

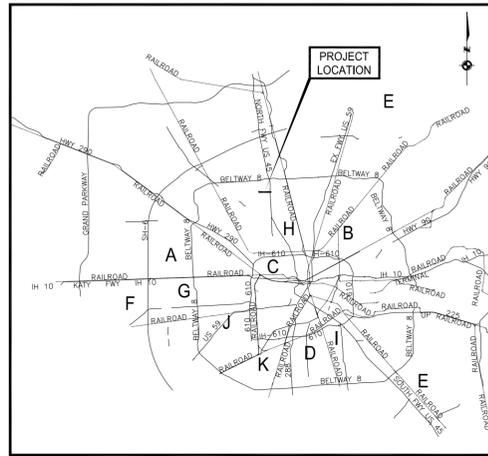
CITY OF HOUSTON

HOUSTON PUBLIC WORKS

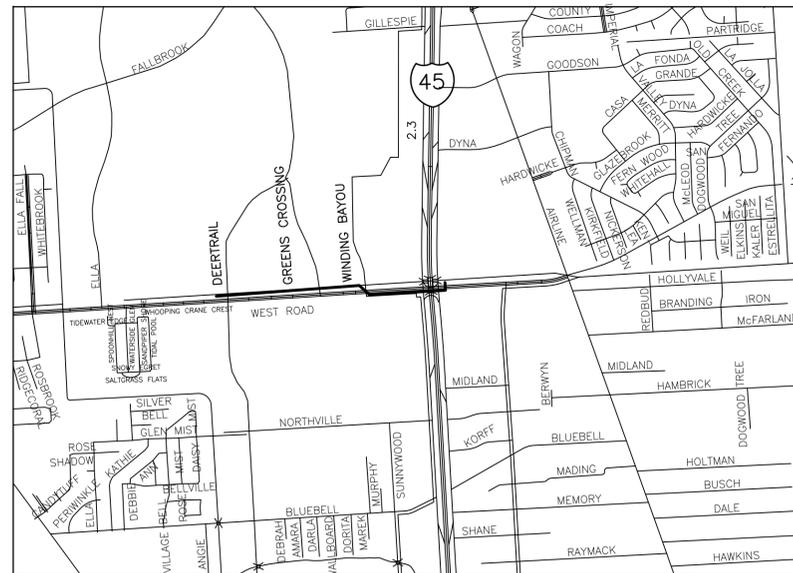
CAPITAL PROJECTS

24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO NORTH IH 45 (EAST ROW)

WBS NO.: S-000900-0180-4

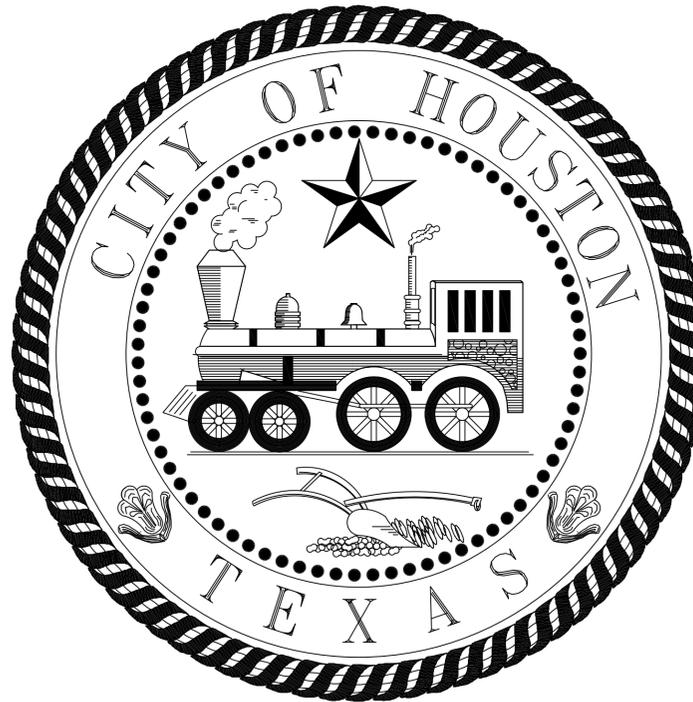


LOCATION MAP
(NOT TO SCALE)
COUNCIL DISTRICT 'B' & 'H'
ETJ



VICINITY MAP
(NOT TO SCALE)
KEY MAP NO. 412 C & D
GIM MAP# 5264 D

TDLR EABPR#: _____ N/A _____



MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT
COUNCIL MEMBERS

AMY PECK DISTRICT A	TARSHA JACKSON DISTRICT B	ABBIE KAMIN DISTRICT C	CARYOLYN EVANS-SHABAZZ DISTRICT D
FRED FLICKINGER DISTRICT E	TIFFANY D. THOMAS DISTRICT F	MARY NAN HUFFMAN DISTRICT G	MARIO CASTILLO DISTRICT H
JOAQUIN MARTINEZ DISTRICT I	EDWARD POLLARD DISTRICT J	MARTHA CASTEX-TATUM DISTRICT K	

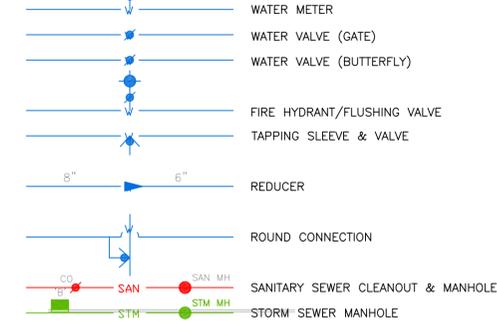
COUNCIL MEMBERS
AT-LARGE

JULIAN RAMIREZ POSITION 1	WILLIE DAVIS POSITION 2
TWILA CARTER POSITION 3	LETITA PLUMMER POSITION 4
SALLIE ALCORN POSITION 5	

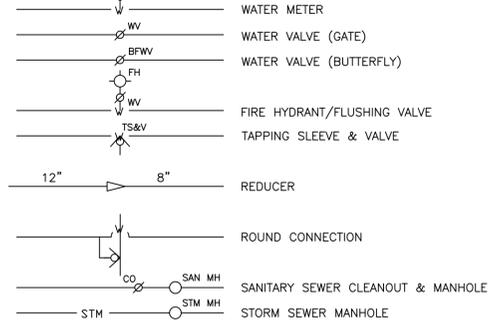
NO.	DATE	APP.
KUO & associates Consulting Engineers & Surveyors 10300 Westoffice Dr., Suite 800 Houston, TX 77042 Tel: (713) 975-8769 Fax: (713) 975-0920 www.kuoassociates.com TBPE Firm Registration No. F-4578 TBPLS Firm Registration No. 10075600		THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF KIRAN V. PUNYAMANTHULA, P.E. TEXAS REG. NO.: 116965 ON 01/13/2025 IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES
SURVEYED BY: KUO & ASSOCIATES, LLC. F. B. NO. P-XXXX		
PARKS-FORESTRY DEPT.		
METRO		
HOUSTON WATER		
TRANSPORTATION & DRAINAGE OPERATIONS		
CAPITAL PROJECTS	SURVEY	
CITY ENGINEER	DATE	
DIRECTOR OF HOUSTON PUBLIC WORKS	DATE	
FOR CITY OF HOUSTON USE ONLY		
SHEET NO 1 OF 85		

App.	
Revisions	
No.	Date

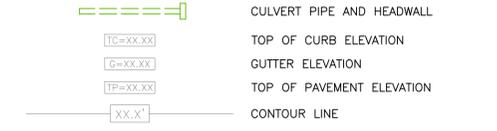
EXISTING PLAN VIEW



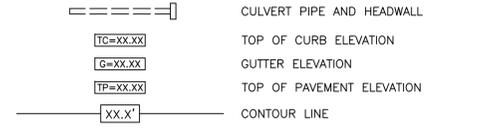
PROPOSED PLAN VIEW



STORM SEWER INLETS



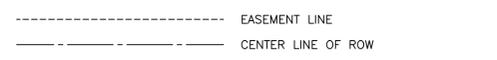
STORM SEWER INLETS



CULVERT PIPE AND HEADWALL



CULVERT PIPE AND HEADWALL



TOP OF CURB ELEVATION



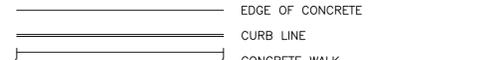
TOP OF CURB ELEVATION



CONTOUR LINE



CONTOUR LINE



EDGE OF DITCHES



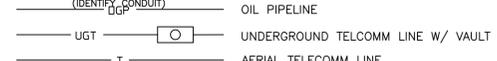
EDGE OF DITCHES



FENCE LINE, WOOD



FENCE LINE, WOOD



EDGE OF CONCRETE



EDGE OF CONCRETE



DIMENSION LINE



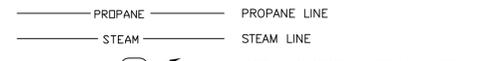
DIMENSION LINE



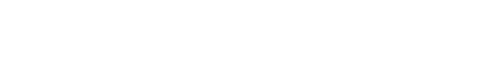
AERIAL POWER LINE



AERIAL POWER LINE



UNDERGROUND POWER LINE



UNDERGROUND POWER LINE



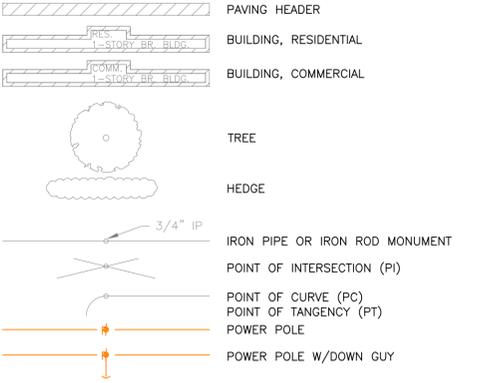
WATER LINE



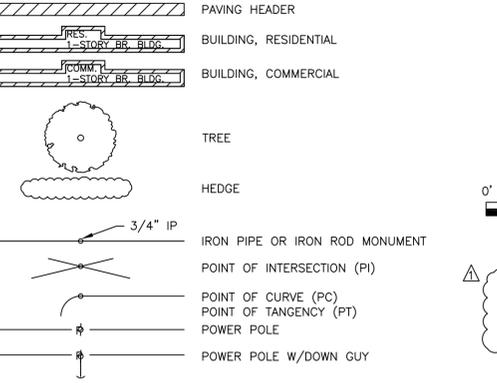
WATER LINE



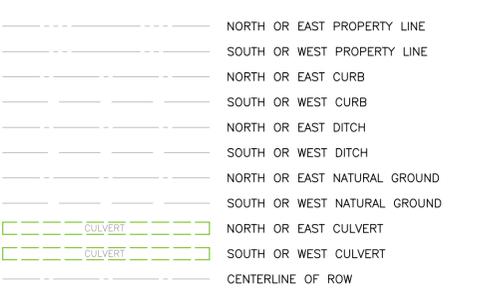
EXISTING PLAN VIEW



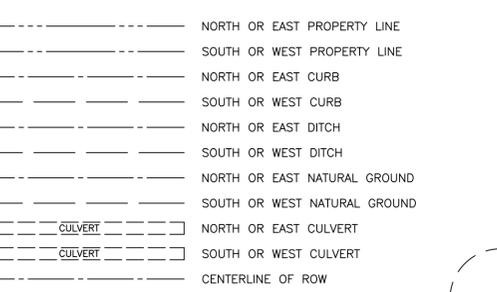
PROPOSED PLAN VIEW



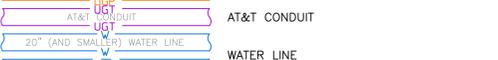
EXISTING PROFILE VIEW



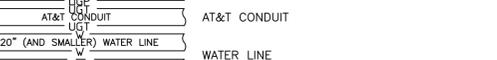
PROPOSED PROFILE VIEW



CENTERPOINT ENERGY CONDUIT



CENTERPOINT ENERGY CONDUIT



GAS LINE



GAS LINE



WESTERN UNION



WESTERN UNION



AT&T CONDUIT



AT&T CONDUIT



WATER LINE



WATER LINE



SANITARY SEWER LINE



SANITARY SEWER LINE



STORM SEWER LINE



STORM SEWER LINE



SANITARY SEWER FORCE MAIN



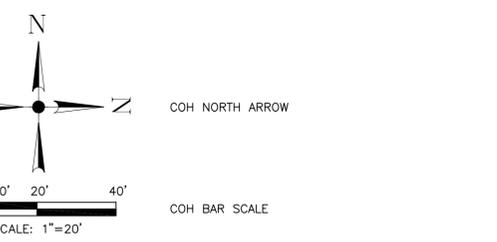
SANITARY SEWER FORCE MAIN



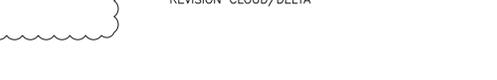
RECLAIMED WATER LINE

RECLAIMED WATER LINE

MISC STANDARD ELEMENTS



DETAIL/SECTION TITLE



SECTION CALLOUT



DETAIL CALLOUT



Jun 13 2025 11:56AM eblm
 S:\Proj-2024\24002 (P30)27-24 IN. W. WBS (1800)09p\Design\Sheets\LEGENDS AND ABBREVIATIONS.dwg
 Plot Date: 6/13/2025 11:56 AM
 Plot Scale: 1/8"=1'-0"
 Plot Size: 11.00 x 17.00
 Plot Orientation: Landscape
 Plot Range: Extents
 Plot Style: acad.ctb
 Plot Device: HP DesignJet 4650

KIRAN V. PUNYAMANTHULA, P.E.
 TEXAS REG. NO.: 116965
 ON 01/13/2025
 IT IS NOT TO BE USED FOR
 PERMIT, BIDDING OR
 CONSTRUCTION PURPOSES

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

LEGEND AND ABBREVIATIONS

WBS NO. S-000900-0180-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 3 OF 85	

CENTERPOINT ENERGY

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE, LLC. WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-2111 or (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT 713-207-2222.

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING AND RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769

WARNING: UNDERGROUND ELECTRICAL FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- ALL INFORMATION CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTORS ARE RESPONSIBLE MAKING THEIR OWN DETERMINATIONS 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 OR BY EXCAVATING IN ADVANCE OF CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES WHEN AND WHERE THEY FALL IN THE PATH OF CONSTRUCTION.
- THE CONTRACTOR IS ALSO RESPONSIBLE FOR CONTACTING THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 AND TEXAS ONE CALL AT 1-800-245-4545, FORTY-EIGHT (48) HOURS PRIOR TO ANY CONSTRUCTION.
- THE LOCATION OF ANY CENTERPOINT ENERGY UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. THEY AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
- ALL PROPOSED FACILITIES SHALL MAINTAIN 12" CLEAR FROM ALL EXISTING UTILITIES.

COMCAST OF HOUSTON, LLC

THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UNDERGROUND FACILITIES BEFORE COMMENCING WORK AND AGREE TO BE FULLY RESPONSIBLE FOR ALL DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND FACILITIES.

FLOOD PLAIN NOTE:

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S PRELIMINARY FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 48201C0880M, REVISED JANUARY 06, 2017 AND PANEL NUMBER 48201C0860L, REVISED JUNE 18, 2017, THE ENTIRE PROJECT LIMITS LIES WITHIN THE UNSHADED ZONE "x", WHICH IS DETERMINED TO BE OUTSIDE THE 500-YR FLOOD ZONE.

METRO

THE CONTRACTOR SHALL CONTACT METRO BUS OPERATIONS, A MINIMUM OF SEVEN (7) TO TEN (10) BUSINESS DAYS PRIOR TO CONSTRUCTION CHANGES. THE CONTACT INFORMATION IS CARL TAYLOR, CARL.TAYLOR@RIDEMETRO.ORG, 713-615-7219 OR SHIRLEY MITCHELL, SHIRLEY.MITCHELL@RIDEMETRO.ORG, 713-615-7212.

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.

4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.

6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. KEVIN RAY AT (713) 614-1983 OR E-MAIL HIM AT kr7896@att.com, IF CABLE LOCATE REQUESTS ARE NOT COMPLETED FOR OUR AT&T TEXAS/SWBT FACILITIES.

GENERAL NOTES

1. THE FLOW LINES AND LOCATIONS OF ALL UNDERGROUND UTILITIES MUST BE LOCATED BY WHATEVER MEANS MAY BE REQUIRED (METAL DETECTION EQUIPMENT, PROBES, EXCAVATION, SURVEY, COORDINATION WITH UTILITY COMPANIES) BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL FIELD VERIFICATION WORK AND UTILITY ADJUSTMENTS SHALL BE COMPLETED PRIOR TO EXCAVATION FOR PROPOSED UTILITIES. NO SEPARATE PAY; INCLUDE COST IN UNIT PRICE FOR WORK IN APPROPRIATE SECTIONS.

2. SERVICES ARE TO BE TRANSFERRED BETWEEN EXISTING AND PROPOSED WATER LINES WITH MINIMUM DISRUPTION OF SERVICE. EXISTING WATER LINES MUST BE MAINTAINED IN SERVICE UNTIL SERVICE TRANSFER IS DONE.

3. CALL THE TRAFFIC MANAGEMENT AND MAINTENANCE DIVISION OF THE CITY OF HOUSTON PUBLIC WORKS AND ENGINEERING DEPARTMENT WHEN WORK IS SCHEDULED NEAR SIGNAL CONDUITS WITHIN THE CITY OF HOUSTON (713) 837-7280. CALL AT LEAST FIVE WORKING DAYS IN ADVANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO EXISTING TRAFFIC SIGNAL CABLES AS A RESULT OF CONSTRUCTION ACTIVITIES FOR THE PROJECT. NO SEPARATE PAYMENT FOR REPAIR TO SIGNAL CONDUIT.

4. SERVICE LINE INSTALLATION COULD BE HINDERED BY THE CEMENT STABILIZED SAND BACKFILL. INCLUDE COST OF CROSSING CEMENT STABILIZED BACKFILL IF ENCOUNTERED DURING SERVICE LINE INSTALLATION IN THE UNIT PRICE OF SERVICES.

5. THE CONTRACTOR TO PROVIDE CUT SHEETS (GROUND ELEVATIONS AND PROPOSED LINE INVERTS WITH AMOUNT OF CUT, LOCATION OF BENDS, FIRE HYDRANTS, VALVES AND OTHER FITTINGS AT EVERY 100 FEET IN TABULAR FORMAT) ON EACH STREET TO THE CITY FOR APPROVAL PRIOR TO CONSTRUCTION AT NO ADDITIONAL COST TO THE CITY.

6. CONTRACTOR MUST REFER TO THE CITY OF HOUSTON STANDARD DETAIL DRAWINGS INCLUDED IN THE CITY OF HOUSTON'S "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" DATED OCTOBER, 2002, FOR ANY OTHER DETAILS NOT INCLUDED IN THE CONSTRUCTION DRAWINGS.

7. CONTRACTOR SHALL COORDINATE AHEAD OF TIME WITH BUSINESS OWNERS AND RESIDENTS FOR INSTALLATION OF WATER LINES IN ENCROACHED AREAS OF THE PUBLIC RIGHT-OF-WAY. NO SEPARATE PAY.

METRO NOTES:

1. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SECURE "TRACK ALLOCATION PERMITS" ISSUED BY METRO RAIL OPERATIONS. CONTACT EDDIE ESPINOSA (EDDIE.ESPINOSA@RIDEMETRO.ORG, 832-392-0758) FOR TRACK ALLOCATION REQUESTS AND TRACK ACCESS PROCEDURES.

2. ALL CONTRACTORS MUST SUCCESSFULLY COMPLETE THE METRO RAIL TRACK SAFETY COURSE PRIOR TO CONSTRUCTION. THE COURSE IS HELD AT THE SERVICE AND INSPECTION FACILITY (S&I) LOCATED AT 5880 TEXAS STREET, HOUSTON, TEXAS 77011, ROOM #107 AND IS OFFERED IN BOTH ENGLISH AND SPANISH. CONTRACTOR MUST EMAIL TRACK.SAFETY@RIDEMETRO.ORG TO SCHEDULE THE CLASS. TRACK SAFETY CERTIFICATION FOR CONTRACTOR IS VALID FOR 1 YEAR.

3. TRACKWAY ALLOCATION REQUEST FORM MUST BE SUBMITTED BY 5:00 PM TUESDAY PRIOR TO THE WEEK OF THE SCHEDULED WORK.

4. WORK ACTIVITIES WITHIN TEN FEET OF THE OVERHEAD CONTACT SYSTEM (OCS) REQUIRE A RED TAG IN ADDITION TO A METRO RAIL WORK PERMIT. THE SUPERINTENDENT, RAIL CONTROL, OR DESIGNEE MAY ALSO REQUIRE A RED TAG DUE TO OTHER SPECIAL CONDITIONS OR SITUATIONS (E.G., CRANES, AREAS OF HEAVY CONSTRUCTION, ETC.).

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS TO ANY METRO FACILITIES DAMAGED DURING CONSTRUCTION. IF THE CONTRACTOR CANNOT IMMEDIATELY MAKE THE REPAIRS TO METRO'S SATISFACTION, METRO WILL MAKE THE REPAIRS AND BILL THE COST TO THE CONTRACTOR.

6. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY IN THE FIELD THAT THERE ARE NO CONFLICTS WITH OUR FIBER OPTICS, COMMUNICATION, SIGNALING, ELECTRICAL POWER, HIGH VOLTAGE CABLES OR ANY OTHER METRO INFRASTRUCTURE.

7. THE CONTRACTOR SHALL CONTACT THE PLANNING, ENGINEERING, AND CONSTRUCTION DEPARTMENT, MUSTAQUE RUMI BY EMAIL AT MUSTAQUE.RUMI@RIDEMETRO.ORG OR BY PHONE 713-615-6217 ONE WEEK PRIOR TO CONSTRUCTION. THE CONSTRUCTION DEPARTMENT MAY ASSIGN AN INSPECTOR TO ASSURE NO DAMAGES ARE MADE TO METRO'S FACILITIES.

8. THE CONTRACTOR SHALL "HAND EXCAVATE" IN THE VICINITY OF COMMUNICATION AND POWER LINES FEEDING THE METRO SYSTEM.

9. AUGER BORE PITS SHALL BE LOCATED AT A MINIMUM DISTANCE OF THIRTY-FIVE FEET (35') FROM CENTERLINE OF TRACKS.

10. THE CONTRACTOR SHALL CONTACT METRO BUS OPERATIONS A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO CONSTRUCTION CHANGES. THE CONTACT INFORMATION IS CARL TAYLOR, CARL.TAYLOR@RIDEMETRO.ORG 713- 615-7219.

11. THE CONTRACTOR SHALL PROVIDE ANY TEMPORARY BUS STOP FACILITIES NEEDED, EXCEPT FOR BUS STOP SIGNS, AT NO COST TO METRO AND SHALL RESTORE ANY AFFECTED BUS STOP TO ITS ORIGINAL CONDITION AND MEET CURRENT AMERICAN DISABILITY ACT (ADA) REQUIREMENTS AS REQUIRED BY LOCAL, STATE, AND FEDERAL CODE AND REQUIREMENTS. NO BUS STOP SHALL BE PERMANENTLY REMOVED WITHOUT APPROVAL FROM METRO.

12. THE CONTRACTOR SHALL CONTACT THE DIRECTOR OF UNIVERSAL ACCESSIBILITY, TIM MILLS BY EMAIL AT TM14@RIDEMETRO.ORG OR BY PHONE 713-739-6861 ONE WEEK PRIOR TO CONSTRUCTION. METRO MAY ASSIGN AN INSPECTOR TO ASSURE NO DAMAGES ARE MADE TO METRO'S FACILITIES. UNIVERSAL ACCESSIBILITY WILL COORDINATE ANY PERMANENT OR TEMPORARY IMPACT ON BUS STOPS, SHELTERS, AND SIDEWALK TO MAINTAIN ACCESSIBILITY.

GENERAL CONSTRUCTION NOTES

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING 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 HOUSTON PUBLIC WORKS.

2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY HOUSTON PUBLIC WORKS. SOILS REPORT WAS PREPARED BY AVILES ENGINEERING, CORP., REPORT NO. G147-17 (Revision 1), DATED DECEMBER, 2021.

3. 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. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, 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. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.

6. 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.

7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

8. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.

9. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

10. THIS PROJECT SHALL BE BUILT BY MEANS OF OPEN CUT EXCEPT AS NOTED ON THE DRAWINGS. CONTRACTOR TO DETERMINE THE LOCATION OF BORE PITS IN FIELD FOR TRENCHLESS CONSTRUCTION. LOCATION OF BORE PITS ARE SUBJECT TO THE CITY ENGINEER'S APPROVAL.

11. THE SIZES OF WATER METERS SHOWN BUT NOT SPECIFICALLY CALLED OUT IN THIS PROJECT ARE ONE INCH OR SMALLER STANDARD CITY OF HOUSTON WATER METERS. ALL OTHER SIZES LARGER THAN ONE INCH ARE SPECIFICALLY CALLED OUT ON THESE DRAWINGS.

12. SERVICES ARE TO BE TRANSFERRED BETWEEN EXISTING AND PROPOSED WATER LINES WITH MINIMUM DISRUPTION OF SERVICE. EXISTING WATER LINES MUST BE MAINTAINED IN SERVICE UNTIL SERVICE TRANSFER IS DONE.

13. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, PARK AND RECREATION DEPARTMENT AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, IN ORDER FOR THEM TO SUSPEND OR RESCHEDULE MOWING OPERATION IN THE MEDIAN OF THE CONSTRUCTION ZONE AREA.

STREET AND BRIDGE CONSTRUCTION NOTES

1. HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL" REFERENCED AT:

https://www.houstonpermittingcenter.org/media/2276/download

2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.

3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.

4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.

5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.

6. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.

7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.

8. EXPOSED 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS; USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C-C DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.

9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.

10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-1457.

11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.

12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS. WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".

13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.

14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.

15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

 <p>KUO & Associates Consulting Engineers & Surveyors 13300 WestOffice Dr., Ste 800, Houston, Texas 77042 Tel: 713-975-8769, Fax: 713-975-0920 www.kuoassociates.com Texas Firm Registration No. F-4578 TSPS Firm Registration No. 10075600</p>	<p>THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF</p> <p>KIRAN V. PUNYAMANTHULA, P.E. TEXAS REG. NO.: 116965</p> <p>ON 01/13/2025 IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES</p>
	<p>SURVEYED BY: Kuo & Associates, LLC. C.O.H. Field Book P-</p>

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

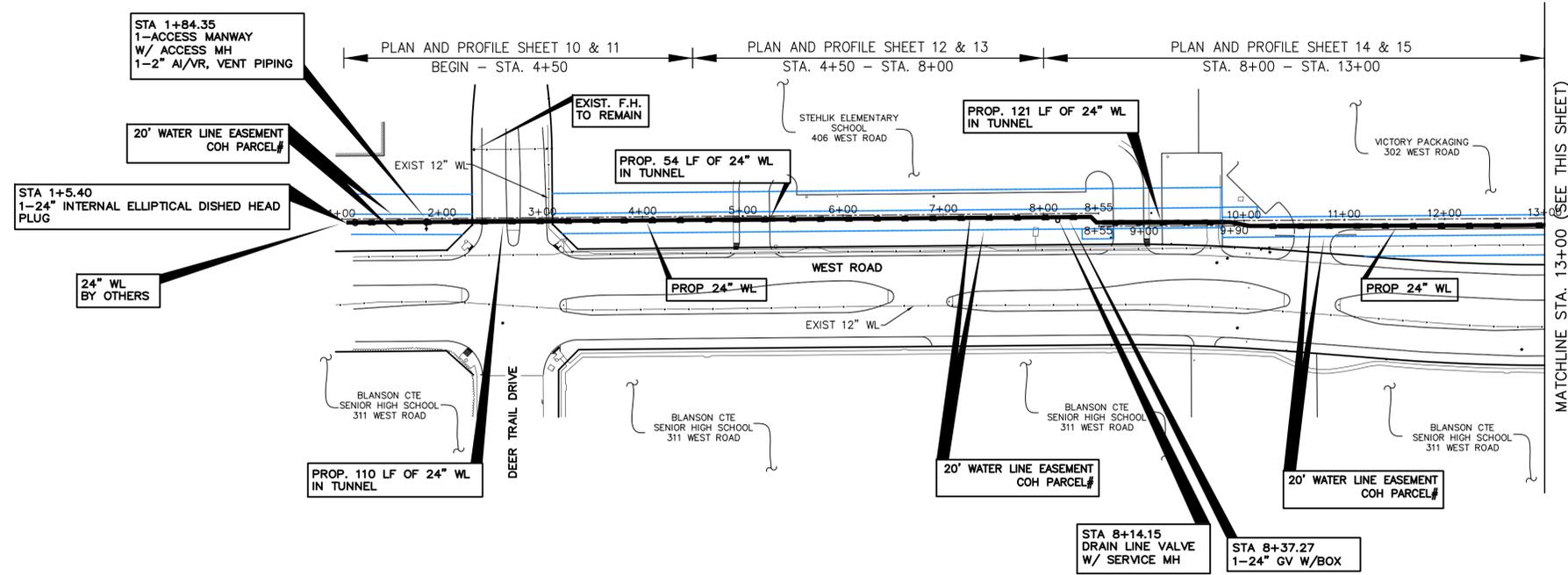
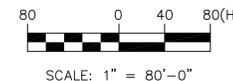
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

UTILITY AND GENERAL CONSTRUCTION NOTES

WBS NO. S-000900-0180-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 4 OF 85

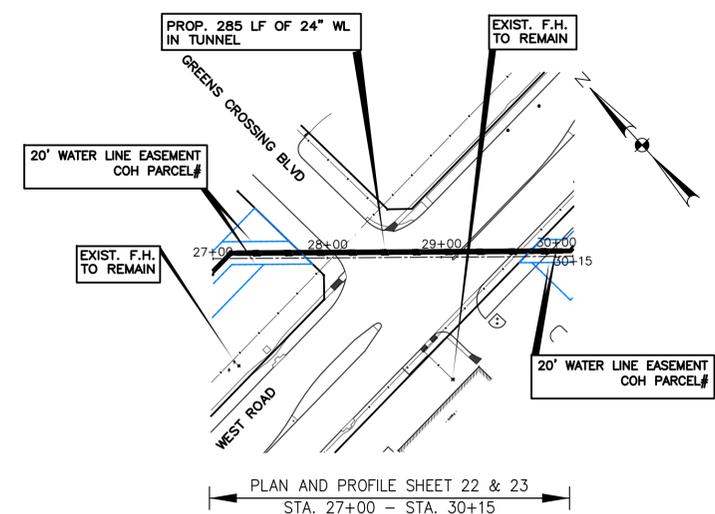
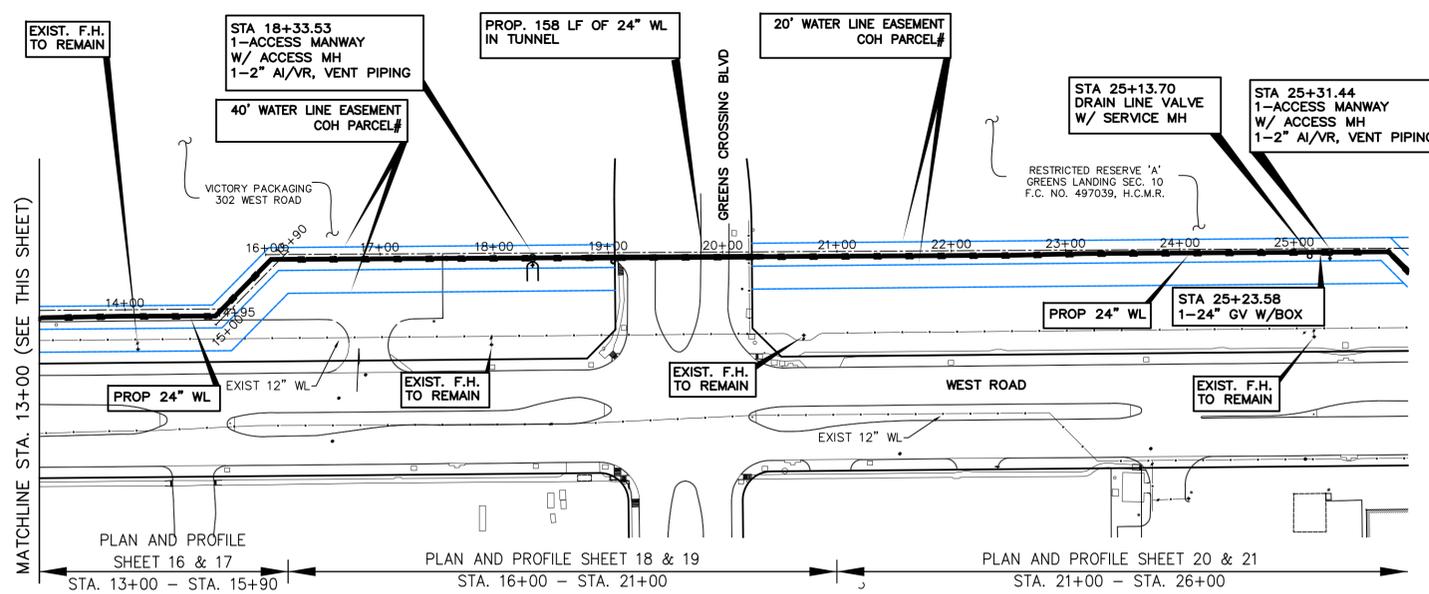
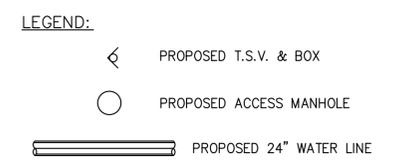
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User: ahbn
Title: 24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

App.	
Revisions	
Date	
No.	



FLOODPLAIN NOTE:
 AS PER FLOOD INSURANCE RATE MAP NUMBER 48201C0470L DATED JUNE 18, 2007, THE ENTIRE SITE IS LOCATED IN 'ZONE X' (UNSHADED) WHICH IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOODPLAIN.

- NOTES:**
1. THIS SHEET IS FOR GENERAL LAYOUT OF WATER LINE DESIGN SHEETS.
 2. ALL STATIONS NOTED ARE FOR DESIGN BASELINE STATIONS.
 3. FOR BORING INFORMATION, SEE GEOTECHNICAL INVESTIGATION REPORT NO.
 4. PPCA LIMITS IN THE VICINITY. REFER TO PLAN SHEET FOR DEFINED LIMITS.
 5. THE CITY OF HOUSTON MAKES NO EXPRESSED OR IMPLIED GUARANTEE AS TO THE ACCURACY OR COMPLETENESS OF THE GEOTECHNICAL ENGINEERING STUDIES NOR OF THE INTERPRETATIONS THEREOF.
 6. SEE PLAN AND PROFILE SHEETS FOR GAS LINES.



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 Consulting Engineers & Surveyors
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 www.kuoassociates.com
 Texas Firm Registration No. F-4578
 TBPLS Firm Registration No. 10075600

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 KIRAN V. PUNYAMANTHULA, P.E.
 TEXAS REG. NO.: 116965
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SURVEYED BY:
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 C.O.H. Field Book P-

CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

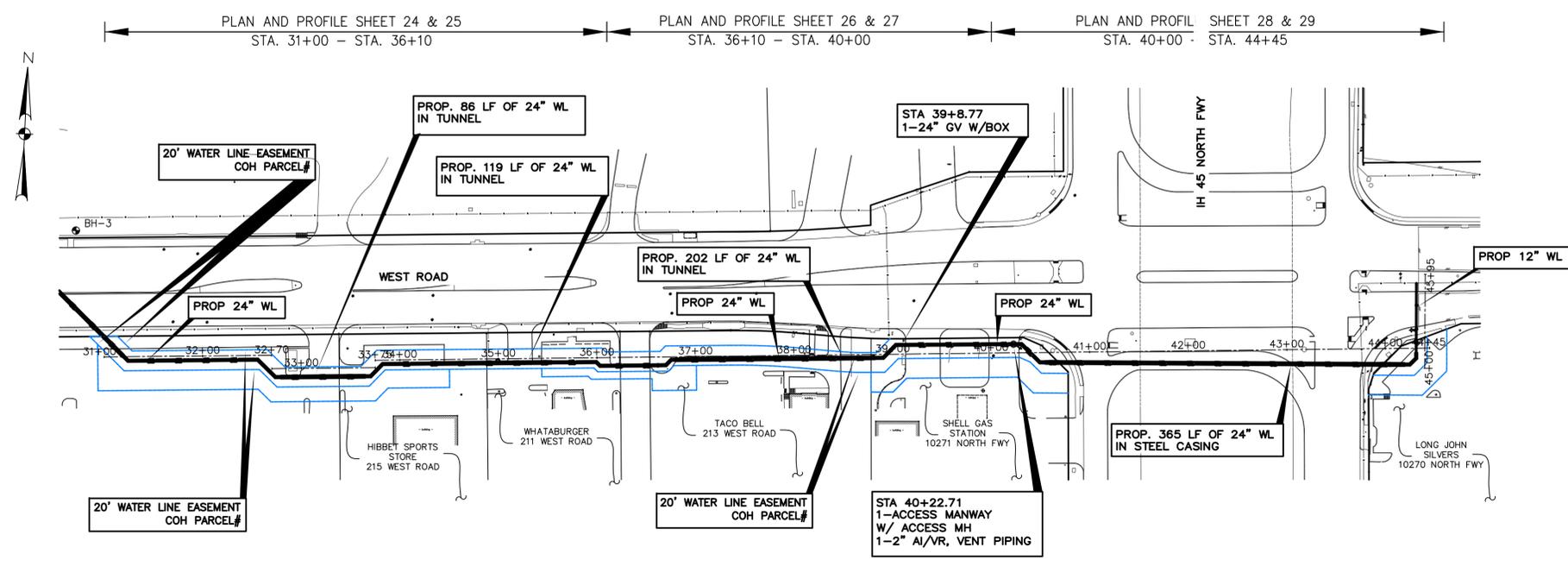
WATER LINE SHEET LAYOUT AND BORING PLAN
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 (SHEET 1 OF 2)

WBS NO.	S-000900-0180-4
DRAWING SCALE	SCALE: 1" = 80'-0"
CITY OF HOUSTON PM	ADAM SABZEVARI
SHEET NO.	5 OF 85



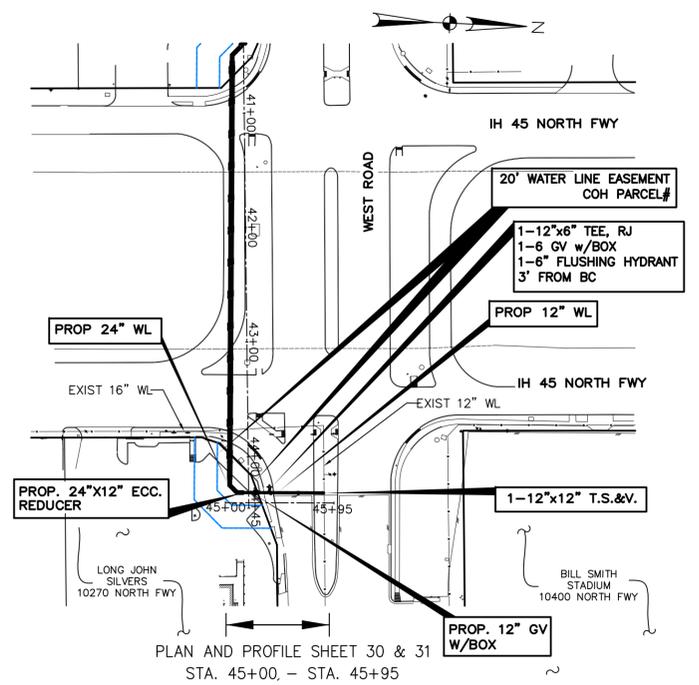
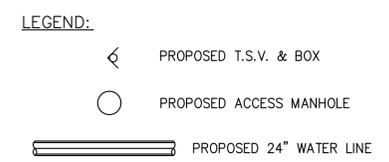
SCALE: 1" = 80'-0"

Revisions	No.	Date



FLOODPLAIN NOTE:
 AS PER FLOOD INSURANCE RATE MAP NUMBER 482010470L DATED JUNE 18, 2007, THE ENTIRE SITE IS LOCATED IN "ZONE X" (UNSHADED) WHICH IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOODPLAIN.

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CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

WATER LINE SHEET LAYOUT AND BORING PLAN

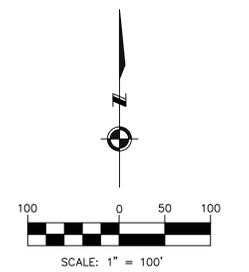
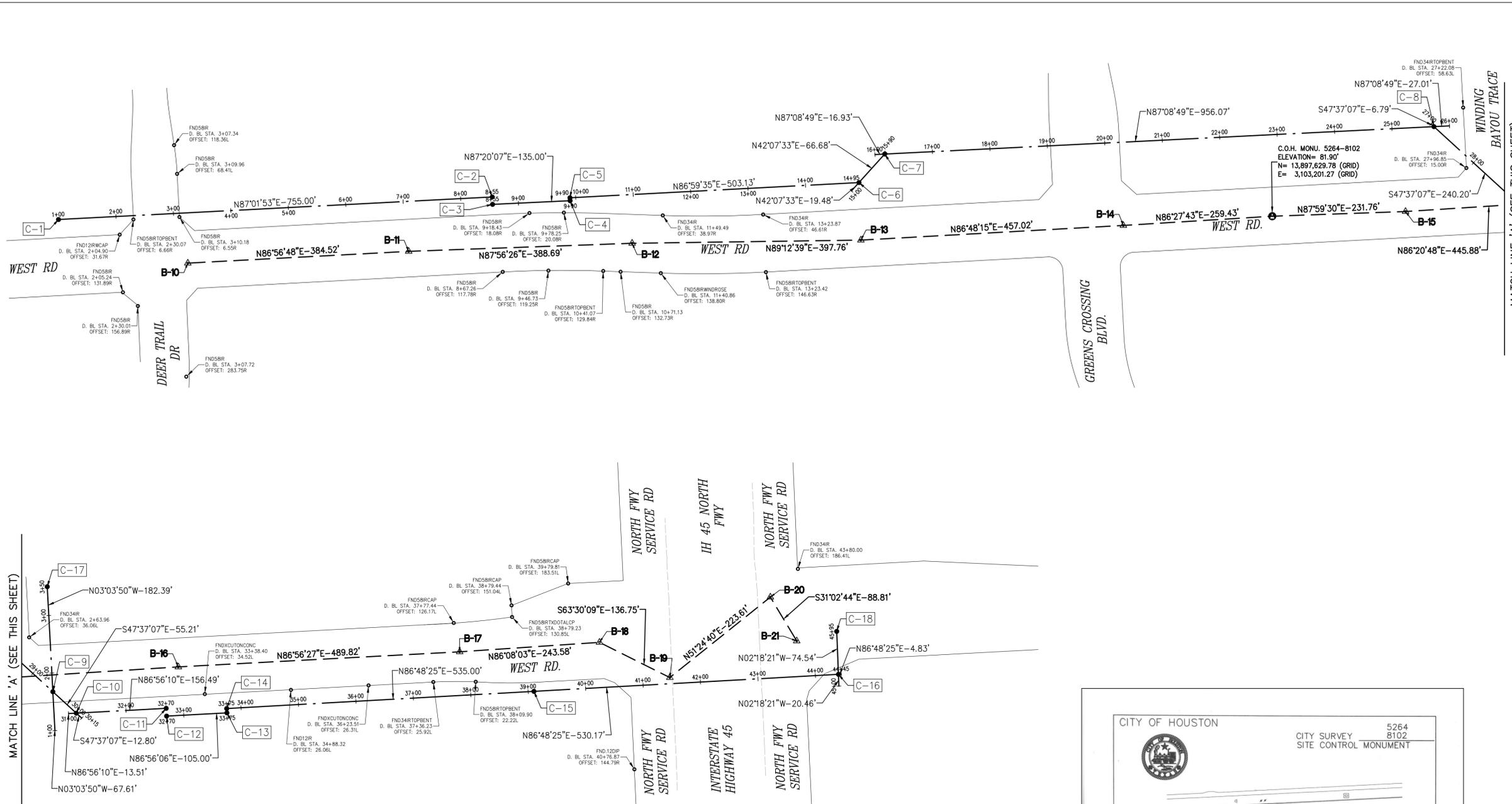
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DRAWING SCALE SCALE: 1" = 80'-0"
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 6 OF 85

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BENCHMARK:
 CITY OF HOUSTON MONUMENT 5264-8102, A BRASS DISK IN CONCRETE, LOCATED IN THE MEDIAN ON WEST ROAD APPROXIMATELY 275 FEET EAST FROM THE INTERSECTION OF GREENS CROSSING BLVD.
 ELEV. 81.90 FEET NAVD 1988 (GEOID '18)*
 * OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED JANUARY 6, 2024.

VERTICAL DATUM ADJUSTMENT:
 THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM 150650) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (GEOID '18) IS 0.37'.
 NAVD 1988, 2001 ADJ. ELEVATION = NAVD 1988 (GEOID '18) ELEVATION + 0.37 FT

NOTE:
 ALL BEARINGS AND DISTANCES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83. ALL DISTANCES ARE IN SURFACE.
 THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID COORDINATES (NAD83) AND MAY BE BROUGHT TO SURFACE BY DIVIDING BY THE COMBINED SCALE FACTOR 0.999870017.

LEGEND:

- B-X** SURVEY CONTROL POINT NUMBER
- C-X** DESIGN BASELINE POINT NUMBER
- ▲** SURVEY CONTROL POINT
- DESIGN BASELINE POINT
- ⊙** CITY OF HOUSTON MONUMENT
- D. BL.: DESIGN BASELINE
- S. BL.: SURVEY BASELINE

MATCH LINE 'A' (SEE THIS SHEET)

MATCH LINE 'A' (SEE THIS SHEET)

DESIGN BASELINE POINTS DATA				
POINT No.	D. BL. STA.	NORTHING (SURFACE)	EASTING (SURFACE)	EASTING (GRID)
C-1	1+00.00	13,899,430.72	3,101,494.51	3,101,091.37
C-2	8+55.00	13,899,469.82	3,102,248.50	3,101,845.26
C-3	8+55.00	13,899,457.02	3,102,249.10	3,101,845.86
C-4	9+90.00	13,899,463.30	3,102,383.95	3,101,980.69
C-5	9+90.00	13,899,468.43	3,102,383.71	3,101,980.45
C-6	14+93.13	13,899,494.82	3,102,886.15	3,102,482.82
C-7	16+16.93	13,899,544.27	3,102,930.87	3,102,527.54
C-8	25+72.99	13,899,591.86	3,103,885.75	3,103,482.30
C-9	29+46.99	13,899,429.95	3,104,063.18	3,103,659.71
C-10	31+13.51	13,899,392.74	3,104,103.96	3,103,700.48
C-11	32+70.00	13,899,401.10	3,104,260.22	3,103,856.72
C-12	32+70.00	13,899,387.63	3,104,260.94	3,103,857.44
C-13	33+75.00	13,899,393.24	3,104,365.79	3,103,962.28
C-14	33+75.00	13,899,400.76	3,104,365.39	3,103,961.88
C-15	39+10.00	13,899,430.56	3,104,899.56	3,104,495.98
C-16	44+40.17	13,899,460.09	3,105,428.91	3,105,025.26
C-17	3+50.00	13,899,613.08	3,104,053.43	3,103,649.96
C-18	45+95.00	13,899,534.57	3,105,425.91	3,105,022.26

SURVEY BASELINE POINTS DATA (TEMPORARY BENCHMARK)						
POINT No.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	ELEVATION	D. BL. STA.
B-10	13,899,355.05	3,101,719.30	13,897,548.37	3,101,316.13	83.32'	3+20.57
B-11	13,899,375.53	3,102,103.28	13,897,568.85	3,101,700.06	82.93'	7+05.09
B-12	13,899,389.50	3,102,491.72	13,897,582.82	3,102,088.45	82.80'	10+93.72
B-13	13,899,394.98	3,102,889.44	13,897,588.30	3,102,486.12	82.34'	14+91.18
B-14	13,899,420.46	3,103,345.76	13,897,613.77	3,102,942.38	82.40'	20+25.14
B-15	13,899,444.59	3,103,836.30	13,897,637.90	3,103,432.86	81.80'	25+16.28
B-16	13,899,473.00	3,104,281.28	13,897,666.31	3,103,877.78	82.18'	32+94.87
B-17	13,899,499.14	3,104,770.40	13,897,692.44	3,104,366.83	83.32'	3054.88
B-18	13,899,515.56	3,105,013.43	13,897,708.86	3,104,609.83	83.32'	3298.46
B-19	13,899,454.55	3,105,135.61	13,897,647.86	3,104,732.19	83.32'	3435.21
B-20	13,899,594.02	3,105,310.60	13,897,787.31	3,104,906.96	83.32'	3658.82
B-21	13,899,517.93	3,105,356.40	13,897,711.23	3,104,952.76	83.32'	3739.43

CITY OF HOUSTON CITY SURVEY 5264 8102 SITE CONTROL MONUMENT

Project WBS# S-000900-0180-3
 Texas Coordinate System of 1983, South Central Zone, U. S. Survey Feet
 X = 3,103,201.27
 Y = 13,897,629.78
 Lat = 29° 54' 54.04034" (N)
 Lon = 95° 25' 03.55523" (W)
 Datum Source & Adjustment: GPS STATIC (OBSERVED ON 01-06-2024)
 Vertical Adjustment used: NAVD '88
 General Location: LOCATED IN MEDIAN 290' EAST OF THE INTERSECTION OF WEST RD AND GREEN CROSSING BLVD
 Date Set: 01-06-2024 Type of Mark: 4A

3 Nearest project control points (bearings and distances stated below):
 1 S 88° 20' 00" W 226.98'
 2 S 86° 11' 40" W 264.24'
 3 S 78° 15' 30" W 325.54'

NOTE:
 1. Bearings are grid bearings.
 2. Scale Factor = (S.F. 0.999870017).
 3. Surface = Grid S.F.

Surveyed By: Kuo & Associates, LLC, 10300 Westoffice Dr., Suite 800, Houston, TX 77042

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 Consulting Engineers & Surveyors
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 Tel: 713-975-8169, Fax: 713-975-0920, www.kuasassociates.com
 TSPS Firm Registration No. F-4578
 TSPS Firm Registration No. 1007560

SURVEYED BY: KUO & ASSOCIATES, LLC. FB NO.

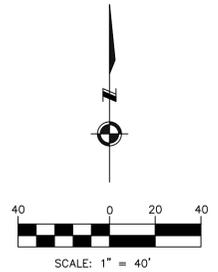
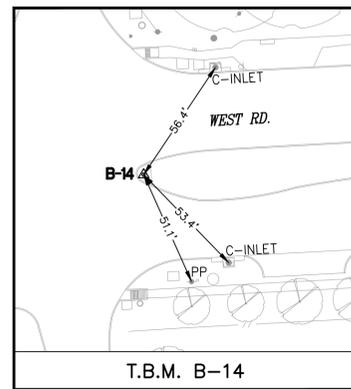
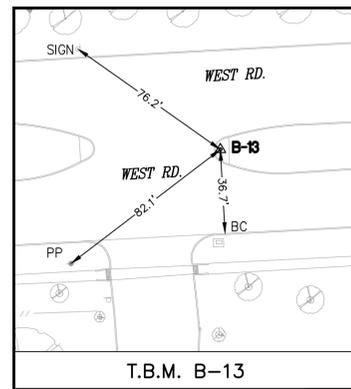
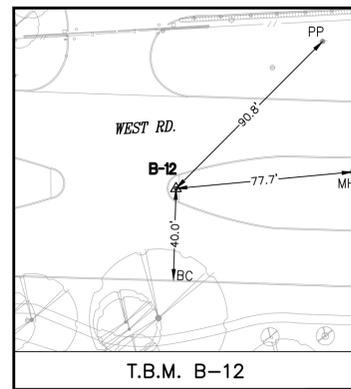
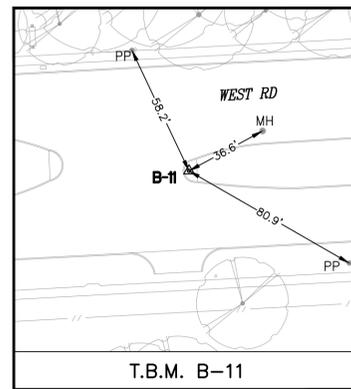
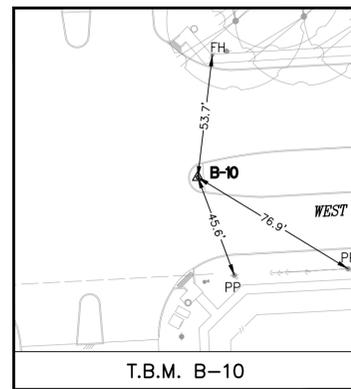
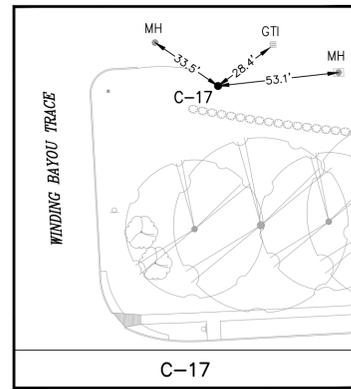
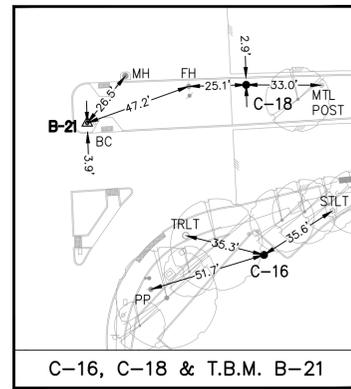
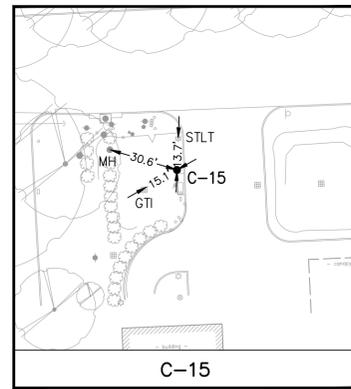
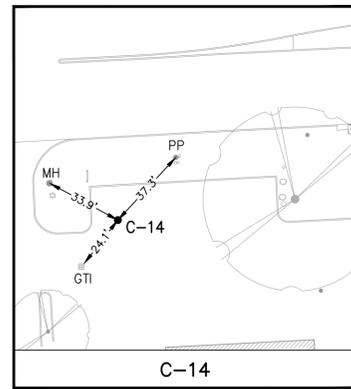
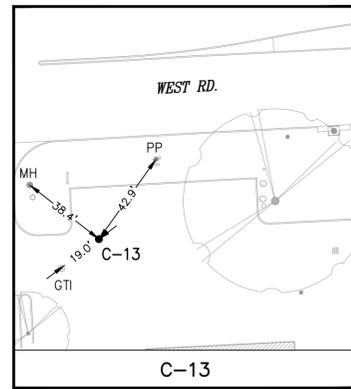
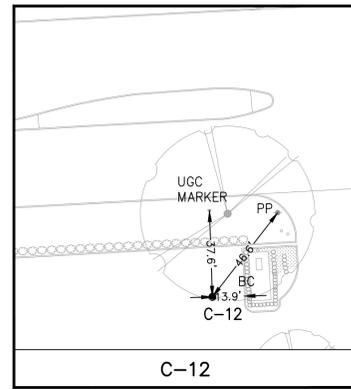
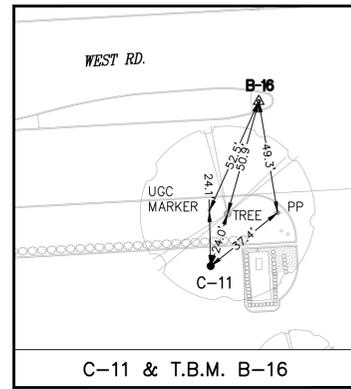
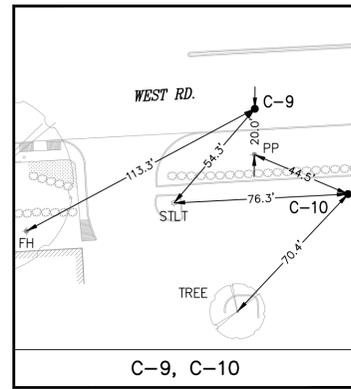
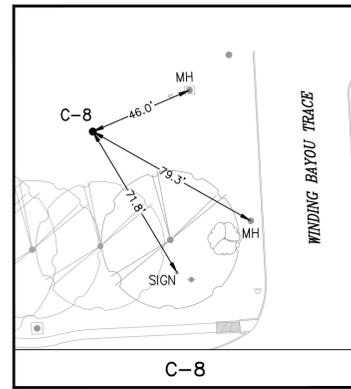
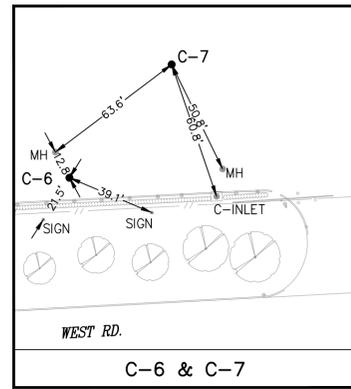
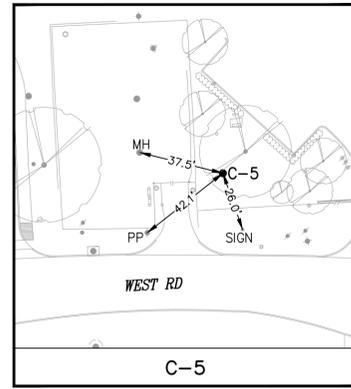
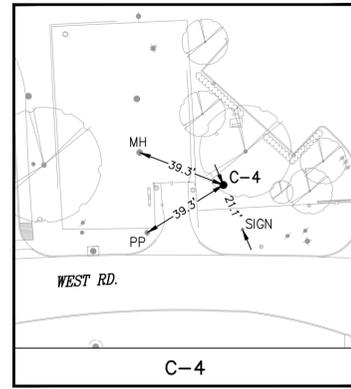
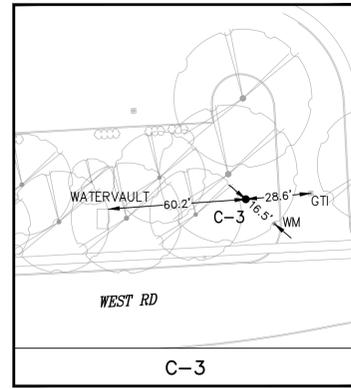
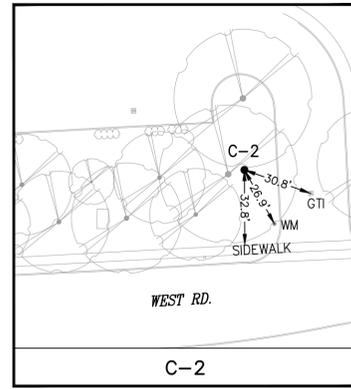
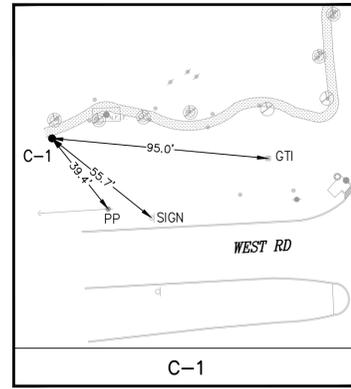
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF KUTUBUL A. M. MANUIDDIN, R.P.L.S. TEXAS REG. NO.: 6404 ON 12/27/2024 IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES

CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N IH-45 (EAST R.O.W.)

