



AUS-SPEC

Infrastructure Specifications

1113 Subgrade and formation stabilisation

1113 SUBGRADE AND FORMATION STABILISATION

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) Cessnock City Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and Cessnock City Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide stabilisation of subgrade materials, as documented.

1.2 CROSS REFERENCES**General**

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- 0136 *General requirements (Construction)*.
- 0152 *Schedule of rates (Construction)*.
- 0161 *Quality management (Construction)*.
- 1101 *Traffic management*.
- 1112 *Earthworks (Road reserve)*.
- 1141 *Flexible pavement base and subbase*.

1.3 STANDARDS**General**

Standard: To Austroads AGPT04D (2019).

1.4 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- CBR: California bearing ratio.
- OMC: Optimum moisture content.
- PI: Plasticity index.
- SMDD: Standard maximum dry density.
- UCS: Unconfined compressive strength.

Definitions

General: For the purposes of this worksection the following definitions apply:

- Allowable working time: Measured from the commencement of incorporating/mixing the first application of the stabilisation binder into the unstabilised materials to the completion of trimming.
- Binder: A binder is a material mixed into or added to the subgrade material to improve its qualities.
- Bulking: The increase in volume of a layer designated for stabilisation resulting from preliminary pulverisation and/or incorporation of stabilisation binder.

- Pozzolan: A siliceous or aluminosiliceous material, which in itself possesses little or no cementitious value but which in finely divided form may be mixed with lime or Portland cement to form a cementitious material.
- Spreader: A truck-mounted mechanised spreader equipped with calibrated load cells and capable of uniformly spreading powdered binders at controlled application rates.
- Stabilisation: The process by which the intrinsic properties of a pavement material are permanently altered by the addition of a stabilisation binder and/or granular material to meet performance expectations in its operating, geological and climatic environment.
- Stabilisation binders: Materials that are used for the purpose of improving the properties of a subgrade or pavement. They are categorised in terms of their main constituents.
- Stabilised material: Any material that has been stabilised by the controlled application of a binder or granular material to improve the load carrying capacity of a pavement layer (usually the basecourse) or the subgrade.
- Stabiliser: A specialised plant/machine with a centrally mounted mixing chamber, that can be connected to a watercart for moisture control and allows uniformity of mixing and depth control during the stabilisation process.

1.5 TOLERANCES

Cementitious blends

Mass of components of the nominated cementitious blend: $\pm 3\%$ from the blend percentages in the nominated mix.

In situ application of stabilisation binder

Spread rate tolerances: $\pm 10\%$ from nominated rate.

Width

Minimum width measured at any point of the stabilised layer: Not less than the documented width by more than 50 mm.

Levels

Surface levels: Conform to the following:

- Subgrade: ± 20 mm of design levels.

Surface quality

Maximum deviation from a 3 m straightedge: -10 mm, after secondary trimming and immediately before sealing.

Ride quality: Conform to Clause 3.10 and Clause M4.

Layer thickness

Subgrade/formation: Within -5 mm and +15 mm of the documented layer thickness.

1.6 SUBMISSIONS

Certification

Stabilisation mix(es): Submit details and certification from a laboratory accredited by NATA for the relevant test methods as evidence of conformity of the mix and its constituent materials to the nominated mix design.

- Materials proposed: Submit details of source and certificates of compliance from a NATA accredited laboratory as evidence that the materials conform to documented requirements.

Execution details

Proposal for construction: Submit details of proposed method, equipment and procedures.

Trial section: Submit documentation demonstrating conformity of the trial section including:

- Record data of actual spread rate to verify conformance to the nominal rates.
- Compaction test results from a NATA accredited laboratory verifying the required relative compaction has been achieved for the trial section.
- Depth check records showing thickness of stabilised layer for in situ stabilisation.
- Survey report of finished levels (only where survey is required as part of the project).
- Record data of straightedge test.

Joints: Submit details of location and types of construction joints.

Records

In situ application of stabilisation binder:

- Spread rate: Submit record data from tray/mat tests or on-board load cells for spread of stabilisation binder.
- Daily record sheet.

In situ mixing:

- Stabilised layer depth: Submit record data of stabilised layer depth.

