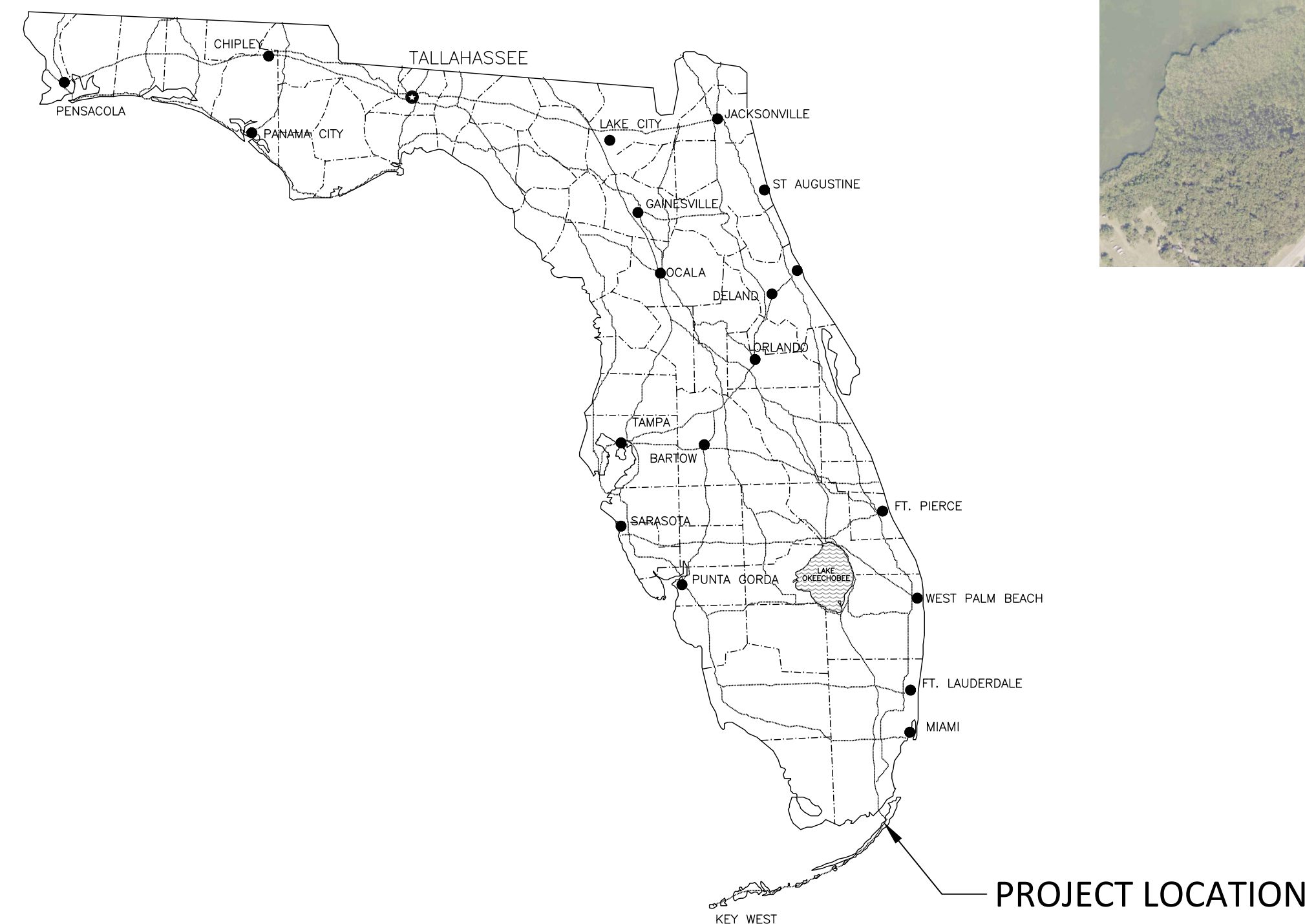


CONSTRUCTION PLANS FOR KEY LARGO WASTEWATER TREATMENT DISTRICT 5 HOMESTEAD AVENUE FORCEMAIN EXTENSION

SECTION 33, TOWNSHIP 61 S, RANGE 39 E
MONROE COUNTY, FLORIDA



STATE OF FLORIDA LOCATION MAP
NOT TO SCALE

KLWTD OFFICIALS:

NICK RODRIGUEZ
PHILIP SCHWARTZ
SUE HEIM
ROBERT MAJESKA
TIM MALONEY
PETER ROSASCO

CHAIRMAN
COMMISSIONER
SECRETARY-TREASURER
COMMISSIONER
VICE CHAIR
GENERAL MANAGER

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OWNER

KEY LARGO WASTEWATER TREATMENT DISTRICT

103355 OVERSEAS HWY
KEY LARGO, FLORIDA 33037

PREPARED BY

THE WEILER ENGINEERING CORPORATION

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digitally signed and sealed by
Edward R. Castle, P.E.
on the date indicated here.
10/18/2023
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and the signature must be verified
on any electronic copies.

Edward R. Castle
Professional Engineer
State of Florida
Registration No. 58574

GENERAL KLWTD PIPING NOTES

COORDINATION OF WORK

- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE OWNER SO THAT CONSTRUCTION WILL NOT USUALLY RESTRAIN OR HINDER OPERATION OF THE EXISTING TREATMENT WORKS. IF, AT ANY TIME, ANY PORTION OF THE TREATMENT WORKS IS OUT OF SERVICE, THE CONTRACTOR MUST OBTAIN APPROVAL FROM THE OWNER AS TO THE DATE, TIME AND LENGTH OF TIME THAT PORTION OF THE TREATMENT WORKS IS OUT OF SERVICE.
- AFTER HAVING COORDINATED HIS WORK WITH THE OWNER, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF THE TIME, TIME LIMITS AND METHODS OF EACH CONNECTION OR ALTERATION AND HAVE APPROVAL OF THE ENGINEER BEFORE ANY WORK IS UNDERTAKEN ON THE CONNECTIONS OR ALTERATIONS.
- BEFORE ANY ROADWAY OR FACILITIES ARE BLOCKED OFF THE OWNER SHALL BE CONTACTED TO COORDINATE CLOSURES.

GENERAL NOTES

- THE REQUIREMENTS OF KLWTD SANITARY SEWER CONSTRUCTION STANDARDS SHALL GOVERN ALL UTILITIES WORK. WHERE A CONFLICT EXISTS IN THE REQUIREMENTS OF A REFERENCED MATERIAL OR INSTALLATION STANDARD, THE REQUIREMENTS OF THE KLWTD SHALL PREVAIL. WHERE THE REQUIREMENTS OF A STATE OR LOCAL AGENCY HAVING JURISDICTION ARE MORE STRINGENT, THOSE REQUIREMENTS SHALL PREVAIL.
- THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE, AT ALL TIMES, ONE COPY OF KLWTD SANITARY SEWER CONSTRUCTION STANDARDS, ONE COPY OF THE CONTRACT DOCUMENTS INCLUDING PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS, AND COPIES OF ANY REQUIRED CONSTRUCTION PERMITS.
- CONTRACTOR IS RESPONSIBLE FOR CHECKING ACTUAL SITE CONDITIONS BEFORE STARTING CONSTRUCTION.
- ANY DISCREPANCIES ON THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND KLWTD BEFORE COMMENCING WORK.
- CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS BEFORE COMMENCING WORK.
- THE CONTRACTOR SHALL CONTACT ALL CONCERNED UTILITIES AND THE ENGINEER AT LEAST 48 HOURS IN ADVANCE OF CONSTRUCTION OPERATIONS.
- NO FIELD CHANGES OR DEVIATIONS FROM DESIGN TO BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER.
- CONTRACTOR TO VERIFY THE LOCATIONS OF ALL UNDERGROUND UTILITIES BEFORE COMMENCEMENT OF WORK.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, DEPTH AND CHARACTER OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER AS LISTED BELOW AND FIELD VERIFY LOCATIONS AND ELEVATIONS OF UTILITIES AT LEAST 72 HOURS IN ADVANCE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE CAUSED BY HIS OPERATIONS.

POWER FLORIDA KEYS ELECTRIC CO-OP 91605 OVERSEAS HIGHWAY TAVERNIER, FLORIDA (305) 852-2431	WATER FLORIDA KEYS AQUEDUCT AUTHORITY ENGINEERING DEPARTMENT P. O. BOX 12299 KEY WEST, FLORIDA 33040 (305) 296-2545	AT&T 101431 OVERSEAS HIGHWAY SUITE 103 KEY LARGO, FL 33037 (305) 451-3222	COMCAST 103400 OVERSEAS HIGHWAY SUITE 101 KEY LARGO, FL 33037 (800) 266-2278
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- THE CONTRACTOR SHALL NOT PLACE ANY FILL MATERIALS WITHIN A WETTED DITCH OR WETLAND AREA WHEN WORKING ADJACENT TO EITHER TYPE OF AREA.
- ALL AREAS DISTURBED DURING CONSTRUCTION OPERATIONS SHALL BE GRADED UNIFORMLY AND RESTORED IN ACCORDANCE WITH THE SPECIFICATIONS.
- NO ADDITIONAL COMPENSATION WILL BE MADE FOR EXPLORATORY WORK OR TEST HOLES.

PIPING

- PIPING PLANS DO NOT PURPORT TO SHOW ALL FITTINGS, SPECIALS, ETC., WHICH MAY BE NECESSARY TO ACCOMMODATE FIELD LAYING CONDITIONS. THE CONTRACTOR SHALL FURNISH AND INSTALL EXTRA PIPE FITTINGS TO AFFORD PROPER PIPE CLEARANCES AND ALIGNMENT WHERE NECESSARY AT NO ADDITIONAL COST TO THE OWNER.
- ALL PIPE SHALL HAVE A MINIMUM COVER OF 3'-0" FROM FINISHED GRADE TO TOP OF PIPE UNLESS OTHERWISE NOTED.
- ALL BENDS, TEES, PLUGS, ETC. ON PRESSURE MAINS SHALL BE RESTRAINED IN ACCORDANCE WITH SPECIFICATIONS.
- CONTRACTOR SHALL INSTALL ALL YARD PIPING AND APPURTENANCES TO THE LIMITS INDICATED UNDER THIS CONTRACT.
- PIPE AND FITTINGS SHALL BE PROVIDED AS REQUIRED TO MAKE CHANGES IN ELEVATION AND DIRECTION. THE CONTRACTOR SHALL COORDINATE ALL PIPING AND CONDUIT FOR PROPER CLEARANCES AND AVOIDANCE OF CONFLICTS.
- ALL TRENCHES FOR NEW PIPING AND CONDUIT SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND BE THOROUGHLY COMPACTED, UNLESS OTHERWISE SPECIFIED.
- ALL NEW PIPES SHALL BE SLOPED UNIFORMLY BETWEEN GIVEN ELEVATIONS, UNLESS INDICATED OTHERWISE.
- PIPING SHALL BE TESTED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS DESCRIBED HEREIN.
- BURIED DUCTILE IRON PIPING SHALL BE POLY WRAPPED IN ACCORDANCE WITH THE SPECIFICATIONS.
- FITTINGS SHALL BE USED FOR PIPE ALIGNMENT CHANGES RATHER THAN DEFLECTING JOINTS. PIPE JOINT DEFLECTIONS WHERE REQUIRED AND OUTLINED BY THE OWNER SHALL NOT EXCEED 75% OF THE MAXIMUM RECOMMENDED DEFLECTION BY THE PIPE MANUFACTURER FOR PVC PIPE AND BY DUCTILE IRON PIPE RESEARCH ASSOCIATION FOR DUCTILE IRON PIPE.
- ALL EXISTING EQUIPMENT, PIPING, VALVES AND OTHER ITEMS REMOVED AND DEEMED REUSABLE DURING CONSTRUCTION OPERATIONS SHALL REMAIN THE PROPERTY OF THE OWNER AT THE OWNER'S DISCRETION, AND SHALL BE STORED ON THE SITE IN THE LOCATION DESIGNATED BY THE OWNER. ANY MATERIALS NOT WANTED BY THE OWNER WILL BE DISPOSED OF AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL MAINTAIN A MINIMUM HORIZONTAL OUTSIDE EDGE TO OUTSIDE EDGE SEPARATION OF 10 FEET AND MINIMUM VERTICAL WALL TO WALL SEPARATION OF 18-INCHES BETWEEN WATER MAINS AND WASTEWATER FORCE MAINS, OR GRAVITY SEWERS. WHEN THIS SEPARATION CANNOT BE MAINTAINED, BOTH PIPE LINE MATERIALS SHALL BE UPGRADED TO DUCTILE IRON. A MINIMUM VERTICAL WALL TO WALL SEPARATION OF 12-INCHES SHALL BE MAINTAINED FOR OTHER UTILITY CROSSINGS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOWS THROUGH EXISTING PIPING AND STRUCTURES AND DIVERSION OF FLOWS AS NECESSARY DURING CONSTRUCTION UNDER THIS CONTRACT TO ENSURE CONTINUATION OF PLANT OPERATION WITHOUT INTERRUPTION. ALL WORK WHICH AFFECTS PLANT OPERATIONS SHALL BE COORDINATED AND SCHEDULED TO THE SATISFACTION OF THE OWNER PRIOR TO BEGINNING. ALL WORK ON EXISTING SYSTEM SHALL BE COORDINATED A MINIMUM OF 72 HOURS PRIOR WITH THE OWNER.
- DIMENSION, ELEVATIONS, AND LOCATIONS SHOWN ON THESE DRAWINGS FOR EXISTING STRUCTURES, PIPING, ETC., MAY BE FROM RECORD DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL INFORMATION PRIOR TO BEGINNING HIS CONSTRUCTION OPERATIONS IN EACH AREA AND AT NO ADDITIONAL COST TO THE OWNER. MAKE ALL NECESSARY ADJUSTMENTS TO PERFORM THE INTENT OF WORK UNDER THIS CONTRACT.
- WHERE PIPING PASSES THROUGH CONCRETE, AND THE CONCRETE IS NOT A SUBMERGED PORTION OF A HYDRAULIC STRUCTURE, THE PIPE SHALL BE SEPARATED FROM THE CONCRETE BY A LAYER OF 1/4-INCH (MIN.) FIBER OR RUBBER EXPANSION JOINT MATERIAL. THE EXPOSED END OF THE MATERIAL SHALL BE SEALED WITH POLYURETHANE SEALANT.
- UNLESS OTHERWISE INDICATED, PROCESS PIPING PASSING THROUGH TANK WALLS MAY BE HELD IN PLACE AND SEALED WITH LINK-SEAL OR SIMILAR RESTRAINT SYSTEM.
- ALL GRAVITY LINES SHALL BE EQUIPPED WITH TWO-WAY CLEAN-OUTS EVERY 75' AND EVERY CHANGE OF DIRECTION LARGER 45'.

SIGNAGE

THE CONTRACTOR SHALL SUPPLY AND MOUNT INFORMATION AND/OR SAFETY SIGNS IN THE LOCATIONS DESIGNATED BY THE OWNER AND DEFINED ON THE DESIGN SCHEDULE CONTAINED HEREIN.

