

6 ROAD NETWORK

6.1 Introduction

The purpose of this section is to provide design guidance for the construction of the road/street network.

Appropriate design standards for roads are important to ensure that Council's assets are constructed to an appropriate standard. These standards allow for cost-effective and long-term benefits that consider environmental effects and reduce the financial impact on Council's infrastructure.

Poor road network design can be costly for Council and ratepayers, and can affect the safety and wellbeing of people and communities.

Note: The words, street and road have the same meaning in terms of this document.

6.1.1 Objectives

Council is responsible for all road assets under its control. Council must therefore ensure that they are designed, constructed and maintained to meet the following general objectives:

- a) The road provides a safe and efficient corridor for all road users in accordance with current and projected traffic volumes;
- b) The road has a high level of street amenity, in keeping with the character of development within the surrounding environment;
- c) The road corridor provides safe access options for pedestrians, cyclists and other legal road users;
- d) The road corridor accommodates a range of infrastructural services, enabling easy access for maintenance and upgrade works within the corridor with a minimum of disruption;
- e) Off-street parking has been provided to meet the needs of the local environment;
- f) Stormwater has been managed effectively so as to avoid flood risk/inundation potential and water quality contamination;
- g) The road carriageway surface is durable and safe;
- h) Access to the road corridor by network utility operators and the road controlling authority is ensured, for road maintenance and access to services within the road reserve.
- i) The road corridor is managed efficiently by network utility operators and the road controlling authority.

- j) The road network is cost-effective to construct and maintain over the lifecycle of the road asset;
- k) The road network meets the needs and expectations of the community in terms of the LTP.
- l) The road meets all requirements of the TRMP, including compliance with any relevant conditions of resource consents

Private access-ways and private roads are not directly a Council responsibility, but their safe and efficient functioning and ongoing maintenance can have an effect on Council’s road network. Council must also ensure that its network does not adversely affect the safety and efficiency of the state highway network, under NZTA as the road controlling authority.

These general objectives guide Council in developing standards that deliver an effective and efficient level of land transportation management.

6.1.2 Key references

Table 6-1 generally summarises all of the external national standards that are relevant to the design and construction of the road network in the Tasman District.

Table 6-1: New Zealand Road Design Standards

Matter	Standard and/or Reference	Comment
Principal Design Guide	Austrroads – Including NZ Supplements	Use for roads, intersections, paving and sight distance criteria.
	NZS:4404 – 2010	Urban and rural road design principles.
Principal pavement standards	New Zealand Transport Agency specifications	
Concrete pavers	IB67 1988	CCANZ Interlocking Concrete Block Road Pavements 1988

Where an Act or Standard is referenced this shall be the current version including any associated amendments.

6.2 Road Design Solutions

6.2.1 General

The following design matters must be addressed in the road design and layout:

- a) The road network must be well connected to ensure efficiency and legibility, reduce congestion at key intersection points and can provide security of access under emergency conditions (See TDC Drawing 602);
- b) Roading layouts shall be planned to maximise convenient access to all users (traffic, cyclists, walkers etc);
- c) Road design alignments shall not be designed in isolation but will require an overall appraisal of the surrounding area, even if adjoining areas are zoned differently;

- d) New roads being added to the network must be guided by what is optimal for the area as a whole, rather than allowing individual developments to be created with minimal roading;
- e) Cross intersections shall be avoided unless designed with sound traffic engineering principles and approved by the Engineering Manager;
- f) New roads shall be extended to the boundaries of the owner's land where the road will require to be ultimately extended into the adjoining land. A temporary turnaround shall be constructed if it is part of a staged development by the same owner;
- g) The road design and layout must be approved as part of a subdivision and/or road area land-use consents, and be consistent with any resource consent conditions that may apply in accordance with the TRMP;
- h) The proposed road meets the standards set out in Appendix 6.
- i) The proposed road is consistent with any "indicative road" layout shown on the planning maps of the TRMP;
- j) The road design, spacing, layouts, and cross sections must be consistent with TDC Drawings 600 to 605.
- k) Final roading layouts will require the approval of the Engineering Manager which will be carried out through the vetting of subdivision consent plans at the time of consent approval.
- l) In redeveloping the existing network there may be constraints such as limited road reserve width and existing development that mean that Council's standard designs cannot always be achieved.
- m) Where a road is developed in stages a temporary turning area shall be provided at the end of the construction and outside the road-to-vest areas.
- n) The temp turning head pavement shall be formed to the same standard as the road and permanently surfaced to provide a minimum 16m diameter turning area for residential areas or such other turning design such as "hammer head".
- o) Where a road abuts an adjoining property and is not part of the consent, the road shall be formed up to the boundary and vested with Council without isolation strips. The turning requirement may be modified to provide some form of turning facility.
- p) Provision shall be made to control stormwater, including the construction of open channels to intercept surface runoff and direct it to an approved stormwater system. If a lot is created with two road frontages, then both roads shall be constructed and vested in Council in the one stage. (This allows full development of the corner section and traffic off the lesser road, or to the requirements of the future landowner).
- q) Stormwater from roads must be managed as part of the overall road design and development proposal:

- i. All stormwater from the carriageway and footpaths shall be collected and managed so as to avoid inundation and water contamination effects;
 - ii. Compliance with the requirements of the TRMP including the need for a discharge consent;
 - iii. Compliance with section 7 of the Engineering Standards, which details the accepted design standards for all methods of stormwater control.
- r) Road/Street Pattern Philosophy – The Council is aiming at a pattern of roads/streets that form a network rather than a series of “trees”. This is to eventually give road users a choice of route for every journey so as to avoid undue concentration of traffic and also to provide more security of access under emergency conditions. In particular, development of new areas will be guided by what is optimal for the area as a whole rather than allowing individual developments to be created with minimal roading. Application of this policy may give due regard to topography and road/street layout and indicative roads.

6.2.2 Geometrical Design of Carriageways

The geometric design of all roads is set out in the following Table 6-2.

Table 6-2: Geometric Design of Carriageway

Design consideration	Standard/Reference	Notes
Design	<p>Intersections at Grade (Guide to Traffic Engineering Practice) Austroads 2005 Part 5; See TDC Drawing 612 to 614.</p> <p>Rural Road Design (Guide to the Geometric Design of Rural Roads), Austroads 2003 and current amendments.</p> <p>Both of these documents are to be read in conjunction with the New Zealand supplements issued from time-to-time to amend any criteria to suit New Zealand conditions and practices.</p>	<p>With regard to the use of the Rural Road Design manual, some modifications and extrapolations may be necessary to suit urban situations. This guide has been included as it is the current design document for horizontal and vertical curvature, super elevation and curve widening.</p> <p>Safety considerations are paramount and designers shall endeavour to eliminate or protect road users from all potential hazards within the safety clear zone appropriate to the road.</p> <p>To maintain driver safety at road intersections it is important to ensure that the crown of the intersecting road does not extend out into the carriageway of the through road.</p>
Gradients	<p>See Appendix 6-1</p> <p>Grades shall be as long as possible and vertical curves provided at all changes of grade.</p>	<p>Minimum/maximum gradients shall apply to the inside of any curves. Minimum gradient on a kerb shall be 0.40%, 1-in-250. Centreline gradients are not acceptable even in cases where the channel gradients may be nearly identical.</p>
Crossfall on Carriageway	<p>Normal crossfall of 1-in-33 (3%) in both directions from the crown shall be developed on all standard carriageways.</p>	<p>Where a uniform cross-fall is developed from kerb to kerb, this shall not be flatter than 1-in-50 (2%).</p>

Design consideration	Standard/Reference	Notes
	<p>Where the kerb levels differ for design purposes, crossfalls varying from 1-in-50 to 1-in-25 (2% to 4%) from the crown may be permitted, coupled with a lateral shift in crown position of up to one quarter of the effective road width.</p>	<p>Unsealed roads (if approved through resource consent) shall have crossfall of 4% to 6% from the centreline crown.</p>
Super-Elevation	<p>Super-elevation will not normally be required or permitted in 50 km/h zones or areas that in the opinion of the Engineering Manager likely to become 50 km/h zones.</p> <p>The maximum super elevation shall not exceed 1-in-12 (8%) where uniform crossfall is developed.</p>	<p>Certain main routes may in the future have an increased speed limit. If this change is a possibility, Council may require super-elevation to be constructed to a speed value nominated at the time of the request.</p> <p>On hillside development super-elevation may be employed where it suits boundary levels up to the allowable design maximum crossfall.</p>
Kerb lines	<p>See TDC Drawings 610 and 611.</p> <p>Where kerbs are used in the road design they shall be at the same level on both sides of the road/street.</p> <p>In special circumstances, the left and right hand kerb lines may be better graded individually.</p> <p>The following maximum difference applies:</p> <p>Width of Carriageway - Maximum Difference in kerb level:</p> <p>7m - 120mm 8m - 140mm 13m – 200mm 14m - 220mm 16.5m - 250mm</p> <p>Kerbs in commercial zones where verandas are present shall be set 450mm out from the veranda.</p>	<p>In special circumstances, the left and right hand kerb lines may be better graded individually in conjunction with centre line levels, footpath levels and boundary levels.</p> <p>Under such circumstances, at a given cross section, the left and right hand kerbs may differ.</p> <p>This allows for a shift in the crown to approximately the quarter point, while maintaining a 3% crossfall.</p>
Curves (and Turning Heads)	<p>See TDC Drawing No. 606.</p> <p>Road Types 1, 2, 3, 9, 10 and 11 shall have transition horizontal curves designed to match or exceed the design speed. Vertical curves shall be designed to exceed the design speed by 10km/hr.</p>	<p>Reduced radii may be considered for any road type on approval of the Engineering Manager; however additional mitigation measures may be required. These may include widening on the inside of curves and/or vesting of additional road reserve to maintain sight lines for the design speed.</p>

Design consideration	Standard/Reference	Notes
	<p>Road types 4, 5, 6, 7, 8, 12, 13, 14 and 15 may be designed with fully circular horizontal curves with a minimum radius of 40m on the centreline.</p> <p>Horizontal curves with radii of 150-350m and Design Speed Values of 70km/hr and above must incorporate a safety recovery width of 1.5m as additional seal on the outside of the curve.</p> <p>The minimum radius of the turning circle of a cul-de-sac shall be 8 metres in residential areas, 12.5 metres in commercial and 15 metres in industrial areas.</p>	<p>In areas where the roads could have a higher design speed in the future Council may require geometric elements to be provided to the higher speed.</p> <p>At intersections, the kerb line shall have a minimum radius of 6 metres, except at major intersections, when the Engineering Manager may require a larger radius.</p> <p>Alternative turning heads (hammerhead or fish tail) in residential cul-de-sacs/access places may be permitted subject to a minimum two-axle truck completing a three-point turn and to the approval of the Engineering Manager.</p>
Slope of Berms	See TDC Drawings 607-609, 615, 616 and 620.	Where it becomes necessary to have a berm steeper than 1-in-12, it shall be necessary to produce design gradients for individual property access to show that these may be satisfactorily negotiated for a 90 percentile vehicle.
Batters	<p>See TDC Drawing 607.</p> <p>Batter slopes and location from boundaries shall conform to TDC Drawings 607 and 608 and shall begin/terminate at the berm edges as shown in TDC drawings.</p> <p>The requirements of Appendix 6-2 must also be met.</p>	<p>Batter slopes shall be suitably planted or hydroseeded to enhance stability on the completion of construction.</p> <p>The road reserve shall terminate at the bottom of the batter when below the road and top of the batter above the road.</p>
Walls	Where conditions indicate reinforced earth walls, retaining walls, and crib walls, benching or similar may be required.	A producer statement for design and construction for any such structure shall be submitted and a building consent obtained, together with safety fencing where drops exceed 1.0m.
Roadside barriers	<p>The road designer shall be responsible for the identification and assessment of potential hazards resulting from the geometric design and/or location of the road.</p> <p>For pedestrian handrails refer to Drawing No's 617 and 618.</p>	Roadside Safety Barriers generally in accordance with TNZ M/23 may be used to mitigate the hazards. Specific design approval shall be required from the Engineering Manager.

6.2.3 Threshold Treatment and Traffic Calming

Designers are encouraged to incorporate “Traffic Calming” measures in the roading design. The following standards apply:

- a) These may include but are not limited to, threshold treatment raised pavement, changes in surface textures, kerb extensions and landscaped medians. See TDC Drawings 621 and 622 and associated delineation.
- b) These measures may only be incorporated in local residential roads (type 4, 5, 6, 7, 8, 12, 13, 14 and 15 Appendix 6) and following discussion with and approval by the Engineering Manager.

6.2.4 Pedestrian Ways

Pedestrian and cyclist access ways are encouraged. The following specifications apply:

- a) Pedestrian/Cycle ways linking roads or parks etc may be required through a subdivision or to link to an existing or proposed subdivision.
- b) For design requirements refer to Section 12. TDC Drawings 623 and 624 show cycle barriers to be constructed where access is restricted.
- c) These access ways may also be used for secondary stormwater flow paths and approved services. Conversely secondary stormwater flow paths when located at the bottom of a cul-de-sac (not approved design), shall incorporate the above accessways or services shall be oversized together with additional sumps.

6.2.5 Bridge Design

Bridge/culvert design shall be in accordance with the Transit NZ Bridge Design Manual. Designs shall also include roadside barriers, batter slope protection, clearances, and foundation assessments.

6.3 Pavement Formation

6.3.1 General

The standard of formation must be consistent with the following conditions:

- a) The carriageway pavement shall be designed to a 25-year design period.
- b) The width of the carriageway shall be in accordance with Appendix 6-2.
- c) Where the work needed to provide the formation width extends outside the road reserve width, the legal road boundary shall be adjusted (vested) to accommodate any retaining structure or batter slope necessary to support the road or adjacent property and for provision of maintenance.
- d) Where any land to be subdivided/developed, fronts any of the above that is not constructed to the current engineering standards, Council will require as a condition of consent that these roads be upgraded at the full cost of the subdivider/developer. This may also require the installation of services or works.

- e) When subdivisions/development fronts or uses an existing substandard road, Council will usually only request full upgrade of half the road on the Consent holders frontage unless a mitigating effect is required on the other side or adjacent to the subdivision ie, only one footpath required and the ideal location being on the opposite side to the development or lot.

6.3.2 Material Specifications

The developer shall comply with national specifications in accordance with Table 6-3: Carriageway Surface Specifications.

Table 6-3: Carriageway Surface Specifications

Construction	Standard
Earthworks	TNZ* Specification F/1
Geotextiles	TNZ Specification F/7
Subsoil Drains	TNZ Specification F/2
Pipe Culverts	TNZ Specification F/3
Basecourse Aggregates	TDC Specification (TDC Drawings 603 to 605), TNZ M4
Basecourse Construction	TNZ Specification B/2
Sealing Binder	TNZ Specification M/1 and M/13
Binder Application	TNZ Specification P/3
Sealing Chip	TNZ Specification M/6
Asphaltic Concrete	TNZ Specification M/10
Paving	TNZ Specification P/9

* **Note** – TNZ or any updates provided by the New Zealand Transport Agency

Table 6-4: Surfacing Methods

Matter	Standard and/or Reference	Comment
General	<p>Residential streets, grade 3/5 chip wearing surface of a two-coat seal operation (2 Bitumen and 2 Chip coats) shall be constructed on the approved basecourse, or 25mm compacted asphaltic concrete mix 10 to cover an emulsion Grade 5 chip seal constructed on the approved basecourse</p> <p>For industrial streets a wearing surface of 50mm depth of mix 15 asphaltic concrete on an emulsion Grade 5 chip seal shall be constructed on the approved basecourse</p> <p>For all roundabouts and the turning heads in residential/industrial/commercial cul-de-sacs, the surface shall be 50mm depth of mix 15 asphaltic concrete on an emulsion Grade 5 chip seal.</p>	<p>Alternative surfacing may be allowed to specific limited areas with the approval of the Engineering Manager.</p> <p>The basecourse surface finish shall be such that when swept it presents a tightly compacted, non-glazed, clean stone mosaic surface that will not ravel as a result of sweeping. The standard of sweeping shall be sufficient to remove all loose aggregate, dirt, dust, silt and other deleterious matter.</p> <p>A two coat chip sealed surface shall always be extended into unsealed side roads, crossings and ROW's. For unsealed roads, the distance is 50m. For ROWs the distance is 5.0m onto the site and for crossings back to the property boundary.</p>

Matter	Standard and/or Reference	Comment
		Other surface treatments may be required depending on traffic, road hierarchy or site configurations such as gradients.
Seal Design	<p>The submitted designs shall include details of:</p> <ul style="list-style-type: none"> • Bitumen/Emulsion to be used • Additives to be used • Application rates • Construction method • Chip size, ALD, AGD, source and PSV value. 	<p>The seal design shall generally be the responsibility of the Designer.</p> <p>The Designer shall submit his seal design for approval by the Engineering Manager, seven (7) days prior to any sealing commencing.</p>
Sealing Binder	<p>The materials used shall meet the requirements of the relevant clauses of the following TNZ specifications.</p> <ul style="list-style-type: none"> • M/1: Specification for Asphaltic Bitumens • M/13: Specification for Adhesion Agents 	Sealing binder shall be either 180/200 penetration grade bitumen or emulsion of a suitable type from an approved supplier.
Sealing Chip	<p>Sealing chip shall meet the requirements of the relevant clauses of TNZ M6 specification.</p> <p>The initial seal coat will usually be a Grade 3 first coat immediately followed by a Grade 5 seal coat.</p>	
Application of Sealing Binder	<p>Application of sealing binder and chip shall be in accordance with TNZ P/3.</p> <p>Where a two-coat seal is specified this shall be applied as a two-coat seal operation (2 Bitumen and 2 chip coats).</p> <p>The bitumen sprayer used for the work shall hold a current E/2 certificate of compliance.</p>	Spraying operations shall be carried out so that private property and street furniture are not affected by over spray. In kerb situations the seal shall overlap the channel by 20mm.
Acceptance Criteria	The two-coat seal shall provide a fully interlocked surface after rolling. Chip loss, bleeding or flushing shall not exceed 5% in any one metre by one metre square of the total sealed area during the maintenance period.	
Asphaltic Concrete	Asphaltic concrete paving (hotmix) shall comply with TNZ Specification M/10 Table 5-1 Mix 10 and shall be a minimum compacted thickness of 25mm. The binder shall be 80/100 penetration bitumen. The construction of the paving shall be carried out in accordance with TNZ P/9.	Industrial streets shall be M/10 Table 5-1 mix 15 with a compacted thickness of 50mm. The Designer shall submit the mix design for approval of the Engineering Manager seven (7) days prior to construction.

Matter	Standard and/or Reference	Comment
Weed Protection	Immediately prior to any form of surfacing, a strip one metre wide adjacent to each channel shall be applied with an approved weed killer at the manufacturer's recommended rate of application.	

6.3.3 Structural Design of Pavement

The pavement shall be designed in general accordance with recognised techniques which include, but are not limited to those listed below.

- a) Soaked CBR Method (CBR design curves are given on TDC Drawing 612 or Austroads pavement design, New Zealand supplement applies to pavement design). Further sub-base testing may be required at the discretion of Council.
- b) Scala/Dynamic Cone Penetrometer (Design curves are given on TDC Drawing 613).
- c) Design method based on Benkleman beam deflections (Design curves are given on TDC Drawing 614).
- d) The Designer shall state the method used and shall supply information to support the design method. Minimum one (1) soaked CBR test per soil type with design.
- e) The following information shall be provided at the same time that Engineering Drawings are submitted for approval:
 - i. All test information obtained to provide a basis for pavement design.
 - ii. Copy of design calculations used to determine pavement thickness.
 - iii. Design life and %HCV and ESA's.
- f) The minimum pavement depth shall be 200mm in streets, roads and commercial/industrial rights of way and 150mm for residential rights-of-way and crossings (subject to sound sub-base strength).
- g) The top 150mm of pavement shall be M4 AP40 basecourse. A specific design is required for each individual road. Also applies to rights-of-way. Refer TDC Drawings 600 and 601.
- h) The Designer may choose to use stabilising agents on the construction courses to reduce the depths required. The Designer shall supply supporting information and test results to prove the type and quantity of stabilising agent is compatible with the type of material and projected use of the road.

This design option shall only be permitted after consultation with and approval by the Engineering Manager.

- i) The use of geotextiles/geogrids as a structural element of the pavement design shall only be permitted after consultation with and approval by the Engineering Manager.

6.3.4 Strength Acceptance Criteria

The Designer shall nominate a method of testing to be used to demonstrate that the construction is within the design criteria. The following conditions apply:

- a) Final testing shall be carried out prior to the surfacing of the pavement. Table 6-5 sets out the deflection standards for each road category.
- b) If no method is nominated or approved by the Engineering Manager, then the method of testing for compliance with the pavement design standard shall be the carrying out of Benkleman Beam tests as set out in TNZ test procedure TI (weighbridge docket for the current day weighing test will be required).
- c) The maximum allowable deflections shall comply with Table 6-5. Both Benkleman Beam test and Nuclear Densometer will be required for type 1-4, 9-11 and 22.

