

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION TfNSW M220

FORMATION GRADING OF UNSEALED ROADS

NOTICE

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
M280				
Ed 1 / Rev 0	All	New specification.	GM, RNIC	19.07.05
Ed 1 / Rev 1	Notes & 1.1	New clause re intended use.	GM, IC	31.08.07
	4.1.4	Minor changes to wording		
	4.1.5	Protection and cleaning of stock grids & races added to the Work.		
Ed 1 / Rev 2	Most	Format corrected	GM, IC	24.10.07
M220				
Ed 2 / Rev 0	All	To match new Maintenance Activities: <ul style="list-style-type: none">• Changed number• Changed Pay Items Changed references to other similarly changed specifications Changed internal referencing format	GM, IC	05.08.08
	4.1.5	Added reinstatement of Signposts and Private Entrances.		
	5.3	Added clause re Accomplishment reporting.		
Ed 3/Rev 0	All	General technical review, and revision of some technical requirements. Format revised.	GM, IAM	19.02.13
Ed 3/Rev 1	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20

GUIDE NOTES (Not Part of Contract Document)

THESE NOTES ARE NOT PART OF THE SPECIFICATION, CONTRACT OR AGREEMENT.

The following notes are intended to provide guidance to TfNSW personnel on the application of the Specification. They do not form part of the Specification, Contract or Agreement.

Using TfNSW M220

TfNSW M220 has been specifically developed for TfNSW maintenance works. It must not be used without a review of its suitability for the application and in the contractual environment.

M220 is a QA specification. The use of QA specifications requires the implementation of a quality system by the service provider which meets the quality system requirements specified in TfNSW Q.

OUTLINE

The Specification M220 is for maintenance grading and resheeting of unsealed roads. Maintenance to retain the shape and ride quality is cyclical with a frequency that depends on traffic, environment and quality of materials. Generally, maintenance involves one of the following operations:

- Grade only,
- Grade and roll with or without addition of water, or
- Grade, incorporate new material, grade, water and roll.

For effective rolling, the material must have a moisture content within the Target Moisture Content Envelope as determined by the Contractor. Leaving uncompacted and loose material on the surface is unacceptable. Therefore, if the moisture content is not achieved, a Hold Point is raised (Clause 4.3).

Where major resurfacing or widening of unsealed road is proposed, TfNSW M290 Pavement Reconstruction should be adapted and used in conjunction with TfNSW 3051.

If earthworks are proposed, use TfNSW R44 Earthworks as well.

SECTION 2 PLANNING - WORK TRIAL

The WORK TRIAL is the default option unless otherwise selected in Annexure M220/A.1. It is used to ensure satisfactory work procedures and establish acceptable moisture content for rolling.

The Principal must review the procedures in the PROJECT QUALITY PLAN, assess material won on site and review test results for any new material. The procedure used in the Trial must follow the PROJECT QUALITY PLAN or be amended following the Trial. The Contractor must document in the PROJECT QUALITY PLAN how the moisture content will be assessed (e.g. a subjective "grab" test of material may be adequate).

The quality of work partially depends on the skill of the grader operator who must be nominated in the PROJECT QUALITY PLAN. As the relative compaction is not routinely tested, the type of roller and number of passes must be included in the PROJECT QUALITY PLAN.

The WORK TRIAL may not be necessary where a Contractor has implemented QA and consistently meets the Specification.

SECTION 3 RESOURCES

The properties for material requirements in Table 2 may be amended to provide for proven local material as noted in Clause 3.2.1. Agreement by the Senior Geotechnical Officer in the Region is required. However, the material properties requested in Table 2 are still required to ensure that a record of this material is provided to the Principal.

Specification TfNSW 3153 sets the minimum requirements for the use of RAP in asphalt. Many of the requirements are similar to the aggregate properties specified in Table 2.

The Target Moisture Content Envelope must be determined by the Contractor as it relates to achieving compaction. It must be less than the Optimum Moisture Content.

SECTION 4 EXECUTION

The section provides for the operations outlined above.

Additional material should only be incorporated where rolling is specified. Additional material may be either:

- Won from the road (e.g. by reclaiming suitable material – refer Clause 3.1), or
- New material supplied by the Contractor (refer Table 2).

The grader operator is not to include vegetation from the table drain restoration into the formation width as this will weaken the granular material under trafficking (refer to Clause 3.1).

For rolling to be effective, the moisture content must be within the TARGET MOISTURE CONTENT ENVELOPE of the material. This can be achieved by:

- Moisture content of material already within the TARGET MOISTURE CONTENT ENVELOPE,
- Material can be dried out to be within the TARGET MOISTURE CONTENT ENVELOPE (i.e. material over-wet), or
- Material can be moistened as permitted in Annexure M220/A.1 to be within the TARGET MOISTURE CONTENT ENVELOPE (in some areas of NSW water is not readily available for roadworks).

