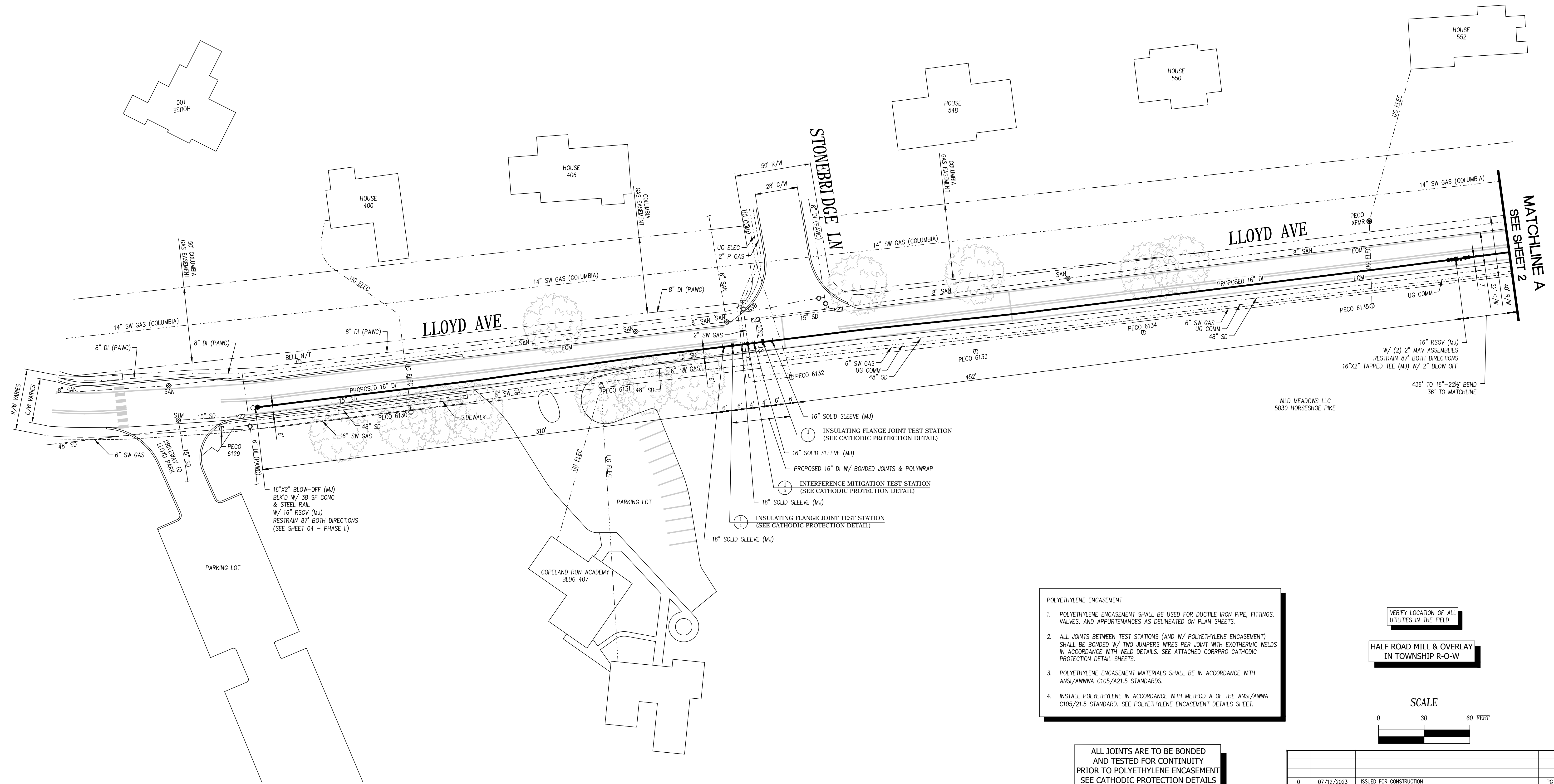


ALL TIE-INS TO BE BLOCKED AND RESTRAINED  
 FOR BLOCKING AND RESTRAINING TABLE SEE SHEET 11  
 PROJECT PRESSURE 250 PSI



16"x2" BLOW-OFF (MJ)  
 BLK'D W/ 38 SF CONC  
 & STEEL RAIL  
 W/ 16" RSCV (MJ)  
 RESTRAIN 87' BOTH DIRECTIONS  
 (SEE SHEET 04 - PHASE II)

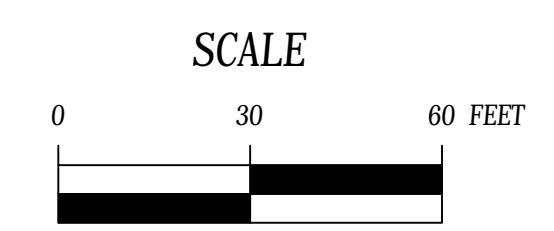
16" RSCV (MJ)  
 W/ (2) 2" MAY ASSEMBLIES  
 RESTRAIN 87' BOTH DIRECTIONS  
 16"x2" TAPPED TEE (MJ) W/ 2" BLOW OFF  
 436' TO 16"-22 1/2" BEND  
 36' TO MATCHLINE

**POLYETHYLENE ENCASUREMENT**

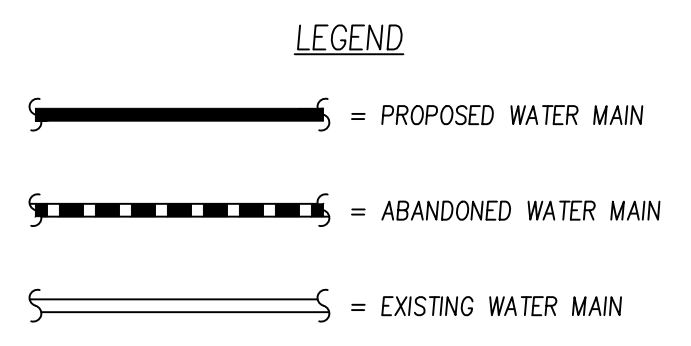
- POLYETHYLENE ENCASUREMENT SHALL BE USED FOR DUCTILE IRON PIPE, FITTINGS, VALVES, AND APPURTENANCES AS DELINEATED ON PLAN SHEETS.
- ALL JOINTS BETWEEN TEST STATIONS (AND W/ POLYETHYLENE ENCASUREMENT) SHALL BE BONDED W/ TWO JUMPERS WIRES PER JOINT WITH EXOTHERMIC WELDS IN ACCORDANCE WITH WELD DETAILS. SEE ATTACHED CORRPRO CATHODIC PROTECTION DETAIL SHEETS.
- POLYETHYLENE ENCASUREMENT MATERIALS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C105/A21.5 STANDARDS.
- INSTALL POLYETHYLENE IN ACCORDANCE WITH METHOD A OF THE ANSI/AWWA C105/21.5 STANDARD. SEE POLYETHYLENE ENCASUREMENT DETAILS SHEET.

VERIFY LOCATION OF ALL UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY IN TOWNSHIP R-O-W



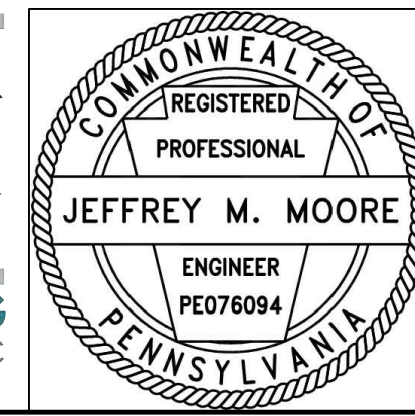
ALL JOINTS ARE TO BE BONDED AND TESTED FOR CONTINUITY PRIOR TO POLYETHYLENE ENCASUREMENT SEE CATHODIC PROTECTION DETAILS



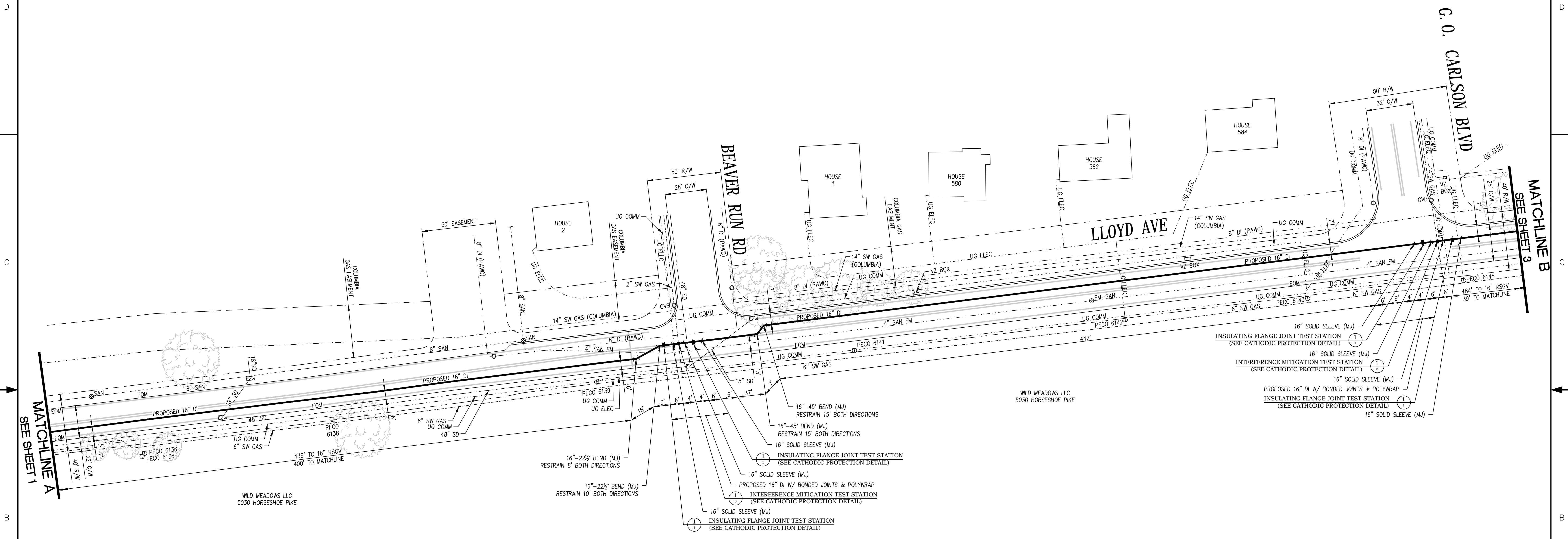
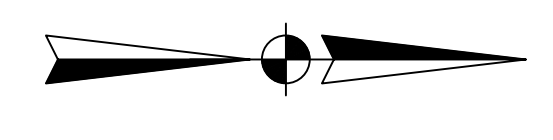
NO	DATE	REVISION	INTL
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0	07/12/2023	DESIGN COMPLETION	PG

AQUA PENNSYLVANIA, INCORPORATED  
 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010  
**PROJECT PLAN FOR:  
 LLOYD AVENUE PHASE III PROJECT**  
 LLOYD AVE  
 CALN TWP, CHESTER COUNTY

DRAWN BY: CR    CHK'D BY: JMM    EXT No: 20133-G  
 DATE: 11/08/2021    SCALE: 1"=30'    PLATE: PP23, PP24  
 PROJECT No: 219.23    ACTIVITY No: 300002328  
 APPROVED: *Jeffrey M. Moore*    **A - 67659**  
 SHEET 1 OF 12



ALL TIE-INS TO BE BLOCKED AND RESTRAINED  
 FOR BLOCKING AND RESTRAINING TABLE SEE SHEET 11  
 PROJECT PRESSURE 250 PSI



MATCHLINE A  
 SEE SHEET 1

MATCHLINE B  
 SEE SHEET 3

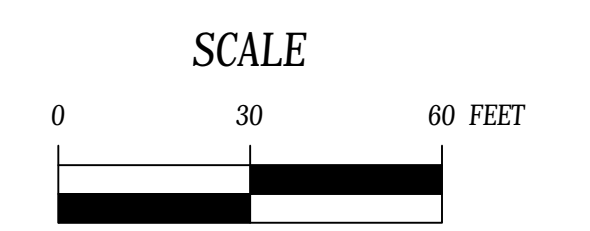
WILD MEADOWS LLC  
 5030 HORSESHOE PIKE

WILD MEADOWS LLC  
 5030 HORSESHOE PIKE

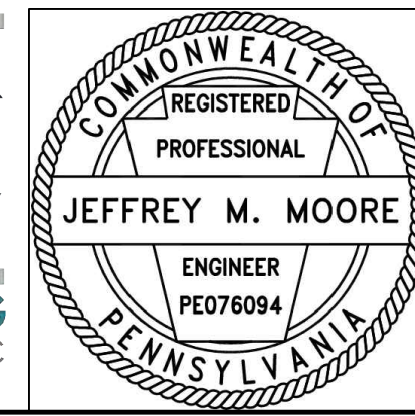
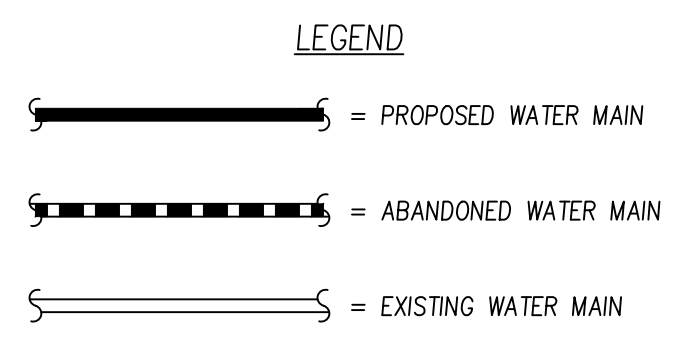
- POLYETHYLENE ENCASEMENT**
- POLYETHYLENE ENCASEMENT SHALL BE USED FOR DUCTILE IRON PIPE, FITTINGS, VALVES, AND APPURTENANCES AS DELINEATED ON PLAN SHEETS.
  - ALL JOINTS BETWEEN TEST STATIONS (AND W/ POLYETHYLENE ENCASEMENT) SHALL BE BONDED W/ TWO JUMPERS WIRES PER JOINT WITH EXOTHERMIC WELDS IN ACCORDANCE WITH WELD DETAILS. SEE ATTACHED CORRPRO CATHODIC PROTECTION DETAIL SHEETS.
  - POLYETHYLENE ENCASEMENT MATERIALS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C105/A21.5 STANDARDS.
  - INSTALL POLYETHYLENE IN ACCORDANCE WITH METHOD A OF THE ANSI/AWWA C105/A21.5 STANDARD. SEE POLYETHYLENE ENCASEMENT DETAILS SHEET.

VERIFY LOCATION OF ALL UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY IN TOWNSHIP R-O-W



ALL JOINTS ARE TO BE BONDED AND TESTED FOR CONTINUITY PRIOR TO POLYETHYLENE ENCASEMENT SEE CATHODIC PROTECTION DETAILS



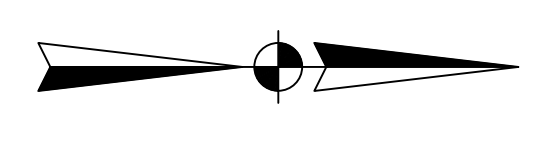
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0	07/12/2023	DESIGN COMPLETION	PG

AQUA PENNSYLVANIA, INCORPORATED  
 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

**PROJECT PLAN FOR:  
 LLOYD AVENUE PHASE III PROJECT**  
 LLOYD AVE  
 CALN TWP, CHESTER COUNTY

DRAWN BY:	CR	CHK'D BY:	JMM	EXT No:	20133-G
DATE:	11/08/2021	SCALE:	1"=30'	PLATE:	PP23, PP24
PROJECT No:	219.23	ACTIVITY No:	300002328	<b>A - 67659</b>	
APPROVED	<i>Jeffrey M. Moore</i>			SHEET 2 OF 12	

CM# 36423 WO# 300002328



ALL TIE-INS TO BE BLOCKED AND RESTRAINED  
 FOR BLOCKING AND RESTRAINING TABLE SEE SHEET 11  
 PROJECT PRESSURE 250 PSI

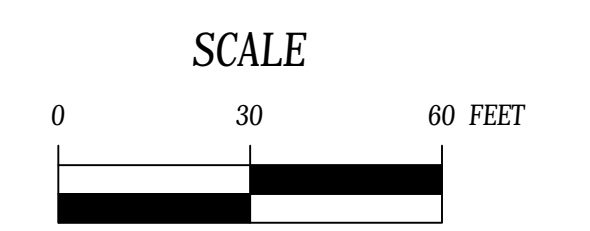


**LEGEND**

- = PROPOSED WATER MAIN
- = ABANDONED WATER MAIN
- = EXISTING WATER MAIN

VERIFY LOCATION OF ALL UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY IN TOWNSHIP R-O-W

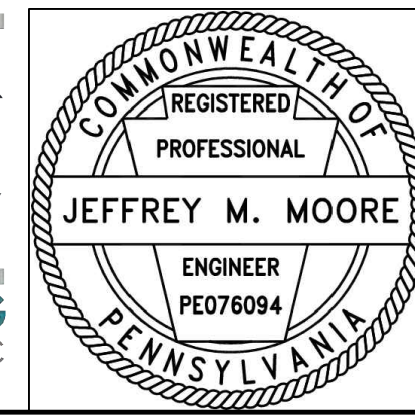


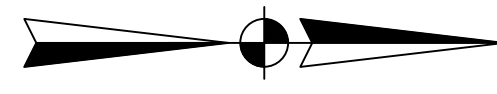
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0	07/12/2023	DESIGN COMPLETION	PG

AQUA PENNSYLVANIA, INCORPORATED  
 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

**PROJECT PLAN FOR:  
 LLOYD AVENUE PHASE III PROJECT**  
 LLOYD AVE  
 CALN TWP, CHESTER COUNTY

DRAWN BY: CR    CHK'D BY: JMM    EXT No: 20133-G  
 DATE: 11/08/2021    SCALE: 1"=30'    PLATE: PP23, PP24  
 PROJECT No: 219.23    ACTIVITY No: 300002328    **A - 67659**  
 APPROVED: *Jeffrey M. Moore*    SHEET 3 OF 12

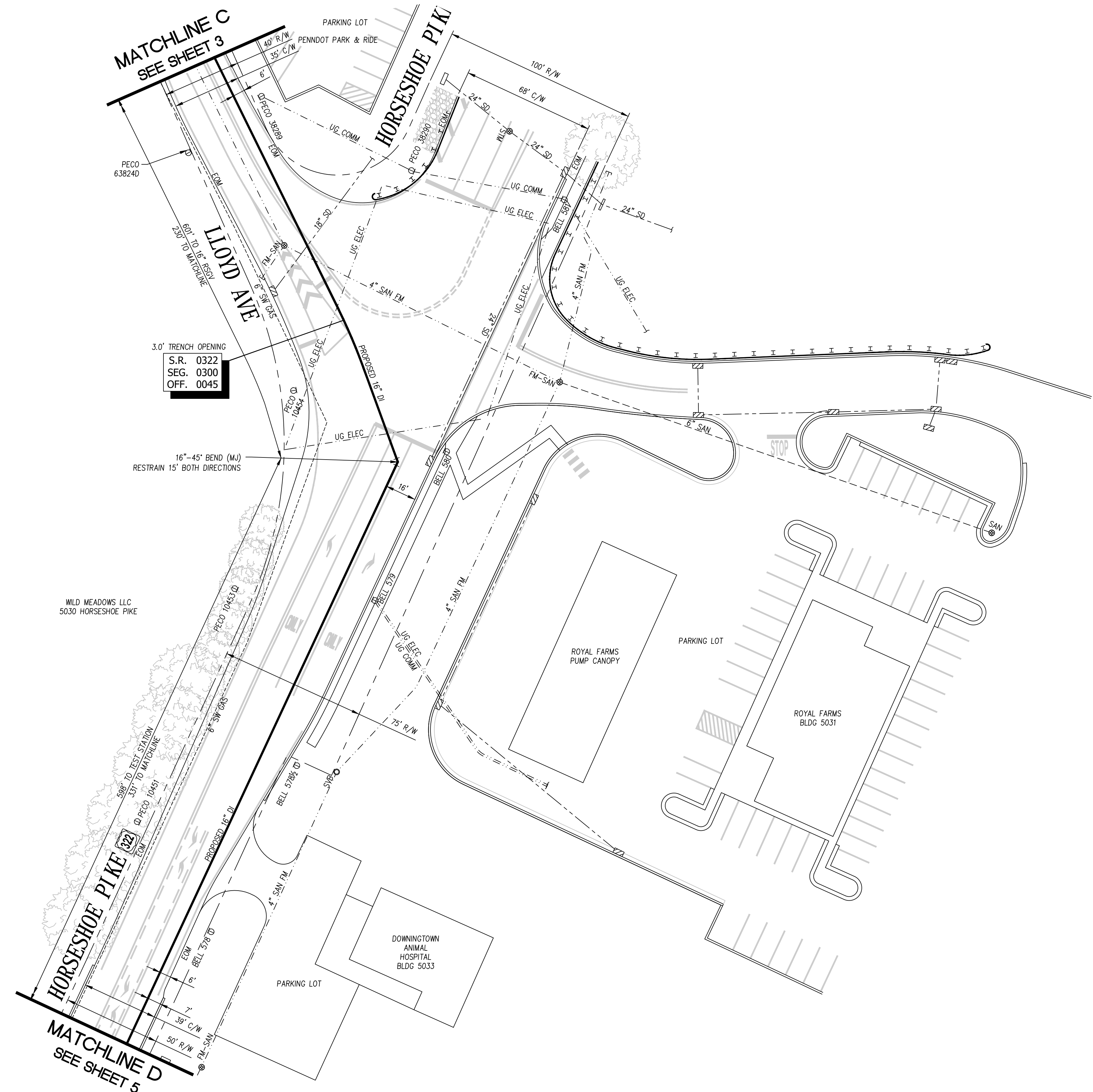




ALL TIE-INS TO BE BLOCKED  
AND RESTRAINED

FOR BLOCKING AND  
RESTRAINING TABLE  
SEE SHEET 11

PROJECT PRESSURE  
250 PSI



3.0' TRENCH OPENING  
S.R. 0322  
SEG. 0300  
OFF. 0045

16"-45° BEND (MJ)  
RESTRAIN 15' BOTH DIRECTIONS

WILD MEADOWS LLC  
5030 HORSESHOE PIKE

ROYAL FARMS  
PUMP CANOPY

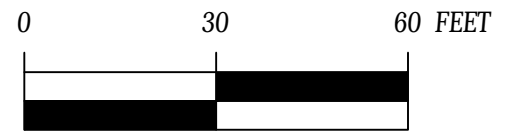
ROYAL FARMS  
BLDG 5031

DOWNTOWN  
ANIMAL  
HOSPITAL  
BLDG 5033

VERIFY LOCATION OF ALL  
UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY  
IN TOWNSHIP R-O-W

SCALE



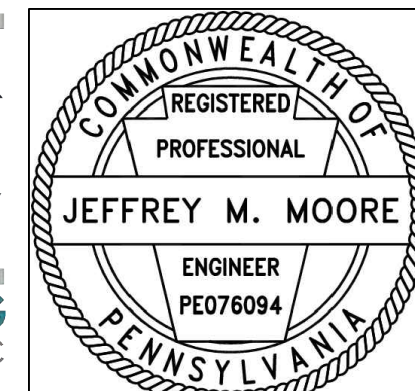
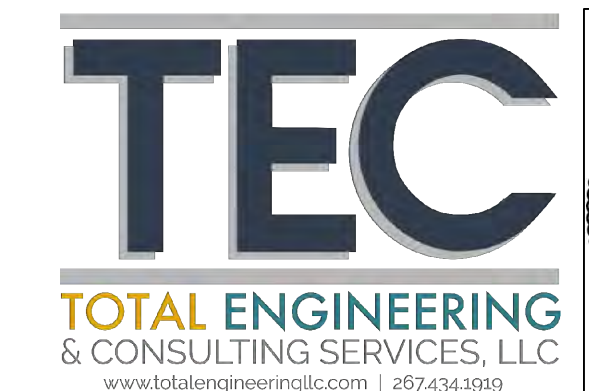
- LEGEND**
- = PROPOSED WATER MAIN
  - = ABANDONED WATER MAIN
  - = EXISTING WATER MAIN

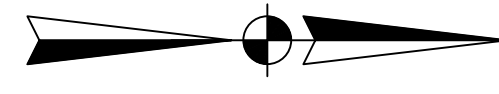
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0	07/12/2023	DESIGN COMPLETION	PG

AQUA PENNSYLVANIA, INCORPORATED  
762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

PROJECT PLAN FOR:  
**LLOYD AVENUE PHASE III PROJECT**  
LLOYD AVE & MANOR AVE (SR 0322)  
CALN TWP, CHESTER COUNTY

DRAWN BY: CR	CHK'D BY: JMM	EXT No: 20133-G
DATE: 11/08/2021	SCALE: 1"=30'	PLATE: PP23, PP24
PROJECT No: 219.23	ACTIVITY No: 300002328	<b>A - 67659</b>
APPROVED: <i>Jeffrey M. Moore</i>		SHEET 4 OF 12





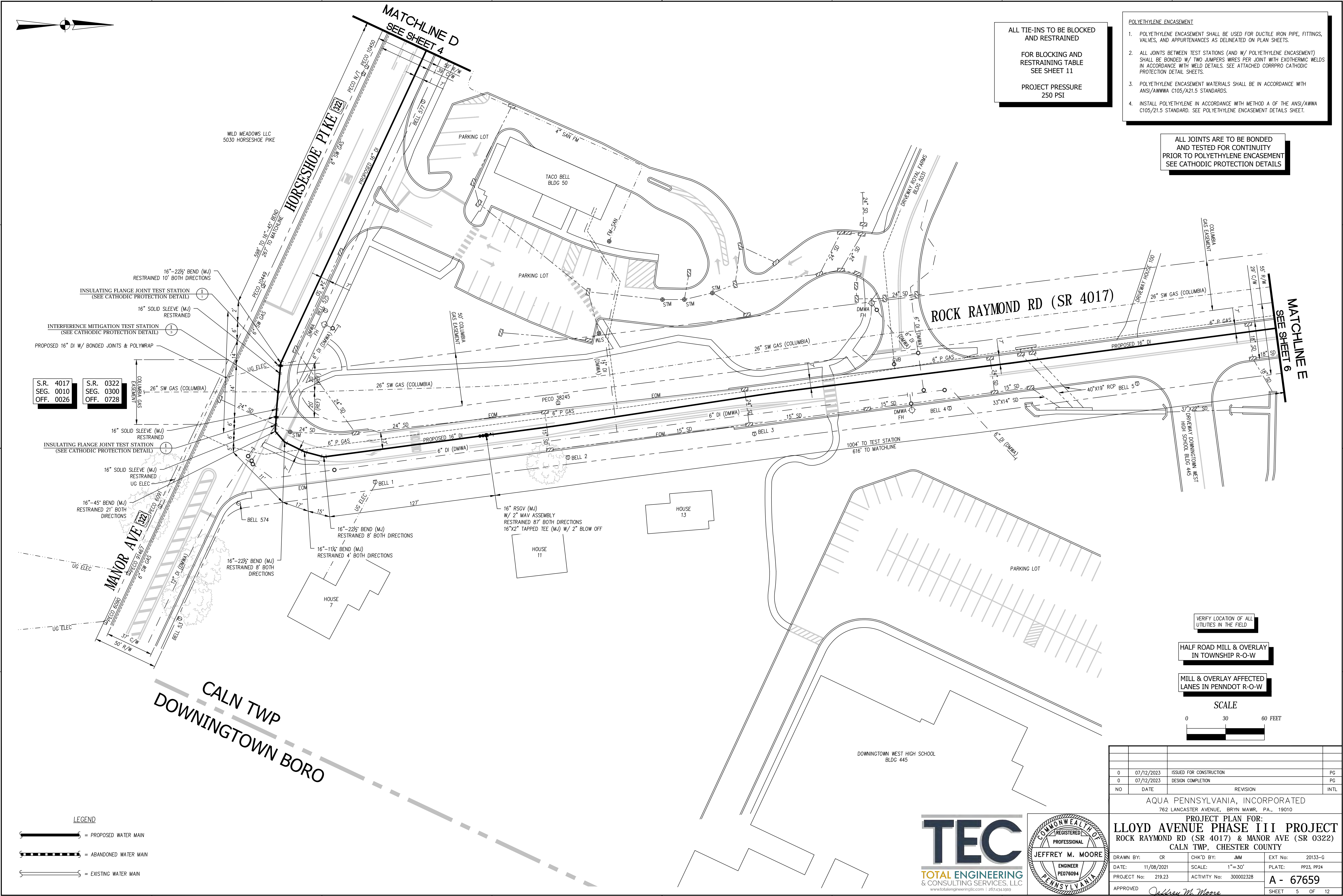
ALL TIE-INS TO BE BLOCKED AND RESTRAINED

FOR BLOCKING AND RESTRAINING TABLE SEE SHEET 11

PROJECT PRESSURE 250 PSI

- POLYETHYLENE ENCASEMENT**
- POLYETHYLENE ENCASEMENT SHALL BE USED FOR DUCTILE IRON PIPE, FITTINGS, VALVES, AND APPURTENANCES AS DELINEATED ON PLAN SHEETS.
  - ALL JOINTS BETWEEN TEST STATIONS (AND W/ POLYETHYLENE ENCASEMENT) SHALL BE BONDED W/ TWO JUMPERS WIRES PER JOINT WITH EXOTHERMIC WELDS IN ACCORDANCE WITH WELD DETAILS. SEE ATTACHED CORRPRO CATHODIC PROTECTION DETAIL SHEETS.
  - POLYETHYLENE ENCASEMENT MATERIALS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C105/A21.5 STANDARDS.
  - INSTALL POLYETHYLENE IN ACCORDANCE WITH METHOD A OF THE ANSI/AWWA C105/21.5 STANDARD. SEE POLYETHYLENE ENCASEMENT DETAILS SHEET.

ALL JOINTS ARE TO BE BONDED AND TESTED FOR CONTINUITY PRIOR TO POLYETHYLENE ENCASEMENT SEE CATHODIC PROTECTION DETAILS



S.R. 4017  
SEG. 0010  
OFF. 0026

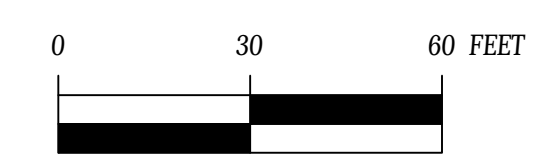
S.R. 0322  
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OFF. 0728

VERIFY LOCATION OF ALL UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY IN TOWNSHIP R-O-W

MILL & OVERLAY AFFECTED LANES IN PENNDOT R-O-W

SCALE

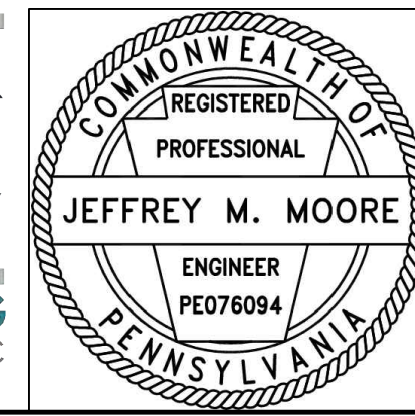


NO	DATE	REVISION	INTL
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0	07/12/2023	DESIGN COMPLETION	PG

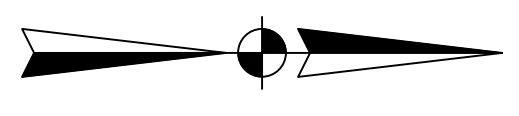
AQUA PENNSYLVANIA, INCORPORATED  
762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

PROJECT PLAN FOR:  
**LLOYD AVENUE PHASE III PROJECT**  
ROCK RAYMOND RD (SR 4017) & MANOR AVE (SR 0322)  
CALN TWP, CHESTER COUNTY

DRAWN BY: CR	CHK'D BY: JMM	EXT No: 20133-G
DATE: 11/08/2021	SCALE: 1"=30'	PLATE: PP23, PP24
PROJECT No: 219.23	ACTIVITY No: 300002328	<b>A - 67659</b>
APPROVED: <i>Jeffrey M. Moore</i>		SHEET 5 OF 12