Table 6-5: Road Deflection Standards

Description	Road Type*	Maximum Deflection
Arterial	1 & 9	0.8mm
Distributor	2 & 10	1.0mm
Collector or Industrial/Commercial	3, 11, 21 & 22	1.3mm
Access Road	4, 12 & 13	1.5mm
Access Place	5, 6, 7, 8, 14 & 15	1.8mm
Private Access	16, 17, 18, 19, 20	2.0mm

*For road classification details see Appendix 6-1.

- a) No more than 5% of the tests shall exceed the maximum as set out in Table 6-6: Road Construction Standards.
- b) No single result shall exceed the maximum allowable by more than 50%.
- c) Any area of excessive deflection shall not exceed 5.0 square metres.
- d) Impact tester/ "Clegg" hammer readings can be used on private ROW's (Road Types 16-20) where the minimum reading after four blows is 35.
- e) Where any areas of the carriageway fail the acceptance testing, the Designer shall nominate this proposed remedial action for approval by the Engineering Manager.
- f) A further set of tests shall be carried out to show that the affected area is up to the required standard.
- g) Once sub-base and basecourse have been laid, the road shall not be used as a haul road and allowed to be contaminated.

In addition to the above testing requirements, the finished road profile shall also meet the following conditions:

- a) The finished shape of the road shall be such that when a straight edge is laid parallel to the centre line of the road or a camber board laid perpendicular to the centre line,

the surface shall not vary from the straight edge or camber board by more than 10mm in any three metre length.

- b) Prior to sealing (within the sealing seasons), the surface of the road shall be clean, reasonably dry and free of ice, frost or loose material, tightly compacted and shall present a clean stone mosaic appearance.
- c) All concrete surfaces, channels, sump surrounds, service boxes, manholes etc shall be completed to their final height to fit the finished (sealed) road profile.
- d) All service boxes and manhole lids shall be finished to within 5-to-10mm above the finished (sealed) road profile. No sealing shall be carried out until inspected and approved by the Engineering Manager's representative.

6.4 Accepted Construction Methods

6.4.1 Placement of Filling

The following standards (Table 6-6) apply to the placement of filling in preparation of the road surface.

Table 6-6: Road Construction Standards

Construction Matter	Method of Construction and/or Standard	Comment
General	Compliance with NZS4431. The fill material shall be spread and compacted in uniform homogeneous layers parallel to the road and consistent with TNZ F1 in road reserves.	See Section 7.4.2 for minimum ground levels.
Compaction Against Existing Slopes	In areas of enclosed filling, where the original ground has a slope steeper than 1-in-2.75 (20°), the original ground surface shall be properly benched before any material is placed against it.	The benches shall be of sufficient width to accommodate compaction and spreading equipment, and shall be arranged so as to be adequately drained during the placement of filling material.
Depth of Layer	The depth of the layer shall be related to the type and model of compaction plant proposed to be used and the type and size of material. When no information is supplied, compliance with TNZ F1 is required. Elsewhere, the layers shall be spread and compacted to a loose depth not exceeding 200mm.	The Designer shall nominate the proposed layer depths and plant, and may be required to supply supporting documentation showing that the proposed compaction method is compatible with the material being used.
Moisture Content	The material shall at all times be placed in compliance with TNZ F1.	Moisture content shall be close to the optimum moisture content for the material under consideration.
Standard of Compaction	The maximum dry density shall be obtained by New Zealand standard compaction at optimum moisture content as detailed in NZS4402 for the appropriate soils. Minimum % of Maximum Dry Density Heavy Clay Silt, Sandy Clay and Gravel – 95-105%, Sands – 100%	Within the carriageway the criteria for Section 6.3.3, structural design of pavement shall take precedence over standards of compaction given in this clause.
Routine Testing	Routine testing shall be carried out on	All tests prior to and during

Construction Matter	Method of Construction and/or Standard	Comment
	<p>earthworks at the rate of one test every one metre depth of filling spaced at 30.0m grid points over the area concerned.</p> <p>The results of these tests shall be supplied to Council within seven days.</p>	<p>construction including sampling shall be carried out by a certified IANZ soil laboratory. Council may carry out further tests at any stage if it considers them necessary.</p>
Stability of Embankments	<p>Where in the opinion of the Engineering Manager the stability of any embankment as planned is in doubt, a stability analysis of the slope may be required.</p>	<p>If work is carried out by the developer which indicates instability, remedial measures shall be undertaken at the developer's expense.</p>

Where the area of fill does not exceed 100.0m² and the depth does not exceed 600mm maximum, the above requirement concerning testing will not be enforced

6.4.2 Subgrade Checking

The following conditions apply to subgrade checking:

- a) Where the extent of cut or fill for the project is too great to make subgrade testing feasible at the design stage, it may be done on completion of earthworks when sub-grade levels have been exposed.
- b) Even in cases where subgrade has been tested as part of the design its condition shall be reviewed on exposure during construction and pavement thicknesses adjusted accordingly. Further testing may be requested by Council.
- c) The results of such testing and/or review along with consequent adjustments to pavement layer thicknesses shall be advised to Council before placing of pavement layers commences.

6.4.3 Subgrade Drainage

Table 6-7 shall apply to subgrade drainage.

Matter	Method of Construction and/or Standard	Comment
General	<p>Drainage shall be a 100mm diameter or equivalent proprietary sub-soil drainage system complying with TNZ F/5 or TNZF/2 where appropriate.</p> <p>The pipe shall be surrounded by drainage aggregate complying with TNZ F/6 which will be wrapped in an appropriate geotextile complying with TNZ F/7.</p>	<p>The construction of the subsoil drain shall be to TNZ F/6.</p>
Sub-soil Drains in Cuts (on hillside subdivisions)	<p>When the road or right-of-way is in cut, a sub-soil drain as per TDC Drawing 620 shall be placed at the toe of the batter.</p>	<p>Connect drain into the back of the nearest sump downstream.</p>
Wet Spots in Subgrade	<p>Any permanent wet spot in the subgrade or any area undercut below adjacent subsoil drains shall be connected to the nearest piped stormwater system by another sub-soil drain.</p>	<p>Where the drain is located under the carriageway, traffic loading shall be taken into consideration for the type of pipe which must comply with TNZ F/2.</p>

Matter	Method of Construction and/or Standard	Comment
Subgrade Drainage Systems	<p>In general, to satisfy the condition that particles do not enter the pipe and no scour occurs in the “filter”, the following ratios must be complied with: (Alternatively a suitable geotextile lining the sub-soil trench may be used)</p> <p>i) 85% size of filter material Size of opening in pipe</p> <p>ii) 15% size of filter material 85% size of protected soil</p> <p>iii) 15% size of filter material 15% size of protected soil</p> <p>It shall be necessary in most cases to manufacture a suitable filter material to comply with the above requirements.</p>	<p>In some cases it may be necessary, due to the nature of the country, to lay an extensive sub-soil drainage system. In such a case, the material covering the pipes shall be graded upwards so that particles cannot enter the pipes</p>

6.5 Kerb and Channel

6.5.1 General

The following standards apply to the design and construction of the road kerb, and channel where these are used in the road design:

- a) All concrete shall be produced in accordance with NZS3104 and supplied by a certified graded plant. Concrete shall be constructed in accordance with the strengths specified and to the manufacturers’ specification
- b) Mountable kerbs shall only be used in flat terrain and with the prior consent of the Engineering Manager. Where mountable kerbs are provided, the corresponding footpath shall be reinforced to the standard required for a standard access crossing.
- c) Design and construction standards in accordance with Table 6-7.

Table 6-7: Kerb and Channel Construction Standard

Matter	Standard and/or Reference	Comments
Excavation and Basecourse	<p>A minimum depth of 100mm of compacted basecourse shall be placed under the kerb and channel.</p> <p>Compaction shall be to a minimum of 98% of maximum dry density.</p> <p>All concrete shall achieve a minimum specified crushing strength of 25MPa at 28 days standard cured.</p>	<p>If unsuitable soil conditions are encountered at the base of kerb and channel, the site shall be trenched out below this depth and backfilled with gravel or other approved fill material in layers of a thickness that is compatible with the type of compaction equipment and material being used.</p>
Formwork	<p>Slip forming of the kerb and channel is generally preferred. The standard of work produced by an individual machine must be approved by the Engineering Manager, prior to any construction.</p>	<p>Formwork for kerb and channel shall be approved dressed timber, steel or aluminium alloy sections adequately oiled or otherwise treated to allow ease of striking without staining of the stripped concrete surface. All formwork shall be accurately placed to the lines and levels of the works</p>

Matter	Standard and/or Reference	Comments
	<p>Construction joints shall be placed at 6m intervals.</p> <p>The profile shall conform to TDC Drawings 610 and 611.</p>	<p>and shall be such as to give the finished kerbs smooth lines, free of kinks and angles.</p>
Accuracy and Standard of Workmanship	<p>Kerbs and channels shall be finished so that on straight sections there is nowhere a deviation of more than 5mm within the length of a 3.0m straight edge; nor anywhere a deviation of more than 5mm from the line and level.</p>	<p>Kerbing and channelling is to be finished with a steel float and any concrete work showing honeycombing or scale in the face is to be removed and replaced with fresh concrete.</p>
Curves	<p>Council may direct that horizontal curves of less than 6m radius shall be constructed using special <i>in situ</i> formwork.</p>	<p>Use of regular forms to produce kinks or a tangent effect shall not be accepted.</p> <p>Changes of grade shall be made with a smooth vertical and horizontal curve.</p>
Benchmarks/Survey Marks	<p>A standard TDC benchmark plaque/survey mark shall be installed on the top of the kerb. A minimum of one plaque shall be installed in each new street, at maximum intervals of 300m.</p> <p>Where a plaque is installed to meet the requirement of LINZ this shall be used as the benchmark and the TDC plaque omitted.</p>	<p>The proposed locations shall be shown on the engineering plans. A reduced level and coordinates shall be established on each new benchmark and shown on the “as built” plans to two decimal places. The origin for the levels shall be from previously established benchmarks, and shall be stated on the drawings. The coordinates shall be established to Sixth Order survey standard accuracy.</p> <p>Where a subdivision is staged, and the above requirements are met it may not be necessary to install a benchmark in each stage.</p> <p>TDC benchmark plaques/survey marks will be supplied by Council at no cost to the developer.</p>
Kerb Entries	<p>Kerb entries may only be installed with the Engineering Manager’s approval and shall be a 125mm x 75mm rectangular box section of galvanised steel with a wall thickness of 4mm.</p>	<p>It shall be recessed back into the kerb by 10mm and extend from the kerb to the property boundary in one continuous length.</p>
Kerb Cut-outs	<p>At intervals and sized as directed by the Engineering Manager.</p>	<p>Kerb cut-outs are used to dispose of stormwater to vegetated swales and will only be approved by the Engineering Manager in certain situations and soil types.</p>

6.6 Footpaths, Crossings and Berms

6.6.1 Footpaths

The following general specifications apply to all footpaths:

- a) The number, location and width of footpaths are shown in Appendix 6-1.
- b) Generally footpaths on hillsides will be placed on the outside (fill) edge of the carriageway.

- c) The surface may be concrete, asphaltic concrete, chip seal (in rural residential areas) or block paving where specifically approved by the Engineering Manager. In areas where tree roots are to be protected, alternatives to allow the soil to breathe can be submitted for approval.
- d) The preferred location for footpaths shall be away from the kerb and channel, with a grass berm between.
- e) The footpath shall meet the material specifications in Table 6-8.

Table 6-8: Footpath Material Specifications

Matter	Standard and/or Reference	Comment
Concrete	<p>Concrete shall achieve a minimum specified crushing strength of 27.5 MPa at 28 days standard cure. A U5 Shallow Textured Broom finish in accordance with NZS3114 is required.</p> <p>Footpaths and entranceways (residential, commercial and industrial) shall be to the dimensions and depths shown on TDC Drawings 615 and 616.</p>	<p>Industrial entrance slabs shall be designed to take the same traffic loadings as the carriageway.</p> <p>Construction joints are required at 6.0m intervals, and on both sides of entrance slabs.</p>
Asphaltic Concrete Footpaths Vehicle crossings	<p>The path shall be paved with 25mm compacted depth of asphaltic concrete mix 10. All areas to be paved must be spray tack-coated prior to paving.</p> <p>Refer to TDC Drawings 615 and 616 for dimensions and details. At residential entrances, the basecourse depth shall be increased to a minimum depth of 150mm and the asphaltic concrete to a minimum compacted depth of 30mm.</p>	<p>Joints in the asphalt surfacing shall be either saw cut or formed to produce a neat straight line at right angles to the edge of the footpath and a flush smooth finish to the surface of the footpath. Joints shall have a tack coat applied to the vertical face.</p> <p>Commercial and industrial entrances shall be designed to take the same traffic loadings as the carriageway.</p>
Chip Seal Footpaths – Rural Residential Areas	<p>The path shall be a 2-coat (grade 4 and 6 chip) seal, with ground-treated (H4) timber batten 75mm x 25mm minimum and be firmly pegged along the edges of the footpath with the top of the batten at finished level. The underlying basecourse shall be a minimum of 150mm of compacted basecourse. The basecourse shall be weed sprayed (slow release granules) prior to sealing.</p>	<p>Chip seal footpaths may be permitted in rural residential areas where cluster housing is envisaged and located remote from the edge of the carriageway.</p>

- a) The surface of the finished footpath shall be such that when a straight edge is placed across the footpath, no area deviates from the straight edge by more than 5mm or by more than 5mm from a 3.0m straight edge when placed along the footpath.
- b) The edge of the footpath shall not deviate by more than 5mm from the line and levels shown on the approved Engineering Drawings.

- c) Where adjacent to a kerb, the surface of the footpath shall be flush with or no more than 5mm above the top of the kerb.
- d) In situations where there is more than a one metre high drop within one metre of the back of a footpath, a handrail complying with TDC Drawing 617 shall be constructed at the back of the footpath or top of the bank.
- e) If the Designer wishes to erect a fence or handrail of an alternative design, then full details shall be submitted to the Engineering Manager for approval. Compliance with the building code and occupational health and safety requirements will also need to be met.
- f) A nominal thickness of compacted basecourse under the footpath shall be 100mm.
- g) Access crossings shall be formed at right angles to the carriageway.

6.6.2 Crossings

Vehicle access and footpath crossing shall be provided in accordance with the following standards and conditions:

- a) Any new access crossing will require Council approval as to its location on the road reserve it adjoins.
- b) For location, surface treatment, sight distance and minimum distance of a vehicle crossing from an intersection, see TRMP section 16.2.
- c) All entranceways shall be sealed or concreted from the kerb and channel, back of footpath or edge of carriageway to the property boundary or beyond as specified in TRMP Figure 16.2A.
- d) Where the footpath is adjacent to the kerb and crossings are within 4.0m of each other, the vehicle crossing shall be continuous to a maximum of 8.0m.
- e) Crossings shall be provided in accordance with the land use and development of the applicable Zone, and in accordance with Table 6-9.
- f) All concrete crossings shall have D12 reinforcing starter bars at 400m centres through the full length of the back of the kerb crossing.

Table 6-9: Crossings Standards

Zone	Standard and/or Reference	Comment
Residential	<p>For standard kerb and channel, one vehicle crossing shall be provided (TDC Drawings 615, 616 and 619) of 4.0m in width at the boundary of all lots in residential areas. Where approved by Council, wider crossings may be provided up to a maximum of 6.0m.</p> <p>For proposed vehicle crossings where the footpath is offset from the kerb a ramped section shall be formed between the back of the kerb and channel and the edge of footpath. See TDC Drawing 616</p>	<p>Vehicle crossings in mountable kerb and channel will be permitted for rights-of-way where the ground profile of the lot falls, generally, towards the right-of-way and the upstream catchment is small.</p> <p>Continuous crossings shall be used round the ends of cul-de-sacs, provided the footpath for the corresponding length is located immediately behind the kerb and is constructed to take the same traffic loadings as the carriageway and suitable provision is made for the disposal of stormwater.</p>

Zone	Standard and/or Reference	Comment
Rural	A minimum 375mm diameter RCRRJ Culvert shall be installed under the entranceway or road crossing but increased sizing will depend on the catchment served.	
Commercial and Rural Residential	One crossing of 5.0m in width on any one allotment. (TDC Drawings 615 and 616). Where approved by Council, wider crossings may be provided up to a maximum of 7.0m. In the case of adjacent property owners wishing to have a mutual crossing at their shared boundary, the maximum permitted total length is 8.0m.	A minimum 375mm diameter RCRRJ culvert shall be installed under the entranceway but increased sizing will depend on the catchment served.
Industrial	One crossing of 6.0m in width on any frontage. Where approved by Council, wider crossings may be provided up to a maximum of 8.0m. In the case of adjacent property owners wishing to have a mutual crossing at their shared boundary, the maximum permitted total length is 8.0m. A wider crossing may be permitted at the discretion of the Engineering Manager.	Industrial crossings shall be designed to carry the same vehicle loading as the carriageway having regard to the foundation conditions of the site. The footpath crossings associated with them shall also be designed to carry the same loading as the carriageway. Where large HCV's will be using a vehicle entrance on a regular basis, a crossing width of 10.0m may be permitted on application to the Engineering Manager.

- a) Pram crossings shall be provided (TDC Drawing 611) of 1.2m width at road intersections, entrances to pedestrian ways and elsewhere as requested by the Engineering Manager. (See Appendix 6-1, 1.5m for when tactile pavers are used).
- b) Tactile pavers shall be installed in the footpath at the location of all pram crossings (and elsewhere as required by Council) in types 1, 2 and 3 roads. Tactile pavers shall be type B warning indicator pattern coloured "red".
- c) There shall be 12 pavers laid 4 across and 3 deep. They shall be installed adjacent to the kerb face and shown on the design engineering plans.
- d) The tactile paver pattern (raised dots) shall be aligned with the direction of pedestrian flow towards the pram crossing on the opposite side of the road.
- e) The footpath surface shall be flush with the edges of the pavers.

6.6.3 Berms and Landscaping

Berms shall be provided alongside the sealed carriageway surface, in accordance with the following standards:

- a) A service berm shall be provided for road types 1-8. Refer Appendix 6-1 and TDC Drawings 608-610.
- b) Where possible a landscape berm shall be provided for road types 1-7. Refer Appendix 6-1 and TDC Drawings 608 to 610. The subgrade shall be capable of allowing root penetration and sustaining growth.
- c) For alternative berm surfacing see Appendix 6-1.

The landscaped berm area shall comply with the following standards:

- a) This final topsoil surface shall be sown with approved seed mixtures. Special soils shall be treated to Council approval.
- b) Topsoil to a firm minimum thickness of 100mm shall be spread on the berms so that a smoothly contoured surface is produced, free of ponding areas. Prior to the sowing of the grass seed, superphosphate shall be spread and mixed with the topsoil at a rate of 30g per square metre.
- c) After fertilising, the berms shall be sown with grass seed that conforms to the following mix proportions:
 - 1.0 kg chewing fescue
 - 4.5 kg dwarf rye grass
 - 0.5 kg browntop
- d) The mixture shall be sown at a rate of 1kg to 40 square metres area.
- e) After two months a dressing of Sulphate of Ammonia applied at a rate of 30g per square metre shall be applied.
- f) Berms shall be maintained by the consent holder until new owners take over maintenance.

Landscape planting shall meet the following standards:

- a) Opportunities for road/street landscaping shall be taken where possible to improve the visual amenity of the district. Landscaping shall be designed to meet the following objectives:
 - i. Functional (provide a sense of separation between the road and the footpath);
 - ii. Aesthetic (frame views);
 - iii. Emphasise landscape features;
 - iv. Soften hard surfaces;
 - v. Enhance aesthetic values; and
 - vi. Road contaminant filtration.
- b) Trees and garden plantings shall be located as to not compromise the integrity and efficient operation of infrastructure services nor reduce sight distance at access crossings and intersections.
- c) The minimum planting size of a landscape tree is 1.5m high with a maximum mature trunk diameter of 100mm unless the local conditions require alternatives.
- d) Species are to be selected in accordance with Council's planting policy and register of suitable species. All plants used shall be healthy, vigorous and free of any defects that may be detrimental to plant growth and development. Council requires the use of locally sourced native species where appropriate.
- e) Street trees are to be provided on service free berms or paved areas within the inner CBD area, as appropriate.
- f) Trees shall be planted using an approved root barrier system.

- g) Street trees planted within pavement areas of the CBD shall be provided in accordance with Council's Reserve Policy document.
- h) Trees in infiltration swales and detention areas shall require specific requirements as to root structure and ability to absorb water and growth in varied climatic conditions.
- i) Rain gardens, kerb cut outs and permeable paving will require specific design including maintenance requirements by appropriately qualified personnel.