Rolling without adequate moisture is unsatisfactory. The material remains loose and work is quickly undone through traffic action. Therefore, a HOLD POINT is included at Clause 4.3.3 if rolling is not feasible under the current scope. Options for the Principal include:

- Permitting the use of water to ensure improved compaction and renegotiating unit rates,
- Reducing the scope to "Grade Only" with no additional material and no rolling,
- Delaying the project until after rain,
- Requiring heavier rollers for compaction provided there is adequate moisture content in the material,
- Addition of new material that is wet so that when incorporated has suitable moisture content.

Reclaimed water may be used for construction and the Contractor is to seek approval from the Principal.

The road crossfall is set at 4% from the crown. On sweeping bends, superelevation should be constructed to match the direction of the roadway and keep the transition zone limited to about 50 m.

SECTION 5 CONFORMITY

Table 2 defines the material conformity requirements. The TfNSW Contract Manager may wish to amend the details in consultation with the Senior Geotechnical Officer in the Region.

Table 3 is a matrix of testing options for the Work and the TfNSW Contract Manager may need to amend the specific testing requirements for the project. Note that the WORK TRIAL may have more testing to ensure that the PROJECT QUALITY PLAN is appropriate. Table 3 can be used as the basis of an ITP for the Work.

ANNEXURES

Annexure M220/A must be completed to detail the nature of the Works. Ensure that each one of the “Yes / No” options has one struck out.

Annexure M220/B includes the relevant Pay Items for the work covered by M220. Ensure that the correct pay items are selected on the Work Order.



Transport
for NSW

QA SPECIFICATION M220

FORMATION GRADING OF UNSEALED ROADS

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VERSION FOR: DATE:

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW M220 Edition 3 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION TfNSW M220

FORMATION GRADING OF UNSEALED ROADS

1 GENERAL

- | | | |
|-----|---|--------------------------------|
| 1.1 | This Specification has been developed specifically for TfNSW maintenance works. It must not be used in any type of contract without consideration of its suitability in the prevailing circumstances. | Intended use |
| 1.2 | The Work to be executed under this Specification includes maintenance grading and resheeting of unsealed road formations and repair of table drains. | Scope |
| 1.3 | Details of work to be carried out under this Specification are described in Annexure M220/A. | Details of work |
| 1.4 | Some words or abbreviations have a special meaning in this Specification and they are explained in Annexure M220/M. | Definitions |
| 1.5 | The standards, specifications and test methods referred to by this Specification are referenced using an abbreviated form (eg TfNSW T198). The titles are given in Annexure M220/M. | Referenced documents |
| 1.6 | Unless specified otherwise, the issue of an Australian Standard or TfNSW Test Method to be used is the issue current one week before closing date for tenders. The TfNSW specification to be used is the issue contained in the contract documentation. | Applicable issue |
| 1.7 | Payment for the activities associated with completing the work detailed under this Specification must be made using the Pay Items referred to in Annexure M220/B. | Measurement and payment |
| 1.8 | Provide the identified records specified in the TfNSW Quality Management System Specification included in the Contract Documents (TfNSW Q) and summarised in Annexure M220/C.2. | Identified records |
| 1.9 | You must provide all responsibilities, such as actions, works, supply of materials, unless stated specifically otherwise. Accordingly, this Specification does not generally use wording such as "You must ..." or "You shall ..." because this is the underlying requirement. However, it is used where actions in a clause involve both You and the Principal and the roles need to be unambiguous. | Interpretation |

2 PLANNING

2.1 PROJECT QUALITY PLANNING REQUIREMENTS

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| 2.1.1 | The requirements of the PROJECT QUALITY PLAN are defined in TfNSW Q. In addition, the PROJECT QUALITY PLAN must: | Plan to include |
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| .1 | Address the HOLD POINTS and WITNESS POINTS required by this Specification and summarised in Annexure M220/C1. The Principal will consider the submitted documents prior to the release of any HOLD POINT. | Hold Points and Witness Points |
| .2 | Provide a contingency plan to minimise the affect of inclement weather (e.g. rain, wind). | Contingency Plan |
| .3 | Address each of the requirements listed in this Specification and summarised in Annexure M220/D1. | Process |
| .4 | Include a requirement for the routine submission of data and supporting documentation, which will certify conformity of all work and materials to the Specification. | Routine submission |

2.1.2	Process Held: Commencement of Work.	HOLD POINT
	Submission: At least 5 BUSINESS DAYS prior to commencing work submit the PROJECT QUALITY PLAN.	
	Release of Hold Point: The PRINCIPAL will consider the submitted PROJECT QUALITY PLAN before authorising the release of the HOLD POINT.	