- LEGEND**
- = PROPOSED WATER MAIN
  - - - = ABANDONED WATER MAIN
  - = EXISTING WATER MAIN

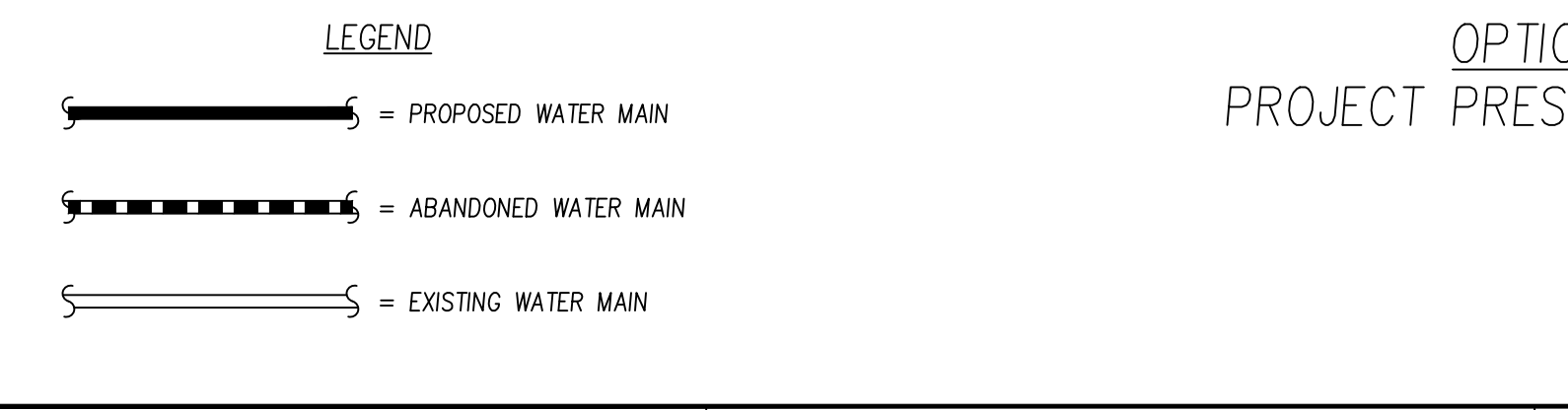
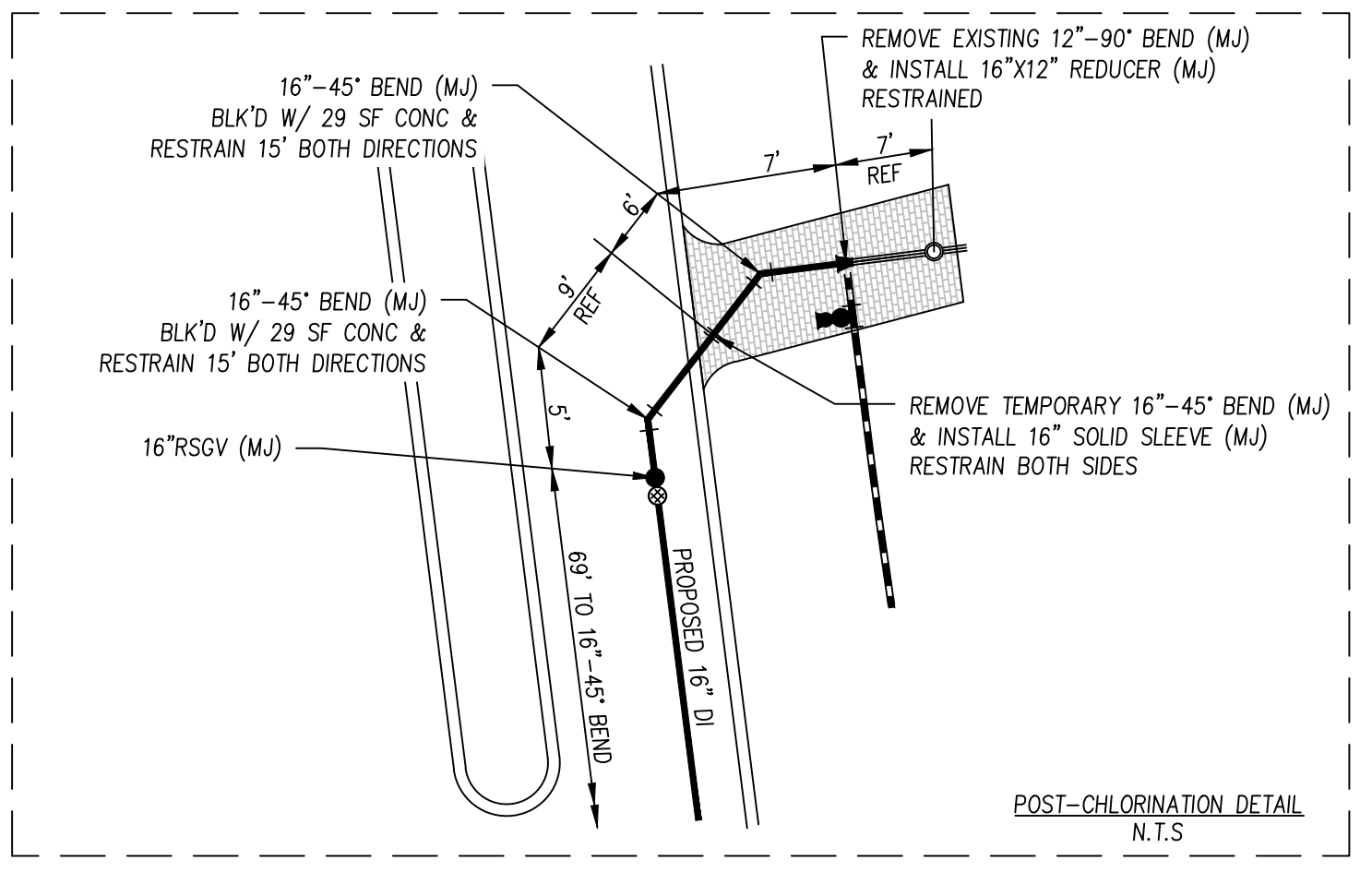
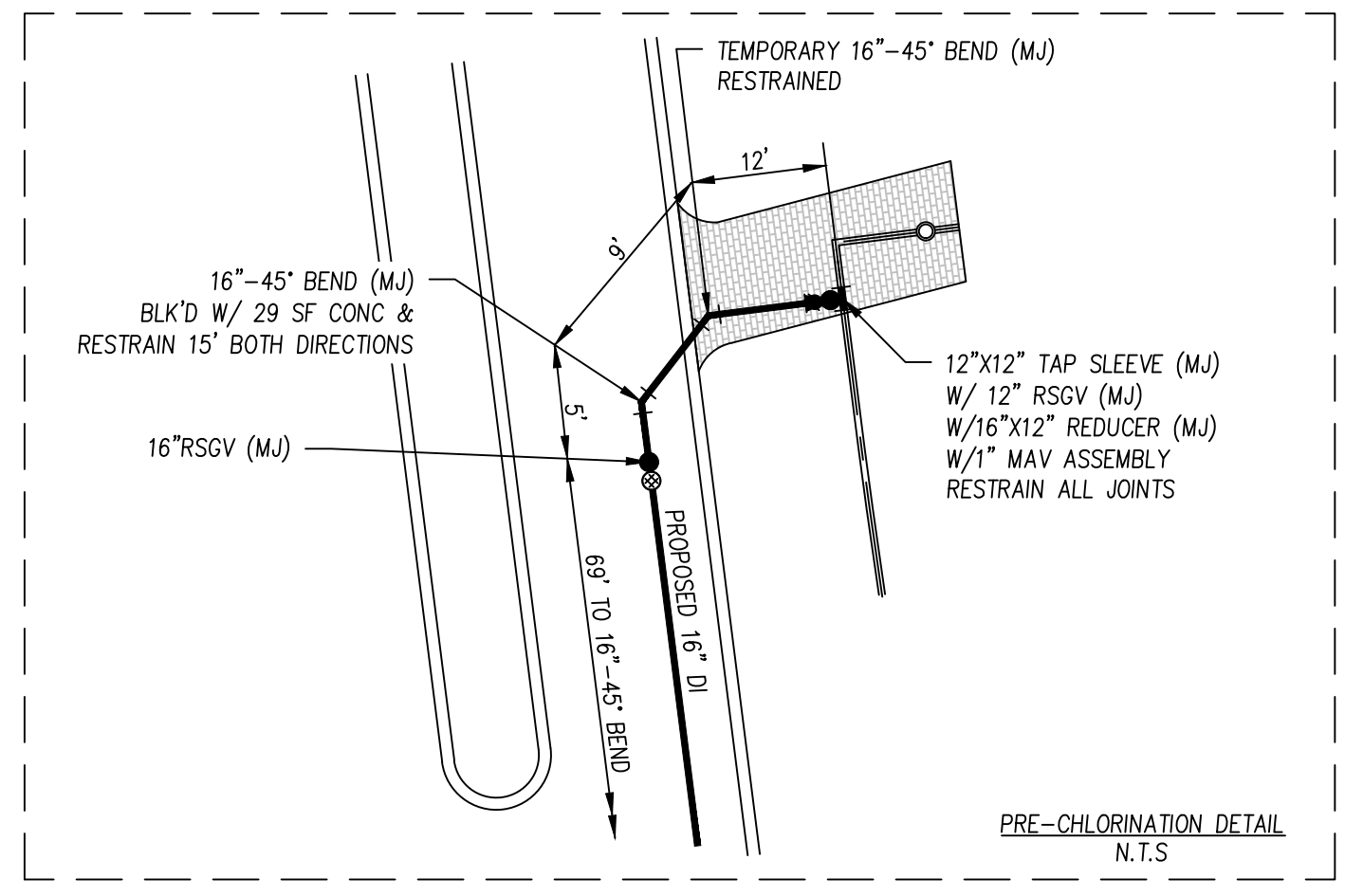
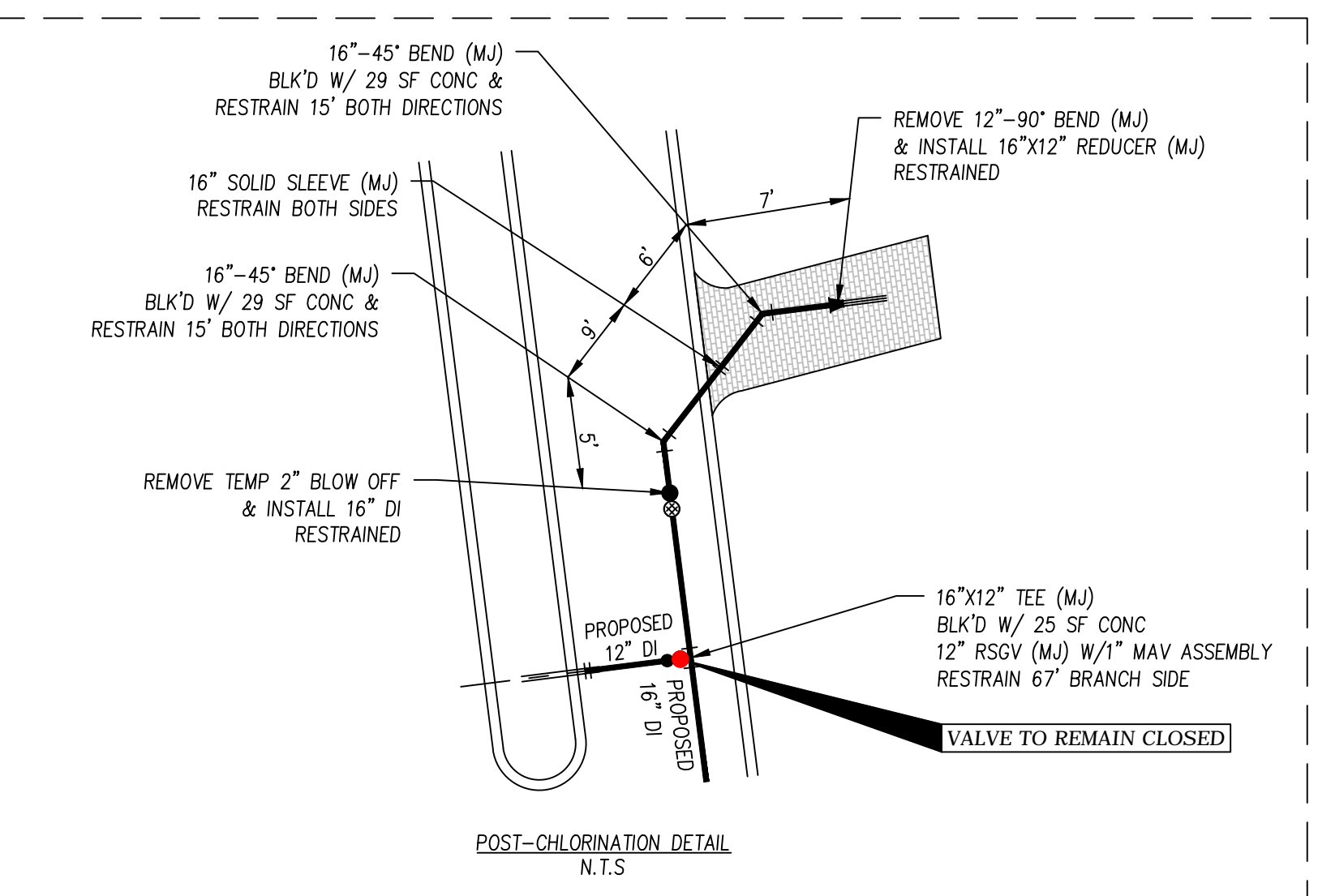
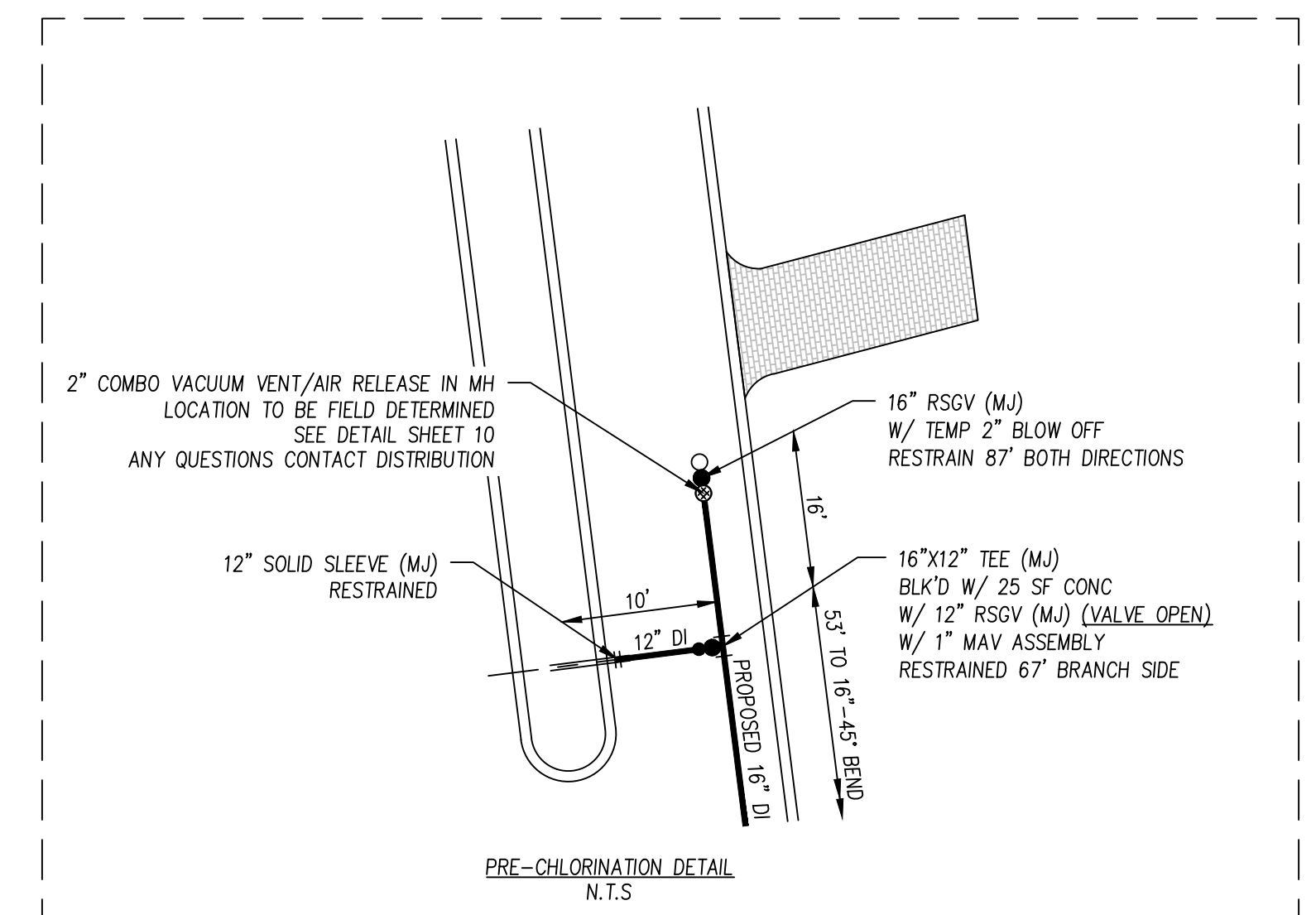
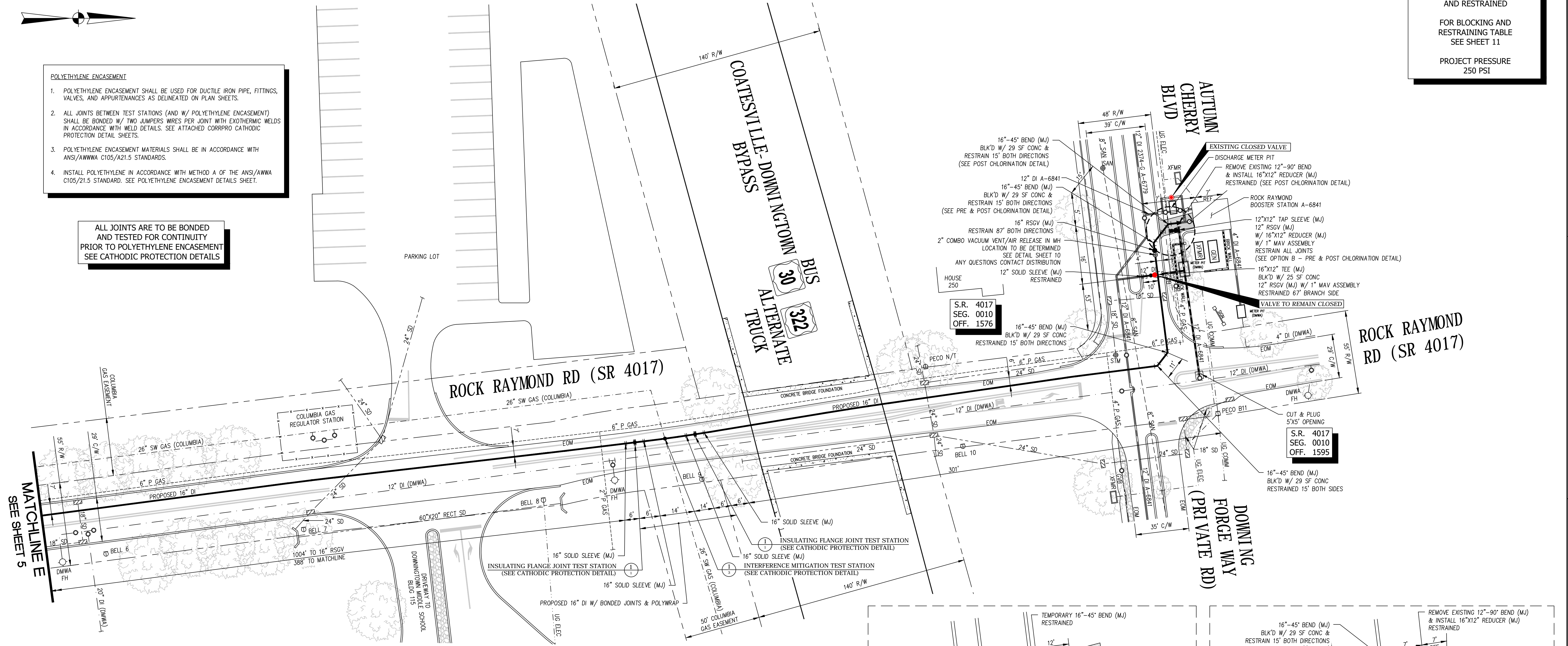


**POLYETHYLENE ENCASEMENT**

- POLYETHYLENE ENCASEMENT SHALL BE USED FOR DUCTILE IRON PIPE, FITTINGS, VALVES, AND APPURTENANCES AS DELINEATED ON PLAN SHEETS.
- ALL JOINTS BETWEEN TEST STATIONS (AND W/ POLYETHYLENE ENCASEMENT) SHALL BE BONDED W/ TWO JUMPERS WIRES PER JOINT WITH EXOTHERMIC WELDS IN ACCORDANCE WITH WELD DETAILS. SEE ATTACHED CORRPRO CATHODIC PROTECTION DETAIL SHEETS.
- POLYETHYLENE ENCASEMENT MATERIALS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C105/A21.5 STANDARDS.
- INSTALL POLYETHYLENE IN ACCORDANCE WITH METHOD A OF THE ANSI/AWWA C105/21.5 STANDARD. SEE POLYETHYLENE ENCASEMENT DETAILS SHEET.

ALL JOINTS ARE TO BE BONDED AND TESTED FOR CONTINUITY PRIOR TO POLYETHYLENE ENCASEMENT SEE CATHODIC PROTECTION DETAILS

ALL TIE-INS TO BE BLOCKED AND RESTRAINED  
FOR BLOCKING AND RESTRAINING TABLE SEE SHEET 11  
PROJECT PRESSURE  
250 PSI

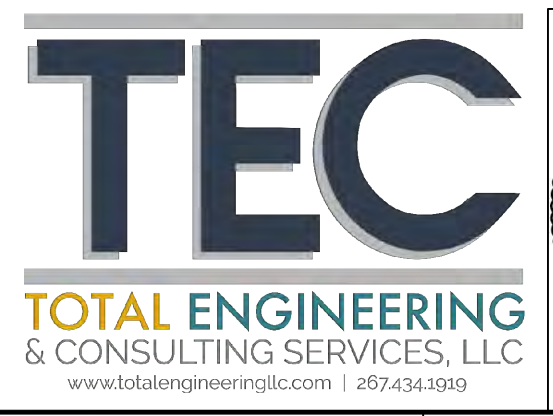
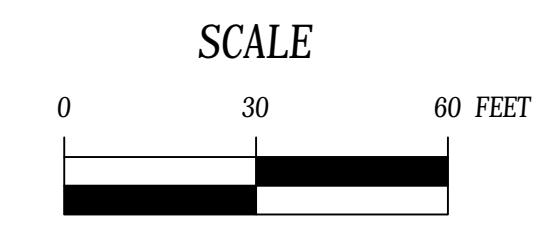


**OPTION A**  
PROJECT PRESSURE 250 PSI

VERIFY LOCATION OF ALL UTILITIES IN THE FIELD

HALF ROAD MILL & OVERLAY IN TOWNSHIP R-O-W

MILL & OVERLAY AFFECTED LANES IN PENNDOT R-O-W



**OPTION B**  
PROJECT PRESSURE 200 PSI

NO	DATE	REVISION	INTL
0	07/12/2023	ISSUED FOR CONSTRUCTION	PG
0	07/12/2023	DESIGN COMPLETION	PG

AQUA PENNSYLVANIA, INCORPORATED 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010			
PROJECT PLAN FOR: <b>LLOYD AVENUE PHASE III PROJECT</b> ROCK RAYMOND RD (SR 4017) & AUTUMN CHERRY BLVD CALN TWP, CHESTER COUNTY			
DRAWN BY: CR	CHK'D BY: JMM	EXT No: 20133-G	
DATE: 11/08/2021	SCALE: 1"=30'	PLATE: PP23, PP24	
PROJECT No: 219.23	ACTIVITY No: 300002328	<b>A - 67659</b>	
APPROVED: <i>Jeffrey M. Moore</i>		SHEET 6 OF 12	





**PATA 121**

1. When a shadow vehicle is not used, distance E is measured from the end of the taper to the beginning of the work space.



Speed S (MPH)	Channelizing Device Spacing		Sign Spacing		Buffer Space E (Feet)	Roll Ahead Space H (Feet)
	2S (Feet)	A (Feet)	Urban A (Feet)	Rural A (Feet)		
25	30	100 - 200	500 - 800	155	150	150
30	60	100 - 200	500 - 800	200	150	150
35	70	100 - 200	500 - 800	250	150	150
40	80	350 - 500	500 - 800	305	150	150
45	90	350 - 500	500 - 800	360	150	150
50	100	350 - 500	500 - 800	425	250	250
55	110	350 - 500	500 - 800	495	250	250

Speed S (MPH)	Merging Taper: L		Shoulder Taper: 1/3L		50' Per Lane Taper	
	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices
25	125	6	65	6	50	6
30	180	7	90	6	50	6
35	245	8	110	6	50	6
40	320	9	130	6	50	6
45	540	13	180	6	50	6
50	600	13	200	6	50	6
55	660	13	220	7	50	6

**PATA 123-A**

- For operations of 15 minutes or less:
  - The ROAD WORK, RIGHT LANE CLOSED, and RIGHT LANE ENDS signs are not required.
  - All channelizing devices may be eliminated if a shadow vehicle is present and the operation does not move.
- When a shadow vehicle is not used, distance E is measured from the end of the taper to the beginning of the work space.



Speed S (MPH)	Channelizing Device Spacing		Sign Spacing		Buffer Space E (Feet)	Roll Ahead Space H (Feet)
	2S (Feet)	A (Feet)	Urban A (Feet)	Rural A (Feet)		
25	30	100 - 200	500 - 800	155	150	150
30	60	100 - 200	500 - 800	200	150	150
35	70	100 - 200	500 - 800	250	150	150
40	80	350 - 500	500 - 800	305	150	150
45	90	350 - 500	500 - 800	360	150	150
50	100	350 - 500	500 - 800	425	250	250
55	110	350 - 500	500 - 800	495	250	250

Speed S (MPH)	Merging Taper: L		50' Per Lane Taper	
	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices
25	125	6	50	6
30	180	7	50	6
35	245	8	50	6
40	320	9	50	6
45	540	13	50	6
50	600	13	50	6
55	660	13	50	6

**PATA 123-B**

- For operations of 15 minutes or less:
  - The ROAD WORK, LANE CLOSED, and LEFT LANE ENDS signs are not required.
  - All channelizing devices may be eliminated if a shadow vehicle is present and the operation does not move.
- When a shadow vehicle is not used, distance E is measured from the end of the taper to the beginning of the work space.



Speed S (MPH)	Channelizing Device Spacing		Sign Spacing		Buffer Space E (Feet)	Roll Ahead Space H (Feet)
	2S (Feet)	A (Feet)	Urban A (Feet)	Rural A (Feet)		
25	30	100 - 200	500 - 800	155	150	150
30	60	100 - 200	500 - 800	200	150	150
35	70	100 - 200	500 - 800	250	150	150
40	80	350 - 500	500 - 800	305	150	150
45	90	350 - 500	500 - 800	360	150	150
50	100	350 - 500	500 - 800	425	250	250
55	110	350 - 500	500 - 800	495	250	250

Speed S (MPH)	Merging Taper: L		50' Per Lane Taper	
	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices
25	125	6	50	6
30	180	7	50	6
35	245	8	50	6
40	320	9	50	6
45	540	13	50	6
50	600	13	50	6
55	660	13	50	6

**PATA 124**

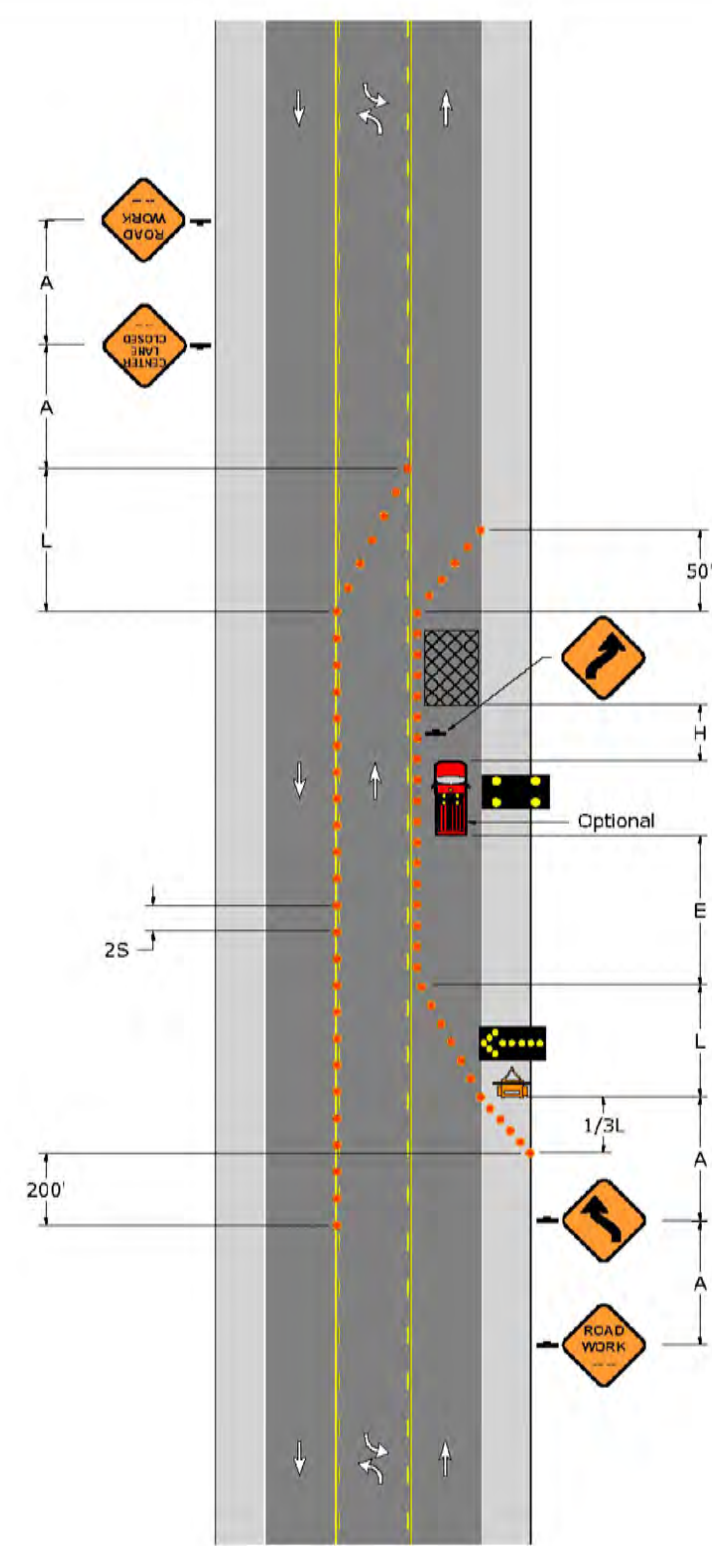
- When a shadow vehicle is not used, distance E is measured from the end of the taper to the beginning of the work space.
- If shadow vehicles are used, use two side-by-side as shown on the PATA drawing.



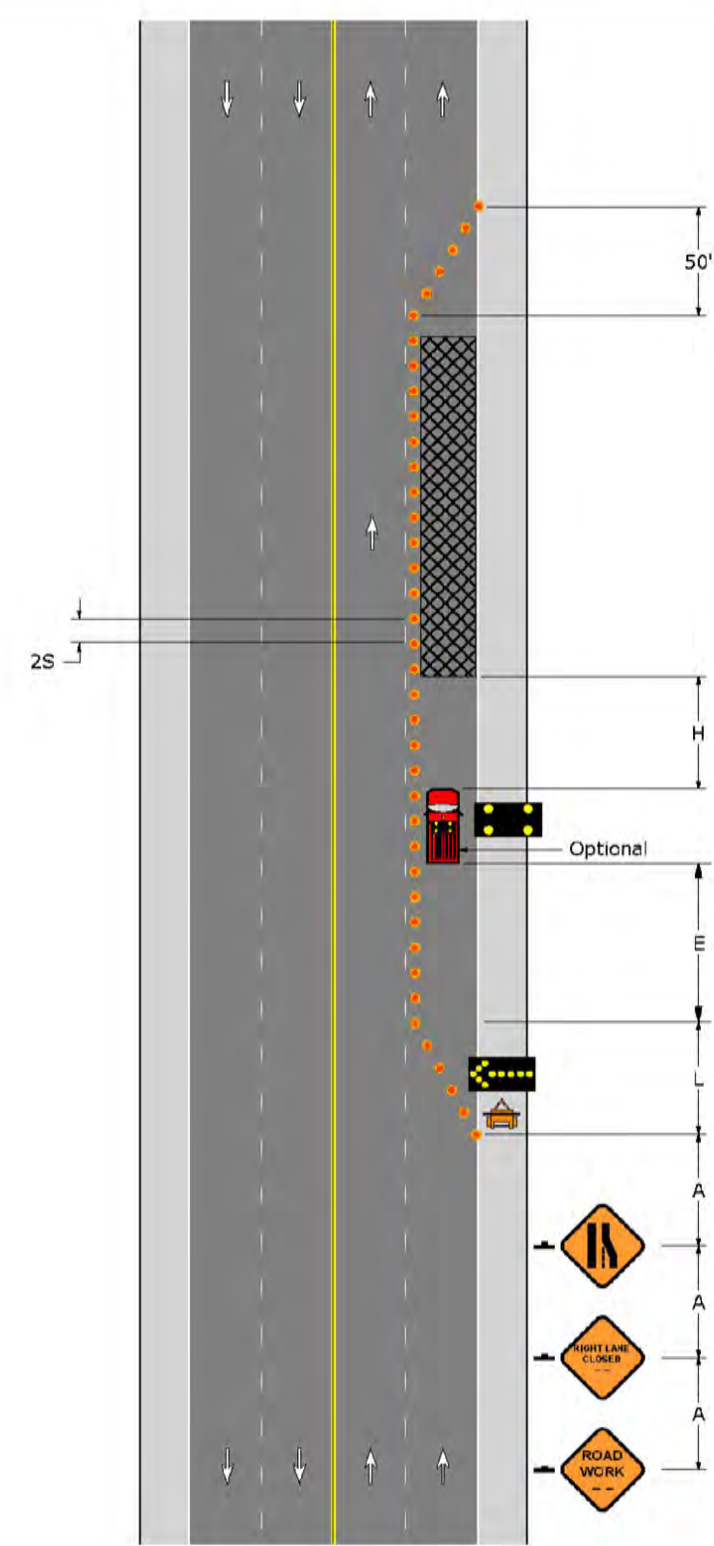
Speed S (MPH)	Channelizing Device Spacing		Sign Spacing		Buffer Space E (Feet)	Roll Ahead Space H (Feet)
	2S (Feet)	A (Feet)	Urban A (Feet)	Rural A (Feet)		
25	30	100 - 200	500 - 800	155	150	150
30	60	100 - 200	500 - 800	200	150	150
35	70	100 - 200	500 - 800	250	150	150
40	80	350 - 500	500 - 800	305	150	150
45	90	350 - 500	500 - 800	360	150	150
50	100	350 - 500	500 - 800	425	250	250
55	110	350 - 500	500 - 800	495	250	250

Speed S (MPH)	Merging Taper: L		Shifting Taper: 1/2L		Shoulder Taper: 1/3L		50' Per Lane Taper	
	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices	Length (Feet)	Minimum Number Of Devices
25	125	6	65	6	45	6	50	6
30	180	7	90	6	60	6	50	6
35	245	8	125	6	85	6	50	6
40	320	9	160	6	110	6	50	6
45	540	13	270	7	180	6	50	6
50	600	13	300	7	200	6	50	6
55	660	13	330	7	220	6	50	6