6.7 Signs and Road/Streetlighting

6.7.1 Signage

The following standards apply to road/street signage:

- a) When submitting the subdivision plan, the Developer shall where a new road/street is to vest with Council, provide a list of at least three suggested road/street names, with alternatives, including any supporting information and background for the preferred choices. (Note – Council will not allow the same names as others used within our district or in Nelson city).
- b) Road/street names and numbers shall be shown on engineering plans and as-built plans. All road signs and markings shall also be shown on the engineering/as built plans.
- c) This shall apply to walkways and common accessways which shall incorporate the word "Way" on the sign.
- d) The Designer shall adhere to the true definitions of road/street descriptions, ie, avenue, drive, crescent etc.
- e) The Designer will be advised of the name(s) that have been approved by Council in terms of its policy and shall be required to pay the prescribed fee. This fee shall cover the administration, supply and erection of a standard road/street name plate, as undertaken by Council's contractor.
- f) In a rural road environment, the rural addressing number will also be included on the sign.
- g) Road signs shall be blue with lower case white reflective lettering and arrow at the direction end. The sign height will be a minimum of 2.5m from the ground level.
- h) If the Designer wishes to incorporate special signs, these shall be in addition to the standard name plate, and be subject to specific approval by Council and LTO agreement.
- i) Supply and erection of any special sign and private signs approved by Council on road reserve will be the responsibility of the Designer. Council has no responsibility to maintain special signs and structures, other than the standard sign. If these special signs and structures, if located on road reserve, fall into disrepair, they may be removed.

- j) All new roading within a subdivision shall incorporate road marking, signage, road signs and delineation to Manual of Traffic Signs and Markings (MOTSAM) Standards (Transit New Zealand/Land Transport New Zealand document).
- k) Regulatory speed signs shall be provided for all new roads where appropriate.
- l) “No Exit” shall be included on all name blades for roads where applicable.

6.7.2 Street Lighting

Pedestrian street lighting shall be provided for traffic and personal safety reasons. Section 10.3 of these standards sets out the Council’s requirements for the provision of street lighting.

6.8 Alternative Assessment Framework (where appropriate)

This section provides guidance to applicants and Council when considering any road network design that does not meet one or more of the conventional standards set out in Appendix 6.2 of this document.

For every road network design proposal, Council reserves the right to require additional control measures to ensure that the design objectives and requirements of Section 6.1.2.

6.8.1 General Information

A general outline of the proposed road design must be provided, addressing the following matters, where relevant:

- a) Describe the activities associated with the design and construction of the new road (eg, subdivision);
- b) Outline the zone, expected development density affecting the proposed road network, and road speed environment;
- c) Provide a copy of all relevant resource consents. This must include a copy of any discharge and/or land use consent conditions where they relate to the site and the requirement to provide a road network;
- d) Provide a site map showing the site, the road network, topographic features and TRMP Zone/Area requirements that apply to the site and the adjoining road network;
- e) Describe the proposed road design and construction method in general terms and/or the design philosophy underpinning the overall design, referencing best practise methods that have been used (eg, low impact design subdivision and development philosophies);
- f) Submit all road plans and construction details in accordance with standard specifications and the criteria in Section 2 to the Engineering Manager for approval.

6.8.2 Design Criteria

The applicant must provide Council with information to show that the design of the proposed road network is capable of achieving the objectives of section 6.1.2.

For the purpose of this document, a capable road network is one that will avoid traffic congestion, traffic safety risks, danger to pedestrians, cyclists and other road users, stormwater inundation or water quality contamination and access to other infrastructure services, and meets the following criteria:

- a) The proposed road is in an urban area and is an access road, or an access place, with a speed environment of 30km/hr;
- b) The proposed road is in a rural area and is an access road with a speed environment of 70km/hr and/or 50km/hr or access place with a speed environment of 30km/hr;
- c) The proposed road or road network provides an overall environment for access roads and access places that places a priority for a living environment.
- d) The road is located within Land Disturbance Area 1 of the TRMP or has shown that it can meet the requirements for earthworks and land disturbance in Land Disturbance Area 2;
- e) Where applicable to the particular road design, design geometrics comply with Austroads Rural Road Design, and NZS4404, and include vertical and horizontal road curvature, super-elevation for the rural environment, road gradient, carriageway cross fall, kerb lines, turning curves, berm slopes, and batters,
- f) The total carriageway surface is at least 5.5m wide as shown in Appendix 6-1
- g) The total road reserve area is at least 12.0m wide or as shown in Appendix 6-1;
- h) In an urban area, parking has been provided to a standard of five vehicles per 100.0m of road length within the road reserve, that is free of the carriageway, obstruction or impediment of any traffic flows, including intersections and crossings, or as otherwise approved by the Engineering Manager;
- i) All underground services are provided for within the road reserve, unobstructed for maintenance and upgrade works;
- j) Directly adjoining the carriageway there is at least 1.4m of roadside berm, free of services, level with or within 150mm above or below the carriageway surface at the centreline.
- k) Pedestrian access not less than 1.4m wide has been provided on at least one side of the road and shall be formed and constructed using a permanent surface and remote from the carriageway kerb and channel;
- l) All pedestrian crossings shall be able to accommodate prams, trolleys or mobility scooters, in accordance with Section 6.6.2.
- m) The layout of the roads and the intersections shall comply with the minimum intersection spacing for access roads and access places as detailed on TDC Drawing 602.
- n) Earthworks and subgrade preparation shall be in accordance with Section 5 or NZS4431 as applicable.

- o) The carriageway pavement has been designed to meet a minimum 25-year design period;
- p) The carriageway surface shall comply with the standards for access roads and access places as detailed in Appendix 6-1.
- q) A stormwater discharge consent has been obtained in accordance with the TRMP, and all relevant standards in Section 7 of the Engineering Standards have been met;
- r) The road design is consistent with all applicable subdivision, land-use and/or stormwater discharge consent conditions.
- s) A landscape and planting plan shall be submitted with the road layout plans and shall be designed in accordance with the principles as detailed in Section 6.6.3.

6.8.3 Design Specifications

The applicant must provide information to Council outlining detailed specifications of the proposed design. The following information must be submitted to Council where applicable:

- a) Plans have been submitted to Council in accordance with Section 2 of this document;
- b) The specifications of all materials used in the design and construction of the road network has been submitted to Council;
- c) The method of construction for any proposed road or network has been provided, including construction techniques and maintenance requirements.

Note: Council reserves the right to request additional information to satisfy itself that the proposed road design and construction can meet the objectives of section 6.1.1.

6.8.4 Maintenance and Management

Information about what, when and how a proposed road network will be maintained to ensure its ongoing effectiveness in achieving stormwater management functions, must be submitted to Council at the time of application. This must include estimated costs of ongoing maintenance and address the following matters where they are applicable:

- a) A description of ongoing maintenance procedures required to ensure that the road network is maintained to avoid safety risks and nuisance concerns;
- b) Specification of any resource consent conditions, and description of how they will be achieved;
- c) Clearly defined ownership and management responsibilities for every part of the road network;
- d) Information to show efficient integration with existing network;
- e) Detailed maintenance requirements and costs for the life of the network;
- f) The replacement value of any part of the network..

Appendix 6-1: Road Design Standards and Private Access

Type	Speed Environment	Hierarchy	Volume Veh/day houses	Lane Widths	Cycle lane widths	Parking Widths/Shoulder	Total Carriage-way Width	Footpaths & Width	Berms		Res width Min	Max Grade	Street-lighting min	Stormwater Control	Pedestrian/pram Cross	Traffic Calming	Intersection Control/give way/stop	Min Carriageway Surface	Min clear zone from Carriageway
									Services	Landscape									
Residential/Commercial/Industrial Road Design																			
1 Residential	60k/hr and above	Arterial	>10,000 Veh/day	2 x 3.5 + 2.5 Flush med	2 x 1.5	2 x 2.0	16.5	2 x 2.0 away from kerb	2 x 1.5	2 x 1.5	26.5	1 in 20	12.5m poles Luminaire 150w son T, V3	K/C both sides	1.5m wide +Tactiles	No	All	Asphaltic Concrete Friction course or similar	3
2 Residential	60k/hr and above	Distributor	1,000 to 10,000 Veh/day	2 x 3.5	2 x 1.5	2 x 2.0	14	2 x 2.0 away from kerb	2 x 1.5	2 x 1.5	24	1 in 8	12.5m poles Luminaire 150w son T, V3	K/C both sides	1.5m wide +Tactiles	No	All	Asphaltic Concrete	3
3 Residential	50 k/hr	Collector	500 to 1,000 Veh/day	2 x 3.0	2 x 1.5	2 x 2.0	13	2 x 1.4 away from kerb	2 x 1.5	2 x 1.5 adj to kerb	21.8	1 in 8	10.5m poles luminaire 110w son-T,V4	K/C both sides	1.5m wide +Tactiles	No	All	2-coat chip, turning heads asphalt	2
Commercial/Industrial								Com/Ind 2 x 3.0		N/A								N/A	
4 Residential	30 k/hr	Access Road	30 to 50 house lots	2 x 3.0	N/A	1 X 2.0	8	2 x 1.4 away from kerb	2 x 1.5	2 x 1.5 adjacent to kerb	16.8	1 in 7	8.5m poles luminaire 70w son T, P3	K/C both sides	1.0m wide	Yes	All	2 coat chip turning heads Asphalt	2
5 Residential	25k/hr	Access Place	< 30 house lots	2 x 2.5	N/A	1 x 2.0	7	1 x 1.4 away from kerb	2 x 1.0	1 x 1.0	11.4	1 in 7	8.5m poles luminaire 70w son T, P3	K/C both sides	1.0m wide	Yes	At TDC discretion	2 coat chip turning heads Asphalt	2
6 Residential Richmond Sth (Var 49&50)	25 k/hr	Access Place	2<50 house lots	2 x 2.5	N/A-	1 x 2.0	7	1 x 1.4 away from kerb	2 x 1.5	2 x 1.5	18.0	1 in 7	5.0m poles luminaire 70 w son T, P3	Mountable kerb + 3.6m swales	1.0m wide	Yes	All	Asphaltic concrete	2
7 Residential Richmond Sth (Var 49&50)	25 k/hr	Lane (see Note 24)	<26 house lots	2 x 2.5	N/A	N/A	5.0	1 x 1.4 away from kerb	2 x 1.0	2 x 1.0	12	1 in 6	5.0m poles luminaire 70 w son T, P3	Mountable kerb + 1.6m swales	1.0m wide	Yes	All	Asphaltic concrete	2
8 Residential steep hillsides>20 deg	25k/hr	Access Place	< 30 house lots	2 x 2.5	N/A	1 x 2.0	7	1 x 1.4 adj K & C, downhill side	1 x 1.0	N/A	9.4 plus batters	1 in 7	8.5m poles luminaire 70w son T, P3	K/C both sides	1.0m wide	Yes	At TDC discretion	2 coat chip turning heads Asphalt	2
Rural Road Design																			
9 Rural	100k/hr	Arterial	1500 Veh/day and above	2 x 3.5	2 x 1.5 sealed	2 x 1.5 metal shoulders	13	N/A	2 x side drains and batters	N/A	20	1 in 8	Flag light at intersections Flangible Base	water table and side drains	N/A	No	All	2 coat chip seal	3
10 Rural	100 k/hr	Distributor road	750 to 1500 Veh/day	2 x 3.25	N/A	2 x 1.0 metal shoulders	8.5	N/A	2 x side drains and batters	N/A	20	1 in 8	Flag light at intersections Flangible base	water table side drains	N/A	No	All	2 coat chip seal	3
11 Rural Rural character	70k/hr	Collector Road	500 V/d or >60 house lots	2 x 3.0	N/A	2x600mm metal shoulders	7.2	1 x 1.4	2 x side drains and batters	N/A	20	1 in 8	Flag light at intersections Flangible Base	Water table side drains	N/A	Yes	All	2 coat chip seal	2
12 Rural/residential Residential character	70k/hr	Access Road	Below 500 V/d or +>60 house lots	2 x 3.0	N/A	2x600mm metal shoulders	7.2	1 x 1.4	2xgrassed swales & batters	N/A	20	1 in 7	Flag light at intersections Flangible Base	Water table side drains	N/A	Yes	All	2 coat chip seal	2
13 Rural/residential Residential character	50k/hr	Access road	20 to 60 house lots	2 x 3.0	N/A	2 x 600 Grassed	7.2	1 x 1.4	2xgrassed swales & batters	N/A	18	1 in 7	P3	subsoils under grassed swale/K& C	N/A	Yes	All	2 coat chip seal	2
14 Rural/residential Residential character	30k/hr	Access Place	7 to 19 house lots	2 x 2.5	N/A	2 x 600 Grassed	6.2	1 x 1.4	2 x grassed swales and batters	N/A	18	1 in 7	P3	subsoils under grassed swale/K& C	N/A	Yes	All	2 coat chip seal	2
15 Rural, Forestry, Farming (Non Residential)	30 to 70k/hr	Access Place	7 to 19 lots	2 x 3.0	N/A	2 x 600mm metal shoulders	7.2	N/A	2 x side drains and batters	N/A	16	1 in 7	P3	Water table side drains	N/A	No	All	Compacted Base/running course,	2

Appendix 6 continued Road Design Standards and Private Access

Private ROW/ACCESS Design

Type	Speed Environment	Hierarchy	Volume Veh/day house	Lane Widths	Cycle lane widths	Parking Widths/Shoulder	Total Carriage-way Width	Footpaths & Width	Berms	Res width Min	Max Grade	Street-lighting min	Stormwater Control K/C or approved	Pedestrian/ pram Cross	Traffic Calming	Intersection Control/give /stop	Min Carriageway Surface	Min clear zone from Carriageway	
16 Private ROW Residential	Residential 10k/hr	ROW urban	5-6 users	5	N/A	N/A	5	N/A	N/A	N/A	6	1 in 6	N/A	N/A	No	N/A	2 coat chip seal	N/A	
17 Private ROW Residential	Residential 10 k/hr	ROW urban	2-4 users	3.5	N/A	N/A	3.5	N/A	N/A	N/A	4	1 in 5	N/A	K/C or approved	N/A	No	N/A	2 coat chip seal 1 in 4.5-5 - concrete	N/A
18 Private sole user residential	Residential 10 k/hr	Urban Access leg	1 user	3	N/A	N/A	3	N/A	N/A	N/A	3.5	1 in 4 Concrete Flatter than 1 in 5 unsealed	N/A	Not to effect adjoining owner	N/A	No	N/A	1 in 4 to 5 Concrete > 1 in 5 Compacted Basecourse	N/A
19 Private ROW Rural & Rural/Residential	Rural 10k/hr	ROW rural	2-6 users	4.5	N/A	2 x 500mm metal shoulders	5.5	N/A	2 x 1.0m side drains	N/A	7.5	1 in 5 Flatter than 1 in 6 unsealed	N/A	side drains to approved outfall	N/A	No	N/A	1 in 5-6 sealed. >1 in 6 Compacted Base/Running course	N/A
20 Private sole user Rural	Rural 10k/hr	Rural Access leg	1 user	3.5	N/A	N/A	3.5	N/A	2 x 1.0m side drains	N/A	5.5	1 in 4 Concrete Flatter than 1 in 5 unsealed	N/A	Not to effect adjoining owner	N/A	No	N/A	Compacted Base/Running course	N/A
21 Industrial private	Private	ROW industrial	<50HCV &<1000vpd and/or up to 10,000m2	2 x 3.0	N/A	1 x 2.5	8.5	1 x 1.4	0.6	N/A	10.5	1 in 8	N/A	K/C or approved	1.5m	No	N/A	2 coat chip seal	N/A
22 Central business Commercial Tourist services	Private	Access lane	1-6 users	4.5	N/A	N/A	4.5	N/A	1 x 1.5	N/A	6.0	1 in 8	N/A	K/C or approved	N/A	No	N/A	2 coat chip seal	N/A

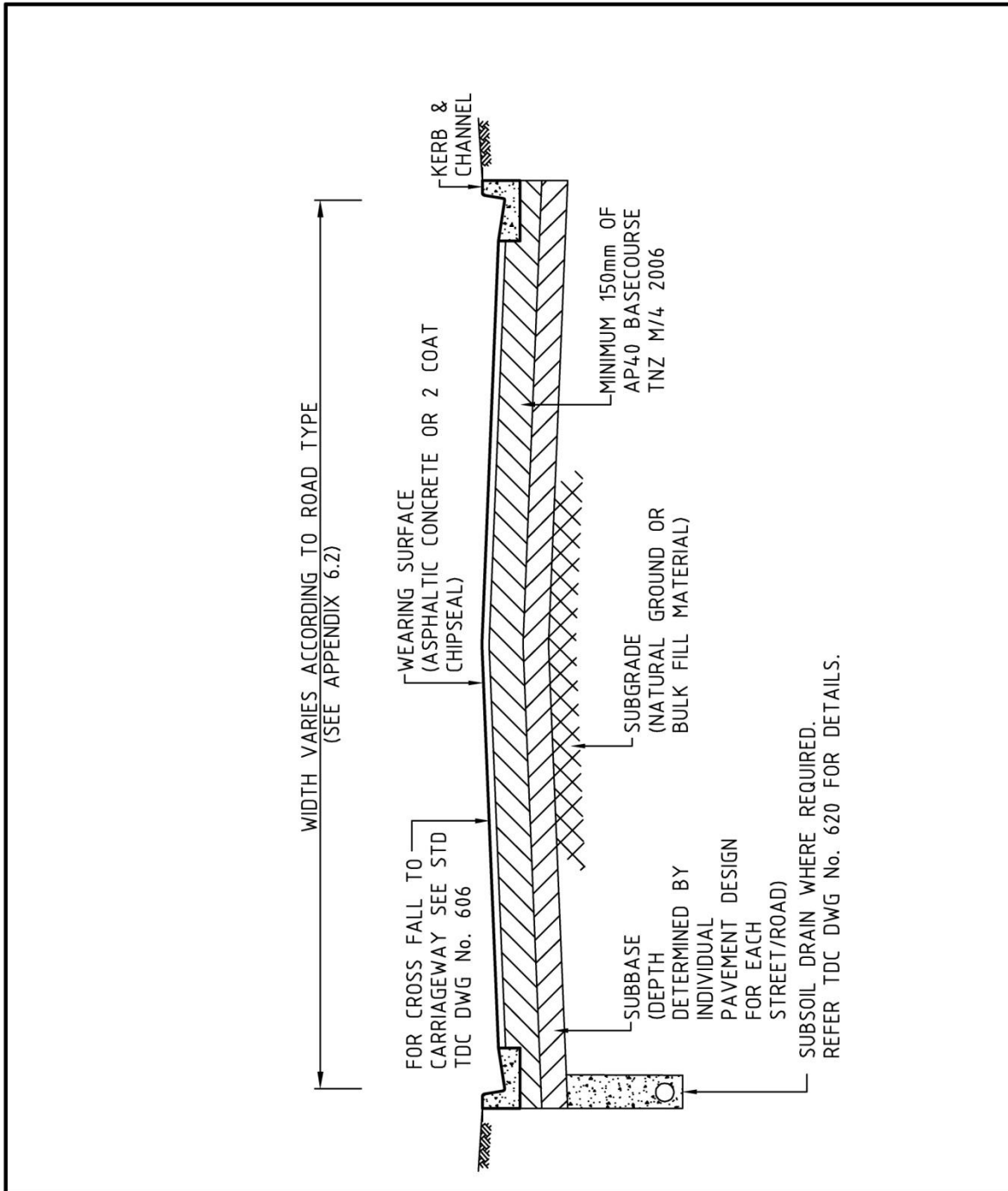
Notes; One household unit equates to approximately 10 VPD in urban/rural-residential zones
See list of notes relevant to the appropriate road type, Appendix 6-2 notes

Appendix 6-1 *continued* – Road Design Standards and Private Access (Notes)

Note 1	Additional road reserve width shall be provided to: Accommodate any retaining structure or slope necessary to support the road or adjacent property; Achieve a complying horizontal alignment; and Accommodate any turning area required by Note 5.
Note 2	For each side of the road where kerb and channel is provided, a 2.0m parking lane shall be required instead of a 0.5m unsealed shoulder. The berm may also be reduced to 1.0m.
Note 3	In residential areas the number of potential household units shall be based on the relevant minimum allotment size as in the Residential Zone Rules, or the actual number of household units proposed, whichever is the greatest. “Veh/day” means vehicles per day
Note 4	Passing bays shall be provided on accesses in all zones. Passing bays may be incorporated in vehicle accesses to a site, eg, the vehicle entrance to a garage in commercial and industrial areas specific passing will be required to accommodate B trains. (Passing bay intervals and maximum lengths shall be as set out in Table 16.2A of the TRMP).
Note 5	An area shall be formed at the end of the cul-de-sacs shown in TDC Drawing 607 to allow turning.
Note 6	Steep hillside means where a road is formed on ground that has an average slope of greater than 20 degrees at right angles to the road.
Note 7	“Rural” means land zoned rural or rural-residential. “Comm” means the commercial zone and CBD. “Indust” means an industrial zone.
Note 8	All dimensions are in metres
Note 9	The width required for landscaping is a continuous strip adjacent to the footpath and free of other services.
Note 10	When determining the number of households served by a future road, an assessment shall be made on the re-subdivision of lots down to the minimum size lots for that zoning and the number of households totalled accordingly.
Note 11	All private access shall have a permanent surface for a minimum distance into the property from the legal boundary of the road and out to the sealed carriageway. (See TRMP Figure 16.2A for seal distance).
Note 12	The layout for services and landscaping shall be in accordance with the diagrams included in the TDC Engineering Standards and Policies.
Note 13	Where a road or access serves land in more than one zone, the requirements for footpaths and berms on each side of the road or access shall be the maximum required for any of the adjoining zones.
Note 14	Street lighting poles shall comply with TDC street lighting policy. Only approved decorative alternative poles can be used. Cul-de-sac lighting pole heights and spacing can be varied but must comply with standards. All lighting shall comply with NZS6701 and AS/NZ 1158 or other TDC-approved alternatives. Pole spacing shall be 45.0m to 50.0m, except for arterial or principal, which require specific design. (See section 10.3.3) for specific design for rural residential roads).

