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# CHRISTCHURCH CITY COUNCIL

## CONSTRUCTION STANDARD SPECIFICATION

### PART 6 – ROADS

#### CSS: PART 6 2019

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**APPENDICES**

- 1 Compliance Requirements Checksheet
- 2 Coloured Road Surfacing Record Sheet

**STANDARD DETAILS**

Kerbs and Channels	SD 601	Kerb & Flat Channel and Interpath Channel
	SD 602	Low Profile Kerb & Flat Channel, Kerb Only and Kerb & Nib
	SD 603	Mountable Median Kerb & Flat Channel, Mountable Median & Low Mountable Kerb
	SD 604	Hillside Channel
	SD 605	Kerb Entry
Paths	SD 606/1	Vehicle Crossing and Typical Footpath Geometry
	SD 606/2	Commercial Vehicle Crossing
	SD 607	Asphaltic Concrete Footpath and Vehicle Crossing Construction
	SD 608	Concrete Footpath and Vehicle Crossing Construction
	SD 609	Gritted Footpath Construction
	SD 627	Traffic Signal Pole Relative to Kerb Cutdown
Vehicle Crossings	SD 611	Vehicle Crossings (Cutdown Kerb)
	SD 612	Dish Channel Vehicle Crossings
	SD 613	Pedestrian and Cycleway Cutdown
	SD 614	Bus Bay
	SD 615	Swale Residential Vehicle Crossing Construction
	SD 616	Piped Residential Vehicle Crossing Over Existing Swale
	SD 617	Open Graded Porous Asphalt (OGPA) at Kerb Crossings
Miscellaneous	SD 621	Pedestrian Safety Fence
	SD 622	Low Retaining Wall
	SD 623	Camber Table
	SD 624	Cycle Stands

	SD 625	Typical Road Reconstruction Cross Section
	SD 626	Wheel Stop
Feature Surfacing	SD 631	Road Hump Details
	SD 633	Cobblestone Edge Treatments
	SD 634	Interlocking Concrete Block Edge Treatments
Islands	SD 635/1	Mid Block Pedestrian Island
	SD 635/2	Mid Block Pedestrian Island Details
	SD 636-638	Details combined into SD 635 Revision 3.0
Roadmarking	SD 641	Typical Road Hump and Platform Roadmarking
	SD 643	Detail deleted Revision 10
	SD 644	Typical Bus Stop Road Markings
Cycle/Pedestrian Markings		
	SD 642	detail moved to SD 661 Revision 3.0
	SD 650	Cycle Lane at Intersections with Edge Lines
	SD 651-657	details deleted Revision 7.0
	SD 658	detail moved to SD 661 Revision 3.0
	SD 659	Typical Pedestrian Crossing Road Markings
	SD 661	Pedestrian and Cycle Symbols
	SD 663	Cycle Lane Symbols
Signs	SD 645	Roundabout Chevron/Name Board
	SD 646	Detail deleted Revision 10
	SD 647	Post Standard Installation Detail
	SD 648	Safe Routes to School Recommended Crossing Points Signage
	SD 649	Width Marker and Hazard Marker
	SD 660	Cycle Giveaway and Supplementary Sign
	SD 662	Street Name Blades
	SD 664	Kerb Top Markers

## 1.0 FOREWORD

This Specification forms Part 6 of the Christchurch City Council Civil Engineering Construction Standard Specification (abbreviated as CSS). All parts of the CSS should be read in conjunction with each other and the Infrastructure Design Standards (abbreviated as IDS).

The full Specification includes the most recently published versions of the following Parts:

- CSS: Part 1 - General
- CSS: Part 2 - Earthworks
- CSS: Part 3 - Utility Drainage
- CSS: Part 4 - Water Supply
- CSS: Part 5 - Lights
- CSS: Part 6 - Roads
- CSS: Part 7 - Landscapes

Part 6 of the Standard Specification includes those Standard Details (SD) relating to this part only. The Standard Details (SD) are not to scale and all units are in millimetres (mm) unless otherwise shown. All rights reserved on Standard Details.

## 2.0 RELATED DOCUMENTS

The latest versions of the following documents shall be read and form part of this standard specification, together with revisions, replacements and amendments up to the date of calling tenders. The requirements of this specification supersede the requirements of any related documents listed or referred to within this specification, except acts of parliament. Where this document is referred to in a contract, the requirements of that contract supersede the requirements of this specification.

Christchurch City Council Infrastructure Design Standards 2018

<https://www.ccc.govt.nz/consents-and-licences/construction-requirements/infrastructure-design-standards/download-the-ids/>

NZS 3109: 1997	Concrete construction
NZS 3114: 1987	Specification for concrete surface finishes
NZS 3116: 2002	Concrete segmental paving
NZS 4407: 2015	Methods of sampling and testing road aggregates
AS/NZS 4586: 2004	Slip resistance classification of new pedestrian surface materials

- AS/NZS 4455.2: 2010 Masonry units, pavers, flags and segmental retaining wall units – Pavers and flags
- AS/NZS 4456: 2003 Masonry units, segmental pavers and flags - Methods of test
- AS/NZS ISO 9001: 2008 Quality management systems – Requirements
- CCANZ IB67 1988 Interlocking Concrete Block Road Pavements  
<http://www.ccanz.org.nz/files/documents/a20d7e5d-b998-4397-b2ca-4e9aacfa5516/IB%2068.pdf>
- CCANZ IB68 1995 Construction of Concrete Block Paving  
<http://www.ccanz.org.nz/files/documents/a20d7e5d-b998-4397-b2ca-4e9aacfa5516/IB%2068.pdf>
- Transit New Zealand Manual of Traffic Signs and Markings (MoTSA M)
- NZTA Traffic Control Devices Manual  
<https://www.nzta.govt.nz/resources/traffic-control-devices-manual/>
- Transit New Zealand Standard Specifications
- Austrroads Guide to Pavement Technology - Part 2: Pavement Structural Design 2012
- New Zealand Supplement to the 2007 Austrroads Pavement Design Guide
- Roading New Zealand Specification for Slurry Surfacing RNZ 9806: June 2010
- Circly Pavement design software
- Transport Research Laboratory Note 27 Instruction for Using Portable Skid Resistance Tester
- NZTA Roads and Traffic Standards 14 - Guidelines for Facilities for Blind and Vision-Impaired Pedestrians (2007)
- Road Safety Manufacturers Association Compliance Standard For Traffic Signs (2010) [http://rsma.traffitech.nz/rsma\\_standard/](http://rsma.traffitech.nz/rsma_standard/)
- NZTA P33: 2017 Specification for Coloured Surfacing  
<https://www.nzta.govt.nz/assets/resources/specification-for-coloured-surfacing-p33/NZTA-P33-Coloured-surfacing-May-2017.pdf>

### **3.0 APPROVAL OF MATERIALS, OPERATORS/CONTRACTORS, LABORATORIES AND WORKMANSHIP**

‘Approved’ in this document means:

- A material listed on the Approved Materials List, with a current Certificate Status and an Approval Status permitting that use;

- A Council-approved contractor authorised to do that specific work and listed on the relevant register;
- approved by the Engineer.

Schedules of approved materials and contractors can be found on the Christchurch City Council web page at:

<http://www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-materials-list/>

<http://www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-contractors/>

Selected materials are specified in CSS: Part 1 - General. CCC SAP20 shall not be used within the carriageway. NZTA M/4:AP20 shall not be used within the carriageway except as a running course in accordance with NZTA B/2.

Approved testing laboratories are IANZ accredited to carry out the particular test being requested.

## **4.0 CONCRETE KERBS AND CHANNELS, MEDIAN KERBS ETC**

### **4.1 Scope of Work**

This specification is for the construction of concrete kerbs and channels. Refer to standard details SD 601-606, SD 611-614 or plans for dimensions.

### **4.2 Excavation and Foundations**

*Existing surfaces shall be sawcut at the limits of excavation if they are not to be reconstructed following the construction of the concrete kerbs and channels etc. Existing kerbs to remain shall be sawcut to 50mm depth on all exposed faces.*

*Set out pegs shall not be damaged or disturbed.*

*Foundations shall be hard, unyielding, free from debris and of uniform bearing. Unsuitable foundation material shall be removed to meet design requirements. Filling shall be compacted to a minimum dry density of 2,100 kg/m<sup>3</sup> and 75% of readings shall equal or exceed 2,150 kg/m<sup>3</sup>.*

*No tolerance on the subgrade level that reduces the depth of the concrete kerb and channel etc will be allowed.*

The Engineer will require the Contractor to confirm that the subgrade achieves the design CBR prior to pouring of concrete.

#### **4.3 Concrete Construction**

*All concrete and work shall comply with CSS: Part 3 clause 12.0 - Structures, unless specified below. In-situ concrete strength shall be at least 20 MPa at 28 days. Cast in-situ concrete shall have a slump of 75mm.*

*All concrete shall be compacted in place.*

*Contraction joints shall be formed at the interface between the existing and new kerb and channel.*

*Concrete finish shall conform to Class U3 of NZS 3114 “Specification for concrete surface finishes”, and all concrete shall be a uniform colour. This includes repairs to damaged concrete and concrete core holes.*

#### **4.4 Contraction Joints**

*Contraction joints shall be installed in new kerbs and channels at approximately 5m spacings with a maximum of 6m.*

*Contraction joints shall be guillotined a minimum depth of 50mm on all exposed faces and on the front face of the channel. The vertical surfaces of the kerb and channel shall not be deformed i.e. the moulded kerb profile shall not alter. The joints shall be left exposed without any slurry trowelled over them.*

*Joints shall be formed each side of a cut down at the thinnest point and on one side of stormwater outlet pipes where the pipe surround is poured continuously with the kerb (on the edge of the pipe).*

#### **4.5 Acceptance Criteria**

*Kerb and channel dimensions shall comply with the specified dimensions with a tolerance of  $\pm 5\text{mm}$ .*

*Channels with a design gradient of 1 in 500 or steeper shall not pond water. The finished level shall be within  $\pm 5\text{mm}$  of design.*

*The line of the kerb shall be straight between tangent points and shall sweep around curves without kinks, flats, or angles in a smooth arc. The maximum deviation from a 3m straight-edge laid along the kerb face shall be 5mm with a cumulative total of all visible gaps of not more than 10mm. The position of the kerbs and channels etc shall be within 10mm of design.*

#### **4.6 Stormwater Outlets to Kerb and Channel**

*Only approved kerb entry adaptors shall be used.*

*Stormwater outlets through the kerb shall be provided at all existing property drains and where ordered by the Engineer, except where the pipe is directed to the underchannel pipe.*

*The kerb entry adaptor shall be installed in conjunction with the pouring of the kerb and channel. The invert of the adaptor shall be level with invert of channel.*

#### **4.7 Testing**

##### **4.7.1.1.1. Metalcourses under the Kerb and Channel**

Densities shall be measured by Nuclear Densometer.

##### **4.7.1.1.2. Kerb and Channel**

Cores shall be taken at a minimum of 1 (one) core at every 50 metre centres. The cores shall be greater than 90mm in diameter and shall be tested for compressive strength by an approved laboratory. The cores shall be clearly marked to identify the contract site and core location. The coring and testing shall be in accordance with NZS 3109 “Concrete construction”.

For machine laid kerb and channel each core shall be assumed to represent the truckload of concrete for that pour.

A copy of the test results shall be sent directly to the Engineer from the testing laboratory.

#### **4.8 Measurement of Works and Basis of Payment**

##### **4.8.1.1.1. Breakout and Disposal**

Payment for breakout and disposal of existing kerb and channel, culvert crossings, sumps and stormwater pipes shall be by lump sum to the limits shown on the plans. The rate shall include excavation, disposal and the recovery of reusable items, where specified.

##### **4.8.1.1.2. Sawcutting**

Saw cutting along the edge of the excavation when the existing path and/or carriageway is not to be reconstructed, shall be per metre, to the nearest 0.2m. Rates are provided for depths in increments of 50mm.

Excavation beyond the limits prescribed shall be made good at the Contractor’s expense.

4.8.1.1.3. Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal.

Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

4.8.1.1.4. Filling

Filling of the excavated unsuitable foundation shall be paid per m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, and shall include for the supply, transport, placing, compaction and trimming of the material.

Measurement of fill shall be by measuring the excavation or by using the agreed dimensions.

4.8.1.1.5. Kerb and Channel

Kerb and channel shall be paid per lineal metre, to the nearest 0.2m. Kerbs and channels shall be measured along the face of the kerb and shall be measured continuously, without deduction at sumps or vehicle crossings (pedestrian, residential or commercial).

Kerb and channel shall include excavation and disposal of spoil, metalcourses under the kerb and channel and their testing, filling behind the kerb, formwork, pumping, contraction joints and curing.

This rate shall also include sweeping the kerb and channel at six weekly intervals over the Defects Liability period.

Backfilling behind the kerb shall be to the subgrade of the proposed path, berm or landscaped area, or if mating in to an existing path, berm or landscaped area, to the existing levels.

4.8.1.1.6. Extra Concrete Base and Reinforcement

Extra concrete base shall be paid per lineal metre, to the nearest 0.2m and shall include excavation and disposal of spoil, formwork, concrete and reinforcing, if ordered.

4.8.1.1.7. Vehicle (Residential and Commercial) and Pedestrian Cutdowns

Vehicle cutdowns shall be paid per lineal metre, to the nearest 0.2m. The rate is extra over the rate for kerb and channel and shall include all costs in forming the cutdowns in the kerbs and in finishing.

4.8.1.1.8. Commercial Crossing Beams

Commercial crossing beams shall be paid per lineal metre, to the nearest 0.2m. The rate shall include all work including excavation and disposal of spoil, formwork, reinforcing, concrete.

4.8.1.1.9. Stormwater Outlets

Payment shall be for the number installed and the rate shall include all work involved including the supply of the kerb entry adaptor.

4.8.1.1.10. Testing

Testing of foundation metals is included in the rate for kerbs and channels.

Payment for testing of concrete cores shall be included in the rate for kerb and channel.

## **5.0 KERB AND CHANNEL REPAIRS**

### **5.1 Scope of Work**

This specification is for repairs to existing kerbs and channels or kerbs including vehicle and pedestrian crossings and stormwater outlets.

### **5.2 Materials**

*All concrete and formwork shall comply with clause 4.0 - Concrete Kerbs and Channels, Median Kerbs etc. All asphaltic concrete used to reinstate paths and carriageways adjacent to the repairs shall comply with clause 6.0 - Asphaltic Concrete Paths, Vehicle Crossings and Cycleways. All concrete used to reinstate paths adjacent to the repairs shall comply with clause 7.0 - Concrete Paths and Vehicle Crossings.*

### **5.3 Excavation and Foundations**

*Areas to be repaired shall be as defined by the specification or marked on the site by the Engineer. All edges, including concrete, shall be sawcut prior to excavation. Sawcut concrete shall have a good bond with the new concrete.*

*All NZTA M/4:AP40 or CCC SAP40 backfill used in the reinstatement shall be compacted to the following minimum Clegg Impact Values: footpaths and residential crossings - 25, commercial crossings and carriageways - 35.*

### **5.4 Kerb and Channel or Kerb Only Repairs**

*Repaired kerb and channel shall be constructed to an even grade between the existing kerb and channel, or to the levels provided. Repaired kerb and channel lengths greater than 10m shall be poured using a kerb machine. Repaired channel areas and reinstated sealed areas shall nowhere hold water. The finished profile of the repaired concrete shall match the existing kerb and channel.*

Reinstatement of adjacent sealed areas in: carriageways shall consist of NZTA M/4:AP40 and NZTA M/10: AC14 or AC20; commercial crossings shall consist of NZTA M/4:AP40 and NZTA M/10:AC10; footpaths and residential crossings shall consist of NZTA M/4:AP40 and NZTA M/10:DG10. Reinstatement of adjacent interlocking concrete block pavers, berm or landscape areas shall consist of materials and finish to match the existing construction in accordance with the requirements for that particular type of work.

### **5.5 Installation of Vehicle and Pedestrian Crossings in Existing Kerb and Flat Channel**

*All work shall comply with SD 611 or SD 613. Construction on the footpath side of the vehicle or pedestrian crossing shall be in accordance with SD 607 or SD 608 and shall comply with clause 6.0 - Asphaltic Concrete Paths, Vehicle Crossings and Cycleways or clause 7.0 - Concrete Paths and Vehicle Crossings. Reinstatement on the carriageway side of commercial crossings shall consist of NZTA M/4:AP40 and NZTA M/10: AC14 or AC20 and shall not extend more than 300mm into the carriageway.*

*The cut down channel shall be constructed to an even grade between the existing kerb and channel. The crossing or the reinstatement shall not hold water at any point.*

### **5.6 Installation of Vehicle and Pedestrian Crossings in Kerb and Dish Channel**

*All work shall comply with SD 612. Construction on the footpath side shall be in accordance with SD 607.*

*An asphaltic concrete ramp shall be constructed on the carriageway side. This ramp shall give a smooth transition through the crossing and shall not cause vehicles to scrape. It shall also give a smooth transition along the carriageway. The ramp shall not extend into any traffic lane without the Engineer's approval.*

*The flow of stormwater in the channel shall not be inhibited.*

### **5.7 Removal of Existing Dish Channel Crossings**

*Crossing blocks shall be removed without damage to the existing kerb and dish channel and all surplus material shall be cleaned from the existing kerb and dish channel.*

*The existing ramp shall be removed and reinstated to typical carriageway levels with 50mm of NZTA M/10: AC14. Edges shall be sawcut prior to the removal of the existing ramp.*

### **5.8 Reinstatement of Cutdown Kerb to Full Height Kerb**

*The kerb portion shall be removed in accordance with SD 611. The finished profile of the repaired concrete shall match the existing kerb.*

*Reinstatement of the footpath shall be in accordance with SD 607 or SD 608 and shall comply with clause 6.0 - Asphaltic Concrete Paths, Vehicle Crossings and Cycleways or clause 7.0 - Concrete Paths and Vehicle Crossings. Reinstatement of the interlocking concrete block paving shall match the existing construction and be in accordance with clause 10 - Interlocking Concrete Block, Cobblestone Paving and Tactile Pavers. Reinstatement of the berm or landscape areas shall match the existing construction and be in accordance with CSS: Part 2 - Earthworks and CSS: Part 7 - Landscapes.*

### **5.9 Installation of New Stormwater Outlets in Existing Kerbs**

*Only approved kerb entry adaptors shall be used. The kerb entry adaptor shall be mortared in place and the concrete cover shall match that over existing outlets.*

*The pipe between the kerb entry and the road boundary shall comply with CSS: Part 3 – Utility Drainage.*

*All paths, berms and landscape areas shall be reinstated to the relevant requirements of this specification.*

### **5.10 Repairs to Existing Stormwater Outlets Through the Kerb**

*A clear path for stormwater shall be provided to the channel.*

*Only approved kerb entry adaptors shall be used. The kerb entry adaptor shall be mortared in place and the concrete cover shall match that over existing outlets. The line of the repair shall match the existing kerb face and top.*

### **5.11 Measurement of Work and Basis of Payment**

#### **5.11.1.1.1. Kerb and Channel or Kerb Only Repairs**

Kerb only or kerb and channel repairs shall be per metre to the nearest 0.2m. The measurement shall be taken along the face of the kerb and shall be taken right through, without deduction at sumps.