Trimming:

- Survey report of finished levels (only where survey is required as part of the project).
- Survey report of compacted thickness for stationary plant mixed pavements (only where survey is required as part of the project).

Completion:

- Surface quality: Submit record data of straightedge test.

Tests

Results: Submit results of testing to **ANNEXURE – MAXIMUM LOT SIZE AND MINIMUM TEST FREQUENCIES**.

Other tests:

- Lime demand test: To RMS T144 (2012) ~~VicRoads RC 131.01 (2018)~~ or **Test Method Q705 (2020)**.
- Minimum pH: 12.4.

Variations

Nominated mix design: Submit details if the source, nature or type of any constituent material, or the proportion of any constituent materials is varied from the nominated mix design for correction or adjustment.

1.7 INSPECTIONS**Notice**

Give notice so that inspection may be made of the following:

- Trial section: Location, materials, methods, equipment, procedures and joint construction.

2 MATERIALS**2.1 CEMENT****General**

Standard: To AS 3972 (2010).

Storage and transport

Storage period: Re-test cement that has been stored for a period in excess of three months from the time of manufacture.

Transport: Transport cement in water tight packaging and protect from moisture until used. Do not use caked or lumpy cement.

2.2 QUICKLIME**General**

Standard: To AS 1672.1 (1997).

Properties

Available lime - calcium oxide: Not less than 85%.

Active slaking time: Not greater than twenty minutes.

Temperature rise on slaking: Not less than 40°C in six minutes.

Particle size distribution of quicklime table

AS sieve size (mm)	% passing
13.2	100
9.5	96–100
4.75	70–100

AS sieve size (mm)	% passing
2.36	0-90

2.3 HYDRATED LIME

General

Standard: To AS 1672.1 (1997).

Properties

Available lime - calcium hydroxide: Not less than 80%.

Form: Dry powder.

Residue on a 300 µm sieve: Not more than 2%.

2.4 GROUND GRANULATED BLAST FURNACE SLAG

General

Standard: To AS 3582.2 (2016).

2.5 FLY ASH

General

Standard: To AS/NZS 3582.1 (2016)..

2.6 CEMENTITIOUS BLENDS

General

Requirement: Conform to the blend proportion and constituents in the nominated mix design in the **ANNEXURE – STABILISATION SCHEDULES**.

Handling and storage

Requirements: Conform to the supplier's handling and storage recommendations.

2.7 WATER

General

Requirement: Use clean water, free from harmful amounts of materials such as oil, salt, acid, alkali and organic or vegetable matter. Potable water will not require testing for conformity.

Content: Provide water with less than the following:

- 600 parts per million of chloride ion.
- 400 parts per million of sulfate ion.
- 1% by mass of undissolved solids.

2.8 TESTING

Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

3 EXECUTION

3.1 GENERAL

Weather conditions

Moisture content: Do not proceed with the stabilisation of pavement materials during wet weather or if rain is likely to occur during any stage of the stabilisation process to significantly change the resultant moisture content and its uniformity in the mix.

Wind: Do not proceed with spreading during windy conditions which may cause loss of stabilisation binder, or cause nuisance or danger to people or property.

Stabilisation: Do not carry out stabilisation when the temperature of the material to be stabilised (at a depth of 50 mm in the pavement for in situ stabilisation) is below 5°C or above 45°C.

3.2 ALLOWABLE WORKING TIME

General

Requirement: Incorporate/mix the stabilisation binder into the subgrade or pavement material to be stabilised, trim and shape the surface to level and fully compact the layer to the required density ratio within the maximum allowable working time, as documented.

Maximum allowable working time table

Binder	Maximum allowable working time (hours)
Slow setting	
Hydrated lime and quicklime	10
Medium setting	
Type GB cements	4
Cementitious blends ¹	As documented
Rapid setting	
Type GP cement	2
Note: Cementitious blends allowable working time: Conform to ANNEXURE - STABILISATION SCHEDULES .	

3.3 TRIAL SECTION

General

Trial section: If required, construct no less than 100 m long trial section for the width of the proposed works and incorporate in the finished works.

