Part 1 Standard for Design of Roadworks

Division 1 Site and Road Layout

1.1.0 General

(1) The ideal site and road layout will result from consideration of the social, environmental and traffic factors, the development layout and engineering constraints.

(2) Engineering constraints include drainage overland flow paths, vertical alignment, horizontal alignment, reasonable access to allotments and the road layout is to accommodate these constraints.

(3) Prior to preparing a development layout plan, it should be ascertained if a layout already exists for the area in question and to ensure that the road network proposed will generally conform with the overall road hierarchy and open space plan envisaged by the Local Government.

(4) Streets are to be designed in accordance with the general parameters outlined in the Transport and Parking Planning Scheme Policy (SC6.4):
- Road Hierarchy Table (6.4.4.1);
- Centre Road Characteristics Table (6.4.4.2);
- Urban Road Characteristics Table (6.4.4.3); or
- Rural Road Characteristics Table (6.4.4.4).

(5) It is essential that full and accurate topographical information be available at the roadworks design stage, to enable an accurate assessment of the suitability of the proposed road locations.

(6) Where a conflict or inconsistency occurs between cited manuals, the manual with the latest publication date is to take precedence.

1.1.1 Design Criteria

(1) Except as specifically varied hereafter, the design of Arterial and Sub-Arterial Roads is to be based on Ipswich City Council Standard Drawings, Department of Transport and Main Roads (DTMR) design manuals and Austroads Guides to Traffic Management, Guides to Road Design and Guides to Road Safety.

(2) Except as specifically varied hereafter, the design of Access Streets, Access Places, Local Industrial Streets, Collector Streets, Major Collector Streets and Industrial Collector Streets is to be based on the Ipswich City Council Standard Drawings and associated technical guidance.

(3) Superelevation is to be provided on all Roads and Streets classified as Major Collector or above.

(4) The minimum grade for all Roads which will ultimately include kerb and channel is to be 0.5% and the minimum grade for all Roads which will ultimately have earth table drains, is to be 1.0%.

Note: Roads constructed without kerb and channel, completely in embankment may have zero grade.

(5) A vertical curve, of parabolic form, is to be provided at every change of grade, where the algebraic change of grade exceeds, for —
a. Access Places, Access Streets, Collector Streets - 1.0%;
b. Major Collector, Sub Arterial, Arterial, Major Arterial - 0.6%

Note: Every effort should be made to provide vertical curves as long as possible, for improved appearance.

(6) A minimum 10 metre vertical curve is to be provided where a side road joins a through road at three way intersections with the following characteristics —
a. the tangent point of a vertical curve in the side road is to be located at, or outside of the kerb line of the through road; and
b. a crest vertical curve that masks the commencement of a horizontal curve is to be avoided.

(7) Crossfalls -
a. all sealed pavements and shoulders are to have crossfalls of 3.0%;
b. the maximum cross-fall on grassed medians on divided roads is to be desirably 1 in 6 with an absolute maximum of 1 in 4; and
c. at median openings, the pavement crossfall is not to exceed 5%.

(8) Provision for cyclists is to be included on all sub-arterial and arterial roads, irrespective of whether off-road bicycle or shared bicycle/pedestrian facilities are also provided on an adjacent verge.

Note: In the case of roads, cyclist facilities are generally provided by means of marked bicycle lanes or wide kerbside lanes/parking lanes/road shoulders, conforming to the requirements of Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety.

(9) Carriageway cross-sections —
a. for Roads are to conform to the requirements of Standard Drawings Nos. SR.04 and SR.05; and
b. for Streets are to conform to the requirements of Appendices D, E, F and G of the Reconfiguring a Lot Code and Standard Drawings Nos. SR.02 and SR.03.

Note: Split level roads/streets should be avoided.

(10) Public lighting -
a. design shall comply with the provisions of Australian Standard AS/NZS 1158 Lighting for Roads and Public Spaces - all parts;
b. for large lot (greater than 3,000m^2) residential streets, street light spacing is a minimum interval of 120m; and
c. within road reserves, is installed on the same side of the road as concrete pathways.

1.1.2 Truncations

(1) Truncations of the real property boundaries are to be provided at speed restriction devices, bends and intersections.

(2) Roadway and footpath widths are to be maintained at the minimum specified widths at any point.

(3) The minimum truncation distance of the real property boundary at an intersection between the following street types is to be:

Street Type A to —	Street Type B	Minimum Truncation Distance
Access Place	Access Street	6.0m
Access Place/Access Street	Collector Street	6.0m
Local Street	Local/Collector Street	6.0m
Access Street/Collector Street	Major Collector Street	6.0m
Collector/Major Collector Street	Collector/Designated Road	8.0m
Local Industrial Street	Local Industrial Street	8.0m
Local Industrial Street	Industrial Collector	8.0m
Industrial Collector	Designated Road	10.0m

(4) Where the intersection angle is other than 90 degrees, the truncation is to be by a chord or chords to a circle of radius equal to the above truncation lengths.