The rate shall include sawcutting, breaking out and disposal, bonding of concrete where sawcut, metalcourses, construction of the new kerb or kerb and channel and reinstatement in front of and behind the kerb.

#### **5.11.1.1.2. Crossings in Existing Kerb and Flat Channel**

Pedestrian and residential vehicle crossings shall be paid per metre to the nearest 0.2m.

Payment for commercial crossings shall be per metre to the nearest 0.2m of reinforced concrete beam installed.

The rate shall include sawcutting, breaking out and disposal, metalcourses, bonding of concrete where sawcut, construction of new cutdown (including reinforced concrete beam in commercial crossings) and reinstatement of the carriageway.

The construction of the footpath or crossing is paid as defined in clause 9.0 – Repairs and Resurfacing of Footpaths, Vehicle Crossings and Cycleways.

5.11.1.1.3. Residential Vehicle and Pedestrian Crossings in Kerb and Dish Channel

Crossings shall be per metre installed, in increments of 0.5m.

Crossings shall include the supply, and installation of kerb blocks and the asphaltic concrete ramp. The rate shall allow for a ramp up to 1m wide over the length of the crossing. Approved ramps wider than 1m shall be paid as a variation.

The construction of the footpath or crossing is paid as defined in clause 9.0 – Repairs and Resurfacing of Footpaths, Vehicle Crossings and Cycleways.

5.11.1.1.4. Commercial Vehicle Crossings in Kerb and Dish Channel

Payment shall be per metre to the nearest 0.2m.

The rate shall include sawcutting, breaking out and disposal of all surplus material, metalcourses, bonding of concrete where sawcut, construction of the new crossing including the PVC pipe and reinforcement and reinstatement on the carriageway side including the AC ramp.

The construction of the crossing is paid as defined in clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways.

5.11.1.1.5. Removal of Existing Dish Channel Crossing

Removal shall be per metre, to the nearest 0.2m and the rate shall include the removal of the ramp and the reinstatement of the shoulder. The rate shall allow for a maximum reinstatement width of 1.5m. Widths greater than this shall be paid as a variation.

The construction of the grass berm is paid as defined in CSS: Part 7 - Landscapes.

5.11.1.1.6. Reinstatement of Cutdown Kerb to Full Height Kerb

Reinstatement shall be per metre, to the nearest 0.2m and the rate shall include sawcutting the kerb.

The construction of the footpath is paid as defined in clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways. The construction of the grass berm is paid as defined in CSS: Part 7 - Landscapes.

5.11.1.1.7. Installation of New Stormwater Outlets in Existing Kerbs

Kerb entry adaptors shall be paid for the number installed. The rate shall include sawcutting, bonding of sawcut concrete, the supply and installation of the kerb entry adaptor and the reinstatement of the kerb.

The installation of the pipe between the kerb entry adaptor and the boundary shall be paid per metre. The rate shall include sawcutting, the supply and installation of the pipe, backfilling and reinstatement of the path and/or berm.

5.11.1.1.8. Repairs to Existing Stormwater Outlets Through the Kerb

Payment shall be for the actual number repaired. The rate shall include sawcutting, bonding of sawcut concrete, the supply and installation of the kerb entry adaptor, reinstatement of the kerb and footpath or grass berm and cleaning the pipe.

## **6.0 ASPHALTIC CONCRETE PATHS, VEHICLE CROSSINGS AND CYCLEWAYS**

### ***6.1 Scope of Work***

This specification is for the construction of asphaltic concrete paths, vehicle crossings and cycleways, as detailed on the standard drawings.

Refer to standard details SD 606-607 or plans for dimensions.

### ***6.2 Excavation and Foundations***

*Existing paths, driveways and cycleways shall be sawcut at the limits of work.*

*Foundations shall be hard, unyielding, free from debris and of uniform bearing. Unsuitable foundation material shall be removed to meet design requirements.*

*No tolerance on the subgrade level that reduces the depth of construction will be allowed.*

The Engineer will require the Contractor to confirm that the subgrade achieves the design CBR prior to the placing of the metalcourses.

### **6.3 Battens**

*Battens and pegs shall comply with SD 607.*

*The finished level of the battens shall be  $\pm 10\text{mm}$  of design provided the path crossfall is in the designed direction. The position of the batten shall be  $\pm 10\text{mm}$  of design. Pegs shall be at least 5mm below the finished batten level.*

*The line of the batten shall be straight between tangent points with the maximum deviation from a 3m straight-edge laid along the batten face of 5mm with a cumulative total of all visible gaps of not more than 15mm and shall sweep around curves without kinks, flats, or angles in a smooth arc.*

*Battens shall be installed perpendicular to the kerb for at least a 300mm length.*

### **6.4 Weed Control**

*Subgrade and metalcourse shall be treated with a soil sterilant containing dichlobenil, e.g. Prefix-D, to prevent re-growth of weeds for a period of 12 months.*

### **6.5 Metalcourse**

*Materials shall comply with CSS: Part 1 - General.*

*The compacted surface shall be finished not less than 15mm (25mm for commercial crossings) below the top of batten and not less than 15mm (25mm for commercial crossings) below the top of kerb and at no other point less than 20mm (30mm for commercial crossings) below the finished level.*

*The gap under a 3m straight-edge placed in any direction shall not exceed 10mm with a cumulative total of all visible gaps of not more than 25mm.*

*At no point on the surface shall the Clegg Impact Value be less than 25 for footpaths and residential crossings, and 35 for commercial vehicle crossings.*

Compaction may be measured by Clegg hammer or other approved impact device. These devices shall be calibrated at 12-month intervals.

### **6.6 Tack coat**

*Prior to the application of the tack coat the surface of the compacted metalcourse shall be free of surface water, clean, free from dust, sand, grit, or any other material that could impair the adhesion of the asphaltic concrete.*

*The tack coat shall be a bitumen emulsion complying with NZTA M/1 and shall be applied uniformly over entire surface at a minimum application rate of 0.25 l/m<sup>2</sup>. There shall be no overspray.*

#### **6.7 Asphaltic Concrete**

*Asphaltic concrete shall comply with CSS: Part 1 - General. It shall be uniform and dense in texture and shall have air voids not less than 2.5% and not more than 11.0% when laid and compacted.*

All tests should achieve these criteria. However, if there are suitable construction records confirmed or audited by the Engineer that prove a better result is not achievable, the work will be accepted as meeting the performance criteria.

*The compacted depth of the mix shall be not less than 20mm for footpaths, residential vehicle crossings and cycleways and not less than 30mm for commercial vehicle crossings. No tolerance that reduces these depths will be accepted.*

*All construction joints shall be at right angles to the kerb or batten and shall be butt jointed and tack coated.*

#### **6.8 Acceptance Criteria**

*The finished surface shall be 5mm above kerbs, pavement edge treatments and battens and shall nowhere hold water. The gap under a 3m straight-edge placed longitudinally shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm for cycleways and 20mm otherwise and the gap under a 1m straight-edge placed transversely shall not exceed 5mm with a cumulative total of all visible gaps of not more than 7mm for cycleways and 10mm otherwise.*

*If requested, the Contractor shall supply weighbridge docket, or verifiable summary, which show the date and time loaded, contract number, mix type, temperature and net weight and truck identification.*

#### **6.9 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **6.10 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of clause 25.0 - Traffic Signs.*

### **6.11 Completion**

*The site shall be clean and tidy on completion of work with all surplus material removed.*

### **6.12 Measurement of Work and Basis of Payment**

#### **6.12.1.1.1. Path Construction**

Paths shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include sawcutting, excavation and disposal of spoil, battens, weed control, metalcourses, tack coat, asphaltic concrete and adjustment of surface boxes not scheduled separately.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

#### **6.12.1.1.2. Vehicle Crossing Construction (residential and commercial)**

Vehicle crossings shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include excavation and disposal of spoil, battens, weed control, metalcourses, tack coat, asphaltic concrete and adjustment of surface boxes not scheduled separately.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

#### **6.12.1.1.3. Cycleway Construction**

Cycleway crossings shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include excavation and disposal of spoil, battens, weed control, metalcourses, tack coat, asphaltic concrete and adjustment of surface boxes not scheduled separately.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

#### **6.12.1.1.4. Bituminous Material Removal**

The scarification and removal of bituminous material shall be paid per m<sup>3</sup>, to the nearest m<sup>3</sup>, and shall include removal of seal and disposal of spoil.

#### **6.12.1.1.5. Unsuitable Foundations**

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal.

Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

6.12.1.1.6. Filling

Filling of the excavated unsuitable foundation shall be paid per m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, and shall include for the supply, transport, placing, compaction and trimming of the material.

Measurement of fill shall be determined from the volume of unsuitable foundations being filled.

6.12.1.1.7. Surface Boxes

The adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings, and traffic signal loop toby boxes shall be included in the rate for path, vehicle crossing or cycleway construction.

Payment for the adjustment of stormwater and sewerage manhole tops shall allow for all work involved.

6.12.1.1.8. Traffic Signs

Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.

## **7.0 CONCRETE PATHS AND VEHICLE CROSSINGS**

### ***7.1 Scope of Work***

This specification is for the construction of concrete paths and residential vehicle crossings, as detailed on the standard drawings.

Refer to standard details SD 608 or plans for dimensions.

### ***7.2 Excavation and Foundations***

*Existing paths and driveways shall be sawcut at the limits of work.*

*Foundations shall be hard, unyielding, free from debris and of uniform bearing. Unsuitable foundation material shall be removed to meet design requirements.*

*Materials shall comply with CSS: Part 1 - General.*

*No tolerance on the subgrade level that reduces the depth of construction will be allowed.*

The Engineer will require the Contractor to confirm that the subgrade achieves the design CBR prior to the placing of the metalcourses.

### **7.3 Formwork**

*Formwork shall comply with the requirements of NZS 3109 “Concrete construction” as amplified below.*

*The finished level of the formwork shall be within  $\pm 10\text{mm}$  of design provided the path crossfall is in the designed direction. The position of the formwork shall be within 10mm of design.*

*The line of the formwork shall be straight between tangent points with the maximum deviation from a 3m straight-edge laid along the face of 5mm with a cumulative total of all visible gaps of not more than 10mm and shall sweep curves around without kinks, flats, or angles in a smooth arc.*

*All formwork shall be removed before backfilling.*

### **7.4 Concrete Materials**

*Unless otherwise specified, concrete shall be Normal Grade ready mixed concrete, with a slump of 50mm and an in-situ concrete strength of at least 20 MPa at 28 days. The maximum size of coarse aggregate shall be 20mm except when otherwise specified.*

*Commercial crossing materials shall be as specified.*

### **7.5 Concrete Construction**

*Concrete construction shall be in accordance with NZS 3109 “Concrete construction”. The concrete finish shall be U5 in accordance with NZS 3114 “Specification for concrete surface finishes” and shall be constructed with the path crossfall.*

*Concrete depth shall be not less than 100mm for footpaths and 150mm for residential vehicle crossings. No tolerance that reduces these depths will be accepted.*

*Contraction joints shall be created within 24 hours of concrete laying. Joints shall be at a maximum of 3m centres and at right angles to the kerb.*

If requested, the Contractor shall supply a certificate showing the strength, slump and mix reference of the concrete and the time at which the concrete was mixed.

### **7.6 Acceptance Criteria**

*The finished surface shall nowhere hold water. The gap under a 3m straight-edge placed longitudinally shall not exceed 5mm with a cumulative total of all visible gaps of not more than 20mm and the gap under a 1m straight-edge placed transversely shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm. The finished surface shall be 5mm above kerbs and pavement edge treatments. All edges shall be chamfered and no sharp edges left exposed. Crack widths shall not exceed 2mm at any point.*

### **7.7 Protection of Pavement**

*Traffic shall be kept off all footpaths, crossings and cycleways until they have achieved a strength of 20 MPa.*

### **7.8 Repairs**

*Any defective concrete shall be replaced by removing and reconstructing the section of path between contraction joints.*

### **7.9 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **7.10 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of clause 25.0 - Traffic Signs.*

### **7.11 Completion**

*Site shall be clean and tidy on completion of work with all surplus material removed.*

### **7.12 Testing**

The Contractor shall supply to the Engineer sufficient information to confirm all other performance criteria have been achieved.

### **7.13 Measurement of Work and Basis of Payment**

#### **7.13.1.1.1. Path Construction**

Paths shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include sawcutting, excavation and disposal of spoil, formwork, metalcourses, concrete and adjustment of surface boxes not scheduled separately.

7.13.1.1.2. Vehicle Crossings

Vehicle crossings shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include for all excavation and disposal of spoil, formwork, metalcourses, concrete and adjustment of surface boxes not scheduled separately.

7.13.1.1.3. Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal.

Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

7.13.1.1.4. Filling

Filling of the excavated unsuitable foundation shall be paid per m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, and shall include for the supply, transport, placing, compaction and trimming of the material.

Measurement of fill shall be determined from the volume of unsuitable foundations being filled.

7.13.1.1.5. Surface Boxes

The adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings, and traffic signal loop toby boxes shall be included in the rate for path or cycleway construction or vehicle crossings.

Payment for the adjustment of stormwater and sewerage manhole tops shall allow for all work involved.

7.13.1.1.6. Traffic Signs

Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.

## **8.0 GRITTED FOOTPATHS**

### ***8.1 Scope of Work***

This specification is for the construction of gravel paths, as detailed on the standard drawings.

Refer to standard details SD 609 or plans for dimensions.

### ***8.2 Excavation and Foundations***

*Foundations shall be hard, unyielding, free from debris and of uniform bearing. Unsuitable foundation material shall be removed to meet design requirements.*

*No tolerance on the subgrade level that reduces the depth of construction will be allowed.*

The Engineer will require the Contractor to gain confirm that the subgrade achieves the design CBR prior to the placing of the metalcourses.

### **8.3 Battens**

*Battens and pegs shall comply with SD 609.*

*The finished level of the battens shall be within  $\pm 10$ mm of design provided the path crossfall is in the designed direction. The position of the batten shall be within 10mm of design. The peg shall be at least 5mm below the finished batten level.*

*The line of the batten shall be straight between tangent points with the maximum deviation from a 3m straight-edge laid along the batten face of 5mm with a cumulative total of all visible gaps of not more than 15mm and shall sweep around curves without kinks, flats, or angles in a smooth arc.*

### **8.4 Weed Control**

*Subgrade and metalcourse shall be treated with a soil sterilant containing dichlobenil, e.g. Prefix-D, to prevent re-growth of weeds for a period of 12 months.*

### **8.5 Metalcourse**

*Materials shall comply with CSS: Part 1 - General.*

*At no point on the surface shall the Clegg Impact Value be less than 25.*

Compaction may be measured by Clegg hammer or other approved impact device. These devices shall be calibrated at 12-month intervals.

### **8.6 Acceptance Criteria**

*The finished surface shall be level with kerbs, pavement edge treatments and battens and shall nowhere hold water at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate.*

*The gap under a 3m straight-edge placed longitudinally shall not exceed 5mm with a cumulative total of all visible gaps of not more than 20mm and the gap under a 1m straight-edge placed transversely shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm. Gaps shall apply at Practical Completion only.*

### **8.7 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **8.8 Completion**

*The site shall be clean and tidy on completion of work with all surplus material removed.*

### **8.9 Measurement of Work and Basis of Payment**

#### **8.9.1.1.1. Path Construction**

Paths shall be paid per m<sup>2</sup> constructed to the nearest m<sup>2</sup>. The rate shall include excavation and disposal of spoil, battens, weed control, metalcourses and adjustment of surface boxes not scheduled separately.

#### **8.9.1.1.2. Unsuitable Foundations**

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal.

Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

#### **8.9.1.1.3. Filling**

Filling of the excavated unsuitable foundation shall be paid per m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, and shall include for the supply, transport, placing, compaction and trimming of the material.

Measurement of fill shall be determined from the volume of unsuitable foundations being filled.

#### **8.9.1.1.4. Surface Boxes**

The adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings, and traffic signal loop toby boxes shall be included in the rate for path, vehicle crossing or cycleway construction.

Payment for the adjustment of stormwater and sewerage manhole tops shall allow for all work involved.

## **9.0 REPAIRS AND RESURFACING OF FOOTPATHS, VEHICLE CROSSINGS AND CYCLEWAYS**

### **9.1 Scope of Work**

This specification is for the repair and resurfacing of asphaltic concrete footpaths, vehicle crossings and cycleways.

### **9.2 Cutting Back Berms to Line Out Path**

*All existing vegetation (i.e. weeds in cracks and grass overgrowing the path edge) in the path area to be resurfaced shall be sprayed with an approved herbicide at least two weeks prior to the cutting back. All dead vegetation, soil etc shall be removed from the path area and disposed of.*

*Berms shall be cut back as close as possible behind the batten line to minimise berm restoration.*

### **9.3 Removal of Lichen**

The Contractor may remove lichen from the surface mechanically or by spraying with a chemical approved by Environment Canterbury for this purpose. Lichen should be removed prior to the application of tack coat and surfacing.

