GENERAL SPECIFICATION : MAINTENANCE

1. SCOPE

This specification sets out general requirements and objectives that apply to all TNZ C series specifications and is to be used in conjunction with any other C specification.

2. PAVEMENT MANAGEMENT OBJECTIVES AND STRATEGY

2.1 General Objectives

The effective and cost efficient maintenance of the highway is central to the operation of Maintenance Contracts.

2.2 Programming of Work

Considerable flexibility is provided in the maintenance specifications to enable the Contractor to exercise the first initiative in determining the programme of work.

Effective operation of such programming will necessitate full consideration by the Contractor of the constraints below to minimise reviewing of work and priorities by the Engineer.

The Contractor shall submit to the Engineer well formulated programmes for both short term and long term maintenance works as agreed with the Engineer at the commencement of the Contract.

It is expected that the programmes would cover as a minimum the type, priority and amount of work proposed and the location.

If in the opinion of the Engineer any programme submitted is assessed to contain more than 5 percent of inaccurate or inappropriately programmed tasks or omissions then it will be returned to the Contractor for checking and resubmission within three (3) working days. Errors may relate to either work identification, repair method allocation or prioritisation.

If during the term of the contract more than two (2) programmes require resubmission due to not complying with the above tolerance the Consultant's costs for rechecking the programme may be deducted from payments due to the Contractor.

If during any twelve (12) month period more than four (4) programmes require resubmission due to programming not complying with the above tolerance the contract may be determined.

2.3 Responsibilities

Provision of flexibility for the Contractor to suggest programmes in no way limits the Engineer's responsibility or powers to alter the content or priorities of proposals submitted by the Contractor. In order to minimise TNZ and road user costs within the constraints identified in Clause 2.4 the Engineer shall remain responsible to the Client for the pavement management strategy and as such will maintain sufficient detail of work requirements to verify proposals submitted by the Contractor.

The Engineer shall require the Contractor in certain circumstances to undertake short term temporary maintenance in lieu of permanent maintenance work as part of the maintenance strategy. Should the Contractor be so instructed in writing the liability for the cost of further short term repairs shall be acknowledged by the Engineer.

2.4 Constraints on Work Scheduling

Any decision to undertake works under the Contract and the priority assigned in relation to the total maintenance requirement is determined by the following factors:

(a) The extent of finance available.

(b) Rehabilitation Programme

The rehabilitation programme is maintained by the Engineer and is continually updated.

This programme indicates future preventative maintenance strategies that are proposed for the highway network, indicating location and timing and it will include items such as resealing, shape correction, and reconstruction.

(c) Traffic Safety Service Standards

The economic safety benefits of maintenance work must be considered.

(d) Standard Maintenance Levels of Service

These shall be referred to for guidance when specific instruction is not available within the Technical Specification or other contract document.

They suggest when work is to be carried out and within what response times. They represent a statement of TNZ policy relating to the standard of service that will be available finance permitting.

2.5 Priority Repairs

Repairs shall be classed as priority where:

(a) The safety of road users is compromised.

(b) It is likely that the area of distress will expand or the required repair method changed such that the cost of remedial work will increase.

(c) Subsequent work depends on the completion of the repair.

3. CONTRACTOR TO INSPECT SITE

The Contractor shall inspect the site of the contract works before tender and be fully familiar with the condition of the highway structure as may be applicable to the particular contract requirement.

4. INSPECTIONS

4.1 Formal Inspections

During the contract period the Contractor and the Engineer shall together undertake inspections of all lengths of State Highway within the contract boundaries. These inspections will be as follows:

- an initial inspection within one week of the first contract meeting
- six monthly inspections
- a final inspection within five working days of the due date for completion of the contract.

The purpose of these inspections is to determine the condition of the contract works at the start, during and at the end of the contract period under the Contractor's management. These inspections may involve both day and night inspections as appropriate.

The methods and standard of recording relevant features by the Contractor shall be agreed between the Contractor and the Engineer at the first contract meeting.

The Contractor and the Engineer shall agree on any items that should be noted as being defective. They shall also agree on any items which are defective, but which the Contractor's routine maintenance cannot be reasonably expected to improve. Such agreements will be recorded and may serve as a basis for programming and judgement of the Contractor's performance during the contract period.

