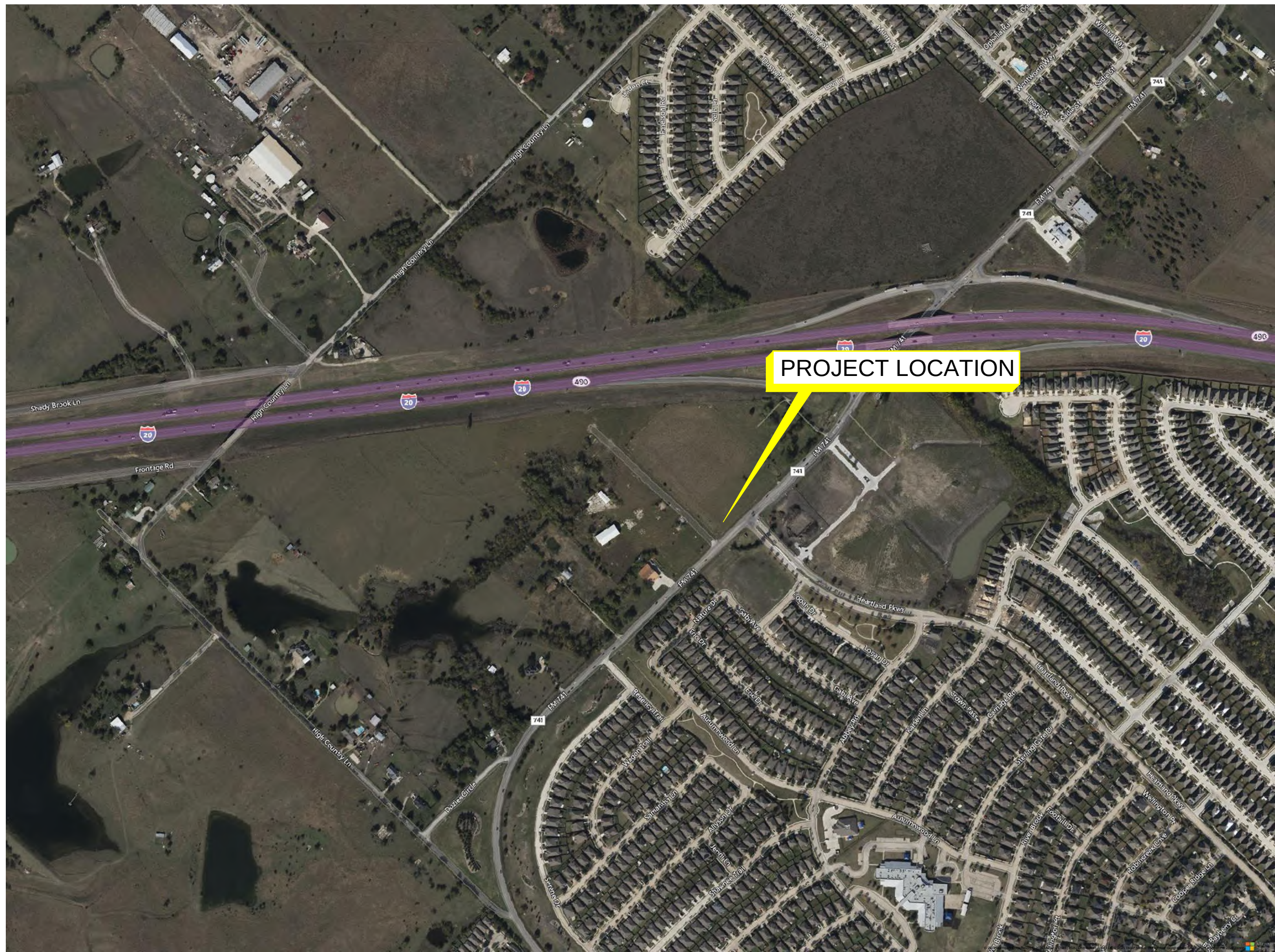
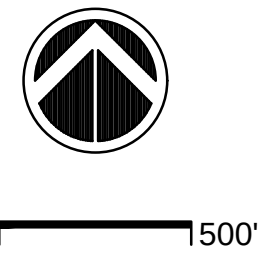




LOCATION MAP
1"=500'



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CITY OF MESQUITE

F.M. 741 WATER METER VAULT

BIDDING SET

CITY OF MESQUITE PROJECT NUMBER 2025-103



MAYOR
DANIEL ALEMAN

CITY COUNCIL MEMBERS
JEFF CASPER
KENNY GREEN
ELIZABETH RODRIGUEZ-ROSS
TANDY BOROUGHS
B.W.SMITH
BRANDON MURDEN

CITY MANAGER
CLIFF KEHELEY



FMI PROJECT No. 24020
MARCH 2025

GENERAL NOTES FOR WATER MAINS AND RELATED APPURTENANCES:		
1. GENERAL:		
1.1.	ALL WATER SYSTEM IMPROVEMENTS IN THE CITY OF MESQUITE, BOTH PRIVATELY AND PUBLICLY MAINTAINED SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF MESQUITE ENGINEERING DESIGN STANDARDS.	
1.2.	ALL WATER SYSTEM DESIGN AND CONSTRUCTION SHALL CONFORM TO THE CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) REGULATIONS. THESE REGULATIONS CAN BE FOUND IN THE TEXAS ADMINISTRATIVE CODE (TAC), TITLE 30, CHAPTER 280, SUBCHAPTER D - (RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS).	
1.3.	ALL WATER SYSTEM DESIGN, CONSTRUCTION AND MATERIALS SHALL CONFORM TO CURRENT AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARDS.	
1.4.	ALL MATERIALS THAT WILL COME INTO CONTACT WITH POTABLE WATER MUST BE APPROVED FOR USE UNDER NATIONAL SANITATION FOUNDATION (NSF) STANDARD 61 (DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS)	
1.5.	WATER SYSTEMS SHALL BE DESIGNED TO COMPLY WITH THE LATEST CITY ADOPTED VERSION OF THE INTERNATIONAL FIRE CODE WITH ADOPTED CITY AMENDMENTS.	
1.6.	WATER SYSTEMS SHALL BE DESIGNED TO COMPLY WITH THE CURRENT INSURANCE SERVICES OFFICE (ISO) FIRE SUPPRESSION RATING SCHEDULE (EDITION 02-03) - SECTION 600 - WATER SUPPLY.	
1.7.	ALL WATER SYSTEM DESIGN AND CONSTRUCTION SHALL CONFORM TO THE CURRENT ADOPTED VERSION OF THE NORTH CENTRAL TEXAS (NCTCOG) - PUBLIC WORKS CONSTRUCTION STANDARDS SPECIFICATIONS AND STANDARD DRAWINGS.	
1.8.	THE INSTALLATION, FLUSHING, DISINFECTION AND TESTING OF ALL WATER SYSTEM IMPROVEMENTS AND COMPONENTS SHALL BE COORDINATED WITH, AND OBSERVED BY, A CITY PUBLIC WORKS CONSTRUCTION INSPECTOR.	
1.9.	MATERIALS MUST CONFORM TO THE CITY OF MESQUITE APPROVED MATERIALS LIST.	
2. GENERAL INSTALLATION:		
2.1.	ALL COMPONENTS OF THE WATER SYSTEM (PIPE, VALVES, FITTINGS, RESTRAINTS, BLOCKING, SERVICES, AND APPURTENANCES) SHALL BE DESIGNED FOR 200 PSI WORKING PRESSURE AND AN AASHTO HS-20 LIVE LOAD EXCEPT WHERE LOADING CONDITIONS COULD EXCEED HS-20 LIVE LOAD LIMITS IN WHICH CASE THE CITY ENGINEER SHALL SPECIFY THE APPROPRIATE DESIGN LOAD.	
2.2.	WATER MAINS AND SANITARY SEWER MAINS SHALL HAVE A MINIMUM CLEARANCE OF NINE (9) FEET. IF THIS CLEARANCE CANNOT BE MAINTAINED, TCEQ ALTERNATE REQUIREMENTS SHALL BE MET.	
2.3.	WATER MAINS ARE GENERALLY PLACED 4' BEHIND THE BACK OF CURB, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.	
2.4.	STORM SEWER INLETS SHALL BE STAKED PRIOR TO WATER MAIN PLACEMENT TO ENSURE NO VALVES FALL WITHIN A CURB.	
2.5.	WARNING TAPE SHALL BE INSTALLED 24 INCHES ABOVE THE TOP OF PIPE OR AS OTHERWISE DIRECTED BY THE CITY ENGINEER. THE TAPE SHALL BE A PLASTIC, HIGH STRETCH, 4-INCH WIDTH TAPE. THE TAPE SHALL BE BLUE IN COLOR AND HAVE THE WORDS "CAUTION - WATER MAIN BURIED BELOW" IMPRINTED ON THE TAPE.	
2.6.	THE CONTRACTOR SHALL COMPLETE ALL FILL AND CUT OPERATIONS IN ACCORDANCE WITH RELEASED ENGINEERING PLANS PRIOR TO INSTALLING ANY UTILITIES (I.E. WATER, SANITARY SEWER, DRAINAGE).	
2.7.	THE CONTRACTOR SHALL NOT OPERATE ANY VALVES IN THE EXISTING WATER SYSTEM NOR OPERATE ANY NEW VALVES THAT WOULD ALLOW CONNECTION TO THE CITY WATER SYSTEM. THE CONTRACTOR SHALL COORDINATE WITH, AND NOTIFY, THE CITY PUBLIC WORKS CONSTRUCTION INSPECTOR 72-HOURS IN ADVANCE TO SCHEDULE A SHUT-DOWN OF THE EXISTING WATER SYSTEM BY CITY PERSONNEL. THE CITY MAY REQUIRE A NIGHT OR WEEKEND SHUT-DOWN IN ORDER TO MAINTAIN CUSTOMER SERVICE. NOTICES TO ALL AFFECTED CUSTOMERS SHALL BE DELIVERED BY THE CONTRACTOR A MINIMUM OF 48-HOURS IN ADVANCE OF SCHEDULED WATER SHUT-DOWN.	
2.8.	THE CITY OF MESQUITE REQUIRES PORTABLE FIRE HYDRANT METERS FOR TEMPORARY AND/OR CONSTRUCTION WATER USE AT CONSTRUCTION SITES. THEY ARE ROUTINELY USED TO ACCOUNT FOR WATER USAGE PRIOR TO INSTALLATION OF A PERMANENT WATER METER. THESE METERS HAVE A BACKFLOW PREVENTION DEVICE ATTACHED. THE CITY REQUIRES SUPPORT FOR THIS DEVICE TO PREVENT EXCESSIVE TORQUE WHEN ATTACHED TO A FIRE HYDRANT. THE CITY REQUIRES PAYMENT FOR EACH METER. AN INVOICE FOR WATER USE IS RENDERED EACH MONTH. ARRANGEMENTS FOR PORTABLE FIRE HYDRANT METERS ARE ADMINISTERED BY THE CITY OF MESQUITE WATER & SEWER ACCOUNTING DIVISION AT 757 N. GALLOWAY AVENUE. PLEASE COORDINATE METER USAGE THROUGH THE UTILITIES DIVISION - METER SERVICES SECTION.	
3. PIPE:		
3.1.	WATER LINE SHALL BE FROM THE CITY OF MESQUITE APPROVED WATER MATERIALS LIST AND SHALL BE EITHER:	
3.1.1.	PVC WATER PIPE, AWWA C-900, CLASS 235, DR 18; 4" - 18" DIAMETER.	
3.1.2.	DUCTILE IRON PIPE, AWWA C151, CLASS 52; LARGER THAN 12" DIAMETER.	
3.1.3.	CONCRETE PRESSURE PIPE, AWWA C303 AND C304; 16" OR LARGER DIAMETER.	
3.2.	BOLTS AND NUTS FOR ALL FITTINGS SHALL BE STAINLESS STEEL GRADE 304 OR 316 OR ASTM A325 TYPE 3 ENHANCED CORROSION RESISTANT STEEL. STAINLESS STEEL ALL-THREAD MAY BE USED IN SOME APPLICATIONS WITH THE APPROVAL OF THE CITY ENGINEER.	
3.3.	ALL FITTINGS, INCLUDING VALVES, SHALL BE MECHANICALLY RESTRAINED USING RESTRAINED FITTINGS AS SHOWN ON THE CITY OF MESQUITE APPROVED MATERIALS LIST FOR WATER AND MEET THE REQUIREMENTS OF ASTM F1674 (PVC) OR U.L. STANDARD 194 (DUCTILE IRON). RESTRAINT GLAND AND BODY AND WEDGE COMPONENTS SHALL BE DUCTILE IRON MATERIAL. FOR PIPE DIAMETERS 12" OR GREATER, WATERLINE PLAN SHALL SHOW LENGTH OF JOINTS TO BE RESTRAINED ON EACH SIDE OF FITTINGS. FOR PIPE DIAMETERS LESS THAN 12", ALL JOINTS WITHIN 15- FEET OF FITTING SHALL BE RESTRAINED.	
3.4.	ALL FITTINGS, VALVES, HYDRANTS, ETC. SHALL BE BLOCKED WITH 2,000 PSI CONCRETE, 4-SACK MINIMUM CEMENT CONTENT. ALL CONCRETE BLOCKING SHALL BE PLACED TO AVOID NUTS AND BOLTS TO ALLOW EASY ACCESS FOR MAINTENANCE. EXCESSIVE BLOCKING SHALL NOT BE ALLOWED AND SHALL BE REMOVED AT THE CONTRACTOR'S EXPENSE. SIZING AND CONSTRUCTION OF BLOCKING SHALL BE AS SHOWN IN STANDARD DRAWINGS 4010A TO 4040 OF THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS PUBLIC WORKS CONSTRUCTION STANDARDS, CURRENT APPROVED EDITION.	
3.5.	ALL DUCTILE IRON PIPE, FITTINGS AND VALVES SHALL BE WRAPPED WITH POLYETHYLENE TUBE WRAP IN ACCORDANCE WITH AWWA C105. THE POLYETHYLENE WRAP MUST BE BLUE IN COLOR. THE WRAP SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C105, METHOD A.	
4. VALVES:		
4.1.	VALVES SHALL BE FLANGED OR ANCHORED TO ADJACENT FITTINGS AT TEE AND CROSS FITTINGS AND ON FIRE HYDRANT LEADS. VALVES SHALL NOT BE USED AT THE DEAD END OF MAINS AS A PLUG. NEW MAINS SHALL START WITH A VALVE AND END WITH A PLUG TO AVOID LEAKAGE WHEN PRESSURE TESTING.	
4.2.	VALVES LOCATED WITHIN A RIGHT-OF-WAY SHALL BE INDICATED ON THE FACE OF THE CURB, OR WHERE CURBS DO NOT EXIST, ON A CONSPICUOUS LOCATION ADJACENT TO THE VALVE LOCATION. MARKINGS ARE TO BE THE CUTTING OF A FOUR (4) INCH HIGH AND 1/8" DEEP LETTER "V" WITH THE POINT OF THE "V" POINTING TOWARDS THE VALVE LOCATION. THE "V" SHALL BE CUT INTO THE CURB OR PAVING USING AN APPROVED MOTOR DRIVEN CONCRETE SAW. THE COMPLETED CUT AND VALVE RISER LIDS SHALL RECEIVE A COATING OF BLUE PAINT IF A MAIN LINE VALVE OR RED IF A FIRE HYDRANT VALVE. CONTRACTOR SHALL CHASE THE INTERIOR, AND EXTERIOR OF THE CUT TO A WIDTH OF ONE (1) INCH.	
4.3.	ALL VALVES SHALL BE MECHANICALLY RESTRAINED AND MEET THE REQUIREMENTS OF ASTM F1674 (PVC) OR U.L. STANDARD 194 (DUCTILE IRON). BOLTS AND NUTS FOR ALL FITTINGS SHALL BE ASTM A325 TYPE 3 ENHANCED CORROSION RESISTANT STEEL, OR STAINLESS STEEL GRADE 304 OR 316.	
4.4.	ADJUSTABLE VALVE BOXES SHALL BE FURNISHED AND SET ON EACH VALVE IN ACCORDANCE WITH THE APPROPRIATE GENERAL DESIGN STANDARDS AND THE CITY OF MESQUITE APPROVED WATER MATERIALS LIST. AFTER THE FINAL CLEAN UP AND ALIGNMENT HAS BEEN COMPLETED, THE CONTRACTOR SHALL CAST IN PLACE A CONCRETE BLOCK, 2-FOOT X 2-FOOT X 4-INCH AROUND ALL VALVE BOX TOPS AT THE FINISH GRADE.	
6. FIRE HYDRANTS:		
6.1.	FIRE HYDRANTS SHALL BE LOCATED TO MINIMIZE INTERFERENCE WITH DRIVEWAYS AND SHALL BE LOCATED WITH SUFFICIENT CLEARANCE FROM DRIVE AND STREET RADIi TO PREVENT THE FIRE HYDRANT FROM BEING STRUCK IF A VEHICLE JUMPS THE CURB AND/OR TAKES A WIDE TURN. HYDRANTS SHALL NOT BE PLACED IN INTERSECTION RADIi OR OTHER LOCATIONS WITH A HIGH PROBABILITY OF BEING DAMAGED BY TRAFFIC. A 3-FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF FIRE HYDRANTS EXCEPT AS OTHERWISE REQUIRED OR APPROVED.	
6.2.	MID-BLOCK FIRE HYDRANTS SHALL BE LOCATED ON PROPERTY LINES (EXTENDED) TO MINIMIZE INTERFERENCE WITH DRIVES AND ON-STREET PARKING.	
6.3.	HYDRANTS SHALL BE PLACED 2- FEET TO 10- FEET FROM THE BACK OF CURB AND SHALL NOT INTERFERE WITH SIDEWALKS, DRIVEWAYS, ETC. HYDRANTS SHALL BE PLACED SO THE BURY MARK IS AT OR ABOVE GROUND OR PAVING LEVEL AND THE BREAKAWAY FLANGE IS NO MORE THAN 6" ABOVE FINISHED GRADE. MOUNDING OF THE GROUND OR PAVING SHALL NOT BE ALLOWED TO ACHIEVE THIS REQUIREMENT. NO MORE THAN ONE EXTENSION OF 18 INCHES MAXIMUM WILL BE ALLOWED FOR GRADE ADJUSTMENT. HYDRANTS SHALL HAVE A BARREL LENGTH OF 4- FEET TO 8- FEET UNLESS APPROVED BY THE CITY ENGINEER. ALL HYDRANTS SHALL BE SURROUNDED BY A MINIMUM 3' WIDE CONCRETE SPLASH PAD BETWEEN THE HYDRANT AND THE CURB AND EXTEND 1' BEYOND THE REAR OF THE HYDRANT TO THE ADJOINING WALK FOR FIREFIGHTING ACCESS AND FOR FLUSHING OPERATIONS.	
6.4.	INSTALLATION SHALL BE OF A TYPE AS DETAILED IN THESE STANDARDS. ALL VALVES SHALL BE FLANGED TO THE TEE. LEAD PIPES FROM VALVE TO HYDRANT SHALL BE ANCHORED OR FLANGED.	
6.5.	IF A FIRE HYDRANT IS OUT OF SERVICE, FOR ANY REASON, THE CONTRACTOR SHALL BAG THE FIRE HYDRANT WITH A BLACK TRASH BAG SECURED WITH DUCT TAPE AND REPORT HYDRANT TO THE UTILITY DISPATCH OFFICE WITH THE REASON WHY IT IS OUT OF SERVICE. THIS	
INCLUDES, BUT IS NOT LIMITED TO, HYDRANTS THAT ARE OUT OF SERVICE FOR THE FOLLOWING REASONS:		
6.5.1.	WATER MAIN VALVED-OFF AND BEING ABANDONED BUT CONNECTED HYDRANT IS NOT YET REMOVED.	
6.5.2.	NEW HYDRANT RECENTLY INSTALLED BUT NOT YET READY FOR SERVICE	
6.5.3.	HYDRANT TEMPORARILY OUT OF SERVICE DUE TO MAIN SHUT DOWN	
6.6.	THE CONTRACTOR SHALL PLACE A STIMSONITE MODEL 88-SSA BLUE FIRE HYDRANT MARKER IN THE STREET ADJACENT TO THE HYDRANT. THE MARKER SHALL BE LOCATED PERPENDICULAR TO THE CURB, AT THE CENTER OF THE DRIVING LANE CLOSEST TO THE FIRE HYDRANT. THE MARKER SHALL BE INSTALLED WITH A TWO PART EPOXY ADHESIVE PER MANUFACTURER'S INSTRUCTIONS.	
6.7.	ALL FIRE HYDRANTS ARE TO BE PAINTED WITH A BASE COAT CONSISTING OF TWO (2) COATS OF ALUMINUM PAINT AS SPECIFIED BELOW. REFER TO CITY OF MESQUITE APPROVED WATER MATERIALS LIST FOR APPROVED PAINT. WHEN A COLOR CODE OTHER THAN ALUMINUM IS REQUIRED, THE TOP BONNET (FROM OPERATING NUT TO UNDERNEATH THE UPPERMOST FLANGE) SHALL BE PAINTED TWO COATS OF THE APPROPRIATE COLOR IN ACCORDANCE WITH THE FOLLOWING COLOR CODE. NOZZLE CAPS ARE NOT TO BE COLOR-CODED.	
6.7.1.	BASE UNDERCOAT: TWO (2) COATS OF ALUMINUM PAINT ARE REQUIRED AS A BASE COAT ON ALL HYDRANTS.	
6.7.2.	OVERCOATS: TWO (2) ADDITIONAL COATS OF PAINT ARE REQUIRED OVER THE BASE COAT. THE COLORS SHALL CONFORM AS FOLLOWS:	
	MAIN SIZE	COLOR
	6 INCHES	ALUMINUM - TOP & BOTTOM
	8 INCHES	BLUE TOP - ALUMINUM BOTTOM
	10 INCHES OR LARGER	YELLOW TOP - ALUMINUM BOTTOM