SURVEY CONTROL MAP (SHEET 1 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000900-0180-3	
DRAWING SCALE	
AS SHOWN	
CITY OF HOUSTON PM	
SHEET NO.	OF



- EXIST. TOPOGRAPHIC LEGEND**
- ASPHALT SYMBOL
 - B OR BB INLET
 - BUSH
 - C INLET
 - CLEANOUT
 - brick column
 - DOWN GUY
 - E INLET
 - ELEC MANHOLE
 - FIRE HYDRANT
 - GAS METER
 - GAS VALVE
 - GATE
 - GRATE INLET
 - GRATE INLET
 - MAIL BOX
 - STORM MANHOLE
 - SANITARY MANHOLE
 - PLANTER
 - POWER POLE
 - POWER POLE W/LT.
 - SIGN
 - SIGNAL POLE
 - SPRINKLER VALVE
 - SPRINKLER HEAD
 - STREET LIGHT/FLOOD LIGHT
 - STREET LIGHT/PARKING LIGHT
 - TREE
 - TREE STUMP
 - TREE-CREPE MYRTLE
 - TREE-PINE
 - WATER METER
 - WATER VALVE
 - IRRIGATION CONTROL VALVE

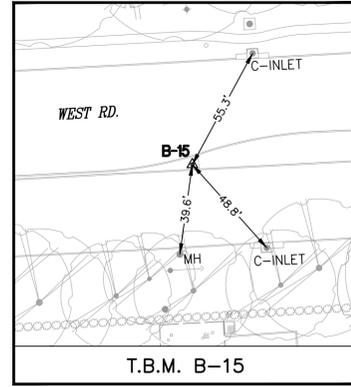
- ABBREVIATIONS**
- FH - FIRE HYDRANT
 - FC - FENCE CORNER
 - LT - LIGHT POLE
 - MB - MAIL BOX
 - MH - MANHOLE
 - MTL - METAL
 - PP - POWER POLE
 - PP/LIGHT - POWER POLE W/LIGHT
 - UGC - UNDERGROUND CABLE
 - WM - WATER METER

KUO & associates, LLC.
Consulting Engineers & Surveyors
 10300 Westoffice Dr., Suite 800, Houston, Texas 77042
 Tel: 713-975-8169, Fax: 713-975-0920, www.kuasassociates.com
 TSPS Firm Registration No. F-4578
 TBPLS Firm Registration No. 1007560

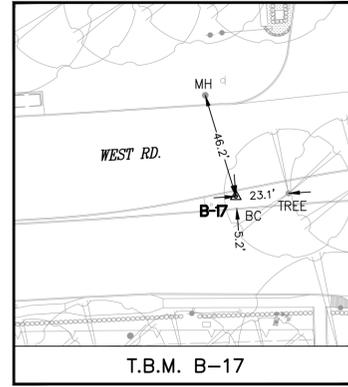
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CITY OF HOUSTON HOUSTON PUBLIC WORKS	
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N IH-45 (EAST R.O.W.)	
SURVEY CONTROL MAP (SHEET 2 OF 3)	
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000900-0180-3	
DRAWING SCALE	
1" = 40'	
CITY OF HOUSTON PM	
SHEET NO.	OF

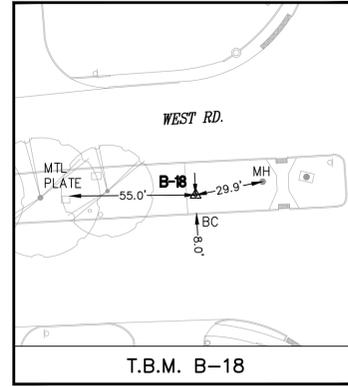
NO.	DATE	REVISION	APP.



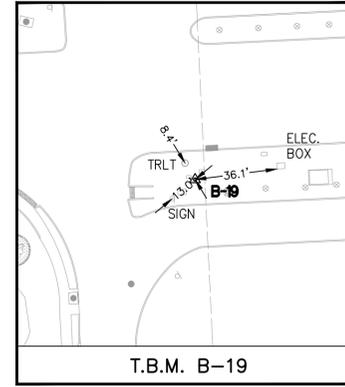
T.B.M. B-15



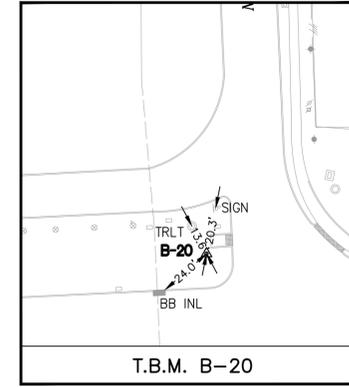
T.B.M. B-17



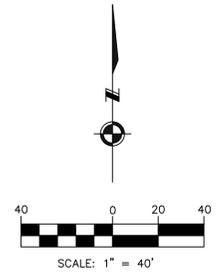
T.B.M. B-18



T.B.M. B-19



T.B.M. B-20



EXIST. TOPOGRAPHIC LEGEND

- | | |
|--|---|
| <ul style="list-style-type: none"> ASPHALT SYMBOL B OR BB INLET BUSH C INLET CLEANOUT brick column DOWN GUY E INLET ELEC MANHOLE FIRE HYDRANT GAS METER GAS VALVE GATE GRATE INLET GRATE INLET MAIL BOX STORM MANHOLE SANITARY MANHOLE | <ul style="list-style-type: none"> PLANTER POWER POLE POWER POLE W/LT. SIGN SIGNAL POLE SPRINKLER VALVE SPRINKLER HEAD STREET LIGHT/FLOOD LIGHT STREET LIGHT/PARKING LIGHT TREE TREE STUMP TREE-CREPE MYRTLE TREE-PINE WATER METER WATER VALVE IRRIGATION CONTROL VALVE |
|--|---|

ABBREVIATIONS

- FH - FIRE HYDRANT
- FC - FENCE CORNER
- LT - LIGHT POLE
- MB - MAIL BOX
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- MTL - METAL
- PP - POWER POLE
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KUO
& associates, LLC.
Consulting Engineers
& Surveyors

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Tel: 713-975-8169, Fax: 713-975-0920, www.kuoassociates.com
TBP Firm Registration No. F-4578
TSPS Firm Registration No. 1007560

SURVEYED BY:
KUO & ASSOCIATES, LLC.
FB NO.

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TEXAS REG. NO.: 6404

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

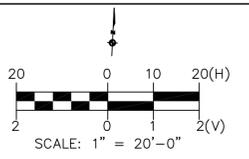
24-INCH WATER LINE ALONG
WEST ROAD FROM DEER TRAIL
DRIVE TO N IH-45 (EAST R.O.W.)

SURVEY CONTROL MAP
(SHEET 3 OF 3)

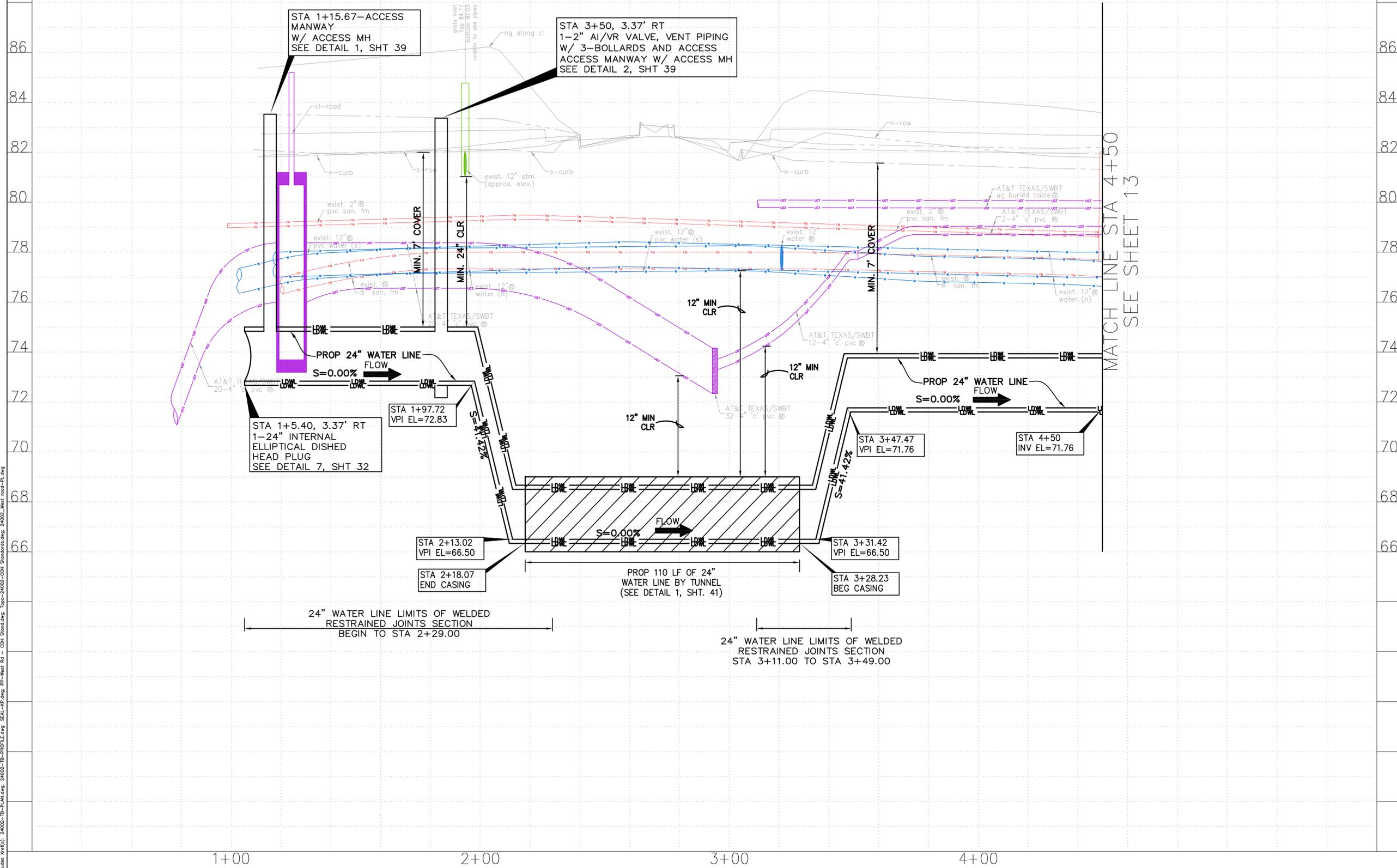
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000900-0180-3	
DRAWING SCALE	
1" = 40'	
CITY OF HOUSTON PM	
SHEET NO.	OF

NO.	DATE	REVISION	APP.

SEE SHEET 10 FOR PLAN



No.	Date	Revisions



TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222. NOTICE: For your safety, you are required by Texas Law to call 811 at least 48 hours before you dig so that underground line can be marked. This signature does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES
Date: _____
CenterPoint Energy Natural Gas utilities shown. (Gas services lines are not shown). This signature not to be used for conflict verification. Signature valid for six months.

Date: _____
CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities - not to be used for conflict verification.) Signature valid for six months.

Date: _____
Approved for AT&T Texas/SWBT underground conduit facilities only. Note: The AT&T electronic signature valid for one year.

10300 Westhoff Dr., Ste 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920
www.kuoassociates.com
Texas Firm Registration No. F-4578
TBPLS Firm Registration No. 10075600

SURVEYED BY:
Kuo & Associates, LLC.
C.O.H. Field Book P-

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TEXAS REG. NO.: 116965
ON 01/13/2025
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)
WEST ROAD
WATER LINE PROFILE
Sta. 1+00 to Sta. 4+50

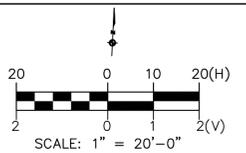
WBS NO. S-000900-0180-4
DRAWING SCALE H: 1"=20' V: 1"=2'
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 11 OF 85

Jun 13 2025 6:21PM .bpl
 S:\Proj\2024\24002 - Deer Trail Along West Rd - Curb Standards.dwg
 Include: Xref(C:\Users\jgarcia\AppData\Local\Temp\24002 - Deer Trail Along West Rd - Curb Standards.dwg; 24002 - West Road - Plan.dwg)

SEE SHEET 15 FOR PROFILE

NOTE(S):

- SEE SHEETS 63 TO 74 FOR CONSTRUCTION PHASING AND SEQUENCING, AND TRAFFIC CONTROL PLANS.
- REFER TO SPEC SECTION 01110.107.D.8.d FOR CONTACT INFORMATION. CONTRACTOR TO NOTIFY BUILDING MANAGEMENT AT LEAST 6 WEEKS PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE EASEMENT AREA. RESTORE EASEMENT AREA (EXCEPT TREES AND LANDSCAPE) BACK TO ORIGINAL OR BETTER CONDITION. COMPLETE ALL RESTORATION WORK WITHIN TEMPORARY CONSTRUCTION EASEMENT DOCUMENT'S TIMELINE.
- TREES ARE LOCATED IN THE VICINITY OF PROPOSED ALIGNMENT OF WATER LINE AND ITS APPURTENANCES. REFER TO THE TREE PROTECTION PLANS SHEETS 80 TO 84, FOR APPROPRIATE PROTECTION MEASURES.



BENCHMARK:
CITY OF HOUSTON MONUMENT 5264-8102,
A BRASS DISK IN CONCRETE, LOCATED IN
THE MEDIAN ON WEST ROAD
APPROXIMATELY 275 FEET EAST FROM THE
INTERSECTION OF GREENS CROSSING BLVD.

ELEV. 81.90 FEET NAVD 1988 (GEOD '18).*

* OBSERVED BY GPS SURVEYING AND
PROCESSED IN REFERENCE TO THE CORS
DATED JANUARY 06, 2024.

T.B.M.
TBM-12
SET 'X' CUT ON CONC.
D. BL STA. 10+93.72 OFFSET: 84.48R
ELEV.=82.80 FEET



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Signature valid for six months.

Date: _____
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facilities only.
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Tel: 713-975-8769, Fax: 713-975-0920
www.kuoadvisors.com
Texas Firm Registration No. F-4578
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C.O.H. Field Book P-

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TEXAS REG. NO.: 116965
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

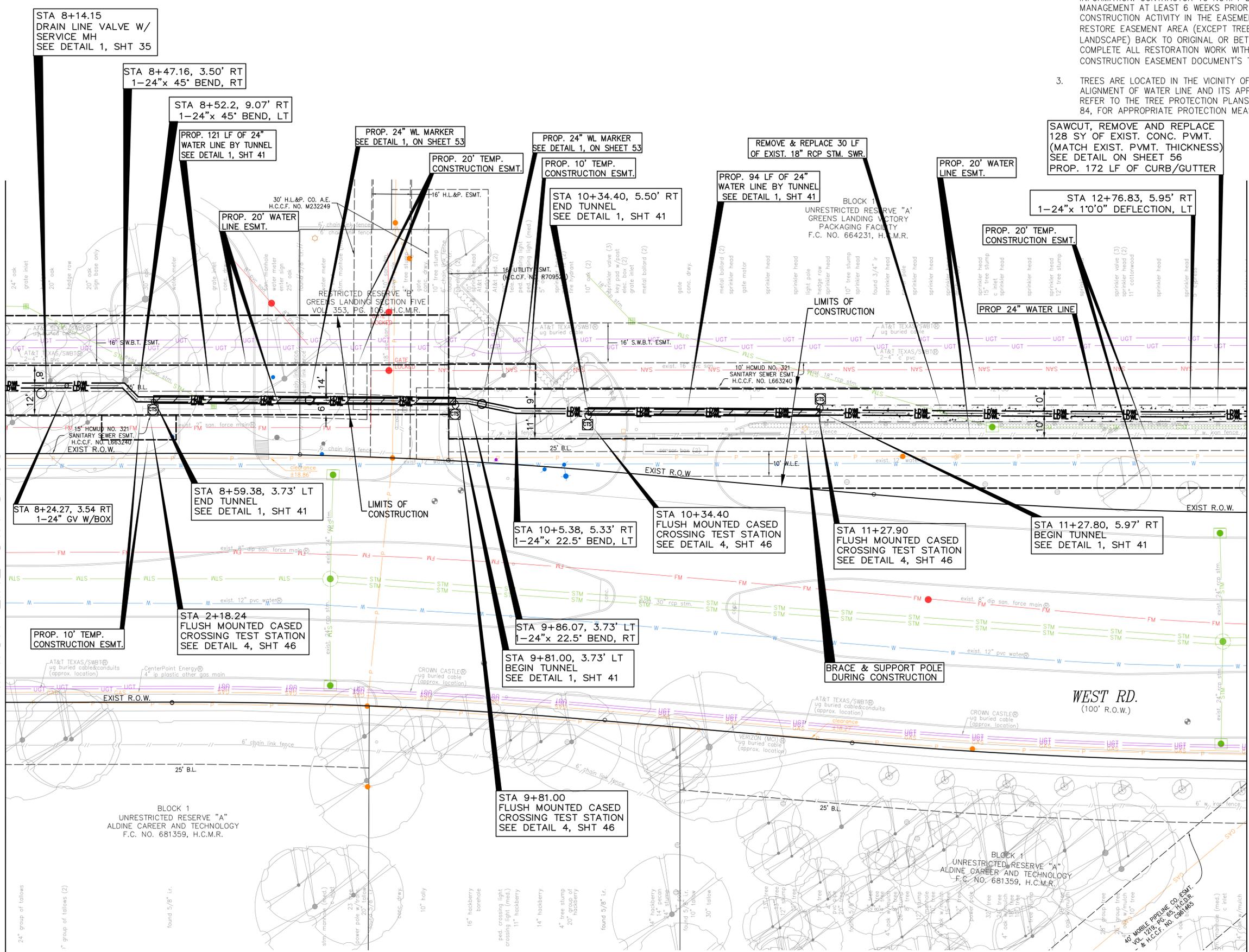
24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

WEST ROAD
WATER LINE PLAN
Sta. 8+00 to Sta. 13+00

WBS NO. S-000900-0180-4
DRAWING SCALE
H: 1"=20' V: 1"=2'
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 14 OF 85

SEE SHEET 12
MATCH LINE STA 8+00

MATCH LINE STA 13+00
SEE SHEET 16



STA 8+14.15
DRAIN LINE VALVE W/
SERVICE MH
SEE DETAIL 1, SHT 35

STA 8+47.16, 3.50' RT
1-24"x 45' BEND, RT

STA 8+52.2, 9.07' RT
1-24"x 45' BEND, LT

PROP. 121 LF OF 24"
WATER LINE BY TUNNEL
SEE DETAIL 1, SHT 41

PROP. 20' WATER
LINE ESMT.

PROP. 24" WL MARKER
SEE DETAIL 1, ON SHEET 53

PROP. 20' TEMP.
CONSTRUCTION ESMT.

PROP. 24" WL MARKER
SEE DETAIL 1, ON SHEET 53

PROP. 10' TEMP.
CONSTRUCTION ESMT.

STA 10+34.40, 5.50' RT
END TUNNEL
SEE DETAIL 1, SHT 41

REMOVE & REPLACE 30 LF
OF EXIST. 18" RCP STM. SWR.

PROP. 94 LF OF 24"
WATER LINE BY TUNNEL
SEE DETAIL 1, SHT 41

PROP. 20' WATER
LINE ESMT.

SAWCUT, REMOVE AND REPLACE
128 SY OF EXIST. CONC. PVMT.
(MATCH EXIST. PVMT. THICKNESS)
SEE DETAIL ON SHEET 56
PROP. 172 LF OF CURB/GUTTER

STA 12+76.83, 5.95' RT
1-24"x 1'0"0 DEFLECTION, LT

PROP. 20' TEMP.
CONSTRUCTION ESMT.

PROP. 24" WATER LINE

STA 8+59.38, 3.73' LT
END TUNNEL
SEE DETAIL 1, SHT 41

STA 2+18.24
FLUSH MOUNTED CASED
CROSSING TEST STATION
SEE DETAIL 4, SHT 46

PROP. 10' TEMP.
CONSTRUCTION ESMT.

STA 10+5.38, 5.33' RT
1-24"x 22.5' BEND, LT

STA 10+34.40
FLUSH MOUNTED CASED
CROSSING TEST STATION
SEE DETAIL 4, SHT 46

STA 11+27.90
FLUSH MOUNTED CASED
CROSSING TEST STATION
SEE DETAIL 4, SHT 46

STA 11+27.80, 5.97' RT
BEGIN TUNNEL
SEE DETAIL 1, SHT 41

STA 9+86.07, 3.73' LT
1-24"x 22.5' BEND, RT

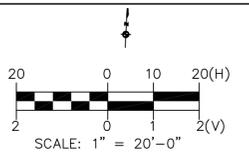
STA 9+81.00, 3.73' LT
BEGIN TUNNEL
SEE DETAIL 1, SHT 41

BRACE & SUPPORT POLE
DURING CONSTRUCTION

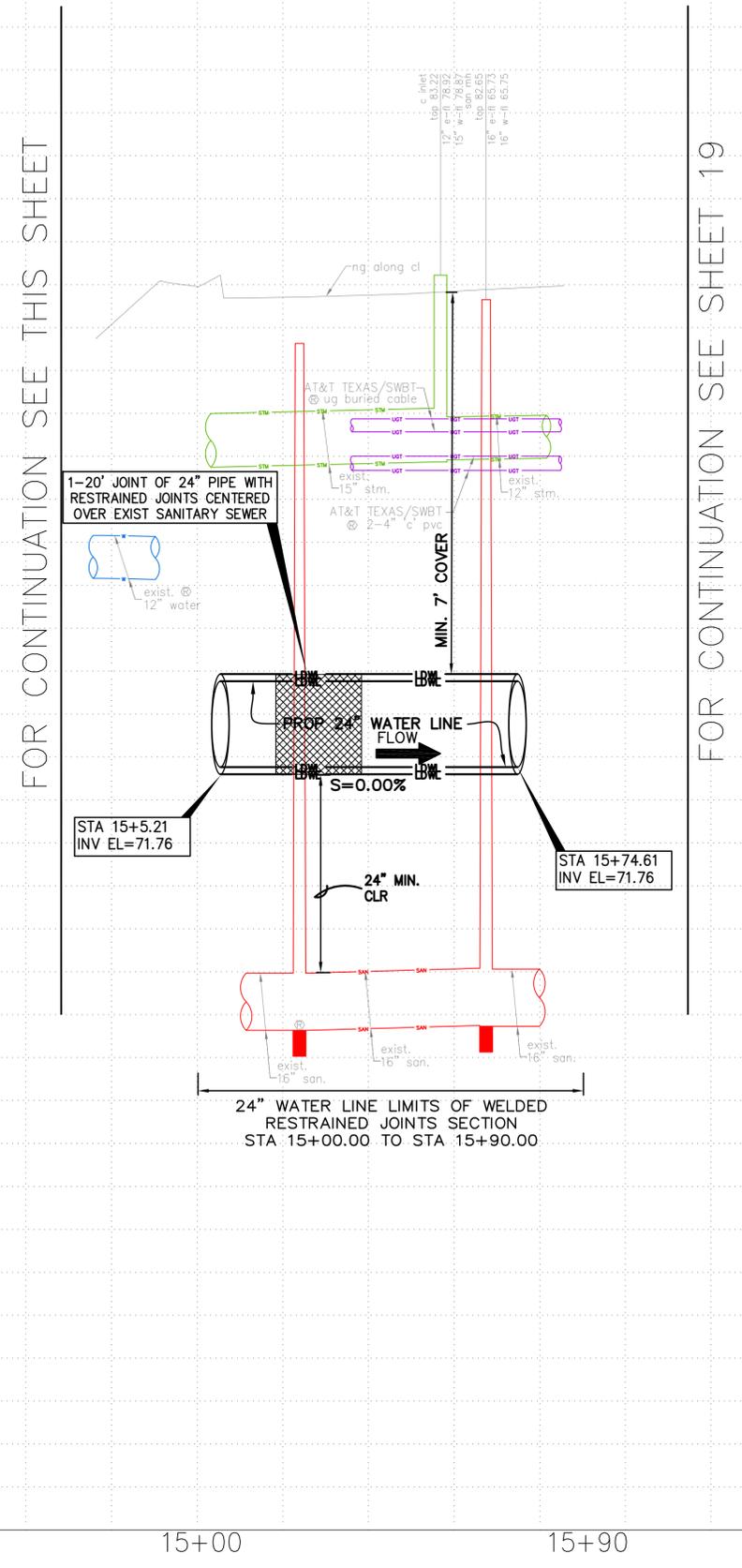
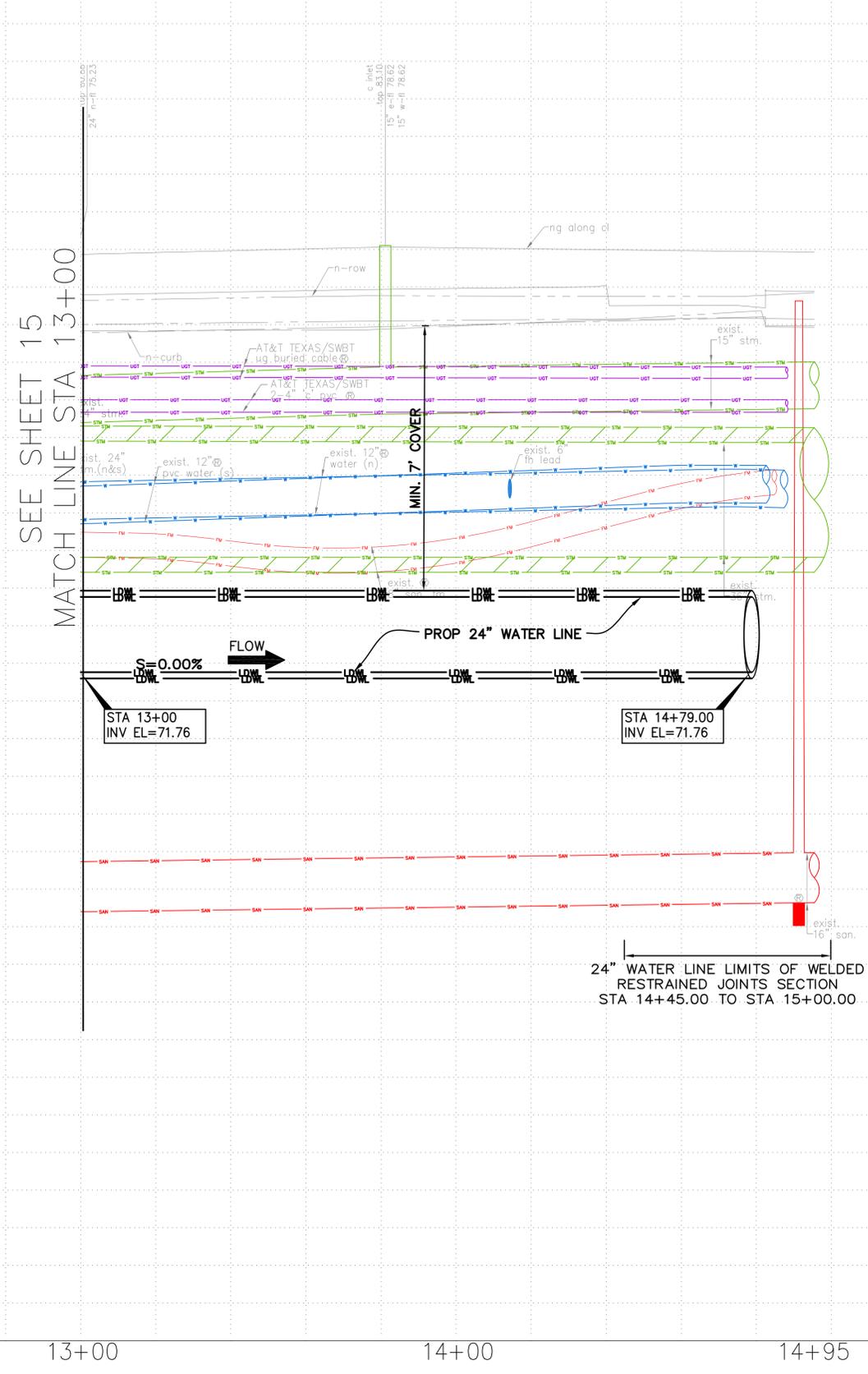
STA 9+81.00
FLUSH MOUNTED CASED
CROSSING TEST STATION
SEE DETAIL 4, SHT 46

Jun 13 2025 7:21PM bol
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Include: Xref(s), 24002-10-PROP.dwg, 24002-10-PROP.dwg, 24002-10-PROP.dwg, 24002-10-PROP.dwg, 24002-10-PROP.dwg, 24002-10-PROP.dwg, 24002-10-PROP.dwg

SEE SHEET 16 FOR PLAN



App.	
Revisions	
No.	Date



FOR CONTINUATION SEE THIS SHEET

FOR CONTINUATION SEE THIS SHEET

FOR CONTINUATION SEE SHEET 19



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 TEXAS REG. NO.: 116965
 ON 01/13/2025
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CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

WEST ROAD
 WATER LINE PROFILE
 Sta. 13+00 to Sta. 15+90

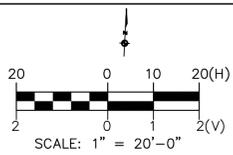
WBS NO. S-000900-0180-4	
DRAWING SCALE	
H: 1"=20' V: 1"=2'	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 17 OF 85	

Jun 13 2025 8:10PM .bpl
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 S:\Proj-2024\24002-CP\Drawings\Design\Sheets\VP-16-CP-Standard.dwg: 24002-CP-Standard.dwg: 24002-CP-Standard.dwg

NOTE(S):

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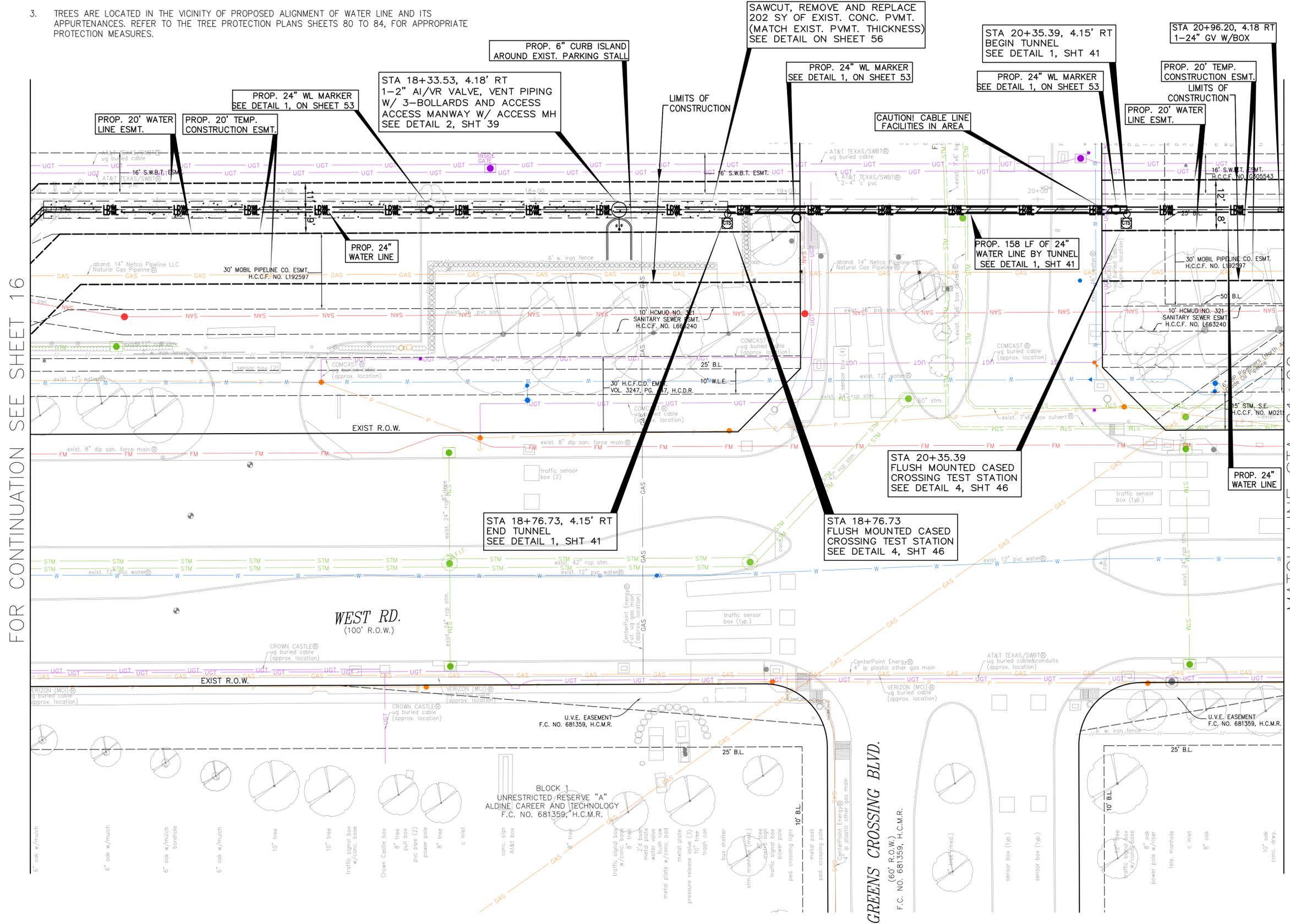
SEE SHEET 19 FOR PROFILE



BENCHMARK:
CITY OF HOUSTON MONUMENT 5264-8102,
A BRASS DISK IN CONCRETE, LOCATED IN
THE MEDIAN ON WEST ROAD
APPROXIMATELY 275 FEET EAST FROM THE
INTERSECTION OF GREENS CROSSING BLVD.
ELEV. 81.90 FEET NAVD 1988 (GEOD '18).*

* OBSERVED BY GPS SURVEYING AND
PROCESSED IN REFERENCE TO THE CORS
DATED JANUARY 06, 2024.

T.B.M.
TBM-14
SET 'X' CUT ON CONC.
D. BL. STA. 20+25.14 OFFSET: 144.31R
ELEV.=82.40 FEET



FOR CONTINUATION SEE SHEET 16

MATCH LINE STA 21+00
SEE SHEET 20



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Date:
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HOUSTON PUBLIC WORKS

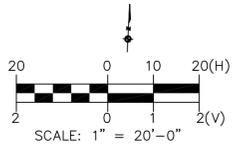
**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

WEST ROAD
WATER LINE PLAN
Sta. 16+00 to Sta. 21+00

WBS NO. S-000900-0180-4	
DRAWING SCALE	
H: 1"=20' V: 1"=2'	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 18 OF 85	

Jun 12 2025 11:09AM sdj
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 P:\West Rd - COB Standards\24002-16-PlanView.dwg
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 24002-16-PlanView.dwg
 24002-16-PlanView.dwg

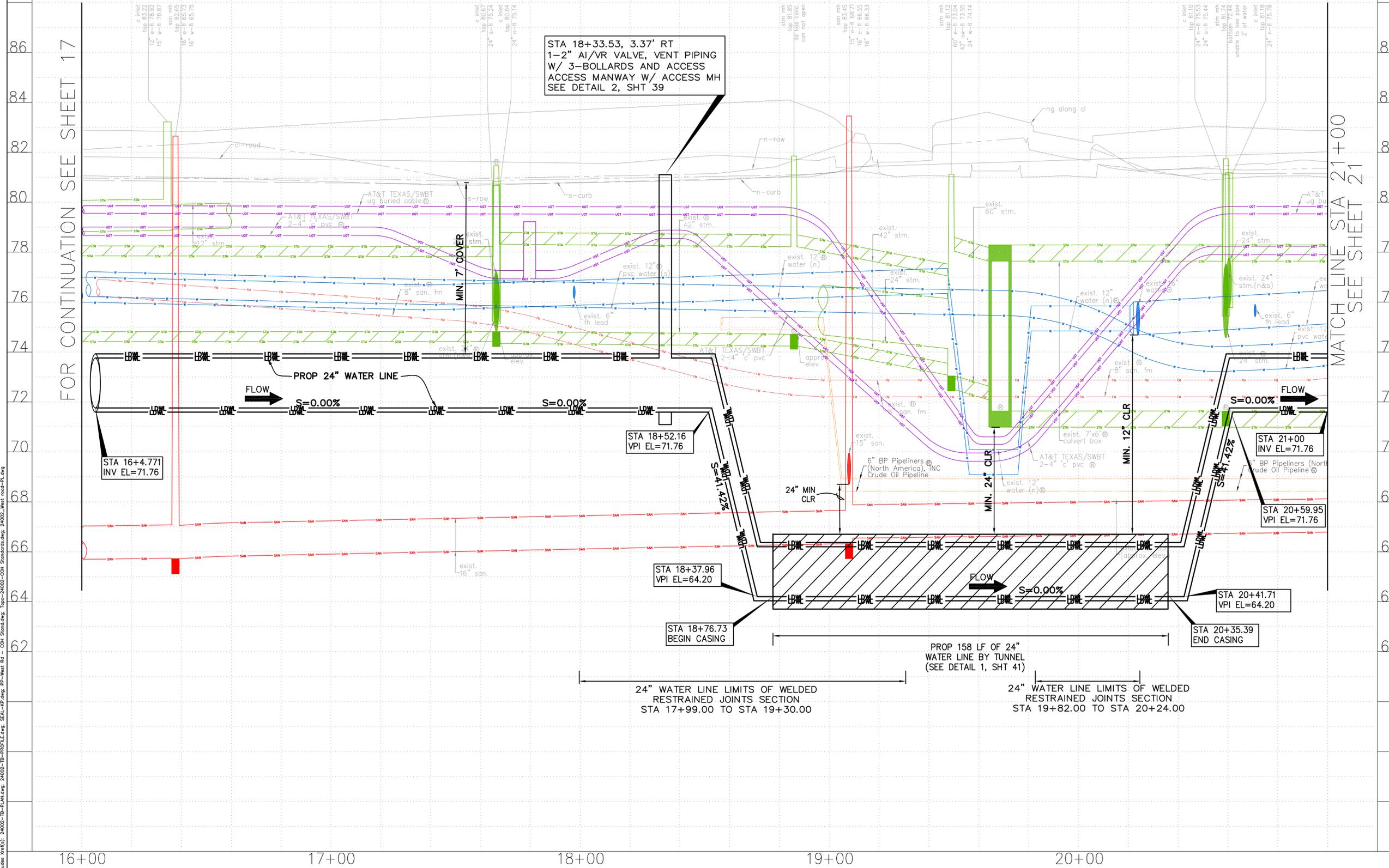
SEE SHEET 18 FOR PLAN



No.	Date	Revisions

FOR CONTINUATION SEE SHEET 17

MATCH LINE STA 21+00
SEE SHEET 21



STA 18+33.53, 3.37' RT
1-2" AI/VR VALVE, VENT PIPING
W/ 3-BOLLARDS AND ACCESS
ACCESS MANWAY W/ ACCESS MH
SEE DETAIL 2, SHT 39

STA 18+52.16
VPI EL=71.76

STA 21+00
INV EL=71.76

STA 20+59.95
VPI EL=71.76

STA 18+37.96
VPI EL=64.20

STA 20+41.71
VPI EL=64.20

STA 18+76.73
BEGIN CASING

STA 20+35.39
END CASING

PROP 158 LF OF 24"
WATER LINE BY TUNNEL
(SEE DETAIL 1, SHT 41)

24" WATER LINE LIMITS OF WELDED
RESTRAINED JOINTS SECTION
STA 17+99.00 TO STA 19+30.00

24" WATER LINE LIMITS OF WELDED
RESTRAINED JOINTS SECTION
STA 19+82.00 TO STA 20+24.00



TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED,
CALL CENTERPOINT ENERGY AT 713-207-2222
NOTICE:
For your safety, you are required by Texas Law to call 811 at least
48 hours before you dig so that underground line can be marked.
This signature does not fulfill your obligation to call 811.

VERIFICATION OF PRIVATE UTILITY LINES

Date: _____
CenterPoint Energy Natural Gas utilities shown.
(Gas services lines are not shown). This signature not to be used for
conflict verification.
Signature valid for six months.

Date: _____
CenterPoint Energy/UNDERGROUND Electrical Facilities
Verification ONLY
(This signature verifies existing underground facilities - not to be used
for conflict verification).
Signature valid for six months.

Date: _____
Approved for AT&T Texas/SWBT underground conduit
facilities only.
Note: The AT&T electronic signature valid for one year.

KUO & Associates
Consulting Engineers
& Surveyors
10300 Westhoff Dr., Ste 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920
www.kuoassociates.com
Texas Firm Registration No. F-4578
TBPUS Firm Registration No. 10075600

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KIRAN V. PUNYAMANTHULA, P.E.
TEXAS REG. NO.: 116965
ON 01/13/2025
IT IS NOT TO BE USED FOR
PERMIT, BIDDING OR
CONSTRUCTION PURPOSES

SURVEYED BY:
Kuo & Associates, LLC.
C.O.H. Field Book P-

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

WEST ROAD
WATER LINE PROFILE
Sta. 16+00 to Sta. 21+00

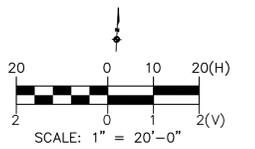
WBS NO. S-000900-0180-4
DRAWING SCALE H: 1"=20' V: 1"=2'
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 19 OF 85

Jun 13 2025 8:10PM
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 Plot Date: 6/13/2025 8:10:00 PM
 Plot User: A.K.

SEE SHEET 25 FOR PROFILE

NOTE(S):

- SEE SHEETS 63 TO 74 FOR CONSTRUCTION PHASING AND SEQUENCING, AND TRAFFIC CONTROL PLANS.
- REFER TO SPEC SECTION 01110.107.D.8.d FOR CONTACT INFORMATION. CONTRACTOR TO NOTIFY BUILDING MANAGEMENT AT LEAST 6 WEEKS PRIOR TO ANY CONSTRUCTION ACTIVITY IN THE EASEMENT AREA. RESTORE EASEMENT AREA (EXCEPT TREES AND LANDSCAPE) BACK TO ORIGINAL OR BETTER CONDITION. COMPLETE ALL RESTORATION WORK WITHIN TEMPORARY CONSTRUCTION EASEMENT DOCUMENT'S TIMELINE.
- TREES ARE LOCATED IN THE VICINITY OF PROPOSED ALIGNMENT OF WATER LINE AND ITS APPURTENANCES. REFER TO THE TREE PROTECTION PLANS SHEETS 80 TO 84, FOR APPROPRIATE PROTECTION MEASURES.



BENCHMARK:
CITY OF HOUSTON MONUMENT 5264-8102,
A BRASS DISK IN CONCRETE, LOCATED IN
THE MEDIAN ON WEST ROAD
APPROXIMATELY 275 FEET EAST FROM THE
INTERSECTION OF GREENS CROSSING BLVD.
ELEV. 81.90 FEET NAVD 1988 (GEOD '18)*

* OBSERVED BY GPS SURVEYING AND
PROCESSED IN REFERENCE TO THE CORS
DATED JANUARY 06, 2024.

T.B.M.

TBM-16
SET 'X' CUT ON CONC.
D. BL STA. 32+94.87 OFFSET: 84.16L
ELEV.=82.18 FEET



Surface Water Transmission Program

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TSPS Firm Registration No. 10075600

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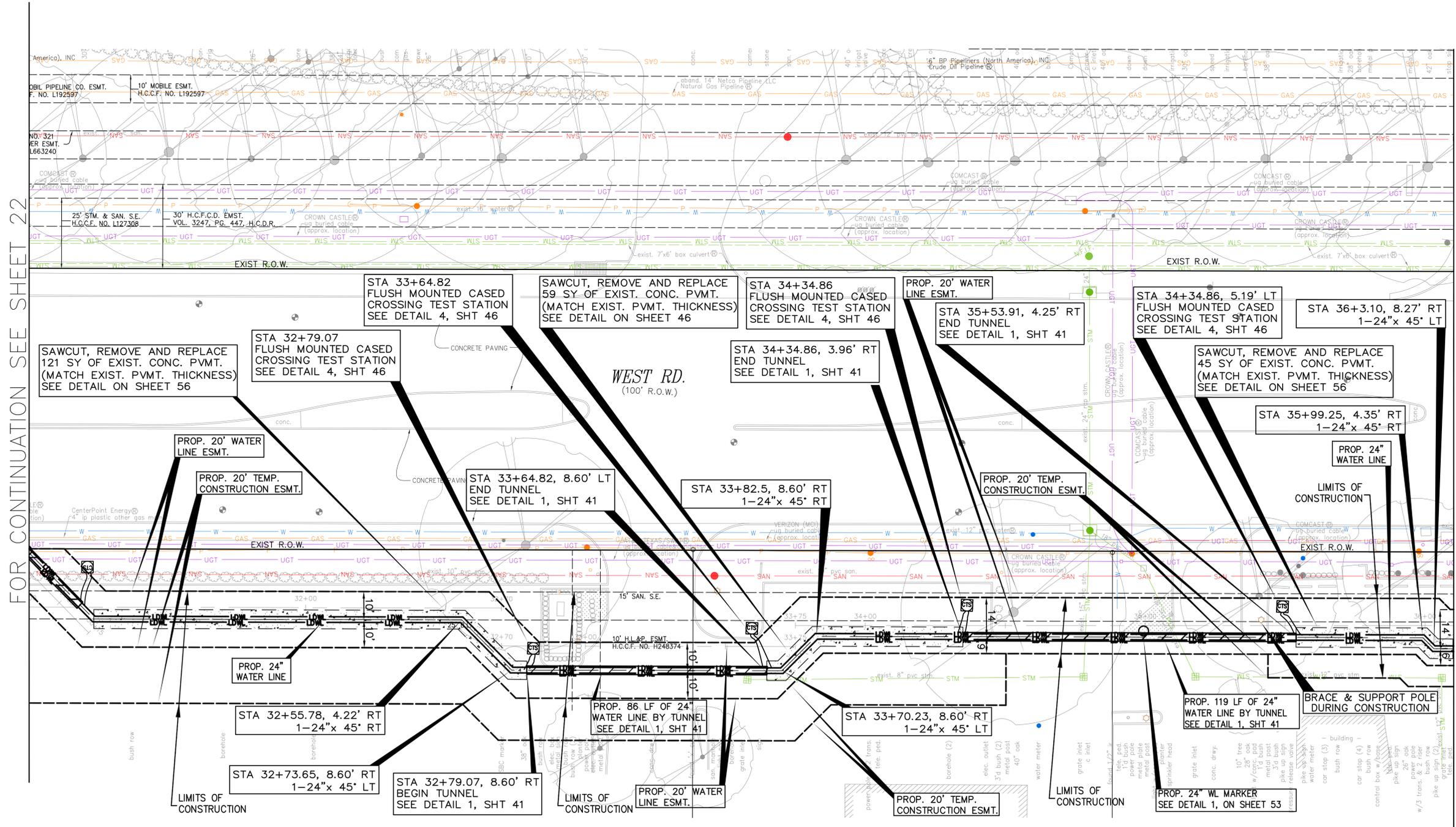
SURVEYED BY:
Kuo & Associates, LLC.
C.O.H. Field Book P-

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

WEST ROAD
WATER LINE PLAN
Sta. 31+00 to Sta. 36+10

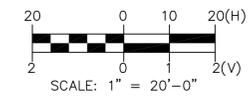
WBS NO.	S-000900-0180-4
DRAWING SCALE	
H: 1"=20' V: 1"=2'	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 24 OF 85	



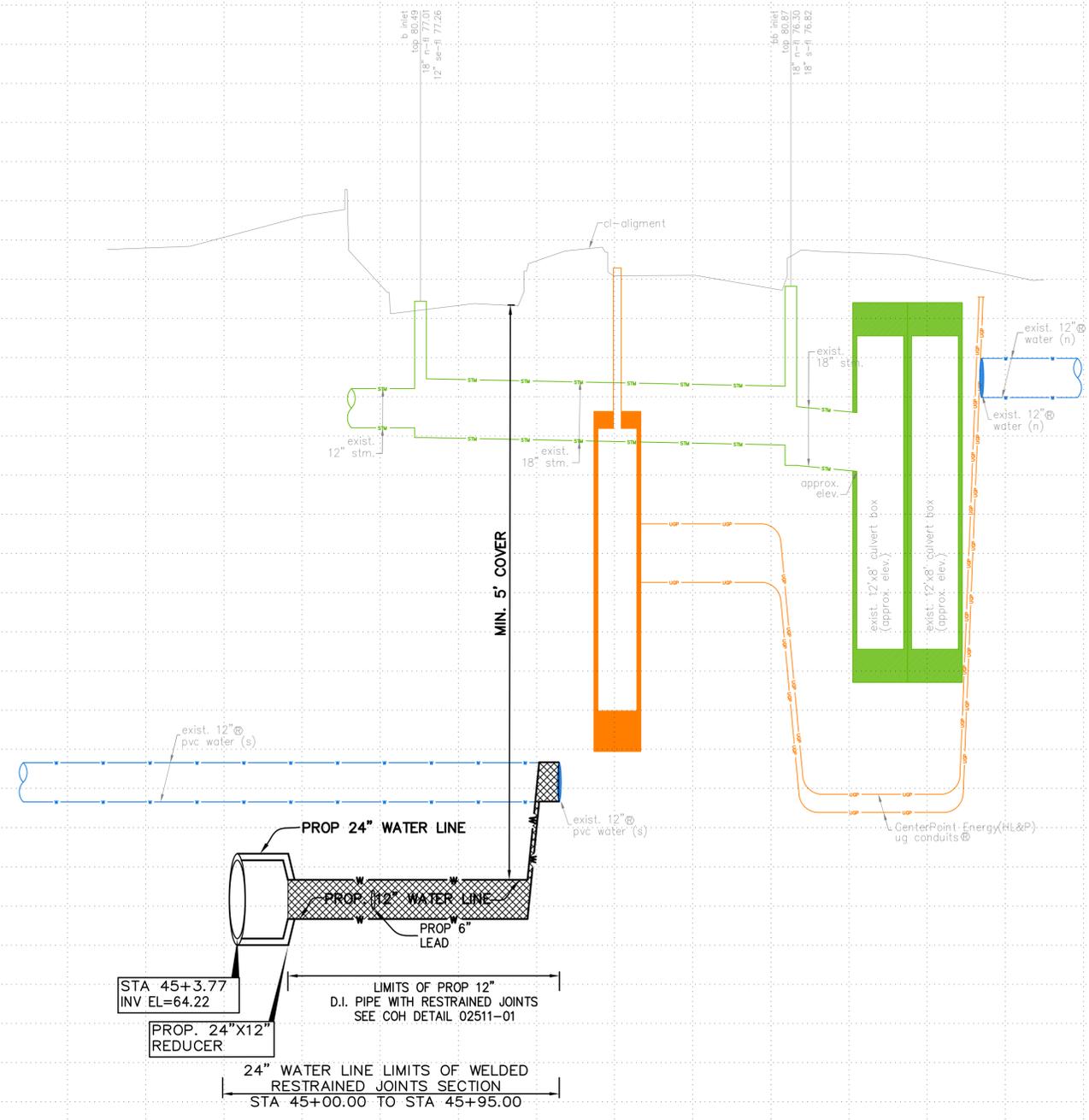
FOR CONTINUATION SEE SHEET 22

MATCH LINE STA 36+10
SEE SHEET 26

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Title: 24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)
Sheet: 24 OF 85



No.	Date	Revisions	App.



