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Bushfire Management Plan (Subdivision Application)

Lot 701 (10) Caporn Street, Sinagra

Prepared for
Buckley Land Pty Ltd
by Strategen

September 2019

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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Bushfire Management Plan (Subdivision Application)

Lot 701 (10) Caporn Street, Sinagra

Strategen is a trading name of
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September 2019

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Document control

Client: Buckley Land Pty Ltd

Report Version	Revision No.	Purpose	Strategen author	Reviewed by	Submitted to Client	
					Form	Date
Draft Report	Rev A	For client review	Brodie Mastrangelo (BPAD 45985, Level 1)	Linden Wears (BPAD 19809, Level 3)	Electronic (email)	21/12/2018
Final Report	**Rev 0**	**Issued for use: to accompany Structure Plan amendment**	**Louisa Robertson (BPAD 36748, Level 1)**	**Zac Cockerill (BPAD 37803, Level 2)**	**Electronic (email)**	**22/02/2019**
Draft Report	Rev B	For client review	Louisa Robertson (BPAD 36748, Level 1)	Linden Wears (BPAD 19809, Level 3)	Electronic (email)	28/05/2019
Final Report	**Rev 1**	**Issued for use: to accompany Structure Plan amendment**	**Louisa Robertson (BPAD 36748, Level 1)**	**Linden Wears (BPAD 19809, Level 3)**	**Electronic (email)**	**18/06/2019**
Final Report	**Rev 2**	**Issued for use: to accompany subdivision application**	**Louisa Robertson (BPAD 36748, Level 1)**	**Linden Wears (BPAD 19809, Level 3)**	**Electronic (email)**	**13/09/2019**

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1. Proposal details

1.1 Background

Urbis, on behalf of Buckley Land Pty Ltd, is seeking to amend the East Wanneroo Cell 2 – Adopted Structure Plan No.4 to facilitate future subdivision and residential development within Lot 701 (10) Caporn Street, Sinagra (the project area), located in the City of Wanneroo. The project area is currently zoned 'residential precinct', which specifies an R-code of R20. The site plan (Figure 1) identifies:

- 30 residential lots
- A temporary public access way (PAW) accommodating a temporary turnaround and serving a temporary subsurface drainage function. The PAW will be converted to a residential lot upon completion of future development to the west.
- internal public road layout
- temporary turn around.

1.2 Site description

The project area comprises approximately 1.53 ha and is surrounded by (see Figure 2):

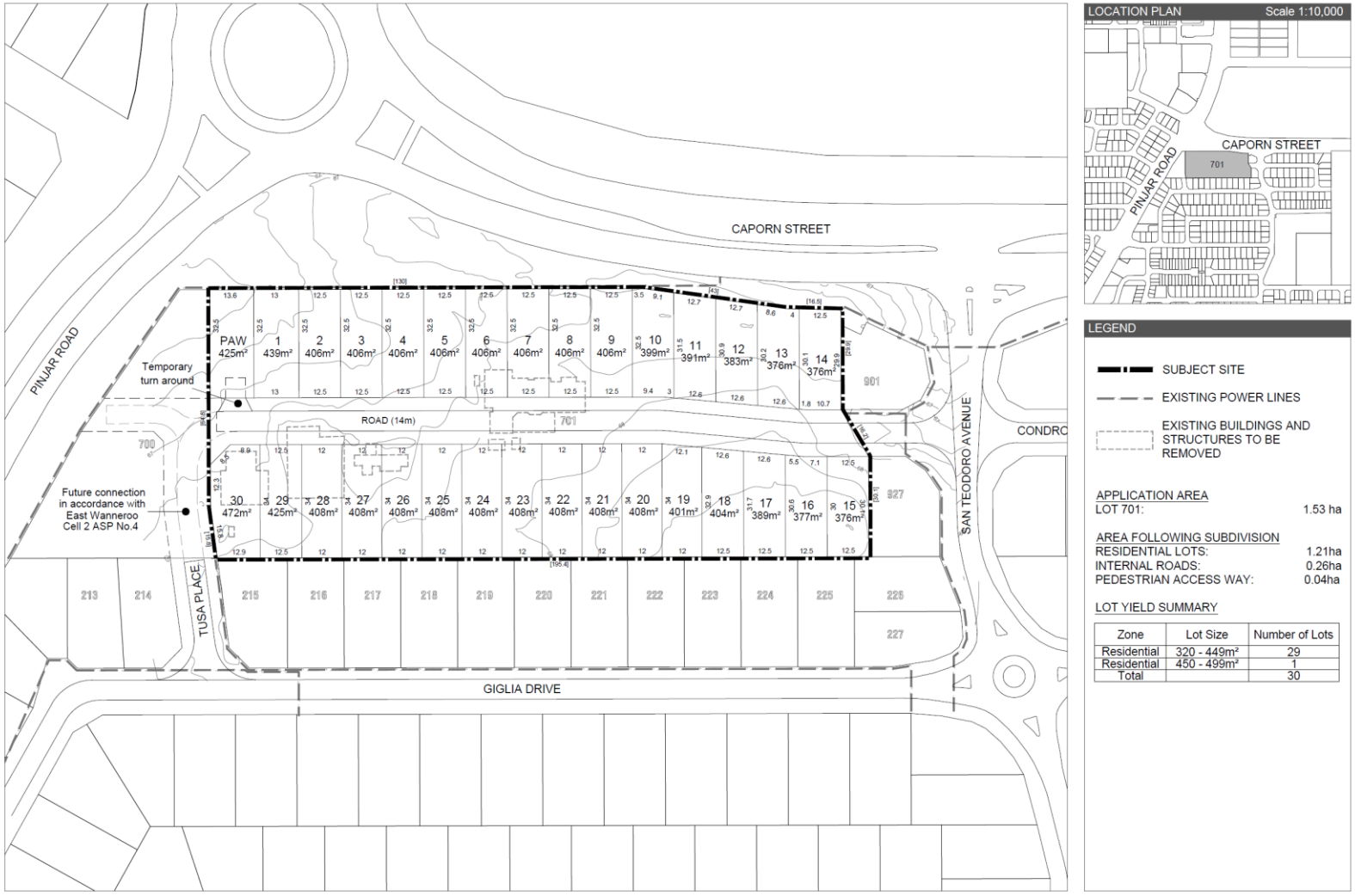
- Caporn Park (Bush Forever site 469) and the 25 m wide Caporn Street road reserve to the north
- existing residential development to the south
- existing residential development to the east
- existing residential development and the 35 m wide Pinjar Road reserve to the west.

