

# Technical Note

## TN 2.11 Duraslot® Burial Depth and Backfill Conditions

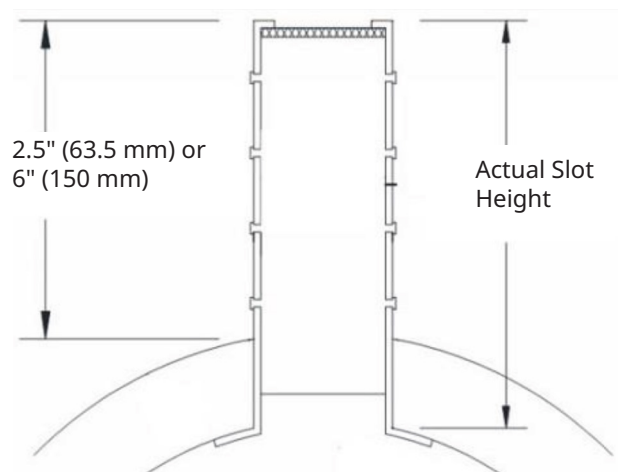
### Overview

The purpose of this technical memo is to provide general design information about Duraslot's slot height, burial depth requirements and backfill conditions. The backfill envelope around the Duraslot drain is the primary structural system to resist surface loads. Requirements for the backfill envelope and installation depth varies depending on loads anticipated in the application. This tech note provides basic configuration details, including burial depth limits for three typical application classes: pedestrian-only, roadway projects, and airport projects. However, it is the responsibility of the design engineer to specify backfill and other installation details which meet their project requirements.

### Burial Depth and Slot Height Limits

Duraslot's standard slot height is referenced two different ways, from grate to outside crown of pipe and the actual slot height as depicted in Figure 1. ADS recommends a minimum slot height (from grate to crown of pipe) of 2.5" (64 mm) for pedestrian-only applications and 6" (153 mm) for installations subject to H-20 loads. The actual slot height is the measurement taken from the top of the grate to the inside crown of the pipe and accounts for the height of the pipe corrugation. Actual slot height should be used when calculating invert elevations (see Table 1 and Table 2 below).

**Figure 1:** Actual Slot Height



In addition to the burial depth, Duraslot's grates should be recessed into the pavement to provide protection for the slot. For a pedestrian only application, the grate should be recessed into the pavement 0.25" (7 mm). For a H-20 loading applications, the slot should be recessed 0.25" - 0.5" (7 mm - 13 mm) into the pavement. Heavier loading applications shall have a 0.5" (13 mm) recess into the pavement.

Table 1 provides the minimum invert depth required for Duraslot, given the pipe size and application. Invert depths (denoted as “H” in Figures 2 – 4) are calculated by adding the inside diameter of the pipe, approximate corrugation thickness, minimum slot height from grate to inside crown of pipe, and the recess into the pavement.

**Table 1:** Minimum Invert Depth below Finish Grade by Pipe Size and Loading Condition

Inside Diameter of Pipe, in. (mm)		4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)
<b>Minimum Invert Depth, in. (mm)</b>	<i>Pedestrian Only:</i>	7.00 (178)	9.25 (235)	11.25 (286)	13.25 (337)	16.00 (407)	19.00 (483)	22.25 (566)	29.00 (737)	35.25 (896)	41.50 (1055)
	<i>Roadway Projects:</i>	10.75 (274)	13.00 (331)	15.00 (381)	17.00 (432)	19.50 (496)	22.50 (572)	25.50 (648)	31.75 (807)	38.75 (985)	44.75 (1137)
	<i>Airport Projects:</i>	13.75 (350)	16.00 (407)	18.00 (458)	20.00 (508)	22.50 (572)	25.50 (648)	28.50 (724)	34.75 (883)	41.75 (1061)	47.75 (1213)

Duraslot can also be made to order with a custom or variable slot height. Table 2 provides the maximum invert depth by pipe diameter. Invert depths are calculated by adding the inside diameter of the pipe, maximum actual slot height and the recess into the pavement.

