 of 13.Prepare root mass of planting material as per Planting and Establishment Sheet 7 of 13.Apply liquid root stimulator to soak entire root ball.Apply Mycorrhizza amendment to the planting pit and incorporate into the top 6"-8" planting bed backfill mix at the required rate. Pay item LANDSCAPE SOIL AMENDMENT (TYPE I) 1006-6001Install plant material root ball.Incorporate dry, non-chemical fertilizer to backfill mix at the rates specified herein.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.SUBSEQUENT APPLICATIONS FOR TREES ONLY;<ol style="list-style-type: none">Install at intervals as outlined on Planting and Establishment Sheet 7 of 13Each injection shall equal one square yard of Landscape Soil Amendment (TY III) 1009-2004Deep root fertilization applications shall occur prior to mulch top dressing if applicable.Inject 1/2 gallon liquid ingredients with additives four (4) inches into the root zone and/or root ball of each tree. Inject in multiple locations around the approximate root zone & 18" O.C.</div><div>ITEM 1009-2005 LANDSCAPE SOIL AMMENDMENT (TYPE IV)</div><div>MATERIALS REQUIREMENTS</div><div>NON-CHEMICAL FERTILIZER WITH THE FOLLOWING REQUIREMENTS;<ol style="list-style-type: none">Is registered with a Texas State Chemist as a commercial fertilizerMeets USEPA guidelines for unrestricted use.Derived from the following biological source: process bat guano or as approved.Contains a minimum of 8.0% nitrogen (4.0% being water insoluble, 6.0% phosphate)Mix into top 6"-8" of backfill mix for each tree, shrub, and ground cover at time of installation, subsequent treatments shall be applied to entire planting area.Use the following product or approved equal<ul style="list-style-type: none">* Microlife Ultimate 8-4-6 manufactured by San Jacinto Environmental Supplies, 713-957-0909.At a rate of 20 lbs. per 1000 square foot of planting bed.ROOT STIMULATOR/FOLIAR SPRAY;<ol style="list-style-type: none">Meets USEPA guidelines for unrestricted use.ComprehensiveApply at a rate of 2 ounces per gallon of water for ±8 ounces per 1,000 square foot.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.Use the following product or approved equal<ul style="list-style-type: none">* Ocean Harvest 4-2-3 distributed by San Jacinto Environmental Supplies, 713-957-0909.EQUIPMENT REQUIREMENTS FOR LIQUID INGREDIENTS<p>For each batch use a delivery tank verified for overall cleanliness, to be free of residue soil, compost, or stains. 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Solutions not applied within 24 hours after mixing shall not be allowed and must be discarded.</p><div>CONSTRUCTION METHODS AND APPLICATION RATES</div><div>SHRUB, ORNAMENTAL GRASSES, AND GROUND COVER ONLY AT TIME OF INSTALLATION;<ol style="list-style-type: none">Contractor shall layout all planting beds and prepare planting beds per the requirements of Planting Bed Preparation, Planting and Establishment Sheet 7 of 13.Prepare root mass of planting material as per Planting and Establishment Sheet 7 of 13.Apply liquid root stimulator to soak entire root ballInstall plant material root ball.Incorporate dry, non-chemical fertilizer to backfill mix at the rates specified herein.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.SUBSEQUENT APPLICATIONS FOR SHRUBS, ORNAMENTAL GRASSES, AND GROUND COVERS ONLY;<ol style="list-style-type: none">Install at intervals as outlined on Planting and Establishment Sheet 7 of 13Apply dry non-chemical fertilizers over entire planting bed limits.Apply prior to installing mulch top dressing if applicable</div></div></div>	<div>ITEM 1009-2005 LANDSCAPE SOIL AMMENDMENT (TYPE IV)</div> <div>MATERIALS REQUIREMENTS</div> <div>NON-CHEMICAL FERTILIZER WITH THE FOLLOWING REQUIREMENTS;<ol style="list-style-type: none">Is registered with a Texas State Chemist as a commercial fertilizerMeets USEPA guidelines for unrestricted use.Derived from the following biological source: process bat guano or as approved.Contains a minimum of 8.0% nitrogen (4.0% being water insoluble, 6.0% phosphate)Mix into top 6"-8" of backfill mix for each tree, shrub, and ground cover at time of installation, subsequent treatments shall be applied to entire planting area.Use the following product or approved equal<ul style="list-style-type: none">* Microlife Ultimate 8-4-6 manufactured by San Jacinto Environmental Supplies, 713-957-0909.At a rate of 20 lbs. per 1000 square foot of planting bed.ROOT STIMULATOR/FOLIAR SPRAY;<ol style="list-style-type: none">Meets USEPA guidelines for unrestricted use.ComprehensiveApply at a rate of 2 ounces per gallon of water for ±8 ounces per 1,000 square foot.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.Use the following product or approved equal<ul style="list-style-type: none">* Ocean Harvest 4-2-3 distributed by San Jacinto Environmental Supplies, 713-957-0909.EQUIPMENT REQUIREMENTS FOR LIQUID INGREDIENTS<p>For each batch use a delivery tank verified for overall cleanliness, to be free of residue soil, compost, or stains. 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Solutions not applied within 24 hours after mixing shall not be allowed and must be discarded.</p><div>CONSTRUCTION METHODS AND APPLICATION RATES</div><div>SHRUB, ORNAMENTAL GRASSES, AND GROUND COVER ONLY AT TIME OF INSTALLATION;<ol style="list-style-type: none">Contractor shall layout all planting beds and prepare planting beds per the requirements of Planting Bed Preparation, Planting and Establishment Sheet 7 of 13.Prepare root mass of planting material as per Planting and Establishment Sheet 7 of 13.Apply liquid root stimulator to soak entire root ballInstall plant material root ball.Incorporate dry, non-chemical fertilizer to backfill mix at the rates specified herein.Apply to root mass of plant material and soak at time of installation, subsequent applications shall be applied as a foliar spray for trees, shrubs, and ground covers.SUBSEQUENT APPLICATIONS FOR SHRUBS, ORNAMENTAL GRASSES, AND GROUND COVERS ONLY;<ol style="list-style-type: none">Install at intervals as outlined on Planting and Establishment Sheet 7 of 13Apply dry non-chemical fertilizers over entire planting bed limits.Apply prior to installing mulch top dressing if applicable</div></div>



NO.	REVISIONS	BY	DATE
	M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		
	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420		
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002	
NORTH PARK DRIVE			
FERTILIZERS AND SOIL AMENDMENTS			
SHEET 5 of 10 (P 107)			
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37
			JOB No. 232
			SHEET No. 699

PROJECT CONDITIONS DURING INSTALLATION AND SUSPENSION

During project installation and suspension periods, project site conditions are contractor's responsibility. Contractor will maintain project site conditions as shown on plans. All project site maintenance work is incidental and is not paid for separately unless otherwise shown on plans. Reference pertinent items of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

DESCRIPTION OF WORK		TIMELINE	
BEGINNING OF PROJECT CONSTRUCTION OR SUSPENSION		END OF CONSTRUCTION/INSTALLATION	
WATERING SEE PLANTING AND ESTABLISHMENT SHEET 4 of 13, VEGETATIVE WATERING SCHEDULE FOR TREES, SHRUBS, VINES)		FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
MOWING, TRIMMING, AND EDGING (From back of curb, retaining wall, barrier, and riprap to bed preparation areas, otherwise 6' width around outside edge of bed preparation areas, around and between planting bed preparation areas, including areas around any structures within the outer limits adjacent to the roadway) DO NOT MOW, TRIM, OR EDGE WITHIN 3' of ANY TREE		FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
WEED CONTROL REQUIREMENT <div><input checked="" type="checkbox"/></div> See PLANTING AND ESTABLISHMENT SHEET 7 of 13 For Requirements	PLANT BASIN, BED, AND WORKSITE MAINTENANCE (Includes keeping all inlets within or near the bed preparation areas free of compost. Maintain bed preparation areas as shown below and reshape beds every 30 days or as site conditions and weather require. If no requirement is selected, maintain per Item 192.3.O.3)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
	PLANT SUPPORTS See PLANTING AND ESTABLISHMENT SHEET 7 of 13 For Requirements	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
	PRUNING (Includes palm plant material and dead, diseased, or damaged palm fronds.)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
	INSECT, DISEASE, AND ANIMAL INSPECTION AND TREATMENT (Exterminate all active ant colonies in bed preparation areas)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
	LITTER AND DEBRIS COLLECTION AND DISPOSAL (Includes planting bed preparation areas and designated mowing limits. In addition, keep all inlets within or near planting bed preparation areas free of debris and litter)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
TREE TRUNK WRAP AND PROTECTION GUARD REMOVAL AND DISPOSAL (Not applicable)		FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
PLANT REPLACEMENT *			
1009-6003	SOIL AMENDMENT (TYPE III) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 13, each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
1009-6004	SOIL AMENDMENT (TYPE IV) (PLANTING AND ESTABLISHMENT SHEETS 4 AND 5 of 13, each application will be paid for separately)	FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
FERTILIZER SEE PLANTING AND ESTABLISHMENT SHEETS 4 of 12, FOR TURF AND SOD INSTALLATION)		FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	
IRRIGATION SYSTEM (ONLY WHEN ITEM 170 IRRIGATION SYSTEM OR A TEMPORARY IRRIGATION SYSTEM IS PART OF THE CONTRACT, SEE IRRIGATION DETAILS AND MATERIALS SHEET 1 OF 13, GUARANTEE AND ACCEPTANCE)		FOLLOW SAME REQUIREMENTS AND FREQUENCY SHOWN ON PLANTING AND ESTABLISHMENT SHEET 7 OF 13.	

* Remove any materials damaged by actions described in Item 7.18.1. Removal and disposal of damaged materials is incidental to Item 192. Contractor may be reimbursed for plant replacement in accordance with Item 7.18.1. Theft is not a reimbursable repair.



NO.	REVISIONS	BY	DATE
	M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		
	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420		
CITY OF HOUSTON HOUSTON PUBLIC WORKS		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ-10 610 ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002	
NORTHPARK DRIVE			
PROJECT CONDITIONS			
SHEET 6 of 13			
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.
CHECKED:	HOU	MONTGOMERY	0912
			37
			232
			700

ITEM 192 LANDSCAPE PLANTING MAINTENANCE REQUIREMENTS

After completion of the project installation, as shown in the plans and approved by the engineer, begin maintenance activities for a period of 90 calendar days as described in ITEM 192.3.O. Payment in accordance with ITEM 192.5 is subject to completion of all scheduled maintenance activities, timeline may also be suspended for failure to complete scheduled maintenance activities. All maintenance work is incidental and is not paid for separately unless otherwise shown on plans.

Reference Item 170 and 192 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown.

Notify engineer prior to each site visit, determination of the completeness of work will be done in the presence of the engineer same day as work activity.

[illegible]

* Remove any materials damaged by actions described in Item 7.18.1. Removal and disposal of damaged materials is incidental to Item 192. Contractor may be reimbursed for plant replacement in accordance with Item 7.18.1. Theft is not a reimbursable repair.

✓ = Work required during defined period of timeline.
All work must be completed for entire project.

NOTES:

Reference Item 5.10 Inspection of the Texas Standard Specifications for



1. Construction and Maintenance of Highways, Streets, and Bridges 2014. At any time during all phases of the contract, any materials or work performed not in accordance with the plans and specifications will be replaced and/or reworked until in compliance. Any adjustments due to the failure to comply with plans and specifications shown will be at contractors expense.
- 2.

[illegible]

