Plan Change 43 – Transportation

and

Plan Change 44 – Works and Network Utilities

Appendix 2: Proposed Plan Change Provisions
Development Manual

matamata piako district council

Matamata-Piako District Council

Development Manual 2010

Contents

Part 4 Stormwater Drainage

Part 5 Wastewater Drainage

Part 1 – General Information

1.0 Background

It has been determined that the 2005 amendment to the Resource Management Act 1991 requires that the Development Manual be integrated into the District Plan in order to be enforceable. Matamata-Piako District Council ("MPDC" or the "Council") has resolved that the MPDC Development Manual should become part of the District Plan, as the "preferred means of compliance".

1.1 Introduction to the Manual

The MPDC Development Manual sets out the processes and standards that are expected to be followed and met whenever any development project is undertaken in accordance with Matamata-Piako District Plan.

The MPDC Development Manual recognises that Council and other network operators will become the owners of the infrastructure created in the subdivision or development process. Council and other network operators will assume responsibility for ongoing maintenance of these systems. To that end it is important that there is confidence that the systems are designed and constructed in a manner that ensures that they are fit for purpose at the time of transfer of ownership.

The performance outcomes, performance criteria and rules for subdivision and developments are set out in the Matamata-Piako District Plan. The MPDC Development Manual represents the "preferred means of compliance" with the District Plan requirements.

The Development Manual is not the only method that may be adopted to comply with the requirements of the District Plan. The Developer may produce an alternative design, however in that case must clearly demonstrate that the design meets the relevant District Plan requirements.

The Development Manual also applies in the case of any renewal or improvement works that are to be carried out by or for Council. They are to be used for any design that is carried out for Council either internally or by an external design consultant.

While it is acknowledged that there are objectives stated within the following section, all subdivision and development proposals will be considered against the performance outcomes of Section 5.9 of the District Plan. The objectives stated within the MPDC Development Manual provide additional guidelines.

1.2 MPDC Infrastructure Code of Practice

The Development Manual is supplemented by MPDC's Infrastructure Code of Practice. The relationship between the two documents can be described as follows:

- The purpose of the development Manual is to guide engineering design, whereas:
- The MPDC Infrastructure Code of Practice sets out the process, ~~incorporates~~ technical specifications and quality systems that apply to all infrastructure services within the District. It contains the standards for materials and construction that are required by MPDC and applies to all infrastructure works

whether by way of direct contact to Council, or where the infrastructure assets will become part of the Council network, or will be vested in Council, following completion.

As such, the two documents are cross-referenced, and should be considered jointly.

The Development Manual is incorporated into the District Plan and is an RMA document. The Infrastructure Code of Practice, on the other hand, ~~This~~ is adopted through the Local Government Act process and will be amended and adopted as changes are identified on an ongoing basis.

1.3 Parties Involved

An approval for subdivision is effectively an agreement between Council (as Territorial Local Authority) and the Developer as the owner of the land being subdivided or developed.

Under this "agreement", the Developer designs and constructs infrastructure services which become assets of the Council and network operators when completed. For its part, Council will issue the certificate(s) that are required before "Titles" will be issued for the separate lots that are created in a subdivision or sign off completion of a development, thus allowing the Developer to sell Title to those lots or to exercise the objectives of the development.

The two key parties involved are:

- Matamata-Piako District Council referred to as the "Council".
- The person who applies for approval for a subdivision or development, referred to as the "Developer".

Each party may have associated parties as follows:

Council may have associated parties including:

- Network operators, e.g. Telecom New Zealand, Powerco Ltd.
- Specialist technical advisers.

The Developer may have associated parties including:

- Developer's Representative.
- Person engaged by the Developer to undertake the role of "Engineer", responsible for certifying the quality and compliance of the development works.
- Specialist technical advisers such as planning, design, engineering and survey consultants.
- Contractor (or Contractors) who carry out the construction works.

The Development Manual also applies to new, renewal or improvement works to be undertaken by Council.

1.4 Development Manual Control

The MPDC Development Manual (2010) is controlled as part of the Council's District Plan. It can only be modified through a Plan Change process.

1.4.1 Suggesting Improvements

Any user of the Manual has the ability to submit an "Opportunity for Improvement" form (OFI) to Council where they feel that there is something in the Manual that could be improved.

1.5 Interpretations and Abbreviations

1.5.1 Interpretation

In this Manual, unless inconsistent with the context, the following shall apply. Should a definition be in conflict with the definitions in the District Plan, then the District Plan shall prevail.

Contractor — Means the company engaged to undertake the physical works.

- In the case of land development, the Contractor shall be responsible to the Developer.
- In the case of works constructed by the Council, the Contractor's responsibility shall be as defined by the General Conditions of Contract for the works.

Council — Means Matamata-Piako District Council, or an authorised representative of the Matamata-Piako District Council.

Developer — means the company or person who is applying for or who holds consent for the land being subdivided or developed.

Developer's Representative — means the person or persons appointed by the Developer to represent them.

Engineer — has a different meaning depending on the party relationships involved in the works:

- Where the work is being carried out as part of a subdivision or development, **Engineer** means a person who is commonly entitled to practice as a Chartered Professional Engineer/Registered Surveyor and has experience in utilities engineering acceptable to Council and who is engaged by the Developer to certify the quality and compliance of development works.
- Where the work is being carried out as a direct contract to Council, then **Engineer** has the meaning as set out in NZS 3910:2003 – Conditions of Contract for Building and Civil Engineering Construction.

Geotechnical Engineer — Means a person who has professional experience in soils engineering and carries Professional Indemnity Insurance cover.

Household Unit — Means any building or group of buildings, or part thereof, used or intended to be used principally for residential purposes and occupied or intended to be occupied by not more than one household.

Means of Compliance	means a method by which the requirements of the District Plan may be complied with. It implies that there may be other methods which may meet the requirement, but which may be subject to specific consideration or approval.
Owner	means the owner of the land being subdivided or developed.
The Works	The works shall generally be defined as the works for which this specification is being used and shall have the definition of "Contract Works" as defined in NZS 3910:2003.
NZTA	New Zealand Transport Agency.

1.5.2 Abbreviations

DC (Document Controller)	is the Democratic Services and H & S Manager of the Council.
DMM (Development Manual Manager)	is the ~~Kaimai Consultants Manager~~ Asset Manager – Strategy and Policy Department of the Council.
MPDC	means the relevant authorised officer of the Council.
LESD	means Landscaping of Engineered Stormwater Devices.
PGU or RPD	means the Regulatory Planning Department of the Council.
~~**P & G or CFD**~~	~~means Community Facilities Department of the Council.~~
~~**TU or RD**~~	~~means the Roading Department of the Council.~~
NZTA	means the New Zealand Transport Agency.
WEL	means the relevant electicity network provider ~~Powerco Ltd~~.
~~**WWS**~~	~~means the Water and Waste Department of Council.~~

1.6 Alternative Solutions

1.6.1 Procedure

The MPDC Development Manual is a means of compliance to meet the performances outcomes within the District Plan.

A developer may wish to depart from the preferred solution as set out in the MPDC Development Manual. The alternative details or specifications needs to be raised with the Council as early as possible in the design process to ensure a collaborative solution can be reached before the resource consent application is made and before detailed construction plans have to be submitted for approval.

This will involve submitting to Council a scoping report and Specification Variation Request form/s which will detail the proposed variation or alternative and identify how the alternative solution meets the design criteria.

Council staff will consider any variation application and provide a response confirming, rejecting or requesting further information or clarification of aspects.

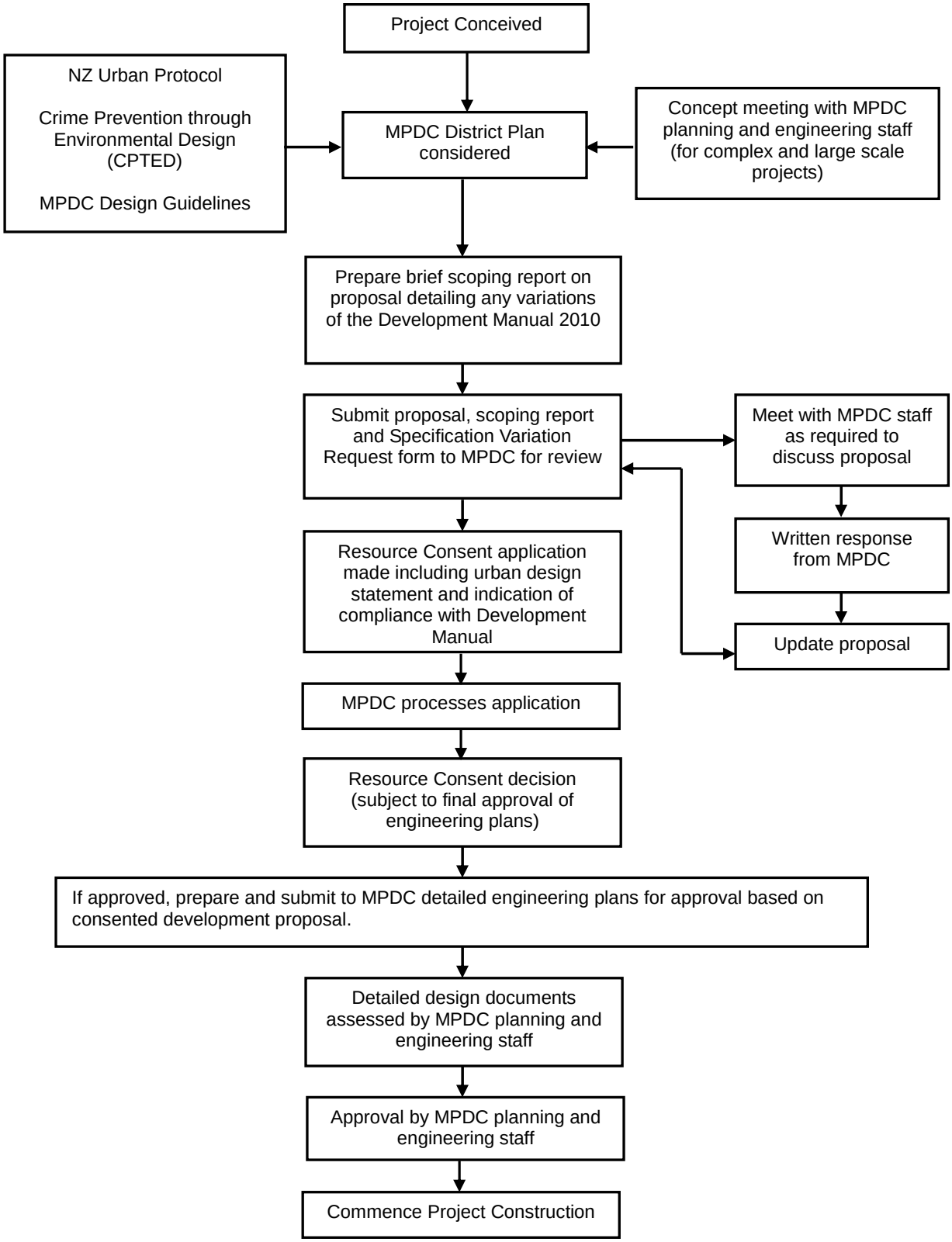
Provided the pre-application process has been successful, all variations from the MPDC Development Manual will be known by the Council, and approval should be a formality.

Ultimately the discretion to accept the variation lies with the Council, under delegated authority. Council expects consultation at the earliest possible stage where alternative engineering solutions are to be sought. The process shall be undertaken without undue delay.

To best achieve these outcomes, the process leading to approval of a development must be collaborative. At the very least it must involve the developer, their professional advisers, Council Planning Staff and Engineering Staff.

The Specific Variation Request form is attached at the end of this section.

The following flow chart illustrates the process to be followed when preparing and submitting a development proposal:


Project Conceived
NZ Urban Protocol
Crime Prevention through Environmental Design (CPTED)
MPDC Design Guidelines
MPDC District Plan considered
Concept meeting with MPDC planning and engineering staff (for complex and large scale projects)
Prepare brief scoping report on proposal detailing any variations of the Development Manual 2010
Submit proposal, scoping report and Specification Variation Request form to MPDC for review
Meet with MPDC staff as required to discuss proposal
Written response from MPDC
Update proposal
Resource Consent application made including urban design statement and indication of compliance with Development Manual
MPDC processes application
Resource Consent decision (subject to final approval of engineering plans)
If approved, prepare and submit to MPDC detailed engineering plans for approval based on consented development proposal.
Detailed design documents assessed by MPDC planning and engineering staff
Approval by MPDC planning and engineering staff
Commence Project Construction

1.6.2 Design Criteria

A developer may depart from any aspect of the MPDC Development Manual, however any departure and the suggested alternative will be assessed against the following design criteria:

1. The performance standards and outcomes of the Matamata-Piako District Plan.

2. The following overriding factors:

   a) The desire to achieve the "Seven Cs" of the New Zealand Urban Design Protocol.
   b) Safe and functional outcomes.
   c) Sustainability of alternatives.
   d) Economics of long term maintenance.

3. The criteria tables below.

The following tables identify specific aspects of design relating to each section of the MPDC Development Manual. These aspects are some of the key criteria that will be considered when assessing an application for departure from the standards. It must be noted that these may not be the only criteria, by which an assessment is made, however these give some guidance as to the expectations of Council when accepting a variation.

Only those departures from the MPDC Development Manual applied for and approved through the "Specific Variation Request Form" (included herein) shall be permitted.

Part 2: Earthworks and Land Stability

Element	Factor	Comment
Earthworks	Design Standards for Earthworks	Minimum standards shall be met.

Part 3: Roading

Element	Factor	Comment
Parking	Adequate Saturation	Sufficient parking shall be provided to cater for a likely need given the neighbourhood environment, housing density, street function and future developments.
Carriageway Width	Street Function / Status / Traffic Volumes	Allowances shall be made to cater for emergency service vehicles. Functional priorities shall be provided for.
	Safety of Cyclists and Pedestrians	The needs of the vulnerable road user shall be considered and incorporated into the development.
	Traffic Safety	All classes of vehicle shall use the carriageway in a safe manner without causing any measurable safety

		concerns.
	Speed Environment	The speed environment shall be appropriate to the function of the road, the type of surrounding development and width of carriageway.
	Connectivity	Roads connecting to the existing network shall have a function and purpose consistent with that network and with future development.
	Horizontal and Vertical Geometry	Safety for all road users shall be the priority and this shall be incorporated into the horizontal and vertical geometry.
	Character	Roads shall have an appropriate character that is consistent with the surrounding neighbourhood.
Intersection Spacing	Intersection Treatment	Close offset intersection spacing may be acceptable if there is appropriate treatment of the intersection consistent with the likely traffic volumes.
	Context	Low speed environments can support less conventional intersections
Intersection Radii	Context	These shall be designed so that they cater for both pedestrian and vehicle movements.
	Safety	Radii on all intersections shall be designed so that they allow for vehicle and pedestrian movements in a safe and consistent manner.
	Access	Radii on roads leading to a business / industrial area shall be designed to cater for heavy commercial vehicle movements.
Sight Distances	No Variation Permitted through the Development Manual variation process.	Adequate sight distances shall be provided in all situations.
Longitudinal Gradients (Increased)	Length of Grade	The steepness shall not be increased so that it causes adverse safety, drainage, visibility alignment or future maintenance issues.
	Location	The location of sudden grade changes shall be located away from intersections and curves (including sag and crest)
	Character	Function and safety shall be maintained where the existing landscape or terrain is altered.
Road Pavement Construction and Testing	No Variation Permitted	The pavement shall be designed to cater for likely traffic in the development, including heavy vehicles e.g. rubbish trucks
Road Drainage	Longevity, Reliability and Maintenance Requirements	Alternative stormwater systems can often require a greater level of servicing and cost to maintain them. Any alternative proposals shall identify the servicing requirements and all whole of life maintenance / capital costs.

	Impact on Formal Reticulation	Any impacts on the downstream reticulation shall be identified and addressed, including positive ones to attenuate the flow.
	Road Safety and Secondary Flowpaths	If the failure of the alternative system results in widespread ponding, this will impact on road safety. Secondary flow paths shall be designed to cater for the entire run-off, in the event of a system failure.
	Local Subsoil Effects	Subsoil drain discharge points shall be located away from the pavement, hillsides and embankments so that pavement saturation / or slope instability does not occur.
Footpaths	Context	Footpaths shall be provided to access public open spaces in a planned and logical manner, and shall meet present and future needs across the development.
Pram Crossings	Safety / Desire Lines	All pram crossings shall be located in a safe location that provides the user with the best visibility of approaching traffic.
Road Lighting	Luminance – No Variation Permitted	Adequate lighting shall be provided throughout the development so that it is safe for all night-time users of footpaths and streets.
Road Markings	Environment	In some special cases a reduction in road markings may be appropriate, but only where other supporting treatments are present and safety is not comprised.
Street Furniture	Context	The provision of street furniture for seating, cycle racks, rubbish bins etc often enhances the built environment.
	Character	The inclusion of appropriate street features and public art can strengthen and enhance the development, neighbourhood and wider community.
	Creativity	The creation of a quality place to live and/or work is often related to the creativity of the space. Appropriate street furniture and its placement can aid in achieving this outcome.
	Safety	All street furniture shall be durable, safe and appropriately positioned so that it enhances the safety of the space.
	Maintenance	Durable street furniture shall be used that is easy and cost effective to maintain and renew.

Part 4: Stormwater Drainage

Element	Factor	Comment
Location	Access	Accessing the pipeline for maintenance and connections
	Disruption / Traffic Delay	Locating the pipeline in the berm may minimise the need for highly restrictive traffic management required during maintenance. This is important in both narrow carriageways and very busy roads.
	Protection of Costly Surfacing	Within town centres or business areas, where special surface coatings may be used, locating pipelines in the berm may reduce the need to uplift and relay expensive paving materials.
Manhole Lids	Availability / Cost	The use of alternative lids, to match the surrounding paving can add to the character of a place, however the cost and availability of replacement lids must be considered.
Catch pits	Efficiency	A standard catch pit in an ideal installation has an entry capacity of 20–25 L/s. Any alternative must be shown to have at least this capacity.
	Effective Screening	The screening effectiveness of any alternative grating must be equivalent to a standard catch pit grating.
	Cost	The cost and ease of replacing the unit or components will be considered.

Part 5: Wastewater Drainage

Element	Factor	Comment
Location	Access	Accessing the pipeline for maintenance and connections
	Disruption / Traffic Delay	Locating the pipeline in the berm may minimise the need for highly restrictive traffic management during maintenance. This is important in both narrow carriageways and very busy roads.
	Protection of Costly Surfacing	Within town centres or business areas, where special surface coatings may be used, locating pipelines in the berm may reduce the need to uplift expensive paving materials.
Manhole Lids	Availability / Cost	The use of alternative lids to match the surrounding paving can add to the character of a place. However the cost and availability of replacement lids must be considered.

Part 6: Water Supply

Element	Factor	Comment
Reticulation Layout	Level of Service	Applicant must show that all proposed and potential users can be serviced to the level of service required, including connectivity to provide through mains where available.
Alignment	Access	Sufficient access must be available for maintenance and future connections to the network.
	Road Widening	If road widening could be possible in the foreseeable future then the location of the main could be a consideration to this future work.

Specification Variation Request

This form must be submitted where the applicant proposes to depart from the requirements of the Development Manual

Application details

Name of applicant:_____

Project name:_____

Project location:_____

Project description:_____

Resource consent number:_____ Date:_____

Variation details

Proposed variation to standard:_____

Section numbers in Development Manual affected:

Section No.	Current standard	Proposed standard

Reason for variation:_____

Sketch of alternative (if applicable):

Office use only

Reviewing officer:_____

Position:_____

Decision: ☐ Approved ☐ Declined

Reason for decision:_____

_____

_____

_____

Conditions:_____

_____

_____

Issued by:_____ Position:_____

Signed:_____ Date:_____

Part 2 – Earthworks and Land Stability

2.0 Background

This section of the Manual sets out the basic design requirements for earthworks that are to be carried out as part of the subdivision or development. Some construction information is included for completeness.

Note: Detailed information on construction standards are included in the MPDC Infrastructure Code of Practice.

2.1 Variations: Earthworks

No variations from the Development Manual will be permitted in respect of earthworks.

2.2 Standards

Any person who is involved in the design of earthworks for a development should be familiar with the following NZ Standards:

NZS 4402:1986 – Methods of Testing Soils for Civil Engineering Purposes
NZS 4431:1989 – Code of Practice for Earth Fill for Residential Development

Note: Developers should also be familiar with the requirements of the ~~Environment~~ Waikato Regional Council Guidelines – "Erosion and Sediment Control for Soil Disturbance Activities".

2.3 Scope

This part of the Manual sets out the requirements for the design of earthworks or preparation for foundations, or both, including:

- The excavation and filling of land to form new contours.
- The assessment and protection of slope stability.
- The suitability of both natural and filled ground for the founding of roads, buildings, services and other works.

Because of the wide range of soil types, physical conditions and environmental factors applying in different areas of the district, it is not possible to lay down precise requirements which will be applicable in all cases.

2.4 General

Earthmoving activities are subject to both Regional and District Council approvals. Resource consents, if required, shall be obtained before commencement of site work.

Choice of final landform is dependent on many factors which may be specific to the development or subdivision. These include:

- Relation with surrounding landscape.
- Size.

- Roading pattern.
- Preservation of natural features.
- Stability.
- Damage by flood or other natural occurrences such as erosion by sea, river, or surface water run-off.

The intent is that every lot shall contain a safe building platform suitable for the erection of building types appropriate to the zoning of the land.

All resource consent applications for subdivision, or any other type of development where land stability needs to be addressed shall be accompanied by a Statement of Suitability for Development relevant to the site. Council may request that a more detailed geotechnical report be undertaken to prove the suitability of the site for its intended purpose after evaluating the engineer's statement.

2.5 Technical Responsibilities

Where any urban land subdivision or development involves carrying out bulk earthworks, or the assessment of slope stability, or the detailed evaluation of the suitability of natural ground for the foundations of buildings, streets, services or other works, then a geotechnical engineer shall be appointed by the developer to carry out the following functions:

a) Prior to detailed planning of any development, to undertake a site inspection and such investigations of subsurface conditions as may be required.

b) To review the drawings and specifications defining the earthworks proposed, and submit a written report to the Council on foundation and stability aspects and any proposed departures from this Manual and associated standards.

2.5.1 Preliminary Site Evaluation

Prior to any detailed planning or design, the Developer or geotechnical engineer, as applicable, shall undertake a preliminary evaluation of the general nature and character of the site in sufficient detail to determine the likely requirements for earthworks or the need for further investigations into the suitability of foundation conditions, or both, and the stability of the natural ground. The preliminary evaluations should be carried out in the context of the total surroundings of the site. In simple cases a visual appraisal may be sufficient. In other cases, depending on the nature of the project, its locality, the scale of development proposed and individual site characteristics, particular attention may need to be given to the following matters, which should normally be considered prior to preparing a scheme of subdivision or development.

a) Drainage

It is important to identify the existing natural drainage pattern of any area and to locate natural springs or seepage.

Where any natural drainage paths are to be interfered with or altered by earthworks, appropriate measures should be taken to ensure that sufficient adequate alternative drainage facilities are provided.

b) Slope Stability

Some natural slopes exist in a state of marginal stability and relatively minor works such as trenching, excavation for streets or building platforms, removal of scrub and vegetation, or the erection of buildings, can lead to failure. Signs of instability include cracked or hummocky surfaces, crescent shaped depressions, crooked fences, trees or power poles leaning uphill or downhill, uneven surfaces, swamps or wet ground in elevated positions, plants such as rushes growing on a slope or water seeping from the ground.

c) Foundation Stability

A study of the general topography of the site and its surroundings may indicate areas which have previously been built up as a result of natural ground movement or by the deliberate placing of fill material. Unless such fill has been placed and compacted under proper control, long-term differential settlement could occur causing damage to superimposed structures, roads, services or other subdivision works.

2.5.2 Specialists Services

Where a soils report is required, then prior to or at the time of applying for a subdivision or development consent, the developer shall submit to Council a written report from a geotechnical engineer setting out the particulars of any investigations carried out. The report should include details of contours, natural features and modifications proposed thereto, and include a statement from the geotechnical engineer as to the suitability of the land for subdivision or development, with details of any special conditions that should be imposed.

Note: A suitable format for this statement of opinion is included within the MPDC Infrastructure Code of Practice.

2.6 Planning and Design

2.6.1 Landform

The final choice of landform should represent the most desirable compromise between taking account of the factors referred to in Section 2.62.62.6 and the preservation of natural features and the natural quality of the landscape including the retention of natural watercourses.

The choice of a suitable landform is dependent on many factors which may be specific to a particular site. In general unnecessary earthworks should be avoided but considerations which may justify the carrying out of earthworks include:

a) Minimising the possibility of damage to property occurring through ground movement in the form of slips, subsidence, creep, erosion or settlement.
b) Minimising the possibility of damage to property occurring through flooding, or surface water run-off.
c) The development of a more desirable roading pattern with improved accessibility to and within the site and the creation of a better sense of orientation and identity for the area as a whole.
d) Efficient overall land utilisation including the quality of individual sites and amenity areas around buildings, the economics of providing engineering services, and the standard of roading and on-site vehicular access.

e) The need to create suitably graded areas for playing fields and other community facilities.
f) The enhancement of the general environmental character of the area by softening the landscape or by artificially creating or emphasising landforms of visual significance, particularly on flat sites or on areas devoid of landscape features.
g) The safety of the site by incorporating CPTED (Crime Prevention through Environmental Design) principles.