8. WATER SYSTEM INSTALLATION:

8.1. EXCAVATION IN GENERAL, SHALL BE MADE IN OPEN CUT FROM THE SURFACE OF THE GROUND AND SHALL BE NO GREATER IN WIDTH AND DEPTH THAN IS NECESSARY TO PERMIT THE PROPER CONSTRUCTION OF THE WORK. WHEN THE TRENCH DEPTH EXCEEDS FIVE (5) FEET, SEE TECHNICAL SPECIFICATION, 3.1.A REGARDING TRENCH SAFETY REQUIREMENTS. THE AMOUNT OF TRENCH EXCAVATION TO GRADE SHALL NOT EXCEED 100 (ONE HUNDRED) FEET FROM THE END OF THE PIPE LAYING OPERATIONS AND NO EXCAVATION SHALL BE 300 (THREE HUNDRED) FEET IN ADVANCE OF THE COMPLETED PIPE OPERATIONS (INCLUDES BACKFILLING). AT THE END OF THE WORKDAY, ALL TRENCH EXCAVATION SHALL BE BACKFILLED OR TRENCH SHALL BE COVERED WITH STEEL PLATES AND SECURED IN PLACE WITH ASPHALT. ANY LANDSCAPING AND IRRIGATION SYSTEM WITHIN THE CITY MEDIANS AND RIGHT-OF-WAYS THAT ARE DISTURBED, REMOVED, OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL CONDITION OR BETTER BY A LICENSED IRRIGATOR.

8.2. WATER MAINS WITH A NOMINAL DIAMETER OF 12" AND SMALLER SHALL HAVE A MINIMUM COVER OF 42" AND WATER MAINS WITH A NOMINAL DIAMETER 18" AND LARGER SHALL HAVE A MINIMUM COVER OF 60-INCHES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.

8.3. THE INSIDE OF ALL PIPE AND FITTINGS SHALL BE KEPT CLEAN DURING INSTALLATION. THE CITY ENGINEER MAY REQUIRE SWABBING OR PIGGING OF ALL NEW PIPE IF THE PIPE IS INSTALLED IN AN UNSANITARY MANOR. SEE SECTION 11 TESTING PROCEDURES FOR MORE INFORMATION.

8.4. ALL WATER PIPE, VALVES, FIRE HYDRANTS, AND FITTINGS SHALL BE INSTALLED BY THE USE OF LIFTING STRAPS. THE USE OF CHAINS IS PROHIBITED.

8.5. BACKFILL:

8.5.1. FOR TRENCHES IN CITY ROW OR UNDER CITY MAINTAINED PAVEMENT (EXISTING AND PROPOSED) OR WHERE INDICATED ON PLANS, TRENCH SHALL BE BACKFILLED WITH RECYCLED CRUSHED CONCRETE FLEXIBLE BASE PER TxDOT ITEM NO. 247, GRADE 1, TYPE D TO BOTTOM OF PROPOSED PAVEMENT.

8.5.2. FOR TRENCHES NOT IN CITY ROW OR UNDER EXISTING OR PROPOSED CITY MAINTAINED PAVEMENT, TRENCH MAY BE BACKFILLED WITH NATIVE SOIL.

8.6. COMPACT EACH 12" LOOSE LAYER OF BACKFILL TO WITHIN 96% TO 100% OF STANDARD PROCTOR DENSITY AT A MOISTURE RANGE OF 0% TO 6% OF OPTIMUM. THE CONTRACTOR SHALL TAKE NEW PROCTORS AT EACH CHANGE IN SOIL TYPE. WATER JETTING WILL NOT BE ALLOWED FOR ANY TRENCH.

9. TESTING PROCEDURES:

9.1. THE CONTRACTOR SHALL EMPLOY AND PAY FOR AN INDEPENDENT TESTING LABORATORY, APPROVED BY THE CITY ENGINEER, TO PERFORM TESTING OF CONSTRUCTION MATERIALS. CONTRACTOR SHALL SUBMIT THE NAME OF THE TESTING LABORATORY PRIOR TO BEGINNING OF WORK. THE CONTRACTOR SHALL NOTIFY THE ASSIGNED CITY PUBLIC WORKS CONSTRUCTION INSPECTOR OF ALL DENSITY TESTING 24 HOURS PRIOR TO THE SCHEDULED TEST. COPIES OF ALL TEST REPORTS SHALL BE SENT TO THE PUBLIC WORKS INSPECTOR FOR REVIEW AND ACCEPTANCE AND INCLUSION IN THE CITY PROJECT FILE. PROJECTS WILL NOT RECEIVE CITY ACCEPTANCE UNTIL ALL TEST RESULTS ARE COMPLETE AND SATISFACTORY.

9.2. DENSITY TESTS SHALL BE PERFORMED AT A FREQUENCY OF ONE TEST PER LIFT, PER 300 LINEAR FEET OF TRENCH (INCLUDING SERVICES) AT LOCATIONS SPECIFIED BY THE CITY PUBLIC WORKS CONSTRUCTION INSPECTOR. ALL NUCLEAR GAUGE DENSITY TESTS SHALL BE PERFORMED PER ASTM D6938. DENSITY TESTS MUST MEET A MINIMUM COMPACTION OF 96% STANDARD PROCTOR DENSITY (ASTM D698) AT A MOISTURE CONTENT OF 0% TO 6% OF OPTIMUM MOISTURE.

9.3. THE PURPOSE OF THIS SPECIFICATION IS TO DEFINE THE MINIMUM REQUIREMENTS FOR THE PRESSURE TESTING AND DISINFECTION OF WATER MAINS, INCLUDING THE PREPARATION OF WATER MAINS, HYDROSTATIC TESTS, FLUSHING, APPLICATION OF CHLORINE, AND SAMPLING FOR THE PRESENCE OF COLIFORM BACTERIA. WATER MAINS, SERVICES AND FIRE SPRINKLER SYSTEMS SHALL BE FLUSHED AND DISINFECTED PER THE FOLLOWING REQUIREMENTS AND IN ACCORDANCE WITH AWWA C651 "DISINFECTING WATER MAINS".

9.4. WATER REQUIRED TO FILL THE NEW MAIN FOR HYDROSTATIC PRESSURE TESTING, DISINFECTION, AND FLUSHING SHALL BE SUPPLIED THROUGH A CONNECTION TO THE EXISTING DISTRIBUTION SYSTEM PROVIDED A NEW VALVE IS PLACED AT THE CONNECTION POINT. **DO NOT TEST AGAINST AN EXISTING VALVE IN THE EXISTING SYSTEM.** AS AN ALTERNATE, AND WITH APPROVAL OF THE CITY PUBLIC WORKS CONSTRUCTION INSPECTOR, POTABLE WATER MAY BE SUPPLIED THROUGH A TEMPORARY CONNECTION BETWEEN THE DISTRIBUTION SYSTEM AND THE NEW MAIN. THE TEMPORARY CONNECTION SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE AND SHALL BE DISCONNECTED DURING THE HYDROSTATIC PRESSURE TEST. THE TEMPORARY CONNECTION SHALL BE REMOVED AT THE END OF TESTING.