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 Consulting Engineers & Surveyors 10300 Westhoff Dr., Ste 800, Houston, Texas 77042 Tel: 713-975-8769, Fax: 713-975-0920 www.kuoassociates.com Texas Firm Registration No. F-4578 TPPLS Firm Registration No. 10075600	THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF KIRAN V. PUNYAMANTHULA, P.E. TEXAS REG. NO.: 116965 ON 01/13/2025 IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

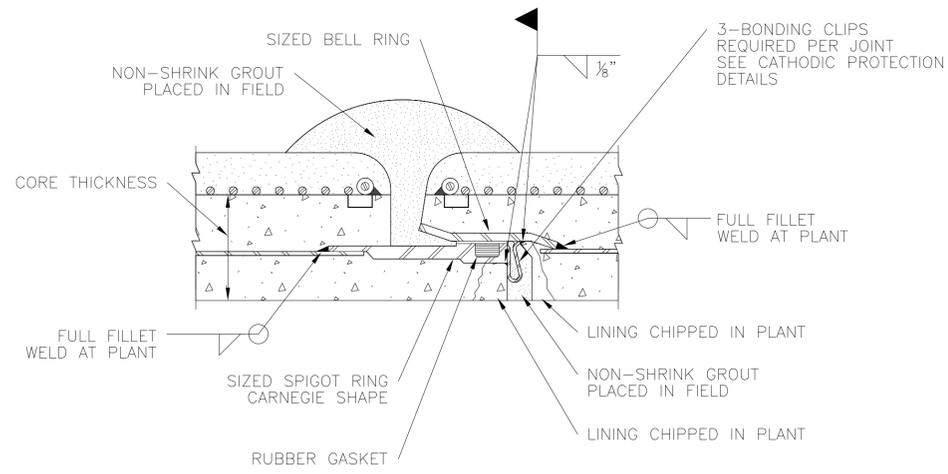
WEST ROAD

WATER LINE PROFILE
Sta. 45+00 to Sta. 45+95

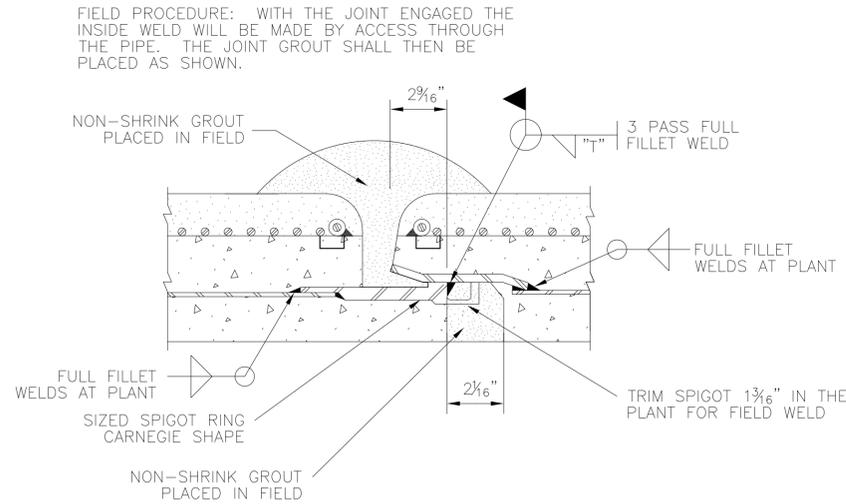
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DRAWING SCALE H: 1"=20' V: 1"=2'
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 31 OF 85

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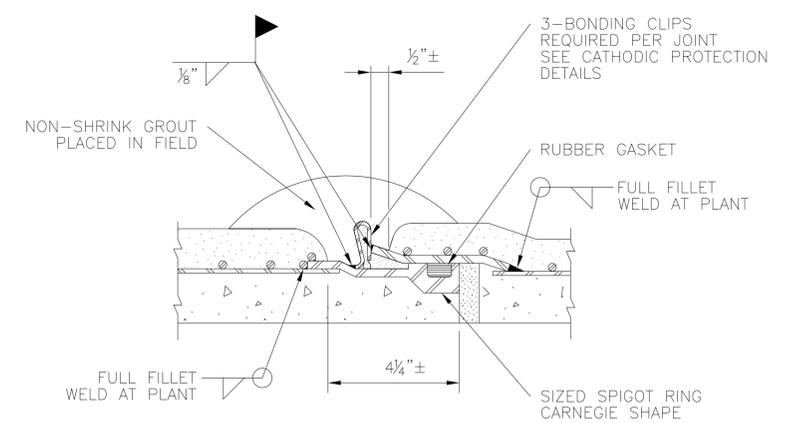
App.
Revisions
No.
Date



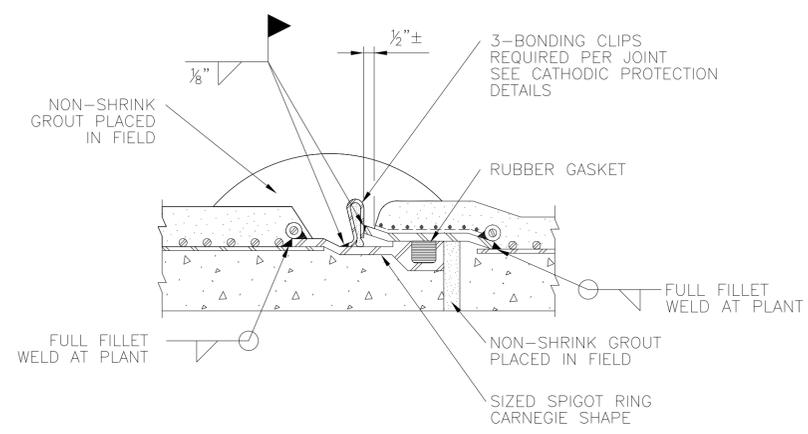
1 JOINT - EMBEDDED CYLINDER PIPE



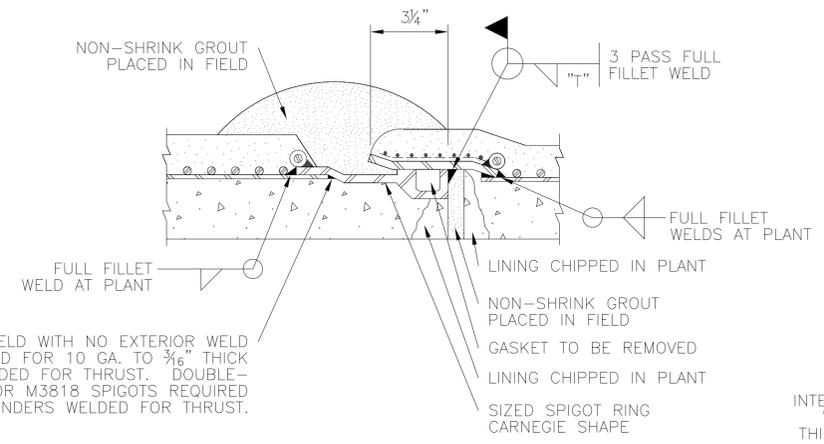
2 WELDED JOINT WITH TRIMMED SPIGOT - EMBEDDED CYLINDER PIPE



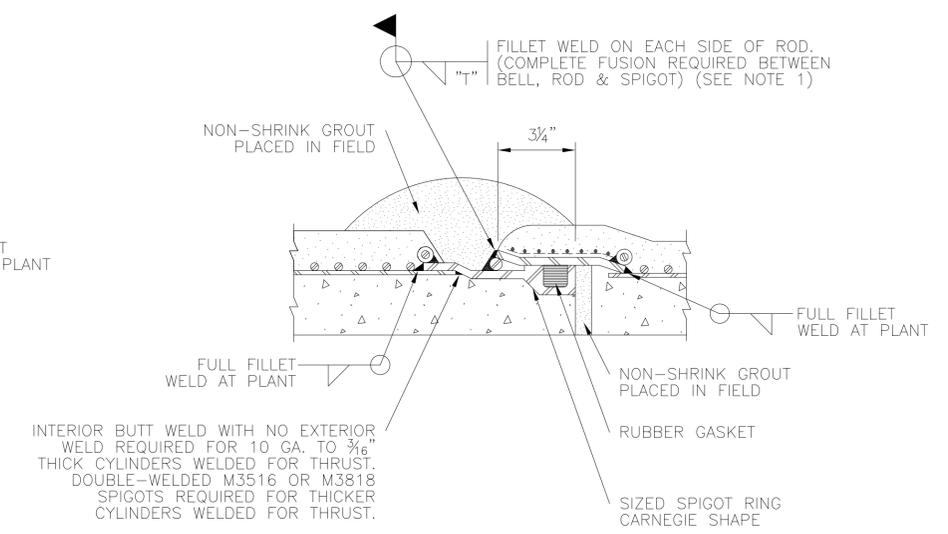
3 JOINT - BAR WRAPPED CYLINDER PIPE



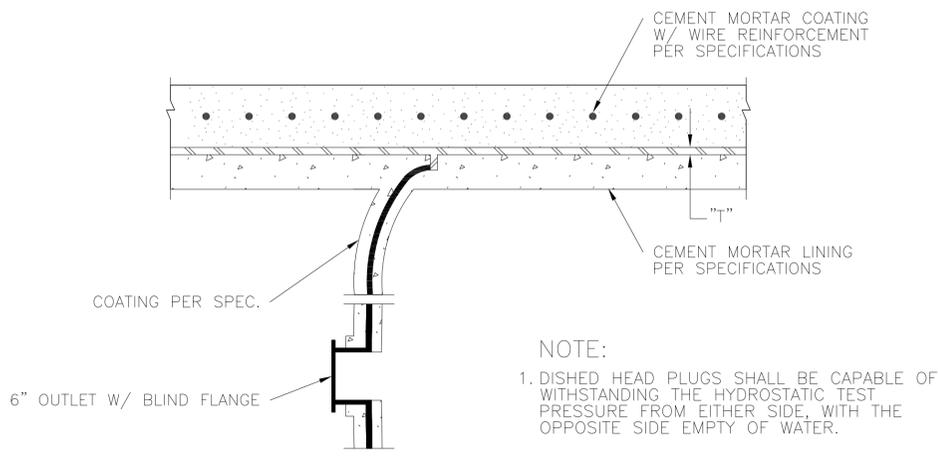
4 JOINT - LINED CYLINDER PIPE



5 WELDED JOINT - LINED CYLINDER PIPE
(INTERIOR WELD FOR WATERLINES 36-INCHES DIAMETER AND LARGER)

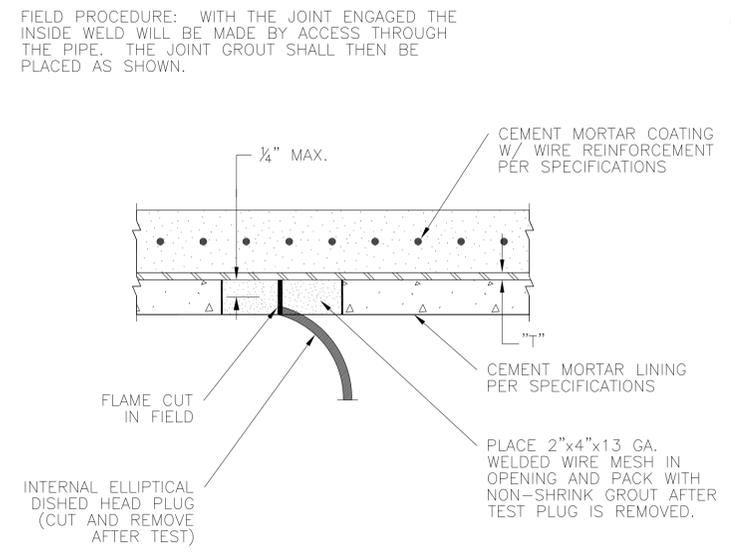


6 WELDED JOINT - LINED CYLINDER PIPE
(EXTERIOR WELD FOR WATER LINES LESS THAN 36-INCHES IN DIAMETER)



NOTE:
1. DISHED HEAD PLUGS SHALL BE CAPABLE OF WITHSTANDING THE HYDROSTATIC TEST PRESSURE FROM EITHER SIDE, WITH THE OPPOSITE SIDE EMPTY OF WATER.

7 INTERNAL ELLIPTICAL DISHED HEAD PLUG
CEMENT MORTAR LINING AND CEMENT MORTAR COATED STEEL PIPE SPECIAL



8 INTERNAL ELLIPTICAL DISHED HEAD PLUG REMOVAL
CEMENT MORTAR LINING AND CEMENT MORTAR COATED STEEL PIPE SPECIAL

FIELD PROCEDURE: WITH THE JOINT ENGAGED THE INSIDE WELD WILL BE MADE BY ACCESS THROUGH THE PIPE. THE JOINT GROUT SHALL THEN BE PLACED AS SHOWN.

FIELD PROCEDURE: PLACE STEEL ROD SNUGLY INTO THE RECESS BETWEEN THE BELL AND SPIGOT. THE WELD MUST BE CONTINUOUS.

- NOTES:
1. T = STEEL CYLINDER THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
 2. FLEXIBLE MASTIC SEALER SHALL BE APPLIED TO THE EXTERIOR OF THE JOINT PRIOR TO JOINT ENGAGEMENT WHEN PIPE IS INSTALLED IN A TUNNEL OR ENCASEMENT PIPE.



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TEXAS REG. NO.: 116965
ON 01/13/2025
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SURVEYED BY:
Kuo & Associates, LLC.
C.O.H. Field Book P-

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD LDWL
PIPE DETAILS

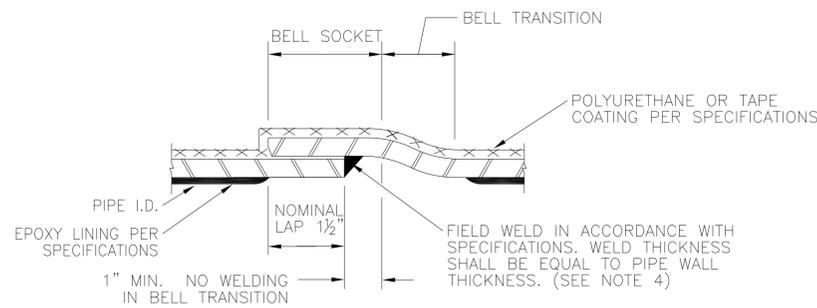
(SHEET 1 OF 2)

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 32 OF 85

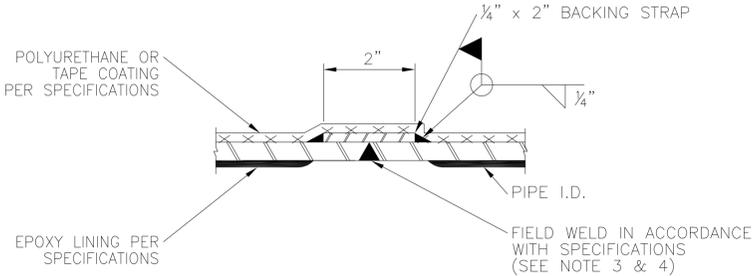
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NOTES:

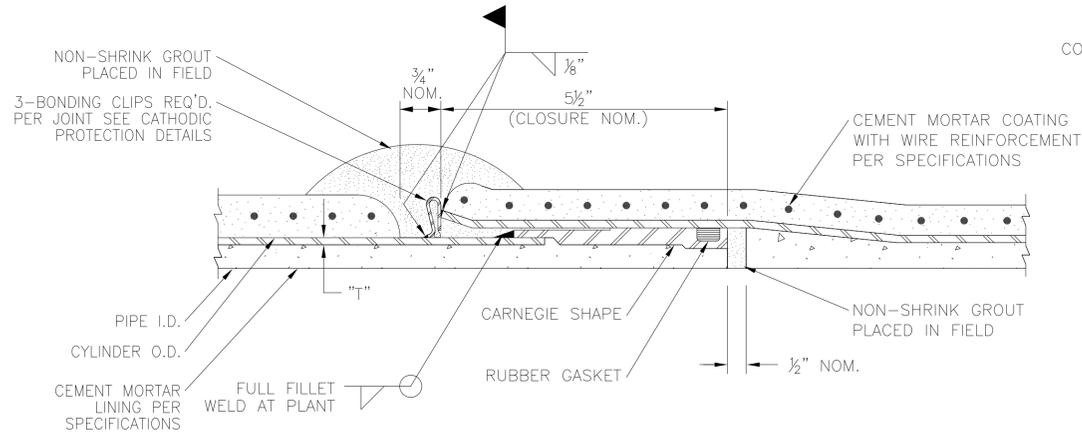
1. OUTSIDE WELD MAY BE SUBSTITUTED FOR INSIDE WELD.



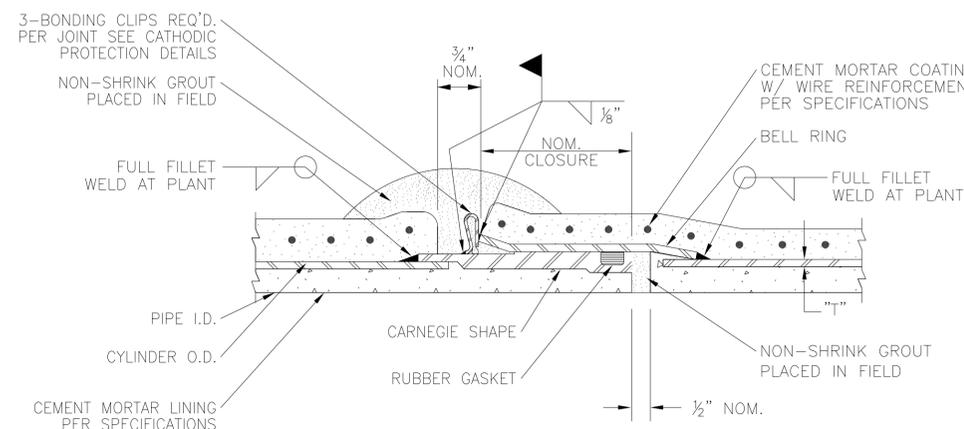
1 LAP-WELD FIELD JOINT - STEEL PIPE JOINT
FLEXIBLE COATING AND LINING



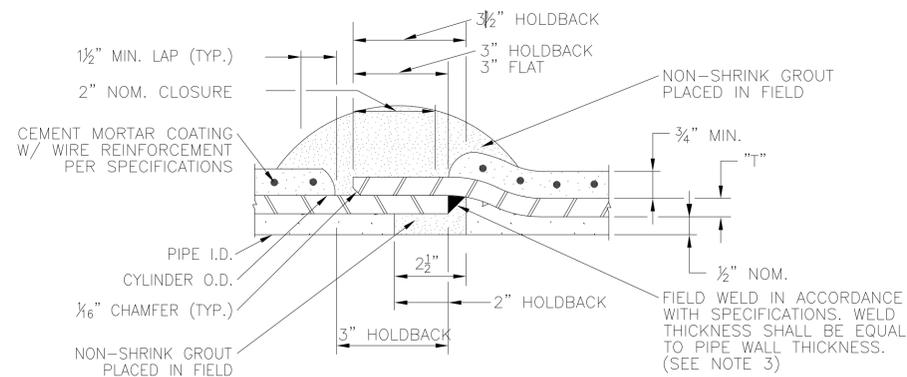
4 BUTT WELD FIELD JOINT - STEEL PIPE JOINT
FLEXIBLE COATING AND LINING



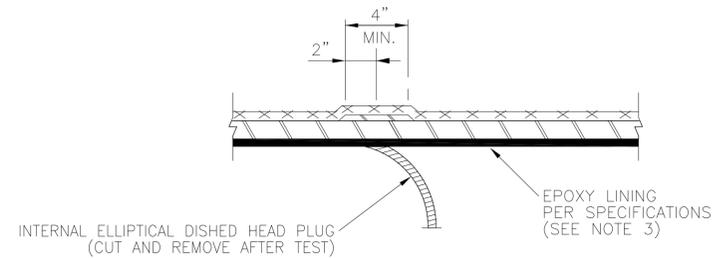
7 CARNEGIE SPIGOT AND EXPANDED BELL - STEEL PIPE JOINT
CEMENT MORTAR LINED & CEMENT MORTAR COATED



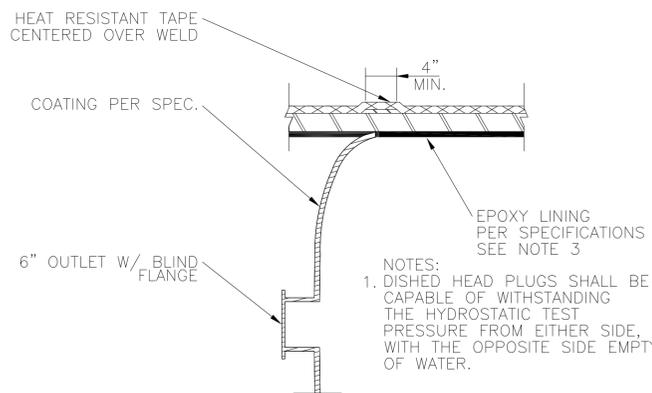
9 CARNEGIE JOINT - STEEL PIPE JOINT
CEMENT MORTAR LINED & CEMENT MORTAR COATED



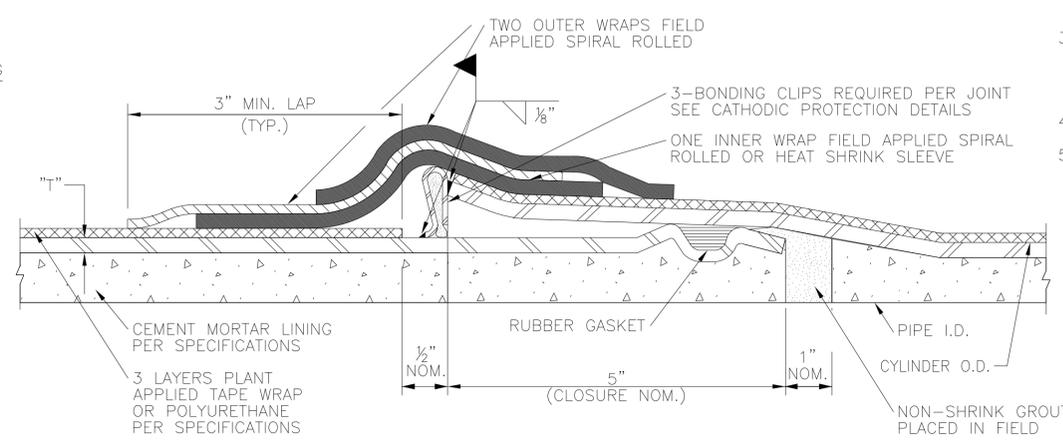
2 LAP-WELD FIELD JOINT - STEEL PIPE JOINT
CEMENT MORTAR LINED & CEMENT MORTAR COATED



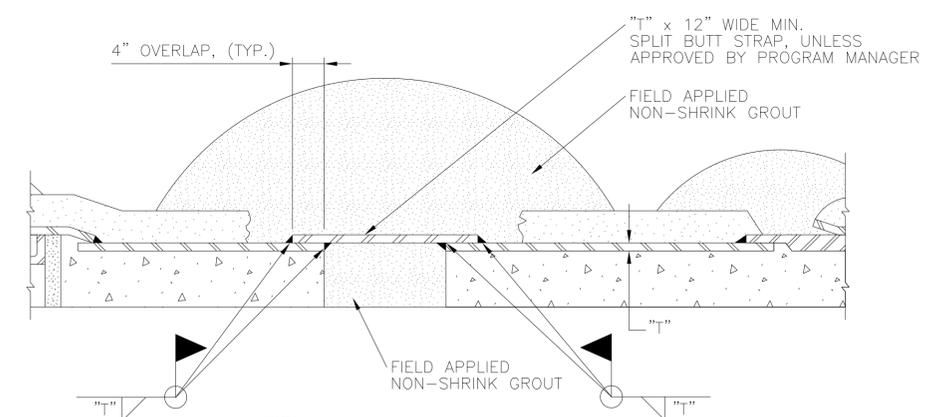
5 INTERNAL ELLIPTICAL DISHED HEAD PLUG REMOVAL
FOR STEEL PIPE WITH FLEXIBLE COATING AND LINING



8 INTERNAL ELLIPTICAL DISHED HEAD PLUG
FOR STEEL PIPE WITH FLEXIBLE COATING AND LINING



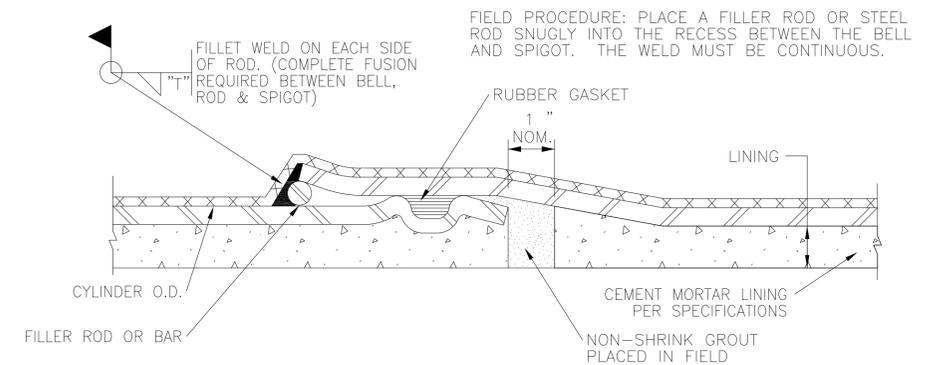
10 O-RING - STEEL PIPE JOINT
CEMENT MORTAR LINED & FLEXIBLE COATING



NOTES:

1. WELD SIZE SHALL MATCH THICKNESS OF BUTT STRAP AND CARRIER PIPE, AS RECOMMENDED BY THE PIPE MANUFACTURER.
2. INTERNAL WELD NOT REQUIRED FOR 30" DIAMETER PIPE AND SMALLER.
3. NO ANGULAR DEFLECTION ALLOWED.

3 CLOSURE PIECE
FOR STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED (SIMILAR FOR FLEXIBLE COATING AND LINING)



6 FIELD WELDED O-RING - STEEL PIPE JOINT
FLEXIBLE COATING AND CEMENT MORTAR LINING (FOR ADJUSTMENTS ONLY AS APPROVED BY ENGINEER AND PIPE MANUFACTURER.)

NOTES:

1. T = STEEL PIPE WALL THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
2. ALL REFERENCES TO PIPE DIAMETER FOR THIS PROJECT SHALL SIGNIFY SIZE MEASURED TO INSIDE DIAMETER OF THE LINED PIPE.
3. DETAILS 1, 4, 5 AND 8 SHOW EPOXY LINING. CEMENT MORTAR LINING TO BE SIMILAR TO DETAILS ON THIS SHEET SHOWING CEMENT MORTAR LINED PIPE, AS APPROVED BY PROGRAM MANAGER.
4. SEE SPECIFICATIONS FOR REPAIR OF EPOXY LINING.
5. WHEN CEMENT MORTAR COATING IS USED FOR STEEL PIPE, FLEXIBLE MASTIC SEALER SHALL BE APPLIED TO THE EXTERIOR OF THE JOINT PRIOR TO JOINT ENGAGEMENT WHEN PIPE IS INSTALLED IN A TUNNEL OR ENCASEMENT PIPE.



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SURVEYED BY:
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

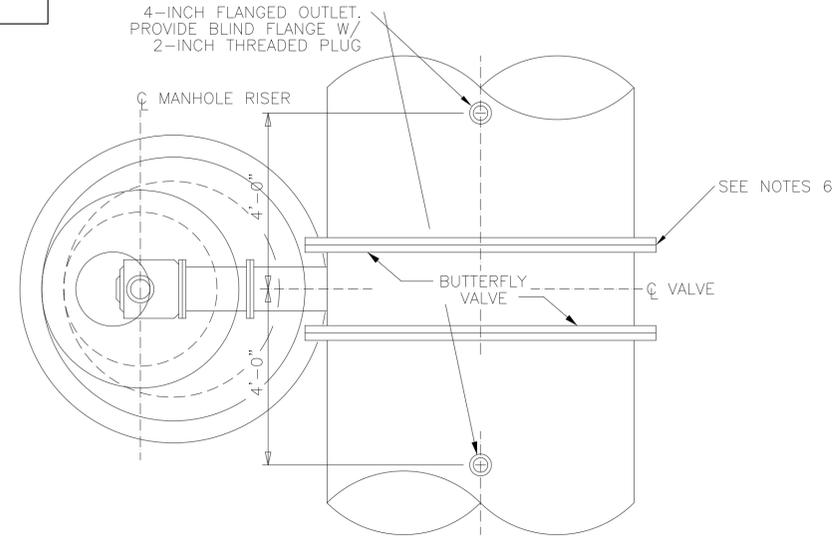
STANDARD LDWL PIPE DETAILS

(SHEET 2 OF 2)

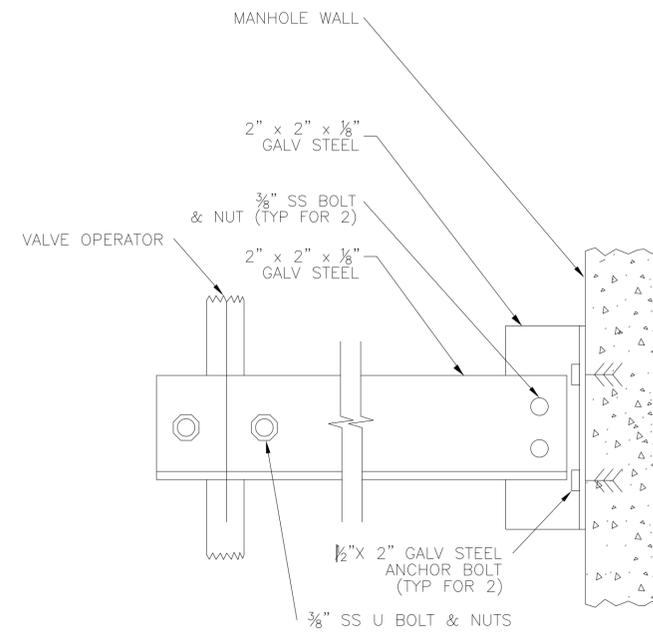
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DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 33 OF 85

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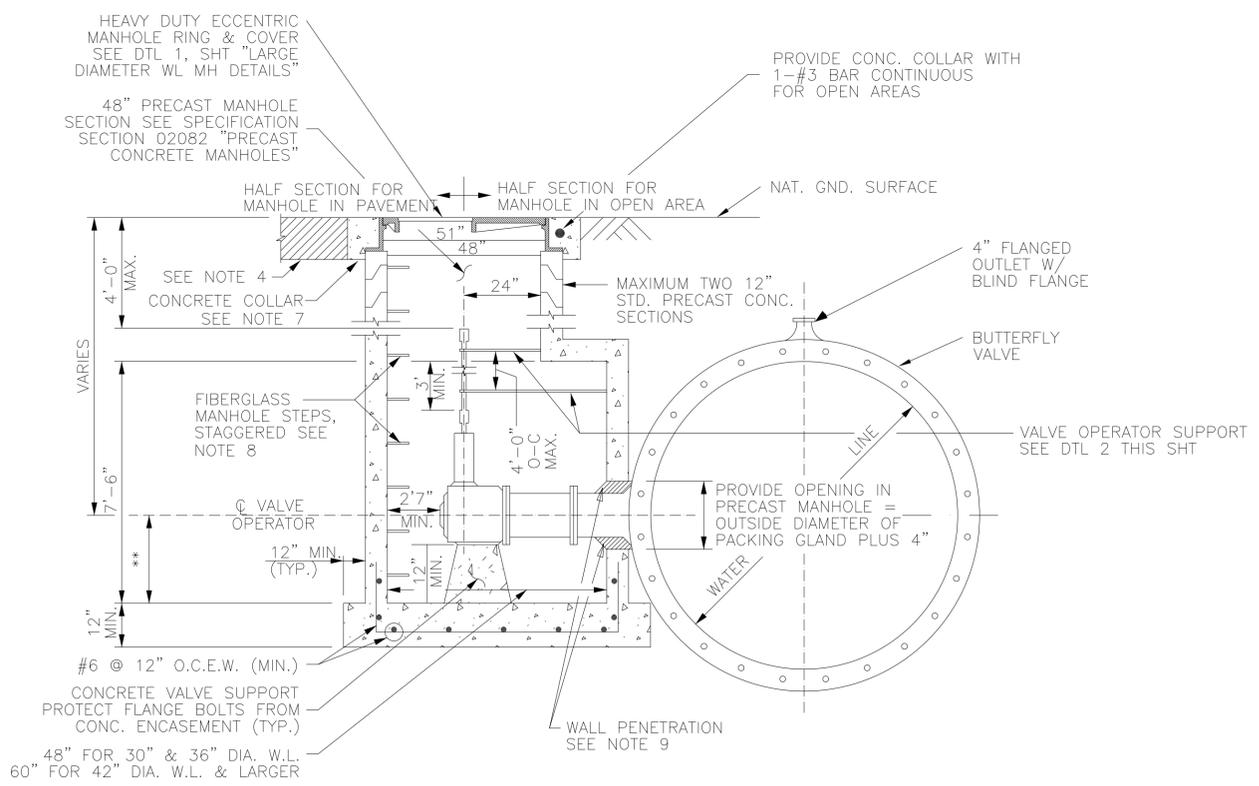
NOTE:
 SHOULD CONTRACTOR DESIRE TO USE VALVES IN A THROTTLED POSITION FOR FILLING OF LINE SEGMENTS, CONTRACTOR IS CAUTIONED TO OBSERVE RECOMMENDATIONS OF VALVE MANUFACTURER IN ORDER TO PRECLUDE DAMAGE ASSOCIATED WITH THIS MODE OF OPERATION.



PLAN



2 VALVE OPERATOR SUPPORT



ELEVATION

1 OPERATOR MANHOLE DETAILS FOR BUTTERFLY VALVES
 (FOR WATER LINES 24-INCHES TO 96-INCH IN DIAMETER)

NOTES:

1. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. PLACE MANHOLE ON NEW COMPACTED (95% S. P. D.) BOTTOM IN ACCORDANCE WITH SPECIFICATION 02316.
3. 2" OPERATING NUT ON LARGE DIAMETER BUTTERFLY VALVES SHALL TURN CLOCKWISE TO OPEN VALVE. ABOVE-GROUND AND PLANT VALVES SHALL OPEN COUNTERCLOCKWISE.
4. FOR PAVEMENT REPAIR, SEE "EXCAVATION, BEDDING, AND BACKFILL DETAIL".
5. FOR MANHOLES DEEPER THAN 20 FEET, PROVIDE SAFETY CLIMBING RAIL (SAF-T-CLIMB OR EQUAL)
6. FOR JOINT BONDING DETAILS AT ISOLATION/BUTTERFLY VALVES SEE CATHODIC PROTECTION DETAILS FOR JOINT BONDING SHEETS.
7. FOR CONCRETE COLLAR SEE "LARGE DIAMETER WATERLINE MANHOLE DETAILS"
8. FOR FIBERGLASS MANHOLE STEPS SEE "LARGE DIAMETER WATERLINE MANHOLE DETAILS"
9. FOR WALL PENETRATION SEE "LARGE DIAMETER WATERLINE MANHOLE DETAILS"



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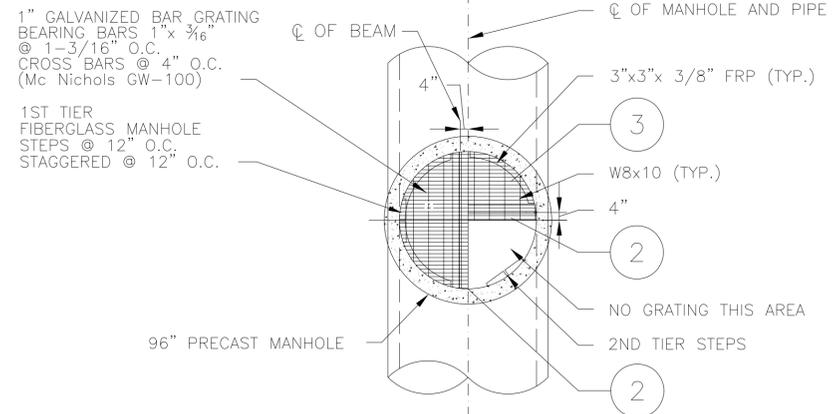
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD LDWL ISOLATION VALVE DETAILS

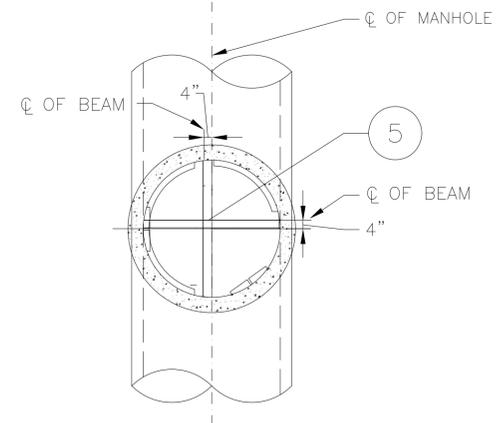
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CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 34 OF 85

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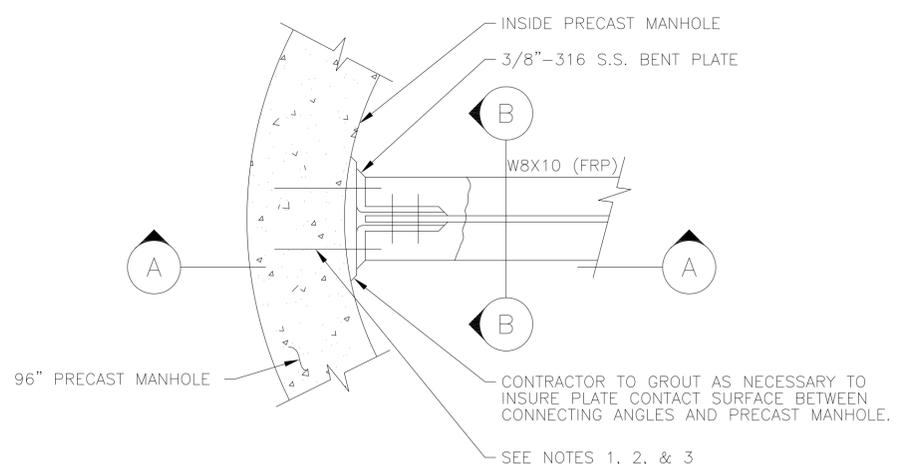
No.	Date	Revisions



PLAN VIEW OF LANDING (W/GRATING SHOWN)



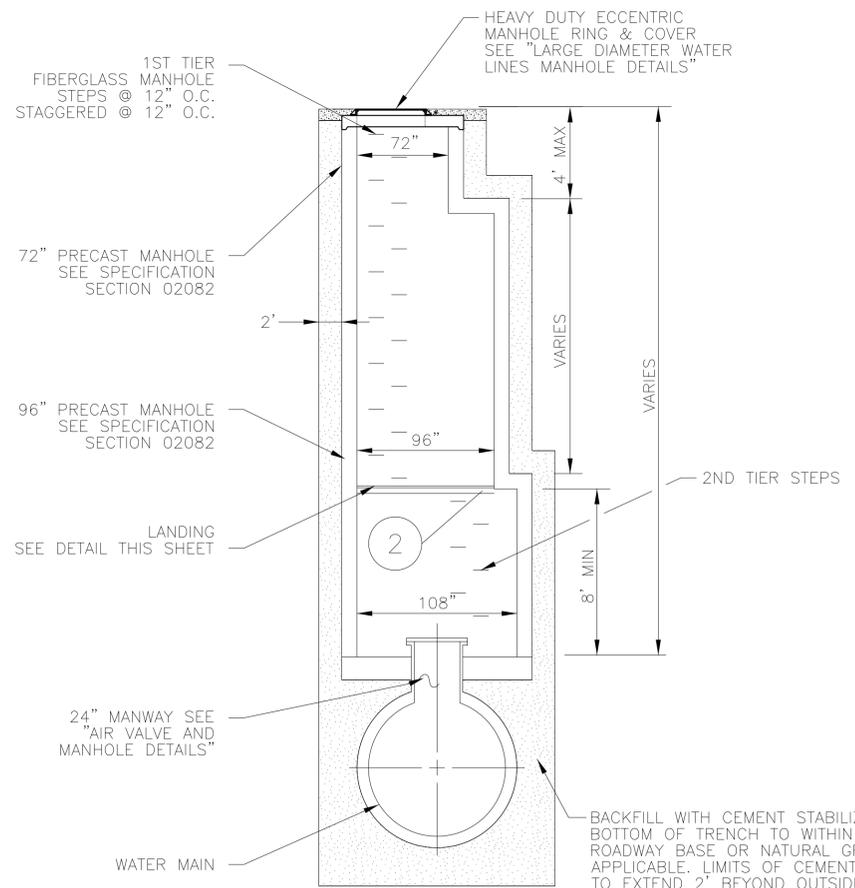
PLAN VIEW OF LANDING (W/O GRATING SHOWN)



2 BEAM CONNECTION DETAIL NO SCALE

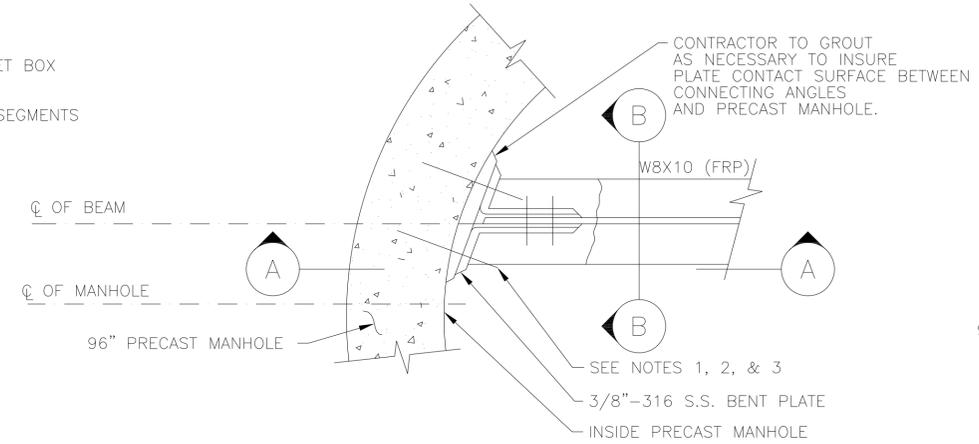
NOTE:

1. ALL STEEL TO BE GRADE 40.
2. ALL CONCRETE TO BE CLASS "A".
3. COORDINATE THE LOCATION AND TYPE JOINTS BETWEEN OFFSET BOX AND PRECAST SECTIONS.
4. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.

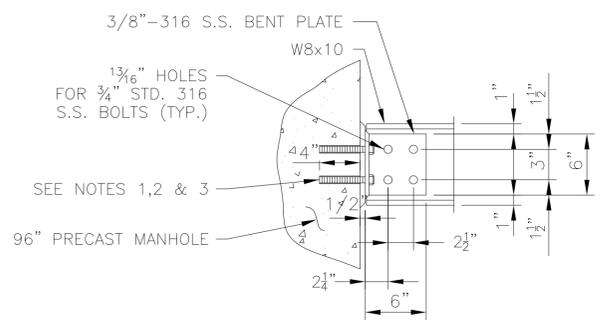


PROFILE

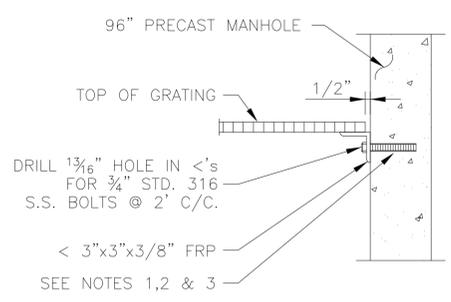
1 EXTRA DEPTH - ACCESS MANHOLE (SEE PLANS FOR LOCATION) NO SCALE



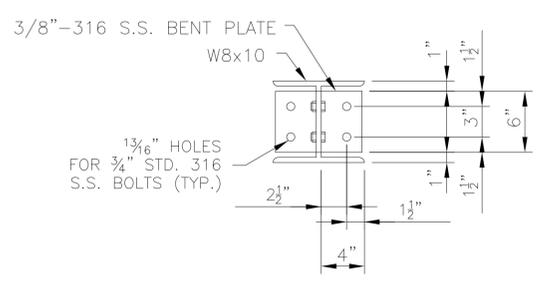
3 BEAM CONNECTION DETAIL NO SCALE



A SECTION NO SCALE



4 ANGLE CONNECTION DETAIL NO SCALE



B SECTION B NO SCALE

NOTES:

1. CONTRACTOR TO DRILL 1 1/4" DIAMETER HOLES 4" DEEP, INTO PRECAST MANHOLE FOR 3/4" DIAMETER ANCHOR BOLTS.
2. GROUT IN 3/4" DIAMETER ANCHOR BOLTS WITH GRUTEM 435 AS MANUFACTURED BY I.W. INDUSTRIES, OR APPROVED EQUAL. MANUFACTURERS INSTRUCTIONS IN THE USE OF ALL MATERIALS SPECIFIED SHALL BE FOLLOWED IN STRICT ACCORDANCE.
3. ANCHOR BOLTS SHALL BE 3/4" DIAMETER x 6" LONG 316 S.S. ALL THREAD BOLTS WITH 2" PROJECTION.

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SUTP
Surface Water Transmission Program

KUO & associates
Consulting Engineers & Surveyors
10300 Westoffice Dr., Ste 800, Houston, Texas 77042
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Texas Firm Registration No. F-4578
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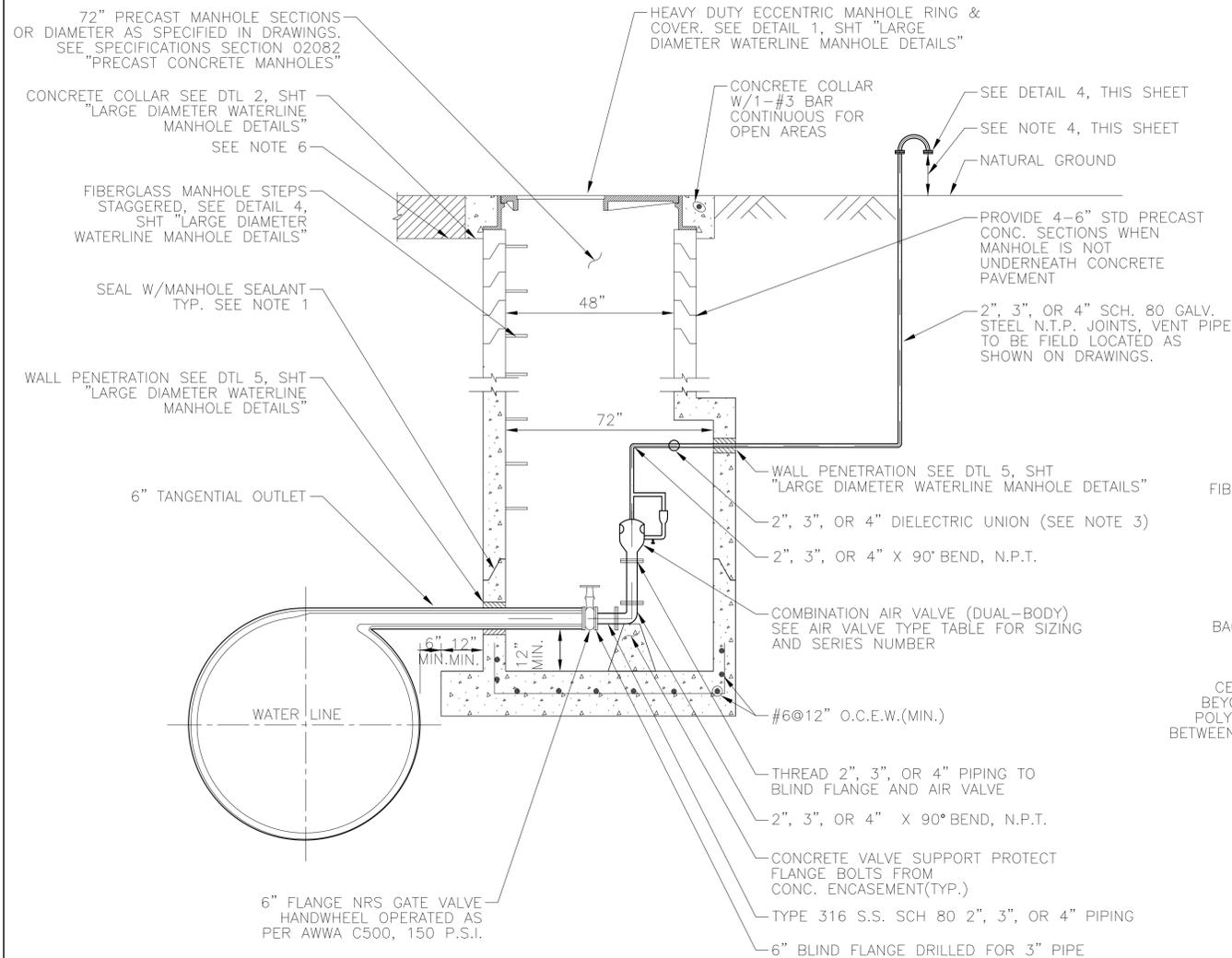
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

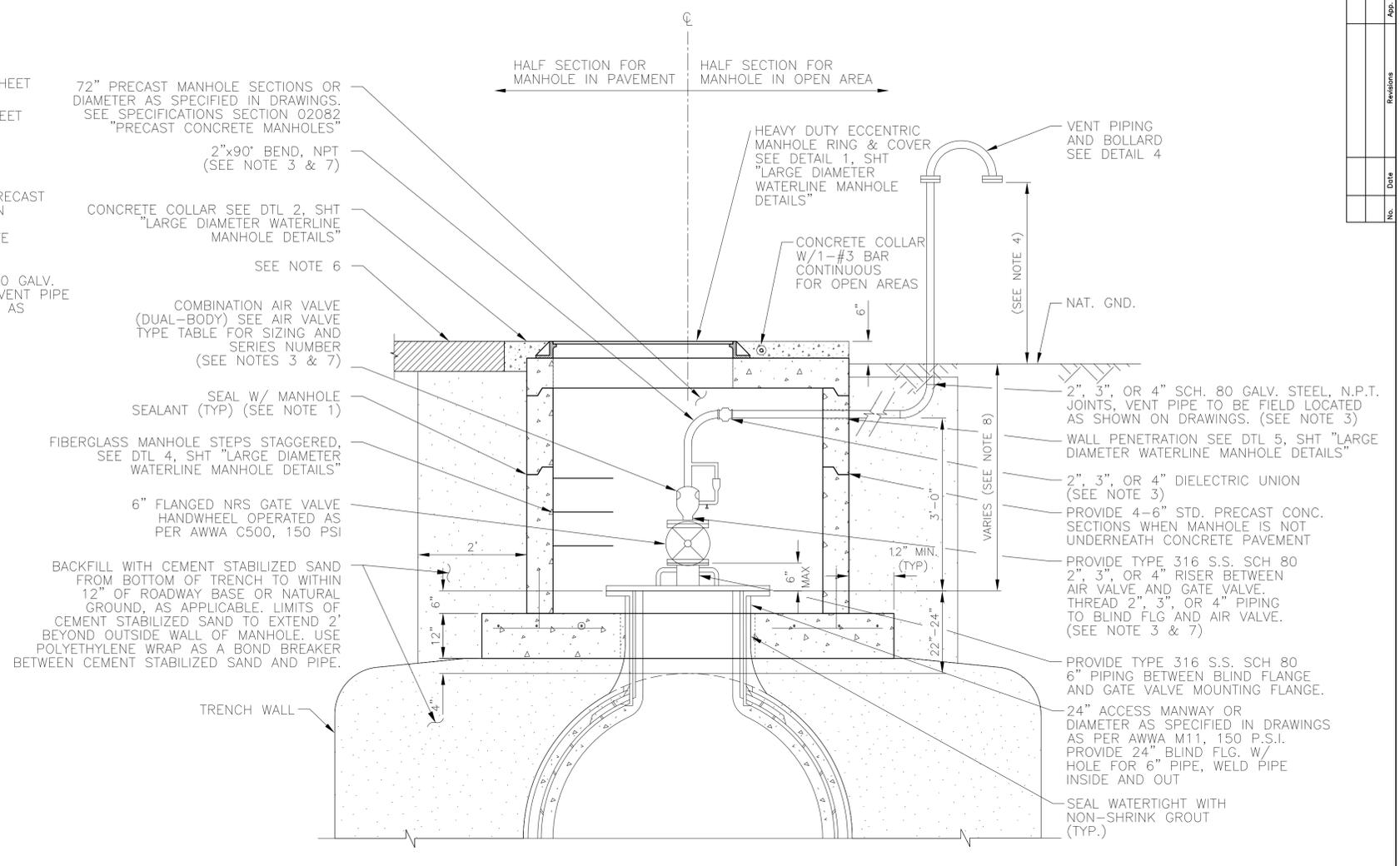
STANDARD LDWL EXTRA DEPTH MANHOLE DETAILS

WBS NO. S-000900-0180-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 37 OF 85	

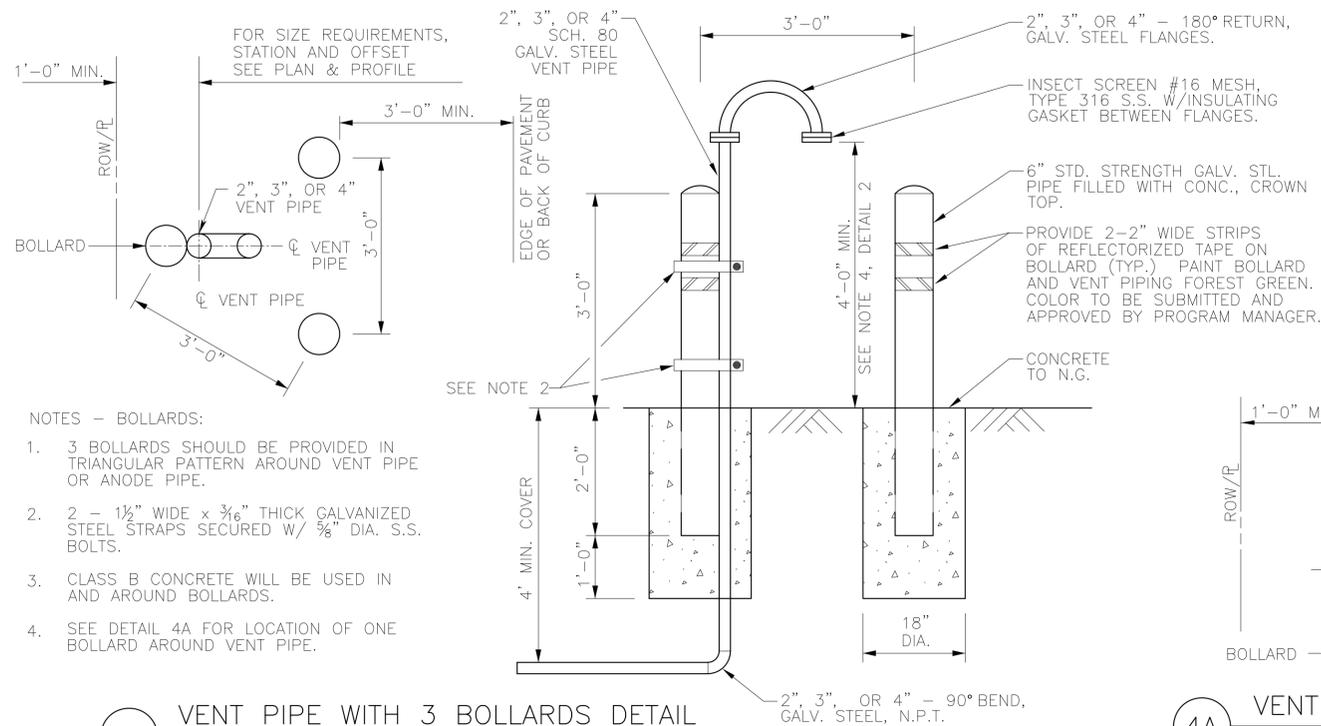
No.	Date	Revisions



1 LOW PROFILE AIR VALVE ASSEMBLY
(FOR WATER LINES 36-INCH TO 90-INCH DIAMETER)



2 AIR VALVE ASSEMBLY IN SERVICE MANHOLE
(FOR WATER LINES 36-INCH TO 90-INCH DIAMETER)

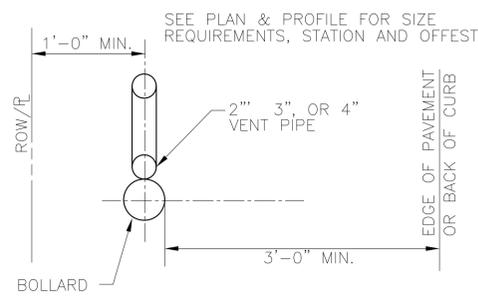


4 VENT PIPE WITH 3 BOLLARDS DETAIL

WATER MAIN DIAMETER	MANUFACTURER (1)	VACUUM (AI/VR)		AIR RELEASE	
		SERIES	ORIFICE SIZE	SERIES	INLET SIZE (NPT)

3 AIR VALVE & TYPE TABLE
(FOR WATER LINES 36" TO 90" DIAMETER)

- (1) OR APPROVED EQUAL.
(2) MINIMUM ORIFICE SIZE REQUIRED. TO BE UPDATED FOR EACH PROJECT BASED ON TRANSIENT ANALYSIS.



4A VENT PIPE WITH 1 BOLLARD DETAIL

- NOTES:**
- PROVIDE RAM-NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
 - FOR MANHOLES DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF-T-CLIMB OR APPROVED EQUAL).
 - PIPING AND APPURTENANCES OF THE SAME DIAMETER AND CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
 - VERIFY THAT LOCATION OF VENT PIPE SCREEN IS 1 FOOT ABOVE 100-YEAR FLOOD PLAIN ELEVATION OR 4 FEET ABOVE NATURAL GROUND WHICHEVER IS HIGHER.
 - REFER TO PLAN AND PROFILE SHEETS FOR LOCATIONS OF AIR VALVES.
 - FOR PAVEMENT REPAIR, SEE SHEET "EXCAVATION, BEDDING, AND BACKFILL DETAILS".
 - PROVIDE AN APPROVED PETROLATUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.
 - IF DEPTH OF COVER IS LESS THAN 5', USE "LOW PROFILE AIR VALVE ASSEMBLY DETAIL"



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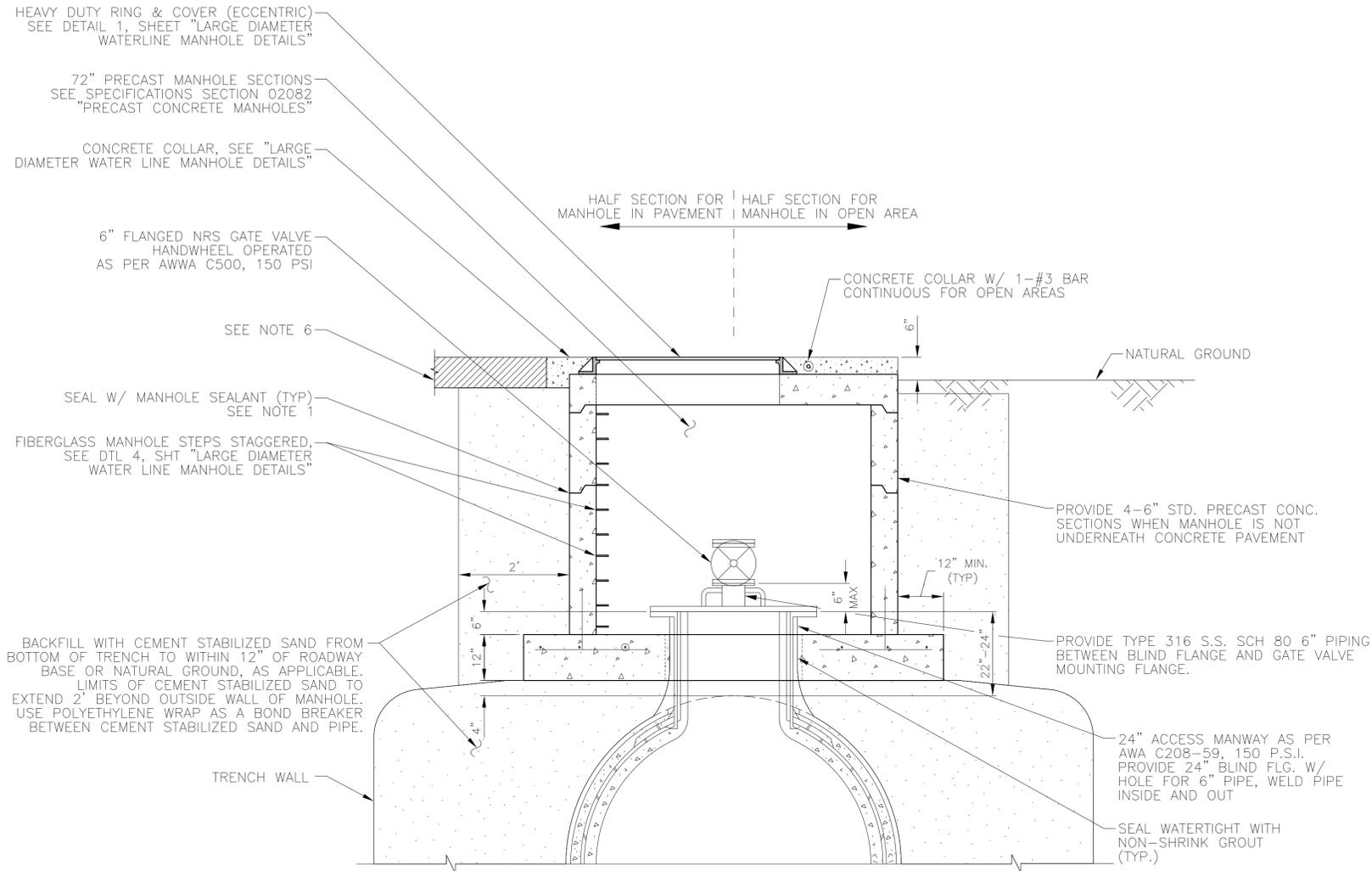
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD LDWL AIR VALVE AND MANHOLE DETAILS

(SHEET 1 OF 2)

WBS NO. S-000900-0180-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 38 OF 85



1 ACCESS MANHOLE
(FOR WATER LINES 36-INCH TO 90-INCH DIAMETER)

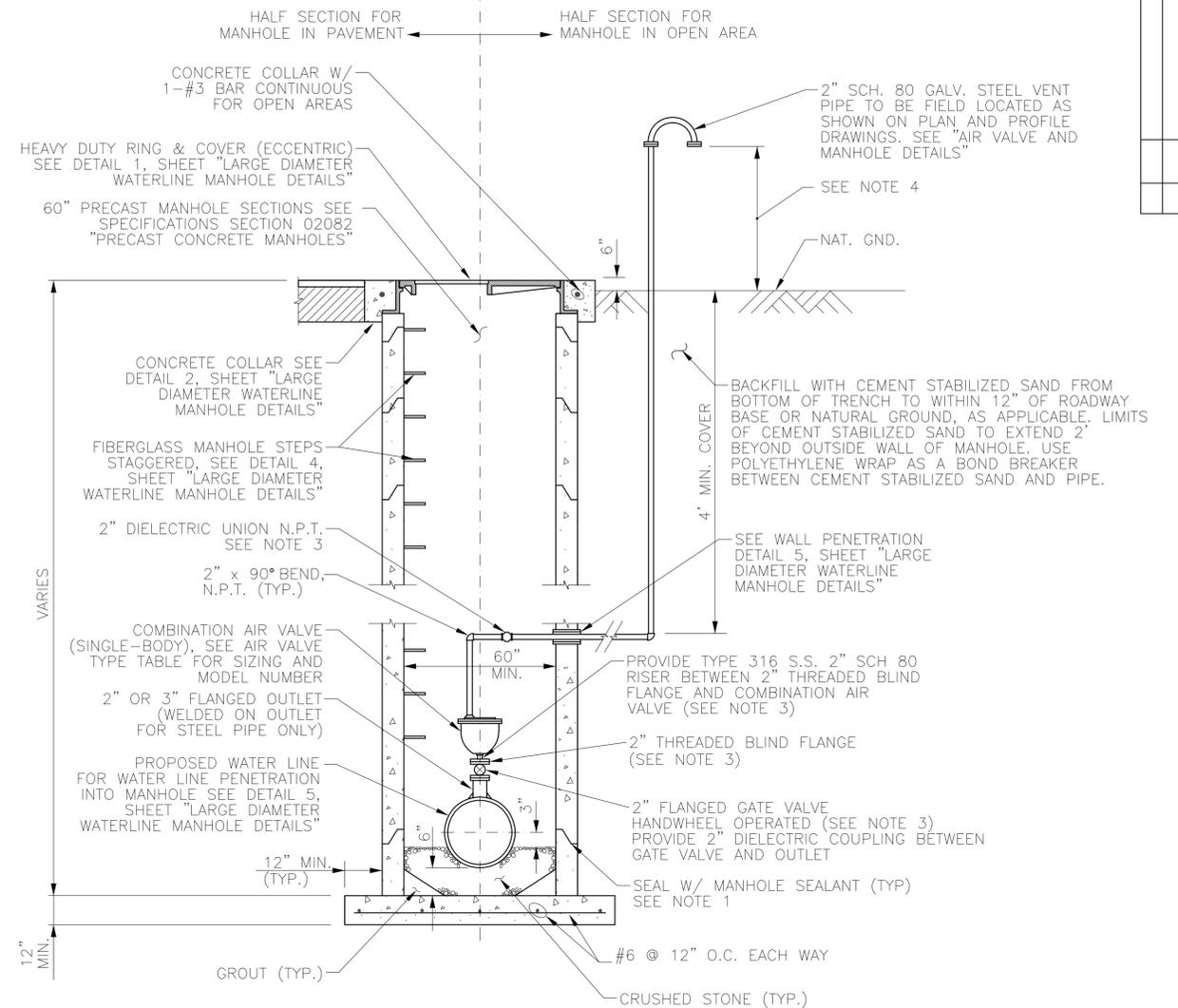
WATER MAIN DIAMETER	MANUFACTURER (1)	VACUUM (AI/VR)		AIR RELEASE		
		SERIES	ORIFICE SIZE	SERIES	INLET SIZE (NPT)	ORIFICE SIZE (2)

AIR VALVE & TYPE TABLE
(FOR WATER LINES 36" TO 90" DIAMETER)

- (1) OR APPROVED EQUAL.
(2) MINIMUM ORIFICE SIZE REQUIRED. TO BE UPDATED FOR EACH PROJECT BASED ON TRANSIENT ANALYSIS.

