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SECTION 15 : ROADMARKING

15.1 GENERAL

This section covers all aspects of roadmarking, as well as the supply and fixing of reflective and/or non-reflective road studs and delineators, and the removal of roadmarking as required.

The latest version of NZ Transport Agency Specifications shall be deemed to form part of the Technical Specifications, except as modified or qualified hereafter.

NZTA M/6	Specification for Sealing Chip
NZTA M/7	Specification for Roadmarking Paint — White & Yellow
NZTA M/7	Notes to Specification for Roadmarking Paint
NZTA M/12	Specification for Raised Pavement Markers
NZTA M/20	Specification for Long Life Roadmarking Materials
NZTA M/20	Notes to Specification for Long Life Roadmarking materials
NZTA M/24	Specification for Audio Tactile Profiled Road Markings
NZTA P/12	Specification for Pavement Marking
NZTA P/12	Notes to Pavement Marking
NZTA P/14	Specification for Installation of Raised Pavement Markers
NZTA P/22	Specification for Reflectorised Pavement Marking
NZTA T/8	Specification for Roadmarking Applicator Testing
NZTA T/12	Specification for Long-Life Pavement Marking Material Applicator Testing

The latest versions of the following publications are also to be read as part of this specification.

TCD Rule	Land Transport NZ - Traffic Control Devices Rule 2004 - Schedules
NZTA	Guide to Urban Roadmarking
NZTA MOTSAM	Manual of Traffic Signs and Roadmarking — Part II
RTS 4	Guidelines for Flush Medians
NZTA COPTTM	Code of Practice for Temporary Traffic Management
NZRF Manuals	Industry 'Best Practice'

15.2 SETTING OUT AND TIMING

The Contractor is to set out the proposed roadmarking in accordance with the approved drawings, and any location marking out provided by the Engineer, with modifications as necessary to make the "lines" pleasing to the eye. Roadmarking layout on plans shall take priority where they differ from the NZTA "Manual of Traffic Signs and Markings"

The Engineer's approval of the set out is required prior to marking. In order to achieve this with least delay the contractor shall liaise with the Engineer and give at least 48 hours notice of when the setting out will be ready for Council to approve or amend.

Roadmarking which has been applied without approval of the set out and needs amending (in Council's opinion), shall be removed, at no cost to Council

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On new surfaces marking of centreline, limit lines and other intersection markings such as Give Ways is to be completed within 48 hours of completion of surfacings. For roads that are not open to traffic, such as new subdivisions, these markings are to be completed before the road is opened to the public. Other markings on new surfaces are to be completed within 7 days of surfacing. For other works such as line removals or maintenance remarks timing will be specified by the Engineer.

15.3 PAINT TYPES

Unless specified otherwise by the Engineer, all roadmarking shall be carried out with one of the following paint types. All paint shall have type approval to NZTA M/7 Class A. All technical data pertaining to the paint and reflective beads shall be supplied as part of the tender documentation including information on product life cycle, including verification of NZTA M/7 type approval .

- Local roads - Alkyd paint, or similar
- Collector roads - Waterborne/Acrylic paint, or similar
- Arterial roads - Long Life or Waterborne/Acrylic paint, or similar
- New markings - Alkyd paint, or similar

The road hierarchy is as defined in the HCC District Plan.

15.3.1 Alkyd Paint

Alkyd paint shall be applied in accordance with NZTA P/12 and NZTA M/7, with the following amendments:

Clause 13.1 (a) NZTA P/12: 2000 — replace with:

"The finished dry film thickness shall be 180 microns or greater as defined by the equation in NZTA P/12 : 2000."

15.3.2 Waterborne/Acrylic Paint

Waterborne paint shall be applied in accordance with NZTA P/12 and NZTA M/7, with the following amendments:

Clause 13.1 (a) NZTA P/12: 2000 — replace with:

"The finished dry film thickness shall be 300 microns or greater as defined by the equation in NZTA P/12 : 2000."

