# CHAPTER 4 -
# ROADING AND LANDSCAPING

## 4.1 EXTRACTS FROM THE DISTRICT PLAN

Refer Appendix 14 Subdivision and Development Standards – Roading & Landscaping

## 4.2 ROADING NETWORK AND DESIGN

### 4.2.1 APPLICATION

Roading drawing – RD –01 gives the minimum requirements in relation to various types of streets, service lanes and private ways.

Roading drawing – RD –02 gives the Standard Location of Services within the berm. Landscaping requirements of the District Plan are in addition to the area of berm taken up by the service locations. The Standard Berm widths are exclusive of landscaping requirements. Such requirements are to be provided in areas of road reserve clear of all services.

The depth and position of the footpath and of all services shown have been fixed by agreement with the Authorities concerned and must be adhered to.

Arterial, commercial and industrial roads will be subject to specific approval.

### 4.2.2 GRADIENTS

These shall be in accordance with the provisions of the Local Government Amendment Act 1979 which generally states that unless otherwise provided for in the Operative District Plan shall be no greater than 1 in 8.

### 4.2.3 CROSSFALL ON CARRIAGEWAY

Normal crossfall of three percent (3%) in both directions from the crown shall be developed on all standard carriageways. However, in exceptional circumstances this requirement may be waived with special approval, but in no case shall be less than two percent (2%) or greater the five percent (5%) from the crown coupled with a lateral shift in the crown of up to one-quarter (¼) of the road width. Where a uniform crossfall is developed from kerb to kerb, this shall not exceed two percent (2%) unless on a curve where super-elevation may be permitted.

### 4.2.4 SUPERELEVATION

Superelevation is not necessary in 50km/h zones or areas that, in the opinion of the Engineer, are likely to become 50km/h zones. Superelevation may however be employed where it suits boundary levels up to the allowable design maximum crossfall. However, certain main routes may in the future have an increased speed limit. If this is a possibility, the Engineer may require superelevation to be constructed to a speed value nominated at the time of the request. In any circumstances the maximum crossfall should not exceed ten percent (10%) where uniform crossfall is developed. Superelevation shall be calculated from N.R.B S2 Tables 1979 (Provisional).

### 4.2.5 KERBLINES

Generally, kerbs will be at the same level on both sides of the street. However, in special circumstances the left-hand and right-hand kerb line may be better graded individually in conjunction with centreline levels, footpath levels and boundary levels. Under such

circumstances at a given cross-section the left-hand and right-hand kerbs may differ from each other in level provided the following standard design tolerances are not exceeded.

**Table 4.1: Maximum difference in kerblines for different widths of carriageways.**

| Width of Carriageway (m) | Maximum Difference in Kerb Line (mm) |
|---|---|
| 7.5 | 140 |
| 8.0 | 150 |
| 8.5 | 160 |
| 11.0 | 175 |
| 13.0 | 200 |

In order to achieve a satisfactory design, it will often be necessary to plot existing centre line and boundary levels as long sections on a separate design sheet at a vertical scale of 1:20 and a longitudinal scale of 1:200. Trial design centre lines and kerb lines should then be plotted and examined in relation to existing boundary and centre lines and existing fixed features such as driveways etc. Where necessary modifications of design lines shall be made to reach a compromise solution matched as closely as possible to all existing features.

Grading shall then be checked visually and if necessary "smoothed" out before final kerb and centre line levels are computed. Final kerb lines and centre lines are then replotted on the engineering plans, the levels being obtained by scaling off the plans of 1:20.

The minimum grade of kerb and channel shall be 0.33% or 1 in 300.

### 4.2.6 HORIZONTAL CURVES

Curves in 50km/h areas may be circular with a minimum radius of 45m on the centre line. In areas that may have a higher speed limit in the future, the Engineer may require Transition curves with a specified speed value. Transition curves shall be computed in accordance with NRB S2 Tables 1979. Widening is not required on circular curves.