Note 15	<p>Any street within the Richmond CBD area bordered by and including Gladstone Road, McGlashen Avenue, Talbot Street, Salisbury Road and Oxford Street, shall be surfaced in asphaltic concrete.</p> <p>Any street within the Motueka CBD area including parts of High Street, Greenwood Street, Pah Street, Wallace Street and Tudor Street shall be surfaced in asphaltic concrete.</p> <p>Any street within the Takaka CBD area including parts of Commercial Street shall be surfaced in asphaltic concrete.</p>
Note 16	<p>Developers may apply for consent from Council to construct a “gateway entrance” to the subdivision. Council accepts no responsibility for maintenance of assets and reserves the right to remove those assets if they deteriorate due to lack of maintenance. Residents of a street can maintain the “gateway entrance” as a private asset (LTO required) on road reserve. Any lighting shall be at the expense of the residents as well as any landscaping and water usage/metering thereof.</p>
Note 17	<p>Road hierarchy is determined by the function the road serves in the network. The traffic volume is used as an indicative guide.</p>
Note 18	<p>Cycleways on collector roads may be omitted on reconstruction of existing roads at Council discretion. All other roads shall meet the requirements of the Regional Land Transport Strategy and Regional Cycling and Walking Strategy.</p>
Note 19	<p>On private ROW, the minimum radius on horizontal curves shall be 30.0m and also comply with safe sight stopping distances.</p>
Note 20	<p>Footpaths on rural and rural/residential roads shall be located a minimum distance of 1.0m away from the outside edge of the shoulder and formed with a minimum 2-coat chip seal with edge supports.</p>
Note 21	<p>For rural/residential character roads, the shoulders may be replaced with concrete edge restraint. The road reserve adjacent to the edge restraint will usually be a gentle grassed (see TDC Drawing 620) and well compacted/geogrid drainage swale no steeper than 1-in-20 longitudinally.</p>
Note 22	<p>Private ROWs with rural/residential character roads shall be sealed and in landscape sensitive areas, shall be limited to the lengths as set out in 16.2A of the TRMP.</p>
Note 23	<p>The minimum road reserve width as shown in Appendix 6-2 may be required to be enlarged to accommodate swales or vegetated gardens where low impact designs or streetscaping are proposed, ie, see type 6 road.</p>
Note 24	<p>Road type 7 “lane” has been placed in the hierarchy in lieu of a private right-of-way. Therefore properties that have access via “lane” shall also have their main frontage to an alternative legal road.”</p>

Drawing 600 – Typical cross section urban carriageway



TYPICAL CROSS SECTION
URBAN CARRIAGEWAY



ASSET MANAGEMENT ENGINEERING

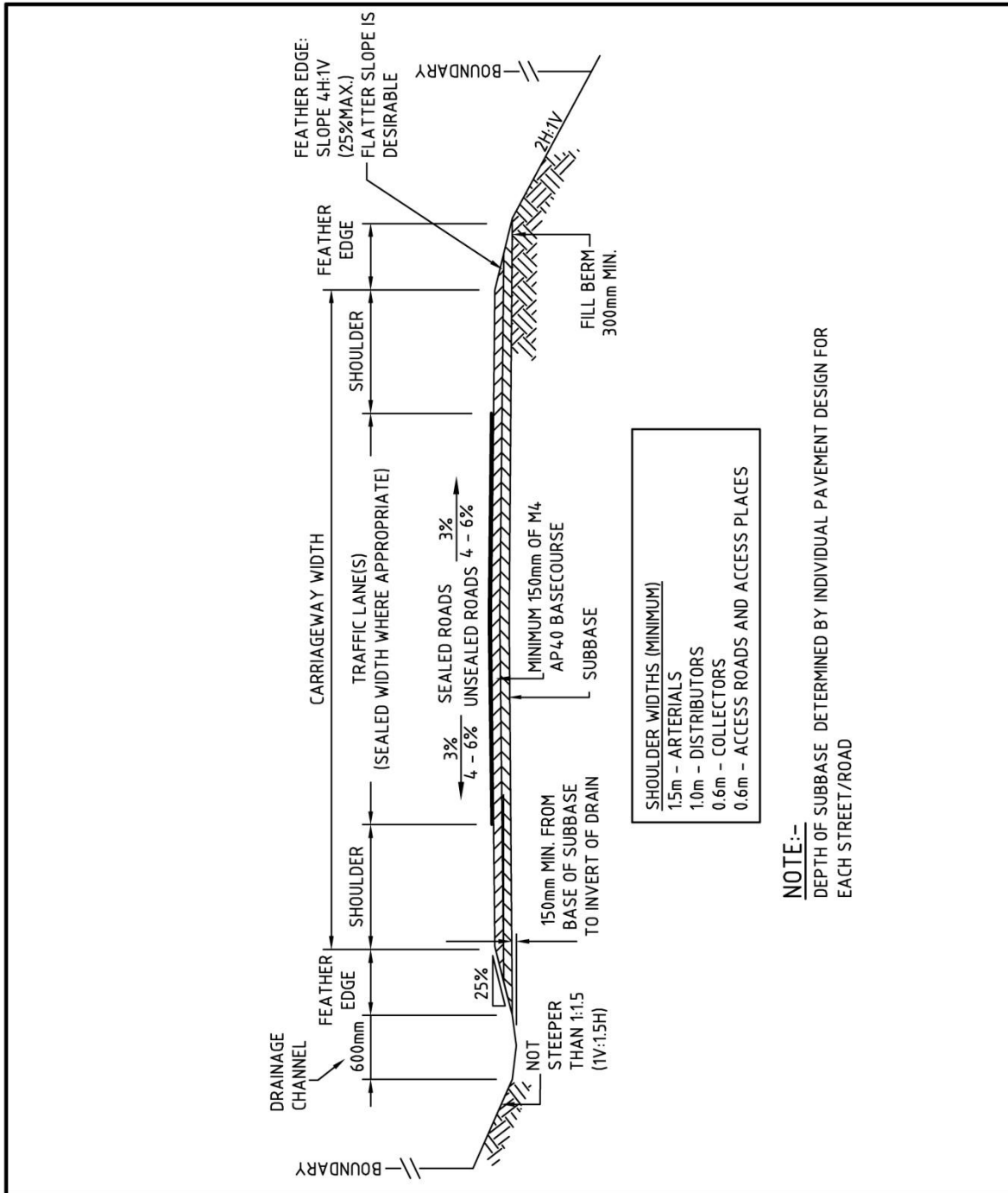
DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

600

Drawing 601 – Typical cross sections rural carriageway



TYPICAL CROSS SECTIONS
RURAL CARRIAGEWAY



ASSET MANAGEMENT ENGINEERING

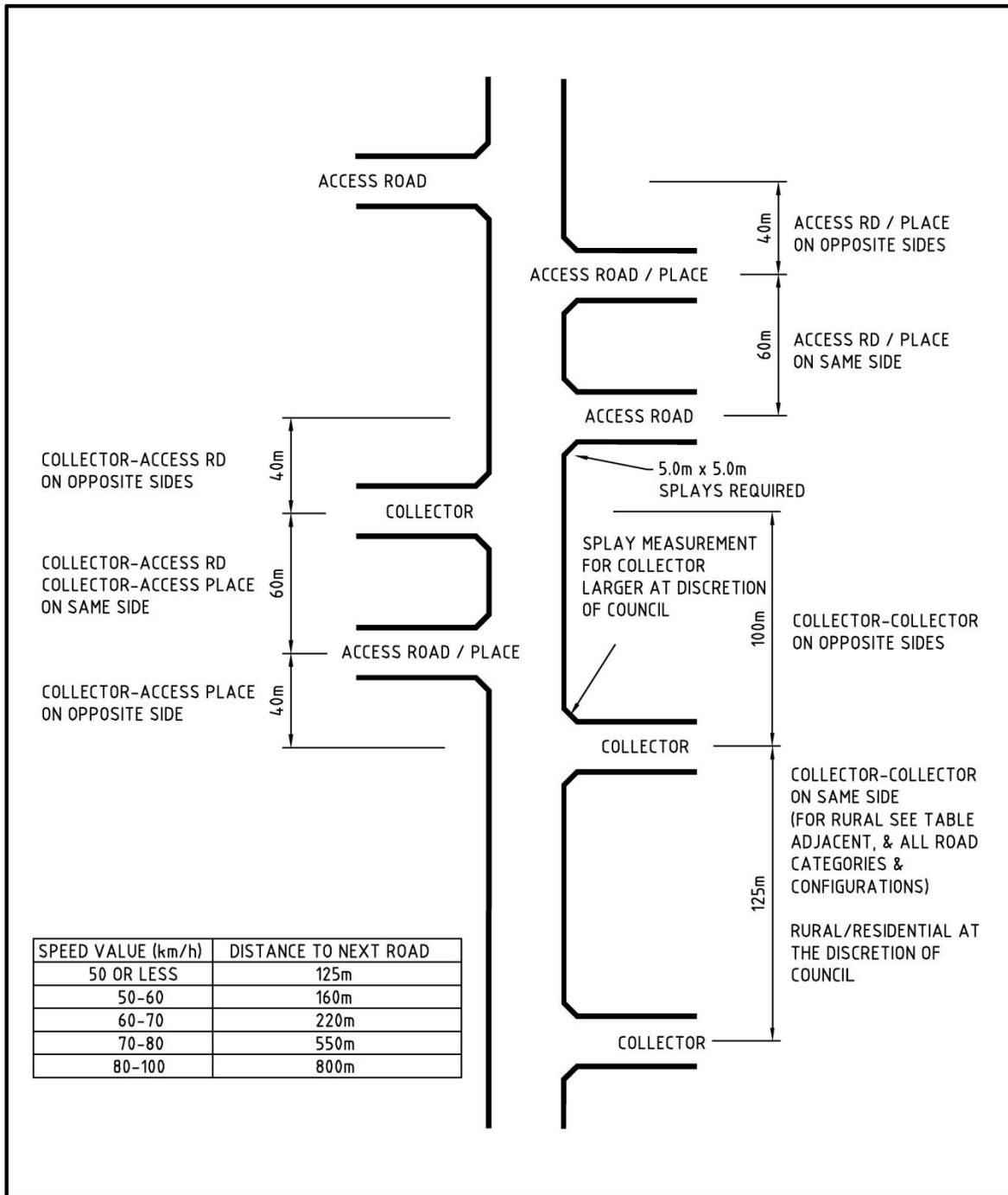
DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER


NOVEMBER 2013
DATE

601

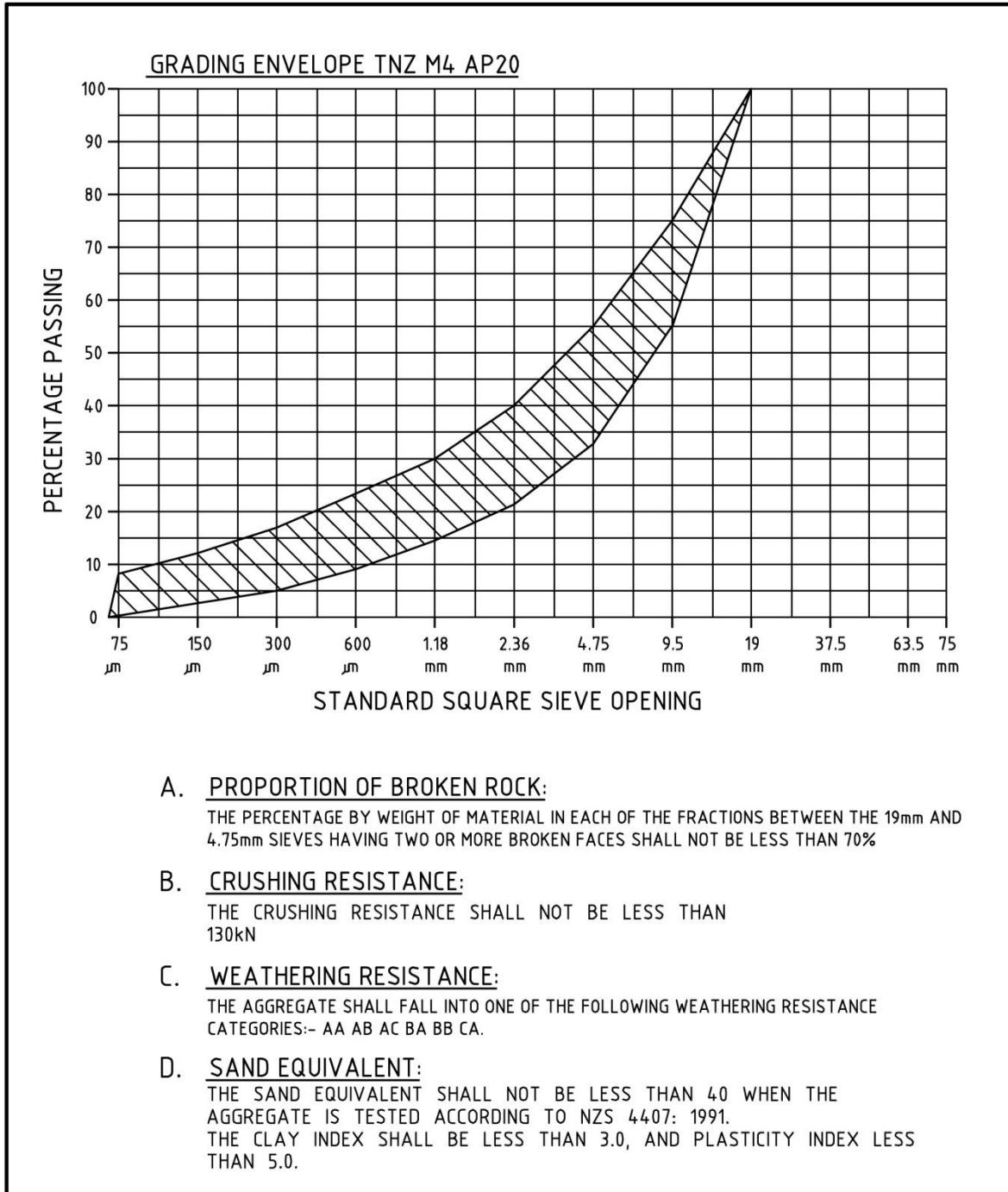
Drawing 602 – Minimum intersection spacing for collectors, access places, access roads, urban and rural




SPEED VALUE (km/h)	DISTANCE TO NEXT ROAD
50 OR LESS	125m
50-60	160m
60-70	220m
70-80	550m
80-100	800m

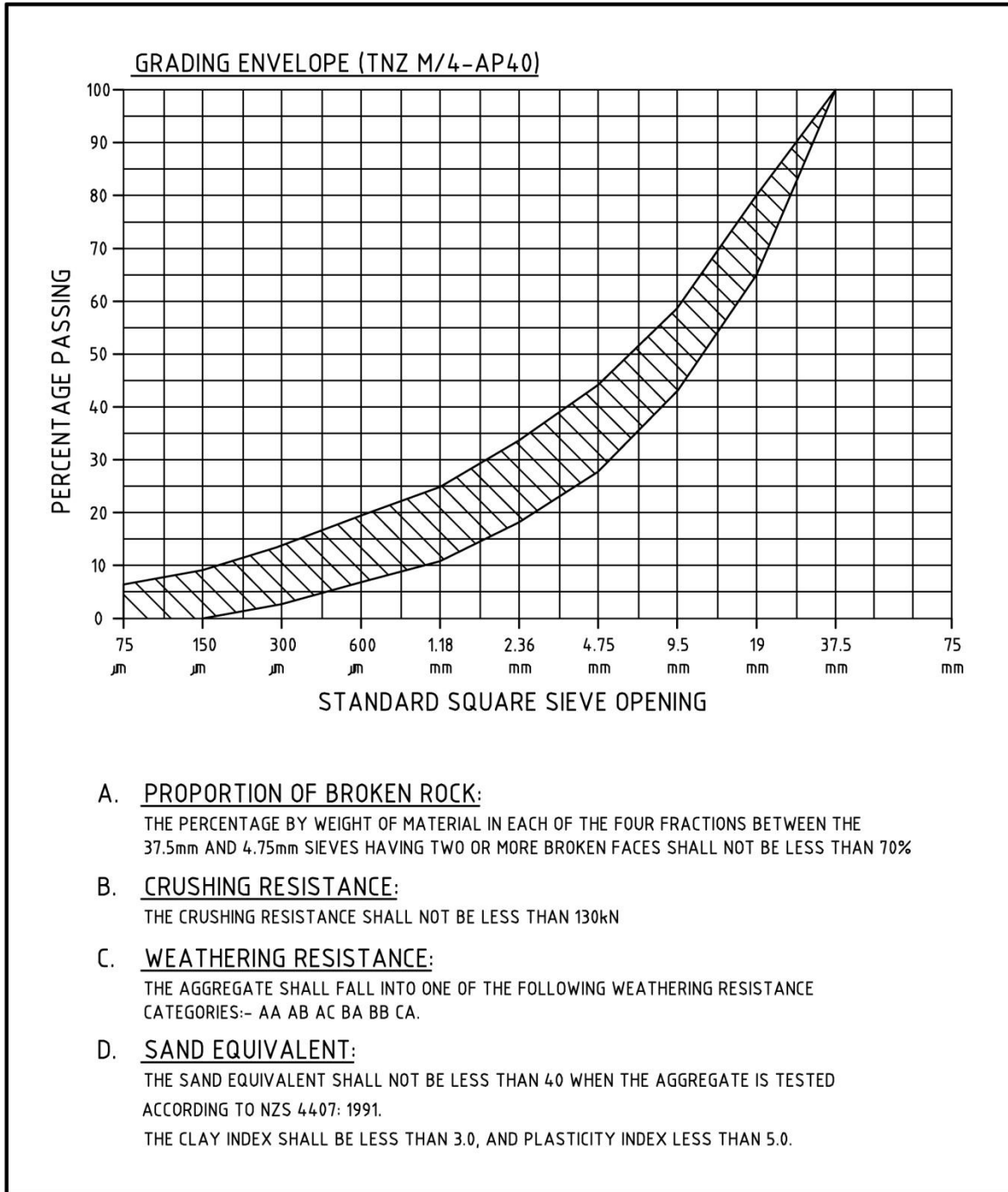
	MINIMUM INTERSECTION SPACING FOR COLLECTORS, ACCESS PLACES, ACCESS ROADS, URBAN & RURAL	
	<p style="text-align: center; margin: 0;">ASSET MANAGEMENT ENGINEERING</p> <p style="margin: 0;">APPROVED <i>[Signature]</i></p> <p style="text-align: center; margin: 0;">ENGINEERING MANAGER</p>	<p style="margin: 0;">DRAWING No.</p> <p style="text-align: center; font-size: 24px; margin: 0;">602</p>

Drawing 603 – 20mm 4 Basecourse Aggregate




	20mm M4 BASECOURSE AGGREGATE	
	<p style="text-align: center;">ASSET MANAGEMENT ENGINEERING</p> <p>APPROVED <i>[Signature]</i> ENGINEERING MANAGER</p>	<p>DRAWING No.</p> <p style="font-size: 24px; text-align: center;">603</p>