All waterborne/acrylic markings are to be Reflectorised.

15.3.3 Chlorinated Rubber

Chlorinated Rubber or similar paint shall be applied in accordance with NZTA P/12 and NZTA M/7, with the following amendments:

Clause 13.1 (a) NZTA P/12: 2000 — replace with:

" The finished dry film thickness shall be 220 microns or greater as defined by the equation NZTA P/12: 2000. "

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All chlorinated rubber markings are to be Reflectorised.

15.3.4 Long Life

Where long life or thermoplastic materials are specified they shall be supplied and applied in accordance with NZTA M/20 specification. The type of longlife material proposed to be used and details of type approval to NZTA M/20 specification shall be submitted with any tender or proposal.

15.3.5 New Markings

New markings will be painted with alkyd or similar paint as per 3.1 of this section with the following amendments:

Clause 13.1 (a) NZTA P/12 : 2000 — replace with:

“The finished dry film thickness shall be 250 microns as defined by the equation in NZTA P/12 : 2000.”

The Contractor may use waterborne or acrylic paint for new markings where the Contractor deems it more efficient to do so, but payment will be based on use of alkyd paint. Alkyd paint must be used on sites that are to be remarked with thermoplastic/long life products at a later date.

15.3.6 Reflectorisation

When markings are specified to be reflectorised this shall be carried out in accordance with NZTA P/22 specification.

15.4 T/8 & T/12 CERTIFICATES & STAFF COMPETENCE

All roadmarking equipment used for applying paint and glass beads shall have current NZTA T/8 certification.

All roadmarking equipment used for applying long life or thermoplastic shall be certified as complying with NZTA T/12 certification.

The senior operator of each roadmarking crew must have at least a minimum qualification approved by the Industry Training Organisation (ITO). At least one person in each roadmarking crews shall be a qualified Traffic Controller (TC) in accordance with Code of Practice for Temporary Traffic Management.

15.5 RAISED PAVEMENT MARKERS (RPM)

All reflectorised pavement markers are to be glass faced (long life) or equivalent with NZTA M/12 type approval. Alternative products will be considered by the Engineer but must be supported with the appropriate technical data.

All pavement markers are to comply with NZTA M/12 (and NZTA M/12 notes). Installation of raised pavement markers shall comply with NZTA P/14, the MOTSAM (latest edition), and any subsequent NZTA document (e.g. RTS 4 "Guidelines for Flush Medians"). Further to this, the Engineer may require specific RPM layouts in certain locations.

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Where 'Active' RPMs are specified these shall incorporate solar panels and LED lights so that they do not rely on reflected light. A suitable device is the Solarlite S Series marketed by Integrated Traffic Solutions. Other devices that deliver similar results may be acceptable but prior approval for their use must be sought from the Engineer, accompanied by full technical data.

15.6 REMOVAL OF ROADMARKING

When redundant roadmarkings require erasure the Engineer will specify the method to be used.

15.6.1 Removal

When 'removal' is specified the roadmarking material (paint or thermoplastic) shall be removed from the road surface. Typical methods include grinding, sandblasting (wet or dry) and ultra high pressure water cutting but other methods will be considered. Care shall be taken so that damage is not caused to the underlying road surface and that 'ghosting' of the marking does not occur. Once complete, the surrounding area shall be swept clean of all sand, paint chips or other debris. This material shall be suitably disposed of by the Contractor. The Contractor is to ensure that no solid matter can enter any waterway or stormwater system as a result of the removal operation. This could require the placement of filters or similar on catchpits etc.

Details of methodology, including materials to be used, equipment, staff skills and qualifications and quality assurance shall be supplied with tenders or proposals.