MISCELLANEOUS METALS

IT IS THE INTENT OF THIS CONTRACT THAT ALL METALS EXPOSED TO THE WEATHER BE NON-FERROUS MATERIALS. ACCEPTABLE MATERIALS OF CONSTRUCTION SHALL BE HIGH GRADE ALUMINUM OR STAINLESS STEEL (GRADE 304L OR BETTER).

TEST PRESSURE

TEST PRESSURE= 100 PSI

PROJECT SITE SAFETY:

- THE ENGINEER/OWNER OR THEIR EMPLOYEES HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER THE CONTRACTOR, ANY SUB-CONTRACTOR OR OTHER ENTITY OR THEIR EMPLOYEES IN CONNECTION WITH THEIR WORK OR ANY JOB SITE HEALTH OR SAFETY PRECAUTIONS.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SITE SAFETY, AND WARRANTS THAT THIS INTENT IS MADE EVIDENT BY THE AGREEMENT BETWEEN OWNER AND CONTRACTOR.
- ALL EXISTING OVERHEAD AND UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS OR ENCOUNTERED THROUGH THE PROGRESSION OF WORK AT THIS PROJECT SITE ARE ASSUMED TO BE LIVE AND ACTIVE, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS WHEN WORKING AROUND EXISTING OVERHEAD OR UNDERGROUND UTILITIES.

SEWER COLLECTION SYSTEM

- GRAVITY SEWER PIPE, WHEN SPECIFIED AS DUCTILE IRON, SHALL BE EPOXY COATED CLASS S1.
- FORCE MAIN SEWER PIPE SHALL CONFORM TO ASTM D2241 SDR 26 (P.R. 160 PSI) OR APPROVED EQUAL.
- JOINTS FOR PVC SEWER SHALL BE RUBBER GASKETED TYPE CONFORMING TO ASTM D3212 AND ASTM F477.
- ALL PVC SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE UNI-BELL PLASTIC PIPE ASSOCIATION STANDARD NI-B-5.

- UNLESS OTHERWISE NOTES MANHOLE TOP ELEVATIONS SHALL BE: PAVED AREA - FLUSH WITH PAVEMENT, UNPAVED AREA - 0.25' ABOVE FINISH GRADE MINIMUM.
- AIR RELEASE VALVES SHALL BE INSTALLED AT ALL HIGH POINTS ALONG FORCE MAIN.
- SERVICE CONNECTIONS SHALL BE 4" FOR SINGLE AND 6" OR LARGER FOR MULTIPLE RESIDENTIAL AND COMMERCIAL SERVICES. LOCATE EACH SERVICE CONNECTION FROM THE CENTER OF THE DOWNSTREAM MANHOLE AND RECORD THEIR LOCATION.
- THE SEWER COLLECTION SYSTEM SHALL NOT BE PLACED IN SERVICE UNTIL THE SYSTEM HAS BEEN VISUALLY INSPECTED AND FLUSHED OF SEDIMENT AND DEBRIS. MUST HAVE APPROVAL FROM KLWTD AND, WHEN APPLICABLE, FROM DEP PRIOR TO PLACING ANY SYSTEM INTO SERVICE.
- GRAVITY SEWER LINES SHALL BE T.V. INSPECTED AND THE ALIGNMENT BETWEEN MANHOLES CHECKED BY USING LIGHTS, LASER BEAMS, OR OTHER SUITABLE MEANS.
- GRAVITY SEWER LINES SHALL BE TESTED BY ONE OF THE FOLLOWING METHODS: WATER EXFILTRATION OR LOW PRESSURE AIR EXFILTRATION AS DIRECTED BY KLWTD REPRESENTATIVE.
- FORCE MAIN SEWER PIPE FITTINGS SHALL BE OF SDR 26 CALLED OUT FOR FORCE MAIN PIPING, MECHANICAL JOINT, CEMENT MORTAR LINES IN ACCORDANCE WITH ANSI 21.3 RATED AT 350 PSI AND SHALL COMPLY WITH ANSI A21.10 AND A21.11.
- MANHOLES AND LIFT STATIONS SHALL BE PHYSICALLY INSPECTED AND HYDROSTATICALLY TESTED TO ENSURE THE ABSENCE OF LEAKS.
- FORCE MAIN SEWER PIPE SHALL BE PRESSURE TESTED IN ACCORDANCE WITH THE ENGINEER'S RECOMMENDATIONS.

CONSTRUCTION IN STREET AND ROAD RIGHT-OF-WAYS

- OPEN ROAD CUTS REQUIRES PRIOR APPROVAL BY THE KLWTD, COUNTY, STATE, OR ANY OTHER AGENCY WHICH MAY HAVE JURISDICTION.
- ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP ARE TO BE IN ACCORDANCE WITH FLORIDA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS AND STANDARDS.
- ALL AREAS IN EXISTING RIGHT-OF-WAY DISTURBED BY CONSTRUCTION SHALL RECEIVE SOLID SOIL.
- STREET OR HIGHWAY RESTORATION TO BE DONE AS PER LOCAL OR STATE AGENCY HAVING JURISDICTION.
- THE CONTRACTOR SHALL COMPLY WITH ALL RULES AND REGULATIONS OF THE STATE, COUNTY, AND CITY AUTHORITIES REGARDING CLOSING OR RESTRICTING THE USE OF PUBLIC STREETS OR HIGHWAYS.
- TRAFFIC CONTROL ON ALL COUNTY AND STATE HIGHWAY RIGHT-OF-WAYS SHALL MEET THE REQUIREMENTS OF THE CURRENT VERSION OF FDOT'S "STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION" AND THE REQUIREMENTS OF THE STATE AND ANY LOCAL AGENCY HAVING JURISDICTION.
- CONTRACTOR SHALL COMPLY WITH THE TRENCH SAFETY ACT (90-90 LAWS OF FLORIDA) EFFECTIVE OCTOBER 1, 1990.
- CONTRACTOR TO HAVE PRE-APPROVED MOT PLANS FOR VARIOUS SITUATIONS ON HAND AND AVAILABLE FOR ON-SITE INSPECTION.

COLLECTION AND TRANSMISSION SYSTEM TESTING AND REPORTING REQUIREMENTS

GENERAL TESTING REQUIREMENTS

- ALL FINAL TESTS SHALL BE MADE IN THE PRESENCE OF A REPRESENTATIVE FROM KEY LARGO WASTEWATER TREATMENT DISTRICT (THE UTILITY). NOTIFY THE UTILITY AT LEAST 48 HOURS BEFORE ANY WORK IS TO BE INSPECTED OR TESTED.
- ALL DEFECTS IN PIPING SHALL BE REPAIRED AND/OR REPLACED AND RETESTED UNTIL ACCEPTABLE. REPAIRS SHALL BE MADE TO THE STANDARD OF QUALITY SPECIFIED FOR THE ENTIRE SYSTEM.
- SECTIONS OF THE SYSTEM MAY BE TESTED SEPARATELY, BUT ANY DEFECT WHICH MAY DEVELOP IN A SECTION PREVIOUSLY TESTED AND ACCEPTED SHALL BE PROMPTLY CORRECTED AND RETESTED. PRESSURE TESTS SHALL BE MADE BETWEEN VALVES TO DEMONSTRATE ABILITY OF VALVES TO SUSTAIN PRESSURE.
- PROVIDE ALL NECESSARY TESTING EQUIPMENT. INCREMENTS ON GAUGES USED FOR PRESSURE PIPE TESTING SHALL BE SCALED TO THE NEAREST 1 PSI, GAUGES AND PUMPS SHALL BE IN GOOD WORKING ORDER WITH NO NOTICEABLE LEAKS.
- TESTS FOR ANY EXPOSED PIPING SHALL BE MADE BEFORE COVERING AND INSTALLATION IS PLACED.
- THE PRESSURE AND LEAKAGE TEST FOR BURIED PIPING SHALL BE MADE AFTER ALL JOINTING OPERATIONS ARE COMPLETED AND RESTRAINTS HAVE BEEN IN PLACE AT LEAST SEVEN (7) DAYS. LINES TESTED BEFORE BACKFILL IS IN PLACE SHALL BE RETESTED AFTER COMPACTED BACKFILL IS PLACED.
- SHORT SECTIONS OF PIPING, SUCH AS THOSE BETWEEN VALVES, MAY BE ISOLATED FOR TESTING. IF SHORT SECTIONS ARE TESTED, TEST PLUGS OR BULKHEADS REQUIRED AT THE ENDS OF THE TEST SECTION TOGETHER WITH ALL ANCHORS, BRACES, AND OTHER DEVICES REQUIRED TO WITHSTAND THE HYDROSTATIC PRESSURE WITHOUT IMPOSING ANY THRUST ON THE PIPELINE. SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE WHICH MAY RESULT FROM THE FAILURE OF TEST PLUGS OR SUPPORTS.
- ALL ITEMS INCLUDING VALVES AND CONTROLS SHALL BE GIVEN A THOROUGH TEST. THE ENTIRE SYSTEM SHALL BE OPERATED FOR TWO (2) DAYS TO PROVE COMPATIBILITY OF EQUIPMENT AND TO ACHIEVE PROPER ADJUSTMENT FOR OPERATION. VALVES, PIPES, TANKS, AND OTHER ITEMS THAT ARE NOT OPERATIONAL OR ARE ONLY OPERATED ON OCCASION SHALL BE TESTED FOR THE ABILITY TO MEET REQUIRED DESIGN CRITERIA.

FORCE MAIN TESTING

PRESSURE AND LEAKAGE TESTING (PVC AND DI MAINS)

- PIPING SHALL BE SLOWLY FILLED WITH WATER AND ALL AIR EXPELLED. CARE SHALL BE TAKEN THAT ALL AIR RELEASE VALVES ARE INSTALLED AND OPEN IN THE SECTION BEING FILLED, AND THAT THE RATE OF FILLING DOES NOT EXCEED THE VENTING CAPACITY OF THE AIR RELEASE VALVES.
- APPLY LEAKAGE TEST PRESSURE OF 100 PSI. MAINTAIN PRESSURE AT A MAXIMUM VARIATION OF 5% DURING ENTIRE LEAKAGE TEST. THE DURATION OF THE LEAKAGE TEST SHALL BE TWO HOURS MINIMUM, AND FOR SUCH ADDITIONAL TIME NECESSARY FOR THE UTILITY TO COMPLETE INSPECTION OF THE SECTION OF LINE UNDER TEST. LEAKAGE MEASUREMENTS SHALL NOT BE STARTED UNTIL A CONSTANT TEST PRESSURE HAS BEEN ESTABLISHED. THE LINE LEAKAGE SHALL BE MEASURED BY MEANS OF A GRADUATED RESERVOIR INSTALLED ON THE SUPPLY SIDE OF THE PRESSURE PUMP.
- NO LEAKAGE IS ALLOWED IN EXPOSED PIPING, BURIED PIPING WITH FLANGED, THREADED, OR WELDED JOINTS, OR BURIED NON-POTABLE PIPING IN CONFLICT WITH POTABLE WATER LINES.
- TESTED SECTIONS OF BURIED PIPING WITH SLIP-TYPE OR MECHANICAL JOINTS WILL NOT BE ACCEPTED IF IT HAS A LEAKAGE RATE IN EXCESS OF THE RATE DETERMINED BY THE FORMULA:
1. AWWA C-600 DUCTILE IRON MAINS: L=SDP/133,200
2. AWWA MANUAL NO. M-23 - PVC MAIN: L=NDP/7,400
L=MAXIMUM PERMISSIBLE LEAKAGE RATE, IN GALLONS PER HOUR, THROUGHOUT THE ENTIRE LENGTH OF LINE BEING TESTED.
S=LENGTH OF LINE TESTED (IN FEET)
D=NOMINAL INTERNAL DIAMETER (IN INCHES) OF THE PIPE
N=NUMBER OF JOINTS ALONG PIPE BEING TESTED
P=THE SQUARE ROOT OF THE ACTUAL PRESSURE (IN PSIG) ON ALL JOINTS IN THE TESTED PORTION OF THE LINE. THIS ACTUAL PRESSURE SHALL BE DETERMINED BY FINDING THE DIFFERENCE BETWEEN THE AVERAGE ELEVATION OF ALL TESTED PIPE JOINTS AND THE ELEVATION OF THE PRESSURE GAUGE AND ADDING THE DIFFERENCE IN ELEVATION HEAD TO THE AUTHORIZED TEST PRESSURE
- ALL APPARENT LEAKS DISCOVERED AFTER FINAL ACCEPTANCE OF THE WORK BY THE UTILITY SHALL BE LOCATED AND REPAIRED, REGARDLESS OF THE TOTAL LINE LEAKAGE RATE.

PRESSURE AND LEAKAGE TESTING (POLYETHYLENE MAINS)

- PIPING SHALL BE SLOWLY FILLED WITH WATER AND ALL AIR EXPELLED. CARE SHALL BE TAKEN TO ENSURE THAT ALL AIR VALVES ARE INSTALLED AND OPEN IN THE SECTION BEING FILLED, AND THAT THE RATE OF FILLING DOES NOT EXCEED THE VENTING CAPACITY OF THE AIR VALVES.
- SUBJECT PIPELINE TO BE TESTED TO A FOUR (4) HOUR EXPANSION PHASE PRIOR TO COMMENCING LEAKAGE TESTING. PIPELINE EXPANSION SHALL BE ACCOMPLISHED BY APPLYING HYDROSTATIC TEST PRESSURE OF 100 PSI. IN ORDER TO COMPENSATE FOR THE INITIAL EXPANSION OF THE PIPELINE, ADD SUFFICIENT MAKEUP WATER AT HOURLY INTERVALS TO RETURN TO THE REQUIRED TEST PRESSURE. AT THE END OF THE FOURTH HOUR, THE TEST PHASE IS TO COMMENCE.
- AT THE CONCLUSION OF THE FOURTH HOUR OF THE EXPANSION PHASE, FILL THE PIPELINE AGAIN WITH MAKEUP WATER TO RETURN TO THE TEST PRESSURE. THE TEST PHASE SHALL CONSIST OF A TWO (2) HOUR OF THREE (3) HOUR PRESSURE TEST, AS REQUIRED BY THE UTILITY. AT THE END OF THE TEST PHASE, MEASURE THE AMOUNT OF MAKEUP WATER REQUIRED TO RETURN TO THE TEST PRESSURE. THE PIPELINE PASSES THE PRESSURE TEST IF THE MAKEUP WATER REQUIRED DOES NOT EXCEED THE FOLLOWING:

NOMINAL PIPE SIZE (IN)	ALLOWABLE MAKEUP WATER (GALLONS/100 FT OF PIPELINE)	
	TWO HOUR TEST	THREE HOUR TEST
4	0.25	0.4
6	0.6	0.9
8	1	1.5
12	2.3	3.4
16	3.3	5
18	4.3	6.5
20	5.5	8
24	8.9	13.3

- IF ANY DEFECTS OR LEAKS ARE REVEALED, THEY SHALL BE CORRECTED AND THE PIPELINE RETESTED AFTER A MINIMUM 24 HOUR RECUPERATION PERIOD BETWEEN THE TESTS. TOTAL TESTING CONDUCTED ON A SECTION OF PIPELINE SHALL NOT EXCEED 8 HOURS WITHIN A 24 HOUR PERIOD.
- ALL APPARENT LEAKS DISCOVERED WITHIN ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER SHALL BE LOCATED AND REPAIRED BY THE CONTRACTOR, REGARDLESS OF THE TOTAL LINE LEAKAGE RATE.

