

TOWN OF HOPEDALE, MASSACHUSETTS

WATER AND SEWER COMMISSION



WATER STORAGE TANK CONSTRUCTION

WATER AND SEWER COMMISSION

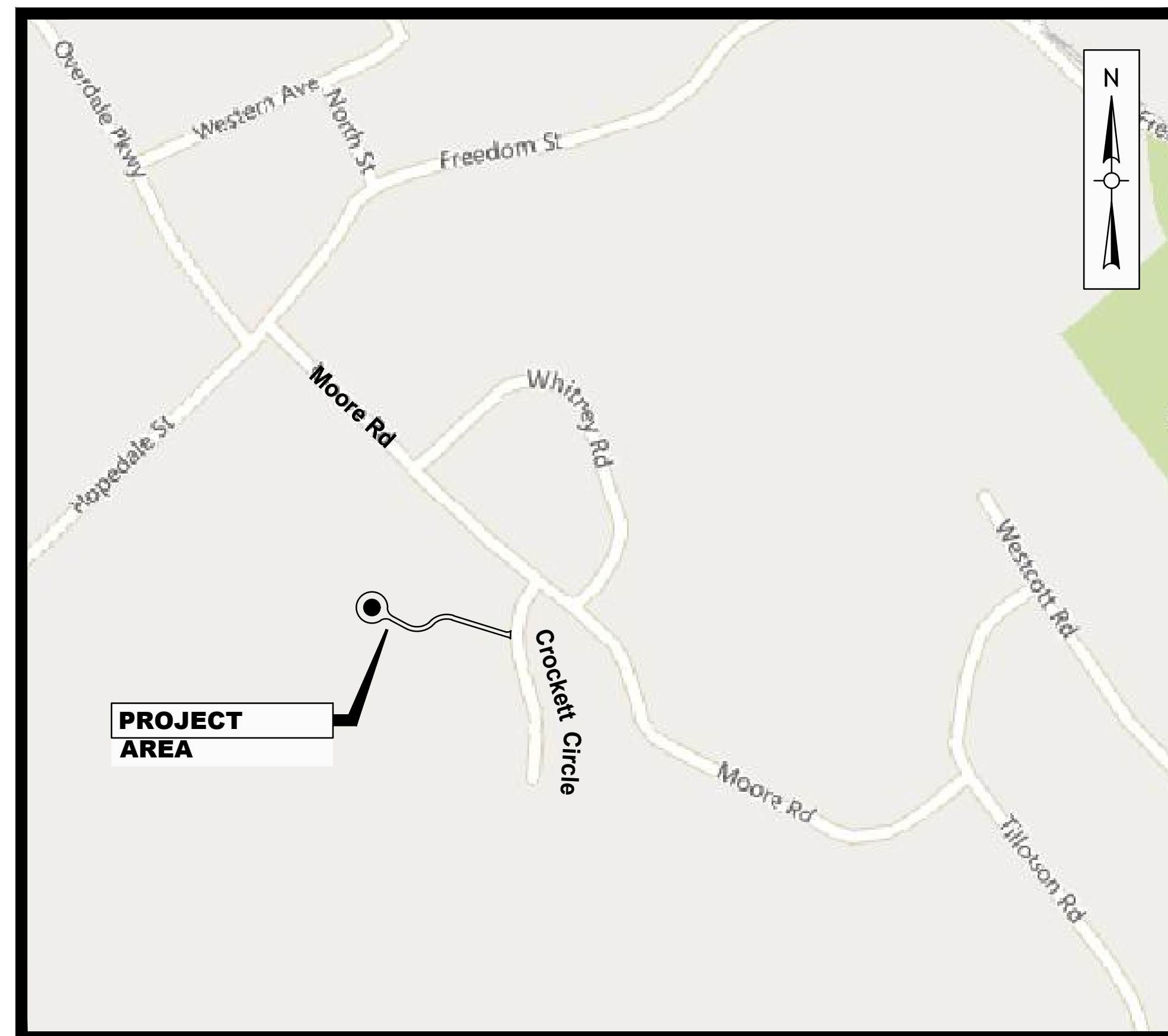
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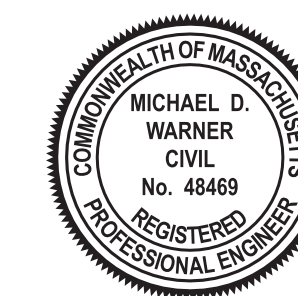
JEFF NUTTING, INTERIM TOWN ADMINISTRATOR

TIMOTHY J. WATSON, WATER & SEWER MANAGER



LOCUS MAP
SCALE : 1"=300'

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W&S Project No.: ENG22-0578
W&S File No.: 249-82

Drawing Title:
**ABBREVIATIONS,
NOTES, AND LEGEND**

Sheet Number:
G001

LEGEND		
DESCRIPTION	EXISTING	PROPOSED
SANITARY SEWER	---S---	---S---
FORCE MAIN	---FM---	---FM---
WATER MAIN	---W---	---W---
TEMPORARY WATER	---TW---	---TW---
STORM DRAIN	---D---	---D---
GAS	---G---	---G---
ELECTRIC	---E---	---E---
OVERHEAD WIRE	---OHW---	---OHW---
TELEPHONE	---T---	---T---
CABLE TELEVISION	---CATV---	---CATV---
GRINDER PUMP	○	● GP
SANITARY SEWER MANHOLE	⊙	● SMH
STORM DRAIN MANHOLE	⊙	● DMH
ELECTRICAL MANHOLE	⊙	● EMH
TELEPHONE MANHOLE	⊙	● TMH
AIR RELEASE VALVE MANHOLE	○	● ARMH
FORCE MAIN CLEANOUT MANHOLE	○	● FMCO
CLEANOUT	○	● CO
CATCH BASIN	□	■ CB
CATCH BASIN (CURB INLET)	■	■
HYDRANT	⊕	⊕
TEMPORARY HYDRANT	⊕	⊕
GATE VALVE	⊕	⊕
CHECK VALVE	⊕	⊕
CURB STOP	⊕	⊕
BUTTERFLY VALVE	⊕	⊕
BALL VALVE	⊕	⊕
REDUCER	⊕	⊕
CAP OR PLUG	⊕	⊕
GAS GATE VALVE	⊕	⊕
UTILITY POLE	⊕	⊕
GUY POLE	⊕	⊕
LIGHT POST	☆	☆
EDGE OF PAVEMENT	---	---
EDGE OF UNPAVED ROAD	---	---
CURB	---	---
SIDEWALK	---	---
RAILROAD		
STONE WALL	○○○○○	○○○○○
RETAINING WALL	RET WALL	RET WALL
FENCE	-x-x-	-x-x-
INDIVIDUAL DECIDUOUS TREE	⊙	⊙
INDIVIDUAL EVERGREEN TREE	⊙	⊙
TREE LINE	~~~~~	~~~~~
SURVEY MARKER	□	□
PROPERTY LINE	---	---
EASEMENT LINE	---	---
LIMIT OF WORK	---	---
APPROX. LIMIT OF REFUSE	---	---
SPOT ELEVATIONS	x100.5	x100.5
CONTOUR LINES	-56-	-56-
DEPRESSION CONTOUR LINES		
HOUSE NUMBER	#35	#35
FLOOR ELEVATION	FL=56.7	FL=56.7
SILL ELEVATION	S=56.7	S=56.7
WETLAND
WETLAND FLAGS	WF-7 WF-8	WF-7 WF-8
RIP RAP	○○○○○	○○○○○
DRAINAGE DITCH / SWALE	---	---
STATE HIGHWAY STATION	10	10
GUARD POST	△	△
BOLLARD	○B	●B
SIGN	○	○
BENCH MARK	⊕	⊕
PERCOLATION TEST	⊕1	⊕ PT-1
TEST PIT	⊕1	⊕ TP-1
BORING	⊕ B-1	⊕ B-1
PROBE	⊕ P-1	⊕ P-1
GROUNDWATER MONITORING WELL	⊕ WS-1	⊕ WS-1
GAS MONITORING WELL	⊕ GMW-1	⊕ GMW-1
GAS VENT	○ GV	● GV
HAY BALES	---	---
ROCK OUTCROP	---	---

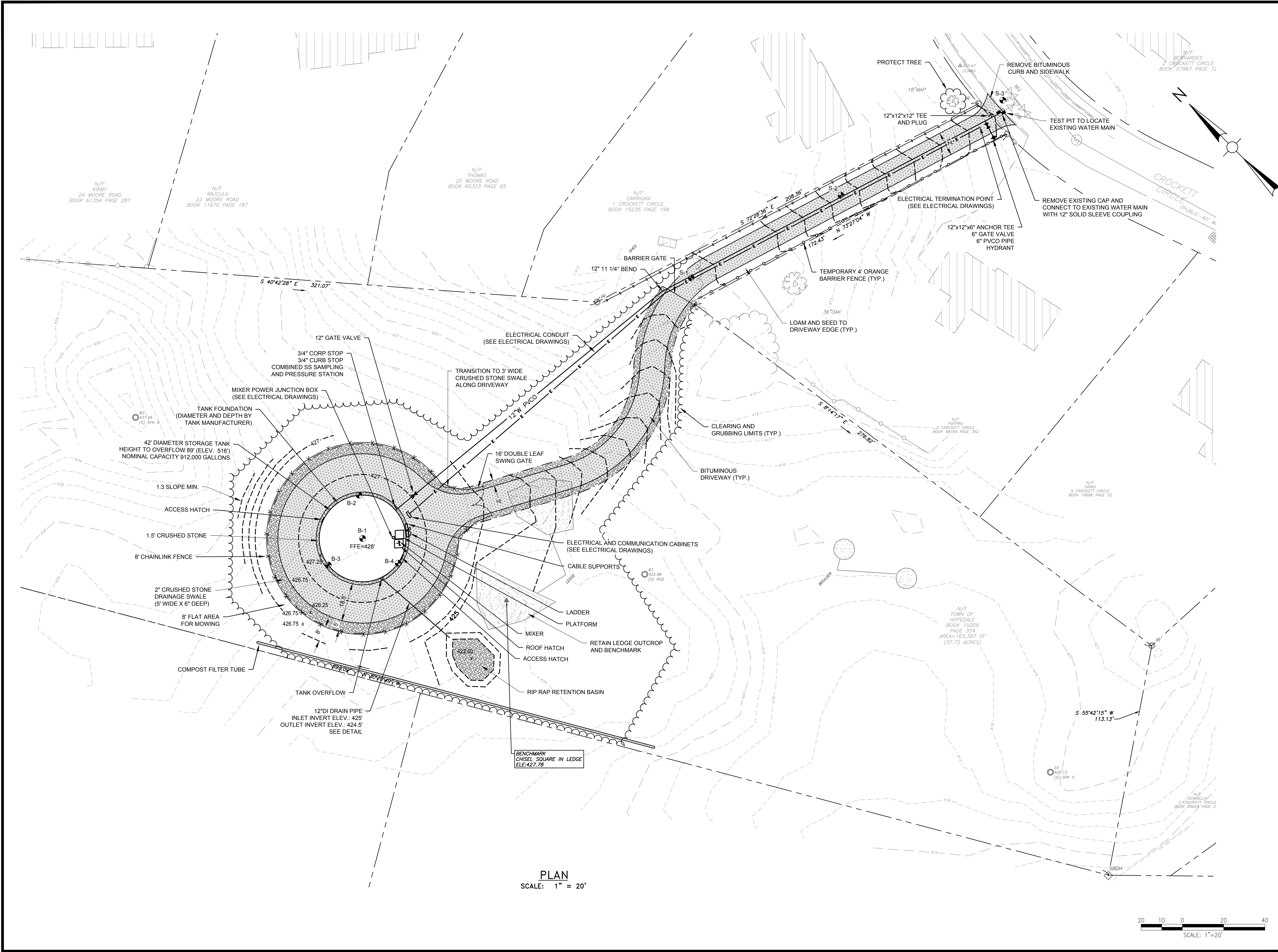
NOTE: ITEMS SHOWN IN THE LEGEND MAY NOT BE PRESENT IN THESE PLANS

ABBREVIATIONS	
AC	ASBESTOS CEMENT PIPE
ACCMP	ASPHALT COATED CORRUGATED METAL PIPE
ARV	AIR RELEASE VALVE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BC	BITUMINOUS CONCRETE
BIT	BITUMINOUS
BLDG	BUILDING
BM	BENCH MARK
BO	BLOW OFF
BV	BUTTERFLY VALVE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CC	CONCRETE CURB
CI	CAST IRON
¢	CENTERLINE
CL	CEMENT LINED
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
CU FT	CUBIC FEET
CY	CUBIC YARD
D	STORM DRAIN, DEPTH FROM RIM TO INVERT
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
DWVG	DRAINAGE DUCTILE VITRIFIED CLAY
E	EAST, ELECTRIC
EA	EACH
EF	EACH FACE
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FLG	FLANGE
FT	FEET
GA	NATURAL GAS
GALV	GALVANIZED
GC	GRANITE CURB
GR	GRANITE
HC	HOUSE CONNECTION
HORIZ	HORIZONTAL
HP	HIGH PRESSURE
HYD	FIRE HYDRANT
I	INVERT
INV	INVERT
ID	INSIDE DIAMETER
IP	IRON PIPE
LB	POUND
LF	LINEAR FEET
LS	LUMP SUM
MAX	MAXIMUM
MB	MAIL BOX
MECH	MECHANICAL
MH	MANHOLE
MassDOT	MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MWRA	MASSACHUSETTS WATER RESOURCES AUTHORITY
N	NORTH
NE	NORTH EAST
NW	NORTH WEST
NF	NOT FOUND
NO OR #	NUMBER
OD	OUTSIDE DIAMETER
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PE	PLAIN END, POLYETHYLENE
¢	PROPERTY LINE
PL	PLATE
PVC	POLYVINYL CHLORIDE
PVCO	MOLECULARLY ORIENTED POLYVINYL CHLORIDE
PVMT	PAVEMENT
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT-OF-WAY
RQD	ROCK QUALITY
S	SEWER, SOUTH
SE	SOUTH EAST
SECT	SECTION
SF	SQUARE FEET
SHT	SHEET
SPEC	SPECIFICATIONS
SO FT	SQUARE FEET
SS	SEWER SERVICE, STAINLESS STEEL
STA	STATION
STL	STEEL
SW	SIDEWALK, SOUTH WEST
T	HYDROSTATIC THRUST, TELEPHONE
TBM	TEMPORARY BENCH MARK
THK	THICK (NESS)
TYP	TYPICAL
UP	UTILITY POLE
VC	VITRIFIED CLAY
VERT	VERTICAL
W	WEST
W/	WITH
W/O	WITHOUT

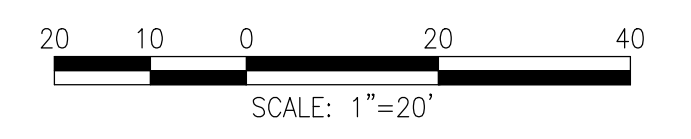
CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL CALL DIGSAFE AT 1-888-344-7233 AND CITY/TOWN DEPARTMENTS AS APPROPRIATE AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN SHOWN.
3. TEST PITS TO LOCATE EXISTING UTILITIES MAY BE ORDERED BY THE ENGINEER TO DETERMINE WHETHER TO RAISE OR LOWER THE PROPOSED WATER MAIN TO CLEAR EXISTING UTILITIES OR VERIFY EXISTING UTILITY LOCATION, SIZE AND TYPE.
4. STONE WALLS, FENCES, MAIL BOXES, SIGNS, CURBS, LIGHT POLES, ETC. SHALL BE REMOVED AS NECESSARY TO PERFORM THE WORK AND REPLACED TO A CONDITION AT LEAST EQUAL TO THAT BEFORE CONSTRUCTION BEGAN. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
5. ALL PAVEMENT DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS.
6. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND PAYMENT LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
7. UNLESS OTHERWISE INDICATED, CONCRETE USED FOR PIPE ANCHOR BLOCKS, BACKING, PIPE CRADLES, ARCHES, AND FILL SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
8. APPROVED JOINT RESTRAINT METHODS SHALL BE PROVIDED FOR WATER MAINS WHERE ANY BENDS, TEES, PLUGS, OR WYES ARE INSTALLED. CONCRETE THRUST BLOCKS, ANCHOR BLOCKS AND TIE RODS MAY BE USED FOR 6-INCH AND 8-INCH PIPE WHERE JOINT RESTRAINT IS NOT FEASIBLE UPON APPROVAL OF THE ENGINEER. SEE TABLE 1 DETAIL FOR REQUIRED RESTRAINING LENGTHS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. THE CONTRACTOR SHALL NOT STORE ANY APPARATUS, MATERIALS, SUPPLIES, OR EQUIPMENT ON DRAINAGE STRUCTURES OR WITHIN 100 FEET OF WETLANDS.
10. NEW WATER MAINS AND SERVICES SHALL BE INSTALLED AT THE MINIMUM DEPTH FROM FINISH GRADE TO TOP OF PIPE AS SHOWN ON THE DRAWINGS. WHERE NECESSARY, NEW WATER MAINS SHALL BE INSTALLED AT A GREATER DEPTH TO CLEAR OBSTACLES SHOWN ON THE DRAWINGS AT NO ADDITIONAL COST TO THE OWNER. MINIMUM CLEARANCES TO UTILITIES, AS SHOWN ON THE DRAWINGS SHALL BE MAINTAINED.
11. ALL FITTINGS, VALVES, AND APPURTANANCES ON PVCO PIPE SHALL BE DUCTILE IRON.
12. EXISTING SERVICES SHALL NOT BE CONNECTED TO THE PROPOSED WATER MAIN UNTIL THAT MAIN HAS PASSED PRESSURE TEST AND DISINFECTION REQUIREMENTS.
13. EXISTING WATER MAINS OR SERVICES SHALL NOT BE ABANDONED WITHOUT THE APPROVAL OF THE OWNER. WATER SERVICE SHALL NOT BE INTERRUPTED MORE THAN 4 HOURS WITHOUT PRIOR APPROVAL OF THE OWNER.
14. ALL HYDRANTS REMOVED SHALL BE SALVAGED AND DELIVERED TO A LOCATION TO BE DETERMINED BY THE OWNER. SURFACE RESTORATION SHALL BE IN KIND UNLESS OTHERWISE NOTED.
15. ANY HYDRANT WHICH IS NOT IN SERVICE SHALL BE COVERED WITH A SECURELY FASTENED AND APPROVED BAG.

16. VALVE BOXES ON MAINS TO BE ABANDONED SHALL BE REMOVED BY THE CONTRACTOR AND DELIVERED TO A LOCATION TO BE DETERMINED BY THE OWNER. SURFACE RESTORATION SHALL BE IN KIND UNLESS OTHERWISE NOTED.
17. THE LOCATION OF PIPES, CAPS, REDUCERS, BENDS, AND OTHER FITTINGS AT POINTS OF CONNECTIONS TO EXISTING MAINS IS APPROXIMATE. CONTRACTOR SHALL DIG A TEST PIT AT EACH LOCATION TO DETERMINE THE DIAMETER AND MATERIAL OF THE EXISTING PIPE AND THE LOCATION OF THE TIE-IN POINT.
18. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING. COVERING WITH STEEL PLATES MAY BE ALLOWED IF APPROVED BY THE ENGINEER.
19. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF MASSACHUSETTS GENERAL LAW CHAPTER 82A, TRENCH EXCAVATION AND SAFETY REQUIREMENTS, TO PREVENT THE GENERAL PUBLIC FROM UNAUTHORIZED ACCESS TO UNATTENDED TRENCHES.
20. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES WHICH HOLD WATER IN THE SYSTEM. THE OWNER WILL, ON 72 HOURS NOTICE FROM THE CONTRACTOR, OPEN AND/OR CLOSE ANY VALVES REQUIRED FOR DRAINING OR ADMITTING WATER TO THE VARIOUS SECTIONS OF THE WATER MAINS. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY IN WRITING 48 HOURS IN ADVANCE, ANY OCCUPANT THAT WILL BE WITHOUT WATER DUE TO A SHUTDOWN.
21. ELEVATIONS REFERENCED ARE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
22. EXISTING UTILITY INFORMATION, TOPOGRAPHIC INFORMATION, EDGE OF PAVEMENT, UTILITY POLE LOCATIONS, AND LOCATIONS OF EXISTING ABOVE GROUND STRUCTURES WERE TAKEN FROM SURVEY PLANS PREPARED BY GUERRIERE & HALNON, INC. DATED SEPTEMBER 13, 2022.
23. ASSESSORS INFORMATION REPRESENTED ON THESE DRAWINGS IS TAKEN FROM THE CITY/TOWN ASSESSOR'S PARCEL MAPS AND IS INCLUDED FOR ILLUSTRATIVE PURPOSES ONLY. ASSESSORS INFORMATION IS NOT INTENDED TO BE AN AUTHORITATIVE RECORD OF PROPERTY BOUNDARIES OR A SOURCE OF INFORMATION FOR AN ACTUAL SURVEY OR LEGAL DESCRIPTION OF THE PROPERTY. NO WORK HAS BEEN PERFORMED TO DETERMINE THE DEPICTED PROPERTY LINES AND THEREFORE, THESE DRAWINGS ARE NOT INTENDED TO BE USED TO DELINEATE ANY EXISTING OR PROPOSED STRUCTURES, FEATURES OR BOUNDARIES RELATIVE TO PROPERTY LINES. AUTHORITATIVE RECORDS OF PROPERTY LINES MAY BE LOCATED AT THE STATE OR MUNICIPAL AGENCY RESPONSIBLE FOR MAINTAINING PUBLIC RECORDS IN WHICH THE PARCEL IS LOCATED. LEGALLY AUTHORITATIVE MAPS OF PROPERTY LINES MAY ONLY BE PRODUCED BY A PROFESSIONAL LAND SURVEYOR.