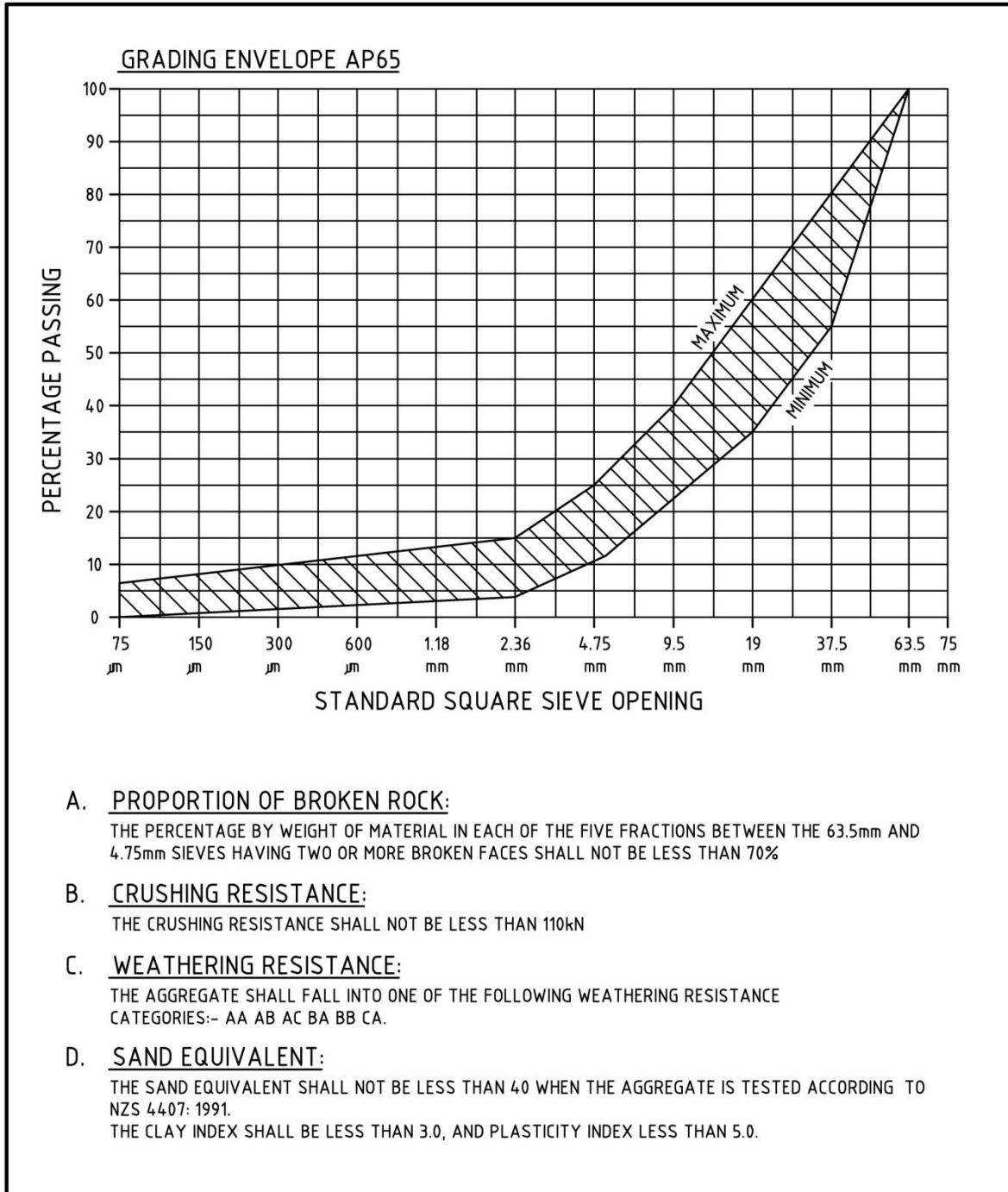
Drawing 604 – 40mm M4 Crushed basecourse aggregate




- A. PROPORTION OF BROKEN ROCK:
THE PERCENTAGE BY WEIGHT OF MATERIAL IN EACH OF THE FOUR FRACTIONS BETWEEN THE 37.5mm AND 4.75mm SIEVES HAVING TWO OR MORE BROKEN FACES SHALL NOT BE LESS THAN 70%
- B. CRUSHING RESISTANCE:
THE CRUSHING RESISTANCE SHALL NOT BE LESS THAN 130kN
- C. WEATHERING RESISTANCE:
THE AGGREGATE SHALL FALL INTO ONE OF THE FOLLOWING WEATHERING RESISTANCE CATEGORIES:- AA AB AC BA BB CA.
- D. SAND EQUIVALENT:
THE SAND EQUIVALENT SHALL NOT BE LESS THAN 40 WHEN THE AGGREGATE IS TESTED ACCORDING TO NZS 4407: 1991.
THE CLAY INDEX SHALL BE LESS THAN 3.0, AND PLASTICITY INDEX LESS THAN 5.0.

	40mm M4 CRUSHED BASECOURSE AGGREGATE	
	<p style="text-align: center; margin: 0;">ASSET MANAGEMENT ENGINEERING</p> <p style="margin: 0;">APPROVED <i>[Signature]</i></p> <p style="text-align: center; margin: 0;">ENGINEERING MANAGER</p>	<p style="margin: 0;">DRAWING No.</p> <p style="text-align: center; font-size: 24px; margin: 0;">604</p>

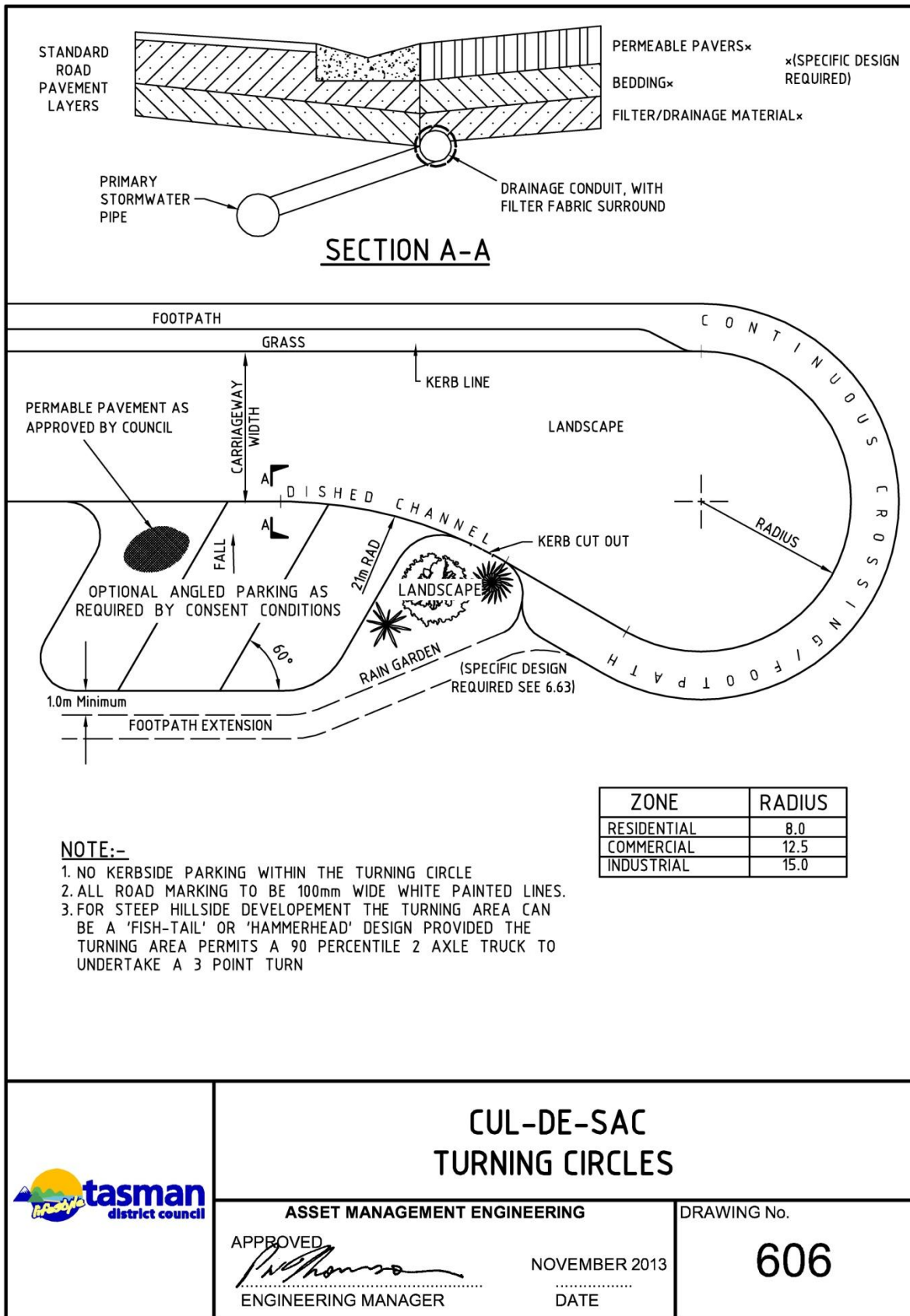
Drawing 605 – 65mm sub-basecourse aggregate



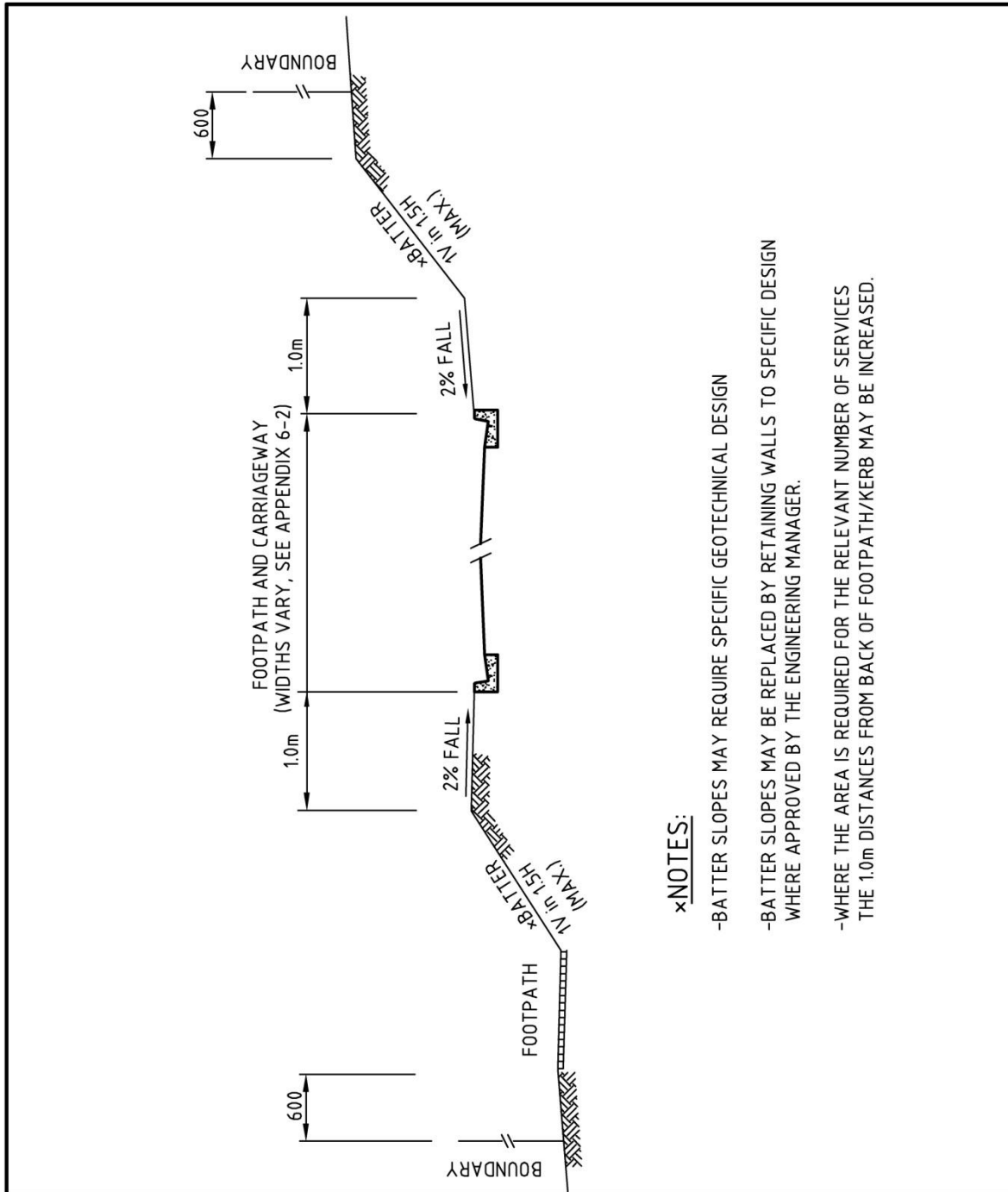
- A. PROPORTION OF BROKEN ROCK:
THE PERCENTAGE BY WEIGHT OF MATERIAL IN EACH OF THE FIVE FRACTIONS BETWEEN THE 63.5mm AND 4.75mm SIEVES HAVING TWO OR MORE BROKEN FACES SHALL NOT BE LESS THAN 70%
- B. CRUSHING RESISTANCE:
THE CRUSHING RESISTANCE SHALL NOT BE LESS THAN 110kN
- C. WEATHERING RESISTANCE:
THE AGGREGATE SHALL FALL INTO ONE OF THE FOLLOWING WEATHERING RESISTANCE CATEGORIES:- AA AB AC BA BB CA.
- D. SAND EQUIVALENT:
THE SAND EQUIVALENT SHALL NOT BE LESS THAN 40 WHEN THE AGGREGATE IS TESTED ACCORDING TO NZS 4407: 1991.
THE CLAY INDEX SHALL BE LESS THAN 3.0, AND PLASTICITY INDEX LESS THAN 5.0.

	65mm SUB-BASECOURSE AGGREGATE	
	<p style="text-align: center; margin: 0;">ASSET MANAGEMENT ENGINEERING</p> <p style="margin: 0;">APPROVED <i>[Signature]</i></p> <p style="text-align: center; margin: 0;">ENGINEERING MANAGER</p>	<p style="margin: 0;">DRAWING No.</p> <p style="text-align: center; font-size: 24px; margin: 0;">605</p>

Drawing 606 – Cul-de-sac turning circles



Drawing 607 – Typical cross sections roadside batters Types 9-12



***NOTES:**

- BATTER SLOPES MAY REQUIRE SPECIFIC GEOTECHNICAL DESIGN
- BATTER SLOPES MAY BE REPLACED BY RETAINING WALLS TO SPECIFIC DESIGN WHERE APPROVED BY THE ENGINEERING MANAGER.
- WHERE THE AREA IS REQUIRED FOR THE RELEVANT NUMBER OF SERVICES THE 1.0m DISTANCES FROM BACK OF FOOTPATH/KERB MAY BE INCREASED.

**TYPICAL CROSS SECTIONS
ROADSIDE BATTERS TYPES 9-12
(APPENDIX 6-2)**



ASSET MANAGEMENT ENGINEERING

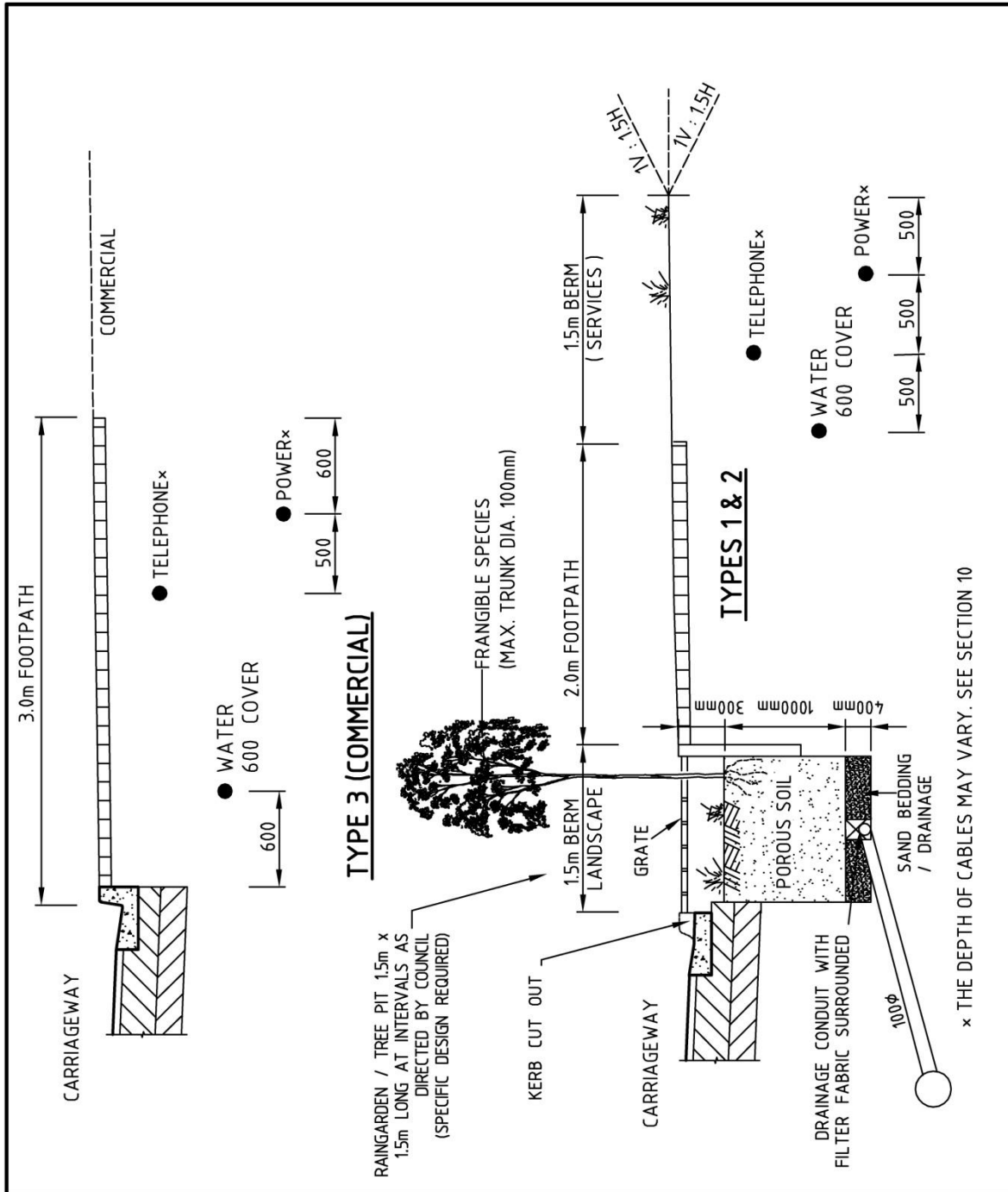
DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

607

Drawing 608 – Typical cross sections (berms) Type 1 & 2 roads & Type 3 commercial



TYPICAL CROSS SECTIONS (BERMS)
TYPE 1 & 2 ROADS & TYPE 3 COMMERCIAL



ASSET MANAGEMENT ENGINEERING

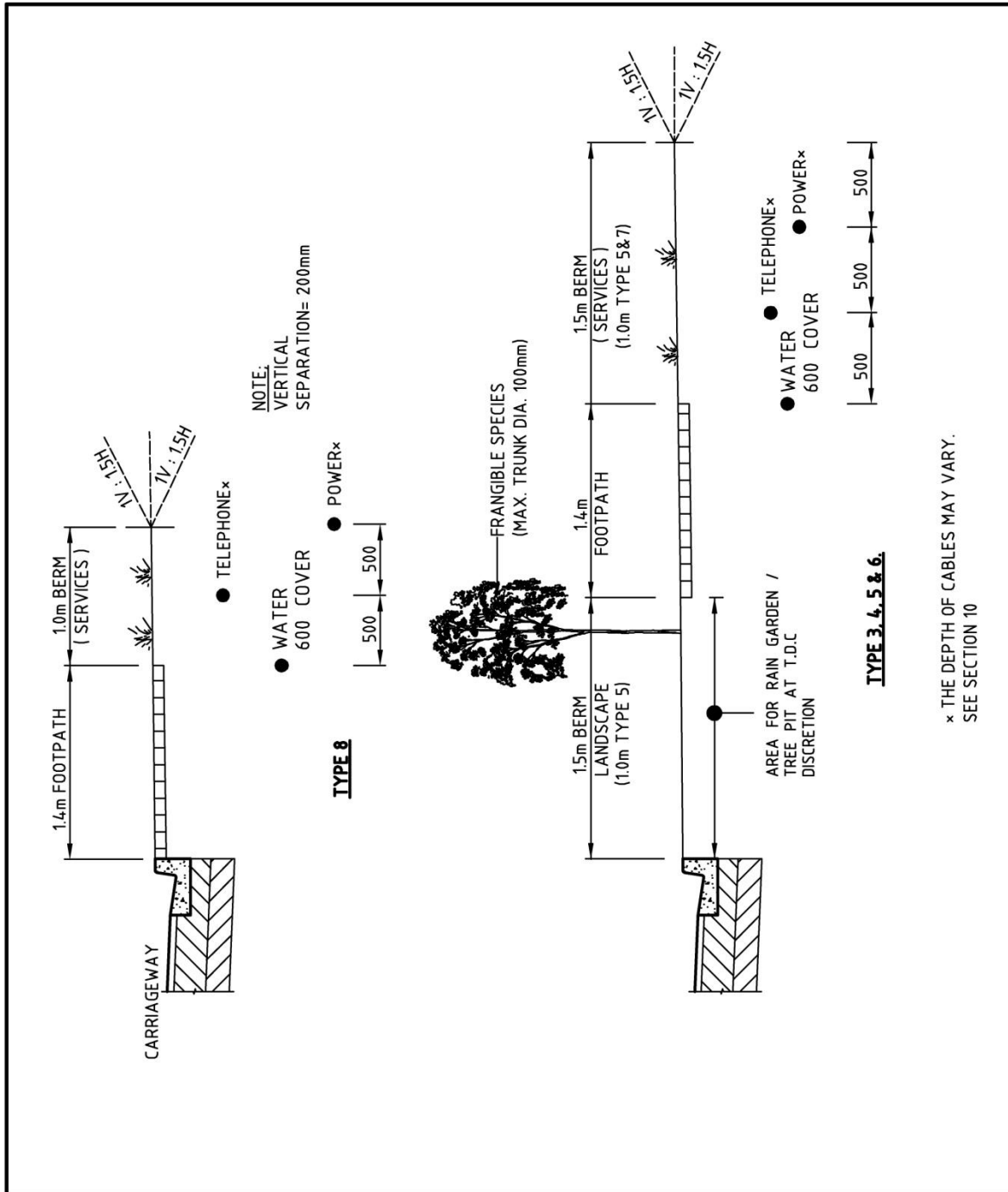
DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

