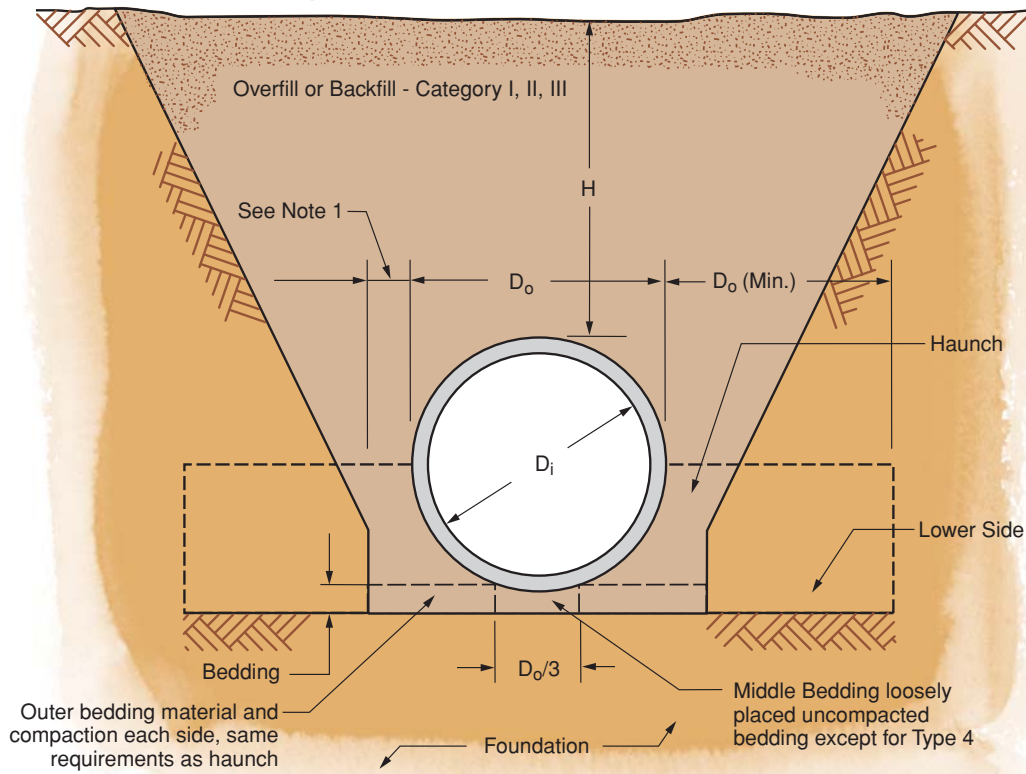


**Figure 1. Standard Trench Installation**



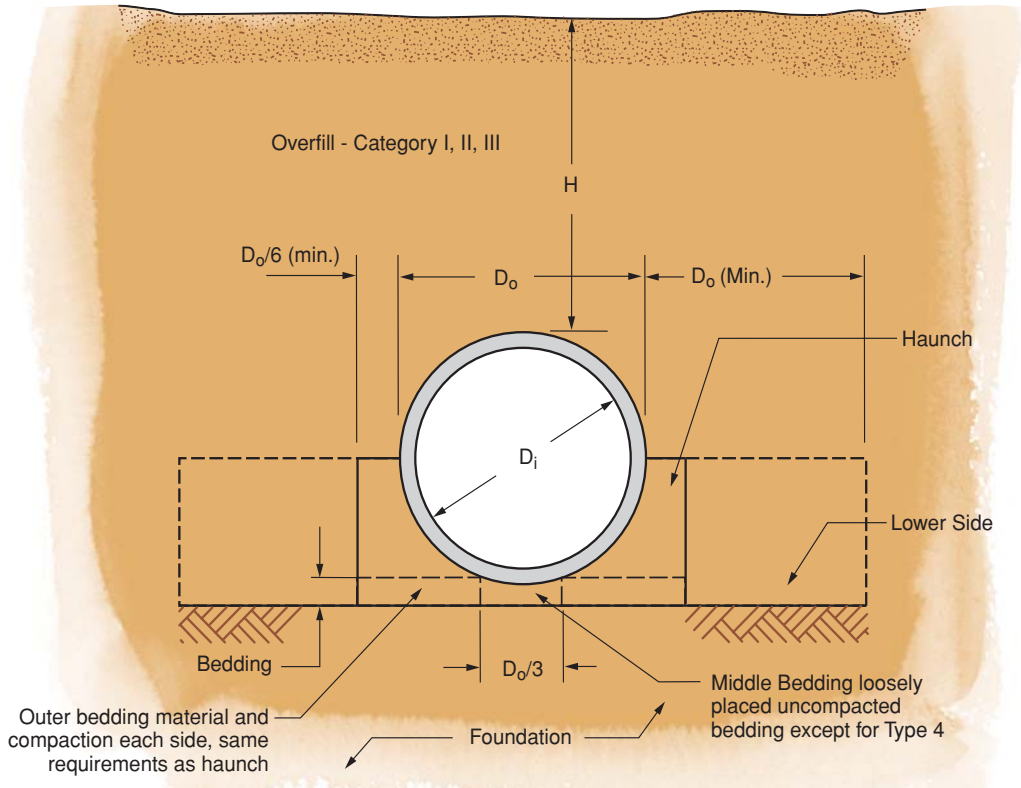
Note 1: Clearance between pipe and trench wall shall be adequate to enable specific compaction, but not less than  $D_o/6$ .

