

# Crossover Guidelines and Specifications

# **Acknowledgement:**

This guideline has been prepared with reference to the Western Australian Local Government Association (WALGA).

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# Glossary

Name	Definition / Commentary				
Alignment of Path	The location of the path within the verge area				
Battle-axe lots	A block of land behind another, with access from the street via a separate crossover				
Block pavement structure	Block patterns which are generally used in the construction of driveways				
Clearance	The space required between the path and an obstruction				
Concrete Apron	The transition between the road surface and the crossover				
Crossfall	Grade across the path width; necessary for adequate drainage				
Crossover	The extension of a driveway from the edge of the property boundary to the edge of the road				
Crossover wings	The flared edges of a driveway				
Culvert	A tunnel carrying an open drain under a road				
Edge Restraint	A support constructed at the edge of a driveway to improve longevity				
Gates	Vertical elements to control access to the path				
Grade	The slope of a path or driveway				
Gutter	Edge of road where it meets the kerb				
Hazards	Any object or situation that constitutes a risk to users				
Kerb	Roadway edge treatment				
Narrow lots	Describes lots with a frontage width of <12m				
Obstructions	An object that constitutes an obstacle to crossover/path users				
Paired crossovers	Combined crossovers which service more than one property and located adjacent to one another				
Shared Path	A pathway that is specifically intended to be used by both pedestrians and bike riders. Note that all paths may be used by cyclists and pedestrians.				
Side-entry pits	A stormwater pit located adjacent to the kerb and designed to collect stormwater from the road surface				
Sightlines	The visual envelope of vehicles and path users				
Standards and Policies	Applicable guidelines for use in Western Australia				
Stopping sight distance	The distance a vehicle driver needs to be able to see in order have room to stop before colliding with something in the roadway				
Street Lights	A light which illuminates surrounding roads and footpaths, usually mounted on a tall post				
Street Trees	Trees located within the verge area				
Utility boxes	An enclosure which houses utility services for electrical, communications, etc.				
Vegetation	Soft landscaping element				

# 1 Introduction

#### 1.1 Objective

To provide property owners, builders and designers with the information required to ensure that crossovers meet the requirements of the City of Melville.

#### 1.2 Purpose

This document comprises guidelines for planning and design of residential and commercial crossovers. It provides a consistent framework to assist builders and their contractors to understand and meet the requirements of the City of Melville.

This Guideline provides for crossover design that references statutory and bestpractice guidance documentation which includes the following:

- Austroads Guide to Road Design
- Australian Standards AS2890.1:Off-street parking (2004)
- State Planning Policy 3.1 Residential Design Codes (R-Codes)
- WAPC Liveable Neighbourhoods

#### 2 Planning Guidelines

#### 2.1 Crossover Approval

In accordance to Schedule 9.1, Clause 7 of the Local Government (Uniform Local Provisions) Regulations 1996, an application to the City of Melville must be made by the landowners to request approval to construct a crossover.

Contact: Verge Infrastructure Officer Technical Services City of Melville 10 Almondbury Road BOORAGOON WA 6154

As the crossover is located within the road reserve, the City or any utilities provider (water, sewer, telecommunications, electricity/gas), may disturb the crossover due to their works. Crossovers will be reinstated in accordance with these specifications and guidelines.

All applications for the construction of a crossover will be required to comply with these guidelines and specifications and are subject to the approval of the City. Any departures must be discussed with the City of Melville through the crossover application process.

#### 2.2 Crossover Density

The principle for designing crossovers in Western Australia is to design for the least amount of crossovers in a given area where possible (R-Codes). This improves the safety of path users and lowers costs associated with constructing and maintaining crossovers. Minimising the number of crossovers also reduces the level of conflict and friction along busier roadways, and creates additional space for street trees, pedestrian crossing and on-street parking.

All residential lots are entitled to access irrespective of the constraints of location (AS2890.1: Clause 3.2.3a).

#### 2.3 Crossover Location and Position

Crossover location shall be determined and crossovers designed to address the following issues and criteria:

#### 2.3.1 Prohibited Locations

Australian Standards (AS2890.1: Figure 3.1) sets out exclusion zones for access driveways related to the proximity of adjacent intersections (refer to Drawing No.1146A3-11E). This exclusion zone may be increased if necessary for signalised intersections to ensure that the driveway is not within the influence of traffic queues. This requirement does not apply to any access driveway serving a property which would otherwise be denied access due to the physical impossibility of meeting the requirement. Additional restrictions are placed on non-domestic driveways and should be discussed with the City of Melville.