608

Drawing 609 – Typical cross sections (berms) Type 3 to 8 roads



TYPICAL CROSS SECTIONS (BERMS)
TYPE 3 TO 8 ROADS



ASSET MANAGEMENT ENGINEERING

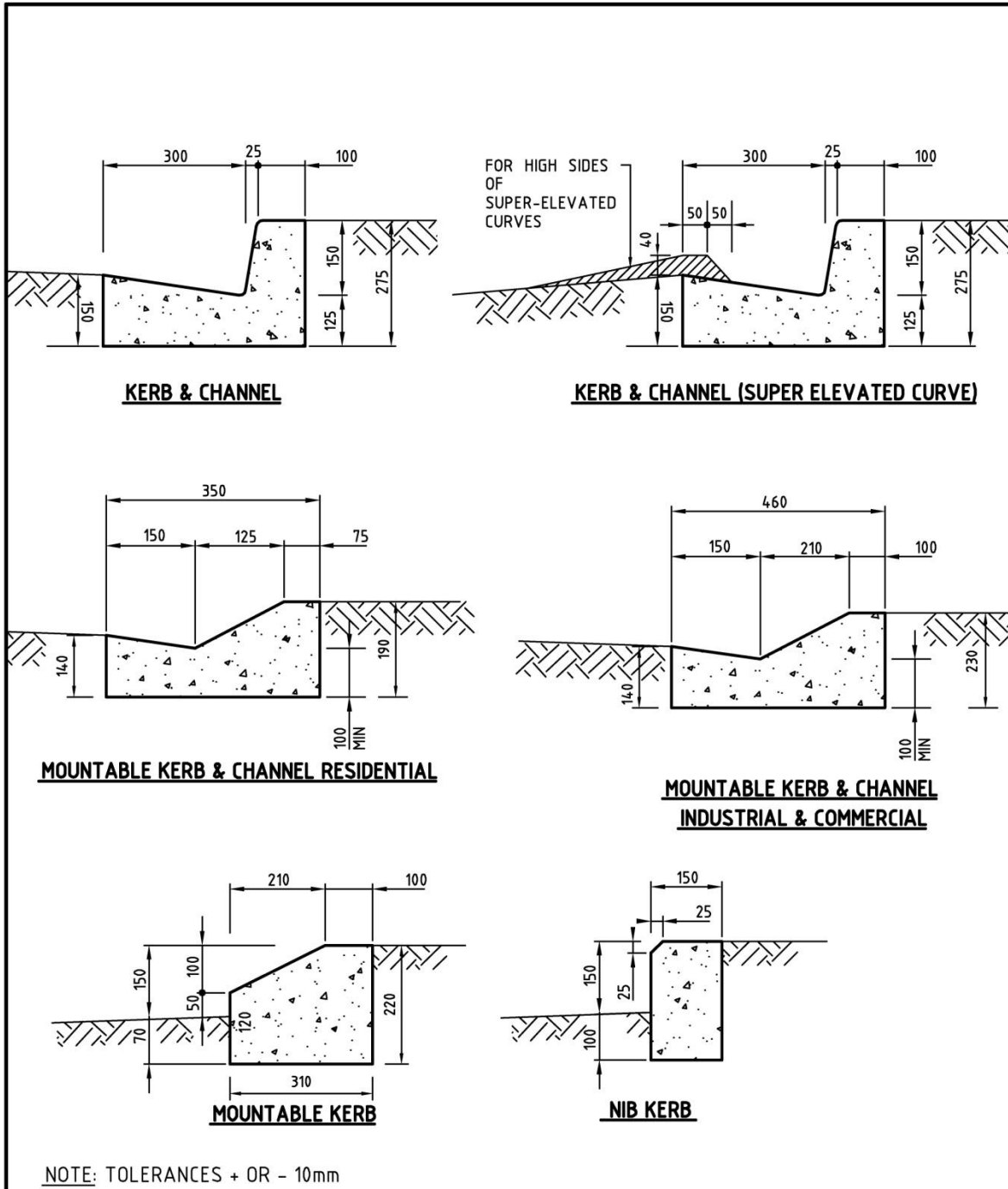
DRAWING No.


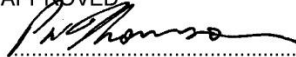
APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

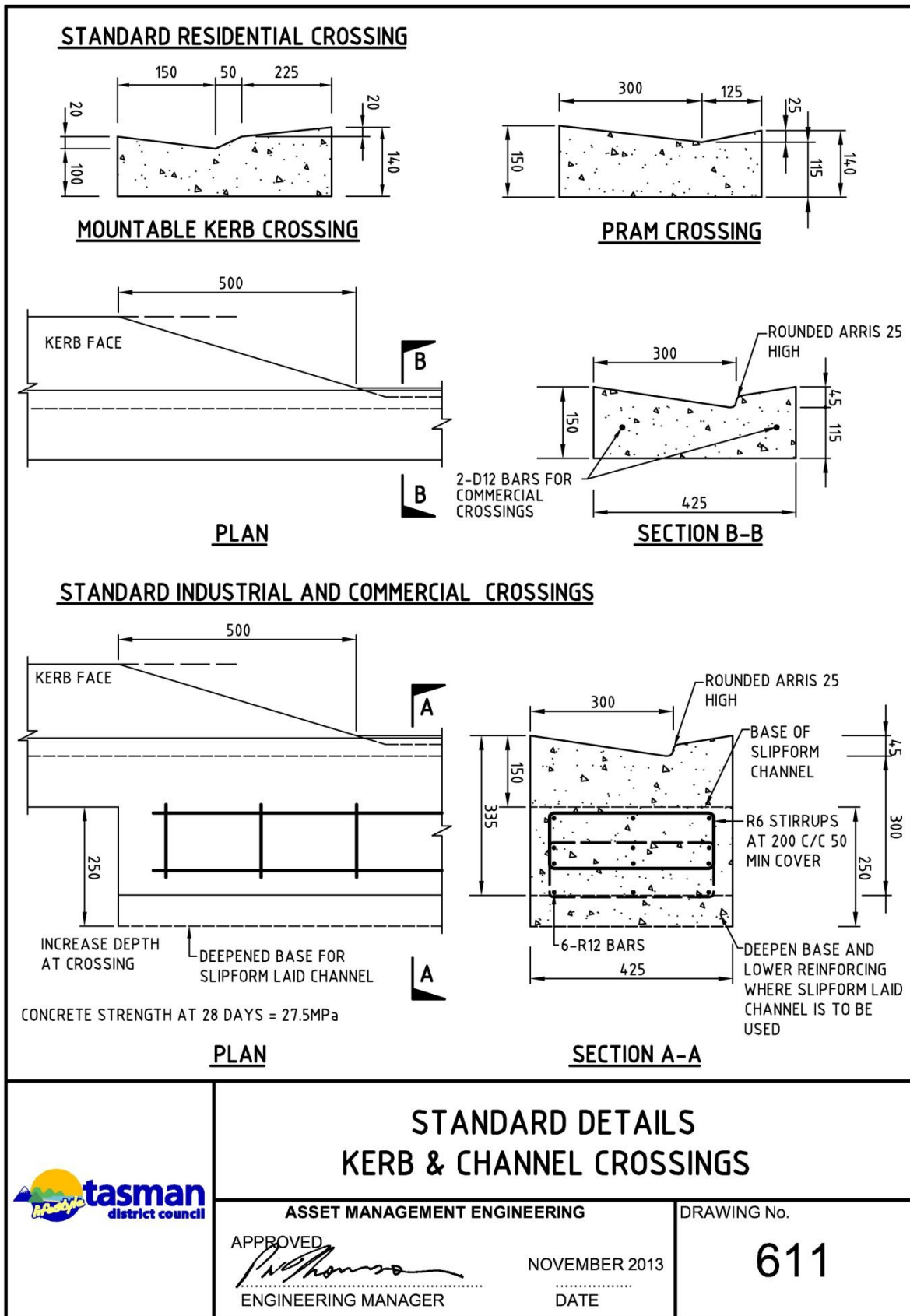
609

Drawing 610 – Standard details kerb and channel profiles

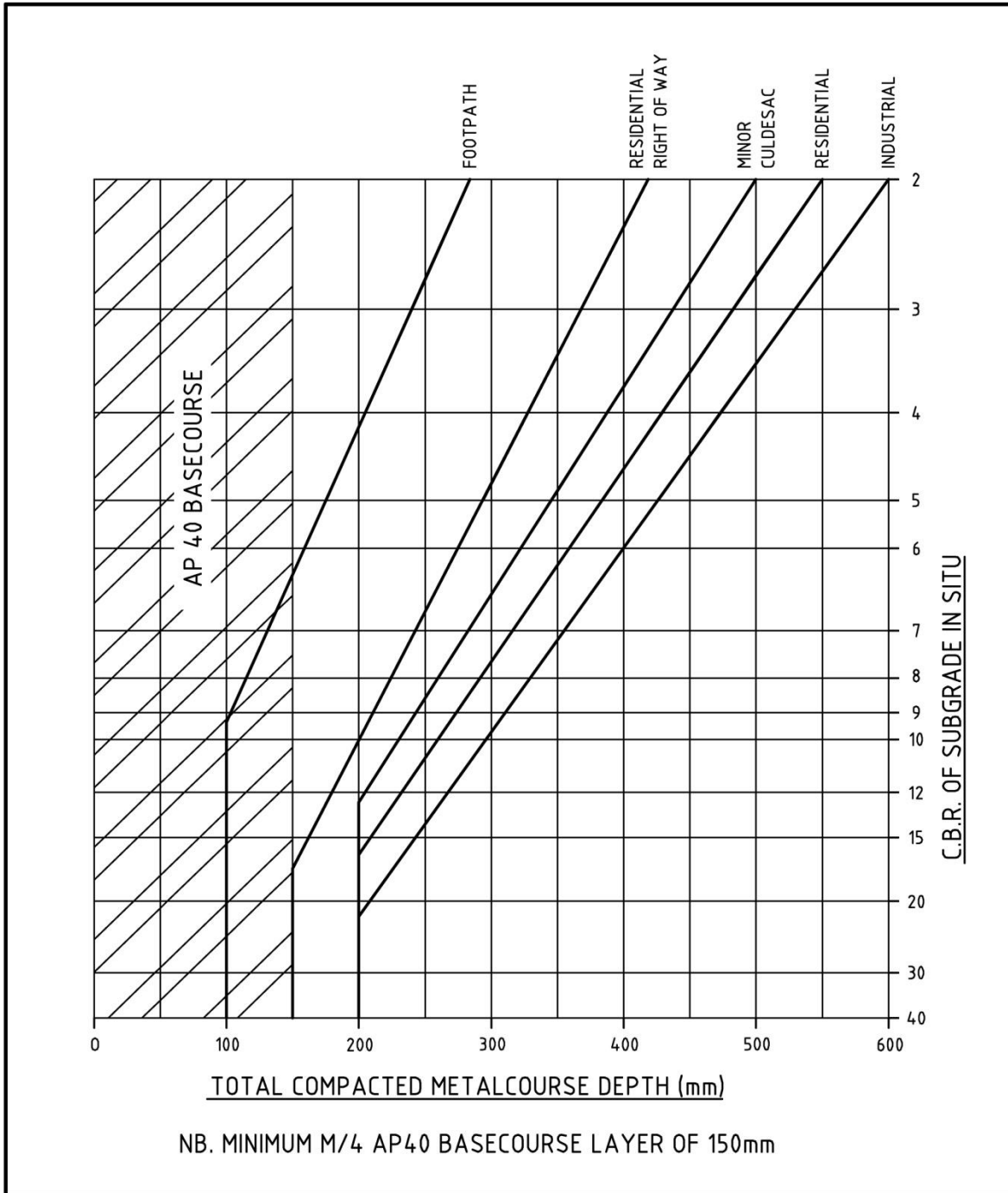



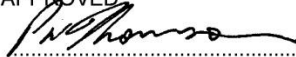
	STANDARD DETAILS KERB & CHANNEL PROFILES	
	ASSET MANAGEMENT ENGINEERING APPROVED  ENGINEERING MANAGER	NOVEMBER 2013 DATE

Drawing 611 – Standard details kerb and channel crossings

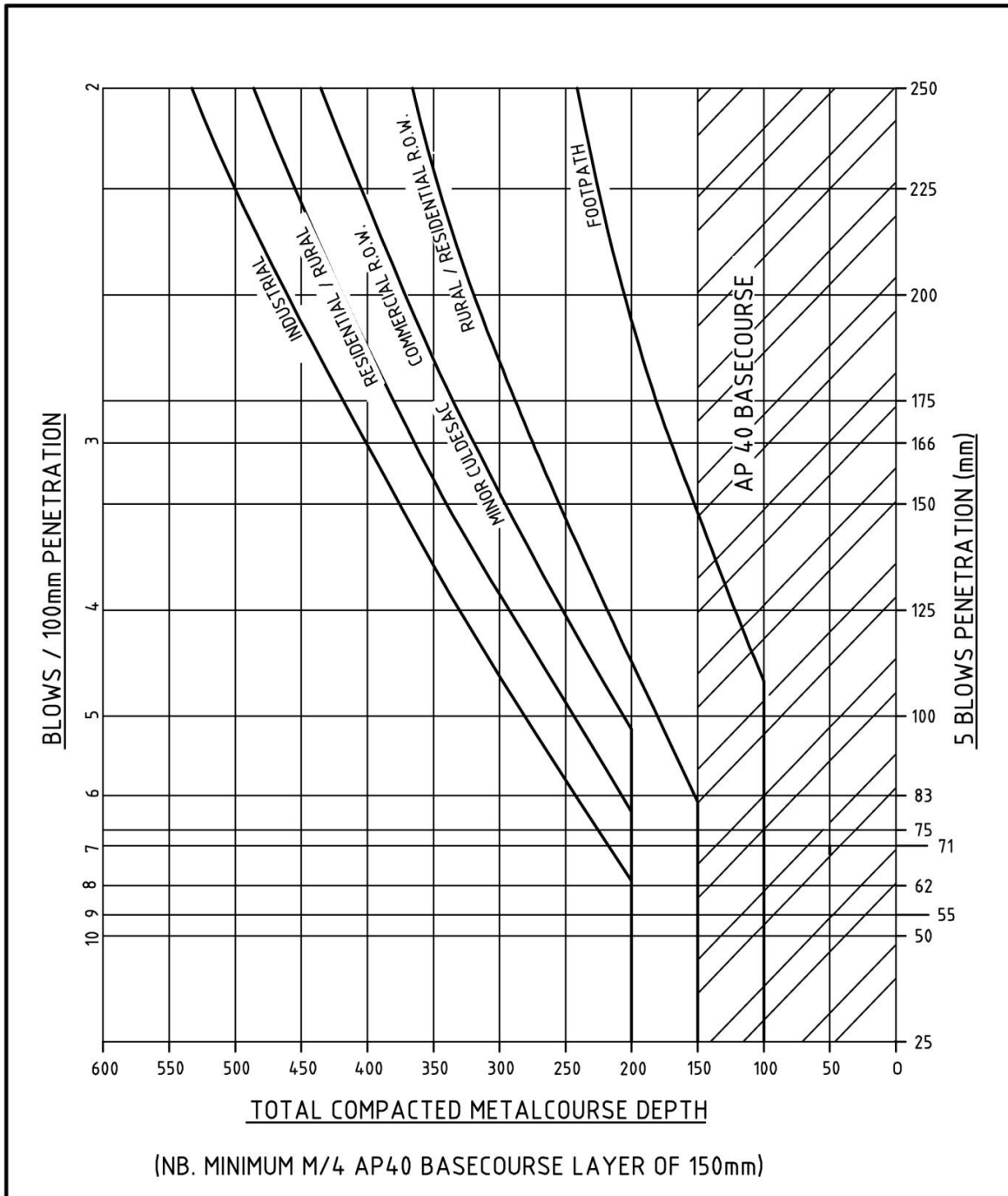


Drawing 612 – Design graph for flexible pavements CBR method



	DESIGN GRAPH FOR FLEXIBLE PAVEMENTS CBR METHOD	
	ASSET MANAGEMENT ENGINEERING APPROVED  ENGINEERING MANAGER	NOVEMBER 2013 DATE

Drawing 613 – Design graph for flexible pavements scala dynamic cone penetrometer



**DESIGN GRAPH FOR FLEXIBLE PAVEMENTS
SCALA DYNAMIC CONE PENETROMETER**

ASSET MANAGEMENT ENGINEERING

DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

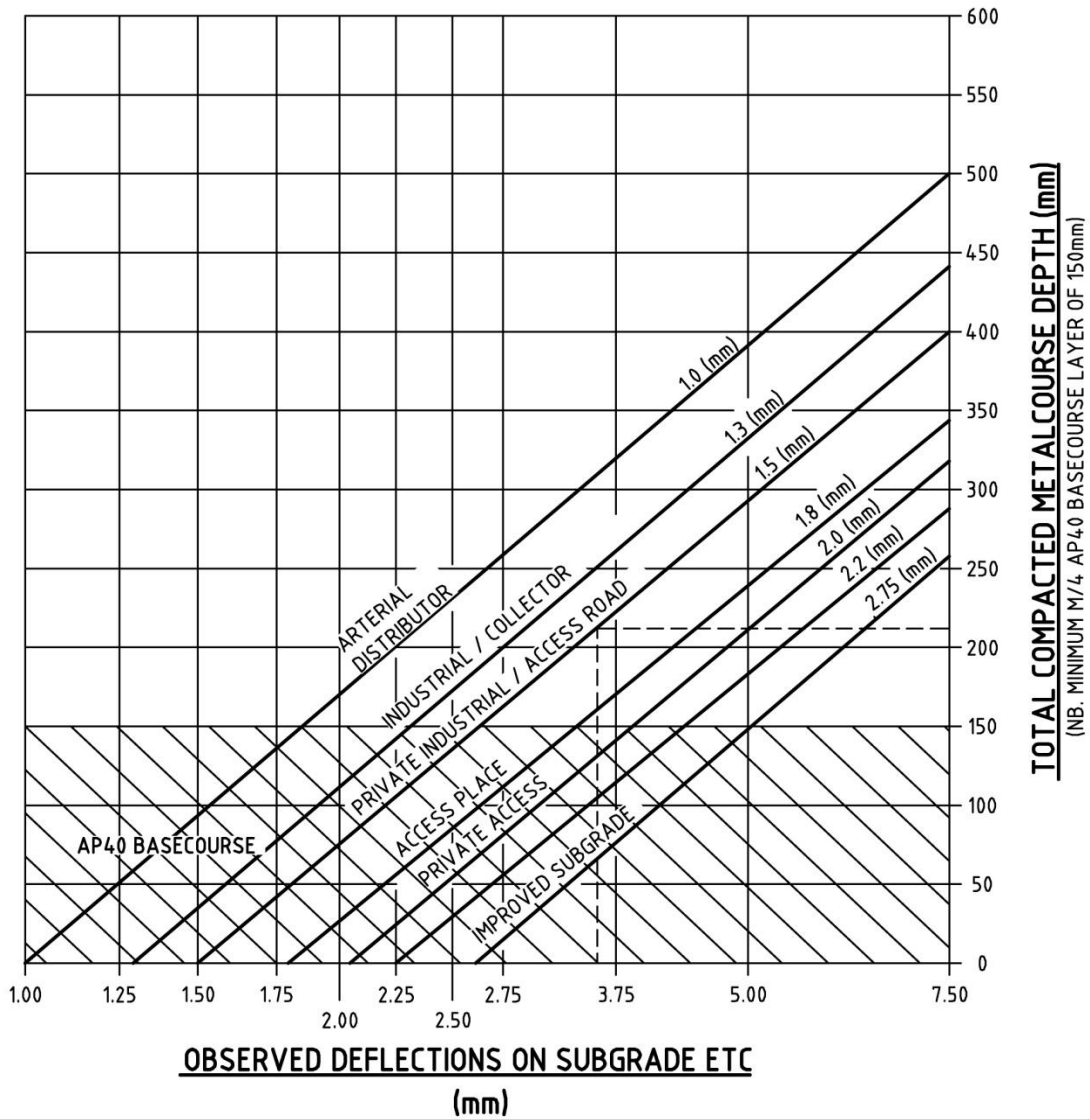
613

Drawing 614 – Design graph for flexible pavements Benkleman beam deflections

EXAMPLE: (SHOWN IN DASHED LINE)