PLAN
SCALE: 1" = 20'



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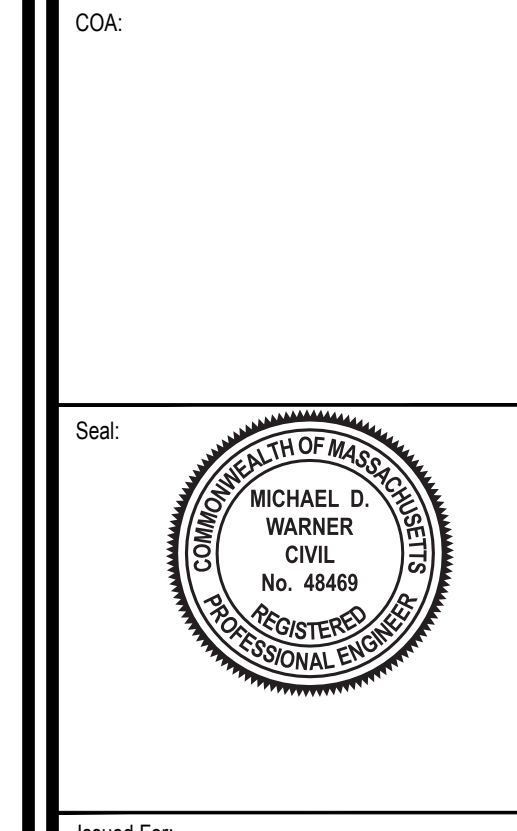
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**WATER STORAGE
TANK SITE PLAN**

Sheet Number:
C101

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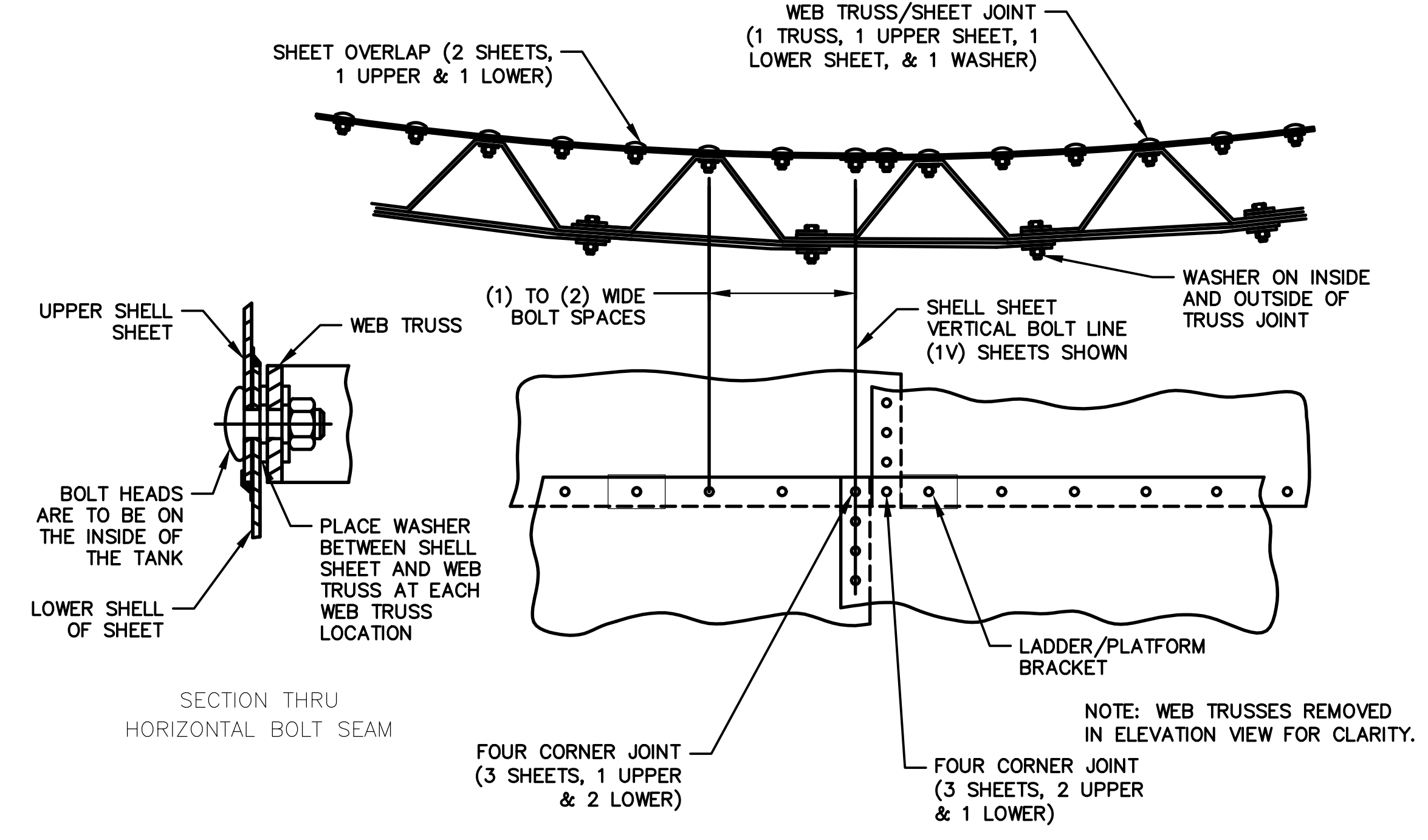
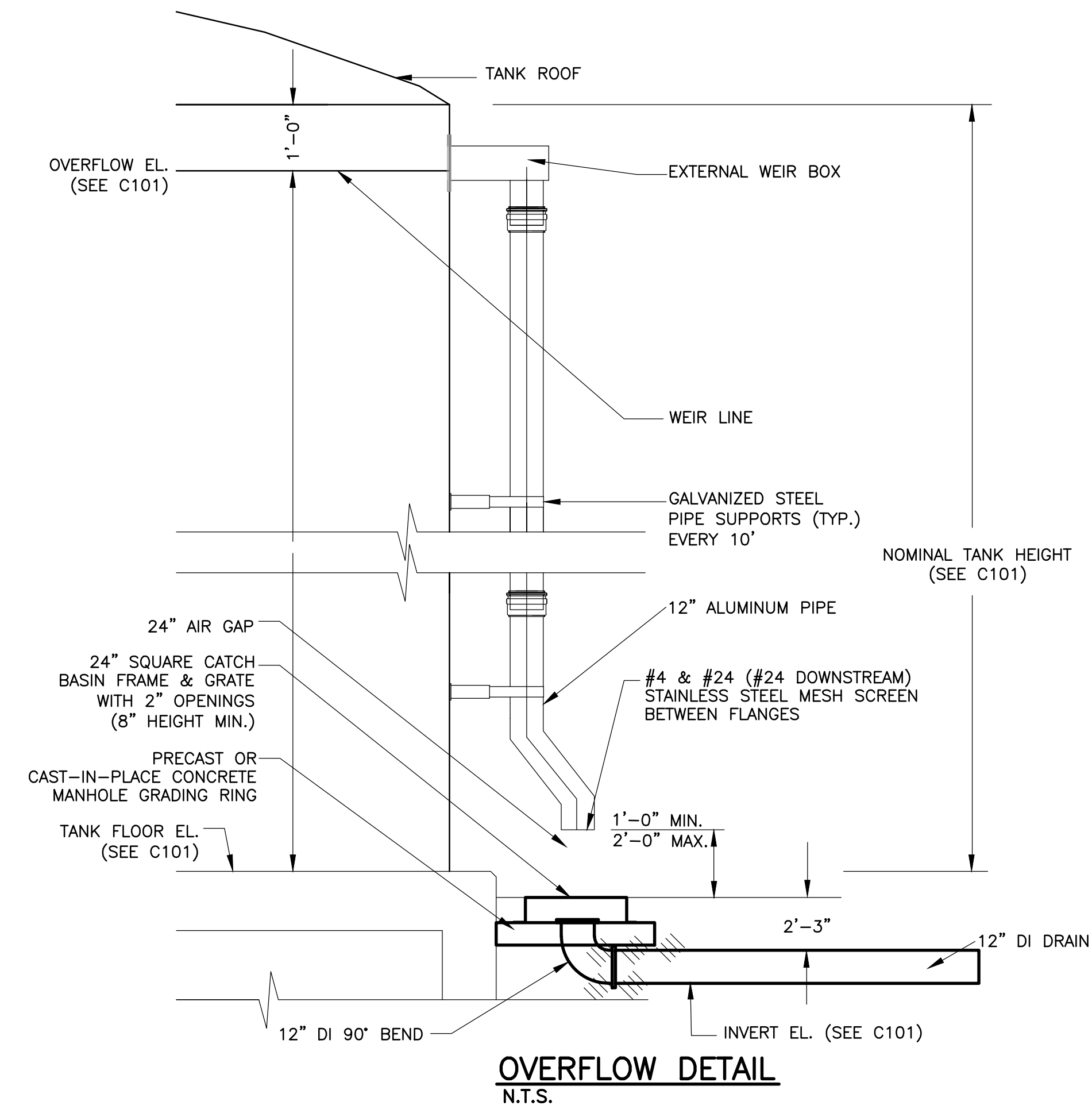
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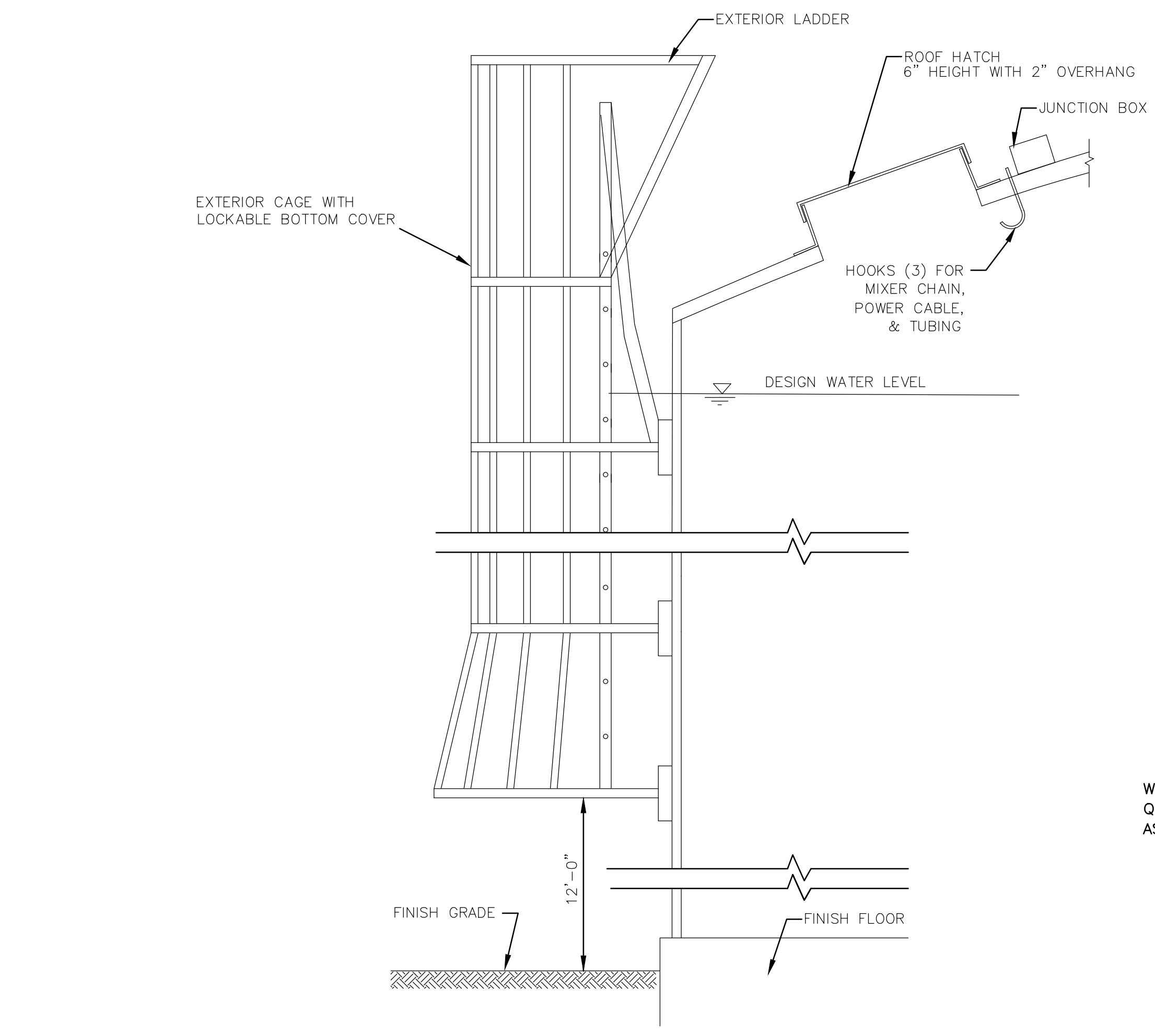
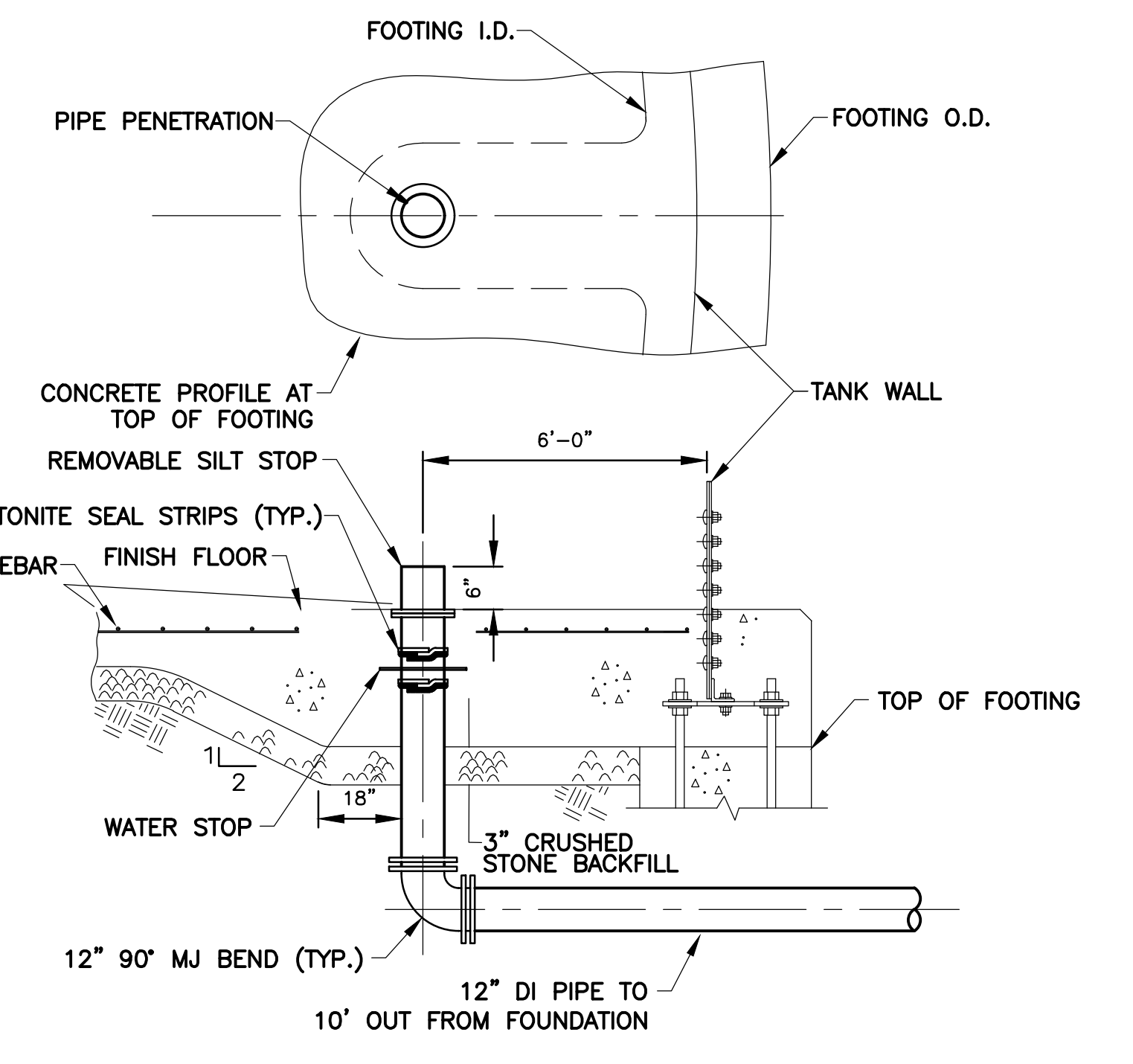
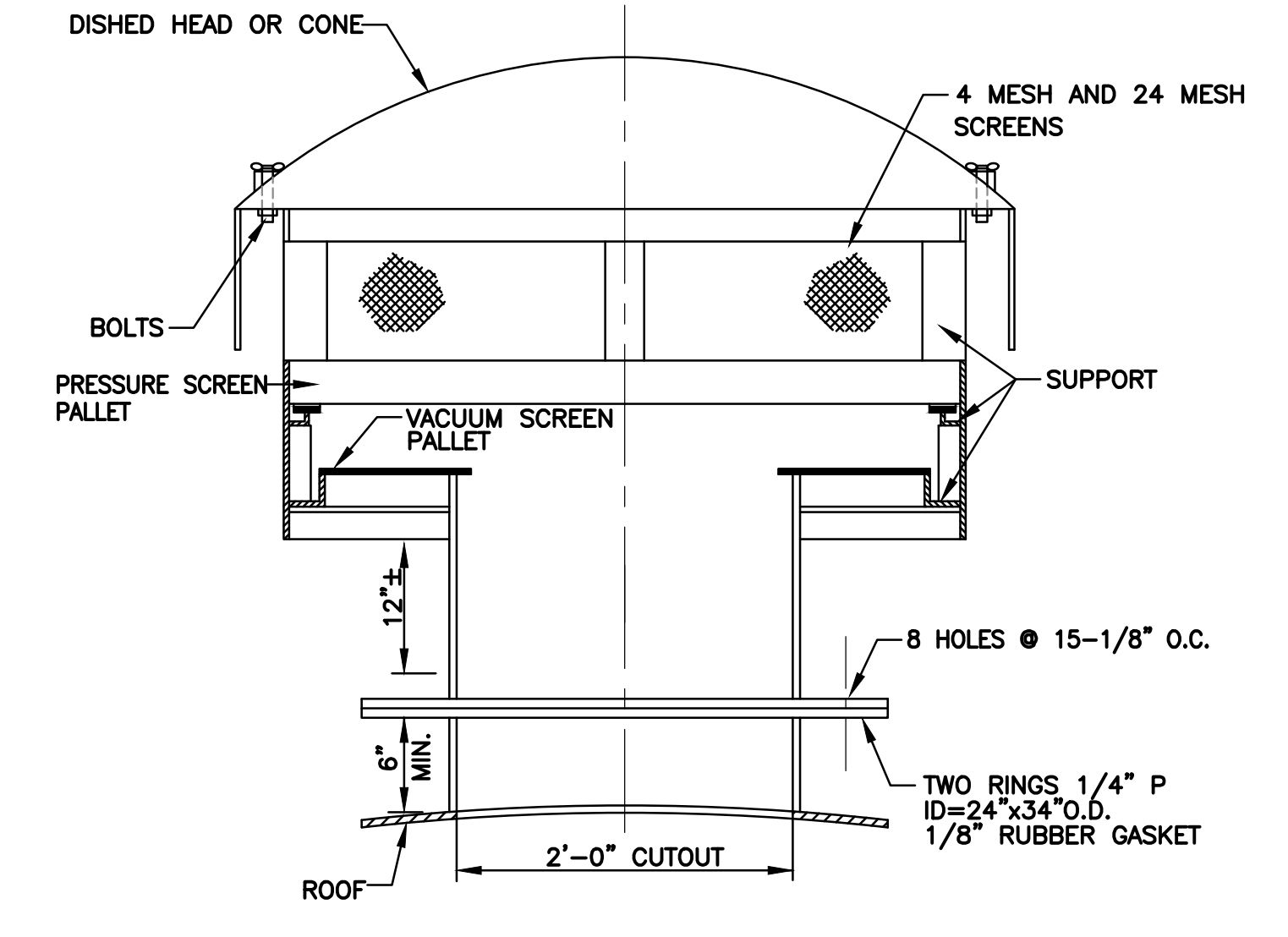
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Drawing Title:
WATER STORAGE TANK DETAILS