GRAVITY SEWER TESTING

VISUAL INSPECTIONS (FOR NEW SYSTEMS ONLY):

- PRIOR TO INSPECTIONS AND TESTING, CLEAN ALL INSTALLED LINES AND MANHOLES.
- AFTER BACKFILL HAS BEEN PLACED, THE UTILITY WILL VISUALLY INSPECT ALL GRAVITY FLOW LINES TO CHECK ALIGNMENT AND GRADE. ALL OBSTRUCTIONS SHALL BE REMOVED.
- PROVIDE LIGHT SOURCE AND MIRRORS FOR LAMPING OF SEWER. ANY SEWER IN WHICH THE DIRECT LIGHT OF A LAMP CANNOT BE VIEWED IN EITHER DIRECTION, FULL CIRCLE, BETWEEN ADJACENT MANHOLES SHALL BE CONSIDERED UNSATISFACTORY, UNLESS THE LINE IS DESIGNED WITH HORIZONTAL DEFLECTIONS, AND SHALL BE REPAIRED.

LEAKAGE TESTING (FOR NEW AND EXISTING SYSTEMS)

- THE ALLOWABLE LIMITS OF INFILTRATION OR EXFILTRATION FOR THE ENTIRE SYSTEM, OR ANY PORTION THEREOF, SHALL NOT EXCEED A RATE OF 100 GALLONS PER INCH OF INSIDE PIPE DIAMETER PER MILE OF PIPE PER 24 HOURS. NO ADDITIONAL ALLOWANCE WILL BE MADE FOR HOUSE SERVICE LINES. THE ALLOWABLE LIMITS OF INFILTRATION OR EXFILTRATION OF MANHOLES SHALL NOT EXCEED A RATE OF FOUR (4) GALLONS PER MANHOLE PER 24 HOURS.
- ANY PART OR ALL OF THE SYSTEM MAY BE TESTED FOR INFILTRATION OR EXFILTRATION, AS DIRECTED BY THE UTILITY. PRIOR TO TESTING FOR INFILTRATION, ISOLATE THE SYSTEM TO ELIMINATE ALL EXTERNAL WATER SOURCES. THE SYSTEM SHALL THEN BE PUMPED OUT SO THAT NORMAL INFILTRATION CONDITIONS EXIST AT THE TIME OF TESTING.
- THE AMOUNTS OF INFILTRATION OR EXFILTRATION SHALL BE DETERMINED BY PUMPING INTO OR OUT OF CALIBRATED DRUMS OR BY OTHER METHODS APPROVED BY THE UTILITY.
- THE EXFILTRATION TEST WILL BE CONDUCTED BY FILLING THE PORTION OF THE SYSTEM BEING TESTED WITH WATER TO A LEVEL EQUAL TO THE LOWEST PART OF THE MANHOLE FRAME.
- TESTS SHALL BE CONDUCTED ON PORTIONS OF THE SYSTEM NOT EXCEEDING THREE MANHOLE RUNS OR MAXIMUM OF 1,200 FEET, WHICHEVER IS GREATER, UNLESS OTHERWISE DIRECTED BY THE UTILITY. TESTS SHALL BE RUN CONTINUOUSLY FOR TWO HOURS. TEST DURATION MAY BE REDUCED TO NO LESS THAN TEN MINUTES AT DIRECTION OF KLWTD INSPECTOR.
- WHERE INFILTRATION OR EXFILTRATION EXCEED THE ALLOWABLE LIMITS SPECIFIED HEREIN, THE DEFECTIVE PIPE, JOINTS, OR OTHER FAULTY CONSTRUCTION SHALL BE LOCATED AND REPAIRED. IF THE DEFECTIVE PORTIONS CANNOT BE LOCATED, THESE PORTIONS SHALL BE REMOVED AND RECONSTRUCTED TO BE EXTENT NECESSARY TO CONFORM TO THE SPECIFIED ALLOWABLE LIMITS.
- THE PROPERTY OWNER, AT NO EXPENSE TO THE UTILITY, SHALL PROVIDE ALL LABOR EQUIPMENT AND MATERIALS, AND SHALL CONDUCT ALL TESTING REQUIRED, UNDER THE DIRECTION OF THE UTILITY.

DEFLECTION TESTING (FOR NEW SYSTEMS ONLY)

- CONDUCT PIPELINE DEFLECTIONS TESTING AFTER THE FINAL BACKFILL HAS BEEN PLACED AT LEAST 30 DAYS.
- MAXIMUM ALLOWABLE PIPE DEFLECTION IS 5%. MEASURE DEFLECTION BY MANUALLY PULLING A MANDREL THROUGH THE PIPE. THE MINIMUM MANDREL DIAMETER SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

NOMINAL PIPE SIZE (IN)	BASE INSIDE DIAMETER (IN) (ASTM D3034 SDR 35 FOR PIPE 6" TO 15", ASTM F679 T-1 FOR PIPE 18" TO 27")	MINIMUM MANDREL OUTER DIAMETER (IN) FOR 5% DEFLECTION TEST
6	5.742	5.45
8	7.665	7.28
10	9.563	9.08
12	11.361	10.79
15	13.898	13.2
18	16.976	16.13
21	20.004	19
24	22.48	21.36
27	25.327	24.06

- DEFLECTION TESTING IS CONSIDERED SATISFACTORY IF THE MANDREL CAN BE PULLED BY HAND THROUGH THE PIPE BEING TESTED. IF THE MANDREL CANNOT BE PULLED THROUGH THE PIPE, REPLACE OR CORRECT THE PIPE AND RETEST UNTIL TESTING IS SATISFACTORY. ANY PIPE REMOVED OR CORRECTED DUE TO FAILING DEFLECTION TESTING SHALL ALSO BE RETESTED FOR LEAKAGE.

LEAKAGE TESTING OF MANHOLES

- PLUG INLETS AND OUTLETS AND FILL MANHOLE WITH WATER TO THE BOTTOM OF THE MANHOLE FRAME AND COVER, BYPASS PUMP SEWAGE AS REQUIRED.
- WHERE PRACTICAL, A MANHOLE MAY BE FILLED 24 HOURS PRIOR TO TIME OF TESTING, IF DESIRED, TO PERMIT NORMAL ABSORPTION INTO THE PIPE WALLS TO TAKE PLACE.
- LEAKAGE IN EACH MANHOLE SHALL NOT EXCEED 0.1 GALLON PER HOUR PER FOOT OF HEAD ABOVE THE INVERT, OR THE GROUNDWATER ELEVATION, WHICHEVER IS HIGHER.
- DEFECTIVE MANHOLES; REPAIR BASED ON PLAN SUBMITTED TO AND APPROVED BY THE UTILITY. RETEST AS SPECIFIED.

Project Information	Design:	LRC
	Drawn:	LRC
Approved By:	AS NOTED	ERC
Scale:	03105.082	ERC
Job No.:	10/18/2023	
Date Issued:		

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GENERAL KLWTD PIPING NOTES

5 HOMESTEAD AVENUE FORCEMAIN KLWTD KEY LARGO, FL

Description	Revisions					
	1	2	3	4	5	6

THIS SHEET IS NOT VALID WITHOUT THE SIGNATURE OF A FLORIDA LICENSED ENGINEER.

Edward R. Castle, P.E.
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ABBREVIATIONS

A A/C Air Conditioner	E EFF Effluent	L LF Linear Foot	R REF Reference
ACP Asbestos Cement Pipe	EL Elevation	LH Left Hand	REQD Required
AL, ALUM Aluminum	ELEV Elevator	LWFC Lightweight Concrete Fill	REV Revision
ALT Alternate	EMER Emergency	LWL Low Water Level	RH Right Hand
AMP Ampere	EO Electrically Operated	M MAX Maximum	RM Room
ARV Air Release Valve	EOP Edge Of Pavement	MBR Membrane Batch Reactor	RPM Revolution Per Minute
ASB Asbestos	EQ Equal or Equalization	MCC Motor Control Center	RFG Refrigerator
AUX Auxiliary	EQUIP Equipment	MECH Mechanical	S S South
AWL Average Water Level	EW Each Way	MEMB Membrane	SBR Sequencing Batch Reactor
B BFP Backflow Preventer	EXH Exhaust	MFM Magnetic Flow Meter	SCH Schedule
BFV Butterfly Valve	EXP Expansion	MG Million Gallons	SECT Section
BHP Brake Horsepower	F FE Flow Element or Fire Extinguisher	MGD Million Gallons Per Day	SD Storm Drain
BL, B L Baseline	FFE Finished Floor Elevation	MH Manhole	SF Square Feet
BLDG Building	FH Fire Hydrant	MIN Minute or Minimum	SHWR Shower
BM Bench Mark	FIN Finished	MISC Miscellaneous	SOV Solenoid Valve
BPS Booster Pump Station	FLG Flange	MJ Mechanical Joint	SPEC Specification
BPV Back Pressure Valve	FLM Flow Meter	MM Millimeter	SS Stainless Steel
BSMT Basement	FM Force Main	MO Motor Operated	STO Storage
BV Ball Valve	FPS Feet Per Second	MSL Mean Sea Level	STD Standard
BYP Bypass	FRP Fiber Reinforced Plastic	MW Megawatt or Monitoring Well	STW Storm Water Well
C CC Center to Center	FT Foot	MWL Maximum Water Level	SYM Symbol
CB Catch Basin	FTG Footing	N N North	T T _{OP} Time and Pressure
CA Compressed Air	G GA Gauge	NA Not Applicable	TB Thurst Block
CCB Chlorine Contact Basin	GAL Gallon	NG Natural Gas	TDH Total Dynamic Head
CEM Cement	GALV Galvanized	NO, # Number	TEMP Temperature
CF Cubic Foot	GLV Globe Valve	NOM Nominal	TOP Top of Pavement
CFS Cubic Feet Per Second	GPD Gallons Per Day	NPT National Pipe Thread	TOS Top of Slab
CFM Cubic Feet Per Minute	GPH Gallons Per Hour	NPW Non-Potable Water	TOW Top of Wall
CI Cast Iron	GPM Gallons Per Minute	NTS Not To Scale	TYP Typical
CIP Cast Iron Pipe	GV Gate Valve	O OC On Center	U UON Unless Otherwise Noted
CIPC Cast-in-Place Concrete	H HB Hose Bibb	OD Outside Diameter	V V Volt
CL, C L Centerline	HDWR Hardware	ODC Odor Control	VAC Vacuum
CLR Clear	HORZ Horizontal	P PC Porous Concrete	VAL VALVE
CMU Concrete Masonry Unit	HP Horsepower	PD Plant Drain	VAT Vinyl Asbestos Tile
CO Clean Out	HR Handrail	PG Pressure Gauge	VCP Vitrified Clay Pipe
COL Column	HT Height	PI Plant Influent	VCT Vitrified Clay Tile
CONC Concrete	HWL High Water Level	PL, PL Property Line	VEL Velocity
CONT Continuous	HZ Hertz	PLC Programmable Logic Center	VIF Verify In Field
CTR Center	I ID Inside Diameter	PLV Plug Valve	VERT Vertical
CV Check Valve	IN, " Inch	PPS Plant Pump Station	VOL Volume
CWR Cold Water Return	INF Influent	PRDV Pressure Reducing Valve	W W Watt or West
CWS Cold Water Supply	INV Invert	PRIM Primary	W/D Washer / Dryer
D DEG, ° Degree	IPF Iron Pin Found	PRV Pressure Relief Valve	WAS Waste Activated Sludge
DI Ductile Iron	IPS Injection Pump Station	PSS Pressure Safty Switch	WS Waste Sludge or Water Stop
DIA, ∅ Diameter	IW Injection Well	PSW Pressure Switch	WT Weight
DIP Ductile Iron Pipe	J JCT Junction	PVC Polyvinyl Chloride	WW Wastewater
DN Down	K KG Kilogram	PVMT Pavement	WWF Welded Wire Fabric
DO Dissolved Oxygen	KSI Kips Per Square Inch	PW Potable Water	WWTP Wastewater Treatment Plant
DS Digested Sludge	KGV Knife Gate Valve	Q QTY Quantity	Y YH Yard Hydrant
E E East	KW Kilowatt	R RAD, R Radius	YR Year
ECC Eccentric	L LAB Laboratory	RC Reinforced Concrete	
EF Each Face	LB Pound	RCC Roller Compacted Concrete	

