12 Digouts

12.1 Scope

This Section sets out the requirements for digout repairs where a structural **pavement** repair is needed.

12.2 Definitions

Terms defined in Table 3.2, Definitions appear in **bold**.

12.3 Response Times

The Contractor must complete all digout repairs, including all surfacing and reinstating **pavement** marking and raised **pavement** markers, by the date shown on the agreed **programme**. In addition:

a) Table 12.1 states the response times for the completion of seal coats following commencement of the repair

b) Table 12.2 states the response time for reinstatement of all **pavement** markings, raised **pavement** markers and removal of all loose chip from site.

Table 12.1: Seal Coats

Class	Response Time	
	First Coat	Second Coat (where required)
M and U	1 Days	1 Month
R1	1 Days	1 Month
R2	2** Days	1 Month
R3	2** Days	1 Month
R4	2** Days	1 Month

Table 12.2: Reinstatement of Roadmarkings, Raised Pavement Markers and Removal of Loose Chip

Class	Response Time		
	Pavement Markings*	Raised Pavement Markers	Removal of Loose Chip*
All Highways	Within 48 hours of completing first coat and, where required, **second coat seals**	Within 72 hours of completing the **second coat seal**, or as specified for **pre-reseal** repairs	Within 48 hours

* Note: All loose chip must be removed prior to reinstatement of **pavement** markings. All **pavement** markings must be reinstated and loose chip must be completely removed from site prior to the removal of temporary traffic control.

** Note: That the finished **pre-reseal** repair, including asphaltic joints, is **flush** with existing **pavement** surfaces and utility covers so as not to create adverse noise and vibration effects.

Where the repair is a **pre-reseal** repair, a **second coat seal** is not required.

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12.4 Specific Requirements

12.4.1. Repair Treatments

A digout is the repair of the existing **pavement** where the repair is undertaken by either of the following methods. If required, the work includes reinstating and/or reconstructing of the adjoining **shoulder**.

12.4.1.1. Digout Repairs

A digout repair includes excavating and replacing the in situ material with:

a) TNZ M/4 basecourse and/or

b) subbase, and/or

c) bitumen bound basecourse, and/or

d) **asphaltic concrete**, and/or

e) geotextile fabric complying with TNZ F/7, and/or

f) any other method and/or materials agreed with the Engineer

and resurfacing with appropriate seal coats constructed as specified in Section 11.

12.4.1.2. Stabilisation Repairs

A stabilisation repair includes stabilising the in situ material and surfacing constructed as specified in Section 11, together with any make up aggregate if required.

12.4.2. Repair Design

The Contractor must design all digout repairs with a minimum design life of 10 years unless indicated otherwise in the Maintenance Intervention Strategy (**MIS**).

The Contractor must have a documented procedure for determining design life including

a) inspection

b) investigation, including laboratory and field testing

c) where appropriate, determining the type and quantity of stabilisation agent and any make up aggregated required to restore grading requirements for the basecourse

d) marking on the **pavement** surface the location and extent of all proposed digout repairs.

If reusing the in situ material is the preferred repair method, the Contractor *must demonstrate* other lower priced methods are inappropriate.

12.4.2.1. Depth of Materials

For backfill of repairs in **pavements** the depth of materials shall meet the repair design requirements defined in Clause 12.4.2. Where the **pavement** depths have not been designed the following shall apply:

a) For digouts up to 200 mm deep, basecourse specified in Clause 12.4.3.4 shall be used. Where a thin **asphaltic concrete** layer is required, the basecourse shall terminate a nominal depth of 20 mm or 2.5 times the maximum **asphaltic concrete** stone size below the finished **pavement** surface, whichever is greater.

b) For digouts deeper than 200 mm, backfill of the top 200 mm shall be basecourse material specified in Clause 12.4.3.4. Backfilling below this depth shall meet the requirements for sub-base backfill defined in clause 12.4.3.3. up to the design **pavement** depth and backfill required below the design **pavement** depth shall meet the requirements for subgrade material specified in clause 12.4.3.2. Where a thin **asphaltic concrete** layer is required, the basecourse shall terminate a nominal depth that is 2.5 times the maximum **asphaltic concrete** stone size below the finished **pavement** surface.

c) For digouts in structural **asphaltic concrete** the depth of **asphaltic concrete** backfill shall match the existing **asphaltic concrete** depth. The type of AC should have properties which are the same or similar to the surrounding AC.

12.4.3. Materials

12.4.3.1. General

All materials used in the repair shall meet the requirements of the appropriate Transit specification, or be approved by the Engineer.