2.6.2 Soils and Investigations

Where appropriate the general nature and shape of the ground should be studied and particular note taken of:

a) The geological nature and distribution of soils.
b) Existing and proposed drainage conditions and the likely effects on ground water.
c) The previous history of ground movements in similar soils in the area.
d) The performance of comparable cuts and fills (if any) in adjacent areas.
e) The existence of peat soils including consistency, depth and extent.

Soil data should be obtained for areas which are intended to:

a) Form *in situ* bases for fills.
b) Yield material for construction of fills.
c) Be exposed as permanent batters.

Sufficient borings, probings, or open cuts should be made to:

a) Classify the soil strata by field and visual methods.
b) Evaluate the likely extent and variation in depths of the principal soil types.
c) Establish the natural ground water levels.

The soil information thus obtained should form the basis for:

a) Further sampling and testing which may be required on representative soil types.
b) Relating subsequent soil test properties to relevant strata over the site.

The appropriate test data for different areas shall be determined by the soils engineer.

2.6.3 Stability Criteria

Settlement

The most important factor in ensuring satisfactory performance of stable fills is the limiting of post-construction differential settlements. The design and construction of fills should be such that these settlements are kept within acceptable limits.

Bearing Capacity

The strength of the ground resisting general shear failure (and resulting gross deformation) under the footings of a house is a local phenomenon distinct from settlement. Fill constructed to minimise settlement in accordance with this Manual will have adequate shear strength.

Shrinkage and Expansion

Where peat soils are present in the area of the subdivision then special provisions shall be made to limit drainage of the peat which would lead to shrinkage.

Slope Stability

In most cases, it is unnecessary or impracticable to measure quantitatively the factor of safety of a slope against shear failure. Maximum slopes of cuts and fills may be determined by the geotechnical engineer from experience and from observation of slopes in the vicinity which have a long-standing history of stability, are of similar height to the proposed slope, and are of apparently similar geological formation.

Where necessary or where a precedent is not available, a special soils engineering investigation should be carried out by the geotechnical engineer to determine acceptable limits to cut and fill slopes. In assessing slope stability, account should be taken of possible future changes in ground water level or other conditions.

Part 3 – Road Works

3.0 Introduction

The Matamata-Piako District Plan sets out the required outcome and performance assessment criteria for development within the district.

This Manual provides standards for the preferred means of compliance in terms of engineering design and construction.

Other means of compliance will be considered in engineering design but must be supported by detailed design philosophy and calculations.

3.1 Variations: Road Works

The way in which the roading and pedestrian networks are laid out, and the elements which contribute to them, are highly influential drivers of urban form and character and are key to how successful an urban area will be. The core design principles, context and site analysis are integral to establishing an appropriate design response and rationale for the road layout and its elements in individual subdivisions and developments and within the context of the surrounding area in which they are located.

It is essential that the network of roads, lanes and footpaths in an urban area are well connected and designed to ensure safety, comfort, efficiency, reduced energy use and improved amenity for a range of users. Infrastructure also needs to share the road space and any above ground landscape elements and infrastructure requirements need to be considered in tandem with below ground infrastructure needs. Careful consideration needs to be given to the block and street layout, block size, street orientation, level of connectivity and width of the road reserve or connection.

No change will be permitted to the requirements for road pavement construction and testing on the road carriageway, or to the luminance of street lighting.

3.2 Definitions

RRU means Road Research Unit
NZTA means the New Zealand Transport Agency

3.3 Road Classification

The MPDC District Plan identifies significant roads (state highways, and regional arterials as identified in the Proposed Waikato Regional Policy Statement: Decisions Version, November 2012), arterial roads, and collector roads ~~state highways and regional arterial roads~~ within Section 9.1.~~1~~2. Roads not specifically listed in the District Plan are local roads. ~~and the road hierarchy is further subdivided within Table 3.1. The classifications are:~~

~~State Highways;~~
~~Regional Arterial Roads~~;
~~Collector Roads;~~
- ~~Sub Collector Roads; and~~

- ~~Local Roads.~~

Table 3.1 below ~~classifies Collector and Local roads in accordance with the indicative traffic volumes and~~ provides some of the geometric and structural standards for the classifications. The Table distinguishes between collector and local roads based on indicative traffic volumes.

Table 3.1: Matamata-Piako District Council
Residential, Business and Industrial Zones

Road Type	General								Seal Width				Shoulders					Berms		Traffic Services		Geometric Alignment			
	Area Served (no. of household units)	Indicative Traffic Volume (vpd)	Design Speed (km/h)	Road Reserve Width (m)	Length (m)	Min. Seal Edge Radius of Minor Road	Pavement Construction	Sealing Surfacing	Turning Area (for no-exit roads)	Min. Traffic c/way Width (m)	Sealed Shoulder Width (m)	Parking Provision Width (m)	Total Width (m)	Metal Shoulder Width (m)	Kerb and Channel	Nom. Feather edge (m)	Feather Edge Slope (H:V)	Clear Zone (m)	Footpath /Cycleway	Services	C/line Markings	Edge Line Markings	Min Grade (%)	Max Grade (%)	Max Super Elevation on Curve (%)	Max Super Elevation at Intersection (%)
Access Leg to an allotment	1	8		3.5 m access leg																			14		
Private Access, including Right of Ways (ROW's)	2 to 3	16–24		4	10–70		150 mm WHAP40 75 mm compacted WHAP20	25 mm AC 125 mm concrete (20 MPa)	Subject to specific design	2.8			2.8		Nib one side. Mountable on other					0.60 m on one or both sides	No		0.5			
Private Access, ROW's	4 to 6	32–48	50	6	71–150		150 mm WHAP40 75 mm compacted WHAP20	25 mm AC 125 mm concrete (20 MPa)	Yes	4.8		Optional	≥4.8								Optional				
Service Lane (industrial / business)		48–800	30	10	0–500	6*	Subject to specific Design (Austroads) Asphalt surface for turning heads		Subject to specific design	6		No parking	6		Non-mountable					Subject to specific design	Optional				
Local Road (cul-de-sac)	7 to 25	56–200	50–80 (max)	18	20	6			Yes	3.5		1 × 2.5 m	6–7			2	5:1		1.5 m on one side		At Council's discretion		Subject to specific design	10	4	4
Local Road (residential)	>25	200–1000				6				3.5			8.5						1.5 m on both side					14		
Local Road (industrial / business)		≤1000				15				4–6		2 × 2.5 m	9–11						1.5 m on one side							
Sub Collector Road (residential)		800–1200				12				7			11						1.5 m on both sides							
Collector Road (residential)		1000–2500				12				7		2 × 2.5 m	12		Non-mountable	2	6:1			Subject to specific design	Yes	Yes	Subject to specific design	Subject to specific design		
Collector Road (industrial / business)		1000+				15																				
~~**Regional** **Arterial Road~~		2500+							Subject to specific design							3		7								

* Minimum radius to allow for vehicle turning paths

~~** Rural-Residential – For lots that will not yield more than 6 residential lots consideration will be given to reducing the reserve width to a min of 6 m~~

~~*** Residential Zone – If the driveway is 50 m or more in length, the formation width could be reduced to 3.5 m with passing bays of 5.5 m every 50 m~~

Table 3.1: Matamata-Piako District Council
Rural and Rural Residential Zones

ROAD TYPE		General									Seal Width			Shoulders					Berms		Traffic Services						Geometric Alignment			
		Area Served (no. of household units)	Indicative Traffic Volume (vpd)	Design Speed (km/hr)	Road Reserve Width (m)	Length (m)	Min. Seal Edge Radius of Minor Road	Pavement Construction	Sealing Surfacing	Turning Area (for no-exit roads)	Min. Traffic c/way Width (m)	Sealed Shoulder Width (m)	Total Width (m)	Metal Shoulder Width (m)	Kerb and Channel	Nom. Feather edge (m)	Feather Edge Slope (H:V)	Clear Zone (m)	Footpath /Cycleway	Services	Marker Posts	C/line Markings	Edge Line Markings	No Pass Lines (where reqd)	Raised Refirsd Pavement Markers	Min Grade (%)	Max Grade (%)	Max Super Elevation on Curve (%)	Max Super Elevation at Intersection (%)
Access leg to an allotment	**Rural**	1	N/A		9*																						14		
	Rural Res				12*																								
Private Access, including Rights of Way (ROWs)	**Rural**	2 to 3	N/A	50	9	0–1000	6*	150 mm WHAP 40	3 lots + Grade 3/5 two coat chipseal	Subject to specific design	3 (6 m for first 20 m)		3		Not preferred and subject to approval					Side slope or boundary		No	Optional						
	Rural Res				12																								
Private Access ROWs	**Rural**	4 to 6	N/A		9			150 mm WHAP 40		Yes	4 (6 m for first 20 m)		4														12.5		
	Rural Res				12**																								
Local Road		>25	48–350	100		500+				Yes	6	0	6	0.5		1.5	5:1	3				At Council's Discretion			0.4				
Collector Road			250–1500	100	20		15	Subject to specific Design (Austroads)	Grade 3/5 two coat chipseal	Yes	6–7	0.1	6–7		Subject to specific design			4	Subject to specific design	Adjacent to boundary	Yes		At Council's Discretion		At Council's Discretion	0.4	10	10	6
~~Regional~~ **Arterial Road**			1500+	100							7	0.5–1	8–9	0.5–1		1.5–2	5:1 / 6:1	4				Yes			Yes	0.4	8		

* Minimum radius to allow for vehicle turning paths

** Rural-Residential – For lots that will not yield more than 6 residential lots consideration will be given to reducing the reserve width to a min of 6 m

~~*** Residential Zone – If the driveway is 50 m or more in length, the formation width could be reduced to 3.5 m with passing bays of 5.5 m every 50 m~~

Standards for Table 3.1

a) The compacted sub-grade for all private accesses or rights of way in this table shall have a CBR of no less than ~~three~~ 10 at depth of 250mm, otherwise pavement depth shall be increased or the sub-grade improved.

b) The trafficable carriageway shall generally be located centrally within the road reserve or private access to enable future development including more seal width.

c) The natural gradient along the access way within 10 m of the road boundary shall be less than 8%.

d) All public no-exit roads shall have sufficient turning dimension to enable a 90 percentile car to enter and leave in a forward direction without reversing (See Figure 3A). The design dimensions should be sufficient to enable a 90 percentile two axle truck (HGV) to undertake a three-point turn (See Figure 3B).

e) Construction of a road or access servicing four or more allotments, or two or more activities, shall have sufficient road reserve width to:

- Accommodate any retaining structure or slope necessary to support the road or adjacent property, and
- Achieve a complying horizontal alignment, and
- Accommodate any turning area required by these standards, and
- Service the traffic generation from non-residential activities likely to use the access, and
- Include passing bays on ROWs, where necessary having regard to topography of land, sight distances and usage, and
- Include an area at the end of a private right of way/access to allow for a 90 percentile car to enter and leave in a forward direction without reversing onto the public road, ~~.~~ and
- Accommodate utility services.

f) Traffic volume – as a guideline allow for 8 vpd / hu (hu = household unit).

g) All Rural and Rural Residential ROWs/Private access shall provide a passing bay every 200 m, or subject to specific design.

h) No ROW or private access shall serve more than six allotments.

i) Cul-de-sac = a road having the same exit and entry location off another road with no potential for future extension of the road.

j) The maximum length of an access strip or a private way shall be 1,000 m. No access lot or private way shall serve more than six allotments and if three or more lots are served then the access lot or private way shall be sealed.

3.4 Philosophy for Road Network Design

To improve the living environment, local roads providing property access should be designed to form a network which does not attract external through traffic. Through their design and layout, local roads should encourage vehicle speeds appropriate to the environment, while providing convenience of access to residents and essential services.

T-junctions and right to left staggers are preferred to cross intersections particularly for local roads. Acute-angle and Y-junctions are to be avoided. Multi-leg intersections may require control by roundabouts.

Intersections on curves, particularly on the inside of curves, other than large radius curves, should be avoided.

Generally, roads should intersect only with roads in the same class or those immediately above or below in classification.

Other than in specifically designed shared environments, pedestrian, cyclist and vehicular traffic should be separated and areas of potential conflict between pedestrians, cyclists and vehicles should be designed to minimise risk.

The advantages of pedestrian walkways outside of road reserves should be considered.

The District encourages cycling in accordance with the Urban Design Protocols. Road networks should provide a convenient and safe cycle access, through a combination of on and off road facilities. See Section 3.11 for further details.

All landscape planting design and implementation within the road reserve shall be as per Part 7.

3.5 Parking

3.5.1 General

Provision shall be made for the parking of vehicles on all roads. The carriageway widths and design speeds specified in Table 3.1 recognise that carriageway parking will occur. Alternative widths and layouts may be suitable which provide for parking in defined areas clear of the through traffic.

3.5.2 Carriageway Parking

As the traffic function of a road becomes more important, it is necessary to provide more specifically for vehicle parking so that moving traffic is not impeded.

Any parking on the carriageway shall be constructed in accordance with Table 3.1.

In industrial roads, because of the mixing of light vehicles with long, less manoeuvrable, heavy vehicles, parking width shall be provided on each side of the carriageway to leave a clear line for moving traffic.

3.5.3 Dimensional Requirements

All parking dimensions shall be in accordance with Figure 3.1.

See also Drawings DG 305 and DG 306 noting that if there is any conflict Figure 3.1 takes precedence.

3.5.4 Indented Parking

To facilitate a clear traffic pathway, indented parking bays and parking in the middle of cul-de-sac heads should be considered.

3.5.5 Mobility Parking

Mobility parking spaces shall be designed according to the dimensions shown in Figure 3.1.

Note: NZS4121:2001 Design for Access and Mobility – Buildings and Associated Facilities provides a useful guide.

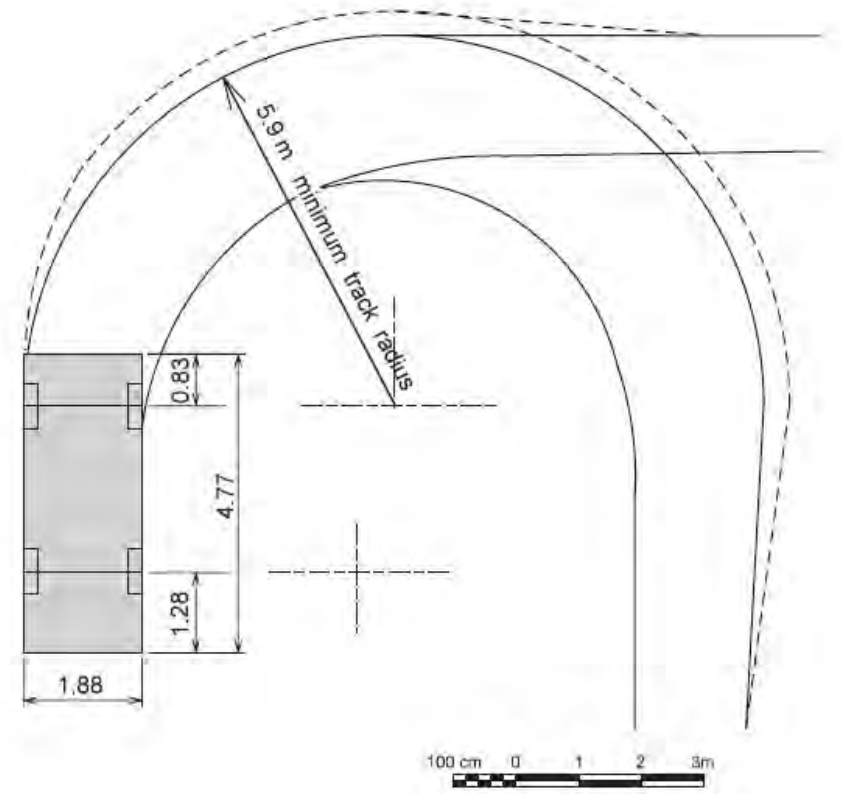
3.5.6 Construction

The surfacing of off-street parking and loading areas (excluding temporary parking) shall meet the following standard:

- The area shall be constructed on a well drained subgrade developed to give a CBR of not less than ~~7~~10, with 200 mm of compacted WHAP 40 basecourse. The area shall be sealed with a two coat Grade 3~~4~~ / Grade 5~~6~~ chip seal ~~or 25 mm of compacted Asphaltic Concrete~~ sprayed 180/200 bitumen to seal the surface, spread Grade 4 or 5 chip to work over so as to avoid disturbing the bitumen, then paved with 25mm of asphaltic concrete. Concrete is an acceptable alternative construction material (as per the MPDC Infrastructure Code of Practice).

All stormwater shall be controlled within the area, and discharge to approved outfalls. All parking areas shall be marked to define required staff and visitor parking spaces.

90 percentile car tracking curves



Legend
Wheel tracks
Front overhang
Clearances:
Speeds less than 10km/hr: 300mm minimum on each side of vehicle.
Speeds greater than 10km/hr: 600mm minimum on each side of vehicle.
NB: Absolute minimum radius - inappropriate for speeds > 10km/hr.

Figure 3A

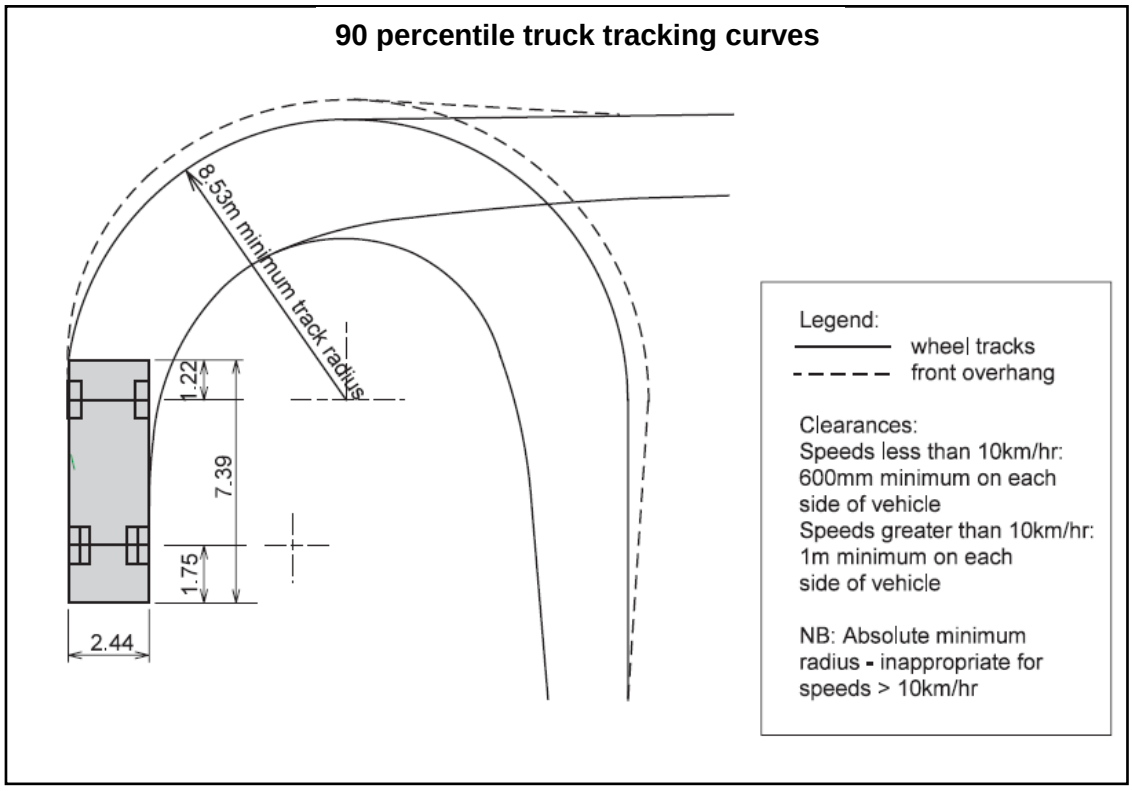
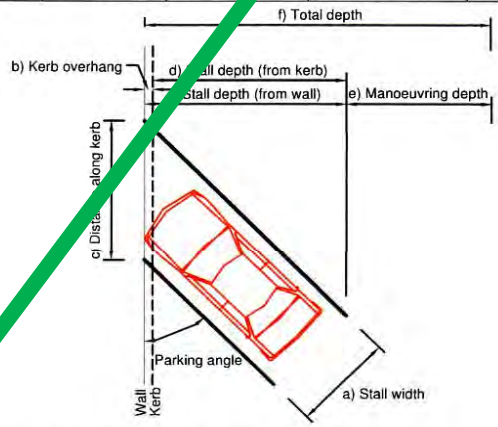

90 percentile truck tracking curves
8.53m minimum track radius
1.22
7.39
1.75
2.44
Legend:
wheel tracks
front overhang
Clearances:
Speeds less than 10km/hr:
600mm minimum on each side of vehicle
Speeds greater than 10km/hr:
1m minimum on each side of vehicle
NB: Absolute minimum radius - inappropriate for speeds > 10km/hr

Figure 3B

Car Parking Dimensions

Parking Angles	Term parking	a) Stall width	b) Kerb overhang	c) Distance along Kerb	d) Stall depth (from Kerb)	e) Manoeuvring depth	f) Total Depth	
							One row	Two rows
0°	Long	2.5	0.2	6.1	2.3	3.7	6.2	8.7
	Short	2.5	0.2	6.1	2.3	3.9	6.4	8.9
	End Bay	2.5	0.2	5.6	2.3	3.7	6.2	8.7
30°	Long	2.5	0.3	5.0	3.8	3.6	7.7	11.8
	Short	2.6	0.3	5.2	3.8	3.7	7.8	11.9
	Accessibl	3.6	0.3	6.4	3.8	3.7	7.8	11.9
45°	Long	2.5	0.4	3.5	4.5	3.5	8.4	13.3
	Short	2.6	0.4	3.7	4.5	3.7	8.6	13.5
	Accessibl	3.6	0.4	4.5	4.5	3.7	8.6	13.5
60°	Long	2.5	0.6	2.9	4.6	3.8	9.0	14.2
	Short	2.6	0.6	3.0	4.6	4.1	9.3	14.5
	Accessibl	3.6	0.6	3.7	4.6	4.1	9.3	14.5
90°	Long	2.5	0.8	2.5	4.1	7.3	12.2	17.1
	Short	2.6	0.8	2.6	4.1	7.7	12.6	17.5
	Accessibl	3.6	0.8	3.2	4.1	7.7	12.6	17.5



Notes:

Long term parking is considered as parking for the following:
- Tenant, employee and commuter parking (generally all day parking);
- Sports facilities, entertainment centres, hotels and motels.

Short term parking is considered as parking for the following:
- Town centres, shopping centres, supermarkets and isolated retail outlets;
- Hospitals, medical centres, medical consultants and school.

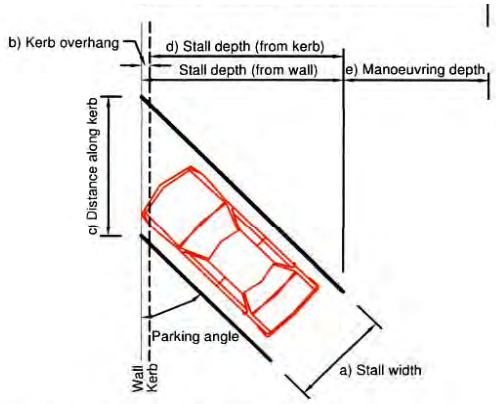
Accessible parking for vehicles requiring wheelchair access shall be as follows:
- 1 space for up to 10 total spaces provided;
- 2 spaces for up to 100 total spaces provided;
- And 1 more space for every additional 50 spaces.

Distance of parking from intersections shall be as follows:
- Parallel parking (0 degree) – 6m on approach and exit;
- Angle parking (30 to 90 degrees) – 12 m on approach and 6m on exit.

~~Figure 3.1~~

Car Parking Dimensions

Parking Angles	Term Parking	a) Stall Width (m)	b) Kerb Overhang (m)	c) Distance along Kerb (m)	d) Stall depth (m)	e) Manoeuvring depth (m)	f) Total Depth (m)	
							One Row	Two Rows
0°	Long	2.5	0.2	6.0	2.5	3.7	6.4	8.9
	Short	2.5	0.2	6.0	2.5	3.9	6.6	9.1
	End Bay	2.5	0.2	5.0	2.5	3.7	6.4	8.9
30°	Long	2.5	0.3	5.0	3.8	3.6	7.7	11.8
	Short	2.6	0.3	5.2	3.8	3.7	7.8	11.9
	Accessible	3.6	0.3	6.4	3.8	3.7	7.8	11.9
45°	Long	2.5	0.4	3.5	4.5	3.5	8.4	13.3
	Short	2.6	0.4	3.7	4.5	3.7	8.6	13.5
	Accessible	3.6	0.4	4.5	4.5	3.7	8.6	13.5
60°	Long	2.5	0.6	2.9	4.6	3.8	9.0	14.2
	Short	2.6	0.6	3.0	4.6	4.1	9.3	14.5
	Accessible	3.6	0.6	3.7	4.6	4.1	9.3	14.5
90°	Long	2.5	0.8	2.5	4.1	7.3	12.2	17.1
	Short	2.6	0.8	2.6	4.1	7.7	12.6	17.5
	Accessible	3.6	0.8	3.2	4.1	7.7	12.6	17.5



Notes:

Long term parking is considered as parking for the following:
- Tenant, employee and commuter parking (generally all day parking);
- Sports facilities, entertainment centres, hotels and motels.

Short term parking is considered as parking for the following:
- Town centres, shopping centres, supermarkets and isolated retail outlets;
- Hospitals, medical centres, medical consultants and school.

Accessible parking for vehicles requiring wheelchair access shall be as follows:
- 1 space for up to 10 total spaces provided;
- 2 spaces for up to 100 total spaces provided;
- And 1 more space for every additional 50 spaces.