#### 2.3.2 Sightlines to Path Users

Crossovers are to be positioned such that sight lines between path users (pedestrians and cyclists) and vehicles are unobstructed by permanent fixtures (fences, trees, etc.).



#### 2.3.3 Distance to Obstructions

All elements of the crossovers shall be located at a minimum distance to obstructions, including wings, as follows:

- Side-entry pits: 1.0m
- Street trees: 2.0m
- Utility boxes: 1.0m (recommended)
- Street lights/Power poles: 1.0m (recommended)
- Bus stops: 1.0m
- Bus shelters: 1.5m
- Pedestrian ramps: 1.0m (recommended)

#### Guidelines and Specifications for Crossovers

If crossovers must be constructed within this distance, the obstruction shall be relocated wherever possible at the property owner's cost. In special cases (e.g. development at brownfield sites, narrow battle-axe driveways and/or paired aprons) where relocation of obstructions is not feasible, justification should be provided to the City of Melville and a decision to be made on a case by case basis.

#### 2.3.4 Paired Aprons

Paired aprons are recommended for narrow lots. Refer Drawing No.1148A3-11E for adjacent crossovers.

#### 2.3.5 Geometry

Crossovers shall be aligned at right angles to the street alignment, wherever possible (*R*-Codes).

#### 2.3.6 Assessment Criteria

A list of criteria for crossover designs are provided below:

- Crossovers shall be adequately paved and drained in accordance with City of Melville requirements.
- The visual and physical continuity of the footpath is to be maintained (or reinstated) through the crossover.
- Crossovers shall provide unobstructed vehicle access to the individual lots and motorists must be able to enter or reverse from the lot in a single movement. (For roads with more than 5,000 vpd, all vehicles must be able to exit in forward gear.)
- If the frontage road is two-way and has more than two lanes and there is a provision for right turns either into or out from the crossover, then additional consultation with City of Melville may be required.

# 3 Design Guidelines

#### 3.1 Layout

Crossover configuration must be provided for the safe turning movement of vehicles both from and onto the road carriageway.

#### 3.1.1 Width

Residential crossover width is defined as follows:

- A minimum of 3.0m for all developments.
- A maximum of 4.5m for lots with a frontage of 12.5m or less.
- A maximum of 6m for lots with a frontage in excess of 12.5m.
- Commercial crossover width 4.5m minimum to 10m maximum.

#### 3.1.2 Length

Storage length must be provided (crossover and/or driveway length) for a vehicle to stand clear of the roadway. Where the entrance has a gate, the set back from the road edge to the gate shall be a minimum of 6m to allow for this (Main Roads Driveways Design Guide). Physical limitation such as verge depth will affect this value. A length less than 6m requires justification and is subject to the City of Melville's approval.

#### **3.1.3 Pedestrian Interface**

Crossovers are defined to be 'Road-Related Areas' under the Road Traffic Code 2000. Pedestrians and cyclists in these areas have priority over vehicles. For this reason it is a requirement that the pedestrian infrastructure be provided in a continuous manner across all crossovers, maintaining path crossfall and material in preference to the crossover construction. Therefore, the crossover must be designed to match path levels, where applicable.

#### 3.1.4 Grades and Levels

- Path construction guidelines dictate a maximum crossfall of 2.5% to cater for people who have a disability (*Austroads Guide to Road Design 6A, Clause 5.6*). To allow the path to shed water and to avoid ponding, a crossfall of 2.0-2.5% is recommended.
- The maximum longitudinal gradient of a crossover at the property boundary is defined by Australian Standards to be 5% (*AS2890.1:2004, Clause 2.6.2 and Clause 3.3a*). This allows safe Disability Access from the path to the property boundary.
- The maximum gradient of a crossover is defined in Section 2.2.1.2 in *IPWEA's Subdivision Guidelines* is 1 in 8 (12.5%)
- In areas of steep grades, *the IPWEA Subdivision Guidelines Section 3.3.4: Verge and property Grades* states that the verge on the high side may be graded at 2.0% for three metres and then battered to suit the finished contours at a maximum of 16%.

#### 3.2 Kerbing and Edging

Existing kerbing shall be removed from the crossover location and replaced with a standard City of Melville crossover apron.

#### 3.2.1 Crossover Apron Design

To provide smooth transition from the road edge to the crossover, and particularly to the pedestrian path, a concrete apron shall be constructed in accordance with City of Melville Drawing No.1145A3-11E.