12.4.3.2. Subgrade Backfill

Subgrade material used as backfill shall have permeability no higher than subgrade material surrounding the repair area. The material shall have a soaked CBR value of not less than 10 unless a higher value is specified in the contract documents

12.4.3.3. Sub-base Backfill

Unless otherwise agreed, all subbase material must have a:

a) minimum soaked CBR value of 40

b) maximum aggregate size no greater than 0.4 times the compacted layer thickness

b) sand equivalent of greater than 35, or a sand equivalent of less than 35, but shall be well graded with no more than 10% by mass passing the 0.425mm sieve

12.4.3.4. Basecourse Backfill

All basecourse aggregate must either comply with TNZ M/4, TNZ M/22 or other materials proven suitable for use as a basecourse subject to the Engineer's agreement..

12.4.3.5. Asphaltic Concrete

Thin **asphaltic concrete** shall comply with TNZ M/10 or any other mix approved by Transit's Engineering Policy Manager. A grade 5 chipseal shall be applied to the repair surface before applying the **asphaltic concrete**. There shall be no sufficient windows left between the chip to ensure an adequate bond between the ashpalt and the binder of the chip seal. Unless required in the contract documents, no diluents shall be used.

Structural **asphaltic concrete** shall be in accordance with TNZ M/10 or any other mix approved by Transit's Engineering Policy Manager

12.4.4. Construction

12.4.4.1. Cutting of the Perimeter

The perimeter of repairs shall be cut with suitable cutting equipment before executing the remainder of the work so that the sealed surface outside the perimeter of the repair area is not disturbed to the extent that the bond between the sealed surface and the basecourse is destroyed. Ragged edges will not be permitted.

12.4.4.2. Positive Drainage

Where necessary, positive **drainage** shall be installed and attention paid to any surface **drainage** improvements which may be necessary to ensure the design life of the digout. **Drainage** conduits shall comply with TNZ F/2 and have an internal diameter of not less than 50mm. The cover over **drainage** conduits shall be not less than 200 mm. The material surrounding the conduit shall be free draining and protect adjacent formations from erosion. **Drainage** trenches shall be backfilled and compacted to the same standards as the digout repair it drains.

12.4.4.3. Construction of Subgrade Backfill

The backfilling of the repair area, up to the levels of the subgrade adjacent to the repair shall be carried out in layers which will allow compaction to a standard no lower than the adjacent subgrade.

12.4.4.4. Construction of Sub-base and Basecourse

Sub-base and basecourse backfill shall be placed in layers of uniform thickness and compacted to provide dense, stable layers which do not weave or creep under the action of compaction equipment or road traffic.

12.4.4.5. Stabilisation Repairs

Where stabilisation of the in situ material is required the quantity of stabilising agent(s) shall be thoroughly mixed into the in situ material and compacted to meet the requirements of 12.4.5.2 above.

The stabilisation of repairs need not be limited to using cement or lime as the stabilising additive. However, any alternative **treatments** must be agreed with the Engineer for use in the contract works.

12.4.4.6. Surfacings

Surfacings shall be constructed as specified in Section 11.

12.4.5. Removal of Surplus Material and Clean Up

All material surplus to requirements shall be removed to approved disposal sites and stockpile areas.

No stockpile areas 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**.

12.5 Drainage

The Contractor must pay specific attention to any necessary **routine drainage maintenance** to ensure the service life is provided.

12.5.1. Surface Water Channels

If required, existing **surface water channels** must be either regraded and **trimmed** or new **surface water channels** constructed for a length up to 5m either side of the digout. The **batter** slopes must be generally as shown in Diagram 3.1.

The **surface water channels** must be well graded and shaped so the tie in with the existing **drainage features** is smooth and continuous and water does not pond.

12.5.2. Other Treatments

The Operational Requirements and the Maintenance Intervention Strategy details the specific technical requirements for the other **treatments** and/or materials.

12.6 Performance Criteria

The performance of the Contractor during the contract period will be measured by the following criteria:

a) that all digouts, including all surfacing and reinstating **pavement** marking and raised **pavement** markers, are carried out in accordance with this Specification by the date shown on the agreed **programme,** and within the response times stated.

b) inspections are completed on time and inspection records are available when requested by the engineer.

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d) the repaired digouts maintain a smooth riding surface within the surface deviation tolerances specified for the length of the **defects liability period**.

e) no **flushing**, **bleeding** or **scabbing** of the sealed surface of the digout repair.

f) there shall be no **depressions** in the finished surface that will allow water to pond.

g) the surface shape of repairs shall be such that the existing road crossfall is maintained.

h) repairs shall be constructed to the tolerances in Appendix 2.3.