Materials and methods: Construct the trial stabilisation using the materials, equipment and methods for placing and finishing the same as would be used for the entire stabilisation works.

In situ application rate of stabilising agent: **To ANNEXURE – STABILISATION SCHEDULES**.

Compaction requirement: **To COMPACTION**.

Width, level, shape and layer thickness requirement: **To TOLERANCES, Width/Level/Shape/Layer thickness**.

Joints: Demonstrate the methods proposed for the construction of joints to conform the documented requirements.

Non-conformance: Assess the non-conforming trial section for fitness for purpose and determine appropriate disposition.

3.4 IN SITU STABILISATION – INITIAL SURFACE PREPARATION

Subgrade stabilisation

Initial shaping: Trim the surface to the required alignment, levels and shape necessary to produce the required final compacted thickness of stabilised material.

Additional granular material: Supply and spread to improve existing pavement material or to correct pavement levels as required.

Surface condition before in situ application of stabilisation binder: Shape, compact and trim the existing surface to facilitate stabilisation, compaction and trimming to the documented alignment, levels and shape.

3.5 IN SITU SPREADING OF STABILISATION BINDERS

General

Construction traffic restrictions: Do not allow construction traffic or equipment, except for the centrally mounted mixer and watercart, to pass over the spread binder until incorporated into the pavement.

Quicklime, cement, cementitious blends or dry powdered polymer

Spreading: Use an approved load calibrated mechanical spreader from a rear or centrally calibrated drop chute capable of recording the output rate at which the binder is applied. Do not use agricultural or tipper-style spreaders. Use spreaders capable of spreading a varying widths through mechanically or manually controlled doors.

Spread rate: Spread stabilisation binder at the nominated spread rate up to a maximum per single spreading pass of 15 kg/m² for Quicklime and Hydrated Lime and 20 kg/m² for all other powder binders.

Record: Document the spread rate.

In situ lime slaking

Timing: If quicklime is used, commence slaking within 30 minutes after spreading, before mixing.

Hydration: Apply water uniformly to produce a material at least 80% hydrated. Do not concentrate water into ruts or hollows, or over water to produce a wet hydrate.

Fully slake quicklime: Use either of the following methods to verify slaking:

- A thermometer to assess the maximum rise in temperature as calcium oxide is converted to calcium hydroxide.
- A visual observation of the change from a granular material to a fine powder. Assess by rubbing the lime between the thumb and finger and confirming the lime is no longer gritty. Use appropriate protective equipment when handling quicklime.

Safety equipment: Use appropriate personal protective equipment during in situ lime slaking.

IN SITU MIXING

General

Rate of work: Complete lane by lane or full width of carriageway in the one day operation.

Pavement bulking: Take into account the degree of bulking to meet documented pavement thickness and finished levels.

Minimum mixing passes: 2.

Additional mixing: If required, carry out additional passes by the mixing equipment to improve visual uniformity of the mix and/or the moisture content.

Stabilised layer: Uniform over the full depth without lenses, pockets, lumps or granules of stabilisation binder.

Mixing equipment: Conform to the following:

- Centrally mounted mixing drum with moisture control.
- Capable of mixing to the documented depth for the layer to be stabilised.
- Minimum power capability: 300 kW (400 hp) for adequate mixing of materials.
- Capable of mixing the stabilising agent uniformly through the full depth and over the whole area of the layer to be stabilised.
- Capable of supplying a calibrated amount of water to the area being agitated by the mixer to provide a uniformly moist mix to the documented moisture content.
- As mixing tools wear, replace to maintain mixing efficiency consistent with that demonstrated during the trial section.
- Do not use tractor or skid steer mounted plant, profilers or graders for mixing of stabilisation binders or moisture addition.

Mixing procedure: Conform to the following:

- In the first pass, mix the binder into the material to 50 mm less than the nominated depth.
- Carry out mixing of the second or final pass to the full documented pavement depth, whilst adding water through the stabiliser.
- Where required, add water after mixing to shape, compact and trim within the allowable working time.

3.6 COMPACTION

General

Requirement: Compact the stabilised layer over the entire area and depth not less than the minimum density requirements as a percentage of the SMDD:

- Subgrade stabilisation: 97%.
- Moisture content of material for compaction: 70% to 110% of OMC.