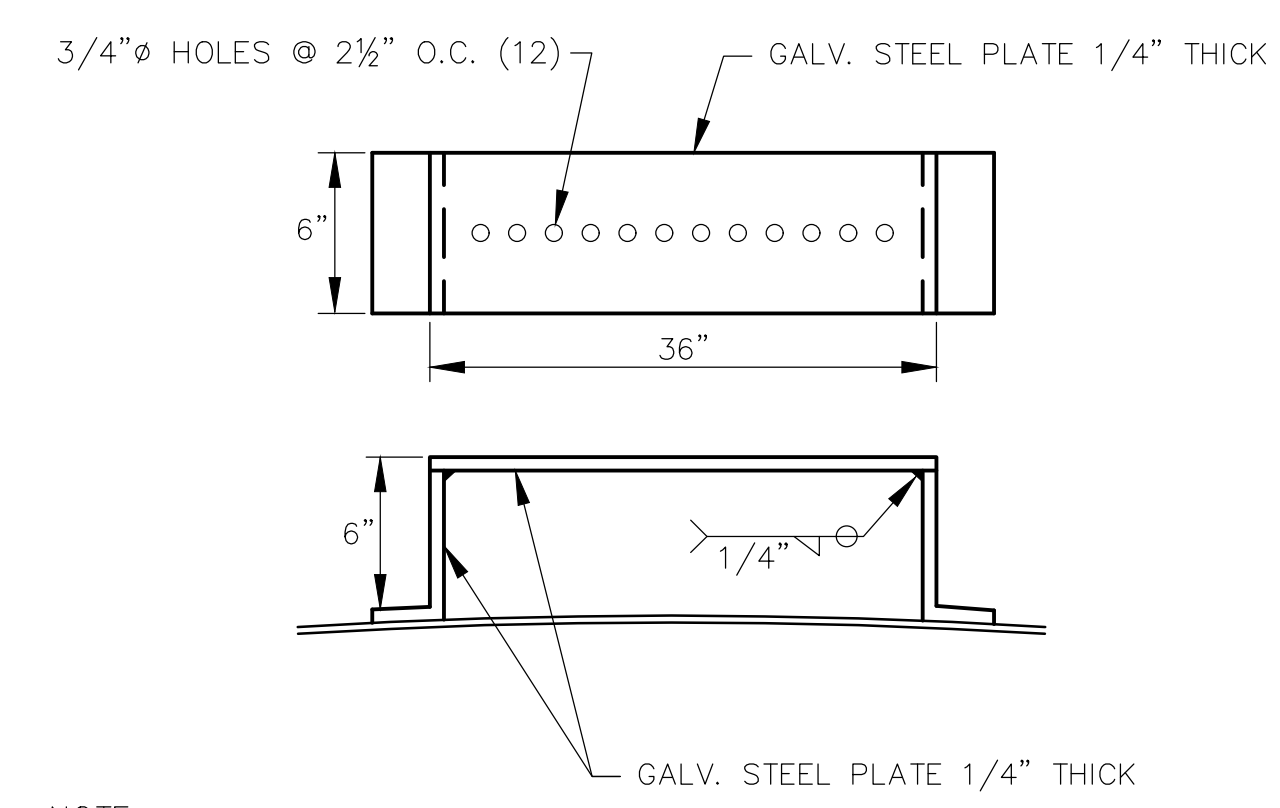
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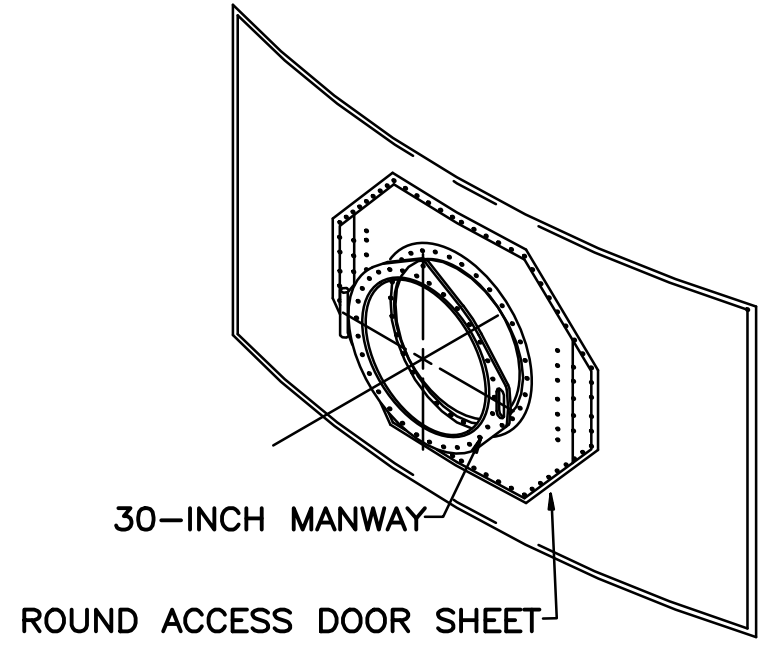
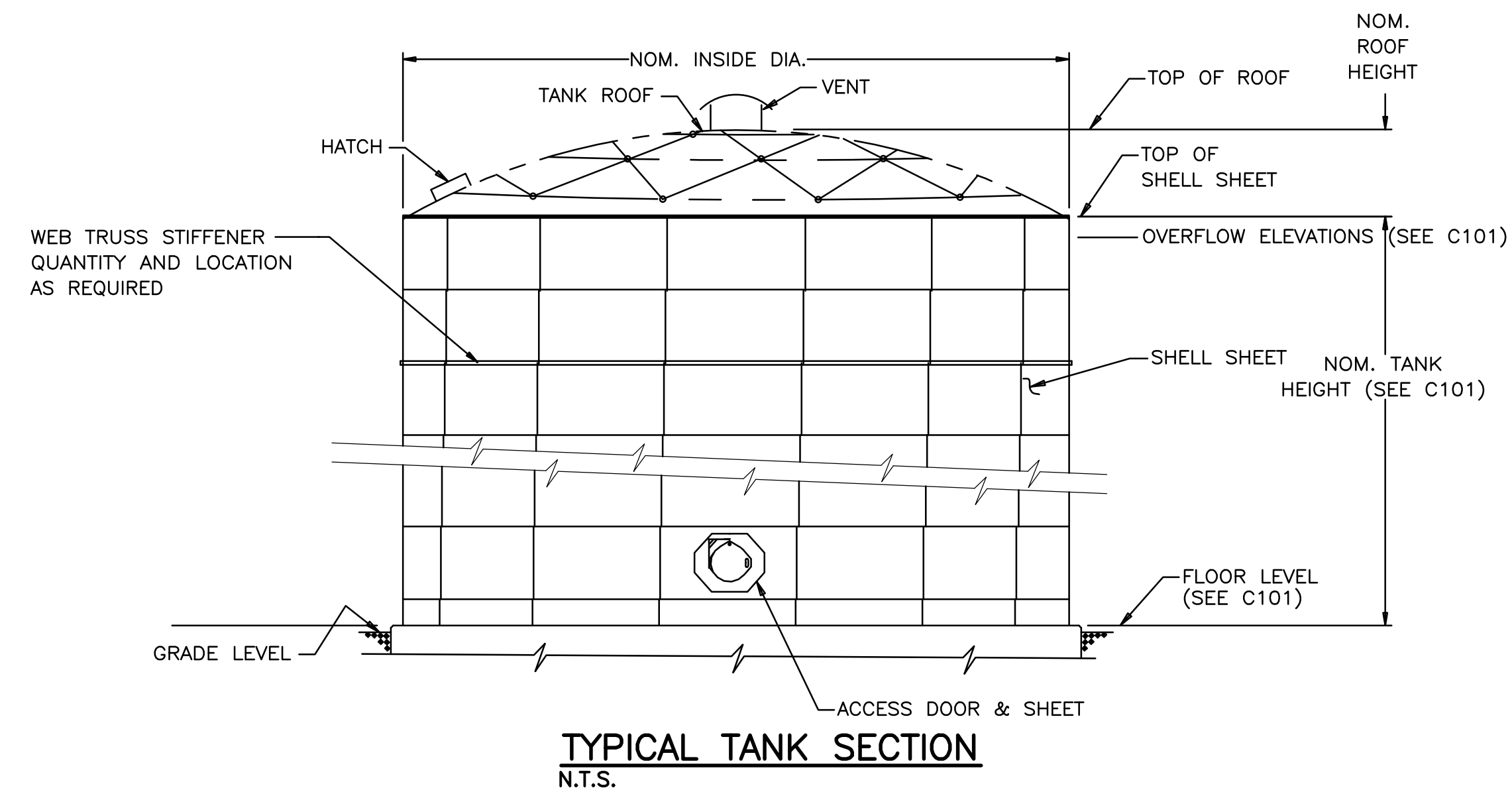
NOTES:
1. DETAIL IS PROVIDED AS REFERENCE ONLY. WEB STIFFENERS TO BE DESIGNED BY TANK MANUFACTURER TO MEET DESIGN CRITERIA LOADING AND TO SUPPORT CELLULAR ANTENNAS AND EQUIPMENT AS SPECIFIED.



NOTE:
HANDRAIL SHALL BE 1.5-INCH DIAMETER SCHEDULE 40 ALUMINUM PIPE, WELDED AND GROUND SMOOTH. JOINTS SHALL BE SHOP WELDED AND GROUND SMOOTH.



NOTE:
VERTICAL SPACING = 10' O.C.
ANTENNA CABLE SUPPORTS TO START AT 6' ABOVE F.F.E.



NOTE:
MANWAY TO INCLUDE HINGE OR DAVIT ARM AND GASKET, NOT SHOWN.

Consultants:

No.	Date	Description

Revisions:

No.	Date	Description

COA:



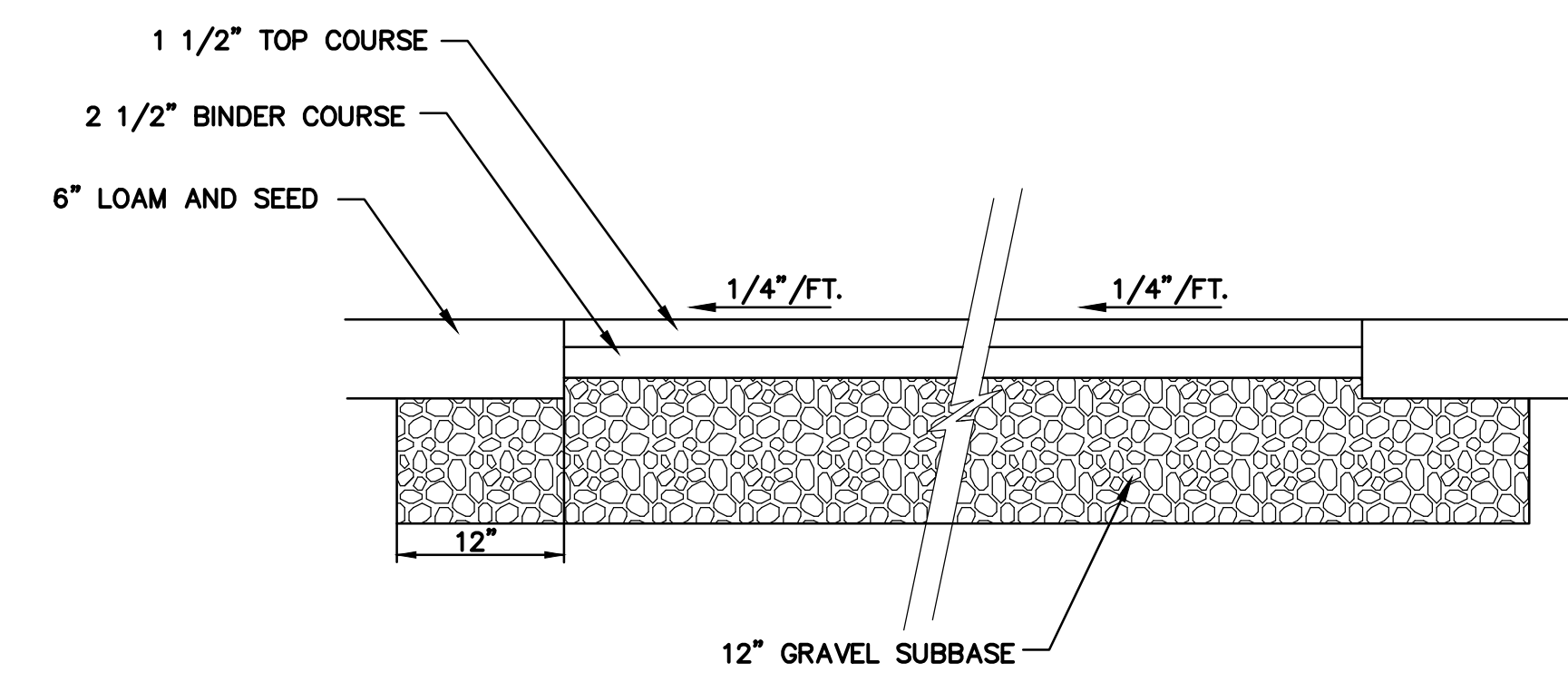
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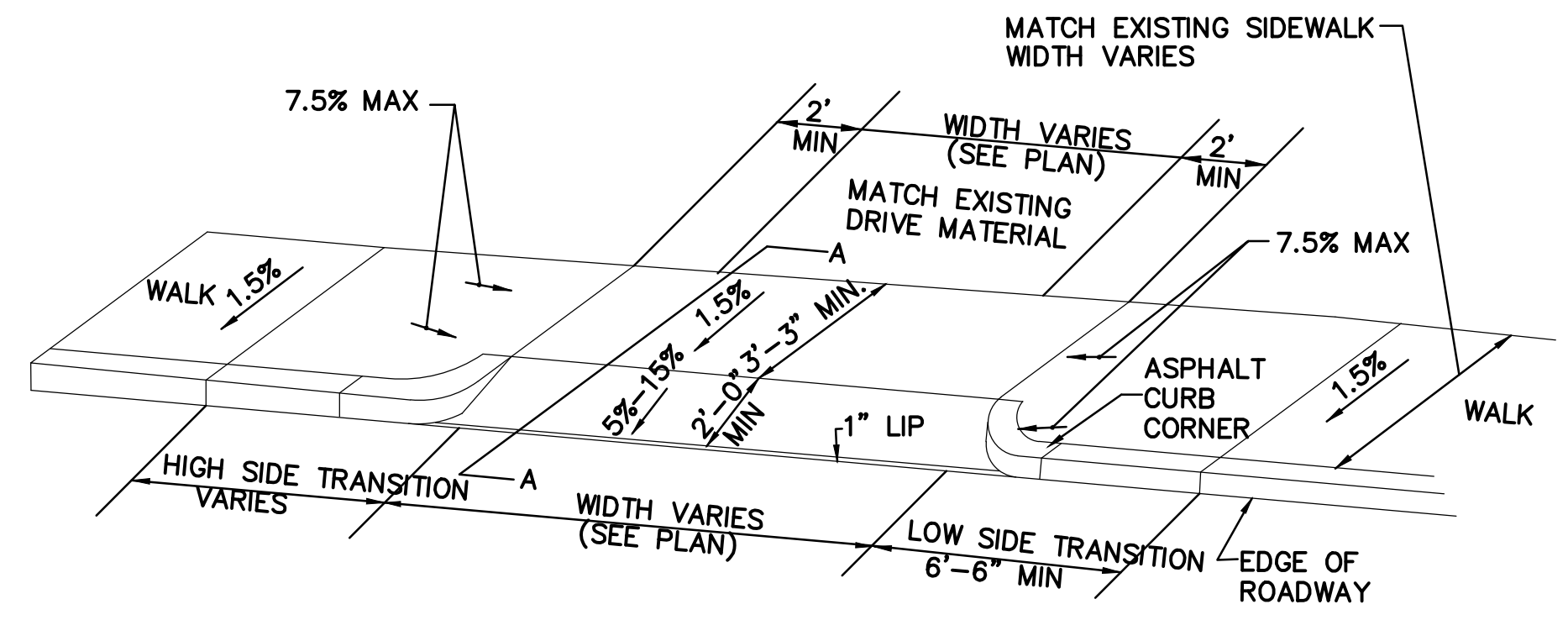
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 W&S File No.: 249-79

Drawing Title: **WATER MAIN AND SITE DETAILS**

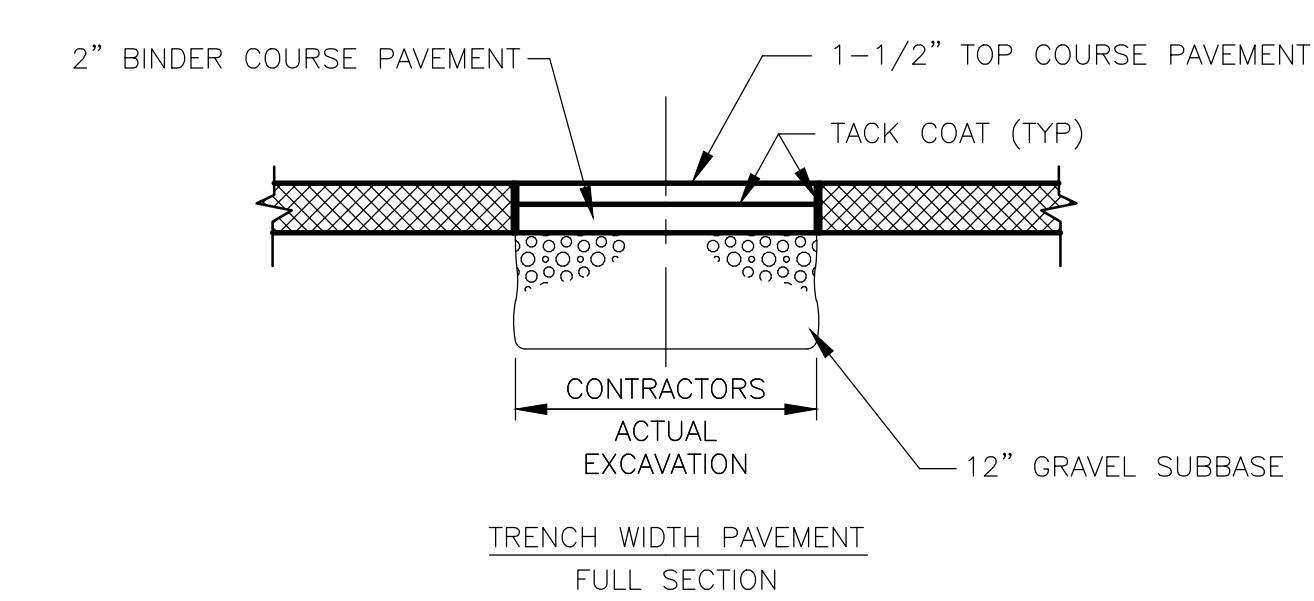
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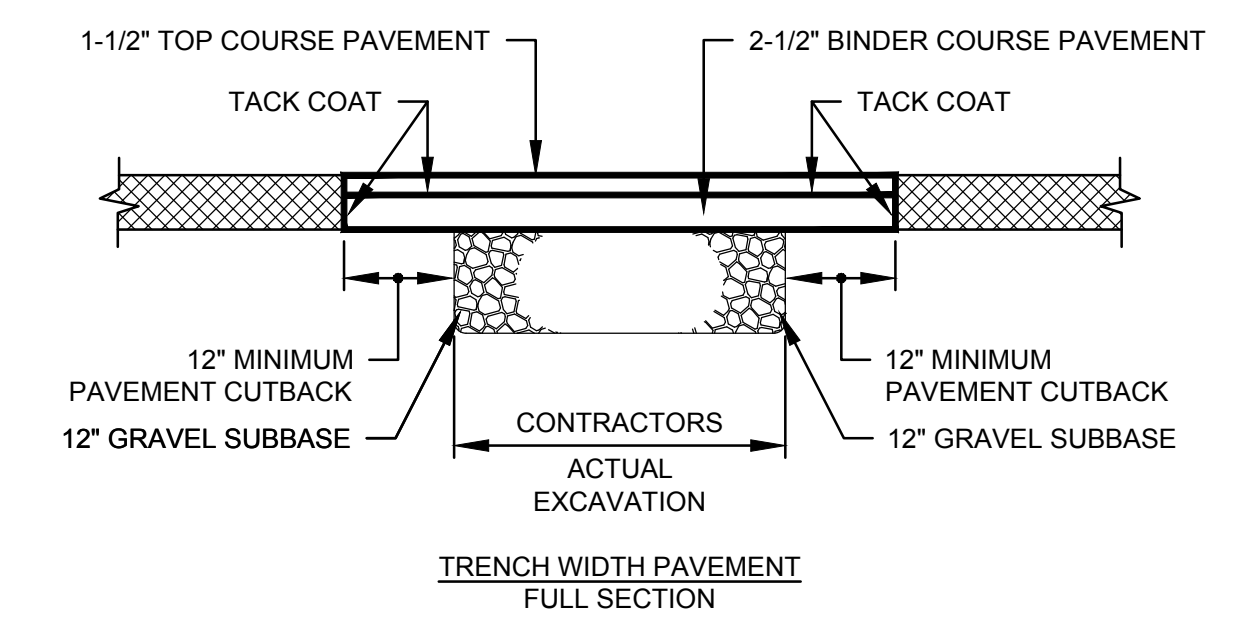
TYPICAL DRIVEWAY PAVEMENT DETAIL
N.T.S.



