



CIVIL DESIGN REQUIREMENTS FOR DEVELOPERS

Part B : Roadworks & Construction Plans

Prepared by
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1. DESIGN STANDARDS

ROAD DESIGN

Longitudinal Grades & Crossfalls

The following design criteria shall be satisfied unless otherwise stated or approved by the Council's Representative.

Longitudinal Grades

- Minimum longitudinal fall on kerb and channel shall not be less than:
 - 0.40% (1 in 250) along straights
 - 0.50% (1 in 200) in court bowls and around returns
- Vertical curves are required where changes in grade exceed:
 - 1.0% along straights
 - 2.0% around returns

Pavement Crossfalls

- Desirable crossfall: 3.0% (1 in 33).
- Maximum crossfall: 4.0% (1 in 25).
- Absolute maximum crossfall (with the approval of the Council's Representative): 5.0% (1 in 20).
- Minimum crossfall: 2.5% (1 in 42).
- Absolute minimum crossfall (with the approval of the Council's Representative): 2.0% (1 in 50).

Nature strip crossfalls

- Desirable fall from building line to top of kerb: 5.0% (1 in 20).
- Maximum fall from building line to top of kerb shall be determined by the vehicle crossing design criteria.
- Top of kerb shall not exceed 50 mm above building line.
- Reverse fall on the nature strip shall:
 - not extend for more than 40 metres in any section
 - not occur at a low point
 - be able to drain from a downstream vehicle crossing

Cut and Fill

- Maximum cut batter: 20.0% (1 in 5).
- Maximum fill batter: 10.0% (1 in 10).

Street Name Signs

General

- Street Name signs shall be provided in accordance with:
- AS 1742.5 - 1997, Manual of Uniform Traffic Control Devices, Part 5 - Street Name and Community Facility Name Signs, and
- RCA Traffic Engineering Manual, Vol. 2, Signs and Markings, July 1986.

Sign Shape and Colour

Street Name signs shall be of rectangular shape with the long axis horizontal. Colours used will be WHITE lettering on a GREEN reflective background. Where the street name requires only a single line, the minimum depth of the sign shall be 150 mm and the lettering used shall be series DN or CN at least 100 mm in height. Where two lines are required, the minimum depth of the sign shall be 240 mm.

Where the orientation of the sign does not adequately indicate the direction to the street, eg. at exits to some roundabouts, an arrow may be incorporated in the sign.

Signs indicating “private streets” (e.g. a road under the care and maintenance of a body corporate) are to include the words “Private Street” on the name plate, below the street name.

Location

Signs shall be provided at intersections in accordance with AS 1742.5-1997.

Road Pavement Design

The road pavement shall be designed in accordance with current Austroads pavement design guidelines. Designs for light traffic pavements shall be based on a 95% confidence limit.

For flexible pavements hot mix asphalt shall be used as the pavement surfacing material. A guide to the selection of the type of hot mix asphalt for various traffic ranges is available from Giummarra, G.J. (ed.) (1995), Sealed Local Roads Manual: Guidelines to Good Practice for the Construction, Maintenance and Rehabilitation of Pavements, p. 2.17.

The minimum pavement thickness, including surfacings, shall be 250 mm for roads that incorporate kerb and channel.

The crushed rock layers of the pavement shall extend at least 150 mm beyond the back of kerb.

All freshly constructed flexible pavements shall be primed, except where the proposed treatment is an asphalt pavement of more than 100 mm depth. The pavement is primed to achieve and maintain a bond between the pavement surface and the bituminous surfacing.

The minimum depth of asphalt for all pavements shall be 80 mm:

- Wearing Course: 30 mm minimum
- Base Course Asphalt: 50 mm minimum

Subdivision Construction

The construction work shall comply with Council’s current approved specifications.

Road Pavement Markings and Traffic Signs

All required road pavement markings and traffic signs shall comply with the current edition of AS 1742, Manual of Uniform Traffic Control Devices.

All pavement markings shall be applied with thermoplastic or cold applied plastic pavement marking material with glass beads.

All redundant road pavement markings shall be removed by grinding (or other method approved by Council's Representative) prior to installation of new linemarking.

Service Authority Assets

For new subdivisions a separate plan shall be included showing the locations and offsets of all services.

All existing services within 5m of proposed works must be shown on plans and drainage longitudinal sections. Contact Melbourne One Call Service Inc via 1100 or Fax No. 1300 652 077.