At intersections the kerb line shall have a minimum speed vale of 50km/h and a minimum sight distance of 60m as set out in NRB Specification S.2. In areas that may have a higher speed value in the future, the minimum speed value and sight distance shall be determined by the Engineer.

### 4.2.7 VERTICAL CURVES

Vertical curves shall be designed for a minimum speed value of 50km/h and a minimum sight distance of 60m, as set out in NRB Specification S.2. In areas that may have a higher speed value in the future, the minimum speed value and sigh distance shall be determined by the Engineer.

### 4.2.8 SLOPE OF BERMS

The normal slope of the grass berm from kerb to boundary shall be four percent (4%). This slope may vary but shall not be less than three (3%) nor more than ten percent (10%).

In all cases the crossfall on the footpath shall not vary outside the limits of two percent (2%) to four percent (4%).

Where it becomes necessary to employ a berm steeper than eight percent (8%) it will be necessary to produce design gradients for individual property access to show that these may be satisfactorily negotiated by a 99 percentile car as defined in the Transport Department Design tables for clearance at sag or summit crossings.

If the berm is flatter than four percent (4%), a reverse fall footpath shall be used with collector channel discharging into a 300mm x 400mm cesspit connected to the stormwater reticulation. Refer to the Standard Drawings.

### 4.2.9 FORMATION WIDTH

The formation width shall be the full width of the street plus 1.2m, all batters to be in private property. Where a subdivision abuts an existing street that will require earthworks in the course of future upgrading, then provision must be made in the subdivision for 3m wide batter easements on the new subdivision sections. If a batter is not practicable then a contribution must be made for the full cost of a retaining structure to the approval of the Engineer.

### 4.2.10 BATTERS

Cut and fill batters in urban areas shall not be steeper than four (4) horizontal to one (1) vertical or such lesser slope as may be required by the Engineer. The top edge of a fill batter or the toe of a cut batter shall be a least 600mm beyond the road boundary. Where the cut and fill affects excessively large areas or in rural areas steeper batters shall be subject to specific design.

### 4.2.11 CROSSINGS

#### 4.2.11.1 Pram Crossings

Crossings shall be constructed in accordance with NZS 4121: 1985. Also see 4.3.4.1.

#### 4.2.11.2 Vehicle Crossings

See 4.3.5.

### 4.2.12 TURNING CIRCLES

Cul-de-sac turning heads shall be provided generally in accordance with the alternatives shown on the Standard Drawings.

Cul-de-sac heads shall have a minimum turning circle of twelve and a half metres (12.5m outside radius) or shall provide enough clearance for a 95 percentile 8m rigid truck, including the swept area plus 600mm.

Where a cul-de-sac head has a radius of less than 12.5 metres, the kerb and channel design shall include a reinforced concrete beam under the channel as shown on RD14 for industrial crossings.

### 4.2.13 INTERVISIBILITY AT INTERSECTIONS

Intervisibility (i.e. visibility from one street to another) at intersections shall be in accordance with the Standard Drawings. Where a local residential street meets a principal street or local distributor, adequate sight distance both up and down the major route is to be provided to enable traffic to emerge safely from the side street. For a design speed of 50km/h on the major route this will require a clear sight distance of 75m (minimum) from the side street.

### 4.2.14 GRADES AT INTERSECTIONS

Centreline grades at major intersections should be kept below three percent (3%) wherever possible. At an intersection of two streets of differing classifications, the grade of the street having the higher classification should be carried through the intersection, adjusting the grades of the lower classified street accordingly. Generally with the centreline grade of the lower classified street intersecting the crossfall of the main street, the distances from the main road centreline are as given in Table 4.2 below.

**Table 4.2: Distance from the main road centreline for different width roads**

| Road Width (m) | Distance from main Road centreline (m) |
|---|---|
| 13.0 | 3.5 |
| 11.0 | 3.0 |
| 8.5 | 2.5 |

### 4.2.15 STRUCTURAL DESIGN OF PAVEMENTS

#### 4.2.15.1 Introduction

The natural soil profiles in the Rotorua District are primarily of volcanic origin and are hence variable both in location and also within individual soil profiles.

