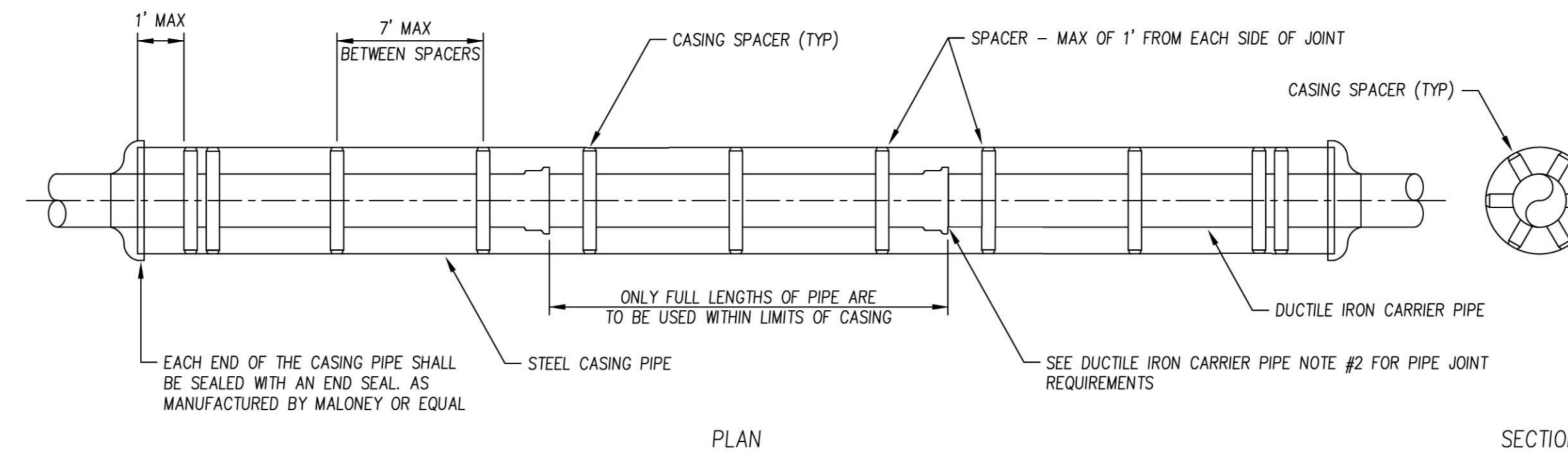


**SEPTA CONSTRUCTION REQUIREMENTS**

- OSHA RULE AND REGULATIONS MUST BE ADHERED TO FOR SAFETY IN EXCAVATIONS, THE DESIGN AND THE SHORING OF THE BORING PITS. ADDITIONALLY, PITS SHALL BE FENCED WITH ADEQUATE LIGHTING FOR PUBLIC SAFETY.
- THE TRACK AND RIGHT-OF-WAY MUST BE PROTECTED FROM ANY EROSION CAUSED BY THE PROJECT FIELD WORK.
- SHORING DESIGN IS THE RESPONSIBILITY OF THE CONTRACTOR. SHORING DETAILS AND CALCULATIONS TO BE APPROVED BY THE REPRESENTATIVE AND SUBMITTED TO SEPTA FOR REVIEW PRIOR TO CONSTRUCTION.
- PROVIDE EVIDENCE THAT SEPTA'S INSURANCE REQUIREMENTS, AS DETERMINED BY SEPTA'S RISK MANAGEMENT OFFICE, HAVE BEEN MET.
- ALL PERSONNEL INVOLVED IN THE FIELD WORK PORTION OF THE PROJECT, AND WHO'S DUTIES MIGHT INVOLVE ENTERING THE SEPTA RIGHT-OF-WAY, WILL BE REQUIRED TO ATTEND A FOUR HOUR SEMINAR IN ORDER TO OBTAIN SAFETY CERTIFICATION, AS MANDATED BY SEPTA AND THE FEDERAL RAILROAD ADMINISTRATION. THE ROADWAY WORKER SAFETY SEMINAR IS HELD BI-WEEKLY AT SEPTA'S MAIN OFFICE, 1234 MARKET STREET IN PHILADELPHIA. CONTACT SEPTA A MINIMUM OF 3 WEEKS IN ADVANCE OF WORK COMMENCING TO SCHEDULE ATTENDANCE FOR PROJECT PERSONNEL.
- PROVIDE NOTIFICATION PRIOR TO THE START OF CONSTRUCTION, INCLUDING UPDATED PROJECT SCHEDULES.
- STAINLESS STEEL CASING SPACERS SPECIFIED SHALL HAVE TWO PIECE STAINLESS BAND WITH POLYETHYLENE RUNNER HEIGHT OF ONE AND A HALF INCHES. RECOMMENDED PLACEMENT OF SPACERS ARE 3 PER 18-20 FT. LENGTH OF PIPE. SPACERS SHALL BE ADVANCED PRODUCT SYSTEMS, (337) 322-6116 OR APPROVED EQUAL.
- A RIGHT OF ENTRY PERMIT MUST BE SECURED PRIOR TO START OF CONSTRUCTION.
- A SIGN IDENTIFYING THE BURIED UTILITY AND EMERGENCY SHUTOFF VALVES WILL BE INSTALLED AT THE PIPE LOCATION. THE SIGN SHALL INCLUDE THE FACILITY OWNER NAME (AQUA) AND CONTACT NUMBER.
- AQUA WILL PROVIDE A REGISTERED SURVEYOR WHO SHALL ESTABLISH THE TOP-OF-RAIL ELEVATIONS, FOR EACH RAIL, PRIOR TO THE START OF WORK. SUBSEQUENT ELEVATION MEASUREMENTS SHALL BE TAKEN DURING AND AT THE COMPLETION OF WORK, IN ORDER TO MONITOR TRACK CONDITIONS ABOVE THE BORE.