Timing:

- Start compaction after mixing.

- Complete compaction within the allowable working time.
- Carry out compaction and trimming in a continuous method.

Compacted surface: Keep compacted layer moist, free from contamination and in good condition, until an overlying layer is constructed.

3.7 TRIMMING

General

Primary trimming: After mixing, trim and compact the layer conforming to *1141 Flexible pavement base and subbase* to produce a tight dense surface parallel with the finished wearing surface levels.

Secondary trimming: Trim the layer to meet shape and level requirements in preparation for the initial seal. Do not use surface slurring or methods which lead to laminations in the pavement.

Trimmed material: Use trimmed material cut to waste as fill or spoil.

Surface quality: Provide finished surface as follows:

- True to line and level without any loose pockets, holes, bumps and flakes.
- Crowned pavements adjacent to gutter: Straight uniform profile from the crown of the pavement to the lip of the gutter.
- Stabilised road shoulders only: Finished profile that is straight and uniform in crossfall from the edge of the existing pavement to the outer edge of the new pavement.

Levels and thickness control methods

General: Provide controls so that the pavement layer thickness is not reduced during secondary trimming and that the pavement levels are within the documented tolerance.

Level and thickness control methods during construction: Determine levels using either survey or stringline measurements from survey pegs taken at close intervals to reduce longitudinal roughness.

Straightedge test

General: Undertake immediately before sealing or before the agreed practical completion of any work component.

3.8 JOINTS

General

Requirement: Conform to the following:

- Form all joints by cutting back into the previously stabilised and compacted sections.
- Remove cut off material and keep joint area clean.
- Maintain cut face of the previous run in a damp condition.
- When compacting the fresh mix, support the roller partly on the previously compacted run.
- Level and shape of the joints: Within the documented limits.

Longitudinal joints

General: Minimise the need for longitudinal joints. If required, demonstrate that joints are unavoidable. If compaction of adjoining runs cannot be achieved within two hours of incorporating stabilisation binder, form a longitudinal joint between runs.

- Locate along lane marking line or midway between lane marking lines.
- Minimum longitudinal overlap of mixing runs: 150 mm.

Transverse joints

General: Form joints under the following circumstances:

- Before start of the day's stabilising process.
- After any delay in excess of 2 hours in the continuity of the stabilisation process.
- Minimum overlap of transverse joints: 1.5 m.
- Remix the material disturbed during cutting back at full depth and incorporate into the new work.

3.9 CURING

General

Traffic: Protect from heavy traffic until cured or the next pavement layer is laid.

Drainage: Maintain drainage for water run-off.

Curing method

Requirement: Cure stabilised material using one of the following methods:

- Water curing: Protect the stabilised work against rapid drying out by keeping it continuously damp during the period before the provision of a subsequent layer or the application of a prime or initial seal. Provide frequent light uniform spray that does not produce significant run off or flooding on sections of the area. Avoid slurring of the surface or leaching of the stabilising agent.
- Constructing the next layer.

Curing period: As documented, but no longer than 6 calendar days.

3.10 TESTING**Quality**

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

Site tests

In situ spread rate testing: Test spread rate using either of the following methods:

- Weigh the contents of a suitable 4-sided tray placed on the pavement and between the wheels of the mechanical spreader. Calculate the rate of stabilising agent spread by dividing the mass collected (kg) by the area of the tray (m²). Take into account the mass of the tray/s.
- Weigh the contents of a 1 x 1 m mat placed on the pavement and between the wheels of the mechanical spreader. The mass weighed will be the result in kg/m². Take into account the mass of the mat.
- If spreading vehicles are fitted with load cells, ascertain the average spreading rate of the stabilising agent by dividing the mass of the stabilising agent spread per run by the area of the run.

In situ mixing: Measure stabilised layer depth using either of the following methods:

- By measuring the depth of cutting adjacent to an existing pavement in two areas within the lot and measure to nearest 5 mm. Use a stringline to assess the depth of stabilised layer as the difference between finish surface level and the bottom of stabilised layer.
- Survey.