9.5. GENERAL PROCEDURES AND PRECAUTIONS TAKEN DURING CONSTRUCTION:

9.5.1. INSPECT MATERIALS PRIOR TO INSTALLATION TO ENSURE THEIR CLEANLINESS AND INTEGRITY.

9.5.2. KEEP INTERIOR OF PIPE DRY AND CLEAN DURING STORAGE AND INSTALLATION. PREVENT CONTAMINATES FROM ENTERING THE WATER MAIN DURING STORAGE AND CONSTRUCTION.

9.5.3. IF DIRT ENTERS THE PIPE DURING STORAGE OR INSTALLATION, IT SHALL BE REMOVED AND THE INTERIOR SURFACE SWABBED WITH A 1 TO 5 PERCENT HYPOCHLORITE DISINFECTING SOLUTION.

9.5.4. DURING CONSTRUCTION OPENINGS IN THE PIPE SHALL BE CLOSED WITH A WATERTIGHT PLUG WHEN PIPE LAYING IS STOPPED AT THE CLOSE OF EACH DAY'S WORK OR FOR OTHER REASONS SUCH AS REST BREAKS AND MEALS TO PREVENT CONTAMINANTS AND ANIMALS FROM ENTERING PIPE.

9.5.5. REMOVE THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAIN BY FLUSHING OR OTHER MEANS.

9.5.6. CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.

9.5.7. PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW CAUSED BY HYDROSTATIC TEST AND DISINFECTION PROCEDURE.

9.5.8. DOCUMENT THAT ADEQUATE LEVELS OF CHLORINE CONTACTED EACH PIPE TO PROVIDE DISINFECTION.

9.5.9. ONCE THE CONTRACTOR HAS BEEN NOTIFIED BY THE CITY PUBLIC WORKS CONSTRUCTION INSPECTOR OF A SUCCESSFULLY (NEGATIVE RESULT) LABORATORY BACTERIOLOGICAL TESTING RESULT, THE CITY UTILITIES DEPARTMENT WILL PLACE THE NEW MAIN INTO SERVICE WITH THE ACTIVE DISTRIBUTION SYSTEM BY TURNING ALL VALVES.

9.6. ALL WATER MAINS, FITTINGS AND SERVICES SHALL BE TESTED WITH A HYDRAULIC TEST PRESSURE OF NOT LESS THAN 200 PSI OVER A PERIOD OF NOT LESS THAN 2 HOURS. THE ALLOWABLE LEAKAGE, IN GALLONS, OF ALL PIPE TESTED SHALL BE CALCULATED PER THE FOLLOWING EQUATION:

ALLOWABLE LEAKAGE =

28.28"L*D

148,000

WHERE: L = LENGTH OF PIPE (FT)

D = DIAMETER OF PIPE (IN)

9.6.1. FOR A TWO HOUR PRESSURE TEST AT A PRESSURE OF 200 PSI, IF THE TESTS INDICATE A LEAKAGE IN EXCESS OF THE ACCEPTABLE RATE, THE CONTRACTOR SHALL BE REQUIRED TO FIND AND REPAIR THE LEAK. EVEN IF THE TEST REQUIREMENTS ARE MET, ALL APPARENT LEAKS SHALL BE REPAIRED AND STOPPED.

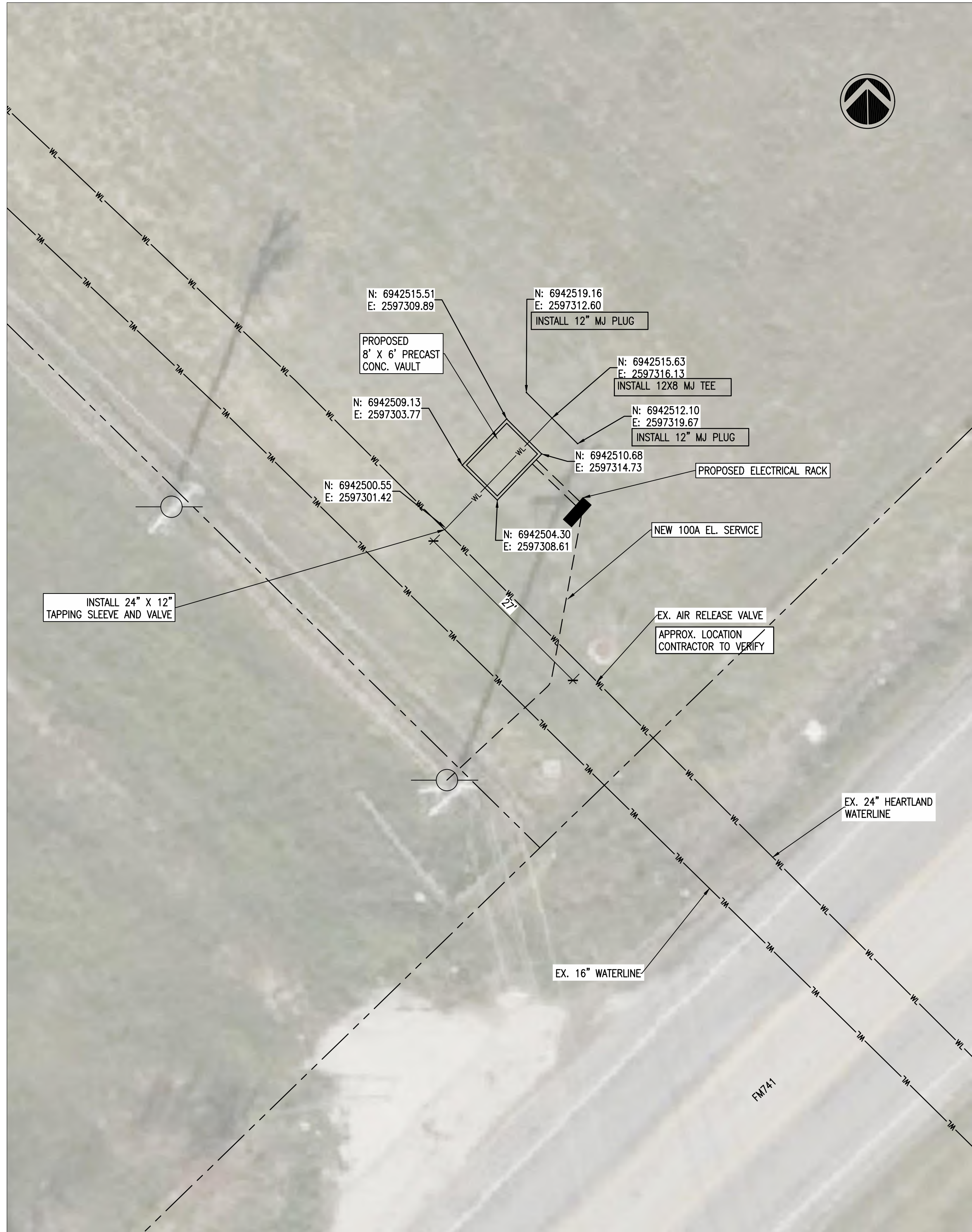
9.6.2. THE HYDROSTATIC PUMP SHALL BE CONNECTED TO A SYSTEM WHERE THE AMOUNT OF LEAKAGE CAN BE DETERMINED BY MEASUREMENT OR GAUGE. THE 200-PSI PRESSURE SHALL BE MAINTAINED AT THE HIGHEST POINT OF THE MAIN BEING TESTED OVER THE ENTIRE 2-HOUR TEST PERIOD. THE LEAKAGE SHALL BE DETERMINED BY COMPARING THE QUANTITY OF WATER IN THE MEASURING SYSTEM AT THE BEGINNING OF THE TEST AND QUANTITY OF WATER AT THE END OF THE TEST. THE DIFFERENCE IN THESE QUANTITIES SHALL BE THE LEAKAGE. AN ALTERNATE METHOD IS TO ADD WATER TO THE MEASURING SYSTEM DURING THE TEST. AT THE END OF THE 2-HOUR TEST, THE QUANTITY OF WATER ADDED SHALL BE THE LEAKAGE.

9.7. FLUSHING AND PIGGING THE MAIN PRIOR TO DISINFECTION / CHLORINATION

9.7.1. BEFORE THE MAIN IS CHLORINATED, IT SHALL BE FILLED TO ELIMINATE AIR POCKETS AND FLUSHED TO REMOVE PARTICULATES. FIRE HYDRANT STEAMER NOZZLES SHALL BE THE PREFERRED APPURTENANCE FOR FLUSHING. THE FLUSHING VELOCITY IN THE MAIN SHALL NOT BE LESS THAN 3.0 FT/SEC. BELOW IS THE REQUIRED FLOW AND OPENINGS NEEDED TO FLUSH PIPELINES WITH A PRESSURE OF 40 PSI.

M	FLOW (GPM)	1" TAP	1.5" TAP	2" TAP	2.5" HYDRANT OUTLET	4.5" HYDRANT OUTLET
4"	120	1			1	1
6"	260		1		1	1
8"	470		2		1	1
10"	730		3	2	1	1
12"	1060			3	2	1
16"	1880			5	2	1

City of Mesquite Approved Materials List for Water Last Revised - May 17, 2022						
BASIC PRODUCT CATEGORY	SUB-CATEGORY	MANUFACTURER	MODEL, TYPE, OR STYLE APPROVED	GOVERNING SPECIFICATION	GENERAL REQUIREMENTS	NOTES
Water Pipe						
Water Main	4" to 18" Dia		PVC, Class 305, DR 18	AWWA C900	Designed for minimum working pressure of 200psi and minimum field test pressure of 200 psi; HS-20 Live Load; HDPE and PVC shall be blue in color	Push on joints: ASTM D-3139; Gaskets: ASTM F477; Fusible PVC and Certa-Lok are acceptable PVC pipe materials
			HDPE, Class 333, DR7	ASTM F714, PE 4710		
		> 12" Dia		Ductile Iron, Class 52	AWWA C151	
Water Services	>16" Dia		Reinforced Concrete Cylindrical Pipe (RCCP)	AWWA C303/C304		
	<1" Dia		Type K Copper			
	>=1" Dia	Rehau Municipex	PEX-A	AWWA C904, ASTM F876	Blue Color	Cross-linked polyethylene; Stainless steel stiffeners shall be used; Install with 12 gauge detectable tracing wire with HDPE coating
Fire Hydrants						
Fire Hydrants		Mueller	Super Centurion 250-A423		Manufactured within 2 years of install date; 1- 4" Steamer Nozzle; 2 - 2.5" Hose Nozzles; 1" Pentagon Operating Nut Turns Counter - Clockwise to Open; Install without chains	
		American Darling	B-84B-5			
		Waterous	Pacer WB67			
		Kennedy	K81A Guardian			
		Clow	Medallion			
Fire Hydrant Paint		M&H	Model 129, 929			
	Aluminum	Flynt				
	Blue	Groco	GRO-LAC, QDM, Part No. 766-1010-01			
Yellow	Groco	GRO-LAC, QDM, Part No. 766-2115-01				
Valves						
Valves	>= 6"	Mueller	Resilient Seat		Valves >24" shall be horizontal installation valves	
		Mueller	Resilient Wedge			
		American Darling	Resilient Wedge			
		US Pipe & Foundry	Metro-Seal Resilient Wedge			
		American Flow Control	Series 2500 Resilient Wedge			
	> 36"	Kennedy	Resilient Wedge			
		Clow	Resilient Wedge			
		MH	Resilient Wedge Gate Valve			
		American	AVK Resilient Seated Gate Valve Series 25, 4"-12"			
		Mueller	Butterfly		Butterfly only allowed with approval of City of Engineer	
Air Release Valves		American Darling	Butterfly			
Valve Stacks and Boxes		Pratt	Butterfly			
Fire Riser		Vent-O-Mat	025 RBX 2521 (1") / 050 RBX 2521 (2")			
		Bass & Hays	Model 2436S			
		Tex Line	Spigot Assembly (4" - 8")			
City of Mesquite Approved Materials List for Water Last Revised - September 8, 2020						
BASIC PRODUCT CATEGORY	SUB-CATEGORY	MANUFACTURER	MODEL, TYPE, OR STYLE APPROVED	GOVERNING SPECIFICATION	GENERAL REQUIREMENTS	NOTES
Fittings, Misc						
Tapping Sleeves		Mueller	H304		Require 3/4" NPT Brass Test Plug; Stainless Steel Tapping Sleeve with Stainless Steel Flange	
		Ford	FTSS, FTSS-MJ			
		Smith-Blair	665, 665MJ			
		Dresser	630			
Ductile Iron		PowerSeal	Model 3490			
		Romac Industries	SST III			
		Uni-Flange	Series 1400			
		EBAA	Iron 1100 Series Megalug			
		Stargrip	Series 3000			
		Tyler Union	Field Lock, Tufgrip 1000			
		SIP Industries	EZ Grip			
		Uni-Flange	Series 1500			
Restraint (Retainer) Glands	PVC	EBAA	Iron 2000PV Series Megalug		Require 3/4" NPT Brass Test Plug; Stainless Steel Tapping Sleeve with Stainless Steel Flange	
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
	SIP Industries	EZ Grip				
	Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell				
	Sigma	One Lok				
Ductile Iron Fittings		American Pipe			Require 3/4" NPT Brass Test Plug; Stainless Steel Tapping Sleeve with Stainless Steel Flange	
		Tyler Pipe Products				
		Clow Products				
		Star Pipe Products	Tees, bends, anchor nipples			
Restraint (Internal Joint Restraint)	C900 PVC Pipe	Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
Couplings		Uni-Flange	Series 1500			
Flushing Systems		EBAA	Iron 2000PV Series Megalug			
Polyethylene Wrap		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
		SIP Industries	EZ Grip			
		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
		Sigma	One Lok			
		American Pipe				
		Tyler Pipe Products				
		Clow Products				
		Star Pipe Products	Tees, bends, anchor nipples			
		Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
		SIP Industries	EZ Grip			
		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
		Sigma	One Lok			
		American Pipe				
		Tyler Pipe Products				
		Clow Products				
		Star Pipe Products	Tees, bends, anchor nipples			
		Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
		SIP Industries	EZ Grip			
		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
		Sigma	One Lok			
		American Pipe				
		Tyler Pipe Products				
		Clow Products				
		Star Pipe Products	Tees, bends, anchor nipples			
		Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
		SIP Industries	EZ Grip			
		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
		Sigma	One Lok			
		American Pipe				
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		Clow Products				
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		Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
		SIP Industries	EZ Grip			
		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
		Sigma	One Lok			
		American Pipe				
		Tyler Pipe Products				
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		Star Pipe Products	Tees, bends, anchor nipples			
		Sigma/Nappco	Tees, bends, anchor nipples			
		Griffin Pipe Products				
		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
		Stargrip	Series 4000			
		Tyler Union	Tufgrip 2000			
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		American Pipe				
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		Star Pipe Products	Tees, bends, anchor nipples			
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		SIP Industries				
		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
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		Napco	Certa-Lok AWWA C900 Restrained Joint Integral Bell			
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		Uni-Flange	Series 1500			
		EBAA	Iron 2000PV Series Megalug			
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		EBAA	Iron 2000PV Series Megalug			
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		Sigma	One Lok			
		American Pipe				