It is therefore not appropriate to provide standard pavement designs or pavement design parameters etc. Individual pavement design is required.

Note:

A pragmatic approach can be used for very low volume pavements based on historical equivalent pavements and soil types, i.e. up to 500vpd and not greater than 1% HCV's.

#### 4.2.15.2 Submission of Test and Design Data

The following information shall be submitted at same time that Engineering Drawings are submitted for approval:

a) All test information obtained to provide a basis for preliminary pavement design, with a reference to origin of design method.
b) Copy of design calculation used to determine pavement thickness.
c) Confirmation of test results and final pavement design to be provided for approval following subgrade construction.

4.2.15.3 Low Volume Roads – 0 – 500 vpd

a) In volcanic ash and sands:
Subject to confirmation required by 4.2.15.2(a). The design can provide for reconstitution of existing soils plus 150mm of rhyolite or 100m M4, with deflection for consistency to be not greater than 3.5mm.

b) <u>All other soils:</u>
Specific design (as for 4.2.15.4 below)

4.2.15.4 Medium Volume Roads – 500vpd – 4000 < 1.5% HCV

Specific design according to State Highway Pavement Design and Rehabilitation (SHPDR) Manual NRB – 1989 is required.

SHPDR – Fig 3. Design Chart to be used only as a guideline and rigorous consideration to be given to the EDA and ESA over the pavement life.

<u>Note:</u> Data is available from RDC of the existing roading network.

NB: EDA or ESA i.e. Equivalent Design Axles or Equivalent Standard Axles.

CBR – a minimum of 5 tests required. Design shall indicate rationale for CBR determination.

4.2.15.5 High Volume Roads - > 4000vpd; > 1.5%HCV's

Design shall principally to be in accordance with State Highway Design and Rehabilitation Manual – NRB – 1989. Other design methods such as: Austroads Pavement Design – A Guide to the Structural Design of Road Pavements and back calculation of existing equivalent pavement performance will be used for design comparison checks.

In all pavement design the EDA or ESA level is to be rigorously determined and the rationale used is to be given.

## 4.2.16 CARRIAGEWAY DESIGN GUIDELINES

**Table 4.3: Basecourse Metal Depth for Low and Medium Volume Roads (0-4000 vpd) urban.**

| **Basecourse[2] Metal Depth[3] (mm)** | | | |
|---|---|---|---|
| **Subgrade CBR[1] (Range)** | **Two Coat Chip Seal[4]** | **25mm Hotmix on 1 Coat Chip Seal[5]** | **80mm Interlocking Pavers[6]** |
| 5[7], <7 | 230[8] | 200[8] | 180[8] |
| 7,<10 | 200[8] | 170[8] | 150 |
| 10,<12 | 170[8] | 140 | 120 |
| 12, <15 | 150 | 120 | 100 |
| 15 or above | 130 | 100 | 80 |

Notes

1. (a) Subgrade testing relating to top 200mm layer. Undisturbed subgrade material (in cut areas) may need to be undercut and recompacted for 400 depth to attain parity with filled areas.

   (b) Laboratory test: Soaked CBR; sample compacted at estimated OMC.

   (c) Test Numbers

| **Test Type** | **Total Carriageway Length (m)** | | | | |
|---|---|---|---|---|---|
| | 50 | 100 | 200 | 400 | Over 500 |
| Laboratory Soaked CBR* | 1 | 2 | 3 | 4 | 5 |

   * If subgrade material is same for entire carriageway, test numbers required can be halved; rounded down.

2. Basecourse metal M4 or M5 for carriageways; GAP 40 for rights of way, vehicle crossings.

3. 'Depth' is compacted depth. This can be verified by "stringing" between tops of kerb after completion of subgrade preparation (also checks subgrade shape) and after basecourse metal preparation.