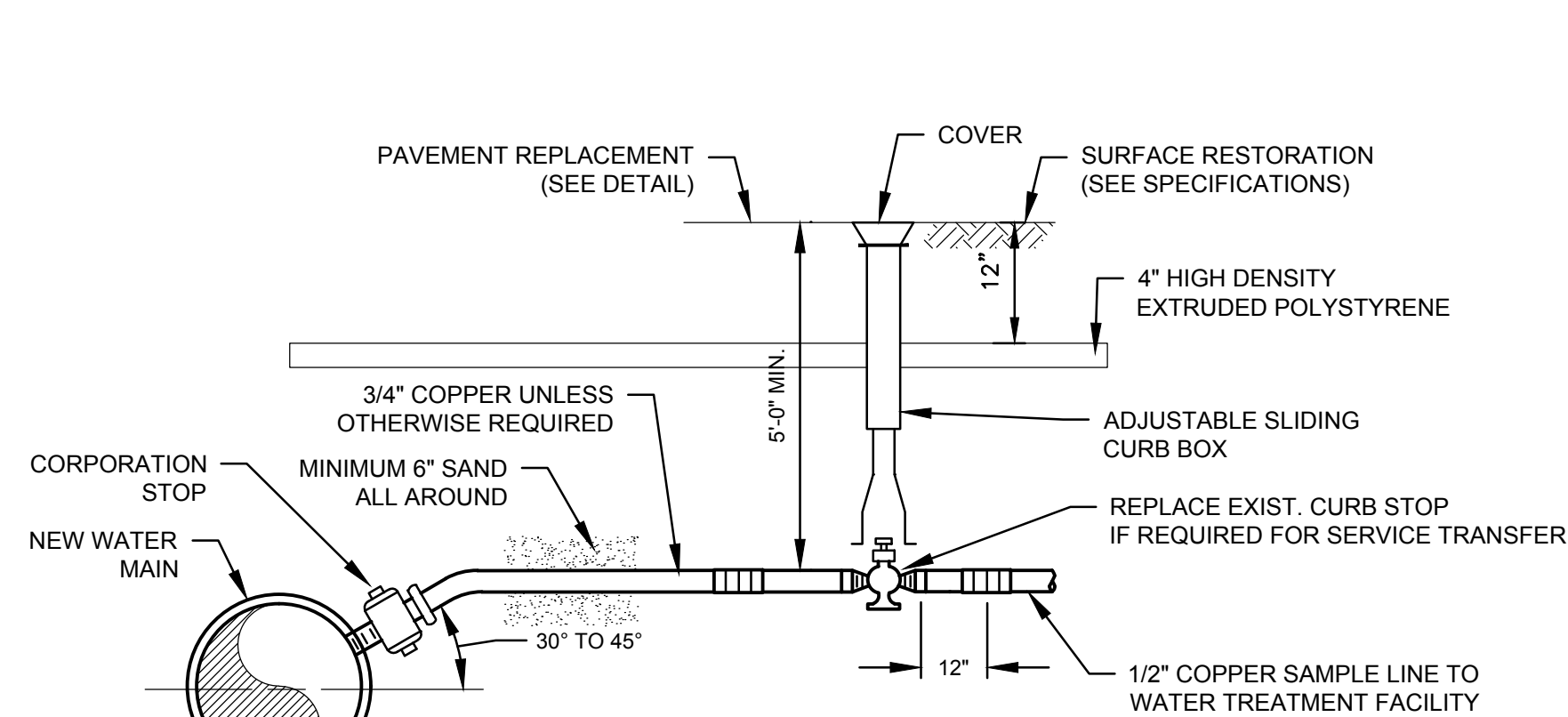
DRIVEWAY APRON
FULL SECTION



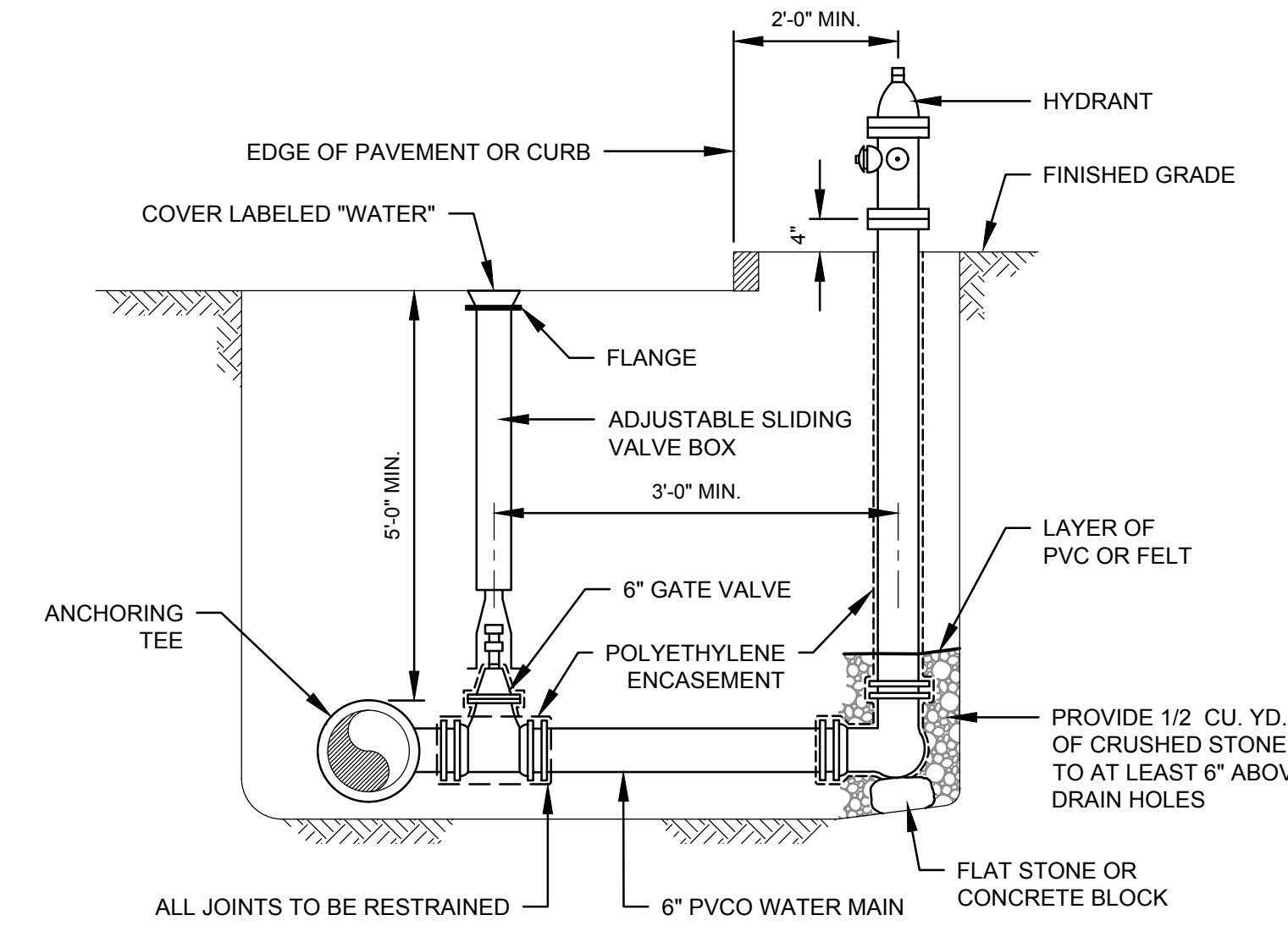
TEMPORARY PAVEMENT REPLACEMENT DETAILS
N.T.S.



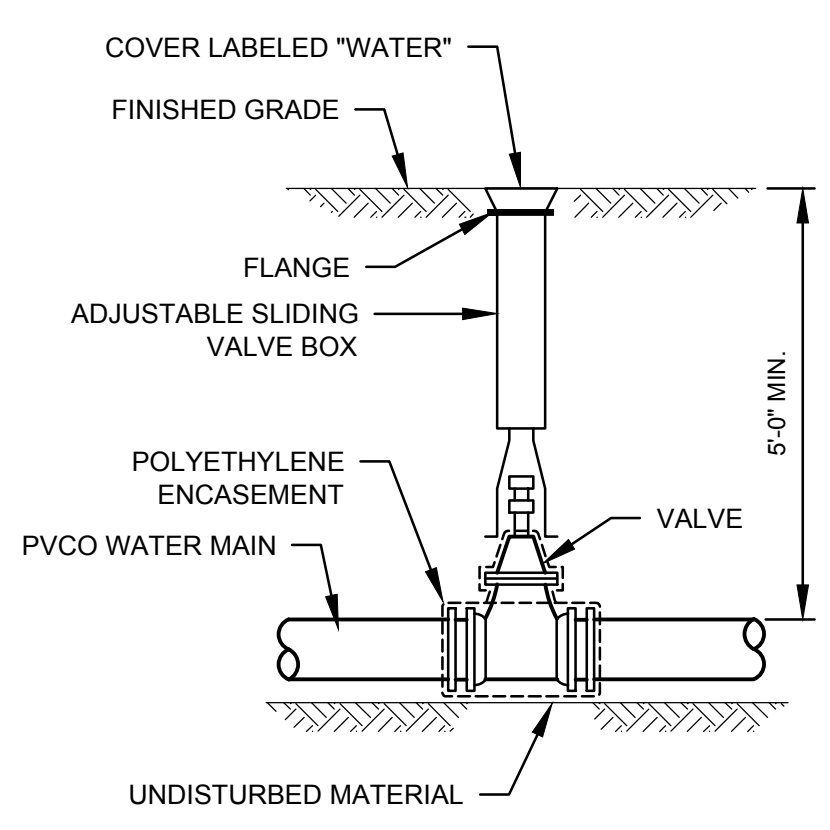
PERMANENT PAVEMENT REPLACEMENT DETAILS
N.T.S.



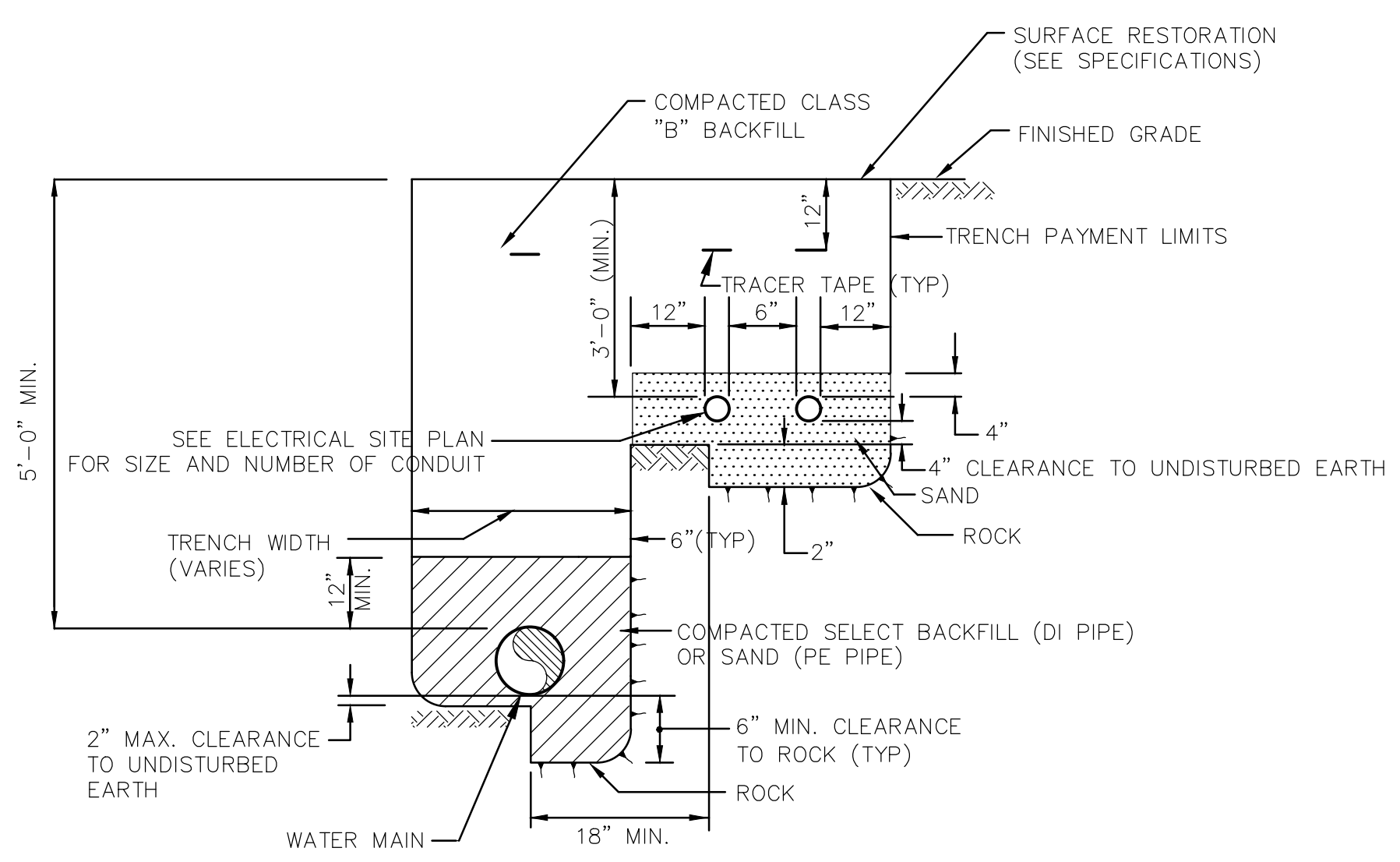
SAMPLE/PRESSURE STATION CONNECTION DETAIL
N.T.S.



HYDRANT AND VALVE DETAIL
N.T.S.



VALVE AND BOX DETAIL
N.T.S.



WATER MAIN AND CONDUIT TRENCH
N.T.S.

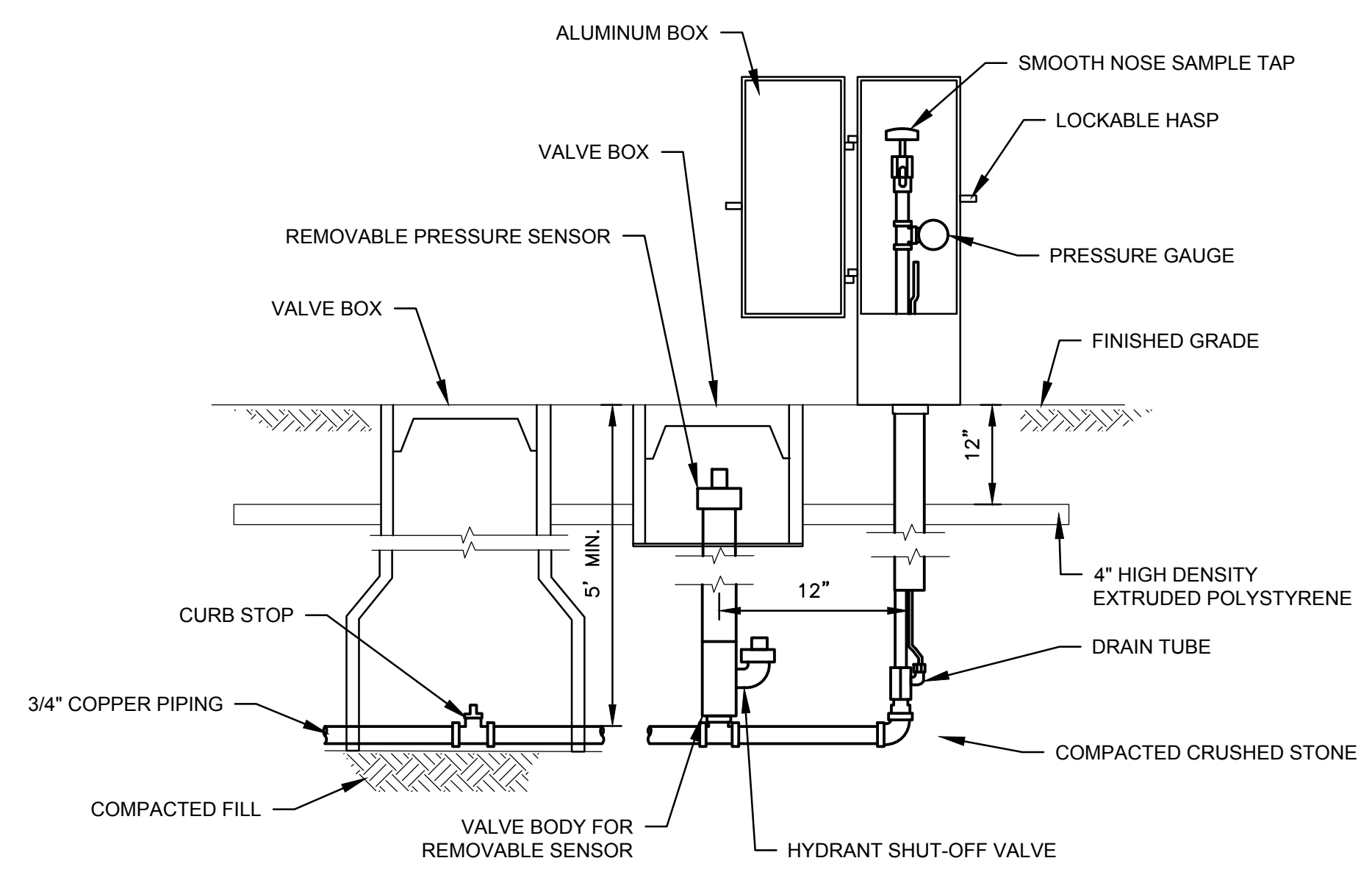
TABLE 1

REQUIRED LENGTH OF RESTRAINED JOINTS FROM FITTINGS (FEET)

PIPE SIZE	90° BEND	45° BEND OR WYE BRANCH	22 1/2° BEND	11 1/4° BEND	PLUG, CAP OR IN-LINE VALVE	TEE (BRANCH)
6"	25 (30.5)	10.5 (12.5)	5 (6)	2.5 (3)	43 (64)	34 (51)
8"	33 (40)	13.5 (16.5)	6.5 (8)	3 (4)	55 (82)	47 (70)
10"	40 (48.5)	16.5 (20)	8 (9.5)	4 (5)	67 (100)	58 (87)
12"	47 (56.5)	19.5 (23.5)	9.5 (11.5)	4.5 (5.5)	79 (118)	70 (105)
16"	59.5 (72)	24.5 (30)	12 (14.5)	6 (7)	101 (152)	92 (139)
20"	72 (86.5)	30 (36)	14.5 (17)	7 (8.5)	123 (184)	114 (171)
24"	84 (100)	35 (41)	16.5 (20)	8 (10)	144 (216)	134 (202)
30"	100 (120)	41 (50)	20 (24)	10 (12)	174 (261)	165 (247)