Compaction tests: Conform to the following:

- Test method: Sample and test the lots for true relative compaction assessments within the nominated allowable working time.
- Laboratory density:
 - . Unbound and modified layers: Test samples to determine maximum dry density (modified compactive effort) in a laboratory to AS 1289.5.2.1 (2017).
 - . Bound layers: Test samples to determine the maximum dry density (modified or standard compactive effort) to the relevant test method within two hours of adding stabilisation binder to the mix.
- Field density testing: Use either of the following methods:
 - Sand replacement method: Test the compacted material to AS 1289.5.3.1 (2004) or AS 1289.5.3.2 (2004) or AS 1289.5.3.5 (1997).
 - Nuclear density meter: Test compacted material to AS 1289.5.8.1 (2007).
 - Relative compaction: To AS 1289.5.7.1 (2006).

Completion tests

Straightedge test: Take measurements with a 3 m straightedge at a minimum of 10 randomly selected stations so as to represent each 200 m lane length or part thereof.

4 ANNEXURE A**4.1 ANNEXURE - STABILISATION SCHEDULES**

This Annexure should be completed for Council or private development projects to specify stabilisation parameters required in conjunction with the contract Drawings. Where there is an inconsistency between the approved Drawings and this Annexure, the approved Drawings shall prevail unless specifically noted otherwise.

General

Requirement: Include the appropriate schedule(s) required for the works.

In situ stabilised subgrades using quicklime or hydrated lime schedule

	A	B	C
Target depth (mm)			
Nominated granular material (type)			
Source of granular material			
Type of stabilisation binder			
Blend constituent no. 1			
Blend constituent no. 2			
Blend constituent no. 3			
Nominated stabilisation binder content (% by mass)			
Lime Demand, LD (%)			
Minimum CBR (%)			
Allowable working time (hours)			
Curing method			
Curing period			
Trial section			

Notes to schedule:

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Nominated granular material: Document the type of granular material to be stabilised. (e.g. CRB20-1, CRB20-2, CRS20, CRS40).

Source of granular material: Document source of granular material to be stabilised. (e.g. Supplier name, quarry location).

Type of stabilisation binder(s): Select from cement or cementitious blends.

Blend constituent 1, 2, 3: Applicable to cementitious blends. Document constituents and blend proportions.

Nominated stabilisation binder content: Specify nominal percentage of stabilisation binder by mass.

UCS: Specify target unconfined compressive strength of stabilised material.

Allowable working time: Within the **Maximum allowance working time table** or specify where appropriate.

Curing method: Select from water curing or bituminous surfacing.

Curing period: Specify time required for curing of stabilised materials.

Trial section: Specify if trial section is required.

4.2 ANNEXURE - SUMMARY OF HOLD AND WITNESS POINTS

For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.

Clause and description	Type	Submission/inspection	Submission/notice details	Process held
SUBMISSIONS, Certification	H – Superintendent and Principal Certifier	Details and certification of stabilisation mix(es) and its constituents	14 working days before commencement of works	Stabilisation mix design

Clause and description	Type	Submission/inspection	Submission/notice details	Process held
Stabilisation mix(es) and its constituents				
SUBMISSIONS, Certification Materials proposed	H – Superintendent and Principal Certifier	Evidence of material conformance	14 working days before commencement of works	Ordering of materials
SUBMISSIONS, Variations Nominated mix design	H – Superintendent and Principal Certifier	Details and certification of new stabilisation mix(es) and its constituents.	14 working days before commencement of works	Stabilisation mix design
SUBMISSIONS, Execution details Trial section	H – Superintendent W – Principal Certifier	Record data of actual spread rate. Compaction test results from a NATA accredited laboratory. Survey report of finished levels (where required). Depth check records showing compacted thickness of stabilised layer. Record data of straightedge test.	2 working days before commencement of remaining stabilisation works	Commencement of remaining stabilisation works
SUBMISSIONS, Execution details Joints	H	Details of location and types	2 working days before construction of joints	Construction of joints
SUBMISSIONS, Execution details Compaction	H – Superintendent W – Principal Certifier	Test results from a NATA accredited laboratory	2 working days before placement of subsequent layers or bituminous surfacing	Placement of subsequent layer; Bituminous surfacing
SUBMISSIONS, Execution details Trimming	H – Superintendent W – Principal Certifier	Survey report of finished levels (where required). Depth check records showing compacted thickness of stabilised layer for in situ stabilisation. Record data of straightedge test. Record data for ride quality (see Clause 3.10 and Clause M4).	2 working days before placement of subsequent layers or bituminous surfacing	Placement of subsequent layer; Bituminous surfacing

