

# TWEED SHIRE COUNCIL

## DEVELOPMENT CONSTRUCTION SPECIFICATION

CQC

## QUALITY CONTROL REQUIREMENTS

VERSION 1.2

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**SPECIFICATION CQC - QUALITY CONTROL REQUIREMENTS**

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**SPECIFICATION CQC**

**QUALITY CONTROL REQUIREMENTS**

**GENERAL**

**CQC1 SCOPE**

- |    |   |   |
|----|---|---|
| 1. | This Specification is for the quality control testing and survey by the Subdivider; including the minimum test frequencies to be employed to demonstrate conformance to the requirements of the technical specifications. | <b><i>Testing and Survey</i></b>  |
| 2. | This Specification will apply as the default requirements where quality control testing and survey, including minimum test frequencies, have not been specified in specific development construction specifications.      | <b><i>Default when testing requirements not specified in other specifications</i></b> |
| 3. | In this Specification, where appropriate, the term "Council" is to be substituted for "The Consent Authority", where Council is not the consent or determining authority for the subdivision.                             | <b><i>Consent Authority</i></b>   |

**CQC2 LOTS**

- |    |  |                                  |
|----|--|----------------------------------|
| 1. | All items of work shall be subdivided into lots. Each lot shall be given a unique lot number.  |                                  |
| 2. | Lots shall be chosen by the Subdivider but shall be within the limits given in Annexure CQC-B. In general, the size of the lot shall not exceed one (1) day's output for each work process designated for lot testing. | <b><i>Lot Size</i></b>           |
| 3. | The lot numbers shall be used as identifiers on all surveys and test results.  | <b><i>Lot Numbers</i></b>        |
| 4. | The Subdivider shall determine the bounds of each lot before sampling and shall identify each lot clearly.   | <b><i>Lot Identification</i></b> |
| 5. | The boundaries of a lot may be changed if subsequent events cause the original lot to be no longer essentially homogeneous.  | <b><i>Lot Boundaries</i></b>     |
| 6. | The lot identification system and sample numbering system shall allow test results to be positively identified with material incorporated in the works.  | <b><i>Test Results</i></b>       |

**CQC3 SAMPLING AND TESTING**

- |    |   |  |
|----|---|--|
| 1. | All compliance inspections and tests shall be based on lots.  | <b><i>Lots</i></b>                               |
| 2. | The maximum lot sizes and minimum testing frequencies are listed in the Annexures to the relevant Specifications and/or in Annexure CQC-B to this Specification. Where no minimum frequency of testing, or maximum lot size is stated in the Specification, the Subdivider shall nominate appropriate frequencies for the Certifying Engineer's approval. | <b><i>Lot Sizes<br/>Frequency of Testing</i></b> |

## QUALITY CONTROL REQUIREMENTS

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- |    |  |   |
|----|--|---|
| 3. | Sampling shall not be restricted to locations dimensioned or otherwise defined for setting out the Works in the design plans or Specification, but shall be undertaken in a random or unbiased manner, as approved by the Certifying Engineer, at any location within the Works to demonstrate its compliance with the Specification.  | <b><i>Sampling Locations</i></b>                  |
| 4. | Where Test Methods are nominated in the Technical Specifications, sampling and testing shall be carried out by a NATA registered laboratory accredited for those test methods and sampling procedures. Sampling shall be conducted by personnel from the NATA registered laboratory which has been accredited for that sampling procedure and shall be supervised by the approved signatory from that laboratory. Test results shall be reported on NATA endorsed test documentation which shall include a statement by the approved signatory certifying that the correct sampling procedures have been followed. | <b><i>Sampling and Testing</i></b>                |
| 5. | In special circumstances Council may accredit a laboratory that is not NATA registered for specific tests or inspection procedures.  | <b><i>Special Accreditation</i></b>               |
| 6. | The Subdivider shall reinstate all core holes, test holes, excavations and any other disturbance resulting from any testing activity. The reinstatement shall be to a standard which is at least equal to the specified requirements for the particular work.  | <b><i>Reinstatement</i></b>                       |
| 7. | Random sampling techniques shall be used for each lot for the control of compaction of each continuous layer of earthworks, flexible pavement and asphalt. Annexure CQC-A defines the method to be used for determining test locations of random sampling in each lot.   | <b><i>Random Sampling</i></b>                     |
| 8. | For quality control of processes other than compaction of layers of earthworks, flexible pavement and asphalt, the sampling locations will be proposed by the Subdivider and will require the approval of the Certifying Engineer.   | <b><i>Sampling Locations</i></b>                  |
| 9. | In all cases the samples shall be each considered to be representative of the lot and all test results will be required to meet the appropriate tolerances for the lot.  | <b><i>All Test Results to Meet Tolerances</i></b> |

### **CQC4 SURVEYING**

- |    |   |                                       |
|----|---|---------------------------------------|
| 1. | Surveying Control shall include all measurement, calculation and record procedures necessary to:<br><br>(a) set out the Works<br><br>(b) verify conformance to the design plans and Specification in relation to dimensions, tolerances and three dimensional position<br><br>(c) determine lengths, areas or volumes of materials or products, where required for measurement of work. | <b><i>Requirements</i></b>            |
| 2. | The Subdivider shall appoint qualified surveyors who are eligible for membership of the Institution of Surveyors, Australia or the Institution of Engineering and Mining Surveyors, Australia to supervise and take responsibility for all Surveying Control.   | <b><i>Surveyor Qualifications</i></b> |
| 3. | The procedures and equipment used must be capable of attaining the tolerances nominated in the Specification.   | <b><i>Equipment</i></b>               |
| 4. | Sampling for conformance verification purposes shall not be restricted to the locations used to set out the Works.  | <b><i>Sampling Locations</i></b>      |