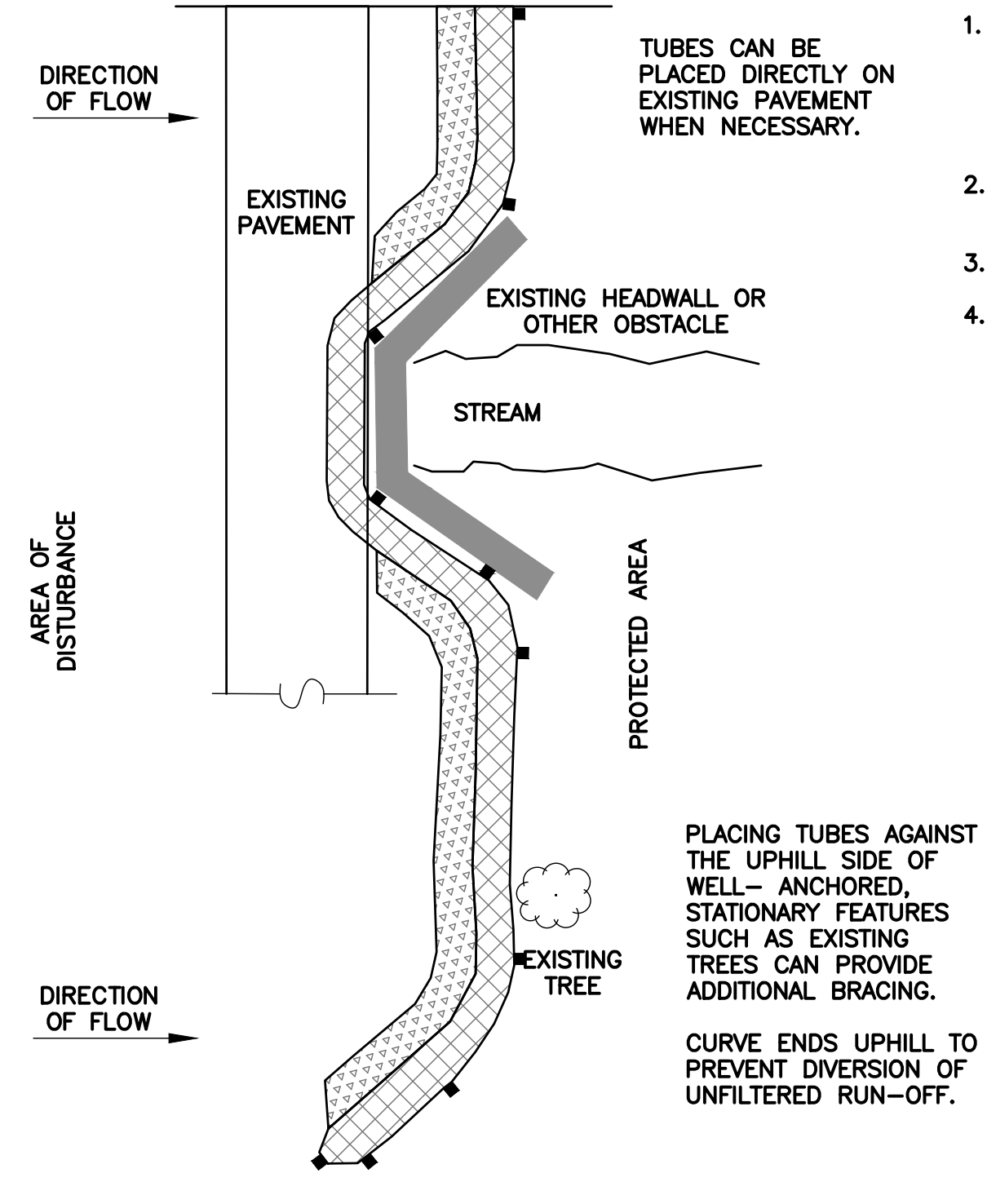
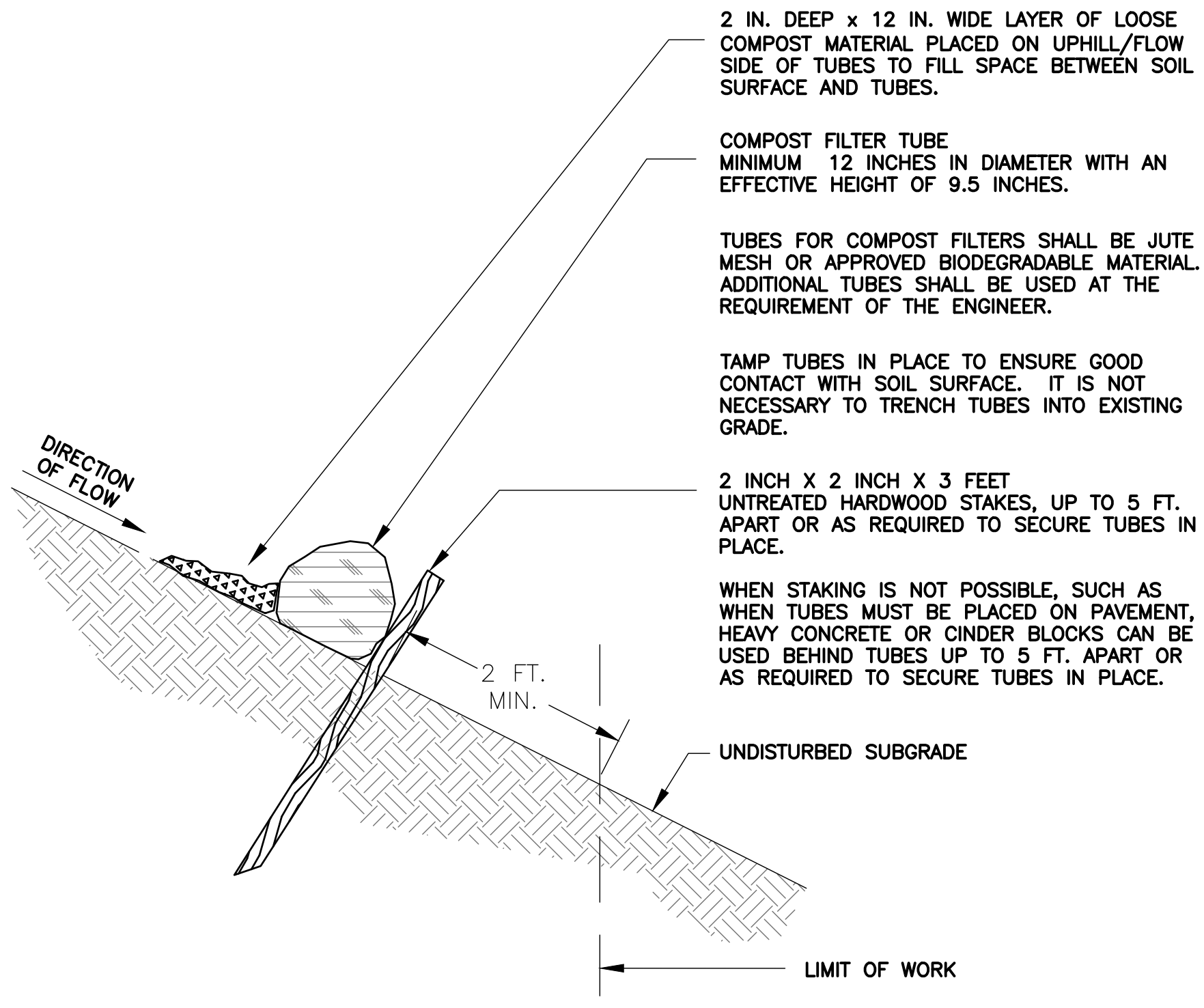
NOTES:

- RESTRAINED LENGTHS LISTED IN PARENTHESES ARE FOR PIPE WRAPPED IN POLYETHYLENE. THE OTHER ASSOCIATED LENGTHS ARE FOR PLAIN UNWRAPPED DUCTILE IRON PIPE.
- THE CONTRACTOR SHALL USE THIS TABLE IN CONJUNCTION WITH THE APPROPRIATE PIPE SPECIFICATION SECTION.

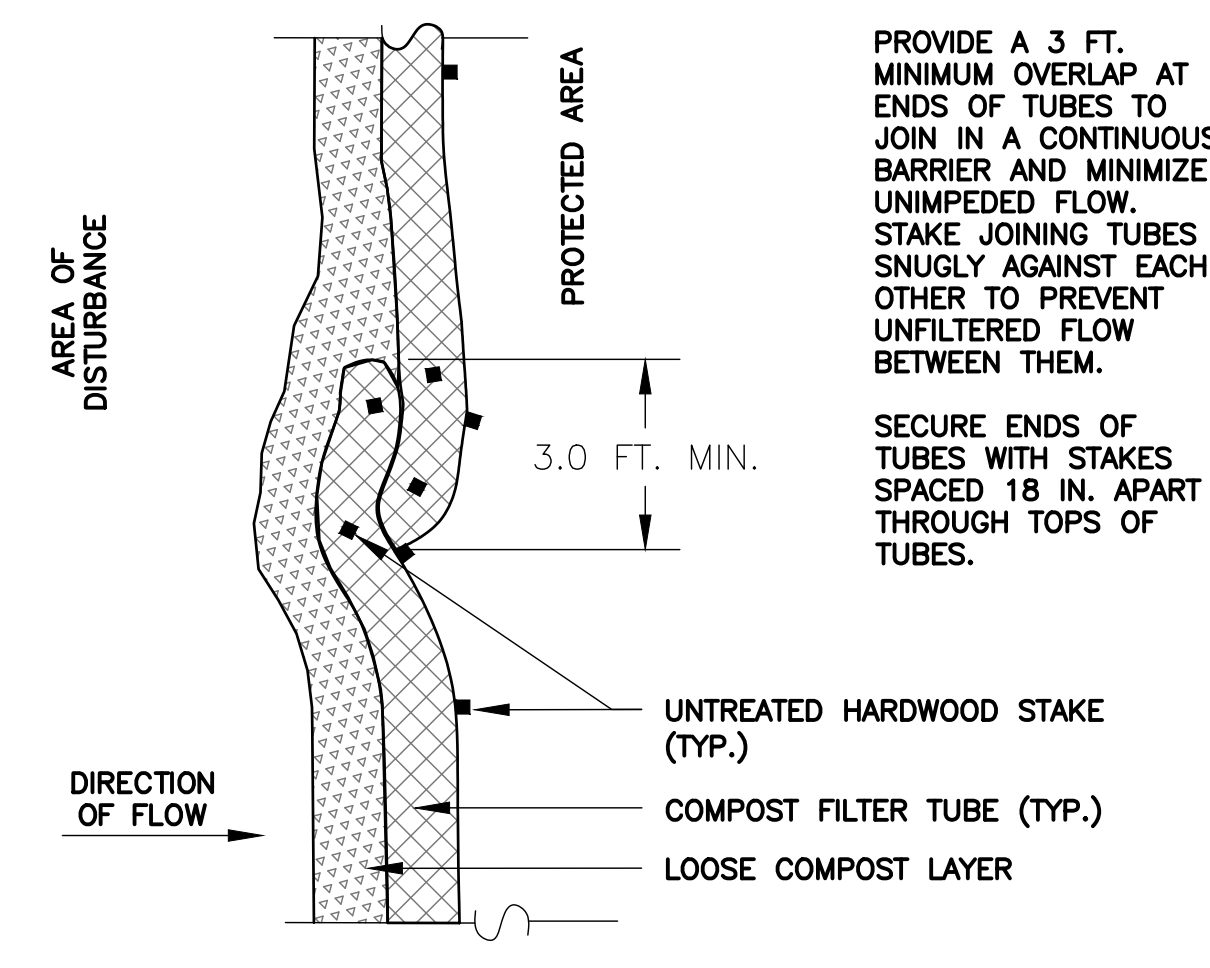


SAMPLE AND PRESSURE MONITORING STATIONS DETAIL
N.T.S.

WESTON & SAMPSON ENGINEERS, INC. 55 WALKERS BROOK DRIVE, SUITE 100, READING, MA 01867
 DRAWING NO. ENG22-0578 SHEET NO. D502

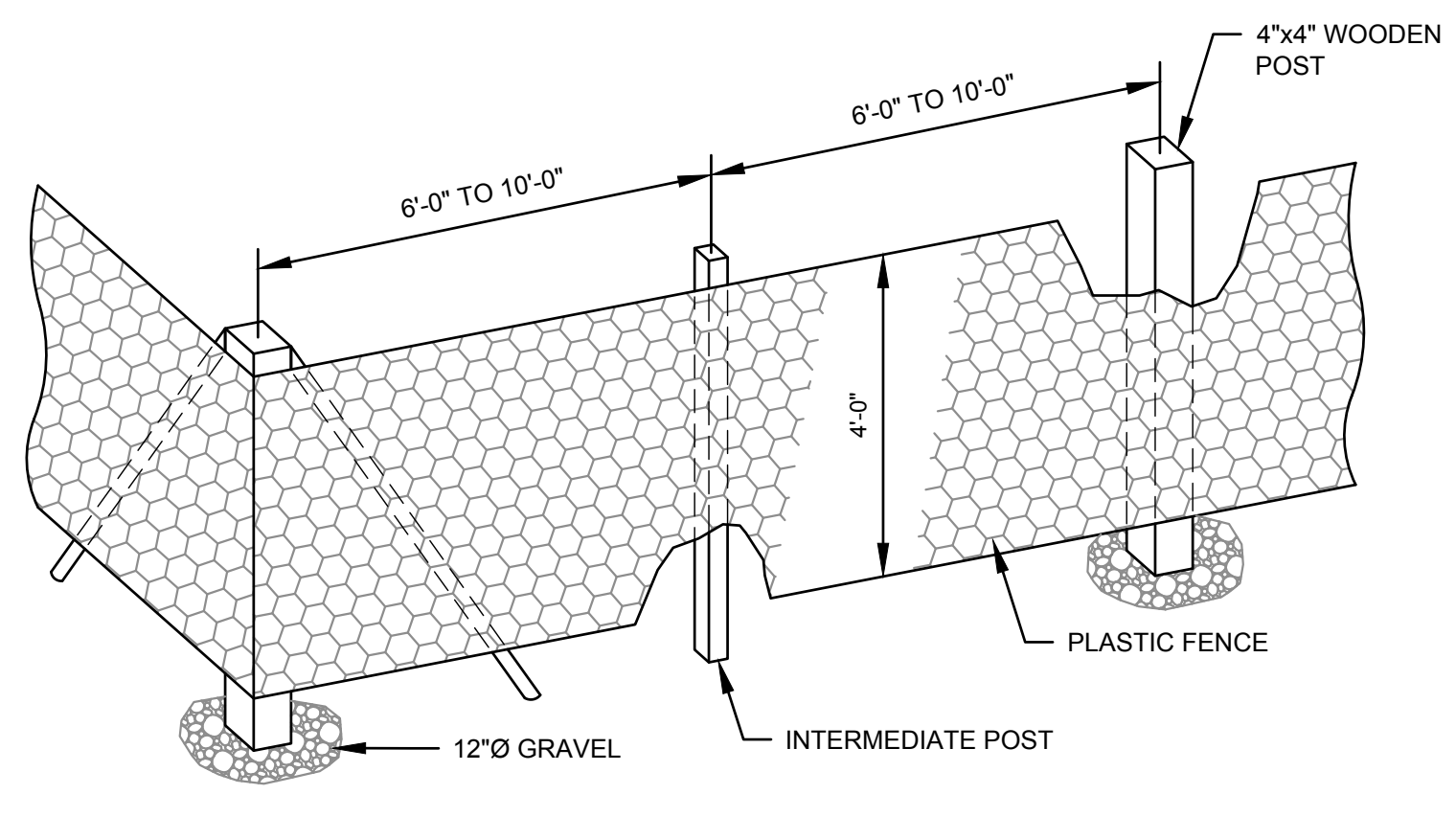


- GENERAL NOTES:**
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
 2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
 3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
 4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.

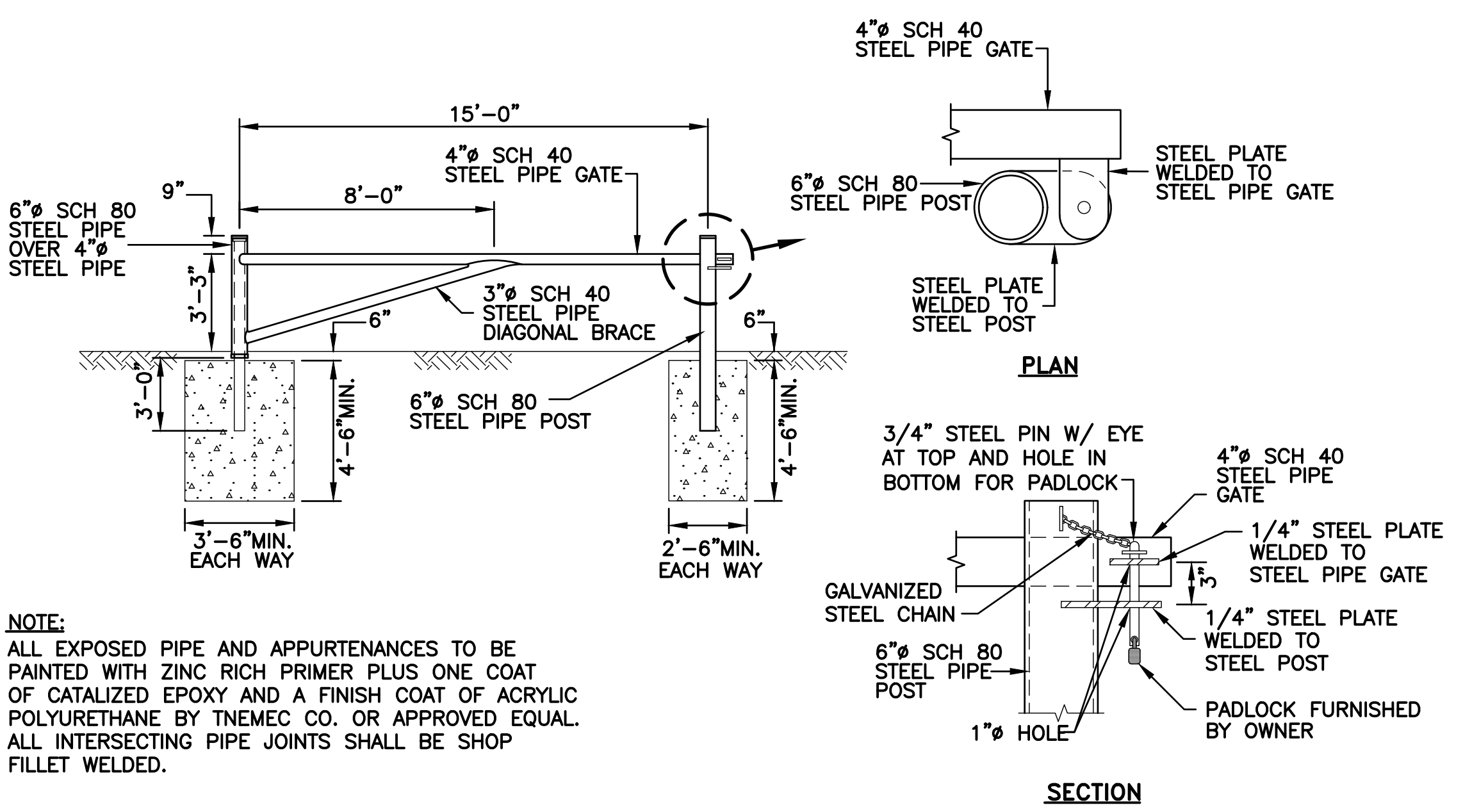


PLAN VIEW
SINGLE COMPOST FILTER TUBE DETAIL
 NOT TO SCALE

PLAN VIEW — JOIN DETAIL

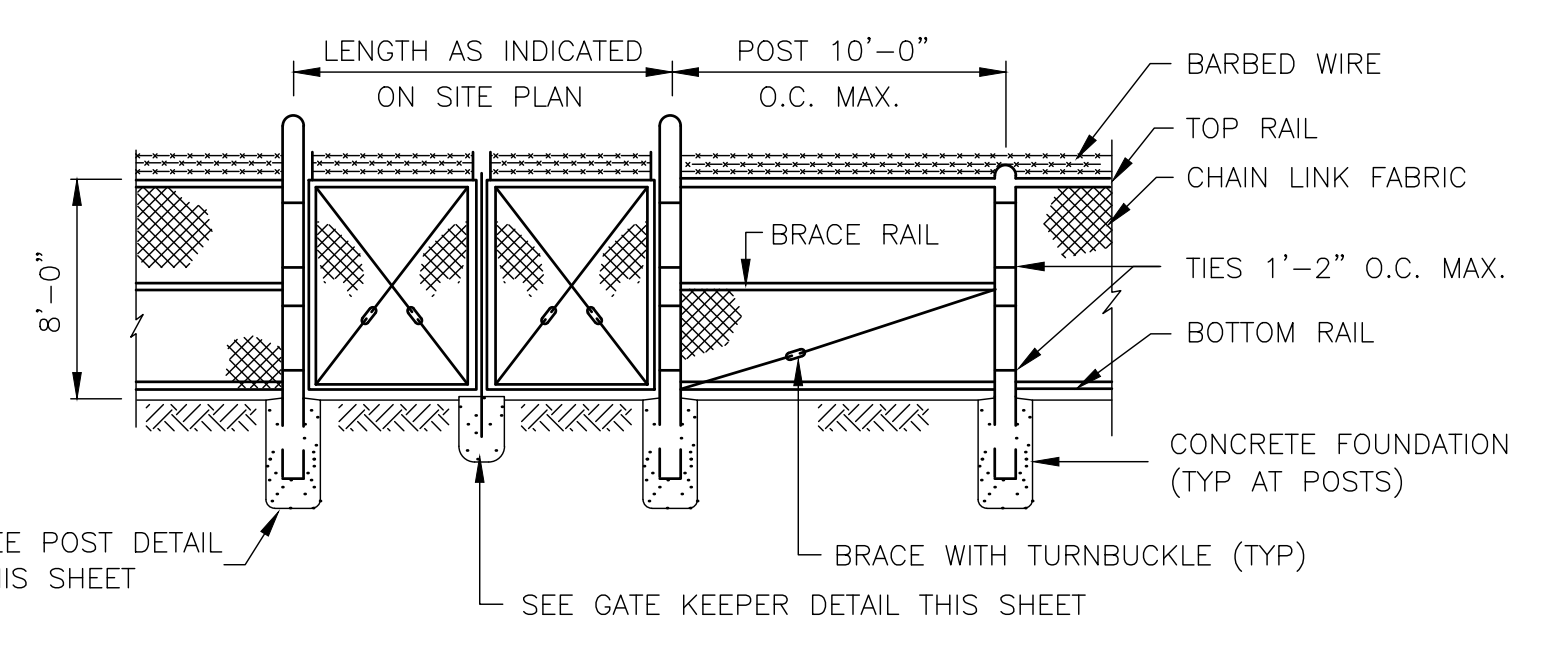
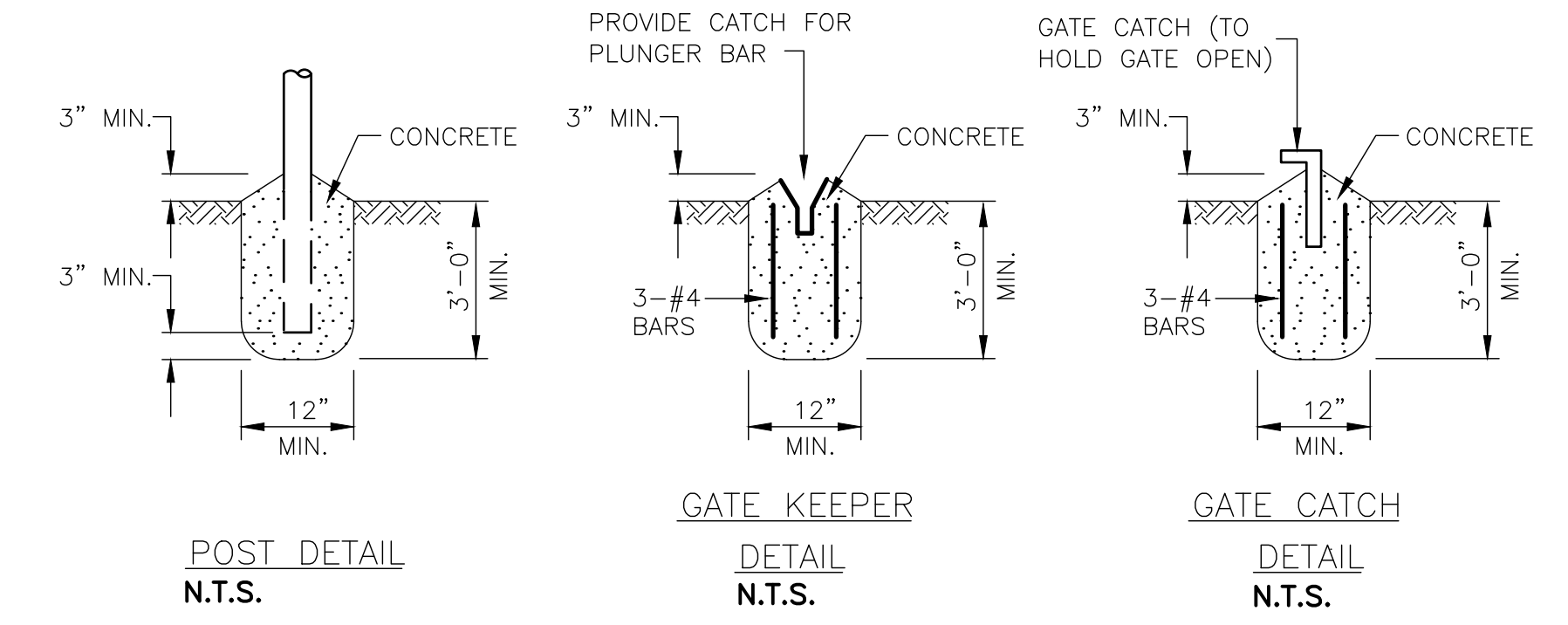


CONSTRUCTION/BARRIER FENCE DETAIL
 N.T.S.