### **9.4 Excavation and Backfilling of Failed Areas and Service Strips**

*Areas to be treated shall be marked by the Engineer.*

*Excavation and backfilling shall be carried out in accordance with clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways. Seal at edges of excavation shall be sawcut and protected from damage.*

*Battens and pegs complying with SD 607 and clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways shall be laid along all edges of the repair where they coincide with the path edge and the path edge is not contained by a concrete kerb or foundation. The batten on the lower edge of the path shall not restrict water runoff.*

*Metalcourse depths shall be 75mm for footpaths and service strips, 125mm for residential vehicle crossings and 275mm for commercial crossings in accordance with SD 607. The compacted basecourse surface shall be finished not less than 20mm (30mm for commercial crossings) below the top of batten, kerb or the finished level.*

*The finished surface shall nowhere hold water and the gap under a 1m straight-edge placed in any direction shall not exceed 10mm with a cumulative total of all visible gaps of not more than 25mm.*

*Compaction shall be measured by Clegg hammer or approved impact device and at no point on the surface shall the Clegg Impact Value be less than 25 for footpaths and residential crossings, and 35 for commercial vehicle crossings.*

#### **9.5 Stormwater Repairs**

*Areas to be treated shall be marked by the Engineer.*

*Edges shall be cut prior to excavation to prevent damage to the existing seal.*

*All pipework shall comply with CSS: Part 3 – Utility Drainage and the pipe shall be cleaned out between the boundary and the kerb at the completion of the work.*

#### **9.6 Removal of Existing Seal Only**

*Seal only shall be removed and disposed of. Edges shall be cut prior to removal of seal to prevent damage to the existing seal.*

#### **9.7 Installation of New Battens in Existing Berms**

*Battens shall comply with SD 607 and clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways. The finished level of the battens shall be set to allow the asphaltic concrete surfacing to be laid in accordance with the requirements of clause 9.8 – Asphaltic Concrete.*

#### **9.8 Asphaltic Concrete**

*Asphaltic concrete shall comply with CSS: Part 1 - General. Asphaltic concrete shall be uniform and dense in texture. All asphaltic concrete shall have air voids not less than 2.5% and not more than 11.0% when laid and compacted.*

All tests should achieve these criteria. However, if there are suitable construction records confirmed or audited by the Engineer that prove a better result is not achievable, the work will be accepted as meeting the performance criteria.

##### **9.8.1.1.1. Asphaltic Concrete Patching (levelling course)**

*Surface and tack coat shall comply with the requirements of clause 9.8.2 – Asphaltic Concrete Surfacing.*

##### **9.8.1.1.2. Asphaltic Concrete Surfacing**

*Tack coat shall be applied in accordance with clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways. If specifically required the surface shall be inspected and approved by the Engineer prior to the application of the tack coat.*

*The nominal compacted depth shall be 15mm with a minimum compacted depth of 10mm over high spots. Over path and residential crossing repair areas the depths*

*shall be 20mm and for commercial crossing areas 30mm. No tolerance that reduces these depths will be accepted.*

*The finished surface shall nowhere hold water. The gap under a 3m straight-edge placed longitudinally shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm for cycleways and 20mm otherwise and the gap under a 1m straight-edge placed transversely shall not exceed 5mm with a cumulative total of all visible gaps of not more than 7mm for cycleways and 10mm otherwise. For new construction, the finished surface shall be -0mm, +5mm above kerbs, pavement edge treatments and battens.*

*All construction joints shall be at right angles to the kerb or batten and shall be butt jointed and tack coated.*

#### 9.8.1.1.3. Additional resurfacing widths

Where the full width of the existing footpath (or crossing) is not being reconstructed, additional resurfacing shall be carried out as follows:

- Where the footpath surface is less than 48 months old, the entire footpath width shall be resurfaced.
- Where the reconstructed width of the footpath exceeds 70% of the footpath width, the entire width shall be resurfaced.
- Where the reconstructed area is within 300 mm of the footpath's support edge or seal joint, this intermediate area shall be included in the resurfacing area.
- Where a trench crosses the footpath from property boundary to kerb in a surface less than 48 months old the resurfaced area shall be a minimum width of 1.0m. In all other cases the resurfacing shall be reinstated to a minimum width of 300 mm.

### **9.9 Weed Control**

*The whole resurfaced footpath area shall not have weed re-growth for a period of 12 months. Only a soil sterilant containing dichlobenil, e.g. Prefix-D, or an herbicide containing glyphosate and metsulfuron, e.g. Roundup, shall be used.*

If weed re-growth occurs within the 12-month period the Contractor shall be responsible for removing the weeds and repairing the damage to the asphaltic concrete surfacing. The repairs must comply with this specification in all respects.

### **9.10 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be*

*adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **9.11 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of clause 25.0 - Traffic Signs.*

### **9.12 Completion**

*Site shall be left clean and tidy on completion of the resurfacing in each street with all surplus material, especially on berms and garden strips removed from the site.*

*All soil required for berm works shall be placed within two weeks of completion of the resurfacing in the street.*

### **9.13 Measurement of Work and Basis of Payment**

#### **9.13.1.1.1. Sawcutting**

Sawcutting shall be paid per lineal metre, to the nearest 0.2m.

#### **9.13.1.1.2. Reconstruction (Repairs)**

Payment shall be made per m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include removal of seal, excavation and disposal of spoil, battens, backfilling and compaction of metalcourse. This rate includes the **extra** depths in the asphaltic concrete surfacing in these areas.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

#### **9.13.1.1.3. Service Strips**

Payment shall be per metre (nominally 300mm wide), to the nearest 0.2m and shall include excavation, disposal of soil, backfilling and compaction of metalcourses. This rate shall include the **extra** depths in the asphaltic concrete surfacing in these areas.

#### **9.13.1.1.4. Reshaping Paths Behind Cutdowns**

Payment shall be made per m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include removal of seal, excavation and disposal of spoil, backfilling and compaction of metalcourse. This rate shall include the **extra** depths in the asphaltic concrete surfacing in these areas.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

9.13.1.1.5. Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal. Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

Filling of the excavated unsuitable foundation area shall be paid for per m<sup>3</sup> solid measure and shall include the supply, placing and compaction of the material.

9.13.1.1.6. Stormwater Repairs

Payment shall be per metre of actual pipe repaired, to the nearest 0.2m and shall include cutting, excavation and disposal of old pipe, supply and installation of new pipe, fittings, backfilling and cleaning of pipe.

9.13.1.1.7. Removal of Existing Seal

Payment shall be by m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include removal of seal and disposal of spoil.

9.13.1.1.8. Battens

Payment shall be per metre of battens installed, to the nearest 0.2m, and shall include all work involved.

9.13.1.1.9. Asphaltic Concrete Patching (levelling course)

Payment shall be by tonne authorised to be laid and shall include sweeping of the surface, tack coating, and the supply, laying and compaction of the asphaltic concrete.

Where the quantity of levelling required for a street is expected to be less than 4 tonnes the Contractor and the Engineer shall estimate the quantity of patching and that shall be the quantity of patching claimed for that street. If it is expected to be over 4 tonnes, the patching shall be carried out separately and a docket supplied for payment.

9.13.1.1.10. Asphaltic Concrete Resurfacing (wearing course)

Payment shall be by m<sup>2</sup> actually resurfaced, to the nearest m<sup>2</sup>, and shall include cutting back berms, sweeping of the surface, removal of lichen, adjustment of surface boxes not scheduled separately, tack coat, weed control and the supply, laying and compaction of the asphaltic concrete.

9.13.1.1.11. Surface Boxes

The adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings and traffic signal loop toby boxes shall be included in the asphaltic concrete surfacing rate.

Payment for the adjustment of stormwater and sewer manhole tops shall allow for all work involved.

9.13.1.1.12. Traffic Signs

Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.

## **10.0 INTERLOCKING CONCRETE BLOCK, COBBLESTONE PAVING AND TACTILE PAVERS**

### ***10.1 Scope of Work***

This specification is for the supply and laying of Interlocking Concrete Block, Cobblestone and Tactile Paving.

Refer to standard details SD 631-635 or plans for dimensions.

### ***10.2 Materials***

*Paving shall comply with NZS 3116 “Concrete segmental paving” except where superseded by the following criteria. The colour shall be as specified.*

10.2.1.1.1. High Pedestrian Areas

*Paving shall comply with NZS 3116 “Concrete segmental paving” part 1 and part 2, clause 202(c) and AS/NZS 4455.2 “Masonry units, pavers, flags and segmental retaining wall units – Pavers and flags” section 1, section 2 clauses 2.2, 2.4, 2.5 and appendix A.*

*Paving shall comply with the specified class as detailed in AS/NZS 4586 and shall have a minimum vehicle skid resistance of 50 tested in accordance with the requirements of TRL Note 27 “Instruction for Using Portable Skid Resistance Tester”.*

*Paving shall have a minimum modulus of rupture of 6 MPa measured in accordance with AS/NZS 4456.5 “Determining breaking load of segmental paving units” and a maximum abrasion index of 3.5 measured in accordance with AS/NZS 4456.9 “Determining abrasion resistance”.*

Material testing shall be carried out in an approved laboratory. Skid resistance testing shall be carried out by an approved laboratory.

### ***10.3 Excavation and Foundations***

*Existing surfaces shall be sawcut at the limits of the work.*

*Ordinary traffic shall not be permitted to traverse the excavated subgrade surface. The Contractor's operations shall not cause pugging or sponging of the subgrade.*

*No tolerance on the subgrade level that reduces the depth of construction will be allowed.*

#### **10.4 Pavement Edge Treatments**

*Concrete edge treatments shall have two vertical faces. Cobblestone edge treatments shall be vertical.*

*The line of the edge treatment shall be straight between tangent points and shall sweep around curves without kinks, flats, or angles in a smooth arc. The maximum deviation from a 3m straight-edge laid along the face of the edge treatment shall be 5mm with a cumulative total of all visible gaps of not more than 10mm.*

*The position of the edge treatment shall be within 10mm of design. The top surface of a concrete edge treatment within the road shall be between 30mm and 50mm of the finished paver surface. The top surface of all other edge treatments shall be within  $\pm 10$ mm of design.*

#### **10.5 Weed Control**

*Subgrade, metalcourse and bedding sand, including around tactile pavers, shall be treated with a soil sterilant containing metsulfuron-methyl, e.g. Meturon, to prevent re-growth of weeds for a period of 12 months.*

#### **10.6 Metalcourse in Footpath Areas**

*Materials shall comply with CSS: Part 1 - General.*

*The surface of the compacted metalcourse shall nowhere hold water, and there shall be no point that will vary more than 8mm under a 3m straight-edge laid in any direction with a cumulative total of all visible gaps of not more than 25mm.*

*Compaction may be measured by Clegg hammer or other approved impact device. These devices shall be calibrated at 12-month intervals. At no point on the surface shall the Clegg Impact Value be less than 25 for footpaths and residential crossings, and 35 for commercial vehicle crossings.*

#### **10.7 Sub-Base Metalcourse in Carriageway Areas**

*Materials shall comply with CSS: Part 1 - General.*

*The sub-base metalcourse surface shall be maintained smooth, compact and true to grade and in such a condition that there is adequate drainage at all times.*

*The Contractor's operations shall not cause pugging or sponging of the subgrade.*

*CCC pitrun and CCC AP65 shall be compacted to a minimum dry density of 2,150kg/m<sup>3</sup>. This includes the filling in unsuitable foundation areas.*

*The finished compacted surface shall be uniform and dense in texture and shall not have segregated areas. It shall be within the following tolerances of design: -25mm, +5mm.*

*The finished surface shall nowhere have depressions that hold water and there shall be no point on the surface that will vary more than 25mm either from a 3m straight-edge laid parallel to the centre of the road, or from a camber board placed at right angles to the centreline.*

#### **10.8 Basecourse in Carriageway Areas**

*Materials shall comply with NZTA M/4:AP40.*

*The basecourse shall be placed in uniform layers by a suitable method to avoid segregation and shall be compacted to a minimum dry density of 2,150kg/m<sup>3</sup>.*

*The finished compacted surface shall be within the following tolerances from design: -5mm, +15mm at any point on the general surface, ±5mm at concrete channel edges and existing levelled edges.*

*The finished surface shall nowhere have depressions that hold water and there shall be no point on the surface that varies more than 12mm from a 3m straight-edge placed parallel to the centre of the road, or from a camber board placed at right angles to the centreline with a cumulative total of all visible gaps of not more than 25mm.*

*The basecourse shall be compacted to a uniformly dense, stable condition and shall not wave or creep under rolling. The finished surface just prior to laying bedding sand and paving shall be uniform in texture with no segregated areas.*

#### **10.9 Paving**

*Laying shall comply with NZS 3116 "Concrete segmental paving" and the Cement and Concrete Association of New Zealand's publications, "IB67 1988 Interlocking Concrete Block Road Pavements" and "IB68 1989 Construction of Concrete Block Paving" except where superseded by this specification. All paving shall have a header strip unless otherwise specified.*

*Plain pavers shall be cut with a power saw. Rumbled cobblestones may be cut with guillotine cutters. The discharge of water from sawcutting pavers shall comply with CSS: Part 1 - General. Cut pavers shall have edges parallel to the adjacent paver, edge treatment or surface opening.*

*Joints shall be kept filled with jointing sand during the defects liability period.*

#### 10.9.1.1.1. Tactile Pavers

*The installation of tactile pavers shall be in accordance with RTS 14 or as specified.*

### **10.10 Acceptance Criteria**

*The finished pavement surface shall be within  $\pm 10\text{mm}$  of the design level except at drainage channels and edge treatments. The pavement surface shall be finished between 2mm and 5mm above the channel or edge treatment at the end of the defects liability period. The difference in level between adjacent blocks shall not exceed 2mm. The joint widths shall be between 2mm and 5mm with an average over the entire pavement of 3mm.*

*The finished pavement surface shall nowhere have depressions that hold water and there shall be no point on the surface that will vary more than 8mm under a 3m straight-edge laid in any direction with a cumulative total of all visible gaps of not more than 15mm, except where design considerations dictate otherwise.*

### **10.11 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **10.12 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of clause 25.0 - Traffic Signs.*

### **10.13 Measurement of Work and Basis of Payment**

#### 10.13.1.1.1. Excavation

*Excavation shall be paid per  $\text{m}^2$  surface area removed, to the nearest  $\text{m}^2$  and the rate shall include disposal.*

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

10.13.1.1.2. Sawcutting, Bituminous Material Removal, Unsuitable Foundations and Filling

Payment for these items will be as detailed in clause 6.0 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways.

10.13.1.1.3. Pavement Edge Treatments

Pavement edge treatments shall be paid per lineal metre to the nearest 0.2m. The rate shall include for all excavation and disposal of spoil, formwork and curing etc.

10.13.1.1.4. Metalcourses in Footpath Areas

Metalcourses shall be included in the rate for paving of footpath areas and shall include supply, placing, compaction, trimming and testing.

10.13.1.1.5. Metalcourses in Carriageway Areas

Sub-base metalcourse and basecourse shall be paid per m<sup>2</sup> constructed, to the nearest m<sup>2</sup>. The rate shall include for all work involved including supply, placing, compaction, trimming and testing.

10.13.1.1.6. Paving in Footpath Areas

Paving shall be paid per m<sup>2</sup> constructed, to the nearest m<sup>2</sup> and the rate shall include metalcourses, sand bedding, weed control, supply and laying of pavers including header strips, cutting, jointing sand including over the Defects Liability Period, compaction and adjustment of surface boxes not scheduled separately. Paving shall also include concrete infill in accordance with Clause 310.2, NZS 3116 “Concrete segmental paving”.

10.13.1.1.7. Paving in Carriageway Areas

Paving shall be paid per m<sup>2</sup> constructed, to the nearest m<sup>2</sup> and the rate shall include for all work including sand bedding, weed control, supply and laying of pavers including header strips, cutting, jointing sand including over the Defects Liability Period and compaction and adjustment of surface boxes not scheduled separately. Paving shall also include concrete infill in accordance with Clause 310.2, NZS 3116 “Concrete segmental paving”.

10.13.1.1.8. Tactile Pavers

Payment shall be per paver and shall include sawcutting, removal of existing seal and disposal of spoil, sand bedding, weed control, supply and laying of pavers, jointing sand including over the Defects Liability Period, compaction and restoration.

Where tactile pavers are laid in tandem with new footpaths, tactile pavers shall be paid extra over the footpath construction specified in clause 6.12 – Asphaltic Concrete Paths, Vehicle Crossings and Cycleways Measurement of Works and Basis of Payment.

10.13.1.1.9. Ramp Construction

Ramp construction shall be paid by metre road width to the specified ramp length. The rate shall include sawcutting, removal of existing seal and metalcourse where necessary, the supply and installation of the asphaltic concrete and the roadmarking of the ramps.

10.13.1.1.10. Surface Boxes

The adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings, and traffic signal loop toby boxes shall be included in the rate for interlocking concrete block construction.

Payment for the adjustment of stormwater and sewerage manhole tops shall allow for all work involved.

10.13.1.1.11. Traffic Signs

Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.

## **11.0 CARRIAGEWAY AND SHOULDER CONSTRUCTION AND REPAIRS**

### ***11.1 Scope of Work***

This specification is for the construction of carriageways and shoulders, and carriageway repairs. This includes excavation, sub-base metalcourse and basecourse.