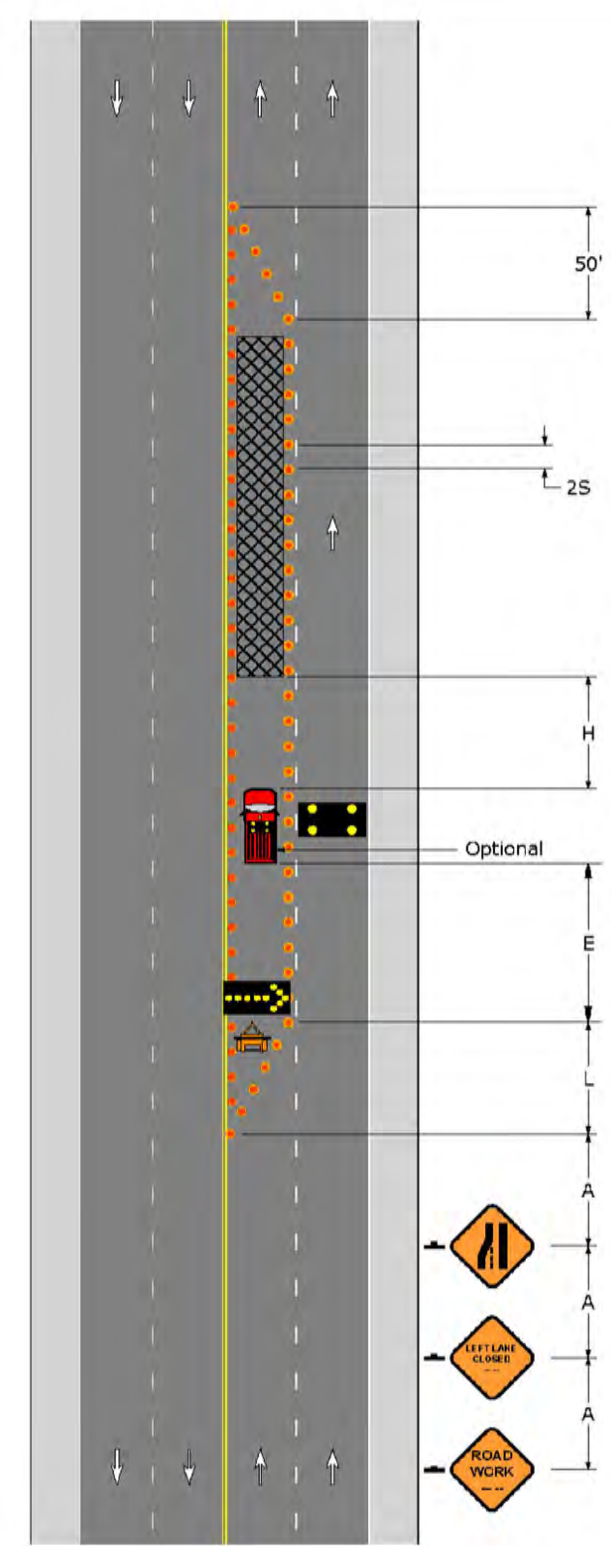
**PATA 121**



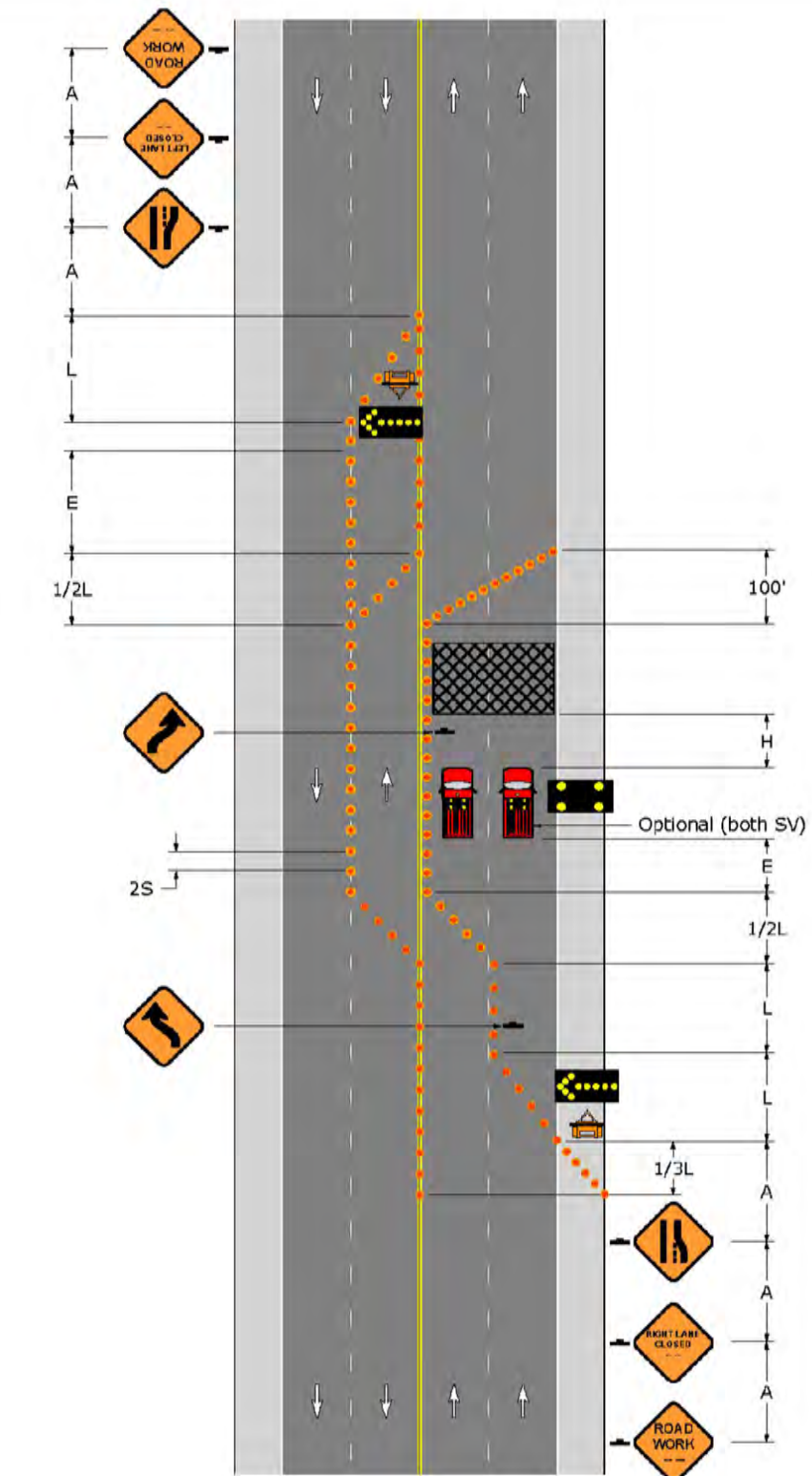
**PATA 123-A**



**PATA 123-B**



**PATA 124**



NO	DATE	REVISION	INTL
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0	07/12/2023	DESIGN COMPLETION	PG

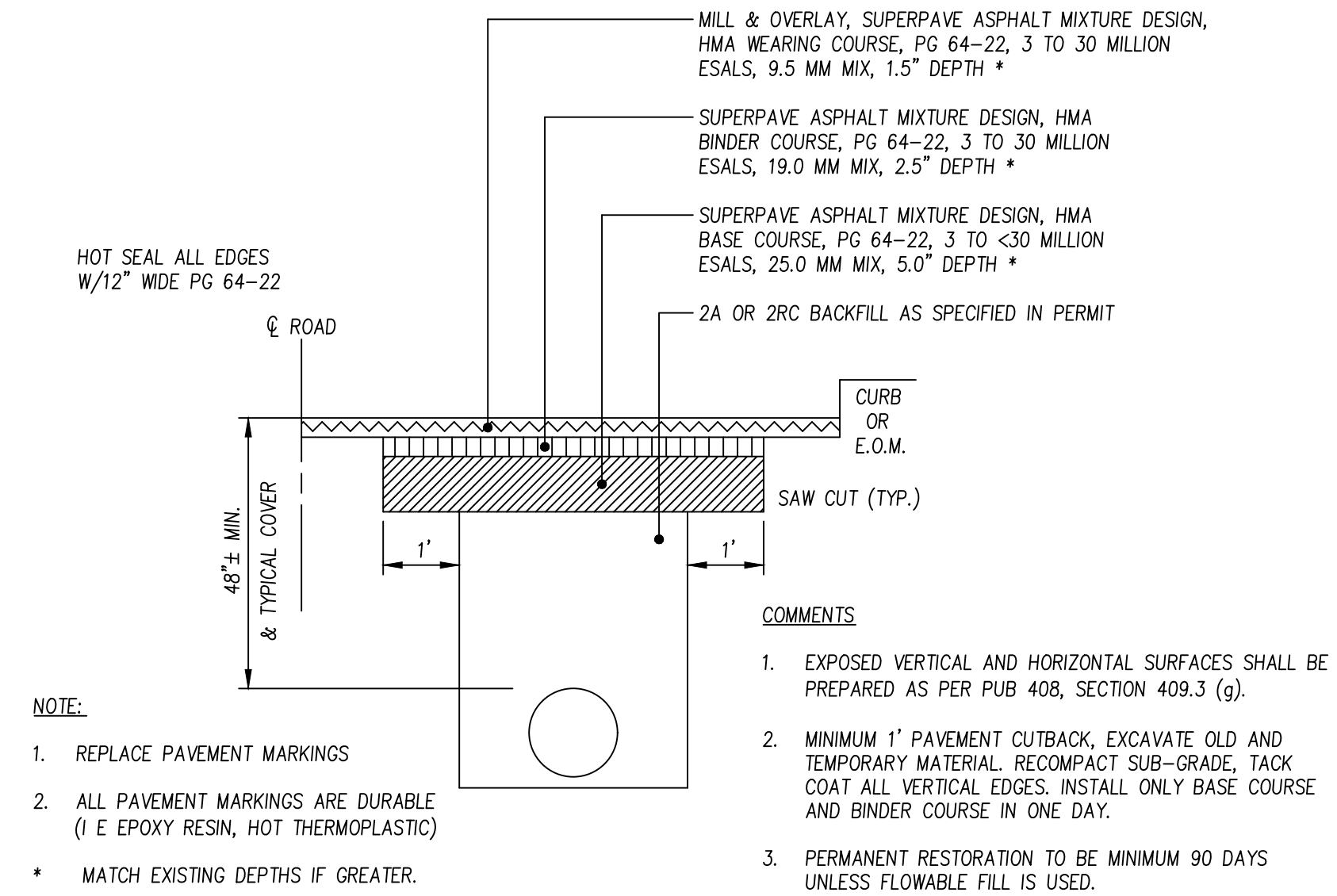
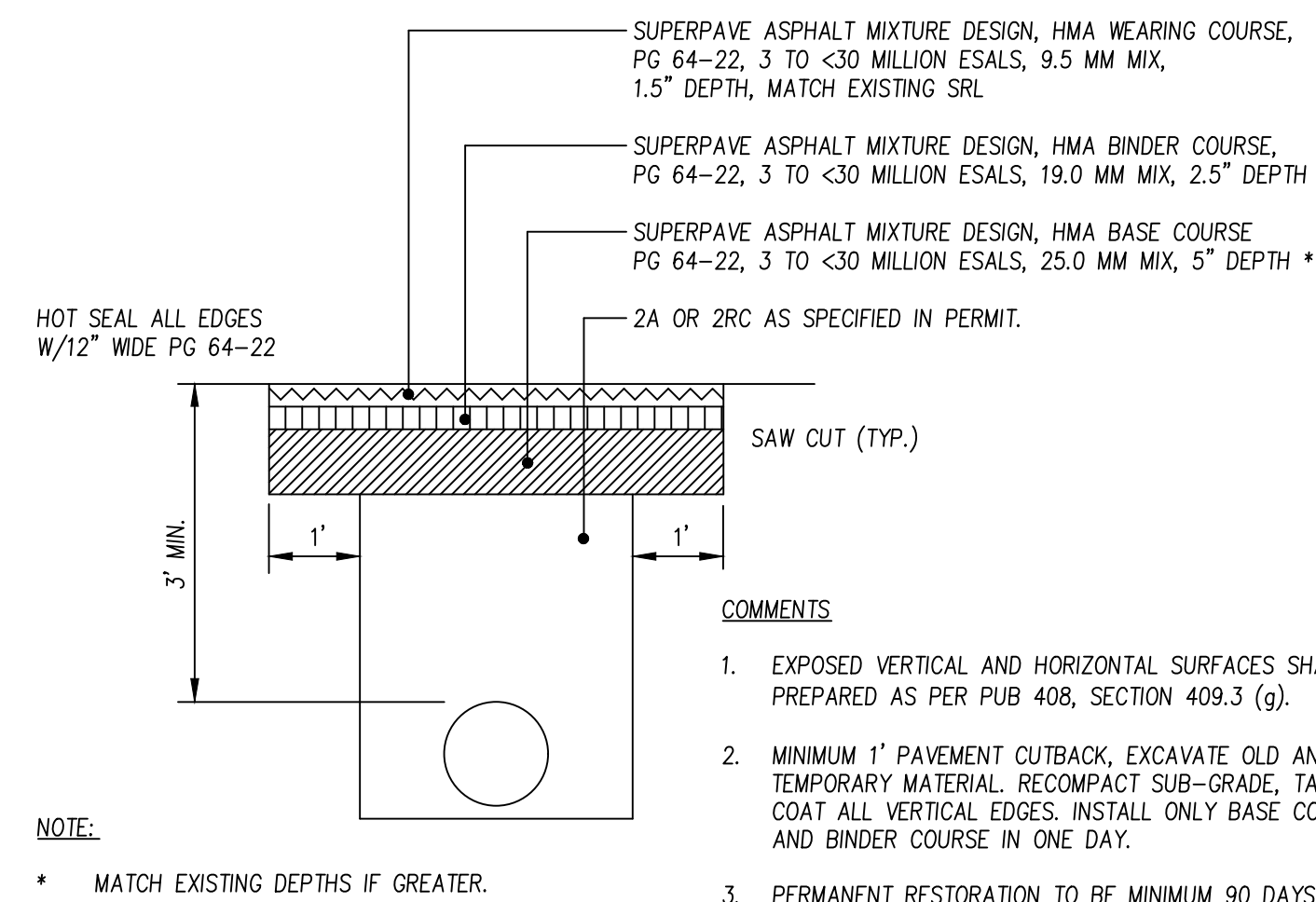
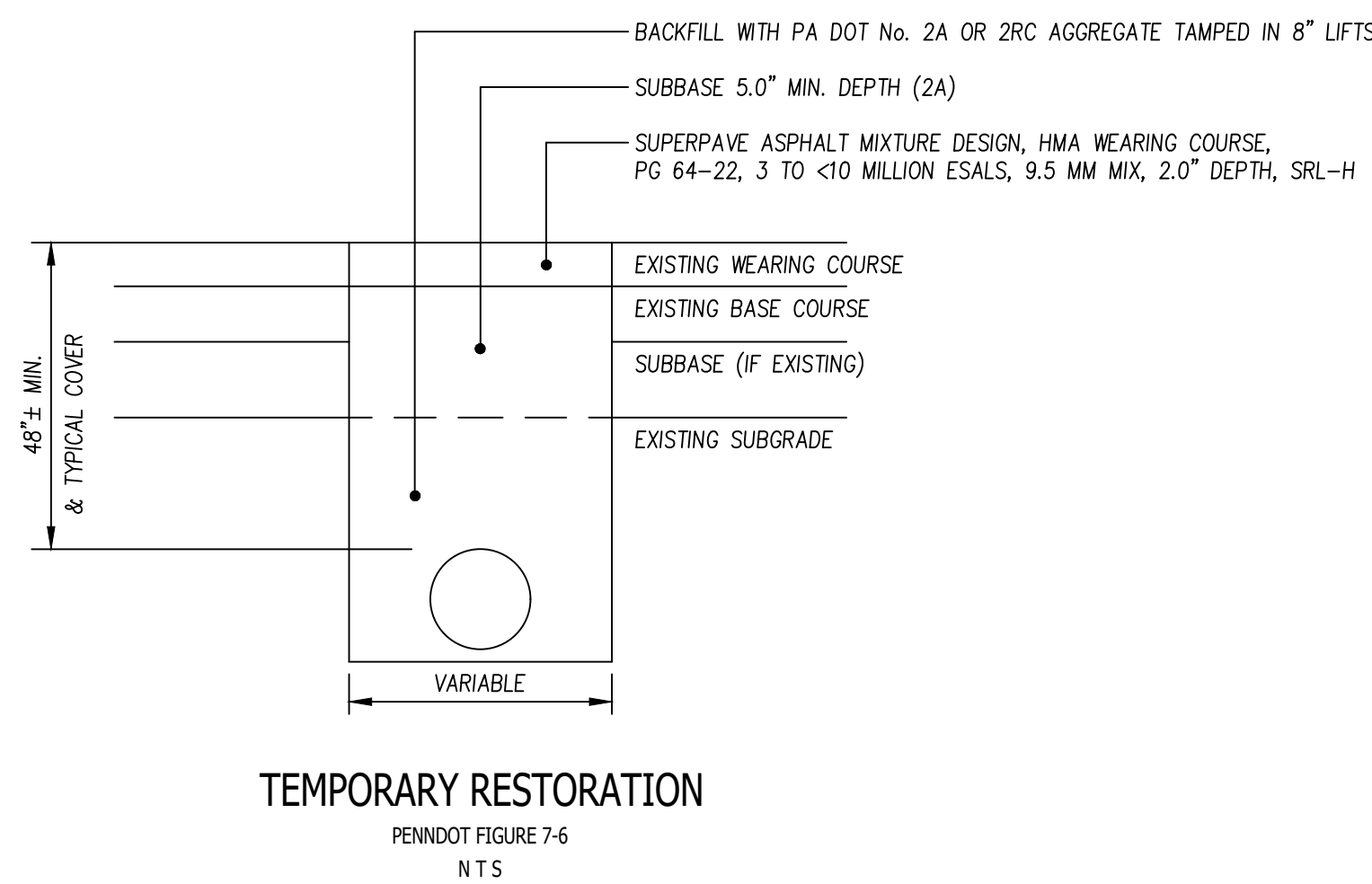
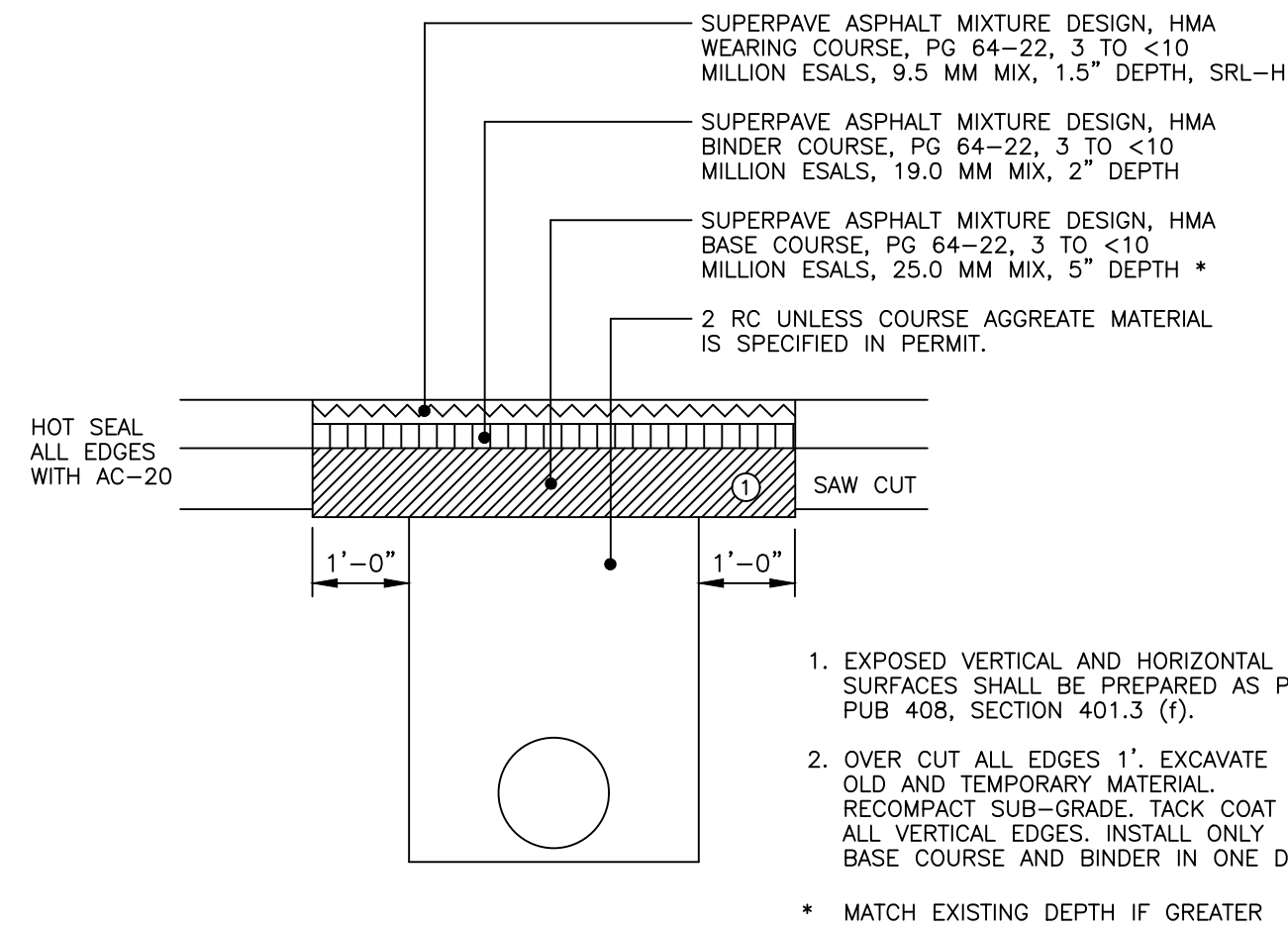
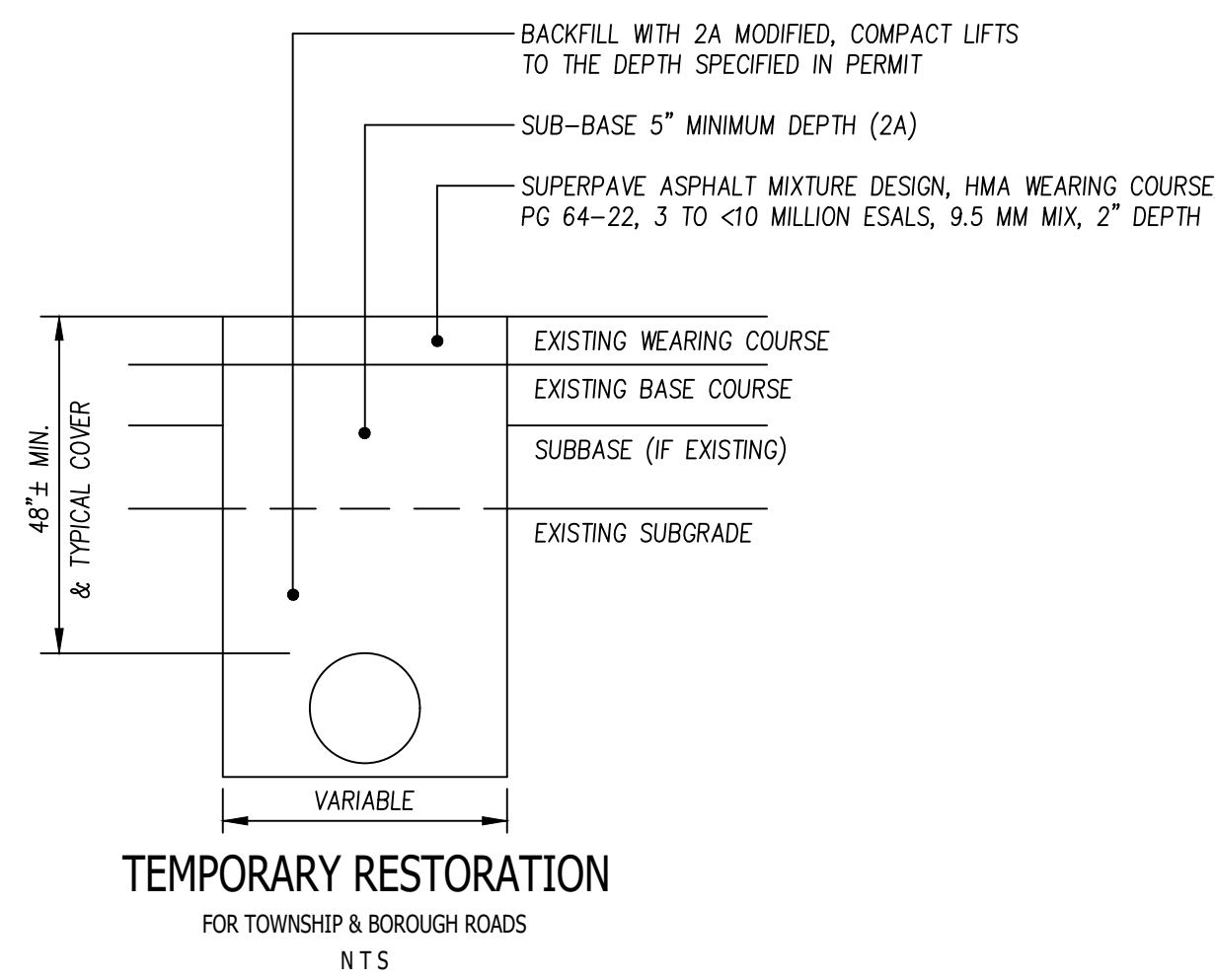
AQUA PENNSYLVANIA, INCORPORATED  
762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

**PROJECT PLAN FOR:  
LLOYD AVENUE PHASE III PROJECT  
TRAFFIC CONTROL DETAILS (2)  
CALN TWP & DOWNINGTOWN BORO, CHESTER COUNTY**

DRAWN BY: CR	CHK'D BY: JMM	EXT No: 20133-G
DATE: 11/08/2021	SCALE: N.T.S.	PLATE: PP23, PP24
PROJECT No: 219.23	ACTIVITY No: 300002328	<b>A - 67659</b>
APPROVED: <i>Jeffrey M. Moore</i>		SHEET 8 OF 12

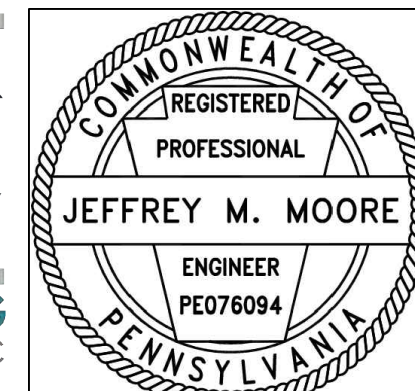
**TEC**  
TOTAL ENGINEERING  
& CONSULTING SERVICES, LLC  
www.totalengineeringllc.com | 287.434.1919

REGISTERED PROFESSIONAL ENGINEER  
JEFFREY M. MOORE  
PE076094  
PENNSYLVANIA

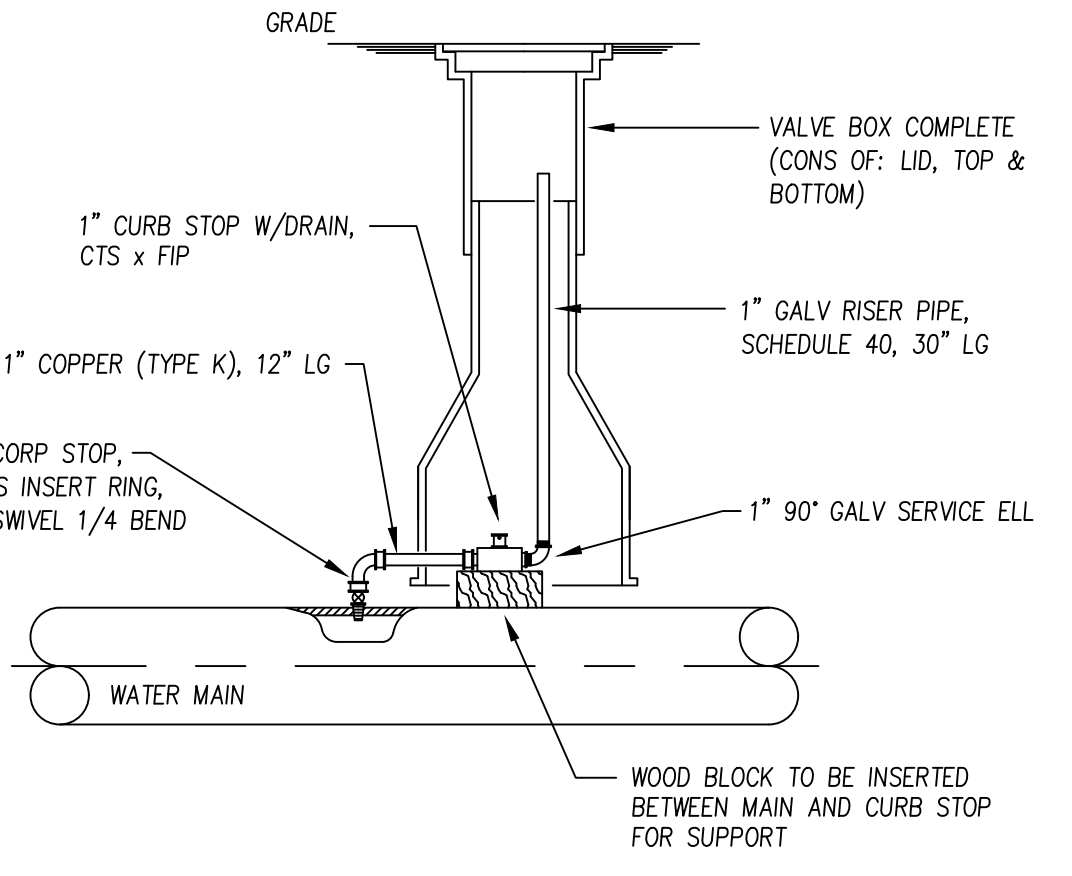


NO	DATE	REVISION	INTL
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0	07/12/2023	DESIGN COMPLETION	PG

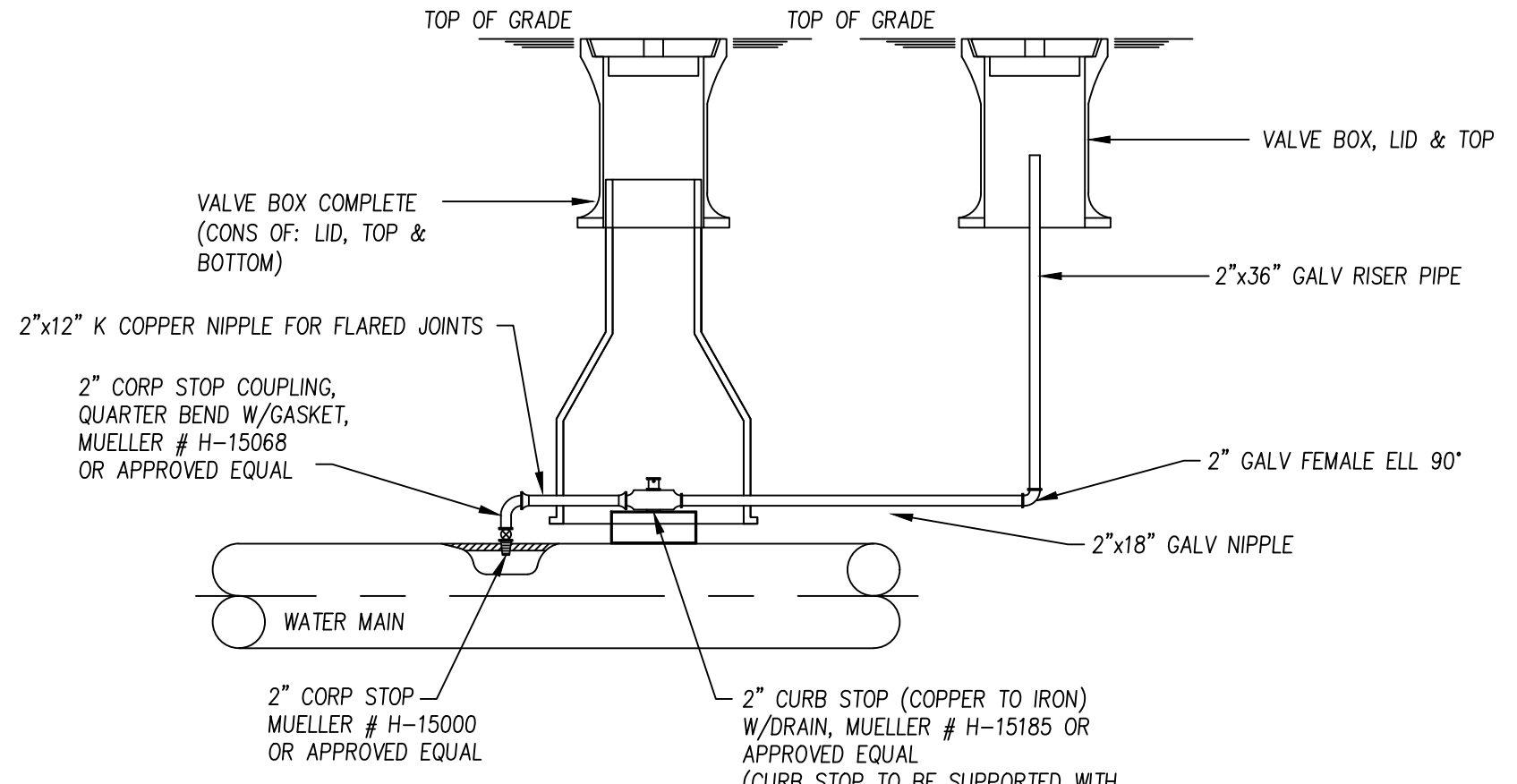
AQUA PENNSYLVANIA, INCORPORATED  
 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010  
 PROJECT PLAN FOR:  
**LLOYD AVENUE PHASE III PROJECT**  
 ROAD RESTORATION DETAILS  
 CALN TWP & DOWNINGTOWN BORO, CHESTER COUNTY



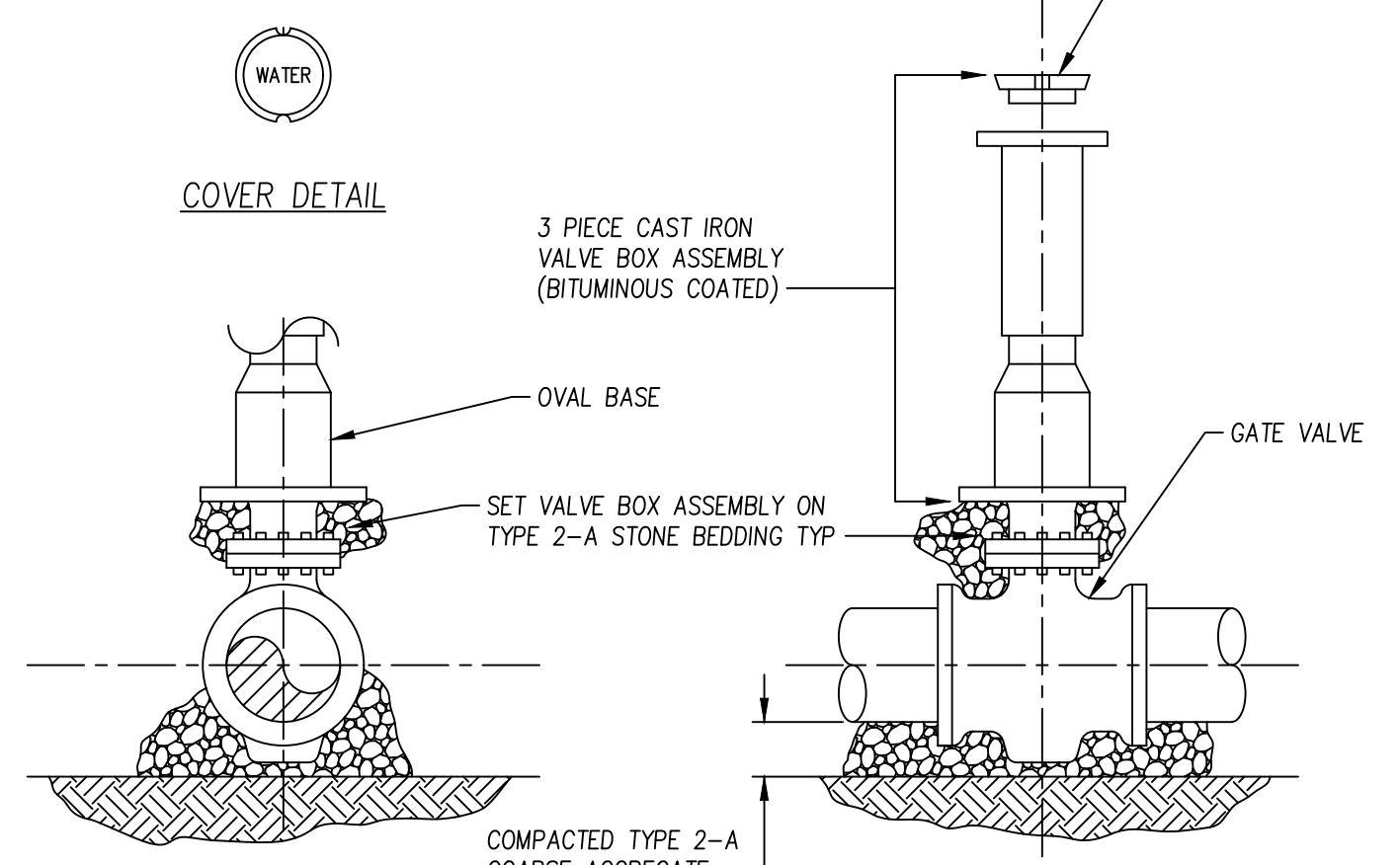
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DATE:	11/08/2021	SCALE:	N.T.S.	PLATE:	PP23, PP24
PROJECT No:	219.23	ACTIVITY No:	300002328	<b>A - 67659</b>	
APPROVED	<i>Jeffrey M. Moore</i>				SHEET 9 OF 12



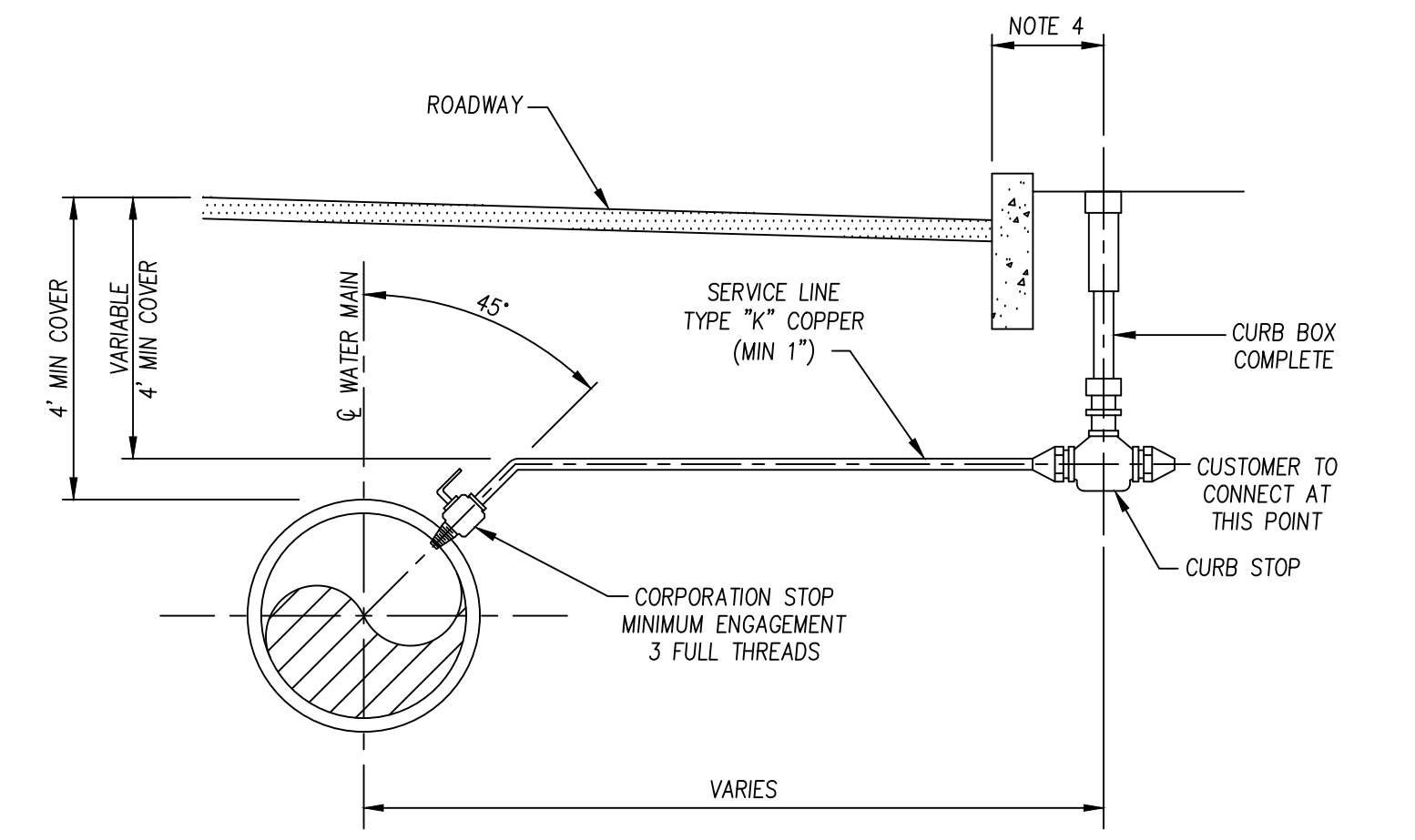
**STANDARD 1" MAV & CL2 ASSEMBLY**  
NTS



**STANDARD 2" MAV & CL2 ASSEMBLY**  
NTS

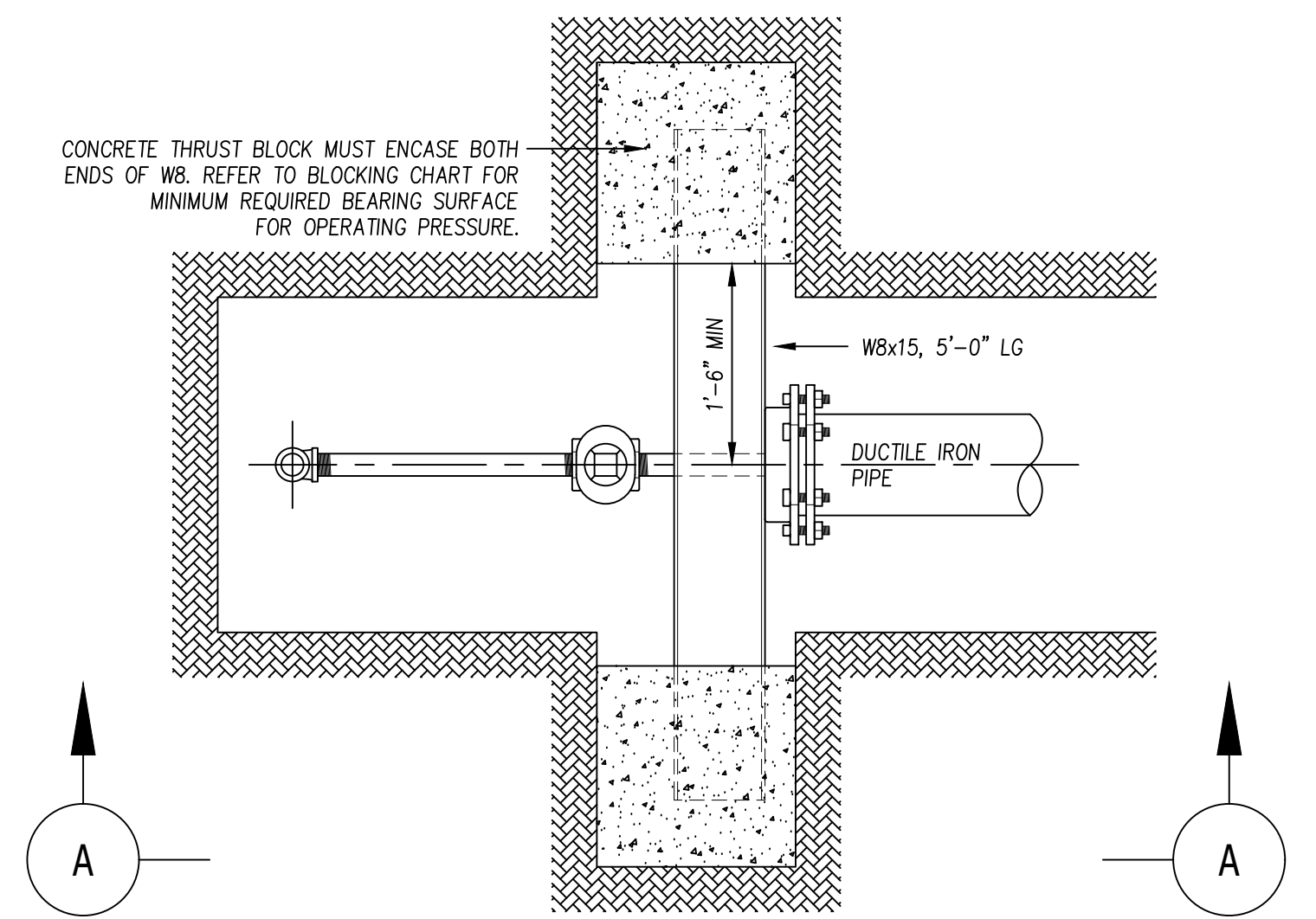


**STANDARD GATE VALVE AND VALVE BOX ASSEMBLY DETAIL**  
NTS

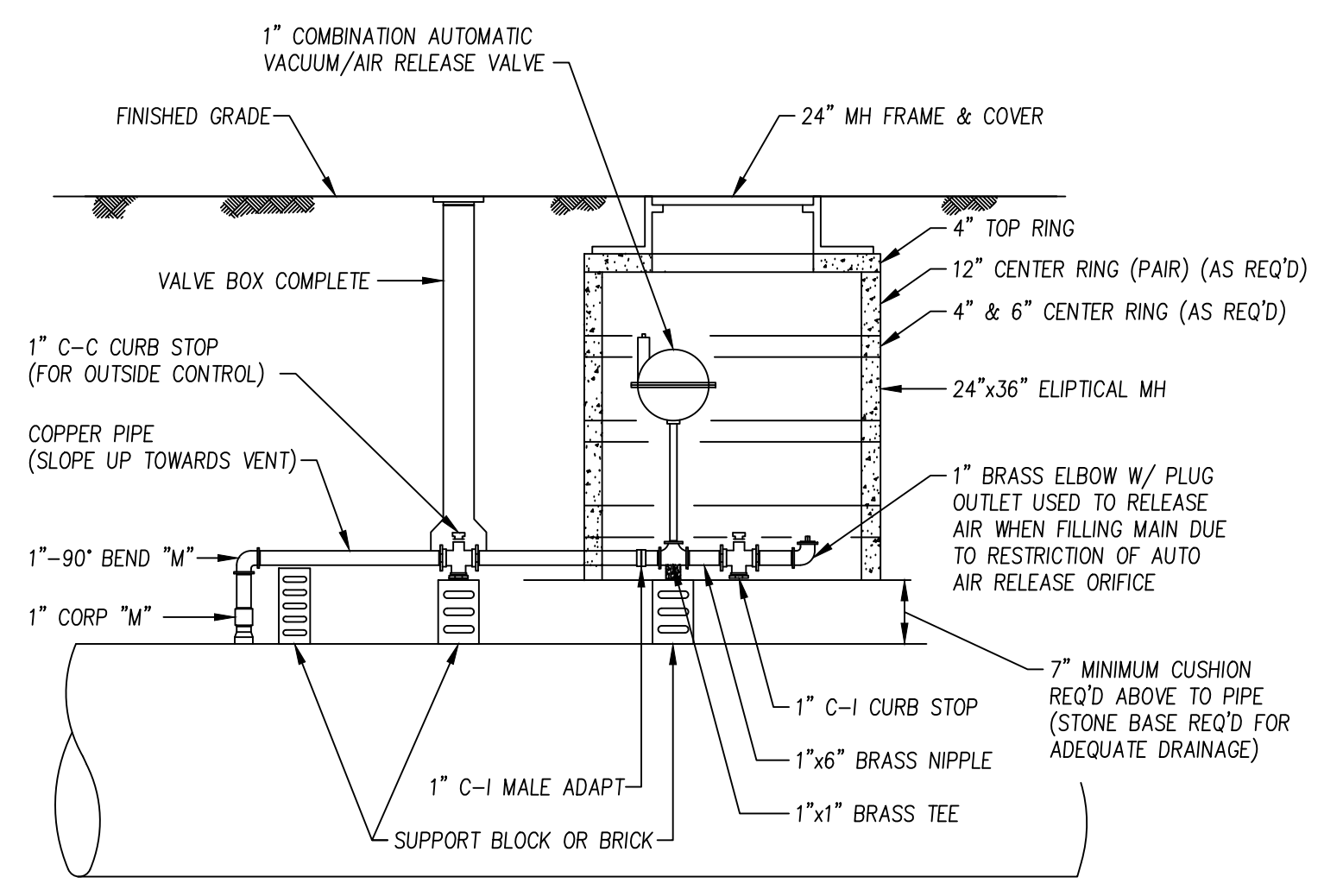


- NOTES:
- FOR STANDARD 1" CONNECTION, PROVIDE A TAPPED COUPLING WITH THREADED INSERT OR DOUBLE-STRAPPED SADDLE CLAMP.
  - DO NOT PLACE CURB STOP IN PAVED AREAS.
  - ALL SERVICE CONNECTIONS SHALL BE LOCATED AT THE MIDPOINT BETWEEN SIDE LOT LINES OR AS DIRECTED BY A AQUA PA FIELD REPRESENTATIVE.
  - WHERE SIDEWALK PARALLELS ROADWAY, THE CURB BOX SHALL BE PLACED BETWEEN THE CURB AND SIDEWALK. ALL OTHER LOCATIONS, CURB BOX TO BE PLACED AS DIRECTED BY A AQUA PA FIELD REPRESENTATIVE.