WATER MAIN DIAMETER	MANUFACTURER (1)	VACUUM (AI/VR)	
		SERIES	ORIFICE SIZE
<=36"	APCO	140C	
	CLAVAL	36	
	PRATT	WCV 01	

AIR VALVE & TYPE TABLE
(FOR WATER LINES SMALLER THAN 36" DIAMETER)



2 COMBINATION AIR VALVE ASSEMBLY IN SERVICE MANHOLE
(FOR WATER LINES SMALLER THAN 36-INCHES DIAMETER)

NOTES:

- PROVIDE RAM-NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
- FOR MANHOLES DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF-T-CLIMB OR APPROVED EQUAL).
- PIPING AND APPURTENANCES OF THE SAME DIAMETER AND CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
- VERIFY THAT LOCATION OF VENT PIPE SCREEN IS 1 FOOT ABOVE 100-YEAR FLOOD PLAIN ELEVATION OR 4 FEET ABOVE NATURAL GROUND WHICHEVER IS HIGHER.
- REFER TO PLAN AND PROFILE SHEETS FOR LOCATIONS OF AIR VALVES.
- FOR PAVEMENT REPAIR, SEE SHEET "EXCAVATION, BEDDING, BACKFILL AND PAVEMENT REPAIR DETAILS".
- PROVIDE AN APPROVED PETROLATUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.



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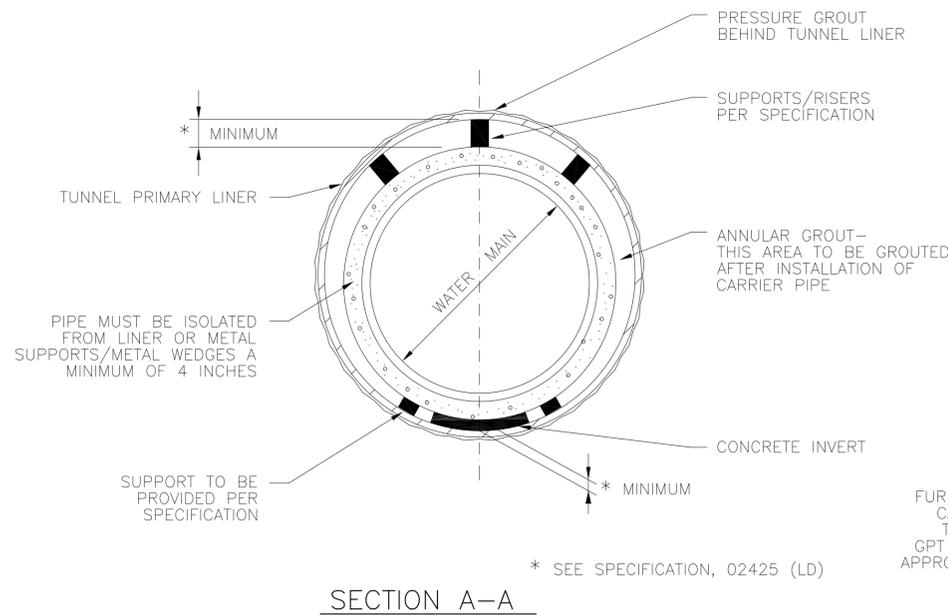
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HOUSTON PUBLIC WORKS

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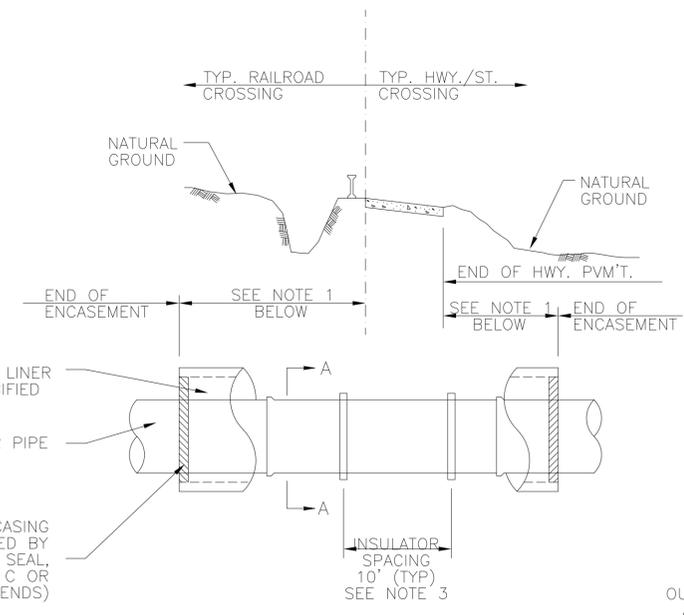
STANDARD LDWL AIR VALVE AND MANHOLE DETAILS

(SHEET 2 OF 2)

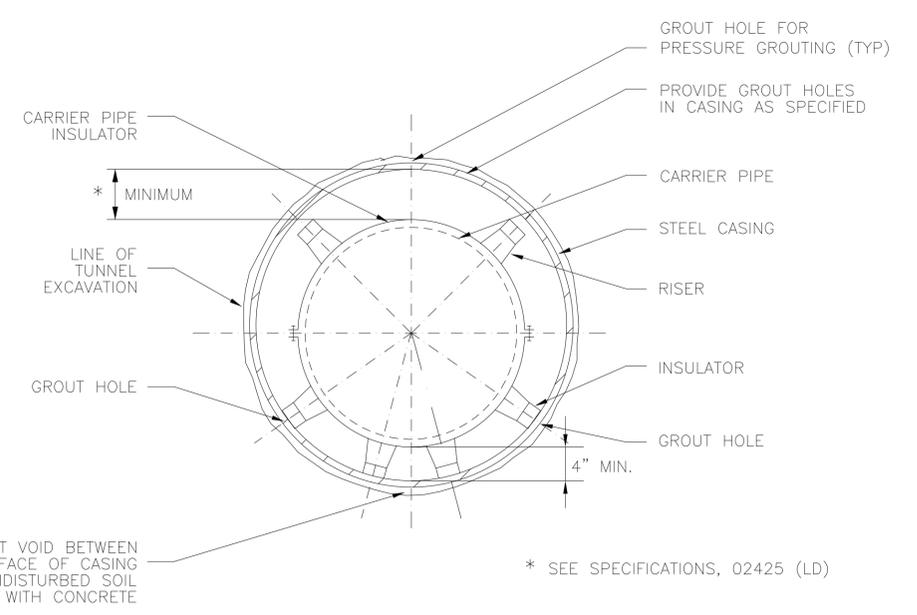
WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 39 OF 85



SECTION A-A



TUNNEL ELEVATION



SECTION A-A

NOTES:

1. DETAIL IS FOR PRESTRESSED CONCRETE CYLINDER PIPE (STEEL PIPE AND D.I.P. ALTERNATE SIMILAR).
2. MINIMUM CLEARANCES SHOWN ON THE PLAN & PROFILE DRAWINGS ARE TO THE O.D. OF TUNNEL LINER. ADJUST PROFILE AS REQUIRED TO MAINTAIN CLEARANCES IDENTIFIED. NO SEPARATE PAY.

1 TUNNEL DETAIL FOR TUNNEL LINER / CASING FOR PCCP OR STEEL PIPE WITH MORTAR BANDS (FOR WATER MAINS 24 INCHES IN DIAMETER AND LARGER)

NOTES:

1. LENGTH OF ENCASEMENT SHALL BE AS SHOWN ON THE PLAN & PROFILE DRAWINGS.
2. LAY CASING PIPE IN OPEN CUT, TUNNEL OR BORE, AS NOTED ON PLAN & PROFILE DRAWINGS.
3. SEE SPECIFICATIONS FOR APPROPRIATE MODEL ACCORDING TO PIPE DIAMETER OR PIPE MANUFACTURER RECOMMENDATIONS.

NOTE

1. ALL TUNNELS IN PPCA ARE TO BE GROUTED

2 TUNNEL DETAIL FOR CASING W/ STEEL CARRIER PIPE AND CASING INSULATOR (FOR WATER MAINS 24 INCHES IN DIAMETER AND LARGER)

MINIMUM TUNNEL LINER / CASING SIZES AND THICKNESS

LOCATION	WATER MAIN DIA.	PIPE MATERIAL	(1) NOMINAL DIAMETER / WALL THICKNESS (IN.)		CASING I.D. WALL THICKNESS IN/IN
			2-FLANGE (2) LINER PLATE	4-FLANGE LINER PLATE	
WEST ROAD - STA. 2+18 TO STA. 3+28	24"	STEEL			37/0.3125
		PCCP			43/0.3750
WEST ROAD - STA. 4+78 TO STA. 5+32	24"	STEEL			37/0.3125
		PCCP			43/0.3750
WEST ROAD - STA. 8+59 TO STA. 9+81	24"	STEEL			37/0.2500
		PCCP			43/0.2500
WEST ROAD - STA. 10+34 TO STA. 11+28	24"	STEEL			37/0.3750
		PCCP			43/0.3750
WEST ROAD - STA. 18+76 TO STA. 20+35	24"	STEEL			37/0.3750
		PCCP			43/0.3750
WEST ROAD - STA. 27+20 TO STA. 30+06	24"	STEEL			37/0.2500
		PCCP			43/0.2500
WEST ROAD - STA. 32+79 TO STA. 33+65	24"	STEEL			37/0.4375
		PCCP			43/0.5000
WEST ROAD - STA. 34+35 TO STA. 35+54	24"	STEEL			37/0.2500
		PCCP			43/0.2500
WEST ROAD - STA. 36+80 TO STA. 38+82	24"	STEEL			37/0.2500
		PCCP			43/0.2500
WEST ROAD - STA. 40+55 TO STA. 44+20	24"	STEEL			37/0.3125
		PCCP			43/0.3750

NOTES:

1. DIAMETER OF LINER PLATE IS AT NEUTRAL AXIS.
2. LINER PLATE IS TWO FLANGE AND NOMINALLY 2-INCH CORRUGATION BY 6-INCH PROFILE.

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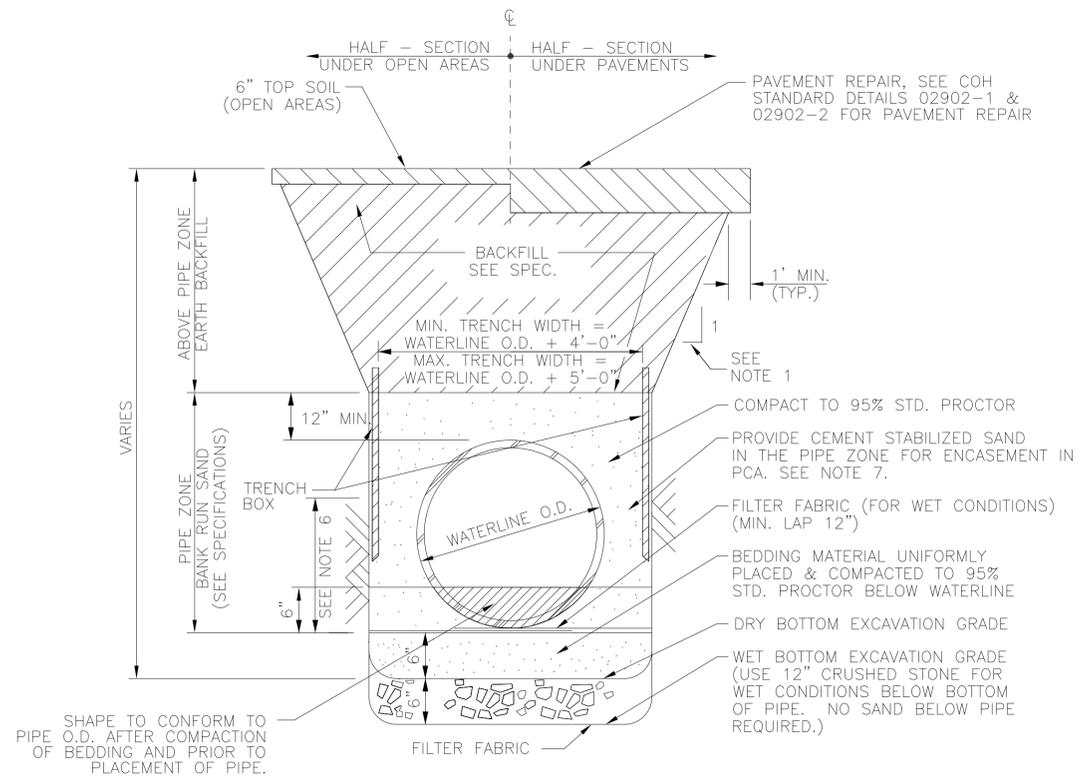
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LDWL TUNNEL AND CASING DETAILS

WBS NO. S-000900-0180-4
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CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 41 OF 85

No.	Date



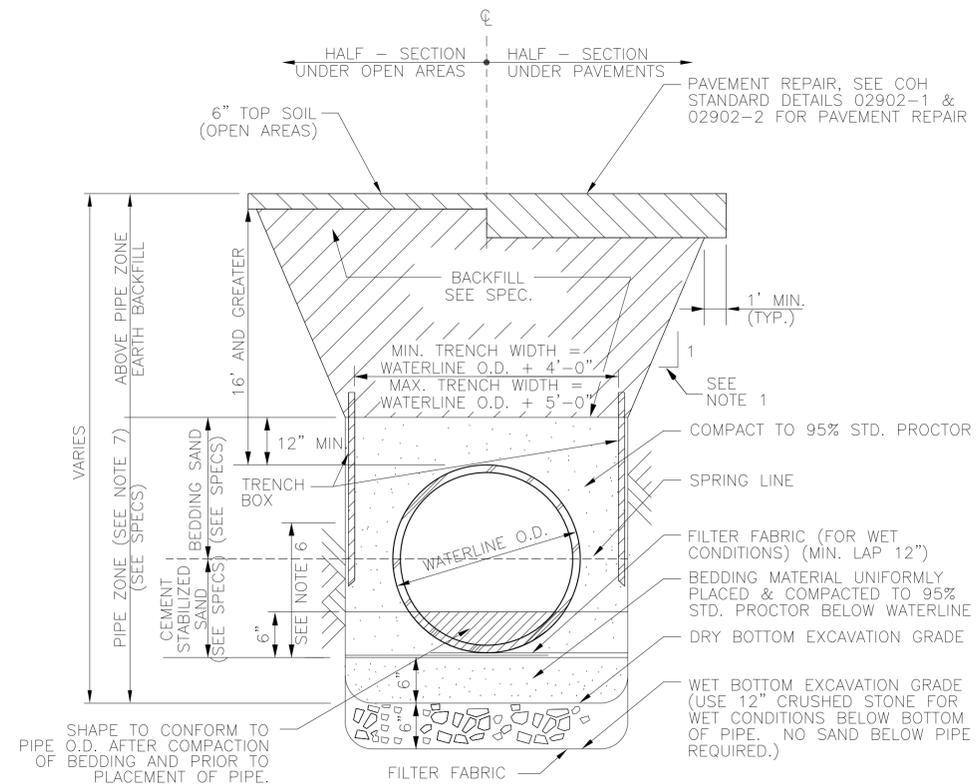
1 EXCAVATION & BACKFILL DETAIL FOR LARGE DIAMETER WATER MAIN

NO SCALE

NOTES:

- SEE TRENCH SAFETY SYSTEM SPECIFICATIONS FOR MAXIMUM ALLOWABLE SLOPES.
- FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
- KEY CONCRETE TRENCH DAM MINIMUM OF 6 INCHES INTO TRENCH BOTTOM AND WALLS.
- TRENCH DAM MAY BE FORMED OR UNFORMED. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 6-INCH MINIMUM THICKNESS AND 6-INCH KEY DEPTH REQUIREMENTS.
- TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SECTION 02317 FOR OTHER REQUIREMENTS.
- THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
- USE FILTER FABRIC AS A BOND BREAKER BETWEEN CEMENT STABILIZED SAND AND PIPE.

MAXIMUM PAVEMENT DISTURBANCE FOR WL INSTALLATION	
WATERLINE I.D. (in.)	DIMENSION (ft.)
24	10
30	11
36	12
42	13
48	14
54	15
60	16
66	16
72	17
78	17
84	18
96	18

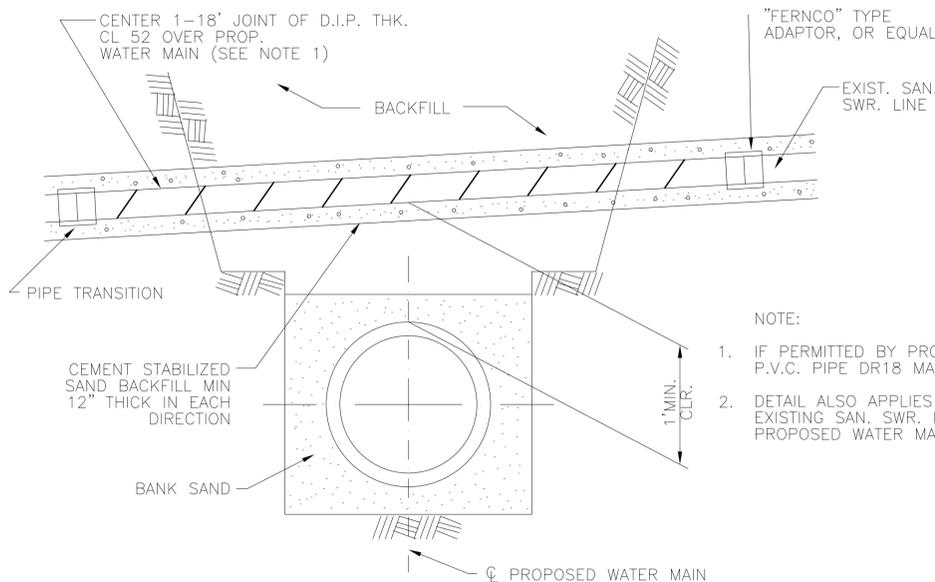


2 EXCAVATION & BACKFILL DETAIL (FOR PCCP OR BAR-WRAPPED PIPE WATER MAIN WITH HEIGHT OF EARTH COVER GREATER THAN 16')

NO SCALE

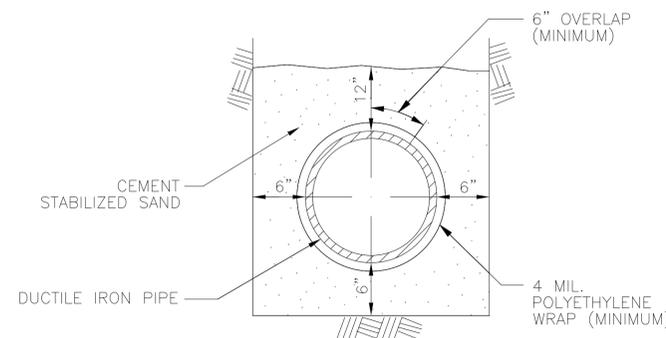
NOTES:

- SEE TRENCH SAFETY SYSTEM SPECIFICATIONS FOR MAXIMUM ALLOWABLE SLOPES.
- FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
- KEY CONCRETE TRENCH DAM MINIMUM OF 6 INCHES INTO TRENCH BOTTOM AND WALLS.
- TRENCH DAM MAY BE FORMED OR UNFORMED. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 6-INCH MINIMUM THICKNESS AND 6-INCH KEY DEPTH REQUIREMENTS.
- TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SECTION 02317 FOR OTHER REQUIREMENTS.
- THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
- USE POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN CEMENT STABILIZED SAND AND PIPE.



3 D.I.P. OVER PROPOSED WATER LINE

NO SCALE



4 EMBEDMENT AND CORROSION PROTECTION FOR SANITARY SEWER DUCTILE IRON PIPE

NO SCALE

NOTES:

- FOLLOWING EXCAVATION OF TRENCH, PLACE A 6" LAYER OF CEMENT STAB. SAND AT BOTTOM OF TRENCH. LAY POLYETHYLENE WRAP IN TRENCH, AND LAY PIPE ON TOP OF WRAP. FOLD WRAP AROUND PIPE WITH A 6" OVERLAP (MIN.) AND TIE AROUND PIPE WITH HEAVY BINDER TWINE, OR EQUAL, ON 6" CENTERS. PROVIDE A 12" OVERLAP (MIN.) AND TIE WITH HEAVY BINDER TWINE END LAPS. PLACE ADDITIONAL CEMENT SAND UP TO 12" ABOVE.
- ALL DUCTILE IRON PIPE SHALL HAVE A POLYETHYLENE "WRAP" OF 4 MIL. THICKNESS (MINIMUM) EXCEPT AS NOTED BELOW.
- WHERE PIPE IS PLACED IN AN AUGER OR TUNNEL OR IN A CASING, PIPE IS TO HAVE A DOUBLE WRAP OF 4 MIL POLYETHYLENE AND SHALL BE BONDED ON 12" CENTERS WITH 1/2" STAINLESS STEEL BANDS. END LAPS TO BE AS SPECIFIED FOR TRENCH SECTIONS.
- REFER TO SPECIFICATION SECTION 02528 - POLYETHYLENE ENCASEMENT/WRAP.

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24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

EXCAVATION, BEDDING, BACKFILL & PAVEMENT REPAIR DETAILS

WBS NO.
S-000900-0180-4

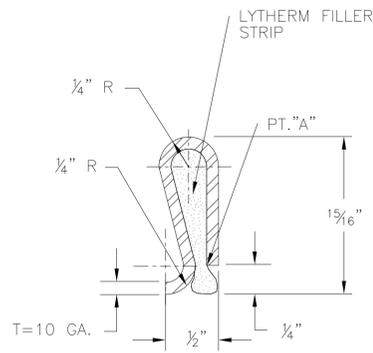
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ADAM SABZEVARI

SHEET NO. 42 OF 85

Revisions

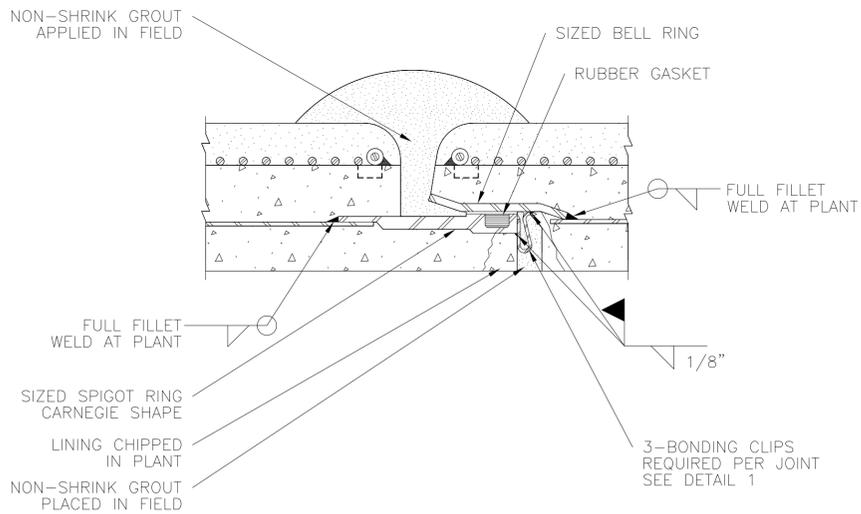
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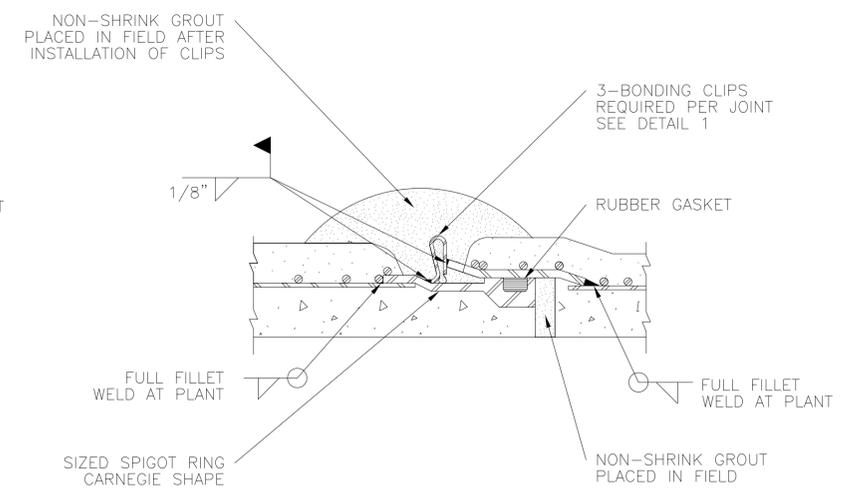
NOTES:

1. STEEL BONDING CLIP: MATERIAL SPECIFICATION --- ASTM A366 (COMMERCIAL QUALITY) CUT LENGTH --- $2\frac{1}{2} \pm \frac{1}{16}$ " WIDTH --- $1\frac{1}{4} \pm \frac{1}{16}$ "
2. LYTHERM FILLER STRIP TO BE 1" x $1\frac{1}{2}$ " WIDE TO OVERLAP SIDES OF CLIP.
3. CRIMP JUMPER OVER FILLER AT "A" TO COMPRESS FILLER CLOSE AT PT. "A" AS MUCH AS POSSIBLE WITHOUT CUTTING FILLER PAD.
4. THREE BONDING CLIPS ARE REQUIRED PER GASKETED JOINT (TYPICAL).
5. BONDING NOT REQUIRED FOR WELDED JOINTS.

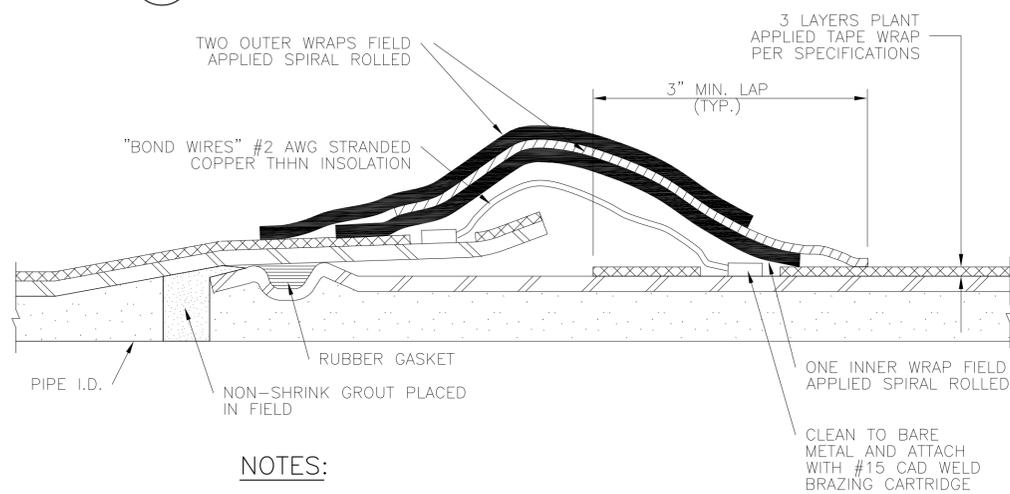
1 STEEL BONDING CLIP DETAIL



2 BONDED JOINT - EMBEDDED CYLINDER PIPE



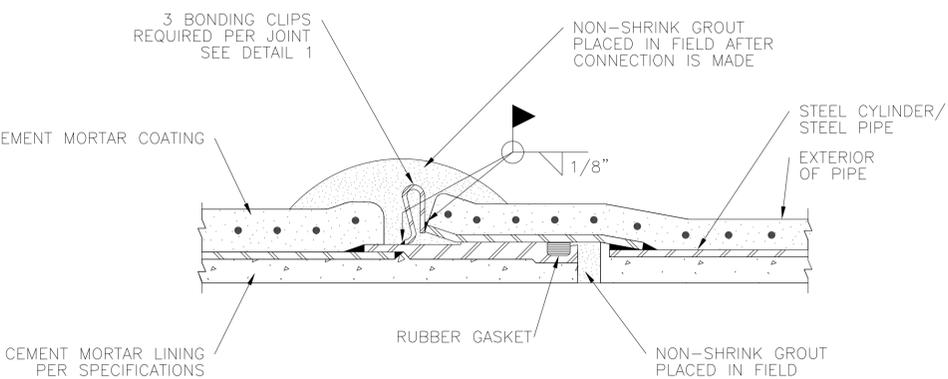
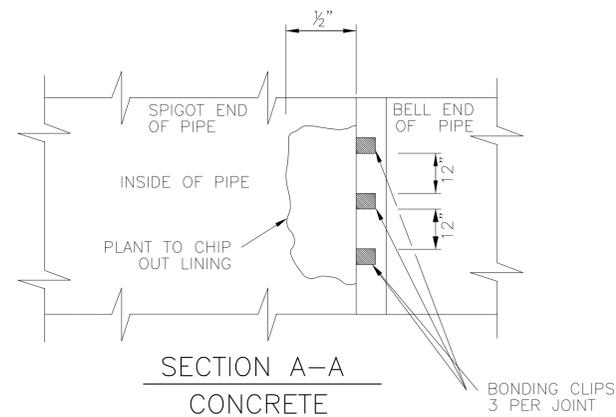
3 BONDED JOINT - BAR WRAPPED CYLINDER PIPE (SIMILAR FOR LINED CYLINDER PIPE)



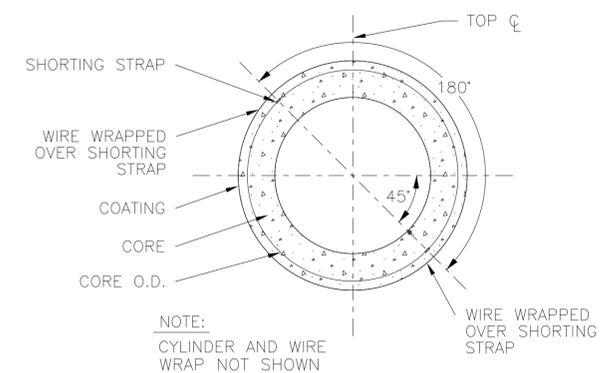
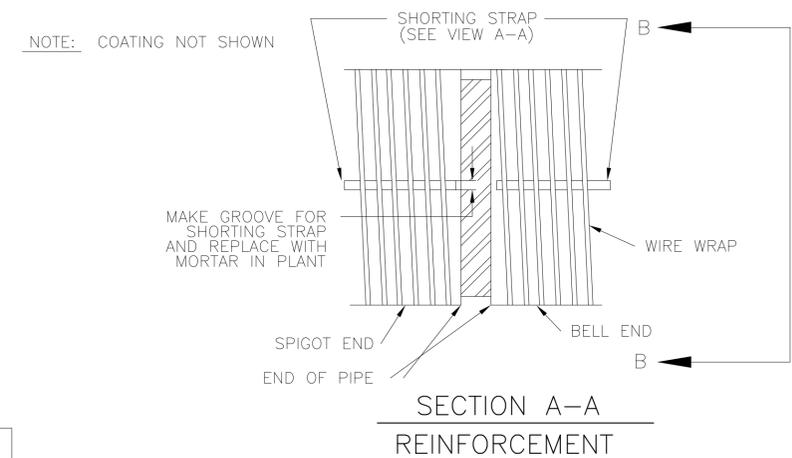
NOTES:

1. STEEL BONDING CLIP IS OPTIONAL TO BOND WIRE.
2. A MINIMUM OF TWO BOND WIRES OR THREE BONDING CLIPS ARE REQUIRED FOR RUBBER GASKETED STEEL PIPE. CLIPS ARE TO BE PROVIDED IN ACCORDANCE WITH DETAILS.
3. BONDING NOT REQUIRED FOR WELDED JOINTS.

4 O-RING STEEL PIPE JOINT DETAIL (CEMENT MORTAR LINED & TAPE WRAPPED SHOWN. FLEXIBLE LINING SIMILAR)



6 ELECTRICAL CONTINUITY BONDING OF EMBEDDED CYLINDER PIPE



NOTE: PLACE BONDING CLIPS IN INTERIOR JOINT RECESS AS SHOWN. WELD CLIPS TO BELL AND SPIGOT USING $\frac{1}{8}$ " FILLET WELD. REMOVE SLAG FROM WELD AND FILL RECESS WITH CEMENT MORTAR, COVERING ALL EXPOSED STEEL.



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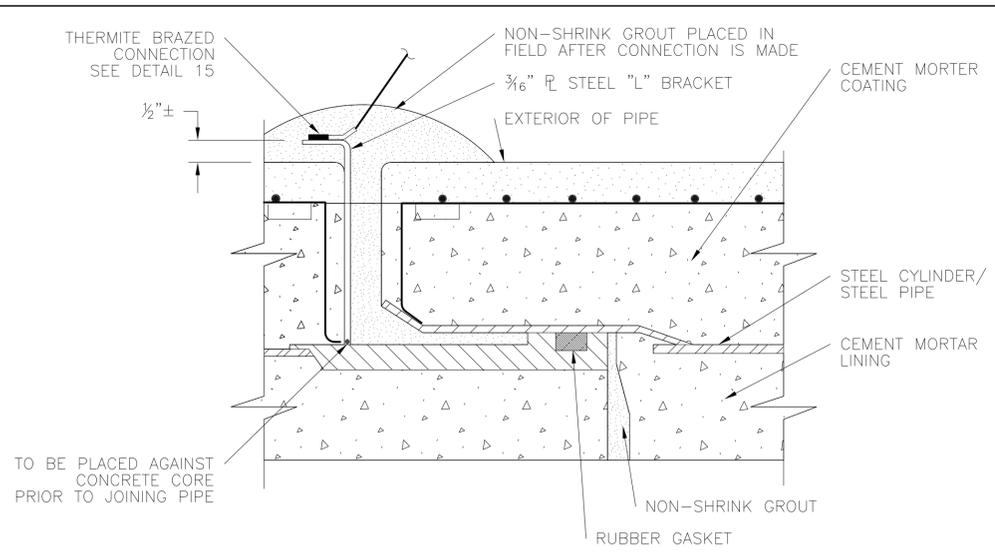
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR JOINT BONDING

(SHEET 1 OF 2)

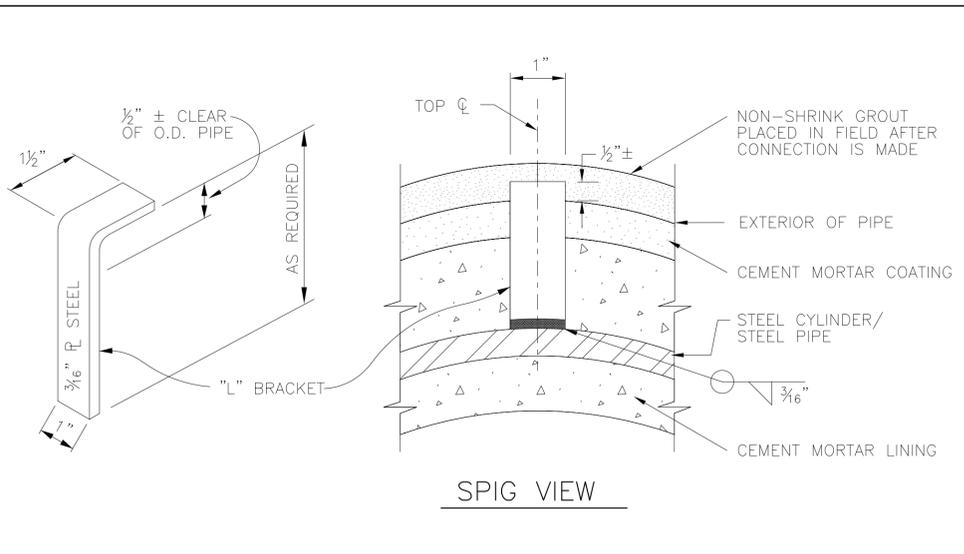
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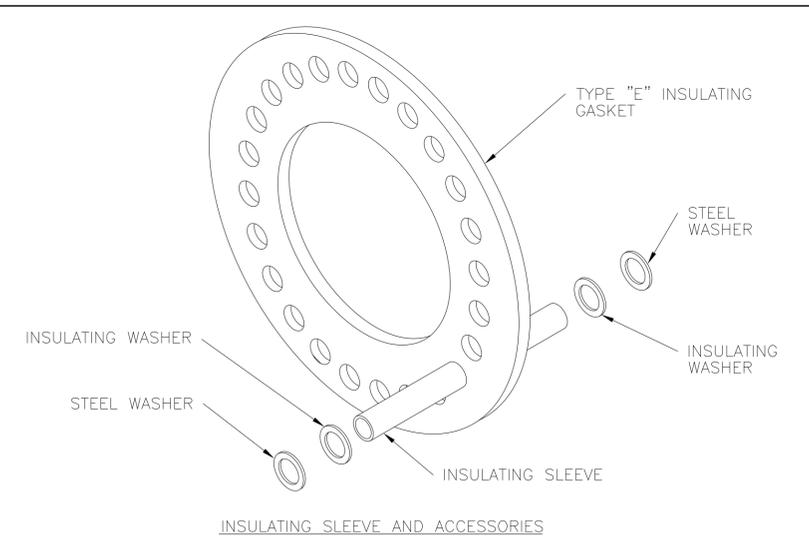
No.	Date	Revisions



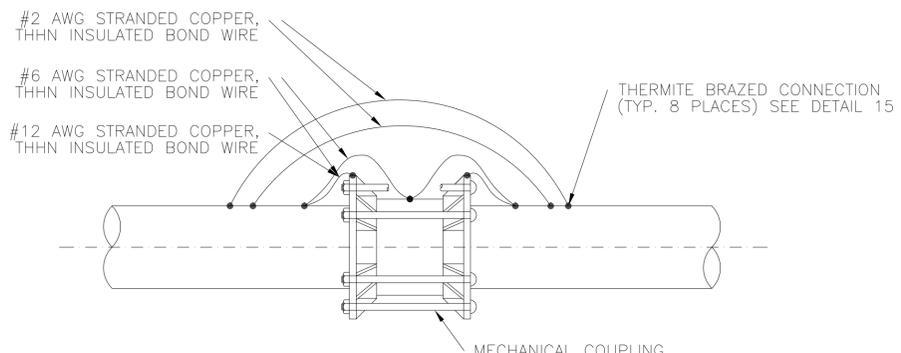
7 TEST LEAD CONNECTION DETAIL



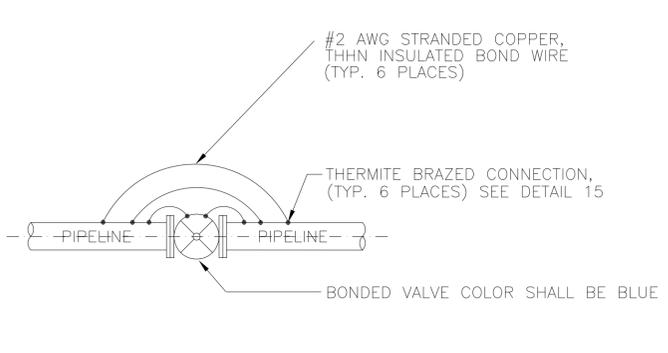
8 "L" BRACKET DETAIL



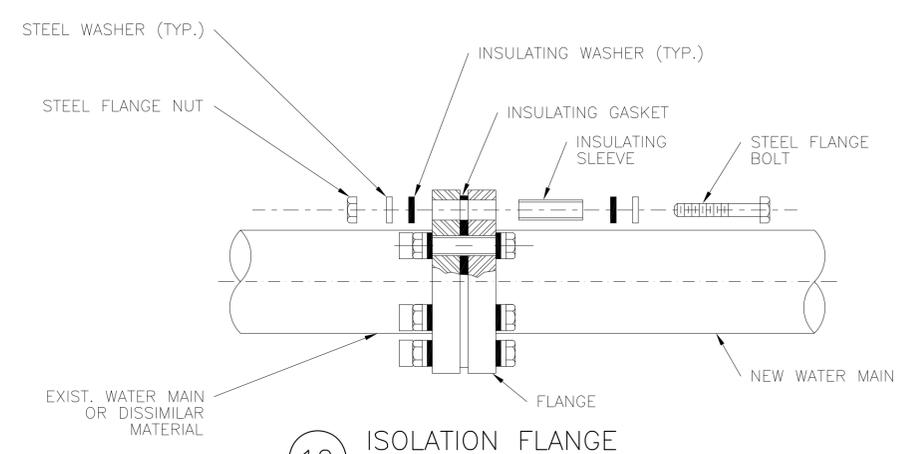
9 ISOLATION FLANGE ASSEMBLY
NOTE: SEE AWWA M11 FOR FLANGE BOLT TIGHTENING SEQUENCE



10 MECHANICAL COUPLING BOND DETAIL

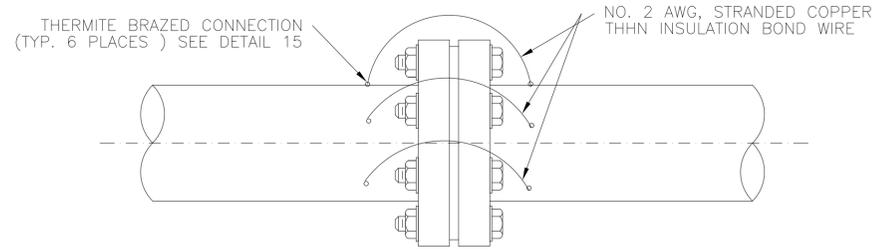


11 VALVE BONDING ARRANGEMENT
MAINLINE WITH CATHODIC PROTECTION

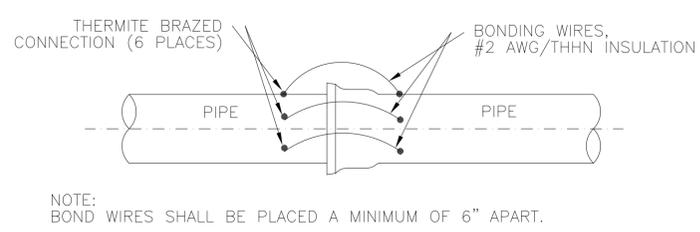


12 ISOLATION FLANGE

NOTES:
1. DETAILS SHOW BONDING ARRANGEMENTS ONLY. SEE JOINT DETAIL FOR PIPE JOINT REQUIREMENTS.

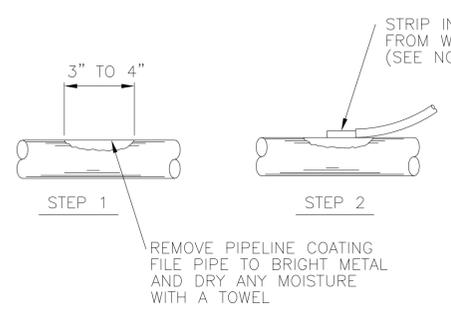


13 ELECTRICAL BONDING ACROSS FLANGE
NOTE: BOND WIRES SHALL BE PLACED A MINIMUM OF 6" APART.

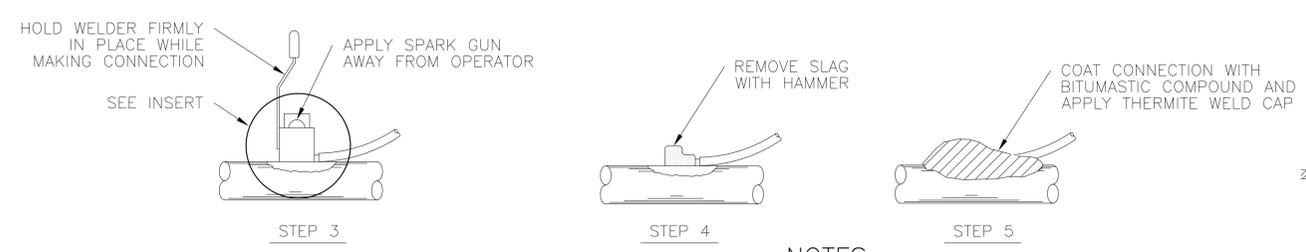


14 BELL & SPIGOT BONDING ARRANGEMENT
DUCTILE IRON PIPE

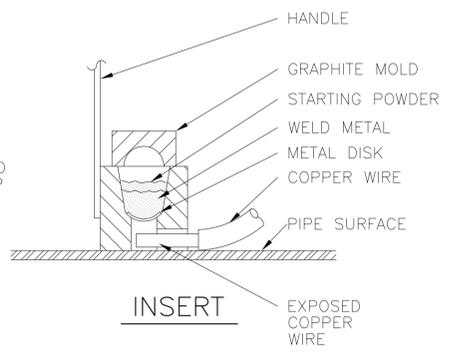
NOTE:
BOND WIRES SHALL BE PLACED A MINIMUM OF 6" APART.



15 THERMITE BRAZED CONNECTION DETAIL



NOTES:
1. WHEN #14 SOLID TO #10 SOLID WIRE IS USED, IT WILL BE NECESSARY TO INSTALL A COPPER SLEEVE OF ADEQUATE SIZE OVER BARE SECTION OF WIRE BEFORE CONNECTION IS ATTEMPTED.
2. THERMITE WELD PROCEDURES SIMILAR FOR "L" BRACKETS.
3. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MFG. RECOMMENDATIONS.



INSERT



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24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

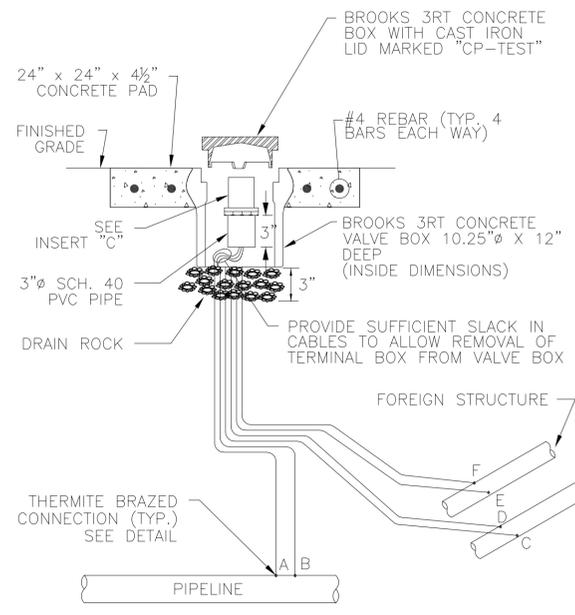
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR JOINT BONDING

(SHEET 2 OF 2)

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 44 OF 85

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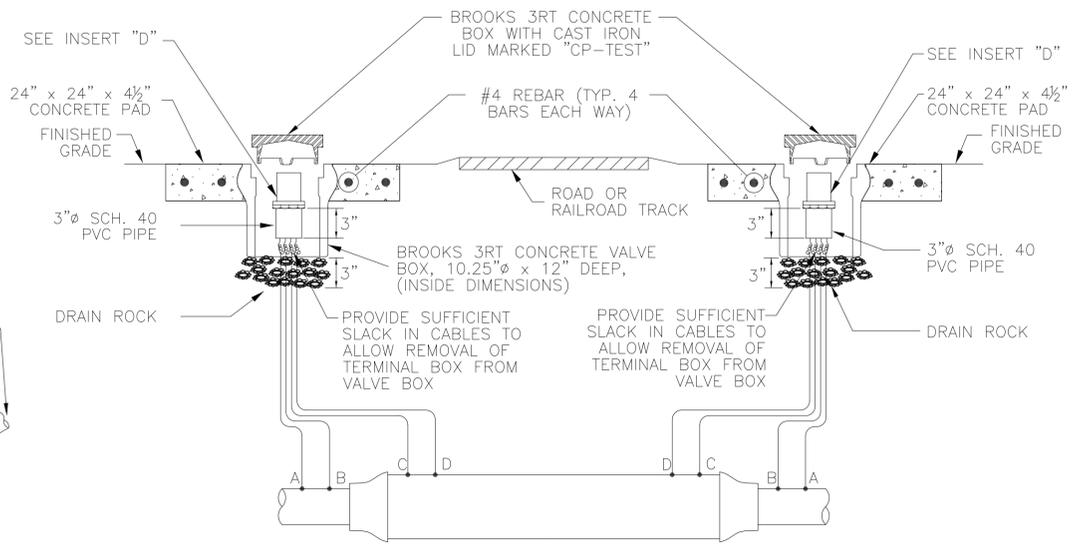
Rev.	Date	App.



- NOTES:
- TEST STATION SHALL BE MOUNTED DIRECTLY ABOVE THE NEW WATER LINE.
 - FOR MORE THAN TWO (2) FOREIGN LINES, INSTALL A COTTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

3 FLUSH MOUNTED FOREIGN LINE TEST STATION

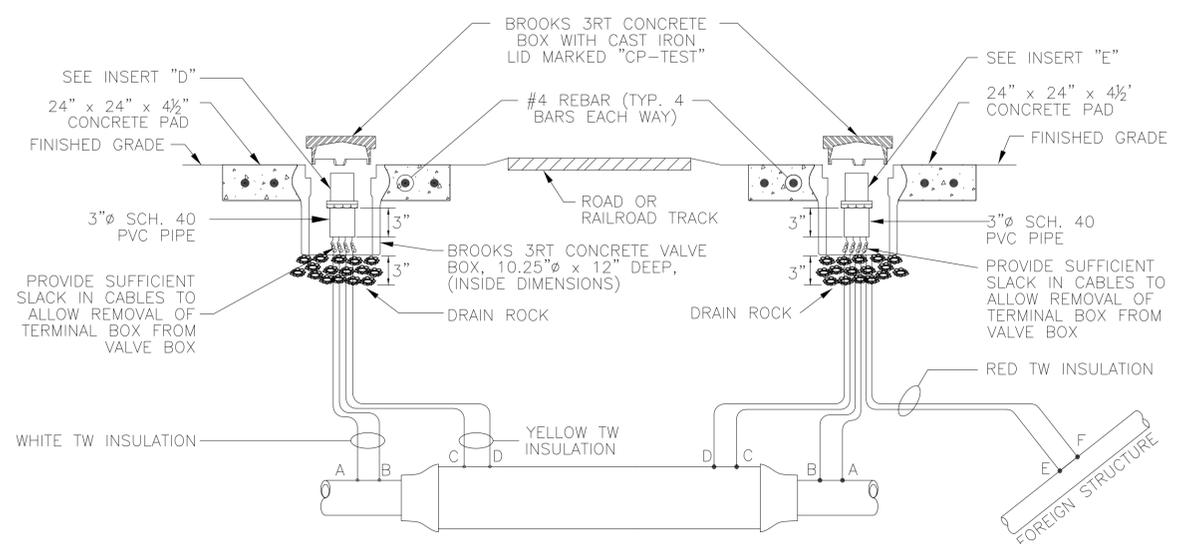
- WIRING CODE:
- * WIRES A & B ARE WHITE
 - * WIRES C, D, E & F ARE RED
 - * WIRES A, C, F ARE #12 AWG TW SOLID COPPER WIRE
 - * WIRES B, D, E ARE #6 AWG TW STRANDED COPPER WIRE
 - * RED WIRES ATTACHED TO FOREIGN OWNED PIPE
 - * WHITE WIRES ATTACHED TO NEW PIPE



- NOTES:
- FOR PARALLEL CASED CROSSINGS, INSTALL A COTTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

4 FLUSH MOUNTED CASED CROSSING TEST STATION

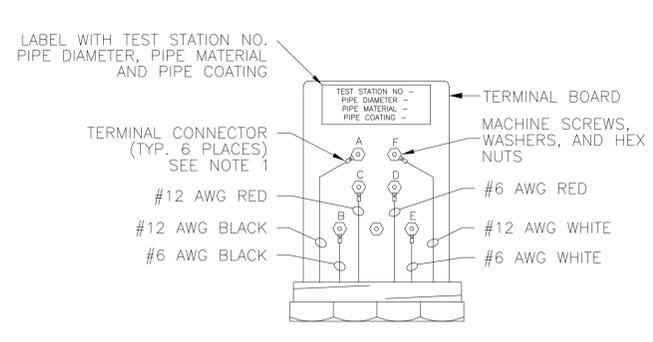
- WIRE CODING:
- * WIRES A & B ARE WHITE, WIRES C & D ARE YELLOW
 - * WIRES A & D ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
 - * WIRES B & C ARE #6 AWG TW STRANDED SINGLE CONDUCTOR
 - * YELLOW WIRES ATTACHED TO CASING
 - * WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE



- NOTES:
- TEST STATION SHALL BE MOUNTED DIRECTLY ABOVE THE NEW WATER LINE.
 - FOR MORE THAN ONE (1) FOREIGN LINE, INSTALL A COTTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

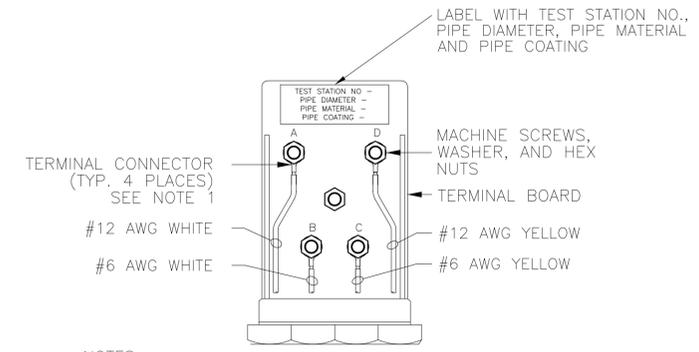
5 FLUSH MOUNTED CASED CROSSING AND FOREIGN LINE TEST STATION

- WIRE CODING:
- * WIRES A & B ARE WHITE, WIRES C & D ARE YELLOW
 - * WIRES E & F ARE RED
 - * WIRES A, C, D & F ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
 - * WIRES B & E ARE #6 AWG TW STRANDED SINGLE CONDUCTOR
 - * WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE
 - * YELLOW WIRES ATTACHED TO CASING
 - * RED WIRES ATTACHED TO FOREIGN OWNED PIPE



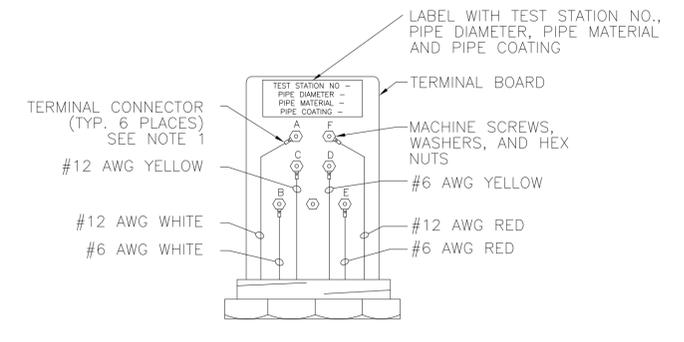
- NOTES:
- TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH 1/4\"/>
 - FOR WIRE SIZE 14-10 AWG, USE THOMAS & BETTS 54101 OR APPROVED EQUAL.
 - FOR WIRE SIZE 6 AWG, USE THOMAS & BETTS 54105 OR APPROVED EQUAL.