A portion of the project area is designated as bushfire prone on the WA *Map of Bush Fire Prone Areas* (DFES 2018; see Plate 1).

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measure 6.3 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

Plate 1: Bush Fire Prone Area mapping (DFES, 2018)



LEGEND

- SUBJECT SITE
- EXISTING POWER LINES
- EXISTING BUILDINGS AND STRUCTURES TO BE REMOVED

APPLICATION AREA
LOT 701: 1.53 ha

AREA FOLLOWING SUBDIVISION
RESIDENTIAL LOTS: 1.21ha
INTERNAL ROADS: 0.26ha
PEDESTRIAN ACCESS WAY: 0.04ha

LOT YIELD SUMMARY

Zone	Lot Size	Number of Lots
Residential	320 - 449m²	29
Residential	450 - 499m²	1
Total		30

URBIS

AMENDED PLAN OF SUBDIVISION
LOT 701 CAPORN STREET, SINAGRA

Level 14, The Quadrant, 1 William Street | Perth WA 6000 Australia | +61 8 9346 0500 | URBIS Pty Ltd | ABN 50 105 256 228

DATA SOURCE: Land Surveys
PROJECTION: PCG 94

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CLIENT: Buckley Land PTY LTD

1:1,000 @ A3
0 10 20m

PROJECT NO. P0002464
DRAWING NO. 02
DATE 09.03.19
REVISION d

Source: Urbis 2019

Figure 1: Site plan

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Figure 2: Site overview

N

Scale 1:2,750 at A4

0 25 50 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 10/09/2019

Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Roads

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Data source: Nearmap: Aerial image, flown 06/2019. Landgate: Cadastre, 2019. Buckley Land Pty. Ltd.. Development layout, 9/2019. Created by: hsullivan

2. Environmental considerations

2.1 Native vegetation – modification and clearing

As the project area is predominantly cleared, heavily degraded and all existing vegetation comprises non-native species, the proposal will not result in clearing of any significant native vegetation. Table 1 provides a summary of a search of publicly available environmental data.

Table 1: Summary of environmental values

Environmental value	Present within or adjacent to project area (Y/N)	Description
Environmentally Sensitive Area	Y	The ESA over the Caporn Park is likely to be associated with the potential TECs in the area and the Bush Forever site identified (BF469).
Wetlands	N	No wetlands were identified.
Waterways	N	No waterways were identified.
Potential Threatened Ecological Communities listed under the EPBC Act	Y	EPBC listed (endangered) TEC Banksia Woodlands of the Swan Coastal Plain identified throughout adjacent land. Banksia woodland is likely to occur in Caporn Park to the north.
Potential habitat for threatened fauna species	Y	Threatened and priority fauna (endangered category) identified within adjacent land. Carnaby's Black Cockatoo habitat identified in the form of potential feeding areas within the Caporn Park to the north of the project area and confirmed roosting areas (buffered) adjacent to the project area. Potential Quenda habitat was also identified in Caporn Park.
Bush Forever Site	Y	Caporn Park is located within Bush Forever site 469.
DBCA managed lands and lands and waters (includes legislated lands and waters and lands of interest)	N	No DBCA legislated lands or waters or lands of interest were identified.
Vegetation associations or complexes with <30% of Pre-European extent remaining outside of constrained areas	Y	The project area was found to be within the Karrakatta Complex-Central and South which comprises predominantly open forest and Banksia woodland. There is less than 30% of the Karrakatta Complex-Central and South remaining of pre-European extent proportion within Perth and Peel.
Environmental offset sites	N	It was confirmed that no environmental offset sites occur within or adjacent to the project area.

No Aboriginal heritage places were identified within the project area or adjacent land.

Due to the highly degraded nature of the project area, including presence of introduced tree species, grass and built form, the proposal is unlikely to have significant environmental impacts. APZs are achievable within existing non-vegetated and low threat areas (i.e. Caporn Street road reserve) and will not require clearing of vegetation with the potential to support conservation significant species.

The Bush Forever designated Caporn Park to the north of the project area is likely to house the conservation significant species that are mapped as having potential to occur within the project area, given the remainder of land adjacent to the project area is predominantly residential development comprising roads, small gardens, paths and low threat POS.

2.2 Revegetation / Landscape Plans

Future landscaping within the project area will be limited to internal road verges and the PAW. Proposed landscaping within the internal road verges and the PAW will be engineered to achieve an excludable vegetation extent under Clause 2.2.3.2 (f). The PAW also serves a drainage function, however all drainage is to be located subsurface.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Strategen assessed effective slope and classified vegetation and exclusions within 150 m of the project area through on-ground verification on 7 December 2018 in accordance with *AS 3959—2009 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2009) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix 1.