4.2 Routine Inspections

The Contractor shall give advance notice in writing to the Engineer or the Engineer's site representative of work required to be inspected. In that notice the elements to be inspected and the date and the time that the work will be completed and available for inspection shall be stipulated. The notice shall be delivered to the Engineer or the Engineer's site representative at least 48 hours before the time that the work is nominated as being available for inspection or as agreed between the Contractor and the Engineer. Should any work not be ready to be inspected within one hour of the time nominated in the notice or agreed by the Contractor and the Engineer, the Engineer or the Engineer's site representative's time and vehicle travel costs shall be reimbursed by the Contractor for any delay beyond one hour, or for any revisits to the site as a consequence of the delay or rework.

4.3 Inspections During Defects Liability Period or on Completion

After being advised by the Contractor that all items under a particular contract have been completed satisfactorily, the Engineer or the Engineer's site representative will make a maximum of two inspections. If, after the first inspection, items are still not properly completed, the Engineer or the Engineer's site representative will so advise the Contractor and will make further inspection(s) as required to accept all the work. All cost incurred by the Engineer or the Engineer's site representative in the third and subsequent inspections shall be reimbursed by the Contractor.

5. MATERIALS AND METHODS

Unless specified otherwise the Contractor shall comply with all relevant and current TNZ specifications in the materials employed on the work and in the methods used for carrying out maintenance work. An up to date list together with copies of these specifications is available at all TNZ Regional offices.

Transit New Zealand requires that Contractors shall undertake the work in a prompt and efficient manner so as to prevent deterioration and maintain the integrity of the highway structure with a minimum effect on road users.

6. QUALITY CONTROL

The Contractor shall take whatever samples, measurement, or any other form of testing which is necessary to be confident that all components of the work comply with the specified requirements before presenting the works for payment purposes.

If the Engineer tests any part of the works and finds that it is not in compliance with the specified requirements, the Contractor shall be liable for the cost of further testing.

7. WORKING HOURS

Unless specified otherwise, the Contractor shall not work on the road during the period from sunset to sunrise or when there is insufficient daylight to render clearly visible a person or equipment at a distance of 100 metres.

An exception is emergency work which may be carried out providing adequate safety lighting and working signs are erected.

8. EXISTING SERVICES

The Contractor shall be responsible for identifying the position of existing services within the area of the contract and shall protect such services from damage during execution of the Contract.

9. REPAIR OF DAMAGE

It shall be the Contractor's responsibility to protect all road surfaces, drainage facilities, traffic aids and the like during the course of the Contract. Traffic aids include signs, edge marker posts, route position pegs, culvert pegs, bridge and hazard markers. Any damage caused to the above which is directly attributable to the Contractor's operations shall be made good at the Contractor's expense.

10. PLANT AND EQUIPMENT

All plant and equipment used on the road shall be highly visible by appropriate painting so that it can be easily identified as maintenance plant by the travelling public.

The plant and equipment shall be matched to the scale of the repair work and shall be operated to avoid damage to the existing road surface or structure adjacent to the repair site.

If any plant, materials or equipment are left within the road reserve after a day's work, they must be positioned at least 2 metres outside the nearest white edgeline and shall be so sited that the road user's view of the road ahead is not obstructed or reduced.

11. SURFACE TEXTURE UNIFORMITY

Maintenance of uniformity of skid resistance characteristics on both wheel paths of any particular lane is considered important, particularly in high demand areas.

The Contractor shall consider this criterion when selecting the chip size to be used in sealing operations and in selecting surfacing for repair work that differs from the adjacent pavement surfacing.

Where it is evident that this requirement cannot be adhered to the Contractor is required to adjust the selection criteria such that general compliance is achieved.

12. ROAD SURFACE SEALING

Much of the repair work associated with maintenance involves chip sealing of the surface of the repair.

Where the first coat seal cannot be applied on the same day the repair has been completed, an emulsion coat may be required to get over the problem of whipoff that occurs when a running course is used to protect the surface. Whipoff can lead to danger to the travelling public and to cyclists and motor cyclists in particular.

The emulsion will soak into the surface of the compacted basecourse and once it breaks will tend to bond the basecourse particles and resist ravelling. Care is needed to ensure that the quantity of emulsion is kept to a minimum so as not to cause bleeding or flushing in subsequent coats.