All existing services that may conflict with proposed assets (e.g. drains) are to be physically located and levelled. The level, offset, size, material and service type are to be shown on relevant longitudinal or cross sections.

Works shall be designed in accordance within the minimum clearance requirements specified by each authority.

Refer final construction plans to each service authority (e.g South East Water, United Energy, Multinet Gas, Telstra and where relevant WAG and Optus) requesting the authority to advise if they have any objections to the proposed works.

Developers shall submit to Council a letter from each of the Service Authorities stating that they have no objection to the developer's proposal.

Fire hydrant spacing shall be in accordance with the current edition of the Water Industry Technical Standards, Technical Standards Manual, Volume 1, Water Reticulation Design Manual.

Blue reflective raised pavement markers shall be located at an offset of 25 mm from the centre line of the road towards the hydrant location.

Underground Services Conduits

Underground services conduits are to be installed in new subdivisions. Conduits shall also be installed for road rehabilitation or reconstruction works where soil types are not conducive to boring.

All conduits are to be placed in locations and made of materials approved in writing by the appropriate service authority.

Size, depth and material of conduits are to be shown on typical cross section.

Conduits are to be placed at a depth below the bottom of the road pavement, with a fall of 1 in 150 from end to end, extending 300 mm beyond back of kerb and plugged at both ends.

The location of underground conduits shall be marked on the face of kerb with an appropriate letter, 50 mm high.

KERB & CHANNEL

Profiles

The following profiles shall be adopted (as applicable):

Residential: Roll-over kerb & channel and roll-over kerb with fall away tray.

Commercial: Barrier kerb & channel and barrier kerb with fall away tray.

Industrial: Semi-mountable kerb & channel and semi-mountable kerb with fall away tray.

Centre medians, roundabouts, traffic devices, etc. (for all land uses):

Semi-mountable kerb & channel and semi-mountable kerb with fall away tray.

All vehicle crossings in commercial and industrial areas shall have the kerb & channel replaced with a layback.

In special circumstances, other profiles will be considered for approval.

VEHICLE CROSSINGS

Standard Drawings

Vehicle crossings shall be constructed or reinstated in accordance with Council's current standard drawings.

Change of Grade

Desirable maximum grade change between road crossfall and vehicle crossing crossfall: 10.5%.

Minimum Crossfall

Proposed vehicle crossings shall not have crossfalls flatter than 1 in 100, if necessary the crossing shall be humped to create adequate reverse fall.

Joints

Expansion Joints:

Shall be provided on both sides of the vehicle crossing and across the building line.

Tooled Joints:

Shall be located as shown on the standard drawing, with a maximum spacing of 1.5 metres.

New Residential Subdivisions

Where mountable kerb and channel is provided, vehicle crossings shall not be constructed prior to the construction of a dwelling on an allotment.

FOOTPATHS

- Path width: 1.5 metres
- Desirable crossfall: 2.0% (1 in 50).
- Maximum crossfall: 3.0% (1 in 33).
- Minimum crossfall: 1.5% (1 in 67).
- Material: 32 MPa concrete
- Expansion joints maximum spacing : 15 metres
- Tooled joints maximum spacing : 1.5 metres
- Minimum depth: 125 mm for new subdivision developments
- Offset from property boundary 200 mm

Notes:

Pavements specified are not suitable for expansive soils or fill material.

PAVERS

Design and installation to be approved by Council. Contact Council's Development Approvals Engineer for details.

BICYCLE PATHS

- Path width: 2.5 metres
- Desirable crossfall: }
- Maximum crossfall: } Refer to Footpaths
- Minimum crossfall: }
- Minimum radius at intersections: 10 metres
- Material: 32 MPa concrete
- Surface Finish: Bescon Tuff-Top 686 dark brown toppings, one bag per 10 m²
- Sealer: Bescon Staseal 686 coloured sealer, 2 coats
- Expansion joints maximum spacing : 15 metres
- Tooled joints maximum spacing : 2.5 metres
- Minimum depth: 125 mm

Notes:

- Assumes firm sub-grade (CBR > 5)
- Pavements specified are not suitable for expansive soils or fill material.
- Bicycle path design shall conform with Guide to Traffic Engineering Practice, Part 14 - Bicycles, Austroads, Sydney, 1993.

SPLAYS

Local streets and collector roads: 3.0 metres minimum.