Distance of parking from intersections shall be as follows:
- Parallel parking (0 degree) – 6m on approach and exit;
- Angle parking (30 to 90 degrees) – 12 m on approach and 6m on exit.

Figure 3.1

3.6 Road, Carriageway and Formation Widths

3.6.1 Road Width

The road width is to provide for:

- Carriageway.
- Parking.
- Cycling.
- Footpaths.
- Berms.
- Services.
- Traffic facilities.
- Landscaping.
- Road furniture.

Minimum road widths are scheduled in Table 3.1.

Preservation, or capitalisation, of some natural feature of a landscape or existing specimen trees may dictate an irregular shaped road width.

Certain carriageway and berm geometrics may require that the road width be increased, usually locally.

Adequate width of road reserve is important and is normally 20 m. Additional width is likely to be required where earthworks are extensive. A minimum clearance of 3 m is desirable between the road reserve boundary and tops of cuttings or toes of embankments.

In rural and rural residential areas fences, if constructed, shall be placed on boundary lines unless written permission is received to do otherwise.

3.6.2 Carriageway Width

Two lanes for moving traffic shall be provided on all roads except where a device is used for traffic control or there is a shared environment (as defined in Table 3.1).

The minimum lane width for moving traffic is 3.0 m, and this should be increased to 3.5 m where the traffic function is dominant. Where there is significant cycle traffic on high volume collector roads, the lane width should be increased and in some cases a marked cycle lane should be provided.

In residential areas, the carriageway may be split into separate one-way lanes for aesthetic or landscaping reasons or to suit ground levels on steep terrain, whilst still retaining adequate manoeuvrability and property access.

Carriageway widths shall be not less than those shown in Table 3.1, except for “local roads” narrower widths may be appropriate for special conditions and designs for these shall be based on actual vehicle and turning dimensions.

Where topography or other considerations make carriageway and berm widths technically difficult and/or uneconomical, the developer may apply for a Variation to allow them to be reduced providing that there is no loss of functionality.

3.6.3 Formation Width

Formation width shall be sufficient to contain the functions described in 3.3.1 above. Where topography permits, the formation width should extend beyond the road ~~boundary~~ carriageway by 500 mm, with batters providing a smooth transition to the adjacent building lot grades.

Where structures retaining private lots are required, these shall be fully located on the lot, not on the road.

3.7 Road Geometry

The requirements in this section generally apply to urban areas where the speed environment is up to 50 km/h. Many of the requirements can also apply in the rural areas where there is a higher speed environment. Where there are requirements that specifically apply to the rural areas these are identified and detailed.

In areas of rural character the geometric design shall include gradients, super-elevation and road widening.

Note: The Austroads publication "Rural Road Design – A Guide to the Geometric Design of Rural Roads" provides useful guidelines.

3.7.1 Road Alignment

Horizontal alignment of roads should be based on terrain and the design speed applicable to the road function.

Vertical alignment of residential roads should ensure that inclines can be negotiated during all weather conditions and sight distances are adequate for safety. The ideal gradient should be considered as a planning factor when selecting locations for shopping centres, service centres, walks or footpaths.

Generally local roads will not require super-elevation or transition curves.

a) Intersection Spacings

The table below sets out minimum spacings between adjacent intersections on different categories of road ~~in a 50 km/h environment~~. All distances are measured along the centreline of the more major road between the centrelines of the intersecting roads.

	~~Local Roads~~	~~Collector or Arterial~~	~~Industrial~~
~~Same Side~~	~~60 m~~	~~90 m~~	~~200 m~~
~~Opposite Sides~~	~~30 m~~	~~45 m~~	~~100 m~~

Intersection Spacing Standards (Same side of the road) – Residential, Rural-Residential, Business and Industrial Zones

85th percentile operating speed	Minimum Intersection Spacing Standards – Intersections on the same side of the road (e – Fig 3.2)		
	Industrial Roads	Arterial Roads	Collector and Local Roads
50 km/h	200 m	90 m	60 m
60 km/h	200 m	90 m	60 m
70 km/h	200 m	90 m	60 m
80 km/h	200 m	90 m	60 m

Intersection Spacing Standards (Opposite sides of the road) – Residential, Rural-Residential, Busines and Industrial Zones

85th percentile operating speed	Minimum Intersection Spacing Standards – Intersections on opposite sides of the road (d – Fig 3.2)		
	Industrial Roads	Arterial Roads	Collector and Local Roads
50 km/h	100 m	45 m	30 m
60 km/h	100 m	45 m	30 m
70 km/h	100 m	45 m	30 m
80 km/h	100 m	45 m	30 m

Intersection Spacing Standards – Rural Zone

85th percentile operating speed	Minimum Intersection Spacing Standards – Irrespective whether the intersection is on the same or opposite sides of the road (d and e – Fig 3.2)	
	Arterial Roads	Collector and Local Roads
50 km/h	125 m	100 m
70 km/h	220 m	200 m
80 km/h	550 m	200 m
100 km/h	800 m	500 m

In all cases a right/left stagger is preferred. If cross roads are unavoidable a roundabout is required for all but low volume roads.

~~In rural and rural residential areas the following shall apply:~~ The following shall apply:

- The location of intersections shall be chosen to ensure adequate spacing and sight distance is available for all vehicle movements.
- New intersections shall not be designed to form crossroads with existing roads.

- Safe Intersection Sight Distance (SISD) shall be provided at any intersection, in accordance with the following table. ~~See also Figure 3.2.~~

Note: The Austroads publication "Guide to Traffic Engineering Practice Part 5: Intersections at Grade" provides a useful guide.

~~Speed (km/h)~~	~~SISD (m)~~
~~40~~	~~70~~
~~50~~	~~90~~
~~60~~	~~115~~
~~70~~	~~140~~
~~80~~	~~175~~
~~90~~	~~210~~
~~100~~	~~250~~
~~110~~	~~290~~
~~120~~	~~330~~

Safe Intersection sight Distance Standards (SISD) – All Roads/All Zones

85th Percentile Operating Speed	**Safe Intersection Sight Distance Standard**
40 km/h	70 m
50 km/h	90 m
60 km/h	115 m
70 km/h	140 m
80 km/h	175 m
90 km/h	210 m
100 km/h	250 m
110 km/h	290 m

b) Intersection Alignments

The preferred angle of intersection shall be 90º.

Kerb radius shall not be less than 6 m (refer Table 3.1).

c) Grades at Intersections

Gradients within 30 m of intersections shall be:

- For Local Roads – a maximum of 1 in ~~10~~20; ideally less than 1 in 33.
- For Collector and ~~Regional~~ Arterial Roads – less than 1 in 50.

d) Roadmarking and Signing

Priority intersections shall be either "Give Way" or "Stop".

Note: The NZTA ~~Manual of Traffic Signs and Markings~~ Traffic Control Devices Manual provides a useful guide.

e) Channelisation at Intersections

All side roads which have a direct access to a state highway or regional arterial road shall be channelised using either kerb extensions and/or a central throat island at the intersection with the state highway or regional arterial road. Such treatments are to be designed and constructed in accordance with this Development Manual.

Side roads expected to carry less than 120 vpd (15 dwellings) and which have a carriageway width of 8 m or less do not require channelisation.

3.7.2 Visibility Requirement

Driver sight distances need to be related to traffic function and vehicle speeds and the resulting visibility splays and envelopes may require the road boundary to be set back.

Tree planting should not be placed in the visibility splay. Only road lighting columns and road signs shall be considered. More detail on requirements for planting within visibility splays is given in Part 7 of this Manual – Street Landscaping.

a) Mid-Block Visibility Requirement

The designer shall submit with the engineering plans the criteria used in determining the visibility distances.

The stopping sight distance measured round a curve shall be along a line 1.5 m into the lane width from the inside kerb.

Note: The Austroads publication "Rural Road Design" provides a guide for the design of horizontal and vertical sight distances along a road.

b) Intersections

The design shall show on the engineering plans, the sight distance provided at each intersection, plus the following information:

- Design Speed.
- Design Vehicle.
- LV – Distance from limit lines to viewpoint.
- ASD – Approach Sight Distance.
- ESD – Entering Sight Distance.
- SISD – Safe Intersection Sight Distance.
- All Radii.

For the SISD determination an object height of ~~1.05 m~~ 1.25m shall be used.

Note: The Austroads publication "Guide to Traffic Engineering Practice Part 5: Intersections at Grade" provides a guide for the design of intersections.

c) Deceleration / Acceleration Lanes

Any intersection with a Collector or higher classification road in a rural area, with a speed environment of greater than 50 km/h shall require properly designed deceleration / acceleration lanes and widening opposite the intersection. A central right-turn waiting bay may be required in certain circumstances. The intersection is to be properly designed by a qualified roading engineer.

Note: The publication "Intersections at Grade" by Austroads is a useful design guide.

d) Roundabouts

The size of a roundabout has a significant role in the performance for capacity, traffic safety and turning movements of vehicles. ~~The following minimum design criteria shall be applied.~~

	~~Road Type~~	~~Central Island Diameter~~	~~Circulating Width~~	~~LV distance~~
~~1~~	~~Local Road~~	~~16 m including a 2 m concrete collar~~	~~Single Lane – 7.0 m~~	~~5.0 m~~
~~2~~	~~Collector Road Industrial~~	~~20 m including a 2 m concrete collar~~	~~Single Lane – 7.0 m Dual lane – 10.5 m~~	~~9.0 m~~
~~3~~	~~Arterial Road~~	~~24 m including a 2 m concrete collar~~	~~Single lane – 7.0 m Dual lane – 10.0 m~~	~~9.0 m~~

~~(LV Distance is defined as the minimum distance from limit lines to view point.)~~

Note: The Austroads publication ~~"Guide to Traffic Engineering Practice Part 6: Roundabouts"~~ "Guide to Road Design Part 4b – Roundabouts" provides a guide to the design of roundabouts.

Minimum criteria may be reduced where:

- Physical constraints such as a building/structure prevent practical implementation of minimum design criteria.
- A roundabout can be shown to form a traffic control device as part of a Local Area traffic management scheme (mini Roundabouts).

Approval of any roundabout below minimum design criteria will be subject to procedures for a Variation.

The application for Variation shall include evidence from the designer supporting that the design will meet capacity, safety and turning movements of intended vehicles.

Traffic modeling shall be required that shows that the design can mitigate the effects of traffic generation due to the development. Where applicable, consideration should be given for future network growth and development. This could include intersection modeling using software such as SIDRA.

Prior to submitting Engineering Plans the designer shall have a Traffic Safety Audit carried out. The audit shall be undertaken in accordance with the NZTA's "Road Safety Procedures for Projects 2004" (refer also to Figure 3C). Any issues rated as serious must be rectified and items rated Important will be evaluated and addressed in a Design Report.

The designer shall show on Engineering Plans the visibility splays for each approach of each roundabout, landscaping details, signage, road marking, and state the:

- Design Speed.
- Design Vehicle.
- LV Distance.
- Central Island Diameter.
- Circulating Width.
- Level of Service.

Note: NZTA's Safety Audit Procedures is a useful guide.

~~e) Traffic Impact Assessments~~ Integrated Transport Assessments

An Integrated Transport Assessment (ITA)~~A Traffic Impact Assessment~~ shall be required for all intersections involving a new public or private road, right of way or vehicle entrance that will generate more than

- ~~40~~ An average of 50 car equivalent movements per day within any one week ~~vehicles movements per day~~ joining onto a Significant Road or Arterial Road~~Regional Arterial Route~~ (as listed in Section 9 of the District Plan).
- An average of 250 car equivalent movements per day within any one week joining onto a Collector Road or Local Road (as listed in Section 9 of the District Plan).

3.7.3 Gradients

a) Longitudinal Gradient

Longitudinal gradient will depend on terrain:

- Minimum gradient subject to evidence that 0.40% is unobtainable up to 0.33%
- Minimum gradient 0.40%
- Maximum gradient (on collector and industrial roads) 8.33%
- Maximum gradient (on residential roads) 12.50%

b) Vertical Curves

For areas where the design speed is ≤ 50 km/h, vertical curves shall have a minimum length of 20 m, except where the grade change is ≤ 1% where the minimum vertical curve length is 10 m.

Note: The Austroads "Rural Road Design" publication provides a guide to the design of vertical curves on rural roads.

c) Super-Elevation

Super-elevation will not normally be needed on local and collector roads (where speed restriction is 50km/h or less) and shall not normally be required on curves in rural residential subdivisions.

d) Crossfall

Normal crossfall = 3%.

Single crossfall will be considered on carriageways up to 7.0 m where normal crossfall is unobtainable.

The maximum longitudinal, or cross sectional slope in turning heads is 6.0%, with the desirable matching normal camber for the pavement type.

3.7.4 Horizontal Curves

The minimum centreline radius for industrial roads, residential collector and sub-collector roads is 80 m.

The minimum centreline radius for local residential roads is 15 m.

Reverse curves are to be separated by an adequate length of straight.

3.7.5 Extra Widening

Where the centreline radius is greater than 60 m, extra widening on curves is not required.

Where curves are less than 60 m radius, extra widening may be applied to the carriageway. In such cases the minimum berm width shall not be reduced.

3.7.6 Cul-de-Sac Heads

In rural and rural residential areas turning heads will be required at the end of all no-exit roads.

In all other cases every cul-de-sac should be provided with a carriageway such that the Design Car may turn without reversing.

Note: The Austroads "Rural Road Design" publication provides a guide to the design of cul-de-sac turning heads.

Provision should also be made, near the end of a cul-de-sac, for three-point turning utilising insets in the kerbline or kerb crossings for the design single unit vehicle. Such kerb crossings shall be specifically designed, such that:

- Outside radius turning circle – minimum radius 6.3 m
- For simple bulbous head – " " 9.0 m
- For simple bulbous head in industrial roads – " " 13.0 m

Off-carriageway parking may be provided in cul-de-sac heads (refer to Section 3.5).

3.7.7 Crossfall on Berms

Footpath crossfall – typical 2.5%
Balance of grass berm crossfall – typical 4.0%

Localised footpath crossfalls in the range of 2% to 4% may be permitted where levels make the typical crossfalls impractical. Localised grass berm crossfalls may similarly

range between 2% and 10%. Engineering drawings should identify any variances from the typical crossfalls.

Berm crossfall shall be satisfactory for vehicle crossings.

3.7.8 Bridges

Where bridging is required this shall be subject to specific design.

Note: Approval to cross a waterway area shall be obtained from the Waikato Regional Council and the bridge design shall be prepared and certified by a Chartered Professional Engineer. Design calculations shall be provided to Council.

Note: The NZTA Bridge Manual standards provide a useful guide.

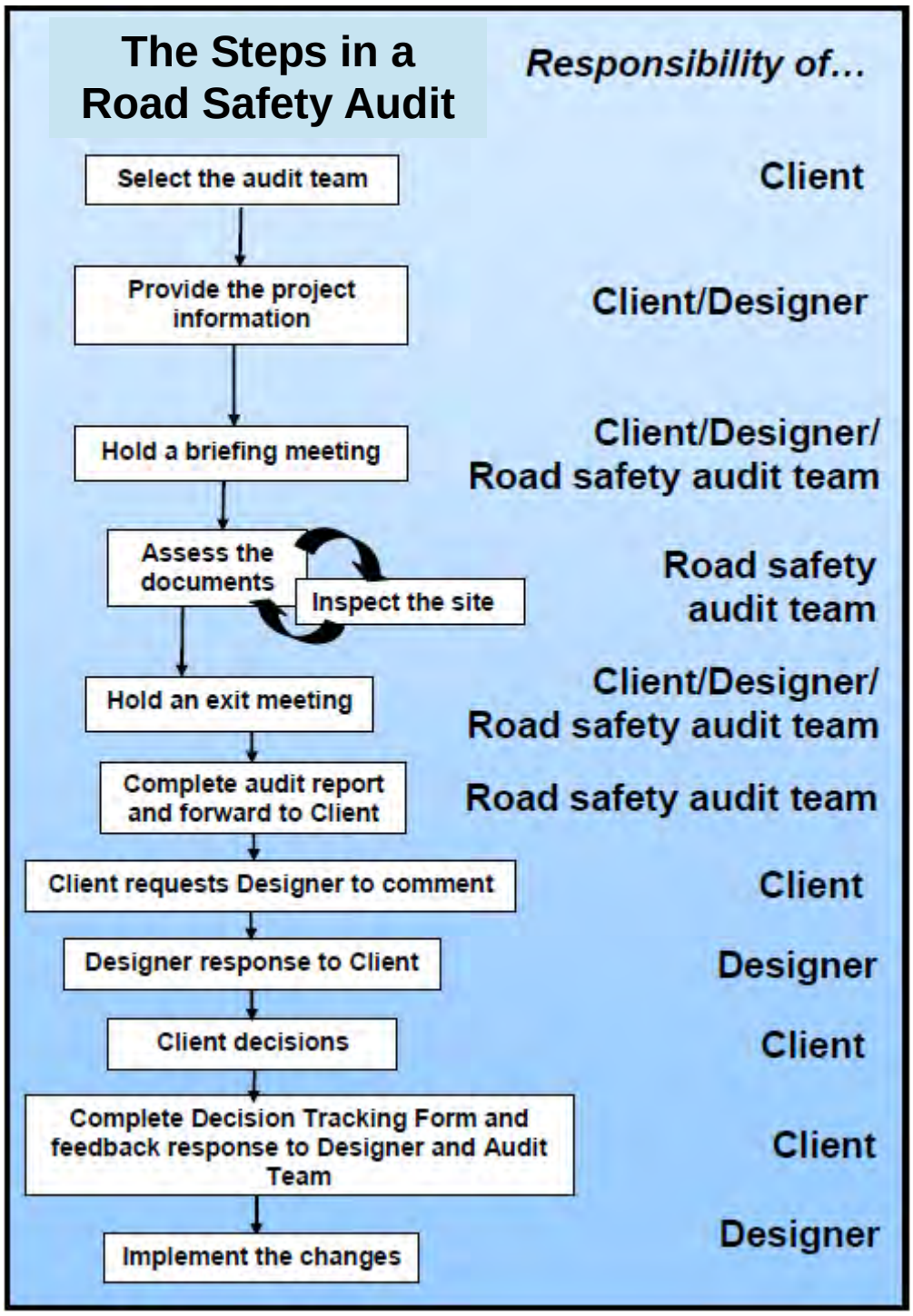

The Steps in a Road Safety Audit
Responsibility of...
Select the audit team
Client
Provide the project information
Client/Designer
Hold a briefing meeting
Client/Designer/ Road safety audit team
Assess the documents
Inspect the site
Road safety audit team
Hold an exit meeting
Client/Designer/ Road safety audit team
Complete audit report and forward to Client
Road safety audit team
Client requests Designer to comment
Client
Designer response to Client
Designer
Client decisions
Client
Complete Decision Tracking Form and feedback response to Designer and Audit Team
Client
Implement the changes
Designer

Figure 3C

3.8 Road Pavement

3.8.1 Flexible Pavement Design

Pavement design shall be undertaken by an engineer experienced in pavement design. It shall apply to all industrial, local residential roads and any roads of higher classification.

a) Design Method

Factors to be included in the design are:

• Design Period	–	30~~25~~ years
• Annual HCV Growth Factor	–	3%
• Load factor EDA/HCA	–	0.6 local roads
	–	0.7 collector roads
	–	0.9 arterial and industrial roads
• % HCV	–	2.5% local road
	–	3.5% collector and higher classification
	–	10% industrial roads

The designer shall provide a design report with the engineering drawings, including the following information as a minimum.

- Results of soils investigations.
- Design assumptions and figures.
- QA measures for consideration.

Note: The design charts in the State Highway Pavement Design and Rehabilitation Manual, or in the Austroads Pavement Design Guide, provide useful guides. NZTA design process shall be for Lower Grade Pavements up to the collector classification and the Premium Flexible Pavements process for roads of higher classification.

For Premium Flexible Pavements the NZTA design document provides a useful guide.

b) CBR Tests

All designs shall be based on soaked CBRs.

In situ CBR results used for compliance shall be the 10 percentile value of tests.

3.8.2 Subgrade Compliance

The subgrade shall be tested for compliance with the CBR and other properties required by the ~~applicable design method~~ MPDC Infrastructure Cod of Practice or as an approved variation to a design method.

Subgrade compliance shall be subject to approval by Council before construction of the next pavement layer.

Note: The MPDC Infrastructure Code of Practice provides useful guidelines.

3.8.3 Sub-Base Layer

- Compaction to CBR ≥ 40.

Sub-base compliance shall be subject to approval by Council before construction of the next pavement layer.

For ~~regional~~ arterial and collector roads a single layer sub-base or upper sub-base layers shall be constructed from WHAP 65 material only with a minimum thickness of 150 mm. ~~For all other roads GAP material is acceptable.~~

3.8.4 Basecourse

For ~~Regional~~ Arterial and Collector roads the aggregate shall be NZTA M4 only.

- Compaction to CBR ≥ 80.

For all other roads an aggregate complying with the WHAP 40 standard is acceptable.

3.8.5 Pavement Layer Construction

Pavement construction below the kerb and channel shall extend 500 mm behind the kerb face.

3.8.6 Surface Sealing

Immediately prior to surfacing the basecourse, a 600 mm wide strip adjacent to the channel must be sprayed with an approved sterilising weed killer.

Asphaltic concrete on first coat seal is mandatory on industrial carriageways and all cul-de-sac turning circles. On residential cul-de-sac heads, asphalt shall be applied until the carriageway becomes constant width.

a) Chip Seal Surfaces

A two coat chip seal comprising a first coat of Grade 3 wet locked with a second coat of Grade 5 is appropriate for most residential roads. Application of the second coat seal shall be delayed until the first coat has had adequate time to mature and should be applied in late summer or autumn. The developer will be responsible for maintenance of the surface until the second seal has been applied and accepted.

Note: Council will require a bond from the developer at the time of 224(c) certificate to cover the cost of the second coat seal. The bond will be held until the second seal is completed to the satisfaction of the ~~Roading Manager~~Asset Manager – Strategy and Policy.

Note: For both first and second coat chip seal, the bitumen application shall extend over the channel lip, but not by more than 25 mm.

b) Asphaltic Concrete on First Coat Chip Seal

An asphaltic concrete layer must be applied over a waterproofing chip seal of ~~grade 4 or g~~Grade 5 chip with a residual bitumen application of 1.0 L/m².

A NZTA M/10 specification Mix 10 is appropriate for residential applications but industrial sites and arterial roads~~sites~~ should consider use of SMA 10. Selection of an appropriate mix for arterial and industrial sites should be agreed with the ~~Roading Manager~~ Asset Manager – Strategy and Policy.

Ramp asphalt to existing sealed surfaces. Minimum thickness asphaltic~~asphalt~~ concrete 25 mm at Mix 10.

3.8.7 Concrete Block Paving

The road pavement may be surfaced with concrete block pavers.

The concrete blocks shall comply, and laying shall be in accordance with recognized good practice. NZS 3116:2002 "Interlocking Concrete Block Paving" and the RRU Technical Recommendation TR10: "Interlocking Concrete Block Paving" provide useful guides.

Pavements specifically for "Light vehicular" use are not acceptable.

Pavers shall be 80 mm thick Firth Holland Autumn Tones or Black Sands pavers, or similar approved by Council's Asset Manager – Stategy and Policy.

On carriageways, pavers shall be laid in a herringbone pattern at 45º to the centreline with the long zigzag parallel to the centreline.

Note: There are useful guidelines in the MPDC Infrastructure Code of Practice.

3.8.8 Unsealed Pavements in Rural Areas

Where approved by the ~~Roading Manager~~ Asset Manager – Strategy and Policy in rural and rural residential areas an unsealed pavement may be constructed. This shall have a minimum compacted thickness of 300 mm of well graded granular material with a minimum soaked CBR of 20. This pavement material shall have sufficient fines to ensure that it does not unravel under the action of traffic. A typical material used on the Council's unsealed roads is a WHAP 40. A 50 mm minimum compacted thickness wearing course shall then be constructed using WHAP 20 or TNZ B/3 AP 20. Normal camber of unsealed pavements shall be 5% to 6%.

3.9 Road Drainage

3.9.1 Subsoil Drains

Where topography dictates or soils are not free draining, subsoil drains will be required behind the kerb as follows:

Minimum subsoil pipe size	–	~~90~~ 110 mm Nexus
Minimum depth to pipe invert	–	700 mm
Minimum width	–	300 mm

3.9.2 Batter Drains

Batter drains behind the boundary may be required to prevent water entering into or onto the berm. They must be constructed as for 3.6.1 above.

3.9.3 Drain Outlet Inverts

Subsoil and batter drain outlets shall be to catchpits or manholes.

3.9.4 Kerb and Channel, Vertical Kerb and Island Kerb

All profiles are to be founded on subgrade with CBR of ~~15~~10. Where pavement depth (refer Table 3.1) is greater than 150 mm, profile shall be laid on a minimum of 75 mm of compacted ~~GAP40~~ GAP20 or WHAP ~~40~~20.

For kerbs with radii tighter than the minimum specified in Table 3.1, or carriageway narrower than standard, "Heavy Duty Kerb and Channel" shall be used.

Note: Suitable kerb profiles are detailed in the MPDC Infrastructure Code of Practice.