TYPICAL BARRIER GATE
 N.T.S.

NOTE:
 ALL EXPOSED PIPE AND APPURTENANCES TO BE PAINTED WITH ZINC RICH PRIMER PLUS ONE COAT OF CATALYZED EPOXY AND A FINISH COAT OF ACRYLIC POLYURETHANE BY TNEC CO. OR APPROVED EQUAL. ALL INTERSECTING PIPE JOINTS SHALL BE SHOP FILLET WELDED.



TYPICAL CHAIN LINK FENCE AND GATE DETAIL
 N.T.S.

Consultants:

Revisions:

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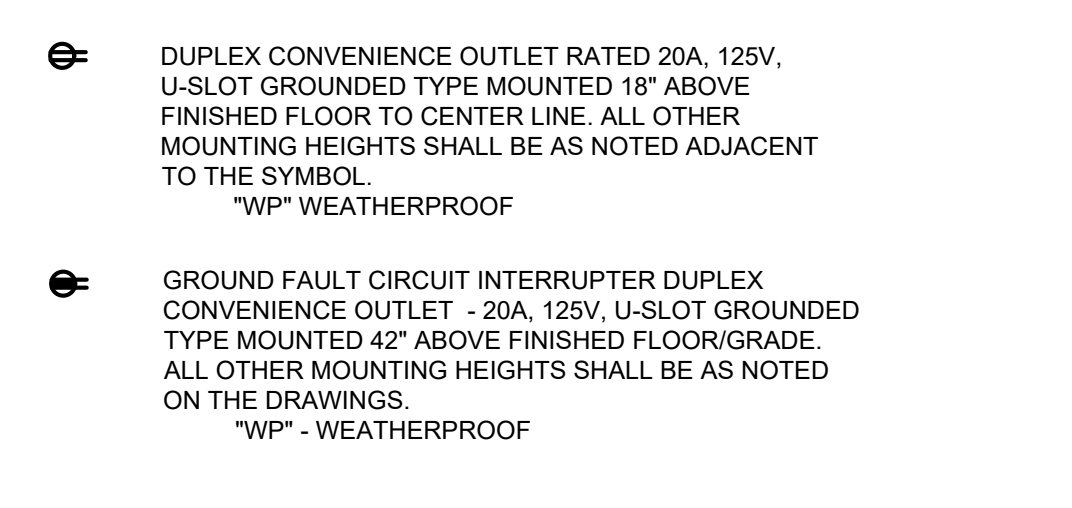
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SITE DETAILS

Sheet Number:
D503

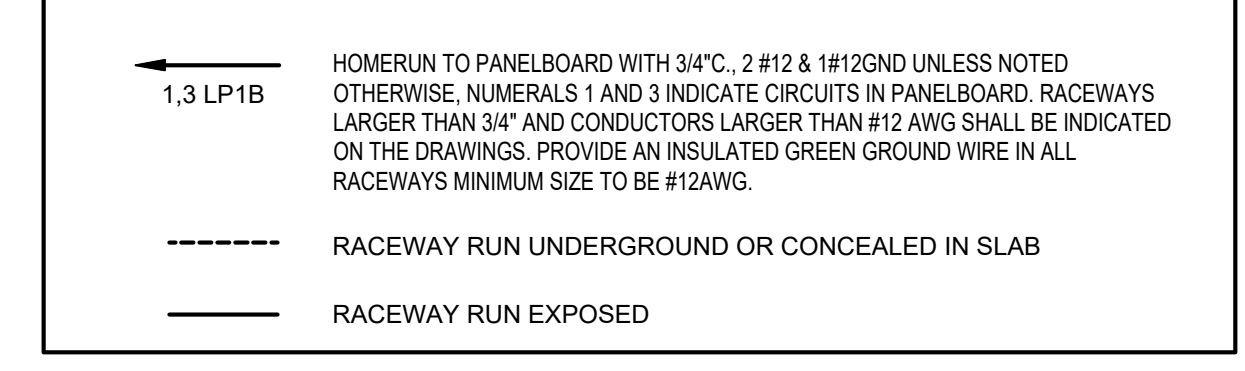
ELECTRICAL ABBREVIATIONS LIST

1P 1 POLE (2P, 3P, 4P, ETC.)	AS AMP SWITCH	CMPR COMPRESSOR	DS SAFETY DISCONNECT SWITCH	FIXT FIXTURE	HTG HEATING	LTG LIGHTING	MSP MOTOR STARTER PANELBOARD	PA PUBLIC ADDRESS	RM ROOM	SYM SYMMETRICAL	V VOLT	∠ ANGLE
A AMPERE	AT AMP TRIP	CONN CONNECTION	DT DOUBLE THROW	FLOR FLOOR	HTR HEATER	LTNG LIGHTING	MSBD MAIN SWITCHBOARD	PB PULL BOX OR PUSHBUTTON	RSC RIGID STEEL CONDUIT	SYS SYSTEM	VA VOLT-AMPERES	@ AT
AC ABOVE COUNTER OR AIR	ATS AUTOMATIC TRANSFER SWITCH	CONST CONSTRUCTION	DWG DRAWING	FLUR FLUORESCENT	HV HIGH VOLTAGE	LV LOW VOLTAGE	MT MOUNT	PE PNEUMATIC ELECTRIC	RTU ROOF TOP UNIT	TEL TELEPHONE	VDT VIDEO DISPLAY TERMINAL	Δ DELTA
CONDITIONER	AUTO AUTOMATIC	CONT CONTINUATION OR CONTINUOUS	EC ELECTRICAL CONTRACTOR	FU FUSE	HVAC HEATING, VENTILATING AND AIR	MAX MAXIMUM	MT.C EMPTY CONDUIT	PED PEDESTAL	SC SURFACE CONDUIT	TEL.DATA TELEPHONE/DATA	VERT VERTICAL	· FEET
ACLG ABOVE CEILING	AUXILARY AUXILIARY	CONTR CONTRACTOR	ELEC ELECTRIC, ELECTRICAL	FUJ FUSED SAFETY DISCONNECT SWITCH	COND CONDITIONING	MAG.S MAGNETIC STARTER	MTR MANUAL TRANSFER SWITCH	PF POWER FACTOR	SEC SECONDARY	TERM TERMINAL	VFD VARIABLE FREQUENCY DRIVE	" INCHES
ADD AUTOMATIC DOOR OPENER	AV AUDIO VISUAL	CONV CONVERTOR	ELEV ELEVATOR	GA GAUGE	HWP HYDRONIC WATER PUMP	MIC MOMENTARY CONTACT	MTR MOTOR, MOTORIZED	PH PHASE	SHT SHEET	TL TWIST LOCK	VOL VOLUME	# NUMBER
AF AMP FRAME	AWG AMERICAN WIRE GAUGE	CP CIRCULATING PUMP	EM EMERGENCY	GAL GALLON	IC INTERRUPTING CAPACITY	MC MECHANICAL CONTRACTOR	N.C. NORMALLY CLOSED	PIV POST INDICATING VALVE	SHW SIMILAR	TR TAMPER RESISTANT	W WATT	∅ PHASE
AFB ABOVE FINISHED FLOOR	BATT BATTERY	CR CT CATHODE-RAY TUBE	EMS ENERGY MANAGEMENT SYSTEM	GALV GALVANIZED	IG ISOLATED GROUND	MCC MAIN CIRCUIT BREAKER	NEC NATIONAL ELECTRICAL CODE	SIN SOLID NEUTRAL	SS STAINLESS STEEL	T-STAT THERMOSTAT	WI WITH	C CENTER LINE
AFG ABOVE FINISHED GRADE	BD BOARD	CTR CURRENT TRANSFORMER	EMT ELECTRICAL METALLIC TUBING	GEN GENERATOR	IMC INTERMEDIATE METAL CONDUIT	MCC MOTOR CONTROL CENTER	NEMA NATIONAL ELECTRICAL	PP POWER POLE	SSW SELECTOR SWITCH	TTC TELEPHONE TERMINAL CABINET	WG WIRE GUARD	PLATE
AFI ARC FAULT CIRCUIT	BLDG BUILDING	CU COPPER	EP ELECTRIC PNEUMATIC	HOA HANDS-OFF-AUTOMATIC SWITCH	INCAND INCANDESCENT	MDC MAIN DISTRIBUTION CENTER	MANUFACTURER'S ASSOCIATION	PAIR PAIR	SPKRS SPEAKER	TV TELEVISION	WH WATER HEATER	
INTERRUPTER	BMS BUILDING MANAGEMENT SYSTEM	DCP DOMESTIC WATER CIRCULATING	EQUIP EQUIPMENT	HOZ HORIZONTAL	IR INFRARED	MDP MAIN DISTRIBUTION PANEL	NFDS NON-FUSED SAFETY DISCONNECT SWITCH	PRI PRIMARY	SPARE SPARE	TVTC TELEVISION TERMINAL CABINET	WO WITHOUT	
AHU AIR HANDLING UNIT	C CONDUIT	DEPT DEPARTMENT	EXIST EXISTING	HOZ HORIZONTAL	J-BOX JUNCTION BOX	MFR MANUFACTURER	NIC NOT IN CONTRACT	PT POTENTIAL TRANSFORMER	SR SURFACE RACEWAY	TYP TYPICAL	WP WEATHERPROOF	
AL ALUMINUM	CAB CABINET	DET DETAIL	EXHA EXHAUST	HP HORSEPOWER	KV KILOVOLT	MFS MAIN FUSED DISCONNECT SWITCH	NL NIGHT LIGHT	PVC POLYVINYL CHLORIDE (CONDUIT)	SS STAINLESS STEEL	UC UNDER COUNTER	XFMR TRANSFORMER	
ALT ALTERNATE	CAT CATALOG	DIA DIAMETER	EXP EXPLOSION PROOF	FA FIRE ALARM	KVA KILOVOLT-AMPERE	MH MANHOLE	N.O. NORMALLY OPEN	STA STATION	UE UNDERGROUND ELECTRICAL	UG UNDERGROUND	XFR TRANSFER	
AMP AMPERE	CATV CABLE TELEVISION	DIA DIAMETER	FA FIRE ALARM	FACP FIRE ALARM CONTROL PANEL	KVAR KILOVOLT-AMPERE REACTIVE	MIC MICROPHONE	N.F. NORMAL POWER FACTOR	STD STANDARD	UG UNDERGROUND	UH UNIT HEATER	XFR TRANSFER	
AMPL AMPLIFIER	CB CIRCUIT BREAKER	DISC DISCONNECT	FABP FIRE ALARM BOOSTER POWER SUPPLY PANEL	FCU FAN COIL UNIT	KW KILOWATT	MISC MISCELLANEOUS	NTS NOT TO SCALE	SURF SURFACE MOUNTED	UT UNDERGROUND TELEPHONE	UV UNIT VENTILATOR OR ULTRAVIOLET		
ANNUN ANNUNCIATOR	CCV CLOSED CIRCUIT TELEVISION	DIST DISTRIBUTION	FCU FAN COIL UNIT	HT HEIGHT	KWH KILOWATT HOUR	MLO MAIN LUGS ONLY	OH OVERHEAD	SW SWITCH	UTILITY UTILITY	UV UNIT VENTILATOR OR ULTRAVIOLET		
APPROX APPROXIMATELY	CLG CEILING	DN DOWN	FCU FAN COIL UNIT	HT HEIGHT	LOC LOCATE OR LOCATION	MMS MANUAL MOTOR STARTER	OHD OVERHEAD DOOR	REQD REQUIRED	UTILITY UTILITY	UV UNIT VENTILATOR OR ULTRAVIOLET		
AQ-STAT AQUASTAT	COMB COMBINATION	DPR DAMPER	FCU FAN COIL UNIT	HT HEIGHT	LT LIGHT	MOA MULTIOUTLET ASSEMBLY	OL OVERLOADS	RM ROOM				
ARCH ARCHITECT, ARCHITECTURAL												

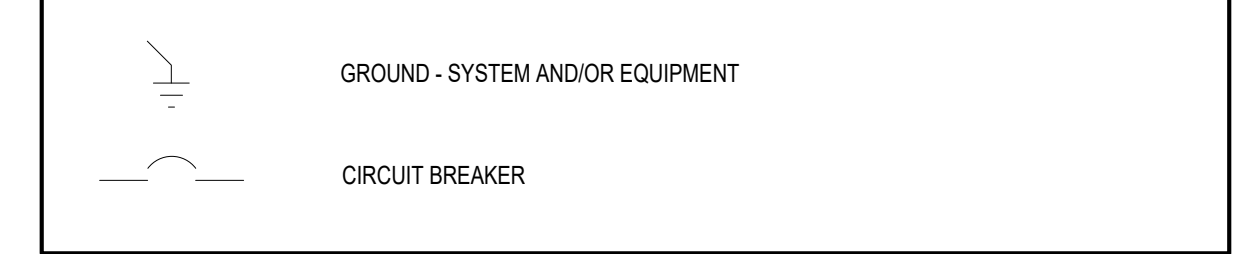
RECEPTACLE LEGEND



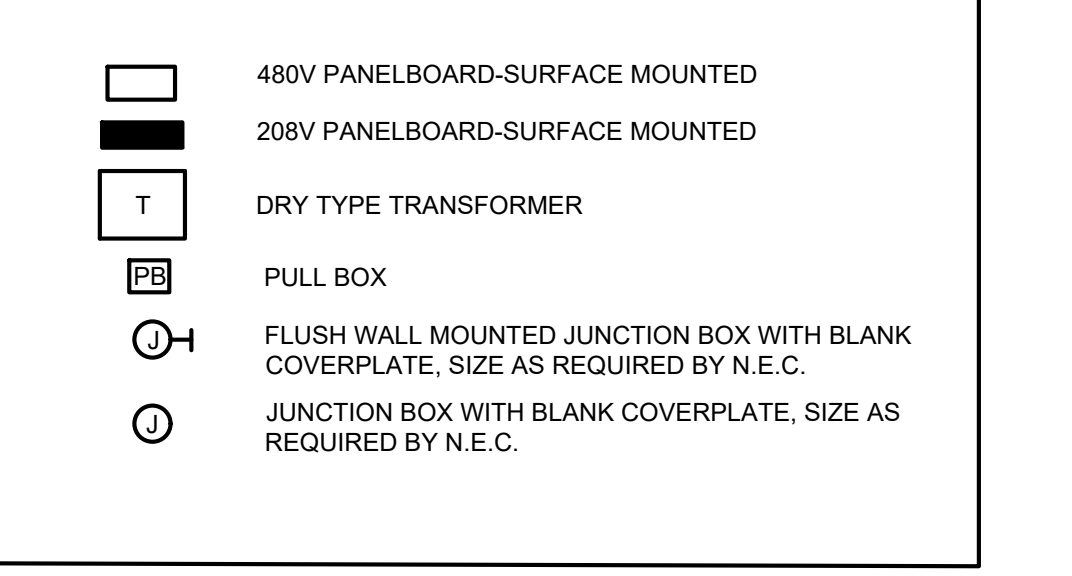
RACEWAY AND WIRING



ONE-LINE POWER DIAGRAM SYMBOLS



POWER LEGEND



PANELBOARD SCHEDULE

DESIGNATION: PPL1	S.C. RATING: 22,000 A/C	REMARKS: SERVICE ENTRANCE RATED					
LOCATION: ELECTRICAL CABINET	SERVICE: 120/240V, 1PH, 3W						
RATING: 100A	MOUNTING: SURFACE						
MAIN: 100A MCB							
CKT. NO.	LOAD DESIGNATION	CIRCUIT BREAKER	LOAD		CIRCUIT BREAKER	LOAD DESIGNATION	CKT. NO.
			A	B			
1	CABINET LIGHT & RECEPTACLE	20	1000	20	TANK MIXER	2	
3	CABINET HEATER	20	1250	20	RTU	4	
5	TANK FLOODLIGHT	20	150	20	SPARE	6	
7	SPARE	20		20		8	
9		20		20		10	
11		20		20		12	
13	SPACE	20		20	SPACE	14	
15		20		20		16	
17		20		20		18	
SUB-TOTAL			1150	1250			
TOTAL			2.40	KVA			
ESTIMATED DEMAND LOAD			2.33	KVA			
TOTAL DEMAND CURRENT			9.70	AMPS			

GENERAL ELECTRICAL NOTES

- DRAWINGS ARE DIAGRAMMATIC ONLY. THE EXACT LOCATION, MOUNTING HEIGHTS, SIZE OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED AND DETERMINED IN THE FIELD.
- ALL STRAIGHT FEEDER, BRANCH CIRCUIT AND AUXILIARY SYSTEM CONDUIT RUNS SHALL BE PROVIDED WITH SUFFICIENT PULL BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 150 FEET. EXACT SIZES OF PULL BOXES AND LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ELECTRICAL CONTRACTOR.
- THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE EQUIPMENT MANUFACTURER AS APPLICABLE AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT; THE POWER WIRING, CONTROL WIRING AND ALL ELECTRICAL CONNECTIONS AND CONDUIT TURN-UPS SHALL BE COORDINATED WITH THE RESPECTIVE CONTRACTORS BEFORE THE START OF CONSTRUCTION IN THE FIELD.
- SLEEVES ARE TO BE UTILIZED FOR PASSAGE OF CONDUITS THROUGH TANK. CONDUITS AND BOXES ARE TO BE SUPPORTED BY THE USE OF PRESET FASTENERS INSTALLED IN FLOORS, WALLS OR COLUMNS. CONDUITS AND BOXES ARE TO BE INSTALLED CONCEALED IN MASONRY WALLS AND ABOVE HUNG CEILINGS. ALL SLEEVES ARE TO BE SEALED WITH APPROVED FIRE STOPPING SEALANT.
- WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE WITH MASSACHUSETTS AMENDMENTS, MASSACHUSETTS BUILDING CODE, NFPA AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION.
- THE WORD "CONTRACTOR" AS USED IN THE "ELECTRICAL WORK" SHALL MEAN THE ELECTRICAL SUBCONTRACTOR.
- CONTRACTOR SHALL PAY FOR ALL PERMITS, INSURANCE AND TESTS, AND SHALL PROVIDE LABOR AND MATERIAL TO COMPLETE THE ELECTRICAL WORK SHOWN.
- CONTRACTOR SHALL PAY ELECTRIC UTILITY COMPANY BACKCHARGES
- CONTRACTOR SHALL PROVIDE ALL REQUIRED COORDINATION WITH ELECTRIC UTILITY.
- EXCEPT AS OTHERWISE NOTED, THE ELECTRICAL WORK SHALL INCLUDE PANELBOARDS, CIRCUIT BREAKERS, FEEDERS, WIRING, RACEWAYS, DEVICES, SAFETY SWITCHES, CONNECTION NECESSARY TO OPERATE MOTORS AND OTHER EQUIPMENT.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY LIGHTING AND POWER AND THE GENERAL CONTRACTOR SHALL PAY ALL ENERGY CHARGES FOR TEMPORARY POWER AND LIGHTING.
- DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK NEAT, CLEAN AND ORDERLY.
- ALL SYSTEMS SHALL BE TESTED FOR SHORT CIRCUIT AND GROUNDS PRIOR TO ENERGIZING AND ANY DEFECTS SHALL BE CORRECTED.
- ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL WORK SHALL BE INCLUDED AS PART OF THIS SECTION.
- COMPLETE SHOP DRAWINGS SHALL BE SUBMITTED FOR ELECTRICAL EQUIPMENT. WHERE SPECIFIED ELECTRICAL EQUIPMENT IS SUBSTITUTED, THE ELECTRICAL CONTRACTOR SHALL SUBMIT COMPLETE SPECIFICATIONS ON THE SUBSTITUTE AS WELL AS THE ITEM ORIGINALLY SPECIFIED.
- MATERIALS SHALL BE SPECIFICATION GRADE AND UL LISTED.
- WHERE MATERIAL IS CALLED OUT IN THE LEGEND BY MANUFACTURER, TYPE OR CATALOG NUMBER, SUCH DESIGNATIONS ARE TO ESTABLISH STANDARDS OR DESIRED QUALITY. ACCEPTANCE OR REJECTIONS OF PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER.
- WORK SHALL BE COORDINATED WITH THAT OF OTHER TRADES TO ELIMINATE INTERFERENCES.
- ELECTRICAL WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION.
- WORK SHALL BE GROUNDED IN ACCORDANCE WITH CODE REQUIREMENTS. COMPLETE EQUIPMENT (INSULATED GREEN WIRE) GROUNDING SYSTEM SHALL BE INSTALLED.
- WIRING METHODS:
A. EXTERIOR UNDERGROUND FEEDERS SHALL BE PVC SCHEDULE 80 FOR DIRECT BURIED AND PVC SCHEDULE 40 FOR CONCRETE ENCASED.
B. EXTERIOR ABOVE GRADE FEEDERS SHALL BE RGS CONDUIT.
C. EQUIPMENT CONNECTIONS SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT.
- CONDUIT PASSING THROUGH FIRE RATED WALLS AND FLOORS SHALL BE PROVIDED WITH ALL NECESSARY MATERIALS TO ENSURE THAT THE FIRE RATED INTEGRITY IS MAINTAINED.
- CONTRACTOR SHALL CHECK EXISTING CONDITIONS TO DETERMINE EXACT EXTENT OF WORK TO BE PERFORMED PRIOR TO BIDDING. DIMENSIONS RELEVANT TO EXISTING WORK SHALL BE VERIFIED IN THE FIELD.
- ELECTRICAL CONTRACTOR SHALL PROVIDE AS-BUILT "CADD" DRAWINGS AT THE COMPLETION OF THE PROJECT.
- ELECTRICAL CONTRACTOR SHALL LABEL ALL ELECTRICAL DEVICES INCLUDING BUT NOT LIMITED TO:
A. RECEPTACLES - PANEL NAME AND CIRCUIT DESIGNATION
B. DISCONNECTS - PANEL NAME, CIRCUIT DESIGNATION AND EQUIPMENT SERVING.
C. THERMAL MOTOR SWITCHES - PANEL NAME, CIRCUIT DESIGNATION AND EQUIPMENT SERVING.
D. ENCLOSED CIRCUIT BREAKERS - PANEL NAME, CIRCUIT DESIGNATION AND EQUIPMENT SERVING.
E. PANELBOARDS - PANEL NAME, VOLTAGE, AMPERAGE, PHASE AS WELL AS PANEL AND CIRCUIT IT IS FED FROM.
F. CONTROL PANEL - PANEL NAME AND CIRCUIT DESIGNATION
G. JUNCTION BOXES - PANEL NAME AND CIRCUIT DESIGNATION
- ADDRESS QUESTIONS TO THE ENGINEER IN WRITING BEFORE AWARD OF CONTRACT, OTHERWISE ENGINEER INTERPRETATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.

