

SECTION 31 50 00

CASING INSTALLATION

PART 1: GENERAL

1.01 GENERAL REQUIREMENTS

- A. The installation of casing pipe shall conform to this Specification and any Federal, State, local highway and railroad crossing requirements.
- B. Casing pipe is required wherever water, sewer, or force mains are installed via the jacking and boring method.

1.02 SUBMITTALS

- A. Submit details of proposed jacking or boring pits to the AW Project Manager showing locations, dimensions, and details of sheeting and shoring required, if requested.

1.03 RELATED WORK

- A. Excavation, backfilling and compaction for jacking and receiving pits and for open cut installation shall conform to the requirements set forth in appropriate Sections Utility Backfill and Compaction Materials.

PART 2: PRODUCTS

2.01 MATERIAL

- A. Casing pipe shall be bare wall steel pipe with minimum yield strength of 35,000 psi.
- B. The inside diameter of the casing pipe shall be: at least 4-inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6--inches in diameter; and at least 6-inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe 6-inches and greater in diameter.
- C. Casing pipe shall have a minimum wall thickness as listed below:

<u>Casing Outside Diameter</u> <u>Inches</u>	<u>Highway Crossing Casing Wall Thickness</u> <u>Inches</u>	<u>Railroad Crossing Casing Wall Thickness</u> <u>Inches</u>
8.625	0.250	0.250
10.75	0.250	0.250
12.75	0.250	0.250
14	0.250	0.281
16	0.250	0.281

<u>Casing Outside Diameter</u> <u>Inches</u>	<u>Highway Crossing Casing Wall Thickness</u> <u>Inches</u>	<u>Railroad Crossings Casing Wall Thickness</u> <u>Inches</u>
18	0.250	0.312
20	0.312	0.344
24	0.312	0.406
30	0.375	0.469
36	0.500	0.532
42	0.500	0.563
48	0.625	0.625
54	0.625	0.688
60	.625	0.750
66	.625	0.813
72	.750	0.875

PART 3: EXECUTION

3.01 ALIGNMENT AND GRADE

- A. Locate pipelines to cross roadways or tracks at 90 degrees where practicable, but not less than 45 degrees. Do not place pipelines in culverts or under bridges where there is likelihood of restricting the area required for the purposes for which the bridges or culverts were built, or of endangering the foundations. Install the casing pipe on an even grade for its entire length and sloped to one end or as noted in a profile plan if provided. Satisfy a maximum tolerance of 1.5% (18" in one hundred feet) with the desired location of the casing or as otherwise required by regulation or specified on the Drawings, whichever is more restrictive.

3.02 WELDING

- A. Steel casing sections shall be connected by seam welding. The seam shall be a butt joint. Field welding shall conform to AWWA Standard C206. Carrier pipes shall not be spiral welded.

3.03 PROTECTION AT ENDS OF CASING

- A. Casing ends shall be sealed to prevent the entrance of foreign materials, but shall allow leakage to pass in the event of a carrier break.

3.04 DEPTH OF INSTALLATION

- A. Unless the depth of casing pipe is specifically specified on the Drawings, the casing pipe depth shall be in accordance with highway or railroad requirements.

3.05 CASING SPACERS

- A. The carrier pipe and casing shall be separated by a spacer manufactured from high density polyethylene. Spacer shall be installed to support the weight of the carrier pipe and its contents. As a minimum, the spacer shall be placed a maximum of three 3-foot from each side of a joint and evenly spaced along the carrier pipe with three 3 spacers per each length of carrier pipe. Timber skids are not allowed. Casing spacer shall be sized according to the manufacture's specifications for pipe sizes.
- B. At the sole discretion of the AW Project Engineer, alternate materials in lieu of those described above and new or improved products may be permitted.

3.06 TRACER WIRE

- A. Installation of tracer wire shall conform to the requirements set forth in Section – Tracer Wire. Where tracer wire cannot be installed through the casing with the carrier pipe, the wire shall be cad welded to the casing ends to allow wire continuity.

3.07 INSTALLATION

- A. Install casing pipes by one of the following methods:

- 1. Jacking

This method shall be in accordance with the current American Railway Engineering Association Specifications, Chapter 1, Part 4, "Jacking Culvert Pipe Through Fills", except that steel pipe shall be used with welded joints. Conduct this operation without hand mining ahead of the pipe and without the use of any type of boring, auguring or drilling equipment.

Design the bracing, backstops, and jacks so that the jacking can progress without stoppage (except for adding lengths of pipe).

- 2. Drilling

This method employs the use of an oil field type rock roller bit, or a plate bit made up of individual roller cutter units, welded to the pipe casing being installed. Turn the pipe for its entire length from the drilling machine to the head to give the bit the necessary cutting action against the ground being drilled. Inject high density slurry (oil field drilling mud) through a supply line to the head to act as a cutter lubricant. Inject this slurry at the rear of the cutter units to prevent any jetting action ahead of the pipe. Advance the drilling machine on a set of steel rails (thus advancing the pipe) by a set of hydraulic jacks. The method can be used to drill earth or rock.

- 3. Boring

This method consists of pushing or pulling the pipe into the fill with a boring auger rotating within the pipe to remove the soil. When augers or similar devices are used for pipe placement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

If an obstruction is encountered during installation that stops the forward action of the pipe, and if it becomes evident that it is impossible to advance the pipe, operations will cease and the pipe shall be abandoned in place and filled completely with grout.

- B. Bored or jacked installations shall have a bore hole essentially the same as the outside diameter of the pipe. Grout any voids that develop. Also grout around the casing pipe when the bore hole diameter is greater than the outside diameter of the pipe by more than 1-inch.

END OF SECTION 31 50 00