### ***11.2 Excavation and Foundations***

*Existing sealed surfaces shall be sawcut at the limits of the work unless otherwise specified.*

*No tolerance on the subgrade level that reduces the depth of construction will be allowed. Unsuitable foundation soils shall be removed to meet design requirements.*

*Ordinary traffic shall not be permitted to traverse the excavated subgrade surface. The Contractor's operations shall not cause pugging or sponging of the subgrade.*

### **11.3 Sub-base Metalcourse**

*Materials shall comply with CSS: Part 1 - General.*

*CCC pitrun and CCC AP65 shall be compacted to a minimum dry density of 2,150kg/m<sup>3</sup>. This includes the filling in unsuitable foundation areas.*

*The Contractor's operations shall not cause pugging or sponging of the subgrade. Contractors shall match site conditions with their plant selection and construction techniques e.g. layer depth, to ensure this does not occur.*

*The sub-base metalcourse surface shall be maintained smooth, compact and true to grade and in such a condition that there is adequate drainage at all times.*

*The finished compacted surface shall be within the following tolerances of design: -25mm, +5mm. It shall be uniform and dense in texture and shall not have segregated areas.*

*The finished compacted surface shall nowhere have depressions that hold water and there shall be no point on the surface that will vary more than 25mm either from a 3m straight-edge laid parallel to the centre of the road, or from a camber board placed at right angles to the centreline.*

### **11.4 Basecourse**

*Materials shall comply with NZTA M/4:AP40 and shall be compacted to a minimum dry density of 2,150kg/m<sup>3</sup>.*

*The material shall be placed in uniform layers by a suitable method to avoid segregation. It shall be compacted to a uniformly dense, stable condition in which it does not wave or creep under rolling.*

*The finished compacted surface shall be within the following tolerances from design. -5mm, +15mm at any point on the general surface, ±5mm of design level at concrete channel edges and existing sealed edges.*

*The finished surface shall nowhere have depressions that hold water and there shall be no point on the surface that varies more than 12mm from a 3m straight-edge placed parallel to the centre of the road, or from a camber board placed at right angles to the centreline with a cumulative total of all visible gaps of not more than 25mm.*

*The finished surface just prior to sealing or surfacing shall be uniform in texture, have no segregated areas, excess dust, or excess moisture.*

Note that the finished sealed or surfaced basecourse surface shall have average NAASRA roughness counts as specified.

### **11.5 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **11.6 Acceptance Criteria**

Acceptance will be measured by one of the methods outlined below. The method applicable and values to be obtained will be specified.

#### 11.6.1.1.1. By Clegg Hammer

#### 11.6.1.1.2. By Nuclear Densometer

Individual readings with the nuclear densometer in the backscatter mode shall be at completely random locations and at not greater than 10m longitudinal intervals.

**No** readings shall be lower than the specified **minimum**.

#### 11.6.1.1.3. By Benkelman Beam

Benkelman Beam testing is specified in the NZTA T/1 document, which sets out equipment and test method requirements.

Beam testing shall commence with a test 5m **beyond** the extent of work, then at 15m intervals for projects greater than 100m in length, or 10m intervals for projects less than 100m. In each case the final reading shall also be beyond the end of the work. The readings beyond the work should not form part of the calculation, as they are required for asset research purposes only.

The true statistical 95%ile or D95 calculation is not considered valid for the relatively low numbers of readings taken for sections of carriageway prepared for chipsealing or asphaltting.

When 20 or more readings are taken, **one** reading higher than the specified 95%ile limit is permissible. For less than 20 readings, **all** shall comply. (Obviously for 40 readings, two readings higher than the specified limits are permissible, and so on). **No** readings shall exceed the specified **maximums**.

11.6.1.1.4. Requirements and Notes Relating to these Criteria

The Engineer will carry out the pavement design using the Guide to Pavement Technology - Part 2: Pavement Structural Design as modified by the New Zealand supplement and the Circlay Pavement design software as the basis for the design, unless otherwise specified.

The Engineer will provide the Contractor with the assumed design information prior to work commencing. This will include:

Assumed Subgrade Type.

Assumed CBR.

EDA's.

Borehole Information (when taken and available).

The Contractor shall be responsible for checking the actual subgrade to ensure it complies with the design assumptions. If it is different from that assumed, or subgrade conditions change during excavation, the Contractor and the Engineer shall discuss this and agree on a new pavement depth to meet the above deflection requirements.

To convert penetrometer readings to CBR values, when confirming pavement designs, use Figure 5.2 "Correlation of Dynamic Cone Penetration and CBR" from Guide to Pavement Technology - Part 2: Pavement Structural Design.

For irregular unsuitable foundation areas up to 50m<sup>2</sup> the Contractor shall remove the unsuitable material to meet the design requirements. The Contractor shall advise the Engineer as soon as practicable and shall provide the Engineer with the following information: area and depth excavated and marked on the plan; CBR and description of the unsuitable material; CBR and description of material at base of unsuitable material excavation. This information may not be required if the Engineer is present on the site.

For chipseal pavements the Engineer may approve sealing before the deflection criteria are met providing the Contractor obtains complying tests prior to the end of the defects liability period and the Contractor has carried out sufficient tests during construction to show there has been adequate compaction of each layer.

**11.7 Testing**

11.7.1.1.1. Compaction

Nuclear density testing shall be carried out by an operator holding Unit Standard 25832 "Use a nuclear density meter to measure compaction of soils, sands, or gravels". All compaction testing appliances shall have current calibration certificates.

11.7.1.1.2. NAASRA

The Contractor shall undertake NAASRA testing on the carriageway where specified. The average and maximum readings shall exclude values affected by intersecting streets, platforms and road humps. The Defects Liability Certificate will not be issued until a complying NAASRA test is received.

All NAASRA results shall be based on a minimum of three runs. Test results shall be reported at 20m intervals. The Contractor shall supply with any test results a calibration test result taken within the week immediately prior to this test. Calibration sites can be obtained from Council.

Christchurch City Council will have a NAASRA testing machine in Christchurch usually in November/December of each year.

The Contractor may carry out their testing at any time by contracting one of the approved suppliers with the ARRB specified vehicle-mounted Laser Profiler or ARRB compliant High Speed Profilers or Walking Profilers.

The Contractor shall supply to the Engineer sufficient information to confirm all performance criteria have been achieved.

***11.8 Measurement of Work and Basis of Payment***

11.8.1.1.1. Sawcutting

Sawcutting shall be per metre, to the nearest 0.2m. Rates are provided for depths in increments of 50mm.

11.8.1.1.2. Excavation for Carriageway Construction

Excavation shall be by m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, as measured on the longitudinal section and cross sections and shall include all work including disposal. Excavation shall cover the full area of the sub-base metalcourse, as defined in clause 11.8.7 – Sub-base Metalcourse and shall include disposal.

Because existing and proposed ground levels are regular, a relatively accurate assessment of the proposed excavation quantities was possible. The Contractor should satisfy themselves that the quantities proposed are correct prior to formal contract agreement, as modification of quantities will only be accepted on the order of the Engineer.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

11.8.1.1.3. Excavation for Shoulder Construction and Repairs

Excavation is paid by  $m^2$ , to the nearest  $m^2$ , excavated to the specified depth and shall include all work including disposal. Excavation shall cover the full area of the sub-base metalcourse as defined in clause 11.8.7 – Sub-base Metalcourse.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

11.8.1.1.4. Bituminous Material Removal

The scarification and removal of bituminous material shall be paid per  $m^3$ , to the nearest  $m^3$ , and shall include removal of seal and disposal of spoil.

11.8.1.1.5. Cut to Fill

Cut to fill shall be by  $m^3$  solid volume, to the nearest  $m^3$ , and shall include all work involved in reclaiming approved material from the excavation and placing and compacting in the fill area, whether direct or via a stockpile.

Because existing and proposed ground levels are regular, a relatively accurate assessment of the proposed excavation quantities was possible. The Contractor should satisfy themselves that the quantities proposed are correct prior to formal contract agreement, as modification of quantities will only be accepted on the order of the Engineer.

11.8.1.1.6. Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per  $m^3$  solid volume of excavation agreed, to the nearest  $m^3$ , including disposal. In carriageway construction this rate shall apply to irregular areas and depths up to  $50m^2$ . Areas larger than  $50m^2$  shall be paid at the rate for general excavation. Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

Filling of the excavated unsuitable foundation area shall be paid per  $m^3$  solid measure, to the nearest  $m^3$ , and include the supply, placing and compaction of the material.

In carriageway construction, the filling of unsuitable foundation areas larger than  $50m^2$  shall be paid by adjusting the rate of the sub-base metalcourse in proportion to the extra depth.

11.8.1.1.7. Sub-base Metalcourse

Sub-base metalcourse layers shall be paid by  $m^2$ , to the nearest  $m^2$ , to the specified compacted depth. The rate shall include supply, placing, compaction and trimming.

Where the shoulder abuts a new kerb and channel, the sub-base metalcourse area shall be measured to the fender of the new kerb and channel. Metalcourse placed under the new kerb and channel, to the limits as shown on SD 625, shall be included in the scheduled item for kerb and channel.

11.8.1.1.8. Basecourse

Basecourse layers shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup>, to the specified compacted depth. The rate shall include supply, placing, compaction and trimming.

11.8.1.1.9. Surface Boxes

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include for all work and materials involved, including repainting.

11.8.1.1.10. Testing

NAASRA testing shall be a lump sum and payment shall be for complying tests only.

The cost of all other construction testing up to the point of showing the pavement meets the specified criteria shall be included in the rates for excavation and metalcourse. This includes testing during the defects liability period if compliance was not achieved prior to sealing. Any additional tests ordered by the Engineer will be paid as a variation if they show compliance with the specification.

## **12.0 STABILISATION**

### ***12.1 Scope of Work***

This specification is for the stabilisation of carriageways. This includes sub-base metalcourse and basecourse.

Limits of work shall be marked or defined by the Engineer.

### ***12.2 Stabilisation***

*Stabilisation shall comply with NZTA B/5 except as amended in the following clauses.*

The Engineer will provide the Contractor with the assumed design information prior to work commencing. This will include:

- Assumed Subgrade Type.
- Assumed CBR.
- EDA's.
- Metalcourse depths.

The Contractor shall be responsible for checking the actual subgrade to ensure it complies with the design assumptions, by potholing at 50m intervals. The Contractor shall provide depths to the Engineer five working days before commencing stabilisation. If the depths are different from that assumed, the Engineer shall provide a new pavement depth to meet the above deflection requirements.

### ***12.3 Materials***

Materials shall be as specified and shall comply with NZTA B/5.

### ***12.4 Stabilising Agents***

Stabilising agents shall be as specified and shall comply with NZTA B/5.

### ***12.5 Preparation***

Surface preparation shall comply with NZTA B/5.

All contaminants shall be intercepted and disposed of in accordance with the requirements of CSS: Part 1 - General.

All stormwater outlets, sumps, service boxes and manholes shall be protected against damage. All spoil shall be removed from the site.

### ***12.6 In-situ Mixing***

The pre-treatment depth shall be as specified and shall comply with NZTA B/5.

The stabilised layer thickness shall be as specified and shall comply with NZTA B/5.

### ***12.7 Surface Shape***

The surface shape shall comply with NZTA B/5. Where the chipsealed stabilised surface is the finished surface, it shall have average NAASRA roughness counts as specified.

### ***12.8 Surface Boxes***

Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.

## **12.9 Testing**

### 12.9.1.1.1. Compaction

Nuclear density testing shall be carried out by an operator holding Unit Standard 25832 “Use a nuclear density meter to measure compaction of soils, sands, or gravels”. All compaction testing appliances shall have current calibration certificates.

### 12.9.1.1.2. NAASRA

The Contractor shall undertake NAASRA testing on the carriageway where specified. The average and maximum readings shall exclude values affected by intersecting streets, platforms and road humps. The Defects Liability Certificate will not be issued until a complying NAASRA test is received.

All NAASRA results shall be based on a minimum of three runs. Test results shall be reported at 20m intervals. The Contractor shall supply with any test results a calibration test result taken within the week immediately prior to this test. Calibration sites can be obtained from Council.

Christchurch City Council will have the NAASRA testing machine in Christchurch at some period during March/April and November/December of each year. The Contractor may arrange to carry out their testing in this period also or may arrange a separate visit.

Contractors should also be aware that, as well as the ARRB Road Info Ltd vehicle-based Laser Profiler, and other High Speed profilers, a NAASRA Walking profiler is available for hire from ARRB Road Info Ltd (Ph. (06) 759-4960) for NAASRA counts.

The Contractor shall supply to the Engineer sufficient information to confirm all performance criteria have been achieved.

## **12.10 Measurement of Work and Basis of Payment**

### 12.10.1.1.1. Sawcutting

Sawcutting shall be per metre, to the nearest 0.2m. Rates are provided for depths in increments of 50mm.

### 12.10.1.1.2. Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per m<sup>3</sup> solid volume of excavation agreed, to the nearest m<sup>3</sup>, including disposal. Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

Filling of the excavated unsuitable foundation area shall be paid per m<sup>3</sup> solid measure, to the nearest m<sup>3</sup>, and include the supply, placing and compaction of the material.

12.10.1.1.3. Supply and placing of imported aggregate

Supply and placing of imported aggregate shall be paid by m<sup>3</sup> solid volume, to the nearest m<sup>3</sup>, as specified in NZTA B/5.

12.10.1.1.4. Pre-treatment

Pre-treatment shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup>, as specified in NZTA B/5.

12.10.1.1.5. Surface Boxes

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include for all work and materials involved, including repainting.

12.10.1.1.6. Testing

NAASRA testing shall be a lump sum and payment shall be for complying tests only.

The cost of all other construction testing up to the point of showing the pavement meets the specified criteria shall be included in the rates for stabilisation. This includes testing during the defects liability period if compliance was not achieved prior to sealing. Any additional tests ordered by the Engineer will be paid as a variation if they show compliance with the specification.

## **13.0 CARRIAGEWAY MAINTENANCE**

### ***13.1 Scope of Work***

This specification is for carriageway maintenance work

The work required will be either defined in the specification or marked on site by the Engineer.

### ***13.2 Materials***

*All materials shall comply with CSS: Part 1 - General.*

*All asphaltic concrete used in this specification shall comply with requirements of clause 18.0 - Laying of Asphaltic Concrete on Carriageways.*

### ***13.3 Texturising and Repairs using Bitumen and Chip***

*Binder shall comply with NZTA M/1. Chip shall comply with NZTA M/6.*

*The surface shall be clean, free from dust, sand, grit or any other material that could impair the adhesion of the bitumen.*

*All surplus chip shall be removed within 48 hours.*

*The surface texture, as measured by sand circle, shall be within the following limits: Grade 5 chip < 170 mm; Grade 6 chip < 185 mm. The surface shall not bleed or flush bitumen.*

### **13.4 Potholes and Edgebreak**

*Potholes and edgebreak shall be trimmed vertical, cleaned, tack coated and filled with asphaltic concrete.*

*The finished surface profile shall match the general profile of the adjacent surface. The finished surface shall nowhere hold water and the gap under a 3m straight-edge placed in any direction shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm.*

### **13.5 Failed Areas**

*Where defined, failed areas shall be excavated and backfilled as specified. All work shall comply with clause 11.0 – Carriageway and Shoulder Construction and Repairs.*

*The finished surface profile shall match the general profile of the adjacent surface. The finished surface shall nowhere hold water and the gap under a 3m straight-edge placed in any direction shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm.*

### **13.6 Shape Correction**

*Depressions, trenches and around service boxes, shall be shape corrected with AC 10.*

*The finished surface profile shall match the general profile of the adjacent surface. The finished surface shall nowhere hold water and the gap under a 3m straight-edge placed in any direction shall not exceed 5mm with a cumulative total of all visible gaps of not more than 10mm.*

### **13.7 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **13.8 Removal of Excess Seal of Manholes**

*Excess seal shall be removed so the finished level of the surface surrounding the manhole is flush with the manhole top and road surface.*

The finished surface shall be either a milled surface in sound seal or a new asphaltic concrete surface. Where the metalcourses are exposed, the surface shall be treated as a pothole.

### ***13.9 Measurement of Work and Basis of Payment***

#### ***13.9.1.1.1. Texturising and Repairs using Bitumen and Chip***

Payment shall be per m<sup>2</sup>, to the nearest m<sup>2</sup>, for the area treated and the rate shall include surface preparation, supply and laying of bitumen and chip, removal of surplus chip and maintenance.

#### ***13.9.1.1.2. Potholes and Edgebreak***

Payment shall be per tonne of asphaltic concrete laid or per pothole repaired and shall include surface preparation including trimming and cleaning, tack coat, supply and lay asphaltic concrete and maintenance.

#### ***13.9.1.1.3. Failed Areas***

Payment for failed areas shall be per m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include excavation, disposal of surplus material, supply and place metalcourses and surfacing.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

#### ***13.9.1.1.4. Shape Correction***

Payment for shape correction using asphaltic concrete shall be per tonne laid and shall include surface preparation, tack coat, supply, lay and compact asphaltic concrete.

#### ***13.9.1.1.5. Surfaces Boxes***

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include repainting.

#### ***13.9.1.1.6. Removal of Excess Seal at Manholes***

Payment shall be per manhole treated and include excavation, disposal of surplus material, supply and placing of surfacing, if required, and milling etc.

## **14.0 LAYING OF GEOTEXTILES AND GEOGRIDS**

### ***14.1 Scope of Work***

This specification is for the laying of geotextiles and geogrids in conjunction with metalcourse construction.

#### **14.2 Materials**

*Materials shall be as specified and shall comply with all clauses of NZTA F/7 except that test results shall be available on request.*

#### **14.3 Installation**

*The geotextile or geogrid shall be laid to NZTA F/7 at the depth specified.*

#### **14.4 Measurement of Work and Basis of Payment**

The geotextile or geogrid shall be paid per m<sup>2</sup> of plan area covered, to the nearest m<sup>2</sup>. No extra payment will be made for laps or returns. The rate shall include all testing.

### **15.0 CARRIAGEWAY CHIPSEALING**

#### **15.1 Scope of Work**

This specification is for the chipsealing of carriageways using cutback, straight run or emulsified binders, and includes first coat, second coat and resealing work.

Limits of work shall be marked or defined by the Engineer.