15.6.2 Paint Blackout

When short term or semi permanent erasure is adequate the redundant markings may be specified to be overpainted with black paint. The paint material shall be one of the paint types specified in Clause 15.3 and should ideally be the same type as the underlying marking. The colour of the paint should be a near match with the colour of the adjacent road pavement. The 'Blackout' shall overlap the edges of the redundant marking. The edge of the overlap should be irregular to minimise the amount of 'ghosting' of the old marking — particularly in wet conditions.

15.6.3 Cold Applied Plastic Blackout

Permanent erasure of markings may be specified to be carried out with cold applied plastic (CAP) material. Existing long life markings or multilayered paint markings should be ground off before applying CAP Blackout. The base coat shall be a 2 component cold plastic designed and formulated for use as a roadmarking material and generally complying with NZTA M/20 specification. The CAP shall be pigmented to a grey or charcoal colour that is close to the colour of the existing road surface. The product shall be mixed and applied in accordance with manufacturer's instructions. Where the area to be blacked out abuts markings that are to remain the edge of the blackout shall be masked off, otherwise an irregular edge to the blackout is desirable to minimise any ghosting effect.

While the plastic material is still wet crushed stone or grit shall be evenly broadcast onto the base.

The grit shall be a sound crushed mineral or synthetic aggregate with 95% passing a 6.7mm BS sieve and no more than 15% passing a 2.36mm BS sieve. The CAP material

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thickness and grit size shall be matched so that approximately 60% of the grit depth is embedded into the plastic material.

The aggregate shall have a maximum of 2% weak materials when tested using the Australian Weak Particles Test (AS 1141.32:1995).

15.7 HIGH FRICTION OR COLOURED AGGREGATE SURFACING

15.7.1 Overall Requirements

High friction or coloured aggregate surfacings are to be applied at locations specified by the Engineer. Both surfacing types generally use a specialised aggregate bonded to the road surface in an epoxy or polyurethane resin so are included in the same specification.

Proprietary surfacing systems shall be applied in accordance with the manufacturer's specification and by the manufacturer's approved applicators.

Documents that relate to this section are:
NZTA — M/6: 2002 Specification for Sealing Chip

All technical documentation regarding the proprietary product or system to be used shall be submitted at the time of tender.

15.7.2 Binder

The binder shall be a suitable epoxy, polyurethane or other approved proprietary product compound. When used in conjunction with coloured aggregates the binder shall be pigmented to the same colour as the aggregate. Thermo plastic binders shall not be used. The cured binder shall be flexible so that it does not crack or delaminate under traffic loadings on non-rigid pavements.

The binder shall be capable of holding the aggregates so they do not become embedded or dislodged under heavy braking.

15.7.3 High Friction Aggregate

The aggregate shall be calcined bauxite or equivalent, which has a PSV greater than 70 when tested in accordance with BS 812: Part 114.

The grading of the aggregate shall be as follows:
less than 5% retained on 4.75mm BS sieve
less than 5% passing 1.18mm BS sieve

The aggregate shall be clean and free of foreign matter. The aggregate shall comply with NZTA M/6 strength, shape and weathering resistance requirements.

15.7.4 Coloured Aggregate

The aggregate shall be a chemically inert, semi translucent, synthetic aggregate that complies with shape, strength and weathering requirements of NZTA M/6 specification and is coated with colouring compound(s) to produce the specified colour. A suitable product is Synthite® manufactured by Omnicrete Pty Ltd. however alternative materials or methods that achieve similar results may be proposed.

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The grading of the aggregate shall be as follows:
less than 5% retained on 4.75mm BS sieve
less than 5% passing 1.18mm BS sieve

The aggregate and binder system shall be designed to achieve a high level of colour retention and resistance to both traffic abrasion and weather such that colour is substantially intact and effective for at least 5 years from initial installation. The aggregate shall have a minimum PSV value of 50 when tested in accordance with BS 812: Part 114. The surfacing must be capable of being cleaned by high pressure water jet to remove dirt grime and debris in order to restore the colour.

15.7.5 Surface Preparation

The surface shall be clean of any dust, detritus or loose matter. Any oil visible on the surface shall be removed by washing with a detergent solution, followed by flushing with clean water or other suitable system.