TYPE OF WORK

ITEMS AND REQUIREMENTS FOR EACH TYPE OF WORK

SODDING	PERMANENT SEEDING		Reference Item 161, 162, 164, 166, 168 of the Texas Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges 2014 for specifications, dimensions, volumes and measurements that are not shown. Use latest Houston District, Special Provisions for those items indicated.											
✓	✓		0161-6012 GENERAL USE COMPOST	APPLICATION RATE General Use Compost 1" Over Entire Area	Item 161.2. Materials. Submit quality control (QC) documentation to the Engineer. Compost producer's STA certification must be dated to meet STA requirements (certification must be within 30 or 90 days per STA requirements). Lab analysis performed by an STA-certified lab must be dated within 30 days before delivery of the compost.									
✓	✓		162-6002 BLOCK SODDING SY	GRASS SPECIES Item 162.2. Materials. Celebration Bermuda (Cynodon Dactylon 'Celebration')	Item 162.2.A. Block Sod. Use block palletized or roll type sod. REMOVE PLASTIC BACKING FROM ROLL TYPE SOD. Place sod within 48 hours of delivery to site. No exceptions. Place sod with joints alternating on each row to prevent continuous joint lines. Peg sod as needed with wood pegs to hold sod in place. Pegging sod is subsidiary to Item 162.									
✓	✓		164-6023 CELLULAR FIBER MULCH	PLANTING MONTH SEED MIX <table><tr><td>OCT 1 - DEC 31</td><td>Unulled Celebration Bermuda ANNUAL RYE GRASS (GULF)</td><td>2lbs / 1000 sf 1.5lbs / 1000 sf</td></tr><tr><td>JAN 1 - APRIL 14</td><td>Hulled Celebration Bermuda Unhulled Celebration Bermuda Annual Rye Grass (GULF)</td><td>1lbs / 1000 sf 1lbs / 1000 sf 3/4lbs / 1000 sf</td></tr><tr><td>APRIL 15 - SEP 15</td><td>Hulled Celebration Bermuda</td><td>2lbs / 1000 sf</td></tr></table>	OCT 1 - DEC 31	Unulled Celebration Bermuda ANNUAL RYE GRASS (GULF)	2lbs / 1000 sf 1.5lbs / 1000 sf	JAN 1 - APRIL 14	Hulled Celebration Bermuda Unhulled Celebration Bermuda Annual Rye Grass (GULF)	1lbs / 1000 sf 1lbs / 1000 sf 3/4lbs / 1000 sf	APRIL 15 - SEP 15	Hulled Celebration Bermuda	2lbs / 1000 sf	PLS (Pure Live Seed) Provide documentation of PLS requirements per Item 164.2.A CONSTRUCTION. Cultivate the area to a depth of 4 inches before placing the seed unless otherwise directed. When performing permanent seeding after an established temporary seeding, cultivate the seedbed to a depth of 4 inches or mow the area before placement of the permanent seed. Plant the seed and place the straw or hay mulch after the area has been completed to lines and grades as shown on the plans. Drill Seeding. Plant seed or seed mixture uniformly over the area shown on the plans at a depth of 1/4 to 1/3 inch using a cultipacker(turfgrass) type seeder. Plant seed along the contour of the slopes. Use broadcast seeding method where site conditions prevent drill seeding method. Broadcast Seeding. Distribute the dry seed or dry seed mixture uniformly over the areas shown on the plans using hand or mechanical distribution on top of soil.
OCT 1 - DEC 31	Unulled Celebration Bermuda ANNUAL RYE GRASS (GULF)	2lbs / 1000 sf 1.5lbs / 1000 sf												
JAN 1 - APRIL 14	Hulled Celebration Bermuda Unhulled Celebration Bermuda Annual Rye Grass (GULF)	1lbs / 1000 sf 1lbs / 1000 sf 3/4lbs / 1000 sf												
APRIL 15 - SEP 15	Hulled Celebration Bermuda	2lbs / 1000 sf												
			164-6051 DRILL SEED(TEMP)(WARM OR COOL) SY Item 164.1. Description Provide and install seeding as shown on District Standard	PLANTING MONTH SEED MIX <table><tr><td>March, April, May, June, July, August, September, October</td><td>Foxtail Millet (Setaria italica)</td><td>- 34.0 lbs PLS/acre</td></tr><tr><td>November, December, January, February,</td><td>Oats (Avena sativa)</td><td>- 72.0 lbs PLS/acre</td></tr></table>	March, April, May, June, July, August, September, October	Foxtail Millet (Setaria italica)	- 34.0 lbs PLS/acre	November, December, January, February,	Oats (Avena sativa)	- 72.0 lbs PLS/acre				
March, April, May, June, July, August, September, October	Foxtail Millet (Setaria italica)	- 34.0 lbs PLS/acre												
November, December, January, February,	Oats (Avena sativa)	- 72.0 lbs PLS/acre												
			164-6009 BROADCAST SEED(TEMP)(WARM) SY Item 164.1. Description Provide and install seeding as shown on District Standard											
			162-6003 STRAW OR HAY MULCH SY	APPLICATION RATE Immediately after planting the seed or seed mixture, apply straw or hay mulch uniformly over the seeded area. Apply straw or hay mulch at 2 tons per acre. Use tacking agent with straw or hay mulch as described on this sheet.	Use straw or hay mulch in conformance with Article 162.2.E, "Mulch." Use biodegradable tacking agents only applied at a rate in accordance with manufacturer's recommendations. Use the following products or an approved equal(see note this sheet): Conweb/Contac Guar Gum, Profile Products Corporation, (307) 655-9565, Ramtec/Procol/Viscol Guar Gum, Ramtec Corporation, (800) 366-1180									
✓	✓		166-6001 FERTILIZER AC Item 166.2. Materials	APPLICATION RATE Apply 0.20 lbs / sy (20lbs per 1000 / sf)	Use a NON-CHEMICAL fertilizer which meets all the following criteria: (1) BRAND NAME must be registered with the Texas State Chemist as a commercial fertilizer. (2) Meets USEPA guidelines for unrestricted use. (3) Derived from biological sources such as, Bat Guano (4) In granular, Pelletized form and essentially dust free. Submit proof of registration and nutrient source to Landscape Architect. Use the following products or an approved equal (see note this sheet): Micro Life Ultimate 6-2-4 as manufactured by San Jacinto Environmental Supplies Attention: Greg Cooper (713) 957 - 0509									
✓	✓		168-6001 VEGETATIVE WATERING MG	APPLICATION RATE Item 168.3 Construction. 6000 gallons/acre per working day X 20 consecutive working days = 120,000 gallons total/acre	Begin watering immediately after installation of seed or sod. Replace, fertilize, and water any seed or sod in poor condition due to the failure to apply the specified amount of water within the time allowed at no expense to the project.									

NO.	REVISIONS				BY
			M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024		
			HNTB Corporation The HNTB Companies		



NO.	REVISIONS	BY	DATE		
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTH PARK DRIVE					
FERTILIZER, SEED, SOD, STRAW, COMPOST, AND WATER					
SHEET 8 OF 13					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					702

SEQUENCE OF WORK

BLOCK SOD	PERMANENT SEEDING
1. GENERAL USE COMPOST 2. FERTILIZER & HUMATES 3. CULTIVATE SOIL (ITEM 162.3) 4. SOD 5. VEGETATIVE WATERING	1. FERTILIZER & SOIL AMENDMENTS 2. GENERAL USE COMPOST 3. CULTIVATE SOIL (ITEM 164.3 AND 161.3.1) 4. PERMANENT SEEDING 5. VEGETATIVE WATERING

ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		
500	NA	South side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		543	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone B		
501	NA	South side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		544	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone B		
502	NA	South side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		545	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone C		
503	NA	South side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		546	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone E		
504	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone A		547	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone B		
505	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone A		548	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		
506	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone A		549	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		
507	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone A		550	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		
508	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone A		551	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		
509	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone A		552	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		
510	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone A		553	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone A		
511	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone C		554	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone B		
512	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone A		555	NA	South side of Northpark Dr.	PINE	11-13	Fair	Preserve		Preservation Treatment		
513	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone A		556	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Preserve		Preservation Treatment		
514	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		557	NA	South side of Northpark Dr.	PINE	11-13	Fair	Preserve		Preservation Treatment		
515	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone B		558	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone A		
516	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone C		559	NA	South side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		
517	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		560	NA	South side of Northpark Dr.	WATER OAK	2.5-4	Fair	Transplant	S	Zone C		
518	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		561	NA	South side of Northpark Dr.	WATER OAK	2.5-4	Fair	Transplant	S	Zone C		
519	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		562	NA	Median of Northpark Dr.	CREPE MYRTLE	11-13	Fair	Remove	A	No Replacement		
520	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone C		563	NA	Median of Northpark Dr.	CREPE MYRTLE	4-8	Fair	Remove	A	No Replacement		
521	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		564	NA	Median of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		
522	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone C		565	NA	Median of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		
523	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone C		566	NA	Median of Northpark Dr.	CREPE MYRTLE	11-13	Fair	Remove	A	No Replacement		
524	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone G		567	NA	Median of Northpark Dr.	CREPE MYRTLE	4-8	Fair	Remove	A	No Replacement		
525	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone F		568	NA	Median of Northpark Dr.	CREPE MYRTLE	4-8	Fair	Remove	A	No Replacement		
526	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone F		569	NA	Median of Northpark Dr.	CREPE MYRTLE	4-8	Fair	Remove	A	No Replacement		
527	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone F		570	NA	North side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		
528	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone E		571	NA	North side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		
529	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone E		572	NA	North side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		
530	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone B		573	NA	North side of Northpark Dr.	CREPE MYRTLE	8-10	Fair	Remove	A	No Replacement		
531	NA	South side of Northpark Dr.	RED OAK	2.5-4	Fair	Transplant	S	Zone C		574	NA	North side of Northpark Dr.	WATER OAK	11-13	Fair	Transplant	S	Zone B		
532	NA	South side of Northpark Dr.	RED OAK	2.5-4	Fair	Transplant	S	Zone C		575	NA	North side of Northpark Dr.	WATER OAK	11-13	Fair	Transplant	S	Zone A		
533	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone D		576	NA	North side of Northpark Dr.	WATER OAK	11-13	Fair	Transplant	S	Zone B		
534	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone G		577	NA	North side of Northpark Dr.	WATER OAK	8-10	Fair	Transplant	S	Zone A		
535	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone G		578	NA	North side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone B		
536	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone A		579	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone C		
537	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone B		580	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone C		
538	NA	South side of Northpark Dr.	PINE	8-10	Fair	Transplant	S	Zone A		581	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone C		
539	NA	South side of Northpark Dr.	RED OAK	11-13	Fair	Transplant	S	Zone D		582	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone C		
540	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone D		583	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone C		
541	NA	South side of Northpark Dr.	PINE	11-13	Fair	Transplant	S	Zone A		584	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		
542	NA	South side of Northpark Dr.	RED OAK	8-10	Fair	Transplant	S	Zone A		585	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		



NO.	REVISIONS			BY	DATE
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE					
TRANSPLANTED TREE INVENTORY TXDOT					
SHEET 9 of 13					
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					703

ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		
586	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		629	21+28	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
587	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		630	21+83	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		
588	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		631	23+24	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
589	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		632	23+37	North side of Northpark Dr.	PINE	8	Fair	Preserve		No Replacement		
590	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		633	23+38	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
591	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		634	23+41	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
592	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		635	23+47	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
593	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		636	23+48	North side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
594	NA	South side of Northpark Dr.	LOBLOLLY PINE	4-8	Fair	Transplant	S	Zone B		637	23+43	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
595	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone B		638	23+52	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
596	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		639	23+63	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
597	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		640	23+69	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
598	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Preserve		Preservation Treatment		641	23+62	North side of Northpark Dr.	OAK	14	Fair	Preserve		No Replacement		
599	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone A		642	24+10	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
600	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		643	24+39	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
601	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		644	24+57	North side of Northpark Dr.	PINE	3	Fair	Remove	A	Replace In For Inch		
602	NA	South side of Northpark Dr.	LIVE OAK	4-8	Fair	Transplant	S	Zone C		645	25+13	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
603	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		646	25+24	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
604	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		647	25+33	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
605	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		648	26+14	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
606	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		649	27+00	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
607	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		650	27+11	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
608	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		651	27+26	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
609	17+47	North side of Northpark Dr.	PINE	16	Fair	Preserve		No Replacement		652	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
610	17+89	North side of Northpark Dr.	OAK	3	Fair	Preserve		No Replacement		653	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
611	18+11	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		654	27+48	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
612	18+37	North side of Northpark Dr.	PINE	12	Fair	Remove	A	Replace In For Inch		655	17+73	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
613	18+50	North side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		656	18+07	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
614	18+60	North side of Northpark Dr.	OAK	3	Fair	Remove	A	Replace In For Inch		657	18+39	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
615	18+73	North side of Northpark Dr.	PINE	10	Fair	Remove	A	Replace In For Inch		658	18+78	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
616	18+93	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		659	19+18	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
617	19+14	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		660	23+89	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
618	19+77	North side of Northpark Dr.	PINE	18	Fair	Remove	A	Replace In For Inch		661	24+41	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
619	20+18	North side of Northpark Dr.	OAK	22	Fair	Remove	A	Replace In For Inch		662	24+84	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
620	20+89	North side of Northpark Dr.	PINE	16	Fair	Remove	A	Replace In For Inch		663	25+15	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
621	20+92	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		664	25+54	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
622	21+09	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		665	25+73	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
623	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		666	26+14	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
624	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		667	17+60	South side of Northpark Dr.	OAK	16	Fair	Preserve		No Replacement		
625	20+98	North side of Northpark Dr.	PINE	24	Fair	Remove	A	Replace In For Inch		668	17+82	South side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		
626	20+95	North side of Northpark Dr.	PINE	22	Fair	Remove	A	Replace In For Inch		669	17+87	South side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
627	20+98	North side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		670	18+44	South side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
628	21+13	North side of Northpark Dr.	PINE	20	Fair	Remove	A	Replace In For Inch		671	18+69	South side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		



NO.	REVISIONS			BY	DATE
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE					
TRANSPLANTED TREE INVENTORY COH					
SHEET 10 of 13					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					704

ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		
586	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		629	21+28	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
587	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		630	21+83	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		
588	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		631	23+24	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
589	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		632	23+37	North side of Northpark Dr.	PINE	8	Fair	Preserve		No Replacement		
590	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		633	23+38	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
591	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		634	23+41	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
592	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		635	23+47	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
593	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		636	23+48	North side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
594	NA	South side of Northpark Dr.	LOBLOLLY PINE	4-8	Fair	Transplant	S	Zone B		637	23+43	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
595	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone B		638	23+52	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
596	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		639	23+63	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
597	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		640	23+69	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
598	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Preserve		Preservation Treatment		641	23+62	North side of Northpark Dr.	OAK	14	Fair	Preserve		No Replacement		
599	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone A		642	24+10	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
600	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		643	24+39	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
601	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		644	24+57	North side of Northpark Dr.	PINE	3	Fair	Remove	A	Replace In For Inch		
602	NA	South side of Northpark Dr.	LIVE OAK	4-8	Fair	Transplant	S	Zone C		645	25+13	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
603	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		646	25+24	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
604	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		647	25+33	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
605	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		648	26+14	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
606	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		649	27+00	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
607	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		650	27+11	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
608	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		651	27+26	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
609	17+47	North side of Northpark Dr.	PINE	16	Fair	Preserve		No Replacement		652	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
610	17+89	North side of Northpark Dr.	OAK	3	Fair	Preserve		No Replacement		653	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
611	18+11	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		654	27+48	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
612	18+37	North side of Northpark Dr.	PINE	12	Fair	Remove	A	Replace In For Inch		655	17+73	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
613	18+50	North side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		656	18+07	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
614	18+60	North side of Northpark Dr.	OAK	3	Fair	Remove	A	Replace In For Inch		657	18+39	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
615	18+73	North side of Northpark Dr.	PINE	10	Fair	Remove	A	Replace In For Inch		658	18+78	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
616	18+93	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		659	19+18	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
617	19+14	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		660	23+89	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
618	19+77	North side of Northpark Dr.	PINE	18	Fair	Remove	A	Replace In For Inch		661	24+41	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
619	20+18	North side of Northpark Dr.	OAK	22	Fair	Remove	A	Replace In For Inch		662	24+84	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
620	20+89	North side of Northpark Dr.	PINE	16	Fair	Remove	A	Replace In For Inch		663	25+15	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
621	20+92	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		664	25+54	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
622	21+09	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		665	25+73	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
623	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		666	26+14	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
624	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		667	17+60	South side of Northpark Dr.	OAK	16	Fair	Preserve		No Replacement		
625	20+98	North side of Northpark Dr.	PINE	24	Fair	Remove	A	Replace In For Inch		668	17+82	South side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		
626	20+95	North side of Northpark Dr.	PINE	22	Fair	Remove	A	Replace In For Inch		669	17+87	South side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
627	20+98	North side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		670	18+44	South side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
628	21+13	North side of Northpark Dr.	PINE	20	Fair	Remove	A	Replace In For Inch		671	18+69	South side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		