3.9.5 Catchpits

a) For developments where the stormwater connection is direct from each lot to stormwater drainage pipes, the area drained per catchpit:

- Gross area drained (carriageway, berm and footpath)	Maximum 900m²
- Area of carriageway	Maximum 450m²
- Maximum spacing of catchpits	100 m
- Maximum spacing of catchpits where private houses connect stormwater to kerb and channel	60 m

b) Preferred location of catchpits:

- At intersections, at the kerbline tangent point
- Upstream of pram crossings
- At changes of gradient on steep roads
- Cul-de-sac heads

c) A double catchpit will be required:

- At the lowest point in a sag vertical curve
- At the ends of a cul-de-sac where water falls to the end
- On all channels where the gradient is steeper than 5%
- Grates shall be the alternative type with bars parallel or perpendicular to the kerb

3.9.6 Dish Channels

For dish channels with footpaths or accessways, concrete is to be on subgrade with CBR not less than ~~7~~10.

Where possible, the design should avoid a requirement for dish channels.

Note: Suitable dish channel profiles are provided in the MPDC Infrastructure Code of Practice.

3.9.7 Road Drainage in Rural and Rural Residential Areas

Channels shall generally be provided for the efficient drainage of surface water and shall be graded to outlets at regular intervals not exceeding 150 m. On steep grades where channels are subject to scouring protection work and outlets at more frequent intervals may be required.

Traversable culvert ends should be installed at suitable locations, particularly on arterial and collector roads.

Swale drains may be allowed in suitable locations.

Culverts, where required, shall be designed in accordance with approved engineering standards. Notwithstanding the outcome of any design calculations, no culvert traversing a road or vehicle entrance shall be smaller than 300 mm in diameter.

In non-urban subdivisions where stormwater from the road formation and adjoining properties cannot be discharged via either open channels or a piped system to an approved outlet, the construction of drilled and lined soakholes and/or roadside berm drainage beds is an option. Any application for this type of disposal system must be accompanied by results of soil percolation tests, specifications and design calculations for Council's approval. The design and testing of these drainage systems shall be carried out by an approved geotechnical engineer.

Note: The MPDC Soakage Guidelines provide a useful guide.

3.10 Footpaths

3.10.1 General

In general, all roads shall have a footpath on both sides.

In the following cases, consideration will be given to one path only:

- Where a short cul-de-sac has been deliberately designed to create a slow speed environment; and
- On minor roads in industrial areas where it can be demonstrated that a second footpath is not justified.

In the case of a properly designed shared environment, i.e. where both vehicles and pedestrians have equal priority, a footpath will not be required.

In locations with high concentrations of pedestrians, e.g. shopping area, outside schools and leading to schools, footpath widths require design in consultation with the ~~relevant Council manager~~ Council's Asset Manager – Strategy and Policy.

- Footpath crossfall shall be as specified in Section 3.7.7.
- Where footpath gradients are steeper than 8.33%, a non-skid surface shall be provided.
- Footpaths shall not be depressed by vehicular crossings.
- In new subdivisions, footpaths should generally be constructed in concrete.
- Footpaths shall generally be located centrally in the berm – refer to Drawing DG 302.

- All footpaths shall provide for safe and convenient access for blind and visually impaired pedestrians.

  Note: The NZTA publication RTX 14 "Guidelines for Facilities that Assist Blind and Visually Impaired Pedestrians" provides full guidelines.

Chip seal footpaths will not be acceptable.

Rural residential subdivisions should make provision for pedestrian access along grass berms – refer to Table 3.1.

3.10.2 Footpath Width

All footpaths are to be 1.5 m wide.

3.10.3 Concrete Footpaths

- Minimum depth of concrete on 25 mm compacted fine granular material 100 mm

Subgrade preparation is not required to extend beyond the edges of footpath.

3.10.4 Asphalt Surfaced Footpaths

- Minimum depth asphalt 25 mm Mix 10
- Minimum depth basecourse 75 mm GAP 20
- Subgrade CBR Minimum 7
- Timber edging and stakes are required.

Note: The MPDC Infrastructure Code of Practice provides guidelines.

3.10.5 Paved Footpaths

- 50 mm Firth Holland Autumn Leaves Pavers or approved equivalent
- 25 mm bedding Sanford Park

Subgrade preparation shall extend at least 100 mm beyond the edge of the pavers.

3.10.6 Pram – Wheelchair Crossings

Pram crossings shall be provided at all intersections. Details are provided in the MPDC Infrastructure Code of Practice.

- Maximum gradient 8.33%

The lip of the crossing shall be flush with the invert of the channel.

3.11 Cycle Traffic

Provision for cyclists on and off the carriageway shall be subject to scheme plan approvals and designed as required.

Provision for cyclists on the carriageway should be in line with "engineering best practice". The preferred width of an on road cycle lane is 1.5 m.

Paths designed for use by cyclists, either exclusively or shared with pedestrians, shall be in line with engineering best practice. The preferred width of shared use paths is 3.0 m.

Note: The Austroads "Guide to Traffic Engineering Practice Part 14: Bicycles" publication provides a useful guide.

3.12 Vehicle Crossings

3.12.1 Definitions

In this section the following definitions apply. Should a definition be in conflict with the definitions in the District Plan, then the District Plan shall prevail.

Road Intersections	Public or private roads, rights of way and vehicle entrances generating more than 100 traffic movements per day shall be treated as an intersection.
Entrance	Up to 2 individual vehicle entrances adjacent to each other.
Vehicle Crossing	Vehicle access from a public or private road to public or private land or right of way.
Speed or Design Speed	Means the 85 percentile of the normal operating speed on the through road.

3.12.2 Vehicle Crossings in Urban Areas

Vehicle crossings shall be provided where an entrance requires that vehicles are crossing the kerb and berm.

Vehicle crossings shall be provided as part of the subdivision or development for private ways and to lots with road frontage less than 5 m in width.

Crossings shall be designed so that the footpath is continuous through the site. In particular:

- Vehicle crossings shall not interfere with the profile of the footpath or the berm except that minor filling may be permitted between the property boundary and the footpath. No retaining walls or structures are permitted to encroach onto the berm and no lowering of the berm is permitted.
- Vehicle crossings shall be constructed with the same material as the adjacent footpath except that for chipsealed or slurry sealed footpaths, the crossing shall be surfaced with asphaltic concrete. Where there is no existing footpath the crossing may be surfaced with concrete or asphalt.
- The vehicle crossing standards apply to the full width of the berm between the kerb and road boundary.
- When constructing a new vehicle crossing, if an existing footpath exists, the footpath is to be cut out and reconstructed to the vehicle crossing standard.
- Where the existing kerb and channel is cracked, the kerb and channel is to be removed and incorporated into the vehicle crossing construction works.
- Chip seal surface applies only in rural environments.

- Sub-grade and sub-base preparation is to extend 100 mm beyond the edges of the crossing.
- ~~Industrial vehicle crossings shall have 665 reinforcing mesh placed centrally in the concrete slab. The reinforcing mesh shall continue through the footpath alignment.~~
- Industrial vehicle crossings shall be designed with consideration given to their rate of usage, loading, and the type of activity undertaken on the site.

For properties at intersections, the vehicle crossing should be off the minor road rather than the major road.

Residential crossings shall possess the following dimensions:

- Single width entrances shall use a crossing width and cut down length of 2.5 m.
- Double width entrances shall use a crossing width and cut down length of 5.4 m.

Business and Industrial crossings shall possess the following dimensions:

- Single width entrances shall use a crossing width and cut down length of 3.5 m.
- Double width entrances shall use a crossing width and cut down length of 6.0 m.

All urban crossings shall be:

- Located to comply with:
  - Minimum sight distance standards at vehicle crossings – Table 3-A;
  - Minimum vehicle crossing separation standards – Table 3-B; and:
  - Standards for minimum separation between vehicle crossings and intersections – Table 3–C; and:
- ~~d~~Designed and constructed in accordance with Drawing DG 308.

Note: The MPDC Infrastructure Code of Practice provides details for the construction of crossings.

3.12.3 Rural and Rural-Residential Vehicle Crossings

Vehicle crossings in rural and rural-residential areas shall be constructed to the same standard as the road they come off. Design shall be as per:

- Drawing DG 307 (District Roads); or:
- Diagrams C, D, or E (State Highways) as required by the table below:.

~~Visibility shall be in accordance with the following table.~~

Type of traffic using accessway (more than one slow, heavy or long vehicle movements per week?)	**Volume of traffic using accessway (ecm/day*)**	**Volume of traffic using state highway (vpd)**	**Accessway type**
No	1–30	<10,000	Diagram C
		≥10,000	Diagram D
	31–100	<10,000	Diagram D
		≥10,000	Diagram E
Yes	1–30	All	Diagram D
	31–100	All	Diagram E

*Equivalent car movements per day. This is calculated either as an average or as weekely average whichever is greater, to cater for the seasonal peaks.

Minimum sight distance shall be in accordance with Table 3-A.

Speed (km/h)	Distance (m)
40	28
50	44
60	63
70	86
80	115
90	140
100	170
110	210
120	250
130	300

("Speed" in the table above refers to the 85th percentile speed environment.)

Access drives shall be formed and maintained so as to adequately control stormwater and to prevent materials such as mud, stones, chip gravel or stock effluent being carried onto public road.

Where a large vehicle entrance is proposed off a roadway with a carriageway width of 6 metres or less then carriageway widening will be required as part of the development. The widening is required to provide a total carriageway width of 6 metres for a length of 15 metres. 5:1 tapering shall then be used to terminate back to the existing edge of seal.

Note: For further information regarding road widening see MPDC Infrastructure Code of Practice.

Separation distances between rural entranceways and to intersections are to be as shown in Tables 3-B and 3-C.on Figure 3.2 below.

No new entrances shall be located closer than 30 metres from a rail crossing without the approval of the NZ Railways Corporation.

For vehicle crossings onto a State Highway the following shall apply:

- Sight Distance Standards

Table App5B/1 – Sight distance standards

Posted speed limit (km/h)	85th percentile operating speed, measured at the site (or if above not known, posted speed	Minimum sight distance standard (m)
Not applicable	50	89
50	60	113
60	70	140
70	80	170
80	90	203
90	100	240
100	110	282

- Separation Distance of Accessways

Table App5B/3 – Guidelines for minimum accessway spacings

Posted speed limit (km/h)	85th percentile operating speed (or if not known, posted speed plus 10 km/h)	Recommended minimum distance between accessway and nearest intersection (m)	Recommended minimum distance between local road accessway and intersection (m)	Recommended minimum distance between accessways (m)	Desirable spacings between accessways and between intersections and accessways on national state highways carrying over 10,000 vpd.
Not applicable	50	30	20	-	125
50	60	30	20	-	160
60	70	30	20	-	220
70	80	100	45	40	305
80	90	100	45	100	400
90	100	200	60	200	500
100	110	200	60	200	500

- Accessway Standards and Guidelines. Accessways onto State Highways are required to comply with the following table and corresponding drawings C, D or E.

Table App5B/4 – Accessway types

Type of traffic using accessway (more than one slow, heavy or long vehicle movements per week?)	Volume of traffic using accessway (ecm/day*)	Volume of traffic using state highway (vpd)	Accessway type
No	1–30	<10,000	Diagram C
		≥10,000	Diagram D
	31–100	<10,000	Diagram D
		≥10,000	Diagram E
Yes	1–30	All	Diagram D
	31–100	All	Diagram E

* Equivalent car movements per day. This is calculated either as an average, or as a weekly average, whichever is greater, to cater for the seasonal peaks.

Note: Vehicle entrances onto State Highways will require NZTA approval as to siting and detail.

3.12.4 Rural and Rural-Residential Vehicle Crossings – Seal Distance from the Carriageway to the Property Boundary

For new vehicle entranceways/crossings or those over which there is a change or increase in intensity in scale of use, they should be constructed in accordance with Drawing DG 307. The seal distance shall be determined based on the following categories:

- Visibility at the Entranceway
- Gradient of Entranceway
- Vehicles Per Day Past the Entranceway

- Posted Speed Limited
- Locality of Other Entranceways
- Effects of Other Entranceways
- Width of Road

The following assessment matrix shall determine the minimum seal distance required from the edge of the carriageway (measured at the centrepoint of the crossing):

Category	Criteria	Weighting	Evaluation Explanation
Visibility at Entranceway	Excellent visibility	10	More than 300 m
	In accordance with DM	5	Meets requirement as per DM
	Poor visibility	0	Does not meet requirement
Gradient of Entrance (12 m back)	Flat gradient	20	Gradient between 1:12 and 12:1
	Steep gradient	0	Gradient steeper than 1:12 and 12:1
VPD past the Entranceway	Very low volume traffic	30	Less than 15 m
	Low to medium traffic volume	20	150–500
	Medium to high traffic volume	10	500–1500
	Very high traffic volume	0	above 1500
Posted Speed Limit	Low speed limit	5	less than 100 km/h
	Open road	0	100 km/h or more
Locality of other Entranceways	Entrances are well away from others	5	Meets requirement as per DM
	Very close to other entranceways	0	Does not meet requirement
Effects of Activity on Entranceway	Only cars use it	15	Light vehicles only
	Occasional stock/delivery truck	10	Occasional stock/delivery truck
	Tanker and occasional stock truck	5	Tanker and occasional stock truck
	Higher use than tanker and occasional stock truck	0	Higher use than tanker and occasional stock truck
Width of Road (sealed carriageway)	Wide road way	15	Wider than 7 m
	Medium width road way	10	Between 7 and 6 m
	Narrow road way	0	Less than 6 m
Total		**100**	

Scoring

Score >70 1 m of seal required
Score 50–70 3 m of seal required
Score <50 5 m of seal required

Exclusions

For roads that are not sealed no seal shall be required for the entranceway.
For rights of way or access legs serving 3 or more lots the seal from the carriageway shall extend to the property boundary.

Table 3-A: Minimum Sight Distance Standards at Vehicle Crossings (All Zones)

85th percentile operating speed	Minimum Sight Distance Standard		
	Significant Roads		All other Roads
	State Highways (> 10,000 vpd)	State Highways (<10,000 vpd) Tahuna-Ohinewai Road; Paeroa-Tahuna Road; Morrinsville-Tahuna Road	
40 km/h	Not applicable	Not applicable	28 m
50 km/h	125 m	89m	44 m
60 km/h	160 m	113m	63 m
70 km/h	220 m	140m	86 m
80 km/h	305 m	170m	115 m
90 km/h	400 m	203m	140 m
100 km/h	500 m	240m	170 m
110 km/h	500 m	282m	210 m

Table 3-B: Minimum vehicle crossing separation standards

85th percentile operating speed	Minimum Spacing between Vehicle Crossings (b – Figure 3.2)			
	Significant Roads		Arterial Roads	Collector and Local Roads
	State Highways (> 10,000 vpd)	State Highways (<10,000 vpd) Tahuna-Ohinewai Road; Paeroa-Tahuna Road; Morrinsville-Tahuna Road		
50 km/h	125 m	15m	15 m	One crossing per title irrespective of spacing and 15m minimum spacing for second or multiple entrances
60 km/h	160 m	15m	15m	One crossing per title irrespective of spacing and 15m minimum spacing for second or multiple entrances
70 km/h	220 m	40m	40m	One crossing per title irrespective of spacing and 30m minimum spacing for second or multiple entrances
80 km/h	306 m	40 m	40m	One crossing per title irrespective of spacing and 30m minimum spacing for second or multiple entrances
90 km/h	400 m	100 m	100m	One crossing per title irrespective of spacing and 30m minimum spacing for second or multiple entrances
100 km/h	500 m	200 m	200m	One crossing per title irrespective of spacing and 80m minimum spacing for second or multiple entrances
110 km/h	500 m	200 m	200m	One crossing per title irrespective of spacing and 80m minimum spacing for second or multiple entrances

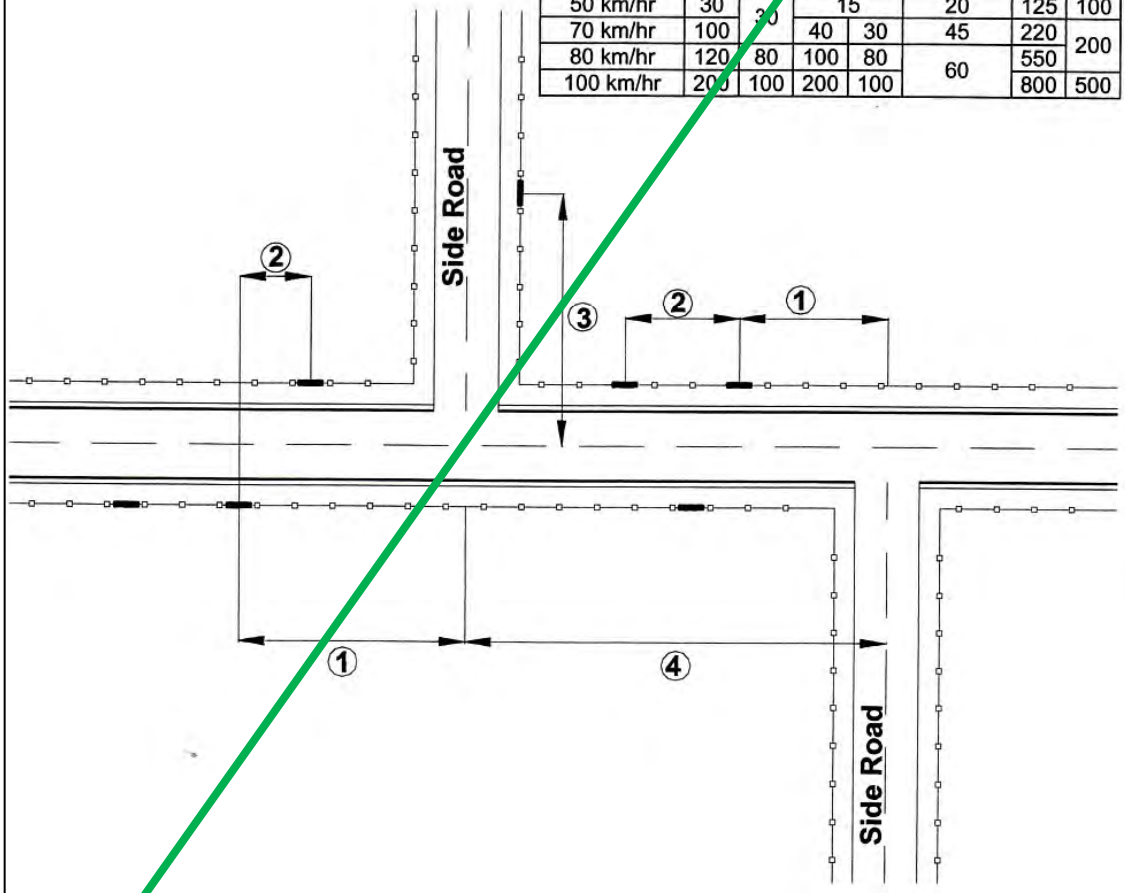
Table 3-C: Standards for minimum seprataion between vehicle crossings and intersections

85th percentile operating speed	Minimum Spacing between Vehicle Crossings and Intersections					
	Significant Roads			Arterial Roads		Collector and Local Roads
	State Highways (> 10,000 vpd)	State Highways (<10,000 vpd) Tahuna-Ohinewai Road; Paeroa-Tahuna Road; Morrinsville-Tahuna Road				
	Crossing on state highway or side road (a and c in Fig 3.2)	Crossing on state highway (a in Fig 3.2)	Crossing on side road (c in Fig 3.2)	Crossing on arterial road (a in Fig 3.2)	Crossing on side road (c in Fig 3.2)	Crossing on either main or side road (a or c in Fig 3.2)
50 km/h	125 m	30 m	20 m	30 m	20 m	20 m
60 km/h	160 m	30 m	20 m	30 m	20 m	20 m
70 km/h	220 m	30 m	20 m	30 m	20 m	20 m
80 km/h	305 m	100 m	45 m	100 m	45 m	45 m
90 km/h	400 m	100 m	45 m	100 m	45 m	45 m
100 km/h	500 m	200 m	60 m	200 m	60 m	60 m
110 km/h	500 m	200 m	60 m	200 m	60 m	60 m

Separation Distances

Separation distance of an access onto a Road from an intersection or between accesses

85th percentile speed (km/hr)	Distance (m)							
	1		2		3		4	
	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road
50 km/hr	30	30	15		20		125	100
70 km/hr	100		40	30	45		220	200
80 km/hr	120	80	100	80	60		550	
100 km/hr	200	100	200	100			800	500



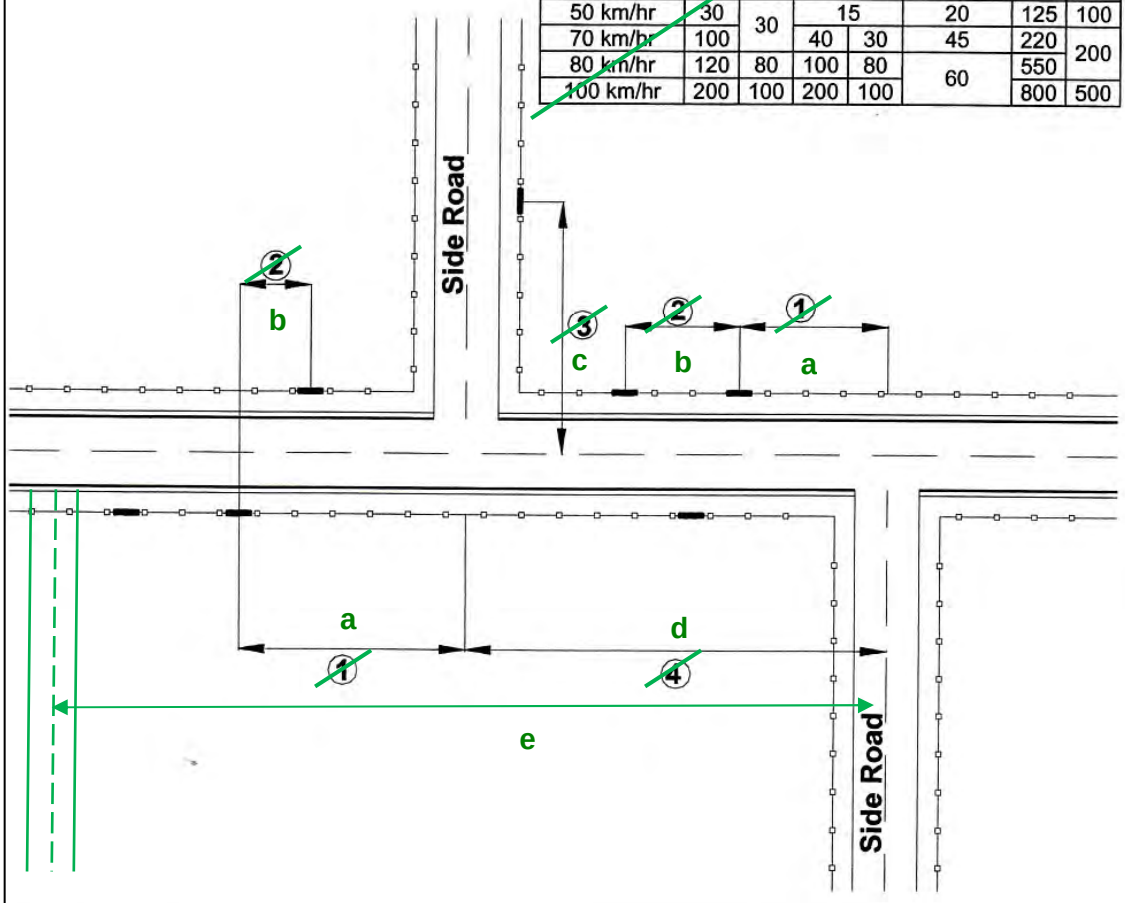
Notes:

- Separation distance is measured taking into account accesses on both sides of the road.
- No more than two adjoining vehicle entrances shall make up a single access.

Separation Distances

Separation distance of an access onto a Road from an intersection or between accesses

85th percentile speed (km/hr)	Distance (m)							
	1		2		3		4	
	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road	Arterial Road	Collector/ Local Road
50 km/hr	30	30	15		20		125	100
70 km/hr	100		40	30	45		220	200
80 km/hr	120	80	100	80	60		550	
100 km/hr	200	100	200	100			800	500



Notes:

- Separation distance is measured taking into account accesses on both sides of the road.
- No more than two adjoining vehicle entrances shall make up a single access.

Figure 3.2

3.13 Berms

Berms shall accommodate footpath, road lighting, underground services, landscaping and grass areas.

The minimum width of berm shall be 4.5 m except for private ways and shared environments. (For layout see Drawings DG 300 and DG 302.)

- Minimum compacted depth of topsoil 75 mm.
- Approved grass seed = Perennial Rye
- Sowing Rate = 1.5 kg/100 m^2

Berms are to be mown during the defects liability period as well as prior to take over by Council.

All landscape planting design and implementation within the road reserve shall be as per Part 7 – Street Landscaping. This includes, but is not restricted to the Dedicated Tree Planting Corridor referenced in Section 7.2.2.2 that requires a minimum 900 mm wide service free corridor within the berm.

3.14 Road Lighting

Road lighting is to be provided on all roads, service lanes, cycle ways, footpaths through reserves and other pedestrian accessways / areas where the lighting is (or will be) managed by the Council and connected to the Electricity Network Operator's road lighting network.

3.14.1 General Requirements

The lighting design shall maximise safety and efficiency while minimising the life cycle cost and impact on the environment.

It is important to design the lighting to blend in with adjacent road lighting, complement the neighbourhood character and – as far as is reasonably practicable – minimise the impact on the neighbouring properties and environment with regard to aesthetics, glare and spill light.

For rural intersections where the total volume on all legs has an AADT > 500, intersection flag lighting shall be used.

In rural areas where design speeds are greater than 70 km/h or in areas where there is an obvious hazard slip-base frangible approved lighting columns shall be used.

3.14.2 Lighting Parameters

Lighting installations shall be designed by a qualified lighting designer who is familiar with the requirements of AS/NZS 1158:2005.