#### 3.2.2 Edging

A restraining edge is required for block paving residential crossovers, as follows: Rigid block or concrete edging is to be provided at the perimeter of all block paved crossovers to prevent lateral movement of the header course. Restraints shall be robust enough to withstand vehicle impact and prevent the lateral movement of the paving blocks. Edge restraints shall be installed to the same level as the crossover.

#### 3.3 Block Pavers

Block pavers shall be a minimum thickness of 60mm.

Applicable block paving patterns for driveway crossovers are 45 or 90 degree herringbone 45 degree diamond pattern as shown on City of Melville Drawing No. 1148A3-11E. The most preferred pattern is 45 or 90 degree herringbone because the pattern tightly interlocks the bricks and it can handle significant weight, which is ideal for driveways. Rectangular stretcher bond are not permitted, as the structural integrity is inferior to other patterns.

#### 3.4 Existing Paths

The path shall be kept in a safe condition at all times, with appropriate signage installed, in accordance with the relevant Australian Standards (AS1742), warning pedestrians of construction works until reinstatement work is completed.

Where the existing footpath or shared path is in-situ concrete, in good condition and is over 100mm thick, the footpath must be preserved, otherwise it should be reinstated to meet the above. The crossover shall be constructed to match levels of the existing/reinstated concrete path. Paths must be reinstated within two (2) days of commencement of works.

#### 3.5 Redundant Crossovers

Redundant crossovers shall be removed and the verge, kerbing and footpath reinstated to match existing and be in accordance with the City of Melville Verge Treatment Policy.

# 4 References

Austroads Guide to Road Design - Part 3: Geometric Design Austroads Guide to Road Design - Part 6A: Paths for Walking and Cycling Australian Standards AS2890.1:Off-street parking (2004) Australian Standard AS1428.1: Design for access and mobility Guidelines for Placement of Power Poles within Road Reserves in Built-Up Areas (Western Power, 2006) IPWEA Local Government Guidelines for Subdivisional Development Local Government (Uniform Local Provisions) Regulations 1996 Road Traffic Code 2000 (WA) State Planning Policy 3.1 - Residential Design Codes (R-Codes) WAPC Liveable Neighbourhood WALGA Crossover Guidelines

#### 5 Specifications

#### 5.1 Crossover Positioning

- a) Minimum 0.5m from the side property line (as per R-Codes including battle-axe driveways servicing a subdivided block).
- b) Minimum 6.0m from the intersection tangent point (TP) in accordance with AS/NZS 2890.1 as per drawing 1146A3-11E.
- c) Roads under the control of Main Roads Western Australia (MRWA) require a minimum of 6m clearance from the intersection tangent point in accordance with AS/NZS2890 and the <u>MRWA Driveway Policy</u>.
- d) For crossovers located near traffic lights, Main Roads Western Australia guidelines and standards apply. Additional restrictions are placed on non-domestic driveways and should be discussed with the City of Melville.
- e) Crossovers shall be constructed at right angles (90 degrees) to the street alignment, wherever practicable. Refer City of Melville Drawing No. 1146A3-11E.
- f) Street Furniture Clearance
  - Side-entry pits: 1.0m
  - Street trees: 2.0m
  - Utility boxes: 1.0m (recommended)
  - Street lights/Power poles: 1.0m (recommended)
  - Bus stops: 1.0m
  - Bus shelters: 1.5m
  - Pedestrian ramps: 1.0m (recommended)

Where physical limitations may prevent attaining these minimum clearances, contact the City of Melville.

#### 5.2 Schedule of Requirements

#### 5.2.1 Residential

- a) Width
  - A minimum of 3m for all developments.
  - A maximum of 4.5m for lots with a frontage of 12.5m or less.
  - A maximum of 6m for lots with a frontage in excess of 12.5m.

#### b) **Depth**

- Concrete: 100mm minimum.
- Brick paving: paver depth to be 60mm minimum (in accordance to AS 2890.1 2004).

# c) Wings

The width of 'wings' on the apron at kerb line shall be 1.2m. In special cases where the standard wing width cannot be achieved, approval must be sought from the City of Melville. Please refer to Paired Aprons Drawing No. 1148A3-11E.

# d) Gradient

- Maximum crossover gradient over paths is 2.5% for the first 2.1m.
- At the property boundary, the maximum longitudinal gradient is 5%.
- In areas of steep grade the verge on the high side may be graded at 2.0% for three metres and then battered to suit the finished contours at a maximum of 16%.

#### e) Levels

The back of apron must be a vertical height of at least 150mm above the channel level of the road, or level to the top of kerb. The crossover shall match up with:

- The existing verge level if it is of uniform height with the adjacent verges.
- The average level of the two adjacent crossovers or verge levels where there are no crossovers.