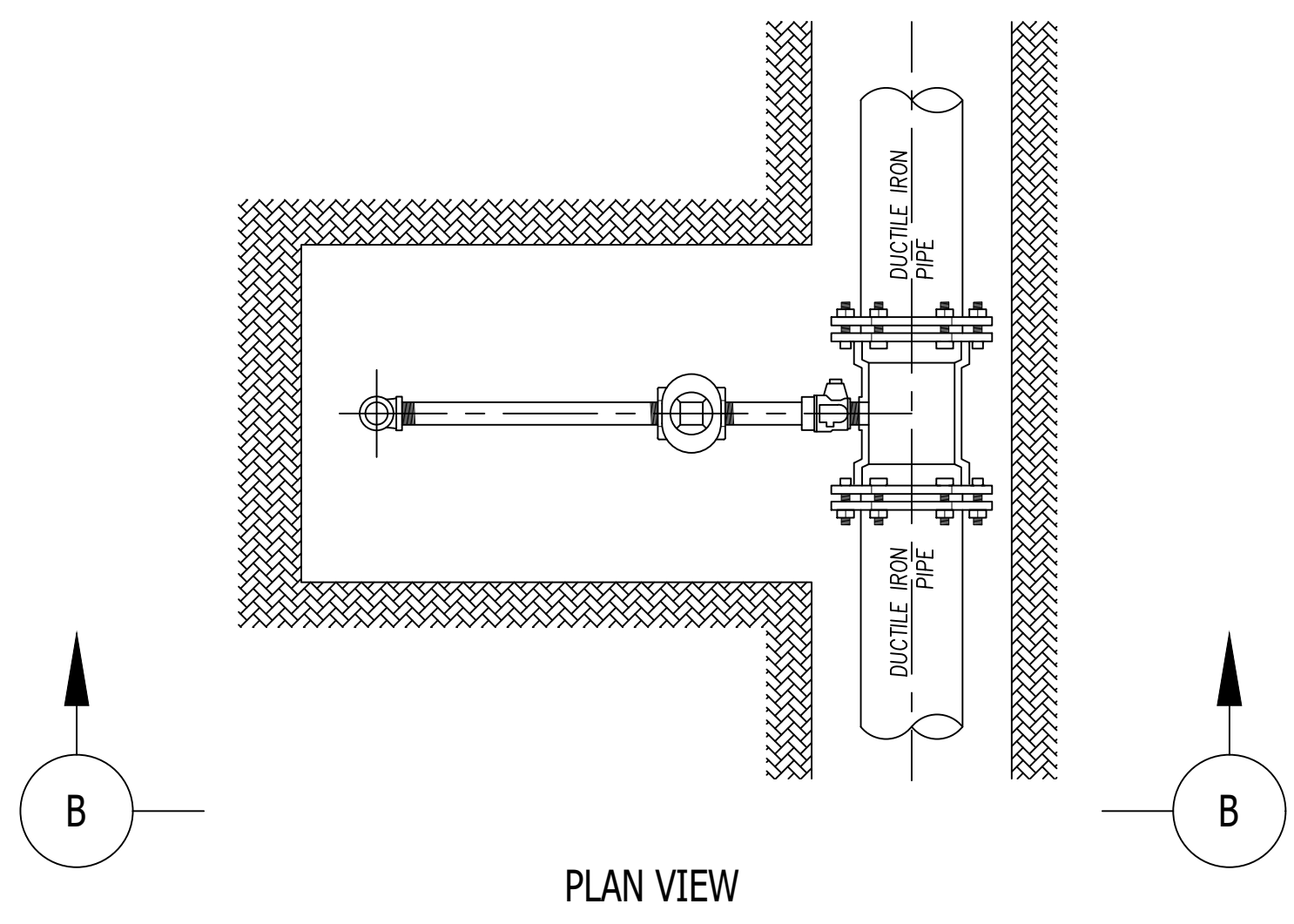
**STANDARD SERVICE CONNECTION**  
NTS



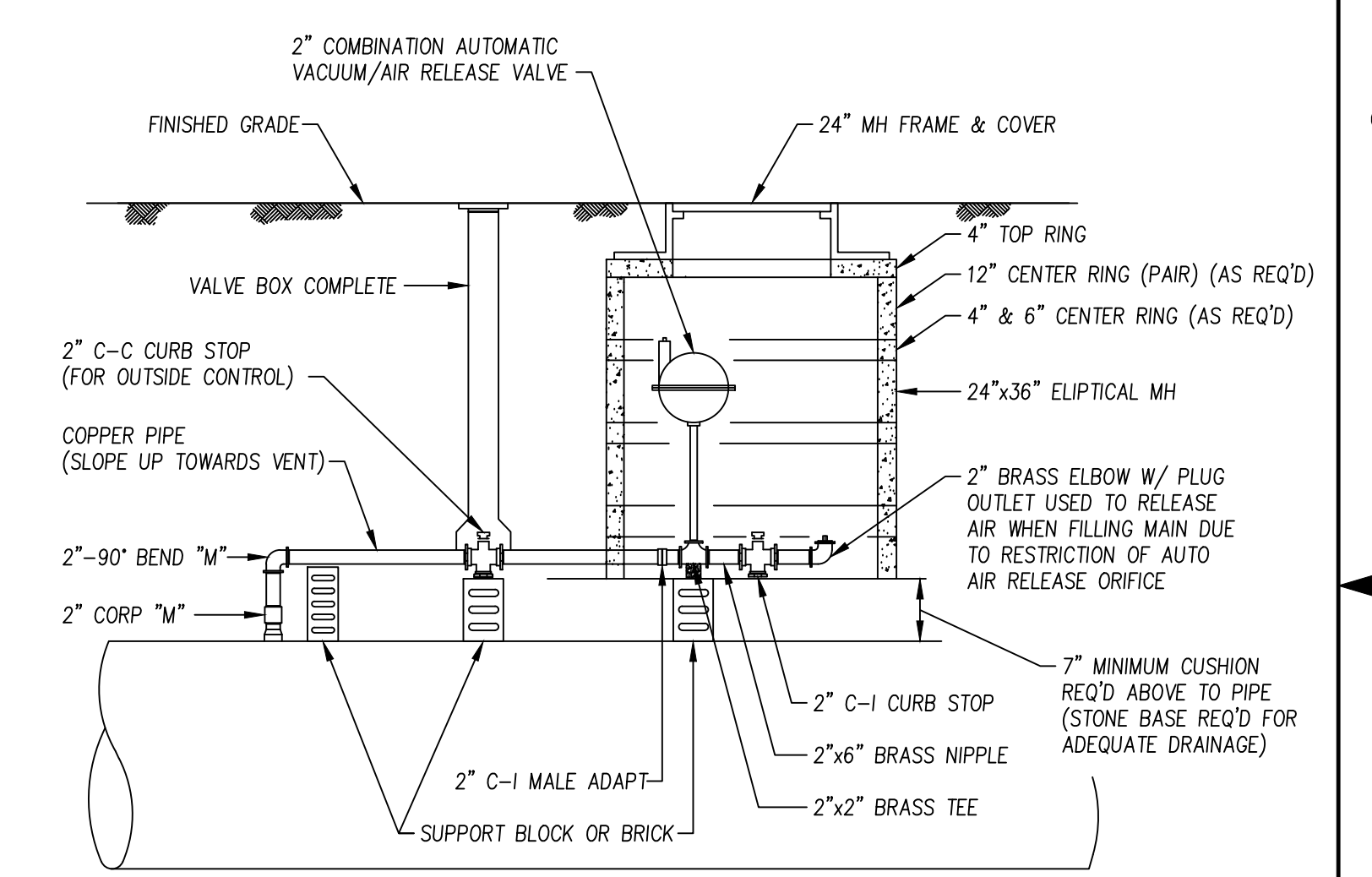
**PLAN VIEW**



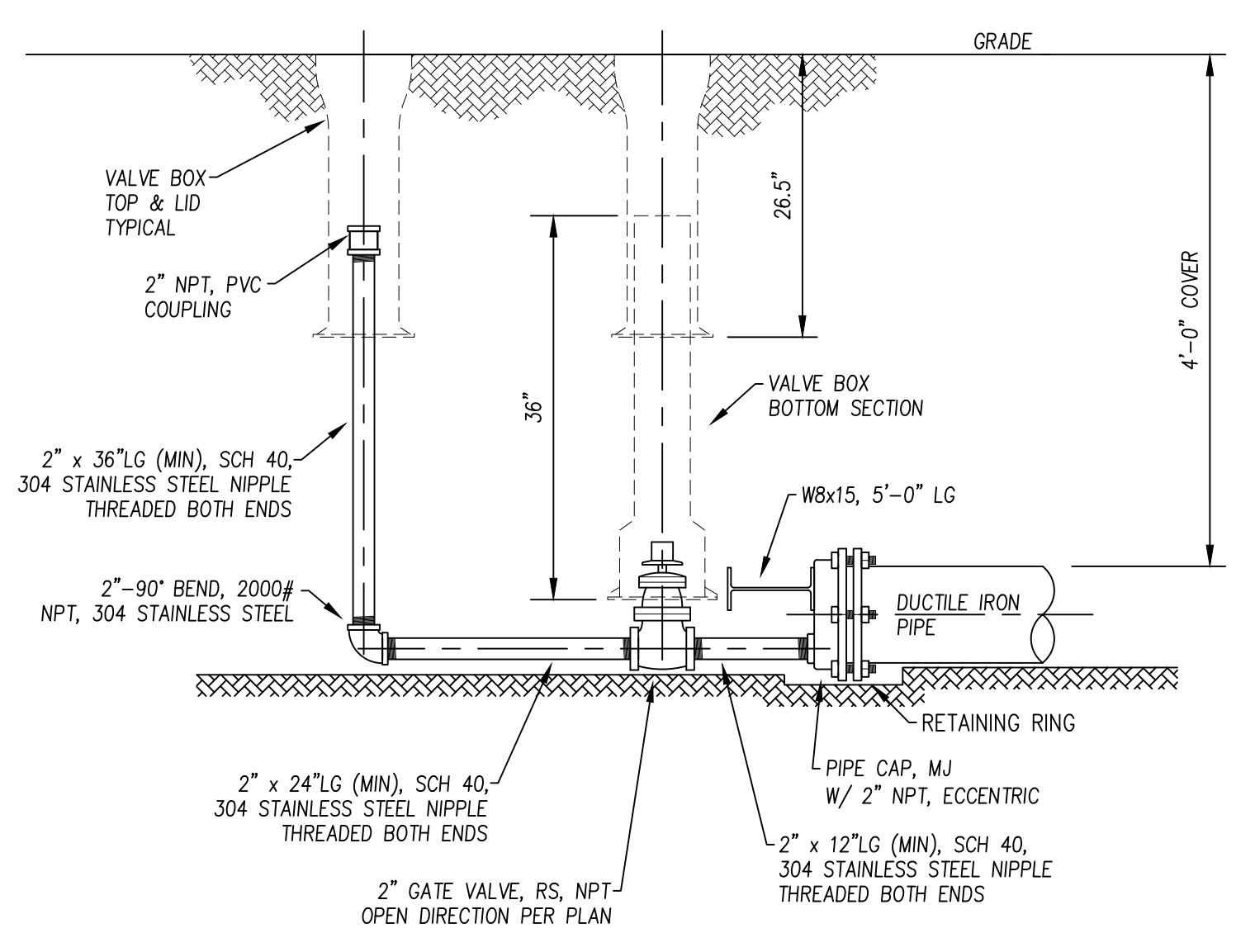
**STANDARD 1" AUTOMATIC AIR VENT**  
NTS



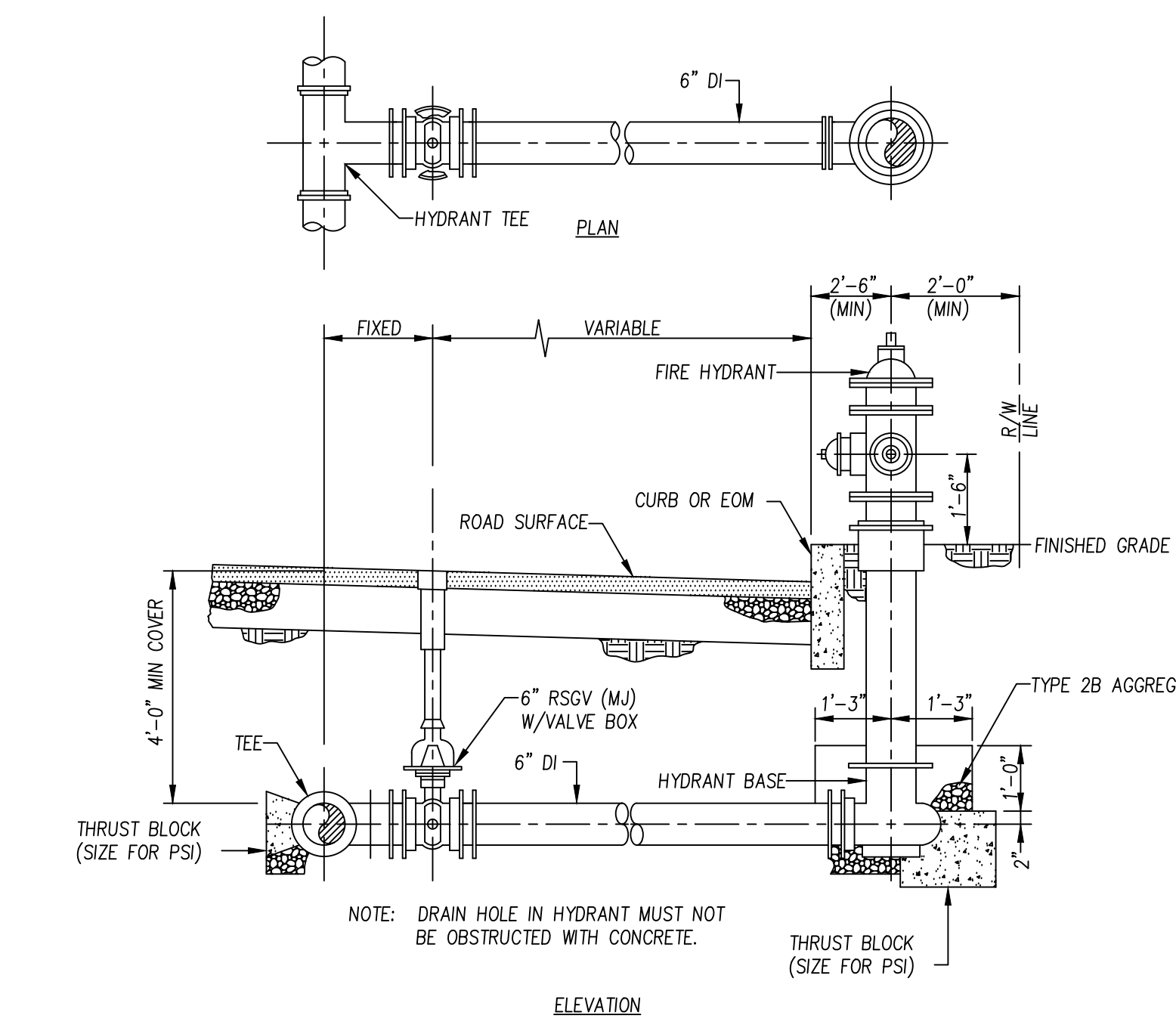
**PLAN VIEW**



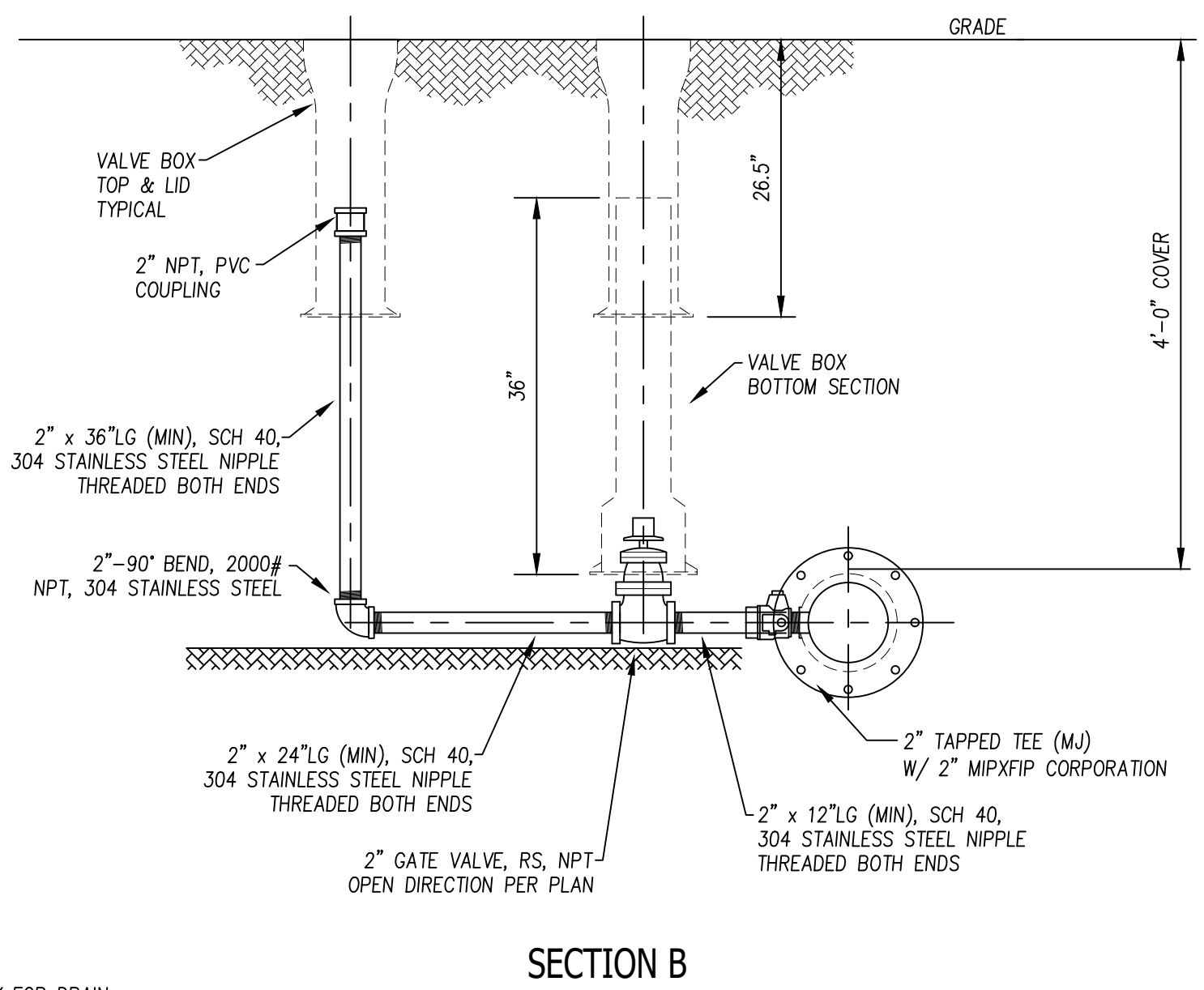
**STANDARD 2" AUTOMATIC AIR VENT**  
NTS



**SECTION A**



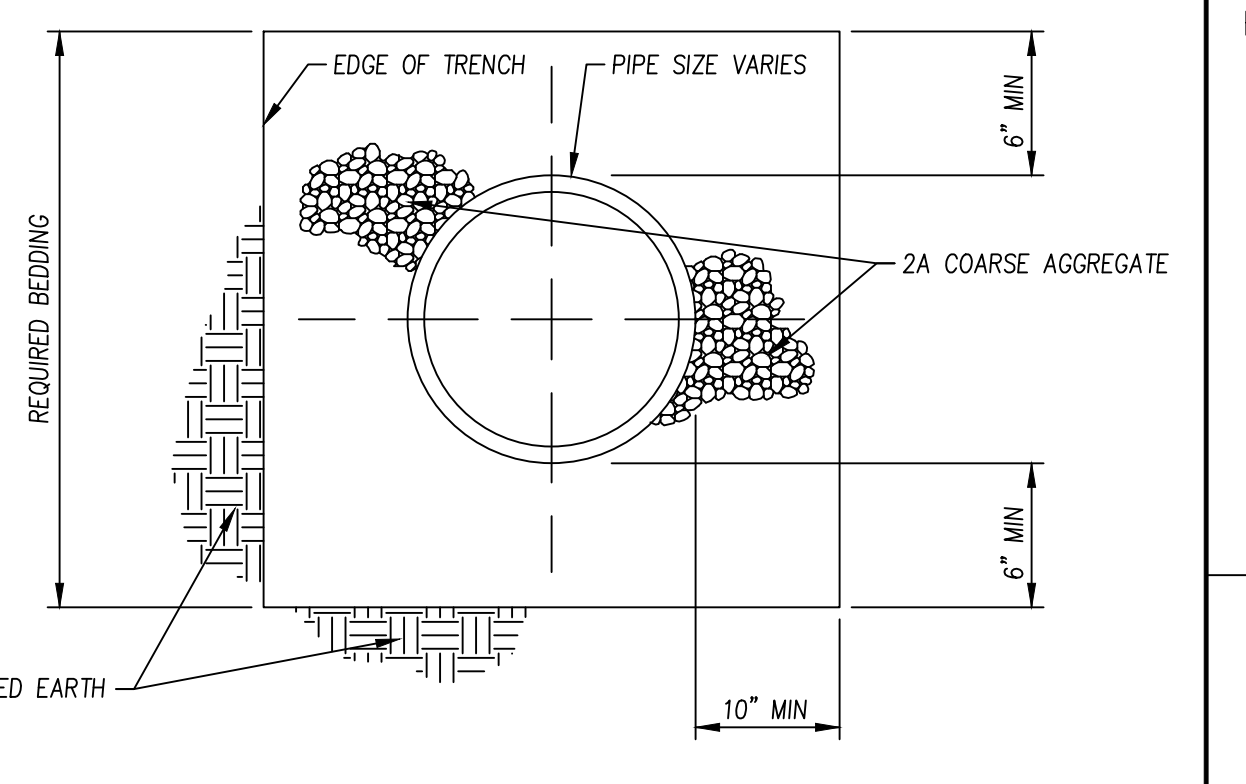
**FIRE HYDRANT DETAIL**  
NTS



**SECTION B**

- NOTES:
- ALL MALE PIPE THREADS ARE TO BE COATED WITH 1/2" WIDE PTFE (TEFLON) THREAD SEAL TAPE, MIL SPEC T27730A, 4 TO 6 WRAPS PER JOINT.

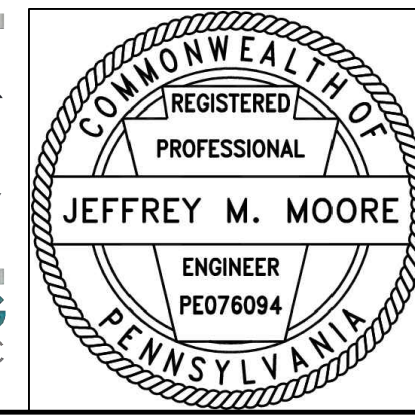
**2" TAPPED TEE W/2" BLOW OFF**  
NTS



**STANDARD PIPE BEDDING DETAIL**  
NTS

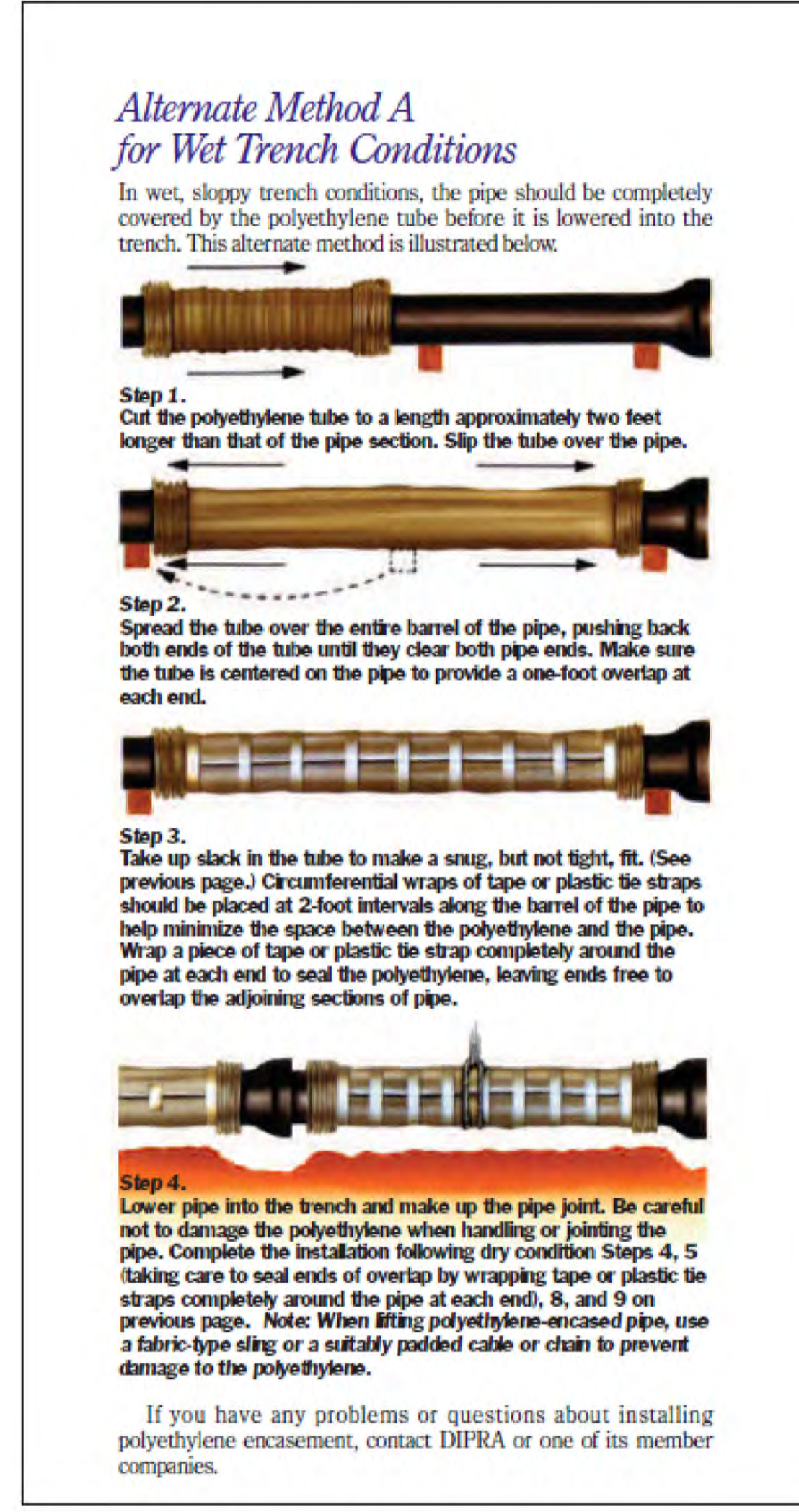
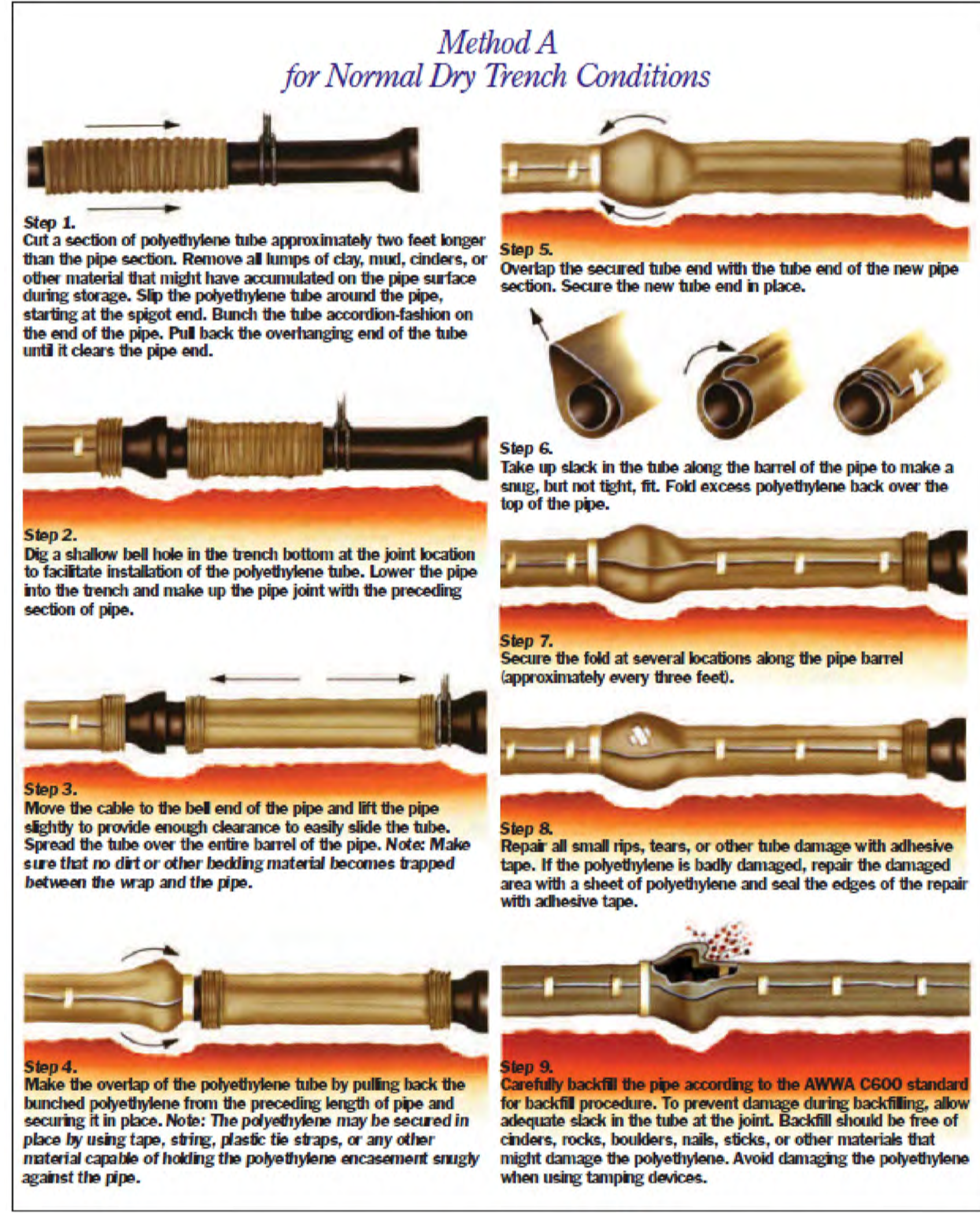
- NOTES:
- WB MEMBER MUST MAKE FULL CONTACT WITH CAP OR PLUG, AND MUST BE SUPPORTED TO PROVIDE 1" MINIMUM VERTICAL CLEARANCE FROM STAINLESS STEEL PIPE.
  - CONCRETE THRUST BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL. NO EXCAVATION IS PERMITTED DOWNSTREAM OF BLOCKING. CONSULT WITH THE ENGINEERING DEPT OF AQUA PA FOR MINIMUM PERMITTED DISTANCE.
  - ALL MALE PIPE THREADS ARE TO BE COATED WITH 1/2" WIDE PTFE (TEFLON) THREAD SEAL TAPE, MIL SPEC T27730A, 4 TO 6 WRAPS PER JOINT.

**STANDARD 2" BLOW OFF**  
NTS



AQUA PENNSYLVANIA, INCORPORATED 762 LANCASTER AVENUE, BRYN MAWR, PA., 19010			
PROJECT PLAN FOR: <b>LLOYD AVENUE PHASE III PROJECT</b> MISCELLANEOUS DETAILS CALN TWP & DOWNTOWNTOWN BORO, CHESTER COUNTY			
DRAWN BY:	CR	CHK'D BY:	JMM
DATE:	11/08/2021	SCALE:	N.T.S.
PROJECT No:	219.23	ACTIVITY No:	300002328
APPROVED:	Jeffrey M. Moore		EXT No: 20133-G
			PLATE: PP23, PP24
			<b>A - 67659</b>
			SHEET 10 OF 12





**REPAIRS:** REPAIR CUTS, TEARS, PUNCTURES, OR DAMAGE TO POLYETHYLENE WITH ADHESIVE TAPE OR WITH A SHORT LENGTH OF POLYETHYLENE SHEET, OR WITH A TUBE CUT OPEN, WRAPPED AROUND THE PIPE TO COVER THE DAMAGED AREA, AND SECURE IN PLACE.

### Appurtenances

**Pipe-shaped appurtenances**  
Cover bends, reducers, offsets, and other pipe-shaped appurtenances in the same manner as the pipe.

**Odd-shaped appurtenances**  
Wrap odd-shaped appurtenances such as valves, tees, and crosses with a flat sheet or split length of polyethylene tube by passing the sheet under and then over the appurtenance and bringing it together around the body of the appurtenance. Make seams by bringing the edges of the polyethylene together, folding over twice, and taping them down.

**Joints**  
Overlap joints as in normal installation; then tape the polyethylene securely in place at valve stems and other penetrations. When bolted-type joints are used, care should always be taken to prevent bolts or other sharp edges of the joint configuration from penetrating the wrap.

**Branches, blowoffs, air valves**  
To provide openings for branches, blowoffs, air valves, and similar appurtenances, make an X-shaped cut in the polyethylene and temporarily fold back the film. After installing the appurtenance, tape the slack securely to the appurtenance and repair the cut and any other damaged areas in the polyethylene with tape.

**Service taps**  
The preferred method of tapping polyethylene-encased Ductile Iron pipe involves wrapping two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. Then install the corporation stop directly through the tape and polyethylene. After the tap is made inspect the entire circumferential area for damage and make any necessary repairs.

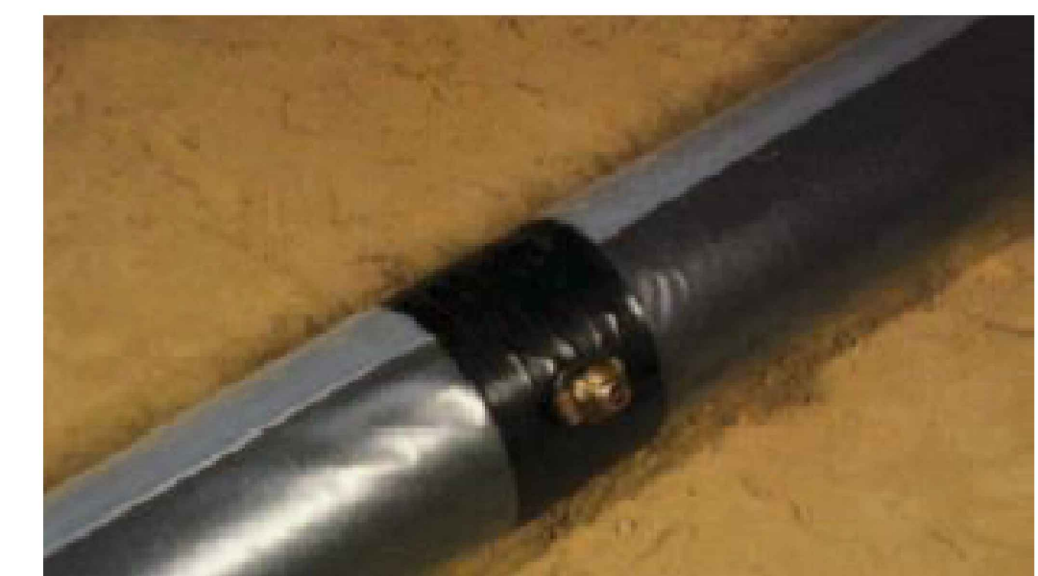
### Tapping Method



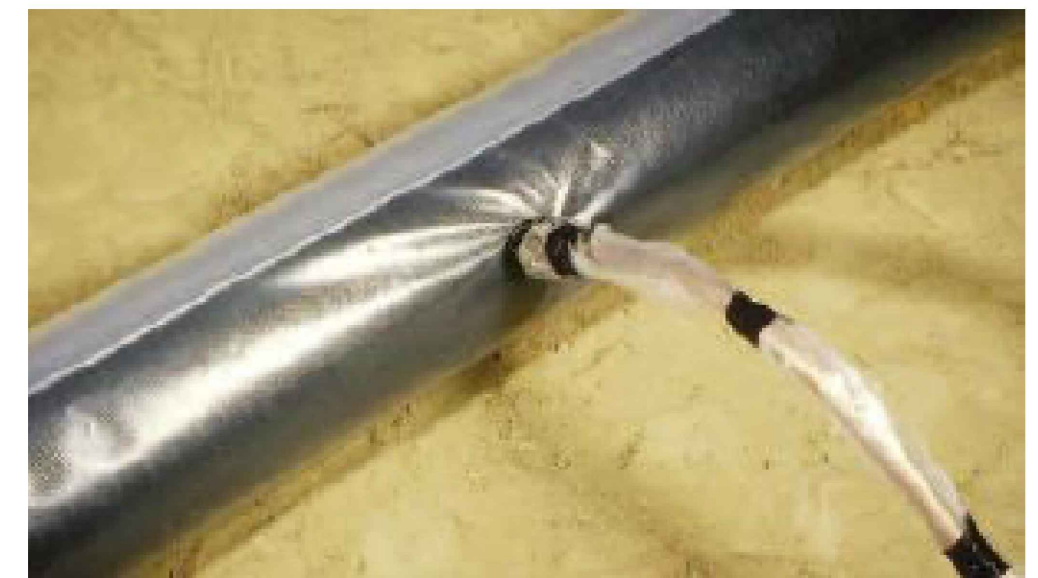
To perform the preferred method of tapping poly ethylene-encased Ductile Iron pipe, wrap two or three layers of poly ethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted.



Mount the tapping machine on the pipe area covered by the poly ethylene tape. Then make the tap and install the corporation stop directly through the tape and polyethylene.



After making the direct service connection, inspect the entire circumferential area for damage and make any necessary repairs.



### House Services

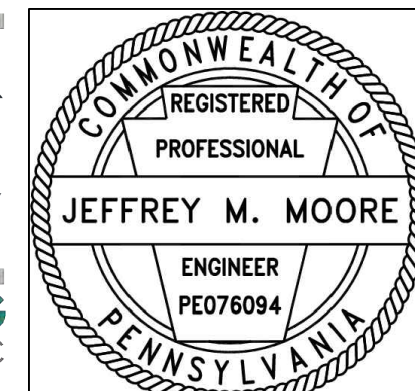
To minimize the possibility of dissimilar metal corrosion at service connections, wrap the corporation stop and a minimum clear distance of three feet of the copper service with polyethylene or a suitable dielectric tape.

NO	DATE	REVISION	INTL
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0	07/12/2023	DESIGN COMPLETION	PG

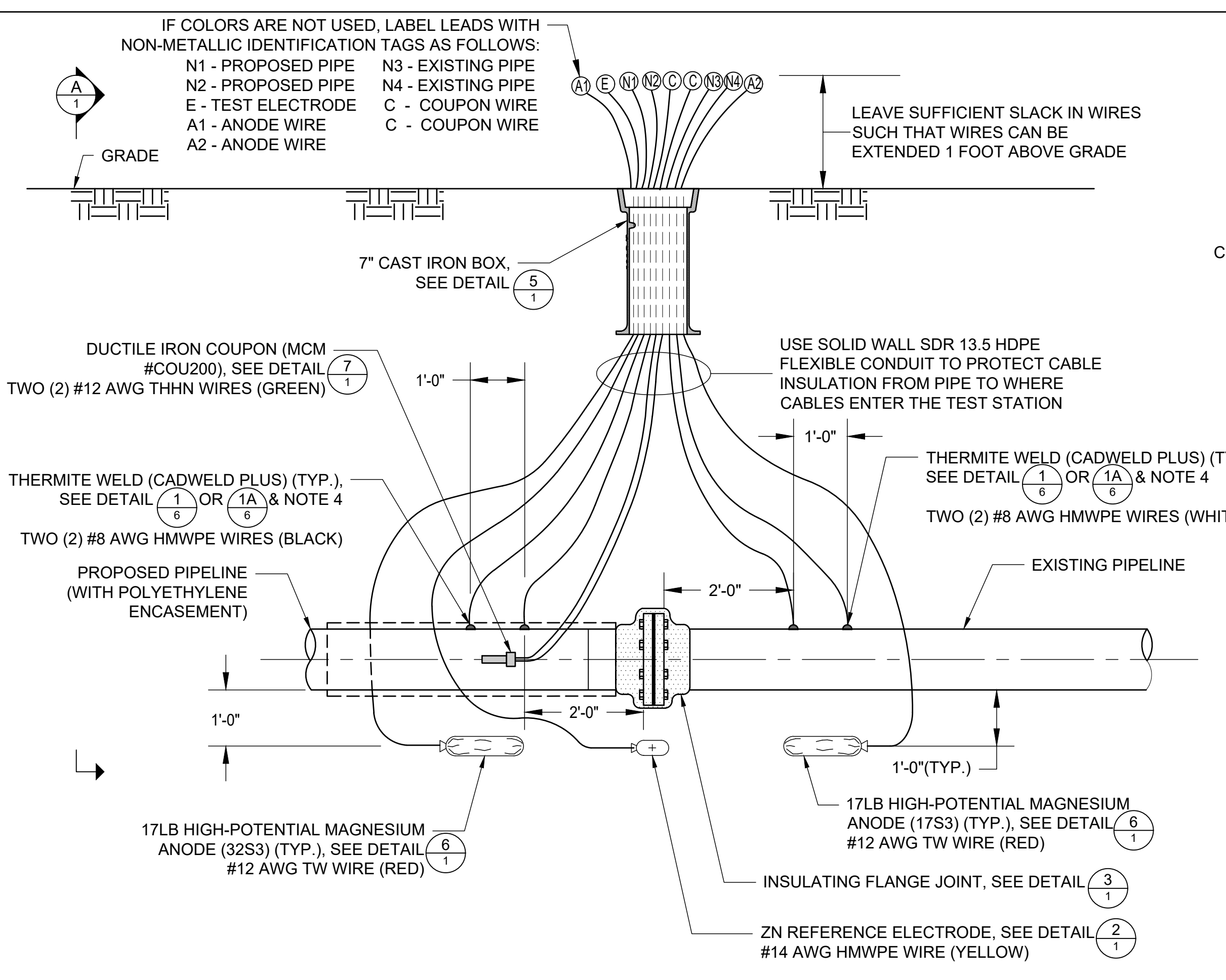
AQUA PENNSYLVANIA, INCORPORATED  
762 LANCASTER AVENUE, BRYN MAWR, PA., 19010

PROJECT PLAN FOR:  
**LLOYD AVENUE PHASE III PROJECT**  
POLYETHYLENE ENCASUREMENT DETAILS  
CALN TWP & DOWNINGTOWN BORO, CHESTER COUNTY

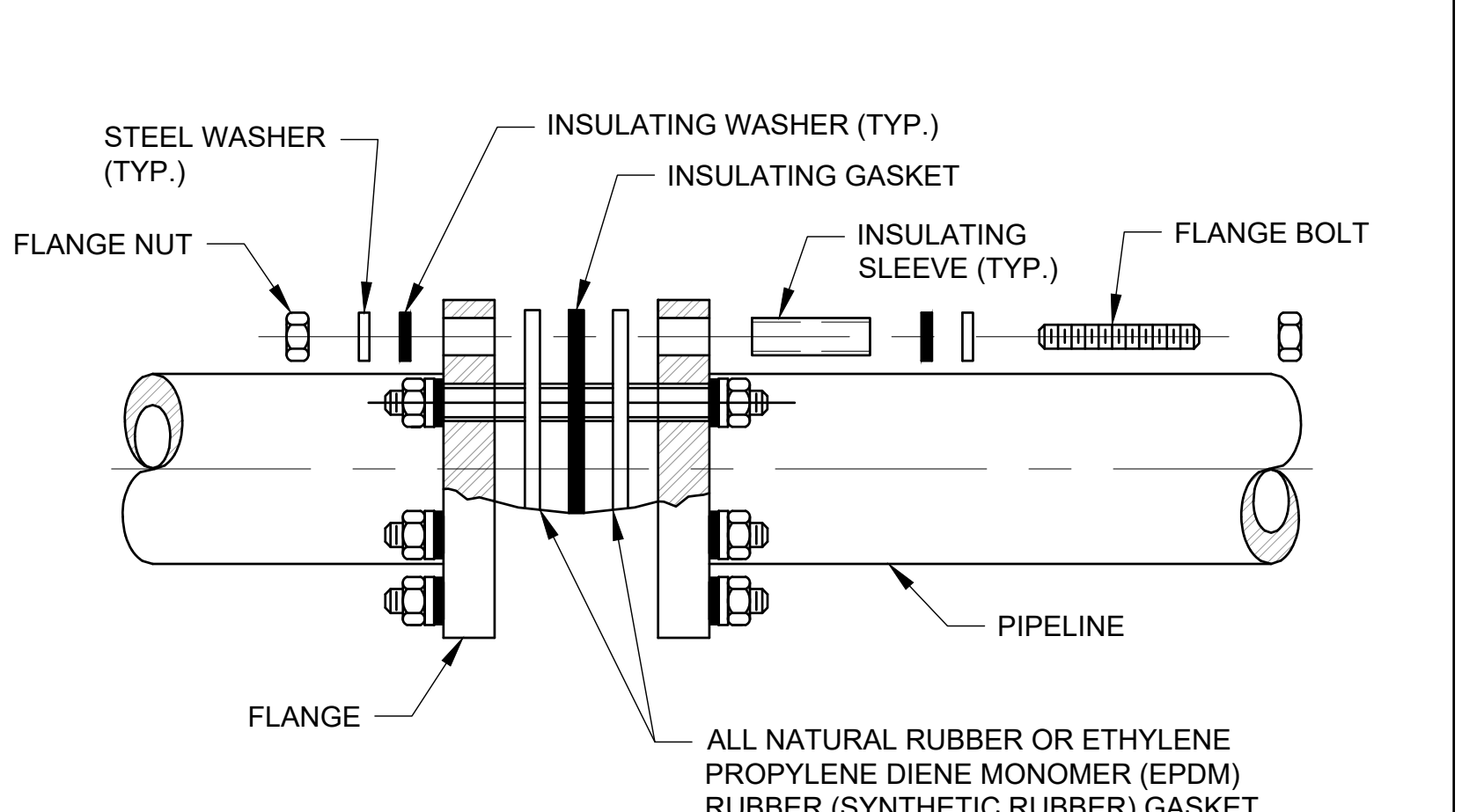
DRAWN BY: CR	CHK'D BY: JMM	EXT No: 20133-G
DATE: 11/08/2021	SCALE: N.T.S.	PLATE: PP23, PP24
PROJECT No: 219.23	ACTIVITY No: 300002328	<b>A - 67659</b>
APPROVED	<i>Jeffrey M. Moore</i>	SHEET 12 OF 12