INSERT "C"



- NOTES:
- TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH 1/4\"/>
 - FOR WIRE SIZE 14-10 AWG, USE THOMAS & BETTS 54101 OR APPROVED EQUAL.
 - FOR WIRE SIZE 6 AWG, USE THOMAS & BETTS 54105 OR APPROVED EQUAL.

INSERT "D"



- NOTES:
- TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH 1/4\"/>
 - FOR WIRE SIZE 14-10 AWG, USE THOMAS & BETTS 54101 OR APPROVED EQUAL.
 - FOR WIRE SIZE 6 AWG, USE THOMAS & BETTS 54105 OR APPROVED EQUAL.

INSERT "E"



Surface Water Transmission Program



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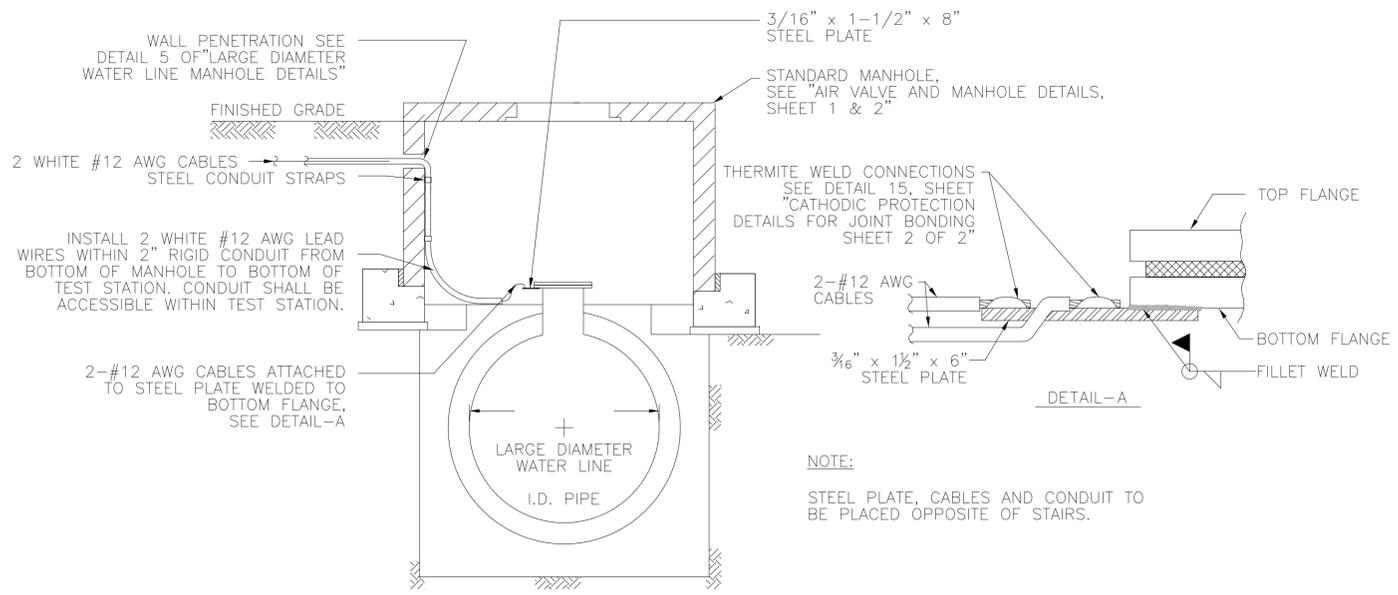
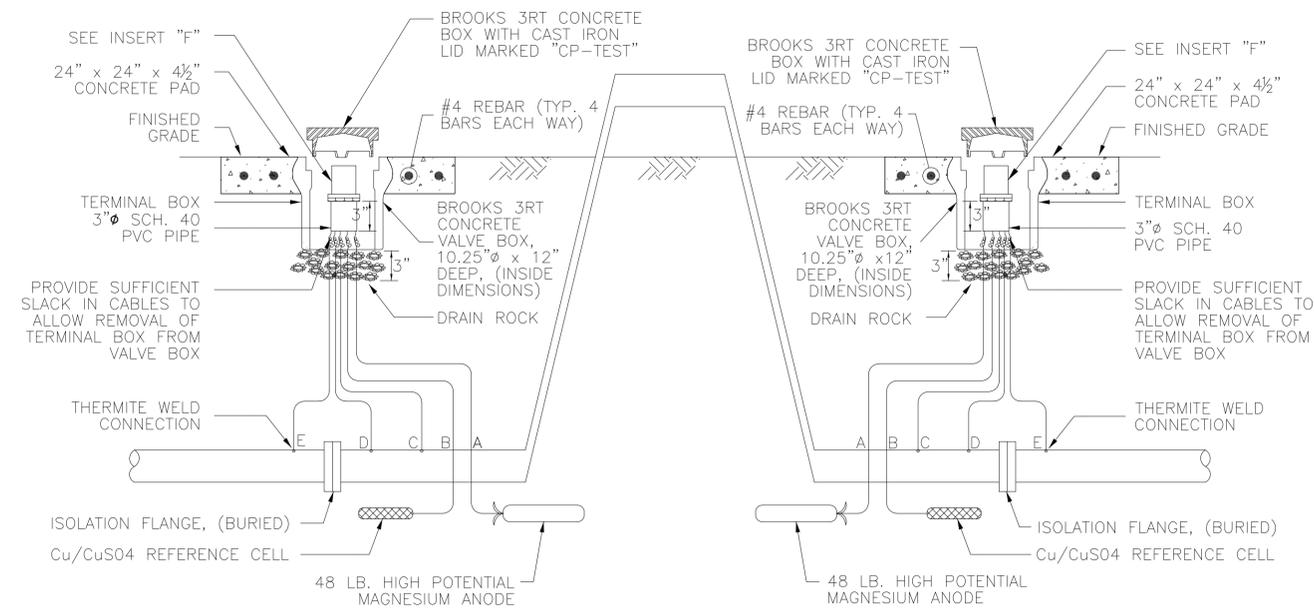
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS

(SHEET 2 OF 3)

WBS NO. S-000900-0180-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 46 OF 85	

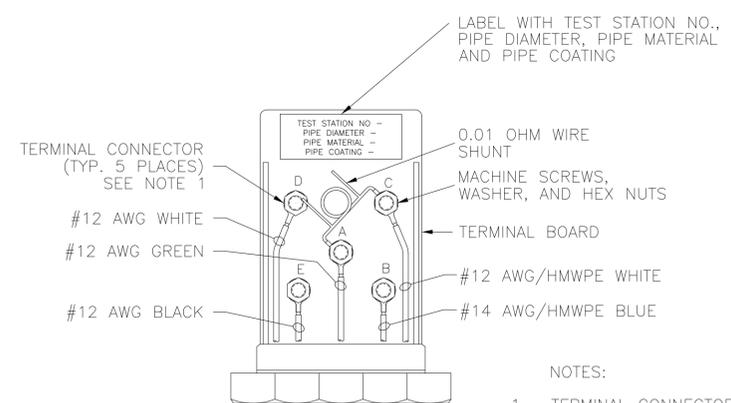
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Revisions
No.
Date



6 ABOVE GROUND CROSSING FLUSH MOUNTED FLANGE ISOLATION AND ANODE INSTALLATION TEST STATION

- WIRE CODING:
 * WIRES C & D ARE WHITE, WIRES E IS BLACK
 * WIRES D & E ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
 * WIRE C IS #12 AWG/HMWPE SOLID STRANDED SINGLE CONDUCTOR WIRE
 * WIRE A IS GREEN #12 AWG ANODE LEAD WIRE TO 48 LB. MAGNESIUM
 * WIRE B IS BLUE #14 AWG/HMWPE LEAD WIRE TO REFERENCE CELL



- NOTES:
 1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH 1/4" STUD SIZE
 - FOR WIRE SIZE 14-10 AWG, USE THOMAS & BETTS 54101 OR APPROVED EQUAL.

7 TEST STATION INSTALLATION IN MANHOLE

TEST STATION TABLE

TEST STATION	STATION NO.	BASELINE	TYPE OF TEST STATION	STRUCTURE
1				
2				
3				
4				
5*				
6				
7*				
8				
9				
10*				
11				
12*				
13				
14				
15				
16				
17				
18				
19*				
20				
21				
22*				
23				
24				
25				
26				
27				
28				
29*				
30				
31*				
32				
33				
34*				
35				
36				
37				

*Do not install these potential test stations if PCCP pipe material is installed. Sacrificial anode test stations to be installed in their place.



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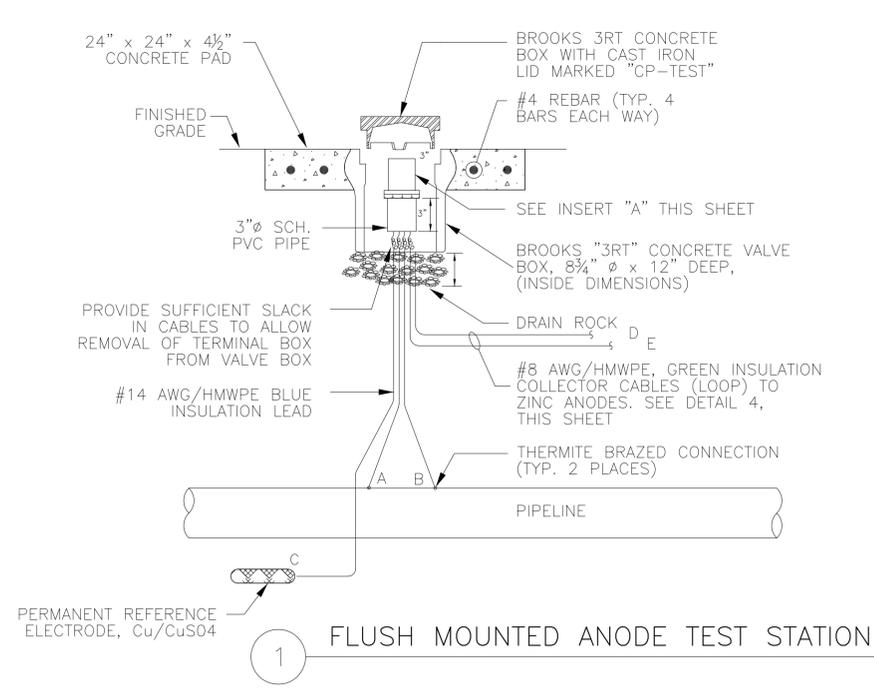
CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

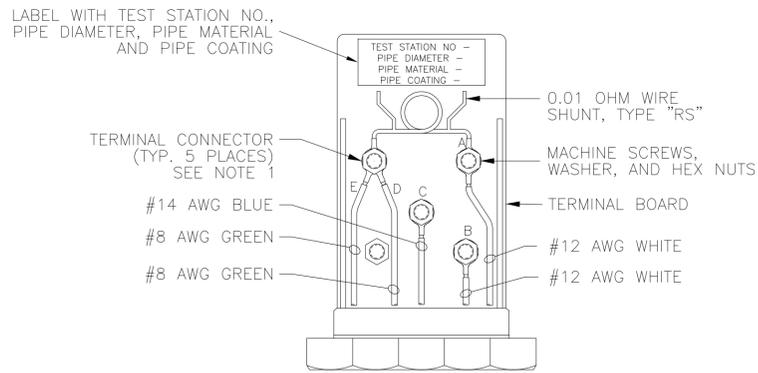
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS

(SHEET 3 OF 3)

WBS NO. S-000900-0180-4
DRAWING SCALE
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CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 47 OF 85

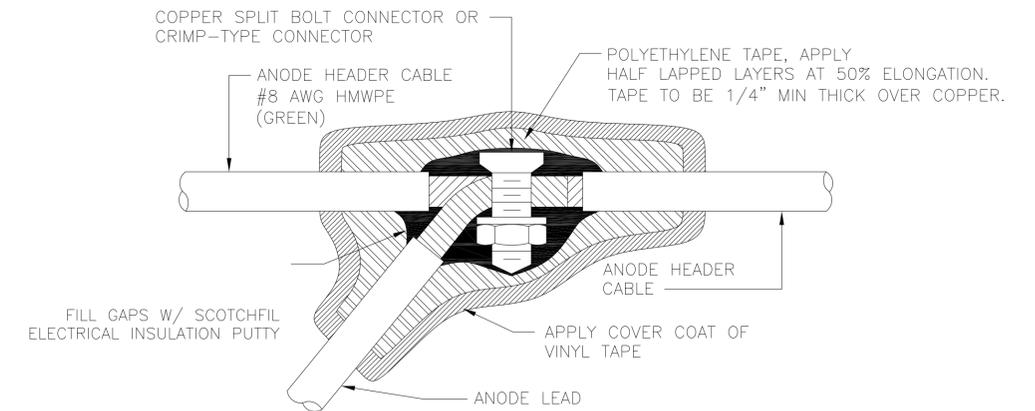


WIRE CODING:
 * WIRES A & B ARE WHITE
 * WIRES A & B ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
 * WIRE C IS BLUE #14 AWG/HMWPE LEAD WIRE TO REFERENCE ELECTRODE
 * WIRES D & E ARE GREEN #8 AWG ANODE LEAD WIRE TO ANODE GROUND BED



NOTES:
 1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH 1/4" STUD SIZE
 - FOR WIRE SIZE 14-10 AWG, USE THOMAS & BETTS 54101 OR APPROVED EQUAL.
 - FOR WIRE SIZE 8 AWG, USE THOMAS & BETTS 54130 OR APPROVED EQUAL.

INSERT "A"

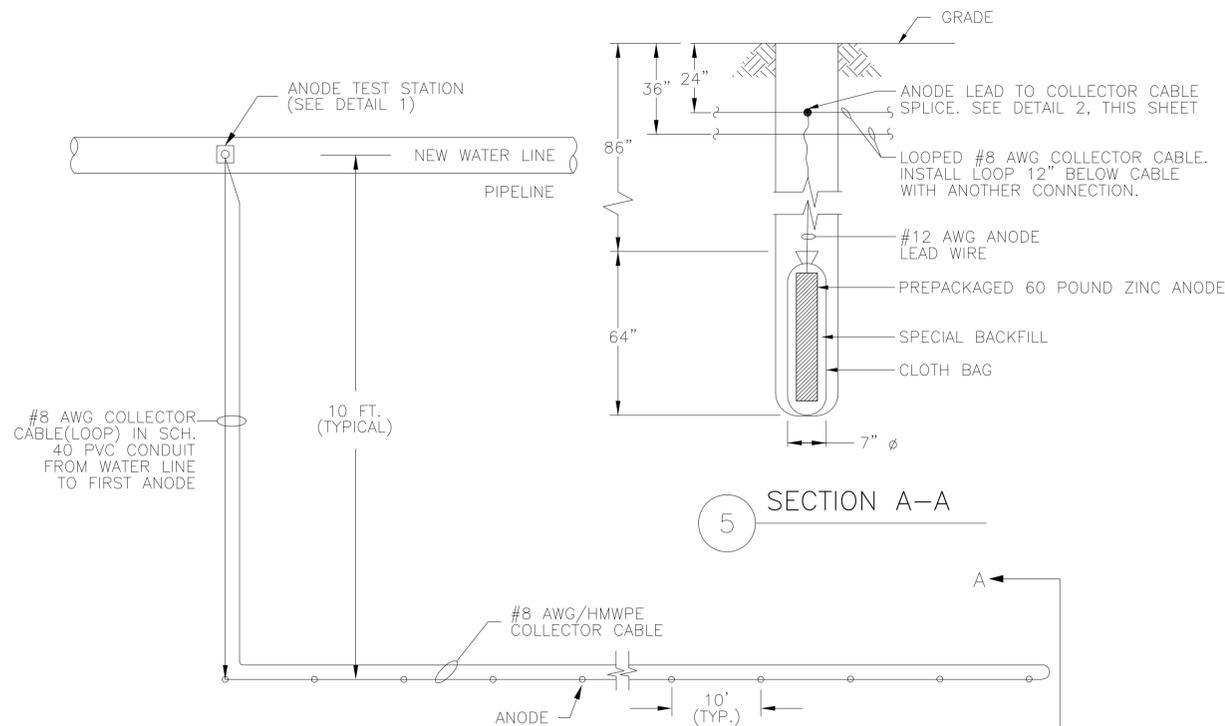


NOTES:
 1. MAKE SPLICE WATERPROOF
 A. SMOOTH ALL IRREGULAR SURFACES WITH ELECTRICAL INSULATION PUTTY.
 B. APPLY 2 LAYERS OF HALF LAPPED RUBBER SPLICING TAPE.
 C. APPLY 2 LAYERS OF HALF LAPPED VINYL ELECTRICAL TAPE.
 2. NUMBER OF WIRES MAY VARY PER SPLICE

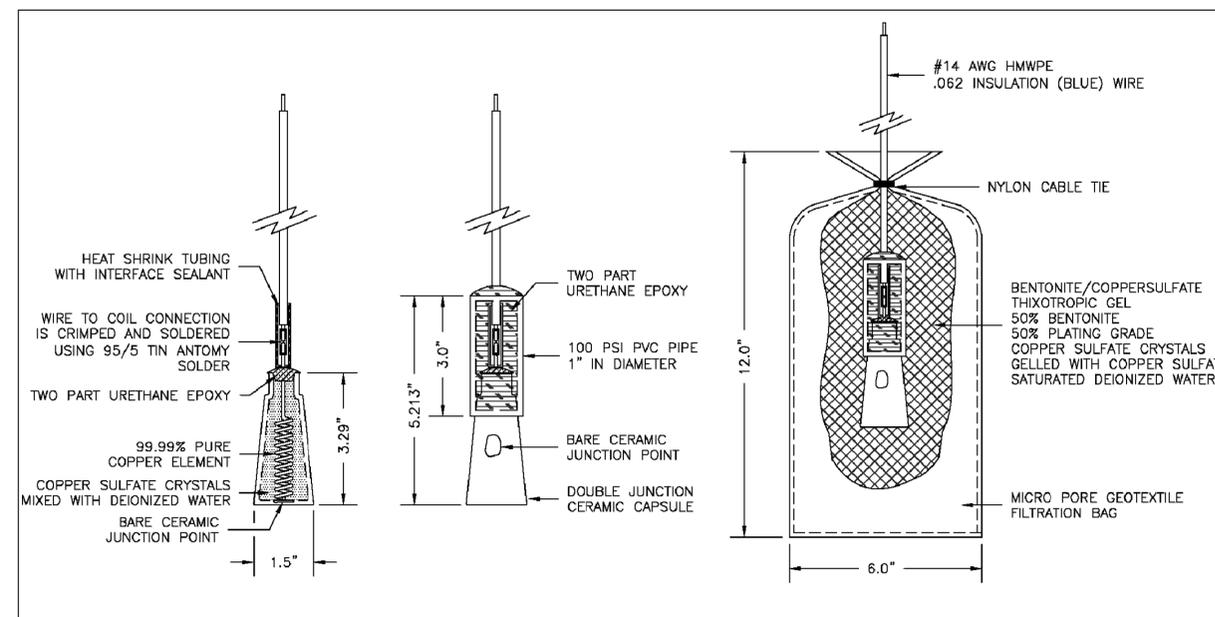
2 SPLICE DETAIL

TEST STATION	STATION NO.	BASELINE	TYPE OF TEST STATION	ANODE SPACING (FT)	NO. OF ANODES	ANODE MODEL
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

ONLY INSTALL SACRIFICIAL ANODE TEST STATIONS IF PCPP PIPE MATERIAL IS SELECTED. FOR STEEL PIPE MATERIAL CATHODIC PROTECTION METHOD, SEE "CATHODIC PROTECTION RECTIFIER AND DEEP ANODE GROUND BED" DETAILS.



4 ANODE TEST STATION PLAN
 NOTE: FOR NUMBER OF ANODES SEE TEST STATION SCHEDULE.



6 Cu/CuSO4 PERMACELL PLUS PERMANENT REFERENCE CELL



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 FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

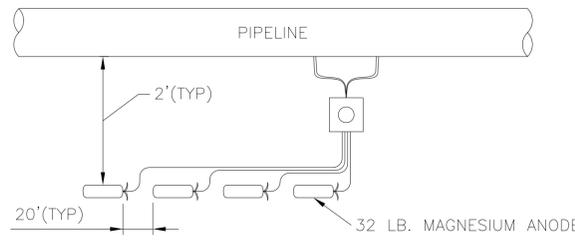
STANDARD LDWL
 CATHODIC PROTECTION DETAILS
 FOR TEST STATIONS AND ANODES

(SHEET 1 OF 2)

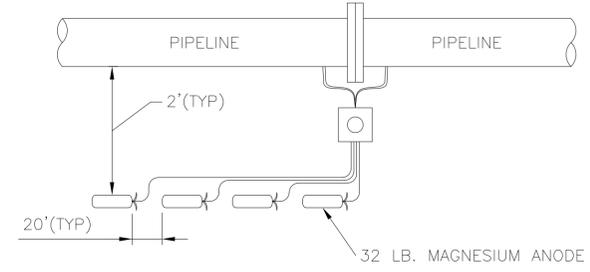
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SHEET NO. 48 OF 85

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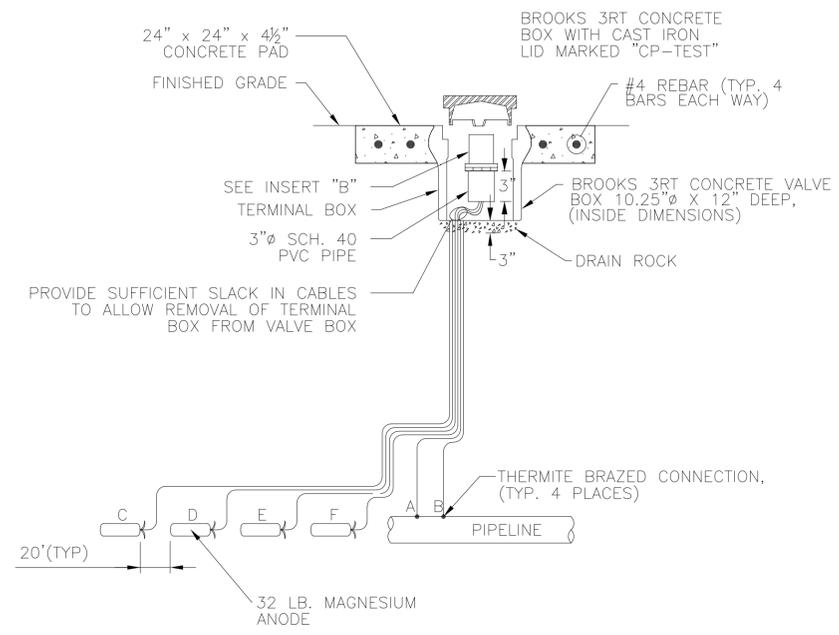
Rev.	No.	Date



FLUSH MOUNTED POTENTIAL AND ANODE TEST STATION PLAN

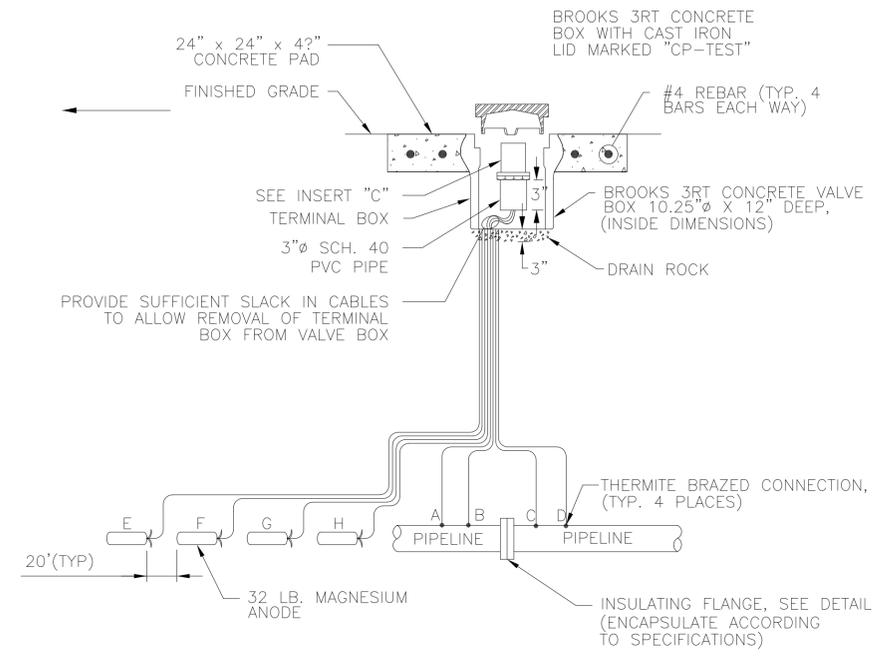


FLUSH MOUNTED FLANGE ISOLATION AND ANODE TEST STATION PLAN



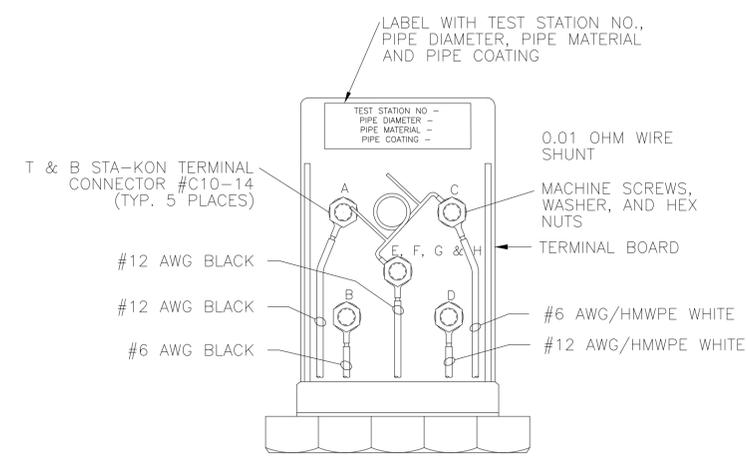
7 FLUSH MOUNTED POTENTIAL AND ANODE TEST STATION SECTION

- WIRE CODING:
 * WIRES A & B ARE WHITE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE TO NEW PIPE.
 * WIRES C, D, E, & F ARE GREEN #12 AWG ANODE LEAD WIRE TO 32 LB. MAGNESIUM ANODES.

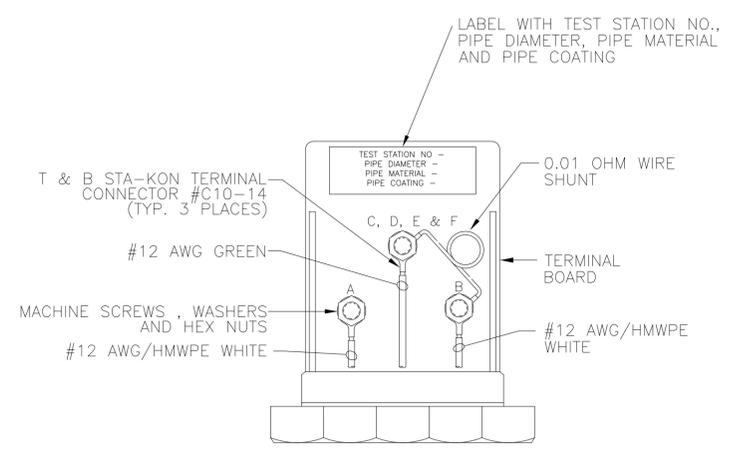


8 FLUSH MOUNTED FLANGE ISOLATION AND ANODE TEST STATION SECTION

- WIRE CODING:
 * WIRES A & B ARE BLACK, WIRES C & D ARE WHITE
 * WIRES A & D ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
 * WIRES B & C ARE #6 AWG TW STRANDED SINGLE CONDUCTOR
 * BLACK WIRES ATTACHED TO UNPROTECTED OR EXISTING PIPE
 * WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE
 * WIRES E, F, G, & H ARE GREEN #12 AWG ANODE LEAD WIRE TO 32 LB. MAGNESIUM ANODES



INSERT "B"



INSERT "C"



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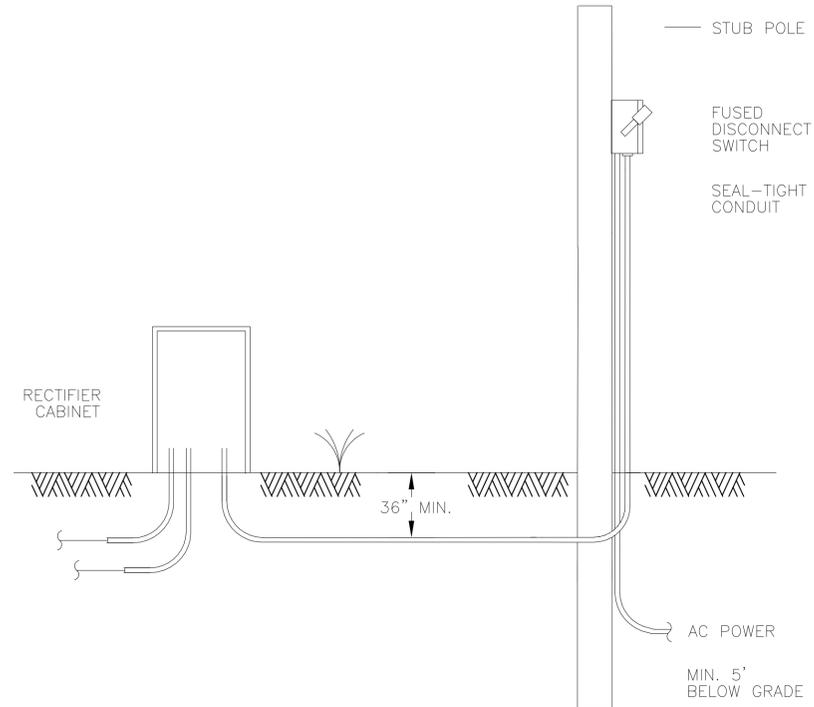
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS AND ANODES

(SHEET 2 OF 2)

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 49 OF 85

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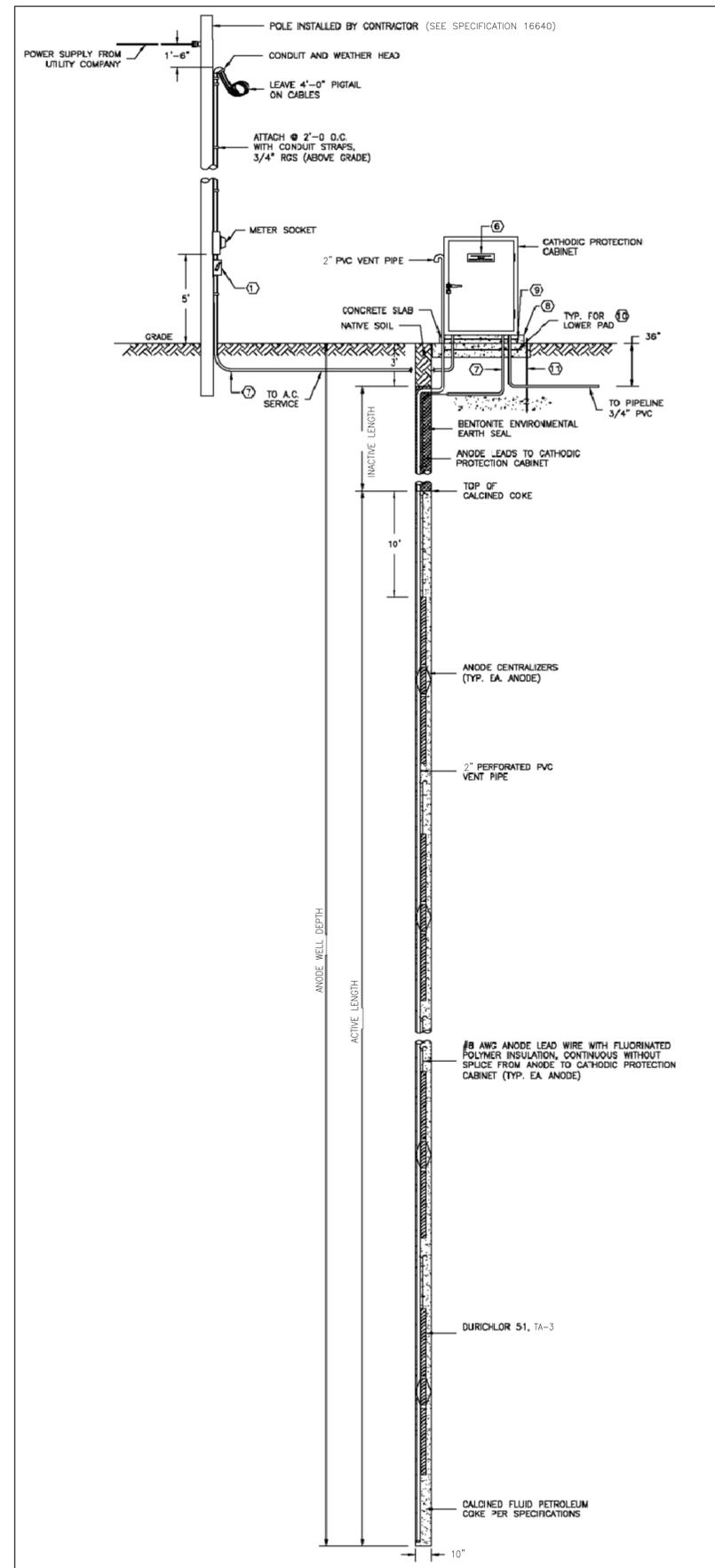


5 AC SERVICE FOR RECTIFIER
NO SCALE

RECTIFIER INFORMATION

RECTIFIER NO.	STATION NO.	BASE LINE	SIZE OF RECTIFIERS		ANODE SIZE	NO. OF ANODES	ACTIVE DEPTH	INACTIVE DEPTH	TOTAL WELL DEPTH
			VOLTS	AMPS					
1									
1									

ONLY INSTALL RECTIFIER AND DEEP ANODE GROUND BED IF STEEL PIPE MATERIAL IS SELECTED. FOR PCCP PIPE MATERIAL CATHODIC PROTECTION METHOD, SEE "CATHODIC PROTECTION DETAILS FOR TEST STATIONS AND ANODES" DETAILS.



6 TYPICAL DEEP ANODE GROUND BED AND A.C. SERVICE FOR CATHODIC PROTECTION CABINET
NO SCALE (SEE SPECIFICATION 16640 FOR DETAILS)

KEYED NOTES:

- FUSED DISCONNECT SWITCH IN A NEMA 1 ENCLOSURE WITH 1-30A FUSED DISCONNECT SWITCH.
- PLASTIC WIRING DUCT (PANDUIT OR EQUAL) 2" W. x 4" H. (MIN.) LENGTH AS REQUIRED. FURNISH WITH COVERS.
- BACK PANEL LOCATED INSIDE OF ENCLOSURE.
- ENCLOSURE: 36" W. x 48" H. x 24" D., 12 GA. TYPE 304 S.S. NEMA 4X, SINGLE DOOR, FREE STANDING, PROVISIONS TO PADLOCK UNIT, LIFTING EYES AND GROUNDING STUD ON DOOR. PROVIDE LOUVERED DOOR TO VENTILATE RECTIFIER UNIT. PROVIDE DRIP SHIELD AND INSIDE SCREEN TO REPEL INSECTS.
- PLACE STICKERS THAT READ:

"DANGER
HIGH VOLTAGE
KEEP OUT"

ON ALL FOUR SIDES AND TOP OF ENCLOSURE.
- PROVIDE PERMANENT ENGRAVED NAME PLATE (BLACK LETTERS ON WHITE BACKGROUND) THAT READS: "CATHODIC PROTECTION CABINET, PROPERTY OF CITY OF HOUSTON, IN CASE OF EMERGENCY CALL 311"
- MAKE TRANSITION FROM PVC CONDUIT (UNDERGROUND TO RGS CONDUIT) ABOVE GROUND.
- COORDINATE SIZE OF CONCRETE PAD WITH SIZE OF CABINET. THE CONCRETE PEDESTAL THAT THE CABINET RESTS ON TO BE 3" WIDER THAN THE CABINET ON ALL SIDES.
- #4 GRADE 60 REBAR @12" OC BOTH WAYS.
- #5 GRADE 60 REBAR @12" OC BOTH WAYS.
- 3/4" x 10' GROUND ROD AND #6 COPPER GROUND CABLE.



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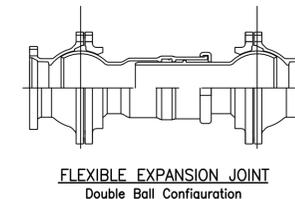
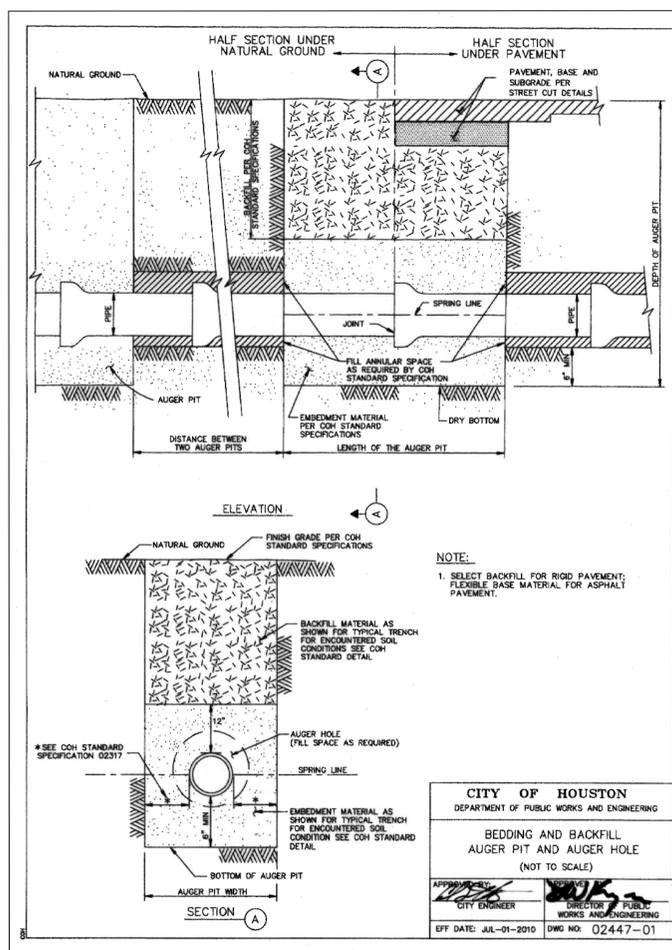
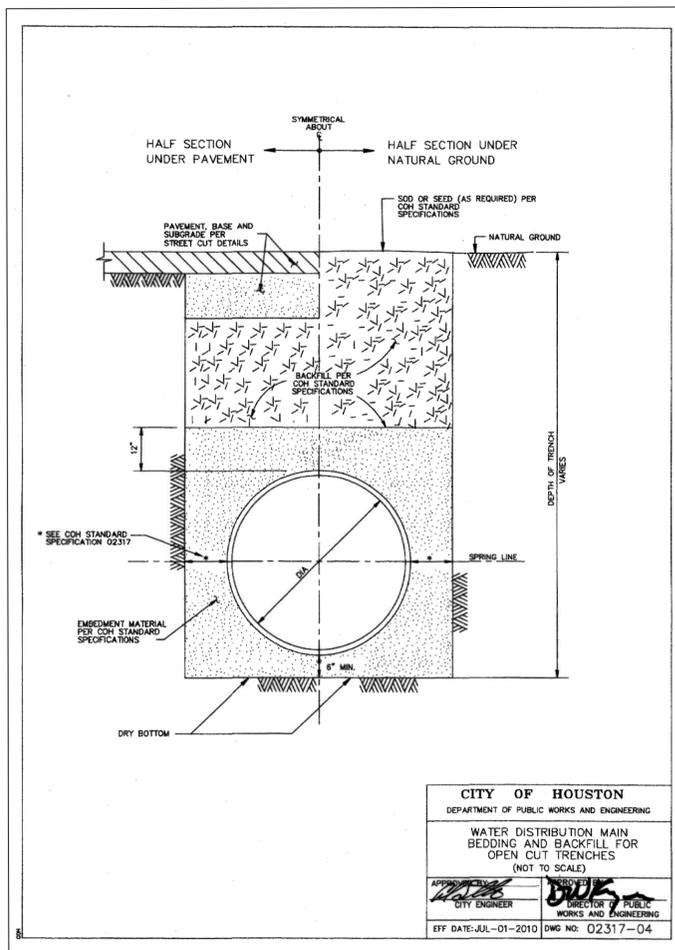
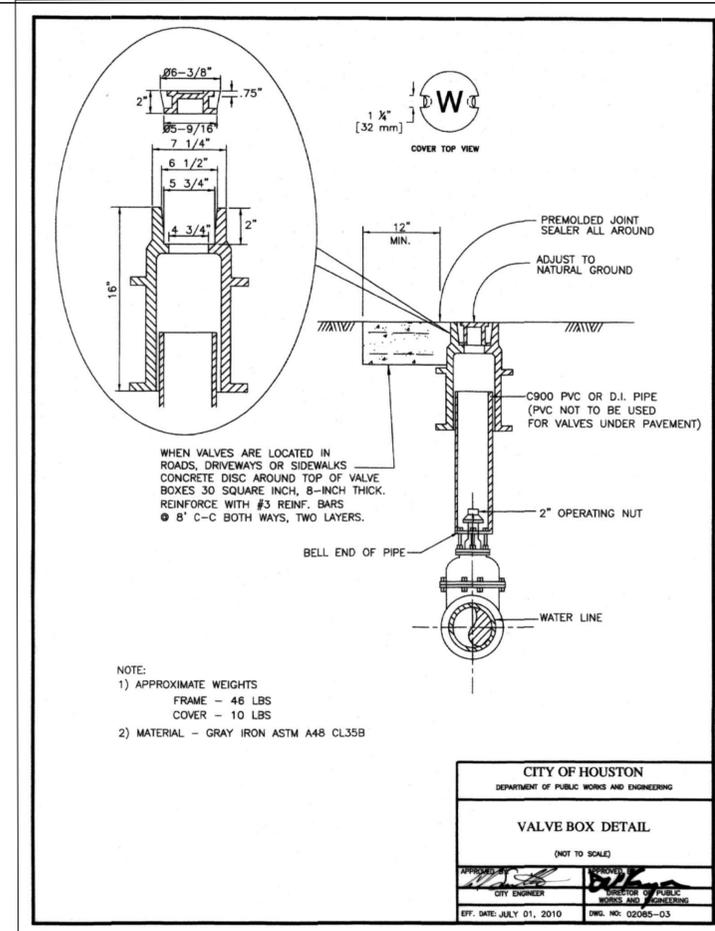
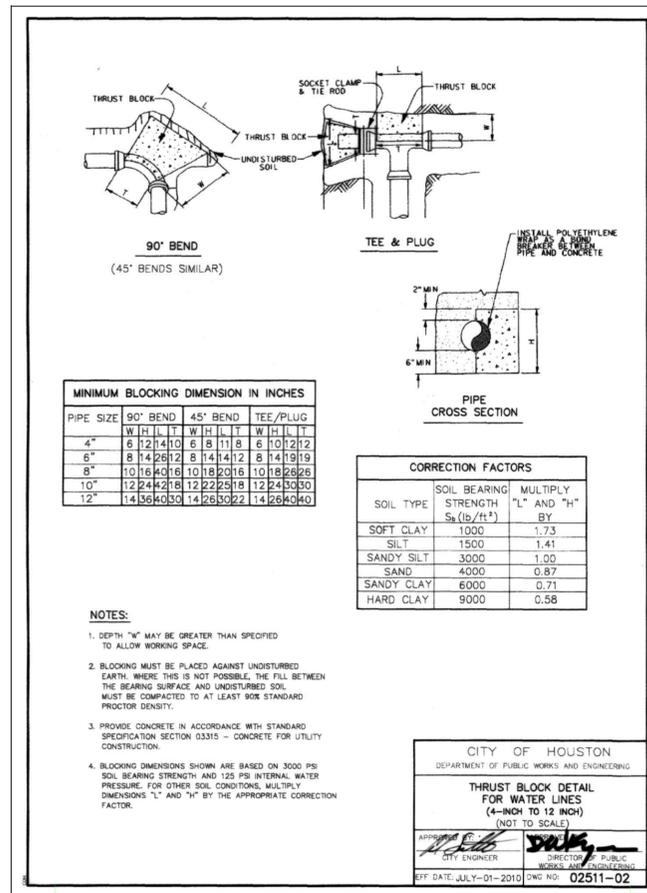
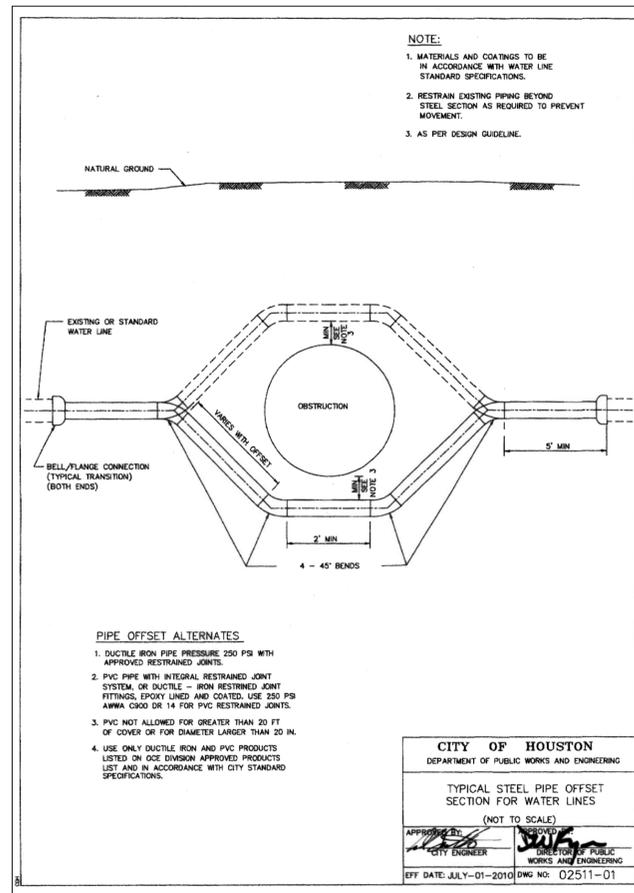
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

STANDARD LDWL
CATHODIC PROTECTION RECTIFIER
AND DEEP ANODE GROUND BED

(SHEET 2 OF 2)

WBS NO. S-000900-0180-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 51 OF 85



Model: EBAA Iron, Inc., Flex-Tend # 412M20 OR Approved Equivalent

FLEXIBLE EXPANSION JOINT SPECIFICATIONS

1. Flexible expansion joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53. Foundry of material shall be readily available upon request.
2. Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 350 psi (250 psi for flexible expansion joints 2 inch and 30 inches diameter and larger). A minimum 2:1 safety factor, determined from the published pressure rating, shall apply. Factor Mutual Approval for the 3 inch through 12 inch sizes is required.
3. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of 20" for 2" - 12", 15" for 14" - 36", 12" for 48" and 4 inch minimum expansion. Additional expansion sleeves shall be available and easily added or removed at the factory or in the field. Both standardized mechanical joint and flange end connections shall be available.
4. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating and gaskets shall meet ANSI/NSF-61.
5. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.
6. Appropriately sized polyethylene sleeves, meeting ANSI/AWWA C105/A21.5, shall be included for direct buried applications.



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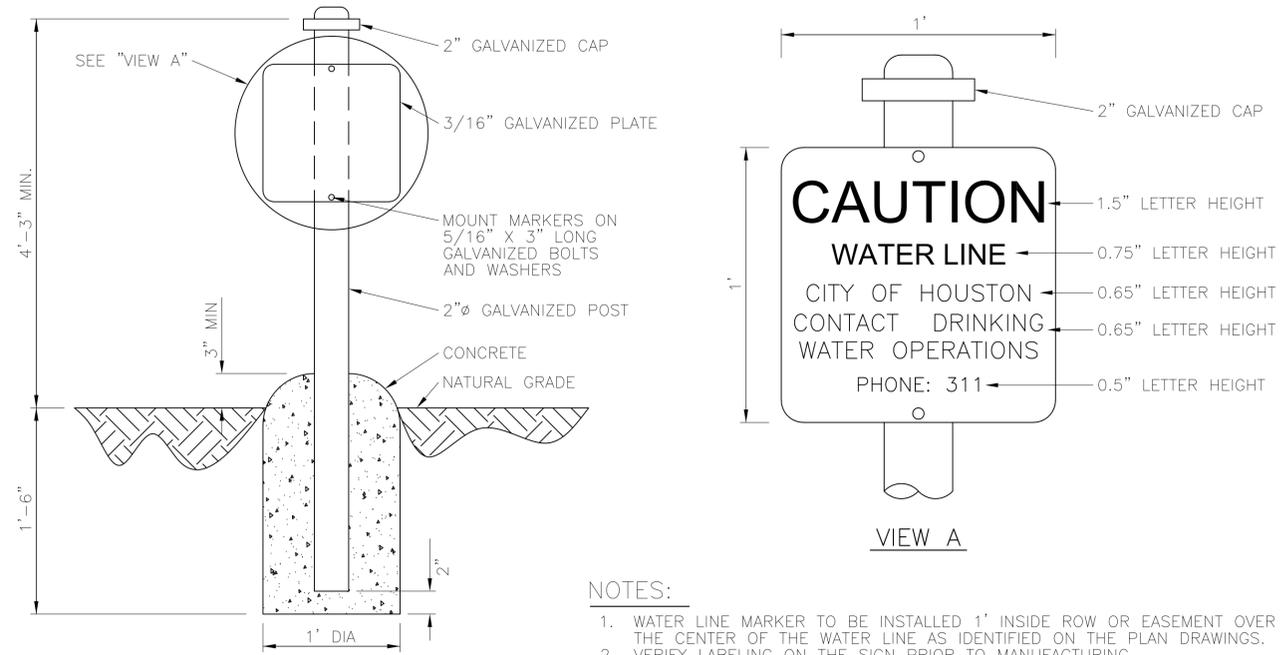
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD SMALL DIAMETER WATER LINE DETAILS

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 52 OF 85

App.	
Rev.	
Doc.	
No.	

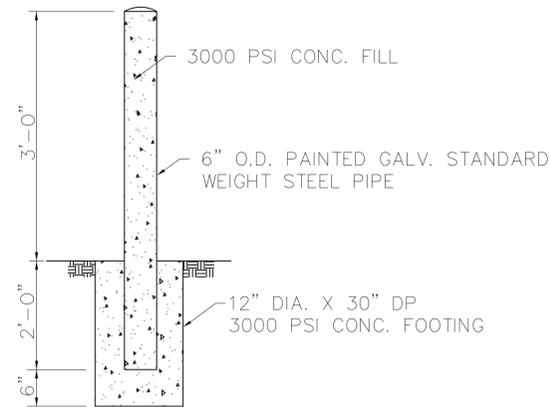


- NOTES:
1. WATER LINE MARKER TO BE INSTALLED 1' INSIDE ROW OR EASEMENT OVER THE CENTER OF THE WATER LINE AS IDENTIFIED ON THE PLAN DRAWINGS.
 2. VERIFY LABELING ON THE SIGN PRIOR TO MANUFACTURING
 3. SIGN TO BE BLUE BACKGROUND WITH BLACK LETTERING. USE BAKED ENAMEL PAINT.

1 WATER LINE MARKER INSTALLATION
NOT TO SCALE

NOTES ON FIXED BOLLARDS:

1. ALL METAL MEMBERS TO RECEIVE PRIMER COATING AFTER FABRICATION.
2. ALL EXPOSED METAL SURFACES OF ASSEMBLY TO RECEIVE TWO COATS OF YELLOW PAINT.
3. DIMENSIONS SHOWN ARE FINISHED, INCLUDING REQUIRED PRIMER AND PAINT COATINGS.