**Table 2:** Maximum Invert Depth below Finish Grade by Pipe Size

Inside Diameter of Pipe, in. (mm)		4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)
<b>Minimum Invert Depth, in. (mm)</b>	<i>Pedestrian Only:</i>	28.25 (718)	30.25 (762)	32.25 (820)	34.25 (870)	48.25 (1226)	51.25 (1302)	54.25 (1378)	60.25 (1531)	66.25 (1683)	72.25 (1836)
	<i>Roadway Projects:</i>	28.50 (724)	30.50 (775)	32.50 (826)	34.50 (877)	48.50 (1232)	51.50 (1309)	54.50 (1385)	60.50 (1537)	66.50 (1690)	72.50 (1842)
	<i>Airport Projects:</i>	28.50 (724)	30.50 (775)	32.50 (826)	34.50 (877)	48.50 (1232)	51.50 (1309)	54.50 (1385)	60.50 (1537)	66.50 (1690)	72.50 (1842)

## Installation Considerations

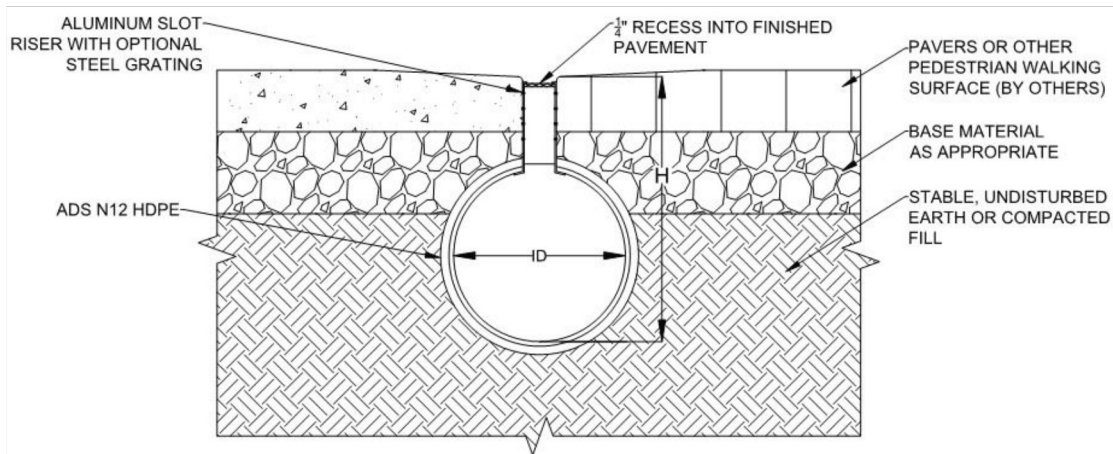
Installation conditions of Duraslot, especially the backfill envelope, drive the structural performance and longevity of the installation. Thus, minimum installation requirements will vary based on the application and project conditions. In particular, the backfill conditions and surface treatment should be specified to resist the project design loads. This section of the technical note provides general installation recommendations for three typical application classes: pedestrian only, roadway projects, and airport projects. Please note that these recommendations are intended as guidance only, and that it is the responsibility of the design engineer to produce installation details appropriate to the project conditions.

### Pedestrian Only Installation

In light duty applications (i.e., pedestrian traffic only), properly compacted soil or gravel may be used to backfill most of the trench. The slot should be recessed at least 0.25" (7 mm) below the top of the pavement overlay. ADS recommends a slot height no less than 2.5" (63.5 mm) from grate to crown of pipe. For invert depth (H) limits per pipe size, refer to Tables 1 – 2. The surface conditions surrounding the Duraslot should be paved to support correct drainage and prevent erosion around the slot. The design of the pavement should be determined by the design engineer to meet the project requirements.

Please note that the standard Duraslot coupler connections are only soiltight. A neoprene sheet or mastic filler provided by others can be used to achieve watertight joints. Figure 2 shows an example profile view of what a final backfill design may look like.