A summary of vegetation exclusions within the 150 m assessment area is as follows:

- existing surrounding non-vegetated land is excluded under Clause 2.2.3.2 (e) (i.e. existing buildings, roads, paths, infrastructure, etc.)
- existing surrounding low threat managed land is excluded under Clause 2.2.3.2 (f) (i.e. managed POS [San Teodoro Park] to the southeast, road verges, managed gardens/landscaping, etc.)
- existing narrow strip of scrub vegetation within the eastern Pinjar Road verge and connecting grassland vegetation within Lot 108 is excluded under Clause 2.2.3.2 (b), being a single area of vegetation less than 1 ha and not within 100 m of other vegetation being classified
- land to be modified to low threat or non-vegetated as part of proposed development within the project area (i.e. buildings, roads, paths, road verges, PAW, managed gardens/landscaping etc) will be excluded under Clause 2.2.3.2 (e) and/or (f).

San Teodoro Park to the southeast is partly managed, featuring manicured lawn, a playground and sparse retention of trees within the western half. This area does not pose a significant bushfire risk to proposed development due to the park being greater than 100 m from the project area and fragmentation/degradation of the remnant vegetation within the east of the park.

Managed vegetation also occurs throughout the adjacent Pinjar Road and Caporn Street road verges and surrounding residential gardens. These areas comprise thin strips of vegetation along the verges and traffic islands of these major roads and feature a heavily mulched ground cover.

3.1.2 Effective slope

Strategen assessed effective slope under classified vegetation through on-ground verification on 7 December 2018 in accordance with AS 3959. Results were cross-referenced with DAFWA 2 m contour data and are depicted in Figure 3.

Classified vegetation to the north of the project area (Plots 1 and 2) has an effective downslope of >0-5° in relation to the project area. On completion of development, no other classifiable vegetation will be located within the 150 m assessment area.

3.1.3 Summary of inputs

Figure 3 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works and implementation of low threat landscaping throughout the project area. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 2.

Table 2: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Applied vegetation classification/exclusion	Effective slope	Comments
1	Class A Forest	Downslope >0-5°	Vegetation within Caporn Park
2	Class B Woodland	Downslope >0-5°	Vegetation within Caporn Park
3	Excluded – Clause 2.2.3.2 [b]	N/A	Vegetation within Pinjar Road reserve and Lot 108
4	Excluded – Clause 2.2.3.2 (e) and (f) - modified to low threat or non-vegetated	N/A	Vegetation within project area
5	Excluded – Clause 2.2.3.2 (e) or (f)	N/A	All remaining land

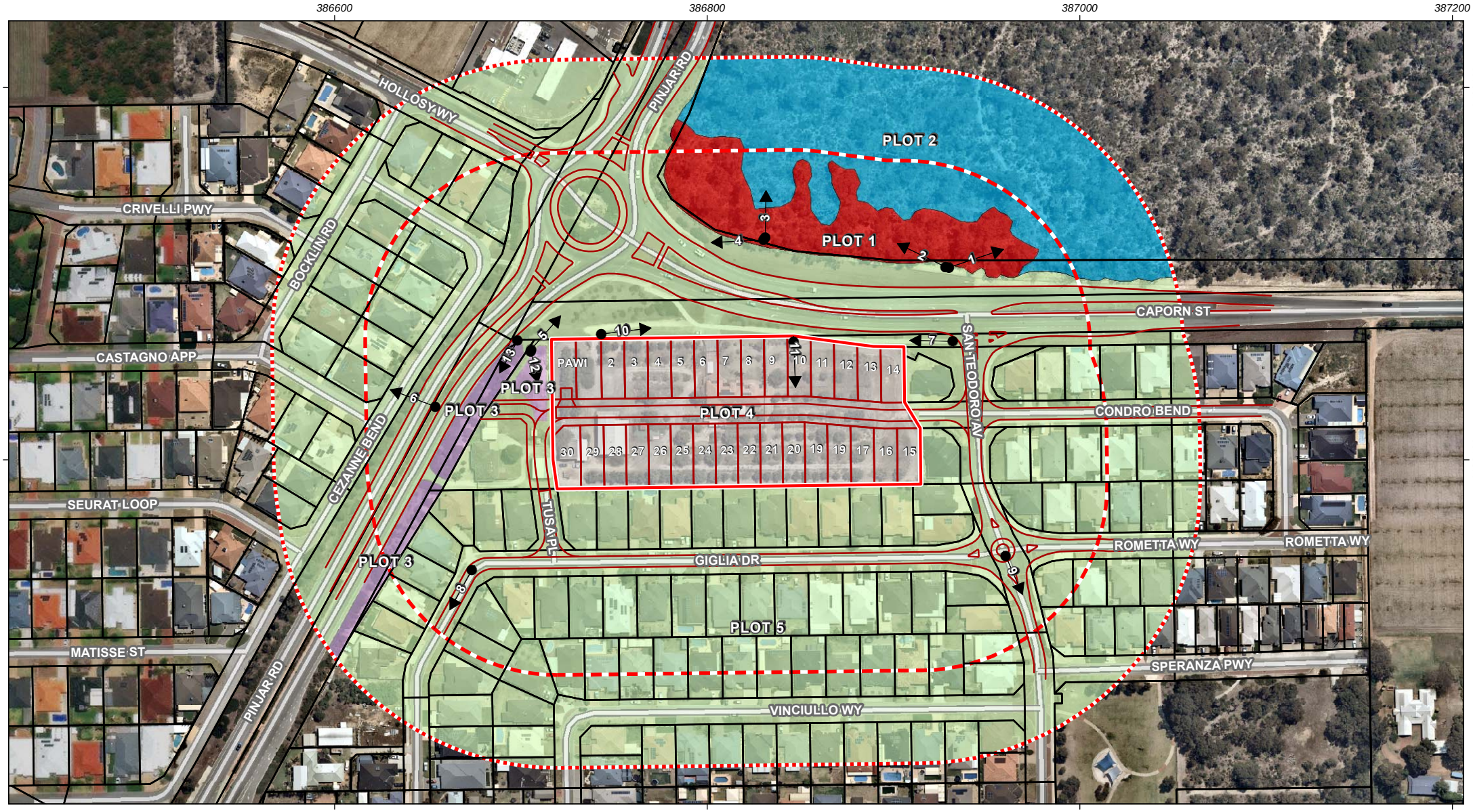

Figure 3: Vegetation classification and effective slope

N

Scale 1:2,750 at A4

0 25 50 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 10/09/2019

Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Proposed development
- Photo point and direction
- Roads