Note: Designers shall also be familiar with the relevant technical specifications included in the MPDC Infrastructure Code of Practice.

The following sections apply to the lighting design:

3.14.2.1 Category V (Traffic Route) Lighting

Category V lighting ~~lighting~~ shall provide a lit environment conducive to the safe and comfortable movement of vehicular and pedestrian traffic at night and discourage illegal acts. The visual requirements of motorists shall predominate.

3.14.2.2 Category P (Local Roads and Pedestrians Area) Lighting

Category P lighting shall be designed to help pedestrians to orientate themselves and detect potential hazards, and discourage fear of crime against the person. The designer shall take into consideration the Category P requirements and the principles of "Crime Prevention through Environmental Design".

To maximise efficiency and minimize the number of lights installed the following Table applies:

Legal Road Width (m)	20	18	16	14	12
Minimum design spacing P3 (m)	40	45	50	Consult with Council	Consult with Council
Minimum design spacing P4 (m)	54	55	55	Consult with Council	Consult with Council

As a guide the following are the preferred mounting heights for the luminaires:

- 6.0 m in residential areas, and
- 7.0 m in industrial areas.

3.14.2.3 Traffic Management Devices

Traffic management devices shall be considered as an integral part of the lighting design and appropriate standards shall be applied.

Lighting of traffic management devices shall be designed to support the purpose of the device:

- Where the device is intended to slow traffic, lighting may need to be installed to a higher standard than normal for that area. This will be to provide sufficient visibility to alert drivers of the presence and speed constraint of the device.
- Where the device is intended to deter through traffic, the device may be identified by signage or by road lighting.

3.14.2.4 Column Locations

Ideally lighting columns should be positioned in line with the side boundary between properties; however these locations do not always coincide with the spacing requirements of the lighting design. If an adjacent property has not been developed (e.g. a new subdivision) and the column cannot be positioned in line with the common boundary, locate the column at least six metres from the boundary to allow for a future vehicle entrance.

Position columns at least one metre away from a vehicle entrance or kerb cut-down. Keep columns clear of any tree canopies in the road or in adjacent properties to prevent shading of the luminaire. Trees in a legal road or on Council land must be at least six metres away from lighting columns and more clearance may be necessary for some tree species or if the tree is protected. Consider the Council requirements for working near to existing trees when locating lighting columns.

When positioning a column against the building line, ensure that it is installed within the legal road or on Council land, and not in private property.

Where possible, columns should be located close to reserve entrances, bus stops and other open spaces to improve safety.

Consider traffic safety when placing lighting columns, especially when they are on or near bends, intersections, threshold treatments, road humps and roundabouts.

3.14.2.5 Column Installation and Foundations

Columns shall be installed as per the manufacturer's requirements.

If the road is at a different level from where the column is being located, design for columns that will achieve the correct mounting height above the road surface to ensure the installed lighting complies with the design requirements. For each light type the mounting height must be uniform and consistent.

Where the longitudinal grade may exceed 1 in 6 or the cross-fall of a road may exceed 6%, it may not be possible to service the light from a cherry-picker. In these situations discuss alternative column types with Council (e.g. columns that will allow the light to be serviced via a ladder).

When a special foundation is required provide a producer statement when applying for engineering approval. Include a hold-point for construction to allow inspection of the foundation before concrete is poured.

When columns requiring special maintenance visits are specified (e.g. frangible – shear base columns), provide Council with a maintenance plan detailing maintenance intervals and work/inspections that need to be carried out.

3.14.2.6 Lighting Equipment

The design life of equipment shall be as shown in the following table:

Component		Design Life
Columns (concrete and steel)		40 years
Outreach arms		40 years
Luminaires		20 years
Lamps	HPS	16,000 hours
	MH	12,000 hours
	Fluorescent	12,000 hours
Painted/powder coated surfaces		10 years

Notes:

All bolts and fittings shall have the same life expectancy as the component.

The design life of luminaires is the expected service life based on manufacturer's data and expected 5% failure rate. Note that lamp manufacturers may publish average rated life at 50% failure rate; this is too long if a lamp replacement programme is implemented. Typical operating hours of road lighting networks within New Zealand is approximately 4,200 hours per annum.

Luminaires, columns and outreach arms that are used in new schemes should be compatible with adjacent lighting and, where practicable, visually match the existing road lighting.

For efficient maintenance, the types of lighting equipment used are usually limited to those already in the lighting network. Introduction of new equipment requires approval from Council prior to use.

Provide detailed information on the design drawings about the columns, outreach arms, luminaires and lamps proposed to be used in the scheme.

3.14.2.7 Category P Lighting in Cycleways and Paths in Reserves

Category P lighting for cycleways and paths in reserves shall be designed to help users to orientate themselves and detect potential hazards. The designer shall take into consideration the Category P requirements and the principles of "Crime Prevention through Environmental Design".

The minimum mounting height is 5.5 m and the maximum is 7.5 m. However, if the lights are located near trees it may be appropriate for the lights to be mounted at a lower height to illuminate underneath the tree canopy and avoid shadowing. In this case a minimum mounting height of 4.5 m may be accepted.

3.14.3 Circuit Cabling

Design of cabling, including control method shall be in accordance to the specifications and requirements of the local Network Owner.

3.14.4 Design Check

In order to demonstrate compliance with the required standard a PS1 design certificate shall be provided by the designer. The documentation listed in Appendix C of AS/NZS1158: 2005 Part 1.1 and Part 3.1 will meet this requirement.

3.14.5 Audit Lighting System

Upon installation and commissioning the streetlights may be audited by Council. This final audit will ensure that the asset's performance and quality of the work comply with Council's requirements.

3.15 Signs and Roadmarking

All regulatory signs and road name signs shall be provided.

White powder coated steel poles shall be used.

Proposed road marking shall be shown on the drawings.

Note: The MPDC Infrastructure Code of Practice provides a guide to the location or mounting of signs and the requirements for road marking.

3.16 Service Lanes

Minimum carriageway width is 6.0 m.

Carriageway is to have concrete edging both sides. Stormwater is to be collected and disposed of. Specific geometric and pavement design is required. Carriageway is to be asphalt.

3.17 Privateways

3.17.1 Urban Residential Privateways

For layout refer to Drawing DG 301.

For dimensions and sealed pavement structure, see Table 3.1.

The minimum inside radius of curves shall be 9.0 m.

The gradient shall not exceed 1:6 unless approved by the Engineer. Where the gradient exceeds 1:6, such safety provisions as may be required by the Engineer shall be provided.

Privateways longer than 75 m shall provide a passing bay.
Particular design requirements are provided in Table 3.1.

Stormwater shall be collected and piped into the stormwater collection system. Stormwater shall not discharge across the vehicle crossing from the privateway to the road.

Vehicle crossing to privateway shall be designed and constructed in accordance with Section 3.123.14 and Drawings DG 301 and DG 308.

3.17.2 Rural Residential Privateways

Particular design requirements are provided in Table 3.1.

3.17.3 Right of Way Producer Statement

A producer statement shall be provided for the design and construction of rights of way with a length of more than 20 metres. On completion of construction the applicant shall provide a producer statement (PS4 or similar) signed by a suitably qualified person. Note: It is recommended that you discuss with Council prior to work being undertaken to determine who is considered suitable for a particular situation.

3.18 Parking Bays

Parking bays shall be constructed to the same standard as the road and continue the carriageway crossfall. If the parking bay is offset from the road carriageway, a dish channel could be used.

3.19 Features and Berm Furniture

3.19.1 Feature Walls

Feature walls will be permitted providing that the following criteria are adhered to:

- All permanent structures shall be erected on land other than road reserve.
- The structure must comply with all building consent and District Plan requirements.
- The structure shall be constructed from durable materials such as concrete, brick, stone, metal, timber.
- No lighting shall be installed that could potentially be hazardous to motorists or irritating to residents, nor shall it compromise the required road lighting.
- Plaque type name plates may be attached to the walls provided the sign complies with the District Plan.
- No services shall be affected by the location and construction of the structure.
- All maintenance costs (including electricity supply if required) shall be at the expense of the owner of the land upon which the structure is sited.
- The structures shall not create traffic safety problems.
- The structure shall be set to permanent levels.
- The structure shall be evaluated through a Traffic Safety Audit and any issues identified in the audit must be rectified to the satisfaction of the Council's Asset Manager – Strategy and Policy.

3.19.2 Berm Furniture

Structures or features which are not part of signage or traffic control will not be permitted on road.

3.20 Pedestrian Accessways

Access ways may be required to link one road to another in order to improve pedestrian and cyclist access.

- Access ways shall be a minimum of 5 m wide (boundary to boundary).
- Access ways shall be provided with lighting to P1 standard.
- Footpaths shall be a minimum of 3 m wide.
- Access paths bounded by private lots and linking between public roads shall be fenced both sides by the Developer. The fence shall be a minimum of 1.2 m high, 3 rails with timber palings.
- Access ways should have sight lines from one end to the other.
- The fence shall provide security for the resident and allow passive surveillance of the walkway.

Note: All fencing shall meet the principles of "Crime Prevention Through Environmental Design" (CPTED). The MPDC Guide to Urban Design Considerations provides useful information.

3.21 Road Design Quality Assurance

The Council requires the following information to be submitted with the engineering drawings:

- A specific Roading Engineering Drawing Quality Assurance checklist shall be completed.
- The name of the appointed representative experienced in development/construction work with whom all discussions and correspondence relating to engineering matters will be undertaken with Council stall shall be identified.
- A Quality Management Plan that shall be compiled to a level of sophistication appropriate to the nature and scale of the proposed works. In the case of minor works this may entail documentation of an inspection by a suitably qualified person. More extensive works will require an appropriate level of quality management.
- A Stage 4 (post-construction) Safety Audit shall be undertaken.

The Council is to provide a set of standard checklists and quality assurance management plan.

3.22 Verandahs

Where required by the District Plan, verandahs shall be provided to meet the dimensions shown in Figure 3.3.

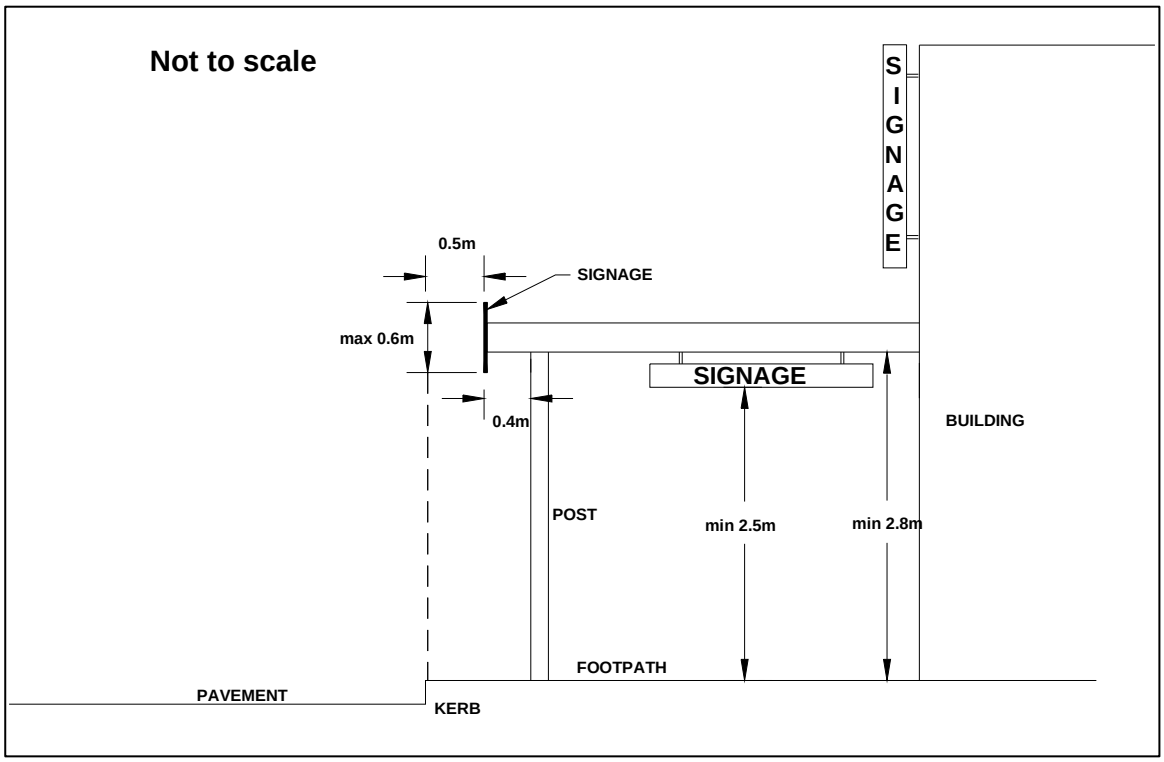


Figure 3.3 – Verandah Details

Verandahs shall be constructed in accordance with the above diagram and the following:

- The outer edge of the verandah shall be set back by 0.5 m from the pavement kerb.
- Continuous with any adjacent verandahs to provide continuity of pedestrian shelter.
- An appropriate height above the footpath to provide pedestrians with shelter from rain at a height of no less than 2.8 m and no higher than 3.5 m.
- Of solid construction.
- Any sign below the verandah shall be no less than 2.5 m from the footpath level and it's size shall comply with District Plan requirements.
- If under-verandah lighting is required, all fittings shall be vandal proof.
- Awnings shall be a minimum of 2.5 m above the footpath level.
- All drainage pipes for stormwater from the verandah shall not be exposed and be contained within the post or adjacent structure.
- Any new posts shall be located as indicated on the drawing above and shall not interfere with any pedestrian or vehicular access.

3.23 Stock Crossings

3.23.1 General

Where there is a need for stock to cross a road on a regular basis due to a farm being located astride the road then the decision as to whether an underpass will be required will be made by the use of the chart in Figure 3.4.

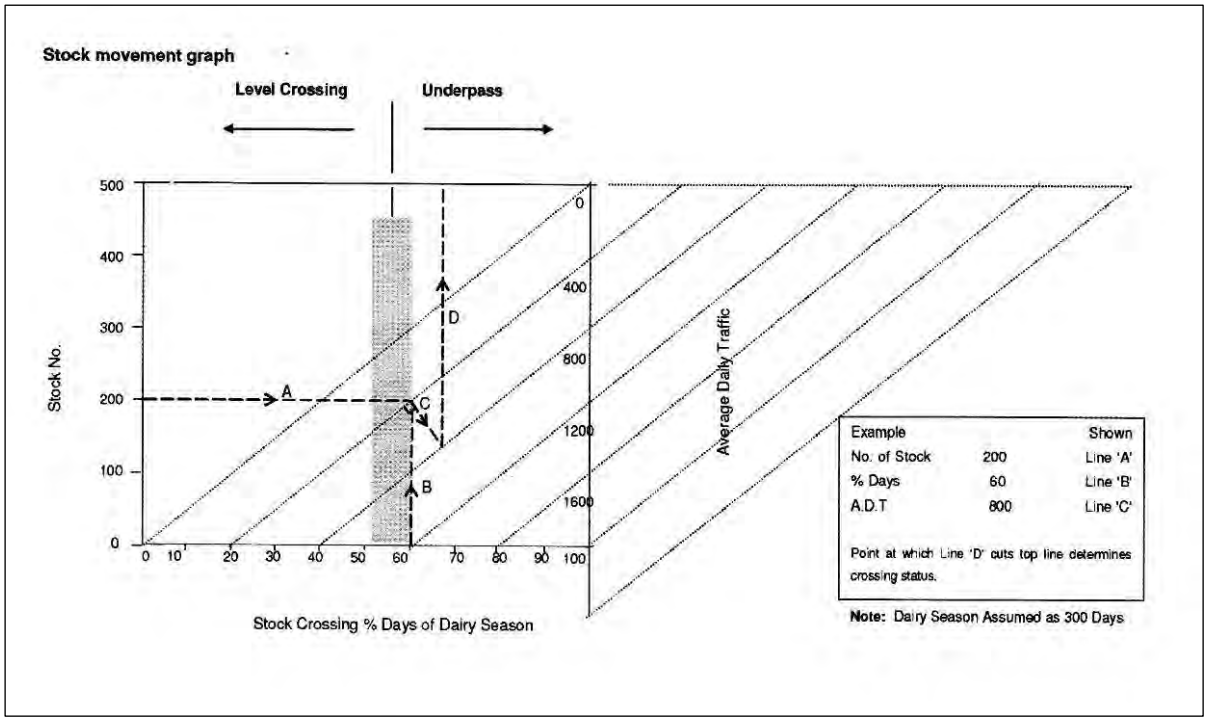


Figure 3.4 – Stock Crossings

3.23.2 Stock Crossing

If a Stock Underpass is not required, a mat shall be placed over the road crossing used by stock for dairy farm units and shall comply with the following:

- That stock shall not be driven across the road during the hours of darkness.
- The stock crossing shall be maintained and operated as to ensure that the road is clean at all time sand to eliminate damage to the road carriageway.
- That the area between the farm gates and the road carriageway on both sides of the road shall be formed to a hard standing metal surface.
- At the request of Council staff, any damage to the road formation, seal, or road drainage attributable to the stock crossing shall be made good at the owners expense.
- The entry and exit points of the stock crossing shall be directly opposite each other.
- The stock crossing shall be located at sites which achieve visibility distances.
- The mat width shall extend 2 m wide either side of the gateway.

3.23.3 Stock Underpass

If a Stock Underpass is required it shall comply with the following:

- The Stock Underpass length shall be a minimum of 7 m either side of the centre of the road. However the final length of the underpass will depend on traffic volume, seal and shoulder width, *in situ* soil conditions, depth and angle of underpass, construction of wingwalls, roadside drainage requirements, traffic safety/risk assessment or any other site specific factors. The developer shall

discuss the requirements for the underpass with the Asset Manager – Strategy and Policy ~~Roading Manager~~ before finalising the design.

- The Underpass shall be designed in accordance with Transit New Zealand's Bridge Manual (September 2004) to HN-HO-72 loading.
- The minimum cover for the underpass shall be as per manufacturing specifications.
- The Underpass shall allow for drainage of the underpass floor and surrounding ground.
- Retaining/wing walls shall be designed to retain the embankment fill.
- Any cut slopes shall be laid back to a safe slope or retained with a properly designed retaining wall.
- A producer statement from the designer of the proposed underpass structure shall be submitted.
- Barrier rails to warn approaching traffic of the hazard shall be installed. The ends may require bridge end or hazard markers as determined by Council's Roading Engineer. A white painted post and rail fence (minimum two coats white acrylic paint) shall be erected from the property boundary fence around the top of the batter of the underpass and back to the boundary fence. The fence shall consist of a minimum of three rails made with timber posts with a diameter of 150 mm and rails of 150 mm by 50 mm.
- The ends of the underpass shall be sufficiently retained to prevent the loss of fill material and stormwater into the underpass openings.
- The pavement shall be reinstated to the same line and levels that existed prior to the construction of the underpass. The pavement material shall comply with Section 3.8 – Road Pavement.
- The applicant shall be responsible for locating and managing all services within the road reserve in vicinity of the works.
- A suitably qualified Engineer shall sign off the design, construction works and the finished Stock Underpass. (Note: It is recommended that you discuss with Council prior to work being undertaken to determine who is considered suitable for a particular situation.)
- A suitably qualified Contractor who shall construct the Stock Underpass, having the relevant health and safety procedures and having undertaken similar works in the past.

3.23.4 Stock Crossings / Stock Underpasses of the Rail Network

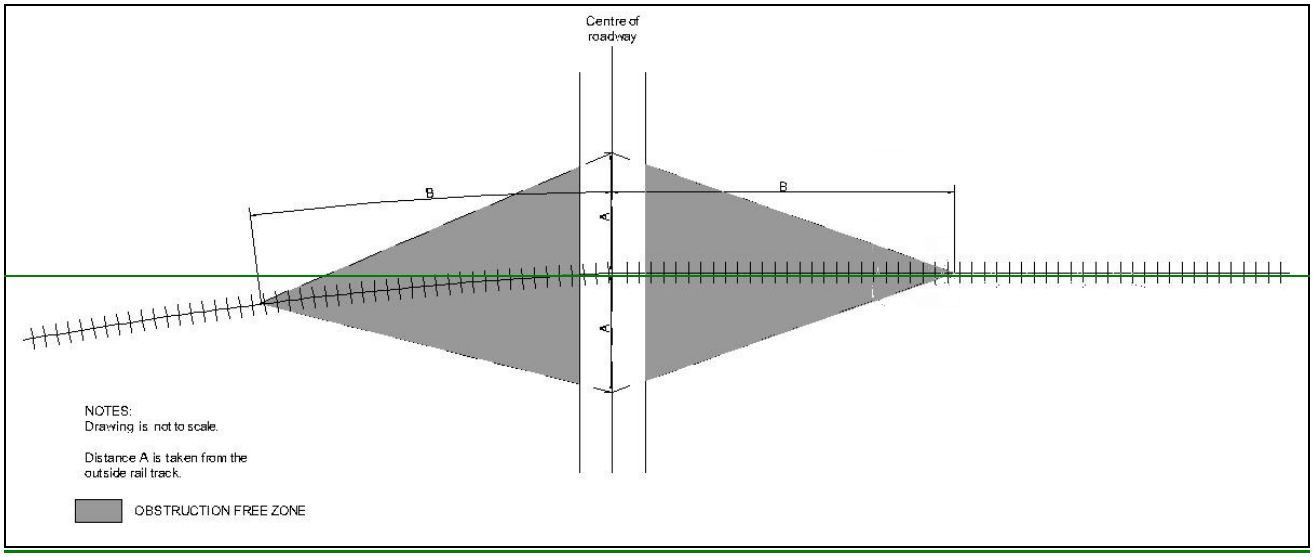
In addition to the requirements of 3.23.2 and 3.23.3 above, if a new stock crossing or underpass is proposed over/under the railway premises the applicant shall obtain the written approval of the NZ Railways Corporation.

3.24 Road–Rail Intersections

Where a railway and a road intersect on the same level, no building or other obstruction which may block the sight lines shall be permitted within an area bounded as set out in Figures 3.5 and 3.6, and Tables 3.5 and 3.6.

Provided that the Council may, subject to agreement with the relevant controlling authority and subject to conditions as may be agreed, waive or vary this requirement if in its opinion the requirements would be unreasonable or inappropriate in the particular circumstances.

~~Figure 3.5: Approach Sight Triangles for Level Crossings~~



~~Table 3.5: Required Approach Sight Distances for Figure 3.5~~

~~Vehicle approach speed (km/h)[1]~~	~~Approach distance A (m)~~	~~Required approach visibility along tracks B (m)~~		
		~~Signs only~~	~~Alarms only~~	~~Alarms and boom gates~~
~~20~~	~~31~~	~~318~~	~~Not applicable~~	
~~30~~	~~50~~	~~282~~	~~Not applicable~~	
~~40~~	~~73~~	~~274~~	~~Not applicable~~	
~~50~~	~~100~~	~~278~~	~~Not applicable~~	
~~60~~	~~130~~	~~287~~	~~Not applicable~~	
~~70~~	~~164~~	~~300~~	~~Not applicable~~	
~~80~~	~~208~~	~~314~~	~~Not applicable~~	
~~90~~	~~251~~	~~330~~	~~Not applicable~~	
~~100~~	~~298~~	~~357~~	~~Not applicable~~	
~~110~~	~~350~~	~~376~~	~~Not applicable~~	

Figure 3.6: Restart Sight Triangles for Level Crossings

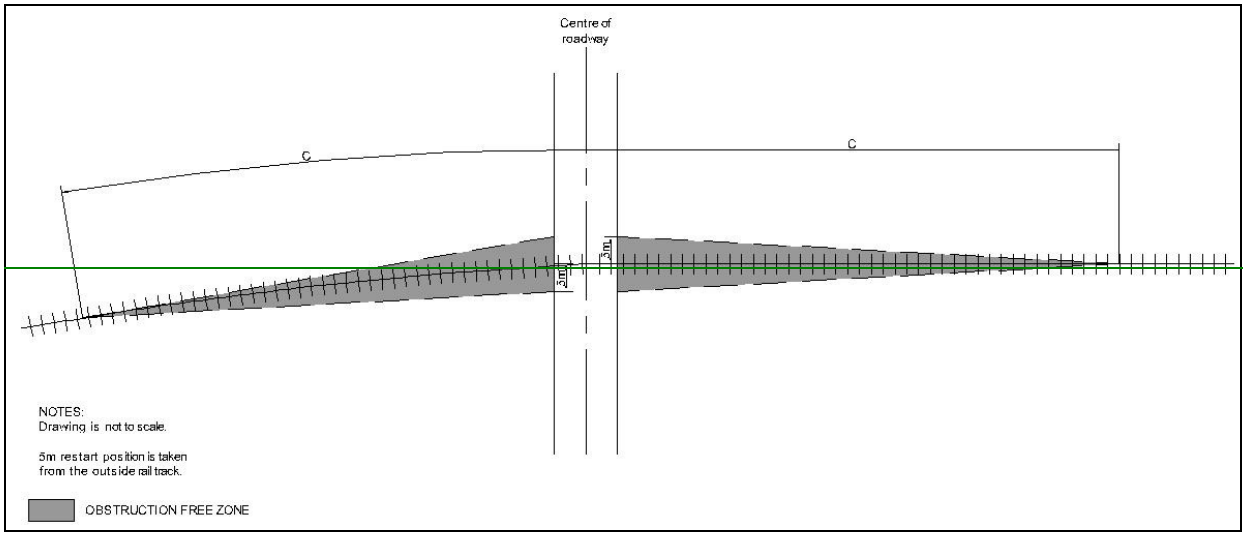


Table 3.6: Required Restart Sight Distances for Level Crossings

Required approach visibility along tracks C (m)		
Signs only	**Alarms only**	**Alarms and boom gates**
677 m	677 m	60 m

Notes:

1. The 85th percentile free-flow vehicle speed of the road shall be adopted. Where this is not known, the signposted road speed + 10% shall be used.

