PILOT SPECIFICATION FOR CALCINED BAUXITE

1. SCOPE

This is a performance-based specification for calcined bauxite applied with non-bituminous binder on an appropriate substrate. The expectation is that the surfacing (including the substrate) will have a life of 6 to 8 years with zero or minimal maintenance.
This specification applies where the substrate is provided by the principal or the Contractor.

2. DEFINITIONS

2.1 Calcined bauxite

For the purposes of this specification, calcined bauxite refers to the entire system of calcined bauxite applied with non-bituminous binder on an appropriate substrate to provide high skid resistance.

Calcined bauxite comprises the following components:

- Binder
- Aggregate
- Compatible Primer (when appropriate)
- Catalyst (as a binder component or optional additive)
- Substrate surface preparation
- Installation equipment
- Installation
- Health & Safety plan
- The substrate

2.2 10m Section

For the purposes of this specification, a 10m section is any 10 m length of lane or shoulder.

2.3 Defects

A defect is any area of surfacing or substrate that fails to meet the requirements of this specification.

2.4 Equilibrium SCRIM Coefficient (ESC)

Equilibrium SCRIM Coefficient (ESC) is the SCRIM Coefficient, SC, adjusted for within year and between year variations.

2.5 SCRIM

SCRIM (Sideway-force Coefficient Routine Investigation Machine) is a machine which provides a reliable method of measuring skid resistance of roads under wet conditions. The New Zealand machines are capable of testing both wheelpaths of long lengths of road at highway speeds and are designated SCRIM+. The + referring to additional instrumentation to measure macrotexture, roughness, rutting, gradient, curvature and GPS location.

2.6 SCRIM Coefficient (SC)

SCRIM Coefficient (SC) is the SCRIM measured low speed skid resistance or microtexture at the time of measurement. It has been corrected for normal load, temperature and travel speed.

3. PERFORMANCE REQUIREMENTS

The calcined bauxite is required to achieve, for the duration of the Defects Liability Period:

- the minimum specified level of skid resistance for both microtexture (Equilibrium SCRIM Coefficient) and macrotexture
- the minimum specified levels of material retention

The substrate shall be strong enough to resist failure planes through the substrate.

3.1 Defects Liability Period

Throughout the Defects Liability Period the calcined bauxite shall meet the performance criteria.

A Defects Liability Period of two years shall apply to all Contract Works, except that the final ESC measurement shall be taken at the time of the next appropriate NZTA High Speed Data Contract (HSDC), which may be up to 30 months after application.

3.2 Skid Resistance

Acceptance of the calcined bauxite skid resistance shall be by SCRIM+ methodology as employed within the NZTA HSDC.

3.2.1 Equilibrium SCRIM Coefficient

During the Defects Liability Period the calcined bauxite shall provide a minimum ESC of 0.65 across at least 95% of all 10 m sections, and shall exceed 0.60 across all 10 m sections.

3.2.2 Macrotexture

The calcined bauxite shall provide a minimum macrotexture of 0.9mm Mean Profile Depth (MPD) average over all 10 m sections and a minimum of 0.6mm MPD at any single location. Measurement of macrotexture at single locations may be by sand circle or portable laser based texture measuring instruments. These checks shall only be undertaken where there are clearly areas of low macrotexture.

3.3 Binder and Aggregate Retention/Loss

The performance criteria are:

a) **Failure of Aggregate to Adhere to Binder**
Aggregate Loss shall not exceed 50% on any 100 x 100 mm square within the Site.

b) **Failure of Binder to Adhere to Substrate or Substrate Failure**
Areas where the binder has failed to adhere to the substrate or where failure planes extend through the substrate shall not exceed:

- A total length of 250mm in any 10 m section, measured longitudinally
- An area of 0.15% of any 10 m section
- An area of 0.1% of the entire site.

Should a substrate failure occur, and the substrate has been provided by the Principal, repair of the substrate and associated surfacing will be by the Contractor, with the agreement of the Engineer and at the Principal's cost.

Should a substrate failure occur and the substrate has been designed and provided by the Contractor, repair of the substrate and associated surfacing will be with the agreement of the Engineer and at the Contractor's cost.

3.4 Visual Appearance

The calcined bauxite shall be installed and maintained with the intention of providing a consistent visual appearance. Care shall be taken to ensure all edge lines are straight or smooth curves, and binder is not spilt on the road surface outside the defined area of treatment.

3.5 Loose Aggregate

After temporary traffic management is removed:

- all loose aggregate shall be removed from the surface, the channel, any roadside drainage structures and the shoulder.
- the surface shall be maintained by the Contractor so that no more than:
  - 150g of loose calcined bauxite aggregate is left on any $1m^2$ area of the surface in the first two months of its service life.
  - 50g of loose calcined bauxite aggregate left on any $1m^2$ area of the surface, after two months.

4. MONITORING AND REMEDIAL ACTION

4.1 Monitoring

Throughout the Defects Liability Period the Contractor shall monitor and maintain the surfacing to ensure the performance criteria in Sub-clauses 3.3 and 3.5 are achieved. Generally monitoring may be by driveover but in cases of doubt or when requested by the Engineer a visual inspection on foot or other testing may be required.

Inspection by the Contractor shall be at a minimum of within one month of installation, within the second month after installation and at least 6-monthly throughout the Defects Liability Period to assess compliance with the performance requirements in Clause 3.

Should any defect occur the Contractor shall notify the Engineer of the defect(s) within 48 hours of identification and respond as outlined below in 4.2.

4.2 Defects and Repairs

Should the calcined bauxite fail to meet the requirements of this specification the Contractor shall:

(a) Respond within 24 hours of identification with positive action to mitigate and control the risk to road users (signs and sweeping alone may not be considered as sufficient action in every event)

(b) Programme corrective repairs, inform the Engineer the method of repair and implement as soon as possible. The repairs shall be completed within four weeks or as agreed with the Engineer. These repairs shall restore the full integrity of the surfacing.

All repairs shall be constructed with straight edges (i.e. 'squared off'), generally parallel to the edgeline. In addition, if the repair works include replacement of the substrate, the new material shall be appropriately sealed to the existing adjacent substrate to prevent water ingress.

5. SUPPORTING DOCUMENTATION

A Contractor shall provide the following supporting documentation for the supply and installation of their calcined bauxite system proposed for use in the contract;

(a) Internationally-recognised certification, if available (e.g. Roads and Bridges Agrément Certificate under the British Board of Agrément's Highway Authorities Product Approval Scheme, classified as Type 1).
(b) Written references from local authorities if certification in accordance with (a) above is not available.
(c) Evidence that the resin binder manufacturer, or their New Zealand agent, has agreed to the Contractor's use of their product, and any conditions attached to this.
(d) Test results from at least one calcined bauxite site within New Zealand or overseas which is more than three months old, and comprises the same calcined bauxite system and its components.
(e) Quality Assurance documentation
(f) Health, Safety and Environmental Plan; HSNO Materials Safety Data Sheets (MSDS) which meet the NZ Code of Practice.
(g) Installation Method Statement.