

GORE DISTRICT COUNCIL

SUBDIVISION AND LAND DEVELOPMENT BYLAW

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SECTION 6

ROADING

6.1 SCOPE

This section applies to roads, accesses and rights of way in both urban and rural subdivisions and land developments.

6.2 OBJECTIVE

The practices specified or advised in this section are intended to:

- (a) Avoid adverse effect on the roading infrastructure of the district and on all of the inhabitants.
- (b) Ensure that roading is provided to meet the proposed and future needs of the inhabitants of the subdivision or land development.

6.3 PERFORMANCE STANDARDS

Roading shall be designed and constructed so that:

- (a) The general performance standards of Section 1.4 are met.
- (b) Adequate levels of access, safety and convenience are provided for all road users, including pedestrians, persons with disabilities and cyclists, while ensuring acceptable levels of amenity and protection of the environment from the impact of traffic.
- (c) A distinctive and hierarchical network of roads is provided having regard to the desired servicing levels with clear physical distinctions between each type of road based on road formation, convenience, traffic volumes, vehicle speeds, public safety and amenity.
- (d) The road hierarchy and network provides convenient linkages in a consistent style between different neighbourhoods and commercial areas. The roading network must provide for both vehicle and pedestrian access to adjoining land where deemed necessary by Council. Cul-de-sac construction shall be limited unless pedestrian linkages to other streets are provided at the end of cul-de-sacs.
- (e) Efficient provision is made for all utility services.
- (f) Allowance is made for sufficient width of carriageway and berm to allow roads to perform their designated functions within the road network.
- (g) Within urban areas adequate provision is made for the planting of trees and shrubs within the road reserve for beautification purposes and for innovative design of parking bays and general streetscape. Such plantings however shall be undertaken so that:
 - (i) no plantings shall be undertaken in a manner where frosting or icing of the roadway could occur. In areas susceptible to icing or frosting the mature height of plantings shall not impinge on the plane created by a slope of 1 in 4 from the edge of the formed carriageway.

- (ii) no plantings shall be located within two metres of any open water channel adjacent to the road.
- (iii) no planting obstructs, impedes or restricts visibility at intersections, property accesses or road corners.
- (h) The road geometry provisions are consistent with the needs of the road hierarchy, physical land characteristics, use and safety. Road widths shall be sufficient to cater for ultimate development of the land.
- (i) Roads are constructed to an appropriate strength to enable the carriage of the proposed vehicle numbers and loading at a minimum total cost to the community, both in initial construction and long-term maintenance.
- (j) A pavement edge is provided that is appropriate for the control of vehicle movements, performs any required drainage function and is structurally adequate.
- (k) All vehicle crossings (e.g. urban, rural, residential, commercial and industrial) are formed, surfaced and drained to allow safe and effective vehicle access from carriageway to the property boundary and in locations that provide safe visibility.

Dispensation may only be permitted subject to approval of Council (see Section 15).

6.4 MEANS OF COMPLIANCE

Roading works shall; be undertaken in conformity with this Bylaw and associated Standard Drawings. Subject to approval of Council (see Section 15) dispensations may be permitted having regard to the following design guides:

- Urban Streets **Austroads** Guide to Traffic Engineering Practice
- Rural Roads **Austroads** Guide to the Geometric Design of Rural Roads.

6.5 ROAD NETWORK LAYOUT

Roads shall be laid out such that:

- (a) The road hierarchy and network provides convenient linkages in a consistent manner between residential neighbourhoods within the District, and the road and pedestrian network provides convenient linkages to activity centres.
- (b) Streets, service lanes and private accesses are laid out to fit in with the general roading requirements of the locality in which they are situated and conform to any provision of the District Plan. The roading layout must provide for access to adjoining land where deemed necessary by Council.
- (c) Access to limited access roads requires the approval of the NZ Transport Agency. All other accesses shall comply as relevant with Standard Drawings R09 – R14.

6.6 ROAD RESERVE WIDTHS

The width of the road reserve shall be as appropriate to comfortably accommodate the carriageway, turning circles, parking lanes or parking bays, footpaths (if applicable) services and streetscaping.

Minimum road reserve widths shall be as set out in Table 6.1.