GENERAL SYMBOL LEGEND

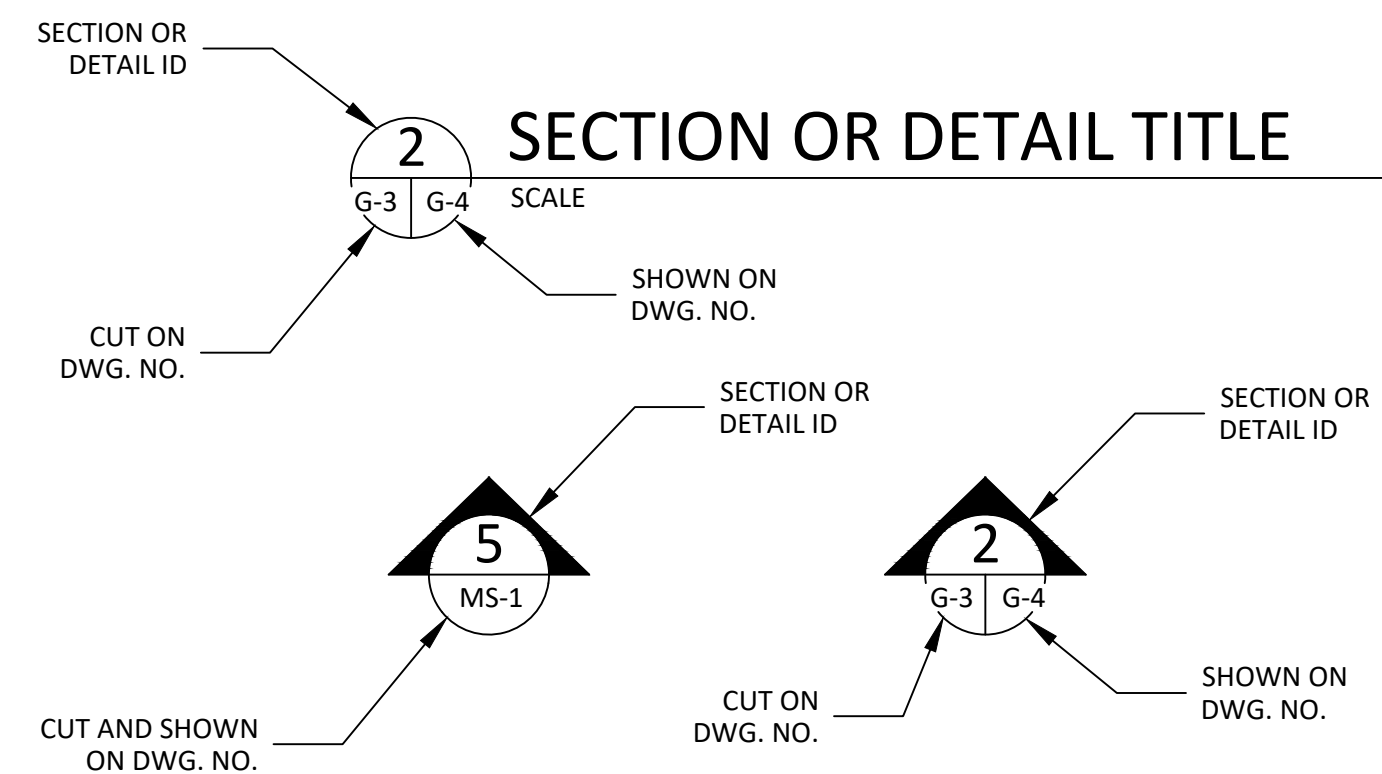
—303—	EXISTING CONTOUR	—OHE—	OVERHEAD ELECTRIC
—303—	FINISHED CONTOUR	⊗ pp	EXISTING POWER LINE
⊕20.5	SPOT ELEVATION	—	NEW PROCESS PIPING
⊙	ELEVATION DESIGNATION	—	NEW PIPING (UNDERGROUND)
⊥	HOSE BIBB	—	EXISTING PIPING
—x—x—	EXISTING ELECTRICAL	⊙	YARD HYDRANT - PROPOSED
—x—x—	EXISTING FENCE	⊙	YARD HYDRANT - EXISTING
—x—x—	NEW FENCE	⊙	FIRE HYDRANT - PROPOSED
—r—	PROPERTY LINE	⊙	FIRE HYDRANT - EXISTING
—R/W—	RIGHT-OF-WAY LINE	CO	CLEAN OUT - PROPOSED
⊥	BALL VALVE	DB-MOV-15	VALVE DESIGNATION
⊥	REDUCER	DB-DIS-5	EQUIPMENT LABEL
⊥	CHECK VALVE	⊙	FIELD MOUNTED
⊥	GATE VALVE	⊙	FIELD PANEL MOUNTED
⊥	PLUG VALVE	⊙	
⊥	BALANCING VALVE	⊙	INTERLOCK
⊥	BUTTERFLY VALVE	⊙	PUMP
⊥	ISOLATION VALVE	⊙	INSTRUMENT (FIELD MTD.)
⊥	SOLENOID VALVE	⊙	INSTRUMENT (MTD. IN PRIMARY LOCATION)
⊥	PNEUMATIC CONTROL VALVE	⊙	SCADA
⊥	PRESSURE REGULATING VALVE	⊙	FLOAT SWITCH
⊥	SURGE RELIEF VALVE	⊙	PILOT LIGHT
⊥	AIR RELEASE VALVE	⊙	
⊥	NEEDLE VALVE	⊙	NEW ASPHALT PAVEMENT
⊥	MOTOR	⊙	
⊥	ELECTRICAL SIGNAL	⊙	EXISTING STRUCTURE
⊥	FLOW METER	⊙	
⊥	CITY WATER LINE (POTABLE)	⊙	NEW STRUCTURE
⊥	PLANT WATER LINE	⊙	
⊥	NATURAL GAS LINE	⊙	
⊥	EXISTING GAS LINE	⊙	
⊥	EXISTING CHLORINE	⊙	
⊥	EXISTING SANITARY SEWER LINE	⊙	
⊥	LIQUID CALIBRATION TUBE	⊙	

NOTE:
LEGEND APPLIES WHERE INADEQUATE DESCRIPTION AVAILABLE. VERIFY CONFLICTS WITH ENGINEER.

HATCH PATTERNS

	CONCRETE		EARTH		GRATING		VEGETATION
	GROUT		STONE/GRAVEL		DIAMOND PLATE		STEEL
	DECKING		WOOD				

SECTION CUTS & DETAIL CALLOUTS




Project Information	LRC	Design:	
	LRC	Drawn:	
	ERC	Checked:	
	ERC	Date Issued:	10/18/2023
Approved By:	AS NOTED	Scale:	
	03105.082	Job No.:	
WEC WATER ENGINEERING CORPORATION	6605 OVERSEAS HIGHWAY MARLBOROUGH, MA 01901 (978) 565-1700		
	ABBREVIATIONS & SYMBOLS		
	5 HOMESTEAD AVENUE FORCEMAIN KLWTD		
	KEY LARGO, FL		
Revisions	1		
	2		
	3		
	4		
	5		
	6		
Description			
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Scale:	AS NOTED
Job No.:	03105.082
Date Issued:	10/18/2023
Design:	LRC
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Checked:	ERC


 6605 OVERSEAS HIGHWAY
 MARA, FL 33050
 (941) 505-1700

AERIAL MAP
5 HOMESTEAD AVENUE FORCEMAIN
KLWTD
KEY LARGO, FL

Description	Revisions

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Project Information			
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Scale:	AS NOTED	Drawn:	LRC
Job No.:	03105.082	Checked:	ERC
Date Issued:	10/18/2023		

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 6605 OVERSEAS HIGHWAY
 MARA, FL 33050
 (941) 505-1700

EXISTING CONDITIONS
5 HOMESTEAD AVENUE FORCEMAIN
KLWTD
KEY LARGO, FL

Revisions	Description
1	
2	
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4	
5	
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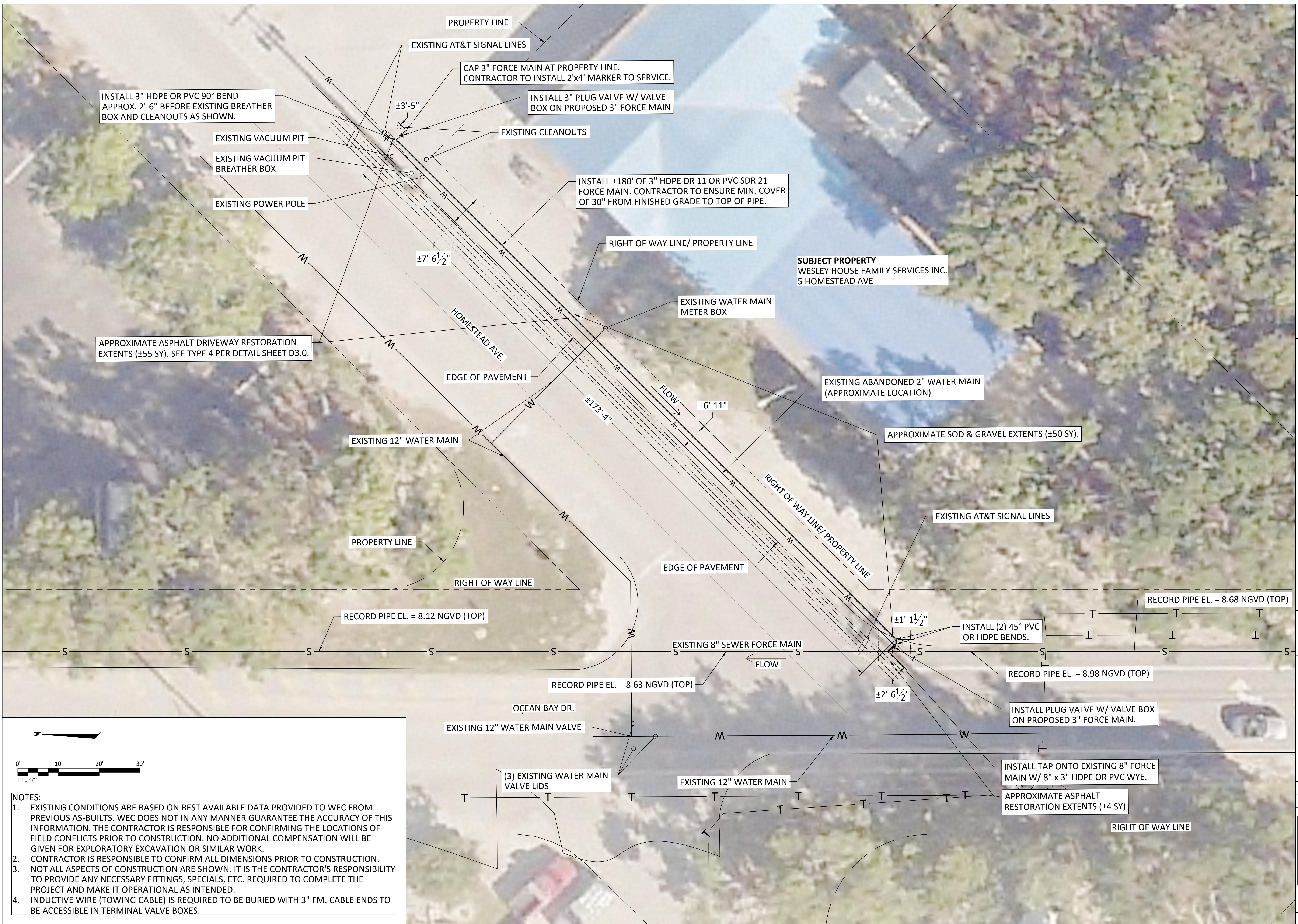
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Project Information	
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Scale:	AS NOTED
Job No.:	03105.082
Date Issued:	10/18/2023
Design:	ERC
Drawn:	ERC
Checked:	ERC

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PROPOSED SITE PLAN
5 HOMESTEAD AVENUE FORCEMAIN
KLWTD
KEY LARGO, FL

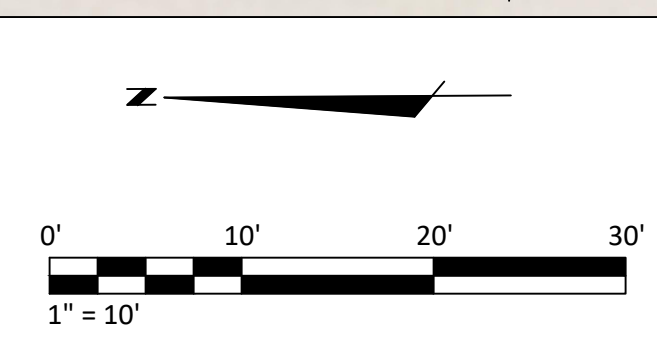
Revisions	Description
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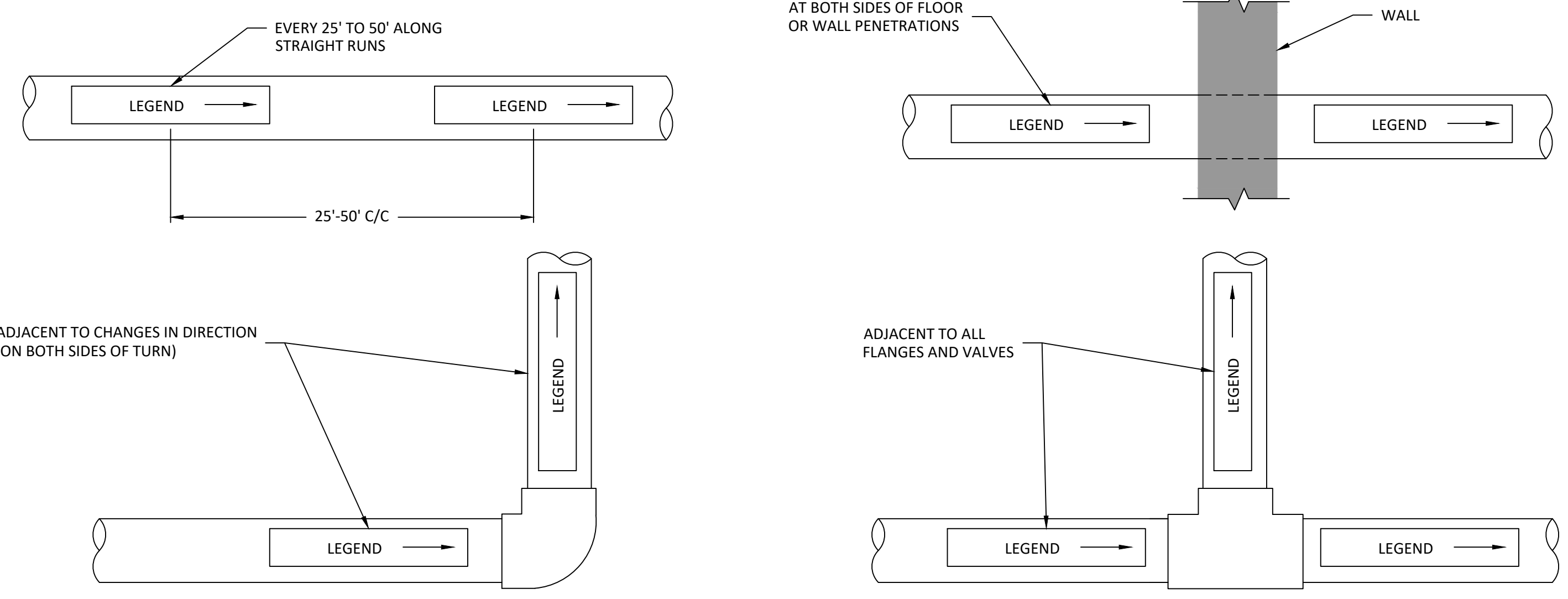
- NOTES:**
- EXISTING CONDITIONS ARE BASED ON BEST AVAILABLE DATA PROVIDED TO WEC FROM PREVIOUS AS-BUILTS. WEC DOES NOT IN ANY MANNER GUARANTEE THE ACCURACY OF THIS INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATIONS OF FIELD CONFLICTS PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR EXPLORATORY EXCAVATION OR SIMILAR WORK.
 - CONTRACTOR IS RESPONSIBLE TO CONFIRM ALL DIMENSIONS PRIOR TO CONSTRUCTION.
 - NOT ALL ASPECTS OF CONSTRUCTION ARE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ANY NECESSARY FITTINGS, SPECIALS, ETC. REQUIRED TO COMPLETE THE PROJECT AND MAKE IT OPERATIONAL AS INTENDED.
 - INDUCTIVE WIRE (TOWING CABLE) IS REQUIRED TO BE BURIED WITH 3" FM. CABLE ENDS TO BE ACCESSIBLE IN TERMINAL VALVE BOXES.