ACCESS ROAD

OBSERVED DEFLECTIONS 3.6mm ADDITIONAL DEPTH OF METALCOURSE REQUIRED = 210mm



DESIGN GRAPH FOR FLEXIBLE PAVEMENTS BENKLEMAN BEAM DEFLECTIONS

ASSET MANAGEMENT ENGINEERING

APPROVED

[Signature]

ENGINEERING MANAGER

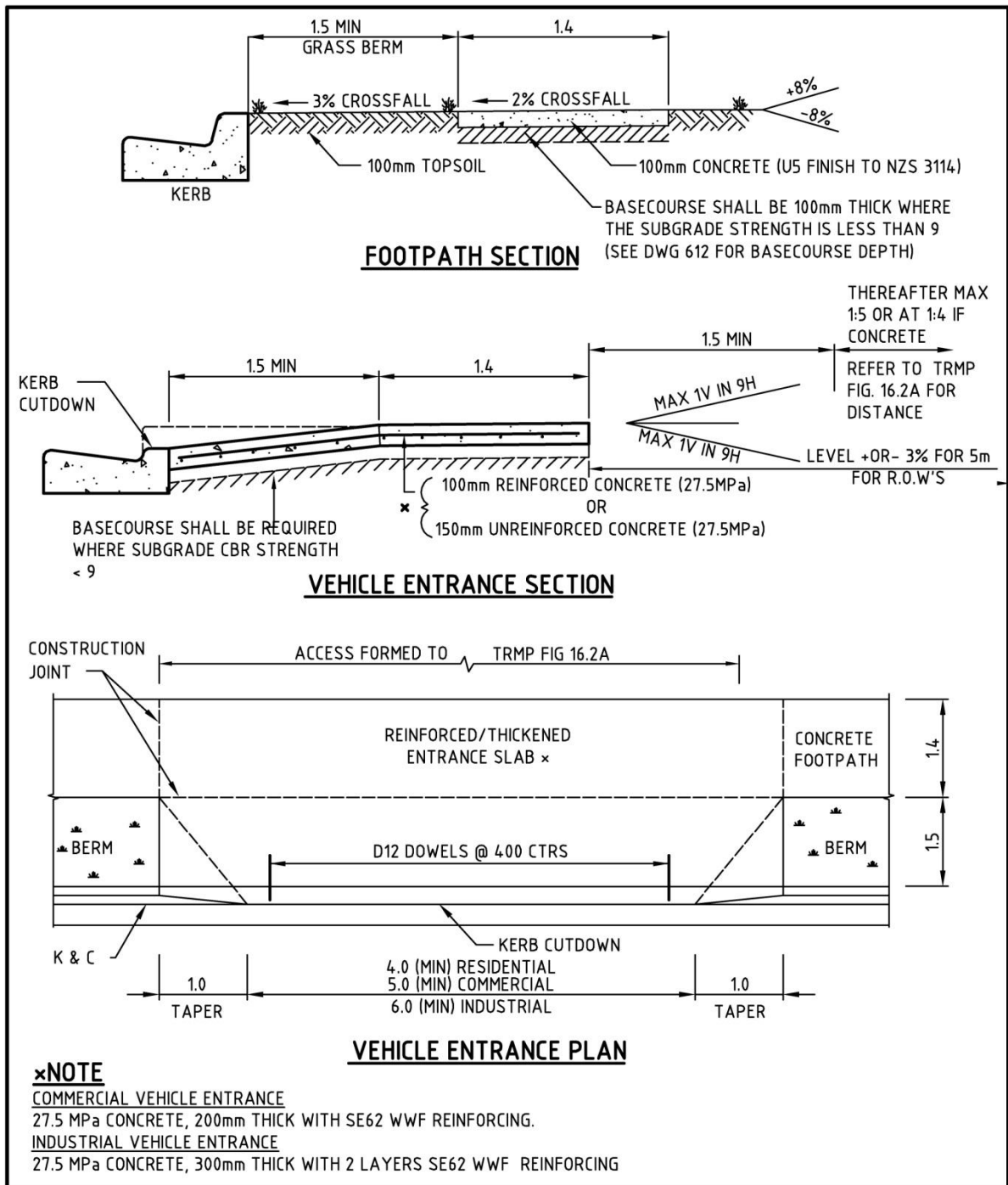
NOVEMBER 2013


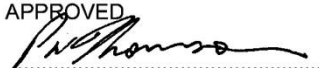
DATE

DRAWING No.

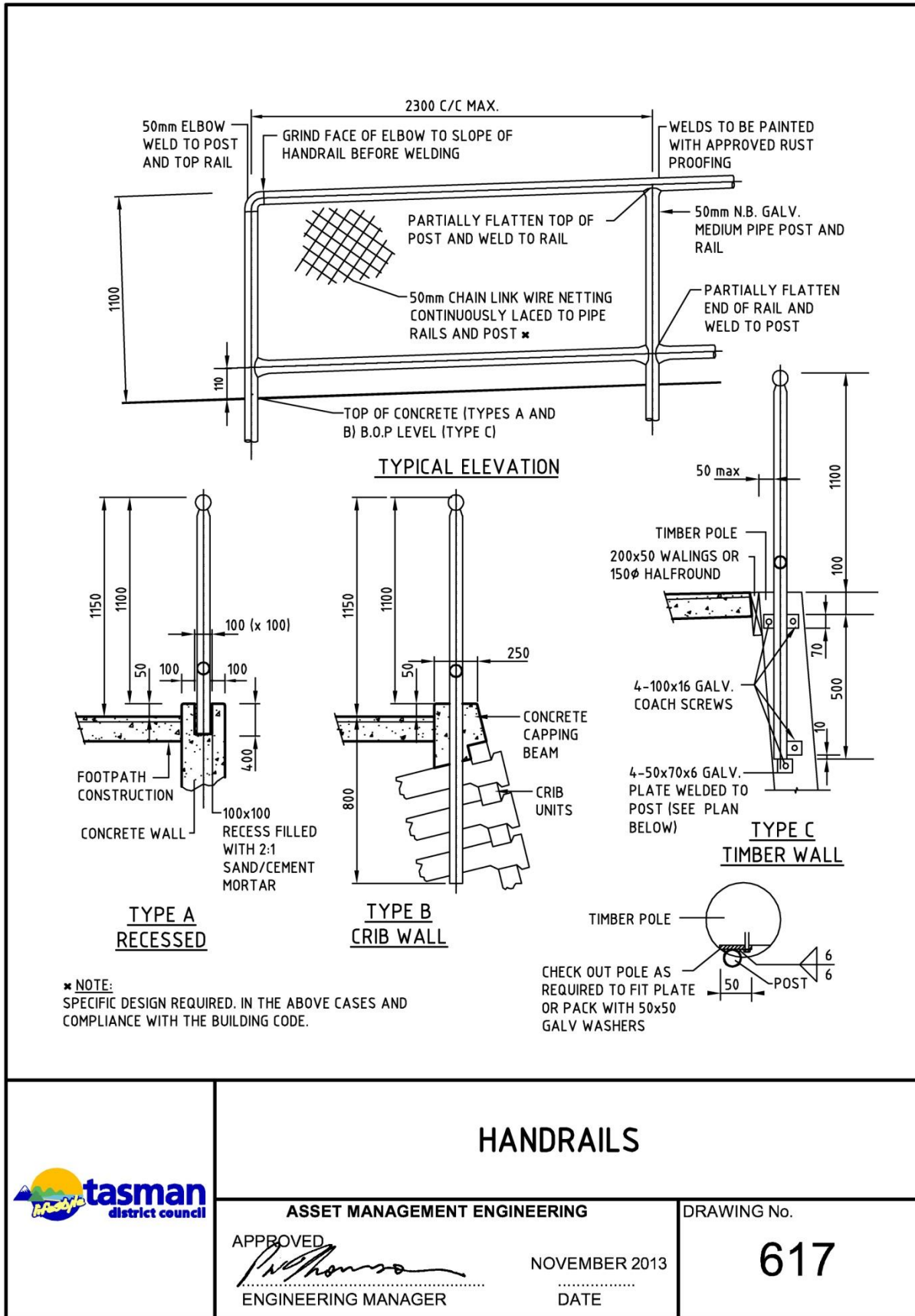
614

Drawing 615 – Standard details 1.4m wide concrete footpath offset from kerb



	STANDARD DETAILS 1.4m WIDE CONCRETE FOOTPATH OFFSET FROM KERB N.B ASPHALTIC CONCRETE MAY BE USED (REFER TDC DRAWING 616)	
	ASSET MANAGEMENT ENGINEERING APPROVED  ENGINEERING MANAGER	NOVEMBER 2013 DATE

Drawing 617 – Handrails



HANDRAILS



ASSET MANAGEMENT ENGINEERING

DRAWING No.

APPROVED

[Signature]
ENGINEERING MANAGER

NOVEMBER 2013

DATE

617

Drawing 618 – Handrails alternative

SPECIFIC DESIGN REQUIRED.

NOTES:

× CHECK ALL DIMENSIONS ON SITE BEFORE COMMENCEMENT OF WORK, FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALED.

× ALL WORK IS TO COMPLY WITH THE NZ BUILDING ACT AND THE NZ BUILDING CODE.

× ALL CONCRETE SHALL COMPLY WITH NZS 3109 1997

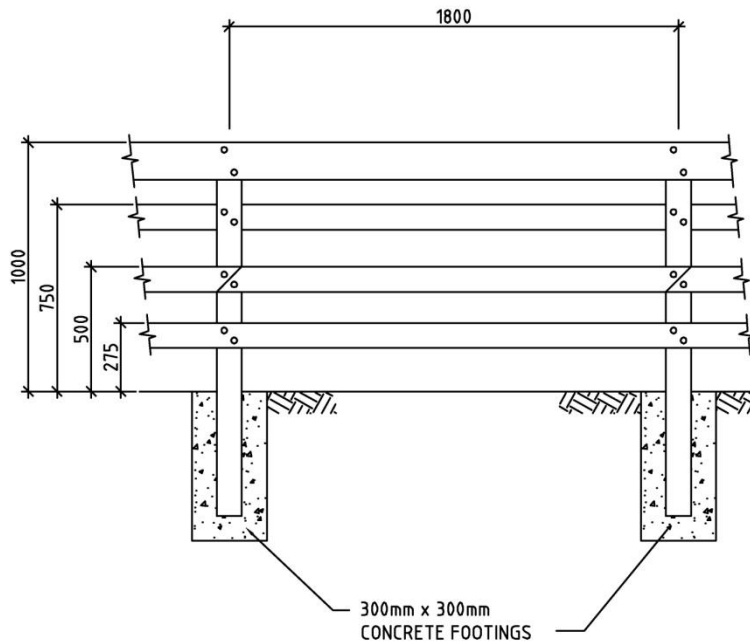
× ALL CONCRETE SHALL BE GRADE 17.5MPa AFTER 28 DAYS.

× ALL FIXINGS TO BE HOT DIPPED GALVANISED TO COMPLY WITH AS/NZS 4680:2006

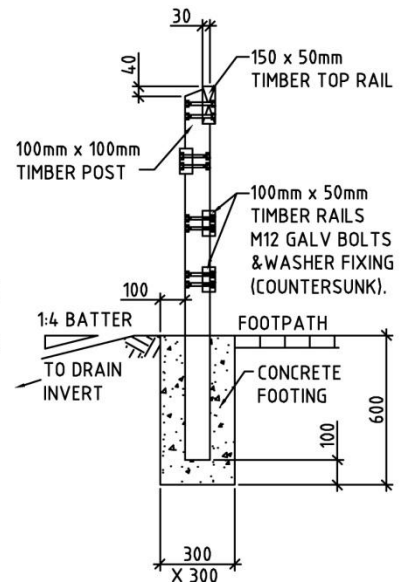
× 100 X 100 POSTS H4 TREATED MACHINE GAUGED PINE

× TIMBER RAILS H3 MACHINE GAUGE PINE.

× CONTRACTOR TO CONFIRM ALL LAYOUT AND CONSTRUCTION DIMENSIONS WITH THE ENGINEER PRIOR TO FENCE INSTALLATION.



FRONT ELEVATION



TYPICAL SECTION



HANDRAILS ALTERNATIVE (COMMERCIAL/INDUSTRIAL AREAS)

ASSET MANAGEMENT ENGINEERING

DRAWING No.

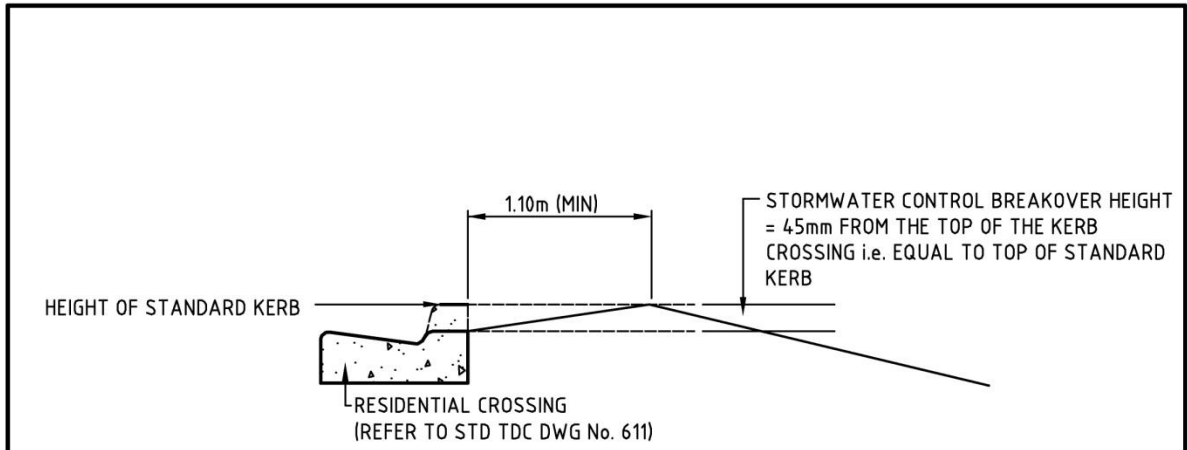
APPROVED

[Signature]
ENGINEERING MANAGER

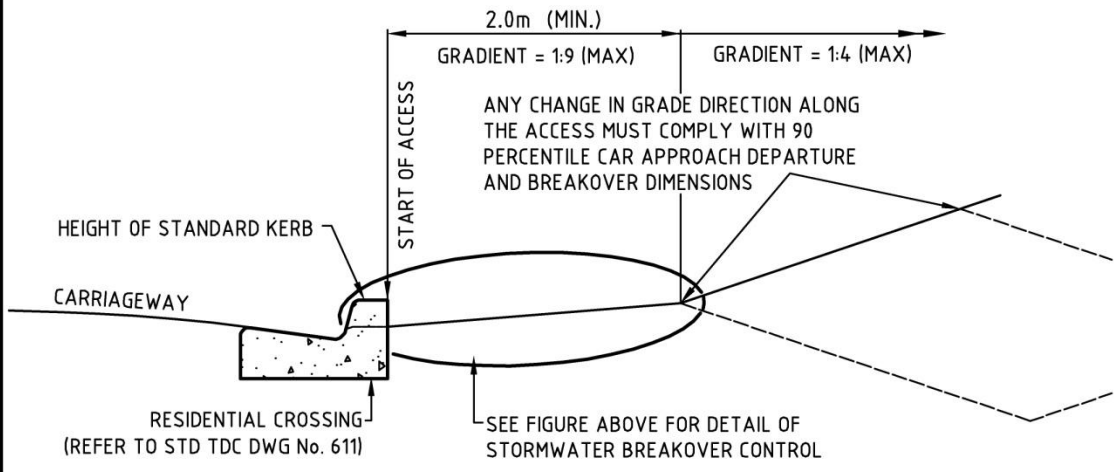
NOVEMBER 2013
DATE

618


Drawing 619 – Access Breakover angles where no proposed footpath



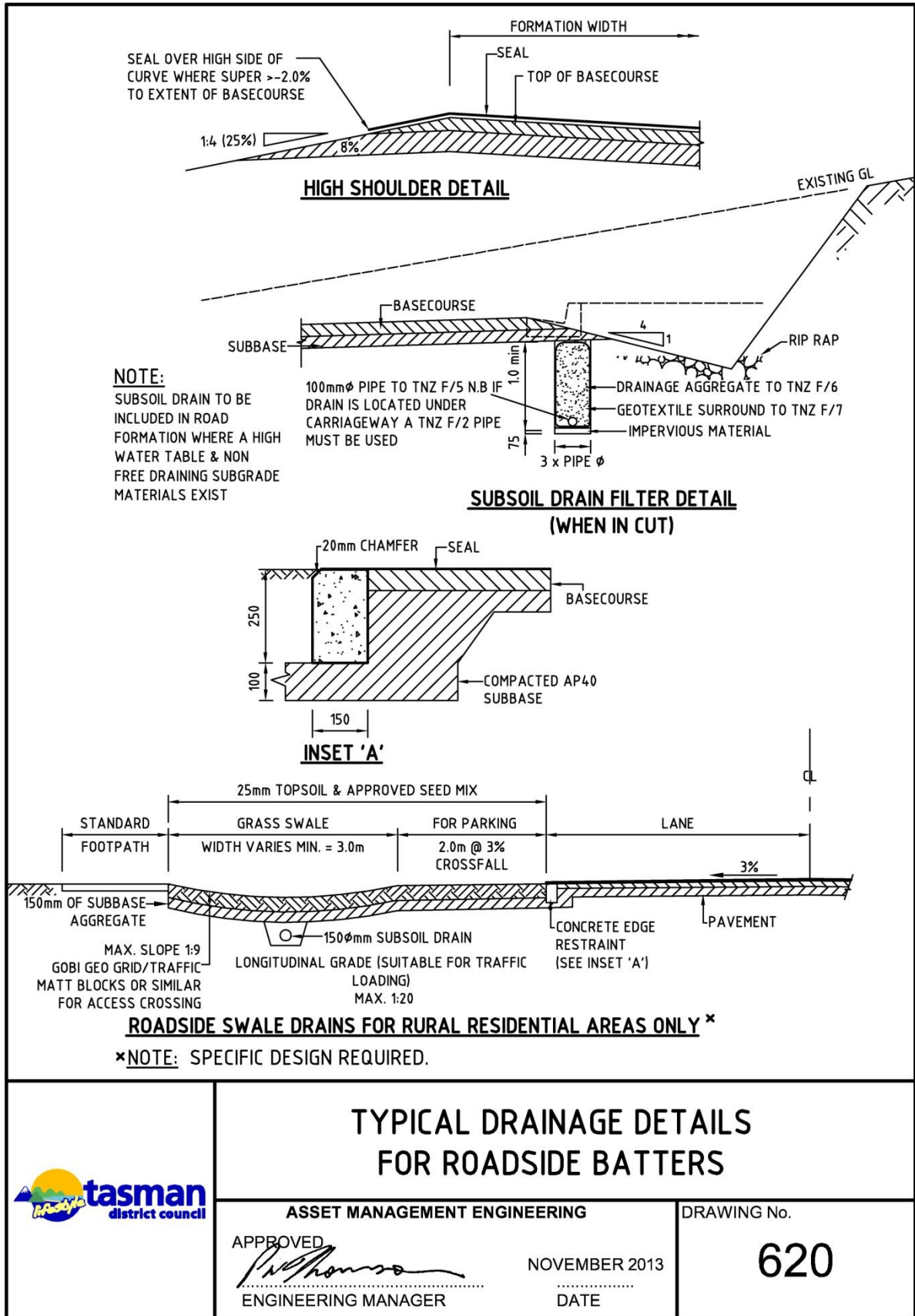
**DIMENSIONS OF STORMWATER BREAKOVER CONTROL
FOR ACCESSES BELOW THE ROAD**



**GRADIENT OF ACCESS AND BREAKOVER ANGLES FOR ACCESS TO SITES WHERE
THERE IS NO EXISTING OR PROPOSED FOOTPATH**

	<p>ACCESS BREAKOVER ANGLES WHERE NO PROPOSED FOOTPATH</p>	
	<p>ASSET MANAGEMENT ENGINEERING</p> <p>APPROVED <i>[Signature]</i> ENGINEERING MANAGER</p>	<p>NOVEMBER 2013 DATE</p>

Drawing 620 – Typical drainage details for roadside batters



TYPICAL DRAINAGE DETAILS FOR ROADSIDE BATTERS



ASSET MANAGEMENT ENGINEERING

DRAWING No.