FILE: CORRPRO C:\USERS\PAUL\CORRPRO - AEGION\AQUA\2021\_08\_FOLDERS\VALVEBOX - AQUA PA - 2021\_08\_01 SERVICES\CONTRACT - BRN MAR PA15 - CAD DRAWINGS\STANDARD DETAILS\AQUA\U40-D220334-C-01(140403595\_07\_DETAILS\_0142020)P2P.DWG [1]



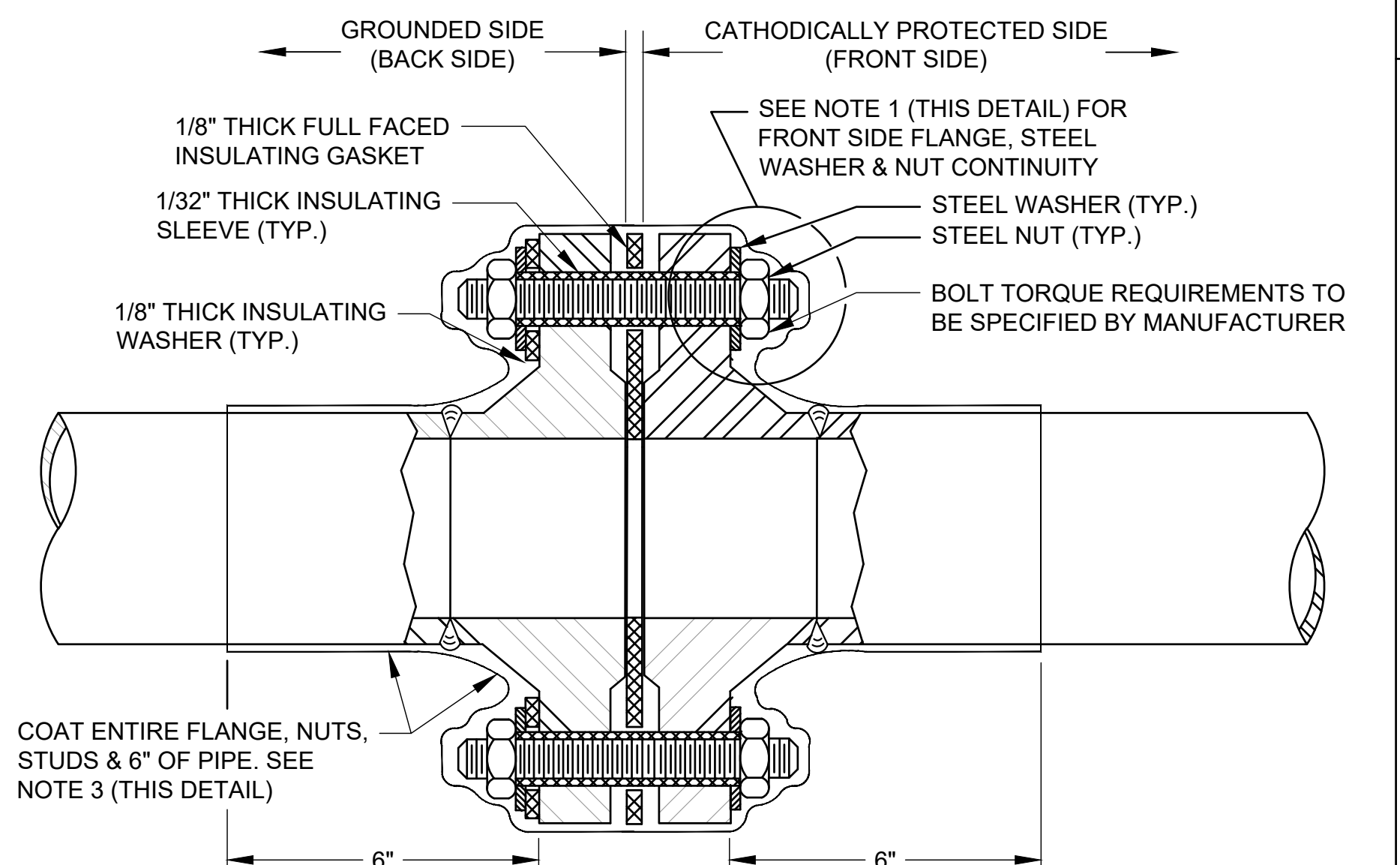
**1** INSULATING FLANGE JOINT TEST STATION WITH MAG. ANODES, COUPON & ELECTRODE - TYPICAL



- NOTES:**
- OBTAIN FLANGE INSULATING KIT FOR CLASS 150, ANSI RATING, DOUBLE PHENOLIC INSULATING WASHERS 1/8" THICK, PHENOLIC INSULATING SLEEVES 1/32" THICK AND NEOPRENE FACED PHENOLIC GASKET - TYPE "E" 1/8" THICK AS MANUFACTURED BY PSI, MALONEY OR APPROVED EQUAL. BOLT TORQUE REQUIREMENTS TO BE SPECIFIED BY MANUFACTURER.
  - CLEAN ALL BOLTS, NUTS, AND FLANGES WITH APPROVED CLEANING SOLVENT TO REMOVE ALL LUBRICATING OIL & GREASE.
  - COAT INTERNALLY EACH FLANGE AND PIPE FOR A DISTANCE OF 3 FT. PRIOR TO ASSEMBLY OF INSULATING COMPONENTS.
  - AFTER ASSEMBLY OF INSULATING COMPONENTS AND PRIOR TO THE COATING OF THE FLANGE, THE ELECTRICAL PROPERTIES OF THE INSULATING FLANGE MUST BE CHECKED AND APPROVED. (2,000,000 OHMS OR GREATER FROM STUD TO FLANGE).
  - COAT INSULATING FLANGE IN ACCORDANCE WITH DETAIL 4

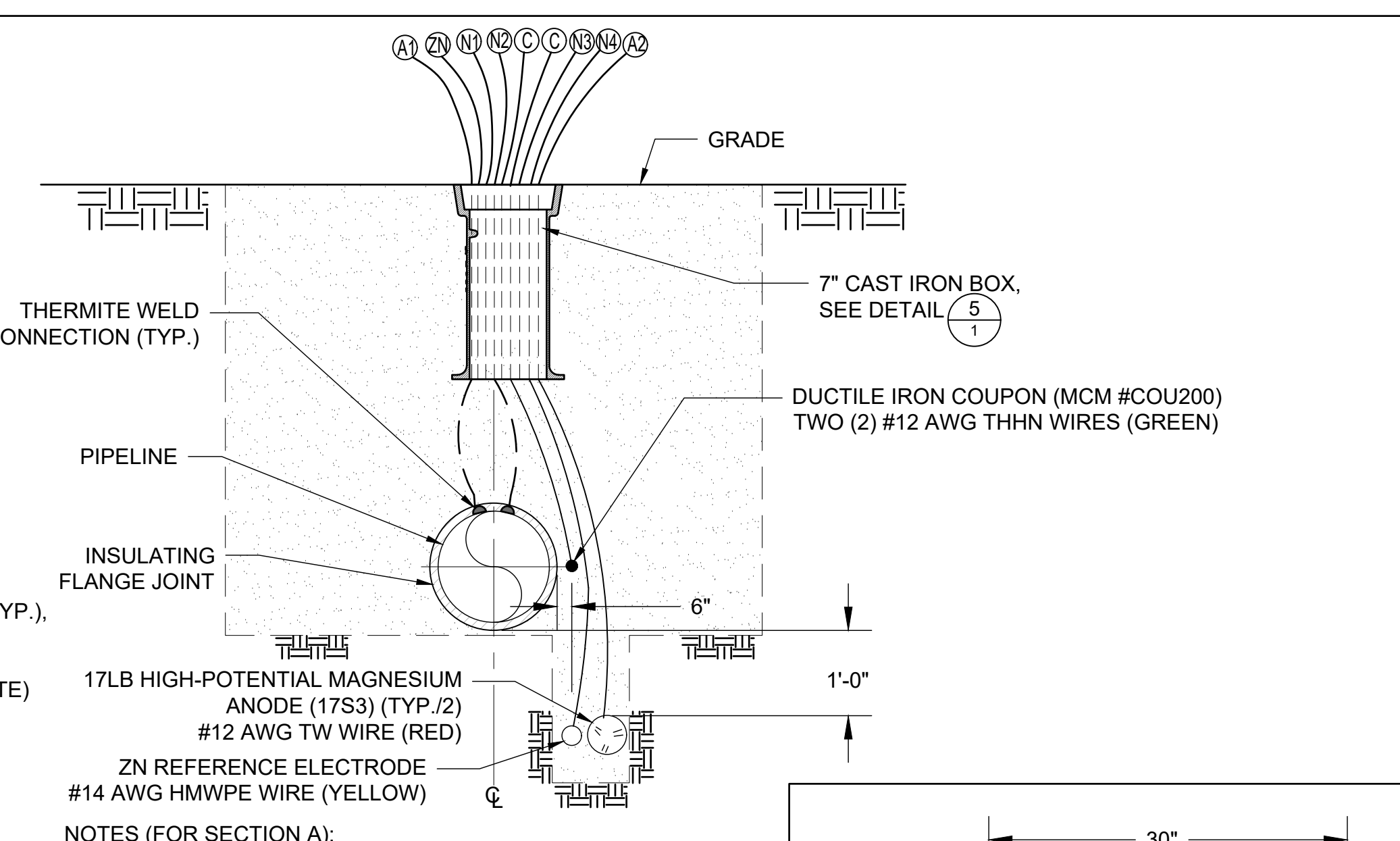
**3** TYPICAL INSULATING FLANGE COMPONENTS

NOTE: FLANGE IJ KITS ARE NOT PROVIDED BY CORRPRO



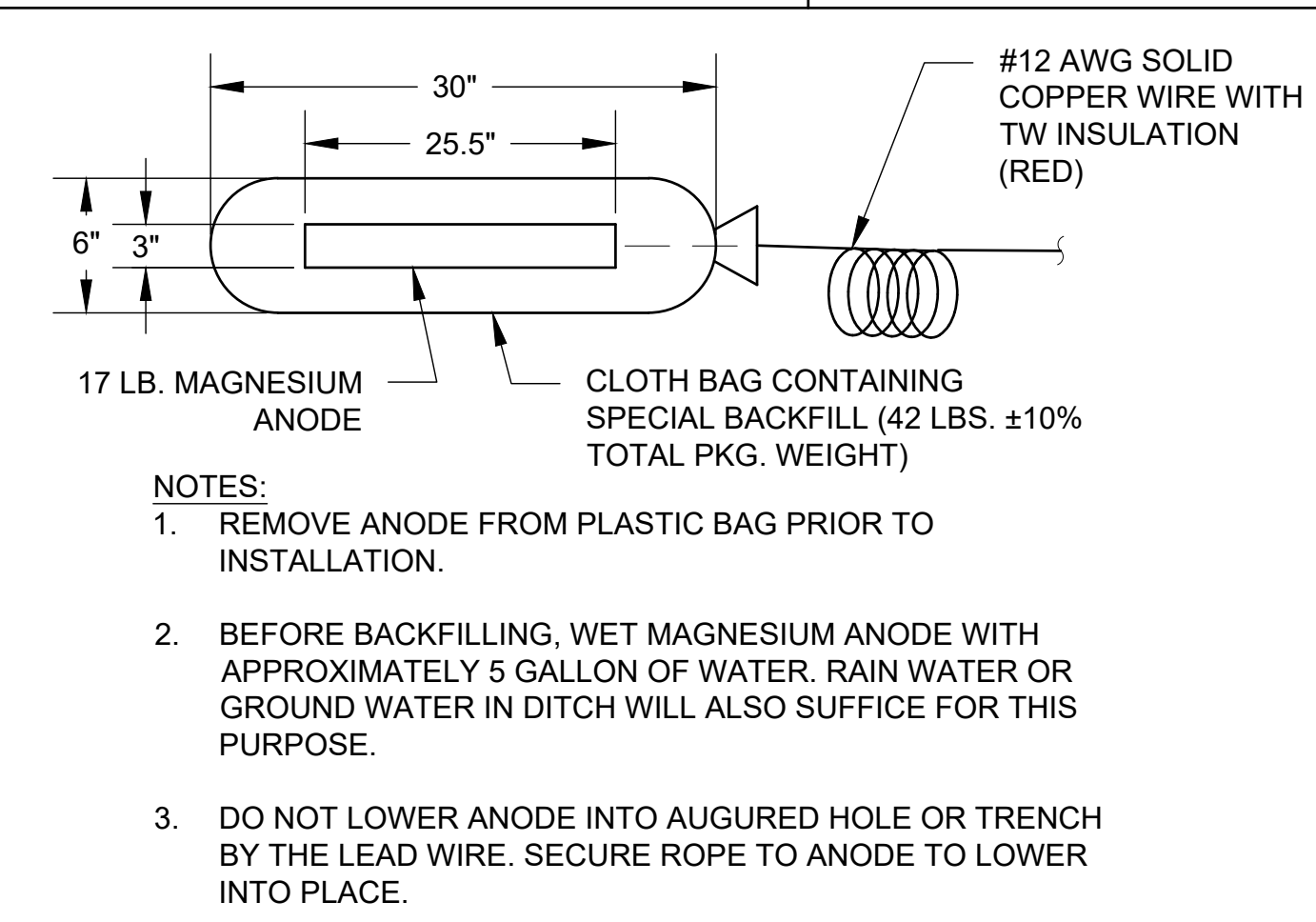
- NOTES:**
- REMOVE DIRT, GREASE AND OIL INCLUDING VISIBLE MOISTURE AND FROST IN ACCORDANCE WITH THE REQUIREMENT OF SSPC-SP1 "SOLVENT CLEANING". REMOVE LOOSE RUST, PAINT AND FOREIGN MATTER BY HAND TOOL CLEANING IN ACCORDANCE WITH SSPC-SP2 OR SP3, "HAND TOOL CLEANING" OR "POWER TOOL CLEANING", ON THE FRONT SIDE ONLY, ENSURE GOOD ELECTRICAL CONTACT BETWEEN THE FLANGE, STEEL WASHER & NUT.
  - AFTER ASSEMBLY OF INSULATING COMPONENTS AND PRIOR TO COATING OF THE FLANGE, THE ELECTRICAL PROPERTIES OF THE INSULATING FLANGE MUST BE CHECKED.
  - COAT ENTIRE FLANGE WITH A WAX-TYPE FILLER AND FIBER TAPE COATING SUCH AS DENSO OR TRENTON OR SHRINK WRAP.
  - COAT INSIDE OF THE FLANGE/PIPE WITH AN NSF 61 APPROVED EPOXY. THE COATED LENGTH DEPENDS ON THE PIPE DIAMETER. FOR THE PIPE UP TO 12"Ø, 6" COATED LENGTH MEASURED FROM THE END OF FLANGE; FOR THE PIPE GREATER THAN 12"Ø, THE VALUE OF THE COATED LENGTH IS PART OF THE DESIGN.

**4** TYPICAL INSULATING FLANGE COATING

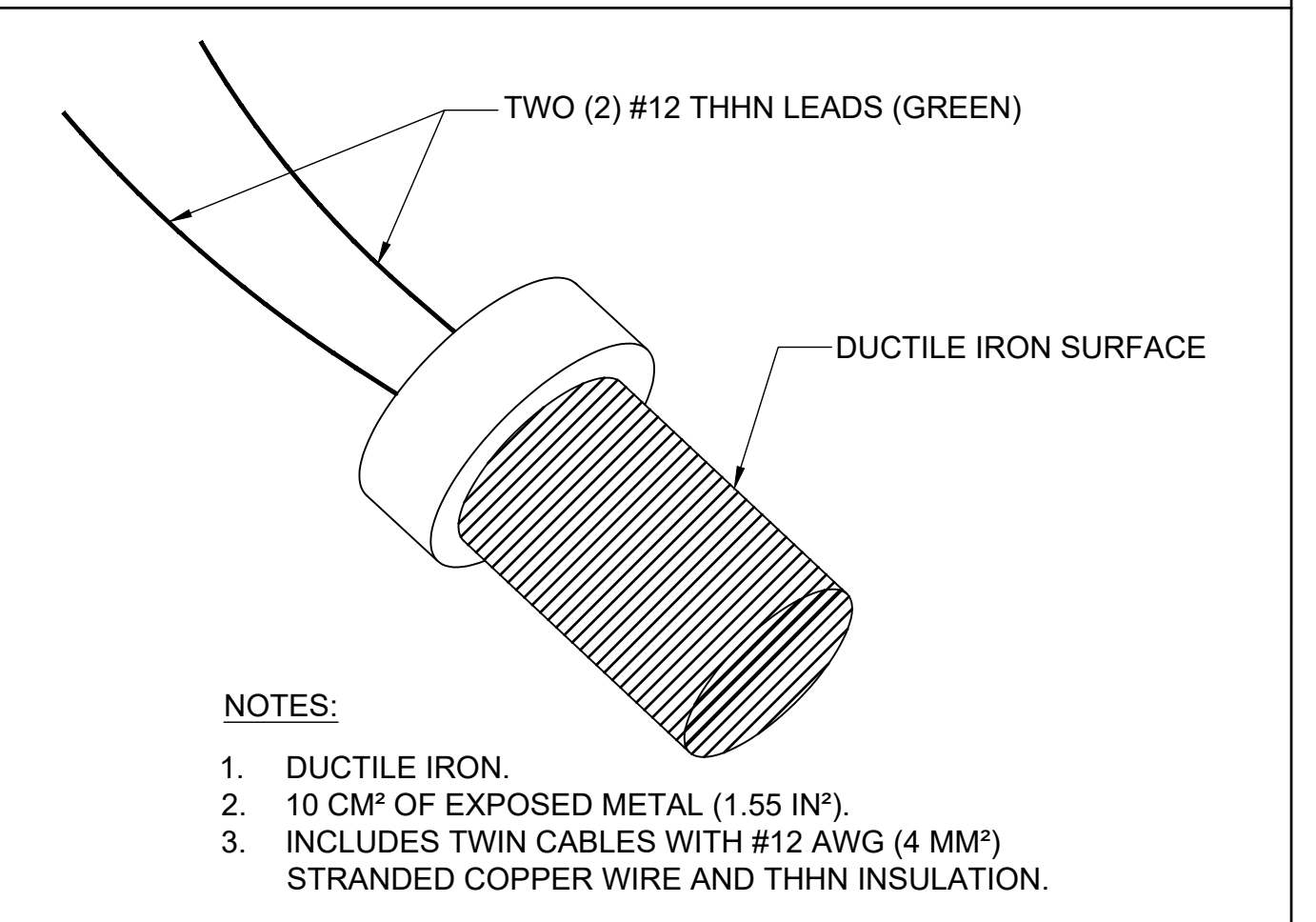


- NOTES (FOR SECTION A):**
- ONLY TWO(2) TEST WIRES SHOWN FOR CLARITY.
  - ANODES, COUPON & ELECTRODE SHALL NOT COME IN CONTACT WITH SAND BACKFILL
- SECTION A-A**
- NOTES:**
- LABEL ALL WIRES AS SHOWN IN DETAIL (IF COLORED WIRE NOT USED).
  - PIPING CONFIGURATION SHOWN IS TYPICAL.
  - IJ SHOULD BE COVERED BY DENSO TAPE PER DETAIL 4 ON THIS SHEET.
  - THERMITE WELDS SHOULD BE COATED IN BITUMASTIC.
  - COATING INSULATING FLANGE PER DETAIL 4/1
  - PIPING BONDING PER DETAIL 2/6, 3/6 OR 5/7

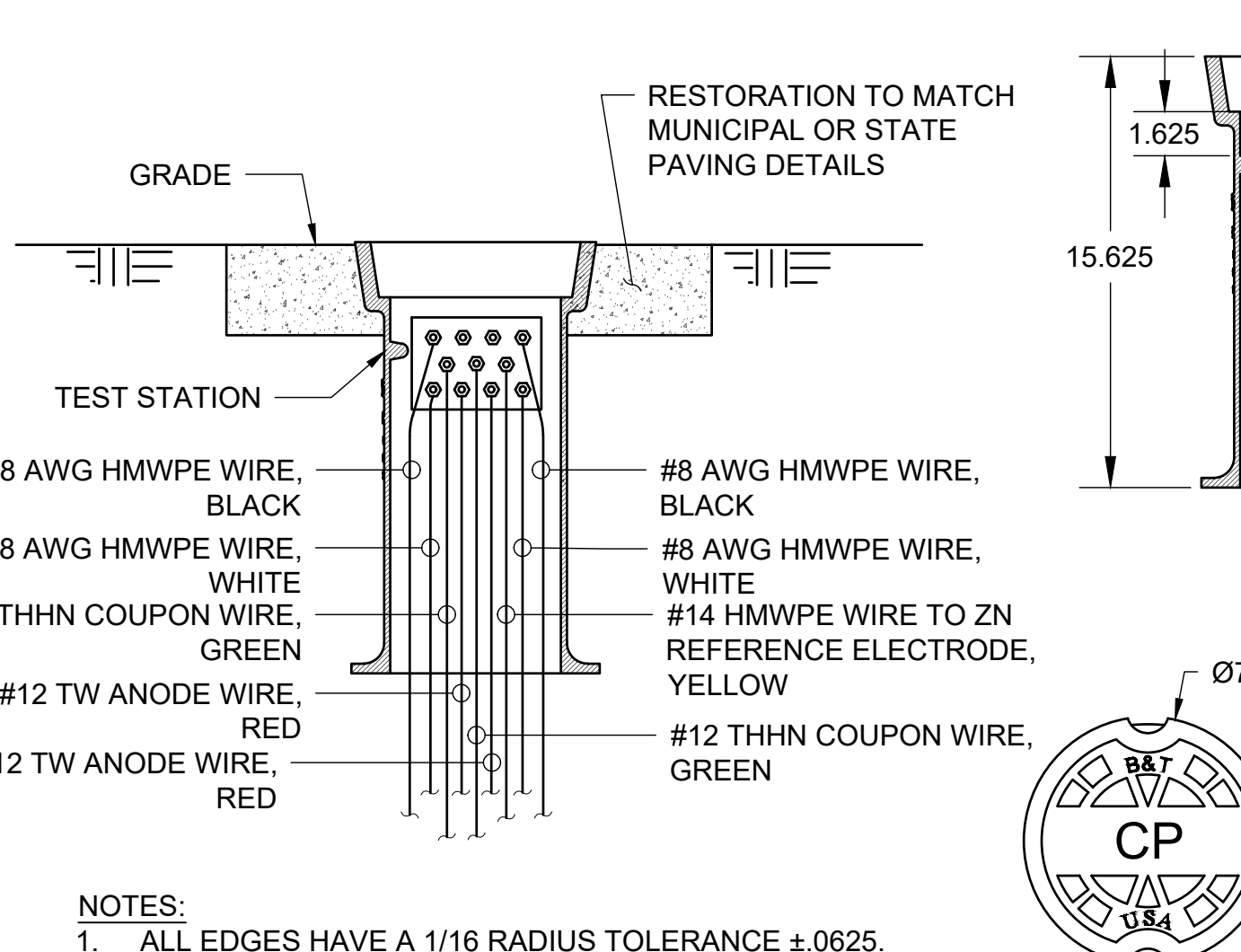
**2** ZINC REFERENCE ELECTRODE (FACTORY MANUFACTURED)



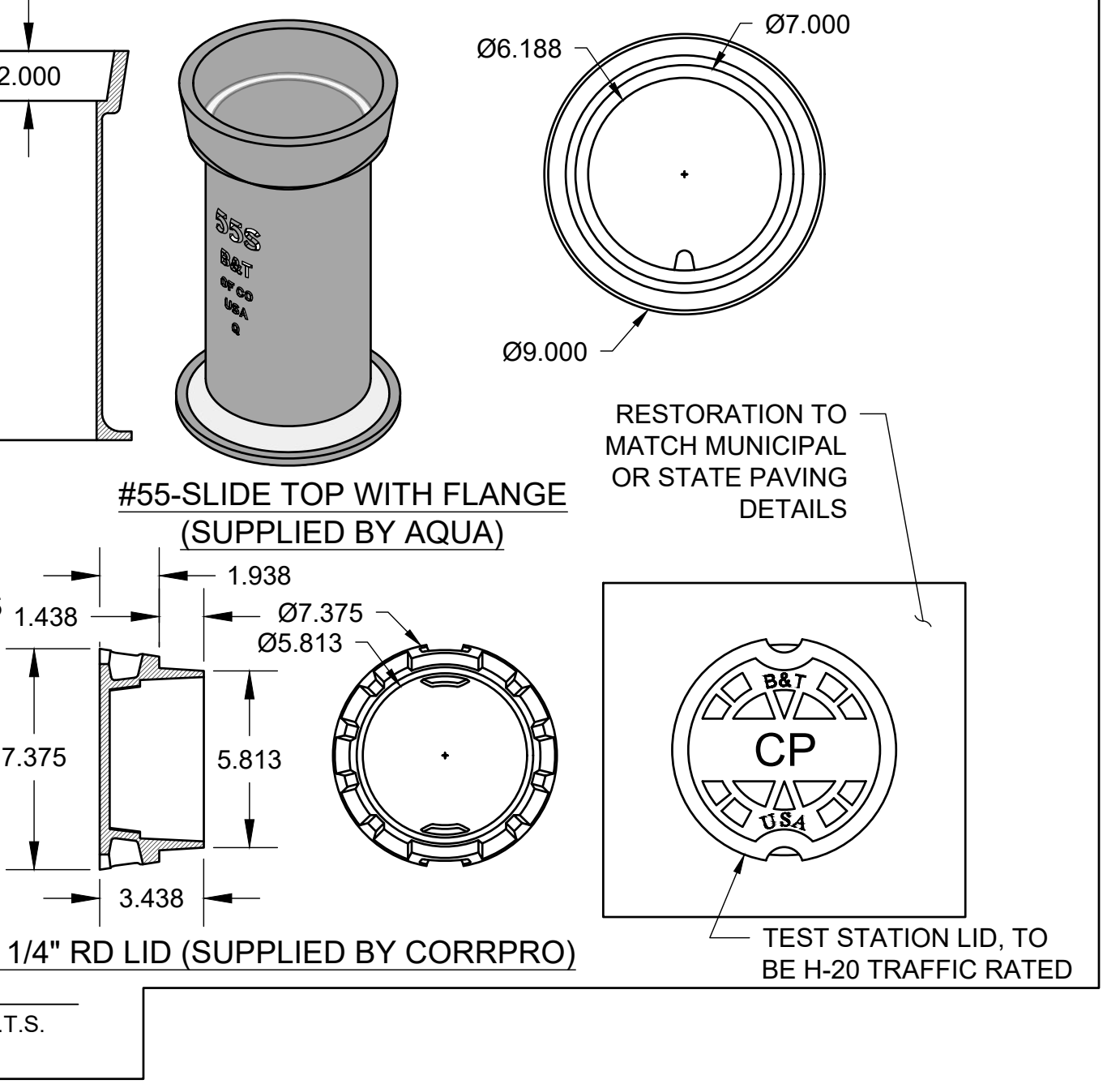
**6** 17 LB. MAGNESIUM ANODE - TYPE 17S3 (FACTORY MANUFACTURED)



**7** MILLER DUCTILE IRON COUPON MODEL: COU200 (FACTORY MANUFACTURED)



**5** TYPICAL 7-INCH VALVE BOX, LID & WIRING INSULATING FLANGE JOINT TEST STATION



**5** TYPICAL 7-INCH VALVE BOX, LID & WIRING INSULATING FLANGE JOINT TEST STATION

**STANDARD INSULATING FLANGE TEST STATION AND INSULATING FLANGE DETAILS**

DETAIL KEY

DETAIL IDENTIFICATION "NUMBER" OR SECTION IDENTIFICATION "LETTER"

SHEET NUMBER ON WHICH SECTION OR DETAIL IS SHOWN

Drawing prepared by:

**corrpro**

An Aegion® Company

NOTICE

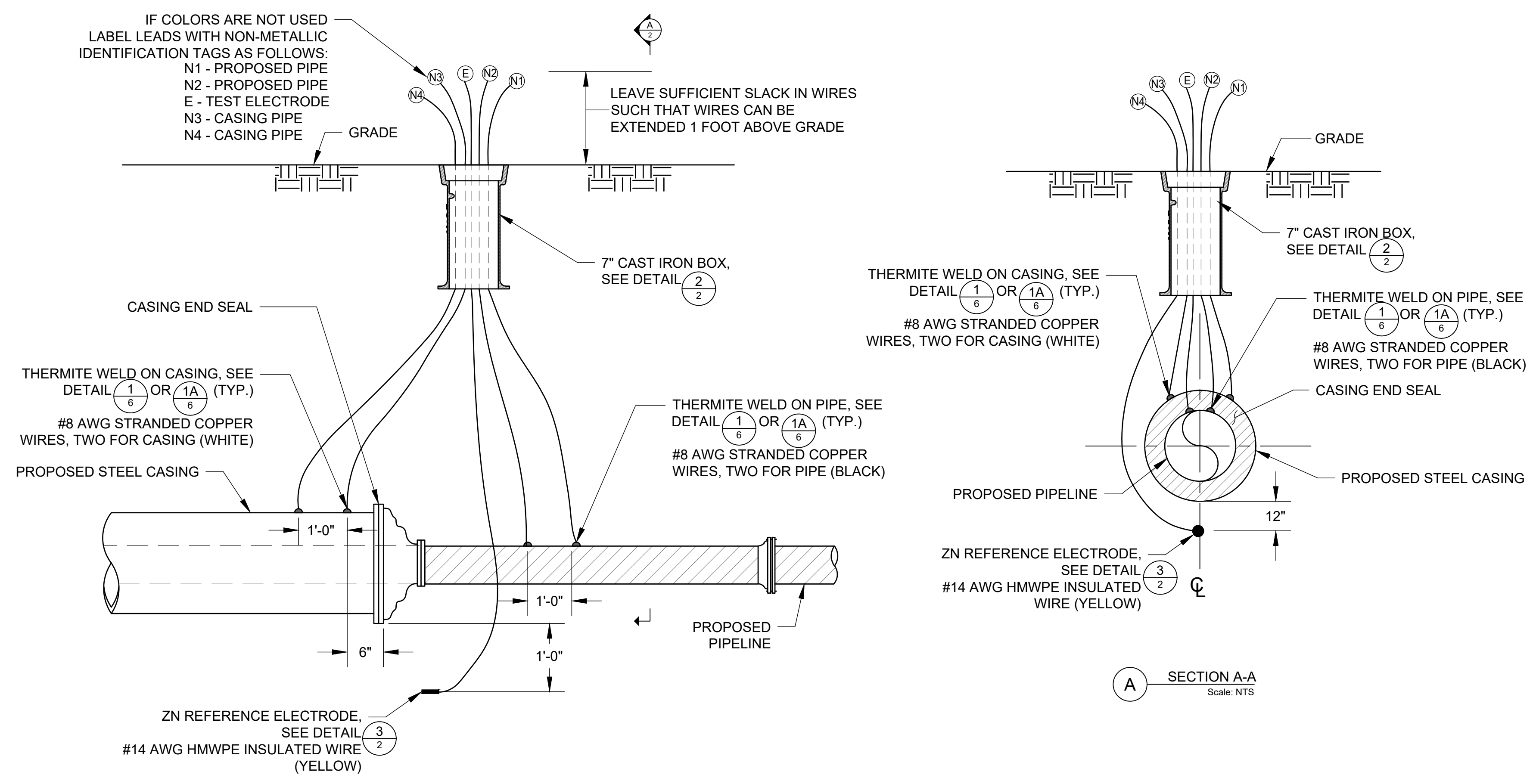
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CCl Cad File: 340403595\_U40-D220334-C-001  
 CCl Dwg. No.: AQUA---

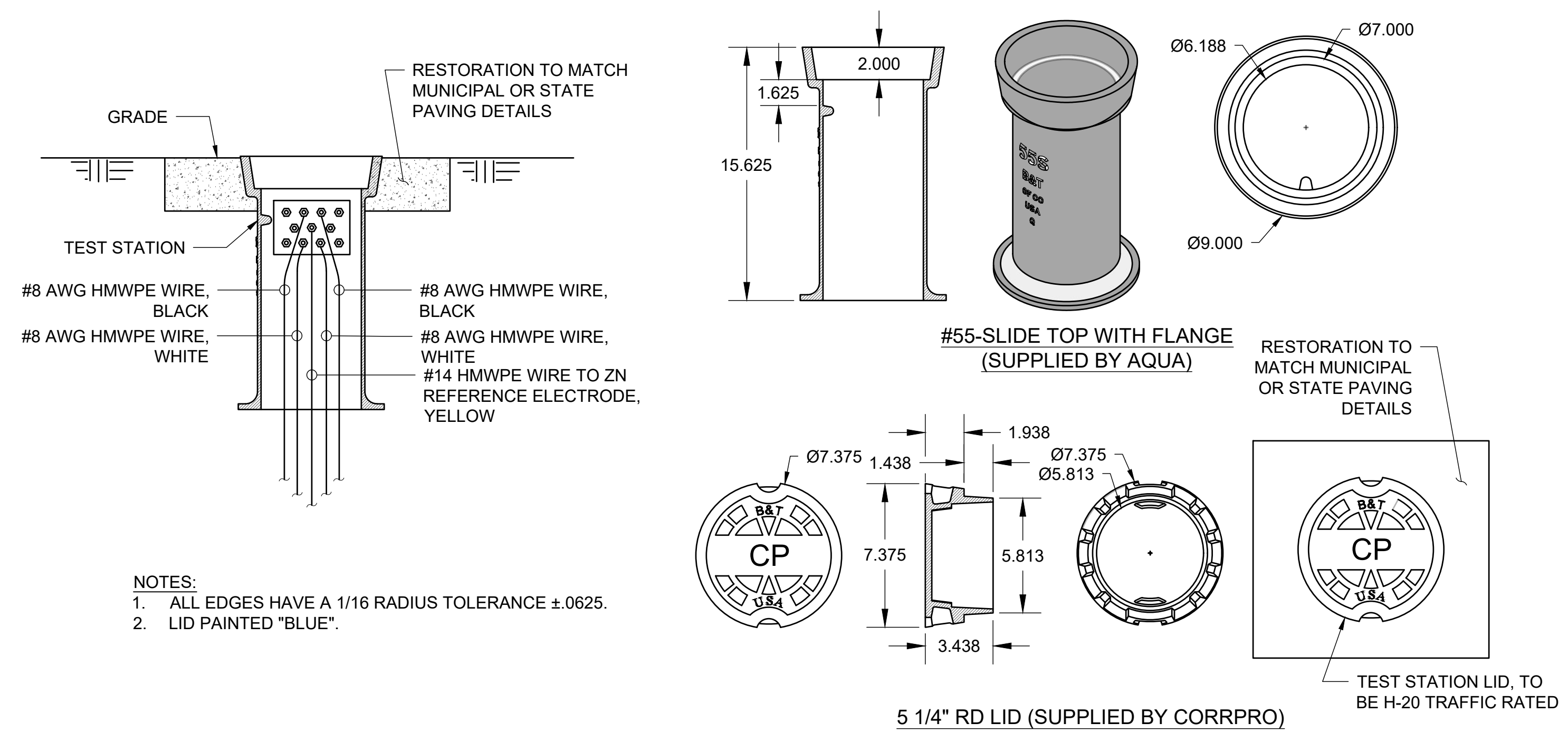
Sht. 1 of 8

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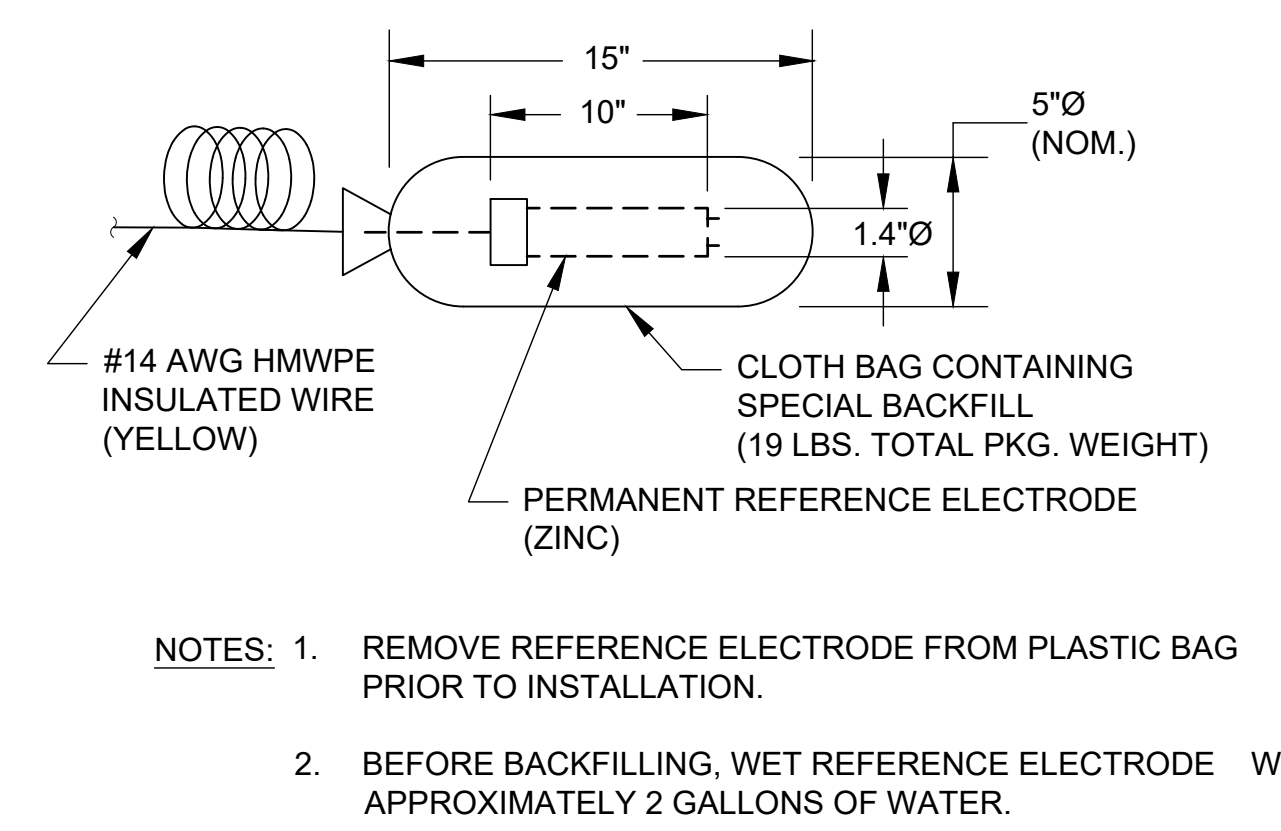
**1** CASING TEST STATION - TYPICAL  
 2

SCALE: N.T.S.



**2** TYPICAL 7-INCH VALVE BOX, LID & WIRING  
 2

SCALE: N.T.S.



**3** ZINC REFERENCE ELECTRODE  
 2 (FACTORY MANUFACTURED)

SCALE: N.T.S.