NO.	REVISIONS				BY	DATE	
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024					
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420					
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002					
NORTHPARK DRIVE							
TRANSPLANTED TREE INVENTORY COH							
SHEET 10 of 13							
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.		
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS		
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.	SHEET No.	
CHECKED:	HOU	MONTGOMERY	0912	37	232	705	

ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		ID #	STATION	LOCATION	SPECIES	DIA. (IN)	CONDITION	STATUS	TREATMENT	MITIGATION		
586	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		629	21+28	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
587	NA	North side of Northpark Dr.	SWEET GUM	2.5-4	Fair	Transplant	S	Zone A		630	21+83	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		
588	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		631	23+24	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
589	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		632	23+37	North side of Northpark Dr.	PINE	8	Fair	Preserve		No Replacement		
590	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		633	23+38	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
591	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		634	23+41	North side of Northpark Dr.	OAK	12	Fair	Preserve		No Replacement		
592	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		635	23+47	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
593	NA	South side of Northpark Dr.	CREPE MYRTLE	2.5-4	Fair	Remove	A	No Replacement		636	23+48	North side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
594	NA	South side of Northpark Dr.	LOBLOLLY PINE	4-8	Fair	Transplant	S	Zone B		637	23+43	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
595	NA	South side of Northpark Dr.	PINE	2.5-4	Fair	Transplant	S	Zone B		638	23+52	North side of Northpark Dr.	OAK	18	Fair	Remove	A	Replace In For Inch		
596	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		639	23+63	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
597	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		640	23+69	North side of Northpark Dr.	OAK	20	Fair	Remove	A	Replace In For Inch		
598	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Preserve		Preservation Treatment		641	23+62	North side of Northpark Dr.	OAK	14	Fair	Preserve		No Replacement		
599	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone A		642	24+10	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
600	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		643	24+39	North side of Northpark Dr.	PINE	3	Fair	Preserve		No Replacement		
601	NA	South side of Northpark Dr.	LIVE OAK	2.5-4	Fair	Transplant	S	Zone B		644	24+57	North side of Northpark Dr.	PINE	3	Fair	Remove	A	Replace In For Inch		
602	NA	South side of Northpark Dr.	LIVE OAK	4-8	Fair	Transplant	S	Zone C		645	25+13	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
603	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		646	25+24	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
604	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		647	25+33	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
605	NA	South side of Northpark Dr.	LIVE OAK	11-13	Fair	Transplant	S	Zone B		648	26+14	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
606	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		649	27+00	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
607	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		650	27+11	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
608	NA	South side of Northpark Dr.	LIVE OAK	8-10	Fair	Transplant	S	Zone A		651	27+26	North side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
609	17+47	North side of Northpark Dr.	PINE	16	Fair	Preserve		No Replacement		652	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
610	17+89	North side of Northpark Dr.	OAK	3	Fair	Preserve		No Replacement		653	27+44	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
611	18+11	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		654	27+48	North side of Northpark Dr.	CREPE MYRTLE	6	Fair	Preserve		No Replacement		
612	18+37	North side of Northpark Dr.	PINE	12	Fair	Remove	A	Replace In For Inch		655	17+73	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
613	18+50	North side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		656	18+07	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
614	18+60	North side of Northpark Dr.	OAK	3	Fair	Remove	A	Replace In For Inch		657	18+39	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
615	18+73	North side of Northpark Dr.	PINE	10	Fair	Remove	A	Replace In For Inch		658	18+78	Median of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		
616	18+93	North side of Northpark Dr.	OAK	4	Fair	Remove	A	Replace In For Inch		659	19+18	Median of Northpark Dr.	CREPE MYRTLE	4	Fair	Remove	A	Replace In For Inch		
617	19+14	North side of Northpark Dr.	PINE	14	Fair	Remove	A	Replace In For Inch		660	23+89	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
618	19+77	North side of Northpark Dr.	PINE	18	Fair	Remove	A	Replace In For Inch		661	24+41	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
619	20+18	North side of Northpark Dr.	OAK	22	Fair	Remove	A	Replace In For Inch		662	24+84	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
620	20+89	North side of Northpark Dr.	PINE	16	Fair	Remove	A	Replace In For Inch		663	25+15	Median of Northpark Dr.	CREPE MYRTLE	6	Fair	Remove	A	Replace In For Inch		
621	20+92	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		664	25+54	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
622	21+09	North side of Northpark Dr.	OAK	14	Fair	Remove	A	Replace In For Inch		665	25+73	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
623	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		666	26+14	Median of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		
624	21+06	North side of Northpark Dr.	OAK	8	Fair	Remove	A	Replace In For Inch		667	17+80	South side of Northpark Dr.	OAK	16	Fair	Preserve		No Replacement		
625	20+98	North side of Northpark Dr.	PINE	24	Fair	Remove	A	Replace In For Inch		668	17+82	South side of Northpark Dr.	OAK	16	Fair	Remove	A	Replace In For Inch		
626	20+95	North side of Northpark Dr.	PINE	22	Fair	Remove	A	Replace In For Inch		669	17+87	South side of Northpark Dr.	CREPE MYRTLE	10	Fair	Remove	A	Replace In For Inch		
627	20+98	North side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		670	18+44	South side of Northpark Dr.	OAK	12	Fair	Remove	A	Replace In For Inch		
628	21+13	North side of Northpark Dr.	PINE	20	Fair	Remove	A	Replace In For Inch		671	18+69	South side of Northpark Dr.	OAK	10	Fair	Remove	A	Replace In For Inch		



NO.	REVISIONS			BY	DATE
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE					
TRANSPLANTED TREE INVENTORY COH					
SHEET 10 of 13					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					706

ID #	STATION	LOCATION	SPECIES	REQ. REPLACE
500	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
501	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
502	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
503	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
562	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
563	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
564	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
565	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
566	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
567	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
568	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
569	NA	Median of Northpark Dr.	CREPE MYRTLE	0.0
570	NA	North side of Northpark Dr.	CREPE MYRTLE	0.0
571	NA	North side of Northpark Dr.	CREPE MYRTLE	0.0
572	NA	North side of Northpark Dr.	CREPE MYRTLE	0.0
573	NA	North side of Northpark Dr.	CREPE MYRTLE	0.0
588	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
589	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
590	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
591	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
592	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
593	NA	South side of Northpark Dr.	CREPE MYRTLE	0.0
611	18+11	North side of Northpark Dr.	OAK	4.0
612	18+37	North side of Northpark Dr.	PINE	12.0
613	18+50	North side of Northpark Dr.	OAK	16.0
614	18+60	North side of Northpark Dr.	OAK	3.0
615	18+73	North side of Northpark Dr.	PINE	10.0
616	18+93	North side of Northpark Dr.	OAK	4.0
617	19+14	North side of Northpark Dr.	PINE	14.0
618	19+77	North side of Northpark Dr.	PINE	18.0
619	20+18	North side of Northpark Dr.	OAK	22.0
620	20+89	North side of Northpark Dr.	PINE	16.0
621	20+92	North side of Northpark Dr.	OAK	14.0
622	21+09	North side of Northpark Dr.	OAK	14.0
623	21+06	North side of Northpark Dr.	OAK	8.0
624	21+06	North side of Northpark Dr.	OAK	8.0
625	20+98	North side of Northpark Dr.	PINE	24.0
626	20+95	North side of Northpark Dr.	PINE	22.0
627	20+98	North side of Northpark Dr.	OAK	10.0
628	21+13	North side of Northpark Dr.	PINE	20.0
629	21+28	North side of Northpark Dr.	OAK	20.0
630	21+83	North side of Northpark Dr.	PINE	14.0
631	23+24	North side of Northpark Dr.	OAK	18.0

ID #	STATION	LOCATION	SPECIES	REQ. REPLACE
635	23+47	North side of Northpark Dr.	OAK	8.0
636	23+48	North side of Northpark Dr.	OAK	12.0
637	23+43	North side of Northpark Dr.	OAK	4.0
638	23+52	North side of Northpark Dr.	OAK	18.0
639	23+63	North side of Northpark Dr.	OAK	8.0
640	23+69	North side of Northpark Dr.	OAK	20.0
644	24+57	North side of Northpark Dr.	PINE	3.0
645	25+13	North side of Northpark Dr.	CREPE MYRTLE	10.0
646	25+24	North side of Northpark Dr.	CREPE MYRTLE	10.0
647	25+33	North side of Northpark Dr.	CREPE MYRTLE	10.0
648	26+14	North side of Northpark Dr.	CREPE MYRTLE	10.0
649	27+00	North side of Northpark Dr.	CREPE MYRTLE	10.0
650	27+11	North side of Northpark Dr.	CREPE MYRTLE	10.0
651	27+26	North side of Northpark Dr.	CREPE MYRTLE	10.0
655	17+73	Median of Northpark Dr.	CREPE MYRTLE	4.0
656	18+07	Median of Northpark Dr.	OAK	4.0
657	18+39	Median of Northpark Dr.	CREPE MYRTLE	4.0
658	18+78	Median of Northpark Dr.	OAK	4.0
659	19+18	Median of Northpark Dr.	CREPE MYRTLE	4.0
660	23+89	Median of Northpark Dr.	CREPE MYRTLE	6.0
661	24+41	Median of Northpark Dr.	CREPE MYRTLE	6.0
662	24+84	Median of Northpark Dr.	CREPE MYRTLE	6.0
663	25+15	Median of Northpark Dr.	CREPE MYRTLE	6.0
664	25+54	Median of Northpark Dr.	OAK	8.0
665	25+73	Median of Northpark Dr.	OAK	8.0
666	26+14	Median of Northpark Dr.	OAK	8.0
668	17+82	South side of Northpark Dr.	OAK	16.0
669	17+87	South side of Northpark Dr.	CREPE MYRTLE	10.0
670	18+44	South side of Northpark Dr.	OAK	12.0
671	18+69	South side of Northpark Dr.	OAK	10.0
672	19+71	South side of Northpark Dr.	CREPE MYRTLE	10.0
673	19+87	South side of Northpark Dr.	CREPE MYRTLE	10.0
674	20+01	South side of Northpark Dr.	CREPE MYRTLE	6.0
675	20+89	South side of Northpark Dr.	OAK	12.0
676	21+72	South side of Northpark Dr.	CREPE MYRTLE	6.0
677	21+84	South side of Northpark Dr.	OAK	4.0
678	21+73	South side of Northpark Dr.	OAK	4.0
679	21+90	South side of Northpark Dr.	OAK	4.0
680	21+82	South side of Northpark Dr.	CREPE MYRTLE	6.0
681	21+89	South side of Northpark Dr.	CREPE MYRTLE	6.0
682	22+69	South side of Northpark Dr.	OAK	2.0
683	23+12	South side of Northpark Dr.	OAK	2.0
684	23+42	South side of Northpark Dr.	OAK	2.0

ID #	STATION	LOCATION	SPECIES	REQ. REPLACE
685	24+79	South side of Northpark Dr.	PINE	4.0
686	24+84	South side of Northpark Dr.	PINE	8.0
687	24+85	South side of Northpark Dr.	PINE	8.0
688	25+09	South side of Northpark Dr.	OAK	20.0
700	29+91	North side of Northpark Dr.	PALM	12.0
701	29+98	North side of Northpark Dr.	PALM	12.0
702	29+95	North side of Northpark Dr.	PALM	12.0
703	30+00	North side of Northpark Dr.	CREPE MYRTLE	6.0
704	30+12	North side of Northpark Dr.	CREPE MYRTLE	12.0
705	30+54	North side of Northpark Dr.	CREPE MYRTLE	6.0
706	30+60	North side of Northpark Dr.	CREPE MYRTLE	6.0
707	31+02	Median of Northpark Dr.	CREPE MYRTLE	12.0
708	31+54	Median of Northpark Dr.	CREPE MYRTLE	12.0
709	31+63	Median of Northpark Dr.	CREPE MYRTLE	12.0
710	32+44	Median of Northpark Dr.	CREPE MYRTLE	12.0
711	33+32	Median of Northpark Dr.	CREPE MYRTLE	6.0
712	33+46	Median of Northpark Dr.	CREPE MYRTLE	6.0
713	33+55	Median of Northpark Dr.	CREPE MYRTLE	6.0
714	33+75	Median of Northpark Dr.	PINE	18.0
715	33+85	Median of Northpark Dr.	CREPE MYRTLE	6.0
716	34+01	Median of Northpark Dr.	CREPE MYRTLE	6.0
717	34+04	Median of Northpark Dr.	CREPE MYRTLE	6.0
718	34+12	Median of Northpark Dr.	CREPE MYRTLE	6.0
719	34+24	Median of Northpark Dr.	PINE	20.0
720	34+29	Median of Northpark Dr.	PINE	20.0
721	33+28	South side of Northpark Dr.	HACKBERRY	10.0
722	33+39	South side of Northpark Dr.	PINE	16.0
723	33+94	South side of Northpark Dr.	HACKBERRY	10.0
724	35+46	South side of Northpark Dr.	PINE	24.0
725	36+29	South side of Northpark Dr.	PINE	24.0
726	36+47	South side of Northpark Dr.	PINE	24.0
727	36+80	South side of Northpark Dr.	PINE	18.0
728	37+59	South side of Northpark Dr.	PINE	24.0
729	38+06	South side of Northpark Dr.	PINE	24.0
730	39+21	South side of Northpark Dr.	PINE	12.0
732	39+73	South side of Northpark Dr.	HACKBERRY	10.0
736	41+16	South side of Northpark Dr.	PINE	14.0
738	41+26	South side of Northpark Dr.	PINE	14.0
747	45+42	South side of Northpark Dr.	PINE	14.0
748	45+49	South side of Northpark Dr.	PINE	14.0
757	49+81	North side of Northpark Dr.	CREPE MYRTLE	6.0
758	49+83	North side of Northpark Dr.	CREPE MYRTLE	6.0