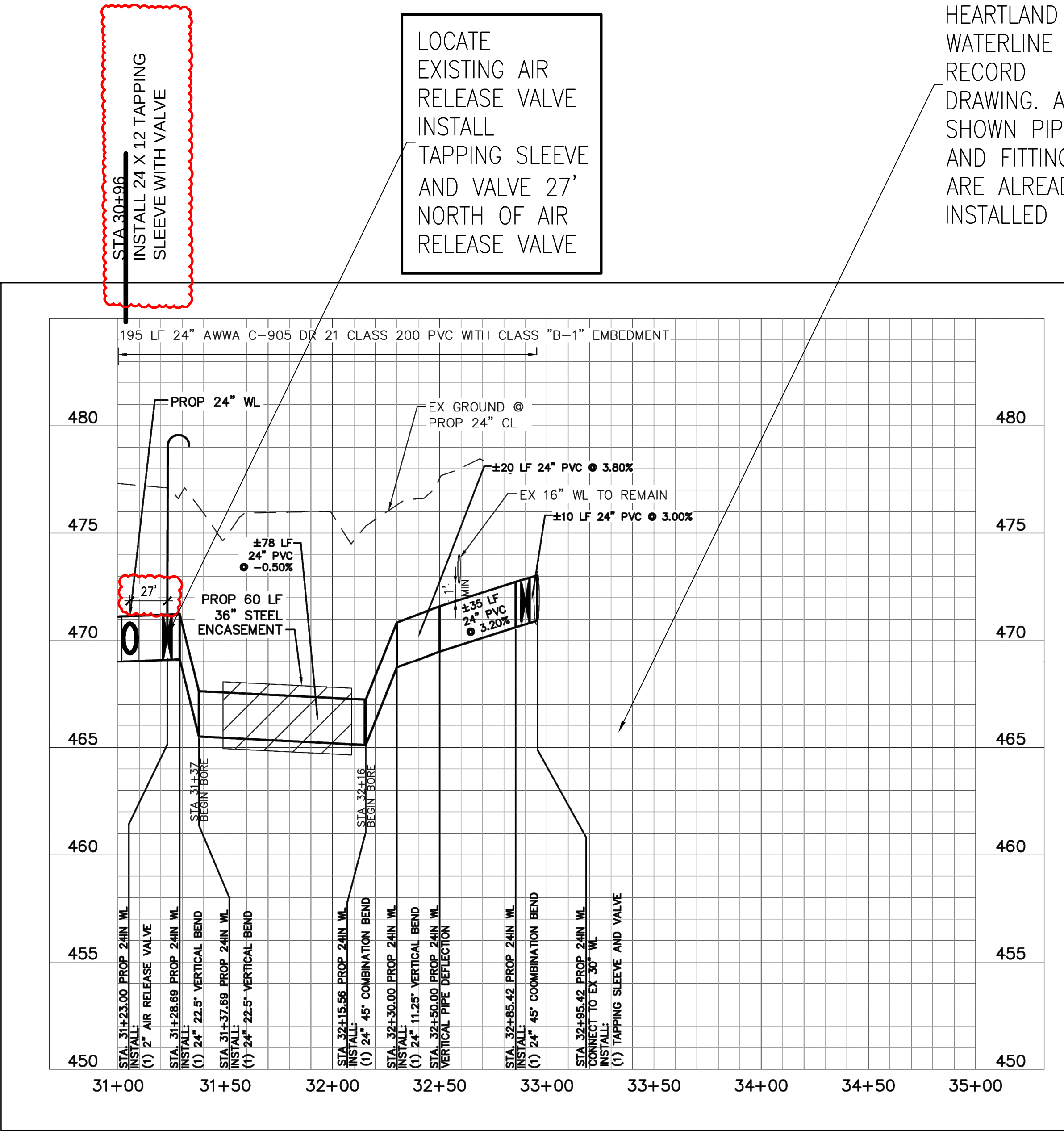
1 SITE PLAN
1"=10'

GENERAL NOTES:

CONTRACTORS SHALL CONDUCT DISTRICT ENGINEER MR. ANDREW MIZEREK, P.E. WITH WESTWOOD MINIMUM TWO WEEKS BEFORE COMMENCING ANY PROJECT ACTIVITIES ON THE EXISTING 24-INCH WATER LINE. CONTACT INFO:

EMAIL: andrew.mizereck@westwoodps.com
OFFICE: 469-215-1800 (MAIN)
CELL: 480-239-3646 (PREFERRED)

NOTE:
PROFILE FROM
HEARTLAND 24"
WATERLINE
RECORD
DRAWING. ALL
SHOWN PIPING
AND FITTINGS
ARE ALREADY
INSTALLED



2 PROFILE VIEW (EXISTING 24-INCH WATERLINE)
NTS

No.	DATE	REVISION	BY

Freeman-McLellan, Inc.
ENGINEERS - ARCHITECTS - PLANNERS
8300 LEFAY, SUITE 1225 DALLAS, TX 75243 PH: 214.983.0555 TX REG ENG PRM 2-2827

CITY OF MESQUITE F.M. 741 WATER METER VAULT SITE PLAN

BIDDING SET

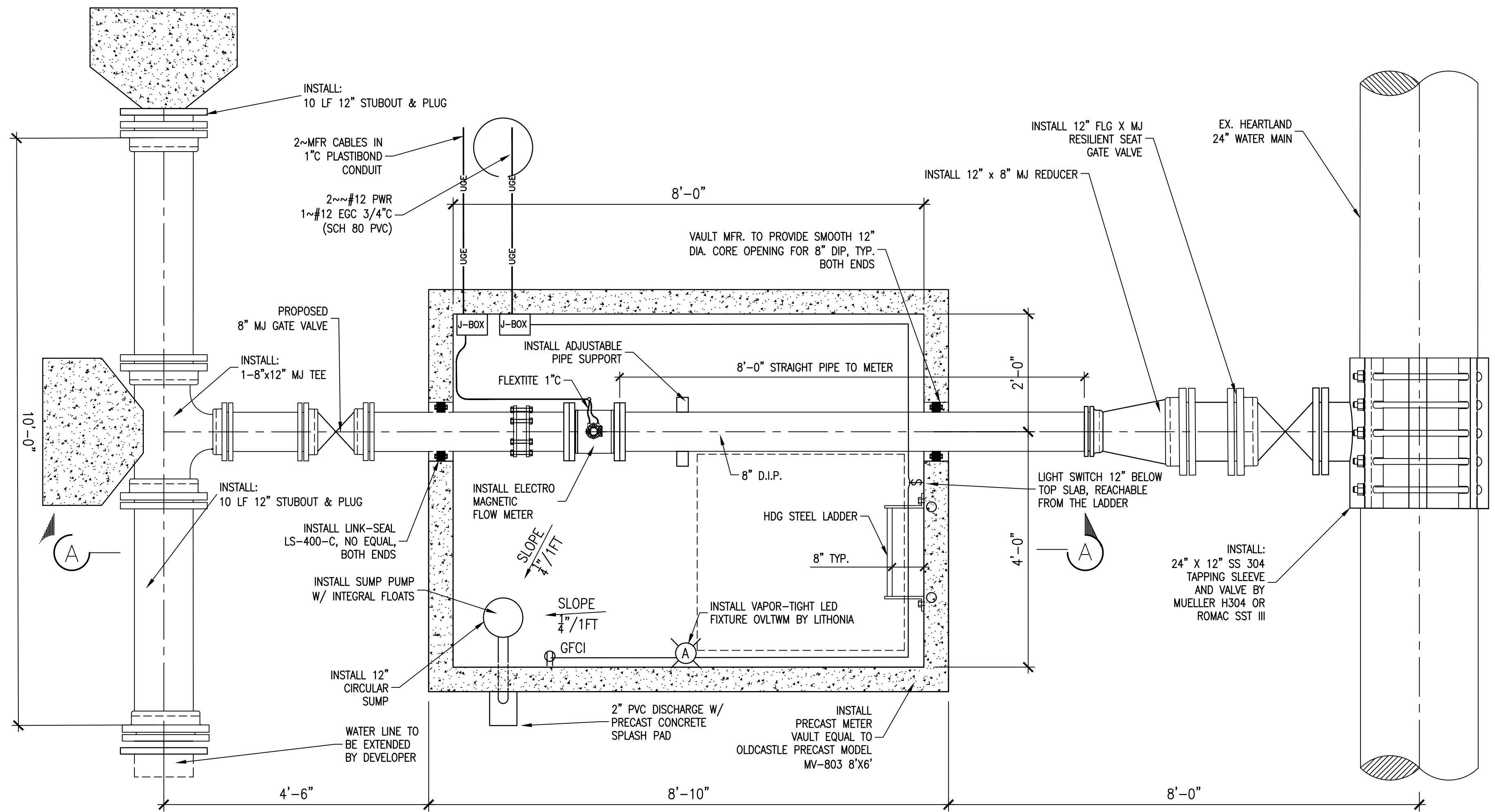
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAMIR LULO, P.E. NO. 90370 ON 3.25.2025

IF SHEET IS IN 11"x17" FORMAT, DRAWINGS ARE AT 1/2 OF NOTED SCALE.