4. For bi-couche seal Grade 3 chip first coat, and Grade 5 second coat.

   For standard 2 coat seal: Grade 3/5 or 4/6.

5. Hotmix 25mm is compacted depth. First coat seal chip Grade 5.

6. Interlocking Pavers: Holland, concrete. Alternatives require approval from District Engineer.

7. For CBR <5, subgrade unsuitable; require alternative material for subbase layer, as per Registered Engineers requirements.

8. Basecourse formation can be split: Topcourse 100mm (compacted) M4 or M5. Sublayer – Balance GAP 40.

## 4.3 ROADING CONSTRUCTION

### 4.3.1 SUBGRADE DRAINAGE

#### 4.3.1.1 Materials for Porous Drains

Pipes may be earthenware field tiles or any approved perforated pipes of the sizes stipulated by the Engineer. Backfill material shall be 20mm – 5mm clean metal or scoria. Backfill material shall be brought up to subgrade level in all cases. Where the drain is under a carriageway perforated pipes only may be used.

#### 4.3.1.2 Cuttings

Where a road is constructed in a cutting and moisture appears on the face of the cutting, a porous drain shall be constructed at the toe of the batter and connected to the nearest cesspit downstream.

#### 4.3.1.3 Kerb and Channel

In areas where soil is not free draining, a porous drain shall be constructed under both channels and connected into the downstream cesspit. The invert level of the drain shall be a minimum of 500mm below subgrade level.

#### 4.3.1.4 Wet Spots in Subgrade

Any permanent wet spot in the subgrade below the line of the longitudinal field tile drains or any area undercut below the level of the longitudinal drains shall be connected to the nearest enclosed stormwater system by a suitable sized porous drain. Where the drain is located under the carriageway, perforated pipes shall be used.

#### 4.3.1.5 Subgrade Drainage Systems

The Engineer, may deem it necessary, due to the nature of the country, that an extensive subsoil drainage system of perforated pipes will need to be laid. In such a case the material covering the pipes shall be graded upwards so that particles cannot enter the pipes. In general, to satisfy the conditions that particles do not enter the pipe and no scour occurs in the 'filter', the ratios to be complied with are shown in Table 4.4 below.

**Table 4.4: Criteria for backfilling material in subsoil drainage systems using perforated pipes**

| Ratio | Value |
|---|---|
| $\frac{\text{85 percent size of filter material}}{\text{Size of opening in pipe}}$ | 2 |
| $\frac{\text{15 percent size of filter material}}{\text{85 percent size of protected soil}}$ | 5 |
| $\frac{\text{15 percent size of filter material}}{\text{15 percent size of protected soil}}$ | 5 |

It will be necessary, in most cases, to manufacture a suitable filter material to comply with the above requirements.

## 4.3.2 KERBS, CHANNELS AND CESSPITS

### 4.3.2.1 Kerbing and Channelling

Kerbing and channelling shall be provided on both sides of the carriageway. Vertical kerbs, approved mountable type kerbs or flush concrete edgings shall be installed as required for the appropriate class of street. Where different types of kerbs are installed, the transition from one type to another shall be made at a crossing or tangent point. Construction of all kerbing and channelling and edging shall be as detailed on the Standard Drawings with expansion joints provided at intervals not exceeding 4m.

Foundations for kerb and channel shall be fully compacted to 100mm outside the back face of the kerb.

Approved mountable type kerbs may be used around cul-de-sac heads to allow for greater frequency of vehicle crossings.

### 4.3.2.2 Cesspits

These shall be constructed as detailed and shown on the Standard Drawings (SD 03 – SD 09).

Cesspits shall be provided:

a) At intervals of all channels in such a position that the maximum “run” of water in any channel is 100m for single carriageways and 60m for dual carriageways.

b) At intersections, located at the uphill kerb line tangent points.

c) At any low spot in a channel.

d) At changes of gradients and/or direction in the channel where there could be a tendency for water to leave the channel in the absence of a cesspit.

e) Where necessary to prevent water discharging across a berm, e.g. from a kerbed and sealed right of way or accessway.