5. The Subdivider shall submit a Survey Conformance Report to the Certifying Engineer for each lot or component where design levels, position and/or tolerances have been specified. The Survey Conformance Report shall show 'specified vs actual' for position (defined by co-ordinates or chainage and offset), level and tolerance as appropriate and shall be certified by the qualified surveyor responsible for the verification survey.

**Conformance  
Report**

**CQC5 RECORDS**

1. Conformance records shall be stored and maintained such that they are readily retrievable and in facilities that provide a suitable environment to minimise deterioration or damage and to prevent loss.
2. The Subdivider shall submit all conformance records to the Certifying Engineer for inspection and approval. If requested by the Certifying Engineer, the Subdivider shall provide copies of the records or test results.

**Storage**

**Copies of  
Records  
Subdivider's  
Cost**

## ANNEXURE CQC-A

### RANDOM SAMPLING

#### CQC-A1 GENERAL

1. Random sampling of test locations shall be used to control relative compaction of each layer of:

- (i) earthworks
- (ii) selected material zone
- (iii) flexible pavement
- (iv) asphalt

which are generally rectangular in area.

#### CQC-A2 SAMPLING RATES

1. The number of samples (n) per lot shall be as indicated in the specific Specification Parts which are summarised in the Sub-Annexure to this Quality Requirements Specification.

#### CQC-A3 RANDOM SAMPLING LOCATIONS

1. Sampling locations within a lot for the control of relative compaction shall be determined as follows:

- (i) Representing the lot as a rectangle, sub-divide the lot lengthwise into equi-area sub-lots in accordance with the number of samples selected (n).
- (ii) Establish six (6) grid lines within the lot, as illustrated in Figure CQC-A2;
- (iii) Throw a die to select a number between 1 and 6. This determines which grid line to use for the sample location in sub-lot 1;
- (iv) Throw die to select a group (1-6) in Table CQC-A1;
- (v) Throw die twice to select two (2) random numbers (between 1 and 6) for row and column in Table CQC-A1 and obtain random fraction R;
- (vi) Length co-ordinate for sample location in Sub-lot 1 =  $RL/n$ ;
- (vii) For sample location in next sub-lot:-

Add  $L/n$  to previous length co-ordinate.  
Add 1 (on a cycle of 6) to previous grid line.