- RAIL MONITORING SHALL BE REQUIRED. RAIL MONITORING DESIGN AND PLAN SHALL BE COMPLETED BY THE CONTRACTOR OR REGISTERED SURVEYOR AND SUBMITTED TO SEPTA FOR APPROVAL PRIOR TO CONSTRUCTION. AT A MINIMUM, RAIL MONITORING REQUIREMENTS ARE AS FOLLOWS:
  - ESTABLISH REMOTE MONITORING POINTS (RMP'S) FOR COLLECTION OF DATA.
  - PRECONSTRUCTION MONITORING ACTIVITIES TO BEGIN AT LEAST 10 DAYS PRIOR TO START OF CONSTRUCTION
  - MONITOR USING TOTAL STATION INSTRUMENT HAVING A MINIMUM ANGULAR ACCURACY OF 1-SECOND AND AN ELECTRONIC DISTANCE MEASUREMENT ACCURACY OF 1.0MM + 2PPM. TOTAL STATION TO LOCATE RMP'S ON TRACK TO BE MONITORED
  - CONTRACTOR SHALL SPACE THE PRISMS AT 15'-6" INTERVALS
  - RMP'S SHALL BE EITHER COMMERCIALY AVAILABLE CALIBRATED REFLECTIVE TARGETS OR SMALL PRISMS. ALL TARGETS SHALL BE MOUNTED AT A UNIFORM ELEVATION BELOW THE TOP OF RAIL.
  - REFLECTIVE TARGETS SHALL BE LESS THAN 3-INCHES SQUARE AND MOUNTED TO THE WEB OF THE RAIL BY ADHESIVE. ALLOWABLE MINIMUM ANGLE FROM INSTRUMENT TO TARGET FACE IS 30 DEGREES.
  - PRISMS MOUNTED ON RAIL BRACKETS SHALL REMAIN AT LEAST 1-INCH BELOW TOP OF RAIL HEAD AND MUST NOT INTERFERE WITH TRACK COMPONENTS.
  - CONTRACTOR SHALL INCLUDE PRISMS ON THE TRACK(S) THE WORK PASSES BENEATH.
  - IF THE PRISMS ENCOUNTER SPECIAL TRACK WORK LOCATIONS (CROSSINGS, TURNOUTS, MITER RAILS), CONTRACTOR SHALL NOTIFY SEPTA TO DETERMINE AN ALTERNATE ARRANGEMENT.
  - THE TOTAL COUNT ALONG THE TRACK SHALL EXTEND THROUGH THE ZONE OF INFLUENCE AND EXTEND AN ADDITIONAL FIVE (5) STATIONS, IN EITHER DIRECTION, OUTSIDE OF THE ZONE OF INFLUENCE.
  - 10.1. ZONE OF INFLUENCE USING THE DIAMETER OR WIDTH OF THE UNDERGROUND WORK, EXTENDING TO THE SURFACE OF THE GROUND AT THE SOIL ANGLE OF REPOSE. SOIL ANGLE OF REPOSE SHOULD BE TAKEN FROM THE DEPTH OF THE UNDERGROUND WORK TO GROUND LEVEL.
- TO MINIMIZE THE POTENTIAL OF THE BORE HOLE COLLAPSING, ALL DRILLING AND BACK REAMING OPERATIONS MUST UTILIZE TRAIL RODS.
- CASING PIPE BORING AND DRILLING OPERATIONS SHALL COMMENCE CONTINUOUSLY WITHOUT STOPPAGE.
- ALL SPOILS GENERATED FROM THE BORING AND DRILLING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF-SITE. NO ON-SITE STORAGE OF SPOIL MATERIALS WILL BE PERMITTED WITHIN SEPTA R/W.