A double cesspit is normally to be provided:

i) At low points to minimise the risk of ponding due to the grating of a single cesspit becoming blocked.

ii) At the end of cul-de-sacs where the total run of water exceeds 100m or 60m for a dual carriageway.

Cesspits shall be connected to the stormwater mains by a minimum of a 225mm dia. pipe for single cesspits, and a minimum of a 300mm dia pipe for double cesspits, led directly into a manhole, except where the Engineer may approve of saddling onto pipes of 600mm diameter or larger, or if the sump lead is less than 1.0 metre long and the saddle is less than 10 metres from the manhole. Saddles shall only be allowed where the manufactured junctions cannot be obtained, and must be approved pre-manufactured type installed to the manufacturer's specification.

Cesspits are to be of the backdrop type with gratings parallel to the kerbline as shown on the Standard Drawings, set as close as possible.

Tolerance for locating the grate frame over the cesspit chamber is plus or minus 30mm forward or back in line with the kerb. Frames cannot be skewed out of alignment sideways when compared to the end walls of the chamber.

Cesspit aprons shall be constructed from 20 mpa strength concrete and shall include one layer of 335 mesh centrally placed in the concrete of the apron area. To prevent cracking, the concrete apron shall be protected from traffic for a minimum of 14 days after pouring.

#### 4.3.2.3 Testing of Cesspits and Channels

Prior to final acceptance by Council, the effectiveness of the channels and cesspits is to be tested by flooding the channel from a fire hydrant or tanker. Any ponding of water in the channel shall render the work unacceptable.

### 4.3.3 FOOTPATHS

#### 4.3.3.1 General

A concrete footpath shall be provided where required.

#### 4.3.3.2 Construction of Footpath

The footpath shall be of concrete with a minimum 28 day strength of 17.5 Mpa. The footpath will normally be 75mm thick laid on a compacted subgrade. Around and adjacent to turning circles in cul-de-sacs, the thickness shall be increased to 100mm, and the concrete shall be reinforced with HRC 665 mesh centrally placed as shown in drawing RD07. Plain concrete shall be preferred for all footpaths. Alternatives such as brick or concrete paving blocks, hotmix asphaltic concrete or coloured concrete may be acceptable at the discretion of the District Engineer.

#### 4.3.3.3 Dimension of Footpath

Footpaths shall be 1.4m minimum wide. Where, under special circumstances, the footpath is located adjacent to the kerb, the width of the footpath shall be 1.5m measured from the front of the kerb. In main shopping areas the footpath width may be increased as required by the Engineer.

#### 4.3.3.4 Low Level Paths

Where, due to the contour of the finished ground surface it is necessary to utilise low level footpath, a dished channel shall be provided. Normally this channel shall follow the same grading as the road kerb and channel, and cesspits of 300mm x 400mm size shall be provided so that the nominal "run of water" does not exceed 100mm. Details of the channel and cesspits are shown on Standard Drawings.

### 4.3.4 CROSSINGS

#### 4.3.4.1 Pram Crossings

A pram crossing as detailed on the Standard Drawings shall be provided in the kerb line at all road intersections.

Preferably the pram crossing should be located immediately "downstream" of a cesspit or at the high spot in the kerb and channel so that there is a minimum flow of water in the channel past the crossing.

### 4.3.5 VEHICULAR CROSSING

A crossing as detailed on the Standard Drawings shall be provided as follows:

a) At the entrance to all strips to rear lots, private ways and service lanes, existing houses, milk tanker entrances and all frequently used entrances. The width of the crossing shall relate to the number of potential lots, and width of service lane/private way formation.

   For vehicle crossings constructed on high speed streets (60km/h highways), the crossing is required to have a 1 metre extension on the approach side for vehicles turning left in.

b) Brick or concrete paving blocks, hotmix asphaltic concrete or coloured concrete crossings may be acceptable at the discretion of the District Engineer.