2 FIXED BOLLARD DETAIL
NOT TO SCALE



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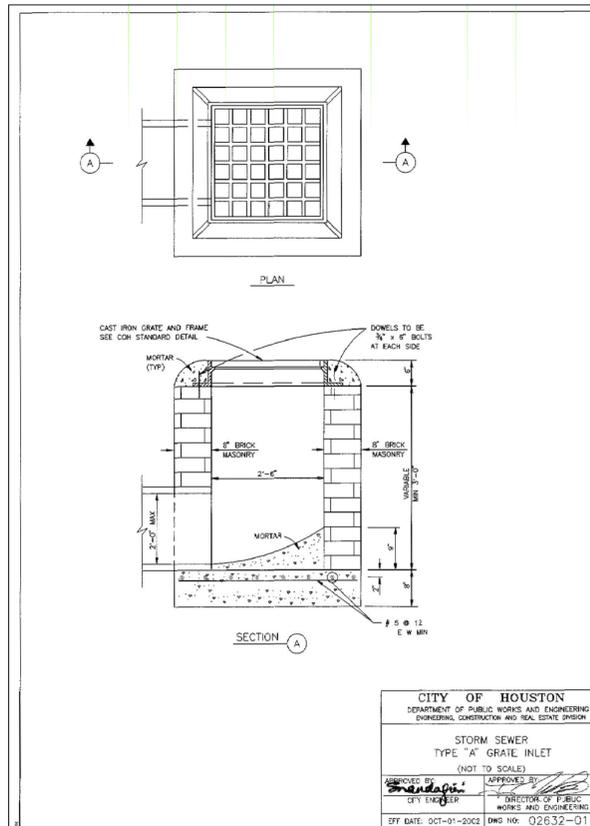
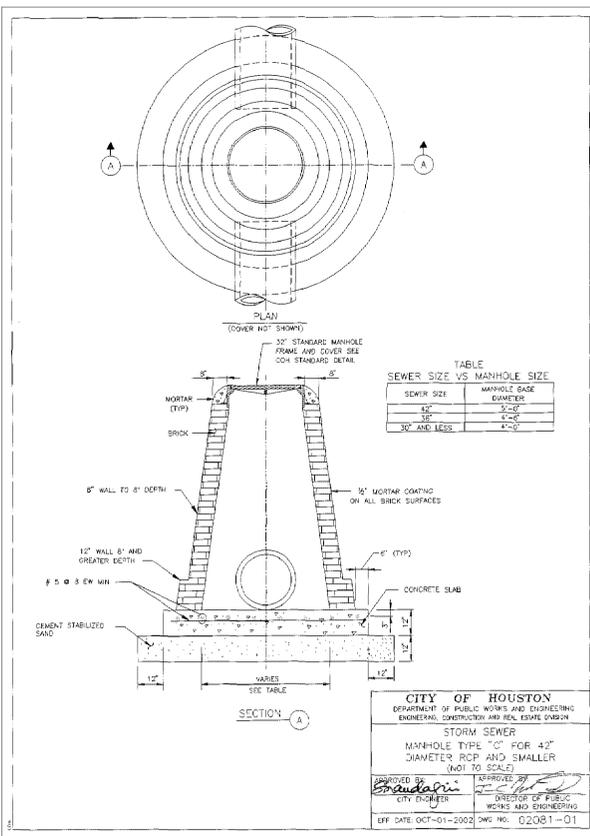
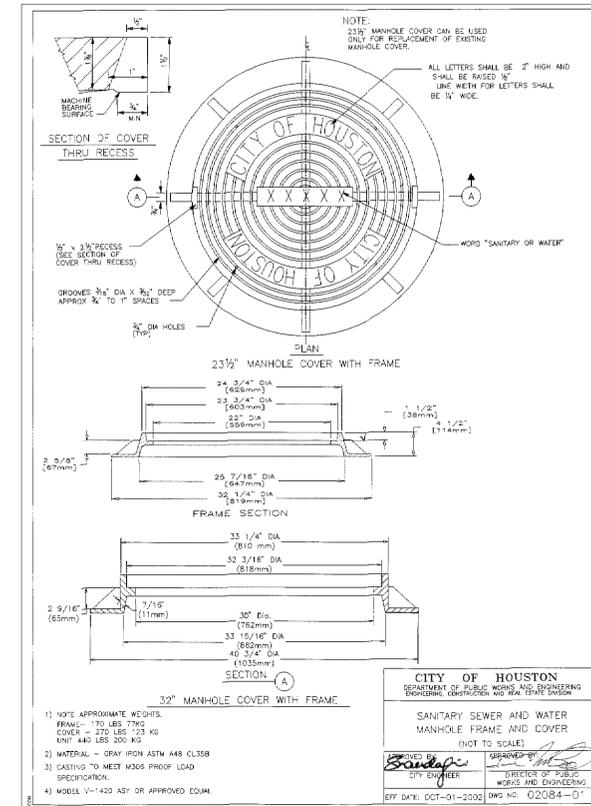
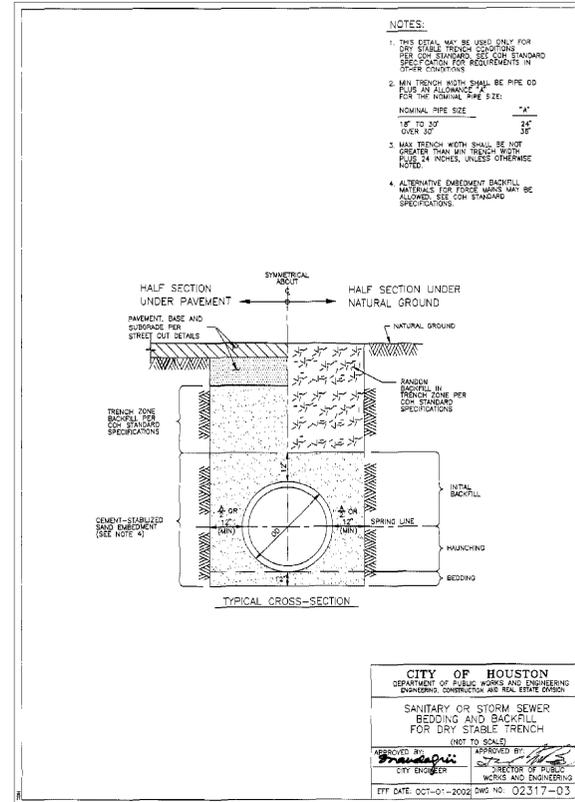
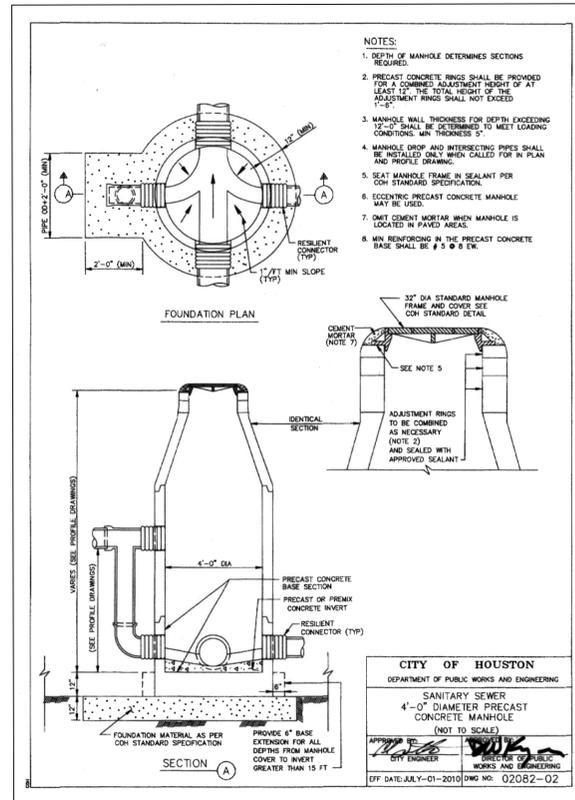
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

MISCELLANEOUS
WATER LINE AND
SITE DETAILS

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 53 OF 85

No.	Date	Revisions



SUTP
Surface Water Transmission Program

KUO & associates
Consulting Engineers & Surveyors
10300 Westoffice Dr., Ste 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920
www.kuoassociates.com
Texas Firm Registration No. F-4578
TBPLS Firm Registration No. 10075600

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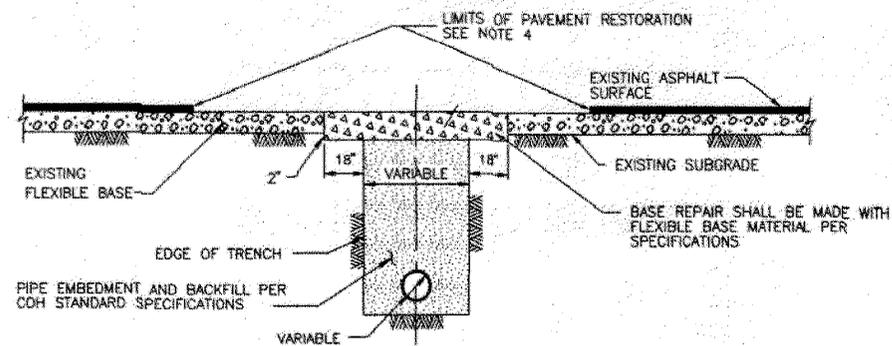
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

MISCELLANEOUS SANITARY SEWER AND STORM SEWER DETAILS

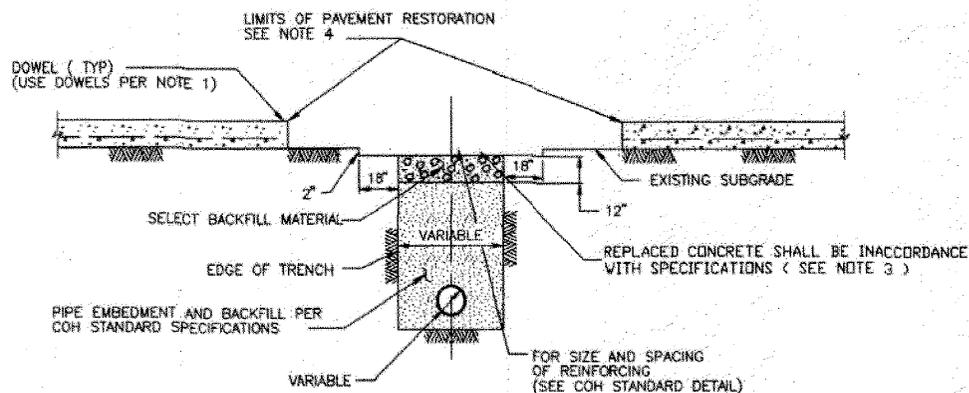
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CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 54 OF 85	

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 Plotter: HP DesignJet 2400

No.	Date	Revisions



SECTION A
REPAIR OF FLEXIBLE BASE PAVEMENT

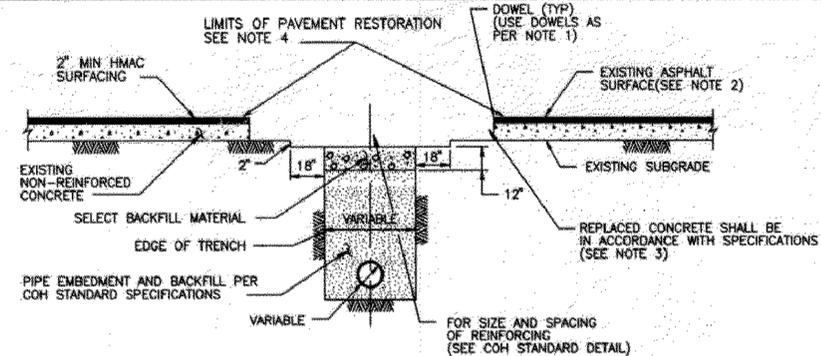


SECTION B
REPAIR OF REINFORCED CONCRETE PAVEMENT

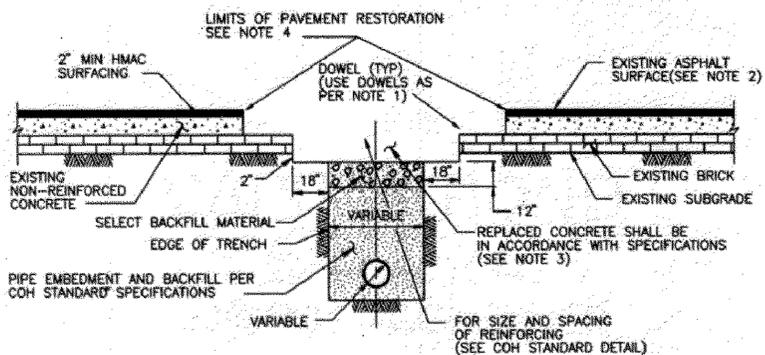
NOTE:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE # 6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH 2" MIN HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENTS.
4. REFER TO STANDARD DETAIL 02951-01 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
PAVEMENT REPAIR DETAILS FOR STREET CUTS (NOT TO SCALE)	
APPROVED BY: <i>S. Audapuri</i> CITY ENGINEER	APPROVED BY: <i>[Signature]</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02902-01



SECTION C
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT



SECTION D
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT WITH BRICK

NOTE:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE # 6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED REPLACE WITH SAME THICKNESS OF HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENT
4. REFER TO STANDARD DETAIL 02951-01 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
PAVEMENT REPAIR DETAILS FOR STREET CUTS NON REINFORCED CONCRETE AND BRICK PAVEMENT (NOT TO SCALE)	
APPROVED BY: <i>S. Audapuri</i> CITY ENGINEER	APPROVED BY: <i>[Signature]</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02902-02



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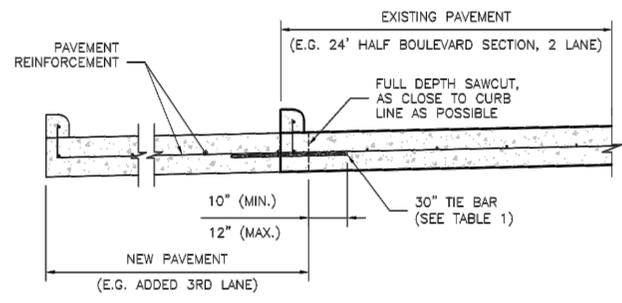
CITY OF HOUSTON
 HOUSTON PUBLIC WORKS
 24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

PAVEMENT REPAIR DETAILS

WBS NO.
 S-000900-0180-4
 DRAWING SCALE
 NOT TO SCALE
 CITY OF HOUSTON PM
 ADAM SABZEVARI
 SHEET NO. 55 OF 85

No.	Date	Revisions

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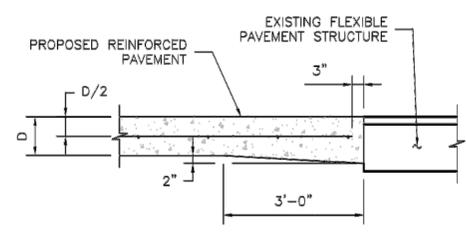


TYPICAL CONCRETE ROADWAY WIDENING DETAIL
SCALE: 1" = 1'-0"

TABLE 1 (CONSTRUCTION JOINT TIE BARS)

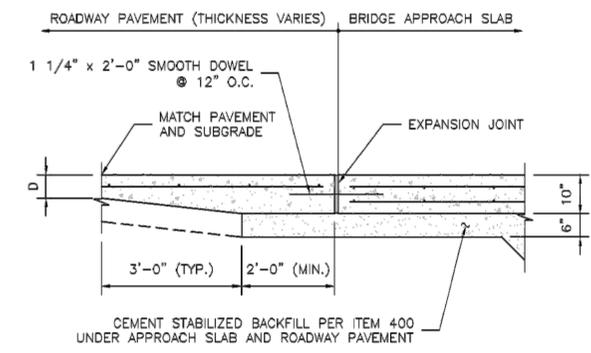
TIE BAR SIZE	PAVEMENT DEPTH
#5 BAR	7" AND LESS
#6 BAR	GREATER THAN 7"

TIE BAR SHALL BE DRILLED INTO EXISTING PAVEMENT (MIN. 10", MAX. 12") AND EPOXIED. (SEE ITEM 361)

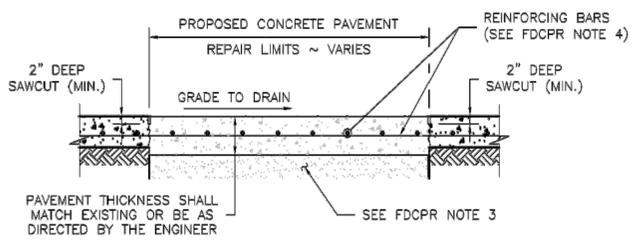


TYPICAL PAVING HEADER
SCALE: 1" = 1'-6"

- NOTES FOR PAVING HEADER:**
- ADDITIONAL CONCRETE FOR PAVING HEADER SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.
 - DISTURBED MATERIAL IN THE FLEXIBLE PAVEMENT WILL BE BACKFILLED WITH ASPHALT CONCRETE PAVEMENT (ACP). THE ACP WILL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.

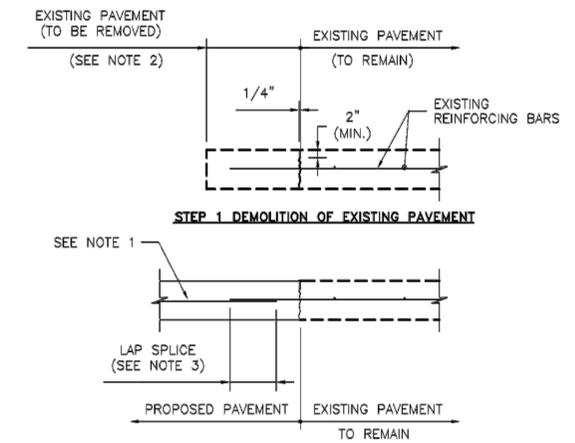


TYPICAL SECTION PAVING TIE-IN TO BRIDGE APPROACH SLAB
SCALE: 1" = 1'-6"



FULL DEPTH CONCRETE PAVEMENT REPAIR
HORIZONTAL SCALE: 1" = 3'-0"
VERTICAL SCALE: 1" = 1'-6"

- FULL DEPTH CONCRETE PAVEMENT REPAIR (FDCPR) NOTES:**
- SAWCUT LIMITS SHALL BE AS DIRECTED BY ENGINEER.
 - EXISTING CONCRETE VERTICAL FACES SHALL BE CLEANED OF ALL DELETERIOUS LOOSE MATERIAL PRIOR TO CONCRETE PLACEMENT.
 - FOR REPAIR/REPLACE AREAS, A 6 INCH DEPTH BASE SHALL BE REMOVED AND REPLACED WITH CEMENT STABILIZED BEDDING AND BACKFILL PER ITEM 400.
 - REINFORCEMENT FOR PAVEMENT 7" THICK AND LESS SHALL BE NO. 4 BARS AT 18" SPACING IN EACH DIRECTION. REINFORCEMENT FOR PAVEMENT GREATER THAN 7" THICK SHALL BE NO. 5 BARS AT 18" IN EACH DIRECTION.
 - ALTERNATIVELY, THE CONTRACTOR MAY CHOOSE TO USE FULL DEPTH SAWCUT WITH DRILLED IN TIE BARS (AS SHOWN ON THE "TYPICAL CONCRETE ROADWAY WIDENING DETAIL" DRAWING). IF THE CONTRACTOR SO CHOOSES, THE SAWCUTTING AND TIE BARS WILL BE AT HIS OWN EXPENSE (THESE ITEMS WILL ONLY BE PAID FOR IF HARRIS COUNTY REQUIRES THE FULL DEPTH SAWCUT AND TIE BARS).



CONCRETE TO CONCRETE STANDARD PAVEMENT TIE-IN
SCALE: 1" = 1'-6"

- NOTES FOR STANDARD PAVEMENT TIE-IN:**
- REINFORCING CENTERED IN PROPOSED PAVEMENT, 3" CLEAR AT EDGES.
 - SAWCUT 2" DEEP MINIMUM AND REMOVE 2'-0" EXISTING PAVEMENT OR PAVEMENT WITH CURB. EXPOSE AND CLEAN EXISTING REINFORCING.
 - 24 BAR DIAMETER LAP SPLICE OR WELD, IF DIRECTED.
 - IF NO EXPOSED REINFORCING STEEL EXISTS, HORIZONTAL TIE BARS SHALL BE GRADE 60, 30" LONG DRILLED AND EMBEDDED 15" INTO THE CENTER OF THE EXISTING CONCRETE SLAB WITH EPOXY OR APPROVED EQUAL. SIZE OF TIE BARS SHALL CONFORM TO TABLE 1. TIE BARS SHALL BE PLACED 24" CENTER TO CENTER.
 - ALTERNATIVELY, THE CONTRACTOR MAY CHOOSE TO USE FULL DEPTH SAWCUT WITH DRILLED IN TIE BARS (AS SHOWN IN THE "TYPICAL CONCRETE ROADWAY WIDENING DETAIL" ON THIS SHEET. IF THE CONTRACTOR SO CHOOSES, THE SAWCUTTING AND TIE BARS WILL BE AT HIS OWN EXPENSE (THESE ITEMS WILL ONLY BE PAID FOR IF HARRIS COUNTY REQUIRES THE FULL DEPTH SAWCUT AND TIE BARS).

NO.	REVISIONS	DATE	NAME
▲			
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HARRIS COUNTY ENGINEERING DEPARTMENT

FOR INTERIM REVIEW ONLY	PROJECT TITLE:	CIVIL STANDARD
DOCUMENT INCOMPLETE. NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES	SHEET DESCRIPTION:	CP-13
ENGINEER: NAME	DRAWN BY:	DATE:
P.E. SERIAL No. NUMBER	JDZ	10/10/23
DATE: / /	PK'D BY:	SHEET NO.:
	PDG	AS NOTED



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HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

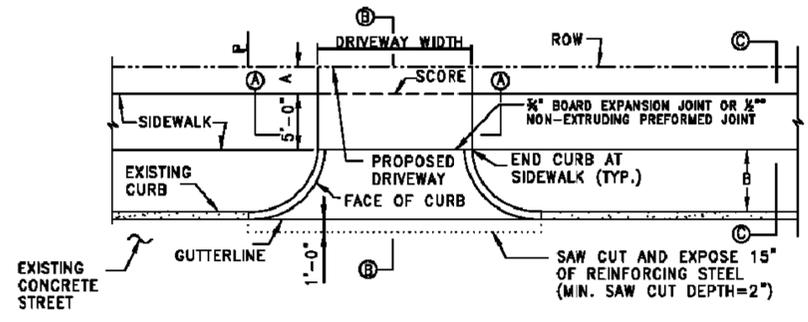
HARRIS COUNTY PAVEMENT REPAIR DETAILS

WBS NO. S-000900-0180-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 56 OF 85

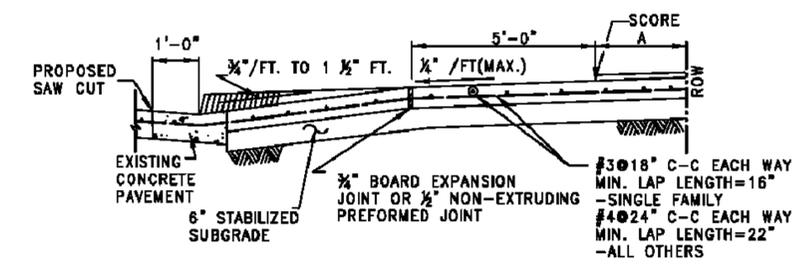
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No.	Date	Revisions

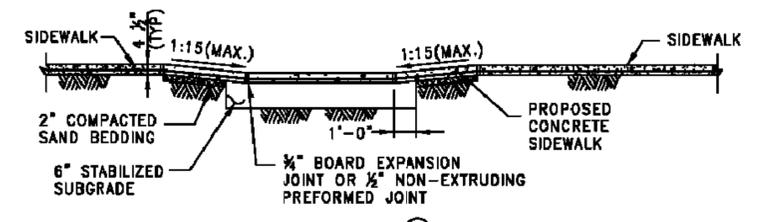
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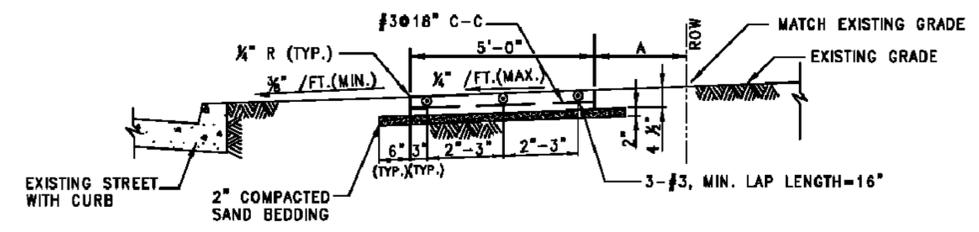
PLAN VIEW - DRIVEWAY
NTS



**SECTION (B)
TYPICAL DRIVEWAY SECTION**
NTS



**SECTION (A)
PROPOSED SIDEWALK THROUGH DRIVEWAY
WITH EXCESSIVE ELEVATION DIFFERENCE
WITH EXISTING SIDEWALK**
NTS



**SECTION (C)
TYPICAL SIDEWALK SECTION**
NTS

NOTES

- IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FEET SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4- FEET WIDE SIDEWALK.
- DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY USE AND 7" THICK FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)
- DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5-1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
- 6X6-W2.9 X W2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL.
- EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALKS SHALL BE ACCORDING TO DRAWING NO. 02752-02.
- REFER CHAPTER 10 DESIGN REQUIREMENTS FOR A AND B.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

DRIVEWAY DETAIL
WITH 6" CURBED STREETS

(NOT TO SCALE)

APPROVED BY: <i>Robert Hoeth</i> CITY ENGINEER	APPROVED BY: <i>Daniel Mancetta</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2009	DWG NO: 02754-01B



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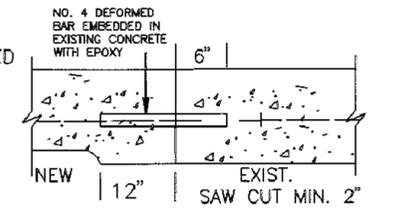
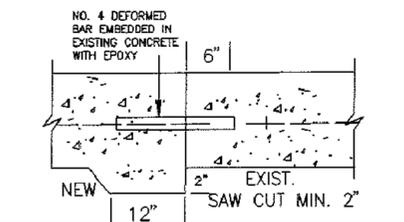
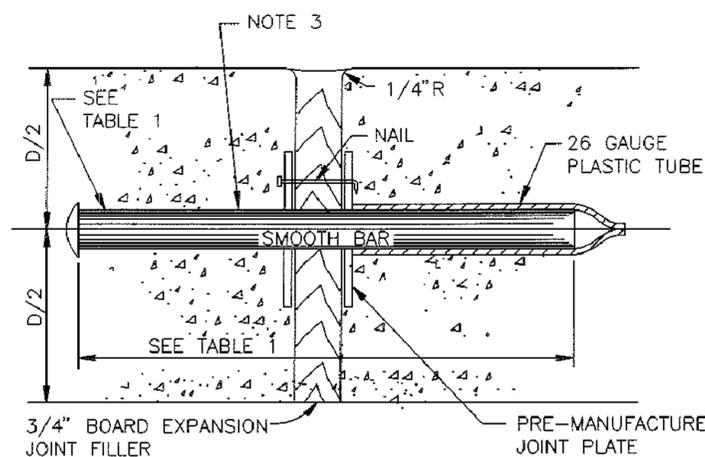
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD
DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

DRIVEWAY DETAILS

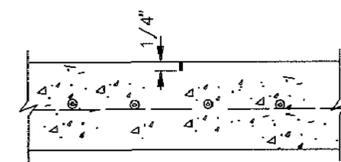
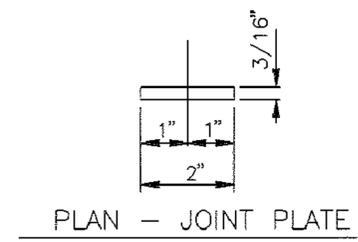
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DRAWING SCALE	
CITY OF HOUSTON PM	
GEORGE HABIB, P.E.	
SHEET NO. 57 OF 84	

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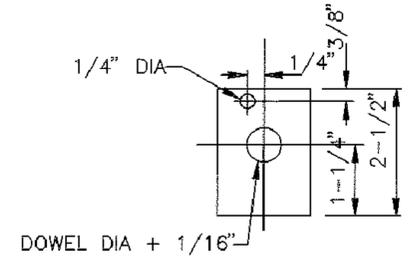


SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S.

SECTION
SIDEWALK TO EXISTING DRIVEWAY
N.T.S.



SECTION
CONTROL JOINT
N.T.S.



ELEVATION - JOINT PLATE
N.T.S.

- NOTES:
1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
 2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 36' FEET. MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5' FEET.
 3. CENTER DOWEL HORIZONTALLY ON JOINT.
 4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN 2" MIN. COVER.

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

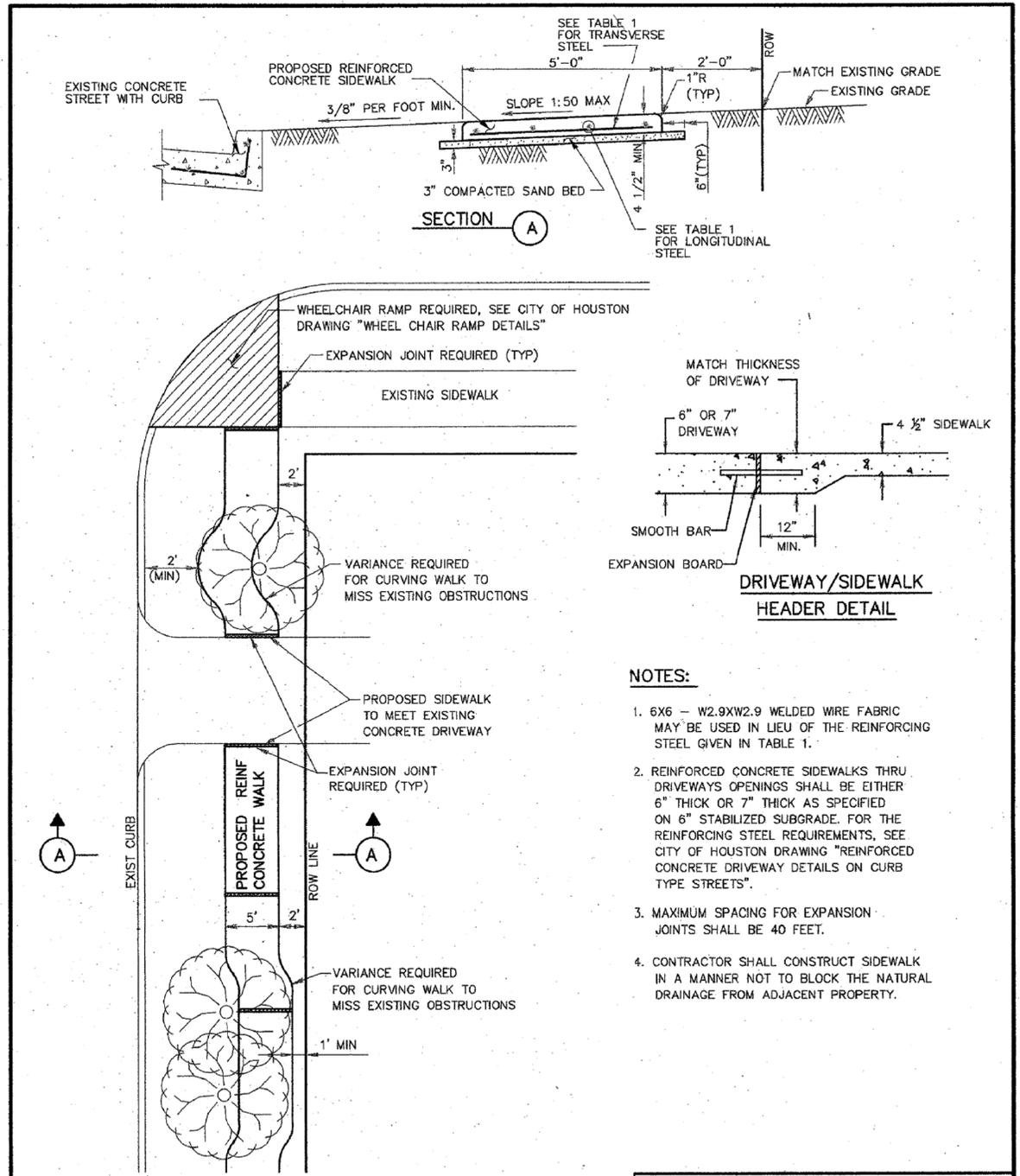
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)

APPROVED BY: *S. Brandagrin* CITY ENGINEER

APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 DWG NO: 02752-02



- NOTES:
1. 6X6 - W2.9XW2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL GIVEN IN TABLE 1.
 2. REINFORCED CONCRETE SIDEWALKS THRU DRIVEWAYS OPENINGS SHALL BE EITHER 6" THICK OR 7" THICK AS SPECIFIED ON 6" STABILIZED SUBGRADE. FOR THE REINFORCING STEEL REQUIREMENTS, SEE CITY OF HOUSTON DRAWING "REINFORCED CONCRETE DRIVEWAY DETAILS ON CURB TYPE STREETS".
 3. MAXIMUM SPACING FOR EXPANSION JOINTS SHALL BE 40 FEET.
 4. CONTRACTOR SHALL CONSTRUCT SIDEWALK IN A MANNER NOT TO BLOCK THE NATURAL DRAINAGE FROM ADJACENT PROPERTY.

TABLE 1
REINFORCING STEEL INFORMATION
FOR 4 1/2" THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
f'c = 3,000 PSI AND fy = 60,000 PSI

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL # 3 BARS			TRANSVERSE STEEL # 3 BARS SPACING (IN)
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONCRETE SIDEWALK DETAILS FOR STREETS WITH CURBS
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER

APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 DWG NO: 02775-01



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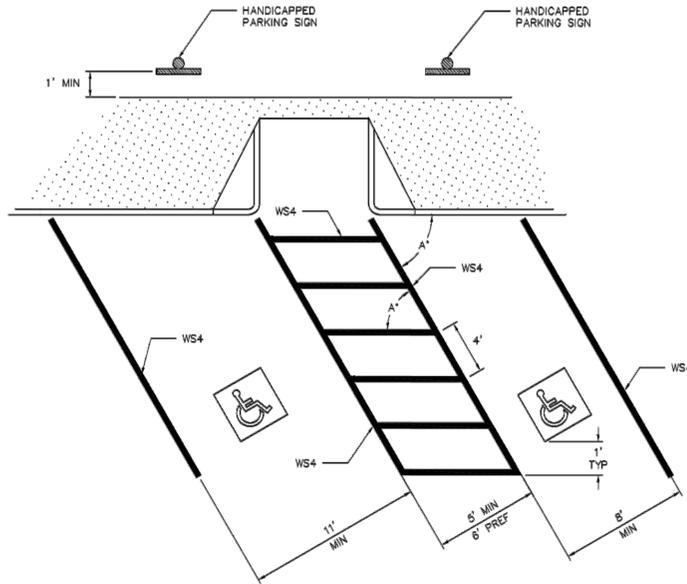
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

SIDEWALK DETAILS

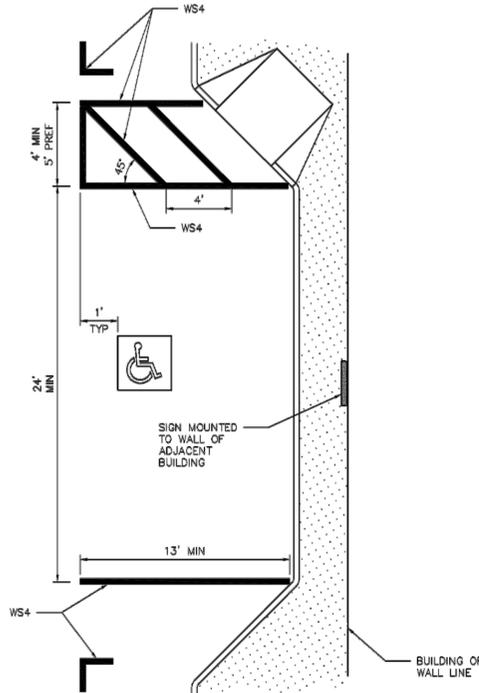
WBS NO. S-000900-0180-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 58 OF 85

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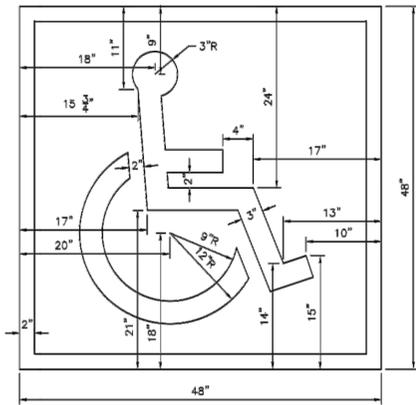
TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS



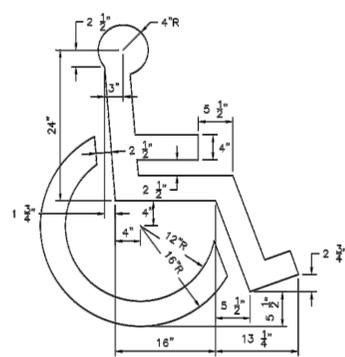
RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS. REFER TO CITY OF HOUSTON STANDARDS ON WHEELCHAIR RAMP CRITERIA.



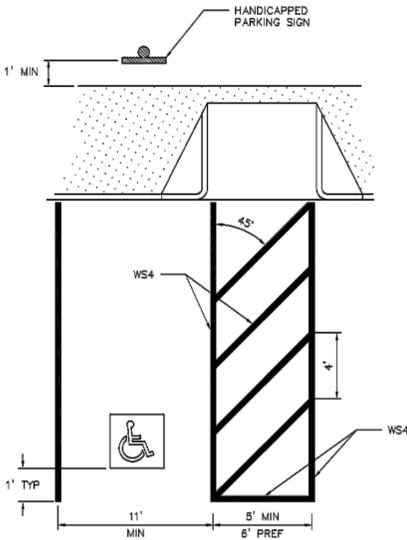
HANDICAPPED PAVEMENT MARKING SYMBOLS



WITH BACKGROUND
SYMBOL & BORDER: WHITE
BACKGROUND: BLUE



SYMBOL ONLY
SYMBOL: BLUE OR WHITE



NOTES:

- ALL PARKING SPACE LIMIT LINES SHALL BE 4".
- AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.
- DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY ± 10%.
- PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):
A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND D) SHALL BE 30" X 30" MINIMUM.
- WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30" X 30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.
- ALL SLOPE IN AND AROUND EXPECTED WHEELCHAIR PATH SHALL NOT EXCEED ADA REQUIREMENTS FOR WHEELCHAIR RAMPS.
- REFER TO CITY OF HOUSTON TRAFFIC SIGN STANDARDS FOR HANDICAPPED PARKING SIGN DETAILS.
- NOTE THAT ANGLED PARKING ON PUBLIC ROADWAYS REQUIRE CITY COUNCIL APPROVAL BEFORE IMPLEMENTATION.

APPROVED BY: Designed by: <i>Sulab halawar</i> SULABHALAWAR	APPROVED BY: Designed by: <i>KIRAN V. PUNYAMANTHULA</i> KIRANVP@CITYOFHOUSTON.ORG
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Designed by: <i>Carl Stubbuck</i> CSTUBBUCK@CITYOFHOUSTON.ORG	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02760-07
CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
PAVEMENT MARKINGS FOR ACCESSIBLE PARKING	
FOR CITY OF HOUSTON USE ONLY	
DRAWING SCALE	
NOT TO SCALE	



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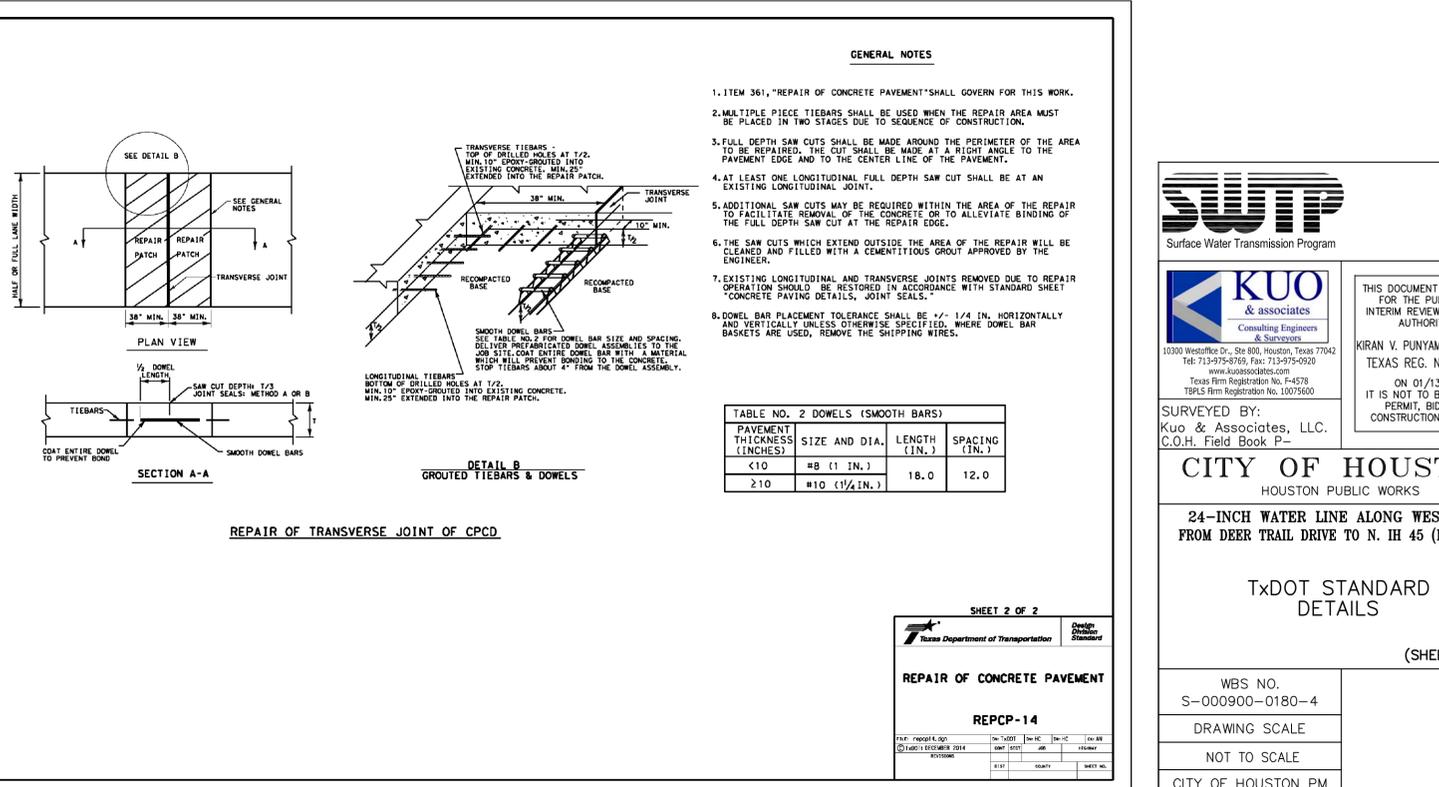
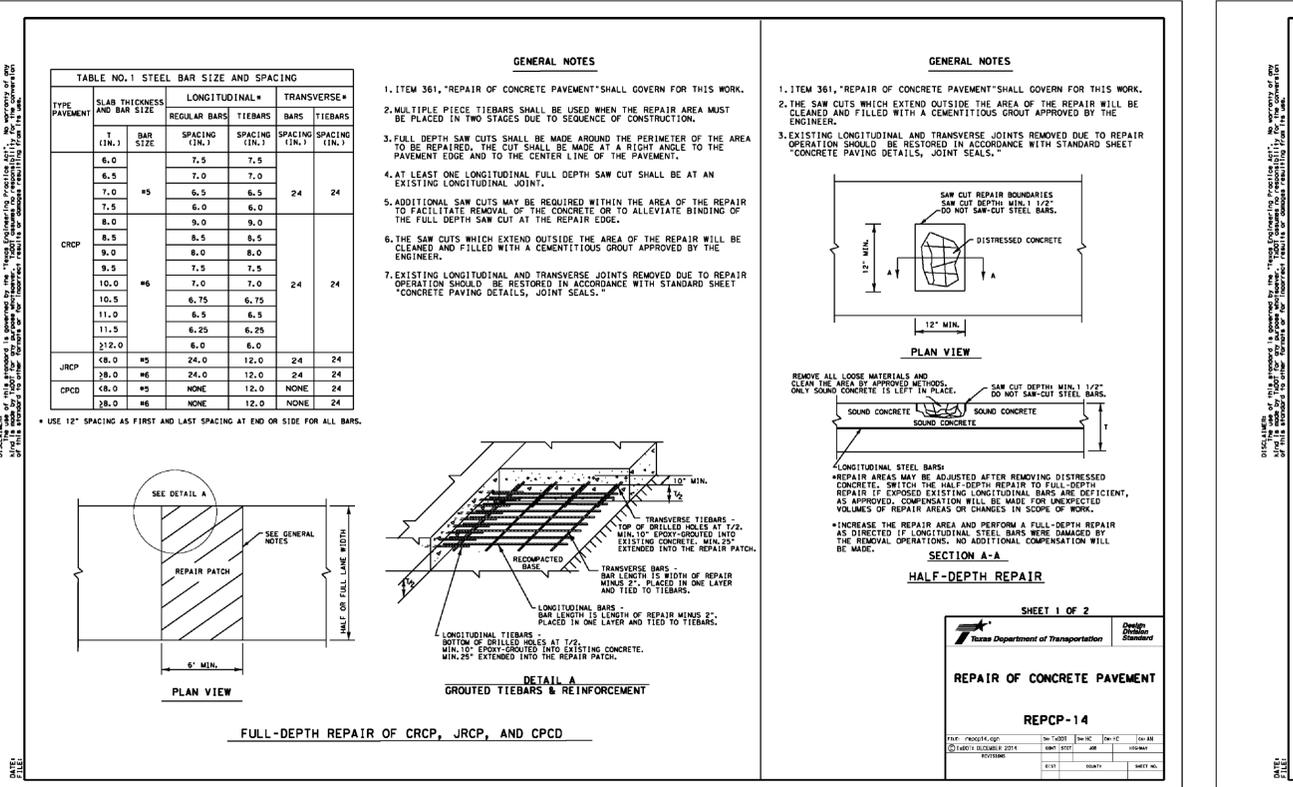
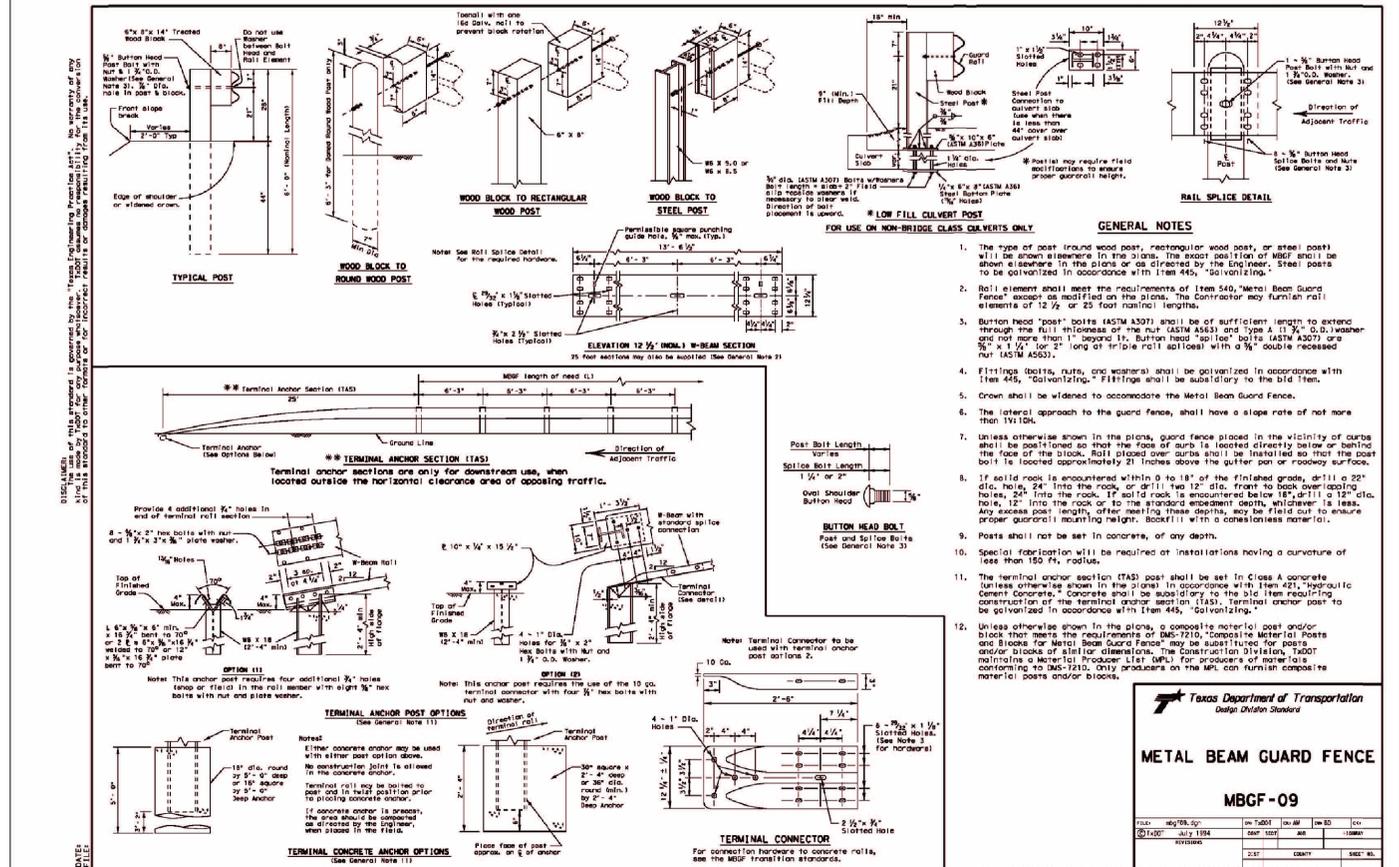
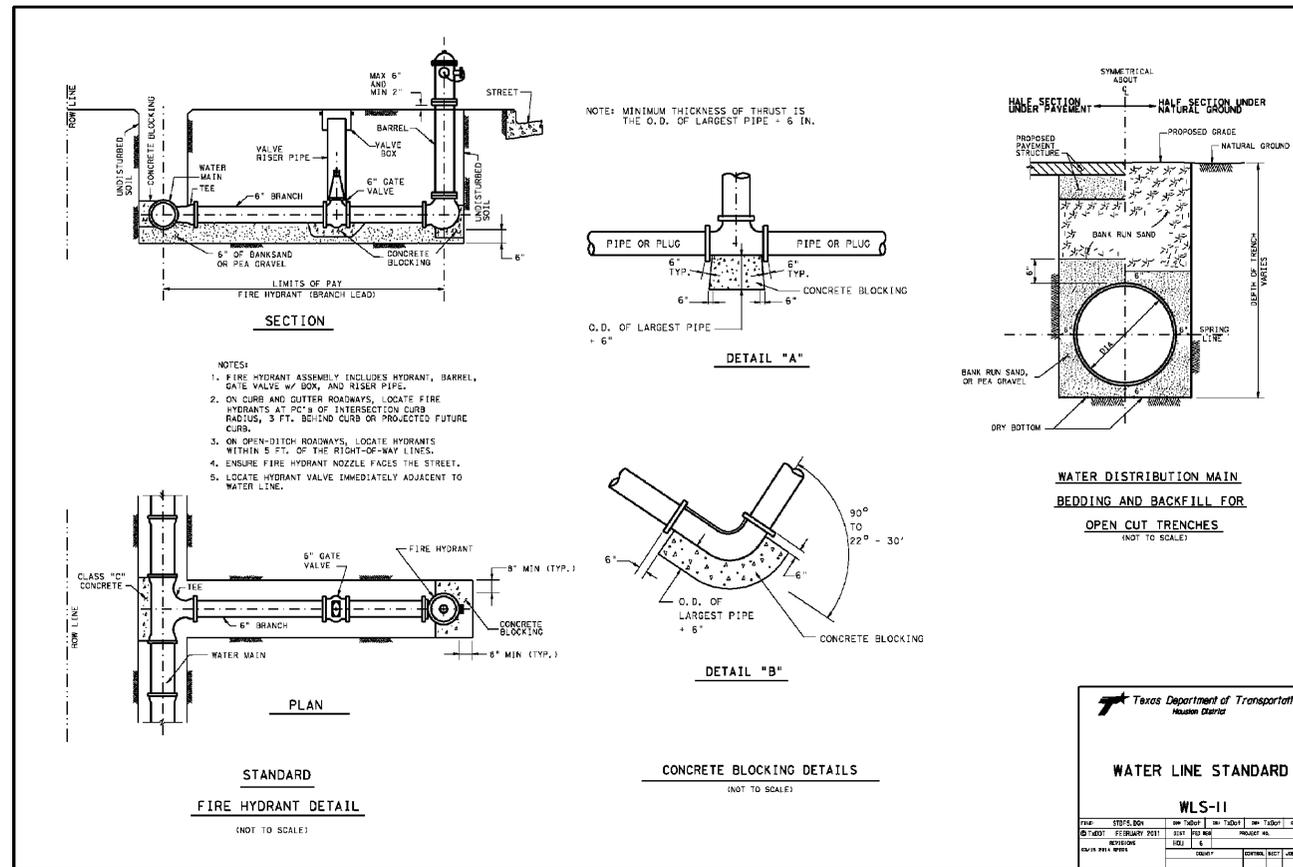
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STANDARD PAVEMENT MARKING DETAILS

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 59 OF 85

No.	Date	Revisions



SUTP
Surface Water Transmission Program

KUO & ASSOCIATES
Consulting Engineers & Surveyors
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www.kuoassociates.com
Texas Firm Registration No. F-4578
TPSLS Firm Registration No. 10075600

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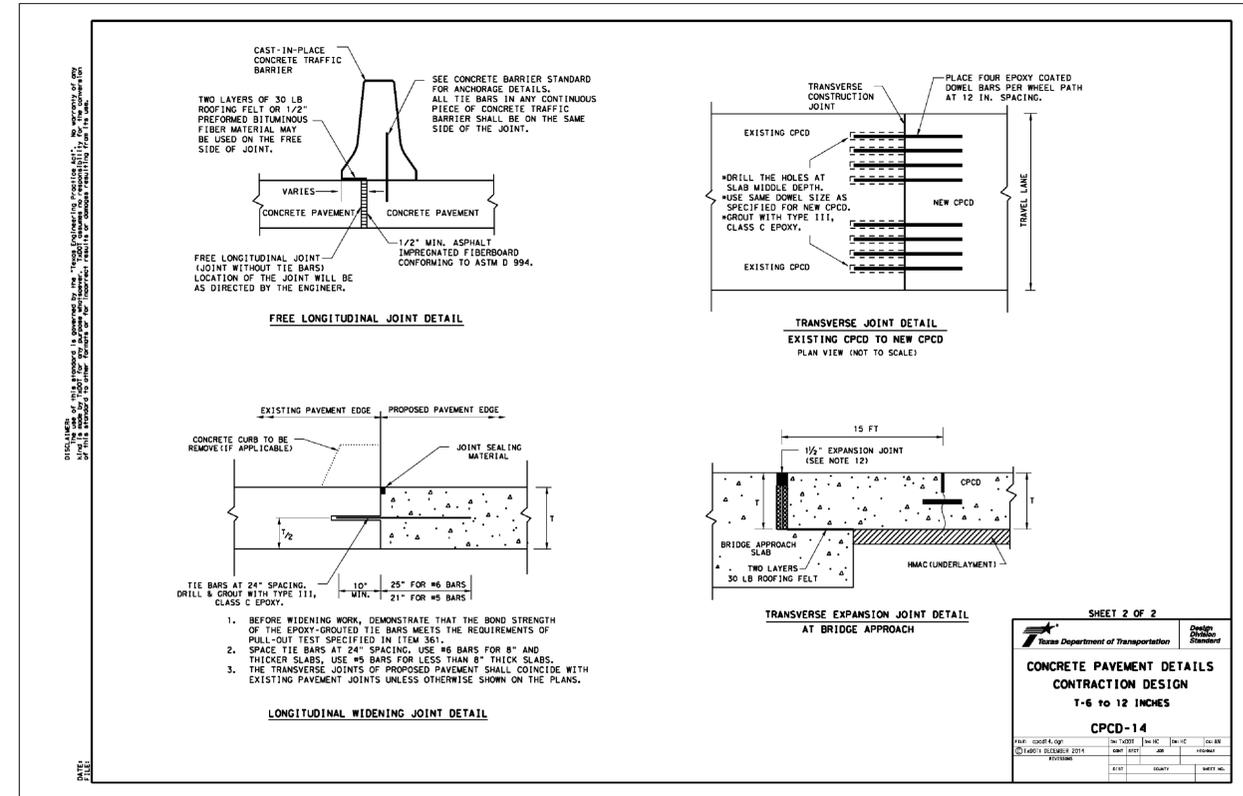
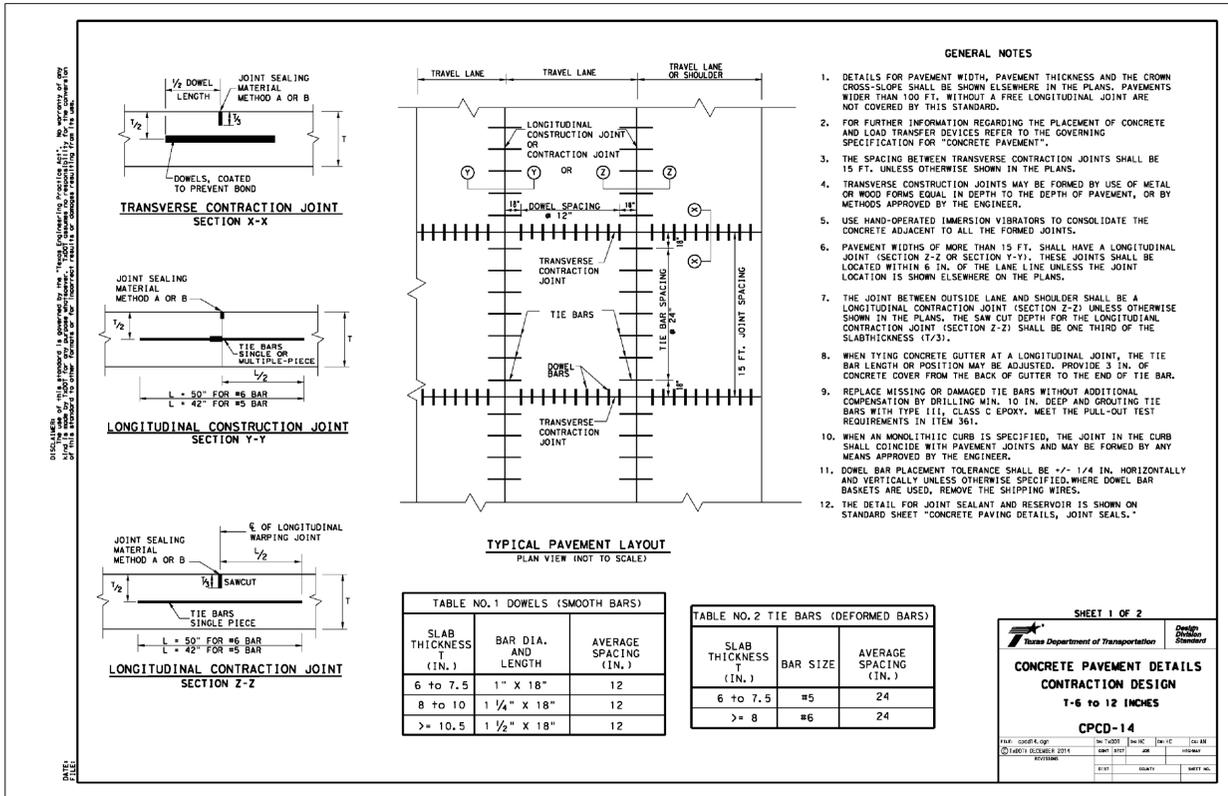
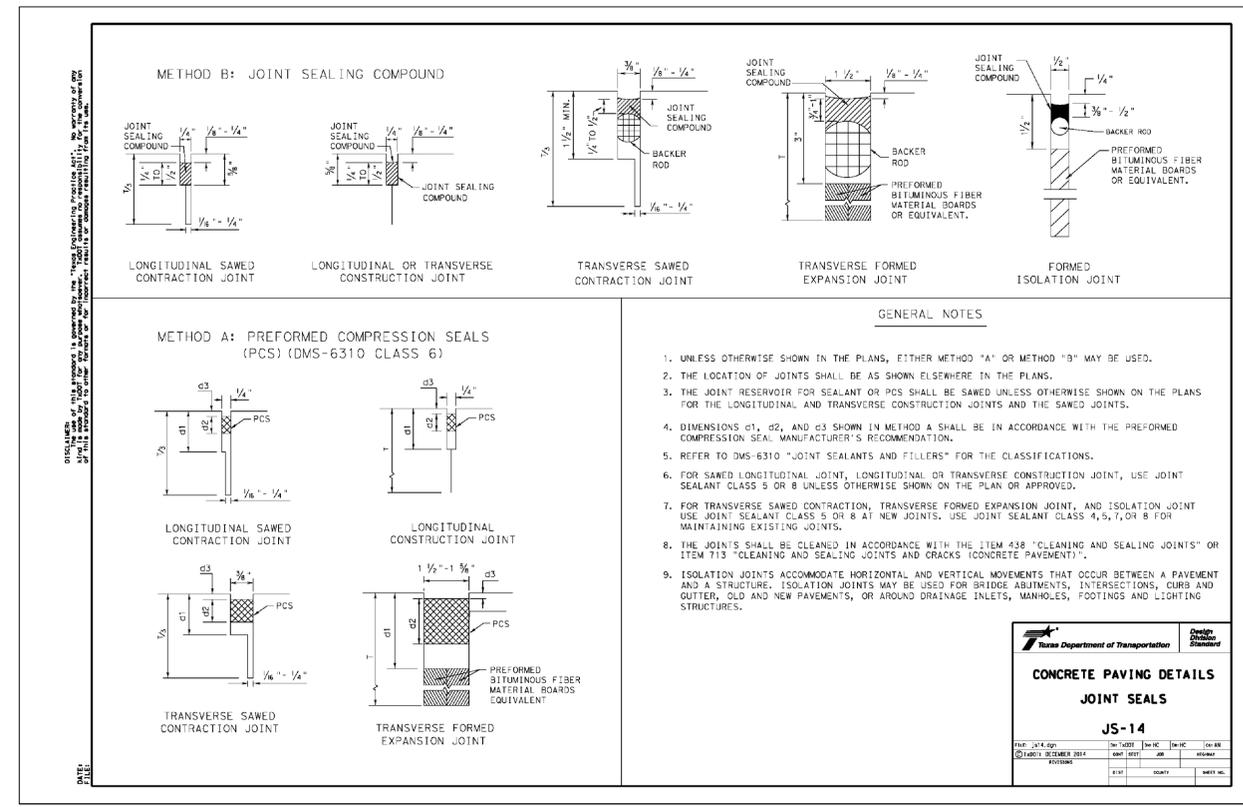
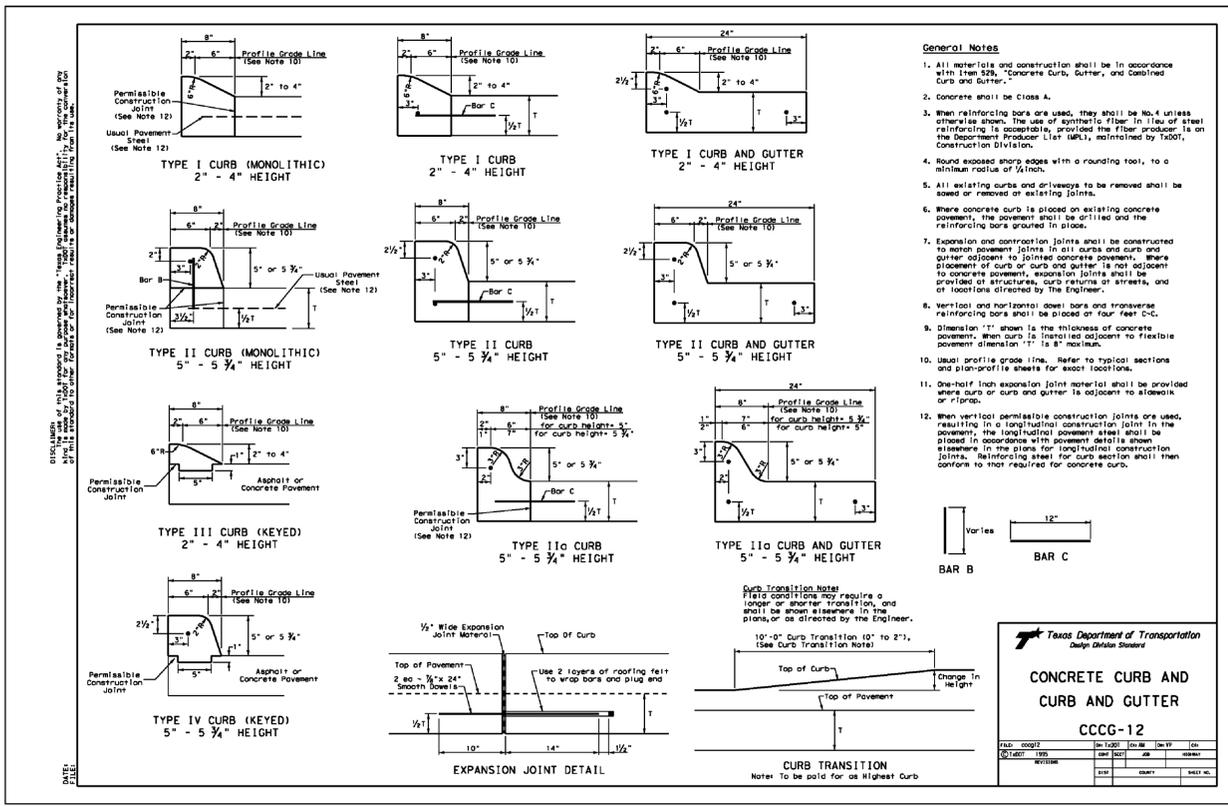
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TxDOT STANDARD DETAILS
(SHEET 1 OF 3)