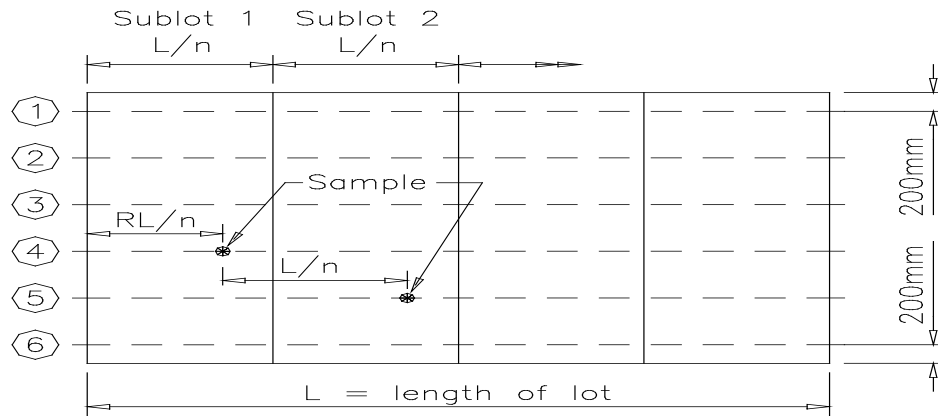


Figure CQC-A2 Sampling Locations for Rectangular Lot

GROUP	ROW	COLUMN					
		(1)	(2)	(3)	(4)	(5)	(6)
(1)	(1)	0.78178	0.45467	0.00347	0.27296	0.00020	0.36517
	(2)	0.59678	0.67931	0.25434	0.59054	0.32444	0.41504
	(3)	0.14464	0.17269	0.61154	0.18291	0.83242	0.50776
	(4)	0.89010	0.44764	0.07451	0.20428	0.49513	0.91440
	(5)	0.91941	0.47726	0.33160	0.30670	0.65114	0.36852
	(6)	0.51085	0.38148	0.22169	0.66578	0.67050	0.69559
(2)	(1)	0.81891	0.48626	0.88892	0.82994	0.16941	0.81528
	(2)	0.37410	0.60232	0.12070	0.79017	0.32981	0.34908
	(3)	0.45921	0.15648	0.58052	0.37413	0.08124	0.97145
	(4)	0.86614	0.94719	0.78872	0.91972	0.45149	0.15107
	(5)	0.26590	0.41140	0.95477	0.81267	0.24018	0.07324
	(6)	0.95205	0.39438	0.73697	0.59427	0.71146	0.00575
(3)	(1)	0.18694	0.36502	0.17828	0.84312	0.57003	0.58583
	(2)	0.91211	0.86936	0.43030	0.27672	0.47393	0.10342
	(3)	0.80714	0.34295	0.00775	0.90855	0.33368	0.21842
	(4)	0.67579	0.92686	0.18005	0.00645	0.11256	0.05278
	(5)	0.03184	0.69876	0.16676	0.43346	0.86992	0.03275
	(6)	0.15623	0.02905	0.72763	0.19095	0.80847	0.39729
(4)	(1)	0.72109	0.17970	0.22505	0.35561	0.98935	0.27818
	(2)	0.37348	0.19381	0.43331	0.75033	0.99963	0.42232
	(3)	0.12129	0.32386	0.56705	0.87165	0.84460	0.92955
	(4)	0.54948	0.08844	0.47061	0.78419	0.18731	0.93485
	(5)	0.15097	0.44967	0.48759	0.84161	0.19212	0.05146
	(6)	0.32360	0.66850	0.99382	0.94050	0.96449	0.96217
(5)	(1)	0.68091	0.54191	0.10910	0.94237	0.23161	0.15167
	(2)	0.97121	0.83626	0.70896	0.45296	0.69475	0.11264
	(3)	0.19723	0.98260	0.57429	0.94789	0.64457	0.20809
	(4)	0.84036	0.14095	0.29451	0.40256	0.34521	0.64924
	(5)	0.97500	0.98056	0.82276	0.97130	0.77329	0.89855
	(6)	0.83244	0.30828	0.06882	0.68471	0.71081	0.91649
(6)	(1)	0.75892	0.29685	0.70044	0.91238	0.53356	0.45239
	(2)	0.13229	0.19701	0.36074	0.32254	0.62045	0.26691
	(3)	0.34789	0.22179	0.91891	0.87651	0.91011	0.97469
	(4)	0.97211	0.68943	0.12831	0.50006	0.20793	0.61151
	(5)	0.24954	0.17809	0.56093	0.51524	0.69135	0.68967
	(6)	0.10062	0.11852	0.47089	0.64765	0.44644	0.35548

Table CQC-A1 - Table of Random Fractions

**ANNEXURE CQC-B**

**MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**

**GENERAL**

1. The maximum lot sizes and minimum test frequencies are separately specified for all major activities covered by the Technical Specifications as listed hereunder.
2. The requirements applicable to these Subdivision Works are identified with an asterisk indicating that only these details are attached in this Annexure.
3. Where material/product quality certification can be obtained from the supplier, tests listed per separable part need not be repeated.
4. If there is any discrepancy between figures stated in the "Maximum Lot Size" and "Minimum Test Frequency" columns of this Specification, to figures stated in the associated "Test Method" documentation, the figures of this Specification will take precedence. **Order of Precedence**

**Contents of Annexure CQC-B**

Item	Sub-Annexure	Required (*) for this Subdivision	Reference Specification	Sub-Annexure Heading
1	B1		C213	Earthworks
2	B2		C220 C221 C222 C223 C224	Drainage, Pipe Drainage, Precast Box Culverts, Drainage Structures, Open Drains including Kerb & Gutter
3	B3		C230 C231 C232 C233	Subsurface Drainage, Subsoil and Foundation Drains, Pavement Drains, Drainage Mats
4	B4		C241	Stabilisation
5	B5		C242	Flexible Pavements
6	B6		C244	Sprayed Bituminous Surfacing
7	B7		C245	Asphaltic Concrete
8	B8		C247 C248	Ready Mixed Concrete Production and Supply
9	B9		C247	Mass Concrete Subbase
10	B10		C248	Plain or Reinforced Concrete Base
11	B11		C255	Bituminous Microsurfacing
12	B12			Reserved
13	B13		C271	Minor Concrete Works
14	B14		C261	Pavement Markings
15	B15		C262	Signposting

**QUALITY CONTROL REQUIREMENTS**

<b>Item</b>	<b>Sub-Annexure</b>	<b>Required (*) for this Subdivision</b>	<b>Reference Specification</b>	<b>Sub-Annexure Heading</b>
16	B16		C273	Landscaping
17	B17		C401	Water Reticulation
18	B18		C402	Sewerage System