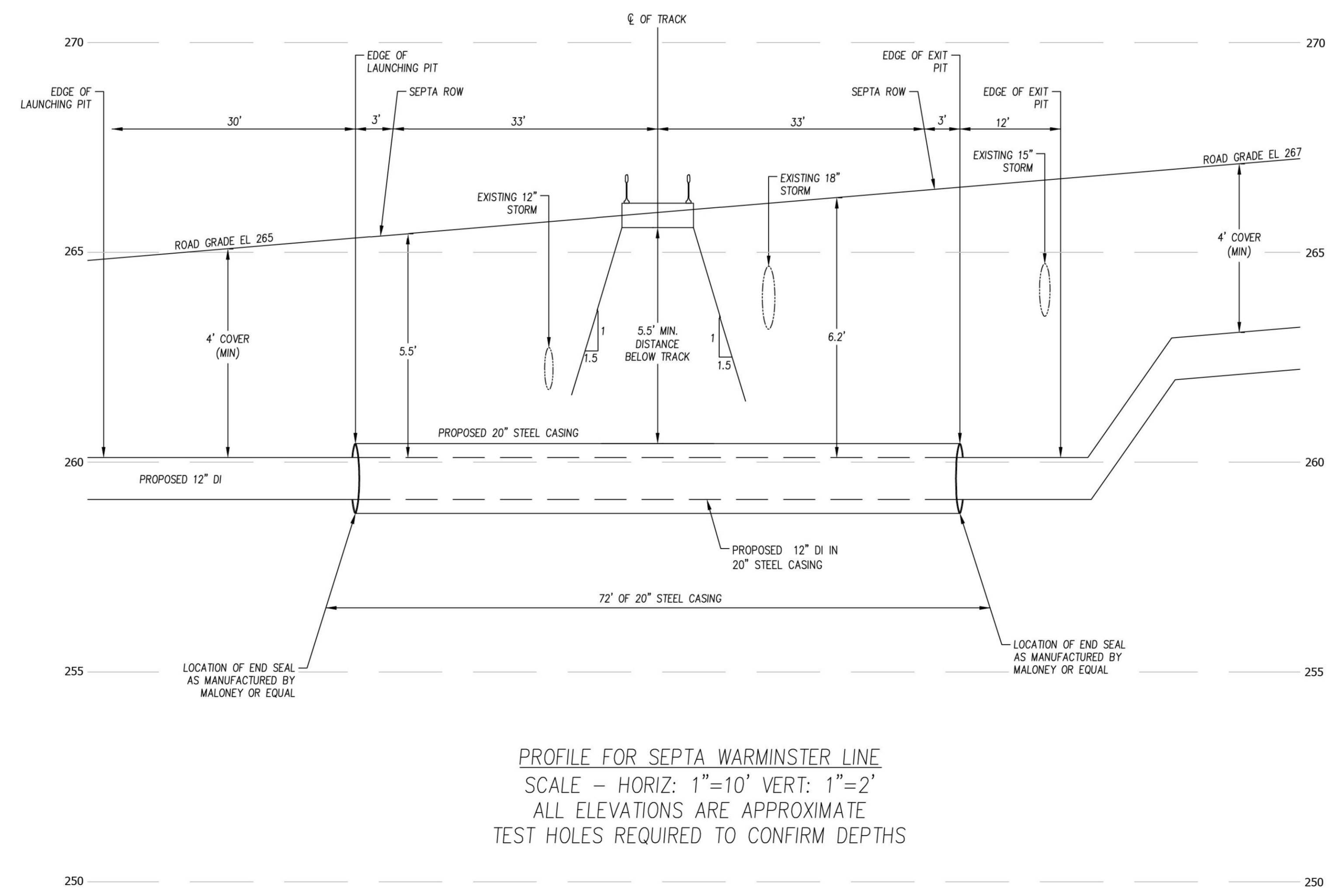
**TOOL BOX MEETINGS:**  
THE CONTRACTOR'S SUPERINTENDENT OR SAFETY OFFICER SHALL HOLD DAILY "TOOL BOX" JOB BRIEFINGS WITH ALL CONTRACTOR PERSONNEL. SUBJECTS, TIME, AND LOCATION CAN BE SET AT THE CONTRACTOR'S CONVENIENCE. SEPTA REQUIRES 3 BUSINESS DAYS PRIOR NOTICE, OR A SCHEDULE OF SUCH TOOL BOX MEETINGS. THIS NOTICE SHALL INCLUDE LOCATION AND AGENDA.