NOTE: TREE REPLACEMENT LOCATIONS SHOWN ON PLANS MUST BE COORDINATED WITH ADJACENT PROPERTY OWNER AND CITY OF HOUSTON URBAN FORESTRY PRIOR TO EXCAVATION FOR PLANTING. COORDINATION SHALL BE COMPLETED BY CONSTRUCTION CONTRACTOR'S CERTIFIED ARBORIST. TREES NOT COVERED BY AN AUTOMATED IRRIGATION SYSTEM TO BE MAINTAINED AND WATERED FOR TWO (2) YEARS FOLLOWING PLANTING PER LANDSCAPE DETAILS(PER PAY ITEM 0166-6003). TIMING OF PLANTING MAY BE DELAYED IN PERIODS OF DROUGHT WITH MANDATORY WATER RESTRICTIONS IN PLACE-TIMING TO BE COORDINATED WITH CITY OF HOUSTON URBAN FORESTRY. TREE MITIGATION TREES TO BE PAID FOR PER THE APPLICABLE PAY ITEM CODE.

TREE REMOVAL SUMMARY		
TOTAL TREE REPLACEMENT INCHES REQUIRED		1,142
TOTAL QUANTITY OF 6" CAL. TREES PLANTED	20	120
TOTAL QUANTITY OF 4" CAL. TREES PLANTED	172	688
TOTAL QUANTITY OF TRANSPLANTED TREES*	83	706
TOTAL QUANTITY INSTALLED ON PROJECT	275	1,514

*CALIPER VARIES, SEE INVENTORY LIST
SEE PLANT LIST FOR SPECIFIC TYPES, SIZES & QUANTITIES.



NO.		REVISIONS		BY	DATE
		M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS		 LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRIZ-10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002			
NORTHPARK DRIVE					
TRANSPLANTED TREE INVENTORY COH					
SHEET 13 of 13					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					707

ELECTRICAL SCOPE OF WORK:

1. PROVIDE AND INSTALL NEW 240/120 VOLT, 3PH, 4W, ELECTRIC SERVICE. COORDINATE INSTALLATION WITH ENTERGY POWER COMPANY REPRESENTATIVE. PROVIDE ALL COORDINATIONS. PERMITTING REQUIREMENTS, ETC, WITH POWER CO. AND PAY ALL FEES.

PROVIDE NEW 200 AMP THREE PHASE PANEL NEMA 3R ON SLACK POLE ADJACENT TO NEW POLE. CONTRACTOR TO PROVIDE SLACK POLE IF NOT PROVIDED BY POWER CO.

4. PROVIDE CONDUIT AND CONDUCTORS TO NEW EQUIPMENT BEING PROVIDED BY OTHERS AND MAKE FINAL CONNECTIONS. PROVIDE ADDITIONAL ELECTRICAL EQUIPMENT AND MATERIALS AS NEEDED/REQUIRED TO ASSIST SUB-CONTRACTORS IN PROVIDING A FULLY FUNCTIONAL SYSTEM.

KEYED NOTES (THIS DRAWING ONLY):

- 1

MAIN DISTRIBUTION PANEL 'MDP'.
- 2

WELL SERVICE ELECTRICAL SUB-PANEL 'W'.
- 3

AERATION ELECTRICAL SUB-PANEL 'A1'.
- 4

AERATION ELECTRICAL SUB-PANEL 'A2'.
- 5

FLOATING AERATION FOUNTAIN #1 WITH LIGHTS
- 6

FLOATING AERATION FOUNTAIN #2 WITH LIGHTS
- 7

POND MAKE-UP WATER WELL
- 8

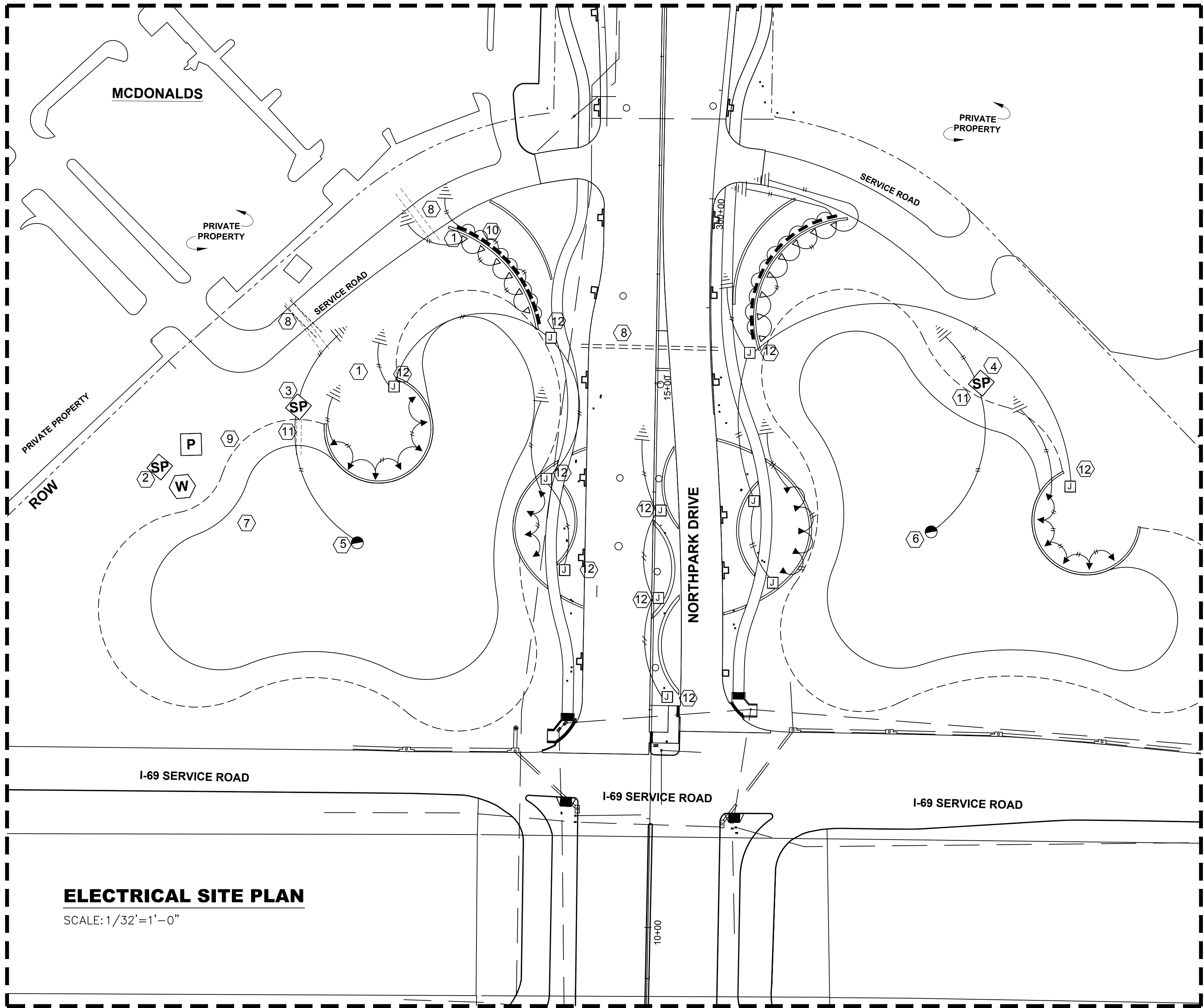
PROP BORE UNDER PAVEMENT FOR ELECTRICAL CONDUITS, QUANTITY 3.
- 9

IRRIGATION PUMP
- 10

PROPOSED ELECTRICAL SERVICE DROP
- 11

PROPOSED 1-1/2" SCHEDULE 40 PVC CONDUIT FROM FOUNTAIN CONTROLLER UNDERGROUND TO WATER EDGE THEN 10' MINIMUM UNDERWATER FOR SO CABLE TO BE PROVIDED AND INSTALLED BY EQUIPMENT SUPPLIER.
- 12

DUPLEX RECEPTACLE OUTLETS. SEE DETAILS.



ELECTRICAL SITE PLAN

SCALE: 1/32"=1'-0"

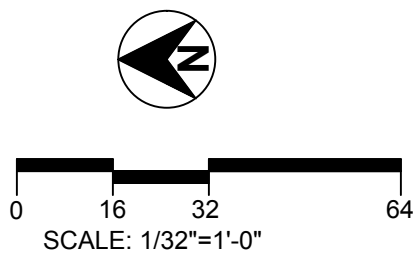
NOTES:

1. PROVIDE AND INSTALL NEW LIGHTS AS SHOWN ON DRAWINGS. LIGHT LOCATIONS AND CONDUIT ROUTING MAY BE ADJUSTED AS REQUIRED TO ACCOMMODATE FIELD CONDITIONS.
2. PROVIDE INTERMEDIATE PULL BOX PER DETAIL SHEET FOR ANY UNDERGROUND CONDUIT RUN OVER 150 FT.
3. PANEL CIRCUIT NUMBERS ARE SHOWN DIAGRAMMATICALLY. ROUTE CONDUIT AS REQUIRED BY FIELD CONDITIONS.
4. PROVIDE CONDUIT SLEEVE UNDER ANY EXISTING PAVEMENT. DO NOT CUT THROUGH PAVEMENT UNLESS SPECIFICALLY AUTHORIZED BY OWNER'S REPRESENTATIVE.
5. UNDERGROUND CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY AND MAY BE RELOCATED AT DISCRETION OF OWNER'S REPRESENTATIVE.
6. ALL OUTSIDE ELECTRICAL EQUIPMENT INSTALLED IN THIS PROJECT SHALL BE LOCKABLE AND VANDAL RESISTANT TO GREATEST EXTENT POSSIBLE. COORDINATE SPECIFIC REQUIREMENTS WITH THE OWNER/ARCHITECT.

7. EQUIPMENT AND CONNECTIONS ARE SHOWN DIAGRAMMATICALLY AND MAY BE RELOCATED AT DISCRETION OF OWNER'S REPRESENTATIVE.
8. PROVIDE CONTACTORS, ASCO 920, 30A/2P, NEMA 3R, NEMA RATED, AND TIME CLOCK. TORK MODEL 7000ZL, NEMA 3R FOR ALL CIRCUITS THAT REQUIRE TIMERS AND/OR CONTACTORS.
9. PROVIDE 1" C.(PVC), 3-10 AWG, FOR IRRIGATION CONTROLLER. PROVIDE CONNECTIONS AS SHOWN ON THIS DRAWING.
10. UNDERGROUND BOXES SHALL BE QUAZITE JUNCTION BOXES "NO CONCRETE WITH METAL COVERS". QUAZITE BOXES ARE AVAILABLE FROM WILDCAT ELECTRIC.
11. ALL S.O. (UNDERWATER) CABLE IS TO BE PROVIDED BY EQUIPMENT MANUFACTURER.

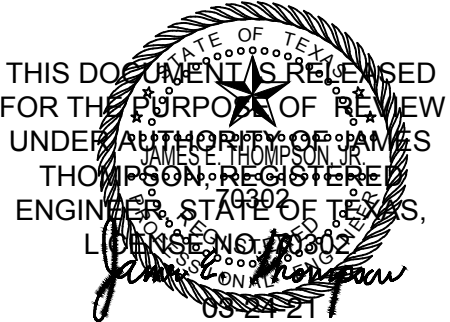
SPECIAL INSTRUCTIONS

1. CONTACT ENTERGY REPRESENTATIVE JUAN SOTO (346-831-9717) PRIOR TO DOING ANY ELECTRICAL WORK. COMPLY WITH ALL ENTERGY REQUIREMENTS. TRANSFORMER POLE LOCATION SHOWN DIAGRAMMATICALLY ONLY AND MAY BE SUBJECT TO RELOCATION CONTINGENT ON ENTERGY REQUIREMENTS.
2. ELECTRICAL CONTRACTOR TO ASSURE PROPER FIXTURE AIMING FOR OPTIMUM LIGHT COVERAGE.
- 3.ELECTRICAL CONTRACTOR TO OBTAIN ALL PERMITS AND PAY ALL FEES.
4. TEMPORARY ELECTRIC POWER IS NOT AVAILABLE AND WILL HAVE TO BE NEGOTIATED WITH ENTERGY COMPANY. RESTROOMS ARE NOT AVAILABLE AND WILL HAVE TO BE PROVIDED ON OWN.
5. ELECTRICAL CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO BID TO FAMILIARIZE HIMSELF/HERSELF WITH THE PROJECT REQUIREMENTS.
6. WHEREVER AN ELECTRICAL PANEL IS INDICATED ON PLANS, PANEL SHALL BE MOUNTED ON 3" GALVANIZED STEEL POLE PER DETAILS PROVIDED. PANEL SHALL BE CLEARLY MARKED WITH PANEL NAME. UPSTREAM PANEL SERVING, SHORT CIRCUIT VALUE, AND DATE. A DIS-CONNECT SWITCH MAY BE PROVIDED IN LIEU OF A PANEL AT DISCRETION OF OWNER'S REPRESENTATIVE. DISCONNECT SHALL BE HEAVY DUTY, NEMA 3R AND SUITABLY RATED.