2. Table 3.5 is based on the sighting distance formula used in NZTA Traffic Control Devices Manual 2008, Part 9 Level Crossings and in the Australian Level Crossing Assessment Model (ALCAM). Distances are conservative and are derived from:
   - A train speed of 110 km/h and a single set of rail tracks
   - A fall of 8% on the approach to the level crossing and a rise of 8% at the level crossing
   - 25 m design truck
   - 90° angle between road and rail
   - Other parameters as specified in NZTA's Traffic Control Devices Manual 2008, Part 9 Level Crossings – Appendix B

3. Tables 3.5 and 3.6 apply to a single set of rail tracks only. For each additional set of tracks add 25 m to distance B, and 50 m to distance C.

4. Speed restrictions are not used in New Zealand around level crossings.

5. The term "restart" refers to commencing moving from a stationary position, such as a stop sign or railway alarms.

No construction of buildings, fences, other structures, placing of obstructions or the growth of vegetation shall be permitted in the immediate vicinity of the road and railway intersections as identified in the above diagrams.

3.24.1 Level Crossing Sight Triangles and Explanations

Developments near Existing Level Crossings

It is important to maintain clear visibility around level crossings to reduce the risk of collisions. All the conditions set out in this standard apply during both the construction and operation stages of any development.

Approach sight triangles at level crossings with Stop or Give Way signs

On sites adjacent to rail level crossings controlled by Stop or Give Way Signs, no building, structure or planting shall be located within the shaded areas shown in Figure 3.5. These are defined by a sight triangle taken 30 metres from the outside rail and 320 metres along the railway track.

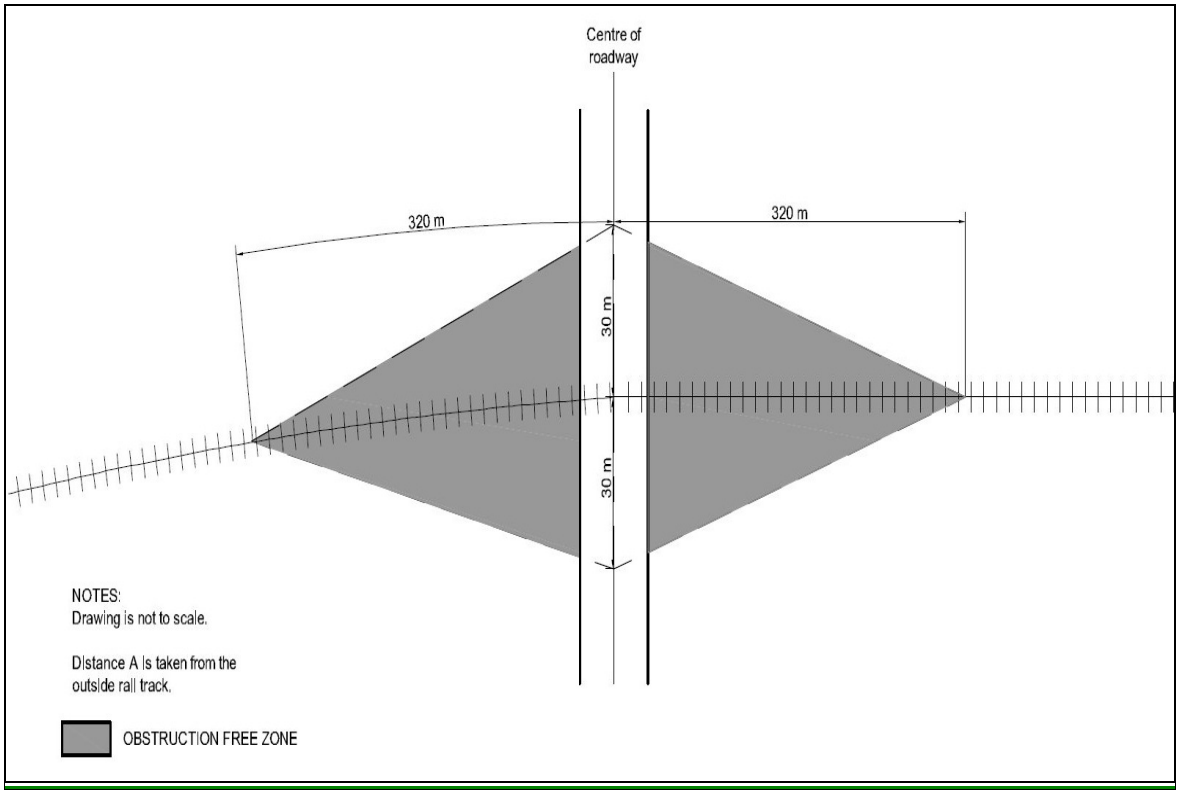


Figure 3.5: Approach Sight Triangles for Level Crossings with "Stop" or "Give Way" Signs

Advice Note:

The approach sight triangles ensure that clear visibility is achieved around rail level crossings with Stop or Give Way signs so that a driver approaching a rail level can either:

- *See a train and stop before the crossing; or*
- *Continue at the approach speed and cross the level crossing safely.*

Of particular concern are developments that include shelter belts, tree planting, or a series of building extensions. These conditions apply irrespective of whether any visual obstructions already exist.

No approach sight triangles apply for level crossings fitted with alarms and/or barrier arms. However, care should be taken to avoid developments that have the potential to obscure visibility of these alarm masts. This is particularly important where there is a curve in the road on the approach to the level crossing, or where the property boundary is close to the edge of the road surface and there is the potential for vegetation growth.

3.24.2 Restart sight triangles at level crossings

On sites adjacent to all rail level crossings, no building, structure or planting shall be located within the shaded areas shown in Figure 3.6. These are defined by a sight triangle taken 5 metres from the outside rail and distance A along the railway track. Distance A depends on the type of control (Table 3.6).

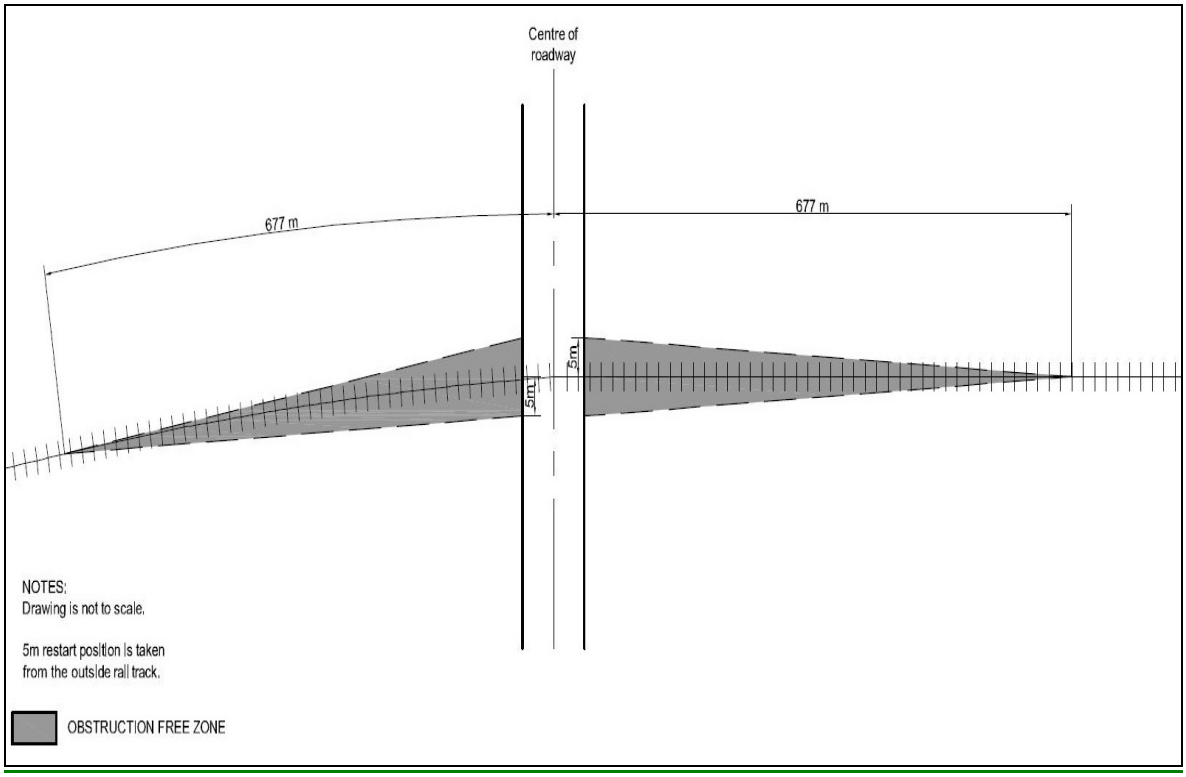


Figure 3.6: Restart Sight Triangles for all Level Crossings

Table 3.6: Required Restart Sight Distances For Figure 3.6

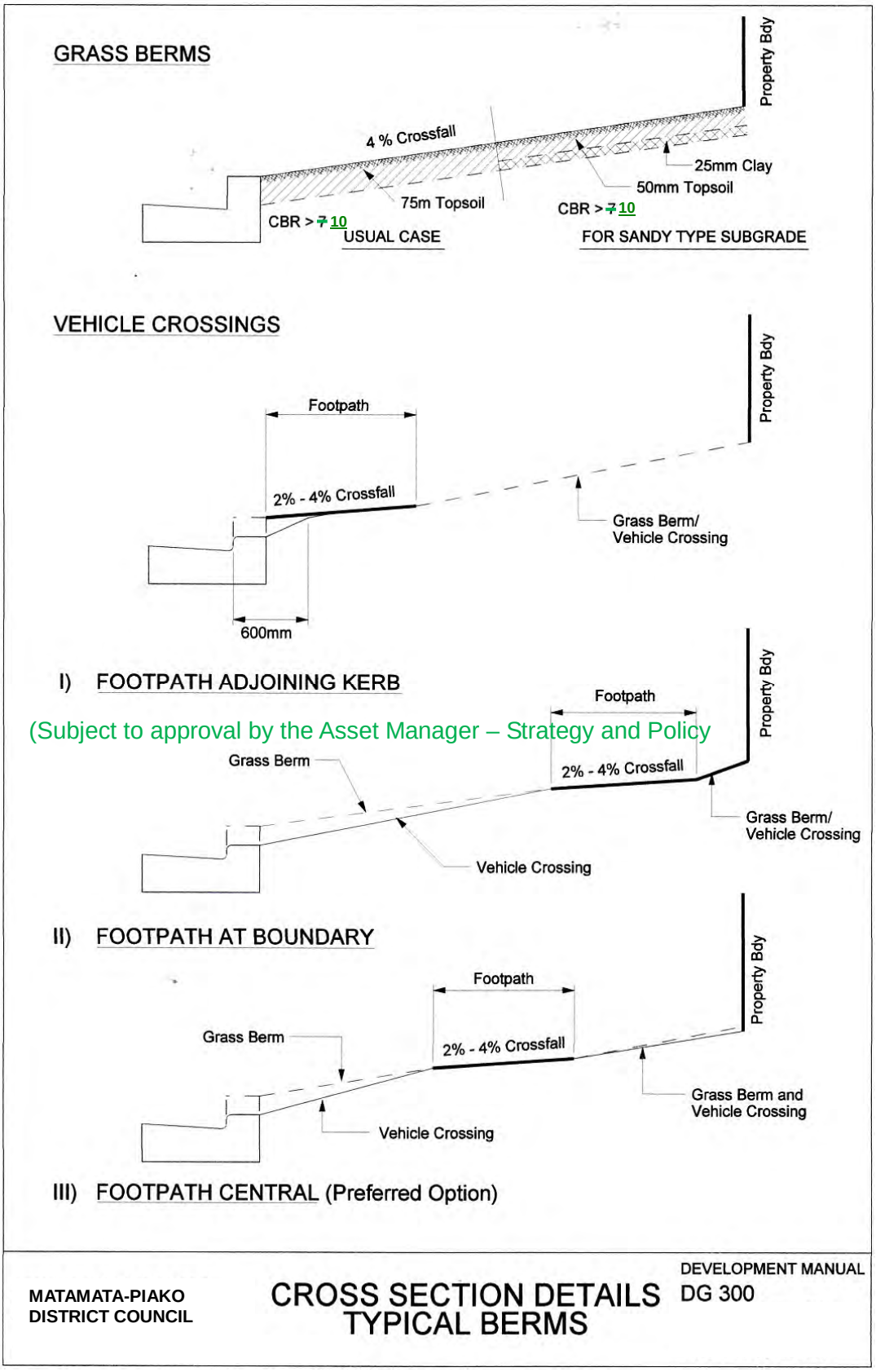
Required approach visibility along tracks A (m)		
Signs only	Alarms only	Alarms and barriers
677 m	677 m	60 m

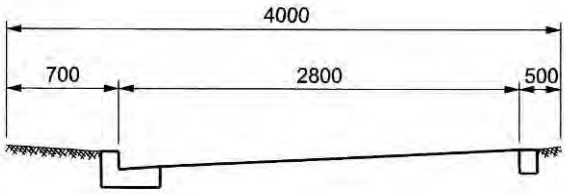
Advice Note:
The restart sight line triangles ensure that a road vehicle driver stopped at a level crossing can see far enough along the railway to be able to start off, cross and clear the level crossing safely before the arrival of any previously unseen train.

Of particular concern are developments that include shelter belts, tree planting, or a series of building extensions. These conditions apply irrespective of whether any visual obstructions already exist.

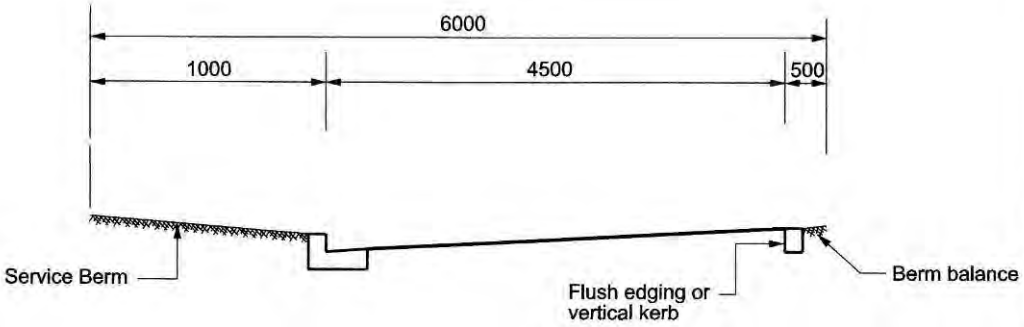
Notes:
1. Figures 3.5 and 3.6 show a single set of rail tracks only. For each additional set of tracks add 25 m to the along-track distance in Figure 3.5, and 50 m to the along-track distance in Figure 3.6.

2. All figures are based on the sighting distance formula used in NZTA Traffic Control Devices Manual 2008, Part 9 Level Crossings. The formulae in this document are performance based; however the rule contains fixed parameters to enable easy application of the standard. Approach and restart distances are derived from a:
   - train speed of 110 km/h
   - vehicle approach speed of 20 km/h
   - fall of 8 % on the approach to the level crossing and a rise of 8 % at the level crossing
   - 25 m design truck length
   - 90° angle between road and rail


GRASS BERMS
Property Bdy
4 % Crossfall
25mm Clay
50mm Topsoil
75m Topsoil
CBR > ~~7~~ 10
USUAL CASE
CBR > ~~7~~ 10
FOR SANDY TYPE SUBGRADE
VEHICLE CROSSINGS
Property Bdy
Footpath
2% - 4% Crossfall
Grass Berm/
Vehicle Crossing
600mm
I) FOOTPATH ADJOINING KERB
(Subject to approval by the Asset Manager – Strategy and Policy
Property Bdy
Footpath
Grass Berm
2% - 4% Crossfall
Grass Berm/
Vehicle Crossing
Vehicle Crossing
II) FOOTPATH AT BOUNDARY
Property Bdy
Footpath
Grass Berm
2% - 4% Crossfall
Grass Berm and
Vehicle Crossing
Vehicle Crossing
III) FOOTPATH CENTRAL (Preferred Option)
MATAMATA-PIAKO
DISTRICT COUNCIL
CROSS SECTION DETAILS
TYPICAL BERMS
DEVELOPMENT MANUAL
DG 300



2 - 3 HOUSEHOLD UNITS



4 - 6 HOUSEHOLD UNITS

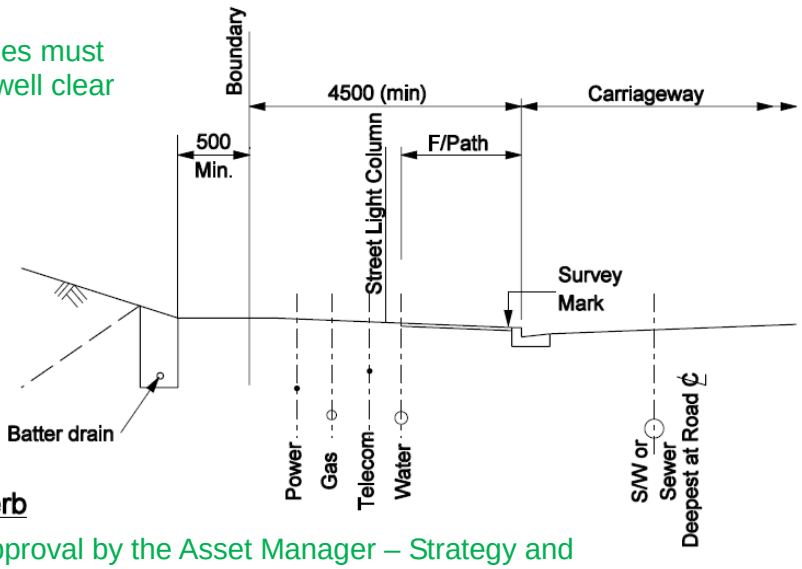
Crossfall direction generally with natural crossfall of country unless special reason for otherwise.

MATAMATA - PIAKO DISTRICT COUNCIL

STANDARD RESIDENTIAL PRIVATEWAYS

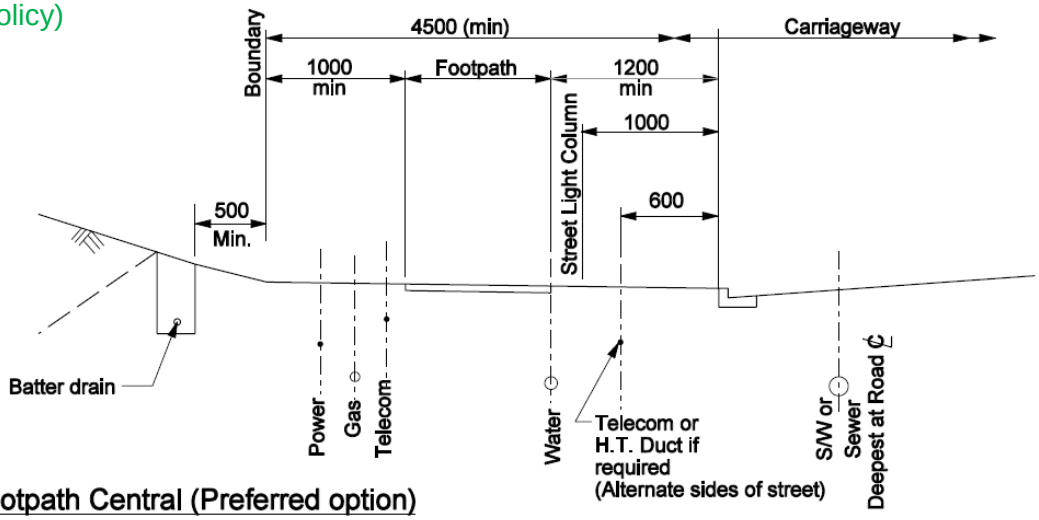
DEVELOPMENT MANUAL
DG 301

Note: Services must be installed well clear of footpath.

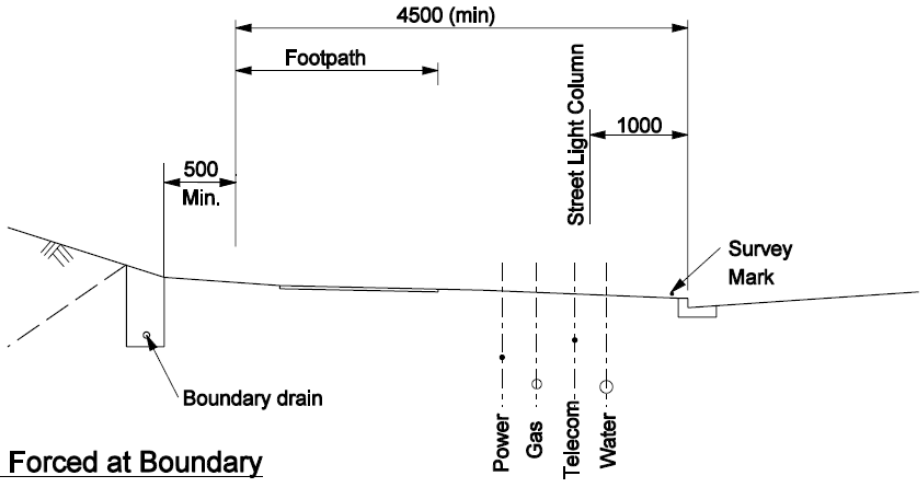


Footpath at Kerb

(Subject to approval by the Asset Manager – Strategy and Policy)



Footpath Central (Preferred option)