Other roads: 5.0 metres minimum

TRAFFIC ISLANDS AND ROUNDABOUTS

Kerbing for traffic islands and roundabouts shall be semi-mountable.

As directed by Council's Representative, infills for roundabouts will be either:

- 150 mm thick, coloured concrete with stamped pattern; or
- planted.

As directed by Council's Representative, infills for traffic islands will be:

- 150 mm thick, coloured concrete with stamped pattern.

STREET LIGHTING

Design and installation to be approved by Council. Contact Council's Development Approvals Engineer for details.

TREES

Where possible, all trees must be preserved and protected at all times.

Where tree roots greater than 40 mm in diameter need to be disturbed, contact shall be made with Council's Team Leader - Parks and Reserves for comments on the most appropriate action to be taken.

RESERVES

A grated pit is to be located at the low point of the reserve and is to discharge into the drainage system.

The minimum fall on the reserve: 1 in 150.

A vehicle crossing is to be provided for access of maintenance vehicles to the reserve.

Seek additional requirements from Kingston City Council's Team Leader - Parks and Reserves.

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2. PRESENTATION OF DESIGNS

GENERAL

The Consultant shall ensure that:

- Sufficient setout information, details and notes are shown such that the designer's intent is obvious to a contractor.
- Council plans retain some level of consistency.
- Construction costs will not increase as a direct result of lack of information shown on the plans.
- Plans are presented in a professional manner that is both clear and easy to read.

SHEET SIZE

Sheets shall be size A1 (841 mm x 594 mm), and with lettering at least 1.5 mm high when reduced to A3 (420 mm x 297 mm).

TITLE BLOCK

The following text is to be provided in the title block prior to producing final plots:

- Drawing title (includes project name, suburb and extent of works)
- Drawing number and file number (supplied by Council)
- Sheet numbers
- Datum reference (Australian Height Datum)
- Name and signature of designer, draftsman, checking officer, and approving officer
- Revision details
- Legend

DRAWING SCALE

Drawings shall not be smaller than the following scales when plotted to suit an A3 size sheet:

- Locality plan 1 : 10,000
- Road alignment plan 1 : 500
- Road intersection plan 1 : 200
- Road longitudinal section 1 : 500 Horiz, 1 : 50 Vert
- Road cross sections 1 : 200 Horiz, 1 : 100 Vert
- Drainage alignment plan 1 : 500
- Drainage longitudinal section 1 : 500 Horiz, 1 : 50 Vert

Unscaled plans must include the words "NOT TO SCALE".

LOCALITY PLAN

Clearly show the site of the proposed works.

LAYOUT PLANS

All sets of plans in excess of 15 sheets shall have an index on the front page.

Chainage zero to commence at a building line of the adjoining street. Where possible increasing chainages to be in the direction of the north point and increasing from left to right across the page.

The orientation of the plan is to be such that the north direction is within the first or fourth quadrants.

The plan is to include all existing features as specified in the existing features survey. Other details to be shown include:

- North arrow
- Scale bar
- Drawing legend
- Extent or limit of work
- Allotment boundaries
- Title description
- Street names
- House numbers
- Lot numbers
- Easement boundaries
- Easement details
- Permanent Survey Marks
- Temporary Bench Marks
- Chainage
- Existing and proposed surface levels
- Contours (existing and proposed)
- Existing and proposed back, face, and lip of kerb and kerb & channel
- Labels indicating types of kerb and channel
- TP chainages and offsets
- Sections of road pavement to be rehabilitated, cold planed or repaired
- Pavement profile
- Full setting out detail (if necessary a separate plan for setting-out may be used)
- Construction details as required
- Proposed areas of cut or fill
- Drainage alignment, including pipe sizes
- Pit centre line chainages and offsets and pit numbers
- House drains
- Concrete works to be replaced
- Saw cut lines
- Vehicle crossings
- Pram crossings
- Footpaths and nature strips
- Thickened footpath at vehicle crossings
- Location, type and size of services
- Underground service conduits
- Proposed alterations to services
- Proposed pavement markings and traffic signs
- Existing pavement markings and traffic signs to be altered
- Proposed street furniture
- Obstructions that may affect , or be affected by the construction of the works, such as buildings, structures, fences, street furniture, vegetation
- Other details relevant to the development

It may be necessary to enlarge various details of the plan for clarity. These should be identified alphabetically, for example, "*see Detail A*", and be displayed either on the same sheet or on an additional plan sheet.