Clause and description	Type	Submission/inspection	Submission/notice details	Process held
INSPECTIONS, Notice Trial Section	H	Location, materials, equipment, methods and joint construction	2 working days before construction of trial section	Construction of trial section
Note: H = Hold Point, W = Witness Point				

4.3 ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES

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 contract	1 per 100 t	AS 3972 (2010) AS 2350 (various)
		Particle size distribution	1 contract	1 per contract	AS 1141.11.1 (2020)
	Hydrated lime				
		Available lime (Ca(OH) ₂)	1 contract	1 per 100 t	AS 4489.6.1 (1997)
		Residue on sieving	1 contract	1 per contract	AS 4489.2.1 (1997)
	Ground blast furnace slag		1 contract	1 per month	AS 3582.2 (2016)
	Fly ash		1 contract	1 per month	AS/NZS 3582.1 (2016)
	Cementitious blends		1 contract	1 per 100 t	TfNSW QA Spec 3211 (2020) part of R75/M
		Blend proportion	1 contract	1 per mix	TfNSW QA Spec 3211 (2020) part of R75/M
	Water				
		Chloride ion content Maximum 600 parts per million	1 contract	1 per contract per source of water	AS 3583.13 (1991) RMS T1004 (2012) TfNSW R75 (2020)
		Sulfate ion content Maximum 400 parts per million	1 contract	1 per contract per source of water	AS 1289.4.2.1 (2020) RMS T1014 (2012) TfNSW R75 (2020)
	Undissolved solids Maximum 1% by mass	1 contract	1 per contract per source of water	TfNSW R75 (2020)	
Mix design	Certification of NATA accredited laboratory – Supplier's documentary evidence and certification		1 mix	1 per mix	Austrroads AGPT04D (2019)

Activity	Key quality verification requirements		Maximum lot size	Minimum test frequency	Test method
In situ spreading	Spread rate			1 per spreading run	Tray test or mat test
	Binder uniformity		1 layer 1,000 m ²	1 per spreading run	Visual
Mixing	Stabilised depth		1 day's placement	1 per mixing run	Survey or Test hole
Trimming and compaction	Finished levels		1 day's placement	One cross section per 25 m	Survey
	Surface quality		1 day's placement	10 per lot	3 m straightedge
	Average layer thickness		1 day's placement	1 per lot	Measure/survey (In situ stabilisation).
	Average width		1 day's placement	1 per 50 lineal m.	Measure/survey
	Relative compaction/moisture content		1 day's placement	1 per 500 m ² , minimum 3 per lot	AS 1289.5.7.1 (2006) AS 1289.5.8.1 (2007) AS 1289.5.3.1 (2004) AS 1289.5.3.2 (2004) AS 1289.5.3.5 (1997)

4.4 ANNEXURE - PAY ITEMS

This Annexure applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate scope
1113.1 Development of mix design	Per test.	Unit cost.
1113.2 Supply and spread of additional granular material	Tonne	All costs associated with supply and spread of additional granular material.
1113.3 Supply and delivery of binder	m ²	All costs associated with supply and delivery of binder.
1113.4 Spread and mix binder	m ²	All costs associated with spreading and mixing binder to the documented thickness with a purpose built mixer.
1113.5 Compacting, trimming and jointing	m ²	All costs associated with compacting and trimming to specified levels of density and strength. All costs associated with jointing is also included.
1113.6 Density testing	test	All costs associated with collection of samples, delivery, laboratory testing and submitting results.
1113.7 Traffic management	Per shift	To 1101 Traffic management.

