

**TWEED SHIRE COUNCIL**

**DEVELOPMENT  
CONSTRUCTION  
SPECIFICATION**

**C231**

**SUBSOIL AND  
FOUNDATION DRAINS**

**VERSION 1.2**

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**SPECIFICATION C231 - SUBSOIL AND FOUNDATION DRAINS**

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**DEVELOPMENT CONSTRUCTION SPECIFICATION C231**

**SUBSOIL AND FOUNDATION DRAINS**

**GENERAL**

**C231.01 SCOPE**

- |    |   |                                 |
|----|---|---------------------------------|
| 1. | This Specification is for the excavation, bedding, installation and backfilling of subsoil and foundation drains.   | <b>Scope</b>                    |
| 2. | Subsoil and foundation drains shall be constructed where and as shown on the design plans or as directed by the Certifying Engineer.                                  | <b>Location</b>                 |
| 3. | This Specification should be read in conjunction with the Specification for SUBSURFACE DRAINAGE – GENERAL.  | <b>Associated Specification</b> |
| 4. | Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Requirements. | <b>Quality</b>                  |

**C231.02 TERMINOLOGY**

- |    |   |                          |
|----|---|--------------------------|
| 1. | Subsoil drains are intended for the drainage of ground water and/or the pavement in cuttings.                             | <b>Subsoil Drains</b>    |
| 2. | Foundation drains are required for the drainage of seepage, springs and wet areas within and adjacent to the foundations. | <b>Foundation Drains</b> |

**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. | <b>Documents<br/>Standards Test<br/>Methods</b> |
|----|---|---|

**(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 |
|---------------|---|--|

**(c) Standard Drawings that apply to this section:**

**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. | <i>Timing of Work</i>         |
| 2. | Where a Selected Material Zone is specified and excessive ground water is encountered, subsoil drains may be installed in two (2) stages as follows:  | <i>Two Stage Construction</i> |
|    | Stage 1: Standard subsoil drains installed below the base of the cutting 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. | <i>Timing of Construction</i> |
|----|--|-------------------------------|

**CONSTRUCTION**

**C231.05 SUBSOIL DRAINS**

**(a) Excavation**

- |    |   |                                 |
|----|---|---------------------------------|
| 1. | Excavation shall be undertaken in accordance with the requirement of the Specification for SUBSURFACE DRAINAGE - GENERAL.   | <i>Associated Specification</i> |
| 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.               | <i>Minimum Grade</i>            |
| 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.  | <i>Over-excavation</i>          |
| 4. | Where a subsoil drain is constructed in two (2) 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. | <i>Two Stage Construction</i>   |

## SUBSOIL AND FOUNDATION DRAINS

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### (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 10mm at any point. **Bedding**
2. The type of filter material shall be as shown on the design plans or as directed by the Certifying Engineer. **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

1. The trench shall be backfilled with filter material to the level specified. The type of filter material shall be as shown on the design plans or as directed by the Certifying Engineer. 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. **Filter Material**
2. The filter material shall be 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. Test results to be submitted with the subdivision works compliance certificate prior to issue of a subdivision certificate. **Compaction of Filter Material**
3. The upper section of the trench, above the level specified for filter material backfill, shall be backfilled with selected 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. Test results to be submitted with the subdivision works compliance certificate prior to issue of a subdivision certificate. **Select Material**
4. Where shown on the design plans or as directed by the Certifying Engineer, 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. Outlets are to be provided as shown on the design plans 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 design plans shall be constructed at the discharge end. **Pipes and Structures**

### (e) Cleanouts

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 design plans. **Location**
2. Details of the required cleanout construction are shown on the design plans. The standard CI caps as shown on the design plans shall be supplied by the Subdivider. **Details**

**C231.06 FOUNDATION DRAINS**

**(a) Excavation**

- |    |   |  |
|----|---|--|
| 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><i>Associated Specification</i></b> |
|----|---|--|

**(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 required line and grade. | <b><i>Bedding</i></b>          |
| 2. | The type of filter material shall be as shown on the design plans or as directed by the Certifying Engineer.  | <b><i>Filter Material</i></b>  |
| 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.                                       | <b><i>Jointing of Pipe</i></b> |

**(c) Backfilling**

- |    |  |   |
|----|--|---|
| 1. | The trench shall be backfilled with filter material in accordance with the provisions of Clause C231.05(c).  | <b><i>Filter Material</i></b>               |
| 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.                                       | <b><i>Earth Backfill and Compaction</i></b> |
| 3. | Where shown on the design plans or as directed by the Certifying Engineer, 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. | <b><i>Geotextile</i></b>                    |

**(d) Outlets**

- |    |   |                                   |
|----|---|-----------------------------------|
| 1. | An outlet structure in accordance with the detail shown on the design plans 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. | <b><i>Construction Detail</i></b> |
|----|---|-----------------------------------|

**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.

<b>Item</b>	<b>Activity</b>	<b>Limits/Tolerances</b>	<b>Spec Clause</b>
1.	<b>Excavation</b> Trench Grade	≥0.5%	C231.05(a)
2.	<b>Laying of Pipe</b> Alignment	Deviation <10mm from specified line at any point	C231.05(b)
3.	<b>Subsoil Drain Backfill</b>		
	(a) Layer thickness	300mm max	C231.05(c)
	(b) Compaction (Relative) Filter and Backfill material	100% standard	C231.05(c)
4.	<b>Outlet Spacing</b>	150m max	C231.05(d)
5.	<b>Cleanout Spacing</b>	60m approx	C231.05(e)
6.	<b>Foundation Drain Backfill</b>		
	(a) Layer thickness	300mm max	C231.05(c)
	(b) Compaction (Relative) Filter material	100% Standard	C231.05(c)
	Backfill material	>95% Standard	C231.06(b)

**Table C231.1 - Summary of Limits and Tolerances**