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PIPE LABEL COLOR CODING (ANSI A13.1)		
FLUID SERVICE	LETTER COLOR	FIELD COLOR
FIRE QUENCHING	WHITE	RED
TOXIC & CORROSIVE	BLACK	ORANGE
FLAMMABLE & OXIDIZING	BLACK	YELLOW
COMBUSTIBLE	WHITE	BROWN
POTABLE, COOLING & OTHER WATER	WHITE	GREEN
COMPRESSED AIR	WHITE	BLUE
DEFINED BY USER	WHITE	BLACK
DEFINED BY USER	BLACK	WHITE
DEFINED BY USER	WHITE	PURPLE
DEFINED BY USER	WHITE	GRAY

PIPE MARKER SIZE SCHEDULE		
OUTER PIPE DIAMETER INCLUDING COVER	MINIMUM LENGTH OF LABEL FIELD COLOR	MINIMUM LETTER HEIGHT
3/8" - 1 1/4"	8"	1/2"
1 1/2" - 2"	8"	3/4"
2 1/2" - 6"	12"	1 1/4"
8" - 10"	24"	2 1/2"
OVER 10"	32"	3 1/2"

- NOTES:
- PIPE MARKING SYSTEM SHALL MEET ANSI/ASME SIZE RECOMMENDATIONS.
 - SIZE OF LETTERS AND LENGTH OF COLOR FIELD SHALL COMPLY WITH ANSI/ASME 13.1 (LATEST EDITION) FOR VARIOUS PIPE DIAMETERS. (SEE PIPE MARKER SIZE SCHEDULE AT LEFT.)
 - FLUID SERVICE DEFINITIONS SHALL BE AS REFERENCED IN ANSI/ASME 13.1 (LATEST EDITION).
 - PIPE COATING AND COLOR(S) SHALL BE AS SHOWN ON PLANS AND IN THE SPECIFICATIONS.

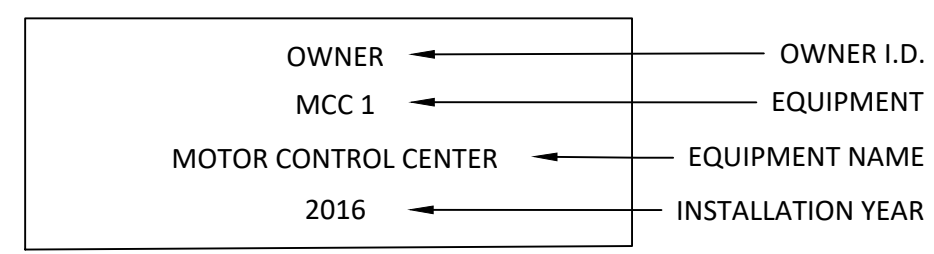


PIPE MARKING STANDARD (ANSI/ASME A13.1)

TYPE	MINIMUM LENGTH (FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S)									
	PIPE SIZE									
	4"	6"	8"	10"	12"	16"	20"	24"	30"	36"
90° BEND	14	19	25	30	34	44	52	60	70	80
45° BEND	6	8	10	12	14	18	21	25	30	34
22-1/2° BEND	3	4	5	6	7	9	10	12	14	16
11-1/4° BEND	1	2	3	4	5	6	7	8	9	10
PLUG OR BRANCH OF TEE	30	40	52	63	72	93	111	130	155	178
VALVE	15	20	25	32	36	47	56	65	78	89

PIPE RESTRAINT TABLE

- NOTES:
- FITTINGS SHALL BE RESTRAINED JOINTS UNLESS OTHERWISE INDICATED.
 - INSTALL FULL LENGTH JOINTS WITH TOTAL LENGTH EQUAL TO OR GREATER THAN SHOWN IN THE TABLE.
 - WHERE TWO OR MORE FITTINGS ARE TOGETHER, USE FITTING WHICH YIELDS GREATEST LENGTH OF RESTRAINED PIPE.
 - ALL LINE VALVES AND THROUGH RUN OF TEES SHALL BE RESTRAINED.
 - FOR PIPE ENCASED IN POLYETHYLENE, INCREASE THE GIVEN VALUE BY A FACTOR OF 1.25.



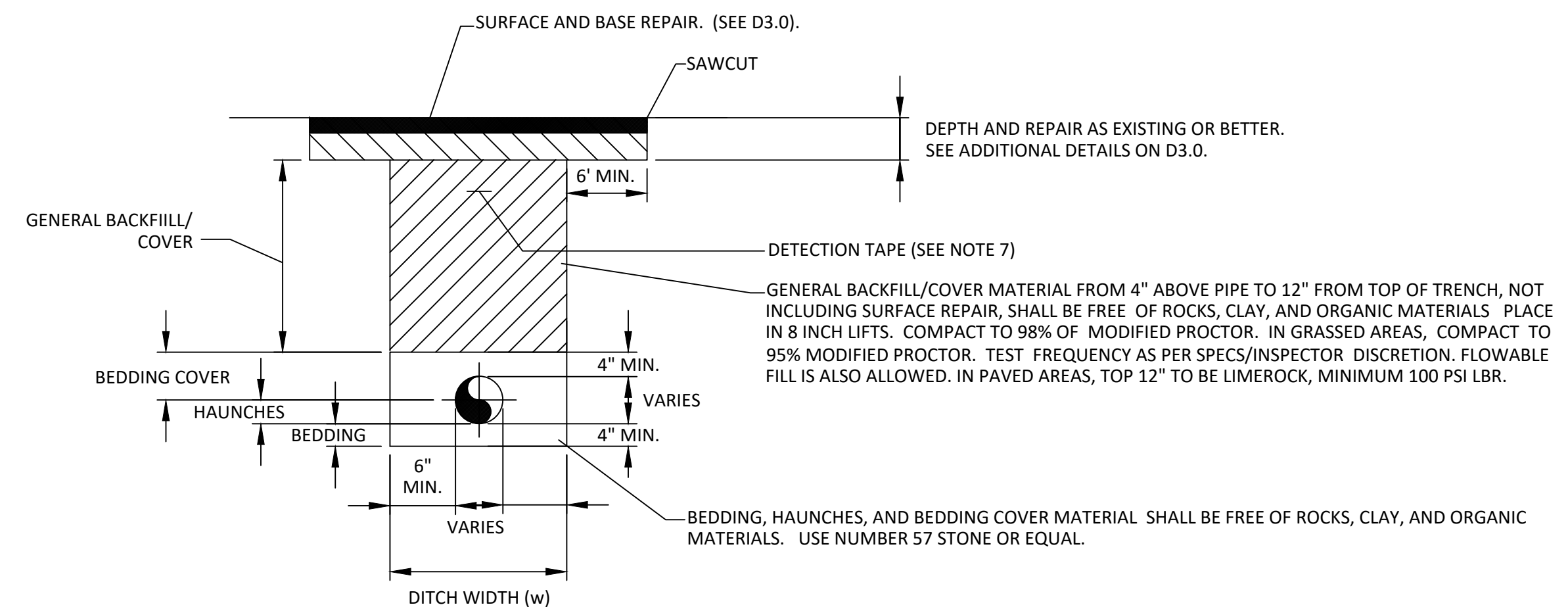
GENERAL NEW EQUIPMENT LABEL

- NOTES:
- NAMEPLATE SHALL BE ENGRAVED RIGID LAMINATED PLASTIC.
 - NAMEPLATES SHALL BE BLACK WITH WHITE LETTERS.
 - LETTER HEIGHT SHALL BE 3/16".
 - FASTEN TO COMPONENT WITH S.S. SCREWS OR ADHESIVE.
 - CONTRACTOR SHALL CONFIRM TEXT DURING SHOP DRAWING PROCESS.
 - ALL NEW EQUIPMENT SHALL BE LABELED.
 - NAMEPLATE(S) SHALL BE SIZED AS SHOWN.

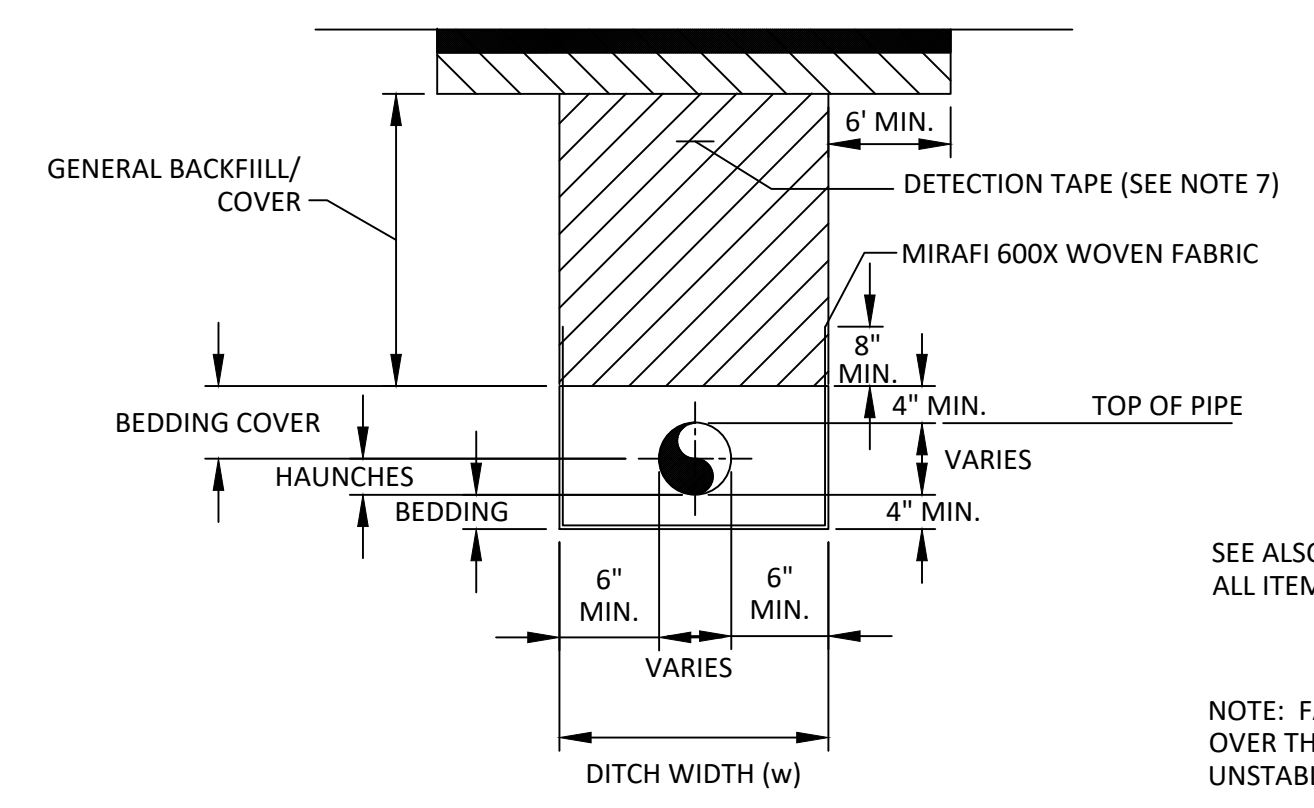
SCALE: NTS

NOTES:

- CONTRACTOR SHALL FOLLOW THE BEDDING, HAUNCHES AND BEDDING COVER OF THIS DETAIL FOR ALL PIPELINE INSTALLATION OUTSIDE FDOT JURISDICTION.
- FOR ALL WORK INSTALLED IN FDOT JURISDICTION FOLLOW THE FDOT DETAIL CRITERIA FOR THE TRENCH AREA ABOVE BEDDING COVER.
- TEMPORARY ASPHALT SHALL BE APPLIED TO ALL TRENCHES NOT REPAIRED WITHIN 14 DAYS AFTER PIPING INSTALLATION WHERE THE FLOWABLE FILL OPTION IS NOT USED.
- AT THE CONTRACTORS OPTION, FLOWABLE FILL MAY BE INSTALLED FLUSH WITH EXISTING PAVEMENT AS A TEMPORARY MEASURE. FINAL RESTORATION WILL REQUIRES MILLING OF THE FLOWABLE FILL AND INSTALLATION OF 1 1/2" OF ASPHALT.
- SEWER MAINS SHALL HAVE A MINIMUM COVER OF 30 INCHES, UNLESS OTHERWISE NOTED.
- SEE SURFACE RESTORATION DETAIL FOR RESTORATION REQUIREMENTS
- 6" WIDE DETECTION TAPE WITH METALLIC BACKING TO BE INSTALLED DIRECTLY ON THE CENTERLINE OF MAIN 1' BELOW THE SURFACE. TAPE TO BE MARKED AS STATED IN THE GENERAL NOTES.
- WHERE PORTIONS OF THE BOTTOM OF TRENCHES OR EXCAVATIONS CONSIST OF MATERIAL UNSTABLE TO SUCH A DEGREE THAT, IN THE OPINION OF THE ENGINEER, IT CANNOT ADEQUATELY SUPPORT THE PIPE OR STRUCTURE, THE BOTTOM SHALL BE OVER-EXCAVATED AND STABILIZED WITH APPROVED COARSE GRANULAR STABILIZATION MATERIAL. MINIMUM DEPTH OF OVER-EXCAVATION IS 2 FEET. IN ADDITION, FILTER FABRIC WILL ALSO BE USED AS SHOWN IN THE DETAIL TO ENCAPSULATE THE BEDDING MATERIAL.
- PAVEMENT RESTORATION FOR LONGITUDINAL CUTS SHALL INCLUDE FULL LANE WIDTH RESURFACING FOR EACH LANE WITHIN WHICH THE CUT EXTENDS. IN SOME CASES IT WILL BE NECESSARY TO OVERLAY MORE THAN ONE (1) LANE W/ ASPHALTIC CONCRETE TO SATISFY PAVEMENT SLOPE.