4.5 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

ARRB	2020	Sealed Roads Best Practice Guide
ARRB	2020	Unsealed Roads Best Practice Guide
AS 1141		Methods for sampling and testing aggregates
AS 1141.11.1	2020	Particle size distribution - Sieving method
AS 1289		Methods of testing soils for engineering purposes
AS 1289.4.2.1	2020	Soil chemical tests - Determination of the sulfate content of a natural soil and the sulfate content of the groundwater - Normal method
AS 1289.5.2.1	2017	Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using modified compactive effort
AS 1289.5.3.1	2004	Soil compaction and density tests - Determination of the field density of a soil - Sand replacement method using a sand-cone pouring apparatus
AS 1289.5.3.2	2004	Soil compaction and density tests - Determination of the field dry density of a soil - Sand replacement method using a sand pouring can, with or without a volume displacer
AS 1289.5.3.5	1997	Soil compaction and density tests - Determination of the field dry density of a soil - Water replacement method
AS 1289.5.7.1	2006	Soil compaction and density tests - Compaction control test - Hilf density ratio and Hilf moisture variation (rapid method)
AS 1289.5.8.1	2007	Soil compaction and density tests - Determination of field density and field moisture content of a soil using a nuclear surface moisture - Density gauge - Direct transmission mode
AS 1672		Limes and limestones
AS 1672.1	1997	Limes for building
AS 2350		Methods of testing portland, blended and masonry cements
AS/NZS 3582		Supplementary cementitious materials
AS/NZS 3582.1	2016	Fly ash
AS 3582.2	2016	Slag - Ground granulated blast-furnace
AS 3583		Methods of test for supplementary cementitious materials for use with portland cement
AS 3583.13	1991	Determination of chloride ion content
AS 3972	2010	General purpose and blended cements
AS 4489		Test methods for limes and limestones
AS 4489.2.1	1997	Fineness - Wet sieving
AS 4489.6.1	1997	Lime index - Available lime
Austrroads AGPT		Guide to pavement technology
Austrroads AGPT04D	2019	Stabilised materials
RMS T144	2012	Hydrated lime for road construction materials (Lime demand test)
RMS T1004	2012	Quantitative determination of chloride ion in water
RMS T1014	2012	Quantitative determination of sulfate ion in water
TfNSW QA Spec 3211	2020	Cementitious materials, binders and fillers
TfNSW R75	2020	In situ pavement stabilisation using slow setting binders
VicRoads RC 131.01	2018	Lime saturation point of soil (pH method)

5 ANNEXURE M – CESSNOCK CITY COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: an authorised representative of Council's Director of Infrastructure and Engineering Services.	Variation procedure
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	DA Conditions
M3.	Refer to the Cessnock City Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	Completion
M4.	<p>Test methods for ride quality: To TfNSW TS 02795.41 RMS T182 (NAASRA roughness), TfNSW TS 02795.45 T187 or TfNSW TS 02795.46.T188 (International Roughness Index).</p> <p>Surface courses on new roads: Provide roughness measurement test results for review after trimming and before sealing. Results are to conform to the relevant RMS specification for the surface course material:</p> <ul style="list-style-type: none"> • Unbound and Modified Base Courses (with or without Sprayed Bituminous Seal): To Table R71/B.3. • Concrete Base Courses: To Table R83/27. • Asphalt Course: To 1144 Asphalt (Roadways) worksection Clause 4.7. RMS specifications R116, R117, R118, R119, R121, R123 or R126, as applicable to the type of asphalt used, are supplementary reference material. <p>Note: Test results generally less than or equal to 1.56m/km/lane (International Roughness Index) comply, and higher values may be acceptable in accordance with the RMS specifications. However, if specified under the Contract, an incentive payment or deduction amount is to be applied in line with the RMS values given.</p> <p>Guidance on threshold levels for maintenance intervention: Refer to ARRB Sealed and Unsealed Roads Best Practice Guides.</p> <p>Amendments: This clause is used in worksections 1113 Stabilisation, 1133 Plain and reinforced concrete base, 1141 Flexible pavement base and subbase, and 1144 Asphalt (Roadways).</p>	Ride quality

6 AMENDMENT HISTORY

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