CAPRICORN MUNICIPAL DEVELOPMENT GUIDELINES

PAVEMENT DRAINS

C232

CONSTRUCTION SPECIFICATION

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Keeping the Capricorn Municipal Development Guidelines up-to-date

The Capricorn Municipal Development Guidelines are living documents which reflect progress of municipal works in the Capricorn Region. To maintain a high level of currency that reflects the current municipal environment, all guidelines are periodically reviewed with new editions published and the possibility of some editions to be removed. Between the publishing of these editions, amendments may be issued. It is important that readers assure themselves they are using current guideline, which should include any amendments which may have been published since the guideline was printed. A guideline will be deemed current at the date of development approval for construction works.

GENERAL

C232.01 SCOPE

C232.01.01 This Specification covers the installation of Sub-Pavement Drains, and Pavement Drains. ***Scope***

C232.01.02 Pavement drains shall be constructed where and as shown on the Drawings. ***Location***

C232.01.03 This Specification should be read in conjunction with the Specification for SUBSURFACE DRAINAGE – GENERAL C230. ***Associated Specification***

C232.01.04 The following order of priority for interpretation of documents will apply: (Please note that reference to a Guideline or Standard, is reference to the latest version of the relevant document, unless specifically a version number is specifically stated) ***Order of Priority***

1. CMDG C232 Pavement Drains Construction Guidelines
2. Australian Standards

C232.02 TERMINOLOGY

C232.02.01 Sub-Pavement Drains are intended for the drainage of the pavement layers unless the subbase is open graded or pervious in nature in which case intra-pavement drains shall be provided. ***Sub-Pavement Drains***

C232.03 REFERENCE DOCUMENTS

Documents Standards Test Methods

C232.03.01 Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

(a) CMDG Specifications

C213 - Earthworks
C230 - Subsurface Drainage - General
C242 - Flexible Pavements
C245 - Asphaltic Concrete

(b) Australian Standards

AS 1289.3.3.1 - Calculation of the plasticity index of a soil.
AS 1289.5.4.1 - Compaction control test - Dry density ratio, moisture variation and moisture ratio
AS 1477 - PVC pipes and fittings for pressure applications.

C232.04 ORDER OF CONSTRUCTION

(a) Sub-Pavement Drains

C232.04.01 Sub-pavement drains shall be constructed as soon as possible after necessary earthworks are completed in the area of the drain. Where stabilisation of the subgrade is required, sub-pavement drain shall be constructed after completion of stabilisation except that where excessive ground water is encountered, sub-pavement drains may be constructed prior to stabilisation of the subgrade.

Timing of Construction

C232.04.02 Where a Selected Material Zone is specified and excessive ground water is encountered, sub-pavement drains may be installed in two stages as follows:

Stage Construction

Stage 1: Standard sub-pavement drains installed below the base of the cutting prior to placement of select material in the Selected Material Zone.

Stage 2: Extension of sub-pavement drain to top of the Selected Material Zone after placement of selected material.

CONSTRUCTION

C232.05 SUB-PAVEMENT DRAINS

(a) Excavation

C232.05.01 Trenches 300mm wide shall be trimmed to the required line and to a minimum depth of 300mm below the bottom of the subbase or below the base of the cutting where two stage construction of the Sub-Pavement Drain is required.

Trench Dimensions

C232.05.02 The bottom of the trench shall be to the same grade as the design pavement surface except where the grade of the roadway is less than 0.5 per cent, in which case the depth of the trench shall be increased to provide a grade of 0.5 per cent in the trench. The bottom of the trench shall be excavated so that no localised ponding of water occurs.

Trench Grade

C232.05.03 Where two stage construction of the sub-pavement is required, excavation for Stage 2 shall be carried out after placement and compaction of the Selected Material Zone. The Stage 2 trench shall be to the same line and width as Stage 1 and to a depth sufficient to provide a clean, full contact with the previously placed filter material. All excavated material shall be disposed to waste or incorporated into fills.

Two-Stage Construction

(b) Laying of Pipe

C232.05.04 The 100mm diameter corrugated slotted plastic piping, complying with the Specification for SUBSURFACE DRAINAGE – GENERAL C230, shall be laid on a bed of filter material 50mm in thickness and shall be laid to the required line and grade. The pipe shall not deviate from the specified line by more than 100mm at any point.