Vegetation classification

- Class A Forest
- Class B Woodland
- Excluded under Clause 2.2.3.2. (b)
- Excluded under Clauses 2.2.3.2. (e) and (f)
- Modified to non-vegetated and low threat

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Data source: Nearmap: Aerial image, flown 06/2019. Landgate: Cadastre, 2019. Buckley Land Pty. Ltd.. Development layout, 9/2019. Created by: hsullivan

3.2 Assessment outputs

The Site Plan (Figure 1) indicates a proposed lot layout; therefore, Strategen has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area. The Method 1 procedure incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation class
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed future development and subsequently informs the standard of building construction and/or setbacks required for proposed habitable development to potentially withstand such impacts.

The results of the BAL contour assessment are detailed in Table 3 and illustrated in Figure 4. The highest BAL applicable to the external boundary of the proposed lots is BAL–19. Through the implementation of building setbacks (to be determined for each applicable lot at the subdivision/BAL compliance/building stage), the highest modified BAL applicable to the proposed lots is BAL-12.5.

Table 3: BAL contour assessment results

Method 1 BAL determination					
Plot	Vegetation classification	Effective slope	Separation distance	Highest BAL	Potential modified BAL^
1	Class A Forest	Downslope >0-5°	45 m	**BAL-19**	BAL-12.5
2	Class B Woodland	Downslope >0-5°	60 m	BAL-12.5	N/A
3	Excluded – Clause 2.2.3.2 [b]	N/A	N/A	BAL-LOW	N/A
4	Excluded – Clause 2.2.3.2 (e) and (f)	N/A	N/A	BAL-LOW	N/A
5	Excluded – Clause 2.2.3.2 (e) or (f)	N/A	N/A	BAL-LOW	N/A

^ The modified BAL can only be confirmed once the building plans for the relevant lots have been prepared to demonstrate compliance with the setback, which will be recommended at the BAL compliance stage.

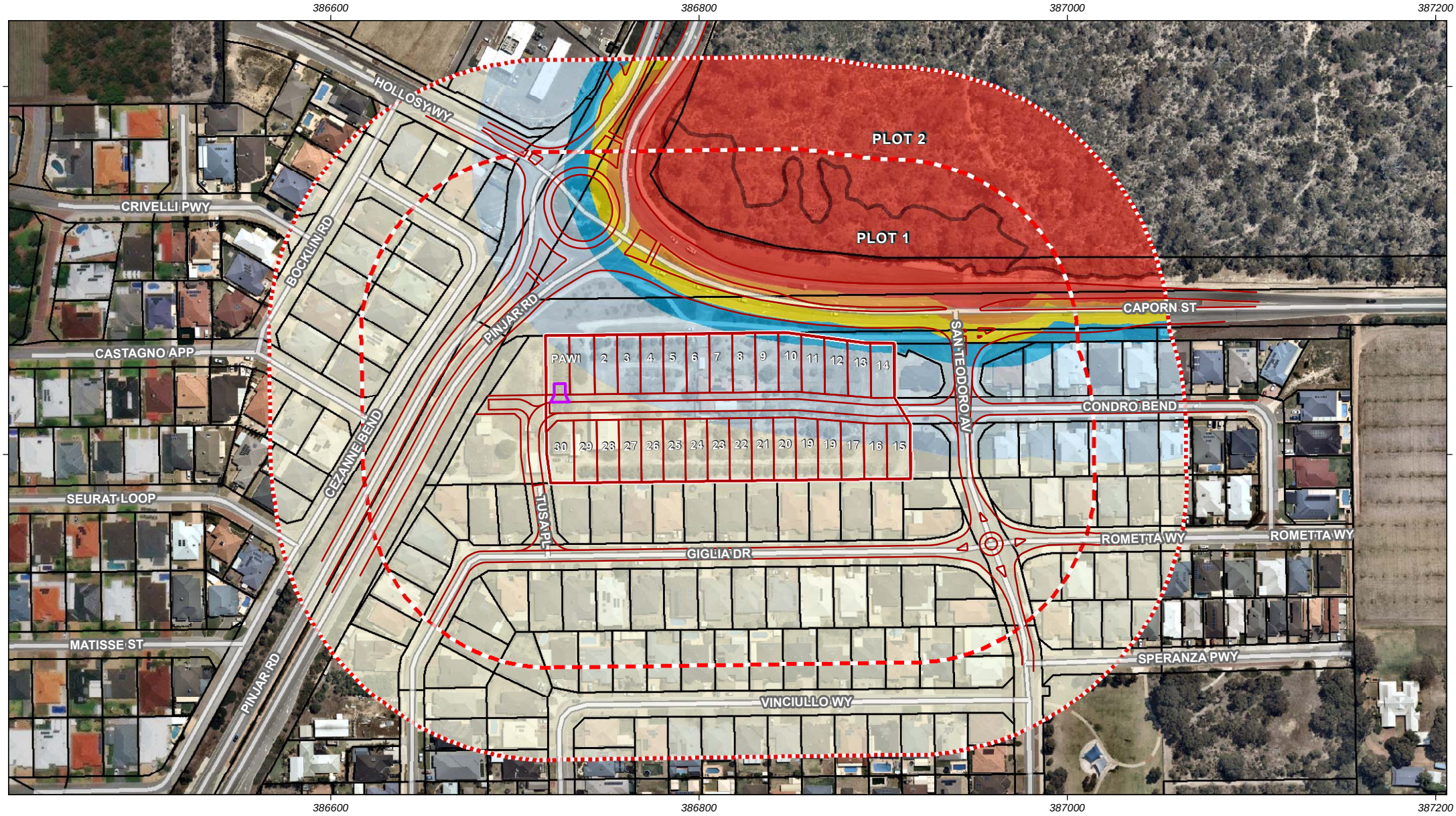

Figure 4: BAL contour map and spatial representation of bushfire management measures