ELECTRICAL NOTES

1. REFER TO LANDSCAPE LIGHTING PLAN FOR FIXTURE SCHEDULE (FINISHES, COLORS, ECT.).



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NO.	REVISIONS						BY	DATE	
<div><div><div>M2L</div></div></div>				<div>M2L ASSOCIATES, INC.</div> <div>8955 KATY FWY, SUITE 300</div> <div>HOUSTON, TX 77024</div>					
<div><div>HNTB</div></div>				<div>HNTB Corporation</div> <div>The HNTB Companies</div> <div>Infrastructure Solutions</div> <div>Firm Registration Number 420</div>					
<div><div>CITY OF HOUSTON</div><div>HOUSTON PUBLIC WORKS</div></div>				<div><div><div>LH RA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10</div><div>C/O ALLEN HUNTON ANDREWS</div><div>KURTH LLP</div><div>600 TRAVIS, SUITE 4200</div><div>HOUSTON, TEXAS 77002</div></div></div>					
<div><div>NORTHPARK DRIVE</div><div>ELECTRICAL SITE PLAN</div><div>E1.0</div></div>									
DESIGNED:	FED. DIV. No.	RD. No.	STATE	CITY OF HOUSTON WBS				HIGHWAY No.	
CHECKED:		6	TEXAS	SEE TITLE SHEET				CS	
DRAWN:	STATE DISTRICT		COUNTY	CONTROL No.	SECTION No.	JOB No.		SHEET No.	
CHECKED:	HOU		MONTGOMERY	0912	37	232		708	

ELECTRICAL SPECIFICATIONS

1. SCOPE

THE SCOPE OF THE WORK COVERED HEREIN CONSISTS OF FURNISHING ALL LABOR, MATERIALS, NECESSARY EQUIPMENT, AND SERVICES TO COMPLETE THE ELECTRICAL WORK AND RELATED WORK IN FULL ACCORDANCE WITH PLANS AS INDICATED ON THE DRAWINGS, AS SPECIFIED HEREIN OR BOTH AND SUBJECT TO THE TERMS AND CONDITIONS OF THE CONTRACT.

ALL ITEMS NOTED HEREIN, SHOWN BY THE ELECTRICAL PLANS, OR REASONABLY TO BE INTERPRETED FROM THE PLANS NECESSARY TO COMPLETE THE ELECTRICAL SYSTEM SHALL BE PROVIDED AND INSTALLED UNDER THE WORK OF THIS SECTION, WHETHER SOME ARE SPECIFICALLY MENTIONED HEREIN OR NOT.

2. CODES, RULES, PERMITS, AND FEES

ELECTRICAL CONTRACTOR IS RESPONSIBLE TO INSURE THAT ALL WORK, BOTH OLD AND NEW, COMPLIES WITH THE LATEST NEC AND APPLICABLE LOCAL AND STATE CODES AND ORDINANCES.

3. DRAWINGS

DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. DRAWINGS ARE NOT TO BE SCALED. THE CIVIL SITE PLAN DRAWINGS AND DETAILS SHALL BE EXAMINED FOR EXACT LOCATION OF FIXTURES AND EQUIPMENT. ANY CONFLICT SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

4. SHOP DRAWINGS

THE SUBCONTRACTOR SHALL SUBMIT TO THE ENGINEER, SIX (6) COPIES FOR APPROVAL OF DETAILED SHOP DRAWINGS OF ALL EQUIPMENT AND ALL MATERIALS REQUIRED TO COMPLETE THE PROJECT.

MATERIALS OR PRODUCTS IDENTIFIED HEREIN AND/OR INDICATED ON DRAWINGS BY TRADE NAME, MANUFACTURER'S NAME OR CATALOG NUMBER SHALL BE PROVIDED AS SPECIFIED. SUBSTITUTE ITEMS SHALL BE CLEARLY IDENTIFIED AS SUCH, AND THE REASON FOR SUBSTITUTION SHALL BE PROVIDED.

5. COOPERATION WITH OTHER TRADES

THE ELECTRICAL CONTRACTOR SHALL FULLY COOPERATE WITH THE OTHER TRADES, AND SHALL FURNISH OTHER CONTRACTORS, WITH COPIES TO THE ENGINEER, ANY INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY. COORDINATE ALL CONDUIT RUNS AND EQUIPMENT WITH OTHER TRADES. VERIFY NAMEPLATE ELECTRICAL DATA OF ACTUAL EQUIPMENT FURNISHED BY OTHERS BEFORE BEGINNING INSTALLATION.

6. CUTTING, PATCHING, AND FINISHING

THE ELECTRICAL CONTRACTOR SHALL DO ALL CUTTING, DRILLING, ETC. REQUIRED FOR WORK, INCLUDING PREPARING OF FINISHED SURFACES, ALL REQUIRED SHORING AND BRACING, AND ALL PROTECTION FOR SAFETY OF PERSONS AND PROPERTY.

7. EXCAVATING AND BACKFILLING

THE ELECTRICAL CONTRACTOR SHALL DO ALL TRENCH AND PIT EXCAVATING AND BACKFILLING REQUIRED FOR WORK UNDER THIS SECTION OF THE SPECIFICATIONS, INCLUDING REPAIRING OF FINISHED SURFACES, ALL REQUIRED SHORING, BRACING, PUMPING, AND ALL PROTECTION FOR SAFETY OF PERSONS AND PROPERTY.

8. MATERIALS AND WORKMANSHIP

ALL MATERIALS AND APPARATUS REQUIRED FOR THIS WORK SHALL BE NEW UNLESS INDICATED OTHERWISE ON THE PLANS. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL ELECTRICAL EQUIPMENT AS SHOWN, VERIFYING ALL MOUNTING HEIGHTS AND EXACT LOCATIONS OF ALL WALL-MOUNTED ELECTRICAL DEVICES WITH THE ENGINEER PRIOR TO ROUGH-IN. CONNECTIONS AND JUNCTION BOXES TO EQUIPMENT ARE DIAGRAMMATIC. VERIFY EXACT LOCATION OF CONNECTIONS TO SPECIFIC EQUIPMENT AND DEVICES.

9. PANELBOARDS AND BREAKERS

BREAKERS SHALL BE AS MANUFACTURED BY CUTLER-HAMMER (OR EQUAL) AND BE OF SIZE AND RATING AS SHOWN ON THE DRAWING. MULTI-POLE BREAKERS SHALL HAVE A SINGLE HANDLE TRIP AND HAVE AN AIC RATING TO MATCH OTHER BREAKERS IN THE PANEL. PROVIDE A REVISED CIRCUIT DIRECTORY, TYPED AND MOUNTED IN A CLEAR PLASTIC SLEEVE, INSIDE THE PANELBOARD.

10. GROUNDING

ALL CONDUITS SHALL HAVE A GROUND WIRE INSTALLED. A CONDUIT GROUND SHALL NOT BE USED. NEW EQUIPMENT SHALL NOT HAVE SEPARATE GROUND ROD, BUT SHALL BE BONDED TO EXISTING GROUNDING SYSTEM VIA GROUNDING CONDUCTORS.

11. MISCELLANEOUS EQUIPMENT

LIGHTING FIXTURES SHALL BE INSTALLED IN ACCORDANCE WITH NEC 2002. CONDUCTORS ABOVE GROUND CONDUCTORS SHALL BE RATED 600V, XHHW OR EQUAL. CONDUCTORS #12AWG AND LARGER SHALL BE STRANDED.

12. CONDUIT

CONDUIT SHALL BE EMT INSIDE & RGS OUTSIDE. LIQUID TIGHT FLEX SHALL BE USED FOR FINAL CONNECTION TO ALL FIXED EQUIPMENT.

13. EQUIPMENT FURNISHED BY OTHERS

ELECTRICAL CONTRACTOR SHALL PROVIDE ALL CONDUIT, WIRE AND DISCONNECT SWITCHES TO CONNECT ELECTRICAL EQUIPMENT SUPPLIED BY OTHERS, WHICH SHALL INCLUDE NEW AND RELOCATED EXISTING EQUIPMENT. ELECTRICAL CONTRACTOR SHALL MAKE ALL FINAL ELECTRICAL CONNECTIONS.

14. RECORD DRAWINGS

THE ELECTRICAL CONTRACTOR SHALL KEEP ACCURATE RECORDS OF ACTUAL CONSTRUCTION, INCLUDING DEVICE LOCATIONS AND CONDUIT RUNS IF DIFFERENT FROM THE PLANS. THE CONTRACTOR SHALL PROVIDE THE OWNER WITH A REPRODUCIBLE SET OF PLANS OF THE COMPLETE ELECTRICAL SYSTEM AS INSTALLED (AS-BUILT DRAWINGS). THE SCALE ON THESE AS-BUILT DRAWINGS SHALL BE NO SMALLER THAN THE SCALE USED ON THE ORIGINAL PLANS.

15. TESTING

FINAL TESTS SHALL BE MADE ONLY AFTER THE ENGINEER IS SATISFIED THAT ALL WORK HAS BEEN COMPLETED. TESTING SHALL INCLUDE ALL SYSTEMS AND SUBSYSTEMS, AND SHALL BE COORDINATED WITH OTHER TRADES. ELECTRICAL CONTRACTOR SHALL NOT BE RELIEVED OF HIS RESPONSIBILITIES UNTIL FINAL TESTING HAS BEEN COMPLETED AND INSTALLATION IS SATISFACTORY TO THE ENGINEER AND OWNER'S REPRESENTATIVE.

16. FINAL ACCEPTANCE

AFTER TESTING, THE FINAL INSPECTION SHALL BE MADE BY THE ENGINEER AND OTHER AUTHORIZED PERSONS ALONG WITH THE ELECTRICAL CONTRACTOR. FINAL ACCEPTANCE OF THE PROJECT SHALL NOT PREJUDICE THE OWNER'S RIGHT TO REQUIRE REPLACEMENT AND/OR REPAIR OF ANY DEFECTIVE WORK OR MATERIALS.

17. ELECTRICAL NOTES

FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, INSURANCE, SERVICES AND PERMITS NECESSARY TO CONSTRUCT AND INSTALL A COMPLETE OPERATING ELECTRICAL SYSTEM.

ALL WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE CODES AS REQUIRED BY THE CITY OF MISSOURI CITY.

CONTRACTOR SHALL OBTAIN ALL PERMITS AND SHALL PAY FOR ALL ASSOCIATED EXPENSES, PRINTING AND INSPECTIONS.

ALL MATERIAL SHALL BE NEW AND UL LISTED. MATERIAL SHALL BEAR THE APPROVAL LABEL OF UL, WHEN SUCH IS AVAILABLE.

UNLESS OTHERWISE SHOWN, ALL BRANCH CIRCUIT WIRES SHALL BE THHN/THWN COPPER. FEEDERS TO PANELBOARDS AND INCOMING SERVICE SHALL BE THW OR THWN COPPER.

ALL ELECTRICAL CONDUITS, RACEWAYS AND CABLES SHALL HAVE A GROUND CONDUCTOR. MINIMUM SIZE SHALL BE NO. 12 AWG.

EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES, SHALL BE COORDINATED WITH THE OWNER AND THE EQUIPMENT VENDOR.

TOGGLE SWITCHES SHALL BE MOUNTED AT 42 INCHES ABOVE FINISHED FLOOR. WALL MOUNTED RECEPTACLES SHALL BE MOUNTED AT 15 INCHES A.F.F. AND 6 INCHES ABOVE COUNTERS.

WIRING DEVICES THAT OCCUR TOGETHER SHALL BE GANGED UNDER A COMMON WALL PLATE.

COLOR OF WALL PLATES SHALL BE AS DIRECTED BY THE OWNER.

EACH PANEL AND SAFETY SWITCH SHALL BE IDENTIFIED BY AN ENGRAVED, LAMINATED NAMEPLATE.

COORDINATE CONDUIT ROUTING AND METHOD OF SUPPORT WITH THE OWNER.

FEEDER INSTALLATION SHALL BE EMT INDOORS AND HDG RIGID STEEL CONDUIT FOR EXPOSED WORK OUTDOORS. BRANCH CIRCUIT INSTALLATION IN CEILING SHALL UTILIZE TYPE AC CABLE WITH GROUND WIRE. CONDUCTORS SHALL BE NO 12 AWG MINIMUM.

HOMERUNS OF 20 AMP BRANCH CIRCUITS EXCEEDING 100 FEET IN LENGTH SHALL BE NO. 10 AWG.

COMPLETE, TYPED PANEL DIRECTORIES SHALL BE PROVIDED UPON COMPLETION OF WORK, INCLUDING EXISTING PANELS.

UPON COMPLETION OF WORK, THE CONTRACTOR SHALL FURNISH THE OWNER A RED MARKED SET OF DRAWINGS INDICATING ALTERATION THAT WERE MADE, UNDERGROUND CONDUIT ROUTING, SCHEMATICS AND EQUIPMENT WIRING DIAGRAMS.