TRENCHING/BEDDING DETAIL



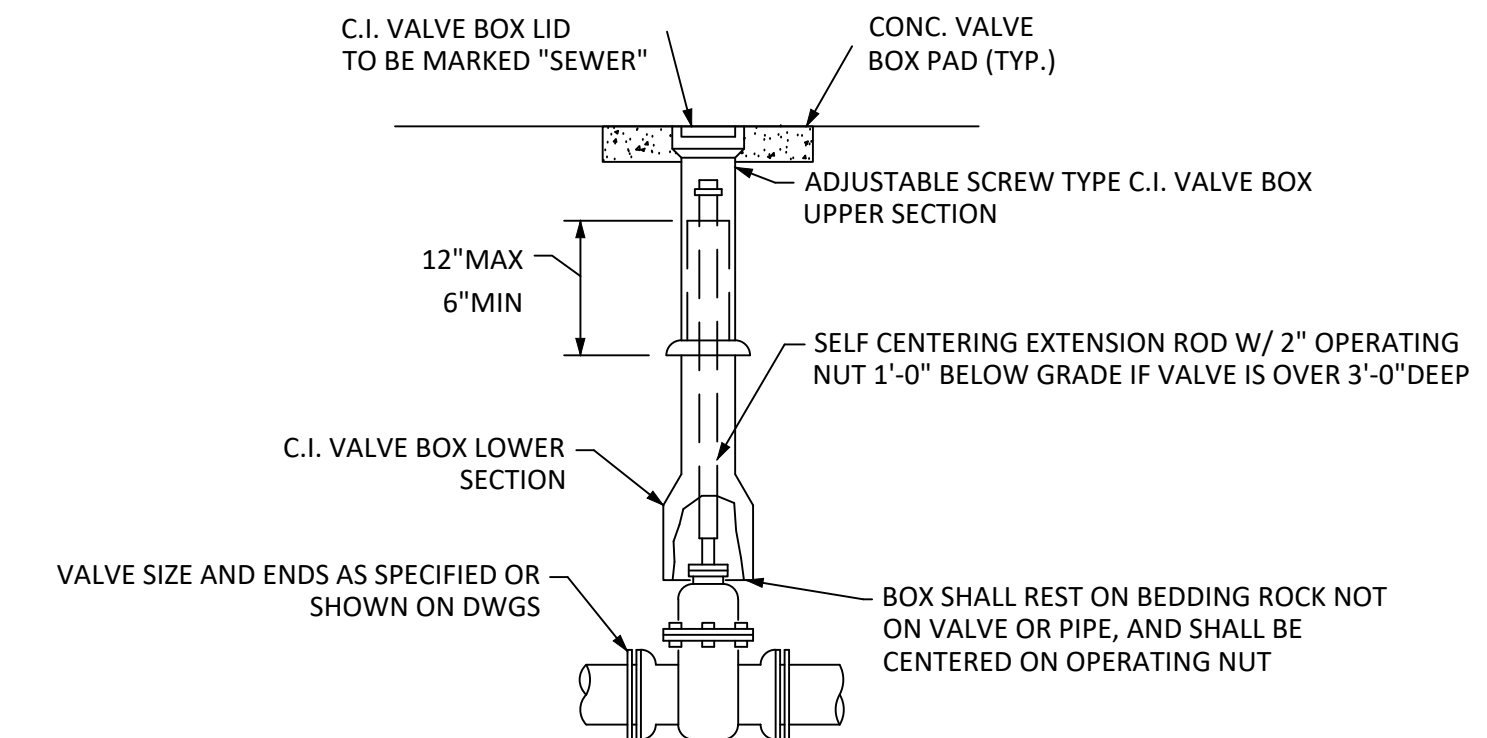
FILTER FABRIC PLACEMENT DETAIL

STANDARD TRENCHING DETAIL

SCALE: NTS

SEE ALSO TRENCH DETAILS FOR ADDITIONAL INFORMATION. ALL ITEMS ARE NOT SHOWN FOR CLARITY.

NOTE: FABRIC MUST EXTEND A MINIMUM OF 12" OVER THE TOP OF THE PIPE OR 12" ABOVE THE UNSTABLE SOILS INTERFACE.



NOTES:

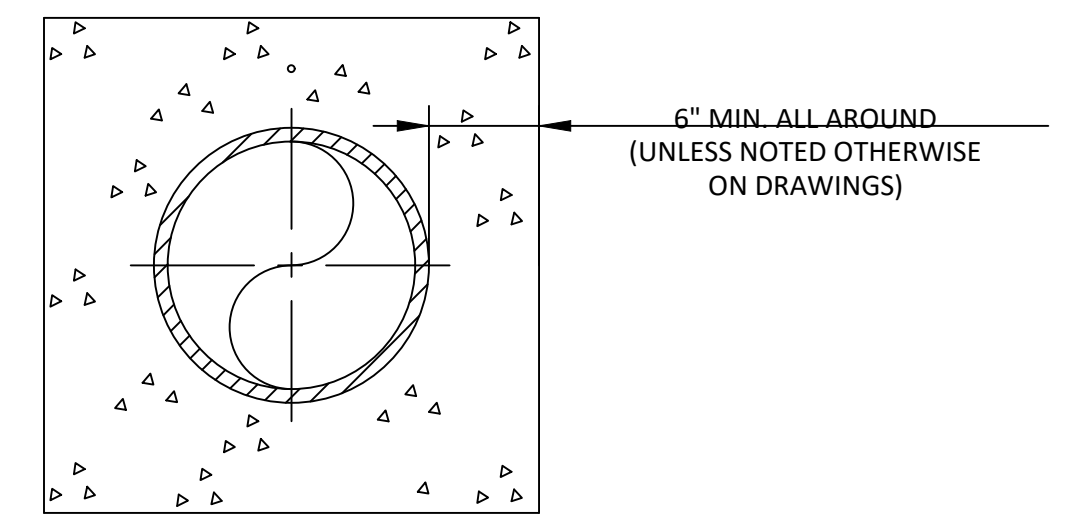
- ADJUSTABLE CAST IRON VALVE BOX SHALL BE TYLER / UNION 6850 SERIES OR EQUAL.
- SEE SPECIFICATION SECTION 15100 FOR MORE INFORMATION ON VALVES.

GATE OR PLUG VALVE W/O GEAR OPERATOR

SCALE: NTS

NOTES:

- CONCRETE ENCASEMENT SHALL BE 3000 PSI.
- CONCRETE ENCASEMENT LENGTH AS NOTED IN DRAWINGS.
- PIPE SHALL BE ENCASED AS SOON AS COVER IS LESS THAN 30" TO TOP OF PIPE.
- VACUUM PIPE TO BE WRAPPED IN PLASTIC BEFORE CONCRETE ENCASEMENT.



CONCRETE PIPE ENCASEMENT

SCALE: NTS

Project Information	LRC	Design:	LRC
Approved By:	ERC	AS NOTED	Drawn:
Scale:		03105.082	Checked:
Job No.:		10/18/2023	Date Issued:

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WELER ENGINEERING CORPORATION
6805 OVERSEAS HIGHWAY
MARIETTA, GA 30050
(901) 505-1700

STANDARD PIPING DETAILS 1
5 HOMESTEAD AVENUE FORCEMAIN
KLWTD
KEY LARGO, FL

Revisions	Description
1	
2	
3	
4	
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6	

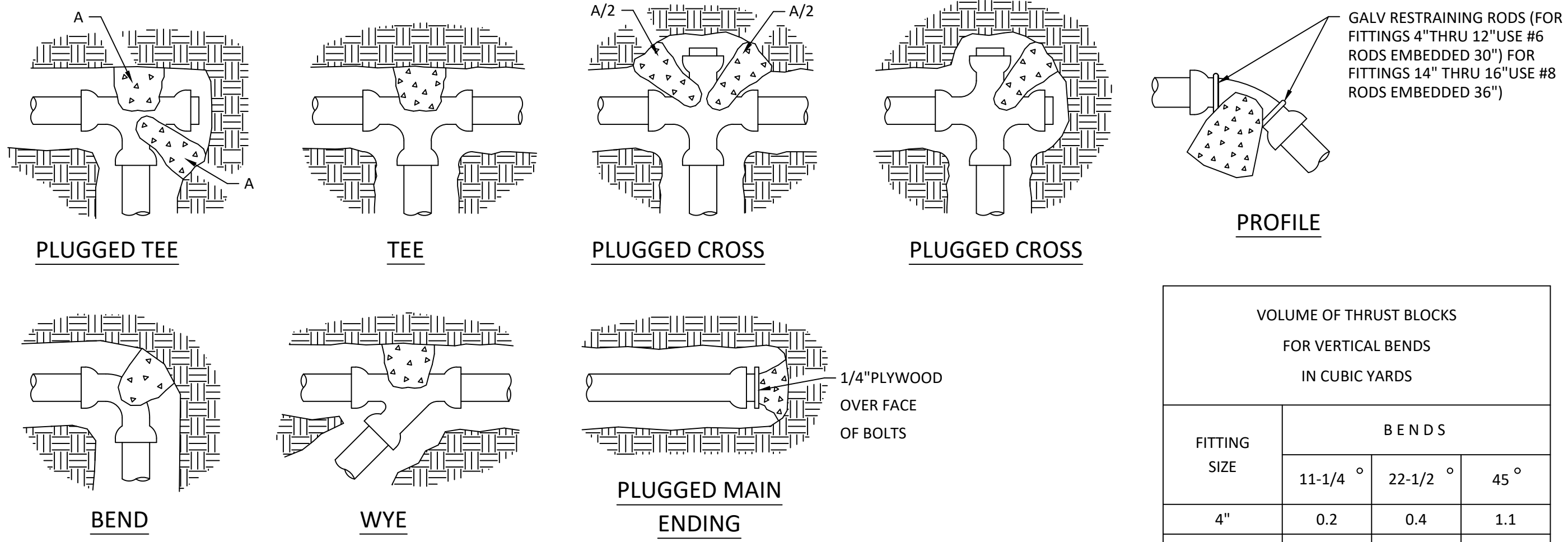
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THRUST BLOCK NOTES

- REQUIRED VOLUMES OR BEARING AREAS INDICATED AT FITTINGS ARE BASED UPON TEST PRESSURES OF 150 PSIG, 2,000 LBS/SF ALLOWABLE SOIL BEARING STRESS AND THE WEIGHT OF CONCRETE EQUAL TO 4050 LBS/CY.
- BEARING AREAS OF THRUST BLOCKS SHALL NOT BE LESS THAN 1.0 SF.
- KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES AND WRAP THE FITTING WITH VISQUEEN PRIOR TO PLACING CONCRETE.
- BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ON DRAWINGS SHALL TAKE PRECEDENCE OVER THIS STANDARD.
- THRUST BLOCKS FOR VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS SHALL BE THE SAME AS HORIZONTAL BENDS.
- COMPUTE BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS AT DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES WITH THE FOLLOWING EQUATION:

BEARING AREA = (REQUIRED TEST PRESSURE/150 X (2,000/ACTUAL SOIL BEARING STRESS)) X (TABLE VALUE)
- COMPUTE VOLUMES OF CONCRETE FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS AT DIFFERENT TEST PRESSURES WITH THE FOLLOWING EQUATION:

VOLUME = (REQUIRED TEST PRESSURE/150) X (TABLE VALUE)

VOLUME OF THRUST BLOCKS FOR VERTICAL BENDS IN CUBIC YARDS

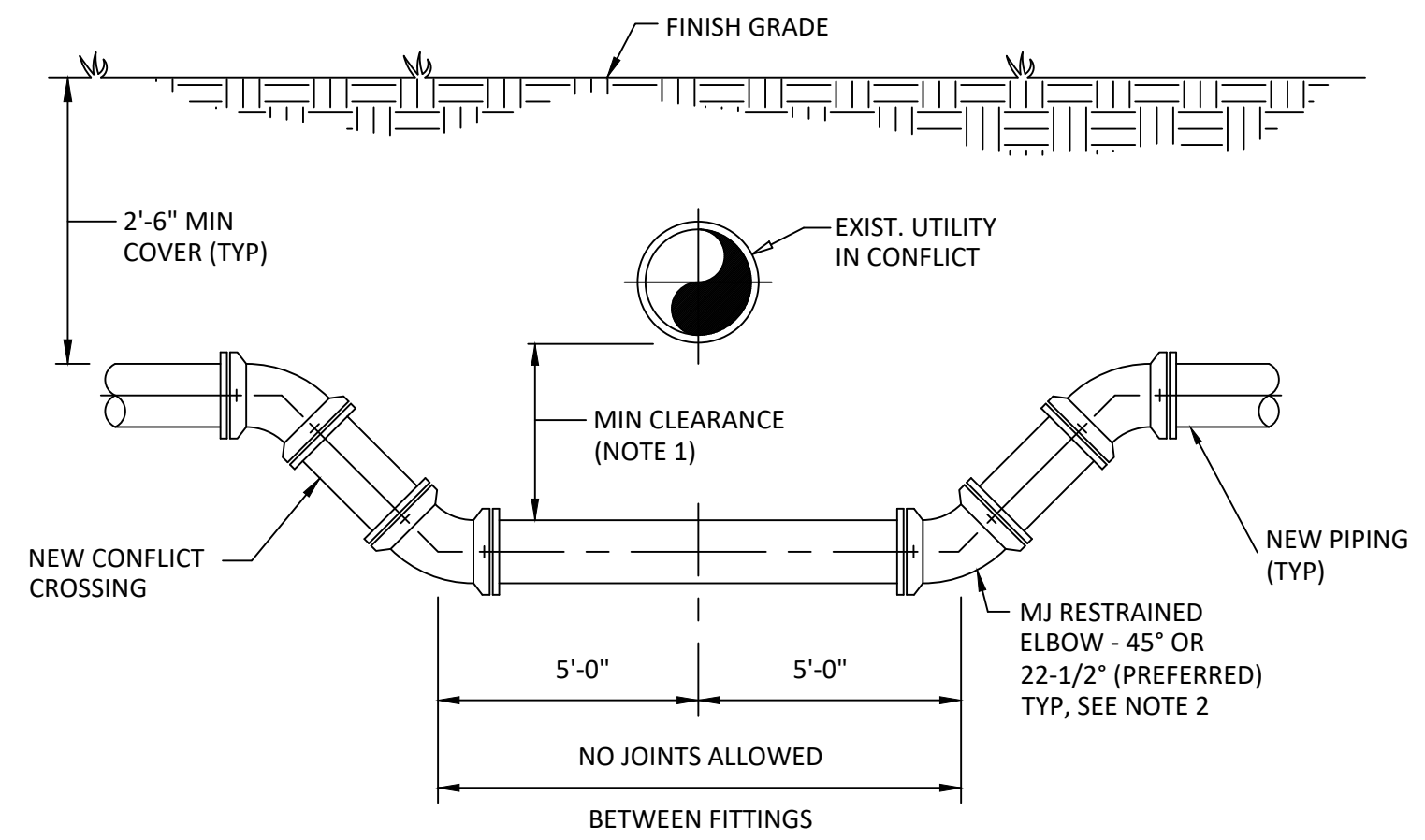
FITTING SIZE	BENDS		
	11-1/4 °	22-1/2 °	45 °
4"	0.2	0.4	1.1
6"	0.4	1.0	2.7
8"	0.6	1.5	4.0
10"	0.9	2.3	6.0
12"	1.3	3.2	8.5
14"	1.8	4.3	11.5
16"	2.3	5.6	14.8

BEARING AREA OF THRUST BLOCKS IN SQ.FT. (HORIZONTAL FITTINGS)

FITTING SIZE	BENDS			TEE, WYE PLUG, OR CAP	TEE (PLUGGED RUN)		90 BEND OR PLUGGED CROSS
	11-1/4 °	22-1/2 °	45 °		A1	A2	
4"			1.0	1.0	1.9	1.4	1.4
6"		1.0	1.6	2.1	4.3	3.0	3.0
8"	1.0	1.5	2.9	3.8	7.6	5.4	5.3
10"	1.2	2.4	4.6	5.9	11.8	8.4	8.4
12"	1.7	3.4	6.6	8.5	17.0	12.0	12.0
14"	2.3	4.6	8.9	11.5	23.0	16.3	16.3
16"	3.0	6.0	11.6	15.0	30.0	21.3	21.3
18"	3.8	7.6	14.6	19.0	38.0	27.0	27.0
20"	4.7	9.4	18.1	23.5	47.0	33.3	33.3
24"	6.8	13.6	26.2	34.0	68.0	48.0	48.0

