Single Wall HDPE Pipe Installation Guide

The recommendations presented here detail how to install a dependable subsurface drainage or groundwater control system. Installation with proper backfill materials, compaction levels, and placement procedures are essential to achieve long term system performance. These recommendations assume that the drainage designer used design criteria available from ASTM F449 and ADS. The designer should discuss installations involving conditions not covered by these documents (poor soils, high loads, or other factors that may affect the performance of the system) with an ADS representative.

Backfill Selection

- Only native soil meeting class I, II, or III, as described in Table 1, are acceptable backfill materials.
- Class I materials can be dumped around pipe. Lightly tamp or knifed to ensure voids are eliminated.
- Non-cohesive sand, sand/gravel mixes and other Class II or III materials must be compacted to remove voids.
- For pipe with burial depths 8' (2.4 m) or less, compaction may not be necessary, provided the trench bottom is shaped in accordance with Figure 2.

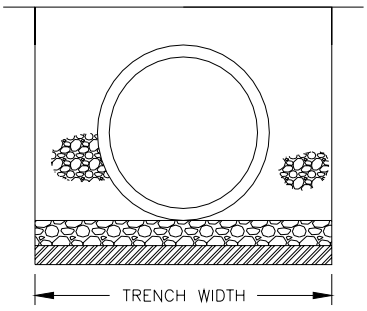
Table 1: Classes of Embedment & Backfill Materials

Description	Soil Classificaton		Min. Compaction Required (Std. Proctor Density (%)
	ASTM D2321	ASTM D2487	
Graded or crushed stone Crushed Gravel	Class I	-	Dumped
Well-graded sand, gravels, and gravelsand mixtures: Poorly graded sand, gravels, and gravel/sand mixtures; Little or no fines	Class II	GW GP SW SP	85%
Silty or clayey gravels, Gravels/ sand/silt or gravels and clay mix-tures, silty or clayey sands, sand/ clay or sand/silt mixtures	Class III	GM GC SM SC	90%
Inorganic silts and low to medium plasticity clays; gravelly, sandy, or silty clays; some fine sands	Class IVA	ML CL	Material Not Recommended

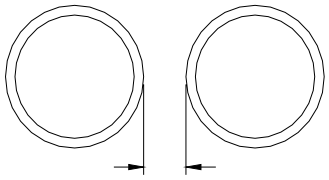
*Layer Heights should not exceed one-half the pipe diameter. Layer heights may also need to be reduced to accommodate compaction method.

ADS

Trench Construction



- Trench or ditch should be just wide enough to place and compact backfill around the entire pipe. Increasing the trench width increases the soil load on the pipe. Where trench walls are stable or supported, provide a width sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact embedment materials. The space between the pipe and trench wall must be enough for the compaction equipment used in the pipe zone. Minimum width shall be not less than the greater of either the pipe outside diameter plus 16” (400 mm) or the pipe outside diameter times 1.25, plus 12” (300 mm).
- For parallel pipe installations allow 12” (300mm) between the pipes.
- As with any pipe, groundwater or seasonal high water tables may impede installation. De-watering is necessary for a safe, and effective installation.
- Trench or ditch bottoms containing bedrock, soft muck or refuse, or other material unable to provide long-term pipe support are unacceptable. Unsatisfactory backfill shall be removed as specified by the design engineer.
- Unless otherwise specified or instructed by a soils specialist, rock or unyielding material shall be removed to 1’ (0.3 m) below grade and 6” (150mm) on either side of pipe and replaced with a suitable material as directed by the design engineer.