2.2 WORK TRIAL

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| 2.2.1 | Unless specified otherwise in Annexure M220/A1, a WORK TRIAL must be conducted and You must demonstrate that the PROJECT QUALITY PLAN achieves the requirements of this Specification. You must adhere to all the procedures in the PROJECT QUALITY PLAN and use the same plant and personnel proposed for use on the Work. | Purpose of trial |
| 2.2.2 | The Principal may require a new WORK TRIAL where: <ul style="list-style-type: none"> .1 Nonconformities occur in a WORK TRIAL, .2 You change the PROJECT QUALITY PLAN, or .3 Work does not comply with this Specification. | Additional trials |
| 2.2.3 | The length of WORK TRIAL must be between 100 m and 200 m long and have a width similar to the proposed work. | Extent of trial |
| 2.2.4 | Process to be Witnessed: WORK TRIAL. | WITNESS POINT |
| | Submission: Notification of the WORK TRIAL at least 3 Business Days prior to the WORK TRIAL starting. | |
| 2.2.5 | Determine conformity of the WORK TRIAL according to Clause 5. | Conformity |
| 2.2.6 | Where necessary, the PROJECT QUALITY PLAN must be revised to ensure that the documented procedures achieved conformity. | Revise Project Quality Plan |

3 RESOURCES

3.1 RE-USE OF EXISTING MATERIAL

Material may be reclaimed from the road for use elsewhere in the road. This material must be uniform with the following properties:

Material properties

- .1 Consist of fine and coarse granular particles that when compacted produce a dense stable layer.
- .2 Consist of sound material that does not breakdown readily.
- .3 Maximum particle size 26.5 mm.
- .4 Free of matter that would adversely affect performance (e.g. clay lumps, organic matter, stumps, branches, roots or rubbish).
- .5 Not to be topsoil, contaminated, or an acid sulphate soil.

3.2 NEW MATERIAL

- 3.2.1 New material must be used in the Works where specified in Annexure M220/A1. The material must conform to the requirements in Table 2. Prevent segregation of material and loss of fines.

Material requirements

Proven local materials may be accepted by the Principal provided test certificates are submitted for all the material properties listed in Table 2.

- 3.2.2 Material may be blended to provide material that will comply with the Specification. The method of blending must be described in the PROJECT QUALITY PLAN.

Blended material

- 3.2.3 The type of RECYCLED MATERIAL that may be incorporated is limited to slag aggregates, crushed concrete, crushed recycled bricks and reclaimed asphalt pavement (RAP).

Recycled material and limit on brick

The proportion of recycled bricks must not exceed 30% by mass of the material used for constructing the road or shoulder.

- 3.2.4 Determine the TARGET MOISTURE CONTENT ENVELOPE for material to achieve a compact and tightly bound surface. The upper limit of the TARGET MOISTURE CONTENT ENVELOPE must be less than the optimum moisture content.

Target moisture content envelope

3.2.5	Process Held: Use of a new material or changed material source. Submission: The following documentation: .1 Proposed location of pit, quarry or blending site. .2 Certificate that material meets the Specification. .3 Copies of approvals, licences and permits for the material source according to Specification TfNSW G36. Release of Hold Point: The PRINCIPAL will consider the submitted documents before authorising the release of the HOLD POINT.	HOLD POINT
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3.3 USE OF STOCKPILE SITES

- 3.3.1 Material must only be stockpiled at: **Nominated location**
- .1 The stockpile locations nominated in Annexure M220/A1, or
 - .2 Sites proposed by You following the release of HOLD POINT (Refer Clause 3.3.3).
- 3.3.2 Stockpile sites required for the Work must be prepared and maintained. Clearly signpost stockpiles to identify the amount and type of material. **Responsibility**

3.3.3	Process Held: Preparation or use of stockpile site proposed by You. Submission: Submit documentation including: .1 Proposed location of stockpile. .2 Copies of approvals, licences and permits for the site to meet requirements according to TfNSW G36. Release of Hold Point: The PRINCIPAL will consider the submitted documents before authorising the release of the HOLD POINT.	HOLD POINT
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- 3.3.4 All stockpiles used for storing material to be used in the Work must be CERTIFIED STOCKPILES unless specified otherwise in Annexure M220/A1. **Certified Stockpiles**

3.3.5	<p>Process Held: Supply of material from a stockpile.</p> <p>Submission: Submit the following documents to verify that the material in the identified stockpile meets the requirements of this Specification:</p> <ul style="list-style-type: none">.1 Unique identification code and location of stockpile..2 Quantity of material represented..3 Proportion of each type of recycled materials in each batch..4 Test results showing conformity with Table 2. <p>Release of Hold Point: The PRINCIPAL will consider the submitted documents before authorising the release of the HOLD POINT.</p>	HOLD POINT
3.3.6	When the HOLD POINT in Clause 3.3.5 is released, the stockpile is regarded as a CERTIFIED STOCKPILE.	Certified Stockpile
3.3.7	<p>Only add new material to a CERTIFIED STOCKPILE where the new material is:</p> <ul style="list-style-type: none">.1 Tested and conforms to the Specification prior to delivery..2 Of the same material type as the CERTIFIED STOCKPILE. <p>Submit test results verifying the conformity of all additional material added to a CERTIFIED STOCKPILE to the Principal.</p>	Additional material
3.3.8	Clean up all stockpile sites nominated in Annexure M220/A.2 following completion of the Work. Restore stockpile sites proposed by You.	Restoration