Table 6.1 Minimum Road Reserve Widths		
Street Type	Maximum Allotments Served	Minimum Reserve Width (metres)
Commercial / Industrial / Mixed Use		
Arterial		20
Collector		20
Local		20
Private Right of Way	3	7
Urban / Residential		
Arterial		20
Collector	100	20
Local	50	20
Cul-de-sac	20	15
Private Right of Way	6	
1 – 3 lots		3.5*
4 lots		4.0
5 lots		4.5
6 lots		5.0
Rural		
Arterial		20
Collector		20
Local	100	20
Cul-de-sac	6	20
Private Right of Way	6	
1 – 3 lots		3.5*
4 lots		4.0
5 lots		4.5
6 lots		5.0
Note * The width of an access serving a single household unit may be reduced to 3 metres if the driveway has unrestricted visibility and the length does not exceed 30 metres.		

Where a vehicle access serves four or more allotments it shall have a minimum reserve width of 6.0 metres for a distance of 10 metres from the road boundary to provide for vehicles to manoeuvre without impeding the flow of traffic on the frontage road.

6.7 ROAD NAMES

Developers are encouraged to suggest names for new roads. However all names for new roads, including named private accesses, are to be approved by Council before sealing of the title plan for the subdivision. Names must comply with the New Zealand Geographic Board's rules. Road names should be short (25 characters or less), not hyphenated or multiple words, readily pronounced and spelt and not resemble other existing names (including geographic feature names) in either spelling or pronunciation.

6.8 CARRIAGEWAY WIDTHS

Carriageways shall be of sufficient width to accommodate forecast traffic loads, parking lanes, cycle lanes, parking bays, and turning movements as applicable.

The standards shown in Table 6.2 shall be adopted:

Table 6.2 Carriage Way and Lane Widths			
Street Type	Minimum Carriage Way Width (metres)	Traffic Lanes (metres)	Parking Lanes (metres)
Commercial / Industrial / Mixed Use			
Arterial	11.0	2 x 3.0	2 x 2.5
Collector	11.0	2 x 3.0	2 x 2.5
Local	8.0	1 x 3.0	2 x 2.5
Private Right of Way	4.0	1 x 3.5	
Urban / Residential			
Arterial	11.0	2 x 3.0	2 x 2.5
Collector	11.0	1 x 3.0	2 x 2.5
Local	8.0	1 x 3.0	2 x 2.5
Cul-de-sac	6.0*	1 x 3.5	1 x 2.5
Private Right of Way			
1 – 5 lots	3.0*		
6 lots	5.0*		
Rural			
Arterial	8.0	2 x 3.5	
Collector	7.4	1 x 3.2	
Local	6.5	2 x 3.0	
Cul-de-sac	6.0*	1 x 5.5	
Private Right of Way			
1 – 5 lots	3.0*		
6 lots	5.0*		
<p>Note * In the case of vehicle accesses 6.0 metres or less in width:</p> <p>(a) where serving more than one allotment and having a length greater than 100 metres, <u>or</u> where unrestricted visibility is not available over its full length, then an appropriately located passing bay shall be required.</p> <p>(b) where serving four or more allotments it shall have a minimum width of 6.0 metres for a distance of 10 metres from the road boundary to provide for vehicles to manoeuvre without impeding the flow of traffic on the frontage road.</p>			

Greater widths may be required by Council where there is:

- Potential frequent use by commercial vehicles
- Potential frequent use of roads by vehicles towing trailers
- Compatibility with existing road widths in the community.

6.9 CARRIAGEWAY SURFACING

Unless specified otherwise, all roads within urban areas shall be finished with a sealed surface constructed from approved materials such as chip seal or asphalt.

The carriageway of roads in rural areas shall be sealed if:

- (a) The subdivision or development is immediately adjacent to land zoned for residential purposes.
- (b) The longitudinal grade on roading is greater than 8% or scour is likely to be a problem because of the nature of the ground or of the construction materials.
- (c) The number of allotments serviced by the road is greater than 10.

Council may also require the carriageway to be sealed if there is a strong possibility that the number of allotments serviced will exceed 10 through further subdivision within 10 years.

Council may waive sealing if the road servicing the development adjoins an existing unsealed road.

Financial contributions set out in section 9-9 of the District Plan specify the level of contribution for roading purposes to be paid.

6.10 WIDTHS OF SHOULDERS

In rural situations where kerbs and channels are not provided, formed shoulders 250 mm wide shall be provided.