(5) Where the intersection is constructed as a roundabout, the truncation is to be the area required to accommodate the relevant roundabout template as outlined in the relevant standard drawings.

(6) The area truncated is to be dedicated as road reserve free of cost to, or compensation by, the local government.

1.1.3 Pavement Tapers

(1) Pavement tapers to existing construction is to be designed in accordance with the Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety based on the design speed of the road and tapers are to be constructed to the same standard as the proposed full road pavements.

1.1.4 Frontage Streets/Roads

(1) Where the street/road frontage to a development is unsealed or unformed at the time of development approval, it is to be constructed to a standard specified in the conditions of approval or where not specified in the conditions of approval no less than the greater of one half of the full width/road or 6 metres from the nominal kerb line to the bitumen edge.

(2) An existing sealed frontage street/road to a development is to be reconstructed to one half of the full width of the street/road unless the existing pavement is adequate for the ultimate design conditions, in which case the pavement shall be widened only with kerb and channel provided at the nominated alignment.

(3) The development frontage roadworks are required to connect to existing road networks and infrastructure (including drainage). In this regard, where a development site frontage abuts, or is in close proximity (e.g. generally within 20m) to a site with an existing paved footpath, or kerb and channel, the developer shall be required to extend (construct) the paved footpath, or kerb and channel from the existing paved footpath, or kerb and channel and for the full frontage of the subject land.

(4) The developer shall also undertake any road widening or infill pavement works necessitated by the extension of the kerb and channel.

Note: This provision is intended to achieve the extension of contiguous lengths of paved footpath, or kerb and channel along the street frontage of a development site. It is not intended to create isolated sections of paved footpath or kerb and channel which do not immediately adjoin or cannot readily connect to an existing paved footpath, or kerb and channel.

(5) Concrete kerb and channel and footpath verge are to be reinstalled in accordance with Council's Standard Drawings to replace any redundant crossover.

(6) Concrete footpaths and kerb ramps are required in accordance with Section 1.1.10 and Section 1.1.12 (9).

(7) Where a development site is isolated from an existing kerb and channel network and is not reasonably expected to be included within the network within ten (10) years, no kerb and channel construction is required.

1.1.5 Intersections

(1) Intersections on roads are to be designed in accordance with the current Department of Transport and Main Roads "Road Planning and Design Manual" and Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety.

Note: The design criteria is to be nominated by the Local Government.

(2) All new intersections of Access Places, Access Streets, Collector Streets, Major Collector Streets, Rural and Industrial Roads are preferably to be designed as a three way intersection.

(3) Where unavoidable, four way intersections are to be designed as roundabouts in accordance with Section 1.1.6 Roundabouts and Standard Drawing No. SR.29, having particular regard to the needs and safety of pedestrians and cyclists.

(4) Four way intersections are to be designed at the junctions of Arterial and Sub Arterial Roads or Major Collector Streets only where signalisation (preferred) or roundabouts are proposed.

(5) All channelisation is to be designed in accordance with the current Department of Transport and Main Roads "Road Planning, and Design" Manual and Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety to accommodate a Design Semi Trailer, providing a clearance of not less than 0.6 metres between the outer wheel track and the kerbs at all points.

Note:

a. Warrants for the provision of channelisation at intersections will be traffic volumes and intersection layout.
b. In general, channelisation will normally be required to be provided:
    i. at all arterial to arterial intersections;
    ii. at all arterial to sub-arterial intersections;
    iii. at most major collector to arterial intersections; and
    iv. at occasional collector to collector intersections.

(6) All intersections:

a. along arterial roads, sub-arterial roads, industrial collectors, industrial access streets or roads which provide access to an existing or proposed land use which require 19m Semi-Trailer access are designed to cater for a 19m Semi-Trailer; and
b. along an approved or intended future B-Double route are to be designed to cater for a B-Double vehicle.

(7) Traffic islands are to be designed in accordance with the current Department of Transport and Main Roads Design Manuals and Austroads Guide to Traffic Management, Guide to Road Design and Guide to Road Safety.

Note: Particular attention is to be given to sight distance when commencing islands at horizontal and vertical curves.

(8) All traffic islands are to be signed and delineated in accordance with the requirements of the Department of Transport and Main Roads "Manual of Uniform Traffic Control Devices" (MUTCD).

(9) Where a marked exclusive bicycle lane is not required, the pavement of a left turn auxiliary lane is to be preferably 3.7 metres wide and, in restricted locations, not less than 3.0 metres wide.