4 EXECUTION

4.1 GENERAL REQUIREMENTS

4.1.1	<p>The Work under this Specification may include one or all of the following methods:</p> <ul style="list-style-type: none">.1 Grade the surface..2 Grade and roll the surface without the addition of water..3 Grade and roll the surface with the addition of water..4 Resheet the surface. <p>Supply and incorporation of new material may also be specified.</p> <p>The actual Work method to be used for a length or road is specified in Annexure M220/A. The applicable clauses for the various work methods are summarised in Table 1.</p>	Work methods
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4.1.2	<p>Process Held: Construction of road where a WORK TRIAL has been specified (refer Annexure M220/A1).</p> <p>Submission: After completion of the WORK TRIAL, submit documentation demonstrating conformity according to Clause 2.2.</p> <p>Release of Hold Point: The PRINCIPAL will consider the submitted documents and may inspect the WORK TRIAL before authorising the release of the HOLD POINT.</p>	HOLD POINT
4.1.3	Before commencing Work, mark the position and extent of the Work according to the details specified in Annexure M220/A1.	Mark and set out
4.1.4	Remove guide posts that are within the work area as required and store them for reinstatement.	Remove guide posts
4.1.5	Road fixtures and delineation must be reinstated in accordance with the following requirements:	Road fixtures
	.1 Guide posts in accordance with Specification TfNSW M3.	Guide posts
	.2 Signposting in accordance with Specifications TfNSW R143 and TfNSW 3400.	Signposting
	.3 Private entrances (including mailboxes) in accordance with TfNSW M1 Clause 4.5.5.	Private entrances
4.1.6	Protect stock grids. Remove any material which entered the grid during the Work.	Stock grids and stock races
	Maintain the integrity of stock races during the Work.	
4.1.7	Protect concrete causeways.	Causeways
4.1.8	Conserve material that complies with Clause 3.1 for subsequent use.	Conserve material

Table 1 — Summary of applicable clauses for the various Work methods

Work method	Applicable Clauses	
	Materials	Execution
Grade only	Not applicable	4.1, 4.2 and 4.6 *
Grade and roll	3.1 - 3.3	4.1 - 4.3 and 4.6 *
Grade, water and roll	3.1 - 3.3	4.1 - 4.4 and 4.6 *
Resheet	3.1 - 3.3	4.1 - 4.6 *
Note: * Clause 4.6 is only applicable where specified in Annexure M220/A1		

4.2 GRADE

4.2.1	Remove unsound material (e.g. vegetation and topsoil) from the surface of the road.	Remove unsound material
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Formation Grading of Unsealed Shoulders

M220

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|-------|--|-------------------------------|
| 4.2.2 | Depressions greater than 30 mm in depth and 300 mm in width must be treated prior to grading by tining the surface in the depression to a depth of about 100 mm. The extent of the tining must extend 150 mm beyond the perimeter of the depression. | Treat depressions |
| 4.2.3 | When grading remove the high points of surface irregularities. | Remove high points |
| 4.2.4 | Regularly remove excess material on adjoining pavement surfaces to prevent a traffic hazard. | Remove excess material |
| 4.2.5 | Trim the material to provide a finished surface that meets the following requirements:

.1 Provide the widths and crossfall specified in Annexure M220/A1 with a crown on straight sections and retain the superelevation on curves.

.2 On the outside of curves, continue superelevation to the edge of formation and do not roll over the edge. | Finished surface |

4.3 GRADE AND ROLL

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|-------|---|----------------------------------|
| 4.3.1 | Assess the suitability of the foundation according to the procedures included in the PROJECT QUALITY PLAN. Where You consider the foundation deficient, advise the Principal of a proposed treatment. | Assess foundation |
| 4.3.2 | Treat unsuitable material where directed by the Principal. Areas may be treated by replacing unsuitable material with material obtained elsewhere in the road that conforms to Clause 3.1 or by adding new material (when specified in Annexure M220/A1). | Treat unsuitable material |

- | | | |
|-------|---|-------------------|
| 4.3.3 | Process Held: Addition of material or rolling where the moisture content of the material is less than the TARGET MOISTURE CONTENT ENVELOPE for the material and water is not permitted in Annexure M220/A1.

Submission: Submit a report comparing moisture content test results with the TARGET MOISTURE CONTENT ENVELOPE.