6.11 TURNING CIRCLES

The heads of cul-de-sacs in residential areas shall incorporate a minimum 19.0 metre diameter turning circle with heavy duty footpath, kerb and channel constructed to give additional turning capacity for large trucks. In commercial and industrial areas the diameter shall be increased to 30 metres. Alternate turning provisions using T, L or Y shaped heads may be accepted for short cul-de-sacs servicing less than five residential properties. Such turning heads shall be sized to accommodate 90 percentile light commercial vehicles.

6.12 SERVICES POSITIONING

Underground services shall be installed as set out in Section 11. A minimum berm width of 1800 mm is required in all streets for service layout with all power and telephone services laid between the back of the footpath and the property's boundary.

6.13 PROVISION FOR LANDSCAPE PLANTING

Where subdivision and development extends, or creates new roadways, five square metres of every additional lot available for development shall be set aside within the road reserve for the purpose of landscaping and street tree planting. Such areas are to be planted and landscaped and are to be spread evenly throughout the street to provide aesthetically pleasing areas. Each such area must be able to contain a 3 metre diameter circle and be free from utility services, both above and below ground.

Landscape plans shall be submitted for approval prior to any planting taking place. Consultation should be undertaken with the Manager of Parks and Reserves prior to choosing species to be included in the landscaping to ensure consistency with Council's street planting regimes.

Proposals for roadside planting shall be designed so that:

- (i) no plantings shall be undertaken in a manner where frosting or icing of the roadway could occur. In areas susceptible to icing or frosting the mature height of plantings shall not impinge on the plane created by a slope of 1 in 4 from the edge of the formed carriageway.
- (ii) no plantings shall be located within two metres of any open water channel adjacent to the road.
- (iii) no planting obstructs, impedes or restricts visibility at intersections, property

accesses or road corners.

In assessing whether to approve any existing or proposed planting application the following principles will be considered:

- (a) Safety Issues
 - shading of the road
 - sight distances at intersections
 - entrances and curves
 - clarification of road definitions
 - shade light effect of the planting
 - frost shading
 - clearance to high voltage power lines
- (b) Asset Preservation
 - water channel and drain integrity
 - seal and road surface integrity
- (c) Utility Protection
 - water, wastewater, telephone
 - stormwater, tile drainage, power and telephone
 - high voltage power lines
- (d) Amenity
 - appropriate species in appropriate locations
 - consistency of species along individual streets
 - creation of an avenue effect
- (d) Equity Issue -fair approach to existing and new planting proposals.

6.14 STREETSCAPING

While considering the **minimum** requirements of the previous clauses and the required performance standards, developers are encouraged to promote innovative streetscapes which blend all of the infrastructure elements into harmonious and pleasing designs.

Street designs should consider the use of such features as carriageway meanders, parking bays rather than parking lanes, special landscaping, different surface colourings, speed reduction features and roundabouts where appropriate.

6.15 KERBS AND CHANNELS

Kerbs and channels shall be provided in all subdivisions and land developments except where:

- (a) the Developer can demonstrate the viability of alternative systems, or
- (b) the average allotment size for the subdivision is at least one hectare.

Kerbs and channels may be required where road gradients and natural ground material are such that artificial drainage methods are required to prevent scour.

The minimum longitudinal grade on channels shall be 1 in 300.

Channels may be omitted on the high side of carriageways with one way crossfall, but the edge of the seal must still be protected by a concrete keeper strip of kerb.

Kerbs and channels including dish channels, shall be of the profiles shown in Standard Drawing R02 (Kerb and Channel Details), and shall be generally constructed from concrete with a minimum 17.5 MPa strength unless approved otherwise. Slip-formed concrete may require higher strengths for operational requirements. Shrinkage control gaps shall be constructed at maximum 4 metre centres.

Concrete kerbs and channels shall generally not be required for rural lifestyle blocks unless needed to prevent scour or where the subdivision is immediately adjacent to an urban resource area with existing kerb and channel.