(10) Where barrier kerb is used these widths, where practicable, are to be increased by at least 0.45 metres.

(11) Where practical, similar widths apply for right turn auxiliary lanes.

(12) On major collector streets, median openings should be provided at all intersections except at intersections with access places.

(13) Intersection spacings -
a. on major collector streets and collectors are a minimum of 100m;
b. a minimum of 400m on arterial roads;
c. a minimum of 300m on sub-arterial roads;
d. a minimum of 100m on major collector and collector streets, and
e. between 60m and 100m on minor collector streets.

(14) On sub-arterial and arterial roads, the minimum spacing of median openings should be approximately 400 metres.

(15) All intersection threshold treatments shall be constructed of concrete in accordance with *Standard Drawing No. SR.28* and shall be highly visible in accordance with the MUTCD.

(16) Threshold treatments should only be provided where a change to the speed environment or intersection priority movement exists.

1.1.6 Traffic Signal Design

(1) The design of traffic signals is to be in accordance with the *DTMR Standard Drawings Road Manual – Part 15*: *Traffic Signals* and Standard Drawing 1425 for rectangular loops at intersections.

(2) The traffic signals must be installed by a contractor who is accredited by DTMR.

(3) The design and installation of traffic signals shall comply with the following additional requirements:
a. round pits for cabling can be used in place of Type 7 pits in accordance with *TMR Standard Drawings 1415, 1416 & 1417 (Drawings 1 & 2)*;
b. all hardware installed shall have current TMR type approval at the time of commissioning;
c. signal controllers are to be either Tyco Eclipse ECX1-62 Series or ATSC4 (preferred);
d. traffic signal controller 'top hat' is to be included;
e. all vehicle loops at new or reconstructed sites shall be rectangular as per *TMR Standard Drawings 1424 & 1425*; and
f. overhead or mast arm lanterns shall be 300mm LED in all cases.

(4) Signal plans should clearly show:
a. posted speed; and
b. pedestrian and vehicle clearance times.

(5) Unless otherwise advised, all intersections shall be designed with Standard Traff phasing. Where geometrically possible, signalised intersections are to have Diamond Overlap Phasing (Single or Double) as per the *RTA Guidelines*. Turning path templates of the intersection are to be provided to support the phasing design.

(6) Vehicle and pedestrian clearance times to be calculated in accordance with the *DTMR Road Planning and Design Manual 1st Edition*.

(7) A bike lane stop line is to be installed 0.5m behind the pedestrian crossing line marking.

(8) A vehicle lane stop line is to be installed 2m behind the bike lane stop line.

(9) All signal station and loop detectors are to be numbered as per standards (in a clockwise manner).

(10) All existing services (such as electric posts) are shown on drawings.

(11) All loop detectors locations are to be drawn to scale.

(12) M number is to be provided by the relevant authority (Ipswich City Council or Transport and Main Roads).

(13) Separate AUTOCAD files are to be provided of the traffic signals design.

(14) General Notes (to be included on the plans):

- this drawing shall be read in conjunction with the *TMR technical specifications ((category 4) – electrical & its) and TMR standard drawings (electrical & its);*
- controller is to be programmed with the latest revision of standard TRAFF firmware;
- personality to be programed with EVP code;
- refer to *TMR SD 1436* for symbol legend;
- all lanterns are to be led type & TMR type approved;
- loops to be rectangular type & configured as per *TMR SD 1424 & 1425;*
- select protective devices (circuit breakers and fuses) in the controller to meet the fault loop impedence requirements of *AS/NZS 3000;*
- traffic signals to be connected under Energex unmetered tariff;
- ensure clearance between traffic signal equipment and overhead power lines are maintained in accordance with Energex and TMR requirements;
- liaise and coordinate with Energex for the mains power connection;
- signals construction contractor is to supply and install:
  - Novaris MPP-RJ 12-1 surge diverter and connection leads in accordance with *TMR SD 1780;*
  - a 4-way GPO for communication equipment in accordance with *TMR SD 1777* is to be implemented within the signal controller cabinet, located below the internal shelf. this is to be connected to the RCD protected power supply as per the *TMR SD 1771 to 1779;*
  - acquisition of a Transmax configured field processor (and cables) compliant with MRTS232;
- certificate of test sticker is to be installed inside controller door; and
- unused cores to be connected to earth.

Note: Necessary permits are to be obtained from Council prior to undertaking works that affect the operation of existing traffic signals.