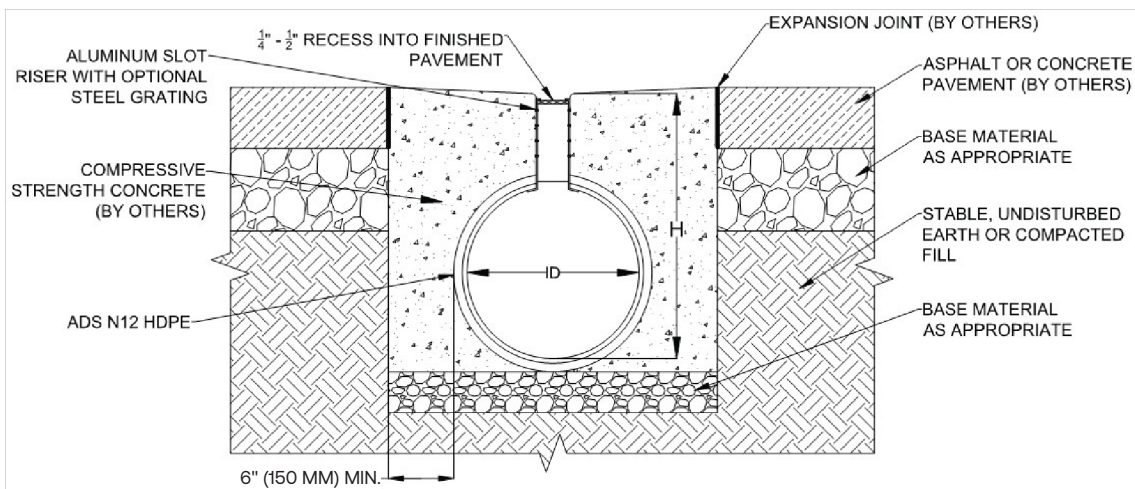
**Figure 2:** Example Installation Detail for Duraslot in a Pedestrian Only Application



## Roadway Installation

For Duraslot applications that involve H-20 design loads, a trench should be excavated so that there is a minimum clearance of 6" (150 mm) on either side of the pipe once lowered into the trench. The slot should be recessed 0.25" - 0.5" (7- 13 mm) below the top of the pavement overlay. ADS recommends a slot height no less than 6" (150 mm) from grate to crown of pipe. For invert depth (H) limits per pipe size, refer to Tables 1 - 2. Bedding material should be added to the trench bottom as necessary to create a stable base for installation. The rest of the trench, from pipe invert to ground surface should be backfilled in concrete. The concrete material requirements should be specified as required by the application. An expansion joint is recommended between the concrete backfill and the abutting pavement to protect the slot. Figure 3 shows an example profile view of what a final backfill design may look like.

**Figure 3:** Example Install Detail for Duraslot in a Roadway Application



## Airport Installations

ADS recommends additional installation considerations for critical infrastructure projects such as airports. The slot should be recessed at least 0.5" (13 mm) below the top of pavement. ADS recommends a slot height of no less than 9" (225 mm) from grate to crown of pipe. For invert depth (H) limits per pipe size, refer to Tables 1 – 2. On projects where design loads are comparable to H-20 traffic, Figure 4 below may be referenced for minimum recommended installation conditions. For installation subject to heavier surface loading, the design engineer should prepare a site-specific design. In general, an installation trench should be excavated, leaving at least 6" (150 mm) of clearance on either side of the pipe. The trench subgrade should be compacted or remediated as necessary, including adding bedding material, to provide a stable base. The rest of the trench, from pipe invert to ground surface should be backfilled in concrete. The design of the concrete backfill, including potential use of reinforcement, should be specified by the design engineer according to the project requirements. An expansion joint is recommended between the concrete backfill and the abutting pavement to protect the slot.

**Figure 4:** Example Backfill Conditions for Duraslot in an Airport Application