ROAD LONGITUDINAL SECTIONS

Longitudinal sections shall be shown along all lengths of proposed kerb and channel and shall align with the chainages shown on the plan view.

Where appropriate, the longitudinal section shall show both future grade lines and temporary works.

Detail to be shown on the longitudinal section shall include:

- Property line levels
- Existing lip of channel levels
- Design lip of channel levels
- Chainages
- Vertical curve details
- Datum RL
- Design grades (%)
- Crossing underground services
- References to intersection details
- Notes as appropriate

ROAD CROSS SECTIONS

Cross sections shall be shown at 10 metre intervals.

A typical cross section is to be provided.

Cross sections shall be adequately dimensioned.

Details to be shown includes:

- Existing surface levels
- Design levels including property line, edge of path, and back, invert and lip of kerb levels and crown or centre line.
- Distances or offsets to crown lines
- Design crossfall on road pavements
- Datum RL
- Design profile of kerb and channel
- Boxing details for reconstructed pavements
- Subsoil drain details
- Size, depth and material of service conduits
- N, S, E or W building lines to be labelled (one per page)
- Notes as appropriate

INTERSECTION DETAILS

Larger detail plan views of the intersection shall be drawn in cases where information required is too detailed to be shown on the main plan.

All curves shall reference to an arc setout table.

Longitudinal sections around curves shall be drawn when level information cannot be clearly shown at tangent points and quarter points on a detail plan. Long sections around the kerb return shall show the following information:

- Design top of kerb and design lip of channel levels.
- Existing surface levels.

- Chainage along lip of channel or back of kerb and corresponding chainage in the street.
- Tangent points shall be numbered both on the plan and the long section. Design levels shall be shown at these points and at quarter points.
- All longitudinal sections around kerb returns shall extend far enough to tie in with the longitudinal section of the main street.
- The longitudinal section shall label transitions between kerb and channel and barrier or semi mountable kerb where applicable.

The plan shall show all set out information for all tangent points in terms of chainage and offsets and all set out information necessary for radii.

Contours shall be shown on the plan view at 50 mm increments in level.

DRAINAGE LONGITUDINAL SECTIONS

Details to be shown on the drainage section include:

- Chainages of all pits
- Design inlet and outlet levels
- Existing invert levels
- Design finished surface levels
- Pipe grades, size and class
- Pipe capacity and full flow velocity
- Backfill material
- Pit numbers
- Underground services within close proximity of proposed works including property connections
- Clearance dimension between underground services and outside of proposed drainage pipe

PIT SCHEDULE

A pit schedule is required for all drainage works and shall include:

- Pit numbers
- Pit size and type
- Finished top of pit level
- Pit depth
- Type and size of pit lid
- Construction notes

DRAINAGE BEDDING AND BACKFILLING

A detail drawing is required showing:

- Bedding material
- Backfill material
- Compaction standards

Note: Drainage trenches under a road pavement or within 1 metre of back of kerb are to be backfilled with Class 3 crushed rock to the underside of the pavement or within 150 mm of the finished surface.

OTHER DETAIL DRAWINGS

- Pavement details

- Sections through traffic islands and roundabouts.

ADDITIONAL INFORMATION TO BE SUBMITTED

All Works

Three (3) paper copies of final drawings shall be submitted for approval.

Consultants designing projects with an estimated construction cost of greater than \$10,000 shall also submit to Council electronic copies of all final drawings prior to receiving approval to commence works.

Electronic files shall be e-mailed to alan.west@kingston.vic.gov.au or posted on disks to the attention of Team Leader - Engineering Design, as either:

- (i) computer files compatible with AutoCAD Release 14, or
- (ii) hand drawn plans that have been scanned and converted into a file that is compatible with AutoCAD Release 14. (This service is provided by a number of companies including Autotech Computing Pty Ltd, ph. (13) 9887 8466.)

GENERAL NOTES

The General Notes listed in APPENDIX 1 - General Notes, page 17, must be included on the plan:

PROJECT SPECIFIC NOTES

The Notes listed in APPENDIX 2 - Sample Project Specific Notes, page 18, are examples of, but not limited to, those that may be required on the drawings.

ADDITIONAL INFORMATION TO BE SUBMITTED

In addition to the design drawings, the consultant must also submit the following information:

All Works

- Proof of ownership and rights of access.