**Sub-Annexure B1 - Specification C213**

**(EARTHWORKS)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Stripping Topsoil	Surface Levels	10,000m <sup>2</sup>	1 Cross Section per 25m	Survey
Excavation	Geometry	10,000m <sup>2</sup>	1 Cross Section per 25m	Survey
Floor of Cuttings	Material Quality – CBR	5,000m <sup>2</sup>	1 per 1,000m <sup>2</sup> *	AS1289.6.1.1
	Compaction	10,000m <sup>2</sup>	1 per 500m <sup>2</sup>	AS1289.5.4.1
Foundation for Embankments	Compaction	5,000m <sup>2</sup>	1 per 500m <sup>2</sup>	AS1289.5.4.1
Embankments - General  Road Carriageway Embankments - Select Zone	Geometry	One layer 10,000m <sup>2</sup>	1 Cross Section per 25m	Survey
	Material Quality – CBR	One layer 5,000m <sup>2</sup>	1 per 800m <sup>3</sup>	AS1289.6.1.1
	Compaction/Moisture Content	One layer 5,000m <sup>2</sup>	1 per 200m <sup>3</sup>	AS1289.5.1.1 AS1289.5.4.1
	Geometry	One layer 10,000m <sup>2</sup>	1 Cross Section per 25m	Survey
	Material Quality - Maximum Particle Size - CBR	10,000m <sup>2</sup> 10,000m <sup>2</sup>	1 per 1,000m <sup>3</sup> * 1 per 500m <sup>3</sup> *	AS1289.6.1.1
	Compaction/Moisture Content	One layer 5,000m <sup>2</sup>	1 per 200m <sup>3</sup>	AS1289.5.1.1, AS1289.5.4.1
Fill Adjacent to Structures: Bridges, Retaining Walls and Cast-in-Situ Culverts	Material Quality			
	- Maximum Particle Size - Plasticity Index	1 Structure 1 Structure	1 per 200m <sup>3</sup> * 1 per 200m <sup>3</sup> *	AS1289.3.3.1
	Compaction/Moisture Content	1 Structure	1 per 2 layers per 50 m <sup>2</sup>	AS1289.5.1.1, AS1289.5.4.1

\* Note: or part thereof, per lot.

**Sub-Annexure B2 – Specifications C220, C221, C222, C223, C224**

**(DRAINAGE, PIPE DRAINAGE, PRECAST BOX CULVERTS, DRAINAGE STRUCTURES, OPEN DRAINS INCLUDING KERB & GUTTER)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Supply of Precast Units	Precast Quality - Suppliers documentary evidence and certification	1 batch	1 per type/size/ class per batch	
Siting and Excavation	Geometry	1 drainage line/structure	1 per drainage line/structure	Survey
Foundation	Compaction	1 drainage line/structure	1 per 20 lin m *	AS1289.5.4.1
Material surrounding Steel Structures	Material Quality - pH/Electrical Resistivity	1 drainage line/structure	1 per material	AS1289.4.3.1 AS1289.4.4.1
Bedding	Material Quality - Particle Size Distribution Compaction/Moisture Content	1 subdivision 1 drainage line/structure	1 per 200m <sup>3</sup> * 1 per layer, per 20 lin m	AS1141.11 , AS1289.5.4.1
Concrete Bedding or Lining	Geometry		1 Cross Section per 25m	Survey and 3m Straight Edge
Installation of Precast Units	Geometry	1 drainage line/structure	1 per drainage line/structure	Survey
Selected Backfill	Material Quality - Maximum Particle Size - Plasticity Index Compaction/Moisture Content	1 subdivision 1 subdivision 1 drainage line/structure	1 per 100m <sup>3</sup> * 1 per 100m <sup>3</sup> * 1 per 2 layers per 50m <sup>2</sup>	AS1289.3.3.1 , AS1289.5.4.1
Rock Fill for Gabions/ Wire Mattresses	Material Quality: - Wet Strength - Wet/Dry Strength Variation	1 subdivision 1 subdivision	1 per subdivision 1 per subdivision	AS1141.22 AS1141.22
Kerb and Gutter	Geometry		1 Cross Section per 25m	Survey and 3m Straight Edge

\* Note: or part thereof, per lot.

**QUALITY CONTROL REQUIREMENTS**

**Sub-Annexure B3 - Specifications C230, C231, C232, C233**

**(SUBSURFACE DRAINAGE, SUBSOIL AND FOUNDATION DRAINS, PAVEMENT DRAINS, DRAINAGE MATS)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD	
Material Supply	Material Quality - Supplier's documentary evidence and certification of:				
	Pipe	1 subdivision /size	1 per type/size		
	Filter Material				
	- Grading (Type A, B, C, D)	1 subdivision /size	1 per type	AS1141.11	
	- Coefficient of Permeability (Type B)	1 subdivision /size	1 per type	AS1289.E5.1 ASTM-D2434-68	
	- Grading Variation after Treatment (Type B)	1 subdivision /size	1 per type	AS1141.11	
	- Wet Strength (Type C, D)	1 subdivision /size	1 per type	AS1141.22	
- 10% Fines Wet/Dry (Type C, D)	1 subdivision /size	1 per type	AS1141.22		
	Geotextile	1 subdivision	1 per type		
Excavation - Trench Base	Line and Grade	1 drainage line	1 per drainage line	Survey	
	Compaction	1 drainage line	1 per 200 lin m*	AS1289.5.4.1	
Bedding and Backfill					
	- Filter Material	Compaction	1 drainage line	1 per drainage line	AS1289.5.4.1
	- Selected Backfill	Compaction	1 drainage line	1 per 200 lin m*	AS1289.5.4.1
- Earth Backfill	Compaction	1 drainage line	1 per 200 lin m*	AS1289.5.4.1	
Drainage Mat	Geometry	2000 <sup>m2</sup>	1 Cross Section per 25m	Survey	

