

ROAD DESIGN NOTE

Pit and pipe invert levels

1. Purpose

The purpose of this Road Design Note (RDN) is to clarify the meaning of pit and pipe invert levels on the pit schedules and drainage longitudinal drawings in order to ensure that construction personnel can correctly interpret the information.

Standard Drawing SD1002 (latest version) has been created for use by the pit builders for this purpose and is attached.

2. Scope

The convention for pit and pipe invert levels shall be applied to all road design drawings for VicRoads funded projects.

3. Background

The final drawing presentation standards for inlet and outlet pipe invert levels at a pit are specified in Section 2.12 of *VicRoads Final Drawing Presentation Guidelines*. As illustrated in SD1002, inset the invert levels to be shown on the drawings are NOT the actual invert levels of the pipes at the pit wall, but rather they are the imaginary levels of the pipe inverts extended to the centre of the pit shaft.

This policy created some confusion on site in interpreting the invert levels provided on the drawings, when there was no Standard Drawing available for inclusion in contract documentation which explained the practice.

4. The adopted standards

In order to clarify the situation, Standard Drawing SD1002 (attached) has been created to explain the meaning of the pit and pipe invert levels shown on the drawings. **The pit invert level has been changed to refer to the top of the pit base slab.** Corresponding changes have been made to VicRoads Final Drawing Presentation Guidelines to ensure that the information is consistent. The practice to be adopted is given below:

4.1 Pipe invert levels

The existing practice for depicting pipe invert levels, as indicated in Section 2.12 of the Final Drawing Presentation

Guidelines will continue to be adopted. That is, the pipe invert levels shown on pit schedules and drainage longitudinal are the imaginary invert levels of the pipes extended to the centre of the pit shaft. Standard Drawing SD1002 has been created to explain this practice.

For pipes laid on steep slopes and /or wide haunched pits, the actual inlet and outlet pipe invert levels at the pit walls may be shown on the drainage longitudinal and on the pit schedule, if requested by the project manager. In this case a note should be placed on the drawing clearly indicating where the levels have been given.

4.2 Pit invert levels

The pit invert level is the level at the top of the pit base slab. The old convention using the outlet pipe invert level at the centre of the pit shaft to represent the pit invert level is no longer applicable. Where the depth of pit 'D' is to be indicated in a pit schedule, it will now represent the true depth of pit, i.e., the difference between the pit invert level, and level of the pit set-out point at the top of the pit.

The relationship between the outlet pipe invert level at the centre of the pit shaft and the pit invert level is shown on Standard Drawing SD1002 and it is given below:

Pit invert level = Outlet pipe invert level - X - T

- where X is the level difference between the outlet pipe invert levels at the centre of the pit shaft and at the pit wall; and
- T is the level difference between the outlet pipe invert level at the pit wall and the invert level of the pit.

Dimension T nominally represents the pipe wall thickness with the intent being to lay the lowest pipe on top of the pit base slab. Pipe wall thicknesses are indicated in the table included on SD1002. In order to simplify invert level calculations and to aid in shaping the bottom of pits a minimum value of 60 mm is to be adopted for T.

No special provision needs to be made for spigot and socket pipes.

Dimension X is usually very small (less than 5mm) and can be neglected unless the outlet pipe is to be laid on a steep slope (1 in 70 or steeper) and/or the pit base is wider than the standard pit base of 750mm.

References

Supersedes RDN 09-06a (March 1997)

Specified sections of AGRD Part 5

Specified sections of AGRD Part 5 – VicRoads Supplement

VicRoads Road Design Guideline Part 7

VicRoads Standard Drawings for Roadworks

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Road Design Notes are subject to periodic review and may be superseded.