#### **15.2 Materials**

##### **15.2.1.1.1. Binders**

*All binders and fluxes shall comply with NZTA M/1 and NZTA P/17.*

*Adhesion agents shall meet NZTA M/13.*

##### **15.2.1.1.2. Sealing Chip**

*All sealing chip shall meet NZTA M/6. Chip grades shall be as specified.*

#### **15.3 Application**

*All work shall be carried out in accordance with the relevant parts of NZTA P/17 except where superseded by this specification. Provide documentation through the Contract Quality Plan.*

*The Contractor shall design binder application rates from the binder type, chip grade and estimated traffic volumes supplied and rates shall be provided to the Engineer prior to starting work. The binder application rate worksheet shall be provided to the Engineer prior to all first coat seals.*

*All sprayers shall meet the requirements of BCA E/2 and have a current E/2 certificate.*

*Sealing records for first coat seals shall be supplied to the Engineer within five working days of spraying and shall include but not be limited to the date sprayed,*

*type and penetration grade binder, type and quantity of all additives, spray temperature, air temperature, area sprayed and actual hot and residual application rates for each spray run.*

#### **15.4 Acceptance Criteria**

*The finished carriageway shape shall be consistently convex across the constructed width, unless otherwise specified. All mate-ins to existing carriageways or concrete kerbs shall be flush.*

##### **15.4.1.1.1. First Coat Seal**

*The finished surface shall be of uniform texture and appearance and shall meet the sand circle test limits specified below at the end of the defects liability period.*

<u>Surface Type (chip grade)</u>	<u>Sand Circle Diameter</u>
3 (8.5-10)	<150
4	<160
5	<170
6	<185
4/6	<165
3/5	<165

##### **15.4.1.1.2. Reseals**

*The finished surface shall comply with the requirements of clause 9 of NZTA P/17.*

For assessment of single coat seals, multi-layer seals, texturing seals and void fills, the pavement will be divided into lots between centres of intersection streets or 200m whichever is the lesser length.

#### **15.5 Trees**

*The Contractor shall ensure that all trees in the street remain undamaged during sealing and no binder shall be applied within 600mm of the trunk of any tree within the area to be used. All work in the vicinity of trees shall be carried out in accordance with CSS: Part 1 - General.*

#### **15.6 Removal of Surplus Chip and Waste Materials**

*All surplus chip in stockpiles on the road reserve shall be removed immediately following the completion of each day's work, unless otherwise approved.*

*All areas with essential road markings shall be swept sufficiently to allow reinstatement of markings within 24 hours.*

After the speed restriction signs are removed and prior to the issue of the Defects Liability Certificate, the surface shall be regularly maintained to the standards

defined in clause 7.3 of NZTA P/17. Any loose chip within this limit that is causing a safety hazard or a nuisance to the public shall be removed. Loose chip at intersections is deemed to be a safety hazard. Nuisance to the public is when a reasonable complaint is made and this could include loose chip on berms, footpaths and driveways.

### **15.7 Reinstatement of Pavement Markings**

*Intersection 'Stop' and 'Give Way' marking and fire hydrants shall be reinstated within 24 hours of sealing. All other roadmarking shall be remarked within 24 hours of initial carriageway sweeping. All roadmarking shall be carried out in terms of clause 26.0 - Roadmarking, Raised Pavement Markers, Kerb Markers and Edge Markers.*

### **15.8 Maintenance**

The Contractor shall maintain the seal in accordance with NZTA P/17 except where superseded by this specification. For seals using chip sizes Grade 5 or 6, the repair must be performed with the same grade as the original chip. The chip used for repairs shall also be from the same source as the original construction.

All defect repairs carried out require a Letter of Guarantee covering those repairs for a period of twelve months following the issue of the Defects Liability Certificate. All repairs must meet all of the contract acceptance criteria during the period of guarantee.

If at any time during the Period of Defects Liability the area of chip loss in any lot exceeds 10% of the total area sealed in that lot the whole carriageway in that lot shall be resealed, unless there is sufficient evidence to support patching only.

The Contractor shall ensure that all reseal repairs are carried out to a standard that will not contribute to flushing in the new seal. Any area of flushing caused by the resealing operation shall have all excess bitumen REMOVED so that all acceptance criteria are achieved. Any adjacent carriageways affected shall also be repaired.

### **15.9 Measurement of Work and Basis of Payment**

#### **15.9.1.1.1. Chipsealing**

Chipsealing shall be paid per m<sup>2</sup>, to the nearest m<sup>2</sup>, for areas that meet the acceptance criteria. This shall include preparation of the surface including sweeping, removal of raised pavement markers, protection of street furniture, traffic and parking control, supply, spraying and spreading of binder and sealing chip and sweeping, removal and disposal of surplus chip. The provision of sealing design and RAMM top surface records shall be included in this rate.

The sealed area does not include any overlaps onto kerbs or adjacent sealed areas. These areas shall be included within the sealing rate.

15.9.1.1.2. Texturising

Texturising shall be paid per m<sup>2</sup> texturised, to the nearest m<sup>2</sup>, and shall include sweeping and removal of surplus chip if required.

15.9.1.1.3. Service Boxes

Painting of valves and hydrants shall be paid for each box painted. The rate for fire hydrants shall include the marker, triangle and circle if required.

15.9.1.1.4. Road Markings

Reinstatement of existing road markings shall be paid as a lump sum.

## **16.0 SLURRY SEALING**

### ***16.1 Scope of Work***

This specification is for the supply and laying of slurry seal.

Limits of the work shall be as marked on site by the Engineer.

### ***16.2 Materials***

*All materials shall comply with the relevant parts of Rooding NZ 9806.*

### ***16.3 Surface Preparation***

*All work shall be carried out in accordance with the relevant parts of Rooding NZ 9806 except where superseded by this specification.*

*Stormwater contamination shall be prevented and all discharges shall be controlled in accordance with CSS: Part 1 - General. All sumps, manhole covers, toby boxes or any other carriageway fittings shall be properly protected from laying operations.*

### ***16.4 Acceptance Criteria***

*All work shall be carried out in accordance with the relevant parts of Rooding NZ 9806.*

### ***16.5 Trees***

*All work in the vicinity of trees shall be carried out in accordance with CSS: Part 1 - General. The Contractor shall ensure that all trees in the street remain undamaged during sealing and no slurry shall be applied within 600mm of the trunk of any tree.*

### **16.6 Removal of Surplus and Waste Material**

*All sumps, manhole covers, toby boxes or any other carriageway fittings shall be promptly cleaned and freed after the work. Paper or fabric placed across the pavement for slurry runs, and binder twine or cord lines used to define the edges of the sealing shall be uplifted immediately after the slurry is spread. These items and all other material shall be stored neatly and removed from the site at the end of the working day. Unless otherwise approved by the Engineer, the Contractor shall remove all surplus chip in stockpiles on the road reserve immediately following completion of each day's work.*

### **16.7 Reinstatement of Pavement Markings**

*All roadmarking shall be carried out in terms of clause 26.0 - Roadmarking, Raised Pavement Markers and Edge Markers. Intersection 'Stop' and 'Give Way' marking and fire hydrants shall be reinstated within 24 hours of sealing. All other roadmarking shall be remarked within 48 hours of sealing.*

### **16.8 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

### **16.9 Testing**

*Testing shall be carried out in accordance with the relevant parts of Roading NZ 9806.*

#### **16.9.1.1.1. Trial Application**

Prior to commencing the contract works, a test section at least 20m long and 2m wide shall be placed at the Contractor's cost away from the contract site and using the proposed materials.

The slurry seal shall be placed and rolled in accordance with this specification and shall be checked for laid depth, consistency and break time. An approved laboratory shall carry out tests to determine the asphalt content and aggregate gradation. If the observations and tests indicate that the slurry seal test section does not conform to the specification, the necessary adjustments shall be made and additional test sections shall be constructed for conformance to the specification.

#### **16.9.1.1.2. Materials**

The Contractor shall supply recently achieved wet track abrasion, wet stripping and wet cohesion tests for the proposed slurry mixes at least one week prior to commencing the contract works.

### **16.10 Measurement of Work and Basis of Payment**

#### 16.10.1.1.1. Surface Preparation

Payment for the preparation of the surface shall be per m<sup>2</sup>, to the nearest m<sup>2</sup> and shall include sweeping, cleaning or removal of detritus and deleterious materials and covering service covers.

#### 16.10.1.1.2. Slurry Sealing

Payment for slurry seal shall be per m<sup>2</sup>, to the nearest m<sup>2</sup>.

#### 16.10.1.1.3. Service Boxes

Painting of valves and hydrants shall be paid for each box painted. The rate for fire hydrants shall include the marker, triangle and circle if required.

#### 16.10.1.1.4. Road Markings

Reinstatement of existing road markings shall be paid as a lump sum.

#### 16.10.1.1.5. Testing

The cost of laying test sections and testing samples shall be included in the slurry sealing rate.

## **17.0 LAYING OF PAVING FABRIC**

### **17.1 Scope of Work**

This specification is for the laying of paving fabrics beneath chipseal and asphaltic concrete.

### **17.2 Materials**

*The paving fabric shall consist of a non-woven needle punched polyester paving fabric manufactured specifically for this purpose and with the specified properties.*

### **17.3 Preparation of the Surface**

*The surface prior to tack coating shall be clean and free from surface water, dust, sand, grit or any other material that could impair the adhesion of the fabric.*

### **17.4 Tack coat**

*The tack coat shall meet the requirements of the paving fabric manufacturer as to type of tack coat and application rate. The Contractor shall provide the Engineer with all details of the tack coat used, spraying temperature, air temperature, area sprayed and the actual application rate for each sprayed run, immediately following the spraying operation.*

### **17.5 Installation**

*The paving fabric shall be laid immediately after the tack coat is applied. The laid fabric shall not contain wrinkles. Wrinkles shall be removed by cutting the fabric. The Contractor shall follow the manufacturer's specifications completely.*

### **17.6 Measurement of Work and Basis of Payment**

Paving fabric shall be paid per m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include preparation, tack coat, supply and installation.

## **18.0 LAYING OF ASPHALTIC CONCRETE ON CARRIAGEWAYS**

### **18.1 Scope of Work**

This specification is for the laying of asphaltic concrete on carriageways and includes asphaltic concrete laid in patches and shoulders and as sheeting and overlays.

The limits of work shall be marked or defined by the Engineer.

Current NAASRA counts are available from the Engineer on request.

### **18.2 Tack coat**

*The base and edges of all areas to be covered by the asphaltic concrete, except prime coats, shall be tack coated with a bitumen emulsion complying with NZTA M/1 and uniformly applied at a residual application rate of 0.15 l/m<sup>2</sup>.*

*The surface prior to tack coating shall be clean and free of surface water, dust, sand, grit or any other material that could impair the adhesion of the tack coat. The application of the tack coat shall consider truck access to the paver and possible tracking by truck wheels.*

### **18.3 Asphaltic Concrete**

*All asphaltic concrete shall comply with CSS: Part 1 - General and NZTA M/10 and be supplied by an asphalt plant certified to AS/NZS ISO 9001 "Quality management systems – Requirements". All asphaltic concrete shall be uniform in density and texture and all asphaltic concrete except thin sheeting works shall have air voids not less than 2.5% and not more than 8.0% on joins or 6.0% in any mat.*

*Asphaltic concrete shall be laid in maximum single compacted layer thicknesses as follows: 100mm for NZTA M/10:AC20, 80mm for NZTA M/10: AC14 and 55mm for DG10.*

*The Contractor shall supply all weighbridge docket, or a verifiable summary, which shall show the date and time loaded, contract number, mix type and temperature and net weight.*

#### **18.4 Joints**

*No uncompleted longitudinal or transverse joints shall be left unprotected and exposed to traffic over night. All joints against existing asphaltic concrete shall be bandaged on the completion of the work.*

#### **18.5 Acceptance Criteria**

*The finished surface shall give a smooth ride with an average NAASRA roughness count of not more than 55mm/km and a maximum count of not more than 75mm/km for new work, and an average count of not more than 65mm/km and a maximum of not more than 90mm/km for shape corrections or overlays of existing pavements.*

*The finished surface shall be 5mm above channel fenders or concrete kerbs and shall not hold water and there shall be no point where the general surface varies more than 5mm from a 3m straight-edge laid longitudinally, with a cumulative total of all visible gaps of not more than 10mm, or more than 5mm from a 1m straight-edge laid transversely, including across service boxes and joints.*

#### **18.6 Reinstatement of Pavement Markings**

*All roadmarking shall be carried out in terms of clause 26.0 - Roadmarking, Raised Pavement Markers, Kerb Markers and Edge Markers. Intersection 'Stop' and 'Give Way' marking and fire hydrants shall be reinstated within 24 hours of sealing. All other roadmarking shall be remarked within 24 hours of initial carriageway sweeping.*

#### **18.7 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

*All surface boxes shall be raised within 72 hours. Surface boxes except fire hydrants may be temporarily covered to remove a traffic hazard except that an indication of their location should be present at all times. Fire hydrants shall be raised immediately if they present a traffic hazard when uncovered.*

## **18.8 Testing**

### 18.8.1.1.1. Asphaltic concrete cores

Asphaltic concrete core samples shall be a fair representation of the paved area. All core results shall be returned to the Engineer. Core samples shall be 100mm in diameter. Testing shall be carried out in an approved laboratory.

### 18.8.1.1.2. NAASRA

Refer to clause 11.7.2 – NAASRA for testing requirements and NAASRA testing machine availability.

## **18.9 Measurement of Work and Basis of Payment**

### 18.9.1.1.1. Asphaltic Concrete

Payment for the asphaltic concrete shall be either per m<sup>2</sup>, to the nearest m<sup>2</sup>, or per tonne of asphaltic concrete laid as specified and shall include preparation of the surface, supply and application of tack coat, supply and laying of the asphaltic concrete, bandaging and asphaltic concrete cores.

### 18.9.1.1.2. Road Markings

Reinstatement of existing road markings shall be paid as a lump sum.

### 18.9.1.1.3. Surface Boxes

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include for all work and materials involved, including repainting.

### 18.9.1.1.4. Testing

NAASRA testing shall be a lump sum and payment shall be for complying tests only.

Testing of asphaltic concrete cores shall be included in the rate for asphaltic concrete.

## **19.0 CARRIAGEWAY SHAPE CORRECTION WITH EMULSION MIXES**

### **19.1 Scope of Work**

This specification is for the shape correction of carriageways with emulsion mix.

Limits of work shall be marked or defined by the Engineer prior to tendering.

Current NAASRA counts are available from the Engineer on request.

### **19.2 Emulsion Mix**

*The Contractor shall supply to the Engineer details of aggregate gradings, residual binder content and other relevant information for the material to be used seven days prior to the commencement of work.*

### **19.3 Tack coat**

*The surface prior to tack coating shall be clean, free from surface water, dust, sand, grit or any other material that could impair the adhesion of the tack coat.*

*The base of all areas to be covered by the emulsion mix shall be tack coated with a bitumen emulsion complying with NZTA M/1 and uniformly applied at a residual application rate of 0.15 l/m<sup>2</sup>.*

### **19.4 Joints**

*No uncompleted longitudinal or transverse joints shall be left unprotected and exposed to traffic over night. No joints shall be left exposed to traffic over night. Exposed joints shall be made safe with the construction of a temporary ramp that shall be removed prior to the continuation of the work.*

### **19.5 Acceptance Criteria**

*The finished surface shall give a smooth ride with the following average NAASRA roughness counts: streets with an average daily traffic (ADT) of more than 1200 shall have an average NAASRA roughness count of not more than 70mm/km and a maximum count of not more than 90mm/km, streets with an average daily traffic (ADT) of less than 1200 shall have an average NAASRA roughness count of not more than 75mm/km and a maximum count of not more than 100mm/km.*

*The finished surface shall be between -0mm and +5mm above channel fenders or concrete kerbs. It shall have no point where the general surface varies more than 5mm from a 3m straight-edge laid longitudinally, with a cumulative total of all visible gaps of not more than 10mm, or more than 5mm from a 1m straight-edge laid transversely, including across service boxes and joints.*

### **19.6 Removal of Surplus Chip and Waste Material**

*Any running course shall be removed from sealed carriageways and adjacent effected areas prior to the removal of the temporary speed restriction signs.*

### **19.7 Reinstatement of Pavement Markings**

*All roadmarking shall be carried out in terms of clause 26.0 - Roadmarking, Raised Pavement Markers, Kerb Markers and Edge Markers. Intersection 'Stop' and 'Give Way' marking and fire hydrants shall be reinstated within 24 hours of sealing. All other roadmarking shall be remarked within 24 hours of initial carriageway sweeping.*

### **19.8 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

*All surface boxes shall be raised within 72 hours. Surface boxes except fire hydrants may be temporarily covered to remove a traffic hazard except that an indication of their location should be present at all times. Fire hydrants shall be raised immediately if they present a traffic hazard when uncovered.*

### **19.9 Testing**

Refer to clause 11.7.2 – NAASRA for testing requirements and NAASRA testing machine availability.

### **19.10 Measurement of Work and Basis of Payment**

#### **19.10.1.1.1. Emulsion Mix**

Payment for emulsion mix shall be per m<sup>2</sup>, to the nearest m<sup>2</sup>, and the rate shall include preparation of surface, supply and application of tack coat, supply and laying of the emulsion mix and removal and disposal of any running course.

#### **19.10.1.1.2. Pre-levelling with Asphaltic Concrete**

Payment for pre-levelling shall be per tonne authorised by the Engineer.

#### **19.10.1.1.3. Road Markings**

Reinstatement of existing road markings shall be paid as a lump sum.

#### **19.10.1.1.4. Surface Boxes**

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include for all work and materials involved, including repainting.

#### **19.10.1.1.5. Testing**

NAASRA testing shall be a lump sum and payment shall be for complying tests only.

## **20.0 CARRIAGEWAY SMOOTHING WITH OPEN GRADED POROUS ASPHALT**

### **20.1 Scope of Work**

This specification is for the laying of open graded porous asphaltic concrete on carriageways.

Limits of work shall be marked or defined by the Engineer.

Current NAASRA counts are available from the Engineer on request.

