

DEVELOPMENT
CONSTRUCTION
SPECIFICATION

C220

STORMWATER DRAINAGE
GENERAL

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
<i>Original</i>	<i>Northern Rivers - Local Government Version</i>	<i>All</i>	<i>Original Edition</i>	<i>LCC</i>	<i>January 1999</i>
1	Major Revision as per Aus-Spec Bulletin Board Release 10	All	AMO	SPM	10/4/03
2	Revisions as per Aus-Spec Bulletin Board releases 11 & 12	All	AMO	SPM	10/4/03
3	Extent Of Work (deleted)	C220.03	O	SPM	24/2/04
4	CCTV Inspections Byron Shire Council	C220.12	A	SPM	25/2/04
5	CCTV Inspections	C220.01 C220.12	AMO	TJE	June 2021

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SPECIFICATION C220 : STORMWATER DRAINAGE - GENERAL

GENERAL

C220.01 INTRODUCTION

1. Drainage works shall form a complete system carrying water through and away from the Works. **Purpose**

2. This is the general Specification common and applicable to all types of drainage lines, open drains, kerb and gutter, and drainage structures and shall be read in conjunction with drainage Specifications:

C221	-	Pipe Drainage
C222	-	Precast Box Culverts
C223	-	Drainage Structures
C224	-	Open Drains, including Kerb and Gutter
C225	-	Stormwater – CCTV Inspections

As applicable to particular Contracts.

C220.02 SCOPE

1. The work to be executed under this Specification consists of:

- (a) preparation for stormwater drainage construction,
- (b) temporary drainage during construction,
- (c) siting of pipes, pipe arches and box culverts.
- (d) all activities and quality requirements associated with excavation and backfilling,
- (e) all concrete work associated with stormwater drainage.

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

C220.03 deleted

C220.04 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) Other Council Specifications

C211	-	Control of Erosion and Sedimentation
C213	-	Earthworks
C271	-	Minor Concrete Works

(b) Australian Standards

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- AS 1289.5.4.1 - Methods of testing soils for engineering purposes – Soil compaction and density tests - Compaction control test - Dry density ratio, moisture variation and moisture ratio
- AS 1289.5.7.1 - Methods of testing soils for engineering purposes – Soil compaction and density tests - Compaction control test Hilf density ratio and Hilf moisture variation (rapid method)

CONSTRUCTION

C220.05 TEMPORARY DRAINAGE DURING CONSTRUCTION

1. All drainage works carried out by the Contractor shall comply with the Specification for CONTROL OF EROSION AND SEDIMENTATION. **Control**
2. The Contractor shall make adequate provision for runoff flows at drainage works under construction to avoid damage or nuisance due to scour, sedimentation, soil erosion, flooding, diversion of flow, damming, undermining, seepage, slumping or other adverse effects to the Works or surrounding areas and structures as a result of the Contractor's activities. **Contractor's Responsibility**
3. The Contractor shall not implement any proposals to dam up or divert existing watercourses (either temporarily or permanently) without the prior approval of the relevant statutory body by way of approved Drawings or written instruction. **Limitations**
4. The Contractor's material and equipment shall be located clear of watercourses or secured so that they will not cause danger or damage in the event of large runoff flows. **Location of Equipment**

C220.06 SITING OF CULVERTS

1. Before commencing construction of any culvert, the Contractor shall set out on site the culvert inlet and outlet positions to the location and levels shown on the Drawings, and shall present this set-out for inspection by the Superintendent for approval. **Set-out**
2. The Superintendent may amend the inlet or outlet locations or designed levels or the culvert length to suit unforeseen site conditions subject to the P.C.A.'s approval. Any activity resulting from such amendments by the Superintendent shall be deemed to be included as part of the work covered by the Schedule of Rates. **Amendments to planned work**
3. Should the Contractor propose changes to the culvert location, length, designed levels, culvert strength, conditions of installation or cover to suit the construction procedures, the Contractor shall present the proposed culvert set-out in addition to the designed set-out for consideration by the Superintendent and P.C.A.. No changes shall be made unless the prior written approval of the Superintendent and P.C.A. is obtained. **Proposed Changes by Contractor**

C220.07 EXCAVATION

1. Before undertaking stormwater drainage excavation, topsoil shall be removed in accordance with the Specification for EARTHWORKS. **Topsoil**
2. In undertaking trench excavation, the Contractor shall provide any shoring, sheet piling or other stabilisation of the sides necessary to comply with statutory requirements. **Safety**
3. Where public utilities exist in the vicinity of stormwater drainage works the Contractor shall obtain the approval of the relevant authority to the method of excavation before commencing excavation. **Approval by Public Utility Authorities**

**Blasting
Operation**

4. Excavation by blasting, if permitted by P.C.A, and the relevant statutory authority shall be carried out to ensure that the peak particle velocity measured on the ground adjacent to any previously installed culvert of drainage structure does not exceed 25 millimetres per second. The Contractor shall comply with other requirements concerning blasting operations in the Specification for EARTHWORKS.