- STEEL CASING PIPE NOTES:**
- ALL CASING PIPE SHALL BE ASTM A53 GRADE B, 0.50" WALL THICKNESS, STANDARD WEIGHT, MANUFACTURED IN ACCORDANCE WITH AWWA C200.
  - CASING PIPE SHALL BE REQUIRED FOR WATER MAINS CROSSING OVER AND UNDER HIGHWAYS, RAILROADS, OR ANY OTHER LOCATION WHERE A LEAKING PIPE CAN CREATE A HAZARDOUS CONDITION. IN GENERAL, CASING PIPE IS NOT REQUIRED FOR MAINS CROSSING BODIES OF WATER.
  - ALL EXPOSED CASING PIPE SHALL BE SHOP BLASTED AND COATED EXTERNALLY IN ACCORDANCE WITH THE STATE DOT PAINT SPECIFICATION FOR STRUCTURAL STEEL.
  - ALL STEEL PIPE BELOW GRADE SHALL BE WRAPPED WITH PROTECTO-WRAP 310, COLD APPLIED PIPE TAPE (WRAPPING TO EXTEND TO A MINIMUM OF 18" BEYOND FINISHED GRADE.) IF APPLICABLE, REFER TO THE CATHODIC PROTECTION PLAN FOR ADDITIONAL CORROSION PROTECTION MEASURES.
  - ALL STEEL PIPE SHALL BE ORDERED WITHOUT COATING 6" FROM EACH END TO ALLOW FOR BEVELING AND WELDING IN THE FIELD.
  - ALL WELDERS SHALL BE CERTIFIED IN ACCORDANCE WITH THE API 1104 CODE OR AN APPROVED EQUAL. CONTRACTOR SHALL PROVIDE OWNER WITH EVIDENCE OF CURRENT WELDER QUALIFICATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
  - ALL PRODUCTION WELDS SHALL BE PERFORMED, TESTED AND INSPECTED IN CONFORMANCE WITH THE CURRENT EDITION OF AWWA C206.
  - ANY WELDER WHO MAKES A PRODUCTION WELD THAT FAILS TO COMPLY WITH THE REQUIREMENTS OF AWWA C206 MAY BE IMMEDIATELY DISQUALIFIED FROM CURRENT AND/OR FUTURE WORK AT THE DISCRETION OF THE OWNER.
- DUCTILE IRON CARRIER PIPE NOTES:**
- ALL DUCTILE IRON PIPE SHALL BE CLASS 52 (MIN.), CEMENT LINED, INTERNALLY AND EXTERNALLY COATED AS PER AWWA C150 (LATEST SPECS).
  - WHEN USING TYTON (OR PUSH-ON) JOINT PIPE, THE USE OF FIELD-LOK (RESTRAINT TYPE) GASKETS ARE REQUIRED AT EACH JOINT WITHIN THE CASING PIPE AND (2) PIPE JOINTS PAST THE CASING END SEAL ON EACH END. PIPE IS TO BE PUSHED THROUGH CASING, NOT PULLED. CONSULT PROJECT CONSTRUCTION PLANS IF OTHER TYPE OF RESTRAINT PIPE IS BEING INSTALLED AND FOLLOW THOSE SPECIFICATIONS ACCORDINGLY.