Where permitted by the Engineer an alternative sealing method using 2 coats of quick breaking emulsion is acceptable.

The Contractor shall be responsible for the repair standard and in particular shall be responsible for choosing binder type, penetration grade, application temperature and rate and the equipment used to apply the binder.

Where the individual area to be sealed is less than $30m^2$, a non-certified distributor may be used provided a uniform application of binder is provided and all end result specification requirements are met.

During spraying of binder or diluent the Contractor shall be responsible for safety precautions and protection of road furniture and users in accordance with TNZ specifications and industry practice.

Rolling may be carried out with any type of rolling equipment except steel vibrating rollers, provided chips are not in any way crushed during the rolling procedure. Rollers which cause chips to be pushed into the pavement course or cause damage to the adjacent pavement are not acceptable.

The Engineer reserves the right to withhold payment where flushing or bleeding of repair work is the result of the Contractor's work method and to arrange for the cost of remedial work to be borne by the Contractor.

13. FLUSHING AND BLEEDING

13.1 General

The following general descriptions of the failure of the surfacing materials termed "flushing" and "bleeding" are intended for clarification purposes.

13.1.1 Flushing

A flushed surface is one in which the binder is approaching or above the mean level of the top of the surfacing aggregate and such that surface texture is lost, and/or water running on the surface drains over the chip rather than through the interstices between them.

13.1.2 Bleeding

Bleeding is the exudation of bituminous binder onto the road surface. A surface that is failing through bleeding is one on which the binder is being picked up on the tyres of passing traffic.

A surface may be flushed to the extent where the binder is above the surfacing aggregate but bleeding does not occur. Bleeding may occur without the presence of any significant flushing.

13.2 Determination of Failure

13.2.1 Performance Based Criteria

To satisfy the performance requirements relating to bleeding and flushing failure, the following requirements shall be met:

(a) The surfacing aggregate shall remain proud of the binder.

(b) The binder shall not be picked up by the tyres of traffic.

(c) The skid resistance shall not deteriorate such that it is significantly lower than that apparent in the same cross section location on the pavement immediately before and after the work.

13.2.2 Measurement Based Criteria

In the event that uncertainty exists in determining acceptability by the above performance based criteria the following measurement based criteria shall be satisfied:

(a) The diameter of the sand circle when measured in accordance with Transit New Zealand Specification T/3 shall be no greater than the following values:

On Asphaltic Concrete Surface	275 mm
On Chip Sealed Surfaces	250 mm

(b) There shall be no evidence of blackening of the surface caused by the presence of binder on the pavement immediately beyond the repair.

13.2.3 Area of Compliance

The above criteria shall apply to the entire surface area of the work, or to any part of it providing the area affected by failure is no less than an area of $0.1m^2$.

14. PREMIXED MATERIALS

14.1 Definition of Premix

Premix includes all bitumen-bound materials, whether hot or cold laid, which have been mixed prior to being placed in the repair area. Bitumen stabilised aggregates are not covered by this specification.

To be classified as premix as opposed to bitumen stabilised aggregate, the mix shall have a binder content greater than 2.5%.

14.2 Hotmix Materials

The requirements for hotmix materials are specified in Transit New Zealand Specifications M/10 and P/11P.

14.3 Other Premixed Materials

14.3.1

Other premix materials shall be designed to meet the service requirements detailed below:

(a) Upon completion of the work the material shall be sufficiently dense and bonded to ensure that it is not displaced, shoved, deformed, or picked up by traffic.

(b) Upon completion of the work and for a period not less than 12 months following, the material shall not bleed or flush.

(c) Any repair shall be uniformly dense and free of segregation.

(d) If the surface of any repair is porous then subsequent sealing of the repair may be necessary to constitute completion. The requirements of Clause 13.3.1(b) above shall then apply to the sealed surface.

14.3.2

The Contractor shall carry out design for the mix in accordance with the procedures set forth for the Marshall Method of Mix design in the second edition of the Asphalt Institute Publication, "Mix Design Methods for Hot-Mix Asphalt Paving", Manual Series **m** 2, using 75 blow compaction. The objective of such design shall be to quantify the stability, air voids ratio and flow achieved in the mix designed to meet the requirements of 12.3.1 above.

The results of testing the material proposed shall be submitted to the Engineer for approval.