With the exception of cu-de-sacs all kerbs installed shall be of a vertical design. Within cul-de-sacs where footpaths are used to provide additional turning area at the head of the cul-de-sacs, or where no dedicated lot access is created the kerb and channel and a footpath shall be constructed as a heavy duty drop crossing in accordance with Standard Drawing R04 (Standard Drop Crossing Details)

6.16 DISH CHANNELS

Dish channels shall be provided:

- (a) At the base of batters where ground water seepage is likely to be a hazard to pedestrians or vehicles.
- (b) Where ground levels are such that it is not possible to construct berm and footpath falls to the kerb and channel.

Dish channels shall be constructed to the same performance standards as kerbs and channels.

6.17 FOOTPATHS

Footpaths shall be provided as set out in Table 6.3.

Table 6.3 Footpath Requirements	
Street Type	Footpath Numbers and Width
Commercial / Industrial / Mixed Use	
Arterial	2 x 1.4
Collector	2 x 1.4
Local	2 x 1.4
Private Right of Way	1 x 1.4
Urban / Residential	
Arterial	2 x 1.4
Collector	2 x 1.4
Local	2 x 1.4
Cul-de-sac	1 x 1.4
Private Right of Way	
Rural	
Arterial	1 x 1.4
Collector	1 x 1.4
Local	1 x 1.4
Cul-de-sac	
Private Right of Way	

The width of footpaths shall be appropriate to the expected foot traffic at a minimum width of 1.4 metres. Where adjacent to existing or proposed schools, shops, halls and other crowd generators a minimum width of between 2.8 and 3.5 metres shall apply.

In all cul-de-sacs or other roads with a reserve width of 15 metres or less, footpaths shall preferably be located immediately behind the kerbs. In other locations a grass berm may separate the footpath and the kerb.

Footpath construction shall be in accordance with Standard Drawing R02 (Kerb and Channel Details).

Proposals to use an alternative surfacing shall be subject to Council's approval with a general guideline being that the finish should match with adjacent footpath finishes.

All footpaths shall be constructed on a prepared subgrade stripped of all topsoil and organic matter and having a minimum CBR test value of 5 (allowable bearing pressure of approximately 80 kPa).

6.18 CYCLEWAYS

Where required by Council, cycleways shall be provided, either separately or in conjunction with footpaths. Cycleways shall have a minimum width of 1.4 metres.

Joint footpath/cycleways shall have a minimum width of 2.5 metres. The surfacing requirements for cycleways shall be the same as for footpaths.

6.19 PRAM/WHEELCHAIR CROSSINGS

Pram crossings shall be provided in the kerb line at all road intersections. The pram crossing shall be constructed in accordance with Standard Drawing R05 (Standard Pedestrian Crossing Details).

Pram crossings shall preferably be located immediately "downstream" of a sump 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. The grade on pram crossings shall not exceed 1 in 8 but shall preferably be no more than 1 in 12.

The surface of crossings shall include an insert at least 1,200 x 600 mm in a tactile non-slip finish to alert visually impaired persons of its presence.

6.20 ALLOTMENT ACCESS

Access to allotments shall be located in conformity with the sight distance, clearance from intersections and minimum access spacing requirements set out in Tables 6.4 – 6.6.

Where data on traffic speeds is available, collected by a suitably qualified or experienced person, then sight distances shall comply with those set out in Table 6.4. In the absence of such data, sight distances shall be calculated based on the posted (legal) speed limits in Table 6.5.

Council may require that access on common lots (rights of way) be formed at the time of subdivision if:

- (a) The topography is such that subsequent construction may affect adjacent land.

- (b) Particular drainage or retaining measures are required to protect adjacent land.
- (c) The special features of the site or the number of lots serviced by the access may lead to conflict between adjacent landowners in the future.

Where the access is required to be formed, its standard shall be appropriate for the intended usage and shall comply with standards set out in this Bylaw.

Table 6.4 Access Standards for Known Operating Speeds Required Sight Distances (metres) (shown on Standard Drawing R13)				
Operating Speed (kph)	Frontage Road Classification			
	Local	Collector		Arterial and State Highway
	Daily Vehicle Movements			
	All	Up to 200	More than 200	All
40	30	35	70	70
50	40	45	89	89
60	55	65	113	113
70	85	85	140	140
80	105	105	170	170
90	130	130	203	203
100	160	160	240	240
110	190	190	282	282
120	230	230	330	330

Note: Operating speed means the 85th percentile speed of vehicles on the frontage road.