**CASING TEST STATION DETAIL**

*Drawing prepared by:*

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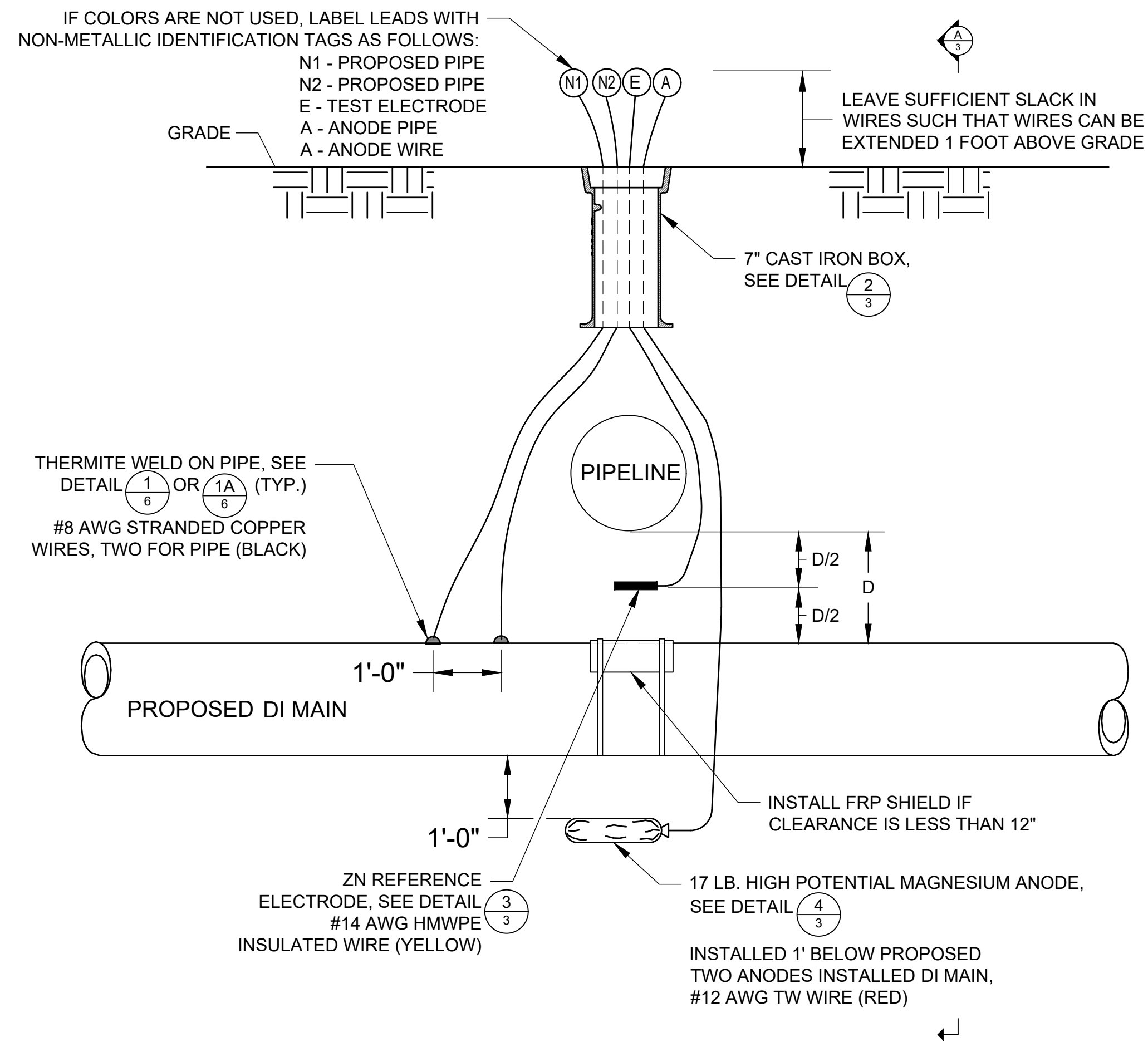
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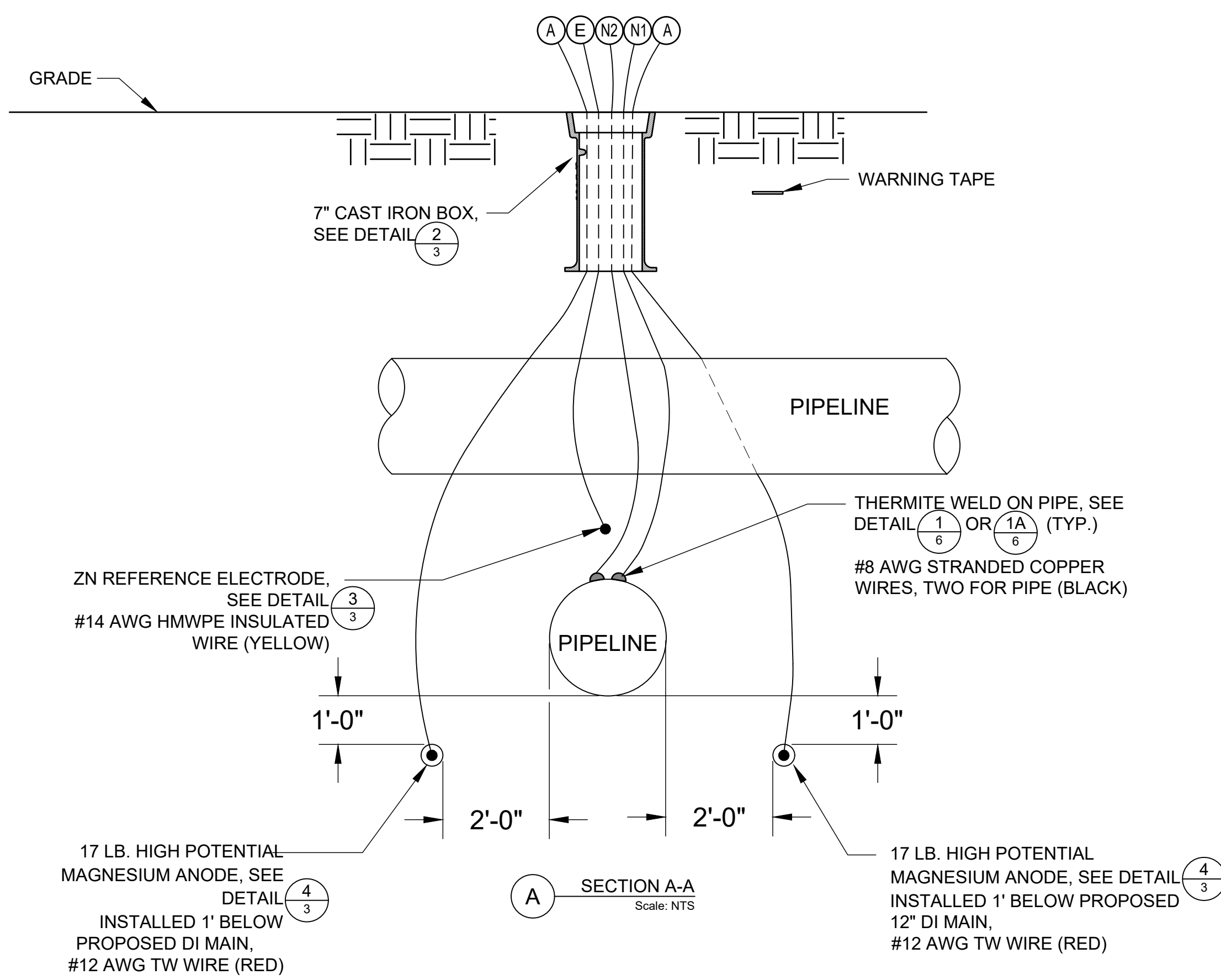
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Sht. 2 of 8

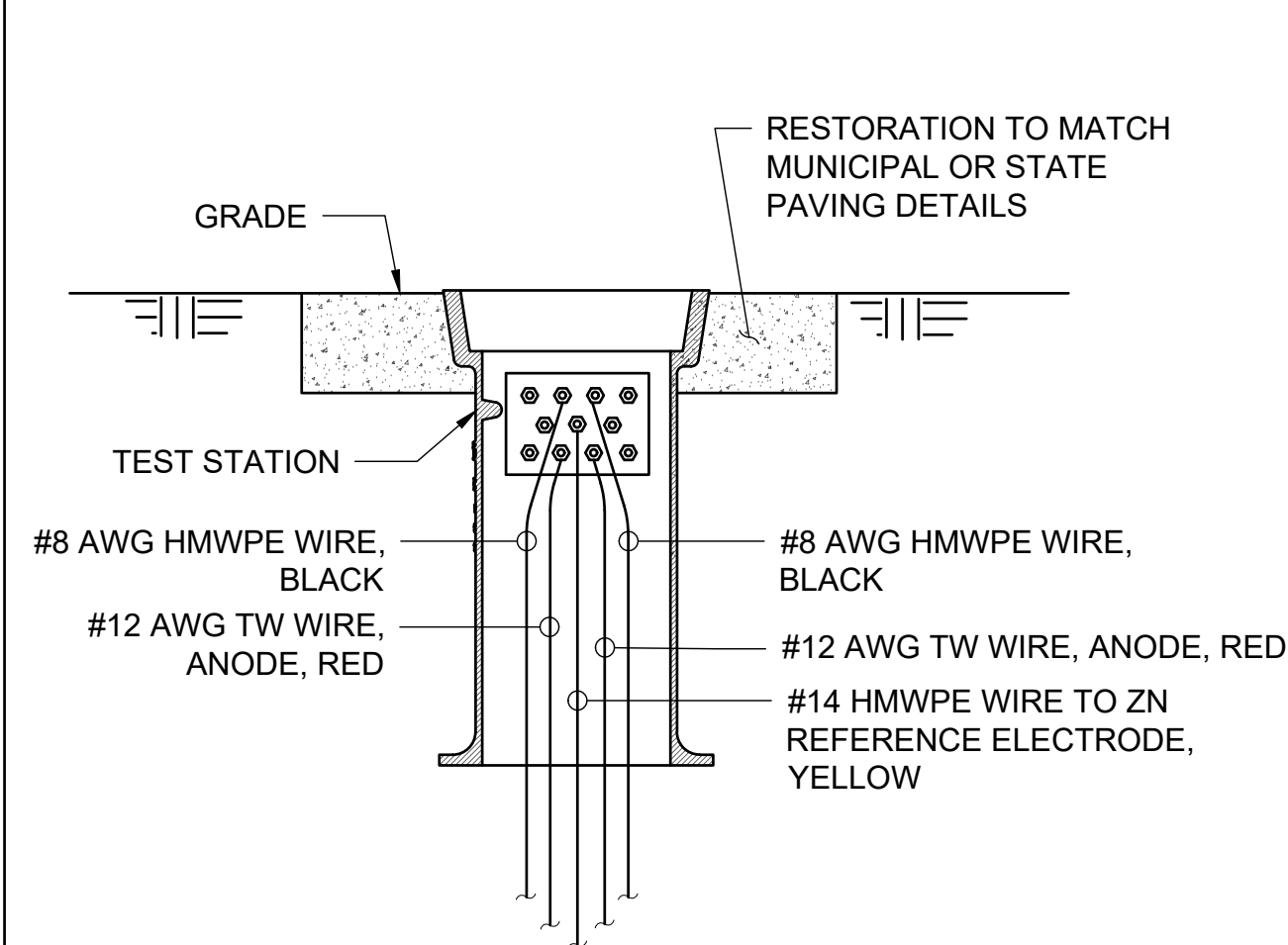
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**1** INTERFERENCE MITIGATION TEST STATION - TYPICAL



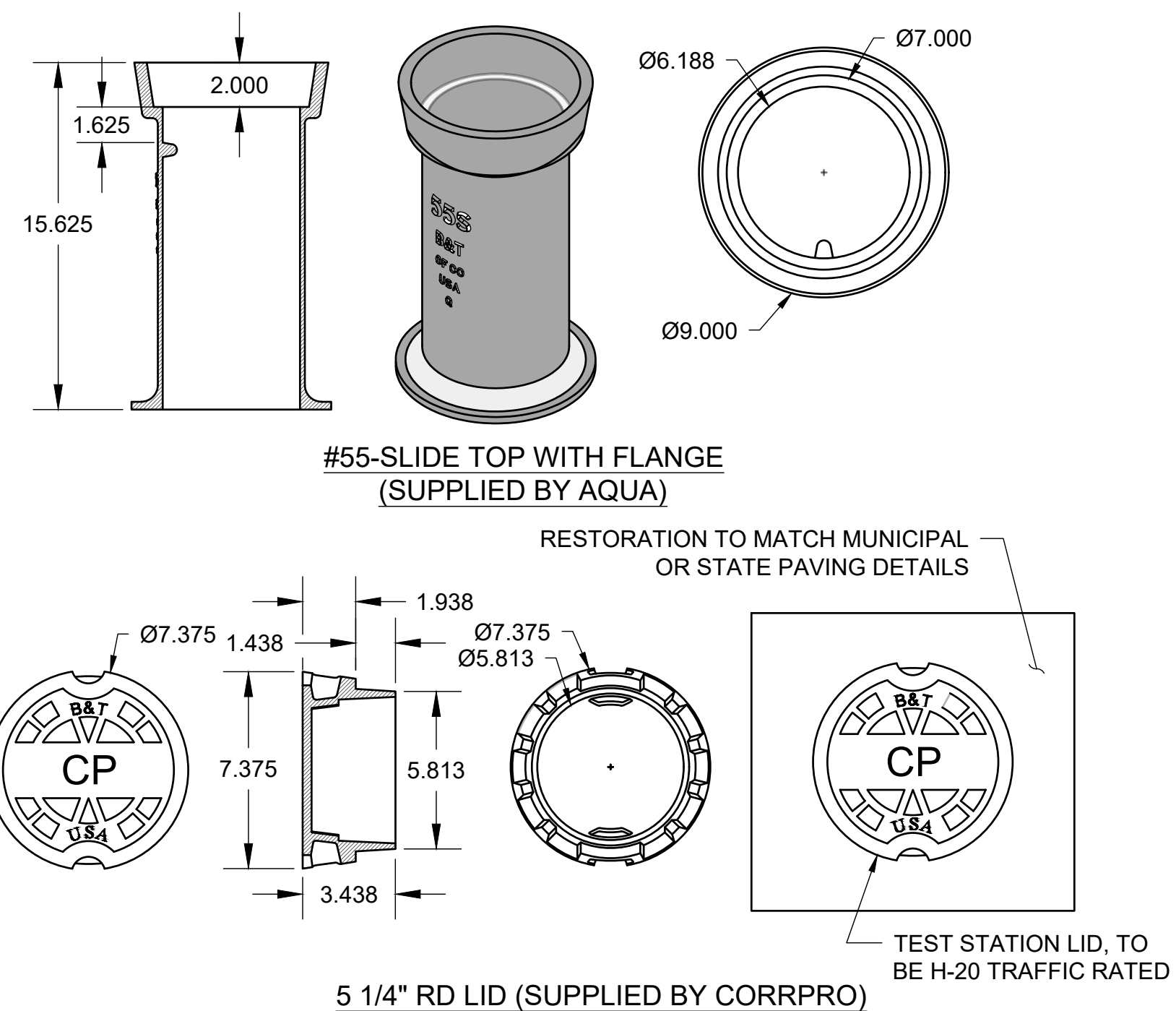
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- NOTES:
1. ALL EDGES HAVE A 1/16 RADIUS TOLERANCE ±.0625.
  2. LID PAINTED "BLUE".

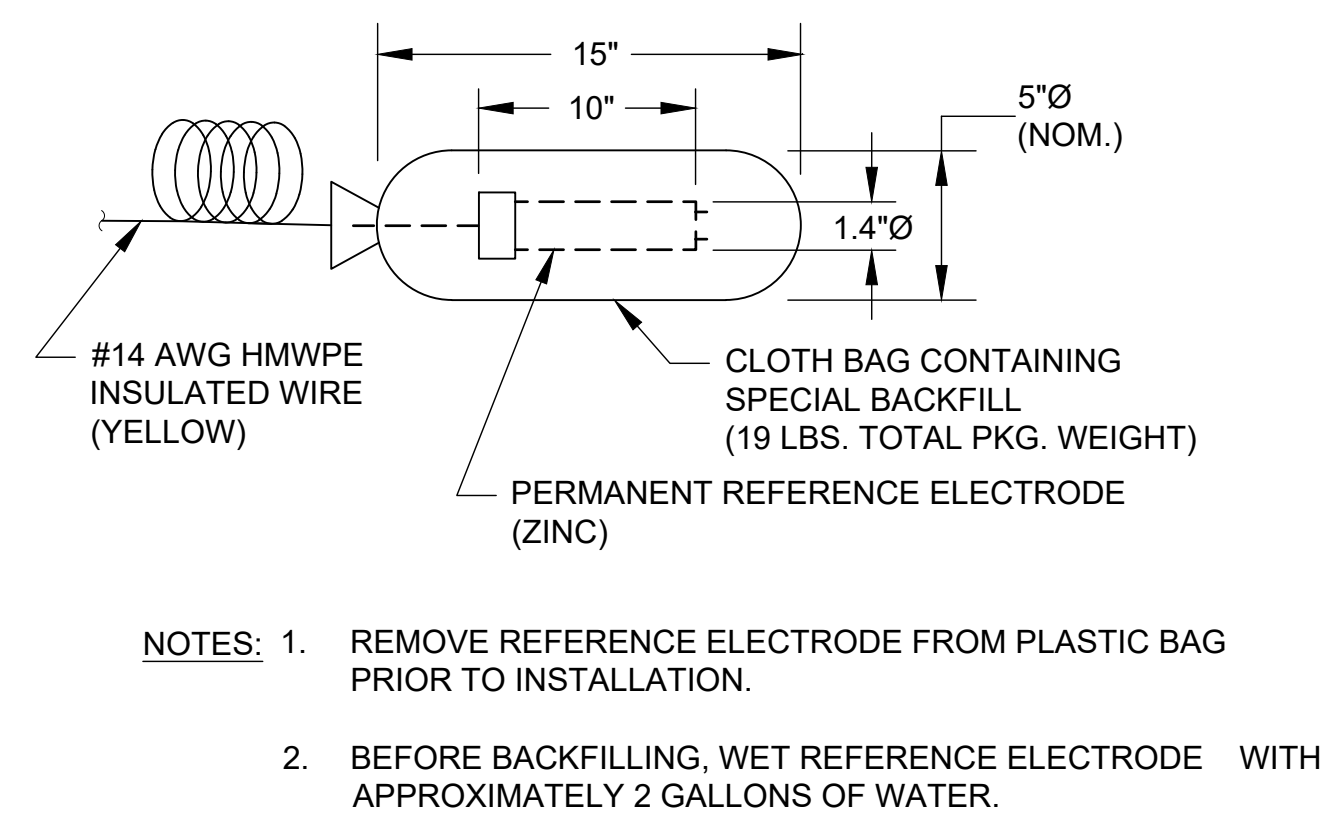
**2** TYPICAL 7-INCH VALVE BOX, LID & WIRING  
**3** INTERFERENCE MITIGATION TEST STATION

SCALE: N.T.S.



**3** ZINC REFERENCE ELECTRODE  
**3** (FACTORY MANUFACTURED)

SCALE: N.T.S.



**4** 17 LB. MAGNESIUM ANODE - TYPE 17S3  
**3** (FACTORY MANUFACTURED)

SCALE: N.T.S.

**INTERFERENCE MITIGATION TEST STATION DETAIL**

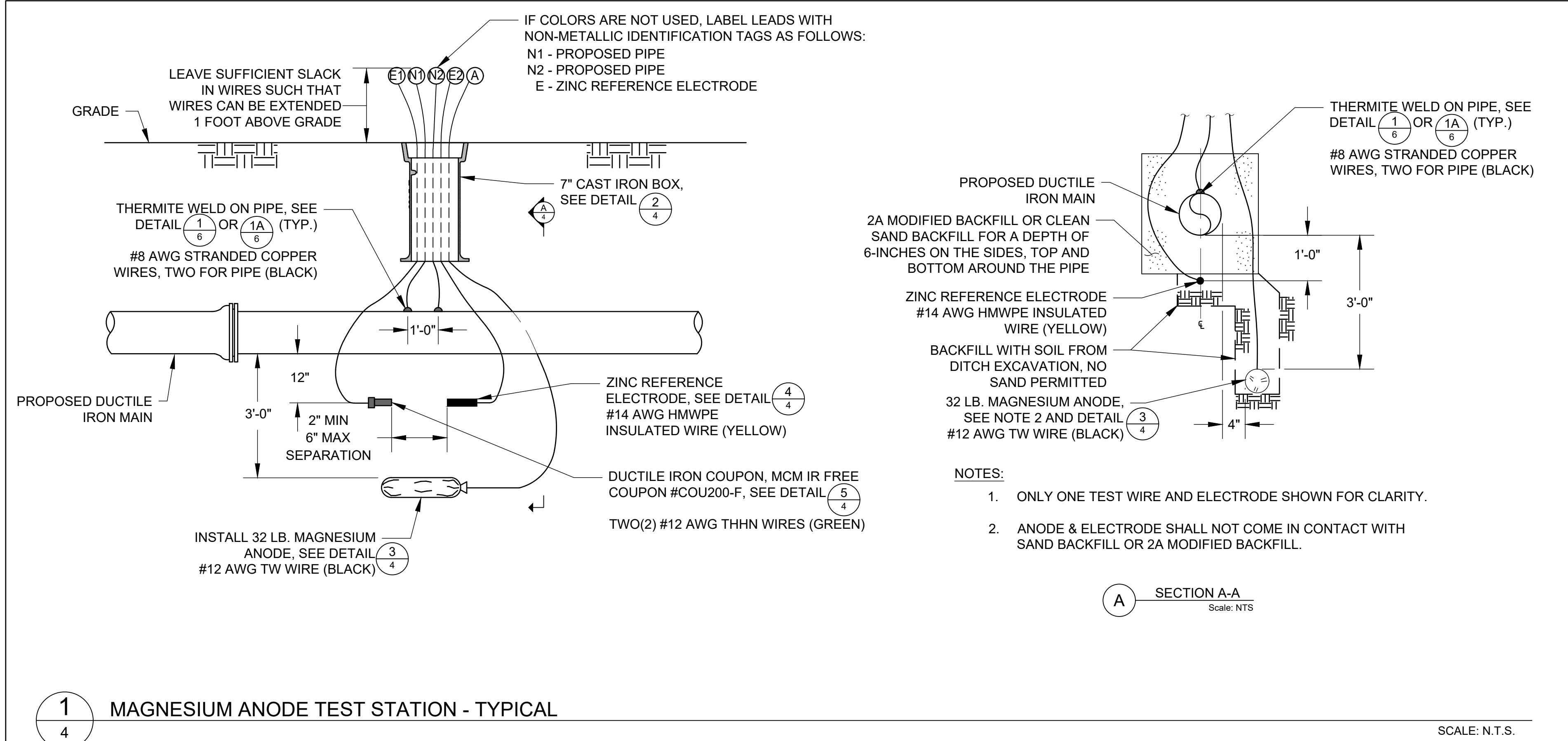
Drawing prepared by:  
**corrpro**  
 An Aegion Company  
 470 Lapp Road  
 Malvern, Pennsylvania 19355  
 Office: (610) 344-7002  
 www.aegion.com

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CCI Cod File: 340403595\_U40-D220334-C-001  
 CCI Dwg. No.: AQUA---

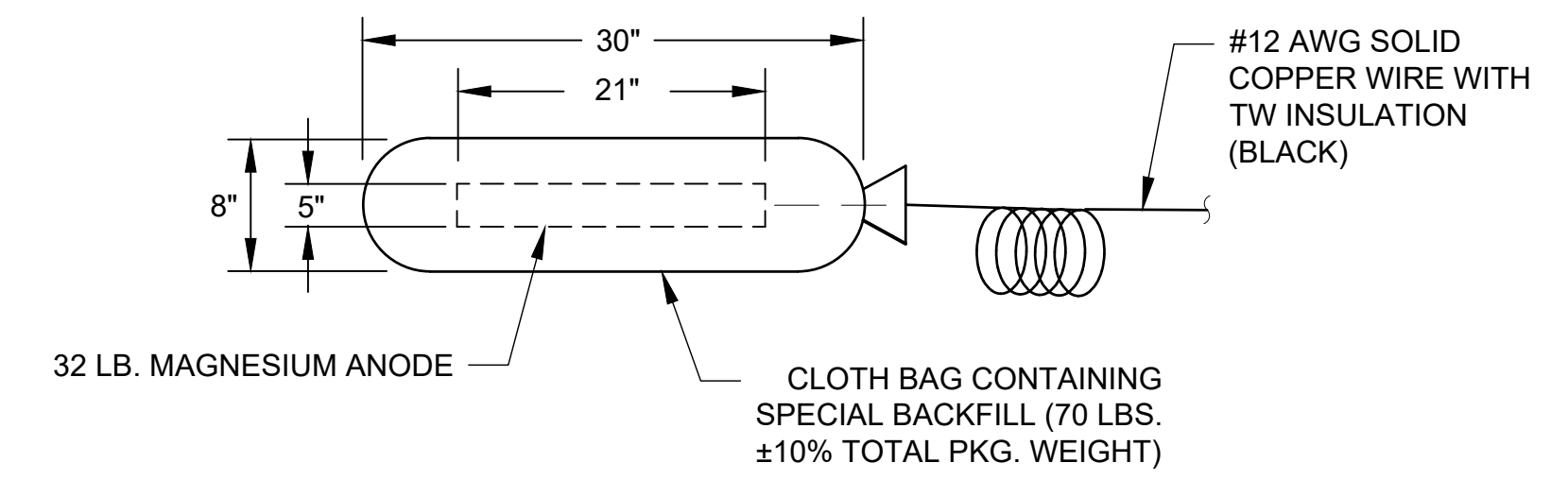


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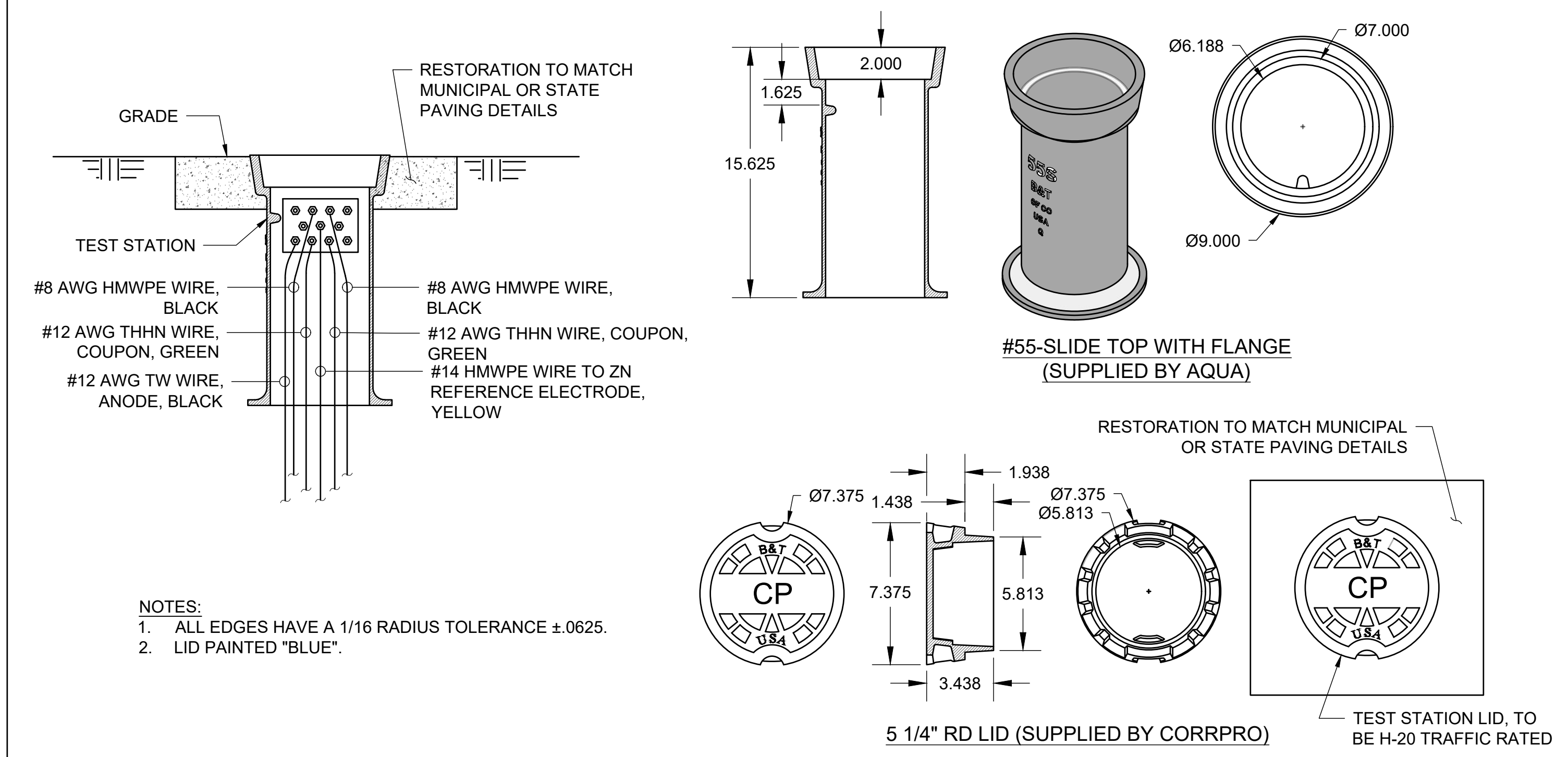
1  
4 MAGNESIUM ANODE TEST STATION - TYPICAL

SCALE: N.T.S.



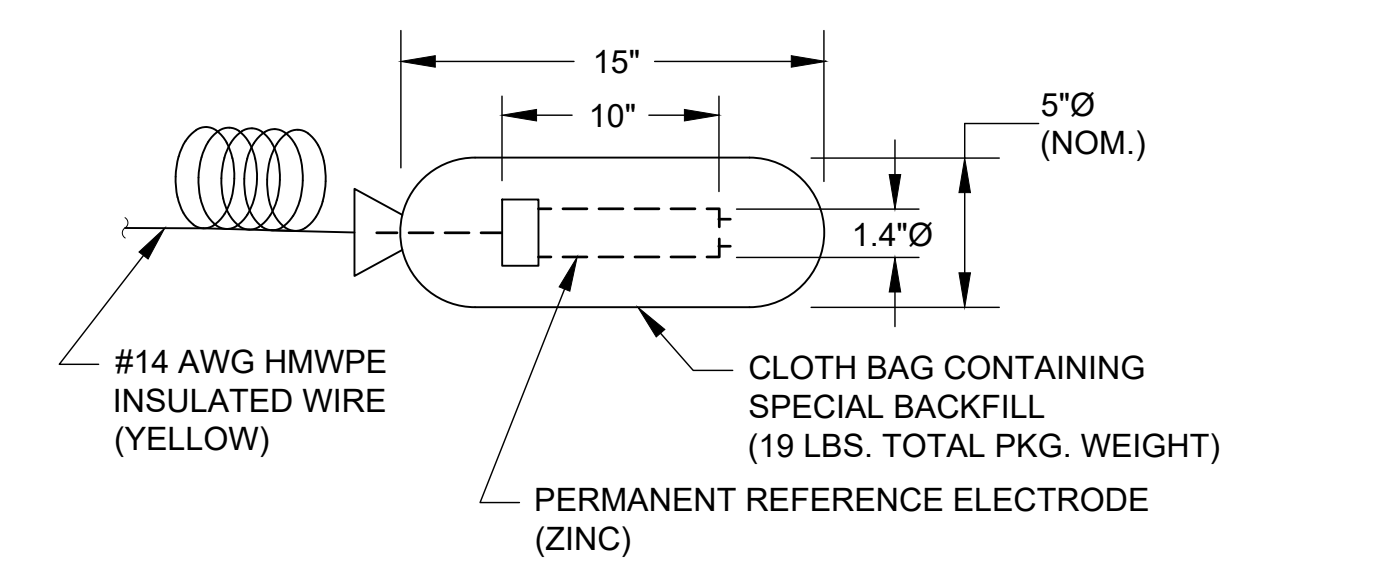
- NOTES:
- REMOVE ANODE FROM PLASTIC BAG PRIOR TO INSTALLATION.
  - BEFORE BACKFILLING, WET MAGNESIUM ANODE WITH APPROXIMATELY 5 GALLON OF WATER. RAIN WATER OR GROUND WATER IN DITCH WILL ALSO SUFFICE FOR THIS PURPOSE.
  - DO NOT LOWER ANODE INTO AUGURED HOLE OR TRENCH BY THE LEAD WIRE. SECURE ROPE TO ANODE TO LOWER INTO PLACE.

3  
4 32 LB. MAGNESIUM ANODE - 32S5 (FACTORY MANUFACTURED) SCALE: N.T.S.



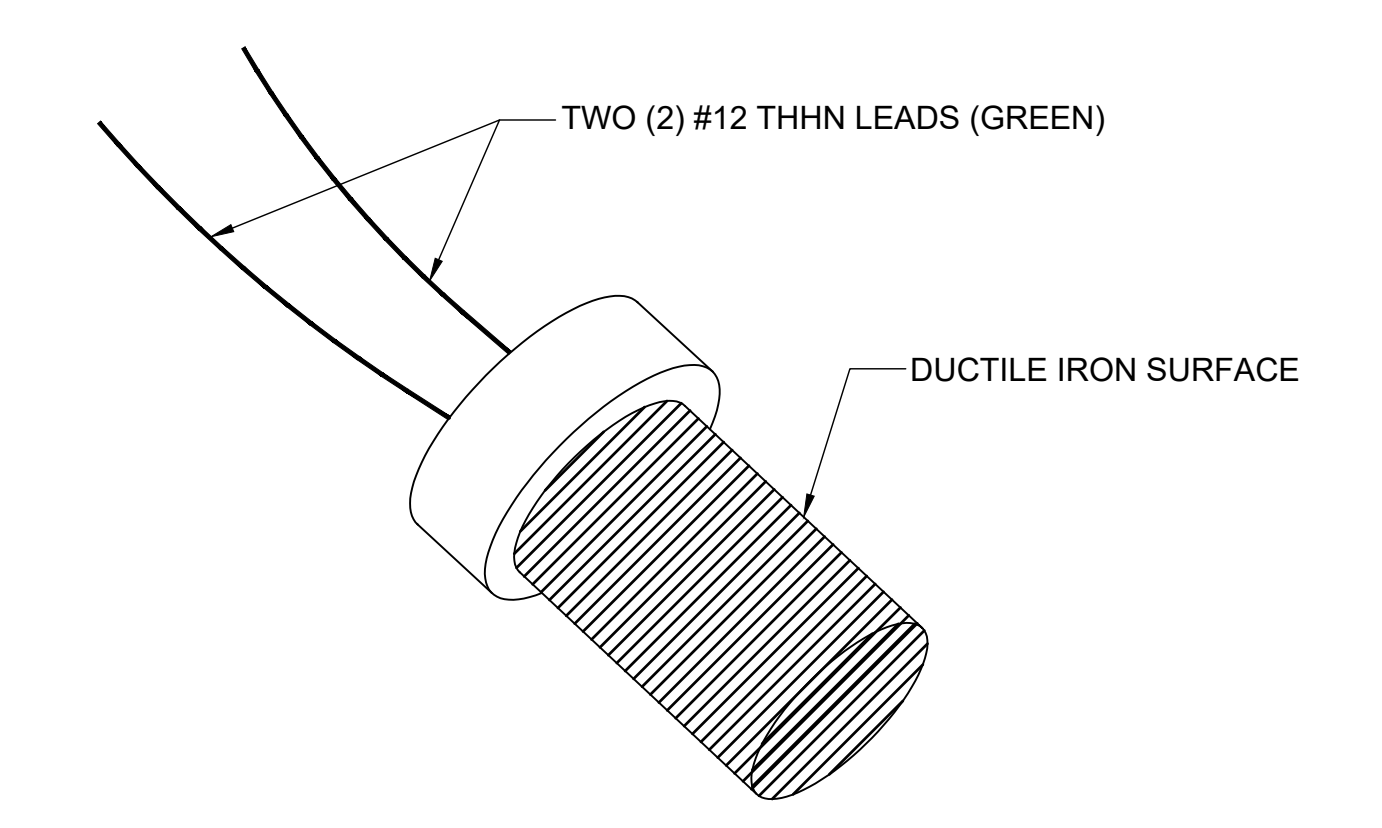
2  
4 TYPICAL 7-INCH VALVE BOX, LID & WIRING

SCALE: N.T.S.



- NOTES:
- REMOVE REFERENCE ELECTRODE FROM PLASTIC BAG PRIOR TO INSTALLATION.
  - BEFORE BACKFILLING, WET REFERENCE ELECTRODE WITH APPROXIMATELY 2 GALLONS OF WATER.

4  
4 ZINC REFERENCE ELECTRODE (FACTORY MANUFACTURED) SCALE: N.T.S.



- NOTES:
- DUCTILE IRON.
  - 10 CM² OF EXPOSED METAL (1.55 IN²).
  - INCLUDES TWIN CABLES WITH #12 AWG (4 MM²) STRANDED COPPER WIRE AND THHN INSULATION.

5  
4 MILLER DUCTILE IRON COUPON MODEL: COU200 SCALE: N.T.S.