Release of Hold Point: The Principal will consider the report and may alter the scope of work prior to authorising the release of the HOLD POINT. | HOLD POINT |
|-------|---|-------------------|

4.4 GRADE, WATER AND ROLL

- | | | |
|-------|---|-------------------------|
| 4.4.1 | During rolling, the moisture content of the material must be uniformly distributed and within the TARGET MOISTURE CONTENT ENVELOPE according to Clause 3.2.4. Where necessary add water to assist compaction. | Moisture Content |
|-------|---|-------------------------|

4.4.2	During construction, prevent any of the following from occurring:	Prevention
	.1 Segregation and loss of material,	
	.2 Slurrying of the surface, or	
	.3 Laminations in the layer.	
4.5	RESHEET	
4.5.1	Loosen the underlying surface layer and then place and spread new material to achieve the required shape. The resulting layer of material must be at least 80 mm thick.	Depth of loose material
4.5.2	Rolling must be completed in a continuous operation and commence immediately after spreading material.	Rolling
4.5.3	Trim the material to provide the average nominal thickness of new material and a smooth ride or meet the requirements on the Drawings (as specified in Annexure M220/A1).	Finished surface
4.6	REPAIR TABLE DRAINS	
4.6.1	Clause 4.6 applies to the repair of TABLE DRAINS where specified in Annexure M220/A1.	Relevance
4.6.2	Remove obstructions that prevent free flow of water into, along or from TABLE DRAINS. Repair scours in or adjacent to the TABLE DRAIN.	Remove obstructions and repair scour
4.6.3	Cut the TABLE DRAIN to meet the requirements on the Drawings (refer Annexure M220/A1) or where no Drawings are provided in accordance with Table 4.	Shape
4.6.4	Do not disturb living vegetation unless specified in Annexure M220/A or as directed by the Principal.	Vegetation
4.6.5	Process Held: Repair of a TABLE DRAIN that cannot comply with the Drawings or Table 4. Submission: Notification of the requirements that cannot be achieved and Your alternative proposal. Release of Hold Point: The PRINCIPAL will consider Your alternative proposal before authorising the release of the HOLD POINT.	HOLD POINT

5 CONFORMITY

5.1 MATERIAL CONFORMITY

- 5.1.1 Conduct random sampling of the relevant material at the point of delivery and after any mixing according to the PROJECT QUALITY PLAN. Perform all the tests at least at the frequency according to Table 2. **Sampling and testing**
- 5.1.2 Complete testing within 7 Business Days after sampling plus any period specified for pretreatment or curing. **Time to complete testing**

Table 2 – New Material Conformity

Test Method	Description	Requirement	Minimum Frequency of Testing
TfNSW T106 (i)	Coarse Particle Size Distribution:		3 per 1000 tonne
	▪ % passing 26.5 mm sieve	100	
	▪ % passing 19.0 mm sieve	95 - 100	
	▪ % passing 2.36 mm sieve	30 - 80	
TfNSW T108 (ii)	Liquid Limit	≤ 25%	3 per 1000 tonne
TfNSW T109 (ii)	Plastic Limit	≤ 15%	3 per 1000 tonne
	Plasticity Index	≥ 5 % and ≤ 10%	
TfNSW T114	Maximum Dry Compressive Strength	≥ 2.8 MPa	1 per 1000 tonne
TfNSW T171	Modified Texas Triaxial No.	≤ 3.5	1 per 1000 tonne
TfNSW T215	Wet Strength	≥ 70 kN	1 per 1000 tonne
	Wet/Dry Strength Variation	≤ 40 %	1 per 1000 tonne
TfNSW T276 (iii)	Material with smooth, polished or glazed surface (including metal, glass, ceramics but not including brick)	≤ 5% by mass	1 per 1000 tonne
	Friable material (including plaster, clay lumps)	≤ 0.5% by mass	1 per 1000 tonne
	Compressible, perishable or vegetable material (including rubber, plastic, cloth, paint, paper, wood)	≤ 0.2% by mass	1 per 1000 tonne

- Notes:
- (i) Pretreatment in accordance with Test Methods TfNSW T102 and TfNSW T103, EXCEPT where material that has been compacted is sampled from the work on-site
 - (ii) If reclaimed asphalt pavement (RAP) is present, the Atterburg limits do not apply.
 - (iii) To be determined where recycled material is present. Refer to Clause 3.2.3 for the limit on the proportion of recycled bricks.

5.2 CONTROL OF CONSTRUCTION

A summary of the construction requirements, required test methods, minimum frequencies of testing and acceptance criteria are given in Tables 3, 4, and 5. **Summary**

Where a testing interval is in metres, it must be measured parallel with the road centreline unless otherwise stated.