\* Note: or part thereof, per lot

**Sub-Annexure B4 - Specification C241**

**(STABILISATION)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Material Supply	Material Quality - Supplier's documentary evidence and certification of:			
	- Cement	1 subdivision	1 per 100t	AS3972
	- Quicklime			
	· Available Lime (CaO content)	1 subdivision	1 per 100t	AS3583.12
	· Slaking Rate	1 subdivision	1 per 100t	T432
	· Particle Size Dist'n	1 subdivision	1 per subdivision	AS1141.11
	- Hydrated Lime			
	· Available Lime (CaOH <sub>2</sub> )	1 subdivision	1 per 100t	AS3583.12
	· Residue on Sieving	1 subdivision	1 per subdivision	AS3583.14
	- Ground Blast Furnace Slag	1 subdivision	1 per month	AS3582.2
- Flyash	1 subdivision	1 per month	AS3582.1	
- Blended Stabilising Agent	1 subdivision	1 per month		
- Water				
Chloride ion content	1 subdivision	1 per subdivision	AS3583.13	
Sulphate ion content	1 subdivision	1 per subdivision	AS1289.4.2.1	
Undissolved solids	1 subdivision	1 per subdivision		
Mix Design	NATA certification - Supplier's documentary evidence and certification	1 mix	1 per mix	
Stationary Mixing Plant	Application rate of stabilising agent	1 day's product'n	1 per 100t	
	Compressive strength of product	1 day's product'n	1 per 400t	AS1289.6.1.1
In-Situ Spreading	Spread rate	1 layer 1,000 <sup>m<sup>2</sup></sup>	1 per lot or 1 per 500m <sup>2</sup>	
	Mix uniformity	1 layer 1,000 <sup>m<sup>2</sup></sup>	1 per 500m <sup>2</sup>	Visual
Trimming and Compaction	Geometry	1 layer 2,000m <sup>2</sup> , max 1 day's placement	One cross section per 25m	Survey
	Surface Quality	"	10 per 200m lane length *	3m Straight Edge
	Average Layer thickness	"	1 per lot	
	Average Width	"	1 per lot	Measure/Survey
	Relative Compaction/Moisture Content	"	3 per lot	AS1289.5.8.1

\* Note: or part thereof, per lot.

**Sub-Annexure B5 - Specification C242**

**(FLEXIBLE PAVEMENTS)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Base and Subbase Supply	Material Quality - Supplier's documentary evidence and certification	1 subdivision		
	- Particle Size Distribution		1 per 1,000t	AS1289.3.6.1
	- Fine Particle Size Distribution Ratio		1 per 1,000t	AS1289.3.6.3
	- Liquid Limit		1 per 1,000t	AS1289.3.1.1
	- Plastic Limit		1 per 1,000t	AS1289.3.3.1
	- Plasticity Index		1 per 1,000t	AS1289.3.3.1
	- Maximum Dry Compressive Strength		1 per 5,000t	T114
	- Particle Shape		1 per 1,000t	AS1141.14
	- Aggregate Wet Strength		1 per 5,000t	AS1141.22
	- Wet/Dry Strength Variation		1 per 5,000t	AS1141.22
	- Modified Texas Triaxial Classification		1 per subdivision	T171
- Unconfined Compressive Strength (Modified)		1 per 5,000t	T116	
- Unconfined Compressive Strength (Bound)	1 subdivision	1 per mix design	T131	
Placement	Geometry: Alignment & Level	One layer 2,000m <sup>2</sup> or max 1 day's placement	1 Cross Section per 15m	Survey
	Width & Surface Trim		10 per selected 200 lin m*	Measure & 3m Straight Edge
	Deflection Control - Benkelman Beam	One layer 5,000m <sup>2</sup> or max 1 day's placement	4 per 1,000m <sup>2</sup> minimum 10 per lot	T160
	Compaction/Moisture Content/ Dry Density Testing	One layer 5,000m <sup>2</sup> or max 1 day's placement	10 per 5,000m <sup>2</sup> layer or 3 per lot if less	AS1289.5.2.1, T130, AS1289.5.4.1 AS1289.5.8.1

\* Note: or part thereof, per lot.



## **Sub-Annexure B6 - Specification C244**

### **(SPRAYED BITUMINOUS SURFACING)**

The minimum test frequencies to be employed for Specification C244 (Sprayed Bituminous Surfacing) will be as detailed in RTA QA Specification R106 – Sprayed Bituminous Surfacing (with Cutback Bitumen), April 1997, Annexure R106/2 – Minimum Frequency of Testing.

## **Sub-Annexure B7 - Specification C245**

### **(ASPHALTIC CONCRETE)**

The minimum test frequencies to be employed for Specification C245 (Asphaltic Concrete) are as follows.

1. For Dense Graded Asphalt Pavements - Refer the relevant provisions as stipulated in the Queensland Department of Main Roads Standard Specification MRS11.30 12/99.
2. For Stone Mastic Asphalt Surfacing - Refer the relevant provisions as stipulated in the Queensland Department of Main Roads Standard Specification MRS11.33 12/99.
3. For Open Graded Asphalt Surfacing - Refer the relevant provisions as stipulated in the Queensland Department of Main Roads Standard Specification MRS11.34 12/99.
4. For Fine Gap Graded Asphalt Pavements - Refer the relevant provisions as stipulated in the Queensland Department of Main Roads Standard Specification MRS11.36 12/99.