Where there is an existing footpath, the vehicle crossing is required to be constructed to the same level, except where the footpath is located next to the kerb.

There shall be three types of crossings – Residential, Commercial/Industrial and Rural.

#### 4.3.5.1 Residential

The residential crossing shall be of 100mm thick unreinforced concrete on a compacted subgrade. Where, however, a concrete footpath is already in position (not adjacent to the kerb line) and the footpath can be shown to be at least 75mm thick, and there is no evidence of damage due to traffic, then the footpath may be left in place and incorporated as part of the crossing. If the footpath is less than 75mm thick, the footpath is required to be removed and the crossing constructed continuously from the kerb to the property boundary.

4.3.5.2 Commercial and Industrial Areas

Crossings shall be provided in all commercial and industrial areas, and as crossings to all private ways and service lanes, and shall be 150m thick and reinforced as shown on the Standard Drawings.

4.3.5.3 Rural

On sealed roads the Rural crossing shall be of 2 coat seal or bi-couche wearing surface on a compacted basecourse of 150mm thickness on subgrade, all as for normal carriageway construction.

The primary purpose of rural crossings is to protect the edge of existing seal. The crossing must therefore be formed to cover the anticipated or (in the case of existing unsealed crossings) the existing swept vehicle area, with the full area of vehicle exit and entry from the carriageway to the legal boundary being covered.

In situations where the legal boundary is either very close to or a considerable distance from the edge of carriageway, the minimum length of the crossing from the edge of carriageway shall be 8.0m.

Rural crossings shall be culverted as necessary.

4.3.5.4 Visibility

Visibility for vehicles exiting and entering vehicle entrance crossings shall comply with the safe stopping and sight distance requirements of the Standard Drawing.

Vehicle crossings on State Highways shall comply with the safe stopping and sight distance requirements of Transit New Zealand.

4.3.5.5 Clearance from services

All vehicle crossings shall be located a minimum of 0.5m clear of any cesspits, powerpoles, hydrants or other similar services. In instances where clearance is not possible, specific design is required to ensure that the asset is protected and will operate efficiently.

4.3.6 BERMS

After the formation, footpath, kerb and channel works have been completed, the berms shall be spread with a 75mm loose depth (65mm depth after rolling) of topsoil. The topsoils shall be graded from kerb top to footpath edge in order to produce the top of topsoil level 12mm below the edge of the footpath, and must not cause a ridge at the footpath that could tend to hold water on the surface of the path.

4.3.7 GRASSING

After topsoiling the berms shall be sown with grass that conforms with the following:

Fertilising

A Starter fertiliser (NITROPHOSKA 12:20:10 or equivalent NPK rates) shall be supplied and spread at an application rate of 20 grams/square metre prior to sowing.

Grassing

The type of grass seed sown and application rate shall be in accordance with the criteria set out below:

a) Amenity Areas

High profile or high class areas:

90% Lobi or Enjoy Fescue
10% Egmont Browntop

Seeding rate 20 grams per square metre.

b) Sportsfields

A good horticultural rye grass e.g Duet or Seville Rye. Seeding rate 30 grams per square metre.

c) Berms

Rye/clover mix at a rate of 30 grams per square metre unless a higher quality turf sward is present, in which case an amenity type turf species shall be spread at the appropriate rate.

Seed shall be sown in at least two directions at right angles lightly raked and compacted with a Cambridge Roller to produce a smooth even surface. All areas are to be watered and maintained until a good sward is established.

## 4.3.8 PAVEMENT CONSTRUCTION

### 4.3.8.1 Acceptance of Pavement

Prior to surfacing the pavement, the Council may require the Subdivider's Representative to arrange for Benkelman Beam tests to be carried out. A section of road shall be accepted as complying with the deflection requirements if the deflection tests do not exceed the following:

a) Not more than five percent (5%) of the tests shall exceed the deflection of 3.5mm.

b) No single result shall exceed 3.5mm by more than thirty percent (30%) (i.e. 4.55mm).

c) No two adjacent readings shall vary from each other by more than twenty-five percent (25%) of 3.5mm (0.875mm).