### **20.2 Porous Asphalt**

*All porous asphalt shall comply with NZTA P/11 for the mix design specified and be supplied by an asphalt plant certified to AS/NZS ISO 9001 "Quality management systems – Requirements". No porous asphalt shall be laid where the pavement surface temperature is less than 10°C.*

*The Contractor shall supply all weighbridge dockets, or verifiable summary, which shall show the date and time loaded, contract number, mix type and temperature and net weight.*

### **20.3 Tack coat**

*The surface prior to tack coating shall be clean, free from surface water, dust, sand, grit or any other material that could impair the adhesion of the tack coat.*

*The base of all areas to be covered by the emulsion mix shall be tack coated with a bitumen emulsion complying with NZTA M/1 and uniformly applied at a residual application rate of 0.15 l/m<sup>2</sup>.*

### **20.4 Joints**

*No uncompleted longitudinal or transverse joints shall be left unprotected and exposed to traffic over night. No joints shall be left exposed to traffic over night. Exposed joints shall be made safe with the construction of a temporary ramp that shall be removed prior to the continuation of the work.*

### **20.5 Edge Treatment**

*Where porous asphalt is laid adjacent to the fender, the constructed edge shall be treated in accordance with SD 617.*

### **20.6 Permanent Ramps**

*All asphaltic concrete shall comply with CSS: Part 1 - General. All ramps shall comply with the requirements of clause 18.0 – Laying of Asphaltic Concrete on Carriageways.*

*Prior to construction of any ramp the adjacent edge of the friction course shall be trimmed straight and vertical. Ramps shall be keyed into the existing carriageway surface.*

*The finished ends of the ramps shall be flush with, and shall provide a smooth transition between the new and existing surfaces with a NAASRA roughness no greater than that of the existing surface.*

### **20.7 Acceptance Criteria**

*The finished surface shall give a smooth ride with an average NAASRA roughness count of not more than 55mm/km and a maximum count of not more than 75mm/km for overlaying new construction work, and an average count of not more than 65mm/km and a maximum of not more than 90mm/km for shape corrections or overlays of existing pavements.*

*The finished surface shall be between -0mm, +5mm at channel fenders or concrete kerbs. It shall have no point where the general surface varies more than 5mm from a 3m straight-edge laid longitudinally, with a cumulative total of all visible gaps of not more than 10mm, or more than 5mm from a 1m straight-edge laid transversely, including across service boxes and joins.*

### **20.8 Reinstatement of Pavement Markings**

*All roadmarking shall be carried out in terms of clause 26.0 - Roadmarking, Raised Pavement Markers, Kerb Markers and Edge Markers.*

### **20.9 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

*All surface boxes shall be raised within 72 hours. Surface boxes except fire hydrants may be temporarily covered to remove a traffic hazard except that an indication of their location should be present at all times. Fire hydrants shall be raised immediately if they present a traffic hazard when uncovered.*

### **20.10 Testing**

*Refer to clause 11.7.2 – NAASRA for testing requirements and NAASRA testing machine availability.*

## **20.11 Measurement of Work and Basis of Payment**

### 20.11.1.1.1. Porous Asphalt

Payment for porous asphalt shall be either per m<sup>2</sup>, to the nearest m<sup>2</sup>, or per tonne as specified and the rate shall include preparation of surface, supply and application of tack coat and supply and laying of the porous asphalt.

### 20.11.1.1.2. Pre-levelling

Payment for pre-levelling shall be per tonne authorised and the rate shall include preparation of surface, supply and application of tack coat and supply and laying of the asphaltic concrete.

### 20.11.1.1.3. Permanent Ramps

Payment for permanent ramps shall be per tonne and the rate shall include trimming of new friction course, preparation of surface, key-in, supply and application of tack coat and supply and laying of the asphaltic concrete.

### 20.11.1.1.4. Milling

Payment for milling to achieve a flush joint with the existing pavement shall be per m<sup>2</sup>, to the nearest m<sup>2</sup> and shall include disposal of surplus material.

### 20.11.1.1.5. Road Markings

Reinstatement of existing road markings shall be paid as a lump sum.

### 20.11.1.1.6. Surface Boxes

Payment for the alteration of surface boxes shall be by lump sum or per box or manhole adjusted as specified and shall include for all work and materials involved, including repainting.

### 20.11.1.1.7. Testing

NAASRA testing shall be a lump sum and payment shall be for complying tests only.

## **21.0 PAVEMENT CRACKFILLING**

### **21.1 Scope of Work**

This specification is for the crackfilling of cracked carriageway pavements.

### **21.2 Materials**

*The crack sealant shall have a minimum softening point of 70°C. The needle penetration at 25°C shall be less than 150mm, the torsional recovery at thirty minutes shall be a minimum of 85% and the ball resilience shall be greater than 50%.*

### **21.3 Preparation of Surface**

*The cracks shall be pressure cleaned and dried and any loose material removed. An approved crack primer shall be applied if required.*

### **21.4 Application of Crack Sealant**

*The edges of all patches and cracks less than 5mm wide shall be treated as follows. The Engineer shall be notified of cracks over 5mm.*

*The crack sealant shall be applied hot and inserted directly into the crack with the surplus screeded off to give a minimum 'bandage' width of 50mm, a minimum thickness of 2mm followed by surfacing with coarse sand.*

*Bandages over 75mm shall be treated to ensure they achieve an equivalent skid resistance to the adjacent pavement.*

### **21.5 Maintenance**

*The Contractor shall remove excess sand the day following the application of the crack sealant.*

*Any crack sealant not adhering to the existing surface shall be replaced during the defects liability period.*

### **21.6 Testing**

The Contractor shall supply recently achieved softening point, needle penetration, torsional recovery and ball resistance test results. All tests shall be carried out by an approved laboratory and shall be furnished at least one week prior to commencing the crackfilling work.

One 2-litre sample of crack sealant shall be taken for testing by the Contractor twice during the contract to ensure that the sealant conforms to this specification.

Laboratory results shall be forwarded to the Engineer as soon as they become available.

### **21.7 Measurement of Works and Basis of Payments**

Crackfilling shall be paid per metre, to the nearest 0.2m, and shall include all work involved. The cost of all testing shall be included in these rates.

## **22.0 COLD MILLING OF CARRIAGEWAYS**

### **22.1 Scope of Work**

This specification is for the cold milling of carriageways.

Limits of work shall be marked or defined by the Engineer.

### **22.2 Milling**

*Where the milled area is to be backfilled, all edges shall be finished vertical. No longitudinal or transverse vertical edges shall be left unprotected and exposed to traffic overnight.*

*All milling machines with a drum width of more than 750mm shall be equipped with a self loading conveyor.*

*All contaminants shall be intercepted and disposed of in accordance with the requirements of CSS: Part 1 - General.*

*All stormwater outlets, sumps, service boxes and manholes shall be protected against damage. All spoil shall be removed from the site.*

### **22.3 Finished Surface**

*The depth milled, after removal of all loose material, shall be  $-0\text{mm}$ ,  $+5\text{mm}$  of the specified depth. The finished surface shall vary no more than 5mm from a 3m straight-edge laid longitudinally or a 1m straight-edge laid transversely, including between adjacent runs.*

### **22.4 Measurement of Work and Basis of Payment**

Payment shall be per  $\text{m}^2$  of milled carriageway, to the nearest  $0.1\text{m}^2$ , and shall include protection of all sumps, stormwater outlets and service boxes from damage and contamination with the milled material and removal of all material resulting from the milling.

## **23.0 GROOVING OF ASPHALTIC CONCRETE ON CARRIAGEWAYS**

### **23.1 Scope of Work**

This specification is for the grooving of asphaltic concrete on carriageways.

Limits of work shall be marked or defined by the Engineer.

### **23.2 Grooving**

*The proposed grooving pattern shall be submitted to the Engineer, for approval, prior to setting out.*

*Groove width shall be not less than 5mm and not more than 8mm. Groove depth shall not be less than 4mm and not more than 8mm. Spacing shall be at not less than 38mm centres and not more than 50mm centres. No grooves shall deviate more than 15mm from set out lines.*

*All contaminants shall be intercepted and disposed of in accordance with the requirements of CSS: Part 1 – General.*

### **23.3 Finished Surface**

*The grooved surface shall be clean, free from staining, dust, sand, grit or any other material associated with the grooving. No slurry material produced from the grooving shall be allowed to dry on the carriageway, especially in new grooves, or in the side channels. All spoil shall be removed from the site.*

### **23.4 Measurement of Work and Basis of Payment**

Payment shall be per m<sup>2</sup> of grooved carriageway, to the nearest m<sup>2</sup>, and shall include setting out of the approved grooving pattern, protection of all sumps, stormwater outlets and service boxes from contamination with the grooving slurry and removal of all material resulting from the grooving.

## **24.0 EXCESS BITUMEN REMOVAL ON CARRIAGEWAYS**

### **24.1 Scope of Work**

This specification is for the removal of excess bitumen by high-pressure waterblasting on chipsealed carriageways.

Limits of work shall be marked or defined by the Engineer.

### **24.2 Waterblasting**

*All areas of carriageway with a sand circle diameter greater than 200mm shall be treated. The final treated surface shall have an average sand circle diameter not greater than 190mm with no sand circles greater than 200mm.*

*All contaminants shall be intercepted and disposed of in accordance with the requirements of CSS: Part 1 – General.*

### **24.3 Finished Surface**

*The waterblasted surface shall be clean, free from excess bitumen, sand, grit or any other material associated with the waterblasting. No waste material produced from the waterblasting shall be allowed to dry on or adhere to the carriageway or the side channels. All spoil shall be removed from the site.*

### **24.4 Testing**

Sand circle tests to NZTA T/3 shall be carried out at the frequency of not less than one per 30m lane length with a minimum of three sand circles to be carried out on any treated area.

#### **24.5 Measurement of Work and Basis of Payment**

Payment shall be per m<sup>2</sup> of carriageway treated, to the nearest m<sup>2</sup>, and shall include protection of sumps, stormwater outlets and service boxes from contamination with the waste material, removal and disposal of all material resulting from the waterblasting, testing and reinstatement of any road markings affected by the works.

### **25.0 TRAFFIC SIGNS**

#### **25.1 Scope of Work**

This specification is for the erection of signs for the control of traffic and the information of road users.

#### **25.2 Regulatory and Permanent Warning Sign Materials**

*Traffic signs shall comply with the Traffic Control Devices Manual except where amended below.*

*All reflectorised surfaces shall be Class 1 High Intensity Prismatic (HIP) 3M retro-reflective sheeting and signs shall be the minimum size specified unless amended below. Fastenings shall not damage or cover the reflective material.*

*All Regulatory signs shall have a substrate of 2.0mm marine grade 5251 aluminium and the reflectorised surface shall be 3M VIP reflective sheeting. Regulatory Speed (RS) 1, 2 and 3 signs shall be a minimum of 750mm diameter. All Regulatory Priority (RP), Regulatory Direction and Placement (RD), Regulatory Road User Restrictions (RJ), Regulatory Lane Use (RL) and Regulatory General Supplementary (RG) signs shall be stiffened by two Signfix small channels.*

*P21 "Bus Stop" signs shall be double sided and the reflectorised surface shall be High Intensity Prismatic reflective sheeting. All other Regulatory Parking signs shall be non-reflective. Regulatory Parking signs with a blue background shall be constructed using 3M blue Scotchcal as the background and may be mounted by 6mm diameter bolt, washer and Nylock nut or similar and neoprene washer to protect the sign face.*

*All Permanent Warning (W) signs shall have a substrate of 2.0mm marine grade 5251 aluminium and be stiffened by two Signfix small channels. All other Permanent Warning (W) signs shall be a minimum size of 750mm x 750mm with the corresponding supplementary plate size.*

*All Non-motorised User Warning Signs (WU) signs shall have the background colour 'fluorescent yellow-green' and the reflectorised surface shall be 3M VIP reflective sheeting.*

*Chevron board signs shall have a substrate of 2.0mm marine grade 5251 aluminium and be stiffened by two Signfix small channels. These signs shall be as specified, to the “Transit New Zealand Manual of Signs and Markings”.*

Double-sided signs (i.e. speed signs) may require external frames allowing them to be either side mounted (to an existing pole) or bottom mounted (to the top of an existing or new post).

The EC film shall be have the symbols cut out of it prior to being placed over the VIP diamond graded sheeting

### **25.3 Street Name Signs**

#### **25.3.1.1.1. Blade Dimensions**

Street name sign blade depths should be nominally:

- 250mm for all intersections on or with major arterial roads,
- 225mm for all other streets, and
- 150mm for supplementary street name plates e.g. No Exit and Private

*All street name blades shall be extruded aluminium (6063T6) of 3mm web thickness with strengthened flange top and bottom (I-section) and square ends.*

*The street name blade finish shall be completely weather resistant and corrosion proof for the life of the sign.*

#### **25.3.1.1.2. Blade Colours and Reflectorisation**

*The background colour shall be blue and the lettering and chevron shall be white.*

*Reflectorisation shall be Class 1 retro-reflectivity. The lettering and background shall have the same reflectorisation with the same class of materials.*

#### **25.3.1.1.3. Lettering Style and Size**

*Lettering shall be Transport Medium and in title case. Letters shall be central on the street name blade and the letter height shall be nominally:*

- 150mm on 250mm blades
- 125mm on 225mm blades, and
- 100mm on 150mm blades (for “No Exit”, “Private” and property numbers).

*To aid conspicuity, lettering shall be no closer to the outside edge of the blade than 50% of the letter height and a 50mm border of background colour above and below the lettering shall be provided.*

*If the sign would exceed 1200mm in length where full letter widths are used, the character width, stroke width and spacing width of the letters may be reduced by no more than 15%.*

#### 25.3.1.1.4. Mounting

*Mounting for street name signs shall ensure that the blades are held rigidly in place. They shall be mounted and maintained with the blades horizontal and with the blade faces in a vertical plane.*

All street name signs and supplementary street name sign plates are typically double sided and end mounted. However a street name sign may be single sided where it only needs to be visible from one approaching direction. For T-intersections, a single sided sign with arrows pointing in each direction is permitted and shall be centre mounted on a single post. The sign layout shall comply with SD 662.

Signs with long road names, which cannot be reduced enough to fit to the 1200mm blade or are unable to be split into two lines, should be placed on single-sided signs with a length of up to 1500mm centrally mounted on a single post. Where a street name sign is centrally mounted and the street name would normally be double sided, then two single sided blades shall be installed so that no part of the sign is obscured.

Where more than one street name sign is mounted on the same pole, the road with higher status or is a through route shall be positioned above the sign for the road with lower status or is a terminating route.

*All street name signs shall be mounted on Council owned assets.*

#### 25.3.1.1.5. Location of Street Name Signs

Where possible street name signs should be located within the area formed by the intersecting road reserve boundaries. Signs should be oriented in the direction of the street or road to which they apply. From all other approaches they should be clearly visible to drivers and pedestrians over at least the distances given in Table 1, under both day and night conditions. Where trees, street curvature, large kerb radii or other factors make it difficult to comply with consistency in sign location, visibility requirements shall take precedence.

Table 1 : Required Visibility for Street Name Signs

Operating Speed (km/h)	Visibility Distance (metres)
50	70
60	90

70	110
80	130
90	150
100	170

Separate, frangible posts should be used for mounting street name signs, although existing Council utility poles or streetlighting columns may be used where these enable the above visibility and location criteria to be met.

Street name signs should be as close as possible to the traffic stream without being vulnerable to damaging passing vehicles, or being damaged by vehicles. Measured from the end of the sign nearest the traffic stream, signs should be at least 500 mm behind the kerb face on kerbed streets, 500 mm behind the kerb face on islands or medians with mountable kerbs, or 600 mm from the shoulder edge on unkerbed roads or streets.

It is generally recommended that signs be no more than 1500 mm behind the kerb face or shoulder edge (provided the mounting post does not obstruct the footpath). There are obvious exceptions to this requirement such as double-sided signs on wide medians, signs on the central island at roundabouts, and signs applying to through routes and located at the head of 'T' intersections.

The number and location of signs required at a particular intersection will depend on factors such as street classification, traffic volume and complexity of the surroundings. Good guidance for recommended sign locations is provided in TCDM Part 2 Section 7 "Street Name Signs".

#### **25.4 Fastenings**

*All Regulatory and Permanent Warning signs shall be supplied complete including Signfix brackets with 19mm mounting straps, buckles and clips for fixing to metal, concrete or wooden posts.*

*Street name blades, for fixing to metal posts, shall be supplied complete including Signfix brackets. Street name blades, for fixing to wooden posts, street light or power poles, shall be supplied fitted with a minimum of two 19mm stainless steel mounting straps, buckles and clips.*

#### **25.5 Posts**

*Wooden posts shall be H4 treated 100mm x 100mm posts, dried to 20–24% moisture content. Posts shall be painted with two coats of white paint. Wooden posts shall only be used in rural locations.*

*Sign posts shall be installed in accordance with SD 647. The post shall be vertical. The excavation for the post shall be restored to the existing construction in accordance with the requirements for that particular type of work.*

*Where the signage surface area exceeds that shown in SD 647, use the table in RSMA Compliance Standard for Traffic Signs to determine the concrete footing design.*

*Signfix posts shall be installed in accordance with SD 635 Detail B, with a ground socket installation depth as specified. The ground socket shall protrude between 30mm – 35mm above the finished ground level.*

### **25.6 Sign Installation**

*All traffic signs shall conform with the Traffic Control Devices Manual to except where otherwise specified in Part 6 Roads.*

*All signs shall be located where specified. The sign shall be attached in accordance with clause 25.4 - Fastenings.*

*RD6L (Keep Left), RD6R (Keep Right), and WL1 (Diverge) signs shall be mounted on Signfix fluted posts, 60mm diameter, 1.2m long with a top cap and a 400mm ground socket. The posts shall be powder coated white with a hexagonal stainless fixing bolt.*

*RP1 (Stop) and RP2 (Give Way) signs shall be mounted as specified on Signfix fluted posts, 76mm diameter, with a top cap and a 400mm ground socket. The posts shall be powder coated white with a hexagonal stainless fixing bolt.*

*Regulatory Parking signs shall be mounted on 60.3mm diameter galvanised pipe, with a top cap.*

*Guide Signs shall be installed as specified.*

### **25.7 Removal of Surplus Signs**

*Surplus signs shall be delivered to the Christchurch City Council Pages Road Store.*

*All old banding shall be removed.*

### **25.8 Measurement of Work and Basis of Payment**

#### **25.8.1.1.1. Sign Installation**

Payment shall be by lump sum or unit rates as specified and shall include all necessary additional fixings.

25.8.1.1.2. Relocation of Signs

Payment shall be by item and shall include all work involved.

25.8.1.1.3. Removal of Surplus Signs

Payment shall be by lump sum.

## **26.0 ROAD MARKING, RAISED PAVEMENT MARKERS, KERB MARKERS AND EDGE MARKERS**

### **26.1 Scope of Work**

This Specification is for the installation of pavement markings, coloured surfacing, raised pavement markers, kerb markers and edge markers on sealed and paved surfaces and kerbs.