1.1.7 Roundabouts

(1) The parameters in the table below are to be used for design purposes:

Street Type	Access	Collector	>Collector
No. of approach lanes	1	1 or 2	2 max
Approach speed km/h	Design speed of street / road		
Minimum swept path speed	10 km/h		
Speed through roundabout km/h	20 max	25 max	50 max
Min radius of centre island(1) (2)	8	8	In accordance with Austroads Guidelines
Stopping sight distance – 1.15m to zero	45	45	

Note: (1) Subject to the required design vehicle for the road hierarchy.
Note: (2) To be measured as a full height island, not inclusive of mountable aprons.

(2) The design of a roundabout is to be in accordance with the Austroads Guide to Road Design Part 4B: Roundabouts and Standard Drawing No. SR.29.
Note: The needs of pedestrians and cyclists are to be addressed at the design stage.

(3) The design shall accommodate the design and checking vehicles as well as the recommended radii in accordance with the Austroads Design Vehicles and Turning Path Templates Guide.

(4) Sub Arterial Roads are to have the same design and checking vehicle as well as the radii as that of an Arterial Road within the Austroads Design Vehicles and Turning Path Templates Guide.

(5) The extended centrelines of the last 20m of approach roadways must pass through the centre point of the roundabout.

(6) The minimum sight distance requirements are to be in accordance with Austroads Guide to Road Design Part 4B: Roundabouts: for Criteria 1, 2 and 3. Criterion 3 is mandatory for Sub-arterials and Arterial Roads and does not apply to Access and Collector Streets.

(7) Central islands of 15m radius or greater (or similar area) shall drain to an internal system and not direct sheet flow of stormwater onto the circulating roadway.

(8) Appropriate cycle facilities in accordance with relevant standards are to be provided up to and through roundabouts for all roads where cycle facilities have been provided.

(9) The minimum verge width at roundabouts shall be in accordance with the design standards for each class of road or street.

(10) Full details of any landscaped islands, together with the associated drainage/irrigation system shall be provided.

(11) Maximum planting height in visibility areas is to be 400mm above pavement unless otherwise approved by Council.

(12) The design of any landscaping for roundabouts is to also ensure that the clear zone and sight distance requirements are also achieved - refer to the *Ipswich Streetscape Design Guideline* for landscaping requirements.

1.1.8 Cul-De-Sac – Turning Areas

(1) Standard Turning Areas at the head of residential cul de sac are to be based on the typical manoeuvring areas for The greater (largest specified requirements) of - Austroads Standards; The Ipswich City Council Standard Drawings; or an 8.8m service vehicle.

(2) The turning area is to be capable of accommodating most vehicles with a single movement turn.

(3) Circular turning heads are required. “T” and “Y” shaped turning heads are not to be used.

(4) Where a full turning circle is provided the minimum kerb radii is to be:
a. approach curve tangential to the turning circle- 20m; and
b. the turning circle- 9m.
Note: Where in a Bushfire Prone Area, the turning circle is to be a minimum of 12.5m.

(5) Turning areas at the ends of cul-de-sac in industrial developments are to be full turning circles with the following minimum kerb radii—
a. approach curve tangential to the turning circle- 30m
b. the turning circle, 12.5m or greater to suit the development design vehicle.

(6) **“**No Through Road” signs shall be erected at the entries to all cul-de-sac and terminating roads.

1.1.9 Access to Allotments

(1) The maximum driveway grades are to be as follows:

Maximum Driveway Grades	Desirable	Absolute
(a) Residential	16.6% (1 in 6)	25% (1 in 4)
(b) Industrial	10% (1 in 10)	16.6% (1 in 6)

Note: Standard footpath profiles are to be maintained.

(2) Driveway access points should not be provided on intersection or roundabout/channelisation approaches, in accordance with the requirements of *AS 2890 – Parking facilities – Off-street car parking*.

(3) The construction of the concrete driveway strip (e.g. handle to hatchet lots) is to conform to *Standard Drawings SR.12, SR.13 and SR.14.*

(4) Where the works are not supervised by a registered engineer (RPEQ) then the concrete works are to be undertaken by an appropriately licensed Queensland Building and Construction Commission (QBCC) Trade Contractor.

(5) The Licensed Trade Contractor must at completion of works provide certification to Council certifying that the works have been undertaken in accordance with applicable *Standard Drawings SR.12, SR.13 and SR.14.*

(6) For rural access (e.g. handle to hatchet lots) a 4m wide compacted gravel pavement is required for the full length of the access strip. Where reciprocal easement rights are proposed for a rural access, the driveway is to be 2 coat bitumen seal for the length over which the reciprocal easement applies to a minimum width of 3m on a 5m pavement.

(7) For rural access, where access is to a sealed road, a 2 coat bitumen sealed accessway is provided to a minimum width of 3m on a 5m pavement from the access road's bitumen surface to the property boundary.