Table 6.5 Access Standards for Posted (Legal) Speed Limits Required Sight Distances (metres) (shown on Standard Drawing R13)			
Posted (Legal) Speed (kph)	Frontage Road Classification		
	Local	Collector	Arterial and State Highway
50	55	55	113
60	85	85	140
70	105	105	170
80	135	135	203
100	210	210	282

Table 6.6 Minimum Access Standards (Refer to Standard Drawing R14)					
Road Class	Posted (Legal) Speed Limit (km/h)	Location of Property Access Relative to Intersection		Spacing Between Adjacent Property Accesses N (m)	
		Distance K (m)	Side Road Distance M (m)	Rural	Urban
Local and Collector Roads	50	19	9	-	-
	60	19	9	-	-
	70	19	9	50	-
	80	60	60	50	50
	100	60	60	50	50
State Highways and Arterial Roads	50	30	20	-	7.5
	60	30	20	-	7.5
	70	100	45	40	7.5
	80	100	45	100	100
	100	200	60	200	200

6.21 VEHICULAR CROSSINGS

Vehicle crossings shall be provided at the time of subdivision as follows:

- At the entrance to all strips to rear lots, private accesses and service lanes, existing houses, commercial and industrial entrances and all frequently used entrances.
- For each front lot where the location of the crossing can be determined reasonably from the contour of the section.

There shall be three types of crossings - Residential, Commercial (including land zoned for Commercial, Industrial, Mixed Use or Rural, with the plan dimensions shown on Table 6.7.

Table 6.7 Width of Crossings		
	Width at property boundary	Width at kerb line or edge of seal
Residential	Minimum 3.0 metres Maximum 6.0 metres	Measurement at property boundary plus 2.0 metres
Commercial (single lane)	3.5 metres	5.5 metres
Commercial (two lane)	6.0 metres	8.0 metres
Rural Domestic or paddock access	Minimum 3.5 metres Maximum 6.0 metres	Refer to Standard Drawing R09
Rural Milk Tanker Access	6.0 metres	Refer to Standard Drawing R12

(a) Urban

Refer Standard Drawing R03 (Standard Plate Crossing Details) and Standard Drawing R04 (Standard Drop Crossing Details). Council shall determine the crossing type to be installed. Unless a drop crossing can be shown to be unsuitable by standard survey then the crossing will be a drop type.

(b) Rural

Rural crossings shall be constructed in conformity with Standard Drawings R09 to R14, with an appropriate depth of compacted hardfill material approved by Council. For typical situations the accepted depth is 250 mm, but this should be varied to suit local ground conditions and actual truck loading.

The main aims of rural crossing design is to protect the adjacent road and maintain drainage. 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. The design shall be in accordance with appropriate Standard Drawings, the Austroads Guidelines for Visibility at Driveways and Section 6.20 above.

If the road is sealed Council shall require the rural crossing to be sealed if:

- (a) Gravel could be transported out on to the carriageway; or
- (b) The speed environment is such that the safety of users exiting from the crossing would be improved by sealing the crossing; or
- (c) Edgebreak is likely to occur at the crossing.

Rural crossings shall be culverted as necessary. The culvert shall be a

minimum of 200 mm diameter, or a larger size where required by Council.

Culverts shall extend a minimum of 500 mm beyond the toe of the crossing backfill.

Crossings shall be installed as soon as practicable once the likely position of the crossing can reasonably be ascertained.

Where the position cannot be ascertained at the time of subdivision Council will require an application to form a crossing to be completed by the new owner and the payment of the prescribed fees as set out in Council's Schedule of Fees.

The construction of a new crossing shall be undertaken by a Council approved contractor experienced in this work and subject to the following requirements as applicable:

- (i) All works within the road reserve shall be submitted to Council for approval, at least ten working days prior to the proposed commencement of work. No work shall be undertaken until Council has issued its approval in writing.
- (ii) Approval of the Gore District Council Reserves Manager must be obtained prior to undertaking any work within the drip line of any tree located within a legal road or located on land owned by Council or held by Council or the Crown under the Reserves Act 1977. Approval is to be requested at least ten working days prior to the proposed commencement of work. No work shall be undertaken until an approval is issued in writing.
- (iii) An appropriate Traffic Management Plan shall be submitted to the Gore District Council Roding Manager at least five working days prior to the proposed commencement of work. No work shall be undertaken until an approval is issued in writing. The approved Traffic Management Plan shall be complied with.
- (iv) Basecourse shall not be placed in any excavation until the Gore District Council Roding Manager has inspected and approved the excavated base. A minimum 24 hours notice to the Roding Manager is to be provided prior to the inspection.
- (v) Concrete, asphalt or other surface material shall not be placed over the completed basecourse until the Gore District Council Roding Manager has inspected and approved the completed basecourse. A minimum 24 hours notice to the Roding Manager is to be provided prior to the inspection.
- (vi) Concrete shall be a minimum of 17.5 MPa Ordinary Grade concrete from a certified concrete plant or a plant providing equivalent evidence of quality control.
- (vii) Any existing concrete footpath utilised as part of any crossing shall be replaced with a HRC 665 mesh reinforced concrete footpath. The mesh shall be centrally positioned and supported on plastic or concrete chairs.
- (viii) Unless otherwise advised at the time of seeking approval to carry out work, a wooden float non-slip finish is required on footpaths. Where gradient dictates a broomed finish shall be provided. A smooth blemish free steel float finish is required on exposed faces of kerb and channel.
- (ix) All adjacent surfaces disturbed during construction shall be reinstated to a similar or better standard within five working days after completion of the work.

6.22 GEOMETRIC DESIGN

Geometric design of roads shall be appropriate for the expected traffic volumes and the design speeds and shall comply with the requirements of Council’s Roading Activity Management Plan.

In general, the following shall be accepted as suitable design guides:

- **Urban Streets - Austroads** Guide to Traffic Engineering Practice
- **Rural Roads - Austroads** Guide to the Geometric Design of Rural Roads.

These general design guides shall be interpreted in conjunction with subsections as below:

(a) Design Speeds

All roads in the 50 km/hr zone urban areas shall be designed for safe traffic movements at 50 km/hr:

Roads in rural areas shall be designed for:

- (i) Arterials and Collectors - 100 km/hr
- (ii) Local through roads - 100 km/hr
- (iii) Local rural roads - 60 km/hr

(b) Longitudinal Gradients

Residential streets shall not be steeper than 12.5%. Arterial roads and major collectors carrying significant volumes of public transport or heavy vehicles shall not be steeper than 8%.

(c) Grades at Intersections

Centreline grades at major intersections should be kept below 3%. 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.

The centreline grade of the lower classified street shall intersect the crossfall of the main street at the following distances from the main road centreline in conformity with Table 6.8.

Table 6.8 Distance of Crossfall Intersect	
Main Road Carriageway Width (m)	Offset from main centreline to intersection point (m)
13.0	3.5
11.0	3.0
8.5	2.5

(d) Vertical Curves

Vertical curves shall be designed for a minimum speed value of 50 km/hr and a minimum sight distance of 60 metres. In areas that may have a higher speed value in the future, the minimum speed value and sight distance shall be determined by Council.

(e) Horizontal Curves

Curves in 50 km/hr areas may be circular with a minimum radius of 50 metres on the centreline. In areas that have or may have a higher speed limit in the future, Council will require transition curves with a specified speed value. Transition curves shall be computed in accordance with a recognised method with a balance of spiral length to circular arc of between 1:1.5 and 1:2:1 and with a maximum rate of rotation of 0.025 metres/sec.

At intersections the kerb line shall have a minimum radius of 9 metre except at major intersections where Council may require a larger radius.

(f) Super elevation

Super elevation is not necessary in 50 km/hr zones, or areas that in the opinion of Council, are likely to become 50 km/hr zones. Super elevation may however be employed where it suits boundary levels up to the allowable design maximum crossfall. All curves in areas with an actual or potential greater than 50 km/hr speed value shall require super elevation to match the 85 percentile speed value. Certain main routes may in the future have an increased speed limit. If this development is a possibility Council may require super elevation to be constructed to a speed value nominated at the time of the request. In any circumstances the maximum crossfall should not exceed 10% where uniform crossfall is developed.

(g) Extra Widening

Widening is not required on circular curves.

Extra widening on curves is not normally required where the centreline radius exceeds 60 metres.

Where curves of less than 50 metres are necessary for topographical or other reasons extra widening of between 0.5 metres and 1.5 metres may be applied according to the width of carriageway normally available to moving traffic, the radius of curvature and to the traffic function of the street. Should it be necessary to preserve a minimum berm width extra widening shall be applied to the street reserve also.