N

Scale 1:2,750 at A4

0 25 50 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 10/09/2019

Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Temporary turnaround
- Classified vegetation
- Proposed development
- Roads

BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low

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Data source: Nearmap: Aerial image, flown 06/2019. Landgate: Cadastre, 2019. Buckley Land Pty. Ltd.. Development layout, 9/2019. Created by: hsullivan

4. Identification of bushfire hazard issues

4.1 Bushfire context

The greatest permanent bushfire threat to the proposed development is from intact remnant vegetation within Caporn Park, approximately 45 m north of the project area. This vegetation has the potential to support fire runs of over 300 m through intact forest and woodland vegetation over a downslope of approximately 2.5 degrees. Banksia woodland covers the majority of Caporn Park (Plot 2) with a Jarrah-Marri forest stand at the Caporn Street interface (Plot 1).

4.2 Bushfire hazard issues

Based on the current on-site vegetation, proposed development is not expected to have a significant impact on native remnant vegetation.

The bushfire threat from vegetation within Caporn Park to the north is greatly reduced due to the separation provided by Caporn Street. However, future habitable development within the project area may still be subject to potential ember attack and low levels of radiant heat should a bushfire occur.

The remainder of vegetation within proximity to the project area is either managed or significantly isolated from any other areas of bushfire prone vegetation. Therefore, the bushfire threat to the project area is limited to that from Caporn Park.

If subdivisional works are to be staged internal to the project area, the following staging provisions may need to be implemented as required and in advance of lot creation to negate any unnecessary bushfire risk from internal development staging:

- internal low threat staging buffers (where possible)
- provision of a temporary turn-around area until such time that formal through access can be achieved onto adjacent development to the south (refer to Section 5).

It is considered that the bushfire risk to the proposed development can be managed through standard application of acceptable solutions under the Guidelines (see Table 4), as well as through a direct bushfire suppression response if required. Sections 5 and 6 outline the bushfire protection criteria and management measures that will facilitate compliance with the requirements of SPP3.7 and the Guidelines at future planning stages. On this basis, Strategen considers the bushfire hazards adjacent to the project area and the associated bushfire risks are readily manageable.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 4.

Table 4: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria	Method of compliance		Proposed bushfire management strategies
	Acceptable solution	Performance-principal based solution	
Element 1: Location	A1.1 Development location	N/A	The BAL contour assessment (see Figure 4 and Table 3) demonstrate that on completion of development, all developable land will achieve a rating of BAL-19 or lower.
Element 2: Siting and design	A2.1 Asset Protection Zone	N/A	On completion of development, all lots will be developed with residential dwellings, driveways and low threat urban landscaping/gardens. In this regard, all residential lots will be maintained in a low threat state. In addition, existing low threat separation is provided external to the site via Caporn Street and Pinjar Road reserves, which provide existing buffers between the project area and the source of bushfire risk within Caporn Park to the north. Therefore, all proposed residential lots are able to achieve BAL-19 or lower without the need for separate APZs. Vacant lots are to be managed as an APZ by the developer until each lot is sold. Management of vacant lots will involve slashing of weeds and grassland on an ongoing basis to a height of less than 50 mm to comply with both Schedule 1 of the Guidelines (refer to Appendix 2) and the City of Wanneroo annual firebreak notice (Appendix 4).
Element 3: Vehicular access	A3.1 Two access routes.	N/A	A combination of existing surrounding public roads and the proposed internal vehicle access network will provide all occupants with the option of travelling to more than two different destinations as follows: • connection to San Teodoro Avenue providing the option of travelling north or south, and subsequent connection with Caporn Street providing the option of travelling east or west • future connection to Giglia Drive to the south and via Tusa Place, providing access east or west • potential future connection to Pinjar Road providing the option of travelling north or south. Following future development of adjacent land between the project area and Pinjar Road to the west (Lot 108), a connection between Tusa Place and Ioppolo Court (future road within the project area) will be established. This will enable through access for the project area to Giglia Drive in the south, and potential connection with Pinjar Road in the west, resulting in removal of the proposed temporary cul-de-sac.
	A3.2 Public road	N/A	All public roads will be constructed to relevant technical requirements under the Guidelines (see Appendix 3).

Bushfire protection criteria	Method of compliance		Proposed bushfire management strategies
	Acceptable solution	Performance-principal based solution	
	A3.3 Cul-de-sac (including a dead-end-road)	PPBS1 – Temporary turn around (refer to 5.2.1)	A temporary dead-end at the western boundary of the project area, at the end of Ioppolo Court (future road within the project area) will result as part of the proposed development. The temporary dead-end will be removed when future residential development within Lot 108 to the west (see Figure 1) will provide a link to Giglia Drive via Tusa Place to the south, and potentially directly to Pinjar Road to the west. The proposed temporary dead-end road will be compliant in terms of length, being less 200 m, and will also be constructed to relevant technical requirements under the Guidelines (see Appendix 3). Inclusion of a temporary 17.5 m diameter cul-de-sac head, in accordance with the requirements Acceptable Solution A3.3 was explored by the proponents, however, this design could not successfully be accommodated within the 14 m wide Ioppolo Court road reserve without impacting on four proposed residential lots. In consultation with the City of Wanneroo, the subdivision design has been revised to include a hammerhead shaped turn around that extends into the temporary PAW only. As the turnaround area dimensions present a deviation from the acceptable solution, the suitability of this turn around area to service the proposed development is included in PPBS1 (refer to Section 5.2.1).
	A3.4 Battle-axe	N/A	N/A No Battle-axes are proposed.
	A3.5 Private driveway longer than 50 m	N/A	N/A No private driveways longer than 50 m will be required for future habitable buildings.
	A3.6 Emergency access way	N/A	N/A No Emergency Access Ways are proposed.
	A3.7 Fire service access routes (perimeter roads)	N/A	N/A No fire service access routes are proposed.
	A3.8 Firebreak width	N/A	N/A Given that all lots will be cleared and developed and less than 0.5 ha in area, individual lot boundary firebreaks will not be required.
Element 4: Water	A4.1 Reticulated areas	N/A	Future residential development will be connected to reticulated water supply via surrounding development. Existing water hydrants are located at 200 m intervals throughout the surrounding residential development.
	A4.2 Non-reticulated areas	N/A	N/A.