CONTRACTOR SHALL CONNECT ALL OWNER-PROVIDED EQUIPMENT AS LISTED IN PANEL SCHEDULES, EQUIPMENT SCHEDULE, AND AS SHOWN ON THE DRAWINGS.

FINAL CONNECTIONS TO CEILING MOUNTED LIGHTING FIXTURES SHALL BE MADE WITH FLEXIBLE METALLIC CONDUIT OR AC CABLE. PROVIDE SLACK SO THAT FIXTURE CAN BE MOVED TO THE NEXT CEILING TILE.

WIRING DEVICES SHALL BE SPECIFICATION GRADE.

CONDUCTOR SIZES, WHERE SHOWN ON THE ONE-LINE DIAGRAM, ARE THE MINIMUM REQUIRED BY THE NEC. CONTRACTOR MAY RESIZE THE PANELBOARD FEEDERS IF CONDITIONS WARRANT. THESE DRAWINGS IDENTIFIED ALL KNOWN ELECTRICAL LOADS AND ASSIGNED CIRCUITS TO EACH OF THE LOADS. CONTRACTOR MAY CONNECT EQUIPMENT TO ANOTHER PANELBOARD OR CIRCUIT AS REQUIRED BY FIELD CONDITIONS.

WHEN CONDUIT CAN NOT BE CONCEALED IN THE WALL, UTILIZE SURFACE RACEWAY BY PANDUIT OR APPROVED EQUAL.

EXHAUST FANS BROAN MODEL 509. SWITCH EXHAUST FANS SEPARATELY FROM REST ROOM LIGHTS.

SCOPE OF WORK PROVIDED IS INTENDED TO COVER MOST ITEMS REQUIRED, BUT SCOPE IS NOT NECESSARILY ALL INCLUSIVE. CONTRACTOR IS RESPONSIBLE FOR ALL WORK ITEMS IDENTIFIED IN THESE PLANS.

CONTRACTOR AT CONCLUSION OF WORK SHALL FIELD VERIFY THAT ALL CIRCUITS ARE NON-OVERLOADING. CONTRACTOR SHALL RE-CIRCUIT AS REQUIRED AND COMBINE CIRCUITS AS NECESSARY TO OBTAIN BALANCED LOADS.

KEYED NOTES:

- 1

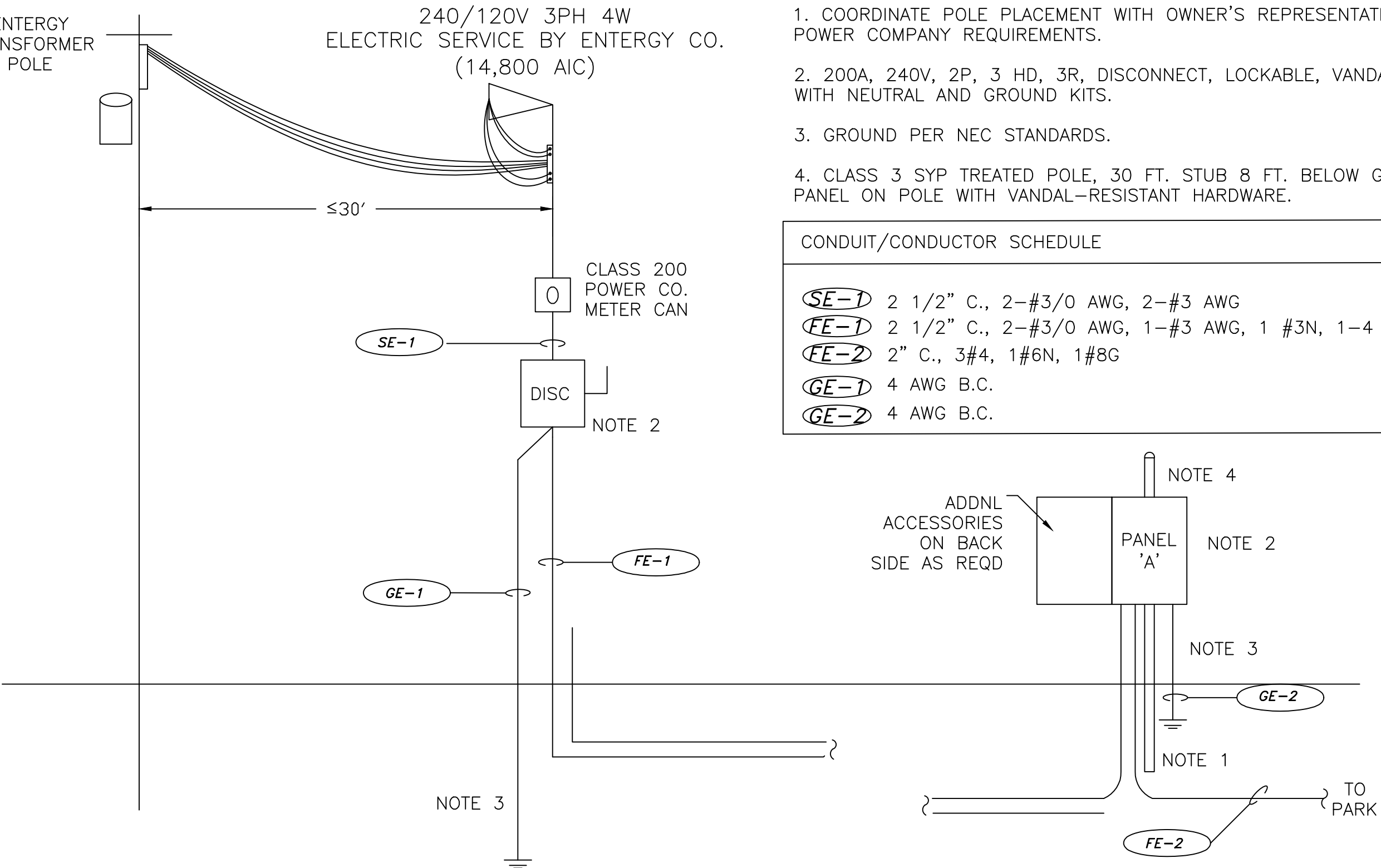
PROPOSED 240V/3PH (HI-LEG) SERVICE.
- 2

NEW DISCONNECT, SERVICE ENTERANCE RATED, 200 AMP, 240 VOLT, THREE PHASE, 4 WIRE, (NEUTRAL AND GROUND KIT REQUIRED), NEMA 3R ENCLOSURE.
- 3

NEW POWER COMPANY METER SOCKET, 3R.
- 4

NEW PANEL 'L', NEMA 3R SEE PANEL SCHEDULE.
- 5

PROVIDE GROUND WITH CONCRETE-ENCASED ELECTRODE. SEE DETAILS (E5.0).



SPECIAL INSTRUCTIONS

1. CONTRACTOR SHALL USE OFF-THE-SHELF MOUNTING HARDWARE WIRE AVAILABLE, BUT SHALL FIELD-MODIFY PARTS AS REQUIRED IF HARDWARE IS NOT AVAILABLE.

2. CONTRACTOR SHALL FIELD-VERIFY AVAILABILITY OF CIRCUITS AND MODIFY DRAWINGS TO ACCOMODATE CIRCUITS AS REQUIRED.

3. SHORT CIRCUIT CALCULATION AND LABELING REQUIREMENTS

A PERMANENTLY AFFIXED LABEL SHALL BE APPLIED WITH AVAILABLE FAULT CURRENT AT THE TIME OF INSTALLATION AND CALCULATION. THE LABEL SHALL ALSO INCLUDE THE DATE OF THE CALCULATION. THE LABEL SHALL BE 2" X 3" IN SIZE AND SAHLL BE BLUE LETTERING ON A CONTRASTING BACKGROUND. THIS LABEL SHALL ALSO INCLUDE THE DATE OF THE CALCULATION.

NOTES

1. NEC 2020 IS APPLICABLE.

2. PROVIDE PANEL WARNING LABELS FOR ARC FLASH HAZARD PER NEC 110.16.

3. EC TO FIELD-VERIFY ACTUAL AIC INTERRUPTING RATING WITH CPE PRIOR TO DOING ANY WORK OR ORDERING ANY EQUIPMENT. PROVIDE EQUIPMENT AS REQUIRED FOR FULLY RATED SYSTEM.

4. THIS IS TO BE A NEW THREE PHASE SERVICE. COORDINATE WITH POWER COMPANY PRIOR TO DOING ANY WORK OR ORDERING ANY MATERIALS. OBTAIN ALL PERMITS AND PAY ALL FEES.

SHORT CIRCUIT CALCULATIONS

(A) XFMR Z (OHMS) 212.00 = 0.003 OHMS

(B) CONDUCTORS Z (OHMS) = 0.027 X 127/1000 X 1 = 0.03 OHMS

SERVICE IC = A+B = 0.0034+0.131 = 0.0165 OHMS

PANEL A (IC) = 227/.0165 = 16788 AIC SYMM

DISCONNECT FUSES FRN-200-R SUITABLE FOR 100KAIC.

PANEL 'L' = 22 KAIC

MAX ISC = 16788 AT DISCONNECT

NOTES

1. COORDINATE POLE PLACEMENT WITH OWNER'S REPRESENTATIVE. OBSERVE POWER COMPANY REQUIREMENTS.

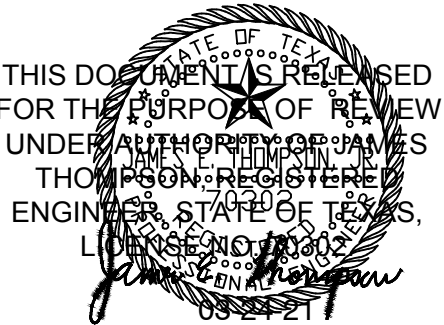
2. 200A, 240V, 2P, 3 HD, 3R, DISCONNECT, LOCKABLE, VANDAL RESISTANT, WITH NEUTRAL AND GROUND KITS.

3. GROUND PER NEC STANDARDS.

4. CLASS 3 SYP TREATED POLE, 30 FT. STUB 8 FT. BELOW GRADE. MOUNT PANEL ON POLE WITH VANDAL-RESISTANT HARDWARE.

ELECTRICAL SPECIFICATIONS

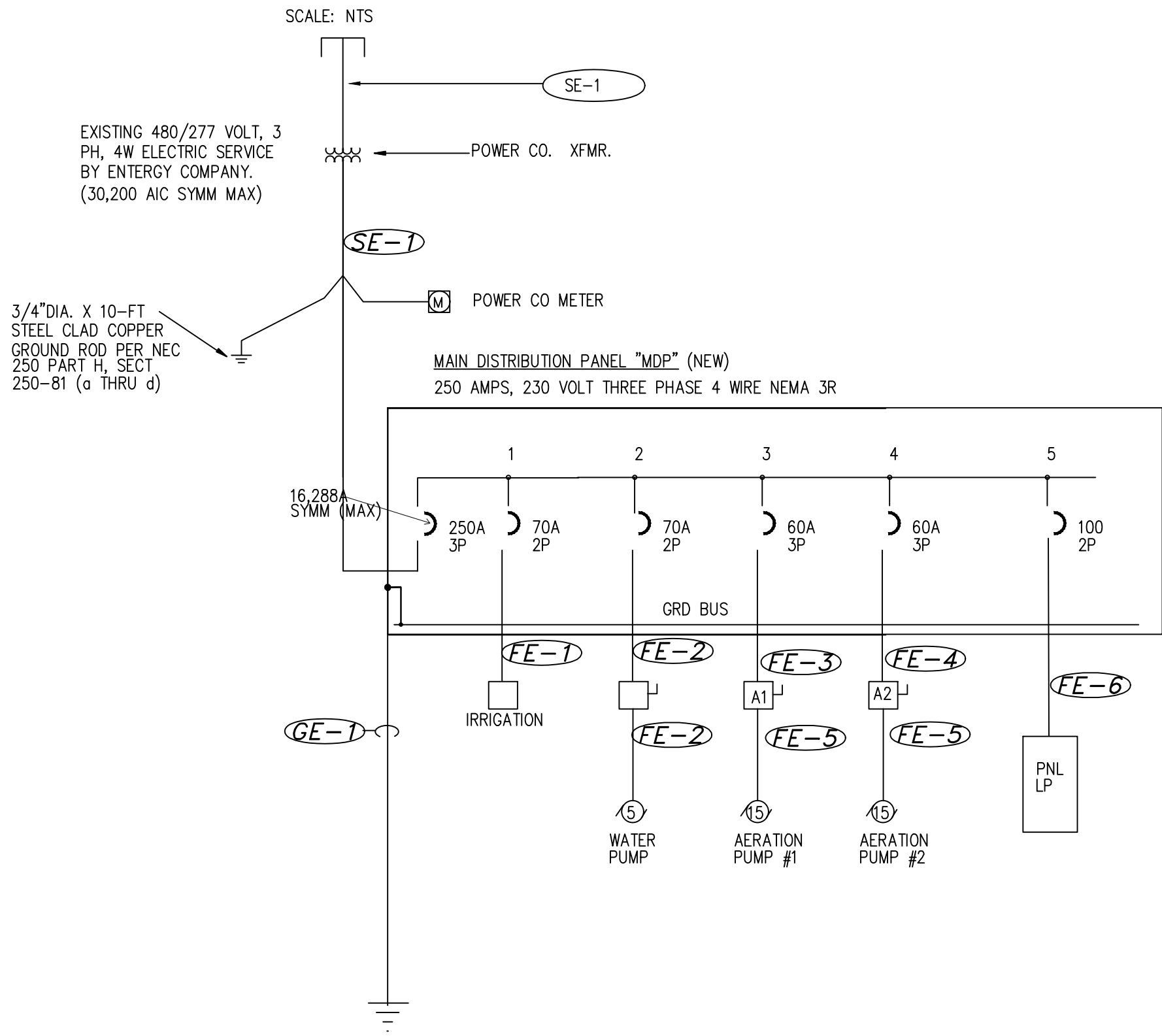
SCALE-NTS



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- Plumbing Design
- Construction Mgt
- Firm Registration #F-1288

NO.	REVISIONS			BY	DATE
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<div>HNTB</div>		HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON		<div>LH RA</div>		LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002	
HOUSTON PUBLIC WORKS					
NORTHPARK DRIVE					
ELECTRICAL ONE LINE DIAGRAM AND ELECTRICAL SCHEDULES					
E2.0					
DESIGNED:	FED. DIV. No.	STATE	CITY OF HOUSTON WBS		HIGHWAY No.
CHECKED:	6	TEXAS	SEE TITLE SHEET		CS
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					709



CONDUIT/CONDUCTOR SCHEDULE	
SE-1	2 1/2" C., 3-#350 KCMIL, 1-#250 KCMIL V N, 1#1/0 G
FE-1	1" C., 3#8, 1#10G
FE-2	1" C., 3#8, 1#10G
FE-3	1 1/2" C., 3-#4 AWG, 1-#6 AWG N, 1-8 AWG G
FE-4	3" C., 3-#3/0, 1-#2/0 AWG N, 1-2 AWG G
FE-5	CABLE BY EQUIPMENT SUPPLIER
FE-6	1-1/2" C., 2-#3, 1-#2N, 1-4G
GE-1	4 AWG B.C.