PROJECT No. 24020
DESIGNED: DL
DRAWN: MDG
CHECKED: DL

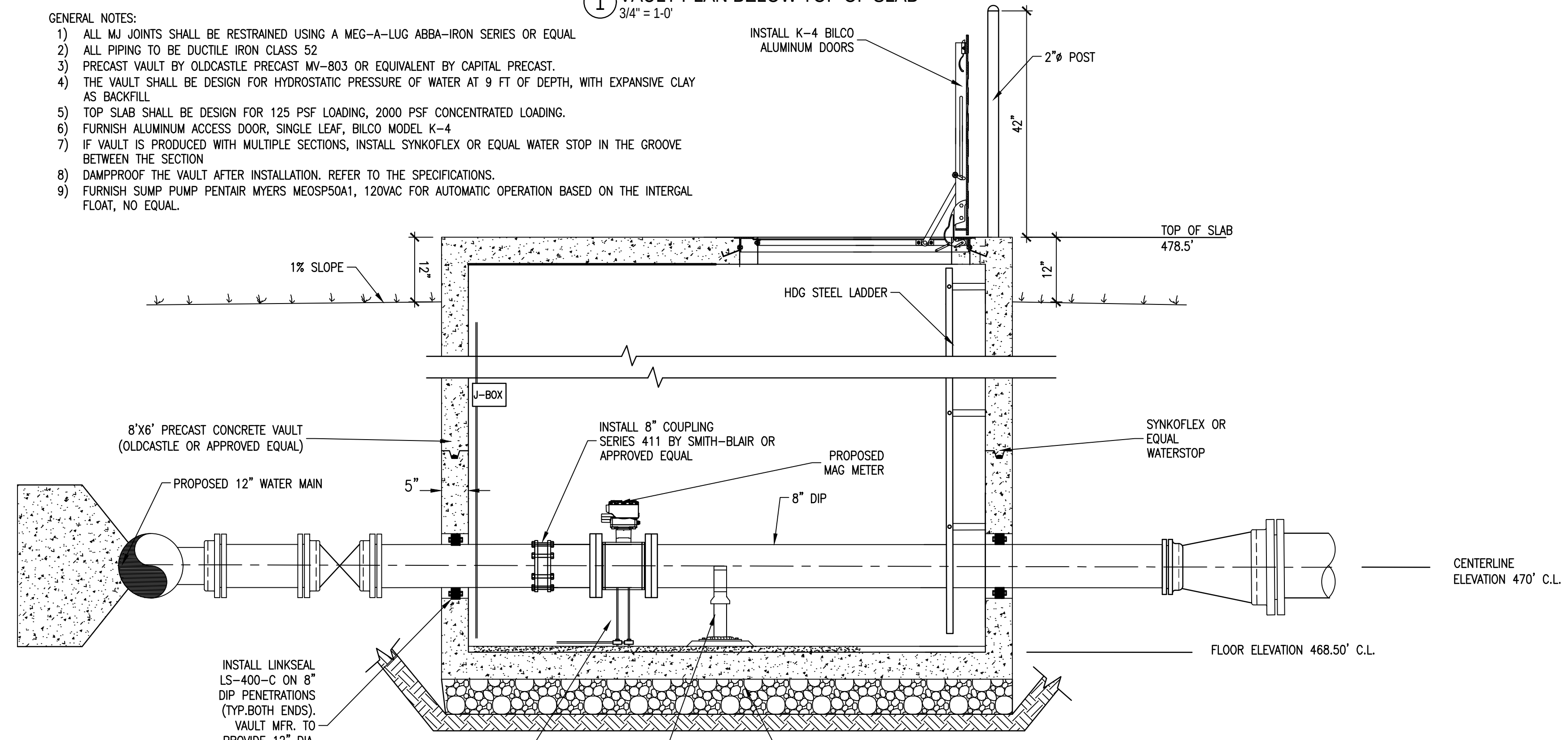
SHEET
C1

SHEET 3 OF 8

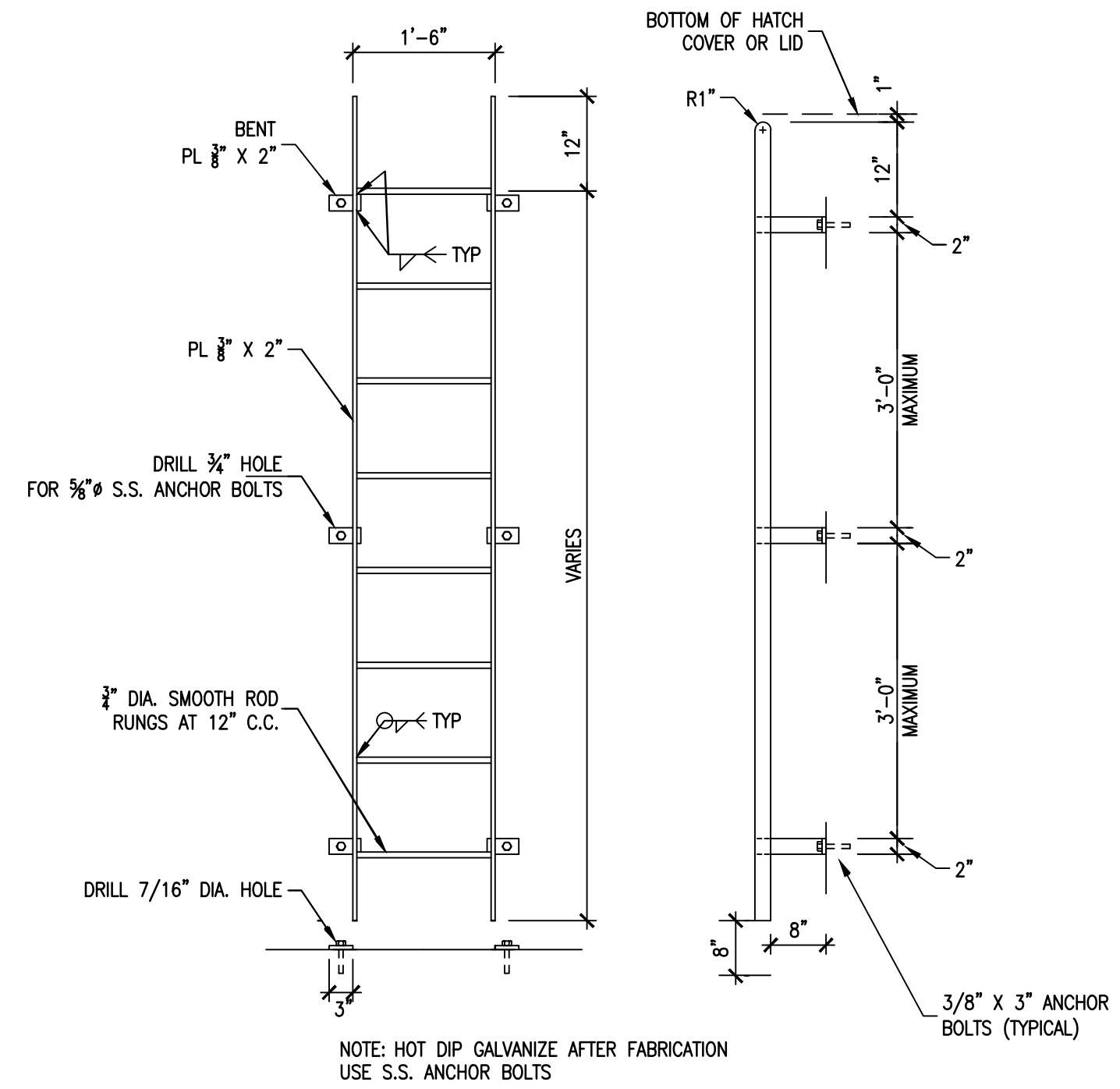


1 VAULT PLAN BELOW TOP OF SLAB
3/4" = 1'-0"

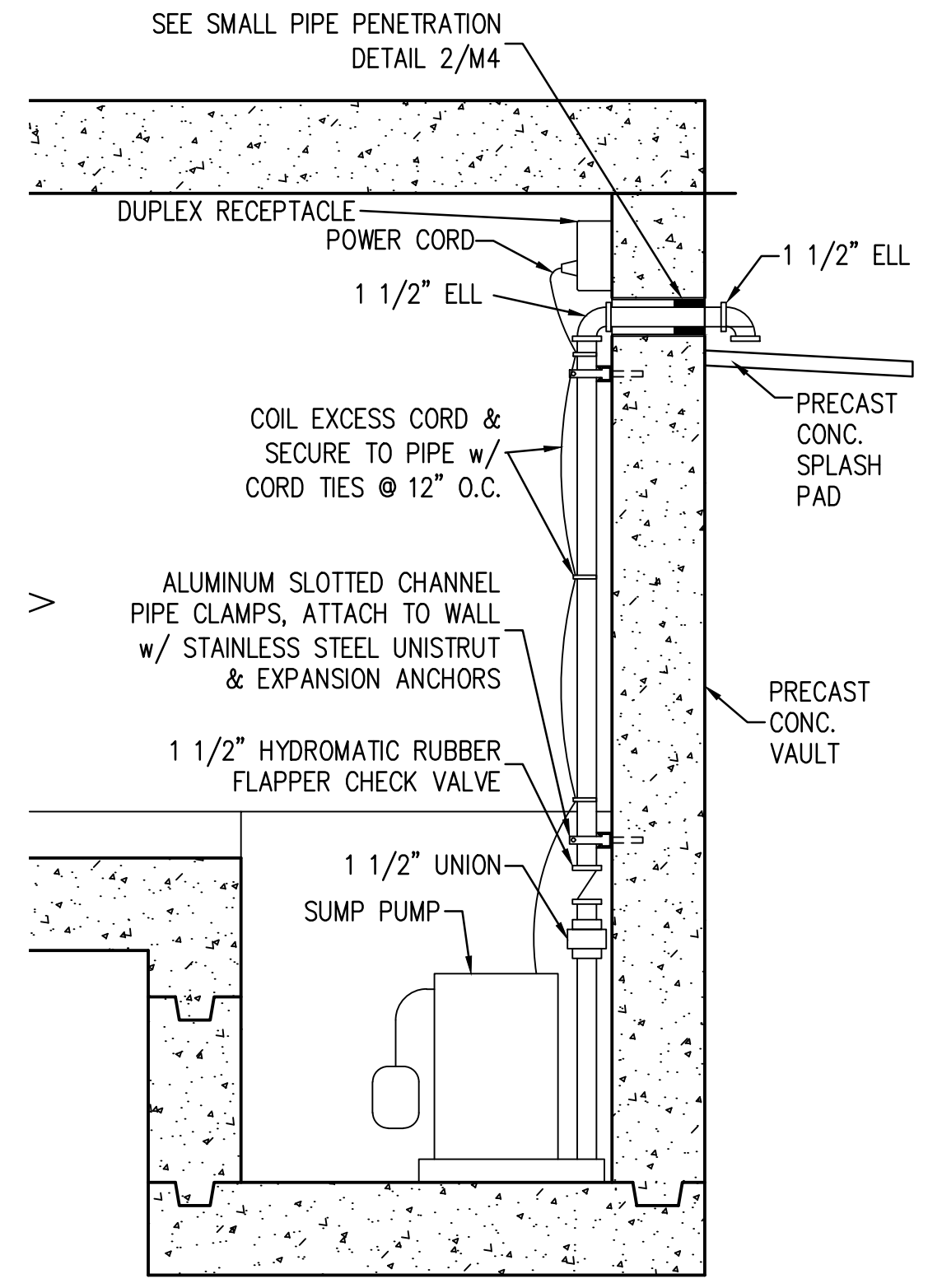
- GENERAL NOTES:
- 1) ALL MJ JOINTS SHALL BE RESTRAINED USING A MEG-A-LUG ABBA-IRON SERIES OR EQUAL
 - 2) ALL PIPING TO BE DUCTILE IRON CLASS 52
 - 3) PRECAST VAULT BY OLDCASTLE PRECAST MV-803 OR EQUIVALENT BY CAPITAL PRECAST.
 - 4) THE VAULT SHALL BE DESIGN FOR HYDROSTATIC PRESSURE OF WATER AT 9 FT OF DEPTH, WITH EXPANSIVE CLAY AS BACKFILL
 - 5) TOP SLAB SHALL BE DESIGN FOR 125 PSF LOADING, 2000 PSF CONCENTRATED LOADING.
 - 6) FURNISH ALUMINUM ACCESS DOOR, SINGLE LEAF, BILCO MODEL K-4
 - 7) IF VAULT IS PRODUCED WITH MULTIPLE SECTIONS, INSTALL SYNKOFLEX OR EQUAL WATER STOP IN THE GROOVE BETWEEN THE SECTION
 - 8) DAMPPROOF THE VAULT AFTER INSTALLATION. REFER TO THE SPECIFICATIONS.
 - 9) FURNISH SUMP PUMP PENTAIR MYERS MEOSP50A1, 120VAC FOR AUTOMATIC OPERATION BASED ON THE INTERGAL FLOAT, NO EQUAL.



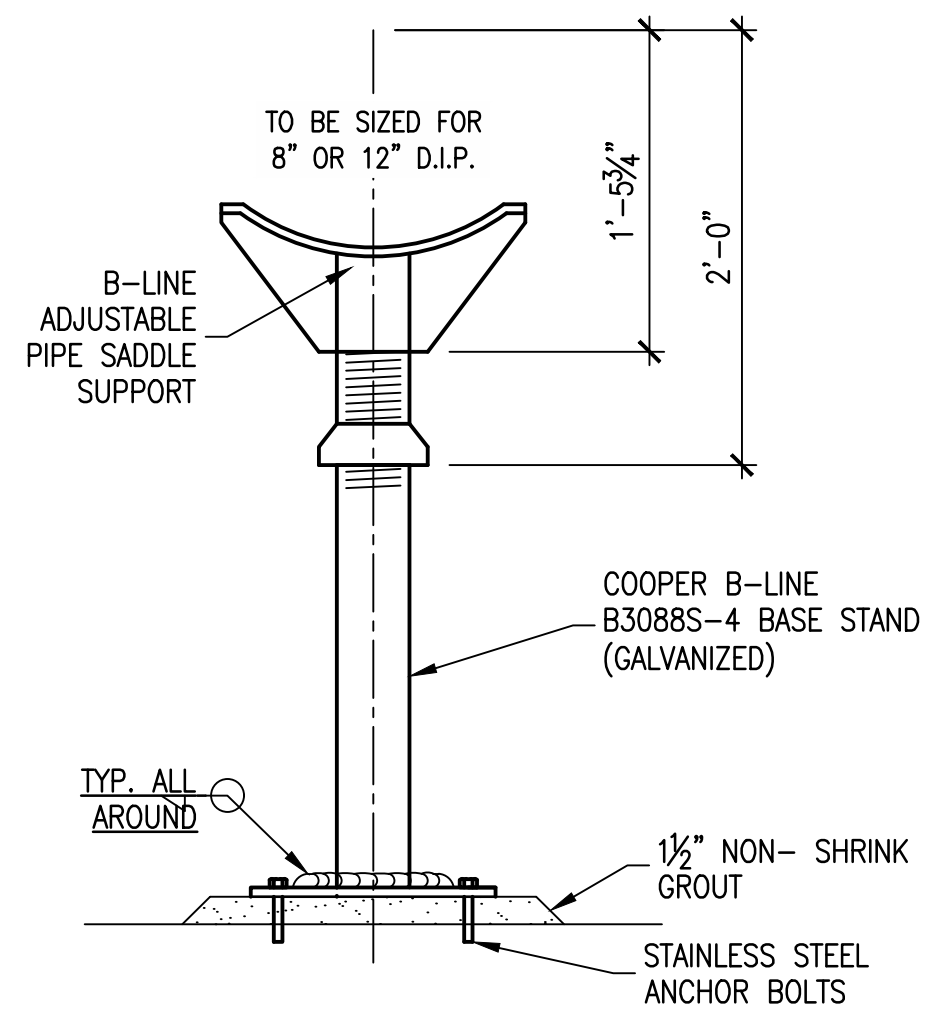
2 SECTION
3/4" = 1'-0"