Bushfire protection criteria	Method of compliance		Proposed bushfire management strategies
	Acceptable solution	Performance-principal based solution	
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A	N/A.

5.2 Performance principle-based solutions (PPBS)

5.2.1 PPBS1: Temporary turn around

Summary of Element 3

Element 3 – Vehicular access	
Intent	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event.
Performance Principle P3	The internal layout, design and construction of public and private vehicular access and egress in the subdivision/ development allow emergency and other vehicles to move through it easily and safely at all times.
Relevant acceptable solution/s	
A3.3 Cul-de-sac (including a dead-end road)	A cul-de-sac and/or a dead-end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent) and specific requirements listed in the Guidelines are to be achieved.

Proposed deviations from the acceptable solution

As discussed in Table 4, a temporary dead-end at the western boundary of the project area will result as part of the proposed development until such a time that residential development within Lot 108 occurs to the west and a road linkage will be provided to Giglia Drive via Tusa Place to the south (refer to Figure 1). There is also potential that a future linkage will be provided directly to Pinjar Road in the west. In this regard, the temporary dead-end road is considered to be unavoidable.

The proposed temporary dead-end road will be compliant in terms of length, being less 200 m, and will also be constructed to relevant technical requirements under the Guidelines (see Appendix 3).

Inclusion of a temporary 17.5 m diameter cul-de-sac head, in accordance with the requirements of Acceptable Solution A3.3 was explored by the proponents, however, this design could not successfully be accommodated within the 14 m wide Ioppolo Court road reserve without impacting on four proposed residential lots. In consultation with the City of Wanneroo, the subdivision design has been revised to include a hammerhead turn around area that extends into the temporary PAW only. It is a requirement of this BMP that the hammerhead turn within the PAW be retained until the road connections are constructed through and complaint with Acceptable Solutions A3.1 and A3.2 making the temporary dead-end and turnaround redundant. The specifications for the temporary turn around are depicted in Appendix 4 and Plate 2.

The revised turnaround design presents a deviation from the acceptable solution as a hammerhead turn around design is proposed instead of a 17.5 m diameter turning circle.

As discussed in the PPBS below, the proposed hammerhead design broadly aligns with the hammerhead arrangement proposed in GL-11: DFES Site Planning and Fire Appliance Specifications and with the design requirements for hammerhead turnaround areas for private driveways under Acceptable Solution A3.5 of the Guidelines.