Note:

a. For subgrade preparation, all topsoil, debris and tree stumps should be removed and the area appropriately levelled to provide a uniform platform for the driveway pavement.
b. Any poor, saturated, highly compressible or otherwise weak areas should be removed and replaced with suitable subgrade or roadbase material adequately compacted with a plate compactor or small roller.
c. If heavy loads are anticipated, such as heavy vehicles used for building construction, the ability of the subgrade to adequately support the loads without excessive deflection and cracking of the pavement needs to be considered.

1.1.10 Verges

(1) The cross-section of the verge (i.e. that portion of the road reserve between the kerb and the property alignment), is to conform with the relevant Standard Drawing.

(2) Where the construction of concrete footpath paving is required, it is to be 1.5 metres in width or 2.0/2.5 metres where required as a shared footpath/bikeway and located in accordance with Standard Drawing No. SR.19.

(3) Services and utilities are to be in accordance with *Standard Drawings Nos. SR.22 and SR.23.*

Note 1.1.9A: Where Energex, Telstra or other Service Providers share a joint user trench, conduits are to be located in accordance with the current policies of those Service Providers.

1.1.11 Pathways

(1) The minimum width of land for a pathway is to be 10.0 metres.

(2) Concrete paving is to conform to *Standard Drawings SR.19 and SR.30.*

(3) The concrete pavement within a pathway is to be constructed to the adjacent kerb and channel together with a kerb ramp.

(4) Pathways are to comply with *CPTED* requirements. Where fencing (a maximum of 1.8m) is provided along pathways, the fencing allows for passive surveillance of the pathway.

(5) Bollards are to be installed to restrict vehicular access at the ends of pathways but are to be located and delineated so as not to create a hazard for pedestrians and cyclists.

(6) A pathway should be provided at the end of cul-de-sacs connecting to the open space system, or the pedestrian or street network.

(7) Footpaths in cul-de-sacs are to extend around the full extent of the cul de sac head.

1.1.12 Bikeways

(1) The minimum width of land for a bikeway is to be 5.0 metres to accommodate a 2.5 metre wide concrete paved bikepath.

(2) The design is to be carried out in accordance with A*S1742.9 Austroads Guide to Traffic Management, Guide to Road Safety and Guide to Road Safety, Department of Transport and Main Roads "Manual of Uniform Traffic Control Devices" (Part 9, Bicycle Facilities)* and the requirements of the *Disability Discrimination Act.*

1.1.13 Kerb and Channel

(1) Concrete kerb and channel is to be provided on both sides of all streets.

(2) For roads, refer to the relevant applicable Standard Drawing to determine if concrete kerb and channel is required.

(3) The standard kerb and channel for residential streets is to be mountable type, Type M1 in accordance with *Standard Drawing No. SR.11*. Where development is infill, the kerb and channel is to match the existing connecting road kerb profile unless another kerb type is required for a particular purpose.

(4) Barrier type kerb and channel with 450mm channel (type B1) in accordance with *Standard Drawing No. SR.11 i*s to be used in the following cases:
a. in streets adjacent to parks;
b. industrial streets, where heavy duty barrier type is to be used (i.e. standard barrier type, increased to minimum 200mm); and
c. shopping centres and in locations where high pedestrian volumes are likely or for greater pedestrian safety, e.g. on the frontage of schools, major sporting facilities and parks.

(5) Semi-mountable type kerb is to be used in the following cases:
a. at Medians and Traffic Islands, semi-mountable or low profile kerb type SM3 for concrete infilled treatments and type SM5 for landscaped treatments in accordance with *Standard Drawing No. SR.11; a*nd
b. at Roundabouts, kerb type M5 on the outer island and type SM4 on the centre island in accordance with *Standard Drawing No. SR.11*.

(6) Where proposed construction adjoins existing kerb and channel the new construction is to be tapered smoothly to the existing kerb and channel.

(7) The grading of kerb and channel is to conform to the road centreline grading, although at locations where the kerb and channel grading diverts from the centreline grade, such as at intersections or on superelevated curves, the minimum channel grade is to be 0.45%.

Note: Every endeavour is to be made to improve the appearance, by providing vertical curves of as long a length as possible, at all changes of grade.

(8) At all changes in horizontal alignment, kerbs and kerb and channel are to be constructed with horizontal curves.

Note: To improve appearance where small deflections occur (e.g. on tapers), horizontal curves shall be as long as possible.

(9) Kerb ramps are to be provided at all kerb returns with a minimum of four (4) to be provided at intersections. Kerb ramps are also to be provided at park entrances and where linking footpaths to the existing footpath network.

1.1.14 Signs and Road Markings

(1) Permanent signing and road marking are to be in accordance with the *AS 1742.2 - 2009 "Manual of Uniform Traffic Control Devices" (MUTCD)* and other relevant, Department of Transport and Main Roads Design Manuals and Guidelines.