New Subdivisions

- Correspondence and approval from service authorities.

APPENDIX 1 - General Notes

1. Works shall be constructed in accordance with the City of Kingston's Standard Drawings and Specifications, current at the time of construction.
2. All TBM levels are to be confirmed by the Contractor prior to commencement of works.
3. All set out is to back of kerb unless noted otherwise.
4. The location of existing service authority assets shall be proved by the Contractor prior to commencement of construction. Any services shown on the drawings are offered as a guide only and are not guaranteed as correct.
5. The Contractor is responsible to obtain information regarding ground conditions throughout the works and to ascertain whether shoring of the trench is required.
6. All trenching shall comply with the Code of Practice for Trenches. Before commencing excavation on any trench greater than 1.5 metres in depth, a notice is to be sent to the Victorian Workcover Authority in accordance with the Code.
7. It is the Contractor's responsibility to maintain the construction area in a safe condition and to be sure that adequate barriers, lights and signs are installed and maintained where necessary in accordance with AS 1742.3-1996 and as directed by the Superintendent.
8. Minimum concrete compressive strength: 32 MPa.
9. Concrete reinstatement to be carried out between existing joints.
10. All road crossings, vehicle crossings, footpaths, and right-of- ways to be saw-cut to existing soil or rock prior to excavation.
11. All UPVC pipes and fittings, including house drain connections, shall be sewer quality.
12. Property drains shall have an inspection opening at each change of direction.
13. At the completion of construction works , all areas disturbed during the construction, eg. kerbs, footpaths, vehicle crossings, road pavement, signs, street furniture, etc, are to be reinstated by the Contractor at the Contractor's cost.
14. Excavated materials, including pipes, pits and broken concrete are to be removed from the site. All tipping charges are to be borne by the Contractor.
15. The site shall have all rubbish removed and be left in a clean and tidy condition to the satisfaction of the Superintendent.
16. This drawing is not to be scaled, use written dimensions only.

APPENDIX 2 - Sample Project Specific Notes

1. TBM is a spike located (insert location).
2. Contact the (insert position title) of the (insert name of the responsible service authority), telephone (insert number), at least 48 hours before any excavation in the vicinity of the (insert name of asset) in (insert name of street and suburb).
3. The project area contains hazardous services including high pressure gas mains, oil transmission lines, water mains, and underground electric and telecommunications cables. For assistance in locating service authority assets or in an emergency contact:

SERVICE	CONTACT	TELEPHONE

4. **DANGER** - Transmission Pressure Gas pipeline
 - High Pressure Gas Pipeline
 - Co-axial Cable
 - Westernport-Altona-Geelong (WAG) Oil Pipeline

Minimum clearance:

Contact: Ph.:

..... clear days notice prior to the commencement of work must be given to the Superintendent.

5. All new or altered services must be in accordance with the requirements of the relevant service authority.
6. All trees must be preserved and protected at all times.
7. Cross sections between the footpath and proposed kerb is representative only. Cross sections may require cut or fill.
8. Remove by grinding (or other method approved by Council's Superintendent) all redundant linemarking prior to installation of new linemarking.
9. Sub-soil drains are to be installed behind the kerb and channel. The sub-soil drains are to connect to the nearest downstream stormwater pit. Where a pit does not exist at the upstream end of the sub-soil drain, construct a 450 mm x 450 mm flushing pit with a 750 mm x 750 mm concrete frame and lid insert. Pit walls and base to be 150 mm thick.
10. All existing house drains to be relaid at a minimum grade of 1 in 100 from the front of path to the point of discharge in accordance with City of Kingston standard drawings. All pipes and fittings to be 100 mm dia. sewer quality UPVC, with an inspection opening placed at each change of direction.
11. No drainage lines are to be backfilled until inspected and passed by Council's Superintendent.
12. The location of house drains shall be marked on the back of the footpath with a "H".
13. All service conduits are to be inspected and passed by Council's Superintendent prior to backfilling.
14. The location of all underground conduits shall be marked on the face of kerb with an appropriate letter, 50 mm high.
15. Reconstruct all vehicle crossings from the front of path. Where the existing section of footpath behind the crossing is inferior to the proposed new crossing, sawcut and remove this section of footpath, reconstructing the full crossing.
16. All disturbed naturestrips to be neatly trimmed and tidied and seeded in accordance with the specifications.

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