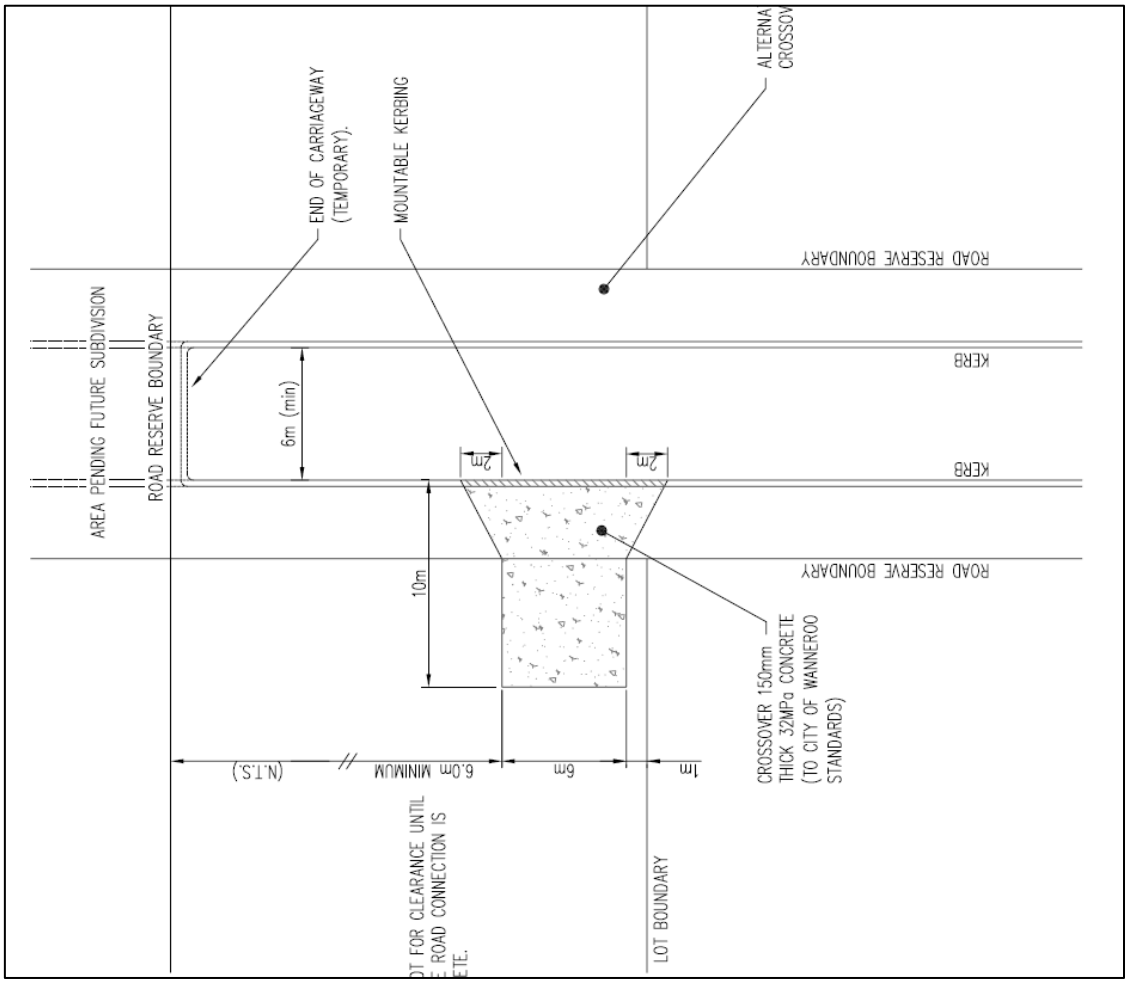


Plate 2: Proposed temporary turnaround specifications (refer to Appendix 4 for full plan)

Potential bushfire hazards associated with the proposed deviations

The provision of a hammerhead shaped turn around may present a hazard in that Type 3.4 appliances and other vehicles may not be able to turn around as efficiently using the hammerhead design as they would using a circular design.

The risks associated with this potential hazard are, however, considered to be minimal due to the temporary nature of the turnaround, low expected traffic volume and the relatively low level of bushfire risk applying to the temporary dead-end road and turnaround. This is discussed in the PPBS below.

Performance principle-based solution

This PPBS has been developed to demonstrate how the proposed development meets or exceeds the intent and performance principle of Element 3 to ensure that vehicular access is available and safe during a bushfire event and the design allows emergency and other vehicles to move through it easily and safely at all times. This will be achieved by demonstrating that the proposed temporary turnaround provides a suitable area for Type 3.4 fire appliances, and other vehicles, to be able to turn around safely and easily at all times.

The proposed turnaround area broadly aligns with the intent of the hammerhead arrangement documented under Acceptable Solution A3.5 of the Guidelines (Private driveways; refer to Plate 3), albeit in a slightly different orientation, and with the turning facility outlined in GL-11: DFES Site Planning and Fire Appliance Specifications (Appendix 5; refer to Plate 4). Additionally it has been demonstrated to be sufficient for fire appliance turnaround using a track circulation drawing (see Appendix 4, which demonstrates that the proposed turnaround area will be suitable for Type 3.4 appliances to be able to effectively turn around.

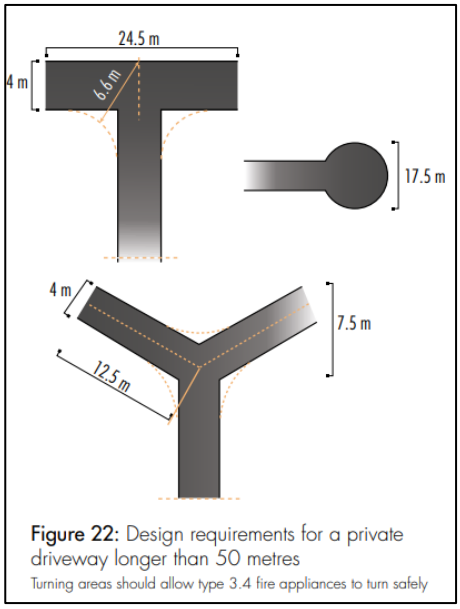


Plate 3: Design requirements for turning areas on private driveways in accordance with Acceptable Solution A3.5 of the Guidelines.

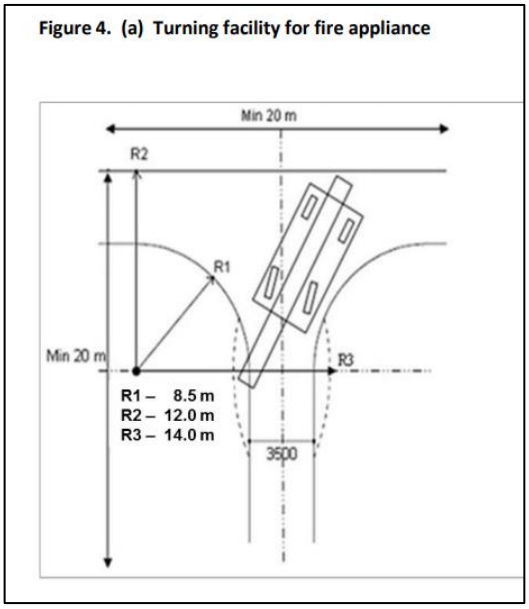


Plate 4: Design requirements for hammerhead turning facilities (DFES, 2017; Appendix 5)

The provided turnaround is 6 m wide, which exceeds the 3.5 m and 4 m minimum widths outlined in Plate 3 and Plate 4. The turnaround is 10 m long, which in addition to the additional 6 m of public road and 4 m of road reserve on the southern side of the road, provides approximately 20 m of length. Because of the truncated north-western lot boundary to Lot 30, an additional 6 m of road is also available to allow reversing vehicles to back into. It is noted this truncation will be constructed using some temporary brick paving to provide a suitable all-weather surface for occasional turnaround. The overall length is ultimately about 26 m for reversing vehicles.

To the west of the turning facility, from the centreline of the turnaround, there is approximately 7.5 m of road to the western edge of the project area. As shown in the track circulation drawing in Appendix 4, this arrangement has been shown to permit a fire appliance approximately 2.5 m wide by 12.5 m long to turnaround. Given urban pumpers and rural type 3.4 appliances are approximately 2.5m wide (2.9m wide with wind mirrors) and only 8.5 m and 8.2 m long respectively, the turnaround arrangement provided is sufficient for an appliance to drive into the turnaround within the PAW and then reverse out into the Lot 30 truncation before driving eastwards on Ioppolo Court.