3 LADDER DETAIL
NTS

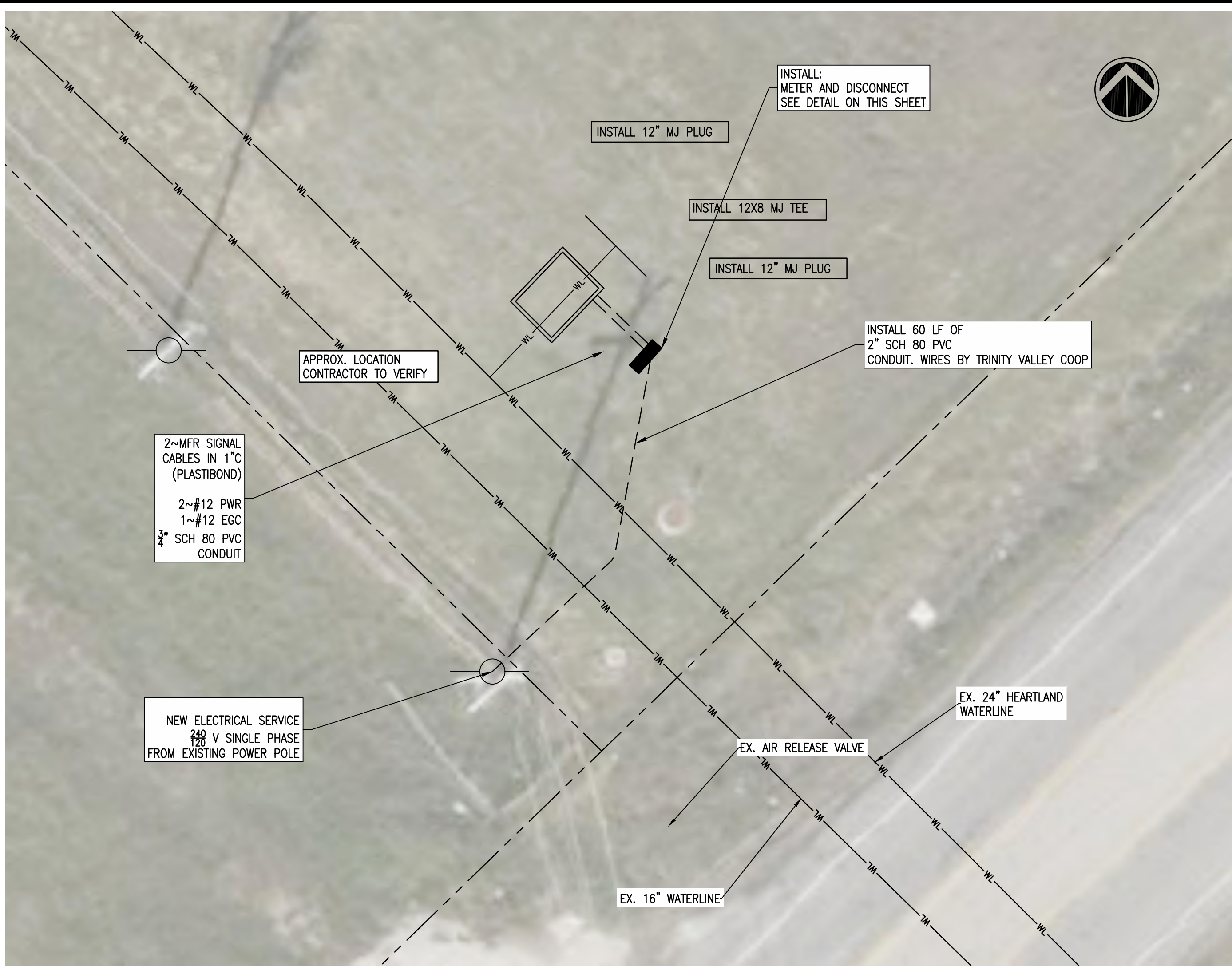


4 SUMP PUMP
NTS

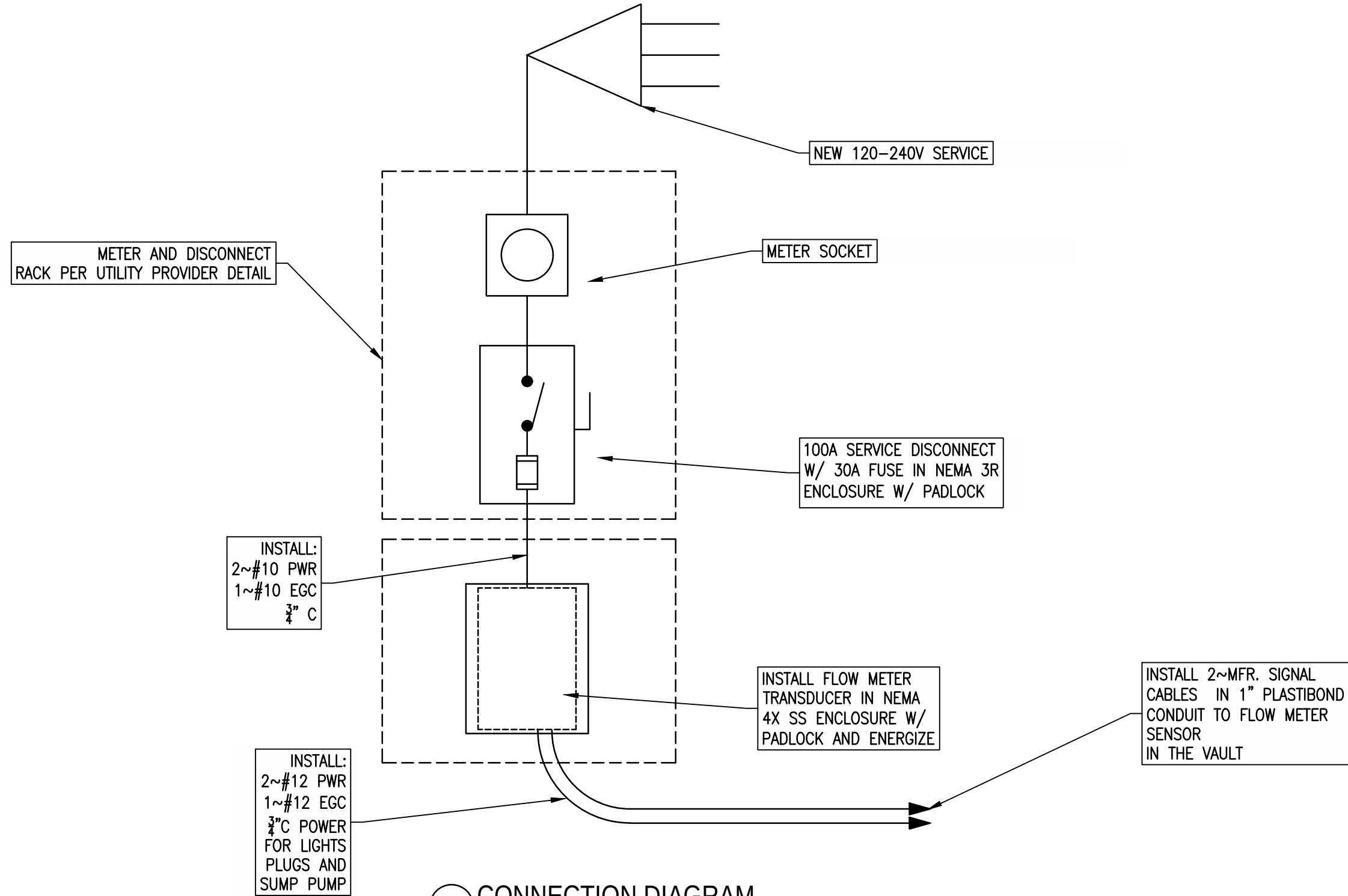


5 ADJUSTABLE PIPE SUPPORT
NTS

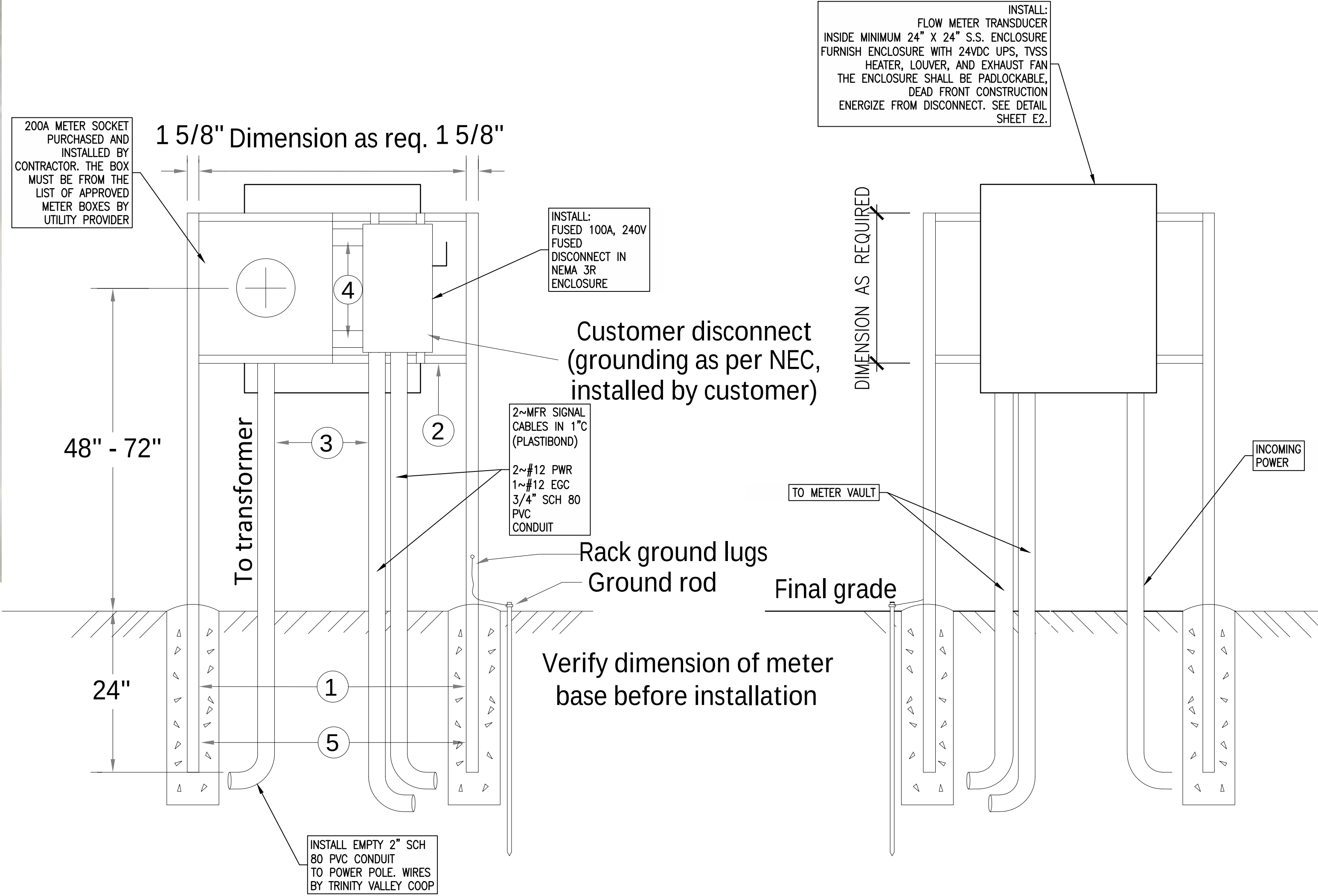
CITY OF MESQUITE		F.M. 741 WATER METER VAULT		MECHANICAL PLAN, SECTION AND DETAILS	
BY	REVISION	DATE	No.	FREEMAN-MILLICAN, INC. ENGINEERS - ARCHITECTS - PLANNERS 9330 LEFAY SUITE 1225 DALLAS, TX 75243 PH: 214.983.6555 TX REG ENG FIRM 2-2627	
BIDDING SET					
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① PLAN VIEW
1" = 10'



② CONNECTION DIAGRAM
NTS



③ METER RACK DETAIL
NTS

Item	Qty	Description
1	2	Strut channel (1 5/8" x 1 5/8" x 8'), galvanized
2	2	Strut channel (1 5/8" x 1 5/8" x 1/8" x 36'), galvanized
3	2	Conduit, schedule 80 PVC, as required
4	1	Conduit, nipple, as required (lowered for meter socket - upper for transocket)
5		Concrete, as required

No.	DATE	REVISION	BY

Freeman-McLellan, Inc.
ENGINEERS - ARCHITECTS - PLANNERS
8300 LEFAY SUITE 1225 DALLAS, TX 75243 PH: 214.983.6565 TX REG ENG FIRM #2827

CITY OF MESQUITE
F.M. 741 WATER METER VAULT

ELECTRICAL SITE PLAN AND RACK DETAILS

BIDDING SET

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAMIR LULO, P.E. NO. 90370 ON 3.25.2025

IF SHEET IS IN 11"x17" FORMAT, DRAWINGS ARE AT 1/2 OF NOTED SCALE.