Filter Bed

HP

C232.05.05 The type of filter materials shall be as shown on the drawings. ***Type***

C232.05.06 Joints in the pipeline shall be kept to the minimum number and, where required, shall be made using a suitable external joint coupling. The inlet ends of all pipes shall be fitted with caps. ***Jointing***

(c) Backfill

C232.05.07 The trench shall be backfilled with filter material to the level specified. The type of filter material shall be as shown on the Drawings. The filter material shall be placed and compacted in layers with a maximum compacted thickness not exceeding 300mm. Tamping around and over the pipe shall be done in such a manner as to avoid damage or disturbance of the pipe. ***Filter Material***

C232.05.08 The filter material shall be compacted for its full depth to a relative compaction of not less than 95 per cent (standard compaction) as determined by AS 1289.5.4.1. ***Compaction***

C232.05.09 On the outlet section of pipes discharging through the fill batters the trench shall be backfilled with the nominated filter material to a depth of 50mm above the pipe. The balance of trench shall be backfilled with earth backfill material of maximum particle size of 50mm and shall be compacted for the full depth to a relative compaction of 95 per cent (standard compaction) as determined by AS 1289.5.4.1. ***Pipe Outlet***

C232.05.10 In case of sub-pavement drains of two stage construction, when it is not practical to place the Pavement Layers or the Selected Material Zone immediately after the construction of Stage 1, the filter material placed to the top of Stage 1 shall be protected from scour and/or contamination by covering with a 50mm thick plug of compacted select fill material having a maximum particle size of 25mm and Plasticity Index of not more than twelve as determined by AS 1289.3.3.1. This plug, any contaminated filter material and any select material covering shall be removed and replaced with the nominated filter material and compacted immediately ahead of the placement of the pavement layer. All excavated material shall be disposed to waste or incorporated in fills. ***Temporary Plug over Filter Material***

(d) Cleanouts

C232.05.11 Cleanouts are to be provided at the commencement of each run of sub-pavement drain line and at intervals of approximately 60m or as shown on the Drawings. ***Location***

C232.05.12 Details of the required cleanout construction are shown on the CMDG Standard Drawings. ***Details***

(e) Outlets

C232.05.13 Outlets are to be provided at maximum intervals of 150m. Where possible sub-pavement drains shall discharge into gully pits and other stormwater drainage structures. Where not possible, an outlet shall be constructed of unslotted plastic pipe of the same diameter as the main run to discharge ***Location***

below the edge of the road shoulder. An outlet structure in accordance with the CMDG Standard Drawings shall be constructed at the discharge end.

C232.05.14 The outlet shall be made rodent proof in accordance with the requirements of the Specification for SUBSURFACE DRAINAGE – GENERAL C230. ***Rodent Proof***

C232.05.15 The outlet shall be located so that erosion of the adjacent area does not occur, or shall be protected by the placement of selected stone in the splash zone of the outlet. ***Erosion Control***

C232.06 PAVEMENT DRAINS

(a) Excavation

C232.06.01 The verge material shall be trimmed to subgrade level and to the minimum width shown on the Drawings. The bottom of the trench is to be constructed at the same grade as the roadway and in such a manner that localised ponding of water does not occur. ***Width and Level***

C232.06.02 Where the grade of the roadway is less than 0.5 per cent the trench shall be excavated to provide a minimum grade of 0.5 per cent. ***Grade***

C232.06.03 When the pipe is to discharge through the fill batter a suitable trench shall be excavated to provide the required grade. ***Discharge Pipe***

(b) Laying of Pipe

C232.06.04 Generally, 100mm diameter slotted corrugated plastic pipe enclosed in seamless tubular filter fabric, complying with the Specification for SUBSURFACE DRAINAGE - GENERAL C230, shall be used for pavement drains. ***Slotted Plastic Pipe***

C232.06.05 Where any part of a shoulder consists of material other than concrete, slotted thick walled PVC pressure pipe, complying with AS 1477, shall be used. Spigot and socket type pipes shall be joined with the socket ends facing upstream and the ends of each pipe shall be securely held against the vertical face of the rigid pavement. At least seven days before commencement of pipe laying, the Contractor shall submit details of the proposed method of securing the pipes against the rigid pavement for the approval of the Council. ***Slotted PVC Pressure Pipe***

HP

C232.06.06 The pipe shall be laid on a prepared bed to the specified line and level. The pipe shall not deviate from the specified line by more than 100mm at any point. ***Prepared Bed***