MAGNESIUM ANODE TEST STATION DETAIL

Drawing prepared by:

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 An Aegion Company

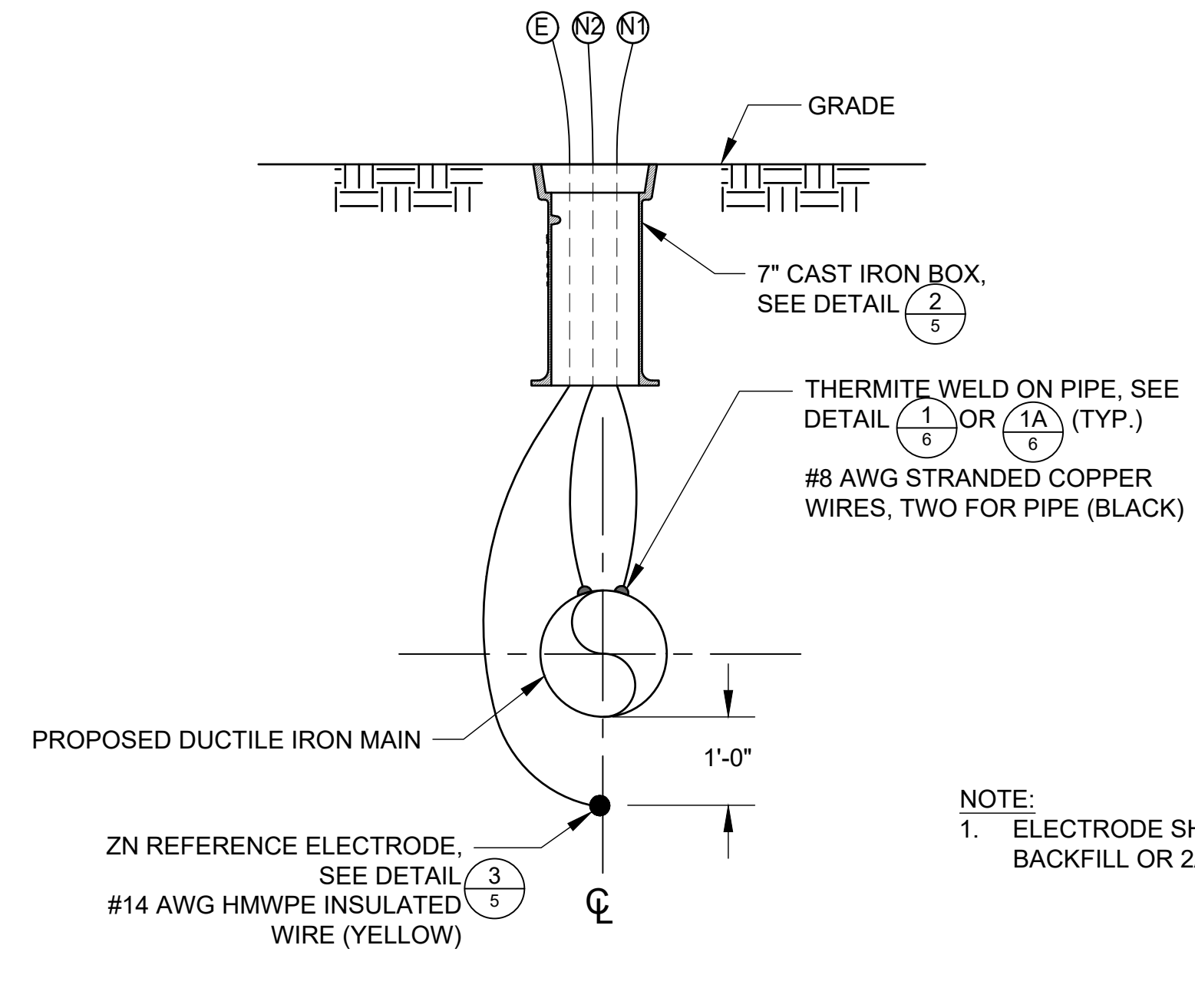
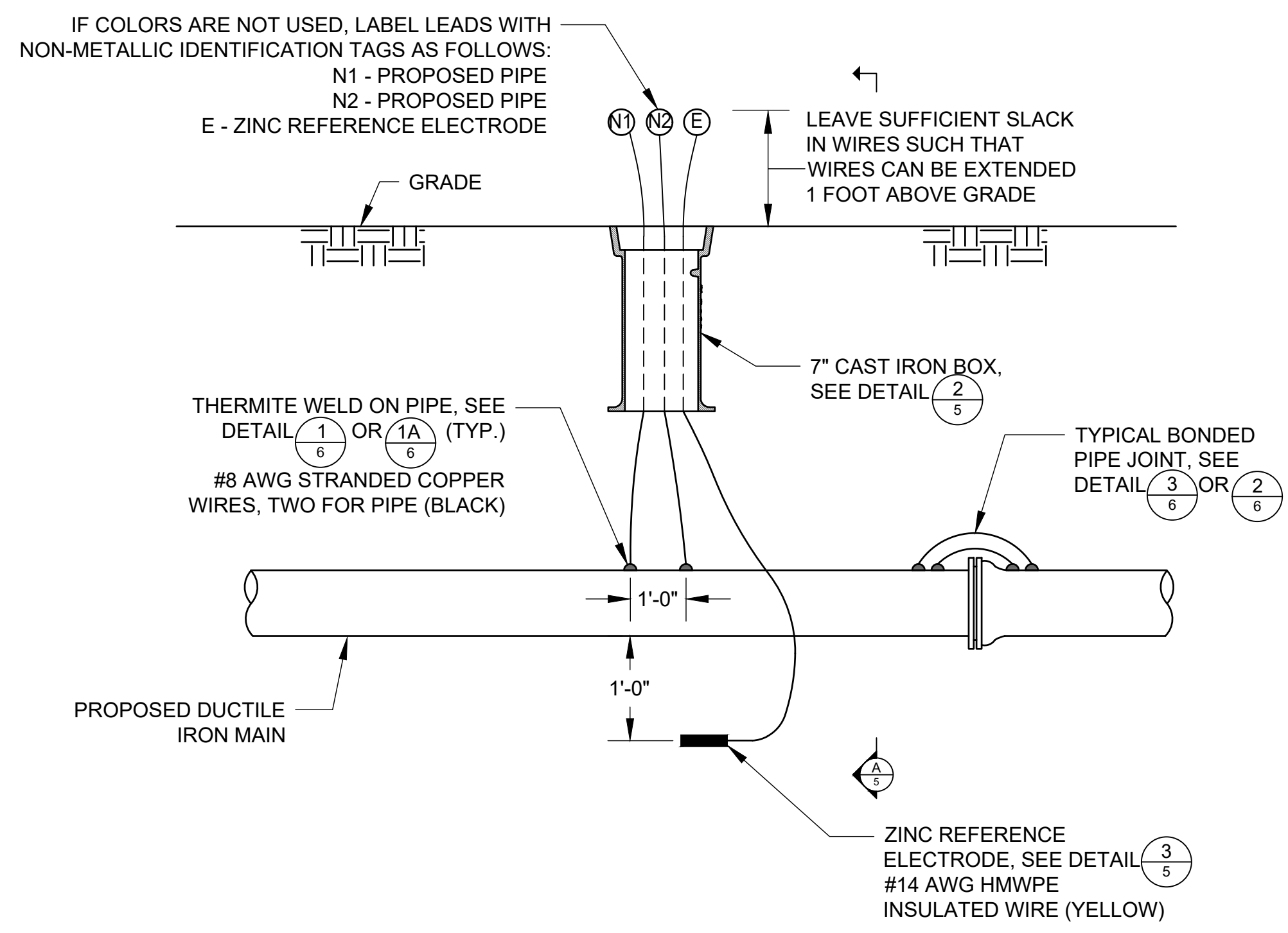
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 CCI Dwg. No.: AQUA---

Sht. 4 of 8

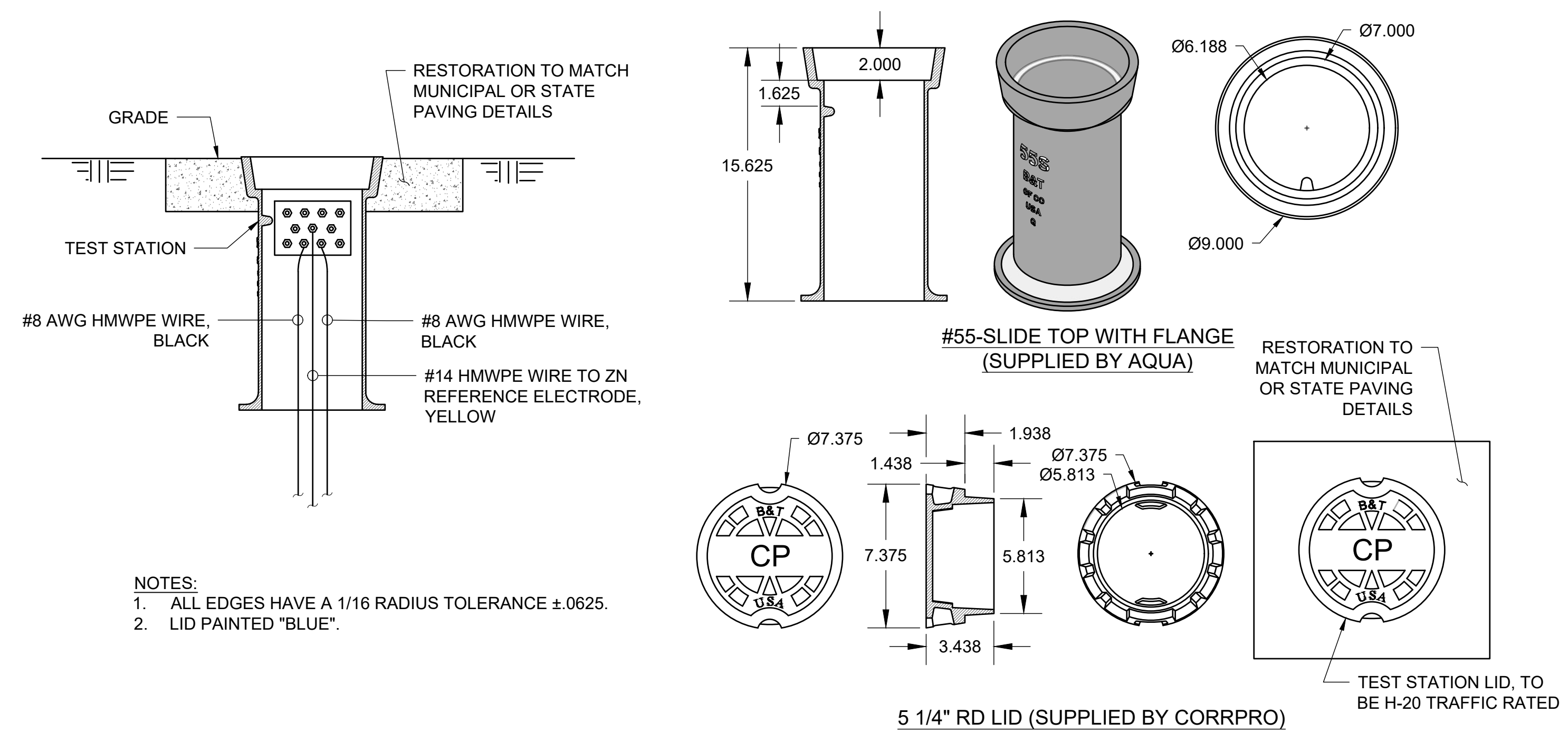


NOTE:  
1. ELECTRODE SHALL NOT COME IN CONTACT WITH SAND BACKFILL OR 2A MODIFIED BACKFILL.

A SECTION A-A  
Scale: N.T.S.

1  
5 THREE WIRE CONTINUITY TEST STATION - TYPICAL

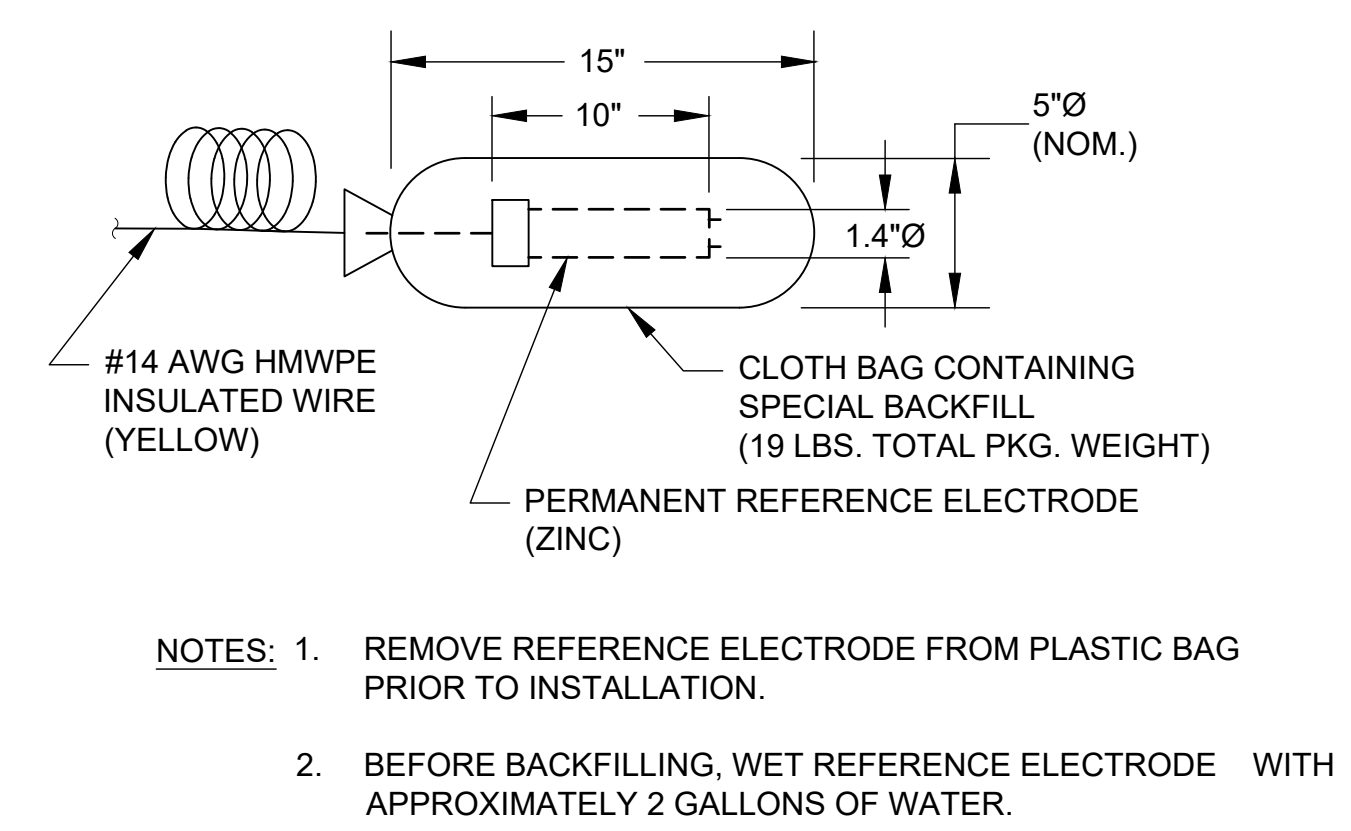
SCALE: N.T.S.



NOTES:  
1. ALL EDGES HAVE A 1/16 RADIUS TOLERANCE ±.0625.  
2. LID PAINTED "BLUE".

2  
5 TYPICAL 7-INCH VALVE BOX, LID & WIRING  
THREE WIRE CONTINUITY TEST STATION

SCALE: N.T.S.



NOTES: 1. REMOVE REFERENCE ELECTRODE FROM PLASTIC BAG PRIOR TO INSTALLATION.  
2. BEFORE BACKFILLING, WET REFERENCE ELECTRODE WITH APPROXIMATELY 2 GALLONS OF WATER.

3  
5 ZINC REFERENCE ELECTRODE  
(FACTORY MANUFACTURED)

SCALE: N.T.S.

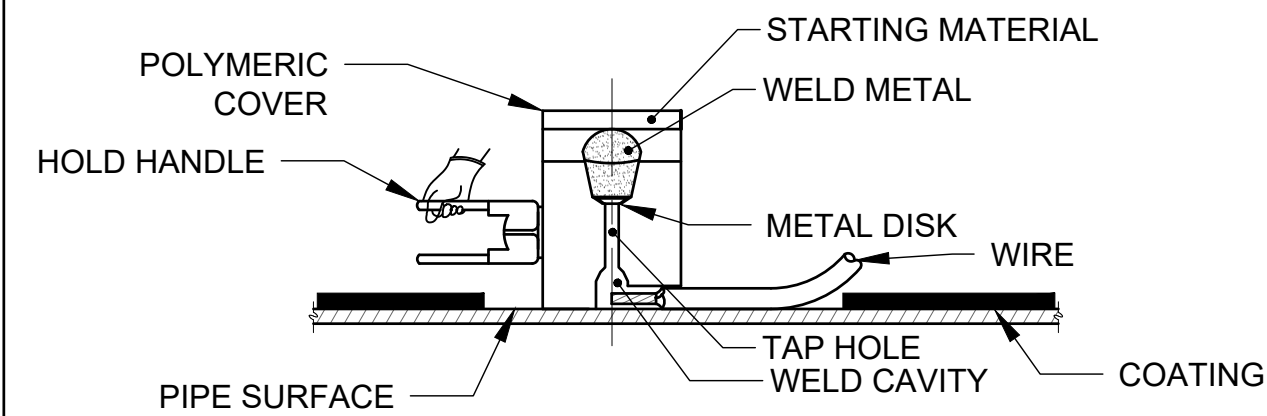
THREE WIRE TEST STATION DETAIL

Drawing prepared by:  
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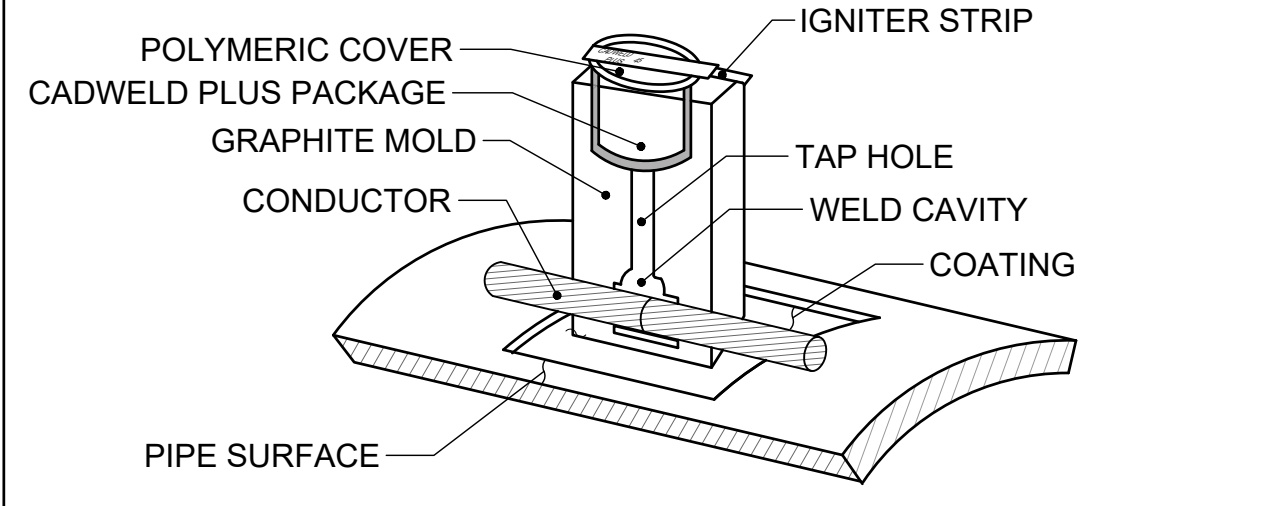
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STEP 1. GRIND STRUCTURE CONNECTION AREA (3"x3") TO BARE SHINY METAL AND CLEAN.



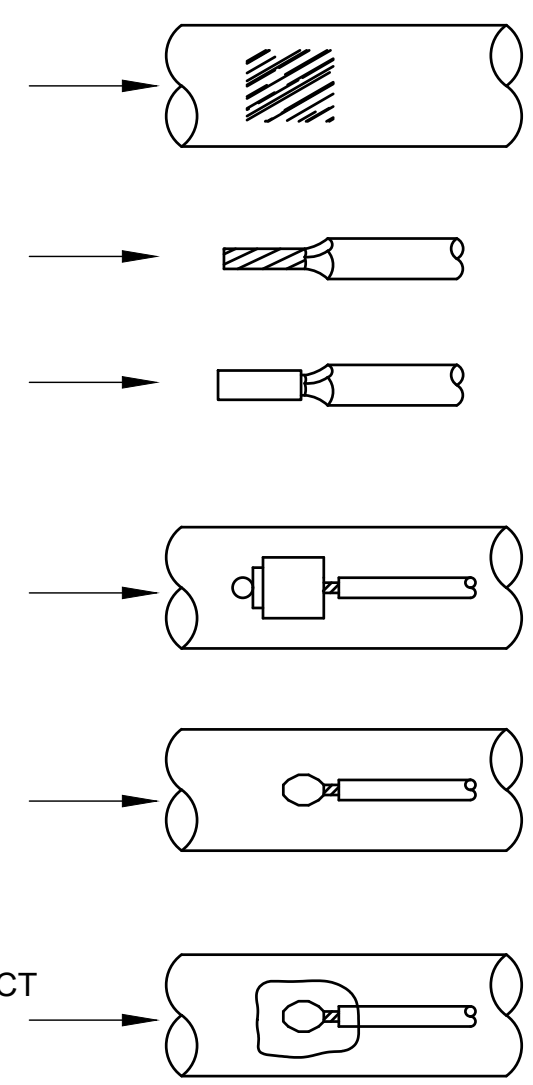
STEP 2. STRIP INSULATION FROM WIRE.

STEP 3. INSTALL COPPER SLEEVE OVER BARE SECTION OF WIRE WHEN REQUIRED.

STEP 4. HOLD MOLD FIRMLY WITH FROM OPERATOR & IGNITE WITH FLINT GUN.

STEP 5. REMOVE SLAG FROM CONNECTION AND PEEN WELD FOR SOUNDNESS.

STEP 6. COVER CONNECTION AND EXPOSED STRUCTURE SURFACE WITH BITUMASTIC COATING PER PROJECT SPECIFICATIONS.



- NOTES:**
1. THE CADWELD PLUS CONTROL UNIT INITIATES THE REACTION OF THE METAL CRUCIBLE.
  2. THE STANDARD UNIT INCLUDES A 1.8 METER (6-FOOT) HIGH TEMPERATURE CONTROL UNIT LEAD.
  3. THE LEAD ATTACHES TO THE IGNITION STRIP USING A CUSTOM MADE, PURPOSE-DESIGNED TERMINATION CLIP.
  4. AFTER THE TERMINATION CLIP IS INSTALLED ON THE IGNITION STRIP, THE INSTALLER PUSHES AND HOLDS THE IGNITION BUTTON TO START A CHARGING AND DISCHARGING SEQUENCE. WITHIN A FEW SECONDS THE CONTROL UNIT SENDS A PREDETERMINED VOLTAGE TO THE IGNITION STRIP AND THE REACTION IS INITIATED.
  5. PROCEDURE SHOWN ABOVE IS TO BE USED AS A GENERAL GUIDE ONLY. CONSULT MANUFACTURER'S LITERATURE FOR SPECIFIC INSTALLATION INSTRUCTIONS.

### CONNECTION TO DUCTILE IRON PIPELINE (TYPE CAHB OR CAHE)

TYPE CAHB TAP CONDUCTOR TO TOP OF HORIZONTAL DUCTILE IRON PIPE OR FLAT SURFACE				TYPE CAHE THROUGH CONDUCTOR TO TOP OF HORIZONTAL DUCTILE IRON PIPE OR FLAT SURFACE			
Welder Part No.1	Welder Price	Weld Metal	Conductor Size	Surface	Welder Part No.1	Welder Price	Weld Metal
CAHA-1G CAHA-1G-P.S.*	CAA CAA	CA25XF-19 CA25XF-19	#14 to #10 Solid (use sleeve CAB-133-1H)** or #8 Solid or Stranded, or #6 Solid	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1G CAEA-1G-P.S.*	CAA CAA	CA32XF-19 CA32XF-19
CAHA-1H CAHA-1H-P.S.*	CAA CAA	CA25XF-19 CA25XF-19	6 Stranded	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1H CAEA-1H-P.S.*	CAA CAA	CA32XF-19 CA32XF-19
CAHA-1K CAHA-1K-P.S.*	CAA CAA	CA45XF-19 CA45XF-19	4 Solid	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1K CAEA-1K-P.S.*	CAA CAA	CA45XF-19 CA45XF-19
CAHA-1L CAHA-1L-P.S.*	CAA CAA	CA45XF-19 CA45XF-19	4 Stranded	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1L CAEA-1L-P.S.*	CAA CAA	CA45XF-19 CA45XF-19
CAHA-1T CAHA-1T-P.S.*	CAA CAA	CA45XF-19 CA45XF-19	2 Solid	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1T CAEA-1T-P.S.*	CAA CAA	CA45XF-19 CA45XF-19
CAHA-1V CAHA-1V-P.S.*	CAA CAA	CA45XF-19 CA45XF-19	2 Stranded	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1V CAEA-1V-P.S.*	CAA CAA	CA45XF-19 CA45XF-19
CAHA-1Y CAHA-1Y-P.S.*	CAA CAA	CA65XF-19 CA65XF-19	1 Stranded	Flat (30" & larger pipe) 4" to 24" pipe	CAEA-1Y CAEA-1Y-P.S.*	CAA CAA	CA65XF-19 CA65XF-19

\* Specify pipe size. Example: For #2 stranded to 6" pipe (Type CAHB) CAHA-1V-6, (Type CAHE) CAEA-1V-6.  
\*\* 1 Sleeve per connection for Type CAHB, 2 Sleeves per connection for Type CAHE.  
† Welder Part No. includes mold frame. If mold only (less frame) is required, order - Welder Part No. - 'M'.  
Do not use Types CAHB, CAHE or CAH on soil pipe (ASTM A74-R2).  
A test weld should be made on a section of the pipe being used to determine possibility of detrimental metallurgical effects. For DUCTILE IRON, see page 17.

INSTALLATION STEPS:  
1. INSERT CADWELD PLUS PACKAGE INTO MOLD (MAY REQUIRE USE OF A COVER/BAFFLE).



2. PRESS AND HOLD CONTROL UNIT SWITCH AND WAIT FOR THE IGNITION.



3. ATTACH CONTROL UNIT TERMINATION CLIP TO IGNITION STRIP.

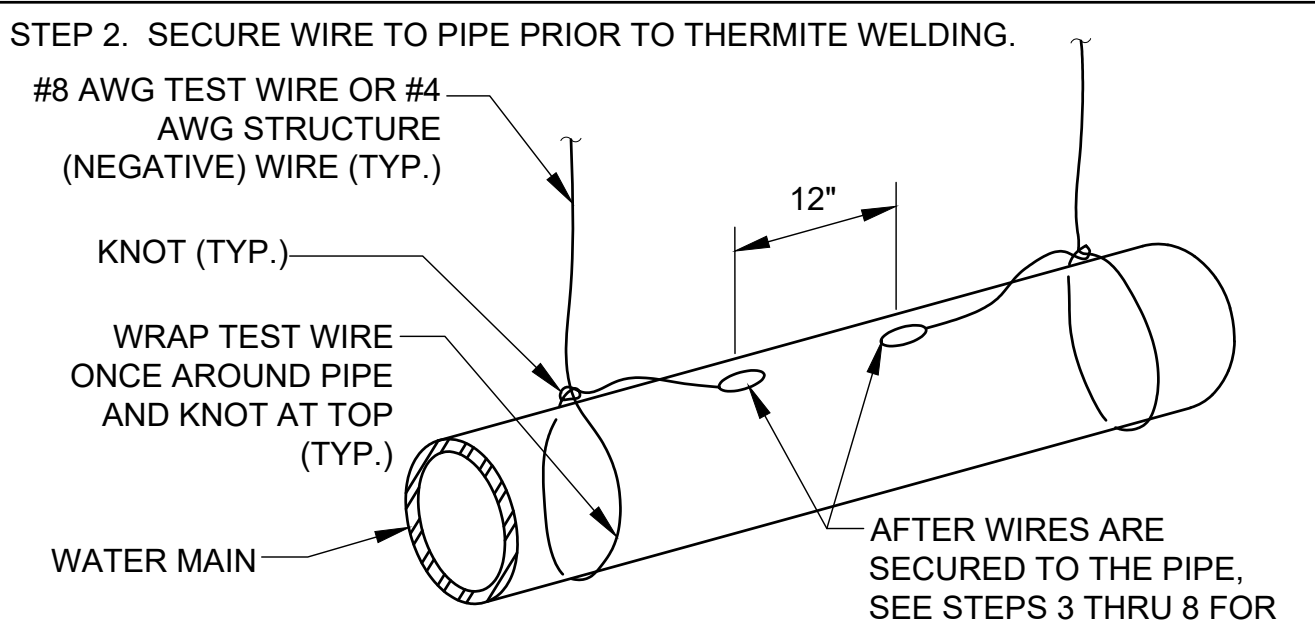
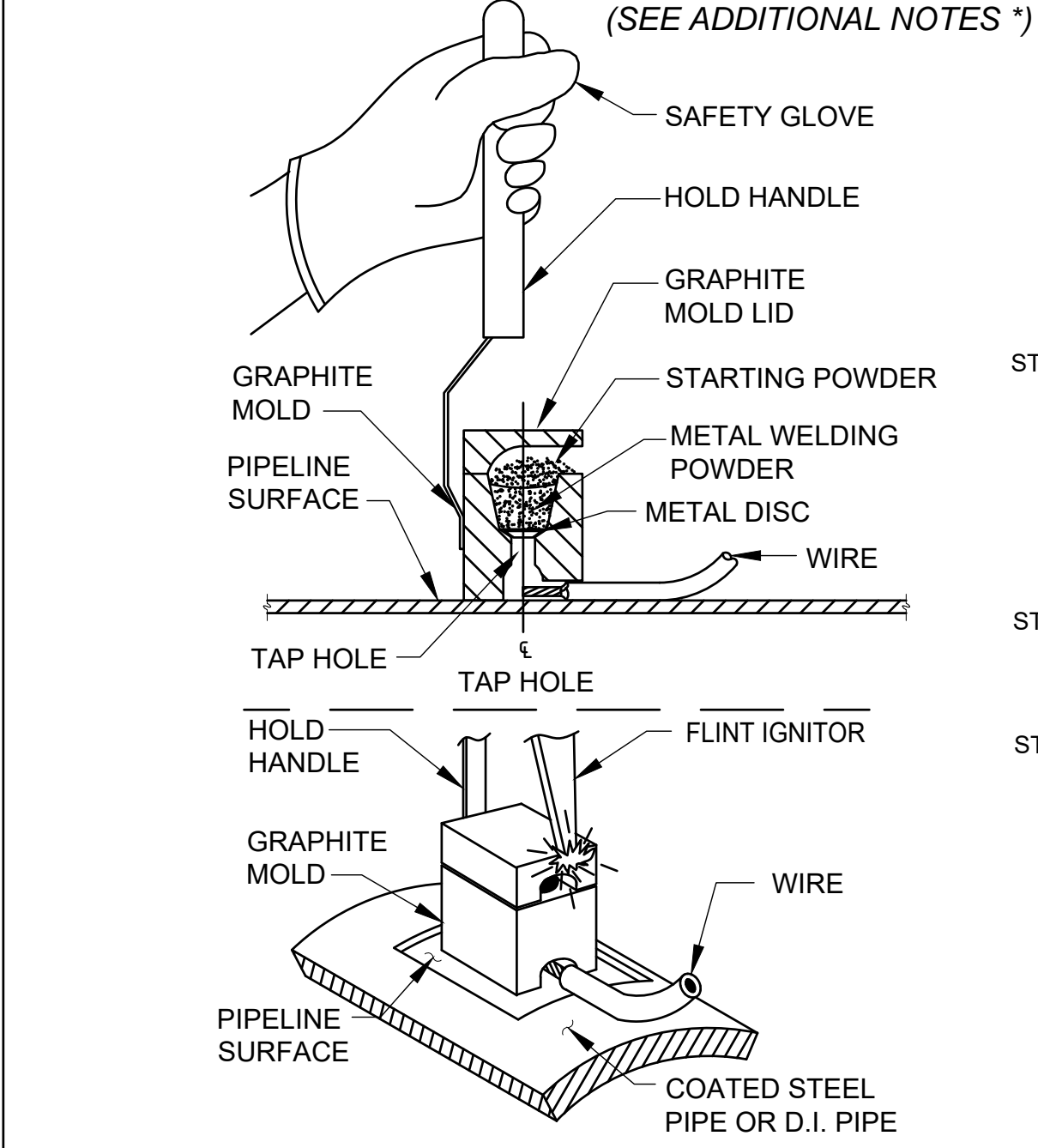


4. OPEN THE MOLD AND REMOVE THE EXPANDED STEEL CUP - NO SPECIAL DISPOSAL REQUIRED.



### 1 CADWELD PLUS EXOTHERMIC WELDING PROCEDURES - TYPICAL SEE ALTERNATE OPTION DETAIL 1A SCALE: N.T.S.

STEP 1. WEAR PROPER CLOTHING, SAFETY GLASSES AND GLOVES WHEN THERMITE WELDING. AVOID BREATHING CONCENTRATIONS OF SMOKE, AS IT MAY BE HAZARDOUS TO YOUR HEALTH. REMOVE OR PROTECT FIRE HAZARDS IN THE WELDING AREA. FAILURE TO ABIDE BY THESE SAFETY PROCEDURES MAY RESULT IN HAZARDOUS SITUATIONS TO THE INDIVIDUAL AND BYSTANDERS.



STEP 3. REMOVE PIPE COATING AREA (3"x3") & GRIND STRUCTURE CONNECTION AREA TO BARE SHINY METAL AND CLEAN. SURFACE TO BE WELDED MUST BE BRIGHT CLEAN WITH FILE OR WIRE BRUSH AND DRY. UNDER SOME CONDITIONS OF TEMPERATURE AND HUMIDITY, THE SURFACE TO BE WELDED WILL SWEAT CAUSING POROUS WELDS. THIS CAN BE ELIMINATED WITH A HAND TORCH PRIOR TO WELDING.

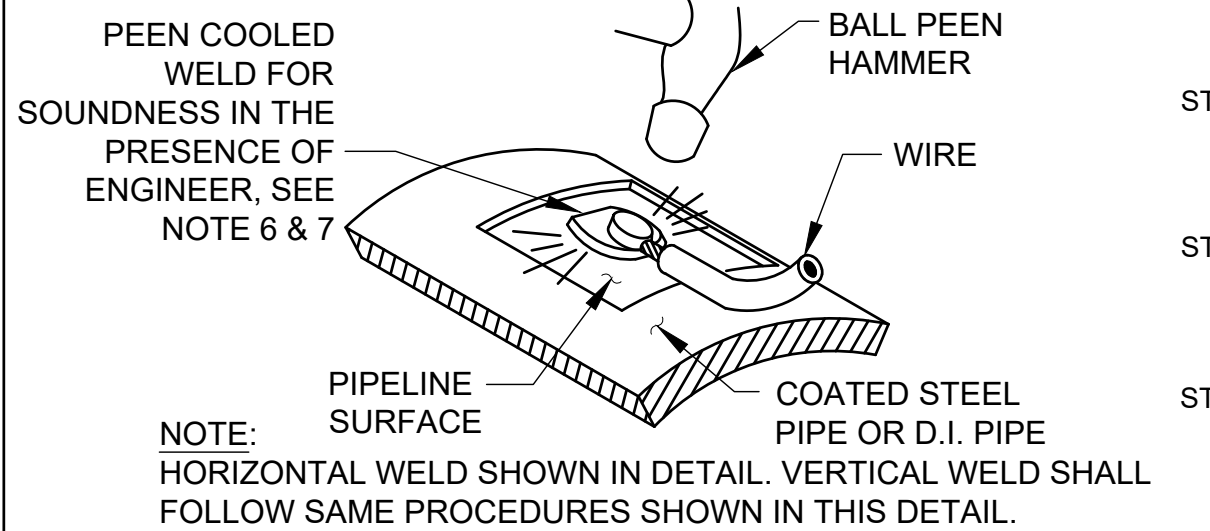
STEP 4. STRIP INSULATION FROM WIRE. EXPOSED CONDUCTORS MUST BE BRIGHT, CLEAN AND DRY. WET CABLES CAN BE DRIED OUT USING A HAND TORCH.

STEP 5. CHECK MOLD TAG FOR MATERIAL TO BE WELDED AND PROPER CARTRIDGE SIZE TO BE USED. MOLD CAN BE DRIED USING A HAND TORCH. PLACE END OF CABLE TO THE CENTER LINE OF THE TAP HOLE. INSERT STEEL DISK BEING SURE IT IS CENTERED OVER THE TAP HOLE. POUR PROPER METAL WELDING POWDER INTO THE CRUCIBLE. CLOSE THE MOLD LID. PLACE SMALL AMOUNT OF STARTING POWDER IN THE IGNITION POCKET. HOLD MOLD FIRMLY BY HANDLE WITH OPENING AWAY FROM INDIVIDUAL AND IGNITE WITH FLINT GUN (NOTE: INDIVIDUAL MUST NOT PLACE EXPOSED BODY PART DIRECTLY OVER LID OR IN FRONT OF LID OPENING TO AVOID INJURY). WAIT 15 SECONDS BEFORE OPENING THE MOLD TO ALLOW WELD METAL TO COOL. FAILURE TO FOLLOW WELDING PROCEDURES MAY RESULT IN IMPROPER WELDS AND DAMAGE TO THE MATERIAL BEING WELDED.

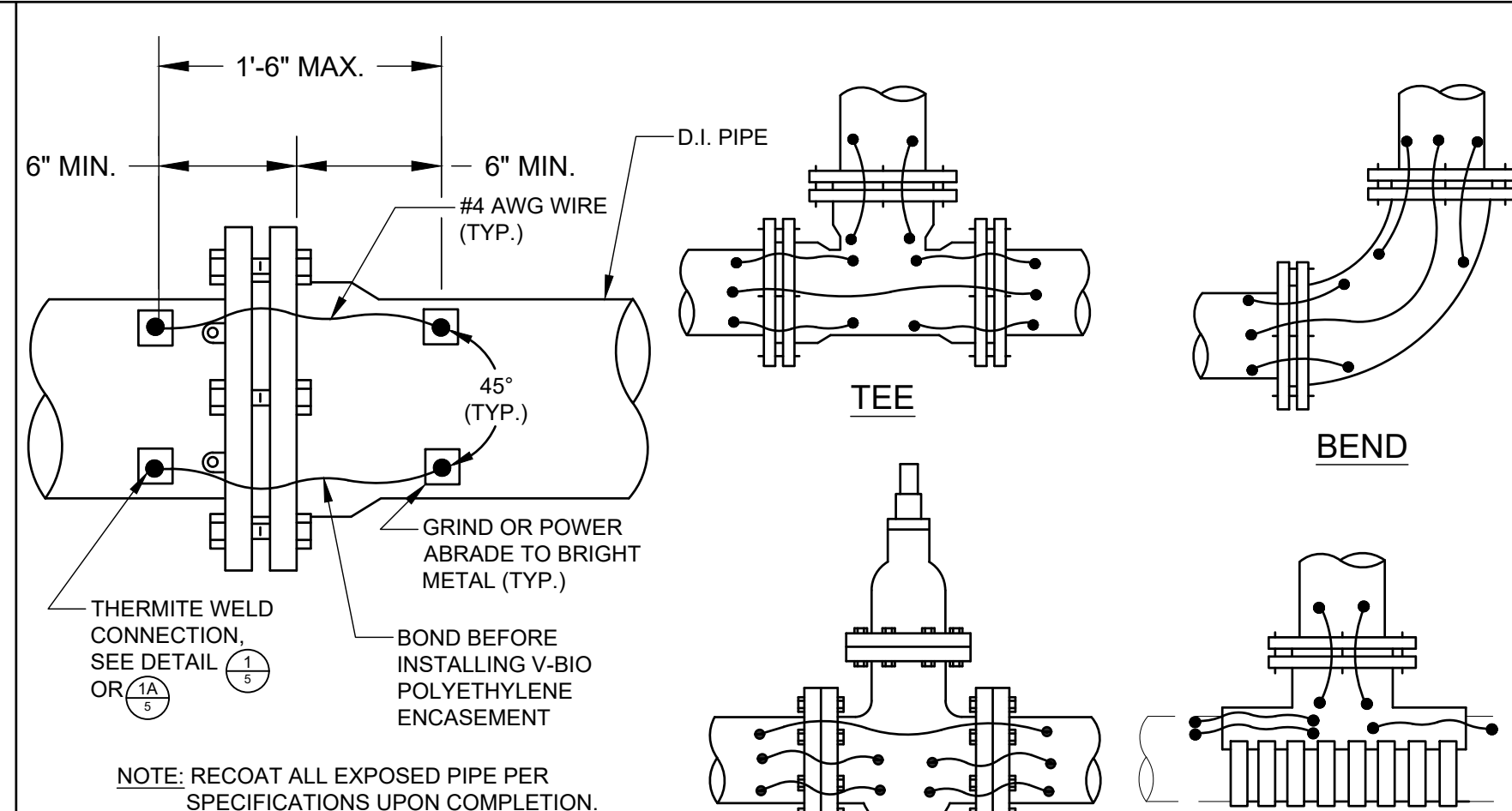
STEP 6. AFTER WELD HAS COOLED, REMOVE SLAG FROM CONNECTION AND PEEN WELD IN THE PRESENCE OF ENGINEER TO DEMONSTRATE SOUNDNESS.

STEP 7. IF WELD BECAME LOOSE DURING PEENING, A NEW WELD MUST BE MADE NOT LESS THAN 6" FROM THE FAILED WELD.

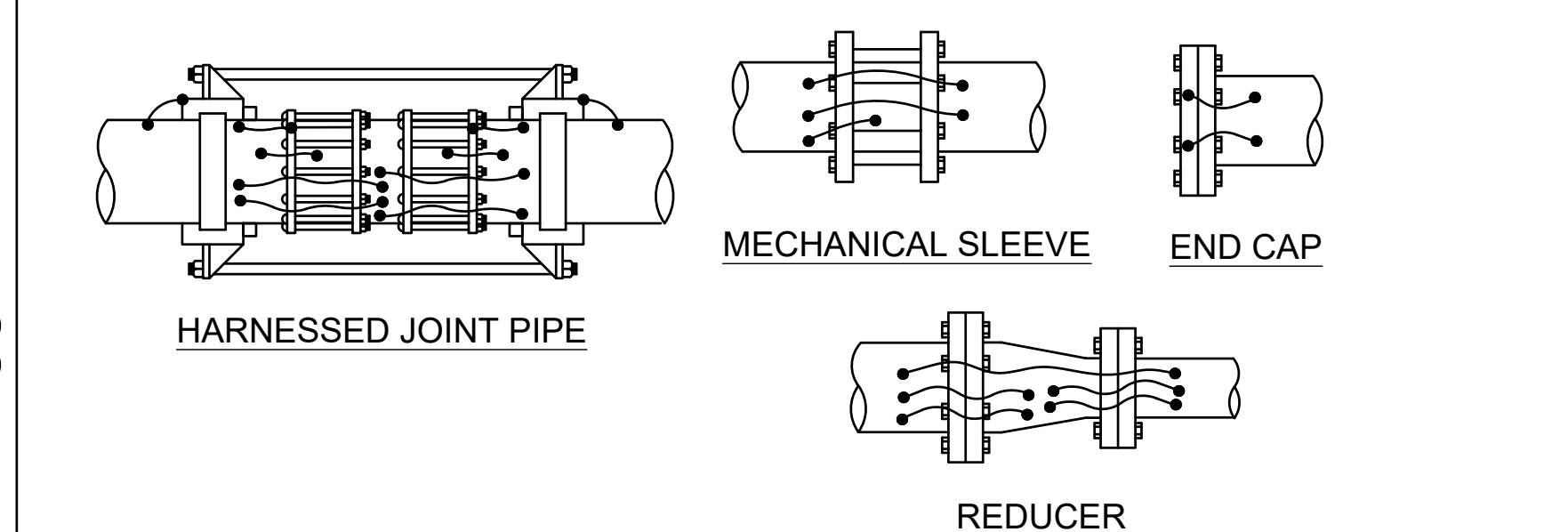
STEP 8. APPLY COATING OVER COMPLETED WELD CONNECTION.



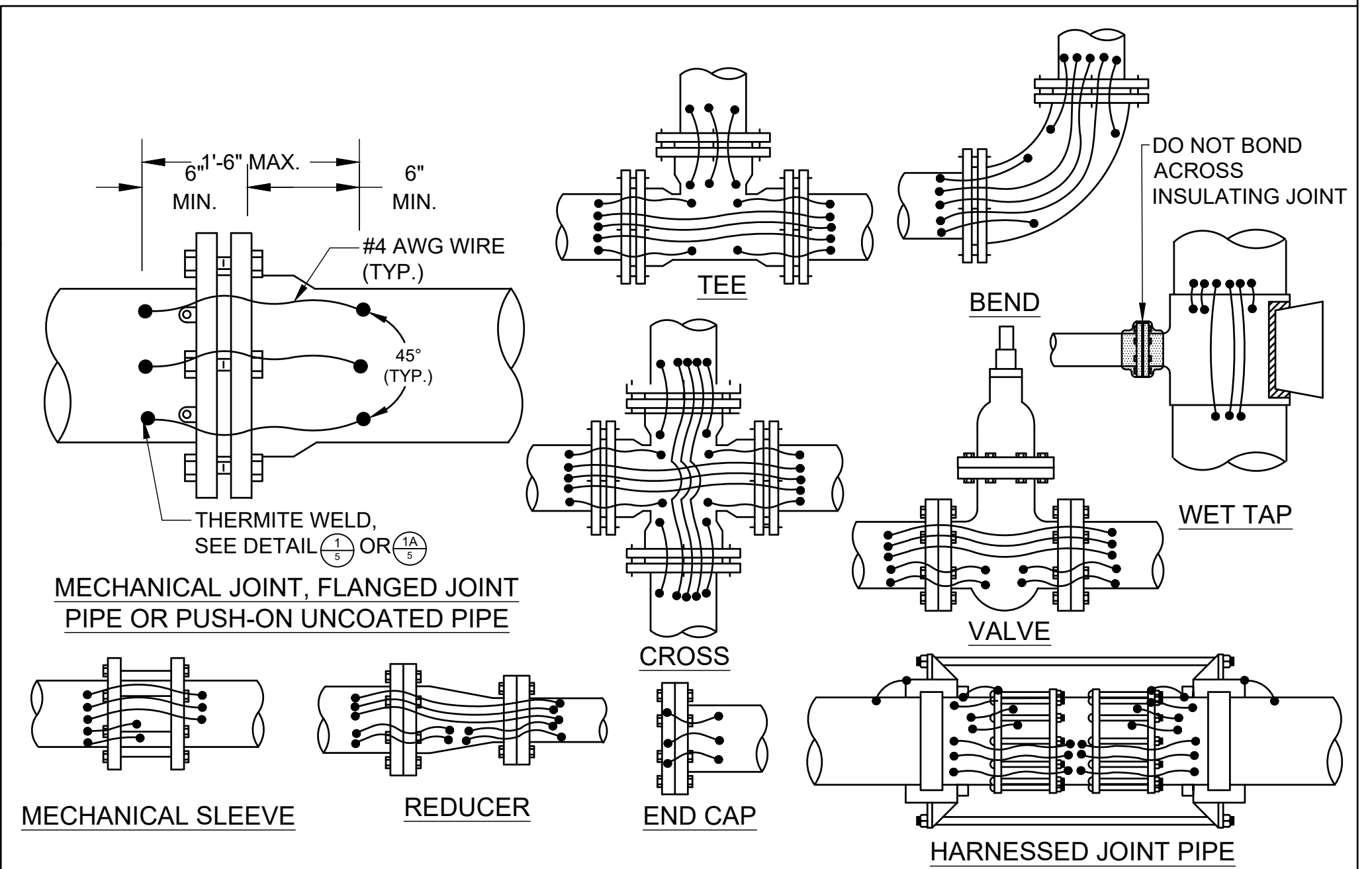
### 1A TYPICAL THERMITE WELD PROCEDURES FOR #8 AWG WIRE AND LARGER SCALE: N.T.S.