NOMINAL PIPE DIAMETER	MINIMUM NOMINAL CASING I.D.
8"	16"
10"	18"
12"	20"
16"	24"
20"	36"

TYPICAL DUCTILE IRON WATER MAIN WITH STEEL CASING AND SPACERS DETAIL



PROFILE FOR SEPTA WARMINSTER LINE  
SCALE - HORIZ: 1"=10' VERT: 1"=2'  
ALL ELEVATIONS ARE APPROXIMATE  
TEST HOLES REQUIRED TO CONFIRM DEPTHS

A-2023-3038368

**CERTIFIED CORRECT PLANS**

Professional Engineer

Approved by: Bureau of Technical Utility Services

PA PUBLIC UTILITY COMMISSION

ATTEST: Secretary

EXHIBIT A

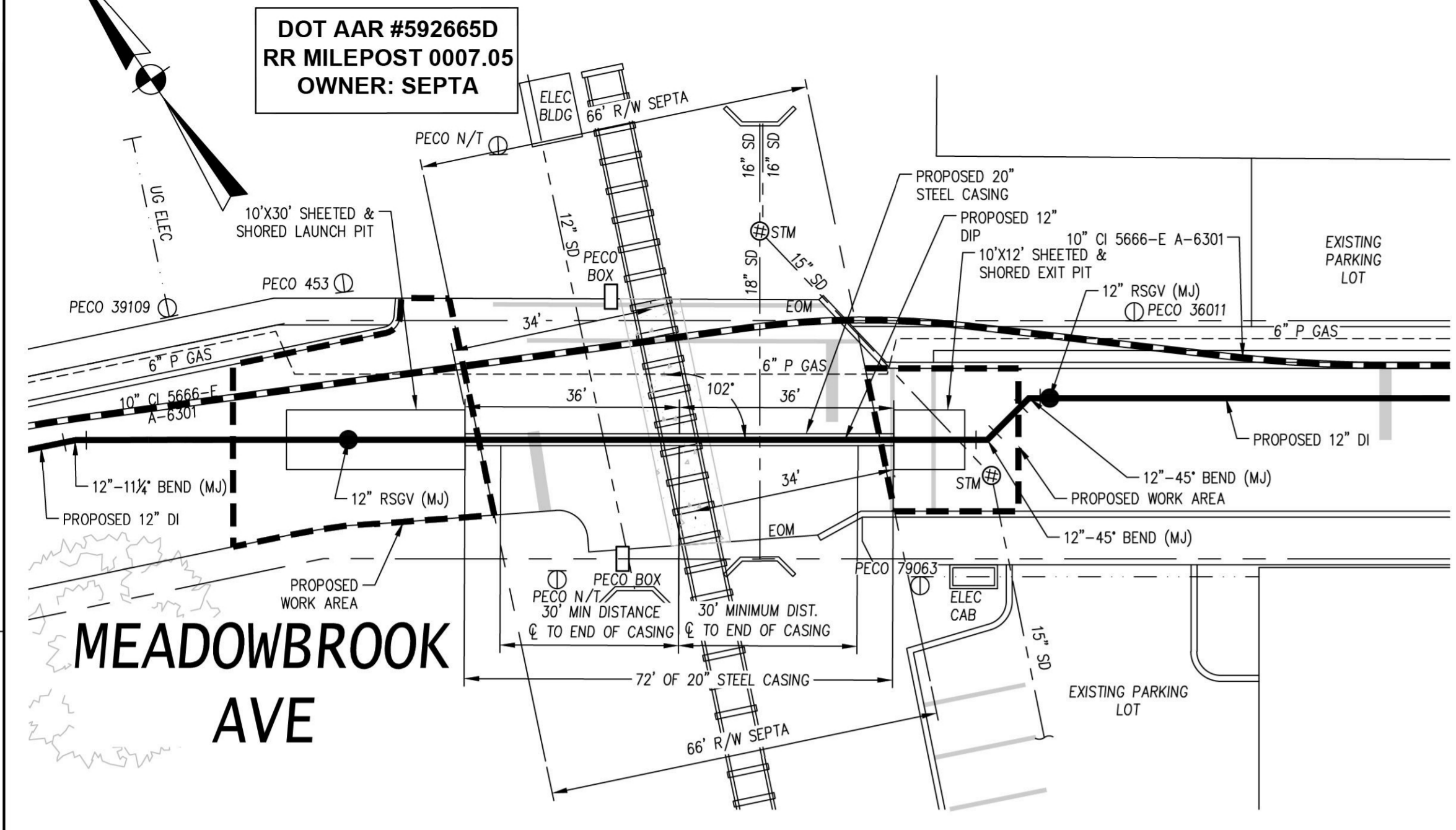
Pipe Crossing Data	Carrier Pipe	Casing Pipe
Contents to be handled	Water	None
Operating Pressure (psi)	62	N/A
Nominal pipe size (")	12"	20"
O.S. Diameter (")	13.20"	20.00"
I.S. Diameter (")	12.46"	19.00"
Wall Thickness (")	0.37"	0.50"
Weight per Foot (lbs)	48.1	104.3
Material	Ductile Iron	Steel
Process of Manufacture	Centrifugally Cast	Welded Round Pipe
Specification	AWWA C150/C151	ASTM A53 & AWWA C200
Grade or Class	Thickness Class 52	A53 GRADE B
Working Pressure (psi)	150	N/A
Type of Joint	Mechanical	Welded
Type of Coating	Bitumastic	Bitumastic
Details of Cathodic Protection	Coating	Wrap or Coating
Details of Seal or Protection at Ends of Coating	N/A	Flexible oil/water resistant rubber end seals
Method of Installation	Pushing	Boring
Specific Min. Yield Strength	42,000 PSI	35,000 PSI