### **26.2 Markings Specification**

All road markings shall conform to “Transit New Zealand Manual of Traffic Signs and Markings Parts I and II” except where otherwise specified in Part 6 Roads.

### **26.3 Materials**

Roadmarking paint, raised pavement markers, kerb markers and edge markers shall be approved materials.

### **26.4 Roadmarking**

Pavement markings shall conform to “Transit New Zealand Manual of Traffic Signs and Markings” except that:

- centrelines, lane lines, cycle lane lines, edge lines, continuity lines and right turn bay taper lines shall be reflectorised.
- limit lines, holding lines, pavement word messages, flush median bars and right run bay bars shall not be reflectorised.
- where a no stopping restriction exceeds 10m, a 1m stripe, and 2m gap shall be used.
- cycle lane markings shall be as shown on the drawings.
- cycle symbols shall be as shown on SD 661 and SD 663. The scale factor used on paths shall be  $X = 35$ , resulting in a cycle logo 630mm wide and 980mm high and a scale factor used on roads shall be  $X = 50$ , resulting in a cycle logo 900mm wide and 1400mm high.

The installation of roadmarking shall be in accordance with NZTA P/12 except where superseded by SD 641-644 and SD 659.

Flush medians shall be marked prior to the construction of traffic islands located within these medians.

*Intersection ‘Stop’ and ‘Give Way’ marking, and fire hydrants shall be remarked within 24 hours of final surfacing. All other roadmarking shall be remarked within 24 hours of carriageway sweeping where the final surfacing is chipseal or 48 hours of final surfacing otherwise.*

*All roadmarking on newly sealed surfaces shall be remarked between 3 and 6 months after the application of the new seal.*

## **26.5 Coloured Surfacing**

### **26.5.1.1.1. Surfacing Specification**

*Coloured surfacing shall be in accordance with NZTA P33:2017 “Specification for Coloured Surfacing” except as amended below.*

*Limits of work shall be marked on construction plans and/or defined on site by the Engineer.*

### **26.5.1.1.2. Nominal Colour Requirements**

Colour	AS 2700S Colour	Surfacing Use
Nominal Green	G26 Apple Green	Bus, Transit Lanes and Cycle Only Lanes
Nominal Red	R13 Signal Red	Road humps, platforms, and pedestrian crossings. Background colouring for speed limit thresholds and advance warning marking
Nominal Blue	B24 Harbour Blue	Mobility Parks
Nominal Yellow	Y14 Golden Yellow	

*Throughout and at the end of the defects liability period, the colour of the surfacing shall remain as per the colour of the submitted and approved colour swatch submitted at tender or prior to the surfacing being laid.*

Where there is disagreement on colour assessment by the specified method of approximate match, an instrument such as a Minolta chromameter (CIE 1931, D65/45/)) shall be used for assessment and the colour surfacing shall be within the approximate rectangular colour space with CIE (x, y) co-ordinates as follows :

- The initial green colour must be defined within an approximate trapezoidal colour space with the co-ordinates :
- (0.32, 0.50)      (0.33, 0.38)    (0.30, 0.36)    (0.19, 0.41)

- During and at the end of the defects liability period, the green colour must lie within the following space :
- (0.32, 0.50) (0.33, 0.38) (0.30, 0.35) (0.19, 0.41)
- The initial red colour must be defined within an approximate trapezoidal colour space with the co-ordinates :
- (0.47, 0.38) (0.56, 0.37) (0.45, 0.32) (0.54, 0.32)
- During and at the end of the defects liability period, the red colour must lie within the following space :
- (0.45, 0.38) (0.56, 0.37) (0.42, 0.33) (0.54, 0.32)
- 

#### 26.5.1.1.3. Materials

Coloured surfacing materials that will be considered for approval include calcined bauxite coloured natural stone and glass.

*The surfacing material and substrate shall be produced and applied with an expectation of eight years life with zero or minimum maintenance for epoxy or polyurethane based surfacing and two years life with zero or minimum maintenance for emulsion based surfacing. The coloured surfacing shall be capable of withstanding normal street cleansing / sweeping operations, including mechanized and vacuum brooming as well as high-pressure water cleaning.*

*All materials used for coloured surfacing shall be free from lead, arsenic, and other hazardous residual chemicals and shall be Ultraviolet (UV) stable over the life of the coloured surfacing. The coloured surfacing aggregate shall consist of clean, dry, hard, tough, durable grains of either calcined bauxite material or glass, of uniform quality, and free from dust, dirt, and other deleterious materials.*

*Calcined bauxite shall be comprised of moderately sharp grains. It shall be one sized with a minimum 95% passing a 2.36mm sieve and a maximum 5% passing a 1.18mm sieve. Glass shall be comprised of cubic material and contain no glass shards. It shall be one sized with a minimum 95% passing a 2.36mm sieve and a maximum 5% passing a 0.6mm sieve.*

#### 26.5.1.1.4. Substrate Preparation

*Stormwater contamination shall be prevented and all discharges shall be controlled in accordance with CSS: Part 1 - General.*

*Sawcuts that exist due to the installation of detector loops shall be masked with tape. The total width of such masking shall not exceed 50mm. The masking tape shall be installed / applied to ensure that the coloured surfacing is not placed over the detector loop sawcuts.*

*Manholes, utility covers, bridge joints, sewer air vents, etc shall be masked or covered and have taped and square edges which when removed have no more than a 50mm reveal. The masking tape and cover shall be installed / applied to ensure that the coloured surfacing is not placed over items or features to be protected.*

26.5.1.1.5. Trees

*All work in the vicinity of trees shall be carried out in accordance with CSS: Part 1 - General. The Contractor shall ensure that all trees in the street remain undamaged and unaffected during surfacing.*

26.5.1.1.6. Protection of Work

*The Contractor shall take all necessary precautions to protect the work from damage, until such time as the new coloured surfacing has developed sufficient strength to carry normal traffic without damage. Traffic shall be kept off the coloured surfacing for either the minimum time recommended by the binder manufacturer or a longer period as necessary to ensure curing of the binder is complete.*

*Prior to opening the site to traffic:*

- all masking and tape shall be removed, and
- all pavement markings, pavement delineation, RRPMs, fire hydrant markings, devices and systems etc shall be reinstated as they existed at the start of the works prior to the coloured surfacing being applied.

*The site shall not be opened to general traffic until the Contractor and Engineer agree that it is neat, tidy, safe, free from excess aggregate, and suitable for trafficking.*

26.5.1.1.7. QA Record Sheet

*The Contractor shall populate the Coloured Road Surfacing Record Sheet (refer Appendix 2) during the laying of the coloured surfacing. This forms part of the Contractor's quality assurance process and shall be provided with the handover documents at Practical Completion.*

26.5.1.1.8. Testing Requirements

Coloured surfacing shall be tested at installation, the end of the defects liability period and two years after installation, for compliance with clause 26.5.2 – Nominal Colour Requirements.

Skid Resistance shall be tested for compliance at installation, the end of the defects liability period and two years after installation. See NZTA P33 Specification for

coloured pavement surfacings, 14.3.2 Surface Friction, Table 14.1 for compliance criteria.

Test frequency and locations are as specified in the contract documents.

#### **26.6 Raised Pavement Markers**

*The installation of raised pavement markers shall conform to NZTA P/14. Markers shall be installed as soon as possible after the construction of the kerbs.*

#### **26.7 Kerb Markers**

*The installation of kerb markers shall be in accordance with the manufacturer's requirements. Kerb markers shall be installed with a presentation angle of 90° to the approaching traffic and located where specified. Markers shall be installed by the specified time.*

Refer to standard detail SD 664 or plans for dimensions.

#### **26.8 Edge Markers**

*The installation of edge markers shall conform to NZTA P/16. Markers shall be installed as soon as possible.*

#### **26.9 Setting Out**

*In addition to Clause 9 of NZTA P/12 and Clause 3 of P/14 the Contractor shall obtain the Engineer's approval to the layout and line of the pilot markings before applying paint or markers to the finished surface.*

#### **26.10 Removal of Painted Markings and Pavement Markers**

*Chemical removal and blacking out of roadmarking paint is not acceptable.*

*The disposal of contaminants from the removal of roadmarking paint shall be in accordance with CSS: Part 1 - General.*

*The Contractor shall repair any damage to the paved surface caused by the removal of paint and pavement markers. Any repairs necessary shall be carried out on the same day that the damage occurred and at the Contractor's expense.*

*The Contractor shall remove any redundant pavement markers.*

#### **26.11 Measurement of Work and Basis of Payment**

Where new markings are reflectorised, rates shall include the application of two coats of paint - a first or under coat and a reflectorised second coat.

26.11.1.1.1. Roadmarking

Payment shall be by lineal metre, to the nearest 0.2m, by m<sup>2</sup>, to the nearest 0.1m<sup>2</sup>, or by item as specified. Dashed line lengths include the gap length.

The rate shall include remarking on new seals in accordance with clause 26.4 – Roadmarking.

26.11.1.1.2. Coloured Surfacing

Payment shall be paid per m<sup>2</sup>, to the nearest m<sup>2</sup>, for areas that meet the acceptance criteria. This shall include preparation of the surface including sweeping, cleaning or removal of detritus and deleterious materials; removal of RRPMs; protection of detector loops, manholes, utility covers, bridge joints, sewer vents, etc; traffic and parking control; supply, application or installation of coloured surfacing; and sweeping, removal and disposal of surplus chip.

The provision of surface design, RAMM top surface records and QA Record Sheet shall be included in this rate.

26.11.1.1.3. Coloured Surfacing Roadmarking and Delineation Reinstatement

Reinstatement of all pavement markings, pavement delineation, RRPMs, fire hydrant markings, devices and systems etc. shall be paid as a lump sum or under scheduled rates as defined elsewhere in this document, whichever is stated in the contract.

26.11.1.1.4. Coloured Surfacing Testing

The cost of testing shall be included in the coloured surfacing rate.

26.11.1.1.5. Raised Pavement Markers

Payment shall be in terms of NZTA P/14.

26.11.1.1.6. Kerb Markers

Payment shall be per marker and shall include supply and installation.

26.11.1.1.7. Edge Markers

Payment shall be in terms of NZTA P/16.

26.11.1.1.8. Removal of Road Marking

Payment shall be by lump sum and include protection of all sumps, stormwater outlets and service boxes from contamination with the slurry. It shall also include the disposal of material resulting from the removal and repair of any damage to the paved surface.

26.11.1.1.9. Removal of Pavement Markers

Payment shall be by item and include repair of any damage to the paved surface.

**27.0 AS-BUILT RECORDS**

The Contractor shall provide Council with as-built records to the requirements set out in CSS: Part 1 clause 5.0 – Quality Assurance

**COMPLIANCE REQUIREMENTS CHECKSHEET - ROADING**

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
<b>1</b>		<b>CONCRETE KERBS AND CHANNELS</b>						
	Pt 6 4.2	Sawcutting	Inspect	All limits sawcut				
	Pt 6 4.2	Foundations	Inspect	Foundations sound				
	Pt 6 4.2	Foundation filling	MDD by ND	Over 2100 kg/m <sup>3</sup> , 75% over 2150 kg/m <sup>3</sup>				
	Pt 6 4.3	Reinforcement	Inspect	Part 3, clause 12.3				
	Pt 6 4.3	Formwork	Inspect	Part 3, clause 12.4				
	Pt 6 4.3	Concrete strength	NZS 3109	20 MPa at 28 days				
	Pt 6 4.3	Concrete slump	NZS 3109	75mm slump				
	Pt 6 4.3	Concrete finish	NZS 3114	U3 finish				
	Pt 6 4.4	Contraction joints	Measure	max 6m spacing, each side of cutdown, each stormwater				
	Pt 6 4.5	Cross section dimensions	Measure	±5mm				
	Pt 6 4.5	Level	Measure	±5mm of design				
	Pt 6 4.5	Horizontal alignment	Measure	Max 5mm gap, cumulative total gap under 10mm for 3m straightedge along kerb face. Within 10mm of design plan location				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 4.6	Stormwater outlet	Inspect	Installed with pouring of kerb, invert to invert				
<b>2</b>		<b>ASPHALTIC CONCRETE PATHS, CROSSINGS AND CYCLEWAYS</b>						
	Pt 6 6.2	Sawcutting	Inspect	All limits sawcut				
	Pt 6 6.2	Foundations	Inspect	Foundations sound, design CBR achieved				
	Pt 6 6.3	Batten level	Measure	± 10mm				
	Pt 6 6.3	Pegs	Measure	5mm below batten				
	Pt 6 6.3	Batten location	Measure	Max 5mm gap, cumulative total gap under 15mm for 3m straightedge along batten. Within 10mm of design plan location				
	Pt 6 6.4	Weed growth	Inspect	No weed growth for 12 months				
	Pt 6 6.5	Metalcourse materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 6.5	Metalcourse surface shape	Measure	15mm below batten or kerb, 25mm if commercial, 20mm below finished level. Max 10mm gap, cumulative total gap under 25mm for 3m straightedge.				
	Pt 6 6.5	Metalcourse surface density	Clegg Hammer	Over 25, over 35 for commercial crossing				
	Pt 6 6.6	Tack coat application	Inspect	Surface clean				
	Pt 6 6.6	Tack coat materials	NZTA M/1	Complies with specification				
	Pt 6 6.6	Tack coat application	Measure	Uniform minimum rate of 0.25 l/m <sup>2</sup>				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 6.7	Asphaltic concrete material	CSS Part 1	Complies with specification				
	Pt 6 6.7	Asphaltic concrete placement	Measure	Air voids between 2.5% and 11%. 20mm depth, 30mm for commercial.				
	Pt 6 6.7	Asphaltic concrete joints	Inspect	Right angles to batten or kerb, tack coated, butt joint				
	Pt 6 6.8	Asphaltic concrete surface	Measure	5mm above batten or kerb, not holding water.				
	Pt 6 6.8	Asphaltic concrete surface	Measure	Longitudinal max 5mm gap, cumulative total gap under 10mm for 3m straightedge for cycleways, 20mm otherwise. Transverse max 5mm gap, cumulative total gap under 7mm for 1m straightedge for cycleways, 10mm otherwise.				
	Pt 6 6.9	Surface boxes adjustment	CSS Part 1	Adjusted as specified				
<b>3</b>		<b>CONCRETE PATHS AND CROSSINGS</b>						
	Pt 6 7.2	Sawcutting	Inspect	All limits sawcut				
	Pt 6 7.2	Foundations	Inspect	Foundations sound, design CBR achieved				
	Pt 6 7.2	Foundation materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 7.3	Formwork	Inspect	Complies with NZS 3109. Removed before backfilling				
	Pt 6 7.3	Place formwork	Measure	Within 10mm of design level and location. Max 5mm gap, cumulative total gap under 10mm for 3m straightedge on face				
	Pt 6 7.4	Concrete materials	NZS 3109	(N) Normal concrete, 20MPa, 19mm max aggregate				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 7.4	Concrete materials	Inspect	Polypropylene in commercial crossing concrete				
	Pt 6 7.5	Concrete depth	Measure	100mm for paths, 150mm residential				
	Pt 6 7.5	Concrete placement	Inspect	Complies with NZS 3109.				
	Pt 6 7.5	Concrete finish	NZS 3114	U5, constructed with path crossfall				
	Pt 6 7.5	Concrete joints	NZS 3109	Created within 24 hours, 3m centres Right angles to kerb				
	Pt 6 7.6	Concrete surface	Measure	5mm above kerb, not holding water, max crack width 2mm				
	Pt 6 7.6	Concrete surface	Inspect	All edges chamfered				
	Pt 6 7.6	Concrete surface	Measure	Longitudinal max 5mm gap, cumulative total gap under 20mm for 3m straightedge. Transverse max 5mm gap, cumulative total gap under 10mm for 1m straightedge.				
	Pt 6 7.7	Protect concrete	Inspect	Until 20MPa strength achieved				
	Pt 6 7.9	Surface boxes adjustment	CSS Part 1	Adjusted as specified				
<b>4</b>		<b>GRITTED PATHS</b>						
	Pt 6 8.2	Foundations	Inspect	Foundations sound, design CBR achieved				
	Pt 6 8.3	Batten level	Measure	± 10mm				
	Pt 6 8.3	Pegs	Measure	5mm below batten				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 8.3	Batten location	Measure	Max 5mm gap, cumulative total gap under 15mm for 3m straightedge along batten. Within 10mm of design plan location				
	Pt 6 8.4	Weed growth	Inspect	No weed growth for 12 months				
	Pt 6 8.5	Metalcourse materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 8.5	Metalcourse surface density	Clegg Hammer	Over 25				
	Pt 6 8.6	Metalcourse surface shape	Measure	Level with batten or kerb and not holding water. Longitudinal max 5mm gap, cumulative total gap under 20mm for 3m straightedge. Transverse max 5mm gap, cumulative total gap under 10mm for 1m straightedge				
	Pt 6 8.7	Surface boxes adjustment	CSS Part 1	Adjusted as specified				
<b>5</b>		<b>REPAIRS TO PATHS (WHERE DIFFERENT FROM CLAUSE 6)</b>						
	Pt 6 9.2	Cutting back berms	Inspect	Existing redundant vegetation sprayed fortnight prior				
	Pt 6 9.4	Metalcourse surface shape	Measure	20mm below batten or kerb, 30mm if commercial. Max 10mm gap, cumulative total gap under 25mm for 1m straightedge.				
	Pt 6 9.5	Stormwater repairs	Inspect	Sawcut excavation, complies with CSS Part 3, pipe cleaned out.				
	Pt 6 9.8.2	Asphaltic concrete resurfacing depth	Measure	15mm nominal, 10mm min				
	Pt 6 9.11	Berm restoration	Inspect	Topsoil placed within fortnight of resurfacing				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
<b>6</b>		<b>INTERLOCKING CONCRETE BLOCK, COBBLESTONE PAVING AND TACTILE PAVERS</b>						
	Pt 6 10.2	Paving materials	NZS 3116	Complies with specification				
	Pt 6 10.2.1	High pedestrian paving materials	Measure	Complies with 10.2.1				
	Pt 6 10.3	Sawcutting	Inspect	All limits sawcut				
	Pt 6 10.3	Foundations	Inspect	Foundations sound				
	Pt 6 10.4	Edge treatments	Inspect	Vertical faces.				
	Pt 6 10.4	Edge treatment line	Measure	Max 5mm gap, cumulative total gap under 10mm for 3m straightedge on face.				
	Pt 6 10.4	Edge treatment location and level	Measure	±10mm. 30-50mm when within road.				
	Pt 6 10.5	Weed growth	Inspect	No weed growth for 12 months				
	Pt 6 10.6	Metalcourse materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 10.6	Metalcourse surface shape	Measure	Not holding water. Max 8mm gap, cumulative total gap under 25mm for 3m straightedge.				
	Pt 6 10.6	Footpath metalcourse surface density	Clegg Hammer	Over 25, over 35 for commercial crossing				
	Pt 6 10.7	Subbase metalcourse materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 10.7	Subbase metalcourse filling	MDD by ND	Over 2150 kg/m <sup>3</sup>				
	Pt 6 10.7	Subbase metalcourse surface level	Measure	-25mm, +5mm				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 10.7	Subbase metalcourse surface	Measure	Max 25mm gap for 3m straightedge and camber board. Not holding water.				
	Pt 6 10.8	Basecourse materials	NZTA M/4:AP40	Complies with specification				
	Pt 6 10.8	Basecourse filling	MDD by ND	Over 2150 kg/m <sup>3</sup>				
	Pt 6 10.8	Basecourse surface level	Measure	-5mm, +15mm, ±5mm at edges				
	Pt 6 10.8	Basecourse surface shape	Measure	Max 12mm gap, cumulative total gap under 25mm for 3m straightedge and camber board. Not holding water.				
	Pt 6 10.8	Basecourse surface texture	Inspect	Uniform, dense, stable				
	Pt 6 10.9	Paving	NZS 3116	Complies with specification				
	Pt 6 10.9	Cutting pavers	Inspect	Waste water controlled				
	Pt 6 10.9.1	Tactile paving	Inspect	Complies with RTS 14				
	Pt 6 10.10	Joints	Measure	Min 2mm, max 5mm, average 3mm, filled with sand				
	Pt 6 10.10	Paving surface level	Measure	±10mm, min 2mm, max 5mm above edge or kerb, not holding water, max 2mm between level adjacent blocks				
	Pt 6 10.10	Paving surface shape	Measure	Max 8mm gap, cumulative total gap under 15mm for 3m straightedge unless designed.				
	Pt 6 10.11	Surface boxes adjustment	CSS Part 1	Adjusted as specified				
<b>7</b>		<b>CARRIAGEWAY AND SHOULDER CONSTRUCTION AND REPAIRS</b>						