#### 5.2.2 Commercial

- a) Width
  - 4.5m minimum to 10m maximum.

#### b) Depth

• Concrete: 150mm minimum including F62 mesh.

#### c) Concrete

High early strength – 32Mpa at twenty-eight (28) days with a non-slip finish.

#### d) Wings

The width of 'wings' on the apron at kerb line shall be 1.5m. In special cases where the standard wing width cannot be achieved, approval must be sought from the City of Melville.

#### e) Gradient

Maximum crossover gradient over paths is 2.5% for the first 2.1m.

- At the property boundary, the maximum longitudinal gradient is 5%.
- In areas of steep grade the verge on the high side may be graded at 2.0% for three metres and then battered to suit the finished contours at a maximum of 16%.

# f) Levels

The back of apron must be a vertical height of at least 150mm above the channel level of the road, or level to the top of kerb. The crossover shall match up with:

- The existing verge level if it is of uniform height with the adjacent verges.
- The average level of the two adjacent crossovers or verge levels where there are no crossovers.

# 5.3 Construction

# 5.3.1 Excavation

Excavation for the crossover shall be taken to the levels, lines and grades as set by the City of Melville crossover specifications. All excavations shall be executed cleanly and efficiently to provide for a consolidated sound base free of depressions, soft spots or any deleterious materials.

- 1. The contractors shall be responsible for ensuring that all excavated material is removed from the site at the same time as the excavation is carried out. No excavated material shall be stockpiled on site or buried in the verge.
- 2. Existing barrier or semi-mountable type kerbing is to be cut with a concrete saw and removed without damage to road pavement, remaining kerbing or services. To facilitate neat removal and subsequent reinstatement, the concrete or bitumen to be removed shall be completely separated from the adjoining concrete or bitumen by means of a concrete or bitumen saw.
- 3. When an existing concrete path has thickness of 100m or more, in good condition, and adjacent to the lot boundary or kerb line, the crossing shall be constructed either side of the concrete path.
- 4. The existing path shall be removed and replaced where it is damaged, is less than 100mm thick or has an incorrect gradient. Crossovers must never take precedence over the path (AS1428.1).
- 5. The subgrade shall be watered, thoroughly compacted and shaped to provide a dense uniform surface.

# 5.3.2 Concrete Crossover

# a) Compaction

The subgrade shall be compacted to a minimum of 95% Maximum Dry Density (MMDD).

#### b) Concrete

Only ready-mixed concrete shall be used in all works, and all concrete used shall develop a minimum compressive strength of 25MPa at twenty-eight (28) days for residential crossovers, and 32MPa at twenty-eight (28) days for commercial crossovers. The concrete to be used shall be composed of a mixture of sand, cement, aggregate and water to give strength specified with a maximum slump of 80mm. The maximum aggregate size shall be 20mm. Concrete and its placement shall conform to AS1379 (1991) and AS3600 (1988) respectively. A copy of the concrete delivery docket is to be provided to the City of Melville as part of the subsidy application.

# c) Reinforcement

Steel reinforcement may be required in the construction of concrete crossovers, for multi-unit developments with higher levels of projected traffic and load.

# d) Placing concrete

The base shall be thoroughly and evenly moistened, but not saturated, prior to placing concrete. All stones or other deleterious materials shall be removed from the base prior to pouring concrete. Concrete shall be evenly placed to the depth specified and shoveled into position continuously and spaded, especially at all edges, to give maximum density. No concrete shall extend on the road surface. No break in operation shall be permitted from time of placing concrete to finishing.

# e) Kerbing

Reinstatement of existing kerbing to match existing profile on the street. Concrete strength to be a minimum of 25MPa @ twenty eight (28) days.

# f) Finishing

Surface finish shall be obtained by screeding to the correct levels and finished with a non-slip dense surface, free of any depressions, float marks, irregularities, honeycomb sections or slurry likely to cause excessive surface wear.

# g) Jointing

Expansion joints shall be full depth joints and filled with bitumenimpregnated canite or similar approved material and butyl mastic sealer. Expansion joints should be located at:

- 1. The lot boundary and both sides of a path where there is a path
- 2. Where it adjoins a rigid structure or any public utility structure.
- 3. The ends of the existing kerbing where kerbing has been removed.
- 4. 6m maximum spacing on long crossings.

Contraction joints shall be made with an approved jointing tool or saw cutting with 2m maximum spacing both laterally and longitudinally.