PROJECT No. 24020

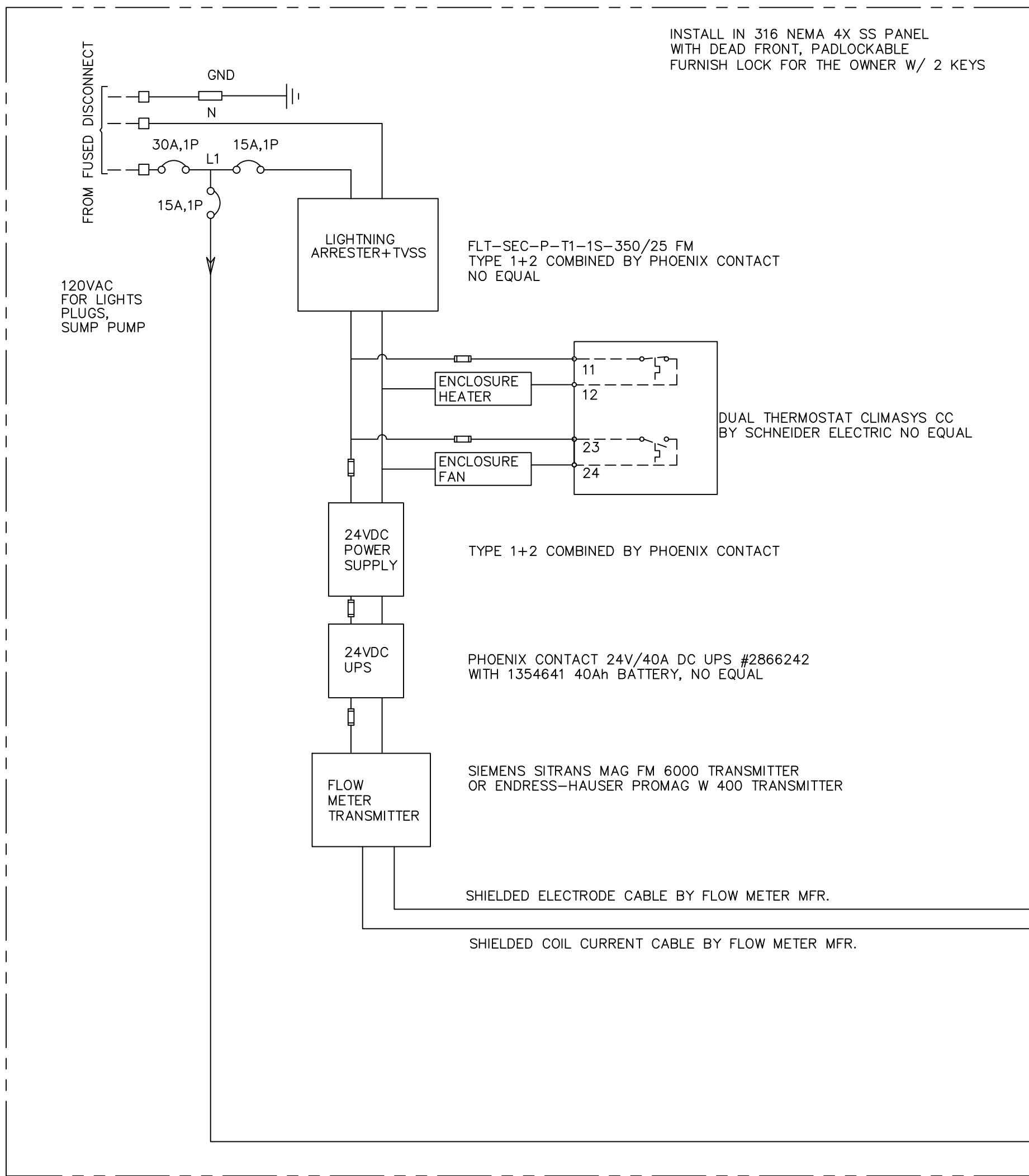
DESIGNED: DL

DRAWN: MDG

CHECKED: DL

SHEET
E1

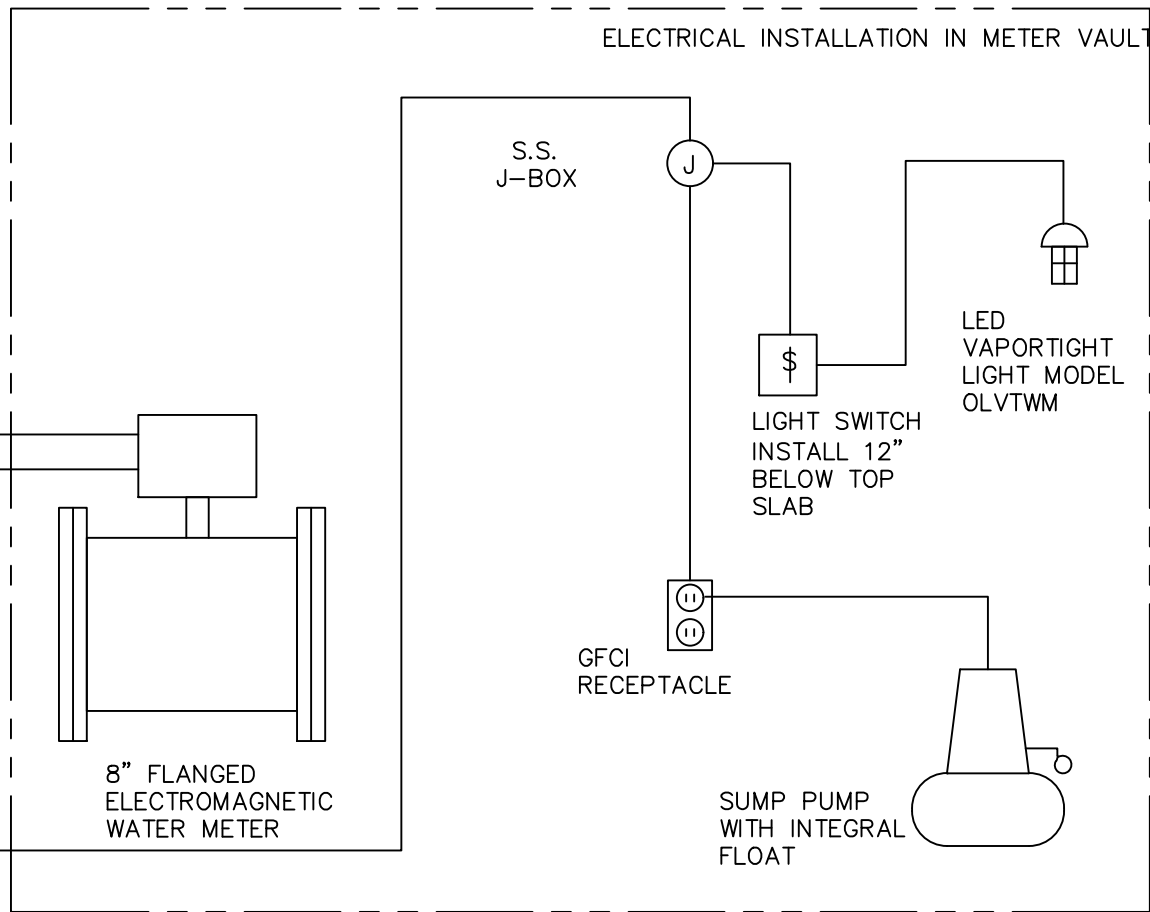
SHEET 5 OF 8



WIRING DIAGRAM IN FLOW CONTROL PANEL

COMPONENT SCHEDULE

Component	Description or model	Manufacturer
Control Panel Enclosure	24"x24" min, NEMA 4X SS, dead-front, padlocked	Hoffman or Wiegmann
Electromagnetic flow meter	Flanged, ANSI 150LB, 8", epoxy coated steel	Sitrans FM Mag 5100W (sensor) with Mag 6000 transmitter OR Endress-Hauser Promag W 400
Miniature Breakers	15A, 1P	Allen Bradley, 1489 series or equal
TVSS	Lightning arrester + surge protector Type 1+2, DIN Rail mounted	FLT-SEC-P-T1-1S-350/25 FM by Phoenix Contact, no equal
24VDC UPS	24V/40A DC UPS, DIN rail mounted	Phoenix Contact, #2866242 with #1354641 battery, no equal
Panel Thermostat	Double thermostat heat/cool	ClimaSys CC model NGYCCOTHDF by Schneider Electric
Panel Fan	Side mounted filter fan, 20 cfm @ 120VAC, 60Hz	HF0416414 by Hoffmann or equal
Panel Heater	100W, 120VAC	nVent/Hoffmann DAH or equal
Panel Louver	Stainless Steel Louver Plate	nVent/Hoffmann AVK812SS6 or equal



WIRING DIAGRAM IN METER VAULT

No.	DATE	REVISION	BY
1			
2			
3			
4			

Freeman Millican, Inc.
ENGINEERS - ARCHITECTS - PLANNERS
8830 LA FAY, SUITE 1225 DALLAS, TX 75243 PH: 214.593.0505 TX REG ENG FRM F-2627

CITY OF MESQUITE
F.M. 741 WATER METER VAULT
FLOW METER PANEL WIRING DIAGRAM

BIDDING SET

STATE OF TEXAS
DAMIR LULO
90370
LICENSED PROFESSIONAL ENGINEER

Damir Lulo

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DAMIR LULO, P.E.
NO. 90370 ON 3.27.2025

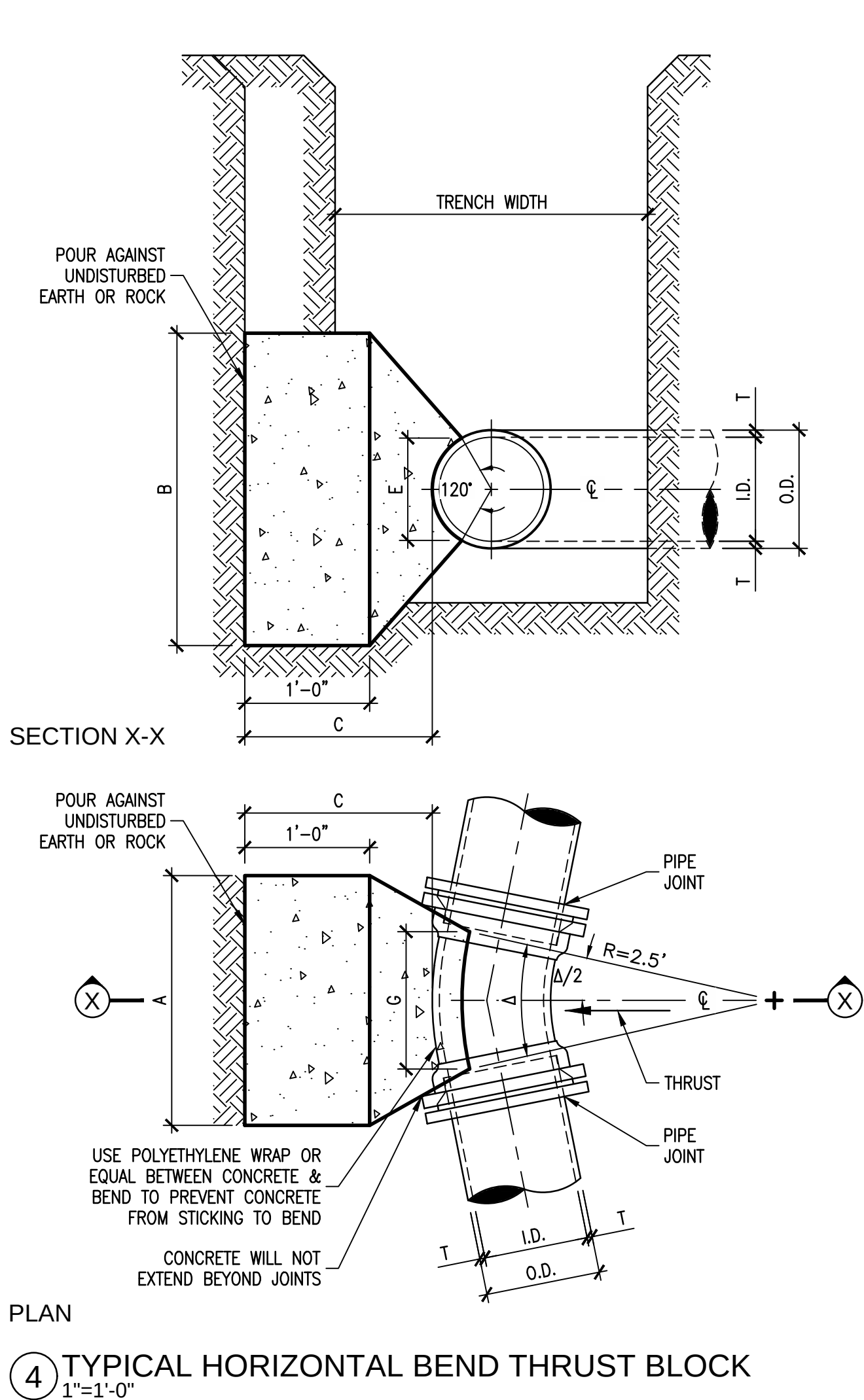
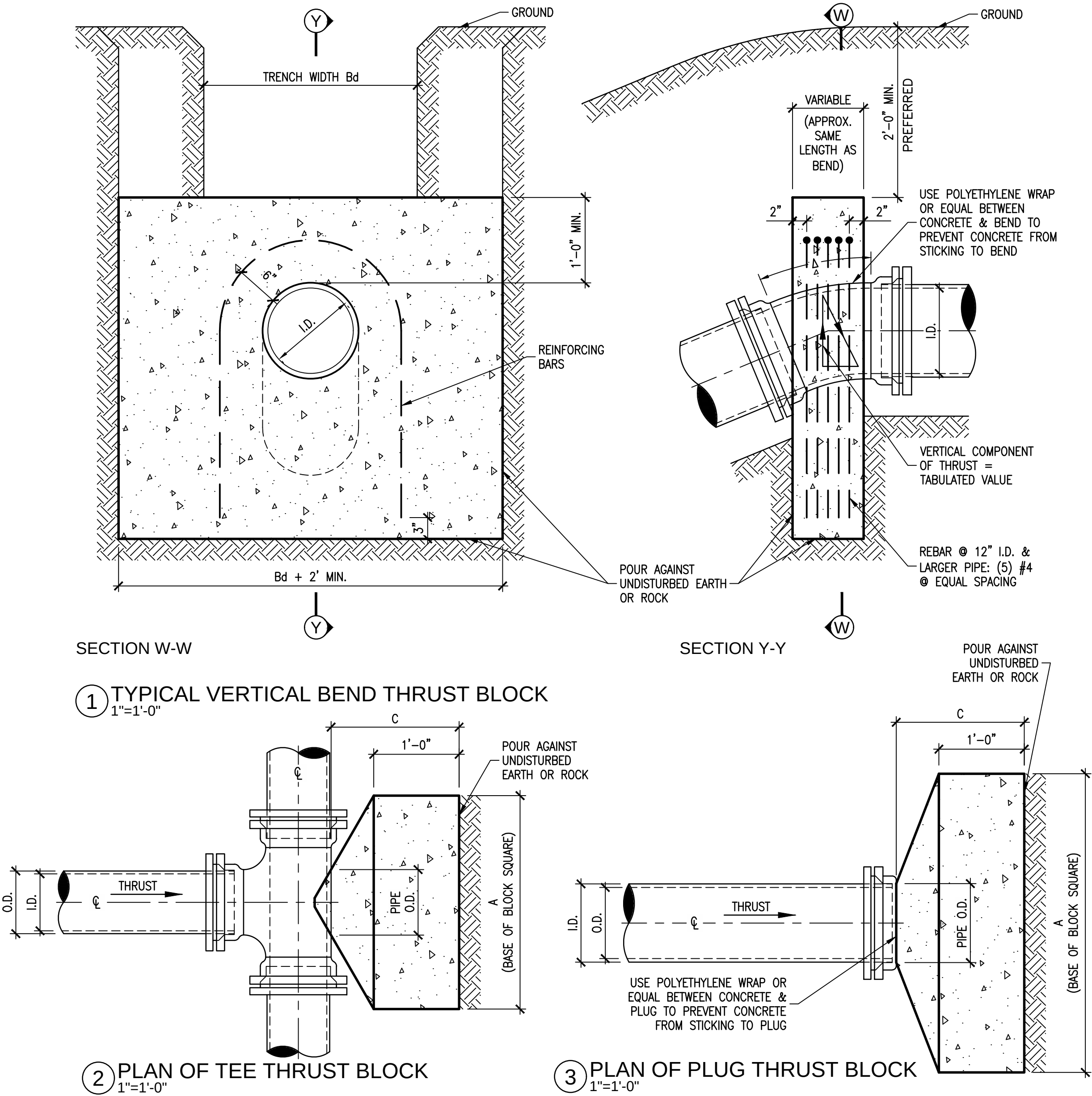
IF SHEET IS IN 11"x17" FORMAT, DRAWINGS ARE AT 1/2" OF NOTED SCALE.