**Note:** It is normally possible, with reasonable compaction, to attain deflection well below the maximum values permitted and in this case consistency as required under c) above will generally govern.

Provided that the deflection tests are satisfactory, the Engineer shall give authority in writing for the specified form of surfacing to proceed.

If the section of road fails to achieve the required standard of deflection, such remedial work as may be necessary to achieve the required standard and subsequent re-testing shall be carried out.

4.3.8.2 Two Coat Seal (TNZ P/03)

A prime seal of fifty-five percent (55%) stable emulsion may be applied where deemed necessary by the Engineer.

The first coat seal shall consist of 180/200 penetration grade bitumen to comply with TNZ M1. The chip shall be Grade 3 complying with TNZ M/6.

This work shall comply with TNZ P/3. Other sealing chip grades may be specified by the Engineer where warranted by anticipated traffic conditions.

Heads of cul-de-sacs and other areas exposed to turning movements are to be dressed with a light-binder-free application of Grade 6 chip immediately after application of the first or second coat seal.

4.3.9 WEED PROTECTION

Immediately prior to any form of surfacing a strip 600mm wide adjacent to each channel shall be sprayed with an approved ground sterilising weed-killer at the manufacturers recommended rate of application.

4.3.10 ALTERNATIVE SURFACE TREATMENT

Where approved or required by the Engineer, the following alternative surface treatments may be used.

4.3.10.1 Asphaltic Concrete

Asphaltic concrete shall comply with NRB Specification M10 and shall be a nominal 20mm wearing course mix (as set out in Table 1 of NRB M10). The binder shall normally be 80/100 penetration bitumen. The Engineer may approve the use of 180/200 penetration bitumen in particular circumstances. Laying of the mix shall be in accordance with NRB P/9.

A structural layer of asphaltic concrete can be laid in lieu of part of the metal pavement and surfacing. Specific design as to grade and thickness shall be to the approval of the Engineer.

4.3.10.2 Bi-Couche Seal System

A two-coat Bi-Couche seal system may be applied using Grade 3 and Grade 5 sealing chip. All chip shall comply with NRB M6 specification. The design of the system shall be subject to the approval of the Engineer.

### 4.3.11 COMMERCIAL SERVICE LANES

All new Commercial buildings shall have a fully formed rear service lanes in order to facilitate delivery of supplies. The Service Lane layout shall be in accordance with the District Plan.

#### 4.3.11.1 Construction

Service lanes shall be formed with a concrete edging strip flush with the surface on one side and a mountable kerb and channel on the other side. Alternatively where a service lane serves development on both sides, it may be formed with concrete edging strips both sides and a central concrete dish channel. Provision shall be made for the disposal of stormwater from the formed area and all Council utility services are to be provided within the service lane. Surfacing shall be subject to specific approval and in general shall be in asphaltic concrete.

Where the service lane crosses an existing or proposed footpath, a commercial vehicle crossing shall be installed by the subdivider or at his expense. The crossing shall be constructed in accordance with paragraph 4.3.5.

### 4.3.12 INDUSTRIAL SERVICE LANES

Industrial Service Lanes shall be constructed as streets and shall be subject to specific approval by the Engineer.

Where a service lane serves properties on one side only the surface may have a single crossfall with mountable kerb and channel on the lower side and concrete edging strip on the higher side.

### 4.3.13 PARKING BAYS

Parking Bays shall be constructed to the same design standards as apply to Commercial Service Lanes and as detailed in the Standard Drawings and shall be surfaced with preferably asphaltic concrete or approved fine chip surface.