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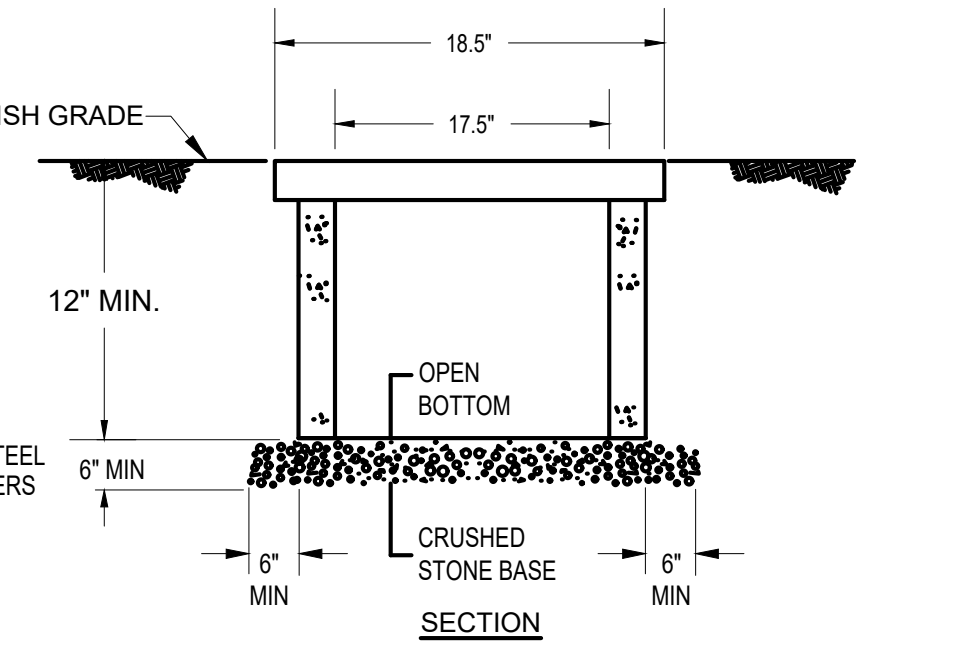
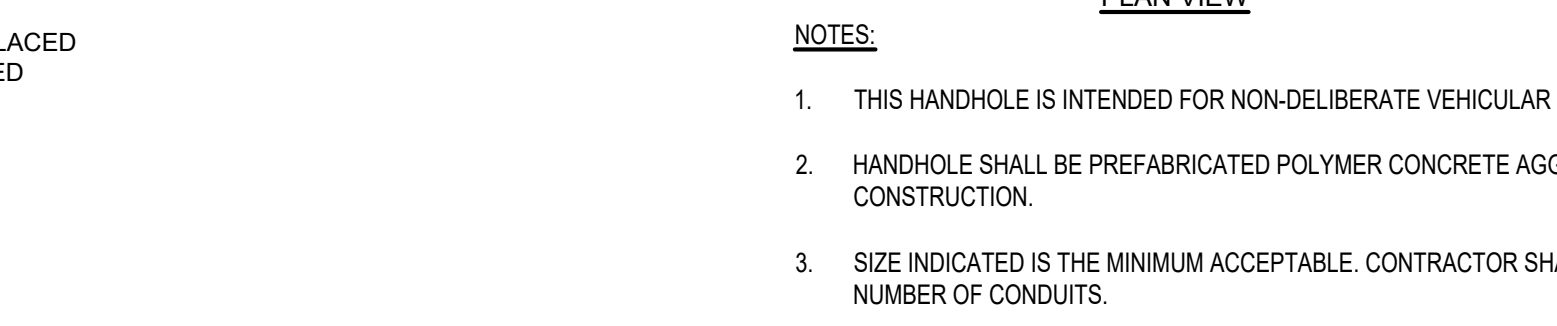
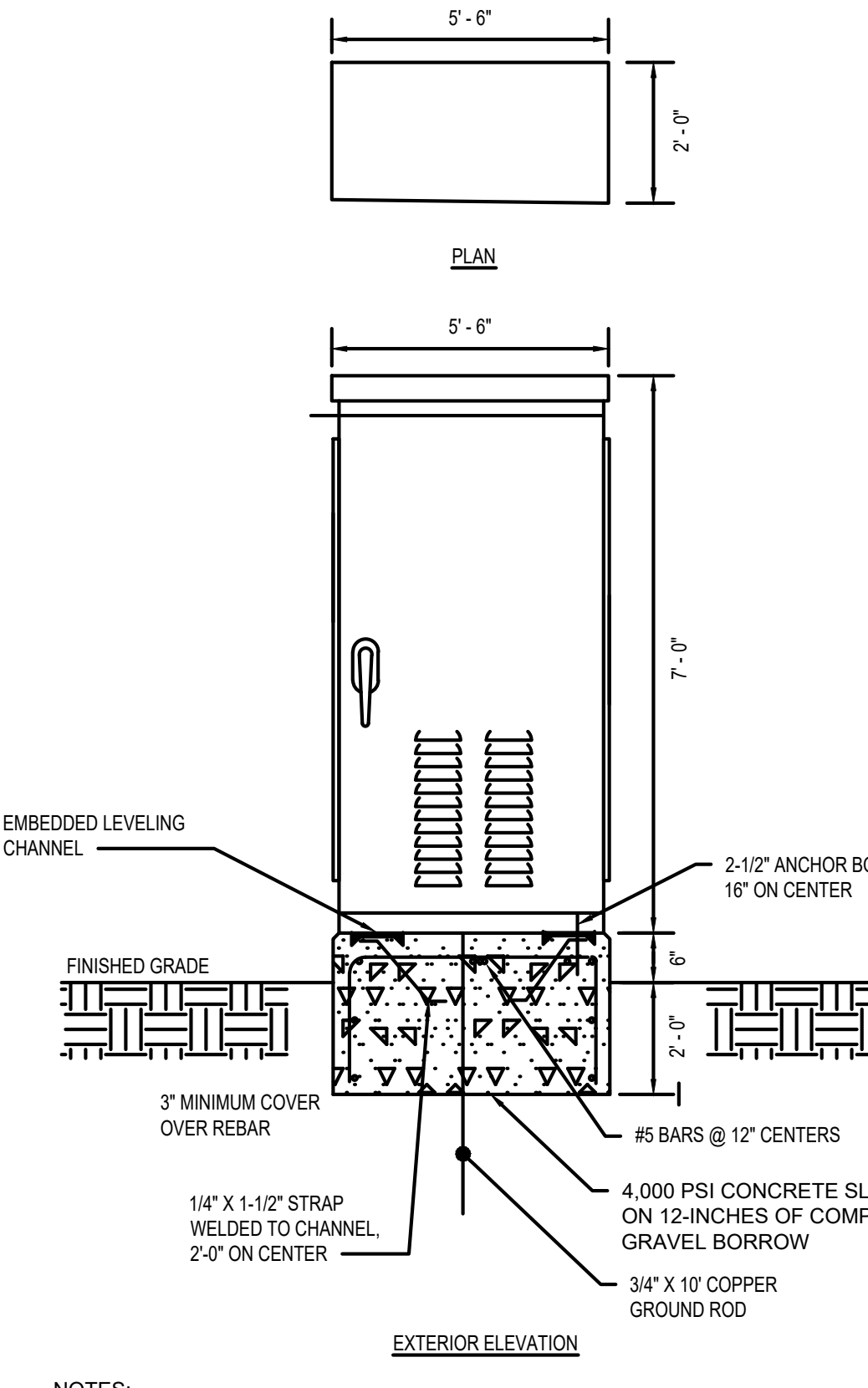
Drawing Title:

ELECTRICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES

Sheet Number:

E001

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NOTES:

- CONTRACTOR SHALL COORDINATE THE EXACT CABINET SIZE WITH ALL MANUFACTURER EQUIPMENT SIZES PRIOR TO SUBMITTING THE CABINET FOR APPROVAL. PROVIDE A SCALED DRAWING SHOWING ALL EQUIPMENT.

NOTES:

- THIS HANDHOLE IS INTENDED FOR NON-DELIBERATE VEHICULAR TRAFFIC ONLY.
- HANDHOLE SHALL BE PREFABRICATED POLYMER CONCRETE AGGREGATE EQUAL TO QUARTZITE OR EQUAL PRE CAST CONCRETE CONSTRUCTION.
- SIZE INDICATED IS THE MINIMUM ACCEPTABLE. CONTRACTOR SHALL COORDINATE EXACT SIZE REQUIRED BASED ON THE APPLICABLE NUMBER OF CONDUITS.

(TYP) REINFORCEMENT - BY GENERAL CONTRACTOR #5 @ 6" T&B

#5 @ 18" OC T&B

CONDUIT (TYP)

PLASTIC CONDUIT SPACERS

FINISHED GRADE

SUB BASE OF SURFACE

POLYETHYLENE WARNING TAPE FULL LENGTH OF DUCT BANK - BY GENERAL CONTRACTOR

COMMON FILL - BY GENERAL CONTRACTOR

7.5" SPACING

3" COVER ALL AROUND

7.5" SPACING

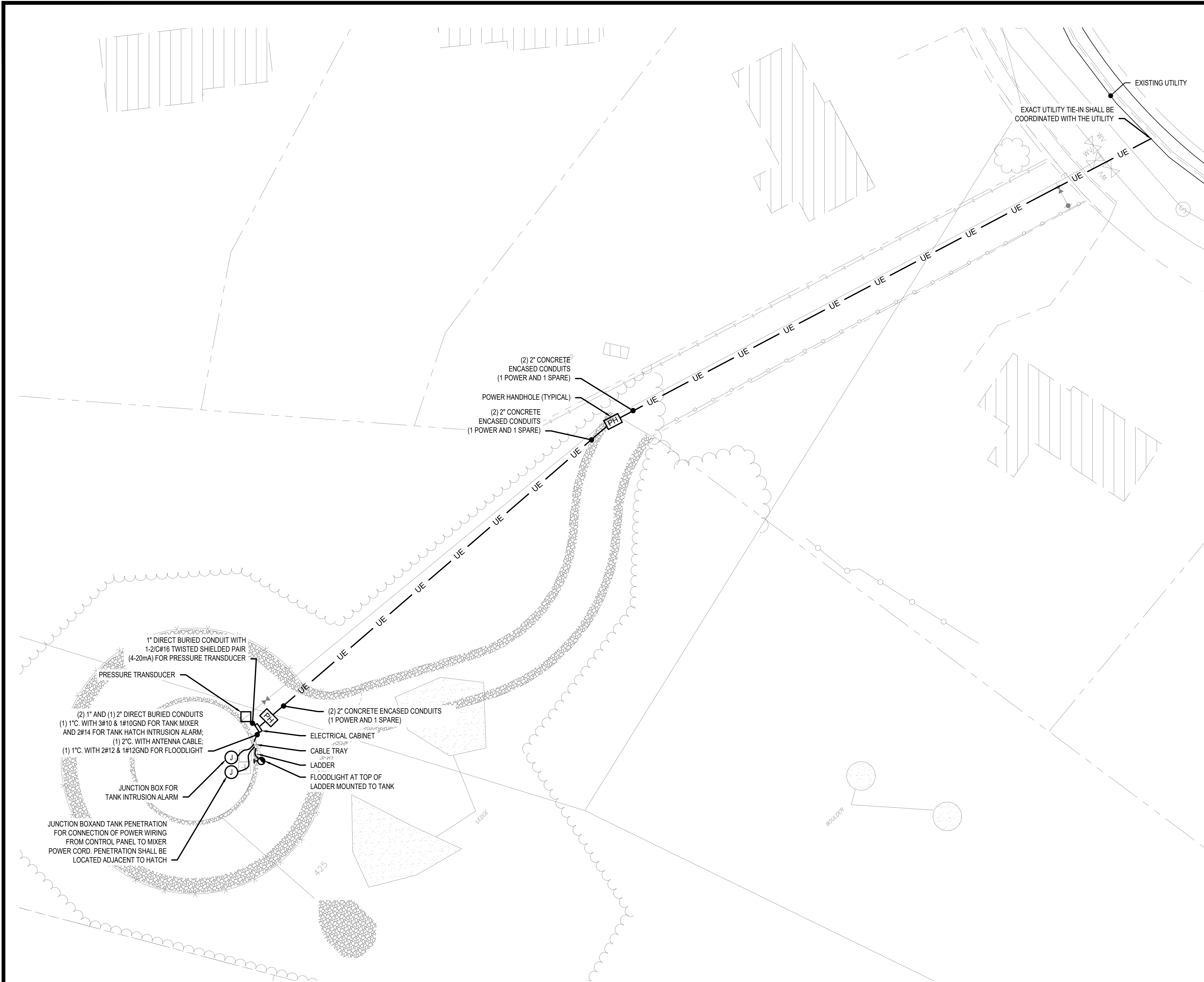
CONCRETE DUCT ENCASEMENT - BY GENERAL CONTRACTOR

3/4" SCREENED GRAVEL OR CRUSHED STONE BASE - BY GENERAL CONTRACTOR

PAD MOUNTED 1-DOOR NEMA 3R/4X ELECTRICAL CABINET DETAIL

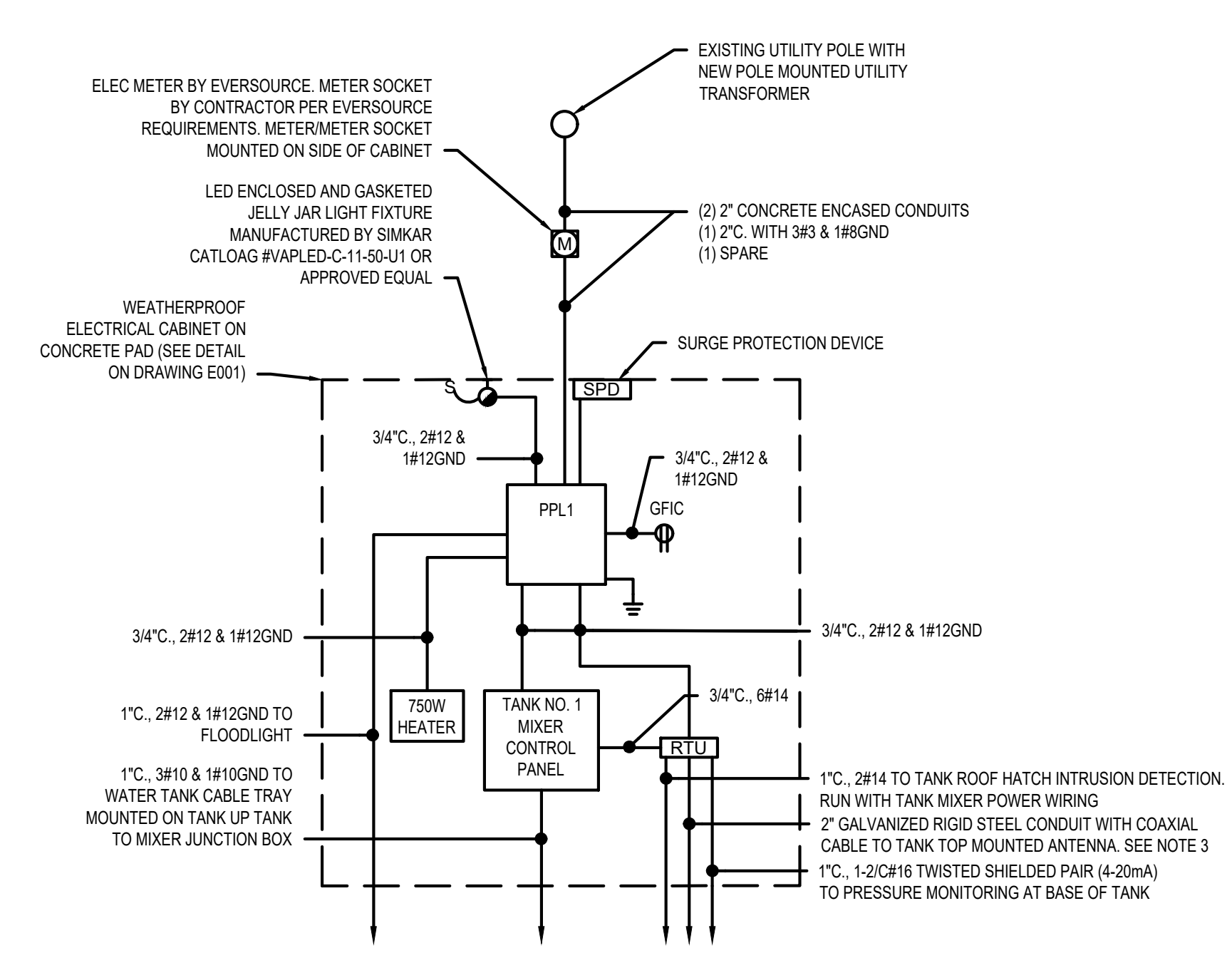
PREFABRICATED HANDHOLE "HH" DETAIL

TYPICAL 2x2 CONCRETE ENCASED DUCT BANK DETAIL



1 ELECTRICAL SITE PLAN
 SCALE: 1" = 20'-0"

 SCALE: 1" = 20'



2 ONE LINE DIAGRAM
 NOT TO SCALE

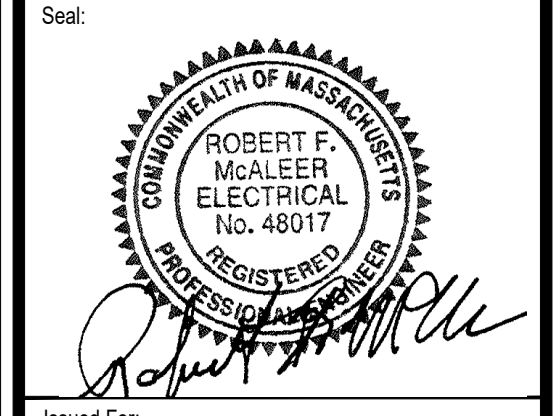
- DRAWING NOTES:**
- REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS, GENERAL NOTES AND DETAILS.
 - WIRING SHALL RUN IN CABLE TRAY UP TANK (HEIGHT OF TANK IS APPROXIMATELY 92'). WIRING SHALL BE SUPPORTED AS REQUIRED PER THE 2023 NATIONAL ELECTRICAL CODE WITH MASSACHUSETTS AMENDMENTS.
 - CONTRACTOR SHALL COORDINATE ANTENNA MOUNTING WITH ANTENNA CONTRACTOR AS WELL AS THE TANK MANUFACTURER. ANTENNA WIRING, SURGE PROTECTOR AND CONNECTORS SHALL BE FURNISHED BY OTHERS. INSTALLED AND WIRED BY THIS CONTRACTOR. FINAL CONNECTIONS WITHIN THE ELECTRICAL CABINET SHALL BE BY OTHERS. MOUNTING SUPPORT ON TANK TOP SHALL BE FURNISHED AND INSTALLED BY OTHERS. SEE SPECIFICATIONS SECTION 13460 FOR COORDINATION.