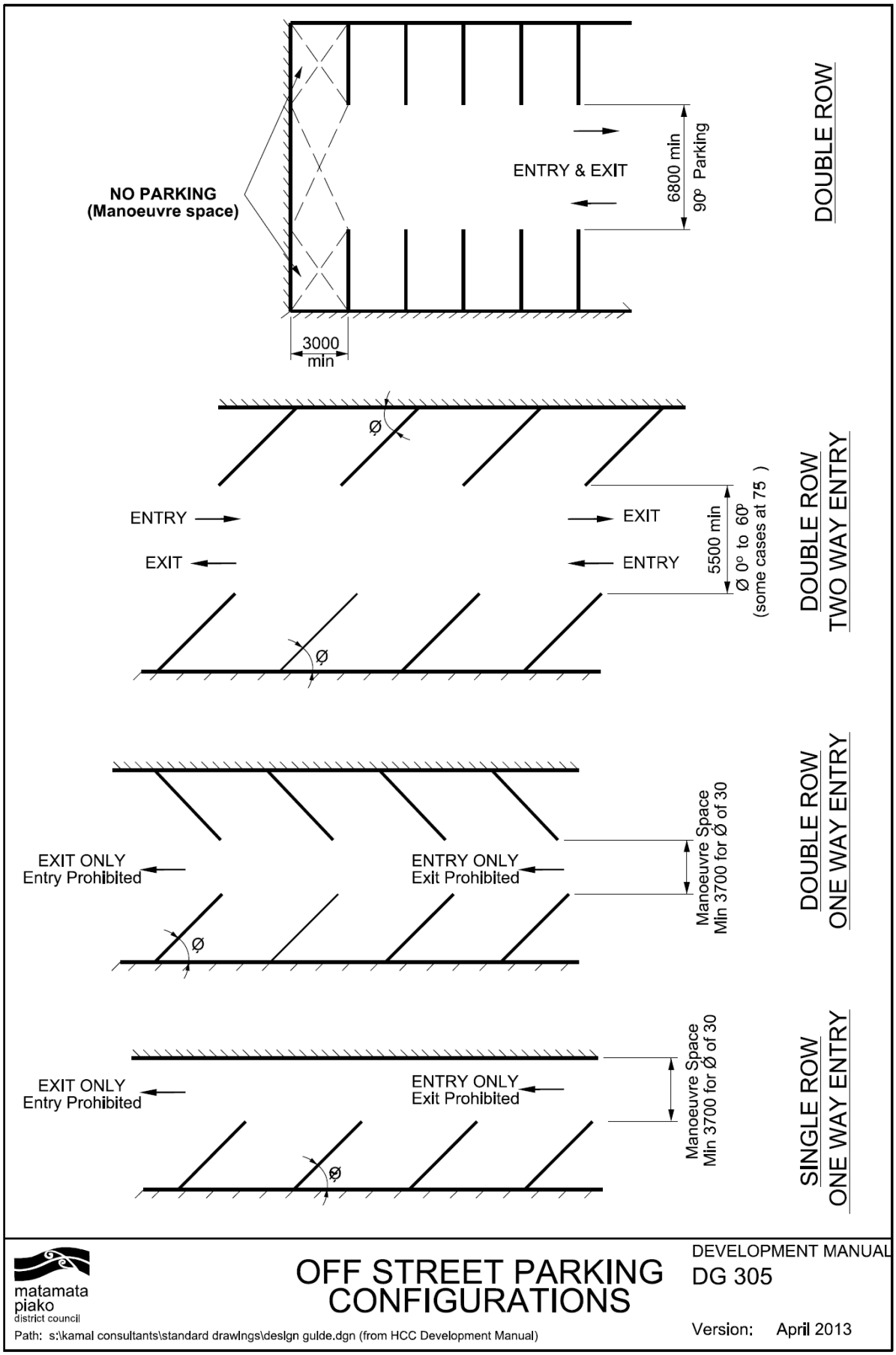


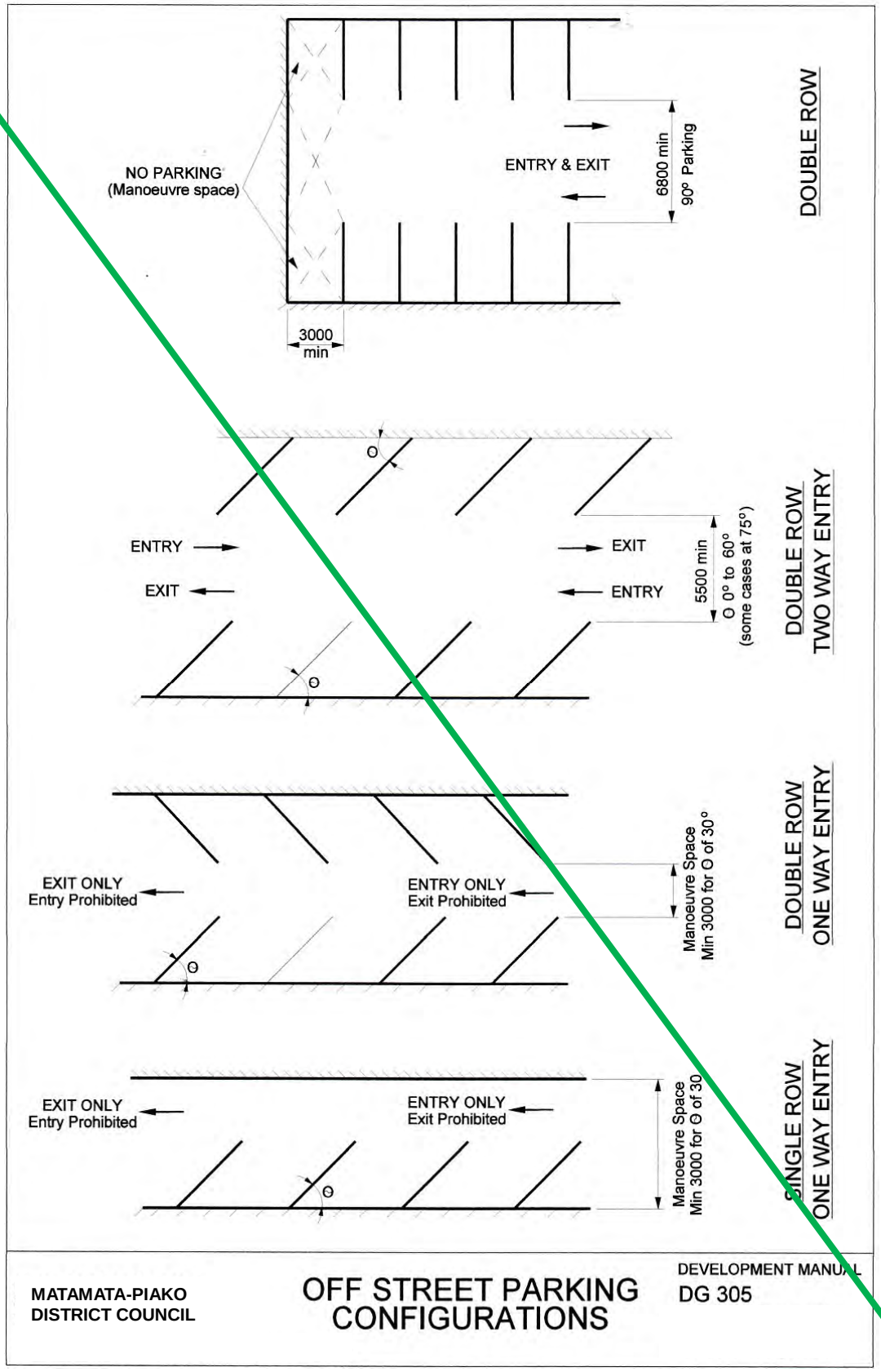
Footpath Forced at Boundary

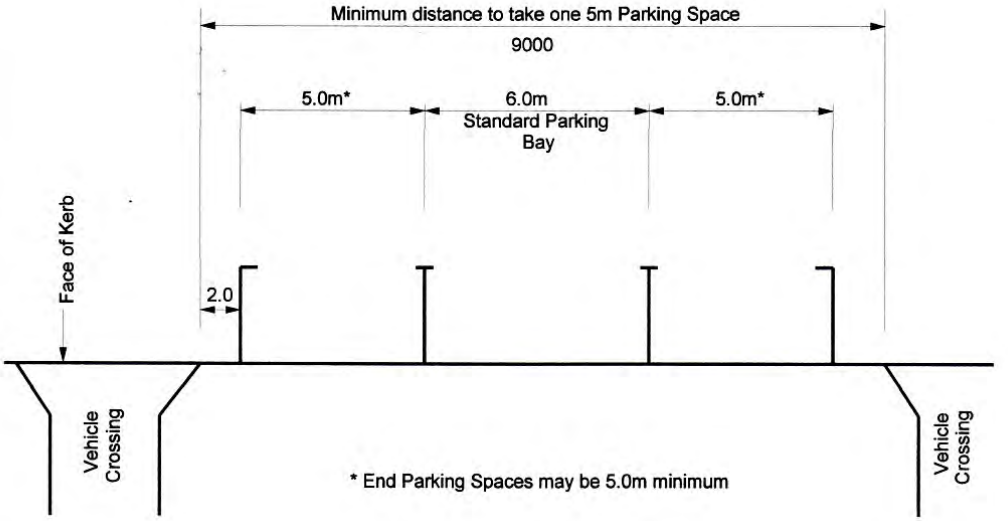
MATAMATA-PIAKO DISTRICT COUNCIL

LOCATION OF SERVICES IN STREETS

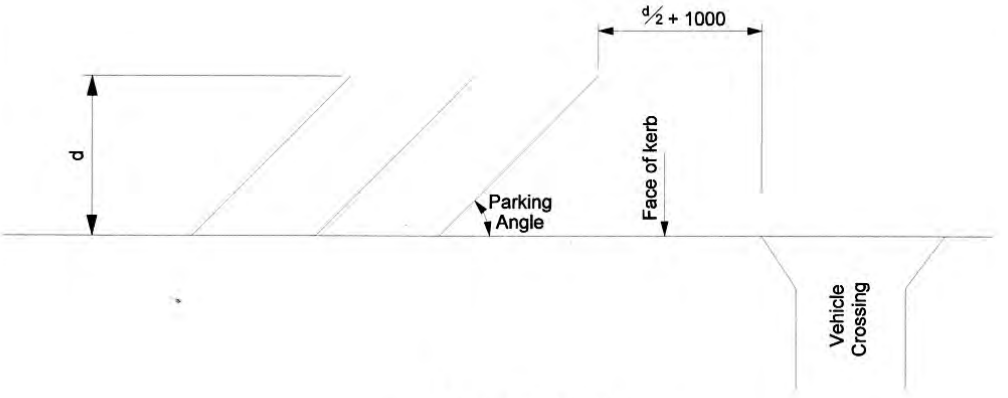
DEVELOPMENT MANUAL
DG 302


DOUBLE ROW
NO PARKING
(Manoeuvre space)
ENTRY & EXIT
6800 min
90° Parking
3000
min
DOUBLE ROW
TWO WAY ENTRY
Ø
ENTRY
EXIT
EXIT
ENTRY
5500 min
Ø 0° to 60°
(some cases at 75)
DOUBLE ROW
ONE WAY ENTRY
EXIT ONLY
Entry Prohibited
ENTRY ONLY
Exit Prohibited
Manoeuvre Space
Min 3700 for Ø of 30
SINGLE ROW
ONE WAY ENTRY
EXIT ONLY
Entry Prohibited
ENTRY ONLY
Exit Prohibited
Manoeuvre Space
Min 3700 for Ø of 30
matamata
piako
district council
OFF STREET PARKING
CONFIGURATIONS
DEVELOPMENT MANUAL
DG 305
Version: April 2013
Path: s:\kamal consultants\standard drawings\design guide.dgn (from HCC Development Manual)


DOUBLE ROW
NO PARKING
(Manoeuvre space)
ENTRY & EXIT
6800 min
90° Parking
3000
min
DOUBLE ROW
TWO WAY ENTRY
ENTRY
EXIT
EXIT
ENTRY
5500 min
Θ 0° to 60°
(some cases at 75°)
DOUBLE ROW
ONE WAY ENTRY
EXIT ONLY
Entry Prohibited
ENTRY ONLY
Exit Prohibited
Manoeuvre Space
Min 3000 for Θ of 30°
SINGLE ROW
ONE WAY ENTRY
EXIT ONLY
Entry Prohibited
ENTRY ONLY
Exit Prohibited
Manoeuvre Space
Min 3000 for Θ of 30°
MATAMATA-PIAKO
DISTRICT COUNCIL
OFF STREET PARKING
CONFIGURATIONS
DEVELOPMENT MANUAL
DG 305

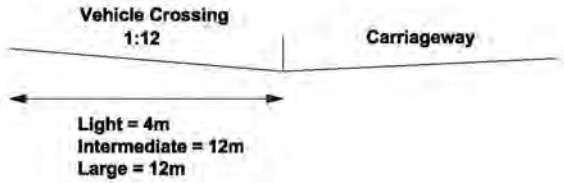


PARALLEL PARKING

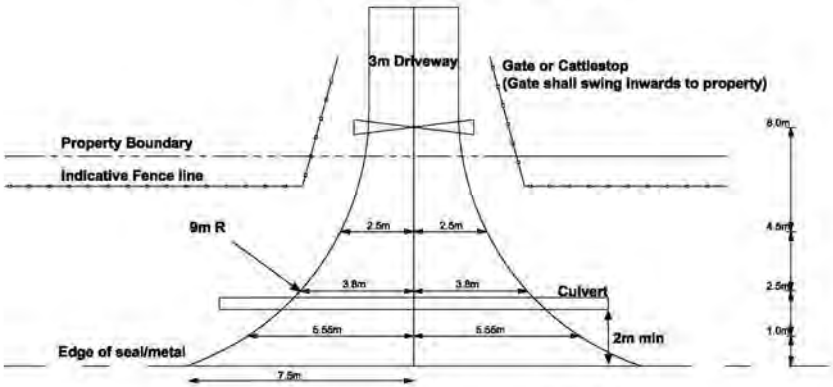


ANGLE PARKING

MATAMATA-PIAKO DISTRICT COUNCIL	PARKING SPACE DIMENSIONS AND LOCATIONS	DEVELOPMENT MANUAL DG 306



ENTRANCE LONGSECTION



Light Vehicle Entrance for Rural Road
< 2 ha

PLAN

NOTES:

1.0 **GENERAL**
1.1 All works shall be constructed in accordance with the following standards and terms as applicable to site specific conditions.
1.2 No work shall be undertaken within the road reserve until Council has approved a traffic management plan.
1.3 The Contractor shall be responsible for the cost of repairs to any underground Utility Service damaged during construction. Any damage shall be rectified to the satisfaction of the Utility Owner.

2.0 **LOCATION**
2.1 Each entrance shall be located to provide a clear sight distance in both directions in accordance with [redacted] of the Development Manual.
2.2 Separation distances shall be as indicated in Figure 3.2 of the Development Manual.

3.0 **CULVERT**
3.1 If an entrance crosses a Regional Council Board Drain or major watercourse, the contractor shall obtain certified waterway approval from WAIKATO REGIONAL COUNCIL.
3.2 If the entrance crosses a watertable or drain, a 300mm diameter minimum, Reinforced Concrete Rubber Ring Joint (R.C.R.R.J) Class X pipe shall be installed, unless otherwise approved by Council's Roading/Consent Engineer.
3.3 Any unsuitable bedding material including vegetation, topsoil and peat shall be removed and replaced in accordance with the pipe manufacturers specifications.
3.4 All culverts shall be laid straight at a constant grade and a minimum of 2.0m from the edge of seal or metal. Socket ends shall always be uphill and the pipe shall be extended to a sufficient length, to ensure the resulting batter is not steeper than 1:3.

4.0 **SUBBASE**
4.1 A minimum subgrade CBR of 5 is required before placement of sub-base material. If this CBR cannot be achieved, Council's Roading/Consent Engineer will advise how to proceed. This may involve an additional depth of pavement construction, or the installation of geosynthetics.
4.2 Pit sand, brown rock or similar material shall be placed, trimmed and compacted to provide 100mm depth of subbase, if required. The subbase shall be placed from the edge of the carriageway to the gate or cattlestop.

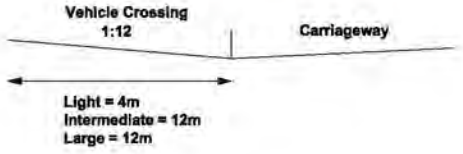
5.0 **BASECOURSE**
5.1 Clean good quality WHAP 40 basecourse metal shall be placed, trimmed and compacted to provide 150mm depth of basecourse from the carriageway to the gate or cattlestop.
5.2 The basecourse material shall be trimmed to provide a crown at the centre of the entrance to ensure adequate surface drainage. The crossfall shall be 5% from the crown.

6.0 **SEALING**
6.1 The entranceway shall be sealed in accordance with [redacted] the Development Manual. Sealing shall be a 180/200 bitumen two coat grade 3 & 5 chip seal.

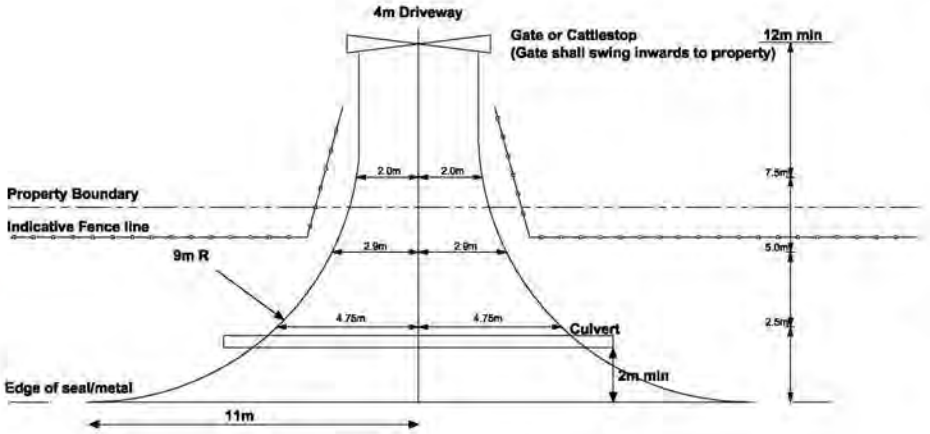
matamata piako district council

Light Vehicle Entrance - Rural and Rural Residential Zones

MPDC DG307a : October 2011



ENTRANCE LONGSECTION



Intermediate Vehicle Entrance for Rural Road

2 ha - 20 ha

PLAN

NOTES:

1.0 **GENERAL**
1.1 All works shall be constructed in accordance with the following standards and terms as applicable to site specific conditions.
1.2 No work shall be undertaken within the road reserve until Council has approved a traffic management plan.
1.3 The Contractor shall be responsible for the cost of repairs to any underground Utility Service damaged during construction. Any damage shall be rectified to the satisfaction of the Utility Owner.

2.0 **LOCATION**
2.1 Each entrance shall be located to provide a clear sight distance in both directions in accordance with [redacted] the Development Manual.
2.2 Separation distances shall be as indicated in Figure 3.2 of the Development Manual.

3.0 **CULVERT**
3.1 If an entrance crosses a Regional Council Board Drain or major watercourse, the contractor shall obtain certified waterway approval from WAIKATO REGIONAL COUNCIL.
3.2 If the entrance crosses a watertable or drain, a 300mm diameter minimum, Reinforced Concrete Rubber Ring Joint (R.C.R.R.J) Class X pipe shall be installed, unless otherwise approved by Council's Roading/Consent Engineer.
3.3 Any unsuitable bedding material including vegetation, topsoil and peat shall be removed and replaced in accordance with the pipe manufacturers specifications.
3.4 All culverts shall be laid straight at a constant grade and a minimum of 2.0m from the edge of seal or metal. Socket ends shall always be uphill and the pipe shall be extended to a sufficient length, to ensure the resulting batter is not steeper than 1:3.

4.0 **SUBBASE**
4.1 A minimum subgrade CBR of 5 is required before placement of sub-base material. If this CBR cannot be achieved, Council's Roading/Consent Engineer will advise how to proceed. This may involve an additional depth of pavement construction, or the installation of geosynthetics.
4.2 Pit sand, brown rock or similar material shall be placed, trimmed and compacted to provide 100mm depth of subbase, if required. The subbase shall be placed from the edge of the carriageway to the gate or cattlestop.

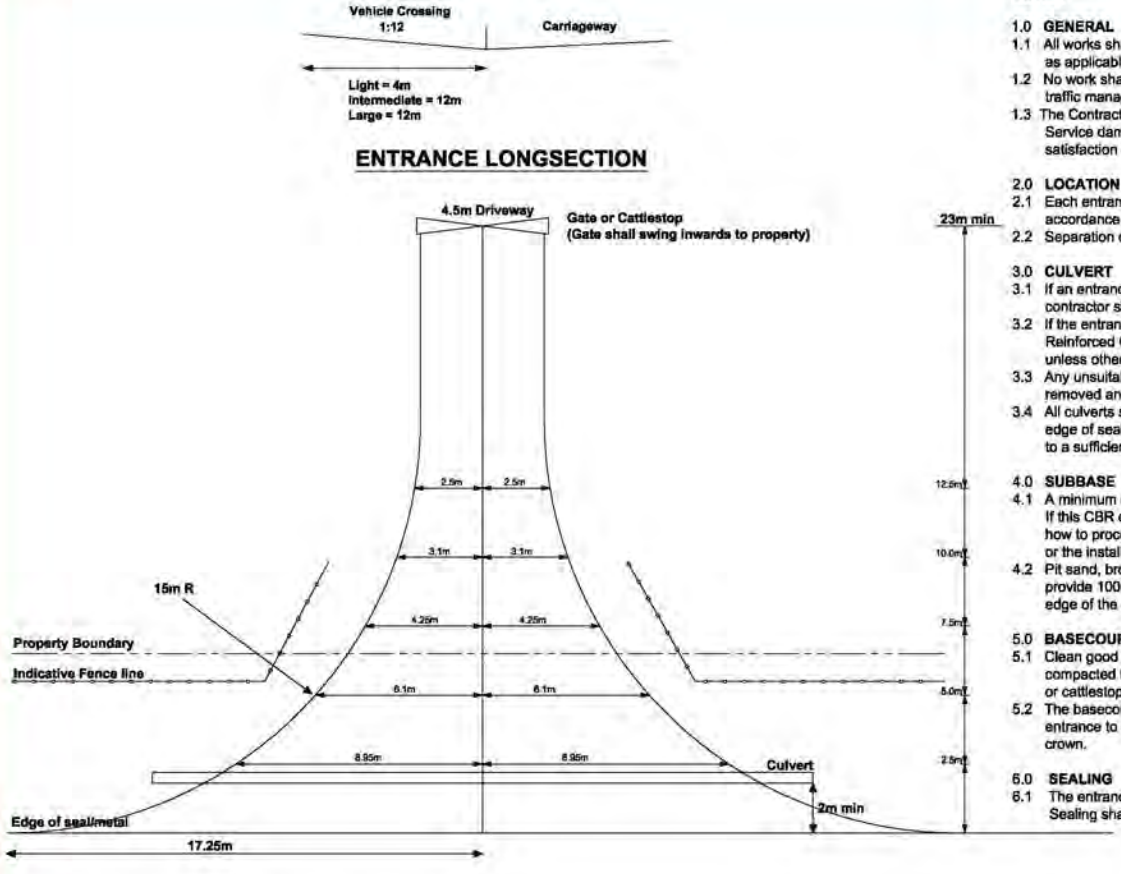
5.0 **BASECOURSE**
5.1 Clean good quality WHAP 40 basecourse metal shall be placed, trimmed and compacted to provide 150mm depth of basecourse from the carriageway to the gate or cattlestop.
5.2 The basecourse material shall be trimmed to provide a crown at the centre of the entrance to ensure adequate surface drainage. The crossfall shall be 5% from the crown.

6.0 **SEALING**
6.1 The entranceway shall be sealed in accordance with [redacted] the Development Manual. Sealing shall be a 180/200 bitumen two coat grade 3 & 5 chip seal.

matamata piako district council

Intermediate Vehicle Entrance - Rural Zone

MPDC DG307b : October 2011



NOTES:

1.0 GENERAL

1.1 All works shall be constructed in accordance with the following standards and terms as applicable to site specific conditions.

1.2 No work shall be undertaken within the road reserve until Council has approved a traffic management plan.

1.3 The Contractor shall be responsible for the cost of repairs to any underground Utility Service damaged during construction. Any damage shall be rectified to the satisfaction of the Utility Owner.

2.0 LOCATION

2.1 Each entrance shall be located to provide a clear sight distance in both directions in accordance with [redacted] of the Development Manual.

2.2 Separation distances shall be as indicated in Figure 3.2 of the Development Manual.

3.0 CULVERT

3.1 If an entrance crosses a Regional Council Board Drain or major watercourse, the contractor shall obtain certified waterway approval from WAIKATO REGIONAL COUNCIL.

3.2 If the entrance crosses a watertable or drain, a 300mm diameter minimum, Reinforced Concrete Rubber Ring Joint (R.C.R.R.J) Class X pipe shall be installed, unless otherwise approved by Council's Roading/Consent Engineer.

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3.4 All culverts shall be laid straight at a constant grade and a minimum of 2.0m from the edge of seal or metal. Socket ends shall always be uphill and the pipe shall be extended to a sufficient length, to ensure the resulting batter is not steeper than 1:3.

4.0 SUBBASE

4.1 A minimum subgrade CBR of 5 is required before placement of sub-base material. If this CBR cannot be achieved, Council's Roading/Consent Engineer will advise how to proceed. This may involve an additional depth of pavement construction, or the installation of geosynthetics.

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5.0 BASECOURSE

5.1 Clean good quality WHAP 40 basecourse metal shall be placed, trimmed and compacted to provide 150mm depth of basecourse from the carriageway to the gate or cattlestop.

5.2 The basecourse material shall be trimmed to provide a crown at the centre of the entrance to ensure adequate surface drainage. The crossfall shall be 5% from the crown.

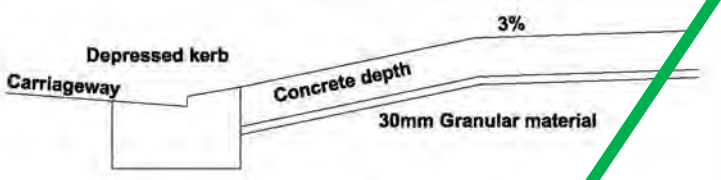
6.0 SEALING

6.1 The entranceway shall be sealed in accordance with [redacted] of the Development Manual. Sealing shall be a 180/200 bitumen two coat grade 3 & 5 chip seal.