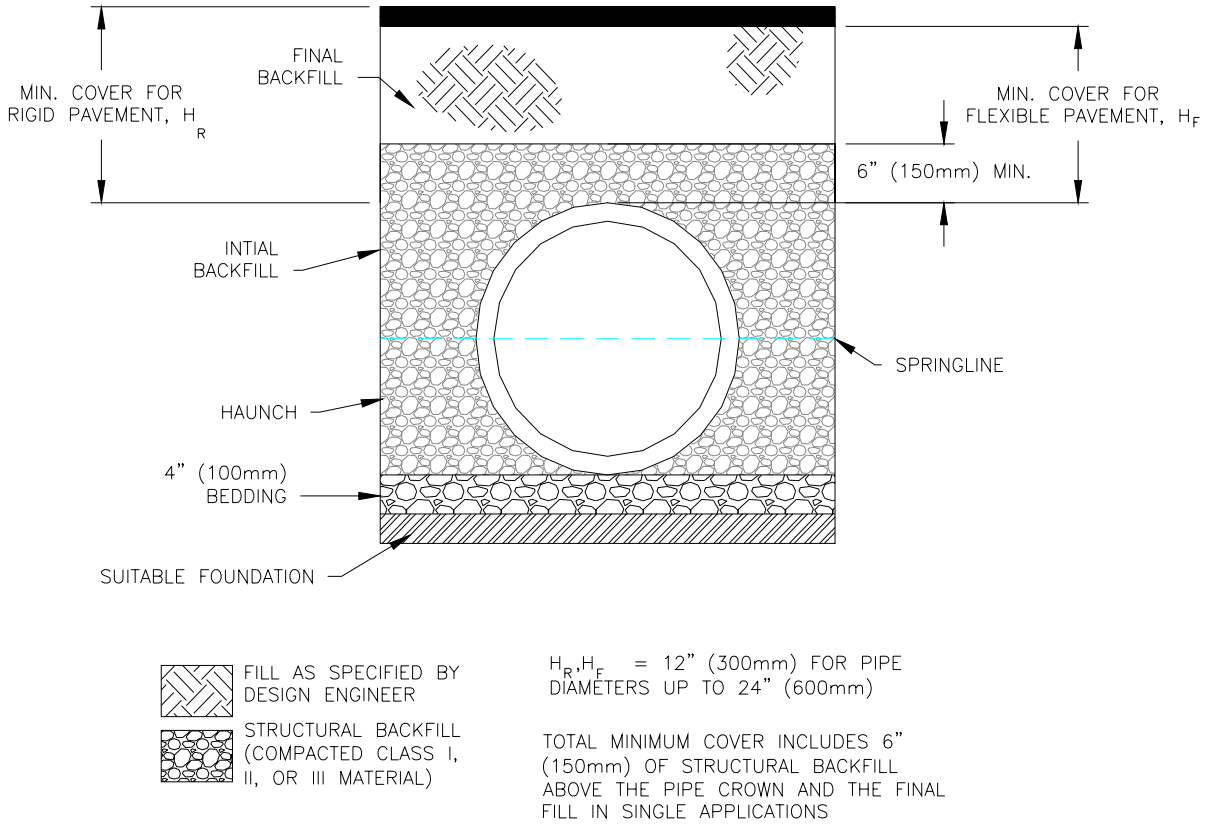


- For a flat bottom trench, bedding must be used for support as in Figure 1. Bedding shall be loosely placed directly under the pipe while the remainder shall be compacted in accordance with Table 1. Shaped trench bottoms may be used in accordance with ASTM F 449, see Figure 2.
- If soft area remains after excavation or if native soil can migrate into backfill, use an approved synthetic fabric (geotextile) to separate native soil from backfill as recommended by the design engineer.

Backfill Envelope Construction

- Place and compact backfill in layers to the meet the requirements of Table 1.
- Pipes laid in parallel installations require the same backfill support.
- Place and compact initial backfill in layers around pipe and at least 6” (150mm) above the crown as shown in Figure 1.
- Avoid impacting pipe with compaction equipment. Inspect if there is a question regarding damage.
- The final minimum cover shall be 1’ (0.3 m) for 3”-24” (75-600mm) pipe, measured from the crown of the pipe to final grade. For paved surface applications, flexible (asphalt) pavement thickness should not be included in the minimum cover as shown in Figure 1.
- If sufficient cover is not provided, mound and compact material over pipe to provide minimum cover needed for load during construction. Note: Construction traffic is heavier than typical roadway vehicles and will require a greater amount of minimum cover.

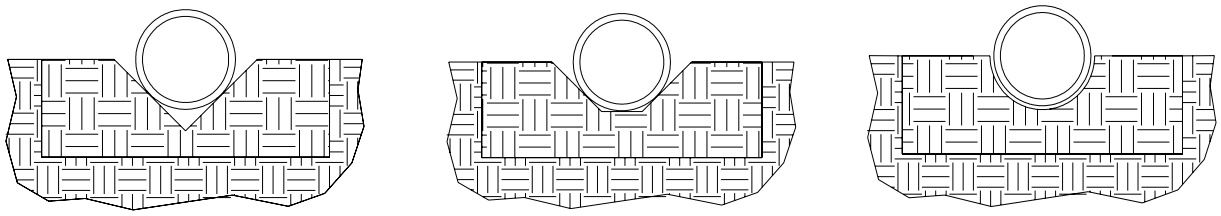
Figure 1
Typical Backfill Structure



Alternate Back Fill Methods: Shaped Trench Bottoms

Shaped trench bottoms may be used in lieu of the standard trench detail shown in Figure 1, provided a free flowing pea gravel or small rock chips are used to fill in the resultant void areas. Pea gravel or small chips shall be clean material passing a 3/8" (9.5mm) sieve meeting the class I, II, or III requirements of ASTM D 2321. This applies **only** to those insitu soil conditions where the native soil can be cut to a stable shaped trench. Line and grade may be affected due to the use of a modified trench bottom which may affect the pipe hydraulics.

Figure 2
Shape Trench Bottoms



2 (a)
"V" Groove
4"- 8"(100 mm - 200 mm)

2 (b)
Trapezoidal Bottom
8"- 24"(200 mm - 600 mm)

2 (c)
Circular Bottom
8"- 24"(200 mm -600 mm)