(2) The removal of pavement marking must be carried out in such a manner as to minimise damage to pavement surface and avoid ambiguous or confusing delineation.

(3) Acceptable methods of removal of pavement marking include high pressure water blasting, grinding and strip sealing.

(4) 'Blacking out' a pavement marking is only suitable as a temporary measure.

(5) Street name signs shall be manufactured and erected in accordance with *Standard Drawing No. SR.26* at each intersection.

Note:
a. All signs and pavement markings shall be adequately dimensioned to ensure accurate setting out.
b. "No Stopping" signs or yellow lines are not required for zones that are already prohibited by road rules.
c. A combination of yellow lines and "No Stopping" signs is not recommended.
d. "No Stopping" signs should only be provided where there is no kerb and channel.
e. Where there is kerb and channel, then yellow lines only should be applied.

1.1.15 Road Edge Guide Posts and Safety Barriers

(1) Road edge guide posts are to be provided at all locations where concrete kerb and channel is not constructed e.g. half road construction; tapers; ends of roads; etc.

Note:
a. For the warrants and locations of safety barriers, refer to the current *Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers.*
b. It is to be confirmed in writing by the designer that the proposed safety barriers are in accordance with the abovementioned design manual and that the safety barrier site selection criteria have been addressed.
c. The Local Government may request the installation of road edge guide posts at the top of embankments where safety barriers are not installed.

1.1.16 Bus Stops

(1) Unless otherwise specified, bus stops must be positioned, designed and constructed in accordance with the Queensland Government Public Transport Infrastructure Manual.

(2) Unless otherwise specified, bus stops (including indented bus bays) are to be located on arterial, sub-arterial and major collector roads.

(3) Where bus bays front any lot on a road, a driveway is to be constructed for each affected lot not within the bus set down area but within the tapers of the bus bay or outside the bus bay area.

(4) The location of any shelter must be placed clear of any adjacent concrete pathways and must be placed a minimum of 1.0m from any property boundary.

Division 2 Flexible Pavement Design

1.2.1 General

(1) This section is intended to facilitate the checking and approval of proposed pavement designs for municipal roadworks associated with reconfigurations and building development works, however, it is not intended to be used in lieu of design manuals.

Pavement designs are to be undertaken in accordance with the methodologies outlined in current Austroads and TMR guidelines except where specific exemptions have been granted by council.

1.2.2 Determination of Subgrade Strength

(1) A design CBR is to be determined for each identifiable unit defined on the basis of topography, geological and drainage condition of the site.

(2) The four day soaked CBR at a compaction of 100% Standard compaction is to be the standard test. The adopted subgrade design CBR shall be based on the lower of:
a. the four day soaked CBRs at a compaction of 100% Standard Compaction at each borehole; and
b. where there is no significant level difference between the current FSL and the proposed FSL, the in-situ CBRs measured in accordance with TMR Test Method Q114B at that borehole.

Note:
a. Tests are to be carried out in a NATA registered laboratory.
b. Test results and pavement design are to be submitted to the Local Government for acceptance prior to a request for subgrade box inspection.
c. For design purposes, it should be assumed that sub-soil drainage will be required at all locations where the bottom of the pavement is below the natural surface.

(4) The sampling is to be randomly located within each length of the proposed roadway with constant subgrade material.

(5) For less than five results the Design CBR shall be the least determined soaked CBR test result.

(6) For five or more results, the Design CBR shall be the 10th percentile of all determined soaked CBR test results.

(7) The samples shall be taken generally in the position of the outer wheel path on both sides of the proposed road.

(8) The frequency of testing required is to be in accordance with the specifications outlined in Table 1.2.1.

Table 1.2.1 — Frequency of Testing for Subgrade

Testing Type	Roads < 120 M	Roads > 120 M

LABORATORY	3 tests on subgrade	1 test on subgrade every 50m
Soaked CBR's and Routine Soil Tests	Lab tests on all relevant materials	Lab tests on all relevant materials
FIELD	3 tests on subgrade	1 test on subgrade every 50m
Dynamic Cone and Field Moisture Content	As per interval listed above	As per interval listed above

1.2.3 Pavement Materials

(1) Pavement materials are to be in accordance with the requirements of the *Department of Transport and Main Roads Specifications Category 5 – Pavements, Subgrade and Surfacing.*

(2) Pavement types are to be as defined in accordance with Table 1.2.3 - Minimum Pavement Course Thickness.

(3) Granular pavement materials are to be Type 2 in accordance with *Department of Transport and Main Roads Specification "MRTS 05 Unbound Pavements"*.