The Engineer will require two weeks to approve test results of any proposed material or for any changes to the design of previously submitted material.

Test results and details submitted shall include:

(a) grading of aggregate used in the mix

(b) variations from the designed grading that would normally be permissable without adversely affecting the performance of the mix

(c) details of the type of binder used in the mix

(d) effective binder content of the mix expressed as a percentage by mass of the total mix

(e) stability, air voids and flow values achieved

(f) any special procedures or controls necessary during the laying of the mix essential to ensure that the service requirements are met

It is appreciated that some premix materials comprise materials that do not achieve their designed characteristics immediately or are such that it is difficult to measure these characteristics. In such cases modification as necessary to the method of test to represent better field conditions shall be quantified. The principal objective of presenting these specific test results shall be as a control mechanism and to assist with resolving determination of acceptability.

14.3.3

Suppliers concerned to maintain the confidentiality of the design of their premixed materials may supply the above information directly to the Engineer clearly marking their statement "Confidential".

15. REMOVAL OF SURPLUS MATERIAL AND CLEAN UP

All material surplus to requirements shall be removed to approved spoil dumps and stock pile areas.

No spoil dumps shall be permitted on the road reserve without written approval of the Engineer.

All repaired areas shall be left clean and tidy on completion of the work including removal of loose chip on the surface or shoulders.

16. REINSTATEMENT OF PAVEMENT MARKING

Where the Contractor's maintenance operations removes road markings or raised pavement markers these shall be reinstated in accordance with TNZ Specification P/12

or P/14 respectively. However, if the marking is less than 200m in length the standards may be relaxed by the following:

- The paint roadmarking equipment does not require a TNZ E/3 Certificate and requirements for the roadmarking applicator and any attendant vehicles are deleted..

- If quality assurance is not required by the head contract then it will not be required for the placement of raised pavement markers or the painted road markings.

- Deletion of the requirement for a materials diary.

The cost for this reinstatement work shall be covered in Contract rates submitted for the maintenance work.

Reinstatement of Road Markings shall be carried out in accordance with the following response times:

Lane Lines on dual carriageway Centre Lines Reflective pavement markers Limit Lines Yellow No Passing Lines	within 48 hours of completion of work
Remaining markings	within 1 week of completion of work

The temporary traffic control shall be maintained until completion of all road markings.

17. TRAFFIC CONTROL

At all times during the work or activities included in this specification the Contractor shall take responsibility to ensure all traffic control is carried out in accordance with the Specification for Temporary Traffic Control, TNZ G/1.

18. URGENT WORK

The Contractor may be directed by the Engineer to undertake urgent work and this work shall be undertaken at the normal schedule rates where applicable plus any reasonable cost for establishment at the site of the work.

19. CONTRACTOR'S RECORDS

The Contractor shall keep accurate and legible records of all inspections carried out which may be required at any time.

In addition the Contractor shall submit on a monthly basis (or other such period as may be agreed by the Engineer) a record of all work undertaken within reference station lengths of the highway. The record shall be clear and concise and is required as a permanent maintenance record for the highway.

The provision of such records shall be deemed to be included in the rates for particular contracts and are required before progress claims can be certified.

20. CONTRACTOR'S DISTANCE MEASUREMENT

In order to present accurate records the Contractor shall make all road distance measurements within an accuracy of ±10m of the distance from the nearest ERP. All measuring systems shall be calibrated and regularly checked for accuracy.

21. BASIS OF PAYMENT

Allowance for all work covered by this specification except programming and scheduling shall be deemed to be included in the contract rates.

Payment for programming and work scheduling for all works specified shall be an all inclusive rate per month.

22. PERFORMANCE CRITERIA

The Engineer shall inform the Contractor in writing when, in his opinion, the Contractor is not meeting any of the performance criteria for any particular specification forming part of the Contract.

The Contractor may respond to the Engineer in writing and, providing this is received within 14 days of receipt of the Engineer's letter, the response will form part of the Engineer's Contract report.

The Regional Manager for Transit New Zealand requires regular reports from the Engineer on Contractor's performance throughout the Contract. Copies of correspondence between the Engineer and Contractor and the Contractor's response regarding performance criteria form part of these reports.

The Engineer's reports throughout the Contract and the final report at the end of the Contract will form a record which will be taken into account in assessment of tenders for future maintenance contracts.