Northern Region
South East Queensland
Joint Regional Councils

Specification No. C231

QUEENSLAND DEVELOPMENT CONSTRUCTION SPECIFICATION

C231

SUBSOIL AND FOUNDATION DRAINS

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C231

SUBSOIL AND FOUNDATION DRAINS

These Specifications have been tailored from the AusSpec Standard Specifications for use within Pine Rivers Shire Council, and in consultation with the Northern Region, South East Queensland, group of Councils.

This group includes Pine Rivers Shire, Redcliffe City, Caboolture Shire, Caloundra City, Maroochy Shire, Noosa Council and Cooloola Shire.

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
EXAMPLE 1	*Provision for acceptance of nonconformance with deduction in Payment*	*XYZ.00*	*AP*	*KP*	*2/6/97*
1	TERMINOLOGY (remove "in cuttings")	C231.02 Part 1	O	LDP/ DKM	4/9/02
2	ORDER OF CONSTRUCTION	C231.04 Part 2	A	LDP/ DKM	4/9/02
3	SUBSOIL DRAINS	C231.05 (b) Part 2	A	LDP/ DKM	4/9/02
4	SUBSOIL DRAINS (change to 97%)	C231.05 (c) Part 2	A	LDP/ DKM	4/9/02
5	FOUNDATION DRAINS	C231.06 (b) Part 2	A	LDP/ DKM	4/9/02
6	PAY ITEMS (remove "to C231(e) inclusive")	C231.09 Part 1	O	LDP/ DKM	4/9/02
7	Pay Item SUBSOIL DRAINS	C231.09 (a)	O	LDP/ DKM	4/9/02
8	Pay Item EXCAVATION FOR SUBSOIL AND FOUNDATION DRAINS	C231(a)	O	LDP/ DKM	4/9/02
9	Pay Item SUBSOIL DRAIN PIPE - 100MM DIA SLOTTED CORRUGATED PLASTIC PIPE	C231 (b)	O	LDP/ DKM	4/9/02

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
10	Pay Item SUPPLY, PLACEMENT AND COMPACTION OF BACKFILL MATERIAL (OTHER THAN FILTER MATERIAL) FOR SUBSOIL AND FOUNDATION DRAINS	C231(c)	O	LDP/ DKM	4/9/02
11	Pay Item SUPPLY AND PLACEMENT OF GEOTEXTILE	C231(d)	O	LDP/ DKM	4/9/02
12	Pay Item CLEANOUT STRUCTURES	C231(e)	O	LDP/ DKM	4/9/02

NORTHERN REGION SOUTH EAST QUEENSLAND
JOINT REGIONAL COUNCILS
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SPECIFICATION C231 : SUBSOIL AND FOUNDATION DRAINS

GENERAL INFORMATION

C231.01 SCOPE

1. The work to be executed under this Specification covers the excavation, bedding, installation and backfilling of subsoil and foundation drains. ***Scope***

2. Subsoil and foundation drains shall be constructed where and as shown on the Drawings or as directed by the Superintendent and/or Council's Engineer. ***Location***

3. This Specification should be read in conjunction with the Specification for SUBSURFACE DRAINAGE - GENERAL. ***Associated Specification***

4. Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Control Requirements. ***Quality***

C231.02 TERMINOLOGY

1. Subsoil drains are intended for the drainage of ground water and/or the pavement. ***Subsoil Drains***

2. Foundation drains are required for the drainage of seepage, springs and wet areas within and adjacent to the foundations. ***Foundation Drains***

C231.03 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated. ***Documents Standards Test Methods***

a) Council Specifications

C213 - Earthworks
C230 - Subsurface Drainage - General

b) Australian Standards

AS 1289.5.4.1 - Compaction control test - Dry density ratio, moisture variation and moisture ratio

C231.04 ORDER OF CONSTRUCTION

(a) Subsoil Drains

1. Subsoil 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, subsoil drains shall be constructed after completion of stabilisation except that, where excessive ground water is encountered, they may be constructed prior to stabilisation of the subgrade.

Timing of Work

2. Where a Selected Material Zone is specified and excessive ground water is encountered, subsoil drains may be installed in two stages as follows:

Two Stage Construction

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

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

(b) Foundation Drains

1. Foundation drains shall be constructed after completion of clearing and stripping operations, and preceding the commencement of embankment construction.

Timing of Construction

CONSTRUCTION

C231.05 SUBSOIL DRAINS

(a) Excavation

Associated Specification

1. Excavation shall be undertaken in accordance with the requirement of the Specification for SUBSURFACE DRAINAGE - GENERAL.

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

Minimum Grade

3. If at any location the trench is excavated below the specified floor level, the trench shall be backfilled with non-porous subgrade material so that when the subgrade material is compacted to a relative compaction, determined by AS 1289.5.4.1, of at least 95 per cent (standard compaction), the bottom of the trench shall be at the specified floor level.

Over-excavation

C231.05 SUBSOIL DRAINS (cont'd)

4. Where a subsoil drain is constructed in two stages, the excavation for Stage 2 shall be carried out after placement and compaction of the selected material zone or the stabilised subgrade layer. The Stage 2 trench shall be excavated to the same line and width as the Stage 1 trench and to a depth to provide a clean, full contact with the filter material placed in Stage 1. All excavated material shall be disposed to waste or incorporated into fills.

Two Stage Construction

(b) Laying of Pipe

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

Bedding

2. The type of filter material shall be as shown on the Drawings or as directed by the Superintendent and Council's Authorised Officer.

Filter Material

3. 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 end of the pipe shall be fitted with a cap.