Table 3 – Construction Requirements

Item	Reference	Characteristic	Test Method/ Procedure (i)	Criteria	Minimum Testing Frequency
.1 Materials	Clause 3.2	Stockpile site conforms	Inspection	Clause 3.2	Each stockpile site
		New material conforms	Table 2	Table 2	Table 2
.2 General Construction Requirements	Clause 4.1	Mark the position and extent of the Work	Inspection and measurement	Annexure M220/A1	Each site
.3 Grade	Clause 4.2	Remove debris	Inspection	Clause 4.2	Each LOT
		Crossfall super-elevation and crown	Measurement	Annexure M220/A1 with tolerance $\pm 1\%$	5 per LOT
		Deviation from a 3 m straightedge laid in any direction on the surface except the crown.	3 m straightedge	≤ 15 mm	5 per LOT
		Formation width	Measurement	-0 to +200 mm	5 per LOT
.4 Grade and Roll	Clause 4.3	Treat Unsuitable Material	Inspection	Directed by the Principal	Each LOT
		Material conforms	Inspection	Clause 3.1 or Clause 3.2	Each LOT
.5 Grade, Water and Roll	Clause 4.4	Moisture content at time of rolling	TfNSW T120, T121 or T180	Clause 3.2.4	5 per LOT (WORK TRIAL)
		Moisture content (ii)	TfNSW T120, T121 or T180	PROJECT QUALITY PLAN	5 per LOT
		Proof rolling top of finished surface	TfNSW T198	No visible deformation, rutting and/or signs of distress or instability.	Each LOT (WORK TRIAL)
.6 Resheet	Clause 4.5	Layer thickness conforms	Inspection and measurement	Clause 4.5	5 per Lot
.7 Repair of Table Drains	Clause 4.6	No obstructions and scours repaired	Inspection	No potential for water to pond	Each drain
		Shape and dimensions conform	Inspection and measurement	Table 4	1 every 50 m of drain

Notes: (i) Use only one of the test methods for a LOT.

(ii) The Contractor's method to assess whether moisture content in the material is within the TARGET MOISTURE CONTENT ENVELOPE.

Table 4 – Requirements for Table Drains where there are no Drawings

Feature	Requirement
.1 Grade	≥ 0.3% ≥ 0.5% for other lined drains
.2 Depth	≥ 300 mm
.3 Waterway area	≥ 0.3 m ²
.4 Shape	Flat floor (without a 'V' shape)
.5 Batter slope adjacent to road	No steeper than 4H:1V
.6 Batter slope distant from road	No steeper than 2H:1V
.7 Invert levels	> 300 mm below the edge of the road or shoulder

5.3 ACCOMPLISHMENT REPORTING

The accomplishment of conforming work must be reported as specified in Table 5.

Table 5 – Accomplishment reporting

Code	Description	Unit of Measure	Accomplishment Reporting
221	Formation grading	km	Report length of road graded.
222	Formation resheeting ^A	km	Report length of road treated.
223	Incorporate new base material ^B	m ³	Report m ³ of loose base material incorporated.
Note	Items with postscripts "A" must be used in conjunction with any one of the items with postscript "B". However each of these items is to be reported separately. Code 222 must be used only in conjunction with Code 223. However each item is to be reported separately.		

ANNEXURE M220/A – DETAILS OF WORK

A1 WORK SUMMARY

Ref.	Road No & name	Location		Work Method *	New Material Type (Refer to Clause 3.2 and Annexure M220/A2)
		From:	To:		

* Indicate as either “Grade only”, “Grade and roll”, “Grade, water and roll” or “Resheet”.

Item	Reference	Requirement
WORK TRIAL	Clause 2.2	YES / NO (“Yes” unless specified otherwise)
Cross Section Drawing	Clause 4.2	Drawing No. _____
Nominal formation width (including shoulders)	Clause 4.2	_____ m
Crossfall	Clause 4.2	4 %
Nominal depth of resheet	Clause 4.5	_____ mm
Repair Table Drains	Clause 4.6	YES / NO

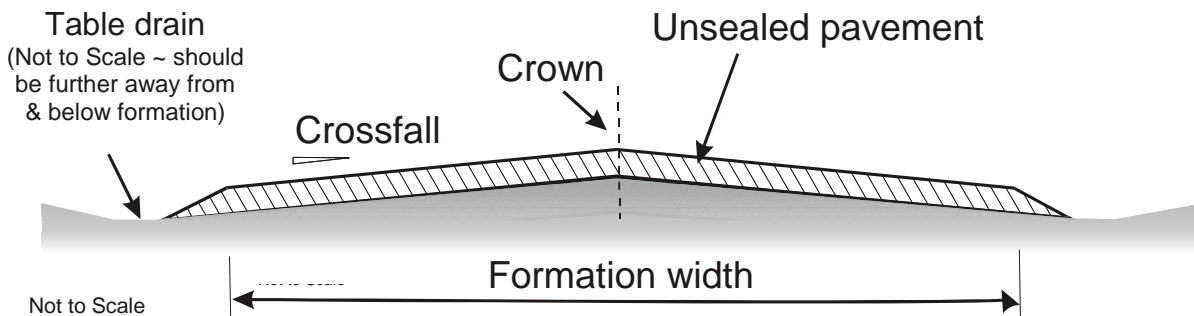


Figure A.1 Typical Cross-Section

Formation Grading of Unsealed Shoulders

M220

A2 NEW MATERIAL

Material Type Annexure M220/A1	Material Description	Source of supply Clause 3.2	Stockpile Location Clause 3.3