The surface is to be completely dry before application of the binder.

All existing roadmarking, pavement markers, catchpits and kerbing shall be suitably masked so that only the road surfacing is coated.

The suitability of application to the pavement at the sites specified shall be discussed with the Engineer using the manufacturer's guidelines.

15.7.6 Mixing, Batching and Application

The Contractor shall follow the manufacturer's guidelines for the mixing, batching and application rates of product unless otherwise directed by the Engineer.

15.7.7 Curing & Aftercare

All maskings are to be removed together with the binder adhering to it. During the curing period, no disturbances or trafficking of the treated surface will be permitted.

The cure time shall be to the manufacturer's recommendations as required under the particular site conditions.

Before trafficking excess chip shall be removed. The Contractor will be required to remove any subsequent chip which may have eroded off the treatment.

15.7.8 Performance

The minimum performance requirements are:

SCRIM Value — shall be at least 0.7 ESC or as specified.

Aggregate Retention — a visual assessment of the surfacing shall be performed to assess the level of coverage and retention. Aggregate retention shall be assessed by determining coverage on any 300mm x 300mm area. The surface shall be rejected if any 3 locations have less than 95% chip coverage.

Texture Depth — the surfacing shall be rejected if any 3 locations have a mean profile depth of 1.0 mm or less (105mm sand circle if determined in accordance with NZTA T/3 specification).

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Cracking/Delamination/Sliding — the surfacing shall be rejected if there are any of the above conditions present at the end of the 3 month defect liability period.

15.7.9 Cleaning

When cleaning of existing high friction or coloured surfacing is required a high pressure water jet or other suitable means shall be used to remove all dirt, grime, debris etc from the surface. Care must be taken to avoid damage to the surfacing.

15.8 COLOURED MARKINGS

When specified some markings may be required in colours other than white or yellow. Typical applications are green cycle way markings or Bus Only lanes. Actual colours will be specified at the time. Such markings shall use one of the paint types specified in clause 15.3 coloured to the specified colour. Paint application shall be in accordance with the relevant clauses of this specification.

15.9 TEMPORARY MARKINGS

When specified temporary markings may be required that can easily be removed when no longer needed. Such markings shall be capable of withstanding normal road traffic and weather conditions for a period of at least 3 months, or longer if specified. When no longer required the markings shall be removed without causing damage to the underlying road surface.

Full details of materials proposed for temporary markings, their method of application and removal and typical properties shall be supplied with any tender or proposal for use. All materials shall be handled and applied in strict accordance with manufacturer's specifications and datasheets. In particular all environmental precautions must be adhered to.

Typical methods of temporary marking include 'removable paint' and self adhesive road marking tape.

15.10 NON STANDARD MARKINGS

15.10.1 Cycle Symbols

The cycle symbol shall be set out as per [Traffic Control Devices Rule](#) diagram M2-3 scaled to be 1200mm or 800mm high as required.

15.10.2 Cycleway 'End'

Cycleway 'End' shall be painted at the end of cycle lanes along with a cycleway symbol, where directed. 'End' shall be 600mm high x 900mm long.

15.10.3 Cycleway Hold Bars

Cycleway hold bars are used at signalised intersections with advance cycle 'stop-boxes'. The cycleway hold bars shall be 100mm wide with 200mm gap. Refer to drawing TS 368.

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15.10.4Speed Cushions

The approach faces of speed cushions shall be painted with reflectorised white triangles approximately 600mm high x 600mm base width. If necessary the width of the triangles shall be varied so that there are at least 3 triangles on each speed cushion and the depth varied to be the full depth of the tapered approach face of the speed cushion.

15.10.5Pedestrian Platforms

The faces of raised pedestrian crossing platforms and full width speed control devices shall be marked with white reflectorised cross hatching as dimensioned in [Traffic Control Devices Rule](#) Diagram M4-2.