**Sub-Annexure B8 - Specifications C247, C248**

**(READY-MIXED CONCRETE PRODUCTION & SUPPLY)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Raw Materials Supply	Material Quality - Supplier's documentary evidence and certification of:-			
	Cement	1 mth's prod'n	1 per week	AS 3972
	Flyash	1 mth's prod'n	1 per month	AS 3582.1
	Water	1 subdivision	1 per subdivision	AS3583.13, AS1289.4.2.1
	Admixtures	1 mth's prod'n	1 per month	AS 1478.1
	Fine Aggregates (C248 only)			
	- Grading	1 wk's prod'n	1 per 200m <sup>3</sup> concrete*	AS1141.11
	- Moisture Content	N/A	1 per day	
	- Sulphate Soundness	1 subdivision	1 per subdivision	AS1141.24
	- Bulk Density	1 subdivision	1 per subdivision	AS 2758.1
	- Unit Mass (particle density)	1 subdivision	1 per subdivision	AS 2758.1
	- Water Absorption	1 subdivision	1 per subdivision	AS 2758.1
	- Material Finer 2µm	1 subdivision	1 per subdivision	AS 2758.1
	- Deleterious Material (Impurities/Reactive)	1 subdivision	1 per subdivision	AS 2758.1
	- Combined Aggregates (C247 and C248)			
	- Grading	1 wk's prod'n	1 per 200m <sup>3</sup> concrete*	AS1141.11
	- Moisture Content	1 wk's prod'n	1 per day	
	- Wet Strength	1 subdivision	1 per subdivision	AS1141.22
	- Wet/Dry Strength Variations	1 subdivision	1 per subdivision	AS1141.22
	- Sulphate Soundness	1 subdivision	1 per subdivision	AS1141.24
	- Particle Shape	1 subdivision	1 per subdivision	AS1141.14
	- Fractured Faces	1 subdivision	1 per subdivision	AS1141.18
- Bulk Density	1 subdivision	1 per subdivision	AS 2758.1	
- Unit Mass (particle density)	1 subdivision	1 per subdivision	AS 2758.1	
- Water Absorption	1 subdivision	1 per subdivision	AS 2758.1	
- Material Finer 75µm	1 subdivision	1 per subdivision	AS 2758.1	

**QUALITY CONTROL REQUIREMENTS**

<b>ACTIVITY</b>	<b>KEY QUALITY VERIFICATION REQUIREMENTS</b>	<b>MAXIMUM LOT SIZE</b>	<b>MINIMUM TEST FREQUENCY</b>	<b>TEST METHOD</b>
Raw Materials Supply (Cont'd)	- Weak Particles	1 subdivision	1 per subdivision	AS 2758.1
	- Light Particles	1 subdivision	1 per subdivision	AS 2758.1
	- Deleterious Materials (Impurities/Reactive)	1 subdivision	1 per subdivision	AS 2758.1
	- Iron Unsoundness	1 subdivision	1 per subdivision	AS 2758.1
	- Falling/Dusting Unsoundness	1 subdivision	1 per subdivision	AS 2758.1
Mix Design	Compressive Strength	1 subdivision mix	1 per mix per subdivision	AS1012.9
	Aggregate Moisture Content	1 subdivision mix	1 per mix per subdivision	
	Consistency – Slump	1 subdivision mix	1 per mix per subdivision	AS1012.3.1
	Air Content	1 subdivision mix	1 per mix per subdivision	AS1012.4 Method 2
	Shrinkage	1 subdivision mix	1 per mix per subdivision	AS1012.13

\* Note: or part thereof, per lot

**Sub-Annexure B9 - Specification C247**

**(MASS CONCRETE SUBBASE)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Concrete Supply	Refer Sub-Annexure B8: Ready-Mixed Concrete Production and Supply			
	Concrete/Air Temperature	50m <sup>3</sup>	1 per 50m <sup>3</sup>	Measure
	Air Content	50m <sup>3</sup>	1 per 50m <sup>3</sup>	AS1012.4 Method 2
	Consistency – Slump	50m <sup>3</sup>	1 per load	AS1012.3.1
	Compressive Strength (7 day)	50m <sup>3</sup>	1 pair per 50m <sup>3</sup>	AS1012.1 AS1012.8 AS1012.9
	Compressive Strength (28 day)	50m <sup>3</sup>	1 pair per 50m <sup>3</sup>	AS1012.1 AS1012.8 AS1012.9
Placement	Thickness	50m <sup>3</sup>	5m grid on plan area	Survey and check with subgrade survey
	Geometry	50m <sup>3</sup>	1 cross section per 15m	Survey and 3m Straight Edge
Curing	Material Quality - Supplier's documentary evidence and certification	1 subdivision	1 per production batch	AS3799 AS1160
	Application Rate	1 day's work	1 per 1000m <sup>2</sup> *	
Joints	Geometry	50m <sup>3</sup>	All joints	Survey