Stockpile(s) prepared by Contractor	Clause 3.3		YES / NO
Degree of restoration for Stockpiles to following completion of Work	Clause 3.3	Remove surplus material	YES / NO
		Clean-up site	YES / NO
		Revegetate	YES / NO

ANNEXURE M220/B – MEASUREMENT AND PAYMENT

B1 GENERAL

- | | | |
|------|--|-----------------------------|
| B1.1 | Pay items are identified in Annexure M220/B2. | Pay Items to be used |
| B1.2 | The price(s) of pay items with a quantity of work in the schedule must be costed and make due allowance for the cost of the activity.

Any pay item with a quantity of work that is not priced is deemed to be included in other priced pay items. | Prices |
| B1.3 | All costs must be distributed between pay items. | Overheads |
| B1.4 | Pay items with a quantity of work specified must not be tendered as a lump sum price. | No Lump Sum |
| B1.5 | The Contractor is not paid for rework required to achieve conformity. | No payment |

Formation Grading of Unsealed Shoulders**M220****B2 SCHEDULE OF PAY ITEMS**

Pay Item *	Item Name and Description	Units
M220P1	Formation Grading	km
M220P1.1	Grade only Grading of existing formation (including table drain) using a grader to remove surface defects. The unit of measure is the length of road (km) accurate to nearest 0.1 km.	Claim length of road graded
M220P1.2	Formation Grading - Grade and roll Grading of existing formation (including table drain) using a grader to remove surface defects. Incorporation of material won on site to restore levels or fill surface defects. Achieve specified compaction using rollers and relying on adequate moisture content in the material. The unit of measure is the length of road (km) accurate to nearest 0.1 km.	km
M220P1.3	Formation Grading - Grade, water and roll Grading of existing formation (including table drain) using a grader to remove surface defects. Incorporation of material won on site to restore levels or fill surface defects. Achieve specified compaction using rollers with application of water to the material to achieve required moisture content. The unit of measure is the length of road (km) accurate to nearest 0.1 km.	km
M220P2	Formation Resheeting - Grade, water and roll Grading of existing formation (including table drain) using a grader to remove surface defects. Incorporation of new granular material and material won on site to restore levels or fill surface defects. Achieve specified compaction using rollers with application of water to the material to achieve required moisture content. The unit of measure is the length of road (km) accurate to nearest 0.1 km.	km Claim length of road treated.
M220P3	Supply, haul and incorporate granular material Supply, haulage and incorporation of new granular material used to restore levels or surface quality of the formation or shoulder. Compacted volume may be derived from loose volume recorded on haulage docket using an agreed conversion factor. Note that excess material or non-conforming material must NOT be included in the calculation.	m³ Claim compacted volume
M220P4	Formation Earthworks (use Specification TfNSW R44)	m³
M220P5	Initial Sealing (use appropriate R series specification eg TfNSW R106)	m²
M220P6	Establishment – Formation Grading Note: It is taken that you have included all the following in tendering your establishment rate - no further payment will be made for them: <ul style="list-style-type: none"> • Plant float to/from the site or project; • Set up and removal of site facilities (eg: office, sheds, toilets); Principals facilities (if required, • Initial travel to site or project; • Daily travel to/from site or project; • Accommodation (eg: on site or motel/hotel). 	Item Establishment is paid once per Work Order.

Pay Item *	Item Name and Description	Units
	<p>* Pay Items are primarily for guidance in preparing Work Orders (which can be Lump Sum or Schedule of Rates).</p> <p>When preparing a Work Order, any or all of the Pay Items may be incorporated: the aim is to improve the accuracy of the Service Provider’s estimation and pricing by:</p> <ul style="list-style-type: none">a) selecting those Pay Items which denote the activities that are to be undertaken andb) requiring the Service Provider to estimate and price each Pay Item individually. <p>When Establishment is a significant cost, the Pay Item specific to it must be incorporated in the Work Order – the cost must not be amortised / absorbed across the other Pay Items.</p> <p>Similarly, when Traffic Control is a significant cost, its Pay Item(s) must be incorporated. See Specification TfNSW G10M for a list of these.</p>	