PANEL 'MDP' (NEW) CU BUS 22 KAIC					230/120V, 3PH 4W SURFACE MOUNT NEMA 3R 250A MCB 250A BUS NEUTRAL+GND BUS				
NO.	DESCRIPTION	LOAD	WIRE	DCP	NO.	DESCRIPTION	LOAD	WIRE	DCP
1	AER FT #1	19520	4	60	2	WATER PUMP	6720	4	70
3			4	3P	4			4	2P
5			4		6	IRRIG CNTRL	6720	4	70
7	AER FT #2	19520	3/0	60	8			4	3P
9			3/0	3P	10			4	
11			3/0		12	PNL 'LP'	8000	3	100
13					14			3	2P
15					16				
17					18				

39040 21740
AMPACITY REQ'D=60780/230/1.732 X 1.25= 190.7 AMPS

PANEL 'LP' (NEW) CU BUS 22 KAIC					120/230V, 1PH 3W SURFACE MOUNT NEMA 3R 100A MCB 100A BUS NEUTRAL+GND BUS				
NO.	DESCRIPTION	LOAD	WIRE	DCP	NO.	DESCRIPTION	LOAD	WIRE	DCP
1	LIGHT CKT 1	1000	10	30	2	LIGHT CKT 5	1000	10	30
3	LIGHT CKT 2	1000	10	30	4	LIGHT CKT 6	1000	10	30
5	LIGHT CKT 3	1000	10	30	6	LIGHT CKT 7	1000	10	30
7	LIGHT CKT 4	1000	10	30	8	LIGHT CKT 8	1000	10	30
9	RECEPT <GFCI>	1000	10	30	10	LIGHT CKT 9	1000	10	30
11	RECEPT <GFCI>	1000	10	30	12	RECEPT <GFCI>	1000	10	30
13	RECEPT <GFCI>	1000	10	30	14				
15	RECEPT <GFCI>	1000	10	30	16				
17	RECEPT <GFCI>	1000	10	30	18				

9000 5000
AMPACITY REQ'D=14000/230 X 1.25= 76.0 AMPS

LIGHTING FIXTURE SCHEDULE						
TYPE	MANUFACTURER & MODEL NO.	FINISH	MOUNTING	NO.,SIZE, & TYPE-LAMPS	QTY	NOTES
L1	BK LTG, #DE-LED-TR-X99-FL-BZP-9-11-A-ELV-120	BZP	NOTE 4	13 WATT-LED	*	1,2,3,4
L2	BK LTG, #HP2-LED-TR-E65-MFL-A9-BZP- 12-11-MT	BZP	GROUND	7 WATT-LED	*	1,2,3,4
J	BK LTG, #RB-18-RE1-ABP-PP-SF	BZP	GROUND		*	1,2,3,4
W1	BK LTG, #SA-LED-X53-WW-BZP-13-11-CV-360SL-	BZP	NOTE 5		*	1,2,3,4

* SEE LANDSCAPE LIGHTING PLAN SHEET 1 OF 1 FOR QUANTITIES

NOTES:

- VERIFY REQUIRED VOLTAGE FOR EACH FIXTURE BEFORE ORDERING.
- ATTACH FIXTURE TO UNDER SIDE OF PAVILION STRUCTURE WITH STAINLESS STEEL BOLTS. PROVIDE MANUFACTURER'S STANDARD ATTACHMENT HARDWARE. ROUTE CONDUIT UP THROUGH COLUMN. SEE LANDSCAPE DRAWINGS.
- ALL WIRES RUN UNDER GROUND SHALL BE XHHW.
- TO BE MOUNTED ON POWER PIPE LESS POWER SUPPLY
- TO BE MOUNTED TO PP-J18-TRE20-BZP-B-SF

ELECTRICAL ONE LINE DIAGRAM AND WIRE SIZES

SCALE-NTS

ELECTRICAL SCHEDULES

SCALE-NTS

ELECTRICAL LOAD ANALYSIS NORTH PARK DRIVE ELECTRICAL ADDITION

SERVICE VOLTAGE : 230/115V, 3 PHASE, 4 WIRE
OCCUPANCY : ROADWAY LANDSCAPE RENOVATION

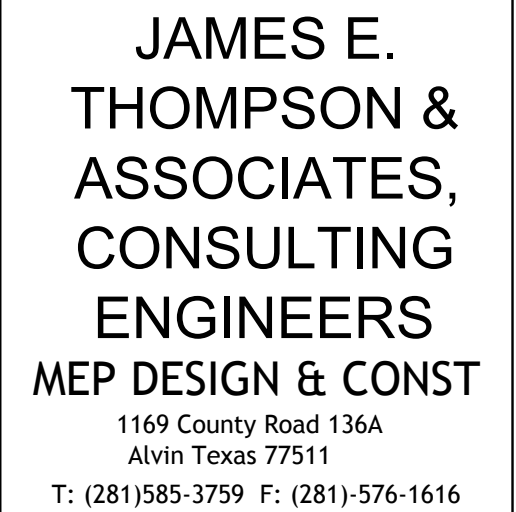
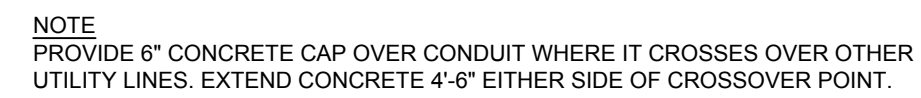
LOAD DESCRIPTION	DIV. %	DESIGN LOAD KVA	REMARKS
1 LIGHTS 9000	125%	11.25	
TOTAL		11.25	
(b) CONNECTED INTERIOR LIGHTING LOAD	0	125%	0 Code loads larger than connected
2 RECEPTACLES, 5	5		5 First 10KVA + 50% Remaining N.E.C. Article 220-13
3 COOLING LOADS	0		0
4 HEATING LOADS	0		0 Cooling loads larger than Heating
5 MOTORS	0		0
6 EQUIPMENT (PUMPS)	60.8		60.8
7 KITCHEN	0	65%	0 N.E.C. Article 220-20
8 OUTSIDE LIGHTING (BLDG MT)	0	125%	0
9 EXHAUST FANS + SUPPLY	0		0
10 25% LARGEST MOTOR	7.0		7.0
25% x Amp x0.480x1.732	2.0		2.0
SUBTOTAL	N/A KVA	86.05 KVA	215.8 AMP.
PROPOSED SERVICE CAPACITY AT 230/115V Provide service feeder from Power Company : Ampacity of service feeder :		89.8 KVA, 1 1/2"C, 3#2	225 AMP.
SPARE CAPACITY AVAILABLE		3.55 KVA,	
PERCENT SPARE CAPACITY AVAILABLE		4.1 %	

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JAMES E. THOMPSON & ASSOCIATES, CONSULTING ENGINEERS
MEP DESIGN & CONST
1169 County Road 136A
Alvin Texas 77511
T: (281)585-3759 F: (281)-576-1616

- Mechanical & Electrical •
- Plumbing Design •
- Construction Mgt •
- Firm Registration #F-1288•

NO.	REVISIONS			BY	DATE
	MZL	MZL ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024			
	HNTB	HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
	CITY OF HOUSTON		LH RA LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TEXAS 77002		
NORTHPARK DRIVE ONE LINE DIAGRAM E3.0					
DESIGNED:	FED. RD. DIV. No.	STATE	CITY OF HOUSTON WBS	HIGHWAY No.	
CHECKED:	6	TEXAS	SEE TITLE SHEET	CS	
DRAWN:	STATE DISTRICT	COUNTY	CONTROL No.	SECTION No.	JOB No.
CHECKED:	HOU	MONTGOMERY	0912	37	232
					710

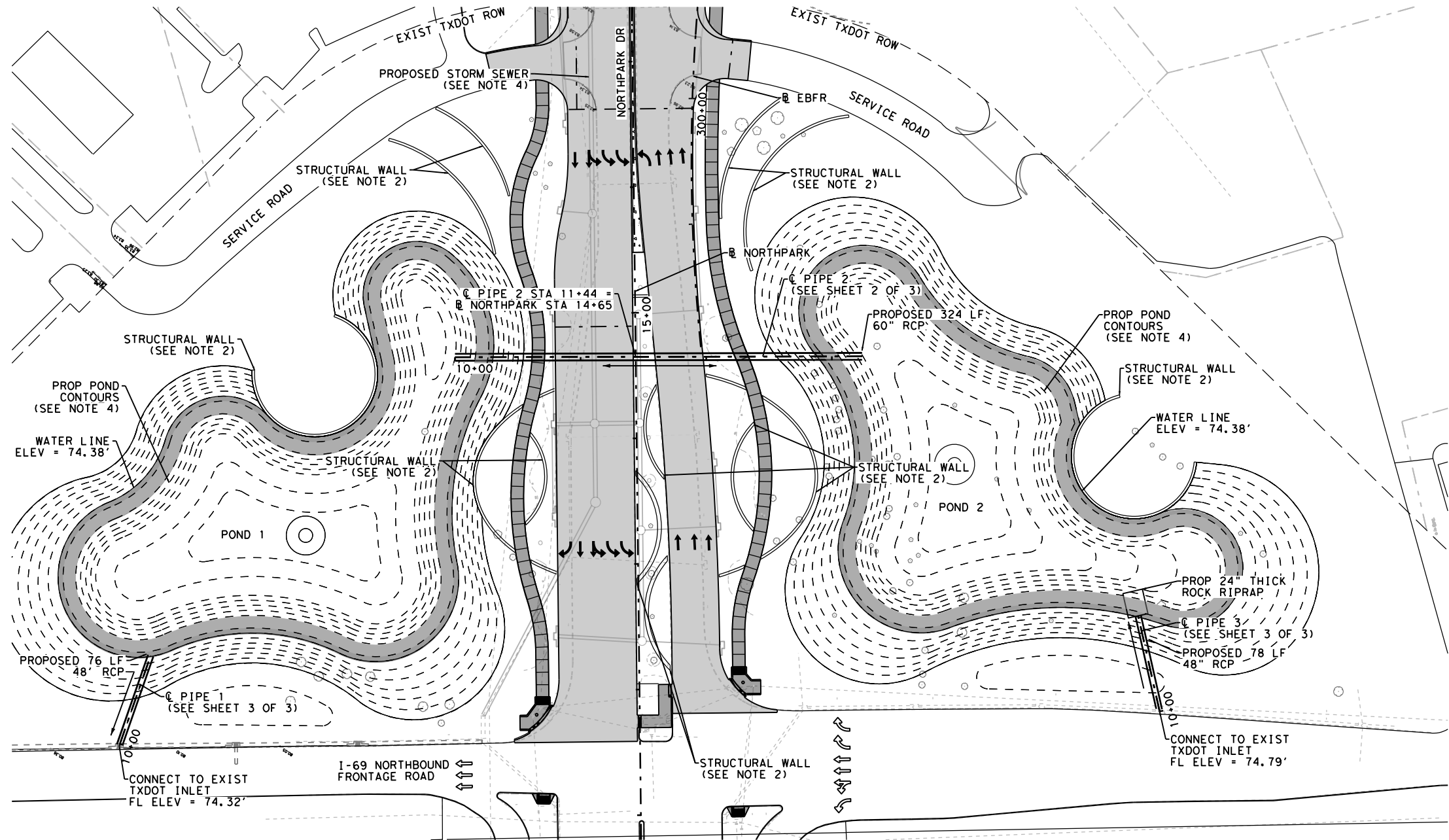


- ## PANEL MOUNTING DETAIL
- SCALE: NTS



NO.	REVISIONS						BY	DATE			
<div><div>M2L</div></div>					M2L ASSOCIATES, INC. 8955 KATY FWY, SUITE 300 HOUSTON, TX 77024						
<div>HNTB</div>					HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420						
CITY OF HOUSTON HOUSTON PUBLIC WORKS					<div><div>LH RA</div><div>LAKE HOUSTON REDEVELOPMENT AUTHORITY & TIRZ 10 c/o ALLEN HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON , TEXAS 77002</div></div>						
NORTH PARK DRIVE											
ELECTRICAL.DETAILS											
E4.0											
DESIGNED:				FED. DIV. No.	RD No.	STATE		CITY OF HOUSTON WBS		HIGHWAY No.	
CHECKED:				6		TEXAS		SEE TITLE SHEET		CS	
DRAWN:		STATE DISTRICT		COUNTY	CONTROL No.		SECTION		JOB No.		SHEET No.
CHECKED:		HOU		MONTGOMERY	0912		37		232		711

PDF Filename: 0220 - PLAN AND PROFILE NORTH PARK DRIVE STA 13+25 TO STA 23+25 SHEET 1 OF 10.pdf



NOTES:

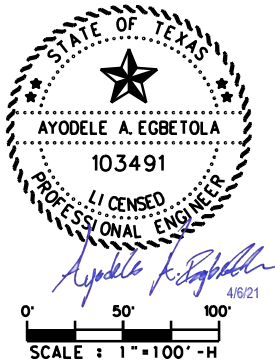
1. REFER TO ROADWAY PLANS FOR ADDITIONAL INFORMATION.