#### 5.3.3 Block Paved Crossover

# a) Base Course

Base course shall consist of road base or crushed limestone (50mm maximum particle size) compacted to give a 100mm thickness. Material to be spread, rolled, water-bound and corrected as necessary to the required shape and grade.

A copy of the base material delivery docket is to be provided to the City of Melville as part of the subsidy application.

# b) Compaction

The base course and subgrade shall have a density of not less than 95% MMDD in accordance with AS1289.5.7.1-2006

c) Bedding layer

The bedding layer shall be a minimum of 30mm loose screeded thickness such that the final compacted thickness is a minimum 20mm. The bedding layer shall be paving sand, free of deleterious soluble salts and other contaminants. The sand should be of uniform moisture content, and is to be spread over the compacted base course and screeded in a loose condition.

# d) Paving Blocks

The paving units shall be either clay or concrete, with a minimum thickness of 60mm thick complying with AS4455.2:2010.

A copy of the paving units delivery docket is to be provided to the City of Melville as part of the subsidy application.

#### e) Laying

The paving units shall be laid onto bedding sand. Part bricks shall be neatly cut to size with hydraulic guillotine, bolster or saw.

#### f) Joint filling

As soon as possible after compaction, dry joint filling sand shall be broomed over the paving units and into the joints. Excess sand shall be removed as soon as the joints are filled.

#### g) Edge restraint

Edge restraint shall be provided to withstand vehicle impact and prevent lateral movement of the paving units. The use of sand/cement mortar is not permitted as an edge restraint. Edge restraint shall be in accordance with Drawing No.1148A3 11E.

#### h) Kerbing

Reinstatement of existing kerbing to match existing profile on the street. Concrete strength to be a minimum of 25MPa @ twenty eight (28) days.

#### 5.4 Contractor Responsibilities

The Contractor shall be responsible for:

- 1. Setting out of levels, construction, inspections and measuring up of work.
- 2. Cutting existing kerbing with a concrete saw and removing the same without damage to pavement or remaining kerbing or services.
- 3. Ensuring that no material run off enters the City's drainage system, or stains the road.
- 4. Removal and disposal of all surplus material from the site and leaving the site in a clean and tidy condition at all times.
- 5. Removal of all formworks without damage to concrete or pavement or existing kerbing.
- 6. Reinstatement to kerbing, concrete or brick paving or bituminous road surfaces damaged during the course of the works.
- 7. Reinstatement to any verge or private property with a landscape mix soil.
- 8. The repair of any damage to Public Utility Services, local government assets and private property during the course of the works.
- 9. The protection of private property from damage and the new crossover surfaces from rain damage or vandalism.
- 10. Liaising and notifying all parties impacted by the works.

- 11. Cutting of all bitumen where removal is required.
- 12. Payment of all fees charged for waste disposal from site.
- 13. Reinstatement of existing footpaths to have priority through the newly constructed crossover.
- 14. Ensuring that an approval for crossover construction has been issued by the City of Melville.
- 15. Traffic management in accordance with AS 1742.3 and the Main Roads Code of Practice for Works on Roads.

#### 6 Drawings

Drawing Number 1145A3-11E – Residential concrete crossover standard construction Drawing Number 1146A3-11E – Residential crossover standard positioning Drawing Number 1148A3-11E – Residential crossover standard paving styles Drawing Number 1360A2-17E – Commercial concrete crossover standard construction









# **Revision History**

Date		Revised by	Approved By	Approved
procedure amended	Description of Change	(Document Owner)	(Supervisor)	(Date)
7/04/2022	Removed discrepancies between drawings and guideline wording and updated Residential Crossover Standard Paving Styles 1148A3-11E	Verge Infrastructure Supervisor	Manager Engineering	7/04/2022
17/3/2020	Commercial Crossover Standard Construction Plan no. 1360A2-17E updated &Residential Crossover Standard Construction Plan no. 1145A3- 11E	Works Coordinator	Manager Engineering	17/3/2020
10/10/2019	Residential Drawing 1146A3-11E Amendment 3 Updated	Verge Infrastructure Supervisor	Manager Engineering	10/10/2019
29/07/2019	Footer Added	Verge Infrastructure Supervisor	Works Coordinator	29/07/2019
20/02/2019	Reviewed	Verge Infrastructure Supervisor	Works Coordinator	20/02/2019
29/11/2018	New Document – Reviewed and Updated	Works Coordinator	29/11/2018	29/11/2018
26/09/2014	New Office 2010 Version	Works Coordinator	Manager Engineering	26/09/2014
08/02/2012	First Uploaded to the BMS	Works Coordinator	Manager Operations	07/02/2012