ANNEXURE M220/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS

C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS

Reference	Type	Process Held or Witnessed
Clause 2.1.2	HOLD	Commencement of Work
Clause 2.2.4	WITNESS	WORK TRIAL
Clause 3.2.5	HOLD	Use of a new, additional or changed material source
Clause 3.3.3	HOLD	Preparation or use of stockpile site proposed by You.
Clause 3.3.5	HOLD	Supply of material from a stockpile
Clause 4.1.2	HOLD	Construction of pavement when a WORK TRIAL has been specified.
Clause 4.3.3	HOLD	Addition of material or rolling where the moisture content of the material is less than the TARGET MOISTURE CONTENT ENVELOPE for the material and water is not permitted in Annexure M220/A.1.
Clause 4.6.5	HOLD	Repair of a TABLE DRAIN that cannot comply with Table 4.

C2 SCHEDULE OF IDENTIFIED RECORDS

Reference	Description of Identified Record
Clause 2.1	PROJECT QUALITY PLAN
Clause 2.2	Test results of a WORK TRIAL
Clause 3.2	Source and quantity of new material
Clause 5	Test records

ANNEXURE M220/D – PLANNING DOCUMENTS**D1 INFORMATION TO BE INCLUDED IN THE PROJECT QUALITY PLAN**

The information to be supplied in the PROJECT QUALITY PLAN must include, but not be limited to the following:

Reference	Process	Details
Clause 2.1	Stopping Work	Contingency plan for ceasing operations in the event of inclement weather.
Clause 3.2	Method of blending materials	To achieve consistent material quality.
Clause 3.2	Delivery of new material	Method of prevent segregation and loss of fines.
Clause 3.3	Stockpile management	Methods to ensure environmental control and other requirements are achieved and stockpile restored.
Clause 4.1	Setting out and measurement	Methods for setting out, process control and calculation of quantities.
Clause 4.2	Trimming	Method and equipment for trimming.
Clause 4.3	Assessment unsuitable areas	Method to assess the suitability of the foundation after removal of surface material.
Clause 4.3 to 4.5	Place, Spread, Shape and Roll	Method and equipment for the removal of existing material, adding material, moisture control, rolling and trimming.
Clause 5	Sampling and testing	Selection and setting out of random sampling points.
Clause 5.1	Sample the material at the point of delivery and after any mixing insitu	Method to sample the material on site.
Clause 5.2	Conformity of moisture content	Method to assess moisture content is within the Target Moisture Content Envelope.

ANNEXURES M220/E TO M220/L – (NOT USED)

**ANNEXURE M220/M – REFERENCED DOCUMENTS AND
DEFINITIONS**

M1 REFERENCED DOCUMENTS

M1.1 TfNSW Specifications

TfNSW G10M	Traffic Management (Maintenance Works)
TfNSW G36	Environmental Protection
TfNSW Q	Quality Management System
TfNSW M1	General Network Management Requirements
TfNSW M3	Routine Services
TfNSW R44	Earthworks
TfNSW R106	Sprayed Bituminous Surfacing (with Cutback Bitumen)

M1.2 TfNSW Test Methods

TfNSW T102	Pretreatment of Samples of Road Materials by Compaction.
TfNSW T103	Pretreatment of Road Materials by Artificial Weathering.
TfNSW T106	Coarse Particle Distribution in Road Materials
TfNSW T108	Liquid Limit of Road Materials
TfNSW T109	Plastic Limit and Plasticity Index of Road Materials.
TfNSW T114	Maximum Dry Compressive Strength of Road Materials
TfNSW T120	Determination of Moisture Content of Road Materials (Standard Method).
TfNSW T121	Determination of Moisture Content of Road Materials (Sand Bath or Hot Plate Method)
TfNSW T171	Modified Texas Triaxial Compression Test for Disturbed Soils, Soil Aggregates and Crushed Rock
TfNSW T180	Determination of Moisture Content of Road Materials (Microwave Oven Method).
TfNSW T198	Proof Rolling
TfNSW T215	Wet/Dry Strength Variation
TfNSW T276	Foreign Materials Content of Recycled Crushed Concrete

M2 DEFINITIONS

CERTIFIED STOCKPILE	A stockpile that has been previously tested and demonstrated to comply with material requirements.
LOT	A Lot is defined in this Specification as one day's work.
PROJECT QUALITY PLAN	Refer to Clause 2.1.

RECYCLED MATERIAL	Material that is derived from sources other than quarrying or mining (e.g. slag aggregate, crushed concrete, crushed brick and reclaimed asphalt pavement).
TABLE DRAIN	Open drainage system that runs along the edge of road parallel with the road centreline.
TARGET MOISTURE CONTENT ENVELOPE	For each material as a range from a minimum to a maximum percentage of the optimum moisture content to achieve the required compaction - refer to Clause 3.1.
WORK TRIAL	Refer to Clause 2.2.

LAST PAGE