\* Note: or part thereof, per lot

**Sub-Annexure B10 - Specification C248**

**(PLAIN OR REINFORCED CONCRETE BASE)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Concrete Supply	Refer Sub-Annexure B8: Ready-Mixed Concrete Production and Supply			
	Concrete/Air Temperature	50m <sup>3</sup>	1 per 50m <sup>3</sup>	Measure
	Air Content	50m <sup>3</sup>	1 per 50m <sup>3</sup>	AS1012.4 Method 2
	Consistency – Slump	50m <sup>3</sup>	1 per load	AS1012.3.1
	Compressive Strength (7 day)	50m <sup>3</sup>	1 pair per 50m <sup>3</sup>	AS1012.1 AS1012.8 AS1012.9
	Compressive Strength (28 day)	50m <sup>3</sup>	1 pair per 50m <sup>3</sup>	AS1012.1 AS1012.8 AS1012.9
Placement	Relative Compaction			
	- Machine Placed	50m <sup>3</sup>	1 per 50m <sup>3*</sup>	AS1012.14
	- Hand Placed	Area between 2 consecutive const. joints or 50m <sup>3</sup> (whichever is the lesser)	2 per lot	AS1012.14
	Thickness	50m <sup>3</sup>	5m grid on plan area	Survey
	Geometry	50m <sup>3</sup>	1 cross section per 15m	Survey and 3m Straight Edge
Ride Quality	Profile Factor	1000m <sup>2</sup>	10/lane/lot	3m Straight Edge
Surface Texture	Texture Depth	1000m <sup>2</sup>	2 per lot	Survey
Curing	Material Quality - Supplier's documentary evidence and certification	1 subdivision	1 per production batch	AS3799 AS1160
	Application Rate	1 day's work	1 per 1000m <sup>2*</sup>	
Joints	Sealant Material Quality Supplier's documentary evidence and certification	1 subdivision	1 per prod'n batch	
	Geometry	50m <sup>3</sup>	All joints	Survey

\* Note: or part thereof, per lot

Sub-Annexure B11 - Specification C255

(BITUMINOUS MICROSURFACING)

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	- Bitumen (prior to emulsification)	1 subdivision	1 per subdivision or change in material	AS2008
	- Bitumen Emulsion			
	· Residual Binder Content (Residue from Evaporation)	1 subdivision	2 per bulk delivery	AS1160, App.D
	- Mineral Aggregates			
	· Degradation Factor	1 subdivision	1 per subdivision or 6 month period	AS1141.25
	· Los Angeles Value	1 subdivision	"	AS1141.23
	· Aggregate Wet Strength	1 subdivision	"	AS1141.22
	· Wet/Dry Strength Variation	1 subdivision	"	AS1141.22
· Polished Aggregate Friction Value	1 subdivision	"	AS1141.42	
· Sand Equivalent	1 subdivision	"	AS1289.3.7.1	
- Mineral Filler	1 month's prod'n	"	AS2357	
- Combined Aggregate Grading	1 subdivision	"	AS1141.11, AS1141.12	
Mix Design - Nominated Mix	Approval of mix and NATA certification - Supplier's documentary evidence and certification	1 subdivision	1 per mix	
Production Mix	Grading	1 day's prod'n or 50m <sup>3</sup>	2 per 50m <sup>3*</sup>	AS2891.3.1
	Residual Binder Content	(whichever is the lesser)	2 per 50m <sup>3*</sup>	AS2891.3.1
Laying	Levels	1 layer, max 200m <sup>3</sup>	1 cross section per 15m	Survey
	Surface Quality	1 layer, max 200m <sup>3</sup>	10 per 100m* lane length	3m Straight Edge

\* Note: or part thereof, per lot

**Sub-Annexure B12 - Reserved**

**Sub-Annexure B13 - Specification C271**

**(MINOR CONCRETE WORKS)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Subgrade	Compaction	1000 lin m or 1000m <sup>2</sup>	1 per 200 lin m or 200m <sup>2</sup>	AS1289.5.4.1
Gravel Subbase Construction	Compaction	1 day's placement	1 per 100 lin m or 100m <sup>2</sup>	AS1289.5.4.1
	Subbase Geometry	1 day's placement	1 per 25 lin m	3m Straight Edge
Steel Supply	Material Quality - Suppliers documentary evidence and certification	1 delivery	1 per production batch	
Ready-Mixed Concrete Supply	Material Quality - Suppliers documentary evidence and certification	1 subdivision	1 per mix type	
	Consistency – Slump	15m <sup>3</sup>	1 per load	AS1012.3 Method 1
	Compressive Strength (7 and 28 day)	15m <sup>3</sup>	2 pairs per 15m <sup>3</sup>	AS1012.1, AS1012.8, AS1012.9
Concrete Placement	Finished Levels	15m <sup>3</sup>	1 cross section per 15m	Survey and 3m Straight Edge
	Surface Dimensions	Single Fabrication	As required to confirm design dimensions	Measure
Backfilling	Material Quality			
	- Maximum particle size	1 subdivision / material type	1 per 200m <sup>3</sup> or lot	
	- Plasticity Index	1 subdivision / material type	1 per 200m <sup>3</sup> or lot	AS1289.3.3.1
	Compaction	1 day's work or max 200m <sup>2</sup>	1 per 200m <sup>2</sup> or lot	AS1289.5.4.1
Sprayed Concrete	Test Panels and Cores	1 subdivision	3 test panels and 4 cores per mix design	AS1012.4, AS1012.9 AS1012.14
	Compressive Strength Cores	15m <sup>3</sup>	2 per 15m <sup>3</sup>	AS1012.4, AS1012.9 AS1012.14
	Curing Material Quality - Supplier's documentary evidence and certification	1 subdivision	1 per production batch	