PROJECT No. 24020
DESIGNED: DL
DRAWN: MDG
CHECKED: DL

SHEET
E2

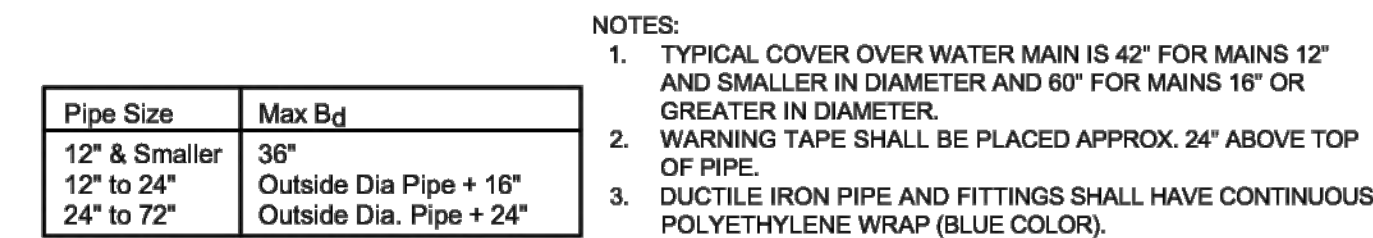
SHEET 6 OF 8

HORIZONTAL BENDS																																																																																															
Δ=11.25 DEG.																Δ=22.50 DEG.																Δ=30 DEG.																Δ=45 DEG.																Δ= 67.50 DEG.																Δ=90 DEG.															
I.D. in.	T in.	C 11.25' ft.	C 22.50'+ ft.	E ft.	I.D. in.	G ft.	THRUST tons	EARTH						ROCK						I.D. in.	G ft.	THRUST tons	EARTH						ROCK						I.D. in.	G ft.	THRUST tons	EARTH						ROCK						I.D. in.	G ft.	THRUST tons	EARTH						ROCK						I.D. in.	G ft.	THRUST tons	EARTH						ROCK																					
								A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.				A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.				A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.				A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.	A ft.	B ft.	VOLUME c.y.																																		
4,6,8	0.4	1.5	1.5	0.9	4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1	4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1	4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2																																					
10,12	0.5	1.5	1.5	1.2	10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1	10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3	10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5																																					
16,18	0.6	1.5	1.5	1.6	16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3	16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6	16,18	4.7	28.3	7.5	4.0	1.9	5.0	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0																																					
20	0.7	1.5	1.5	1.8	20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.5	0.4	20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7	20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5																																					
24	0.9	1.5	1.5	2.1	24	1.1	8.9	3.0	3.0	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.0	0.5	24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1	24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1																																					
30	2.9	1.5	1.9	2.6	30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8	30	3.6	27.5	5.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6	30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3																																					
36	4.5	1.5	2.3	3.3	36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3	36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6	36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3																																					
42	5.0	1.8	2.6	3.8	42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1	42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2	42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7																																					
48	5.5	2.0	3.0	4.3	48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8	48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3	48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4																																					
54	6.0	2.3	3.4	4.8	54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1	54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9	54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1																																					
60	6.5	2.5	3.8	5.3	60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3	60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0	60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0																																					
66	6.8	2.8	4.1	5.7	66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2	66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2	66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5																																					
72	7.5	3.0	4.5	6.3	72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1	72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7	72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0																																					
78	7.5	3.3	4.9	6.7	78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7	78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9	78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2	26.0	10.0	53.2																																					
84	8.0	3.5	5.3	7.2	84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8	84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6	84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8																																					
90	8.5	3.8	5.6	7.7	90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7	90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6	90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2																																					
96	9.0	4.0	6.0	8.2	96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8	96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5	96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.8	48.0	16.0	199.0	32.0	12.0	95.1																																					



VERTICAL BENDS																	
11.25 DEG.			22.50 DEG.			30 DEG.			45 DEG.			67.50 DEG.			90 DEG.		
I.D. in.	THRUST tons	VOLUME c.y.	I.D. in.	THRUST tons	VOLUME c.y.	I.D. in.	THRUST tons	VOLUME c.y.	I.D. in.	THRUST tons	VOLUME c.y.	I.D. in.	THRUST tons	VOLUME c.y.	I.D. in.	THRUST tons	VOLUME c.y.
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8				
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12				
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18				
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20				
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24				
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30				
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36				
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42				
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48				
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54				
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60				
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66				
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72				
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78				
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84				
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90				
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96				

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Top of Existing Pavement, Soil, or Proposed Pavement

Remove Valve Cover and Entire C.I. Valve Stack.

Valve Stack (Remove Entire C.I. Valve Stack)

Backfill Pipe Below Valve Stack with 2,000 psi Concrete or Crushed Concrete Flexible Base (TxDOT Item 247, Grade 1, Type D)

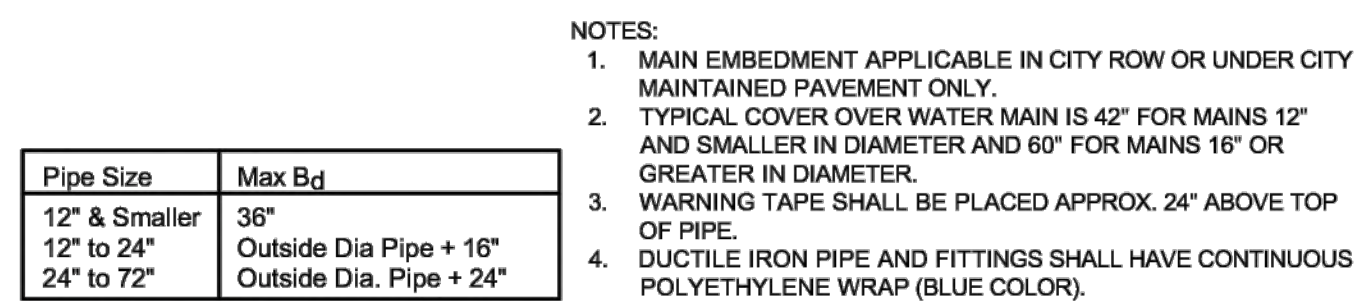
PVC Valve Stack Extension (May Remain)

Existing Valve (May Remain)

The diagram shows a cross-section of a valve assembly being installed into a hole in the ground. At the top, a horizontal line represents the ground surface. Below it, a section of the old concrete valve stack is shown with diagonal hatching and is labeled 'Remove Valve Cover and Entire C.I. Valve Stack.' Below this, a new PVC valve stack extension is shown, labeled 'PVC Valve Stack Extension (May Remain)'. This extension sits on top of an existing valve, which is labeled 'Existing Valve (May Remain)'. The space between the PVC extension and the existing valve is filled with a stippled pattern representing concrete or crushed concrete, labeled 'Backfill Pipe Below Valve Stack with 2,000 psi Concrete or Crushed Concrete Flexible Base (TxDOT Item 247, Grade 1, Type D)'. The entire assembly is shown within a circular opening in the ground.

NOTES:

1. NOT IN PAVEMENT - MATCH EXISTING SOIL AND SOD. COMPACT TO 95% STANDARD PROCTOR DENSITY.
2. IN PAVEMENT - ALL PAVEMENT REPAIRS MUST CONFORM TO DETAIL G-2.



Stainless Steel Screen
(Minimum 16 Openings Per Inch)
with Stainless Steel Hose Clamp

Cap

6"

2" Schedule 40 Gal. Steel Vent Pipe

R.O.W. Line

4"

Finished Grade

2" Combination Air Release Valve

Meter Box
Bass & Hays
55-A1S

1/4" x 3/4" Galvanized
Straps,
Place @ 18" Center to
Center From Top of Post

3" Minimum

2" Copper Pipe
Slope up 1/4"
Per Foot

2" Corporation Stop

8" Blind Flange
Tapped for 2"

8" Flanged Outlet

6"

2% 12"

2" Curb Stop

Washed Gravel

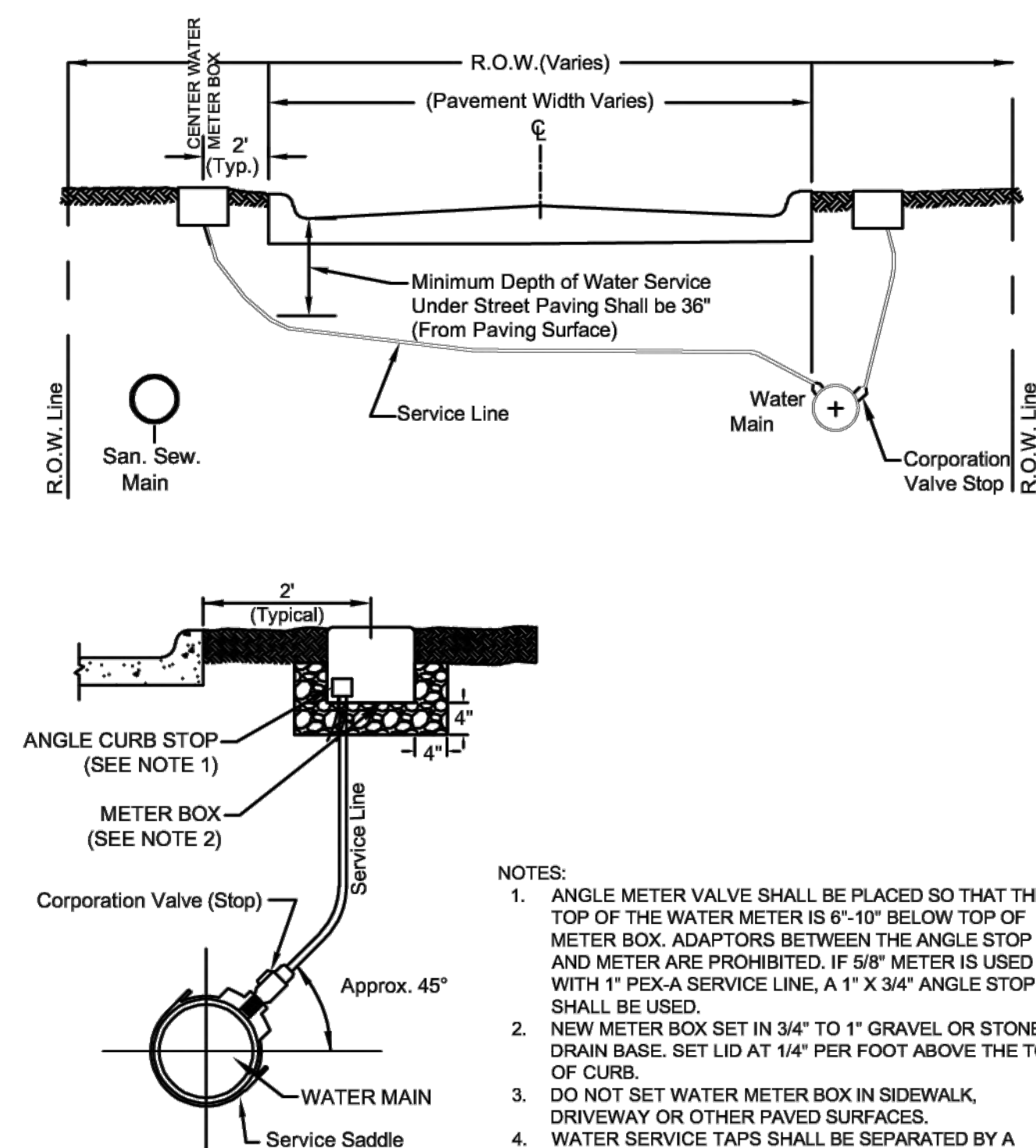
4" Galvanized Steel Post
(Schedule 40) Fill With Concrete

Sweat Fittings With NTP Threads to
Bottom of Combination

Water Main

NOTES:

1. FOR 2" AIR RELEASE VALVE.
2. FOR LARGER SIZES CONSULT WITH CITY ENGINEER.
3. CORPORATION & CURB STOP PER TYPICAL SERVICE DETAIL.



Corporation Valve (Stop)

Service Line

Approx. 45°

WATER MAIN

Service Saddle

NOTES:

1. ANGLE METER VALVE SHALL BE PLACED SO THAT THE TOP OF THE WATER METER IS 6"-10" BELOW TOP OF METER BOX. ADAPTORS BETWEEN THE ANGLE STOP AND METER ARE PROHIBITED. IF 5/8" METER IS USED WITH 1" PE-X-A SERVICE LINE, A 1" X 3/4" ANGLE STOP SHALL BE USED.
2. NEW METER BOX SET IN 3/4" TO 1" GRAVEL OR STONE DRAIN BASE. SET LID AT 1/4" PER FOOT ABOVE THE TOP OF CURB.
3. DO NOT SET WATER METER BOX IN SIDEWALK, DRIVEWAY OR OTHER PAVED SURFACES.
4. WATER SERVICE TAPS SHALL BE SEPARATED BY A MINIMUM 3' SPACE ALONG THE MAIN.
5. SERVICE LINES SHALL BE 3/4", 1", 1.5", 2" OR 4". SIZE FOR SERVICE LINES GREATER THAN 4" SHALL BE APPROVED BY THE CITY ENGINEER. FOR SERVICES GREATER THAN 2", A 4" VALVE SHALL BE INSTALLED PRIOR TO THE METER BOX.



This plan view diagram illustrates the layout of a street intersection, including the following features and labels:

- Sanitary Sewer Service, Located At Opposite Lot Edge from Water Service (Typ.):** Indicated by a line pointing to a service line on the opposite side of the lot from the water service.
- Water Service Located at Edge of Lot (Typ.):** Indicated by a line pointing to a service line at the edge of the lot.
- R.O.W. (Right of Way):** Multiple lines indicating the boundaries of the right of way on all sides of the intersection.
- San. Sew. (Sanitary Sewer):** Lines representing the sanitary sewer main and service lines.
- Back of Curb:** A line indicating the back of the curb on the left side of the intersection.
- Blue Stimsonite Reflector (To Mark Fire Hydrant):** A line pointing to a reflector marking the fire hydrant.
- Water:** Lines representing the water main and service lines.
- Water Main 4' Behind Back of Curb (Typ.):** A line pointing to the water main location relative to the curb.
- FH 10':** A line pointing to the fire hydrant, which is 10 feet from the curb.
- Wages:** A line pointing to the wages (curb) on the left side of the intersection.
- Paving Width B - B (Varies):** A dimension line indicating the paving width, which varies.
- 6':** A dimension line indicating a 6-foot width.
- R.O.W. (Varies):** A dimension line indicating that the right of way width varies.

NOTES:

1. WATER MAINS SHALL NOT BE IN STREET. SANITARY SEWER MAY BE INSTALLED IN STREET AT LOCATION APPROVED BY CITY ENGINEER.
2. FIRE HYDRANTS LOCATED AT STREET INTERSECTIONS SHALL BE PLACED A MINIMUM OF 10' FROM THE STREET RADIUS TANGENT POINT.
3. ALL WATER AND SEWER SERVICE LOCATIONS SHALL BE MARKED AT THE CURB AND PAINTED PER CITY STANDARDS.
4. WATER METERS FOR LOT WITH DRIVEWAY ACCESS OFF AN ALLEY SHOULD BE AT THE CENTER OF THE LOT. FOR LOTS WITH DRIVEWAY ACCESS OFF THE STREET, WATER METERS SHOULD BE LOCATED NEAR THE PROPERTY LINE AS SHOWN IN THIS DETAIL.