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 11.2	Sawcutting	Inspect	All limits sawcut				
	Pt 6 11.2	Foundations	Inspect	Foundations sound				
	Pt 6 11.3	Subbase metalcourse materials	<i>Specify</i>	<i>Specify</i>				
	Pt 6 11.3	Subbase metalcourse filling	MDD by ND	Over 2150 kg/m <sup>3</sup>				
	Pt 6 11.3	Subbase metalcourse surface texture	Inspect	Uniform, dense, stable, well drained				
	Pt 6 11.3	Subbase metalcourse surface level	Measure	-25mm, +5mm				
	Pt 6 11.3	Subbase metalcourse surface	Measure	Max 25mm gap for 3m straightedge and camber board. Not holding water.				
	Pt 6 11.4	Basecourse materials	NZTA M/4:AP40	Complies with specification				
	Pt 6 11.4	Basecourse filling	MDD by ND	Over 2150 kg/m <sup>3</sup>				
	Pt 6 11.4	Basecourse surface level	Measure	-5mm, +15mm, ±5mm at edges				
	Pt 6 11.4	Basecourse surface shape	Measure	Max 12mm gap, cumulative total gap under 25mm for 3m straightedge and camber board. Not holding water.				
	Pt 6 11.4	Basecourse surface texture	Inspect	Uniform, dense, stable				
	Pt 6 11.4	Basecourse strength	NAASRA/ Benkelman Beam	<i>Specify</i>				
	Pt 6 11.5	Surface boxes adjustment	CSS Part 1	Adjusted as specified				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
<b>8</b>		<b>CARRIAGEWAY MAINTENANCE (WHERE DIFFERENT FROM RELATED CLAUSES)</b>						
	Pt 6 13.3	Texturised surface texture	Measure	Grade 5 < 170mm, grade 6 < 185mm				
	Pt 6 13.4	Repairs and shape correction	Measure	Max 5mm gap, cumulative total gap under 10mm for 3m straightedge. Not holding water.				
	Pt 6 13.8	Excess seal at manholes	Inspect	Level with manhole top and surrounding road surface				
<b>9</b>		<b>GEOTEXTILES AND GEOGRIDS</b>						
	Pt 6 14.2	Materials	NZTA F/7	Complies with specification				
	Pt 6 14.3	Installation	NZTA F/7	Complies with specification				
<b>10</b>		<b>CARRIAGEWAY CHIPSEALING</b>						
	Pt 6 15.2	Binder materials	NZTA M/1	Complies with specification				
	Pt 6 15.2	Binder supply	AS/NZS ISO 9001	Provide quality records				
	Pt 6 15.2	Adhesion agents	NZTA M/13	Complies with specification				
	Pt 6 15.2	Sealing chip	NZTA M/6	Complies with specification				
	Pt 6 15.3	Seal design	NZTA P/17	Provide design prior to application				
	Pt 6 15.3	Sprayer	NZTA E/2	Complies with specification				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 15.3	Seal application	NZTA P/17	Complies with specification, except as amended by clause 15. Supply seal records within 5 days				
	Pt 6 15.4	Chipseal surface shape	Inspect	Convex, mate-ins flush				
	Pt 6 15.4.1	First coat seal texture	Measure	Complies with table in clause 15.4.1				
	Pt 6 15.4.2	Reseal seal texture	NZTA P/17	Complies with clause 13				
	Pt 6 15.5	Trees	Inspect	No binder within 600mm of tree, no damage				
	Pt 6 15.6	Stockpiles	Inspect	Removed at end of day				
	Pt 6 15.6	Surplus chip	Inspect	Road kept free of excess chip				
	Pt 6 15.7	Roadmarking reinstatement	Inspect	Roadmarking reinstated within 24 hours of sealing or sweeping, as specified				
<b>11</b>		<b>SLURRY SEALING</b>						
	Pt 6 16.2.1	Tack coat materials	NZTA M/1	Complies with specification				
	Pt 6 16.2.2	Bitumen emulsion materials	NZTA M/1	Cationic emulsion				
	Pt 6 16.2.3	Type 1 slurry aggregate materials	NZS 4407	Complies with grading, polished stone and sand equivalent specification				
	Pt 6 16.2.4	Type 2 slurry aggregate materials	NZS 4407	Complies with grading, polished stone and sand equivalent specification				
	Pt 6 16.2.5	Type 1 slurry materials	measure	Complies with residual asphalt, aggregate weight, break time and abrasion loss specification				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 16.2.6	Type 2 slurry materials	CSS Part 6 15.2.6	Complies with residual asphalt, aggregate weight, break time and abrasion loss specification				
	Pt 6 16.3	Mixing equipment	Inspect	Proof of calibration prior to use				
	Pt 6 16.3	Spreading equipment	Inspect	Applies slurry at specified rate. Spreader box is clean				
	Pt 6 16.3	Roller	Inspect	Minimum weight of 7 tonnes over 7 tyres.				
	Pt 6 16.4	Slurry conditions	Inspect	Temperature above 15°C, will not freeze, or be rained on.				
	Pt 6 16.5	Surface preparation	Inspect	Surface sound, clean				
	Pt 6 16.5	Stormwater protection	Inspect	Runoff controlled				
	Pt 6 16.6	Tack coat application	Inspect	Where required only, excess tack coat removed				
	Pt 6 16.7	Slurry application	Inspect	Surface moistened at 0.1 – 0.2 l/m <sup>2</sup> . No free water remains.				
	Pt 6 16.15. 2	Sampling	Measure	Slurry complies with specification				
	Pt 6 16.8	Finished surface	Inspect	Smooth, continuous, uniform, homogeneous				
	Pt 6 16.9	Curing	Inspect	Not trafficked until cured				
	Pt 6 16.10	Finished surface depth	Measure	Type 1 compacted depth 3.5mm + 1mm, - 0. Type 2 compacted depth 5.5mm ±1mm				
	Pt 6 16.11	Trees	Inspect	No slurry within 600mm of tree, no damage				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 16.12	Stockpiles	Inspect	Removed at end of day				
	Pt 6 16.12	Working items and materials	Inspect	Remove at end of day				
	Pt 6 16.13	Roadmarking reinstatement	Inspect	Intersection and fire hydrant roadmarking reinstated within 24 hours of sealing. All other marking within 48 hours				
	Pt 6 16.14	Surface boxes adjustment	CSS Part 1	Adjusted as specified				
<b>12</b>		<b>PAVING FABRIC</b>						
	Pt 6 17.2	Paving fabric materials	Inspect	Complies with manufacturer's specification				
	Pt 6 17.3	Tack coat application	Inspect	Surface clean				
	Pt 6 17.4	Tack coat materials	Inspect	Complies with manufacturer's specification				
	Pt 6 17.4	Tack coat application	Measure	Complies with manufacturer's specification				
	Pt 6 17.4	Fabric installation	Inspect	Complies with manufacturer's specification. No wrinkles. Laid immediately after tack coat.				
<b>13</b>		<b>LAYING ASPHALTIC CONCRETE ON CARRIAGEWAYS</b>						
	Pt 6 18.2	Tack coat application	Inspect	Surface clean				
	Pt 6 18.2	Tack coat materials	NZTA M/1	Complies with specification				
	Pt 6 18.2	Tack coat application	Measure	Uniform minimum rate of 0.15 l/m <sup>2</sup>				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 18.3	Asphaltic concrete material	CSS Part 1	Complies with specification				
	Pt 6 18.3	Asphaltic concrete placement	Measure	Air voids between 2.5% and 6%, 8% on joins. Max layer depth 60mm AC20, 50mm AC14, 30mm AC10.				
	Pt 6 18.4	Asphaltic concrete joints	Inspect	All uncompleted joints protected over night, cold joints bandaged				
	Pt 6 18.5	Asphaltic concrete surface	Measure	5mm above fender or kerb, not holding water.				
	Pt 6 18.5	Asphaltic concrete surface	Measure	Longitudinal max 5mm gap, cumulative total gap under 10mm for 3m straightedge. Transverse max 5mm gap for 1m straightedge.				
	Pt 6 18.5	Asphaltic surface	NAASRA	Max 75mm/km, average 55mm/km for new work. Max 90mm/km, 65mm/km overlays				
	Pt 6 18.6	Roadmarking reinstatement	Inspect	Roadmarking reinstated within 24 hours of sealing or sweeping, as specified				
	Pt 6 18.7	Surface boxes adjustment	CSS Part 1	Adjusted as specified, within 72 hours. Fire hydrants always accessible.				
<b>14</b>		<b>CARRIAGEWAY SHAPE CORRECTION WITH EMULSION MIX</b>						
	Pt 6 19.2	Emulsion mix material	Inspect	Details provided 7 days before laying.				
	Pt 6 19.3	Tack coat application	Inspect	Surface clean				
	Pt 6 19.3	Tack coat materials	NZTA M/1	Complies with specification				
	Pt 6 19.3	Tack coat application	Measure	Uniform minimum rate of 0.15 l/m <sup>2</sup>				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 19.3	Asphaltic concrete placement	Measure	Air voids between 2.5% and 6%, 8% on joints. Max layer depth 60mm AC20, 50mm AC14, 30mm AC10.				
	Pt 6 19.4	Emulsion mix joints	Inspect	All uncompleted joints protected over night				
	Pt 6 19.5	Asphaltic concrete surface	Measure	0-5mm above fender or kerb				
	Pt 6 19.5	Asphaltic concrete surface	Measure	Longitudinal max 5mm gap, cumulative total gap under 10mm for 3m straightedge. Transverse max 5mm gap for 1m straightedge.				
	Pt 6 19.5	Asphaltic surface	NAASRA	Max 100mm/km, average 75mm/km for <1200 ADT. Max 90mm/km, 70m/km >1200 ADT.				
	Pt 6 19.6	Surplus chip	Inspect	Road swept prior to removal of speed restrictions				
	Pt 6 18.7	Roadmarking reinstatement	Inspect	Roadmarking reinstated within 24 hours of sealing or sweeping, as specified				
	Pt 6 19.8	Surface boxes adjustment	CSS Part 1	Adjusted as specified, within 72 hours. Fire hydrants always accessible.				
<b>15</b>		<b>CARRIAGEWAY SMOOTHING WITH POROUS ASPHALT</b>						
	Pt 6 20.2	Asphalt material	NZTA P/11	Complies with specification				
	Pt 6 20.2	Asphaltic concrete placement	Measure	Temperature over 10°C.				
	Pt 6 20.3	Tack coat application	Inspect	Surface clean				
	Pt 6 20.3	Tack coat materials	NZTA M/1	Complies with specification				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 20.3	Tack coat application	Measure	Uniform minimum rate of 0.15 l/m <sup>2</sup>				
	Pt 6 20.2	Asphaltic concrete placement	Measure	Air voids between 2.5% and 6%, 8% on joins. Max layer depth 60mm AC20, 50mm AC14, 30mm AC10.				
	Pt 6 20.4	Asphaltic concrete joints	Inspect	All uncompleted joints protected over night				
	Pt 6 20.5	Asphaltic concrete edge treatment	Inspect	Fender treated in accordance with SD 617				
	Pt 6 20.6	Permanent ramps	Inspect	Materials and placement complies with Part 6 clause 18.				
	Pt 6 20.6	Permanent ramp placement	Inspect	Joint vertical, straight. Ramp keyed into existing surface				
	Pt 6 20.7	Asphaltic concrete surface	Measure	0-5mm above fender or kerb				
	Pt 6 20.7	Asphaltic concrete surface	Measure	Longitudinal max 5mm gap, cumulative total gap under 10mm for 3m straightedge. Transverse max 5mm gap for 1m straightedge.				
	Pt 6 20.7	Asphaltic surface	NAASRA	Max 75mm/km, average 55mm/km for new work. Max 90mm/km, 65mm/km overlays				
	Pt 6 20.8	Roadmarking reinstatement	Inspect	Roadmarking reinstated				
	Pt 6 20.9	Surface boxes adjustment	CSS Part 1	Adjusted as specified, within 72 hours. Fire hydrants always accessible.				
<b>16</b>		<b>PAVEMENT CRACKFILLING</b>						
	Pt 6 21.2	Crackfilling materials	Measure	Complies with specification.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 21.3	Surface preparation	Inspect	Cracks clean and dry, under 5mm width				
	Pt 6 21.4	Crackfilling application	Inspect	Sealant hot, bandage 100mm wide, 2mm thick, sanded				
	Pt 6 21.5	Maintenance	Inspect	Swept within 48 hours				
<b>17</b>		<b>COLD MILLING</b>						
	Pt 6 22.2	Milling process	Inspect	Waste water controlled, waste removed				
	Pt 6 22.2	Milling process	Inspect	Backfilled edges vertical, edges protected overnight				
	Pt 6 22.3	Finished surface	Measure	0m, +5mm specified depth. Max 5mm gap longitudinal for 3m straightedge, transverse for 1m straightedge.				
<b>18</b>		<b>GROOVING</b>						
	Pt 6 23.2	Grooving pattern	Inspect	Approved prior to work				
	Pt 6 23.2	Grooving process	Measure	Width 5-8mm, depth 4-8mm. Spacing 38-50mm. Grooved within 15mm of set out lines.				
	Pt 6 23.2	Grooving process	Inspect	Waste water controlled, waste removed				
	Pt 6 23.3	Finished surface	Inspect	Clean of dust and slurry				
<b>19</b>		<b>EXCESS BITUMEN REMOVAL</b>						
	Pt 6 24.2	Waterblasting area	NZTA T/3	Max sandcircle 200mm, average 190mm				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 24.2	Waterblasting process	Inspect	Waste water controlled, waste removed				
	Pt 6 24.3	Finished surface	Inspect	Clean of dust and spoil				
<b>20</b>		<b>TRAFFIC SIGNS</b>						
	Pt 6 25.2	Regulatory and Permanent Warning sign materials	NZS 5414, NZTA manual	Complies with specification				
	Pt 6 25.3	Street sign materials	Inspect	Complies with specification				
	Pt 6 25.4	Fastening materials	Inspect	Complies with specification				
	Pt 6 25.5	Post materials	Inspect	Complies with specification				
	Pt 6 25.5	Post installation	Inspect	All posts to SD 647				
	Pt 6 25.6	Sign installation	NZTA manual	Complies with specification				
	Pt 6 25.6	Sign installation	Inspect	Located where specified, mounted using specified materials				
	Pt 6 25.7	Surplus signs	Inspect	Old signs and banding removed				
<b>21</b>		<b>ROADMARKING AND MARKERS</b>						
	Pt 6 26.2	Marking layout	NZTA manual, CSS	Complies with specification				
	Pt 6 26.3	Roadmarking materials	Inspect	Materials comply with 'approved materials' list				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 6 26.4	Roadmarking installation	NZTA P/12, SD 659, 641- 644	Complies with specification				
	Pt 6 26.4	Cycle roadmarking installation	NZTA P/12, SD 650, 663, 661, 663	Complies with specification				
	Pt 6 26.4	Roadmarking installation	Inspect	Flush medians painted before traffic islands constructed				
	Pt 6 26.5	RPM installation	NZTA P/14	Complies with specification, installed asap				
	Pt 6 26.6	Kerb marker installation	SD 664	Complies with manufacturer's specifications, at right angle to traffic, where specified and by specified time				
	Pt 6 26.7	Edge marker installation	NZTA P/16	Complies with specification, installed asap				
	Pt 6 26.8	Set out	Inspect	Approval gained before marking or installation				
	Pt 6 26.9	Marking and marker removal process	Inspect	Removal complete, damage repaired				
	Pt 6 26.9	Paint removal process	Inspect	Waste water controlled, waste removed				