2. REFER TO LANDSCAPING PLANS FOR ADDITIONAL INFORMATION.
3. REFER TO UTILITY PLANS FOR ADDITIONAL INFORMATION.

4. REFER TO DRAINAGE PLANS FOR ADDITIONAL INFORMATION.

LEGEND

- PROP ROADWAY
- PROP BRIDGE
- STABILIZATION SHELF
- PROP SIDE PATH

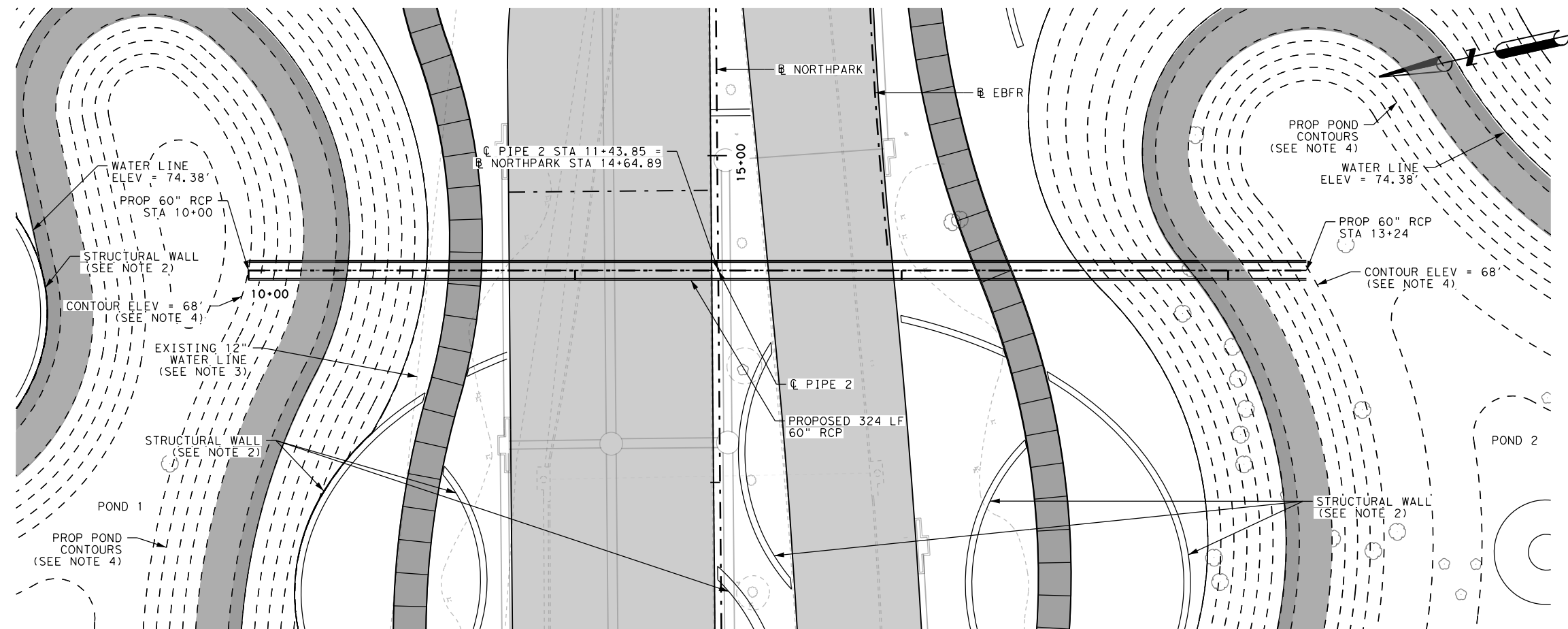


NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE EQUALIZER PIPE LAYOUT			
SHEET 1 OF 3			
DESIGNED:	FED. RD. DIV. NO. 6	STATE TEXAS	CITY OF HOUSTON WBS
CHECKED:		SEE TITLE SHEET	CS
DRAWN:	STATE DISTRICT NO. HOU	COUNTY MONTGOMERY	CONTROL NO. 0912
CHECKED:		SECTION 37	JOB NO. 232
			SHEET NO. 712

4/6/2021

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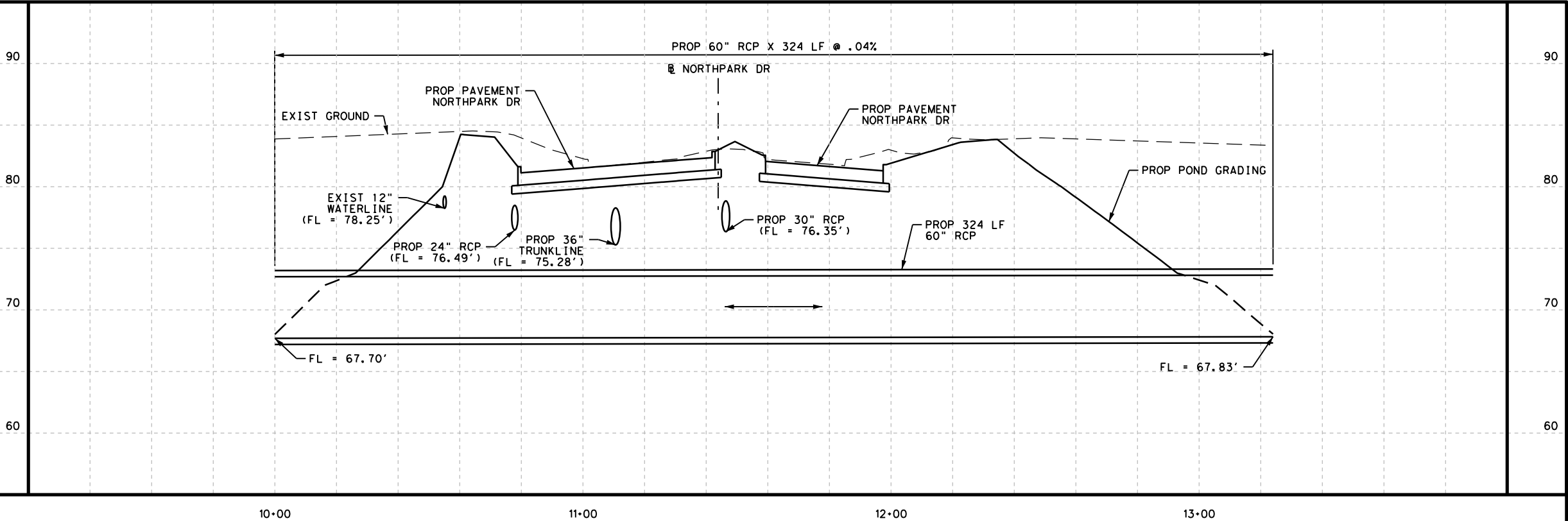
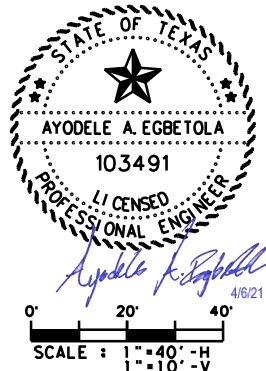
NOTES:

1. REFER TO ROADWAY PLANS FOR ADDITIONAL INFORMATION.

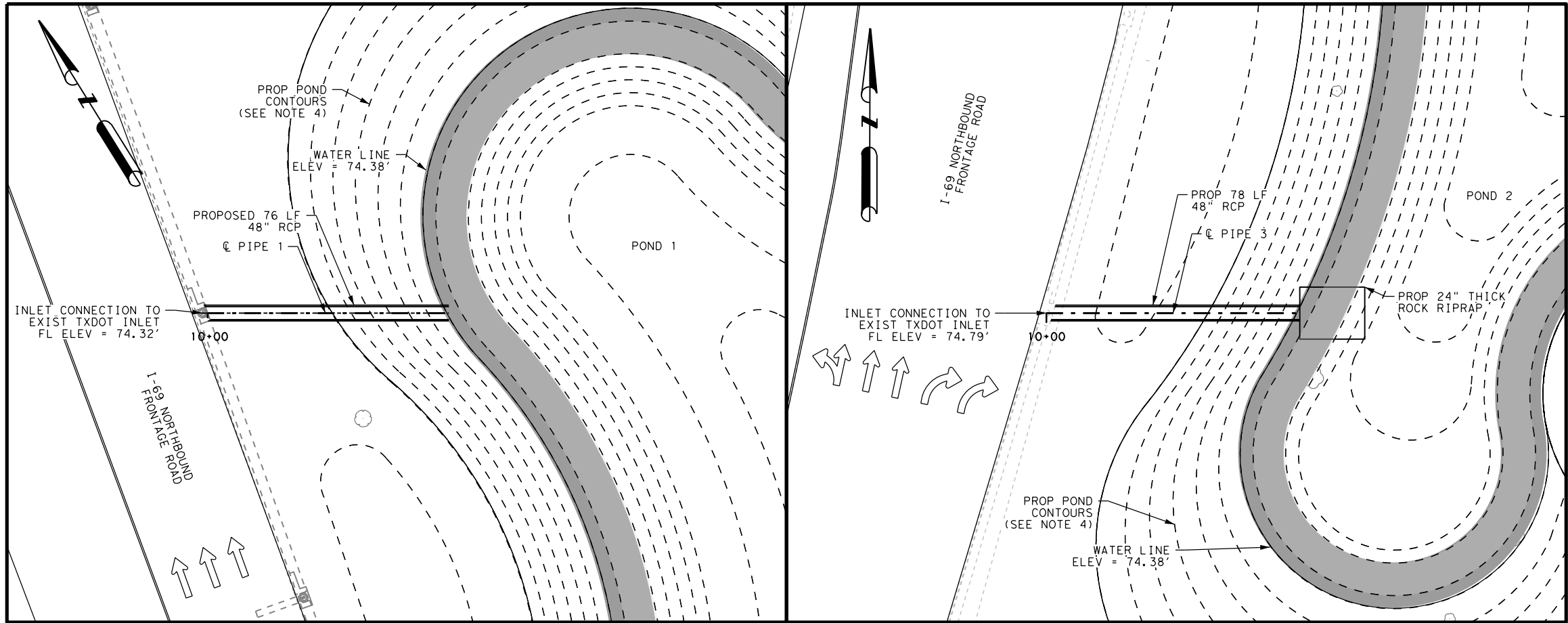
2. REFER TO LANDSCAPING PLANS FOR ADDITIONAL INFORMATION.
3. REFER TO UTILITY PLANS FOR ADDITIONAL INFORMATION.

4. REFER TO DRAINAGE PLANS FOR ADDITIONAL INFORMATION.

LEGEND			
	PROP ROADWAY		PROP BRIDGE
	STABILIZATION SHELF		PROP SIDE PATH



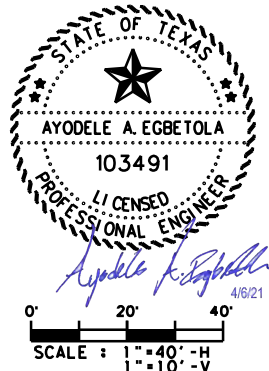
REVISIONS			
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE PLAN AND PROFILE 60" RCP EQUALIZER PIPE			
SHEET 2 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 713



NOTES:

1. REFER TO ROADWAY PLANS FOR ADDITIONAL INFORMATION.
2. REFER TO LANDSCAPING PLANS FOR ADDITIONAL INFORMATION.
3. REFER TO UTILITY PLANS FOR ADDITIONAL INFORMATION.
4. REFER TO DRAINAGE PLANS FOR ADDITIONAL INFORMATION.

LEGEND			
	PROP ROADWAY		PROP BRIDGE
	STABILIZATION SHELF		PROP SIDE PATH



REVISIONS			
NO.	REVISIONS	BY	DATE
HNTB HNTB Corporation The HNTB Companies Infrastructure Solutions Firm Registration Number 420			
LAKE HOUSTON REDEVELOPMENT AUTHORITY & TRZ-10 600 HUNTON ANDREWS KURTH LLP 600 TRAVIS, SUITE 4200 HOUSTON, TX 77007			
CITY OF HOUSTON HOUSTON PUBLIC WORKS NORTH PARK DRIVE PLAN AND PROFILE 48" RCP INFLOW AND OUTFLOW PIPE			
SHEET 3 OF 3			
DESIGNED:	FED. RD. DIV. NO.	STATE	CITY OF HOUSTON WBS
CHECKED:	6	TEXAS	SEE TITLE SHEET
DRAWN:	STATE DISTRICT	COUNTY	CONTROL SECTION
CHECKED:	HOU	MONTGOMERY	0912 37 232 714