(h) Crossfall On Carriageway

Normal crossfall of 3% in both directions from the crown shall be developed on all standard sealed carriageways. Where a uniform crossfall is developed from kerb to kerb this shall not exceed 2% unless on a curve where super elevation may be permitted.

In rural situations with gravelled carriageways normal crossfall shall be 6% in both directions from the crown.

(i) Grading Of Kerb Lines

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 in Table 6.9 are not exceeded.

Table 6.9 Permitted Elevation Differences in Kerb Levels	
Width of Carriageway (m)	Maximum Difference in Kerb Level (mm)
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 centreline 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 centrelines and kerb lines should then be plotted and examined in relation to existing boundary and centrelines, 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 centreline levels are computed.

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

(j) Intervisibility At Intersections

Where new road intersections are created adequate sight distance is to be provided to enable traffic to move safely from one road to another. The intersection visibility shall comply with Section 4.14.1 of Council’s District Plan.

6.23 FORMATION DESIGN AND CONSTRUCTION

The formation shall be designed and constructed in accordance with accepted engineering practice for a design life of at least 25 years.

The materials used and procedures employed shall be in accordance with New Zealand Transport Agency guidelines in order to meet Council’s performance standards. Crushed basecourse aggregate shall be to NZTA M/4: Specification for Basecourse Aggregate standard.

Construction shall aim for the proportions of the maximum dry density (MDD) at the optimum moisture content (OMC) as specified in NZTA B/2 Construction of Unbound Granular Pavement Layers.

The following performance measures may be employed:

- (a) Densities shall be within 2% of the plateau density as measured by the nuclear density meter (NDM).
- (b) Benkleman Beam deflection tests which do not exceed the following standards.
 - Not more than 5% of the tests shall exceed the maximum as follows:

Table 6.10 Permitted Deflection Test Allowances		
Road Type		Maximum deflection (mm)
Urban	Arterial	0.75
	Collector	0.75
	Local	1.00
Rural	Arterial	1.50
	Collector	2.00
	Local	2.50

- No single result shall exceed the maximum allowable by more than 40%.
- No two adjacent readings shall vary from each other by more than 20% of the maximum allowable value given above.

(c) Other methods approved by Council.

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

If the section of road fails to achieve the required standard, the Developer shall arrange for the carrying out of such remedial work as may be necessary to achieve the required standard and subsequent retesting.

Prior to sealing sufficient traffic or passes of a pneumatic-tyred roller shall pass over the roadway (covered by a layer of running course) to produce a suitable surface for sealing.

This surface shall:

- Have a uniform, dense, stable surface free from contaminants, excess crusher dust and other blinding material.
- Be at the optimum moisture content.
- Have a mosaic texture when broomed which is sufficiently stable that it does not scour during the brooming operation.
- Be fully cured.
- Be within +0, -5 mm of design level for chip seal surfacing and within +5, -5 mm of design level for asphaltic surfacing at bound edges.
- Have no deviation exceeding 10 mm on a 3 metre straight edge at other locations and be such that there are no sudden changes or areas of where water ponding may occur.

6.24 SURFACE DESIGN AND CONSTRUCTION

Roading materials and construction methods shall be sufficient to give at least the minimum design lives set out in Section 1.4.

Acceptable solutions are:

- (a) Chip Seal Two coat bitumen chip seal using grades 3 and 5 chips (NZTA:M/6: Specification for Sealing Chip) and 180/200 penetration grade bitumen (NZTA:M/1: Specification for Roothing Bitumens) in accordance with NZTA

Specifications P/3: Specifications for Paving and Surfacing & Construction - First Coat Sealing, and P/4: Specifications for Paving and Surfacing & Construction - Resealing.

- (b) Asphaltic Concrete Asphaltic concrete of at least 30 mm, but subject to specific design, may be used as an alternative to chip sealing. The asphaltic concrete shall comply with NZTA Specifications M/10: Specification for Asphaltic Concrete and P/9: Specifications for paving and surfacing & construction - Specification for the Construction of Asphaltic Concrete Paving.

- (d) Other Surfaces Acceptance of other surfacing shall be subject to provision of information to prove the strength, reliability and durability of the materials to the satisfaction of Council.