**Excavation
Level**

5. Trench or foundation excavation for stormwater drainage works shall be undertaken to the planned level for the bottom of the specified bedding or foundation level. All loose material shall be removed by the Contractor.

**Unsuitable
Material**

6. Any material at the bottom of the trench or at foundation level which the Superintendent deems to be unsuitable in accordance with this specification shall be removed and disposed in accordance with the Specification for EARTHWORKS by the Contractor and replaced with backfill material in accordance with the requirements of this Specification and the Specifications for particular culvert types. The bottom of the excavated trench or foundation, after any unsuitable material has been removed and replaced, shall be parallel with the specified level and slope of the culvert.

Spoil

7. The excavated material shall be used in the construction of embankments backfilling or spoiled in accordance with the Specification for EARTHWORKS.

C220.08 BACKFILLING

1. Backfilling shall be carried out in accordance with the requirements of the relevant culverts or drainage structures Specifications and to the compaction requirements specified below.

C220.09 COMPACTION

1. Foundations, bedding and backfilling shall be compacted to the following requirements when tested in accordance with AS 1289.5.4.1 for standard compactive effort (other than for pipe drainage).

Standard

	Relative Compaction
Foundations or trench base to a depth of 150mm below foundation levels	95%
Material replacing unsuitable material	95%
Bedding material (other than for pipe drainage)	95%
Selected backfill and ordinary backfill material below 1.5m of finished surface	95%
within 1.5m of finished surface	100%
Backfill material within the selected Material zone	100%

Compaction requirements adjacent to pipe drainage for concrete, steel or UPVC pipes are set out in the Specification for PIPE DRAINAGE.

Layers

2. All material shall be compacted in layers not exceeding 150mm compacted thickness. Each layer shall be compacted to the relative compaction specified before the next layer is commenced.

**Moisture
Content**

3. At the time of compaction, the moisture content of the material shall be adjusted so as to permit the specified compaction to be attained at a moisture content which,

unless otherwise approved by the P.C.A., is neither less than 60 per cent nor more than 95 per cent of the apparent optimum moisture content, as determined by AS 1289.5.7.1 (standard compaction).

4. When compacting adjacent to culverts or drainage structures, the Contractor shall adopt compaction methods which will not cause damage or misalignment to any culvert or drainage structure. Any damage caused shall be rectified, and all costs of such rectification shall be borne by the Contractor.

Precautions

**Contractor's
Cost**

C220.10 CONCRETE WORK

1. For all concrete work, the Contractor shall comply with the Specification for MINOR CONCRETE WORKS in relation to the supply and placement of normal class concrete and steel reinforcement, formwork, tolerances, construction joints, curing and protection.

Specification

C220.11 SPRAYED CONCRETE

1. If sprayed concrete has been specified, shown on the Drawings or directed by the Superintendent, it shall comply with requirements in the Specification for MINOR CONCRETE WORKS.

Standard

SPECIAL REQUIREMENTS

C220.12 CCTV INSPECTIONS

1. In subdivision works, CCTV inspection shall be undertaken on all underground stormwater pipe systems. A report and video tape of the inspections shall be provided to Council for approval prior to the release of the Subdivision Certificate.

**Subdivision
Works**

2. For all general civil works excluding subdivision works, CCTV inspection shall be undertaken on all underground stormwater pipe systems. A report and video tape of the inspections shall be provided to Council for approval prior to the release of the Security Bond or Occupation Certificate.

**General Civil
Works**

3. All CCTV inspection and reporting shall be undertaken in accordance with C225.

**CCTV
requirements**

C220.13 RESERVED

LIMITS AND TOLERANCES

C220.14 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses in this Specification are summarised in Table C220.1 below:

Item	Activity	Limits/Tolerances	Spec Clause
1.	Excavation by Blasting		
	peak particle velocity	≤25mm/sec	C220.07
2.	Relative Compaction (Standard)		
	(a) Foundations or trench base to a depth of 150mm below foundation levels	95%	C220.09
	(b) Material replacing unsuitable material	95%	C220.09
	(c) Bedding material	95%	C220.09
	(d) Selected backfill and ordinary backfill material:		C220.09
	• below 1.5m of finished surface	95%	
	• within 1.5m of finished surface	100%	
	(e) Backfill material within the selected material zone	100%	C220.09
3.	Backfill		
	(a) Layers	≤ 150mm	C220.09
	(b) Moisture Content	>60%, <95%	C220.09

Table C220.1 - Summary of Limits and Tolerances