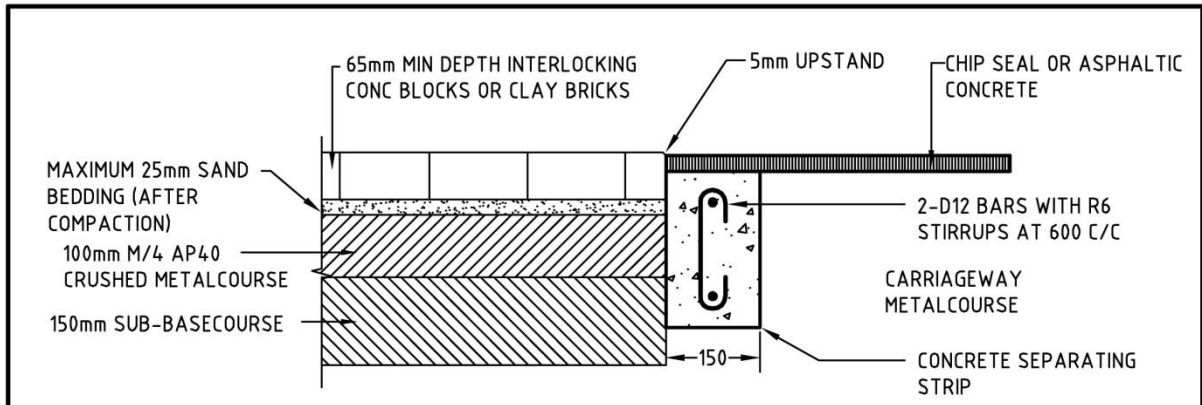
APPROVED

P. Thomson
ENGINEERING MANAGER

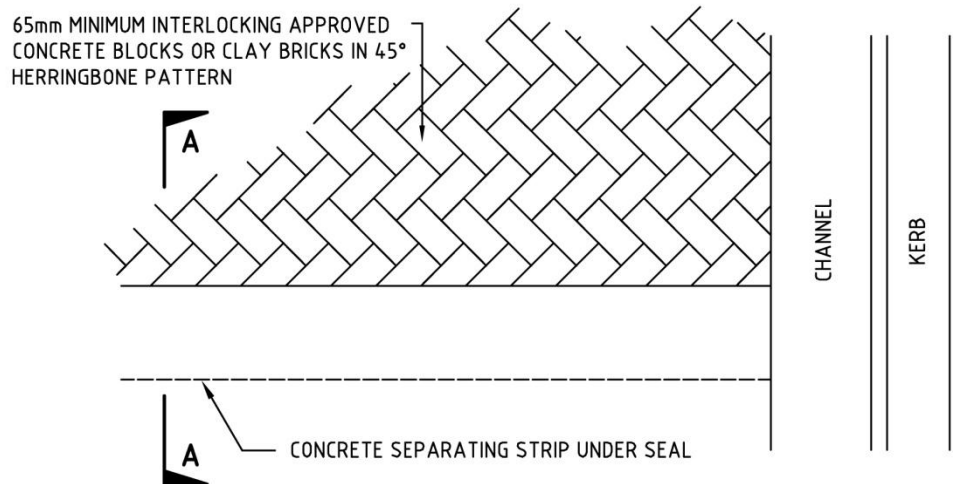
NOVEMBER 2013
DATE

620

Drawing 621 – Carriageway thresholds (concrete blocks or clay bricks)




SECTION A-A
CARRIAGEWAY THRESHOLDS



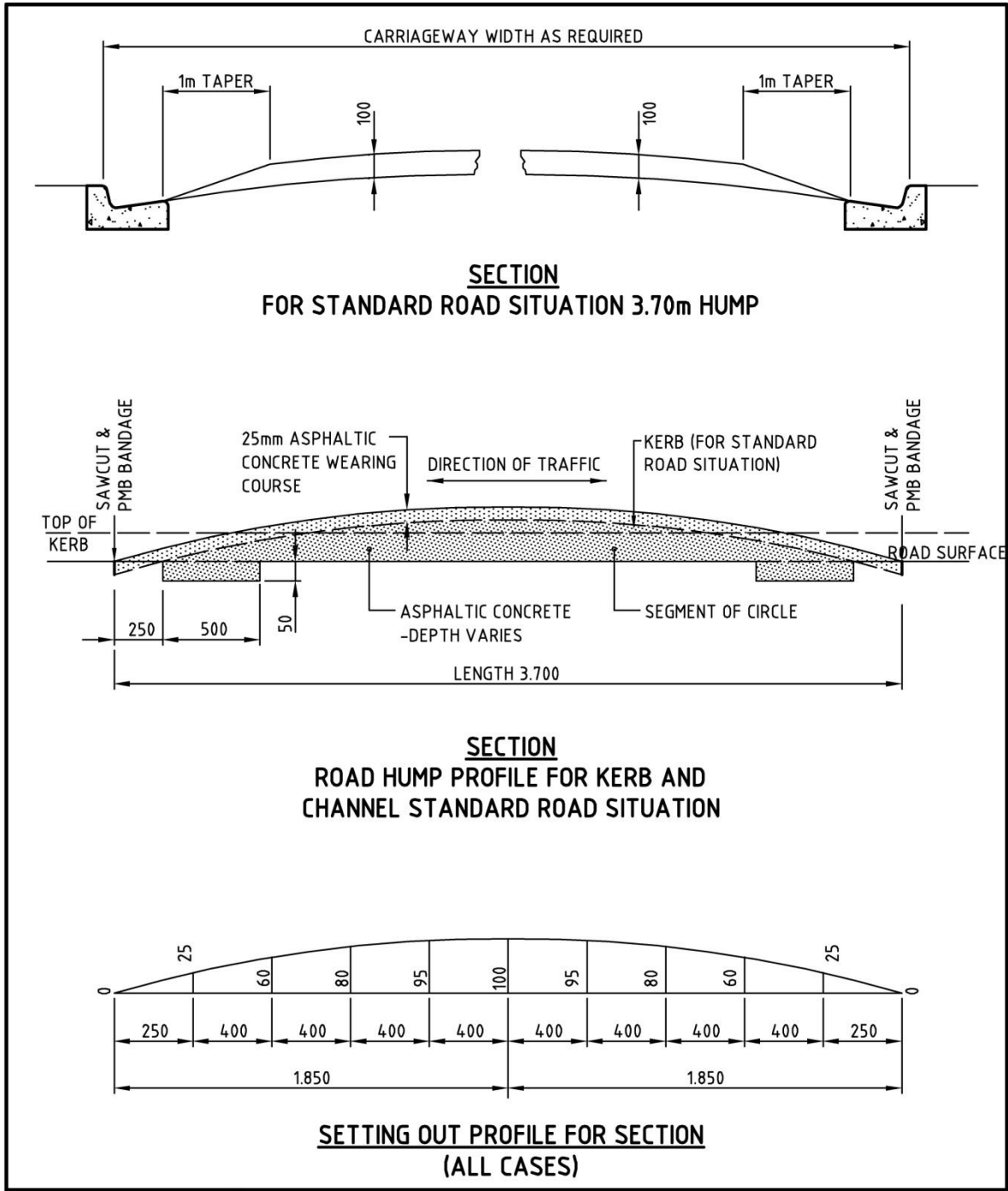
CARRIAGEWAY THRESHOLDS - PART PLAN


NOTES:

1. CONCRETE BLOCKS SHALL COMPLY WITH NZS 3116: 2002
2. CLAY BRICKS SHALL COMPLY WITH THE AUSTRALIAN BRICK DEVELOPMENT RESEARCH INSTITUTES "SPECIFICATION FOR FIRED CLAY PAVERS FOR SITES SUBJECTED TO VEHICULAR AND PEDESTRIAN TRAFFIC"
3. LAYING OF PAVERS SHALL COMPLY WITH THE CEMENT AND CONCRETE ASSOCIATION OF NZ "INTERLOCKING CONCRETE BLOCK ROAD PAVEMENTS" (SEPT 1988)

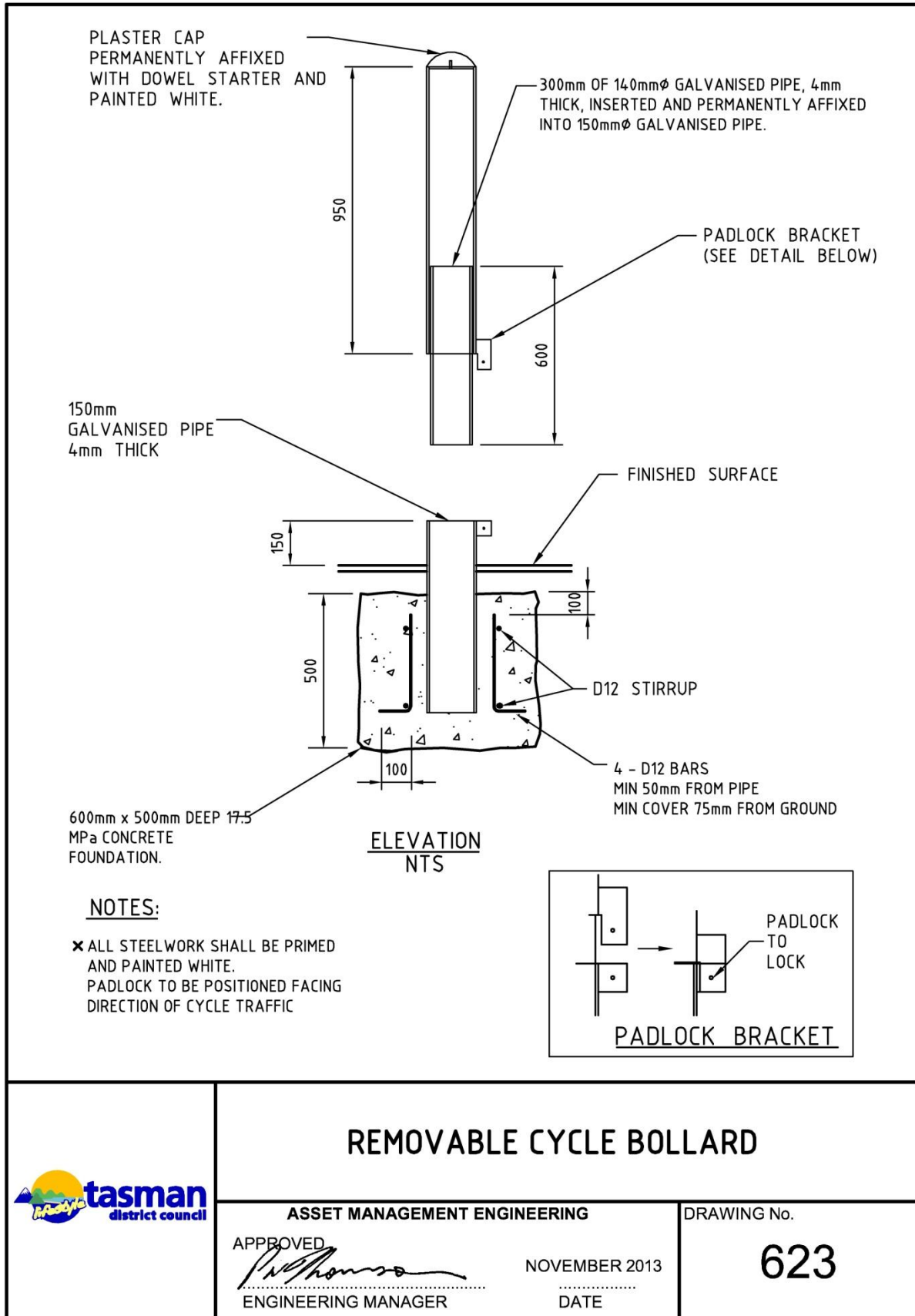
	<h2 style="margin: 0;">CARRIAGEWAY THRESHOLDS</h2> <h3 style="margin: 0;">(CONCRETE BLOCKS OR CLAY BRICKS)</h3>	
	<p>ASSET MANAGEMENT ENGINEERING</p> <p>APPROVED <i>[Signature]</i></p> <p>ENGINEERING MANAGER</p>	<p>NOVEMBER 2013</p> <p>DATE</p>
		<p>DRAWING No.</p> <h1 style="margin: 0;">621</h1>

Drawing 622 – Road hump details



	<h2 style="margin: 0;">ROAD HUMP DETAILS</h2>
<p style="text-align: center; margin: 0;">ASSET MANAGEMENT ENGINEERING</p> <p style="text-align: center; margin: 0;">APPROVED</p> <p style="text-align: center; margin: 0;"><i>[Signature]</i></p> <p style="text-align: center; margin: 0;">ENGINEERING MANAGER</p>	<p style="text-align: right; margin: 0;">DRAWING No.</p> <p style="text-align: center; font-size: 2em; margin: 0;">622</p> <p style="text-align: center; margin: 0;">NOVEMBER 2013</p> <p style="text-align: center; margin: 0;">DATE</p>

Drawing 623 – Removable cycle bollard



REMOVABLE CYCLE BOLLARD



ASSET MANAGEMENT ENGINEERING

DRAWING No.

APPROVED

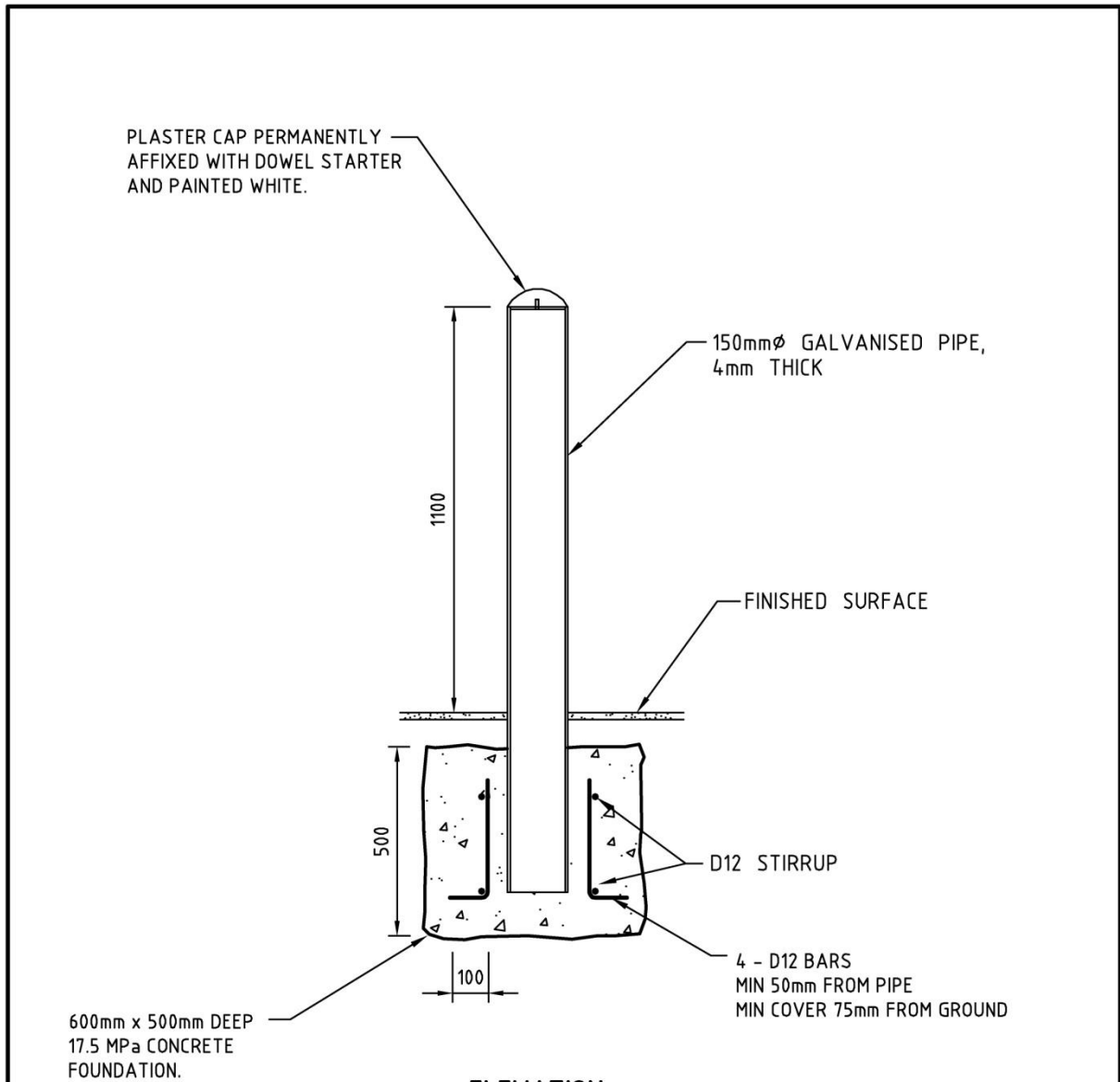
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013

DATE

623

Drawing 624 – Standard cycle bollard



ELEVATION

NOTES:

✗ ALL STEELWORK SHALL BE PRIMED AND PAINTED WHITE WITH REFLECTIVE STRIPS VISABLE FROM BOTH WAYS

STANDARD CYCLE BOLLARD



ASSET MANAGEMENT ENGINEERING

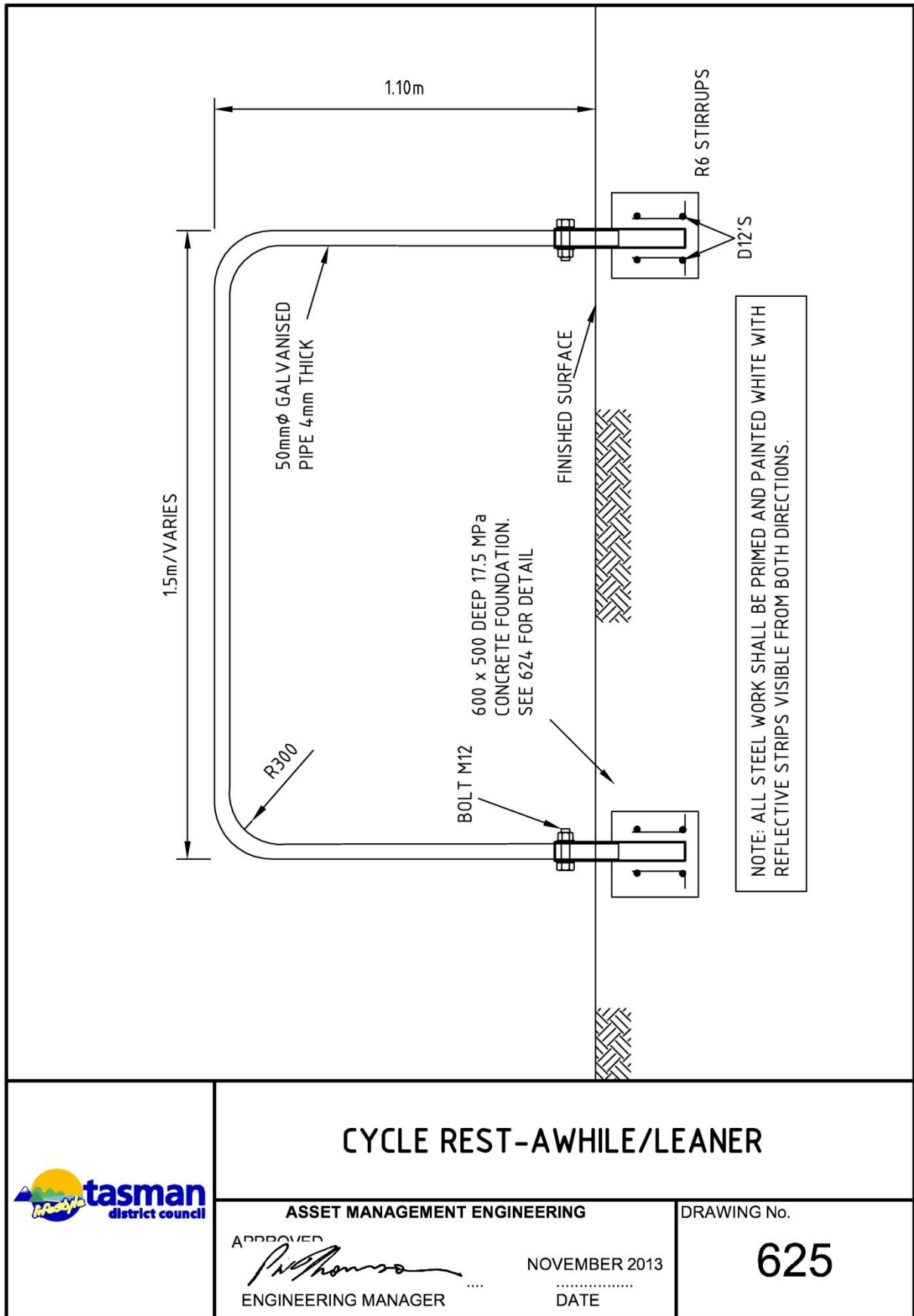
DRAWING No.

APPROVED
[Signature]
ENGINEERING MANAGER

NOVEMBER 2013
DATE

624

Drawing 625 – Cycle rest-awhile/leaner



CYCLE REST-AWHILE/LEANER



ASSET MANAGEMENT ENGINEERING

APPROVED
P. Thomson
 ENGINEERING MANAGER

NOVEMBER 2013
 DATE

DRAWING No.

625