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

PROJECT PLAN FOR:  
**MEADOWBROOK AVENUE PROJECT**  
SEPTA RAILROAD CROSSING - JACK AND BORE  
HATBORO BOROUGH, MONTGOMERY COUNTY

DRAWN BY: TM	CHK'D BY: JMM	EXT No: 19485-E
DATE: 01/25/2022	SCALE: N.T.S.	PLATE: S-7, T-7
PROJECT No: 898.14	ACTIVITY No: 15900326867	<b>A - 66607</b>
APPROVED		SHEET 7 OF 13

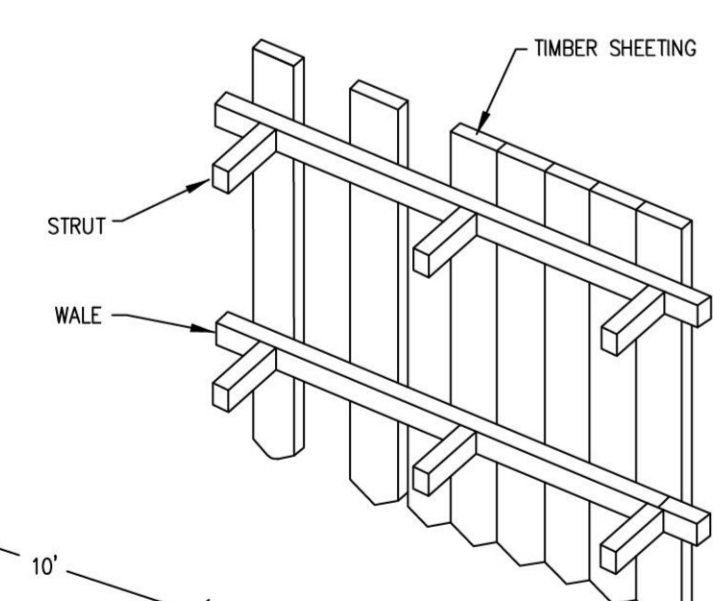
**TEC**  
TOTAL ENGINEERING & CONSULTING SERVICES, LLC  
www.tecengineeringllc.com | 287.434.1099



PLAN FOR SEPTA WARMINSTER LINE  
SCALE - 1"=20'