Consultants:

Revisions:

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 Seal:



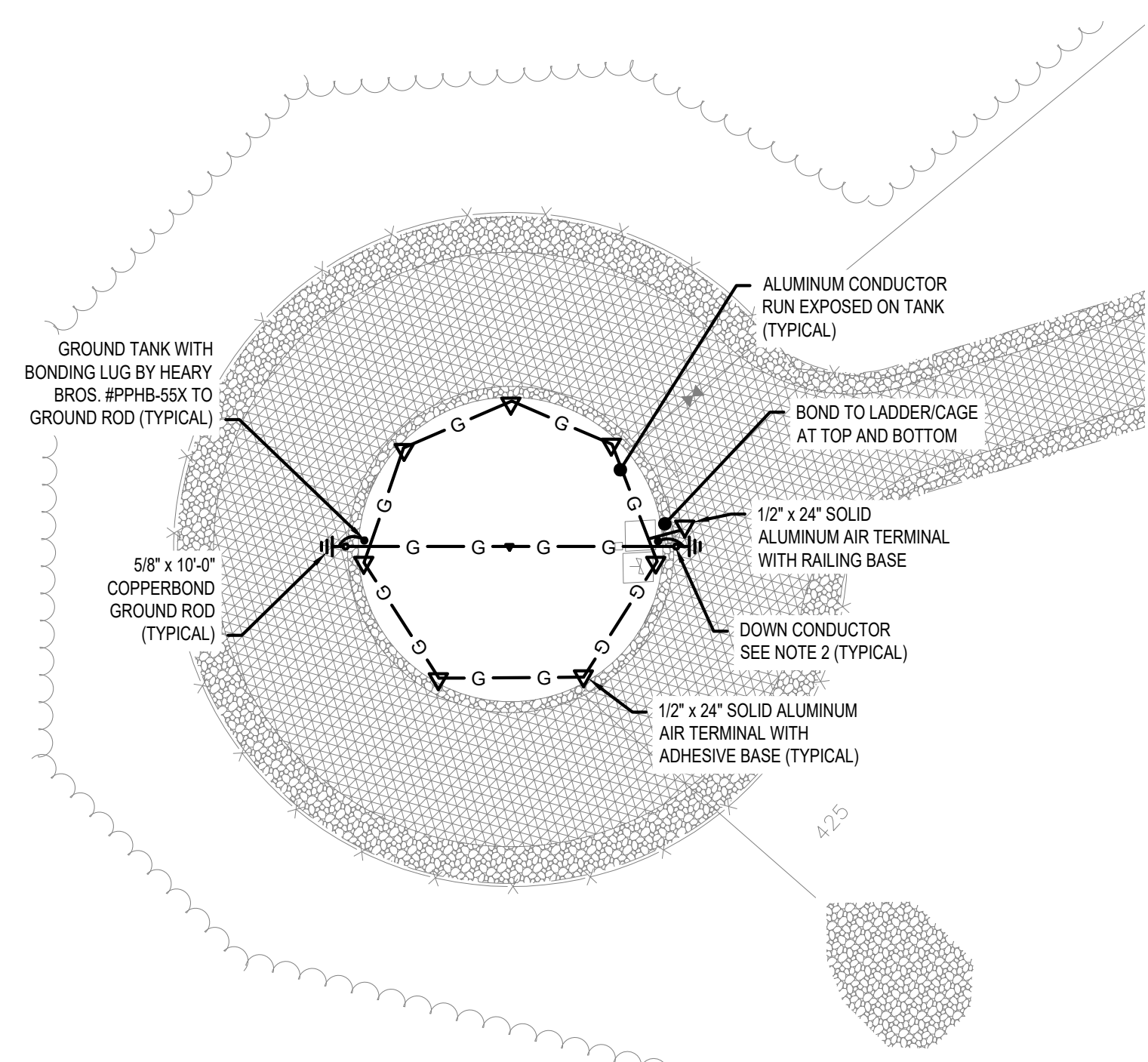
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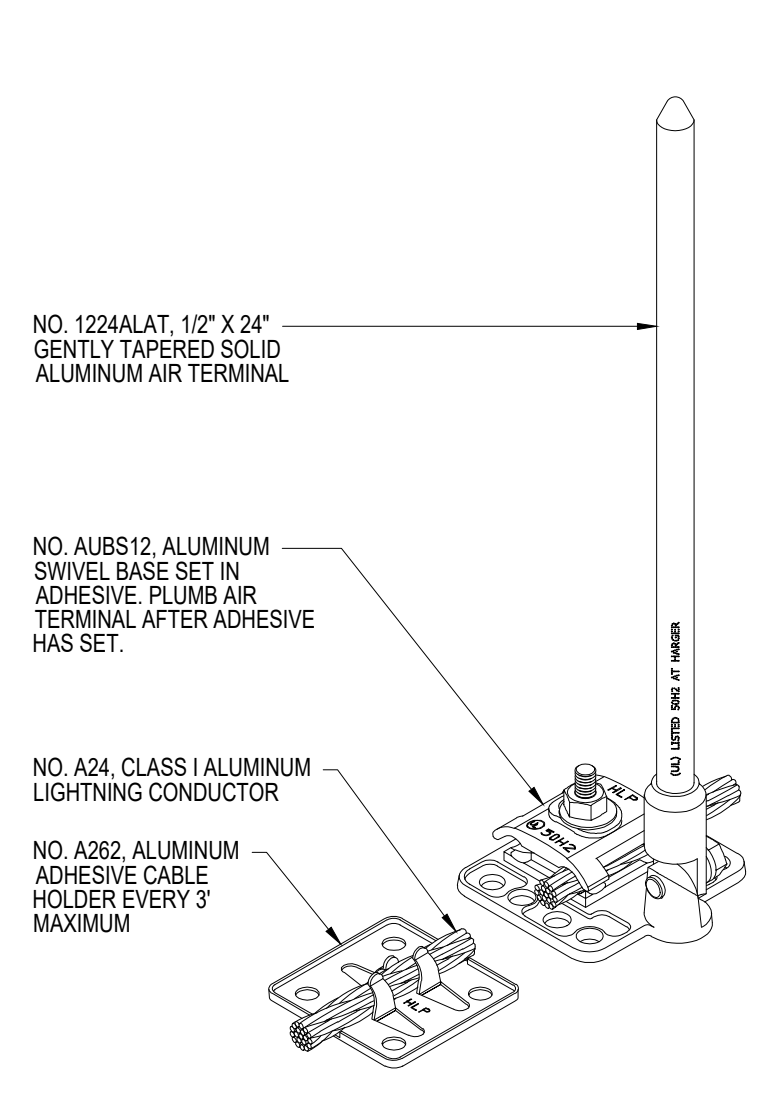
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WATER STORAGE TANK ELECTRICAL SITE PLAN

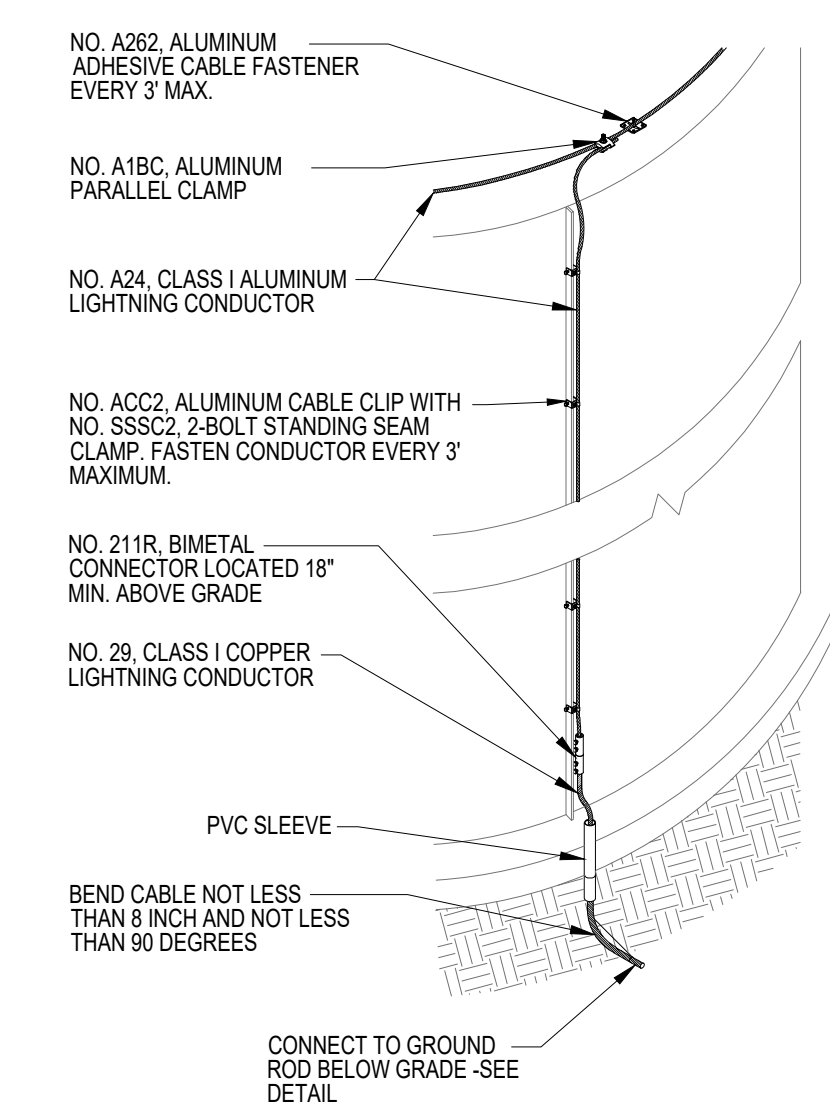
Sheet Number:
E101



1 LIGHTNING PROTECTION PLAN (REFER TO DRAWING NOTE 2)
 SCALE: 1" = 20'-0"
 0' 10' 20' 40'
 SCALE: 1" = 20'



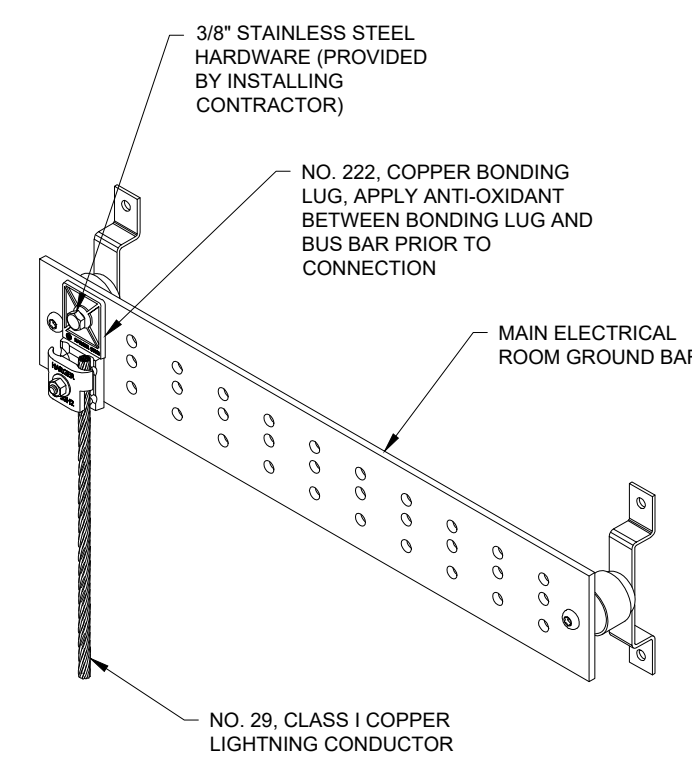
2 AIR TERMINAL DETAIL
 NOT TO SCALE



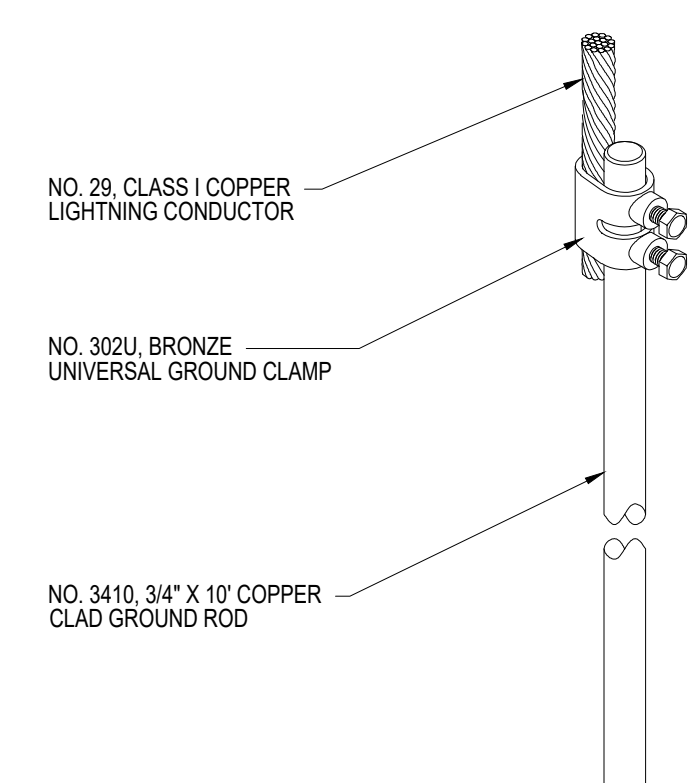
3 DOWN CONDUCTOR DETAIL
 NOT TO SCALE

GENERAL SYSTEM NOTES

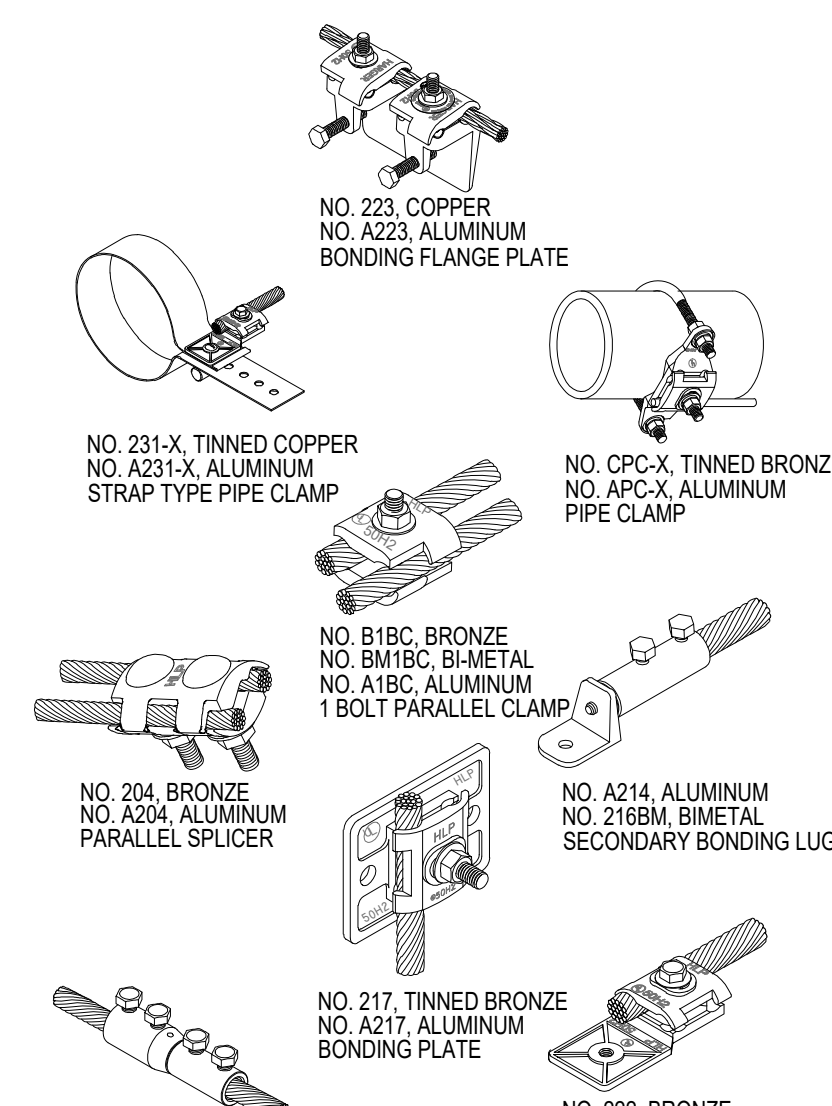
1. THE COMPLETED INSTALLATION SHALL MEET THE "INSTALLATION REQUIREMENTS FOR LIGHTNING PROTECTION SYSTEMS, UL 96A" OF UNDERWRITERS LABORATORIES INC.
2. THE COMPLETED INSTALLATION SHALL BE CERTIFIED BY UNDERWRITERS LABORATORIES (UL) WITH A "MASTER LABEL CERTIFICATE" OR "LETTER OF FINDINGS" COMPLIANT WITH UL 96A (CURRENT EDITION).
3. ALL CONDUCTIVE SERVICES (ELECTRICAL COMMUNICATIONS, ETC.) AND BURIED METALLIC PIPING (WATER, FIRE, SANITARY, STORM, ETC.) WHICH ENTERS THE PROTECTED BUILDING SHALL BE BONDED TO THE LIGHTNING PROTECTION SYSTEM WITHIN 12 FT (3.6M) OF GRADE.
4. THE LIGHTNING PROTECTION SYSTEM REQUIRES A SURGE PROTECTION DEVICE TO BE INSTALLED ON EACH ELECTRIC SERVICE ENTRANCE. THESE SURGE PROTECTION DEVICES MUST BE A TYPE 1 OR TYPE 2 SURGE PROTECTION DEVICE THAT IS LISTED TO COMPLY WITH UL 1449, 4TH EDITION AND HAVE A NOMINAL DISCHARGE CURRENT (IN) OF 20KA PER PHASE.
5. THE LIGHTNING PROTECTION SYSTEM REQUIRES A SURGE PROTECTION DEVICE TO BE INSTALLED ON EACH CONDUCTIVE SIGNAL, DATA AND COMMUNICATION LINE. THESE SURGE PROTECTION DEVICES SHALL BE LISTED TO COMPLY WITH UL-462 "THE STANDARD FOR ANTENNA-DISCHARGE UNITS"; UL-497 "THE STANDARD FOR PROTECTORS FOR PAIRED-CONDUCTOR COMMUNICATIONS CIRCUITS" OR UL-497C "THE STANDARD FOR PROTECTORS FOR COAXIAL COMMUNICATIONS CIRCUITS" AND HAVE A 10 KA MAXIMUM DISCHARGE CURRENT (MAX) WHEN INSTALLED AT THE ENTRANCE.
6. FASTENING METHOD OF THE AIR TERMINAL BASES AND CONDUCTOR SHALL BE COMPATIBLE WITH THE ROOFING MATERIALS. ROOFING CONTRACTOR SHALL PROVIDE WRITTEN APPROVAL INDICATING ACCEPTANCE OF PROPOSED METHOD OR WRITTEN REQUIREMENTS FOR A FASTENING METHOD WHICH WILL NOT VOID THE ROOFING WARRANTY.
7. ROOF PADS, PAVERS, FLASHING OR ANY OTHER SPECIAL ROOFING MATERIALS REQUIRED FOR THE INSTALLATION OF THE LIGHTNING PROTECTION SYSTEM SHALL BE FURNISHED AND INSTALLED BY THE ROOFING CONTRACTOR.
8. STRIKE TERMINATION DEVICES SHALL BE PLACED ON RIDGES OF PITCHED ROOFS AND AROUND THE PERIMETER OF FLAT OR GENTLY SLOPING ROOFS AT INTERVALS NOT EXCEEDING 20 FT (6 M). STRIKE TERMINATION DEVICES 24 IN. (610 MM) OR MORE ABOVE THE OBJECT OR AREA TO BE PROTECTED SHALL BE PERMITTED TO BE PLACED AT INTERVALS NOT EXCEEDING 25 FT (7.6 M).
9. MAIN CONDUCTORS SHALL INTERCONNECT ALL STRIKE TERMINATION DEVICES AND SHALL HAVE A DOWNWARD OR HORIZONTAL PATH TO GROUND. CONDUCTORS ARE ALLOWED TO RISE, PROVIDED A 3:12 (1/4) SLOPE IS MAINTAINED. ALL BENDS IN THE CONDUCTOR SHALL HAVE A MINIMUM RADIUS OF 8 IN. (200 MM) NOR SHALL THE BEND HAVE AN INCLUDED ANGLE OF LESS THAN 90 DEGREES.
10. THE TIP OF A STRIKE TERMINATION DEVICE SHALL NOT BE LESS THAN 10 IN. (250 MM) ABOVE THE OBJECT OR AREA



4 ELECTRICAL SERVICE BONDING
 NOT TO SCALE



5 GROUND ROD DETAIL
 NOT TO SCALE



6 BONDING/SPLICING DETAILS
 NOT TO SCALE

- DRAWING NOTES:**
1. REFER TO DRAWING E001 FOR LEGEND, ABBREVIATIONS, GENERAL NOTES AND DETAILS

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Drawing Title: **WATER STORAGE TANK LIGHTNING PROTECTION PLAN**

Sheet Number: **E102**