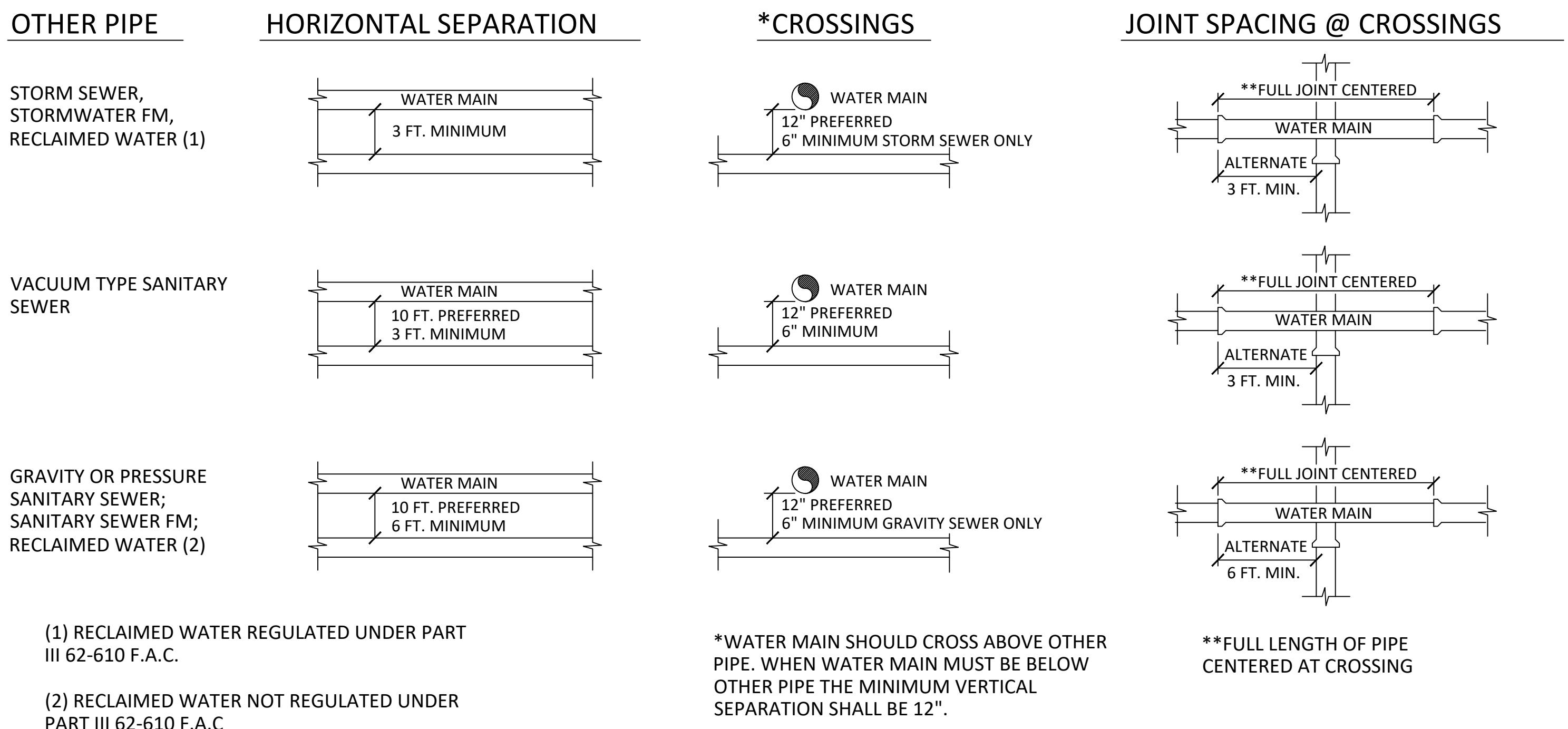
THRUST BLOCK NOTES AND DETAILS
(THRUST BLOCKS ALLOWED AT LOCATIONS SHOWN ON DRAWINGS ONLY)

- NOTES:**
- MINIMUM VERTICAL CLEARANCES SHALL BE IN ACCORDANCE WITH STANDARD SEPARATION STATEMENT.
 - ALL JOINTS OF CROSSING SHALL BE RESTRAINED PER JOINT RESTRAINT DETAILS.
 - JOINT RESTRAINT SHALL BE AS SPECIFIED IN SECTION 15005 - DUCTILE IRON PIPE OR SECTION 15002 - POLYVINYLCHLORIDE (PVC) PRESSURE PIPE, AS APPLICABLE.
 - PIPE JOINTS MAY BE DEFLECTED AS AN ALTERNATIVE TO FITTINGS AT CONTRACTORS DISCRETION. DO NOT EXCEED PIPE MANUFACTURERS SPECIFIED MAXIMUM DEFLECTION.
 - DETAIL MAY BE MODIFIED IN FIELD WHERE TWO (2) OR MORE UTILITY CONFLICTS ARE IN CLOSE PROXIMITY WITH EACH OTHER. COORDINATE IN FIELD WITH RESIDENT PROJECT REPRESENTATIVE.



UTILITY CROSSING

FDEP PIPE SEPARATION DETAIL



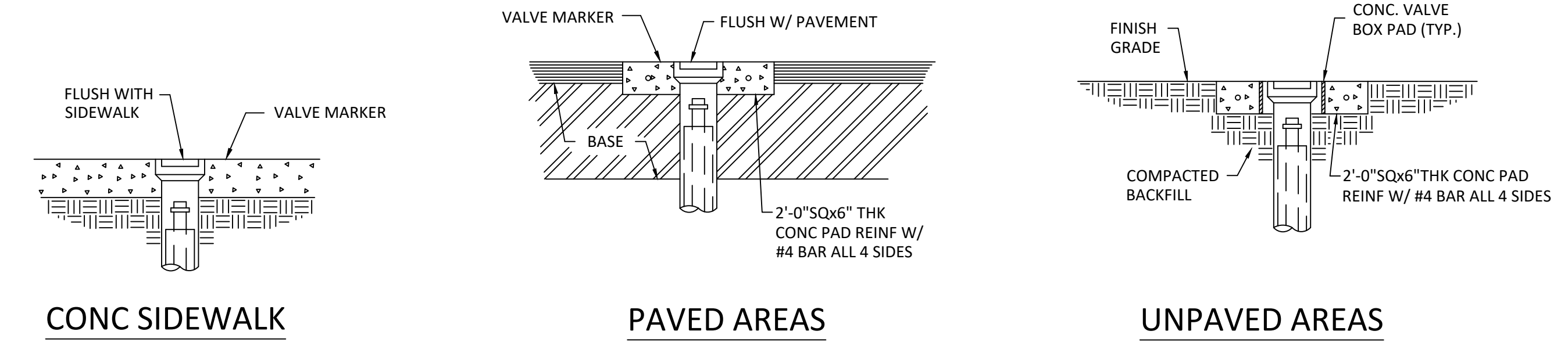
- RECLAIMED WATER REGULATED UNDER PART III 62-610 F.A.C.
- RECLAIMED WATER NOT REGULATED UNDER PART III 62-610 F.A.C.

*WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE THE MINIMUM VERTICAL SEPARATION SHALL BE 12".

**FULL LENGTH OF PIPE CENTERED AT CROSSING

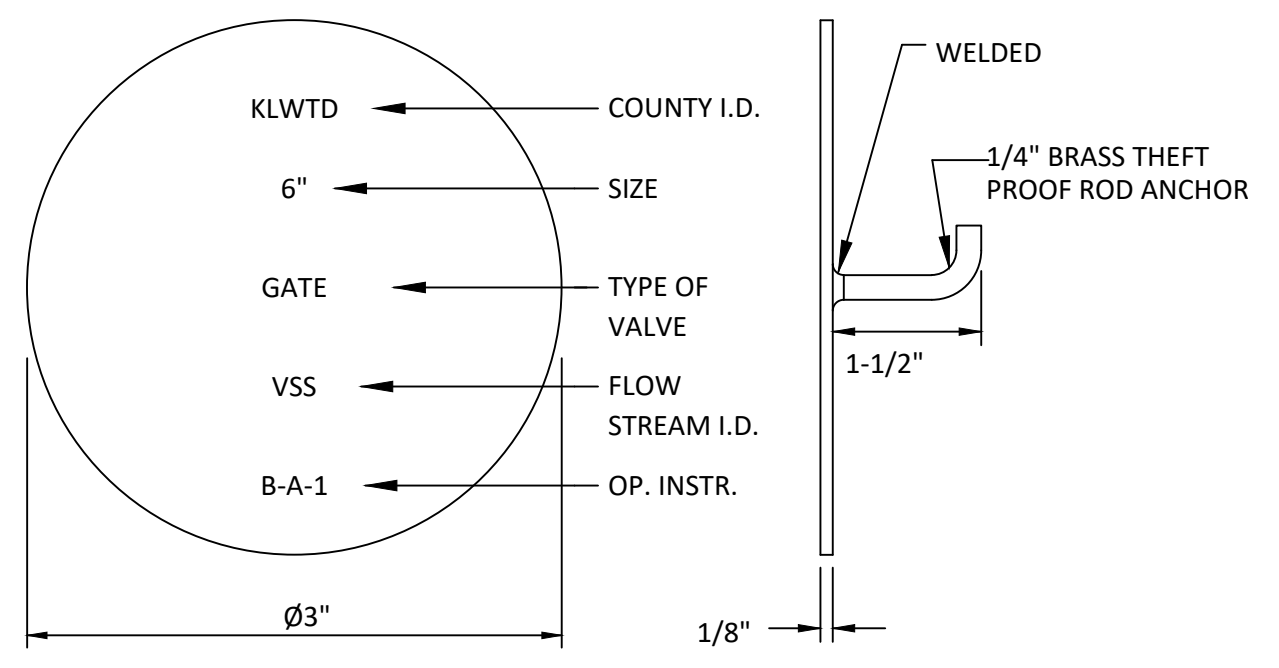
LOCATION OF PUBLIC WATER SYSTEM MAINS

THE TABLE REPRESENTS THE MINIMUM SEPARATION REQUIREMENTS AS DESCRIBED IN F.D.E.P. RULES OF THE FLORIDA ADMINISTRATION CODE (F.A.C.) N.T.S.