**BORING PROCEDURE**

- WORK AREAS WILL BE CLEARED, PRECAUTIONS TO PROTECT EXISTING DRAINAGE AND EROSION CONDITIONS WILL BE TAKEN. APPROPRIATE SIGNS TO DIVERT TRAFFIC WILL BE PLACED IN ACCORDANCE WITH SEPTA AND BOROUGH OF HATBORO SPECIFICATIONS; NO EQUIPMENT SHALL BE OPERATED ON OR NEAR THE TRACK IN ANY WAY THAT COULD ERODE THE TRACK SHOULDER OR TRACK STRUCTURE. EQUIPMENT IS THEN STAGED ON SITE AND NECESSARY TRAFFIC CONTROLS AND DESIGNATED WORK AREAS PUT IN PLACE.
- CONSTRUCT ONE (1) 10'X30' LAUNCH PIT AND ONE (1) 10'X12' EXIT PIT. THE LAUNCH PITS WILL BE OUTSIDE OF THE SEPTA RIGHT-OF-WAY. ALL PITS WILL HAVE SHEETED AND SHORED WALLS PER DETAIL (SEE THIS SHEET).
- INSTALL BORING MACHINE RAILS AND LEVEL WITH FLOOR OF LAUNCH PIT. PLACE THE BORING MACHINE ON THE RAILS.
- PLACE CASING PIPE ON RAILS AND ATTACH BORING HEAD AND AUGERS TO THE BORING MACHINE.
- THE TRACKS OF THE RAILROAD WILL BE SURVEYED BEFORE BORING BEGINS.
- AS THE HOLE IS BORED, SOIL IS REMOVED FROM LAUNCH PIT AND A COMPLETE SECTION OF CASING PIPE IS INSERTED. THE NEXT SECTION OF CASING IS WELDED TO THE EXISTING CASING AND AUGERS ARE ADDED TO THE BORING MACHINE. THIS PROCEDURE IS REPEATED UNTIL THE CASING EXTENDS ACROSS THE RAILROAD RIGHT-OF-WAY INTO THE EXIT PIT.
- DURING THE BORING PROCEDURE THE TRACKS WILL BE SURVEYED TO CHECK FOR ANY CHANGE IN ELEVATION.
- AFTER THE CASING IS INSERTED THE CASING SPACERS ARE ATTACHED TO THE CARRIER PIPE PER DETAIL. (SEE THIS SHEET).
- THE CARRIER PIPE AND SPACERS ARE INSERTED IN THE CASING PIPE UNTIL IT REACHES THE OTHER SIDE OF THE RAILROAD RIGHT-OF-WAY AND/OR THE EXIT PIT.
- THE CASING PIPE IS SEALED PER DETAIL, THIS SHEET. THE EXIT PIT AND TRENCH ARE BACKFILLED AND RESTORED TO MATCH EXISTING CONDITIONS.
- THE BORING MACHINE AND RAILS ARE REMOVED AND THE LAUNCH/EXIT PITS ARE BACKFILLED AND RESTORED TO EXISTING CONDITIONS. BACKFILL AND RESTORATION TO BE IN ACCORDANCE WITH BOROUGH OF HATBORO SPECIFICATIONS AND REQUIREMENTS. SIGNS IDENTIFYING THE BURIED UTILITY SHALL BE PLACED AT THE PIPE LOCATION OUTSIDE RAILROAD RIGHT-OF-WAY.
- THE TRACK OF THE RAILROAD IS THEN SURVEYED FOR ANY ELEVATION CHANGES. WHEN DISTURBED AREAS ARE RESTORED TO ORIGINAL CONDITION, TRAFFIC CONTROL AND EQUIPMENT IS REMOVED.



**TIMBER WALL CONSTRUCTION**  
TIMBER SHEETING 2 TO 3 INCHES THICK IS GENERALLY USED.  
THE BOTTOM EDGE IS CUT AS A 45° ANGLE FOR THE PENETRATING SOIL.  
SHEETING SHOULD BE DRIVEN IN WAVES WITH TIP PENETRATING 2 TO 3 FEET BELOW ADJACENT EXCAVATION LEVELS.  
AS EXCAVATION IS CARRIED TO APPROXIMATE BOTTOM OF SHEETS, THEY ARE REDRIVEN AN ADDITIONAL 2 TO 3 FEET BELOW EXCAVATION LEVEL AND THE CYCLE IS REPEATED, AT PROPER DEPTH, BRACING IS INSTALLED.  
THE WALES TRANSFER THE LOAD FROM THE TIMBER TIE-BACK SYSTEM TO THE STRUT

**CROSS SECTION, HYDRAULIC SHORING**  
HYDRAULIC SHORING SHOULD BE CHECKED AT LEAST ONCE PER SHFT FOR LEAKING HOSES AND/OR CYLINDERS, BROKEN CONNECTIONS, CRACKED NIPPLES, BENT BASES, AND ANY OTHER DAMAGED OR DEFECTIVE PARTS

All shoring should be installed from the top down and removed from the bottom up.

**TYPICAL SHEETING AND SHORING**