(4) A bitumen prime coat and a 10mm bituminous seal coat, are to be placed on the upper granular layer immediately under the asphalt layer.

1.2.4 Determination of Design Traffic

(1) All pavements are to be designed for a 20 year service life, unless advised otherwise by council. In the absence of actual traffic data, or modelling indicating future traffic volumes, the design ESA's in Table 1.2.2 are to be adopted for the various road classifications.

Table 1.2.2 — Design ESA's by Road Class

Description	Road Class	ESA's
Access Place	A (30 Lots Max.)	5×10^4
Access Street	A1 (75 Lots Max.)	1.0×10^5
Collector	B (300 Lots Max.)	2.0×10^5
Major Collector	C (1000 Lots Max.)	1.0×10^6
Industrial	D	7.0×10^6
Sub-Arterial & Arterial	E	ESAs as approved by Council

1.2.5 Minimum Pavement Thickness

(1) Pavement and asphaltic concrete course thickness are to be in accordance with Table 1.2.3 - Minimum Pavement Course Thickness.

(2) For subgrades that are unable to adequately support construction traffic (i.e. will not support a loaded water cart without deformation), the material should be treated as a soft subgrade and one of the following measures is to be adopted:
a. some form of working platform is to be provided (minimum depth 300mm, CBR 15 material);
b. use of geotextile sheeting; and
c. stabilise the soil by use of a mixture of cement or lime.

Table 1.2.3 — Minimum Pavement Course Thickness

Minimum Total Pavement Thickness (mm) (excluding AC Surfacing)					
CBR of Subgrade	**A**	**A1**	**B**	**C**	**D AND E**
1 and 2	Pavement Thickness to be determined by the latest edition of Austroads and TMR guidelines				
3	350	390	430	Pavement Thickness to be determined by the latest edition of Austroads and TMR guidelines	Pavement Thickness to be determined by the latest edition of Austroads and TMR guidelines
4	325	340	370		
5	270	325	330		
6	240	270	325		

7	225	240	270		
8	225	230	250		
9	225	225	230		
10	225	225	225		
12	225	225	225		
14	225	225	225		
16	225	225	225		
18	225	225	225		
20	225	225	225		
Minimum Course Thickness					
Asphalt Surface Course	35mm (AC14)	35mm (AC14)	35MM (AC14)	As required in accordance with TMR Specification 'MRTS30' for AC14	As required in accordance with TMR Specification 'MRTS30' for AC14
Base Course Type 2.1 (Min CBR80)	125	125	125	135	150
Upper Sub Base Type 2.3 (Min CBR45)	100	100	100	100	150
Lower Sub Base Type 2.5 (Min CBR15)	As required to obtain minimum thickness (100mm minimum layer thickness)				

Note:

a. This table has been derived from Austroads Guide to Pavement Technology Part 2 : Pavement Structural Design – Design Chart of Granular Pavements with Thin Bituminous Surfacing.
b. CBR is the lower of the 4 day soaked CBR and the in-situ CBR.
c. If upper sub-base course minimum thickness cannot be achieved, then base course material is to be used for full pavement depth.
d. Class C, D and E roads will require a bound layer beneath the asphalt surface course to prevent premature fatigue failure of the surface layer. Layer thicknesses to comply with *TMR specification MRTS30.*

Division 3 Electrical Reticulation and Street Lighting

1.3.1 Design Criteria

(1) Public lighting design shall comply with the provisions of *Australian Standard AS/NZS 1158 Lighting for Roads and Public Spaces* - all parts.

(2) The minimum street lighting Category is PR4.

(3) Road Street lighting poles and luminaires must be supplied at "Network Public Lighting (NPL) 3" tariff unless otherwise advised in writing by the Ipswich City Council.

(4) A pedestrian underpass or tunnel lighting category to be accordance with *Austroad Guidelines and AS/NZ 1158 Series*.

(5) All cross road conduits for electricity shall be at an angle between 45 degree and 90 degree to the road centreline.

(6) Cross-road electricity conduits must not cross over or under any other service, but must remain clear over the full length. This requirement does not apply to any service which is aligned parallel with the centreline of the road, and located within its service allocation.

(7) The design form outcome is to maintain consistency and uniformity in terms of luminaire type, lamp type, wattage, mounting height, outreach size and spacing.

(8) Outreach of 4.5m length should be avoided where practical.

(9) All poles and outreaches must be hot dipped galvanised.

(10) The use of coloured poles and outreaches must be limited to heritage and decorative types, specifically "Nostalgia" and "Avenue", unless otherwise permitted in writing by Ipswich City Council.

(11) All coloured poles, outreaches and luminaire housings or hood must be powder coated and uniform black colour only.