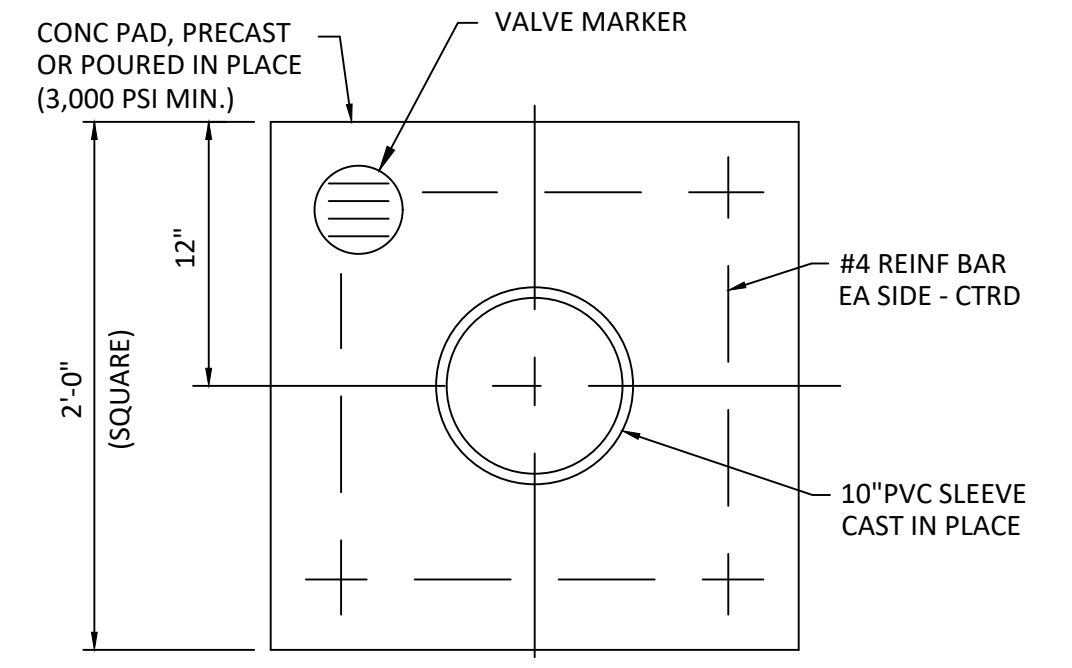
VALVE BOX SETTING DETAILS

SCALE: NTS



BURIED VALVE MARKER

SCALE: NTS

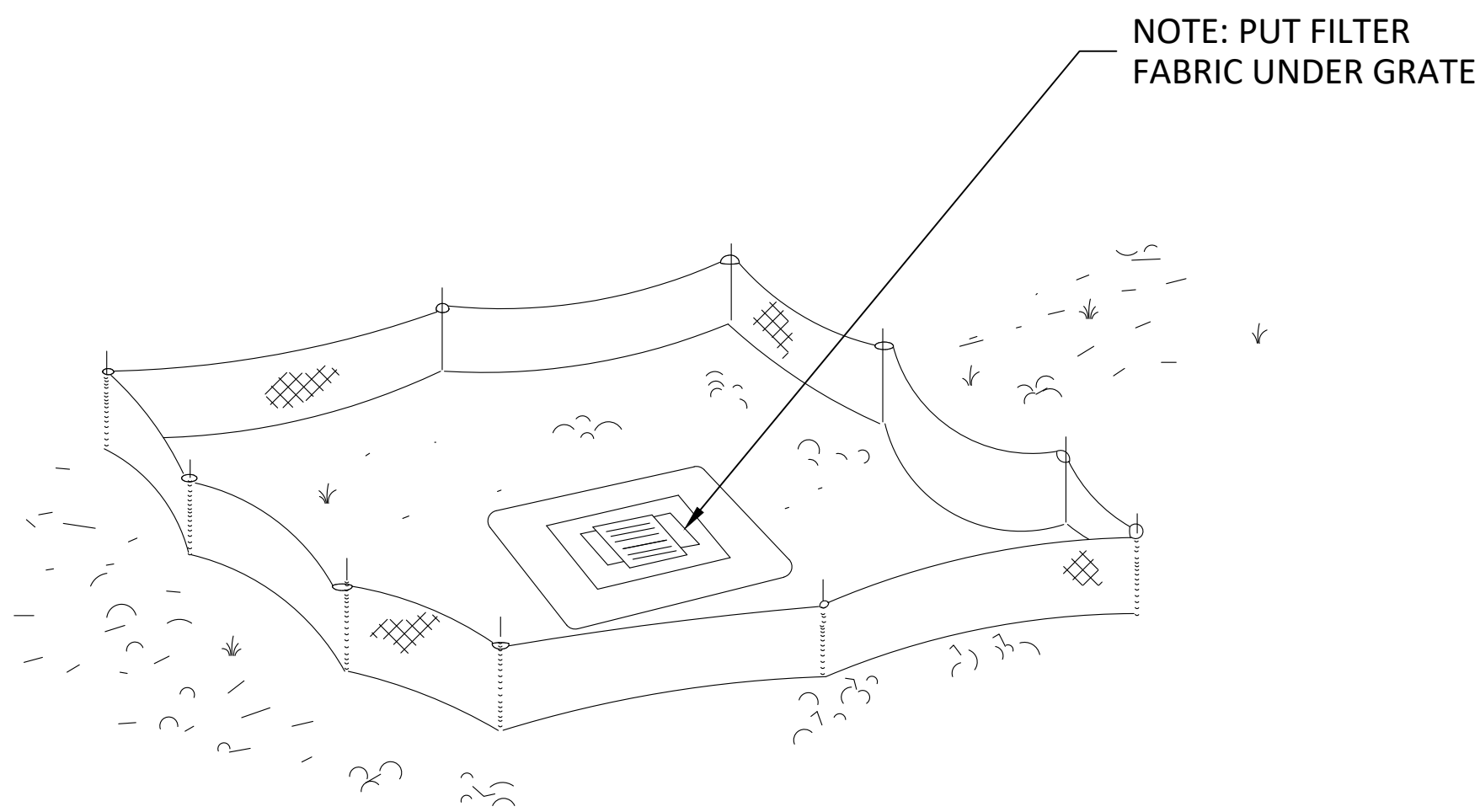


CONCRETE VALVE BOX PAD

SCALE: NTS

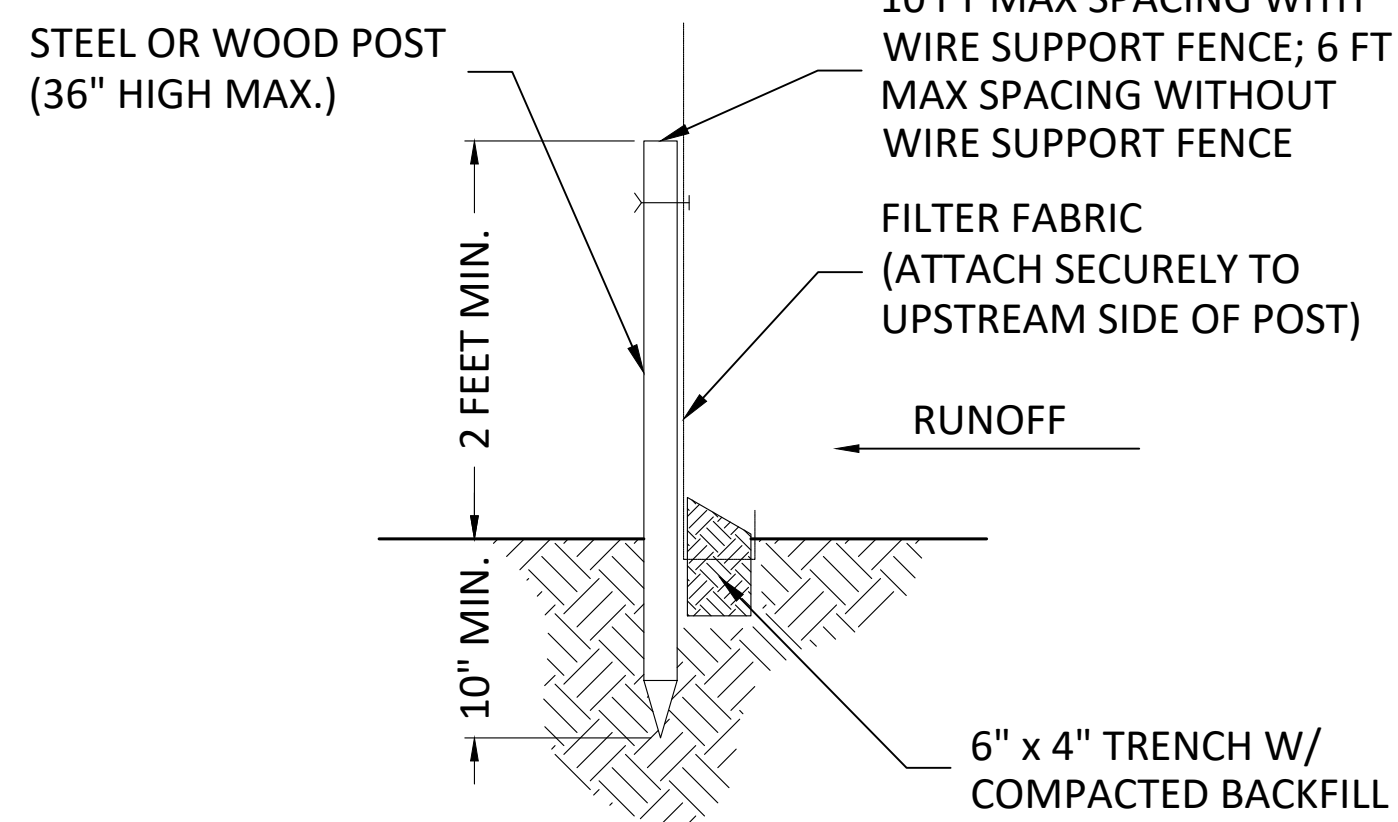
Project Information	LRC	Design:	LRC
	ERC	AS NOTED	Drawn:
Approved By:	Scale:	Job No.:	Checked:
	AS NOTED	03105.082	10/18/2023
WEC WATER ENGINEERING CORPORATION	6605 OVERSEAS HIGHWAY MARIETTA, GA 30050 (904) 505-1700		
	STANDARD PIPING DETAILS 2 5 HOMESTEAD AVENUE FORCEMAIN KLWTD KEY LARGO, FL		
Revisions	Description		
1	THIS SHEET IS NOT VALID WITHOUT THE SIGNATURE AND SEAL OF A FLORIDA LICENSED ENGINEER.		
2	Edward R. Castle, P.E. State of Florida, License No. 58574 This item has been digitally signed and sealed by Edward R. Castle, P.E. on the date indicated here. 10/18/2023 Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.		
3	Edward R. Castle Professional Engineer State of Florida Registration No. 58574		
4	Sheet No. D2.0		

USER: WECoe PLOTTED THE 02.0 PIPING LAYOUT OF C:\Users\WECoe\Weller Engineering Dropbox\Weller Engineering Projects\Keys Projects\Key Largo\KLWTD\Projects\KLWTD 5 Homestead Ave Forceman\Design\CAD Files\KLWTD 5 Homestead Ave 231017.dwg, 8(+)

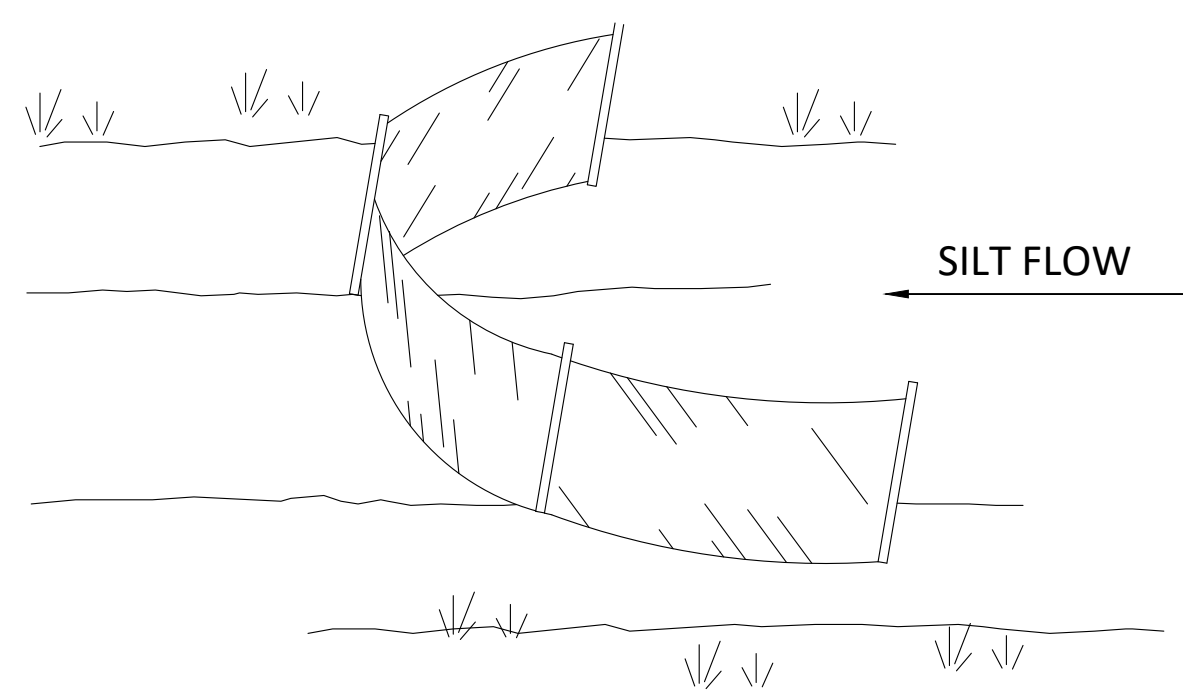


STAKED SILTY BARRIER OR SILTY FENCE PROTECTION AROUND DITCH BOTTOM INLETS
SCALE: NTS

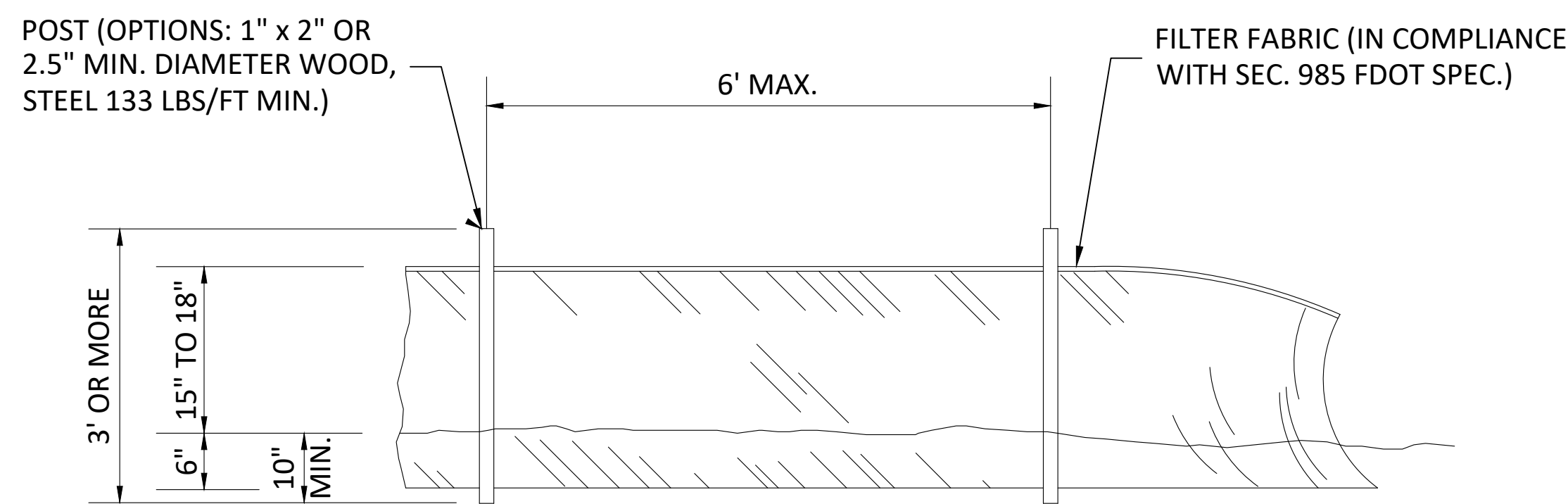
- NOTES:**
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
 2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
 3. SILTY FENCE SHALL BE INSTALLED AT LEAST 1 FT AWAY FROM VEGETATION DRIP LINE.



SILTY FENCE DETAIL - TRENCH WITH NATIVE BACKFILL
SCALE: NTS



TYPE III SILTY FENCE
SCALE: NTS



TYPICAL SILTY FENCE
SCALE: NTS

NOTE: CONTRACTOR TO INSPECT SILTY FENCE DAILY AND REPAIR IMMEDIATELY IF DAMAGED.

EROSION CONTROL MAINTENANCE SCHEDULE

THE CONTRACTOR SHALL INSTALL SILTY FENCE, STAKED HAY BALES, AND AND OTHER EROSION CONTROL DEVICES AS SHOWN ON THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION. THESE INSTALLATIONS AS SHOWN ON THE DRAWINGS SHALL BE CONSIDERED THE MINIMUM EROSION/SILTATION PROTECTION REQUIRED FOR THE SITE. IN ADDITION THE ENGINEER, OWNER, OR OWNER'S REPRESENTATIVE MAY DEEM IT NECESSARY TO INSTALL PROTECTIVE FACILITIES ELSEWHERE ON THE SITE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE EROSION PROTECTION FACILITIES THROUGH COMPLETION OF CONSTRUCTION. THE CONTRACTOR SHALL PERFORM DAILY INSPECTIONS OF THE FACILITIES TO ENSURE THAT THE EROSION PROTECTION FACILITIES ARE MAINTAINING THEIR PROTECTION FUNCTIONS AND INTEGRITY.

IN ADDITION TO THE INSTALLATION OF EROSION PROTECTION FACILITIES, THE ENGINEER, OWNER, OR OWNER'S REPRESENTATIVE MAY DEEM IT NECESSARY, UPON INSPECTION OF THE SITE, THAT TURBIDITY MONITORING BE PERFORMED BY THE CONTRACTOR IF GREATER THAN 0 NTU'S ABOVE BACKGROUND LEVELS ARE DETCTED. THE MONITORING SHALL BE PERFORMED DAILY IF BACKGROUND TURBIDITY LEVELS REACH 25-29 NTU'S. FOR BACKGROUND TURBIDITY LEVELS LESS THAN 25 NTU'S, TURBIDITY MONITORING SHALL BE PERFORMED WEEKLY. IF BACKGROUND TURBIDITY LEVELS ARE GREATER THAN 29 NTU'S, ALL CONSTRUCTION ACTIVITIES SHALL STOP AND THE CONTRACTOR SHALL PROVIDE ADDITIONAL EROSION PROTECTION NECESSARY TO RETURN LEVELS TO 29 NTU'S OR LESS. CONSTRUCTION ACTIVITIES SHALL BEGIN AGAIN ONLY UPON APPROVAL BY THE ENGINEER, OWNER, OR OWNER'S REPRESENTATIVE.

ALL EROSION PROTECTION FACILITIES SHALL BE REMOVED AFTER CONSTRUCTION COMPLETION, AND WHEN A VEGETATIVE COVER HAS BEEN WELL ESTABLISHED OVER THE CONSTRUCTED AREAS. PER THE PLANS: THE CONTRACTOR SHALL REMOVE PROTECTION FACILITIES ONLY UPON APPROVAL BY THE ENGINEER, OWNER, OR OWNER'S REPRESENTATIVE.

Project Information	ERC	Design:	LRC
Approved By:	AS NOTED	Drawn:	LRC
Scale:	03105.082	Checked:	ERC
Job No.:	10/18/2023		
Date Issued:			

WELLER ENGINEERING CORPORATION
WELLER *excellence in engineering*
6605 OVERSEAS HIGHWAY
MARRIETTA, GA 30050
(901) 505-1700

BMP DETAILS
5 HOMESTEAD AVENUE FORCEMAIN
KLWTD
KEY LARGO, FL

Description	Revisions

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10/18/2023
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