**SOILS AND MINIMUM COMPACTION REQUIREMENTS**

Installation Type	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	95% Category I	Undisturbed natural soil with firmness equivalent to the following placed soils: 90% Category I, 95% Category II, or 100% Category III, or embankment to the same requirements
Type 2	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	90% Category I or 95% Category II	Undisturbed natural soil with firmness equivalent to the following placed soils: 85% Category I, 90% Category II, or 95% Category III, or embankment to the same requirements
Type 3	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	85% Category I, 90% Category II, or 95% Category III	Undisturbed natural soil with firmness equivalent to the following placed soils: 85% Category I, 90% Category II, or 95% Category III, or embankment to the same requirements
Type 4	No bedding required, except if rock foundation, use $D_o/12$ minimum; not less than 6 in.	No compaction required, except if Category III, use 85%	No compaction required, except if Category III, use 85%

1. Compaction and soil symbols, that is, 95% Category I, refer to Category I soil material with a minimum standard proctor compaction of 95%.
2. The trench top elevation shall be no lower than 0.1 H below finished grade or, for roadways, its top shall be no lower than an elevation of 1 ft below the bottom of the pavement base material.
3. When the trench width specified must be exceeded, the engineer shall be notified.
4. Soil in bedding and haunch zones shall be compacted to at least the same compaction as specified for the majority of soil in the backfill zone.
5. The trench width shall be wider than shown if required for adequate space to attain the specified compaction in the haunch and bedding zones.
6. For trench walls that are within 10 degrees of vertical, the compaction or firmness of the soil in the trench walls and lower side zone need not be considered. See Note 3.
7. For trench walls with greater than 10 degree slopes that consist of embankment, the lower side shall be compacted to at least the same compaction as specified for the soil in the backfill zone. See Note 3.
8. Required bedding thickness is the thickness of the bedding after the placement of the pipe on the bedding and prior to the placement of the backfill.

**Figure 2. Standard Embankment Installation**



**SOILS AND MINIMUM COMPACTION REQUIREMENTS**

Installation Type	Bedding Thickness	Haunch and Outer Bedding	Lower Side
Type 1	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	95% Category I	90% Category I, 95% Category II, or 100% Category III
Type 2	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	90% Category I or 95% Category II	85% Category I, 90% Category II, or 95% Category III
Type 3	$D_o/24$ minimum; not less than 3 in. If rock foundation, use $D_o/12$ minimum; not less than 6 in.	85% Category I, 90% Category II, or 95% Category III	85% Category I, 90% Category II, or 95% Category III
Type 4	No bedding required, except if rock foundation, use $D_o/12$ minimum; not less than 6 in.	No compaction required, except if Category III, use 85%	No compaction required, except if Category III, use 85%

1. Compaction and soil symbols, that is, 95% Category I, refer to Category I soil material with a minimum standard proctor compaction of 95%.
2. Soil in the outer bedding, haunch, and lower side zones, except within  $D_o/3$  from the pipe springline, shall be compacted to at least the same compaction as the majority of soil in the overfill zone.
3. Required bedding thickness is the thickness of the bedding after the placement of the pipe on the bedding and prior to the placement of the backfill.
4. A subtrench is defined as a trench with its top below finished grade by more than 0.1H or, for roadways, its top is at an elevation lower than 1 ft below the bottom of the pavement base material. The minimum width of a subtrench shall be  $1.33 D_o$ , or wider, if required for adequate space to attain the specified compaction in the haunch and bedding zones. For subtrenches with walls of natural soil, any portion of the lower side zone in the subtrench wall shall be at least as firm as an equivalent soil placed to the compaction requirements specified for the lower side zone and as firm as the majority of soil in the overfill zone, or it shall be removed and replaced with soil compacted to the specified level.