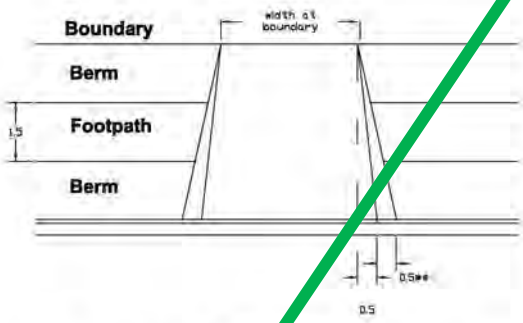
matamata piako district council

Large Vehicle Entrance - Rural Zone

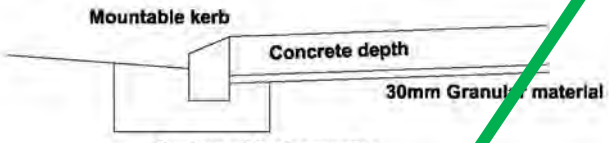
MPDC DG307c : October 2011



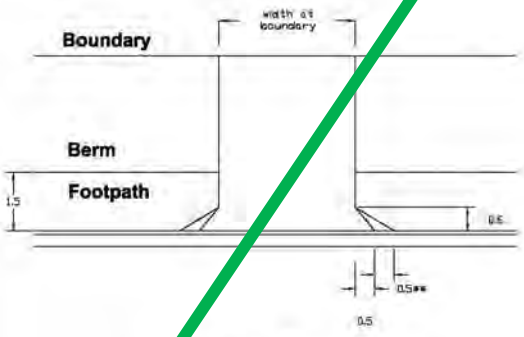
Section of kerb crossing



Vehicle Crossing
Where footpath is seperated from the Kerb



Section of kerb crossing



Vehicle Crossing
Where footpath is next to Kerb

Concrete Grades
- All concrete to be min 20mpa
- All industrial/commercial crossings to be reinforced with one or two layers of HRC 665 mesh

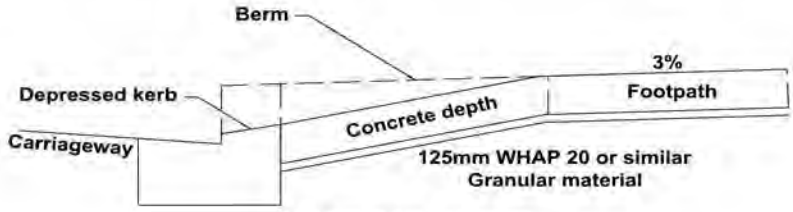
Construction depths
- Residential Vehicle crossings - 120mm
- Footpaths - 100mm
- Crossings for industrial, commercial or joint ownership accessways - 150mm

Refer to the Development Manual for the following:
- Sight Visibility
- Separation Distance
- Width of crossing

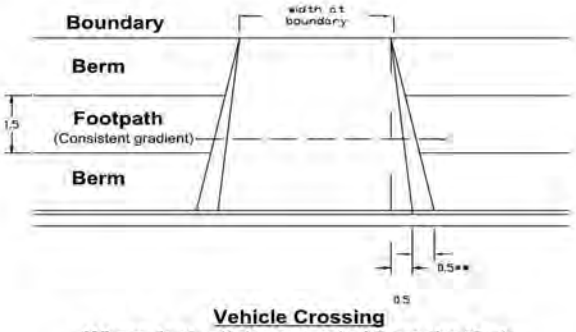
matamata piako district council

Urban/Industrial Vehicle Crossings

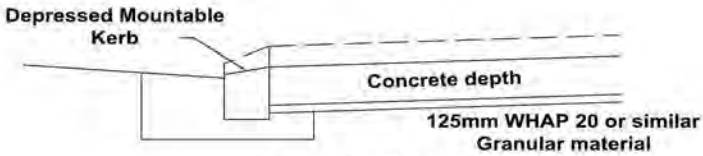
MPDC DG 308 : December 2010



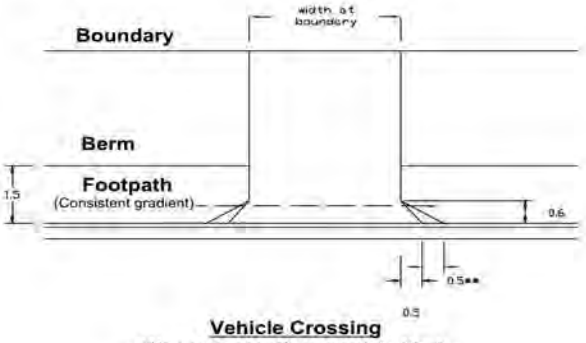
Section of kerb crossing



Vehicle Crossing
Where footpath is seperated from the Kerb



Section of kerb crossing



Vehicle Crossing
Where footpath is next to Kerb

Concrete Grades

- Min 20mpa & depth 100mm for Footpaths
- Min 20mpa & depth 125mm for Standard entrances
- Min 30mpa & depth 175mm for Industrial crossings
- All industrial/commercial crossings to be reinforced with one layer of HRC 665mesh

Construction depths (WHAP20 or similar)

- Footpaths - 25mm
- Residential Vehicle crossings -75mm
- Industrial or joint ownership accessways - 125mm
- Min subgrade CBR = 10

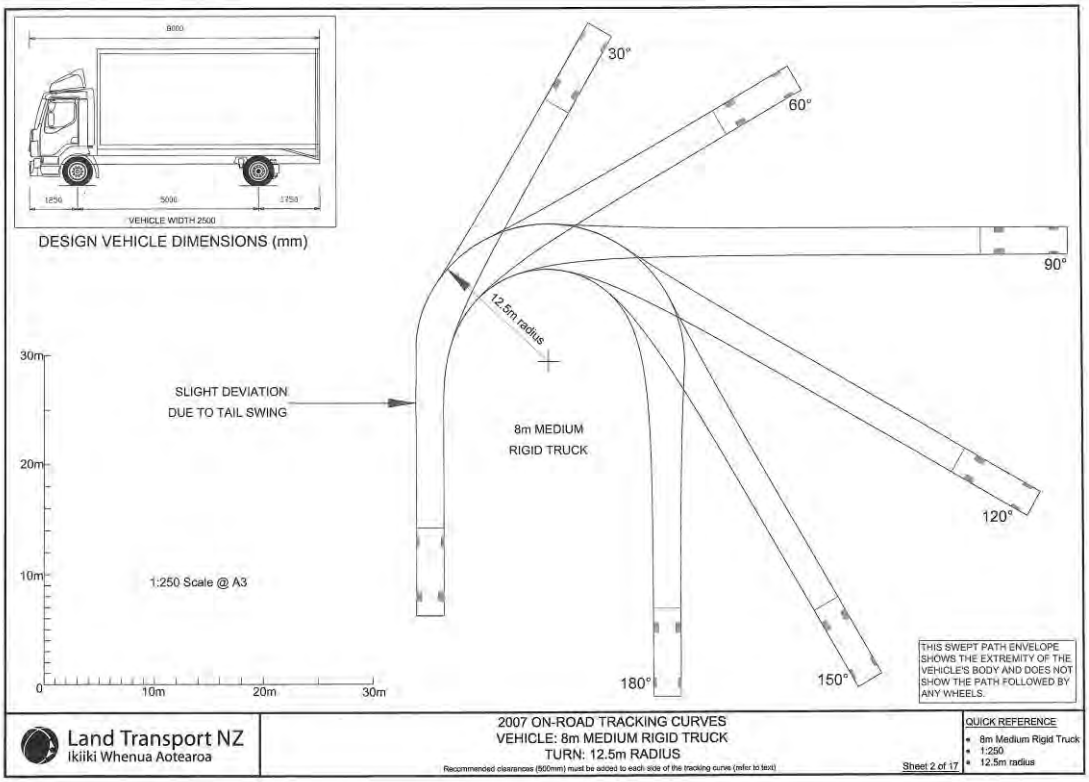
Refer to the Development Manual for the following:

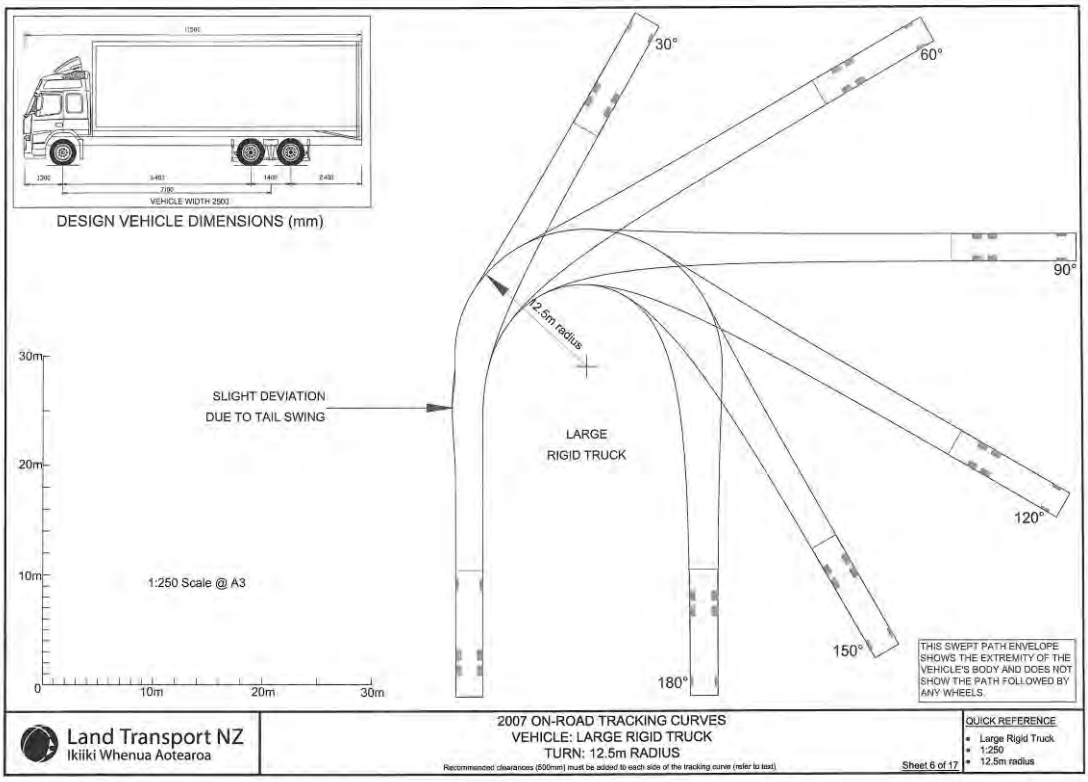
- Sight Visibility
- Separation Distance
- Width of crossing

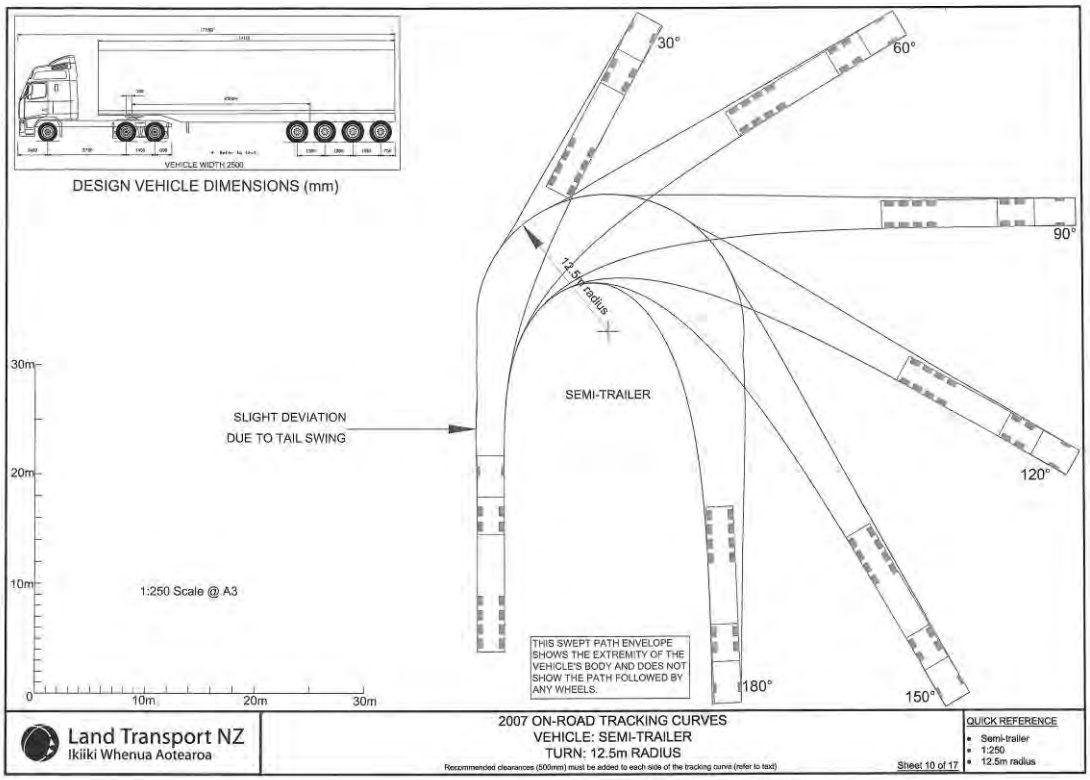
matamata piako district council

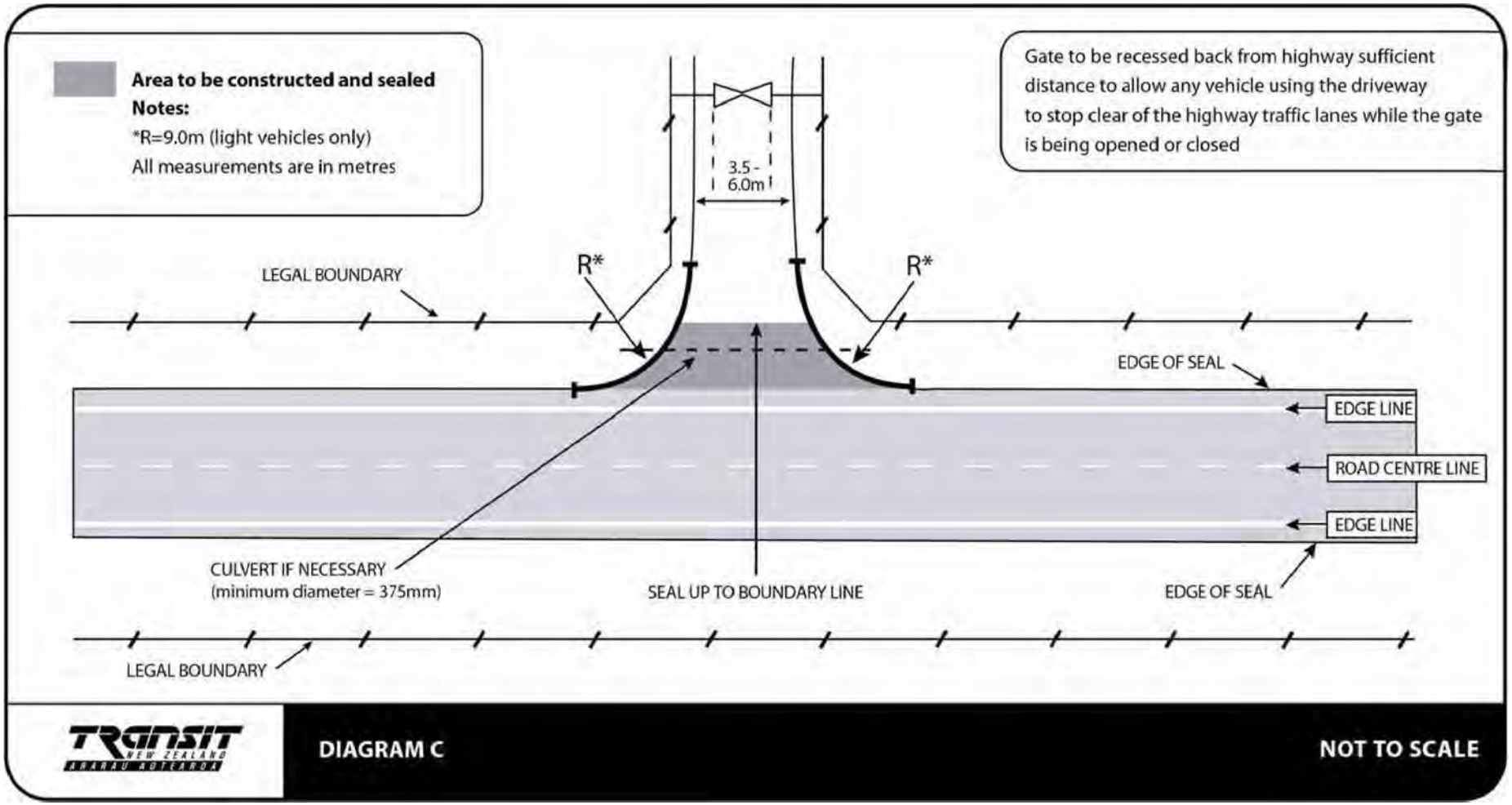
Urban/Industrial Vehicle Crossings

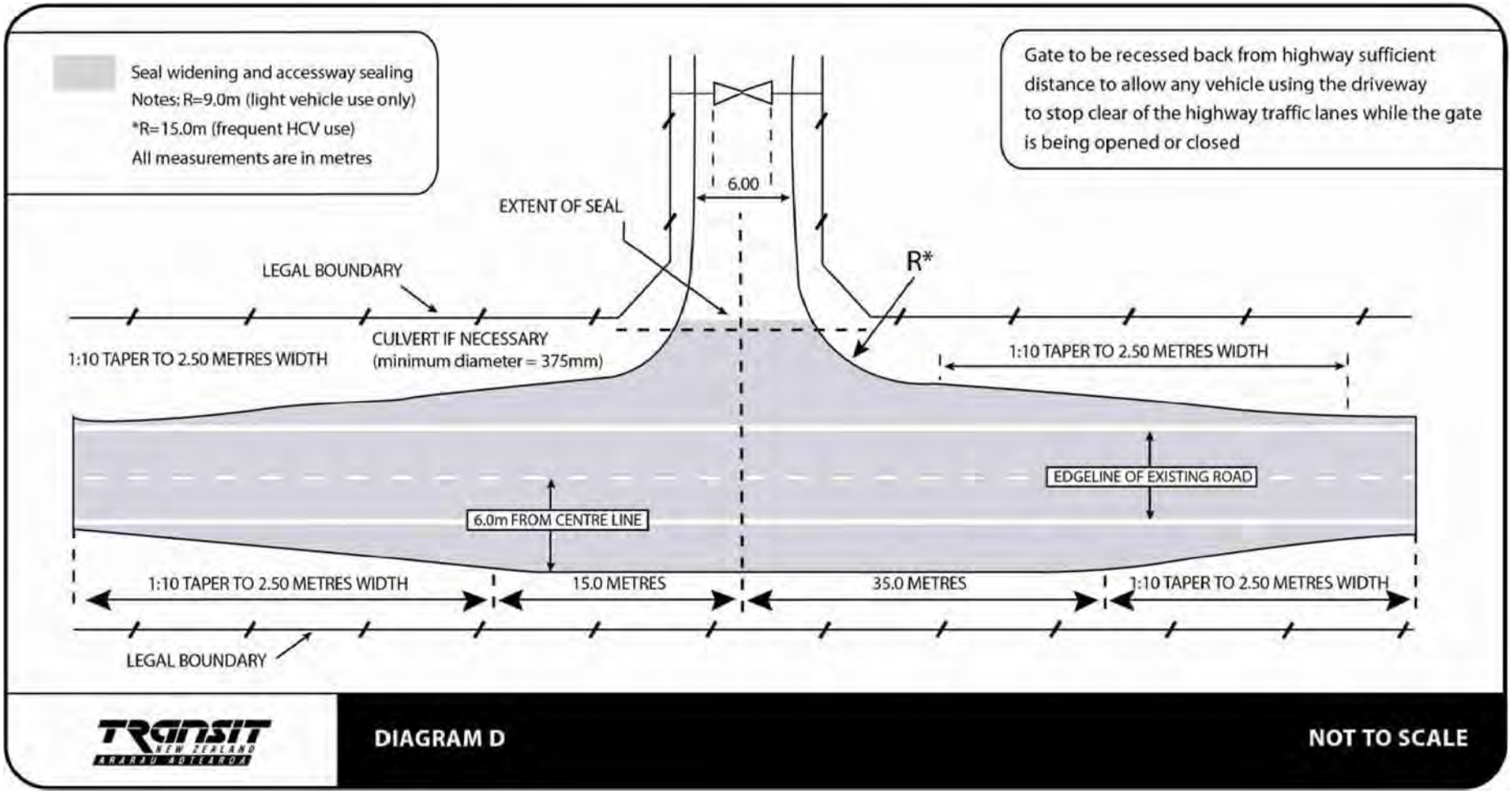
MPDC DG 308 : October 2013


DESIGN VEHICLE DIMENSIONS (mm)
VEHICLE WIDTH 2500
30°
60°
90°
120°
150°
180°
12.5m radius
SLIGHT DEVIATION
DUE TO TAIL SWING
8m MEDIUM
RIGID TRUCK
30m
20m
10m
0
10m
20m
30m
1:250 Scale @ A3
THIS SWEPT PATH ENVELOPE SHOWS THE EXTREMITY OF THE VEHICLE'S BODY AND DOES NOT SHOW THE PATH FOLLOWED BY ANY WHEELS.
Land Transport NZ
Ikiiki Whenua Aotearoa
2007 ON-ROAD TRACKING CURVES
VEHICLE: 8m MEDIUM RIGID TRUCK
TURN: 12.5m RADIUS
Recommended clearances (500mm) must be added to each side of the tracking curve (refer to text)
Sheet 2 of 17
QUICK REFERENCE
8m Medium Rigid Truck
1:250
12.5m radius

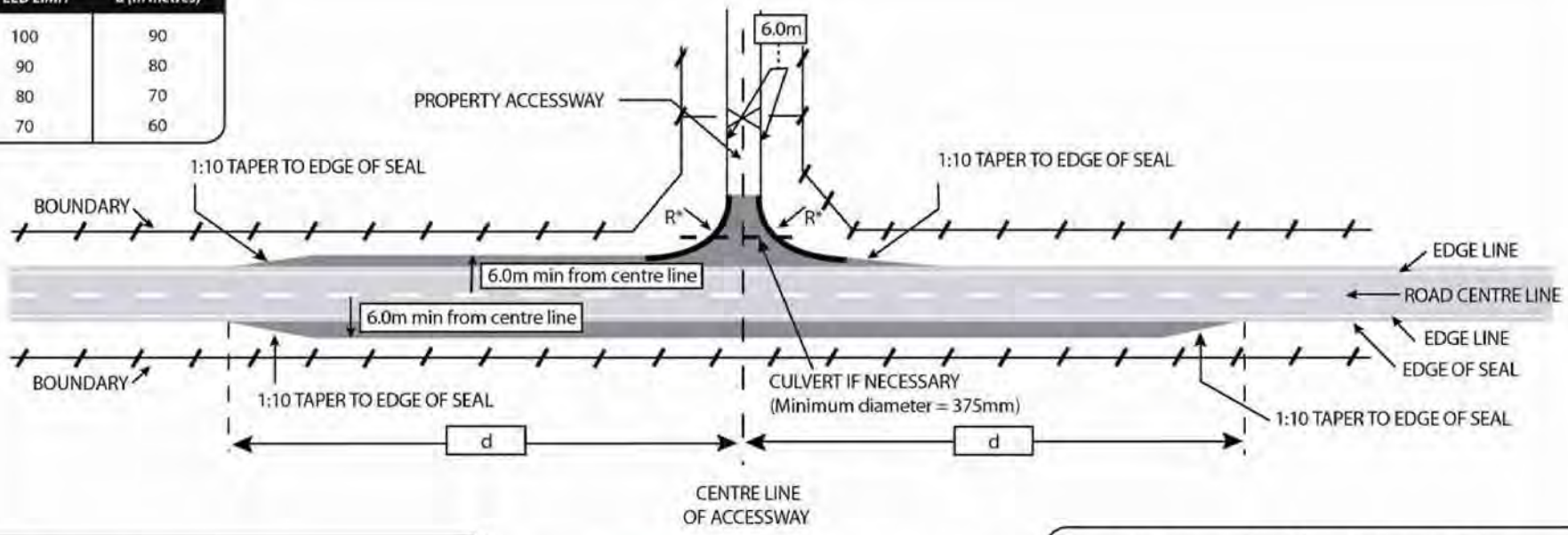

DESIGN VEHICLE DIMENSIONS (mm)
VEHICLE WIDTH 2500
30°
60°
90°
120°
150°
180°
12.5m radius
SLIGHT DEVIATION
DUE TO TAIL SWING
LARGE
RIGID TRUCK
30m
20m
10m
0
10m
20m
30m
1:250 Scale @ A3
THIS SWEPT PATH ENVELOPE SHOWS THE EXTREMITY OF THE VEHICLE'S BODY AND DOES NOT SHOW THE PATH FOLLOWED BY ANY WHEELS.
Land Transport NZ
Ikiiki Whenua Aotearoa
2007 ON-ROAD TRACKING CURVES
VEHICLE: LARGE RIGID TRUCK
TURN: 12.5m RADIUS
Recommended clearances (500mm) must be added to each side of the tracking curve (refer to text)
Sheet 6 of 17
QUICK REFERENCE
Large Rigid Truck
1:250
12.5m radius


VEHICLE WIDTH 2500
DESIGN VEHICLE DIMENSIONS (mm)
30°
60°
90°
120°
150°
180°
12.5m radius
SEMI-TRAILER
SLIGHT DEVIATION
DUE TO TAIL SWING
30m
20m
10m
0
10m
20m
30m
1:250 Scale @ A3
THIS SWEPT PATH ENVELOPE SHOWS THE EXTREMITY OF THE VEHICLE'S BODY AND DOES NOT SHOW THE PATH FOLLOWED BY ANY WHEELS.
Land Transport NZ
Ikiiki Whenua Aotearoa
2007 ON-ROAD TRACKING CURVES
VEHICLE: SEMI-TRAILER
TURN: 12.5m RADIUS
Recommended clearances (500mm) must be added to each side of the tracking curve (refer to text)
Sheet 10 of 17
QUICK REFERENCE
Semi-trailer
1:250
12.5m radius


Area to be constructed and sealed
Notes:
*R=9.0m (light vehicles only)
All measurements are in metres
Gate to be recessed back from highway sufficient distance to allow any vehicle using the driveway to stop clear of the highway traffic lanes while the gate is being opened or closed
3.5 - 6.0m
LEGAL BOUNDARY
R*
R*
EDGE OF SEAL
EDGE LINE
ROAD CENTRE LINE
EDGE LINE
CULVERT IF NECESSARY
(minimum diameter = 375mm)
SEAL UP TO BOUNDARY LINE
EDGE OF SEAL
LEGAL BOUNDARY
DIAGRAM C
NOT TO SCALE


Seal widening and accessway sealing
Notes: R=9.0m (light vehicle use only)
*R=15.0m (frequent HCV use)
All measurements are in metres
Gate to be recessed back from highway sufficient distance to allow any vehicle using the driveway to stop clear of the highway traffic lanes while the gate is being opened or closed
6.00
EXTENT OF SEAL
LEGAL BOUNDARY
R*
CULVERT IF NECESSARY
(minimum diameter = 375mm)
1:10 TAPER TO 2.50 METRES WIDTH
1:10 TAPER TO 2.50 METRES WIDTH
EDGELINE OF EXISTING ROAD
6.0m FROM CENTRE LINE
1:10 TAPER TO 2.50 METRES WIDTH
15.0 METRES
35.0 METRES
1:10 TAPER TO 2.50 METRES WIDTH
LEGAL BOUNDARY
TRANSIT NEW ZEALAND
DIAGRAM D
NOT TO SCALE

LENGTH OF SHOULDER WIDENING	
SPEED LIMIT	*d (in metres)*
100	90
90	80
80	70
70	60



Bellmouth Radii (R)

R= 9.0m (Light vehicle use only)
R= 15.0m (Frequent HCV use)

Area to be constructed and sealed

Note: All measurements are in metres

Gate to be recessed back from highway sufficient distance to allow any vehicle using the driveway to stop clear of the highway traffic lanes while the gate is being opened or closed

TRANSIT NEW ZEALAND ARARAU AOTEAROA

DIAGRAM E

NOT TO SCALE