### 2 JOINT BONDING CONFIGURATIONS (UP TO 36" PIPE) SCALE: N.T.S.



**\* ADDITIONAL NOTES:**  
Prior to starting any exothermic welding activities, you must have a 20lb. (9kg) class ABC fire extinguisher and must be wearing non-synthetic long sleeve shirt or elbow-length gloves to eliminate slag from coming in contact with bare skin. Ensure that the surface below exothermic process is non-flammable. If needed, utilize a fire blanket or other non-flammable as a barrier.



### 3 JOINT BONDING CONFIGURATIONS (38" PIPE AND LARGER) SCALE: N.T.S.

- NOTES (FOR DETAILS 2 & 3 ON THIS SHEET):**
1. COATING OF BELL & SPIGOT JOINT MUST BE COATED PRIOR TO INSTALLING BOND WIRES.
  2. THERMITE WELD BONDING WIRES TO TOP OF PIPE OF FITTING.
  3. BOND WIRE LENGTH SHALL BE KEPT TO A MINIMUM OF 1'-6" UNLESS APPROVED BY THE ENGINEER. LEAVE SLACK IN ALL CABLES.
  4. TWO BOND WIRES SHALL BE USED ACROSS EACH PIPE JOINT.
  5. COAT ALL THERMITE WELDS AND EXPOSED COPPER WITH A PREFABRICATED ONE PIECE, ELASTOMERIC FILLED PLASTIC CAP (ROYSTON HANDI-CAP OR APPROVED EQUAL).
  6. ON EXTERNALLY COATED PIPE, REPAIR PIPE COATING IN ACCORDANCE WITH THE COATING MANUFACTURER'S RECOMMENDATIONS.
  7. WIRE SIZE FOR BONDING JOINTS SHALL BE AS FOLLOWS:
- | PIPE SIZE       | WIRE SIZE    |
|-----------------|--------------|
| LARGER THAN 30" | #2 AWG HMWPE |
| 6" TO 30"       | #4 AWG HMWPE |
| 4" & SMALLER    | #6 AWG HMWPE |

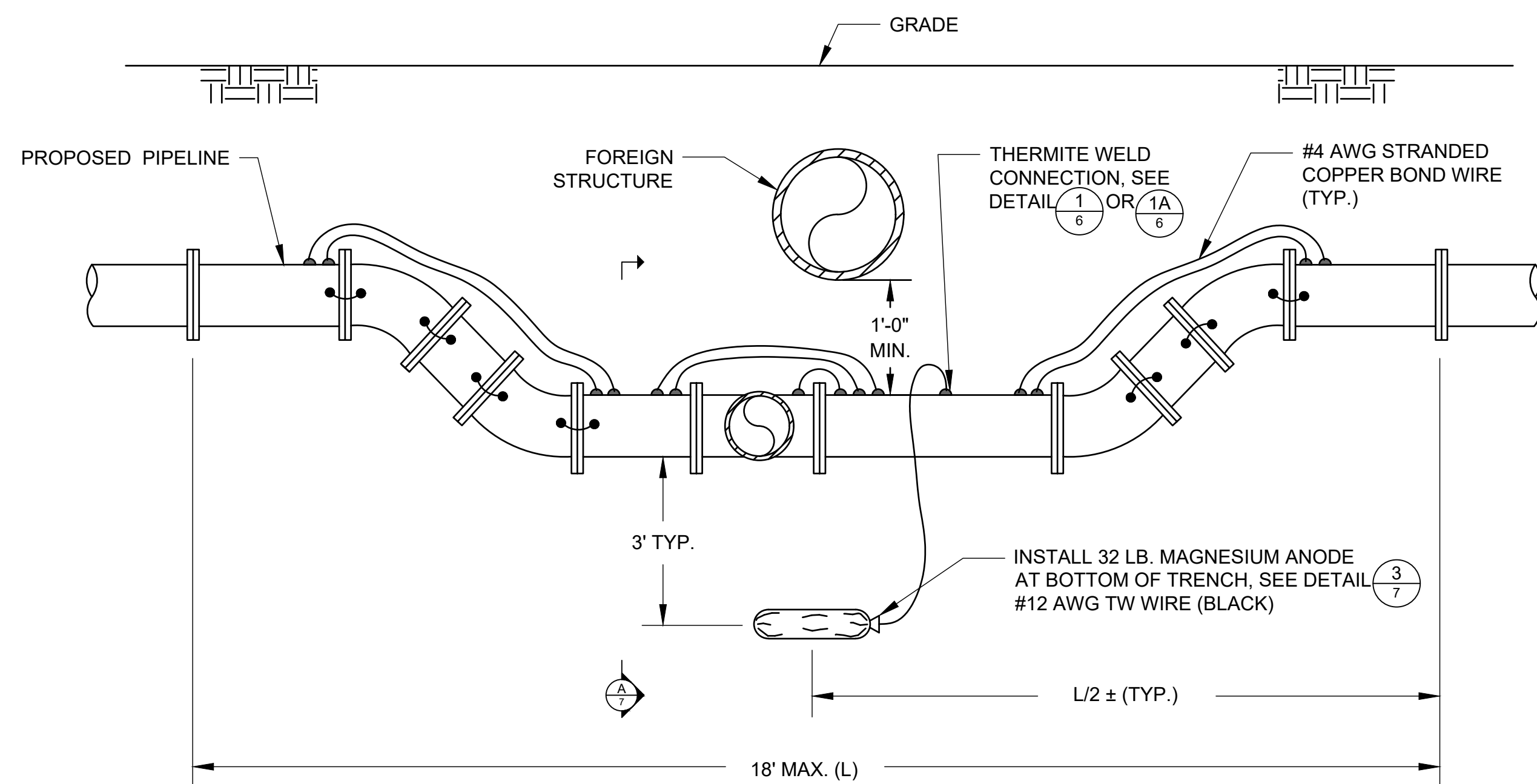
- Required Minimum Personal Protective Equipment:  
ANSI Z-89.1 Hard hat  
ANSI Z-87.1 Safety glasses  
ANSI Z-41.1 Safety boot  
ANSI approved gloves  
Non-synthetic long sleeve shirt OR elbow length gloves  
Calibrated Gas Monitor  
20 lb. (9kg) Class ABC Fire Extinguisher
- Optional Personal Protective Equipment:  
ANSI approved Flame-Resistant Clothing (FRC)  
Face shield  
Fire blanket  
Respirator (appropriate for work environment)

### CADWELD & THERMITE WELDING PROCEDURES AND JOINT BONDING CONFIGURATION DETAILS

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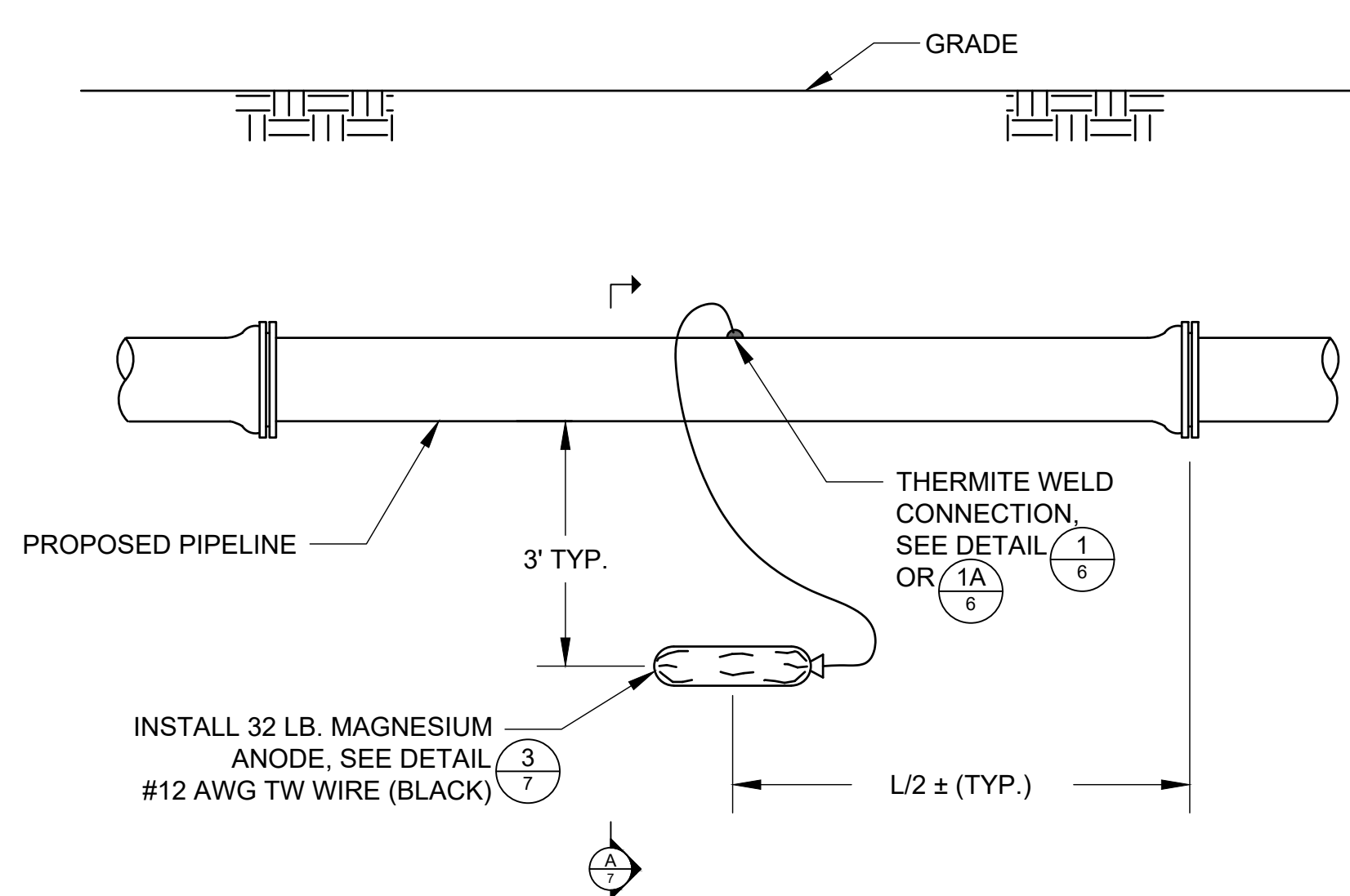
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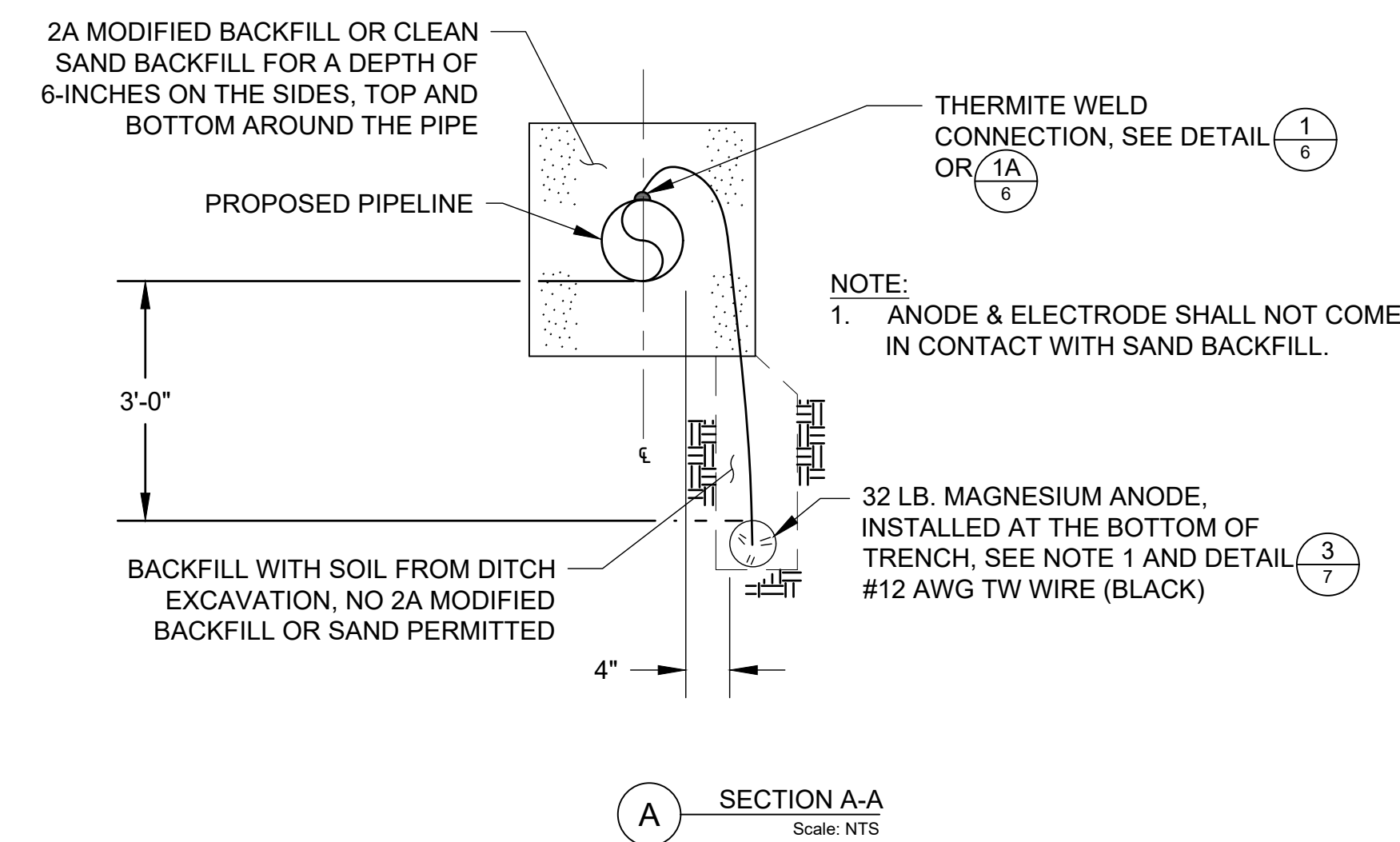


- NOTES:
- WHERE A SINGLE FITTING IS INVOLVED, IT SHOULD BE BONDED TO ONE OF THE CONNECTING PIPES TO WHICH AN ANODE HAS BEEN ATTACHED. A SEPARATE ANODE FOR THE FITTING IS NOT REQUIRED.
  - INSTALL ANODE AT THE BOTTOM OF TRENCH AND DIRECTLY CONNECTED TO PIPE.
  - ANODE ONLY SHOWN HORIZONTALLY INSTALLED; AND ANODE CAN BE INSTALLED VERTICALLY PER FIELD CONDITIONS.

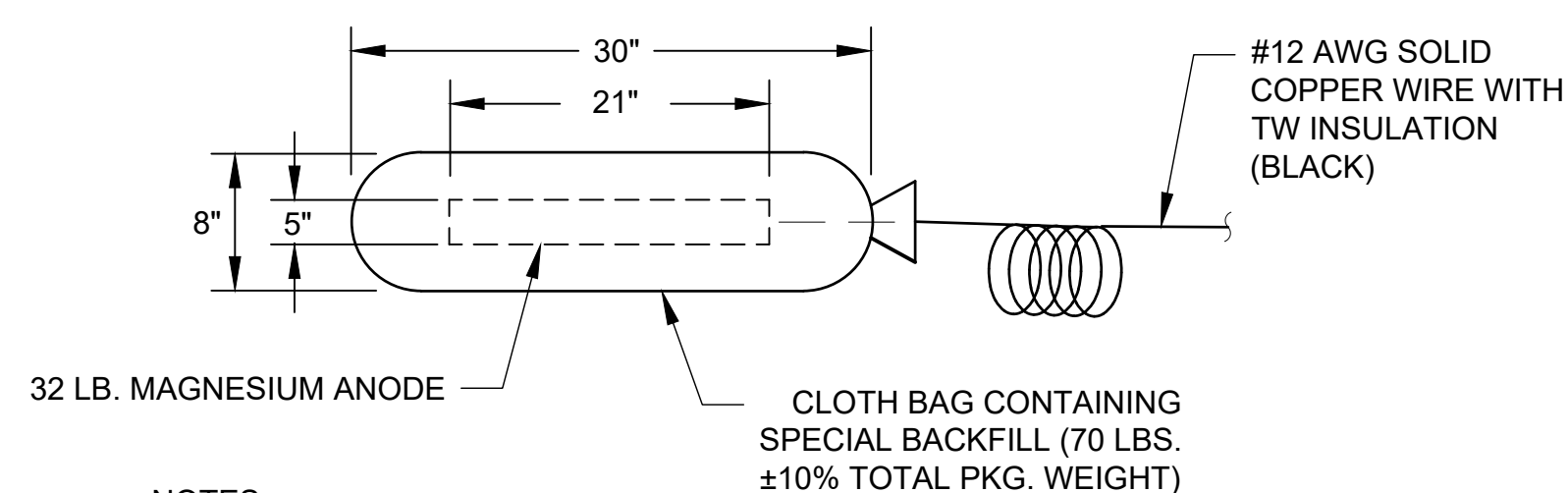
**1** GROUPING OF FITTINGS FOR ANODE INSTALLATION - TYPICAL  
SCALE: N.T.S.



**2** MAGNESIUM ANODE INSTALLATION (STRAIGHT PIPE SEGMENT)  
SCALE: N.T.S.

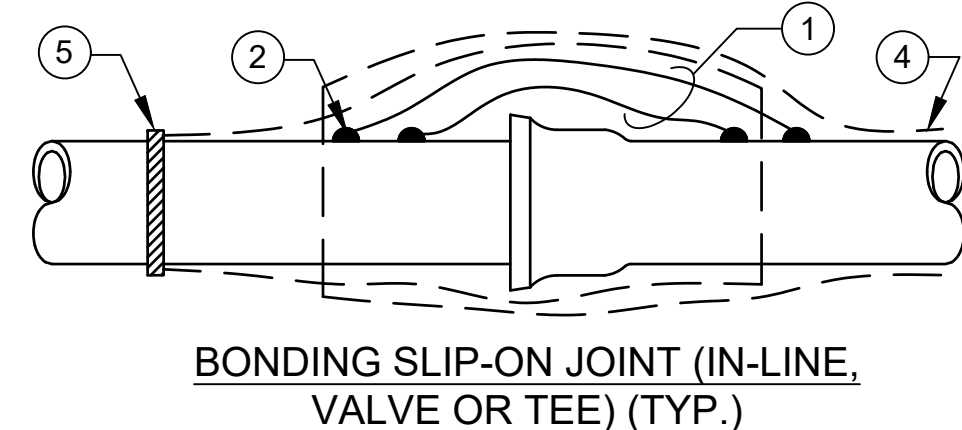


**A** SECTION A-A  
Scale: N.T.S.

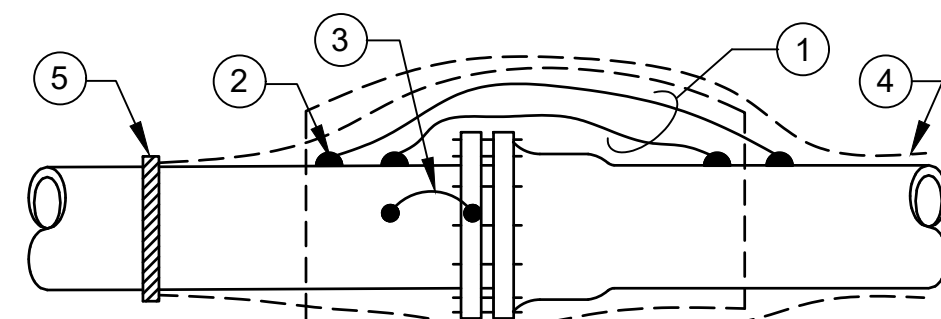


- NOTES:
- REMOVE ANODE FROM PLASTIC BAG PRIOR TO INSTALLATION.
  - BEFORE BACKFILLING, WET MAGNESIUM ANODE WITH APPROXIMATELY 5 GALLON OF WATER. RAIN WATER OR GROUND WATER IN DITCH WILL ALSO SUFFICE FOR THIS PURPOSE.
  - DO NOT LOWER ANODE INTO AUGURED HOLE OR TRENCH BY THE LEAD WIRE. SECURE ROPE TO ANODE TO LOWER INTO PLACE.

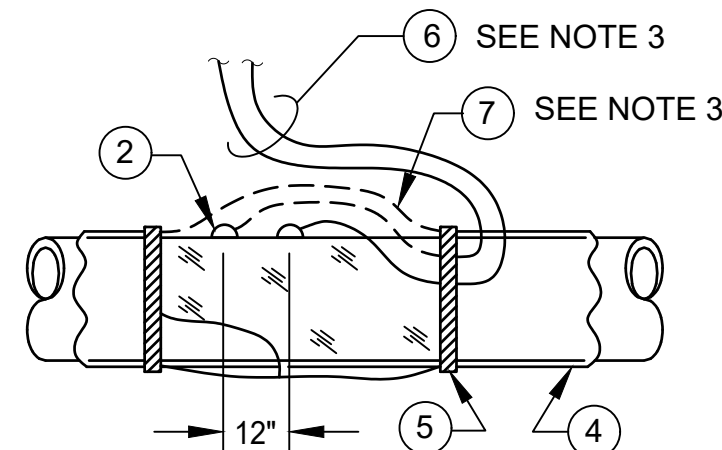
**3** 32 LB. MAGNESIUM ANODE - 32S5  
(FACTORY MANUFACTURED)  
SCALE: N.T.S.



BONDING SLIP-ON JOINT (IN-LINE, VALVE OR TEE) (TYP.)



BONDING RESTRAINED JOINT (IN-LINE, VALVE OR TEE) (TYP.)

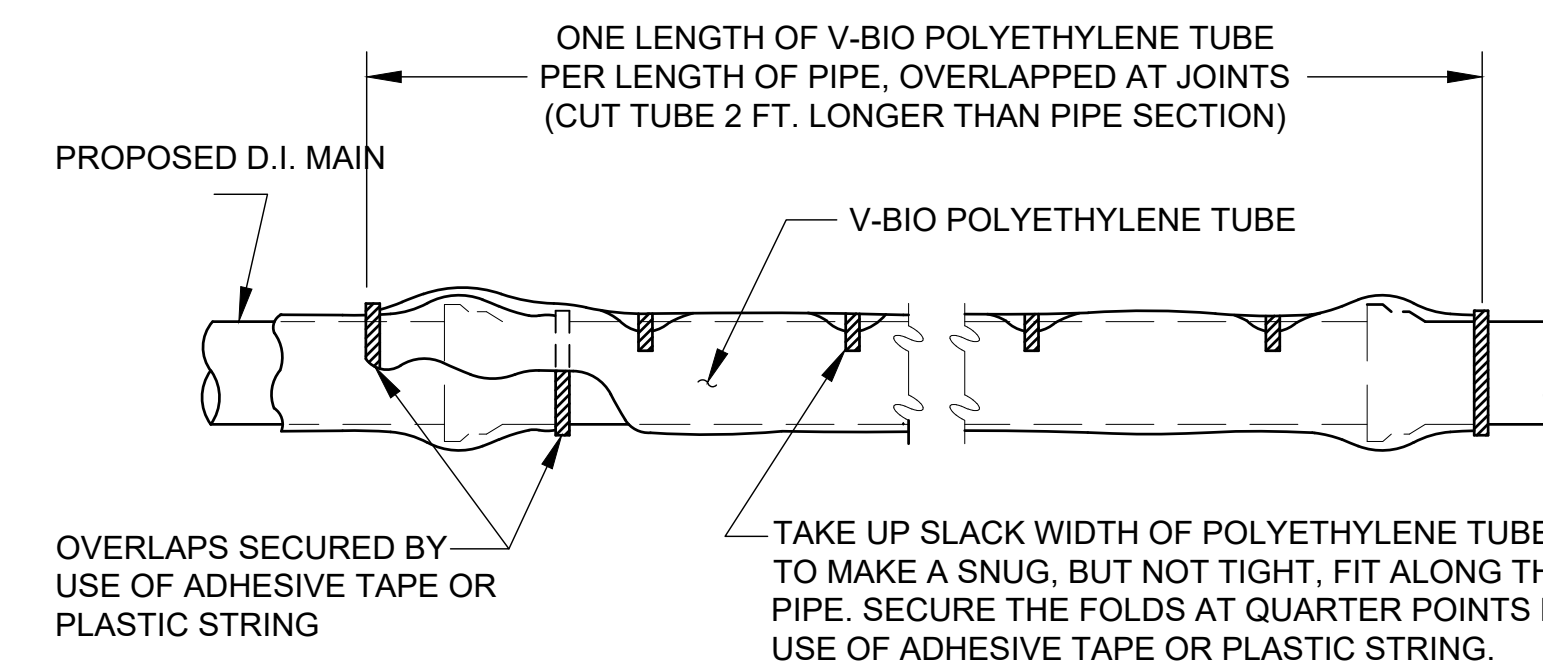


PIPE TEST WIRES - TYP.

**5** PIPE JOINT BONDING & TEST WIRES (UNDER POLYWRAP)  
SCALE: N.T.S.

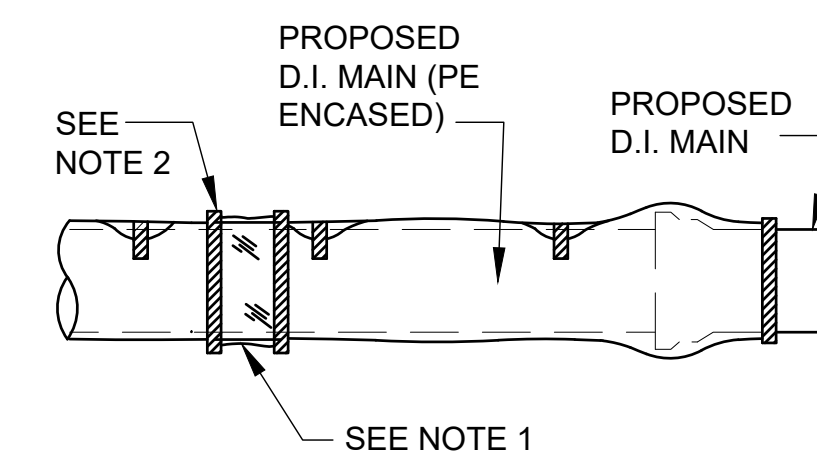
- KEY
- FOR BOND WIRE INSTALLATION, SEE DETAILS **2** & **3**
  - THERMITE WELD, SEE DETAIL **1** OR **1A**
  - ONE (1) #2 AWG HMWPE BOND CABLE
  - V-BIO POLYETHYLENE ENCASUREMENT, SEE DETAIL **6**
  - SECURE END OF V-BIO POLYETHYLENE ENCASUREMENT OR REPAIR PIECE BY USE OF ADHESIVE TAPE OR PLASTIC STRING.
  - TWO (2) #8 AWG TEST WIRES
  - POLYETHYLENE TUBE REPAIR PIECE

- NOTES: (FOR PIPE TEST WIRES)
- INSTALL POLYETHYLENE TUBE OVER PIPE PRIOR TO INSTALLING TEST WIRES.
  - SLIT POLYETHYLENE TUBE AT LENGTH REQUIRED TO THERMITE WELD WIRES TO THE PIPE.
  - ROUTE TEST WIRES AS SHOWN ALONG TOP OF PIPE AND INSTALL POLYETHYLENE TUBE REPAIR PIECE PER DETAIL **7**



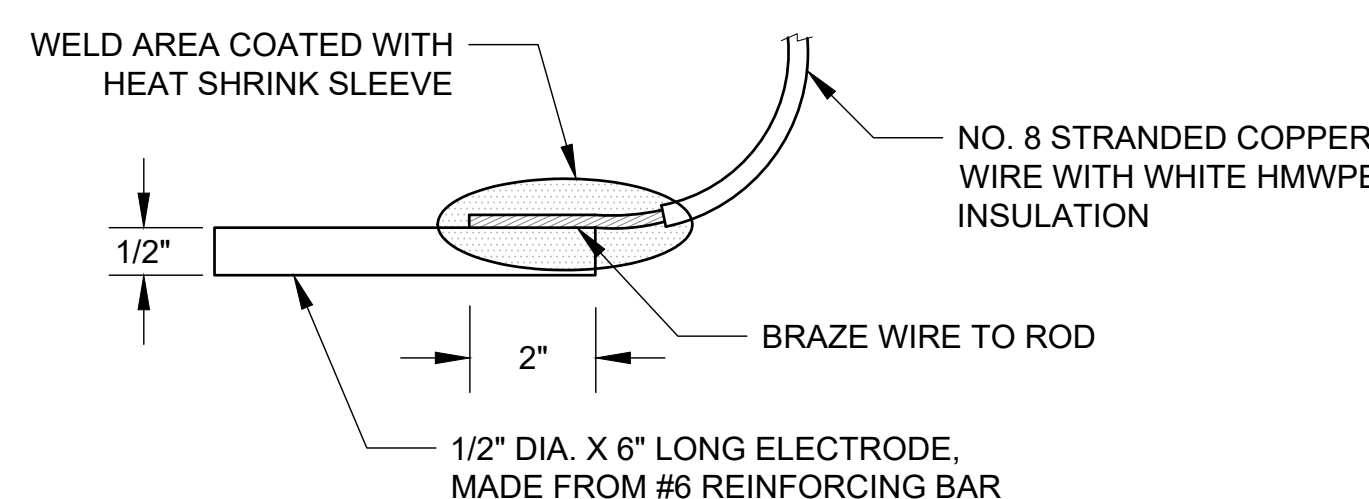
- NOTES:
- WRAP POLYETHYLENE TUBE OVER BOND WIRES (WIRES & PROBE NOT SHOWN FOR CLARITY)
  - REPAIR RIPS, PUNCTURES, OR OTHER DAMAGE TO POLYETHYLENE TUBE PER DETAIL **7**

**6** LOOSE POLYETHYLENE WRAP INSTALLATION - TYPICAL  
SCALE: N.T.S.



- NOTES:
- REPAIR RIPS, PUNCTURES, OR OTHER DAMAGE TO POLYETHYLENE TUBE WITH ADHESIVE TAPE OR SHORT LENGTH OF POLYETHYLENE TUBE CUT OPEN AND WRAPPED AROUND PIPE.
  - SECURE EDGES POLYETHYLENE REPAIR PIECE BY USE OF ADHESIVE TAPE OR PLASTIC STRING.

**7** POLYETHYLENE WRAP REPAIR - TYPICAL  
SCALE: N.T.S.



**4** STEEL REBAR TEST ELECTRODE  
(IF APPLICABLE)  
SCALE: N.T.S.

STANDARD STRAIGHT PIPE MAGNESIUM ANODE INSTALLATION AND POLYETHYLENE WRAP DETAILS

Drawing prepared by:

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CCI Cod File: 340403595\_U40-D220334-C-001  
CCI Dwg. No.: AQUA---

FILE: C:\CORRPRO\2\USERS\PAH\ORIG\2021\_05\FOLDERS\AQUA\_U40-2220334-C-01\AQUA\_U40-2220334-C-01\AQUA\_U40-2220334-C-01\CADWELD PLUS MATERIAL TEST STATIONS DETAIL5.AQUA\_U40-2220334-C-01.DWG, PLOT DETAILS, 07/14/2023 10:52:58 AM

STANDARD MATERIAL LIST ASSEMBLIES			
PART NUMBER		QUANTITY	WELD METAL
<b>TYPICAL INSULATING FLANGE JOINT TEST STATION W/MAG. ANODES, COUPON &amp; ELECTRODE</b>			
PART NUMBER	MATERIAL DESCRIPTION	QUANTITY	
54973006	#55 PAINTED BLUE W/ "CP" ON LID	1	
54975044	CP TEST NM-11 TERM BOARD	1	
54070940	ANODE MG HP 17#D3 ASSY PKGD W/ 25' #12 AWG TW RED	2	
54119328	MCM IR FREE COUPON #COU200 W/ 2-25' #12 THHN GREEN	1	
54049817	WIRE #8 HMWPE 7 STR CU BLACK	50	
54049868	WIRE #8 HMWPE STR CU WHITE	50	
54951536	GMC STAPERM REF CELL ZN-4-UG PKGD W/25' #14 RHH-RHW YELLOW	1	
VARIABLES	CAD WELD PLUS (PIPE SIZE DEPENDANT)	4	
54041989	ROYSTON A-51 PLUS 1 GAL CAN ROSKOTE, UN1139-HAZ (GALLON)	1	
<b>INTERFERENCE MITIGATION TEST STATION</b>			
PART NUMBER	MATERIAL DESCRIPTION	QUANTITY	
54973006	#55 PAINTED BLUE W/ "CP" ON LID	1	
54975044	CP TEST NM-11 TERM BOARD	1	
54070940	ANODE MG HP 17#D3 ASSY PKGD W/ 25' #12 AWG TW RED	2	
54049817	WIRE #8 HMWPE 7 STR CU BLACK	50	
54951536	GMC STAPERM REF CELL ZN-4-UG PKGD W/25' #14 RHH-RHW YELLOW	1	
VARIABLES	CAD WELD PLUS (PIPE SIZE DEPENDANT)	2	
54041989	ROYSTON A-51 PLUS 1 GAL CAN ROSKOTE, UN1139-HAZ (GALLON)	1	
<b>CASING TEST STATION</b>			
PART NUMBER	MATERIAL DESCRIPTION	QUANTITY	
54973006	#55 PAINTED BLUE W/ "CP" ON LID	1	
54975044	CP TEST NM-11 TERM BOARD	1	
54049817	WIRE #8 HMWPE 7 STR CU BLACK	50	
54049868	WIRE #8 HMWPE STR CU WHITE	50	
54951536	GMC STAPERM REF CELL ZN-4-UG PKGD W/25' #14 RHH-RHW YELLOW	1	
VARIABLES	CAD WELD PLUS (PIPE SIZE DEPENDANT)	4	
54041989	ROYSTON A-51 PLUS 1 GAL CAN ROSKOTE, UN1139-HAZ (GALLON)	1	
<b>MAGNESIUM ANODE TEST STATION</b>			
PART NUMBER	MATERIAL DESCRIPTION	QUANTITY	
54973006	#55 PAINTED BLUE W/ "CP" ON LID	1	
54975044	CP TEST NM-11 TERM BOARD	1	
54070940	ANODE MG HP 32# ASSY PKGD W/ 25' #12 AWG TW RED	1	
54951536	GMC STAPERM REF CELL ZN-4-UG PKGD W/25' #14 RHH-RHW YELLOW	1	
54119328	MCM IR FREE COUPON #COU200 W/ 2-25' #12 THHN GREEN	1	
54049817	WIRE #8 HMWPE 7 STR CU BLACK	50	
VARIABLES	CAD WELD PLUS (PIPE SIZE DEPENDANT)	2	
54041989	ROYSTON A-51 PLUS 1 GAL CAN ROSKOTE, UN1139-HAZ (GALLON)	1	
<b>THREE WIRE CONTINUITY TEST STATION</b>			
PART NUMBER	MATERIAL DESCRIPTION	QUANTITY	
54973006	#55 PAINTED BLUE W/ "CP" ON LID	1	
54975044	CP TEST NM-11 TERM BOARD	1	
54951536	GMC STAPERM REF CELL ZN-4-UG PKGD W/25' #14 RHH-RHW YELLOW	1	
54049817	WIRE #8 HMWPE 7 STR CU BLACK	50	
VARIABLES	CAD WELD PLUS (PIPE SIZE DEPENDANT)	2	
54041989	ROYSTON A-51 PLUS 1 GAL CAN ROSKOTE, UN1139-HAZ (GALLON)	1	

STANDARD MATERIAL LIST ASSEMBLIES			
PART NUMBER	AQUA STANDARD MATERIAL PART NUMBERS	QUANTITY	WELD METAL
<b>CAD WELD PLUS MATERIAL</b>			
PART NUMBER	WELDER MOLDS FOR #14 - #6 SOLID WIRE	WELD METAL	PART NUMBER
54062835	CADWELDER CAHBA-1G-04 MOLD HB W/F 14-6 WIRE 4" PIPE	CA25PLUASXF19	54126368
54862314	CADWELDER CAHBA-1G-06 MOLD HB W/F 14-6 WIRE 6" PIPE	CA25PLUASXF19	54126368
54142659	CADWELDER CAHBA-1G-08 MOLD HB W/F 14-6 WIRE 8" PIPE	CA25PLUASXF19	54126368
54942218	CADWELDER CAHBA-1G-10 MOLD HB W/F #6 WIRE 10" PIPE	CA25PLUASXF19	54126368
54197326	CADWELDER CAHBA-1G-12 MOLD HB W/F 14-6 WIRE 12" PIPE	CA25PLUASXF19	54126368
54904140	CADWELDER CAHBA-1G-16 MOLD HB W/F 14-6 WIRE 16" PIPE	CA25PLUASXF19	54126368
54918277	CADWELDER CAHBA-1G-20 MOLD HB W/F 14-6 WIRE 20" PIPE	CA25PLUASXF19	54126368
54904131	CADWELDER CAHBA-1G-24 MOLD HB W/F 14-6 WIRE 24" PIPE	CA25PLUASXF19	54126368
54660552	CADWELDER CAHBA-1G MOLD HB W/F 14-6 WIRE 30" PIPE & LARGER	CA25PLUASXF19	54126368
<b>CAD WELD PLUS CONTROL UNIT</b>			
PART NUMBER	WELDER MOLDS FOR #4 STRANDED (BOND WIRES)	WELD METAL	PART NUMBER
54062851	CADWELDER CAHBA-1L-04 MOLD HB W/F #4 STR WIRE 4" PIPE	CA45PLUSXF19	54555306
54925240	CADWELDER CAHBA-1L-06 MOLD HB W/F #4 STR WIRE 6" PIPE	CA45PLUSXF19	54555306
54599819	CADWELDER CAHBA-1L-08 MOLD HB W/F #4 STR WIRE 8" PIPE	CA45PLUSXF19	54555306
54942226	CADWELDER CAHBA-1L-10 MOLD HB W/F #4 STR WIRE 10" PIPE	CA45PLUSXF19	54555306
54197351	CADWELDER CAHBA-1L-12 MOLD HB W/F #4 STR WIRE 12" PIPE	CA45PLUSXF19	54555306
54949436	CADWELDER CAHBA-1L-16 MOLD HB W/F #4 STR WIRE 16" PIPE	CA45PLUSXF19	54555306
54103713	CADWELDER CAHBA-1L-20 MOLD HB W/F #4 STR WIRE 20" PIPE	CA45PLUSXF19	54555306
54945101	CADWELDER CAHBA-1L24 MOLD HB W/F #4 STR WIRE 24" PIPE	CA45PLUSXF19	54555306
54062843	CADWELDER CAHBA-1L MOLD HB W/F #4 STR WIRE 30-UP	CA45PLUSXF19	54555306
PART NUMBER	WELDER MOLDS FOR #4 STRANDED (BOND WIRES)	WELD METAL	PART NUMBER
54062860	CADWELDER CAHBA-1V MOLD HB W/F #2 STR WIRE 30-UP	CA45PLUSXF19	54555306
PART NUMBER	CADWELD PLUS CONTROL UNIT	WELD METAL	PART NUMBER
54065681	CADWELD CONTROL UNIT PLUSCU2L15, REPLACEABLE 15FT		

**NOTE:**

1. TO DETERMINE WHAT MOLD OR WELD METALS ARE REQUIRED, SEE TABLE ON SHEET 5 TITLED "CONNECTION TO DUCTILE IRON PIPELINE).

**STANDARD TEST STATION MATERIAL LIST ASSEMBLIES**



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