\* Note: or part thereof, per lot



**Sub-Annexure B14 - Specification C261**

**(PAVEMENT MARKINGS)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	- Paint	1 subdivision	1 per subdivision or change in material	
	- Glass Beads	1 subdivision	"	
	- Thermoplastic Material	1 subdivision	"	
	- Raised Pavement Markers	1 subdivision	"	
Paint Application	Wet Film Thickness	1 subdivision	1 per site visit or change in pressure settings	AS 1580.107.3
	Application Rate of Glass Beads	1 subdivision	1 per site visit or change in pressure settings	Annexure C261A
Thermoplastic Application	Cold Film Thickness	1 subdivision	1 per site visit or change in pressure settings	Measure by micrometer
	Application Rate of Glass Beads	1 subdivision	1 per site visit or change in pressure settings	Annexure C261A

**Sub-Annexure B15 - Specification C262**

**(SIGNPOSTING)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Materials Supply	Material Quality - Supplier's documentary evidence and certification of: - Sign Blanks - Aluminium Extrusion Backing - Retro-reflective Material - Non-reflective Paint - Non-reflective Sheet Material - Steel Sign Support Structures	1 subdivision  1 subdivision 1 subdivision 1 subdivision 1 subdivision	1 per subdivision, or change in material " " " " "	
Concrete Foundations	Refer 'Minor Concrete Works'			

**Sub-Annexure B16 - Specification C273**

**(LANDSCAPING)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Seed	Certification of Authenticity for the prescribed Mix	1 subdivision	Certification for each production batch delivered	
Imported Topsoil	Material Quality - Ph - Organic Content - Soluble Salt Content	10,000 <sup>m2</sup> 10,000 <sup>m2</sup> 10,000 <sup>m2</sup>	1 per 500m <sup>3</sup> 1 per 500m <sup>3</sup> 1 per 500m <sup>3</sup>	AS4419
Mulch for Planting	Material Quality	1 subdivision	1 subdivision	AS4454

**Sub-Annexure B17 - Specification C401**

**(WATER RETICULATION)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	- uPVC Pipes	1 subdivision	1 per subdivision	AS2977
	- Ductile Iron Pipes	1 subdivision	"	AS2280 and AS2129
	- Copper Pipe	1 subdivision	"	AS1432
	- Polyethylene Pipe	1 subdivision	"	AS1159
	- Stop Valves Material	1 subdivision	"	AS2638 and AS2129
	- Non Return Valves	1 subdivision	"	AS3578
	- Spring Hydrants	1 subdivision	1 per subdivision	AS3952
Siting and Excavation	Geometry	1 line	1 per line	Survey
Bedding	Material Quality - Grading	1 subdivision	1 per subdivision per source	AS2032
Thrust and Anchor Blocks	Refer Sub-Annexure B13			
Concrete Encasement	Refer Sub-Annexure B13			
Chamber Covers and Frames	Geometry	1 cover/frame	1 per cover/frame	survey
Testing of Pipelines	Pressure testing	1 line	1 per line	As specified C401.37
Backfill and Compaction	Compaction	1 line	1 per 2 layers max 100m <sup>2</sup>	1289.5.6.1 AS 1289.5.4.1 AS 1289.5.1.1
Switchgear and Control gear Assembly	Electrical function	each installation	1 factory test per installation	AS3439
Commissioning of Pumping Station	Certification testing of electrical installation in accordance with relevant Australian Standards	1 installation	1 per installation	

**Sub-Annexure B18 - Specification C402  
(SEWERAGE SYSTEM)**

ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	- uPVC Pipes	1 subdivision	1 per subdivision	AS1477
	- Ductile Iron Pipes	1 subdivision	"	AS2280 and AS2129
	- Vitrified Clay Pipes	1 subdivision	"	AS1741
	- Precast Access Chambers	1 subdivision	"	AS4198
Siting and Excavation	Geometry	1 line/ structure	1 per line/ structure	Survey
Bedding	Material Quality - Grading	1 subdivision	1 per subdivision per source	
Concrete Bedding	Refer Sub-Annexure B13			
Laying and Jointing of Pipes, Access Chambers, Structures	Geometry	1 line	1 per line	Survey
Thrust and Anchor Blocks	Refer Sub-Annexure B13			
Concrete Encasement	Refer Sub-Annexure B13			
Cast-in-situ Access Chambers	Material Quality - Tri-Calcium Aluminate Content	1 subdivision	1 per subdivision per source	AS3972
	- Fineness Index	1 subdivision	"	AS3972
	- Minimum Cement Content	1 subdivision	"	AS3972
Acceptance Test of Gravitation Mains and Access Chambers	- Compressed Air Testing	1 line	1 per line	As specified C402.42 C402.43
	- Hydrostatic Testing	1 per test length Test length = 1370m pipeline dia.(mm)	1 per line	As specified C402.45
Backfill and Compaction	Compaction	1 line	1 per 2 layers max 100m <sup>2</sup>	AS 1289.5.6.1 AS 1289.5.4.1 AS 1289.5.1.1
Switchgear and Control gear Assembly	Electrical Compliance	each installation	1 factory test per installation	AS3439

## QUALITY CONTROL REQUIREMENTS

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ACTIVITY	KEY QUALITY VERIFICATION REQUIREMENTS	MAXIMUM LOT SIZE	MINIMUM TEST FREQUENCY	TEST METHOD
Commissioning of Pumping Station	Certification testing of electrical installation in accordance with relevant Australian Standards	1 installation	1 per installation	