WBS NO. S-000900-0180-4
DRAWING SCALE NOT TO SCALE
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 60 OF 85

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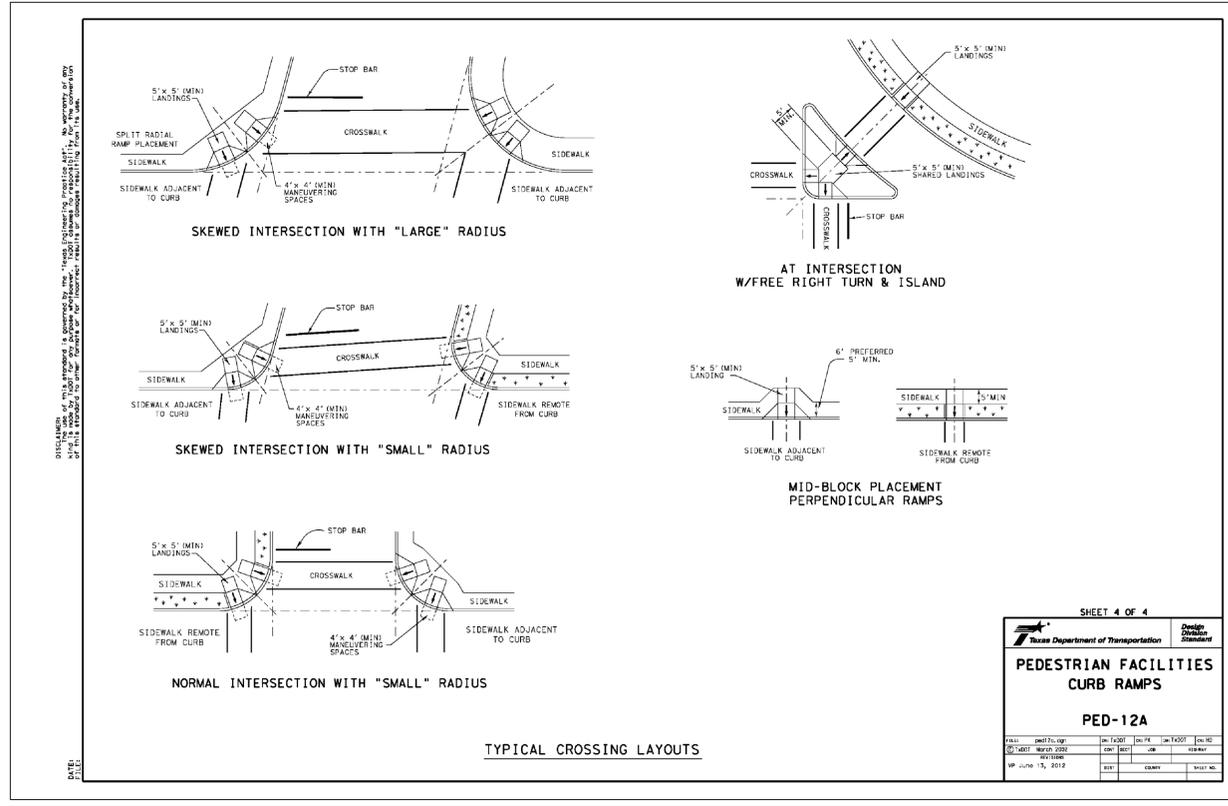
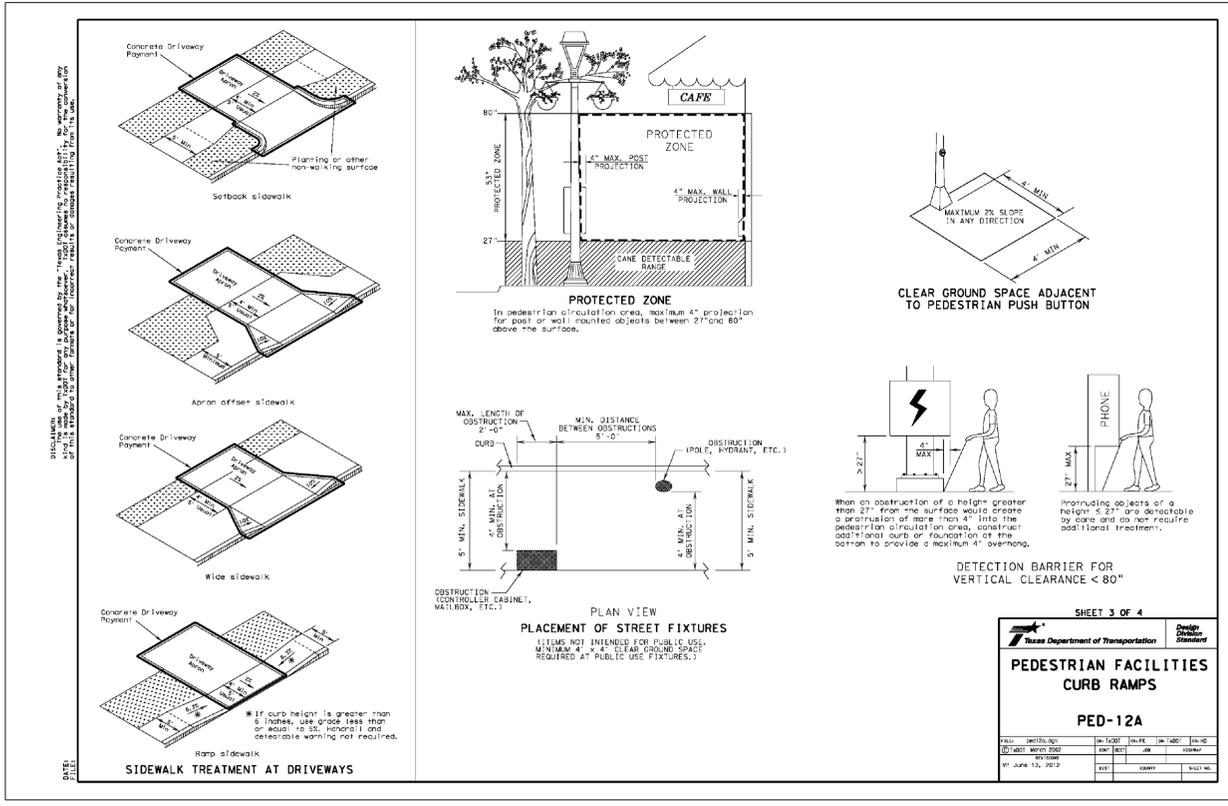
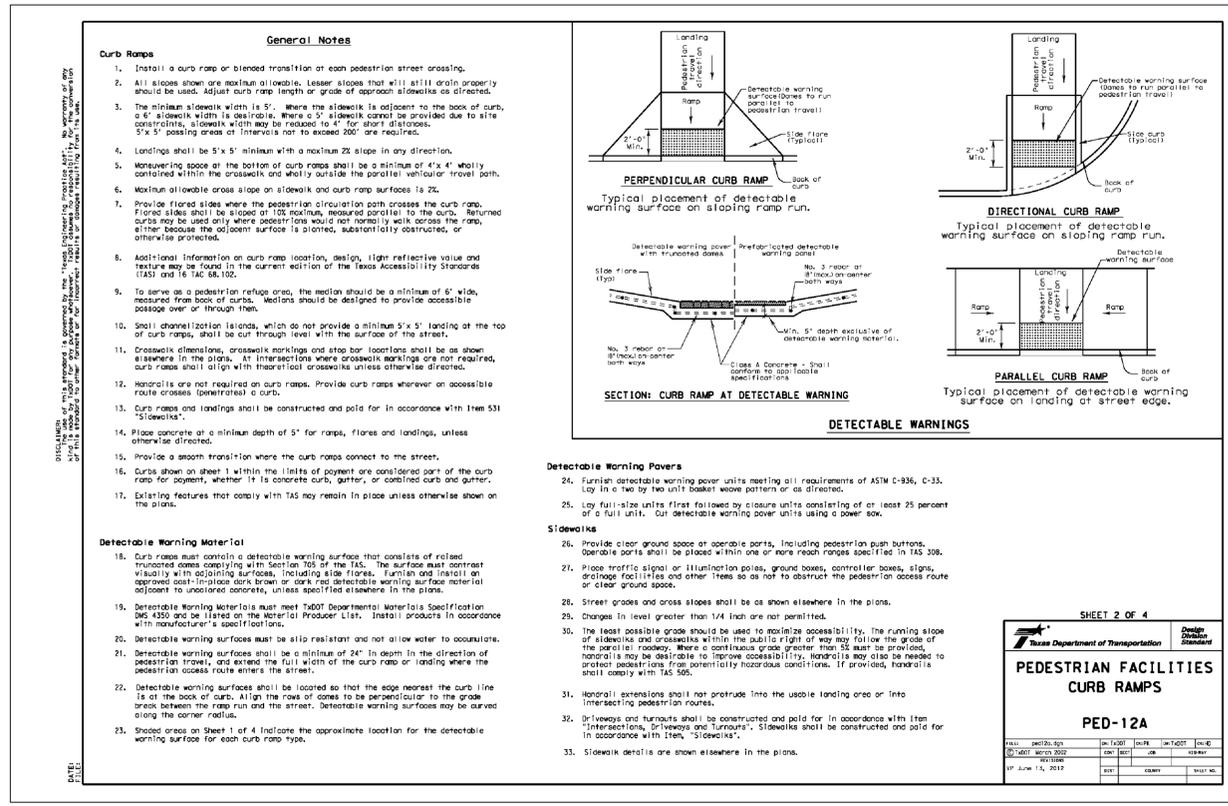
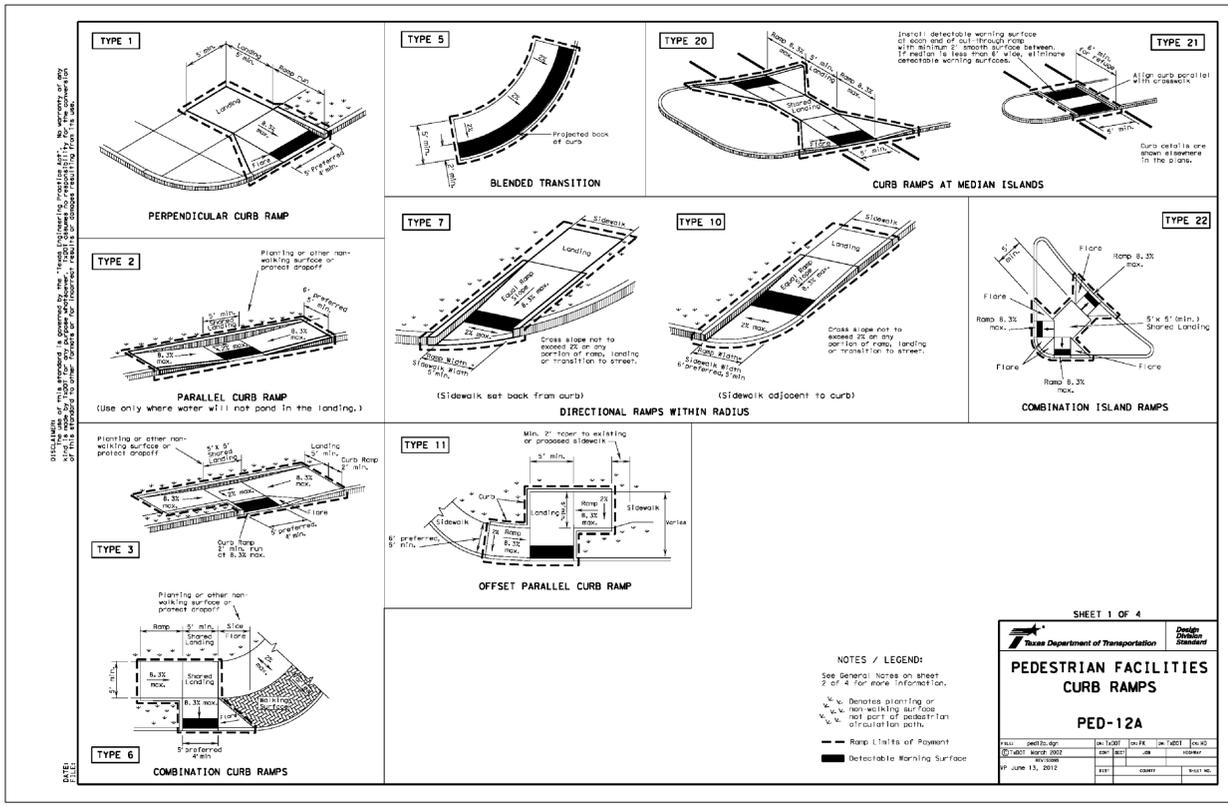
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TxDOT STANDARD DETAILS
(SHEET 2 OF 3)

WBS NO. S-000900-0180-4
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CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 61 OF 85

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TxDOT STANDARD DETAILS
(SHEET 3 OF 3)

WBS NO.
S-000900-0180-4

DRAWING SCALE
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CITY OF HOUSTON PM
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No.	Date	Revisions

GENERAL NOTES

- THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) LATEST EDITION WITH REVISIONS DURING THE ENTIRE CONSTRUCTION PERIOD.
- ALL SIGNS AND TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST VERSION OF THE TMUTCD.
- NO LANES SHALL BE CLOSED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM MONDAY THRU FRIDAY WITHOUT APPROVAL OF THE CITY TRAFFIC ENGINEER.
- NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00 PM TO 7:00 AM.
- CONTRACTOR SHALL MAINTAIN APPROVED NUMBER OF THROUGH LANES OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION WORKING HOURS. TRAFFIC CONTROL PLANS SHALL INCLUDE ONE-WAY AND/OR DETOUR PLANS. CONTRACTOR SHALL MAINTAIN ADA COMPLIANT PEDESTRIAN ACCESS TO BUS STOPS AND ADEQUATE BUS ACCESS TO ALL THE BUS STOPS.
- CONTRACTOR SHALL MAINTAIN TRAFFIC LANES AND DETOURS ACCORDING TO TRAFFIC CONTROL PLANS DURING WORKING HOURS.
- CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW WHEN FEASIBLE.
- IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF "TRAFFIC CONTROL PLANS" DURING THE CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PREPARE AND SUBMIT AN ALTERNATE SET OF TRAFFIC CONTROL PLANS TO THE CITY OF HOUSTON PROJECT MANAGER FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION. THESE PLANS SHALL BE DRAWN TO SCALE ON REPRODUCIBLE MYLARS AND SHALL BE SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS. OFFICE OF CITY ENGINEER, MOBILITY PERMITS SECTION REPRESENTATIVE APPROVAL IS REQUIRED TO ACCEPT THE PROPOSED CHANGES.
- CONTRACTOR SHALL SECURE LANE/SIDEWALK/BICYCLE FACILITY CLOSURE PERMITS FROM OFFICE OF CITY ENGINEER (MOBILITY PERMIT SECTION AT <https://geohub.houston.tx.gov>) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.
- CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES.
- DURING PAVEMENT SURFACE RESTORATION PROJECTS, THE CONTRACTOR SHALL NOT OPEN CLOSED LANES UNTIL THE PAVEMENT SURFACE HAS CURED ENOUGH TO ALLOW VEHICULAR TRAFFIC ACCORDING TO CITY OF HOUSTON STANDARD SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND COORDINATING ALL CONSTRUCTION ACTIVITIES WITH STAKE HOLDERS IN THE VICINITY INCLUDING EMERGENCY RESPONSE AGENCIES SUCH AS HOUSTON POLICE DEPARTMENT, HOUSTON FIRE DEPARTMENT, AND METROPOLITAN TRANSIT AUTHORITY.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ISSUING ALL WORK DIRECTIVES TO ALL SUB-CONTRACTORS, UTILITY COMPANIES, AND ALL OTHER ENTITIES PERFORMING CONSTRUCTION WORK ASSOCIATED WITH THE PROJECT.
- NOTHING IN THESE NOTES OR PLANS SHALL RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT; INCLUDING SAFETY OF ALL MODES OF TRANSPORTATION, PERSONS, AND PROPERTY, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO WORKING HOURS.
- THE OFFICE OF CITY ENGINEER (MOBILITY PERMITS GROUP) PER THE DIRECTION OF THE CITY TRAFFIC ENGINEER HAVE THE RIGHT TO DEMAND THE INSTALLATION OF ADDITIONAL TRAFFIC CONTROL DEVICES OR MODIFICATIONS OF THESE PLANS AND NOTES, AS DEEMED NECESSARY TO PROMOTE THE SAFE AND ORDERLY FLOW OF TRAFFIC, INCLUDING PEDESTRIANS AND BICYCLES, THROUGH THE CONSTRUCTION WORK ZONE. THE CONTRACTOR SHALL COMPLY WITH THESE ADDITIONAL REQUESTS OR MODIFICATIONS WITH DUE DILIGENCE.
- ALL EXISTING TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE MAINTAINED IN VISIBLE LOCATIONS DURING CONSTRUCTION UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM CITY OF HOUSTON PROJECT MANAGER. THE CONTRACTOR SHALL RESTORE OR REPLACE (AT THE DISCRETION OF THE CITY TRAFFIC ENGINEER) ANY PAVEMENT MARKING OR SIGNING DAMAGE DURING CONSTRUCTION OPERATIONS, INCLUDING RAISED PAVEMENT MARKERS (RPMs).
- WHEN ENTERING OR LEAVING ROADWAYS CARRYING PUBLIC TRAFFIC, THE CONTRACTOR'S EQUIPMENT, WHETHER EMPTY OR LOADED SHALL IN ALL CASES YIELD TO PUBLIC TRAFFIC WITH THE ASSISTANCE OF CONTRACTOR PROVIDED CERTIFIED FLAGGER/PEACE OFFICER.
- ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE. ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A MINIMUM OF ONE TRAVEL LANE SHALL BE MAINTAINED ACROSS THE DRIVEWAYS, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM CITY OF HOUSTON PROJECT MANAGER.
- SPILLAGE RESULTING FROM HAULING OPERATIONS ALONG OR ACROSS ANY PUBLIC TRAVELED WAY SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR.
- THE CONTRACTOR SHALL SUBMIT AN APPLICATION FOR TEMPORARY PARKING RESTRICTIONS IF THERE ARE PARKING METERS LOCATED AT THE PROPOSED LANE CLOSURES FROM PARKING MANAGEMENT DIVISION (832-393-8690) AT LEAST TEN BUSINESS DAYS BEFORE IMPLEMENTATION OF LANE CLOSURES. IN ADDITION, TEMPORARY NO PARKING SIGNS SHALL BE POSTED 24 HOURS PRIOR TO COMMENCEMENT OF WORK.
- ADDITIONAL OFF DUTY OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DISCRETION OF THE CITY PROJECT MANAGER EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON THE PROJECT PLANS.
- THE CONTRACTOR SHALL REPLACE WITHIN 72 HOURS, ALL TRAFFIC SIGNAL LOOP DETECTORS DAMAGED DURING CONSTRUCTION.
- IN GENERAL, A SOLAR POWERED FLASHING ARROW BOARD SHALL BE REQUIRED ON ALL MAJOR THROUGHFARE LANES CLOSURES. EXCEPTIONS TO FLASHING ARROW BOARDS AND/OR IMPLEMENTATION ON RESIDENTIAL LANE CLOSURES SHALL BE APPROVED BY CITY TRAFFIC ENGINEER.
- APPROVED TRAFFIC CONTROL PLAN SHALL BE IN PLACE BEFORE STARTING ANY EXCAVATION.
- WATER FILLED BARRIERS CAN BE USED AS INSTRUCTED BY THE ENGINEER AND APPROVED BY THE CITY FOR PROJECTS WHERE SPACE IS LIMITED AND HEAVY EQUIPMENT TO PLACE CONCRETE BARRIERS IS NOT FEASIBLE. WATER FILLED BARRIERS SHALL NOT BE USED ON ROADWAYS WITH A POSTED SPEED LIMIT MORE THAN 45 MPH.
- WATER FILLED BARRIERS MUST BE INSTALLED AND MAINTAINED PER THE MANUFACTURER'S REQUIREMENTS AND ROUTINELY INSPECTED FOR DEFECTS.
- IF WATER FILLED BARRIER IS PROVIDED, USE ENVIRONMENTALLY SAFE ANTI-FREEZING AGENT IN THE WATER WHEN IT IS APPLICABLE PER MANUFACTURER SPECIFICATIONS AND RECOVER AGENT WHEN THE BARRIER IS DRAINED.

- DISPOSE OF WATER AND AGENT PROPERLY. DO NOT DRAIN WATER FILLED BARRIER INTO OR ACROSS AN EXISTING TRAVEL LANE.
- PROVIDE BARRIER UNITS THAT ARE CAPABLE OF BEING LIFTED AND MOVED WHEN FILLED IF DRAINING IS NOT POSSIBLE.
- PROVIDE WATER FILLED BARRIER THAT ACTS AS ITS OWN FREE STANDING, NON-REDIRECTIVE END TREATMENT.
- WHEN WATER FILLED BARRIERS ARE USED TO CHANNELIZE PEDESTRIANS, THEY MUST HAVE A CONTINUOUS DETECTABLE BOTTOM FOR USERS OF LONG CANES AND THE TOP OF THE UNIT SHALL NOT BE LESS THAN 32 INCHES IN HEIGHT.
- ANY CLOSURE OF A PEDESTRIAN OR BICYCLE FACILITY SHALL REQUIRE THE SHORTEST DETOUR THAT MAINTAINS THE SAFETY OF PEDESTRIAN AND/OR BICYCLISTS.

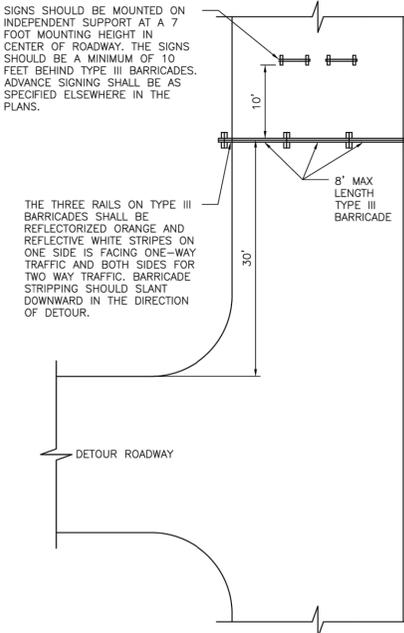
SPACING FOR CHANNELIZING DEVICES

- PLASTIC DRUMS ON MERGING TAPER @ 30' C - C WITH CHEVRON SIGN @ 60' C - C AND WARNING LIGHTS FOR OVERNIGHT CLOSURE.
- PLASTIC DRUMS ON DOWNSTREAM TAPER @ 30' C - C (RETURN TAPER AND BARRICADE ARE OPTIONAL AND DIVIDED ROADWAY SECTION)
- PLASTIC DRUMS ON RADII @ 35' C - C.
- PLASTIC DRUMS ON TANGENT @ 35' C - C WITH VERTICAL PANEL AT 70' C - C AND APPROVED WARNING LIGHT @ 70' C - C (FOR OVERNIGHT CLOSURE).
- PLASTIC DRUMS IN FRONT OF CONSTRUCTION ZONE @ 20' C - C WITH VERTICAL PANEL AT 40' C - C AND APPROVED WARNING LIGHT @ 40' C - C (FOR OVERNIGHT CLOSURE).
- CONCRETE TRAFFIC BARRIER (CTB) OR LOW PROFILE CONCRETE TRAFFIC BARRIER (LPCTB) WITH APPROVED REFLECTORS @ 10' C - C IF PAVEMENT DROP IS GREATER THAN 1 FOOT.
- PLASTIC DRUMS W/GUARD RAIL MOUNTED.
- SELF- RIGHTING VERTICAL PANEL SPACING.
 - 4 LANES TO 2 LANES UNDIVIDED ROADWAY SECTION @ 20' C - C.
 - 4 LANES DIVIDED ROADWAY TO ONE SIDE TWO WAY ROADWAY @ 20' C - C.
 - LEFT LANE AND RIGHT LANE STORAGE BAYS @ 15' C - C.
- SPACING SHOWN ON TRAFFIC CONTROL SHALL SUPERSEDE THE ABOVE SPACING.
- SPACING MAY BE ADJUSTED TO PROVIDE DRIVEWAYS, INTERSECTIONS AND /OR MEDIAN OPENINGS.

POSTED SPEED (MPH)	SIGN SPACING "X" (FEET)	MIN. DESIRABLE TAPER LENGTH "L"			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	120'	150'	165'	180'	30'	60'-75'
35	160'	205'	225'	245'	35'	70'-90'
40	240'	265'	295'	320'	40'	80'-100'
45	320'	450'	495'	540'	45'	90'-110'
50	400'	500'	550'	600'	50'	100'-125'
55	500'	550'	605'	660'	55'	110'-140'

POSTED SPEED (MPH)	DISTANCE "D" (FEET)
30	200
35	250
40	305
45	360
50	425
55	495

SIGNS SHOULD BE MOUNTED ON INDEPENDENT SUPPORT AT A 7 FOOT MOUNTING HEIGHT IN CENTER OF ROADWAY. THE SIGNS SHOULD BE A MINIMUM OF 10 FEET BEHIND TYPE III BARRICADES. ADVANCE SIGNING SHALL BE AS SPECIFIED ELSEWHERE IN THE PLANS.



PLAN VIEW
TYPE III BARRICADE (POST AND SKID)
TYPICAL APPLICATION

LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

APPROVED BY: <i>Sudal Banwar</i> DESIGNED BY CITY ENGINEER	APPROVED BY: <i>KRANE NGUYEN</i> DESIGNED BY CITY TRAFFIC ENGINEER
APPROVED BY: <i>Carl Hallock</i> DESIGNED BY DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-01
CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
TCP NOTES CHANNELIZING DEVICES AND BARRICADES	
FOR CITY OF HOUSTON USE ONLY	
DRAWING SCALE	
NOT TO SCALE	



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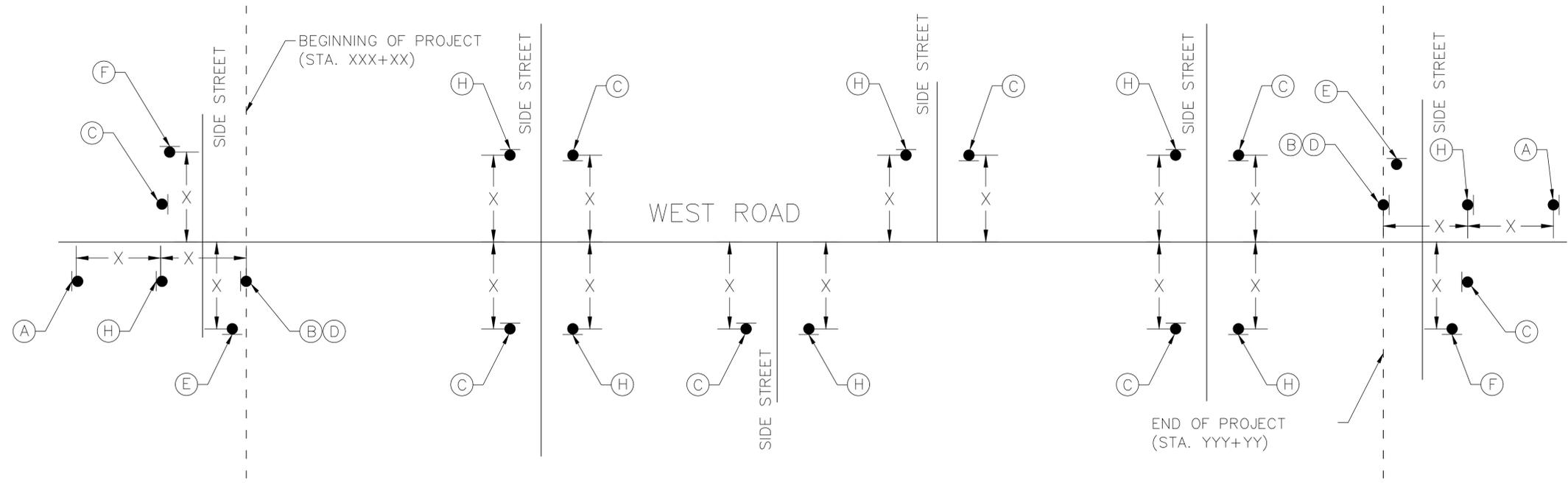
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TRAFFIC CONTROL PLAN NOTES
CHANNELIZING DEVICES AND BARRICADES

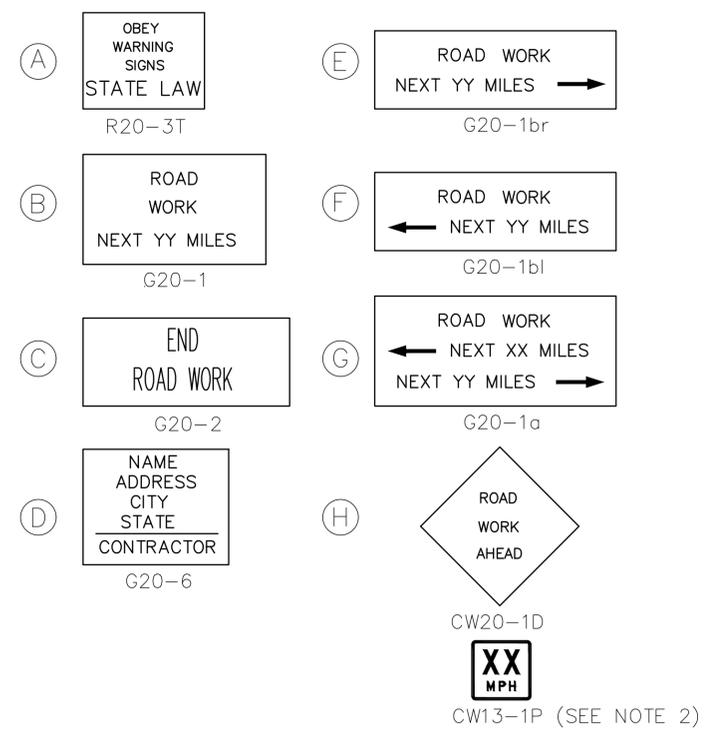
WBS NO.
S-000900-0180-3
DRAWING SCALE
N/A
CITY OF HOUSTON PM
ADAM SABZEVARI
SHEET NO. 64 OF 85

NO.	DATE	REVISIONS

No.	Date	Revisions



WORK ZONE SIGNS



NOTES:

- CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD – LATEST EDITION WITH REVISIONS) DURING CONSTRUCTION.
- NO LANES SHALL BE BLOCKED FROM 7AM TO 9AM AND 4PM TO 6:30PM MONDAY THRU FRIDAY.



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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

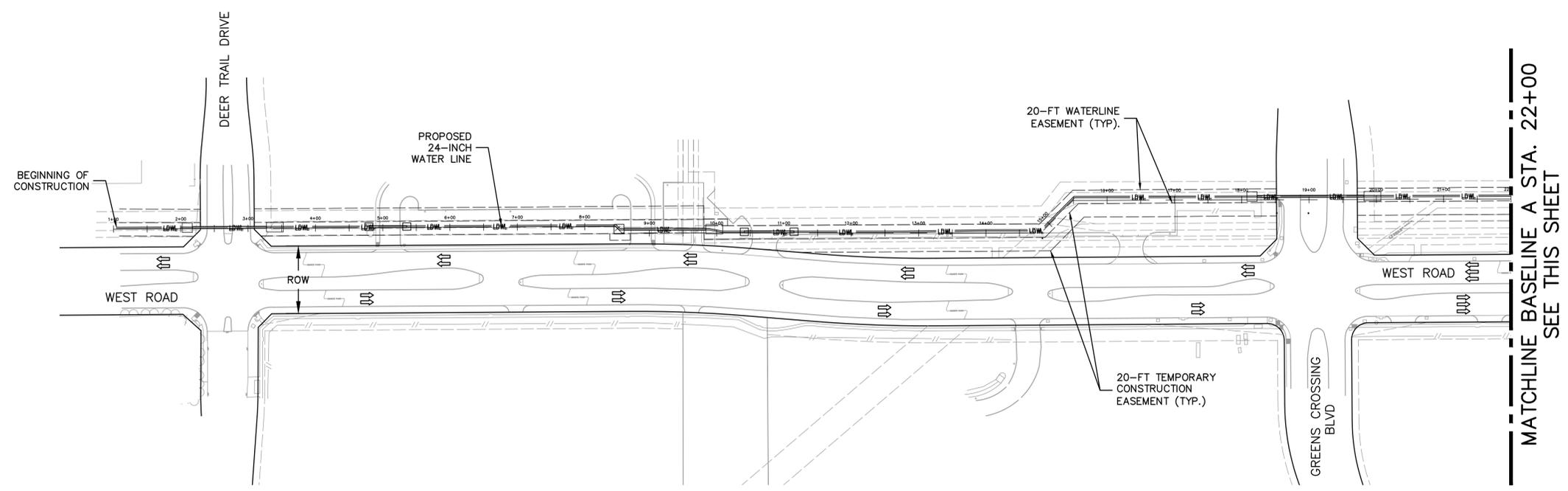
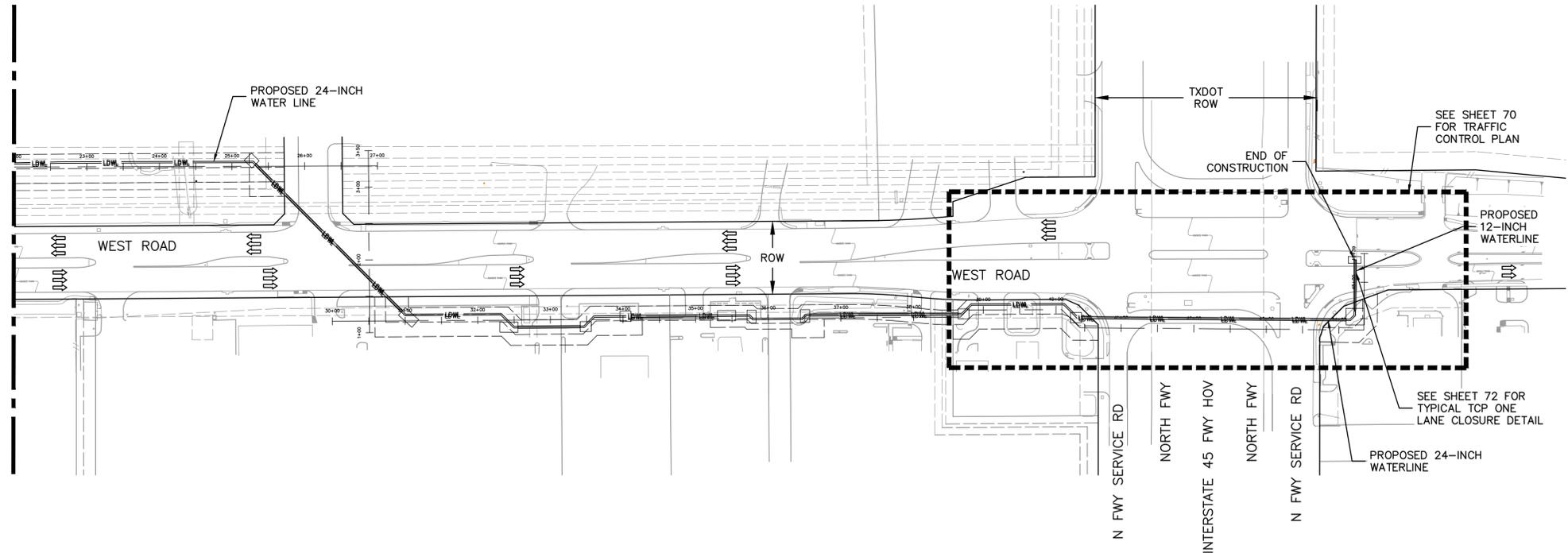
TCP DETAIL
PROJECT APPROACH SIGNING DETAIL

WBS NO. S-000900-0180-3
DRAWING SCALE N/A
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 65 OF 85

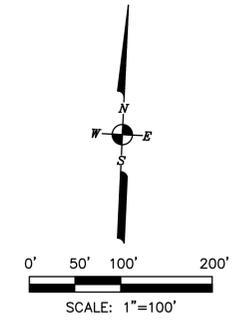
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 SEE THIS SHEET



MATCHLINE BASELINE A STA. 22+00
 SEE THIS SHEET



- NOTES:**
1. ALL CONSTRUCTION PHASES CAN BE DIVIDED INTO MULTIPLE STEPS IF DEEMED NECESSARY BY THE CONTRACTOR.
 2. THE PROPOSED BORE PIT LOCATIONS SHOWN ARE BASED ON BEST ENGINEERING JUDGMENT; ACTUAL LOCATIONS ARE TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD.



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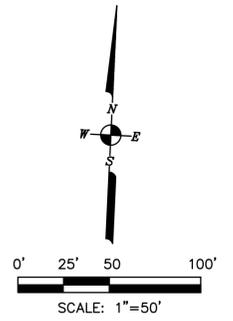
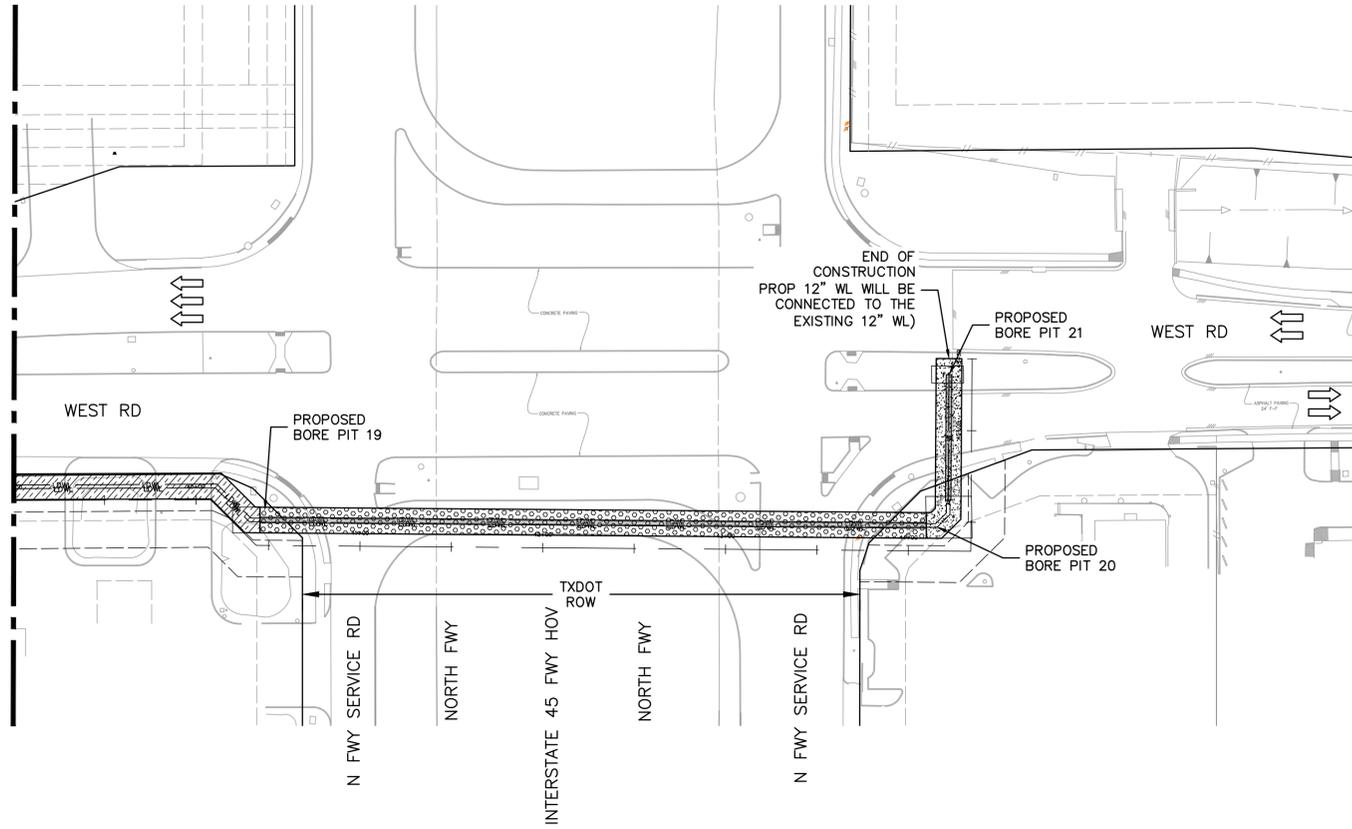
CITY OF HOUSTON
 HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TRAFFIC CONTROL PLAN
 OVERALL LAYOUT

WBS NO. S-000900-0180-3
DRAWING SCALE H: 1"=100'
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 66 OF 85

No.	Date	Revisions

MATCHLINE BASELINE A STA. 39+00
SEE SHEET - 67



NOTES:

1. ALL CONSTRUCTION PHASES CAN BE DIVIDED INTO MULTIPLE STEPS IF DEEMED NECESSARY BY THE CONTRACTOR.
2. THE PROPOSED BORE PIT LOCATIONS SHOWN ARE BASED ON BEST ENGINEERING JUDGMENT; ACTUAL LOCATIONS ARE TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD.
3. NO TWO ADJACENT DRIVEWAYS TO BE CLOSED AT THE SAME TIME DURING CONSTRUCTION.

LEGEND:

- PHASE 14
- PHASE 15
- PHASE 16
- PHASE 17



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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

TRAFFIC CONTROL PLAN
PHASING LAYOUT (2 OF 2)

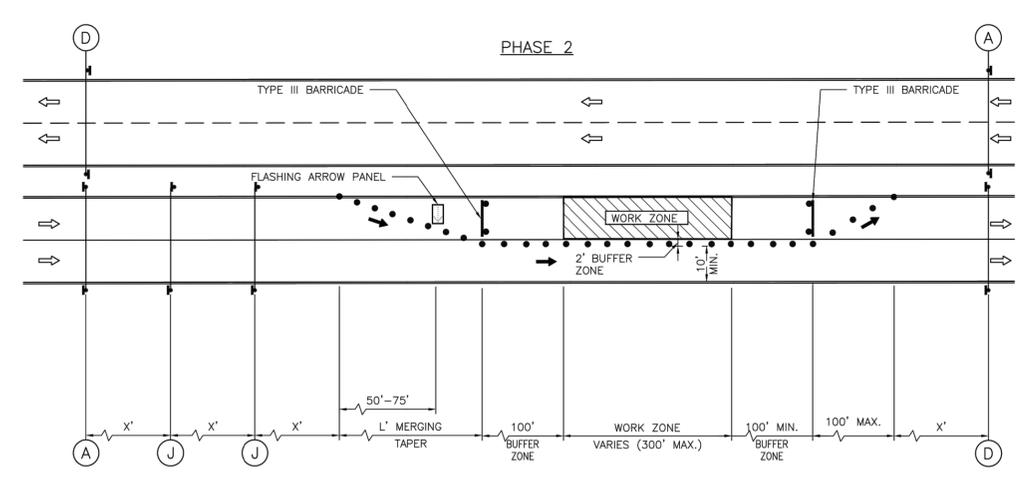
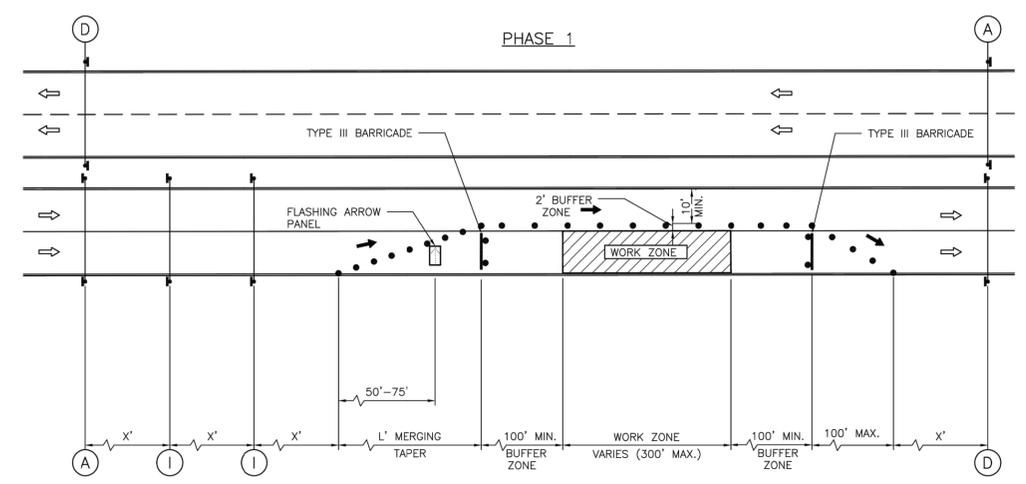
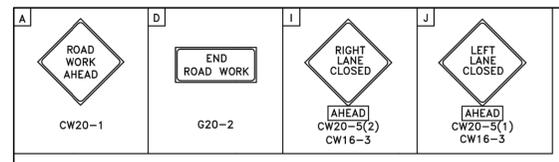
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DRAWING SCALE	
H: 1"=50'	
CITY OF HOUSTON PM	
ADAM SABZEVARI	
SHEET NO. 68 OF 85	

No.	Date	Revisions	APP.

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LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

NOTES:

1. RETURN TAPERS AND DOWNSTREAM BARRICADES ARE OPTIONAL ON A DIVIDED ROADWAY SECTION.
2. DOUBLE SIGNS SHALL BE USED ONLY ON ROADWAYS WITH MEDIANS.
3. FOR DIMENSIONS REFER TO SHEET 01555-01.
4. INSTALL FLASHERS ON DRUMS WHERE REQUIRED AND APPROVED BY CITY TRAFFIC ENGINEER.

APPROVED BY: Desigined by: <i>Sulad hamwar</i> 16178806474747	APPROVED BY: Desigined by: <i>HARANG NGUYEN</i> 16428276247842...
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Desigined by: <i>Carl Hubbard</i> 16151118728442	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-04
CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
TCP ONE LANE CLOSURE PHASE 1 & 2	
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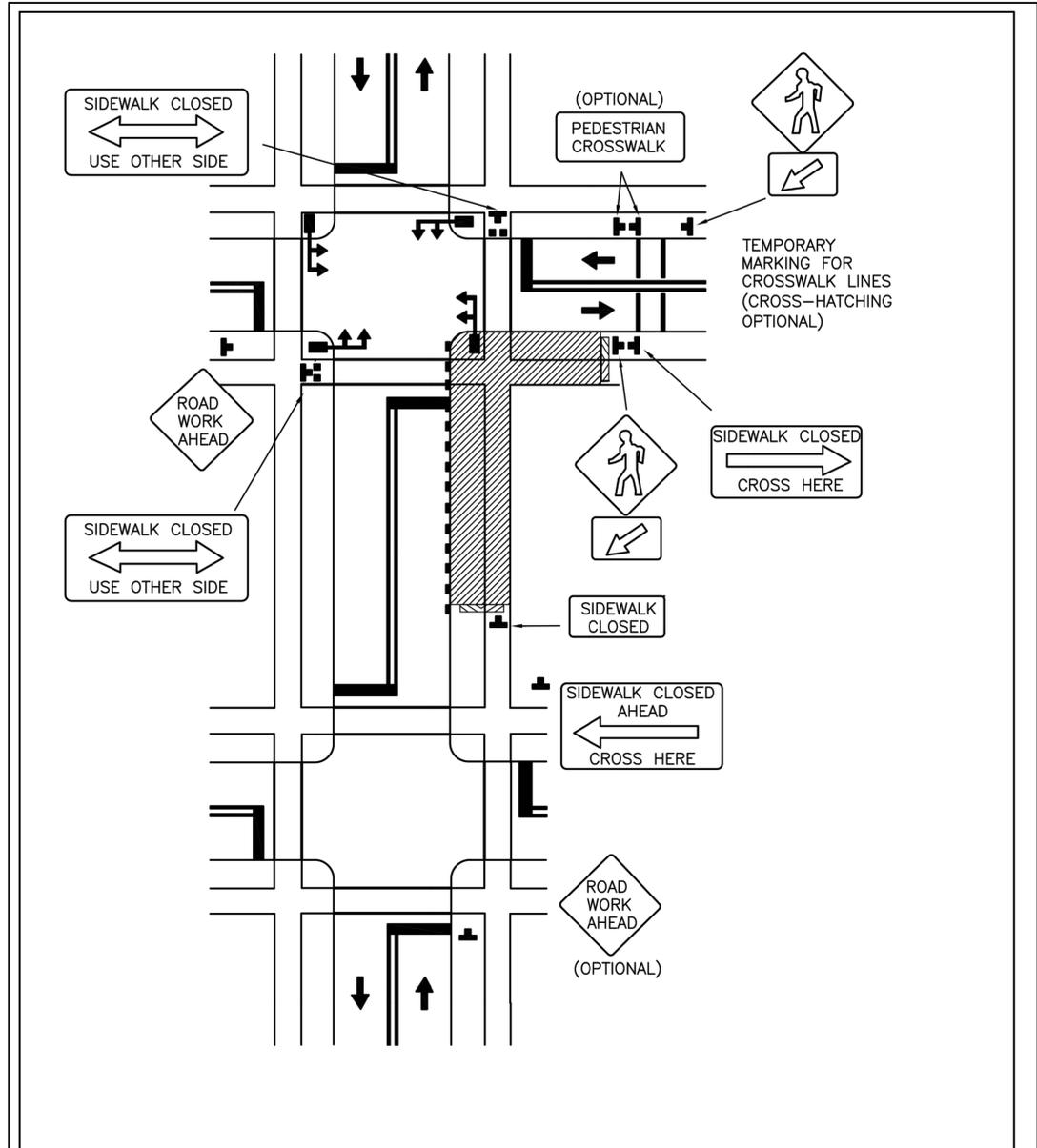
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CITY OF HOUSTON
 HOUSTON PUBLIC WORKS
 24-INCH WATER LINE ALONG WEST ROAD
 FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)
 TCP DETAIL
 ONE LANE CLOSURE PHASE 1 & 2

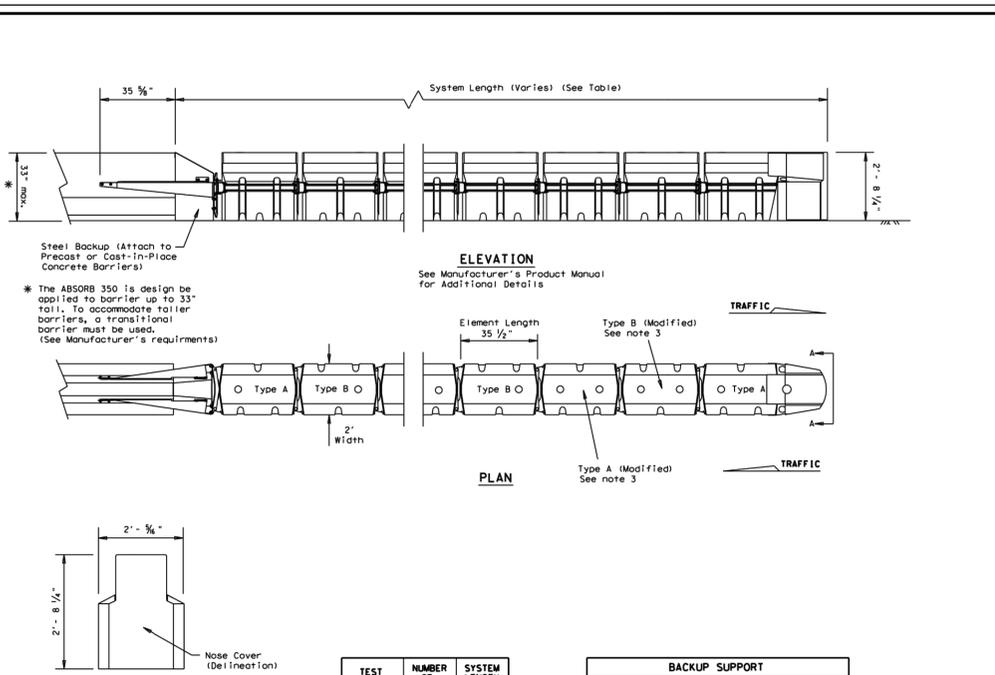
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DRAWING SCALE N/A
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 72 OF 85

No.	Date	Revisions

Rev.	Date	Description



DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



- GENERAL NOTES**
- Refer to installation manual and configuration chart for specific system assembly and element orientation. For additional information, contact Interstate Steel Inc. at (432)263-3725.
 - The ABSORB 350 system is approved for use in temporary (Work Zone) locations. The ABSORB 350 is a water-filled non-reflective, gating crash cushion that does not need to be attached to a foundation and can be installed on top of concrete, asphalt, or any surface capable of bearing the weight of the system.
 - Modified Type A and Type B elements require drilling of an additional 3" Dia. hole (as shown). See Manufacturer's installation manual for details.
 - Maximum permissible cross-slope is 8%.
 - The installation area should be free from curbs, elevated objects, or depressions.
 - The ABSORB 350 should be approximately parallel with the barrier or E of merging barrier.

BILL OF MATERIAL

PRODUCT CODE	QTY	DESCRIPTION
B010825	1	Replacement Nose Assembly
B010830	1	Nose Piece Cover
B000303	TBD	Type A Element Assembly
B000708	TBD	Type B Element Assembly
B000706	TBD	Replacement Element Type A
B000708	TBD	Replacement Element Type B
B000520	1	Replacement Transition to PCB
A010420	TBD	Pin Link Hinge Locking
B000520	1	Transition Adapter Assembly
B000209	TBD	Strap Left Adapter
B000207	TBD	Strap Right Adapter
B000611	TBD	Adapter Hinge Plate
A000521	TBD	Anchor Bolt (U-Bolt)
B000518	1	Tapered Adapter
B020421	TBD	I Beam Adapter Female
B020420	TBD	I Beam Adapter Male
C021212	1	Transition to Link

(TBD) = To Be Determined, depending on System Length. (See manufacturer's product manual)

TEST LEVEL	NUMBER OF ELEMENTS	SYSTEM LENGTH (approx.)
TL-2	5	20' - 0"
TL-3	10	35' - 0"

BACKUP SUPPORT
Steel Backup (Attach to Concrete Barriers, Precast or Cast-in-Place)

TRANSITION OPTIONS
Steel Backup to Vertical Wall
Steel Backup to Concrete Traffic Barriers

Required Information
The use of the ABSORB 350 is restricted to a maximum barrier height of 33 inches.