Joints and Capping

(c) Backfilling

Filter Material

1. The trench shall be backfilled with filter material to the level specified. The type of filter material shall be as shown on the Drawings or as directed by the Superintendent. The filter material shall be placed and compacted in layers with a maximum compacted thickness of 300mm. Tamping around and over the pipe shall be done in such a manner as to avoid damage or disturbance to the pipe.

2. The filter material shall be compacted for its full depth to a relative compaction of not less than 97 per cent (standard compaction) as determined by AS 1289.5.4.1.

Compaction of Filter Material

3. The upper section of the trench, above the level specified for filter material backfill, shall be backfilled with selected free draining backfill material, conforming to the requirements of the Specification - EARTHWORKS, compacted for its full depth to a relative compaction of not less than 100 per cent (standard compaction) as determined by AS 1289.5.4.1.

Select Material

4. Where shown on the Drawings or as directed by the Superintendent, a geotextile conforming with the requirements of the Specification for SUBSURFACE DRAINAGE – GENERAL, shall be provided at the interface between the filter material and adjoining materials. Laps of 500mm shall be provided at joints in the fabric.

Geotextile

C231.05 SUBSOIL DRAINS (cont'd)

(d) Outlets

Pipes and Structures

1. Outlets are to be provided as shown on the Drawings or at maximum intervals of 150m. Subsoil 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 targeted subsurface water catchment. An outlet structure in accordance with the Drawings shall be constructed at the discharge end.

(e) Cleanouts

Location

1. Cleanouts are to be provided at the commencement of each run of subsoil drain line and at intervals of approximately 60m or as shown on the Drawings.

Details

2. 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.

C231.06 FOUNDATION DRAINS

(a) Excavation

Associated Specification

1. Excavation shall be undertaken in accordance with the requirements of the Specification for SUBSURFACE DRAINAGE - GENERAL and Clause C231.05 of this Specification.

(b) Laying of Pipe

Bedding

1. The 100mm diameter corrugated slotted plastic piping, complying with the Specification for SUBSURFACE DRAINAGE - GENERAL, shall be laid on a bed of filter material 50mm in thickness and shall be laid to the required line and grade.

Filter Material

2. The type of filter material shall be as shown on the Drawings or as directed by the Superintendent and Council's Authorised Officer.

Jointing of Pipe

3. 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 end of the pipe shall be fitted with a PVC cap.

(c) Backfilling

Filter Material

1. The trench shall be backfilled with filter material in accordance with the provisions of Clause C231.05(c).

Earth Backfill and Compaction

2. The upper section of the trench, above the level specified for filter material backfill, shall be backfilled with suitable earth backfill material, 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.

C231.06 FOUNDATION DRAINS (cont'd)

3. Where shown on the Drawings or as directed by the Superintendent, a geotextile, conforming with the requirements of the Specification for SUBSURFACE DRAINAGE - GENERAL, shall be provided at the interface between the filter material and adjoining materials. Laps of 500mm shall be provided at joints in the fabric.

Geotextile

(d) Outlets

1. An outlet structure in accordance with the detail shown on the Drawings and the Specification for SUBSURFACE DRAINAGE - GENERAL shall be constructed at the discharge end. 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.

Construction Detail

SPECIAL REQUIREMENTS

C231.07 RESERVED

LIMITS AND TOLERANCES

C231.08 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses in this Specification are summarised in Table C231.1 below.

Item	Activity	Limits/Tolerances	Spec Clause
1.	**Excavation** Trench Grade	≥0.5%	C231.05(a)
2.	**Laying of Pipe** Alignment	Deviation <100mm from specified line at any point	C231.05(b)
3.	**Subsoil Drain Backfill**		
	(a) Layer thickness	300mm max	C231.05(c)
	(b) Compaction (Relative) Filter and Backfill material	100% standard	C231.05(c)
4.	**Outlet Spacing**	150m max	C231.05(d)
5.	**Cleanout Spacing**	60m approx	C231.05(e)
6.	**Foundation Drain Backfill**		

Item	Activity	Limits/Tolerances	Spec Clause
6.	**Foundation Drain Backfill**		
	(a) Layer thickness	300mm max	C231.05(c)
	(b) Compaction (Relative)	100% Standard	C231.05(c)
	Filter material	>95% Standard	C231.06(b)
	Backfill material		

Table C231.1
Summary of Limits and Tolerances

MEASUREMENT AND PAYMENT

C231.09 PAY ITEMS

1. Payment shall be made for all activities associated with completing the work detailed under this Specification in accordance with Pay Item C231.09(a).

2. A lump sum price for any of these items shall not be accepted.

3. If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by the Contractor, it shall be understood that due allowance has been made in the other items for the cost of the activity which has not been priced.

4. Filter material and outlet structures are measured and paid in accordance with the Specification for SUBSURFACE DRAINAGE - GENERAL.

Pay Item C231.09(a) SUBSOIL DRAINS

1. The unit of measurement shall be the linear metre measured along the centreline of each particular subsoil drain and shall be the plan length between centres of drainage structures or outlets.

2. The schedule rate shall include:

- Supply
- Setting out and associated survey work;
- Replacement for over excavation for any reason;
- Control of stormwater run-off, temporary drainage and erosion and sedimentation control.
- Connections, markers, fittings and seamless tubular filter fabric where specified
- Excavation and backfilling
- Laying
- Jointing (including connections)
- Selected filter material
- Embankment material trench backfilling
- Supply placing and securing of the geo-textile material
- Cleanout structure constructed in accordance with the Drawings