### 4.3.14 ACCESSWAYS

#### 4.3.14.1 Pedestrian

All pedestrian accessways, when not part of a reserve, shall be provided with the following:

a) Concrete footpath full width of accessway, boundary to boundary.

b) Cycle barriers as per the Standard Drawings.

c) Fence both sides as per the Standard Drawings.

d) Adequate stormwater collection to prevent water flowing down the length of the accessway.

e) Street Lighting

When the length of the pedestrian accessway exceeds 100m, provision must be made for installing lighting at distances not exceeding 75m apart and not less than 60m from the legal road or 45m from the end of the accessway. The power supply may be connected to the street light circuit. Where the pedestrian accessway does not incorporate street lights, a street light within the road reserve should coincide with the end of the accessway to provide safety lighting. Refer to 4.3.16.

4.3.14.2 Private Ways – Formation

The carriageway shall conform to the Standard Drawings and the requirements of the District Plan, or appropriate Local Specific Requirements and have a uniform crossfall of three percent (3%) with a standard mountable kerb and channel on the low side of the road and an edging strip on the high side. On the high side the sealing shall be carried out against the edging strip. Where approved by the Engineer, a crossfall of three percent (3%) both ways from a central crown to flush concrete edging strips may be used. This will only be permitted in flat country where the longitudinal and transverse grades adjoining the carriageway are not more than two percent (2%).

Concrete strips may be constructed subject to the following conditions:

- 2 x 900 x 100 strips on compacted subgrade; 800 gap, closed in at end or at least 4 metres from the access point.
- Maximum of two dwelling served
- Maximum longitudinal grad, 1:40
- No crossfall; grass infill gap
- Maximum length of body of access; 40 metres
- No provision necessary for drainage

Private ways cover all Right of Way and multiple unit and common driveway situations.

4.3.14.3 Stormwater Drainage

Where necessary stormwater drainage shall be provided, so that the maximum “run off” does not exceed 100m.

4.3.14.4 Surfacing

Concrete or asphaltic concrete surface shall be provided on the accessway. In special circumstances a two coat chip seal may be provided but this requires special approval from the Engineer.

4.3.14.5 Vehicular Access

Where vehicular access is across any berm on the legal road reserve, a vehicular crossing shall be provided at the Subdivider’s expense in accordance with the Standard Drawings.

4.3.14.6 Private Services

Private services shall be installed in the accessway of sufficient length and capacity to serve all properties or building sites utilising the accessway for frontage to the public road.

### 4.3.15 STREET SIGNS

Street name signs shall be supplied and erected in accordance with RDC Signs and Traffic Aids policy at all intersections, including intersections with existing streets or roads.

### 4.3.16 STREET LIGHTING

The subdivider shall arrange for the installation of the necessary underground street lighting cable, standard and fittings for all new roads in accordance with the relevant New Zealand Standard, together with accessway lighting where required. Also see 8.2.

The standard lamp fittings is “Goughlight 500”.

Traffic calming devices shall have an increased lighting level as set out in AS/NZ 1158.

### 4.3.17 PAVEMENT MARKINGS

All pavement markings shall be in accordance with Transit New Zealand Standards.

All hydrant and valve marking shall comply with Section 7.15.

### 4.3.18 CARRIAGEWAY RE-LEVELLING

If the level of the carriageway is altered then any utility surface feature i.e. manhole, valve box, hydrant cover, etc, shall be re-levelled in accordance with the relevant standard drawing – SD 10, SD 11, SD 22, SS 08, SS 22, WS 01, WS 02, WS 04, WS 12.

### 4.3.19 BRIDGES AND CULVERTS

When the road or accessway includes a bridge or culvert then the bridge or culvert shall be certified by a Registered Engineer as:-

1) Complying with Transit New Zealand standards and

2) a) Capable of carrying a design loading of HNH072 (public road bridges)

OR

b) Capable of carrying a design loading of 0.85HN72 (private road bridges).

Existing bridges or culverts not meeting this standard shall be upgraded to the standard or replaced with structures complying with the standard.