Texas Department of Transportation
Design Division Standard

**BARRIER SYSTEMS
ABSORB 350
CRASH CUSHION
(TEMPORARY, WORK ZONE)
ABSORB-13**

DATE: 08/01/2005	DESIGNER: [Signature]	CHECKED: [Signature]	DATE: 08/01/2005
PROJECT: [Blank]	CONTRACT: [Blank]	SHEET NO: [Blank]	TOTAL SHEETS: [Blank]

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

**CROSSWALK CLOSURES
AND PEDESTRIAN DETOURS**

(SCALE: NOT TO SCALE)
EFF DATE: NOV-27-2023 DWG NO: 01555-16

APPROVED BY:

DocuSigned by: Suhail Karwar CITY ENGINEER	DocuSigned by: KHANG NGUYEN CITY TRAFFIC ENGINEER	DocuSigned by: Carl Haddock DIRECTOR OF HPW
---	--	--



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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

**24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)**

TCP DETAIL
CROSSWALK CLOSURES AND PEDESTRIAN
DETOURS AND BARRIER SYSTEM ABSORB 350

WBS NO. S-000900-0180-3
DRAWING SCALE N/A
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 73 OF 85

Jan 07 2025 10:30AM sd...
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HYPER-CHLORINATED WATER NOTES

1. HYPER CHLORINATED WATER SHALL NOT BE DISCHARGED TO THE STORM SEWER DRAINAGE SYSTEM UNLESS THE CHLORINE CONCENTRATION IS REDUCED TO 4PPM OR LESS BY CHEMICALLY TREATING WITH DECHLORINATE OR BY ON-SITE RETENTION UNTIL NATURAL ATTENUATION OCCUR.
2. DISCHARGE OF HIGH FLOW RATE AND VELOCITIES SHALL BE DIRECTED TO VELOCITY DISSIPATION DEVICES.
3. CHLORINE CAN BURN VEGETATION, SO IT SHOULD NOT BE USED TO WATER VEGETATION THAT IS BEING USED FOR STABILIZATION. VEGETATED FILTERS OR BUFFERS, OR OTHER VEGETATION TO BE PRESERVED.
4. HYPER CHLORINATED WATER MAY BE DISCHARGED TO AN ON-SITE RETENTION AREA UNTIL NATURAL ATTENUATION OCCURS. THE AREA MAY BE A DRY RETENTION, STRONG RETENTION, PACING OR A PORTION OF SITE MAY BE GRADED TO FORM A TEMPORARY BIT OR BERMED AREA.
5. NATURAL ATTENUATION OF CHLORINE MAY BE AIDED BY AERATION. EIGHT CAN BE ADDED TO THE WATER BY DIRECTING THE DISCHARGE OVER A ROUGH SURFACE BEFORE IT ENTERS THE TEMPORARY RETENTION AREA OR AN AERATION DEVICE CAN BE PLACED IN THE RETENTION AREA.
6. ON-SITE DISCHARGE MAY BE REQUIRED SEVERAL HOURS TO A FEW DAYS BEFORE THE WATER IS SAFE TO DISCHARGE. THE RATE AT WHICH CHLORINE WILL IS ATTENUATE BY SOIL CONDITIONS, AND WEATHER CONDITIONS. ATTENUATION WILL OCCUR QUICKEST DURING WARM, SUNNY AND DRY PERIODS.

SPILL AND LEAK RESPONSE NOTES

1. RECORDS OF RELEASES THAT EXCEED THE REPORTABLE QUANTITY (RO) OIL AND HAZARDOUS SUBSTANCES SHOULD BE MAINTAINED IN ACCORDANCE WITH THE FEDERAL AND STATE REGULATIONS.
2. EMERGENCY CONTACT INFORMATION AND SPILL RESPONSE PROCEDURES SHALL BE POSTED IN A READILY AVAILABLE AREA FOR ACCESS BY ALL EMPLOYEES AND SUBCONTRACTORS
3. SPILL CONTAINMENT KIT SHOULD BE MAINTAINED FOR PETROLEUM PRODUCTS AND OTHER CHEMICALS THAT ARE REGULARLY ONSITE, MATERIALS IN KITS SHOULD BE BASED ON CONTAINMENT GUIDELINES IN THE MATERIALS SAFETY AND DATA SHEETS (MSDS) FOR THE SUBSTANCE MOST FREQUENTLY ONSITE
4. SPILL KITS ARE INTENDED FOR RESPONSE TO SMALL SPILLS, TYPICALLY LESS THAN 5 GALLONS, OR SUBSTANCES THAT ARE NOT EXTREMELY HAZARDOUS
5. SIGNIFICANT SPILLS OR OTHER RELEASES WARRANT IMMEDIATE RESPONSE BY TRAINED PROFESSIONALS
6. SUSPECTED JOB SITE CONTAMINATION SHOULD BE IMMEDIATELY REPORTED TO REGULATORY AUTHORITIES AND PROTECTIVE ACTIONS TAKEN.
7. THE CONTRACTOR SHOULD BE REQUIRED TO DESIGNATE A SITE SUPERINTENDENT, FOREMAN, SAFET OFFICER, OR OTHER SENIOR PERSON WHO IS ONSITE DAILY TO BE THE SPILL AND LEAK RESPONSE COORDINATOR (SLRC) AND MUST HAVE KNOWLEDGE OF AND BE TRAINED IN CORRECT SPILL AND LEAK RESPONSE PROCEDURES.

SANITARY WASTE NOTES

1. THE CONTRACTOR SHALL PROVIDE AN APPROPRIATE NUMBER OF PORTABLE TOILETS BASED ON THE NUMBER OF EMPLOYEES USING THE TOILETS AND THE HOURS THEY WILL WORK.
2. SANITARY FACILITIES SHALL BE PLACED A MINIMUM OF 50 FEET AWAY FROM STORM DRAIN INLETS, CONVEYANCE, CHANNELS OR SURFACE WATERS. IF UNABLE TO MEET THE 50 FEET REQUIREMENT DUE TO SITE CONFIGURATION, PORTABLE TOILETS SHALL BE A MINIMUM OF 20 FEET AWAY FROM STORM DRAIN INLETS, CONVEYANCE CHANNELS OR SURFACE WATER AND SECONDARY CONTAINMENT SHALL BE PROVIDED IN CASE OF SPILLS.
3. THE LOCATION OF THE PORTABLE TOILET SHALL BE ACCESSIBLE TO MAINTENANCE TRUCKS WITHOUT DAMAGING EROSION AND SEDIMENT CONTROLS OR CAUSING EROSIONS OR TRACKING PROBLEMS.
4. SANITARY FACILITIES SHALL BE FULLY ENCLOSED AND DESIGNED IN A MANNER THAT MINIMIZES THE EXPOSURE OF SANITARY WASTE TO PRECIPITATION AND STORMWATER RUNOFF.
5. WHEN HICH WINDS ARE EXPECTED, PORTABLE TOILET SHALL BE ANCHORED OR OTHERWISE SECURED TO PREVENT THEM FROM BEING BLOWN OVER.
6. THE COMPANY THAT SUPPLIES AND MAINTAINS THE PORTABLE TOILETS SHALL BE NOTIFIED IMMEDIATELY IF A TOILET IS TIPPED OVER OR DAMAGED IN A WAY THAT RESULTS IN A DISCHARGE. DISCHARGED SOLID MATTER SHALL BE VACUUMED INTO A SEPTIC TRUCK BY THE COMPANY THAT MAINTAINS THE TOILETS.
7. SANITARY FACILITIES SHALL NOT BE PERMITTED ON PUBLIC SIDEWALKS, STREETS OR INLETS.

SUBGRADE STABILIZATION NOTES

1. MINIMIZE THE DISCHARGE OF THE CHEMICAL STABILIZERS BY THE CONTRACTOR BY LIMITING THE AMOUNT OF STABILIZING AGENT ONSITE TO THAT WHICH CAN BE THOROUGHLY MIXED AND COMPACTED BY THE END OF EACH WORKDAY.
2. STABILIZERS SHALL BE APPLIED AT RATES THAT RESULT IN NO RUN OFF.
3. STABILIZATION SHALL NOT OCCUR IMMEDIATELY BEFORE AND DURING RAINFALL EVENTS.
4. NO TRAFFIC OTHER THAN WATER TRUCKS, AND MIXING EQUIPMENT SHALL BE ALLOWED TO PASS OVER THE AREA BEING STABILIZED UNTIL AFTER COMPLETION OF MIXING THE CHEMICALS.
5. AREA ADJACENT AND DOWNSTREAM OF STABILIZED AREA SHALL BE ROUGHENED TO INTERCEPT CHEMICAL RUNOFF AND REDUCE RUNOFF VELOCITY.
6. GEOTEXTILE FABRICS SUCH AS THOSE USED FOR SILT FENCE SHOULD NOT BE USED TO TREAT CHEMICAL RUNOFF, BECAUSE THE CHEMICALS ARE DISSOLVED IN THE WATER AND WON'T BE AFFECTED BY A BARRIER AND THE SUSPENDED SOLIDS ARE SIGNIFICANTLY SMALLER THAN THE APPARENT OPENING SIZE OF THE FABRIC.
7. IF SOIL STABILIZERS ARE STORED ONSITE, THEY SHALL BE CONSIDERED HAZARDOUS MATERIAL AND SHALL BE MANAGED ACCORDING TO THE CRITERIA OF CHEMICAL MANAGEMENT TO CAPTURE ANY ACCIDENTAL LIME OR ANY CHEMICAL OVERFLOW.
8. THE CONTRACTOR SHALL INSTALL BMP'S TO ALL INLETS AND OPENINGS CONNECTED TO THE STORM SEWER SYSTEMS TO PREVENT LIME FROM ENTERING THE MS4 SYSTEM.

DEBRIS AND TRASH NOTES

1. ALL WASTE SOURCES AND STORAGE AREAS SHALL BE LOCATED A MINIMUM OF 50 FEET AWAY FROM INLETS, SWALES, DRAINAGE WAYS, CHANNELS, AND OTHER WATERS, IF THE SITE CONFIGURATION PROVIDE SUFFICIENT SPACE TO DO SO. IN NO CASE SHALL MATERIAL AND WASTE SOURCES BE CLOSURE THAN 20 FROM INLETS, SWALES, DRAINAGE WAYS, CHANNELS, AND OTHER WATERS.
2. CONSTRUCTION WASTE AND TRASH SHALL BE STORED IN A MANNER THAT MINIMIZES IT'S EXPOSURE TO PRECIPITATION AND STORM WATER RUN OFF.
3. WHENEVER POSSIBLE MINIMIZE PRODUCTION OF DEBRIS AND TRASH.
4. INSTRUCT CONSTRUCTION WORKERS IN PROPER DEBRIS AND TRASH STORAGE AND HANDLING PROCEDURES.
5. SEGREGATE POTENTIAL HAZARDOUS WASTE FROM NON-HAZARDOUS CONSTRUCTION SITE DEBRIS.
6. PROHIBIT LITTERING BY WORKERS AND VISITORS.
7. POLICE SITE DAILY FOR LITTER AND DEBRIS.
8. ENFORCE SOLID WASTE HANDLING AND STORAGE PROCEDURES.
9. IF FEASIBLE, RECYCLE CONSTRUCTION AND DEMOLITION DEBRIS SUCH AS WOOD, METAL, AND CONCRETE.
10. TRASH AND DEBRIS SHALL BE REMOVED FROM THE SITE AT REGULAR INTERVALS THAT ARE SCHEDULED TO EMPTY CONTAINERS WHEN THEY ARE 90 PERCENT FULL OR MORE FREQUENTLY.
11. GENERAL CONSTRUCTION DEBRIS MAY BE HAULED TO A LICENSED CONSTRUCTION DEBRIS LANDFILL.
12. USE WASTE AND RECYCLING HAULERS/ FACILITIES APPROVED BY THE LOCAL MUNICIPALITY.
13. CHIPPING OF TREES AND AND BRUSH FOR USE SUCH AS MULCH IS PREFERRED ALTERNATIVE TO OFFSITE DISPOSAL
14. NO WASTE, TRASH OR DEBRIS SHALL BE BURIED, BURNED OR OTHERWISE DISPOSED OF ONSITE.
15. CLEARLY MARK ON ALL DEBRIS AND TRASH CONTAINERS WHICH MATERIALS ARE ACCEPTABLE. FOREMAN AND/OR CONSTRUCTION SUPERVISOR SHALL MONITOR ONSITE SOLID WASTE STORAGE AND DISPOSAL PROCEDURE DAILY.

					APP.
					Revisions
					Date
					No.



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 Kuo & Associates, Inc.
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INTERIM REVIEW ONLY
 THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF RAM GULIANI P.E. 101094 ON 1/7/2025. IT IS NOT TO BE USED FOR CONSTRUCTION

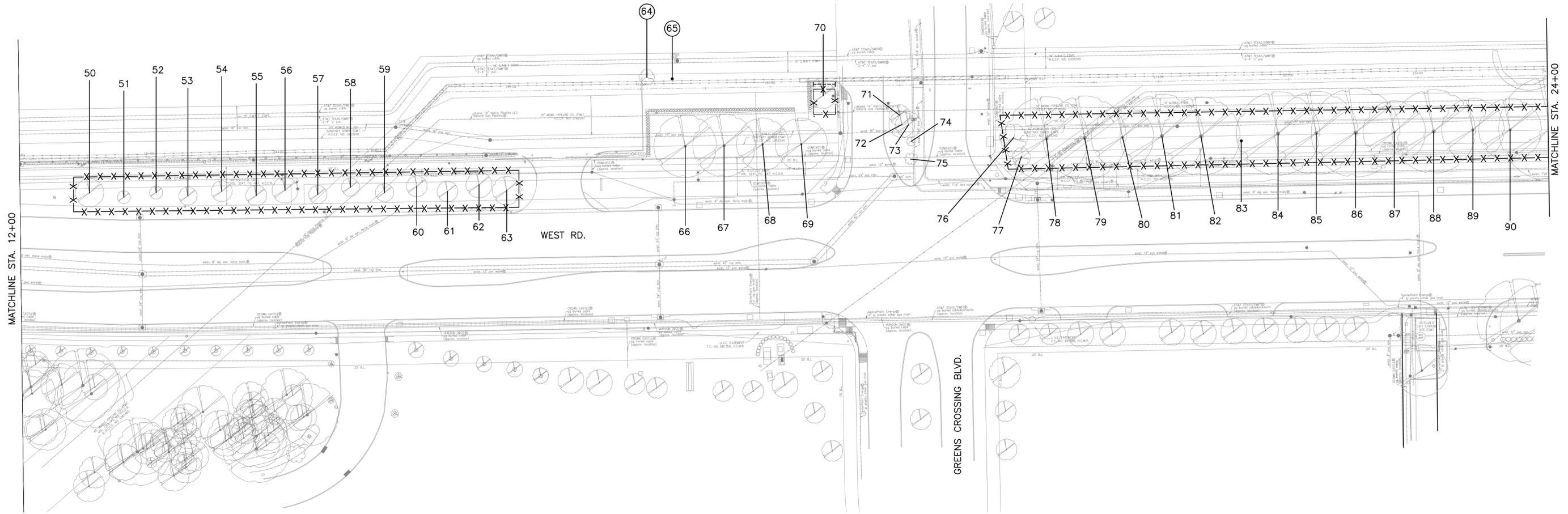
CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

STORM WATER POLLUTION PREVENTION PLAN
 GENERAL NOTES

WBS NO. S-000900-0180-3
DRAWING SCALE N/A
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 75 OF 85

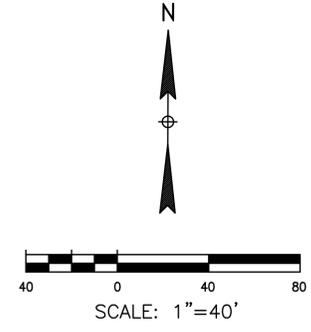
Jan 07 2025 10:30AM and
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 Title: 24INCH Water Line Along West Road From Deer Trail Drive To N. IH 45 (East Row)
 User: Administrator
 Job: 24INCH Water Line Along West Road From Deer Trail Drive To N. IH 45 (East Row)
 Job Path: C:\Users\Public\Documents\Bentley\Drawings\Standard.dwg
 Job Title: 24INCH Water Line Along West Road From Deer Trail Drive To N. IH 45 (East Row)
 Job User: Administrator
 Job Path: C:\Users\Public\Documents\Bentley\Drawings\Standard.dwg
 Job Title: 24INCH Water Line Along West Road From Deer Trail Drive To N. IH 45 (East Row)
 Job User: Administrator



Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
50	302 West Road	11" Sycamore	Private tree		Fence
51	302 West Road	6" Baldcypress	Private tree		Fence
52	302 West Road	5" Baldcypress	Private tree		Fence
53	302 West Road	9" Baldcypress	Private tree		Fence
54	302 West Road	13" Live Oak	Private tree		Fence
55	302 West Road	9" Live Oak	Private tree		Fence
56	302 West Road	12" Live Oak	Private tree		Fence
57	302 West Road	10" Sycamore	Private tree		Fence
58	302 West Road	10" Sycamore	Private tree		Fence
59	302 West Road	9" Sycamore	Private tree		Fence
60	302 West Road	10" Live Oak	Private tree		Fence
61	302 West Road	10" Live Oak	Private tree		Fence
62	302 West Road	11" Live Oak	Private tree		Fence
63	302 West Road	12" Live Oak	Private tree		Fence
64	302 West Road	10" Crepe Myrtle	Private tree	Remove for open cut	Remove tree, No replacement required
65	302 West Road	7" Live Oak	Private tree	Remove for open cut	Remove tree, No replacement required
66	302 West Road	23" Live Oak	Private tree	Not impacted	
67	302 West Road	22" Live Oak	Private tree	Not impacted	
68	302 West Road	19" Live Oak	Private tree	Not impacted	
69	302 West Road	18" Live Oak	Private tree	Not impacted	
70	302 West Road	11" Live Oak	Private tree		Root prune for waterline, Fence, Clearance prune
71	Median	10" Mulberry	Not ordinance tree		
72	Median	6" Wax Myrtle	Not ordinance tree		
73	Median	5" Wax Myrtle	Not ordinance tree		
74	Median	11" Crepe Myrtle	Not ordinance tree		
75	Median	7" Crepe Myrtle	Not ordinance tree		
76	Not available	12" Crepe Myrtle	Private tree		
77	Not available	7" Crepe Myrtle	Private tree		
78	Not available	24" Live Oak	Corridor tree		Fence
79	Not available	27" Live Oak	Corridor tree		Fence
80	Not available	18" Live Oak	Corridor tree		Fence
81	Not available	21" Live Oak	Corridor tree		Fence
82	Not available	23" Live Oak	Corridor tree		Fence
83	Not available	24" Live Oak	Corridor tree		Fence
84	Not available	19" Live Oak	Corridor tree		Fence
85	Not available	22" Live Oak	Corridor tree		Fence
86	Not available	25" Live Oak	Corridor tree		Fence
87	Not available	21" Live Oak	Corridor tree		Fence
88	Not available	26" Live Oak	Corridor tree		Fence
89	Not available	18" Live Oak	Corridor tree		Fence
90	Not available	17" Live Oak	Corridor tree		Fence

NOTE:

- THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED NOVEMBER 2024. THE PLAN CONSIDERS ALL FITTINGS, VERTICAL OFFSETS AND AREAS OF NECESSARY EXCAVATION. CHANGES MADE TO DESIGN MAY COMPROMISE THE TREE PROTECTION PLAN. REFER SPECIFICATIONS 01562 AND 02915.
- CN KOEHL URBAN FORESTRY, INC. HAS NOT BEEN CONTRACTED TO COMPLETE ANY TREE RISK ASSESSMENTS ON THIS PROJECT—THIS TPP INCLUDES PROTECTION MEASURES FOR SPECIES OF TREES PROTECTED BY APPLICABLE ORDINANCE ONLY. CN KOEHL URBAN FORESTRY, INC. DOES NOT GUARANTEE CONDITION OR STRUCTURAL INTEGRITY OF ANY TREE LOCATED ON OR ADJACENT TO THIS PROJECT.
- IN AREAS WHERE INDIVIDUAL TREES HAVE NOT BEEN TIED IN BY SURVEY, APPROXIMATE LOCATION IS INDICATED ON TPP WITH A DOT AND TREE NUMBER. ACCURACY OF REPRESENTED LOCATION IS NOT GUARANTEED BY CN KOEHL URBAN FORESTRY, INC.
- THE CONTRACTOR'S ARBORIST WILL MARK LOCATIONS OF TREES TO BE PLANTED AND OBTAIN APPROVAL BY CITY ENGINEER AND CITY FORESTER BEFORE PURCHASING OR EXCAVATING PLANTING HOLE OF EACH TREE.



	TREE NUMBER/LOCATION
	TREE TO BE REMOVED
	TREE PROTECTION FENCE
	ROOT PRUNING TRENCH



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CITY OF HOUSTON
 HOUSTON PUBLIC WORKS
 24-INCH WATER LINE ALONG WEST ROAD
 FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TREE PROTECTION PLAN
 SHEET 2 OF 5

WBS NO. S-000900-0180-3
DRAWING SCALE 1"=40'-0"
CITY OF HOUSTON PM ADAM SABZEVARI
SHEET NO. 81 OF 85

Jan 02 2025 8:31PM Wed 10:00 WEST 80x110 WEST 10x10 TP 2-A-401
 Includes: Xref(0), Title-24h, W, West, Rd- Add, annotations, Topo-24002-C01, Standards.dwg, 24002_West road-Plan.dwg

App.	
Revisions	
Date	
No.	

Tree Removal List				
Tree No.	Location	Description		Replacement requirement
11	Alief ISD	25" Live Oak		0
12	Alief ISD	26" Live Oak		0
13	Alief ISD	25" Live Oak		0
14	Alief ISD	13" Live Oak		0
15	Alief ISD	28" Live Oak		0
16	Alief ISD	30" Live Oak		0
17	Alief ISD	27" Live Oak		0
18	Alief ISD	23" Live Oak		0
19	Alief ISD	24" Live Oak		0
20	Alief ISD	23" Live Oak		0
22	400 West Road	20" Live Oak		0
23	400 West Road	21" Live Oak		0
24	400 West Road	18" Live Oak		0
25	400 West Road	23" Live Oak		0
26	400 West Road	17" Live Oak		0
27	400 West Road	22" Stump		0
28	400 West Road	24" Stump		0
29	400 West Road	24" Stump		0
30	400 West Road	23" Live Oak		0
31	400 West Road	26" Live Oak		0
32	400 West Road	21" Live Oak		0
33	400 West Road	19" Live Oak		0
34	400 West Road	18" Live Oak		0
35	400 West Road	20" Live Oak		0
36	400 West Road	20" Live Oak		0
37	400 West Road	18" Live Oak		0
38	400 West Road	22" Live Oak		0
39	400 West Road	19" Live Oak		0
40	400 West Road	20" Live Oak		0
41	400 West Road	23" Live Oak		0
46	302 West Road	20" Live Oak		0
47	302 West Road	8" Live Oak		0
48	302 West Road	11" Live Oak		0
49	302 West Road	10" Live Oak		0
64	302 West Road	10" Crepe Myrtle		0
65	302 West Road	7" Live Oak		0
110	211 West Rd	16" Live Oak		0
126	Not available	15" Live Oak		0
127	Not available	18" Live Oak		0
128	Not available	10" Live Oak		0
129	Not available	17" Live Oak		17
TOTAL REPLACEMENT INCHES REQUIRED				17

Tree Replacement List			
Quantity	Caliper Size	Species	Container/Tree Spade size
TOTAL REPLACEMENT INCHES INCLUDED IN PLAN			0

NOTE: Tree replacement locations are not shown on plans. Contractor must coordinate with City of Houston Urban Forestry and Houston Public Works prior to PURCHASING trees. This project may not have adequate room for all required replacement trees without creating regulatory sign or traffic/pedestrian visibility issues. Number of trees and planting locations will be determined by City of Houston Urban Forestry in construction phase. Trees that are planted are to be maintained and watered for 2 years following planting per standard spec 02915. 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. Trees in esplanade groupings to be planted in common bed with 4" of hardwood mulch between trees.

Trees are to be maintained and watered for 2 years following planting per standard spec 02915. Timing of planting may be delayed in periods of drought with mandatory water restrictions in place-timing to be coordinated with City of Houston Forestry.

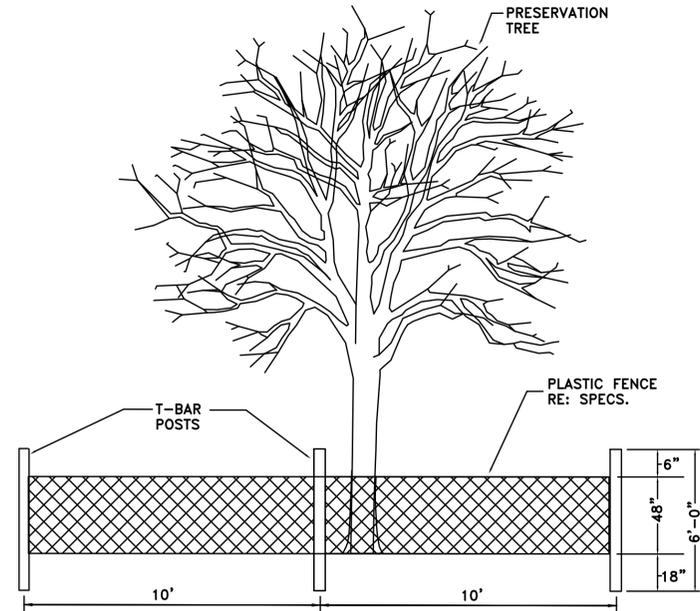
Tree replacement locations shall comply with Houston Public Works spec sections 02811, 02911, 02912, 02915, 02921 & 02922. In general trees along sides of street right of ways shall be no closer than 3' to back of curb or 20' from another tree. Trees in medians shall be no closer than 6' back of curb, 75' from an intersection, 50' to a median cut, or 20' from another tree. Contractor to coordinate locations with City Forestry and HPW prior to PURCHASING trees. All replacement trees called out on plans may not be planted on project relative to coordination with listed parties.

Cash Allowance Due Parks from HPW for Balance of Mitigation Not Planted on Project

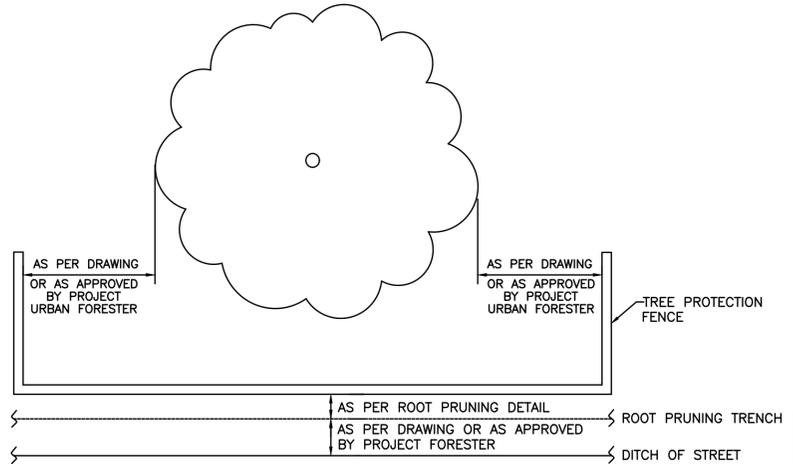
	Required Mitigation total	Mitigation rate/inch	
0-5.99"		289.47	\$ -
6-11.99"		482.47	\$ -
12" +	17	643.3	\$ 10,936.10
TOTAL REQUIRED MITIGATION FEE			\$ 10,936.10

Arboriculturally Significant Tree List		
Tree No.	Location	Description
11	400 West Road	25" Live Oak
12	400 West Road	26" Live Oak
13	400 West Road	25" Live Oak
15	400 West Road	28" Live Oak
16	400 West Road	30" Live Oak
17	400 West Road	27" Live Oak
19	400 West Road	24" Live Oak
31	400 West Road	26" Live Oak
43	400 West Road	24" Live Oak
78	Not available	24" Live Oak
79	Not available	27" Live Oak
83	Not available	24" Live Oak
86	Not available	25" Live Oak
88	Not available	26" Live Oak
91	Not available	27" Live Oak
92	Not available	27" Live Oak
95	Not available	25" Live Oak
102	Not available	27" Live Oak
104	Not available	31" Live Oak
107	Not available	33" Live Oak
113	211 West Rd	31" Live Oak
116	211 West Rd	27" Live Oak

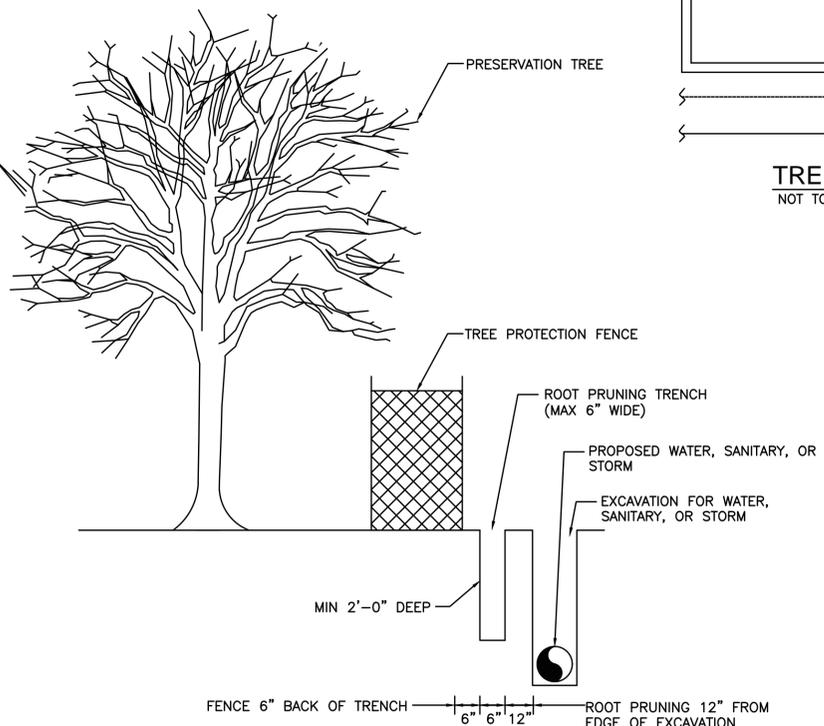
Trees Identified by City of Houston Forestry/Parks & Recreation Department as Arboriculturally Significant are identified here and/or in treatment schedule included on TPP sheets. Arboriculturally Significant trees are to be pruned under direct supervision of City of Houston Forestry. Minimal pruning will be allowed for construction equipment access, and in some cases no pruning will be allowed. Contractor must review conditions around and/or under the canopy of Arboriculturally Significant trees and consider restrictions when preparing cost estimate and planning construction equipment that will be necessary to accomplish design installation with minimal to no tree pruning.



TREE PROTECTION FENCING DETAIL A
NOT TO SCALE



TREE PROTECTION FENCING DETAIL B
NOT TO SCALE



ROOT PRUNE FOR WATER, SANITARY, OR STORM LINE
NOT TO SCALE



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CITY OF HOUSTON
HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD
FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

TREE PROTECTION PLAN
SHEET 5 OF 5

WBS NO. S-000900-0180-3
DRAWING SCALE 1"=40'-0"
CITY OF HOUSTON PM ADAM SABZEYARI
SHEET NO. 84 OF 85

Jan 02 2025 6:32PM Wed 10 WEST PROJ\1010 WEST PROJ - 5.dwg
 Inc:Kuo, A, M, S, T, W, West, R, Add, amichang

APP.
Revisions
No.
Date

1. PAVING
(FOR H.C. PUBLIC R.O.W. ONLY)

DESIGN THICKNESS OF PAVING (IN.)	STABILIZED SUBGRADE DEPTH (IN.)	DESIGN STRENGTH OF CONCRETE (PSI)	STEEL SPACING LONG (IN.)	SPACING TRANS. (IN.)

DRIVEWAYS (in H.C. ROW only)

DRWY	WIDTH	MATERIAL	CULVERT?	NEAREST X-STREET	DIST. TO X-STREET
1					
2					
3					
4					
5					

II. HARRIS COUNTY STANDARD DRIVEWAY DETAIL APPEARS ON SHEET _____

FIRE APPARATUS ACCESS ROAD

REQUIRED AND SHOWN ON SHEET(S) _____
 NOT REQUIRED DUE TO _____

CURBING

I. ISLANDS AND MEDIANS REQUIRE STANDARD 6" CURBING
 STANDARD 6" CURBING PROPOSED
 4" x 12" CURBING PROPOSED EXCEPT AT MEDIANS AND ISLANDS

TRAFFIC CONSIDERATIONS

I. MEDIAN CUTS
 NO MEDIAN CUT OR RELOCATION IS PROPOSED
 MEDIAN MODIFICATIONS ARE SHOWN ON SHEET _____

II. LEFT / RIGHT TURN LANE
 NO LEFT / RIGHT TURN LANE IS PROPOSED
 LEFT / RIGHT TURN LANE IS SHOWN ON SHEET _____

III. TRAFFIC CONTROL PLAN
 NO WORK IN THE RIGHT OF WAY IS PROPOSED THAT WOULD INTERFERE WITH TRAFFIC FLOW
 TRAFFIC CONTROL SHOWN ON SHEET _____

IV. TRAFFIC SIGNAL
 NO TRAFFIC SIGNAL IS EXISTING / PROPOSED
 EXISTING TRAFFIC SIGNAL DEVICES (T.C. BOXES AND LOOPS) SHOWN ON SHEET _____
 PROPOSED TRAFFIC SIGNAL (BY OTHERS) _____

V. TRAFFIC IMPACT ANALYSIS
 NO TRAFFIC IMPACT ANALYSIS IS REQUIRED
 TRAFFIC IMPACT ANALYSIS HAS BEEN APPROVED ON DATE: _____
 PLAN TITLE: _____
 HCPID PROJECT NO.: _____

2. RESIDENTIAL / SUBDIVISION DRAINAGE

I. PROPOSED DRAINAGE SYSTEM TYPE
 STORM SEWER
 ROADSIDE DITCH
 LOW IMPACT DEVELOPMENT (LID)

II. DESIGN METHOD USED
 CITY OF HOUSTON _____ YEAR FREQUENCY
 OTHER: _____

III. DRAINAGE SYSTEM OUTFALLS DIRECTLY TO EXISTING
 DETENTION POND (APPROVED H.C. PRJ NO.): _____
 DETENTION POND MAINTAINED BY: _____
 HCFCD DRAINAGE DITCH UNIT NO.: _____
 H.C. ROADSIDE DITCH (ROAD NAME): _____
 H.C. STORM SEWER (APPROVED H.C. PRJ NO.): _____

IV. H.C. OUTFALL CALCULATIONS
 ROADSIDE DITCH OUTFALL:
 ALLOWABLE OUTFALL RATE: 0.0027 x _____ LF Frontage = _____ (CFS)
 PROPOSED OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET _____
 STORM SEWER OUTFALL:
 CAPACITY ALLOCATED TO TRACT FROM D. A. MAP: _____ (CFS)
 FROM DRAINAGE AREA MAP DATED: _____
 PREPARED BY: _____
 APPROVED H.C. PROJECT NO.: _____
 ACTUAL OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET _____

V. DETENTION PROVIDED BY
 DETENTION BASIN IS PART THIS PLAN SET. SERVICE AREA MAP IS ON SHEET _____
 REGIONAL DETENTION BASIN SYSTEM (APPROVED H.C. PRJ NO.): _____

PROPOSED STORM SEWER IS SUBMERGED (AGREEMENT MUST BE PROVIDED).
 STATIC W.S.E. @ OUTFALL IS _____

OFFSITE SHEET FLOW: (100 YEAR)

OFFSITE SHEET FLOW MAPPING, TOTAL DISCHARGE CALCULATIONS, AND DESIGN ACCOMMODATIONS ARE SHOWN ON SHEET _____ OR AS PRESENTED IN THE APPROVED DRAINAGE STUDY ENTITLED _____

TOTAL AGREEMENT = _____
 TOTAL DISCHARGE = _____

NOTE: ALL OFFSITE SHEET FLOW FROM ADJACENT PROPERTIES MUST BE IDENTIFIED AND PROPERLY ACCOUNTED FOR IN THE PROJECT. THE SIGNING ENGINEER HEREBY CERTIFIES THAT THESE AREAS HAVE BEEN ADDRESSED.

3. COMMERCIAL / OTHER SITE DRAINAGE

I. PROPOSED DRAINAGE AREA
 NEW DEVELOPMENT AREA:
 RE-DEVELOPMENT AREA (AMOUNT INCREASED IMPERVIOUS AREA): _____
 LOW IMPACT DEVELOPMENT (LID)

II. DETENTION VOLUME
 .55 (CHANNEL)
 .65 (STM SWR)
 1.00 (RD. DITCH)
 OTHER: _____

NEW AREA * = _____ ACRE FEET
 DETENTION REQUIRED * = _____

PROPOSED DETENTION VOLUME = _____ ACRE FEET
 PROPOSED DETENTION VOLUME CALCULATIONS ARE SHOWN ON SHEET _____

DETECTION VOLUME PROVIDED BY EXISTING DETENTION POND APPROVED H.C. PROJECT NO.: _____
 DETENTION POND SERVICE AREA MAP IS PROVIDED ON SHEET _____

III. OUTFALL
 OUTFALL TO _____
 H.C. ROADSIDE DITCH
 EXISTING H.C. STORM SEWER
 OTHER _____

ROADSIDE DITCH OUTFALL:
 ALLOWABLE OUTFALL RATE: 0.0027 x _____ LF Frontage = _____ (CFS)
 PROPOSED OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET _____

STORM SEWER OUTFALL:
 CAPACITY ALLOCATED TO TRACT FROM D. A. MAP: _____ (CFS)
 FROM DRAINAGE AREA MAP DATED: _____
 PREPARED BY: _____
 APPROVED H.C. PROJECT NO.: _____
 ACTUAL OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET _____

IV. PUMPED DETENTION FACILITIES
 VOLUME THAT GRAVITY FLOWS: _____ ACRE FEET
 VOLUME THAT IS PUMPED: _____ ACRE FEET
 ENTRANCE VELOCITY INTO ROADSIDE DITCH OR STORM SEWER _____
 PUMP SPECIFICATIONS AND AUTOMATIC SHUTOFF PLAN FOR ROADSIDE DITCH & STORM SEWER OUTFALLS APPEAR ON SHEET _____

V. FLOW RESTRICTOR SIZE
 OUTFALL PIPE SIZE: _____
 RESTRICTOR PIPE SIZE: _____

NOTE: ALL ROADSIDE DITCH OUTFALLS REQUIRE EROSION CONTROL MEASURES. RIPRAP IS NOT ALLOWED AS AN EROSION CONTROL MEASURE IN HARRIS COUNTY ROW. ALL PUMPED DETENTION OUTFALLS TO ROADSIDE DITCHES REQUIRE MANHOLE W/ LEADS.

4. WATER AND WASTEWATER

I. COMMERCIAL PROJECTS
 DOES PROPERTY HAVE EXISTING AND/OR PROPOSED UTILITIES?
 YES NO

IF YES, CHECK THE BOX THAT APPLIES TO THIS PROJECT
 PUBLIC WATER & SANITARY
 PRIVATE WATER WELL & SEPTIC SYSTEM
 PUBLIC WATER & PRIVATE SEPTIC SYSTEM
 PRIVATE WATER WELL & PUBLIC SANITARY

NOTE: PUBLIC UTILITIES REQUIRE A LETTER FROM THE DISTRICT/ MUNICIPALITY AUTHORIZING SERVICE & CONNECTION. THIS IS REQUIRED FOR PLAN APPROVAL.
 UTILITY DISTRICT/MUNICIPALITY NAME: _____
 H.C. SEPTIC PERMIT/REQUEST NO.: _____

NOTE: SEPTIC SYSTEMS REQUIRE H.C. WASTE WATER REVIEW

H.C. WASTE WATER REVIEWER APPROVAL
 NAME & DATE: _____
 REVIEWER COMMENTS: _____

NOTE: ALL EXISTING AND PROPOSED UTILITIES MUST BE ACCURATELY SHOWN & LABELED ON THE SITE PLANS.

II. SUBDIVISION PROJECTS
 UTILITY DISTRICT/MUNICIPALITY NAME: _____
 PRIVATE WATER & WASTE WATER SYSTEMS
 PRIVATE WATER & INDIVIDUAL OSSF
 INDIVIDUAL WATER WELL & OSSF

NOTE: A COPY OF TCEQ APPROVAL FOR PRIVATE WATER & WASTE WATER SYSTEMS IS REQUIRED FOR PLAN APPROVAL.

5. DESCRIPTION OF PROPERTY

I. LEGAL DESCRIPTION
 A. ACREAGE: _____

B. SUBDIVISION: _____

C. ADJACENT ROADS: _____

II. PLATTING
 A. SUBDIVISION PLAT
 PROPOSED PLAT / REPLAT
 RECORDED PLAT / REPLAT
 PLAT NAME: _____

B. STREETS PROPOSED
 PUBLIC
 PRIVATE
 PUBLIC & PRIVATE
 NONE

H.C. PLAT NUMBER: _____

III. JURISDICTIONS
 CITY OF HOUSTON
 ETJ, CITY OF HOUSTON
 ETJ, CITY OF _____
 NO ETJ

IV. HCAD ACCOUNT NOS. (ALL)

V. UNOBSTRUCTED VISIBILITY EASEMENT (U.V.E.)
 REQUIRED AND SHOWN ON SHEET(S) _____
 NOT REQUIRED

NOTE: ALL APPROVED, FINAL PLATS AND ASSOCIATED CPC101 FORMS MUST BE INCLUDED WITH PLAN SUBMITTAL.

6. STORM WATER QUALITY

I. SWPPP: CONSTRUCTION MEASURES (Complete for ALL projects)
 DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S) _____
 DISTURBS <1AC. N/A

II. APPLICABILITY FOR PERMANENT FEATURES. (must be completed on all projects)
 EXEMPT NEW DEVELOPMENT:
 PROJECT IS ON A PARCEL LESS THAN 5 ACRES. (must be verified with plat)
 EXEMPT REDEVELOPMENT:
 PROJECT DOES NOT MEET THE DEFINITION OF SIGNIFICANT REDEVELOPMENT (Part A, EXEMPT GRANDFATHERED:
 (FOR VERIFICATION: PROVIDE ORIGINAL DRAINAGE AREA MAP INCLUDING CALCULATIONS)

GENERAL:
 PROJECT'S SWQ REQUIREMENTS LIE IN AN INCORPORATED CITY OF _____

STORM WATER QUALITY PERMIT REQUIREMENT FOR THIS PROJECT IS COVERED BY PROJECT TITLE: _____ & SWQ PERMIT NO. _____

STORMWATER QUALITY MANAGEMENT PLAN:
 SITE PLAN ON SHEET(S) _____

III. PERMANENT SWQ FEATURES. (COMPLETE IF NOT EXEMPT)
 VEGETATIVE CONTROLS USED: (FILTER STRIP, GRASSY SWALE, URBAN FORESTRY) DETAILS AND CALCULATIONS APPEAR ON SHEET(S) _____
 POND STRUCTURE USED (WET, DRY, WETLANDS) DETAILS AND CALCULATIONS APPEAR ON SHEET(S) _____
 HYDRODYNAMIC-TYPE SEPARATOR MODEL: _____
 OTHER(S): _____

HCED SIGNATURE BLOCK

124-INCH WATER LINE ALONG WEST ROAD FROM
 PROJECT NAME: DEER TRAIL DR. TO N. IH 45 (EAST ROW). WBS NO. S-000900-0180-3
 ADDRESS: _____

WAS ACCEPTED BY THE FOLLOWING GROUPS FOR THE PURPOSES LISTED BELOW:

ENGINEERING DIVISION

BY _____ INTERPOSE NO OBJECTION DATE _____
 BY _____ AS TO LOCATION OF ITEMS IN COUNTY RIGHT OF WAY DATE _____
 BY _____ AS TO PAVING AND/OR DRAINAGE ONLY DATE _____
 BY _____ AS TO STORM WATER QUALITY DATE _____

ADDITIONAL COMMENTS: _____

HARRIS COUNTY FLOOD CONTROL DISTRICT

INTERPOSE NO OBJECTION
 BY _____ FOR ITEMS LOCATED OUTSIDE OF HCFCF RIGHT-OF-WAY DATE _____
 APPROVED: _____
 BY _____ FOR ITEMS LOCATED WITHIN EXISTING HCFCF RIGHT-OF-WAY DATE _____
 APPROVED: _____
 BY _____ FOR ITEMS LOCATED WITHIN PROPOSED HCFCF RIGHT-OF-WAY DATE _____
 APPROVED: _____

ADDITIONAL COMMENTS: _____

THE PROJECT WAS REVIEWED. HOWEVER, THIS DOES NOT MEAN THE ENTIRE PROJECT, INCLUDING ALL SUPPORTING DATA AND CALCULATIONS HAVE BEEN COMPLETELY CHECKED AND VERIFIED. THESE DRAWINGS ARE SIGNED, DATED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS, WHICH THEREFORE CONVEYS THE ENGINEER'S RESPONSIBILITY AND ACCOUNTABILITY. THIS DOES NOT RELIEVE ANY PARTY FROM COMPLYING WITH APPROPRIATE FEDERAL, STATE AND LOCAL ENVIRONMENTAL, RULES, LAWS, AND REGULATIONS AND ANY OTHER LEGALLY ADOPTED REGULATION OR ORDINANCE RELATED TO LAND DEVELOPMENT. IF THE CITY SIGNATURES ARE REQUIRED BY ORDINANCE, COUNTY PERMITS WILL NOT BE ISSUED UNTIL SUCH SIGNATURES ARE OBTAINED. THESE SIGNATURES ARE VALID FOR A MAXIMUM OF TWO YEARS.

ENGINEER'S CERTIFICATION

I, _____, A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, DO HEREBY CERTIFY THAT THE INFORMATION PRESENTED ON THIS SHEET IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND THAT I AM NOT VIOLATING ANY PROVISION OF THE CURRENT TEXAS ENGINEERING PRACTICE ACT AND RULES CONCERNING THE PRACTICE OF ENGINEERING AND PROFESSIONAL ENGINEERING LICENSURE.

ANY VIOLATIONS WILL BE FORWARDED TO THE HARRIS COUNTY DISTRICT ATTORNEY'S OFFICE FOR PROSECUTION. THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS 1 THRU 85. **SEAL**

SIGNATURE _____ DATE _____

7. FLOOD CONTROL DISTRICT CRITERIA

I. DETENTION SUMMARY

RAINFALL EVENT PROBABILITY (10-YEAR)	PRE-DEVELOPED PEAK RUNOFF (CFS)	POST-DEVELOPED PEAK RUNOFF (CFS)	DETECTION BASIN PEAK OUTFLOW (CFS)	MAXIMUM WATER SURFACE ELEVATION	STORAGE VOLUME (AC-FT)	STORAGE RATE (AC-FT PER AD)
1% EXCEEDANCE (10-YEAR)						
1% EXCEEDANCE (100-YEAR)						

ADDITIONAL CRITERIA FOR PUMPED DETENTION BASINS:
 VOLUME OF PUMPED 1% EXCEEDANCE STORAGE VOLUME _____ AC-FT = _____ % OF TOTAL VOLUME
 MAXIMUM DESIGN OUTFLOW VELOCITY INTO HCFCF CHANNEL _____ FT/SEC.
 DRAIN TIME FOR BASIN _____ HOURS BASED ON _____ HEAD CONDITIONS.

STORMWATER DRAINAGE DESIGN REPORT

REPORT TITLE _____
 REPORT DATE _____
 DATE OF ACCEPTANCE BY HCFCF OR FLOODPLAIN ADMINISTRATOR _____ HCFCF PROJECT # _____

STORMWATER DETENTION FOR THE PROPOSED WORK CONTAINED IN THESE PLANS IS PROVIDED BY OTHER PLANS:
 PLAN TITLE _____
 ENGINEERING FIRM _____ DATE SIGNED BY HCFCF _____ HCFCF PROJECT # _____

II. HCFCF STANDARD NOTES: SEE SHEET _____ OF THESE PLANS.

III. HCFCF STANDARD DETAILS: SEE SHEET _____ OF THESE PLANS.

IV. REFER TO PLAN SHEETS 43 & 44 FOR EXISTING AND PROPOSED RIGHT OF WAY DELINEATION AND COMPLETE RECORDING INFORMATION TO INCLUDE CLERK'S FILE NUMBERS, TYPE OF ESTATE (E.G., DRAINAGE EASEMENT, FEE STRIP, ETC.) AND GRANTEE (E.G., COH, HCFCF, PUBLIC, TXDOT, ETC.)

NOTES:
 I. COMPLETE ONLY IF HCFCF OR HARRIS COUNTY IS REQUIRING DETENTION.
 II. COMPLETE ONLY IF PROJECT HAS WITHIN IT OR IS IMMEDIATELY ADJACENT TO AN EXISTING OR PROPOSED HCFCF MAINTAINED CHANNEL, OR DETENTION BASIN.
 III. COMPLETE ONLY IF PROJECT INCLUDES NEW OUTFALL, BACKSLOPE INTERCEPTOR OR OTHER RELATED WORK WITHIN AN EXISTING OR PROPOSED HCFCF MAINTAINED CHANNEL OR DETENTION BASIN.
 IV. COMPLETE ONLY IF PROJECT HAS WITHIN OR IMMEDIATELY ADJACENT TO AN EXISTING OR PROPOSED PUBLIC DRAINAGE CHANNEL OR DETENTION BASIN.

8. FLOOD PLAIN STATUS

I. GENERAL INFORMATION
 FIRM PANEL(S) FOR PROPERTY: 482010470L
 FIRM PANEL(S) DATE: JUNE 18, 2007
 STATUS OF PROPERTY ON MAP
 ENTIRELY LOCATED IN UNSHADED ZONE "X"
 LOCATED PARTIALLY OR ENTIRELY IN ANY "A" ZONE OR SHADED ZONE "X", DELINEATE FLOODPLAIN BOUNDARY ON CONSTRUCTION DRAWINGS (DRAINAGE LAYOUT PG. NO. _____) (BASE FLOOD LEVEL _____)
 LOCATED IN THE 10-YEAR FLOODPLAIN
 SITE REMOVED FROM FLOODPLAIN BY LOMR, LOMR-F, LOMA CASE NO. _____ REVISED FLOODPLAIN IS SHOWN ON SHEET _____

ELEVATION INFORMATION
 BENCHMARK USED
 HARRIS COUNTY FLOODPLAIN REFERENCE MARK
 HARRIS-GALVESTON COASTAL SUBSIDENCE DISTRICT BENCHMARK (FOR COASTAL AREAS)
 DESCRIPTION OF BENCHMARK INCLUDING ELEVATION, DATUM AND YEAR OF ADJUSTMENT (2001 ADJ.) _____ CITY OF HOUSTON MONUMENT _____

II. FLOOD PLAIN DETERMINATION BASED ON GROUND ELEVATION
 PROPERTY LIES ENTIRELY ABOVE THE BASE FLOOD LEVEL AND IN SHADED ZONE "X"
 PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE BASE FLOOD LEVEL

III. FLOODPLAIN STORAGE SUMMARY (APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FLOODPLAIN AS DELINEATED BY FIRM PANEL)
 A. TOTAL VOLUME OF MATERIAL PROPOSED TO BE MOVED OR PLACED WITHIN THE FIRM DELINEATED FLOODPLAIN (FILL, BASE, CONCRETE, ASPHALT, ETC.): _____
 B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM DELINEATED FLOODPLAIN: _____
 I.E., BELOW ELEVATION _____ (2001 ADJ.) _____ CUBIC YARDS
 C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET _____

NOTES:
 I. COMPLETE FOR ALL PROJECTS
 II. COMPLETE ONLY IF PROJECT IS ADJACENT TO 100-YEAR FLOOD PLAIN

IV. CLOMR REQUIRED CLOMR REQUIRED VERIFIED BY: _____

FOR PROJECTS LOCATED IN ANY LOCATIONS:
 Development constructed or placed in accordance with these plans will comply with all provisions of the Regulations of Harris County, Texas for Floodplain Management. No new O&M activities in the flood plain and no O&M activities in the flood plain.
FOUNDATION NOTES: (Apply to each building or building addition regarding a class II permit)
 All water towers, basements, air conditioning units, electrical distribution panels, and any other mechanical or electrical equipment must be elevated in accordance with Section 414 of Harris County Floodplain regulations.
 All critical electrical serving a light switch or meter located below the base (100-year) flood elevation shall be dropped from above and be a separate feeder.
 All materials used below the 100-year base flood elevation are on approved FEMA Technical Bulletin 2004 or Class 5 water-resistant, and approved in accordance with FEMA Technical Bulletin 2004 foundation openings.
 If the property is located within the designated 100-year floodplain or one-year floodplain of construction up to twenty (20) inches above the base flood elevation must use minimum concrete or steel. These materials must be used for piers, columns and foundation walls.
 Construction of critical care facilities on land located below the base (100-year) flood elevation in the 100-year flood plain or within the base (100-year) flood plain shall have the base flood elevation in three (3) feet more above the base flood elevation.
 Floodproofing and sealing measures must be taken to ensure that non-substances will not be displaced by or released into floodwaters.
 Access routes elevated to or above the level of the base flood shall be provided to all critical facilities in the event possible.
 Temporary structures (Elevations) in the floodplain or one-year floodplain of construction up to twenty (20) inches or within the base flood elevation must use minimum concrete or steel. These materials must be used for piers, columns and foundation walls.
 Floodproofing and sealing measures must be taken to ensure that non-substances will not be displaced by or released into floodwaters.
 The County Engineer's Office will post flood inspection notices on the structures once all requirements have been met.

9. WORK IN HCFCF RIGHT-OF-WAY

I. TYPE OF WORK TO BE PERFORMED IN CHANNEL
 OUTFALL
 UTILITY CROSSING
 ROADWAY BRIDGE / CULVERT CROSSING
 FILL ACTIVITY
 REHABILITATION OF CHANNEL
 MAINTENANCE
 TEMPORARY CROSSING
 OTHER _____

24-INCH WATER LINE

II. USAGE ENVIRONMENTAL PERMIT
 US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER(S) _____
 US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMITS _____
 OTHER _____
 NO PERMITS REQUIRED
 EXPLAIN: _____

III. REFERENCE / BASIS OF DETERMINATION
 ENVIRONMENTAL CONSULTANT REPORT BY REPORT TITLE _____ REPORT DATE _____
 OTHER _____

NOTES:
 I. - II. REQUIRED ON PROJECTS WITH WORK IN A HCFCF CHANNEL. PLEASE REFERENCE SECTION 17 OF THE FLOOD CONTROL DISTRICT POLICY, CRITERIA, AND PROCEDURE MANUAL FOR MORE INFORMATION.

10. PERMITS REQUIRED

DOES THE PROPERTY HAVE ANY VIOLATIONS? IF SO PLEASE PROVIDE ALL VIOLATION NUMBERS.

TO BE FILLED OUT BY HARRIS COUNTY
 STORM WATER QUALITY
 SEPTIC (EXISTING) SEPTIC (PROPOSED)
 CIVIL SITE WORK (PHASE II PERMIT CLASS I (non-floodplain))
 CIVIL SITE WORK (PHASE II PERMIT CLASS II (floodplain))
 DRIVEWAY WITH CULVERT _____ CURB AND GUTTER _____
 BUILDING PERMITS (NO. OF BUILDINGS = _____) CRITICAL FACILITY
 SUBDIVISION INFRASTRUCTURE PHASE II (NO. OF LOTS = _____)
 NOTICE OF DETENTION AFFIDAVIT REQUIRED
 MUD MAINTENANCE AGREEMENT REQUIRED
 HCFCF ROW NOTIFICATION PERMIT REQUIRED
 NOTES: PROPOSED 24-INCH WATER LINE _____

WORK IN HARRIS COUNTY R.O.W.
 UTILITY WORK
 LEFT TURN LANE
 OTHER CONSTRUCTION _____

11. CURB RAMPS
 A. ARE CURB RAMPS THAT CONNECT TO PUBLIC STREETS PROPOSED IN THIS SET OF PLANS? [] YES [X] NO

12. LANDSCAPING
 REQUIRED AND SHOWN ON SHEET(S) _____
 NOT REQUIRED

REVISIONS

NOTE: REVISION BLOCK IS TO BE USED ONLY FOR CHANGES MADE AFTER PLANS HAVE BEEN APPROVED BY HARRIS COUNTY.

DATE	SHEET NO.	DESCRIPTION	P.E. INITIAL	H.C. APPROVED DATE

HARRIS COUNTY PROJECT NO. 1802260128 SHEET NUMBER _____ OF _____

HARRIS COUNTY ENGINEERING DEPARTMENT REVIEW SHEET

KUO & associates
 Consulting Engineers & Surveyors
 13300 Westfield Dr., Ste 800, Houston, Texas 77042
 Tel: 713-975-8769, Fax: 713-975-0920
 www.kuoassociates.com
 Texas Firm Registration No. F-4578
 TPUS Firm Registration No. 10075600

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF
KIRAN V. PUNYAMANTHULA, P.E.
 TEXAS REG. NO.: 116965
 ON 01/13/2025
 IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES

CITY OF HOUSTON
 HOUSTON PUBLIC WORKS
24-INCH WATER LINE ALONG WEST ROAD FROM DEER TRAIL DRIVE TO N. IH 45 (EAST ROW)

HARRIS COUNTY EXPRESS REVIEW SHEET

WBS NO. S-000900-0180-4
 DRAWING SCALE
 NOT TO SCALE
 CITY OF HOUSTON PM
 ADAM SABZEVARI
 SHEET NO. 85 OF 85

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