(12) Lighting design shall minimise obtrusive lighting on existing and future dwellings. Maximum illuminance values shall not exceed values of light technical parameters listed in *AS4282:2019 table 3.2*. Environmental zones are determined as per *AS4282:2019 table 3.1*.

(13) Shields, covers or shrouds may be used to reduce effects of obtrusive lighting with written permission of Ipswich City Council and where lighting category compliance is demonstrated.

(14) Where lighting is proposed within a 6 kilometre radius of an airport then aeroscreen based lenses must be used so that there is no upward light projection in accordance with civil aviation regulation.

(15) All luminaires are to be Light-emitting Diode (LED) type light source.

(16) The Luminaire must be included on the Australian Energy Market Operator (AEMO) Load Table for NPL 3 public lighting.

(17) The luminaire performance must satisfy the specifications provided in Table 1.2.4.

(18) Street lighting circuits do not require residual circuit protection in accordance with *AS/NZS 3000:2018 Electrical Installations Clause 2.6.3.2.3.3 Exception 2.*

(19) All equipment shall be designed and installed in accordance with the requirements of this policy and as detailed in *Standard Drawings Nos. SL.01 – SL.08*.

(20) Where pits for underground cable installation are to be used the bottom entry of conduits to pits is not permitted.

Table 1.2.4 — LED Luminaire Performance Specifications

<table>
<tr><th>Criteria</th><th>Performance</th></tr>
<tr><td>Material</td><td>No polycarbonate elements unless UV stabilised</td></tr>
<tr><td>Thermal Endurance</td><td>Cooling system shall consist of a heat sink only and shall be resistant to debris build up to maintain heat dissipation performance.</td></tr>
<tr><td>Design Life</td><td>Luminaires – minimum service life of 20 years
Lamp – 50,000 hours to achieve a lamp lumen maintenance factor of L90 or higher (based on 4560 hours per annum to exceed 12 years for a lamp replacement cycle).</td></tr>
<tr><td>Lumen depreciation</td><td>After 50,000 hours, when tested in accordance with Clause 5.7 of AS1158.6 shall be greater than or equal to L90.</td></tr>
<tr><td>Correlated Colour Temperature (CCT)</td><td>Nominal CCT shall be 4000 (K).</td></tr>
<tr><td>Colour Render Index (CRI)</td><td>Colour Rendering Index to be between 70 and 100 at full lumen output.</td></tr>
<tr><td>Luminaire control</td><td>Local photo electric (PE) cell.
Fitted with NEMA 7 pin socket and wired to the LED driver for monitor and remote control
Where NEMA 7 pin plug is not installed then a weather resistant cover is to be installed to prevent material ingress to socket.</td></tr>
<tr><td>Luminaire Efficiency</td><td>NPL 3 streetlight LED luminaire efficiency to be equal or exceed the following lumens / per watt requirement:

Major Roads - V Lighting Categories:
<table>
<tr><td>Category</td><td>Efficiency
(Lumens / Watt)</td></tr>
<tr><td>V3</td><td>110</td></tr>
<tr><td>V5</td><td>110</td></tr>
</table>
</td></tr>
</table>

	Minor Roads - PR Lighting Categories:	
	Category	Efficiency (Lumens / Watt)
	PR3	100
	PR4	110
	PR5	110

Table 1.2.4 — LED Luminaire Performance Specifications continued

Criteria	Performance
Environment Conditions	Must be suitable to operate within South East Queensland temperature ranges and climatic conditions.
Component connections	Spigot fixing sizes in accordance with Clause 4.10 AS1798. Depth of spigot as specified in Table 2.2 AS1158.6. Capable of wireless control. Fitted with NEMA 7 contact pattern photocell receptacle base and matching shorting plug.
Safety	Electrical interference must not exceed limits prescribed in AS CISPR 15.
Mass weight	No greater than 7.2kg for P Category lighting schemes and 15kg for V Category lighting schemes.
Power system and quality	Minimum power factor is 0.9. Harmonic distortion and flicker shall satisfy electrical entity specifications.
Warranty	Warranty must be provided for full replacement of the luminaire due to failure for minimum 10 years. Includes the LED light engine and power supply and driver. Failure is deemed where there is less than 70% light output from the LED module.

Note:

a. The installed lighting should where practical reduce and minimise installation, operational and maintenance cost.
b. This can be achieved by:
   (i) maximising lighting offsets, thereby minimising the quantity of luminaries; and
   (ii) selection of appropriate luminaire type and wattage.

1.3.2 Street Lighting Pole Location

In general, lighting poles are to be located—

a. on the same side as the constructed concrete footpath for residential access streets;
b. in line with property side boundaries; and
c. to facilitate maintenance access by an authority service vehicle, pole offset is to be 1.0m for zero boundary lots.

You have reached the end of the page.