C232.06.07 Joints in the pipe shall be kept to a minimum number and shall be made using an external joint coupling approved by the Superintendent. ***Jointing***

C232.06.08 The inlet end of the pipe shall be fitted with a cap. ***Inlet Cap***

C232.06.09 The outlet section of a pipe from the vertical face of the rigid pavement to an outlet in the embankment batter shall be unslotted and the pipe joints in this length of pipe shall be sealed with mastic. ***Outlet Pipe***

(c) Backfilling

C232.06.10 The pipe shall be covered with Type B filter material to the dimensions shown on the Drawings. ***Filter Material***

C232.06.11 Mechanical compaction of this filter material is not required, however after placement of the filter material it shall be soaked with water. Where necessary additional filter material shall be added and soaked to provide the final dimensions shown on the Drawings. ***Soaking of Filter Material***

C232.06.12 Backfilling over the edge drain shall be done in such a manner as to avoid damage or disturbance of the pipe. Backfill material shall be selected material as required for verges and in accordance with the requirements of the Specification EARTHWORKS C213. Backfilling shall be compacted to a relative compaction of not less than 100 per cent (standard compaction) as determined by AS 1289.5.4.1. ***Procedure and Compaction***

(d) Cleanouts

C232.06.13 Cleanouts are to be provided at the commencement of each run of edge drain line and at intervals of approximately 60m or as shown on the Drawings. ***Location***

C232.06.14 Details of the required cleanout construction are shown on the Drawings. The standard CI caps as shown on the Drawings shall be supplied by the Contractor. ***Construction Detail***

(e) Outlets

C232.06.15 Outlets are to be provided as shown on the Drawings or at maximum intervals of 150m. Pavement drains shall discharge into gully pits and other stormwater drainage structures. Outlets shall be constructed of unslotted plastic pipe of the same diameter as the main run when outside the pavement area. An outlet structure in accordance with the Drawings shall be constructed at the discharge end. ***Location***

C232.06.16 The outlet shall be made rodent proof in accordance with the requirements of the Specification for SUBSURFACE DRAINAGE - GENERAL C230. ***Rodent Proof***

C232.06.17 The outlet shall be located so that erosion of the adjacent area does not occur, or shall be protected by the placement of selected stone in the splash zone of the outlet. ***Erosion Control***

LIMITS AND TOLERANCES

C232.07 SUMMARY OF LIMITS AND TOLERANCES

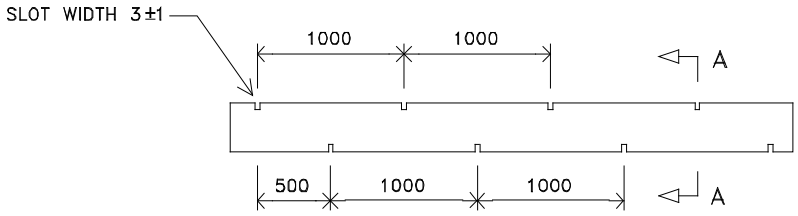
C232.07.01 The limits and tolerances applicable to the various clauses in this Specification are summarised in **Table C232.077.1** below.

Table C232.077.1 - Summary of Limits and Tolerances

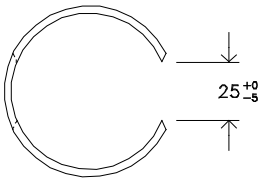
Item	Activity	Limits/Tolerances	Spec Clause
1.	**Excavation**		
	Trench Grade	≥0.5%	C232.05(a)
2.	**Sub-Pavement Drain**		
	Alignment	Deviation <100mm from specified line	C232.05(b)
	Backfill		
	(a) Layer thickness	300mm max	C232.05(c)
	(b) Compaction (Relative)		
	Filter material	95% Standard	C232.05(c)
	Backfill material	>95% Standard	C232.05(c)
	Cleanout Spacing	60m approx	C232.05(d)
	Outlet Spacing	150m max	C232.05(e)
3.	**Pavement Drains**		
	Alignment	Deviation <100mm from specified line	C232.06(b)
	Compaction (Relative) Backfill material	100% standard	C232.06(c)

ANNEXURE C232A

C232.08 SLOTTING DETAILS FOR THICK WALLED PVC PLASTIC PIPE



PLAN



SECTION A–A

Diagram not to scale
Dimensions are in millimetres