It is assumed that the reason that circular turning areas are preferred for use within the public road network as opposed to the alternative hammerhead and Y-shaped designs that are deemed suitable for private driveway situations is that they provide a turning area for multiple vehicles in succession and have a lesser potential to result in road blockages which will allow for more safe and efficient use. In the case of this particular development, it is not envisaged that the general public would attempt to use the proposed dead-end road as a thoroughfare during a bushfire emergency when the immediately surrounding public road network would provide the most suitable traffic route. The road will also be sign-posted as a dead-end (or no through road) which will further prevent non-local traffic from using it. In addition, it is expected that residents evacuating the proposed development would be able to turn onto the road directly from their driveways and head east to San Teodoro Avenue without the need to use the turnaround area. At San Teodoro Road, vehicular egress is possible to the south, away from the main bushfire risk to the site at Caporn Park in the north.

As there are only 31 developable lots along the dead-end road (including PAW), traffic flows are likely to be low in any case, meaning that if vehicles did need to utilise the turnaround, the effects on traffic flow are expected to be limited. On this basis, the primary intended use of the turnaround area would be for attending firefighting appliances. As discussed in the previous paragraph, the dimensions of the proposed turn around are deemed to be suitable for fire appliances to be able to turn around.

In addition to the turnaround being unlikely to inhibit traffic flows, as well as the fact that it will provide a suitable turning area for Type 3.4 appliances and other vehicles, the actual bushfire threat to the temporary dead-end road and turn around should also be considered.

The proposed temporary turnaround is located in a BAL-LOW area, which is the lowest level of bushfire attack under AS 3959, and is not considered to be sufficient to warrant a building response and impacts on people and vehicles are expected to also be limited. In this regard, the proposed temporary turnaround is located in an area of low bushfire risk and it is considered that emergency and other vehicles would be able to utilise the turnaround safely under all conditions. Furthermore, Ioppolo Court itself is considered to provide a relatively safe evacuation route from the dead-end portion of the road to the wider public road network in the event of a bushfire emergency as the worst-case BAL applying to the road is BAL-12.5. BAL-12.5 impacts are primarily associated with ember attack and low levels of radiant heat impact. In this regard, occupants evacuating in vehicles toward San Teodoro Avenue and attending firefighters are unlikely to be subject to significant levels of bushfire attack while using the road to egress or access the proposed development. Furthermore, the residential houses constructed within the northern lots of the project area will largely shield the future road from radiant heat impacts.

On the basis of the above information and considering that the proposed dead-end road and associated turnaround are only temporary in nature, the proposed turnaround is considered sufficient to enable fire appliance turnaround and to provide for safe vehicular access and egress for both firefighters and the site occupants during a bushfire emergency, allowing emergency and other vehicles to move through the proposed development easily and safely at all times.

5.3 Discussion of bushfire management strategies

Strategen provides the following detailed discussion on the proposed bushfire management measures to inform ongoing planning stages of the development.

5.3.1 On-site staging buffers

If development (and therefore clearing) is to occur on a staged basis (which is unlikely), clearing in advance will need to occur to ensure building construction is not inhibited by a temporary vegetation extent located within adjacent development stages yet to be cleared. This can be achieved by ensuring that each approved stage subject to construction is surrounded by an on-site cleared or low threat buffer prior to development (not including vegetation proposed to be retained). Once the buffer is created, it will need to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of the next development stage. This will assist in managing temporary on-site vegetation hazards.

5.3.2 Fuel management within cleared vacant lots

Cleared vacant lots are to be managed on a regular and ongoing basis by the developer until sale of lots after which time landowners will be responsible for ongoing management. Management will involve slashing/mowing of grassland and weeds to height of less than 50 mm to comply with both Schedule 1 of the Guidelines (see Appendix 2) and The City of Wanneroo annual firebreak notice (Appendix 4).

5.3.3 Temporary vehicular access provisions:

A temporary turn around is to be established in advance of lot creation in accordance with the approved plan of subdivision. Justification and specifications for the temporary turn-around are detailed in Section 5.2.1.

Where staged road construction is less than 200 m long, a temporary compliant cul-de-sac is able to be adopted with suitable turn-around head until such time that formal through-access is provided/extended into adjacent development stages.

5.3.4 Road verge fuel management:

Surrounding road verges that have been excluded as low threat will need to continue to be managed to ensure the understorey and surface fuels remain in a low threat, minimal fuel condition in accordance with Clause 2.2.3.2 (f) of AS 3959. Ongoing road verge management is the responsibility of the City.

5.3.5 Landscaping plans

Proposed landscaping plans for the project area (including the PAW and road verges) will need to reflect the bushfire management measures required under this BMP and future subdivision and DA stage BMPs, including establishment and demonstrated ongoing compliance with Clause 2.2.3.2 (e) and/or (f) exclusions.

5.3.6 Notification on Title

Notification is to be placed on the Title of proposed lots subject to BAL-12.5 or higher (either through condition of subdivision or other head of power) to ensure landowners/proponents and prospective purchasers are aware that their lot is subject to an approved BMP and BAL assessment.

5.3.7 Hammerhead turnaround on PAW

As the proposed temporary turnaround will extend into the temporary PAW, it is a requirement of this BMP that the hammerhead turn within the PAW be retained until the temporary dead-end road is extended through to connect to Tusa Place, thereby complying with Acceptable Solutions A3.1 and A3.2.

5.3.8 BAL compliance and/or individual lot BAL assessment at future stages

A BAL compliance report and/or individual lot BAL assessment may be prepared at the discretion of the City/WAPC following completion of subdivisional works and prior to lot title to validate and confirm the accuracy of BAL assessments depicted in the BMP or demonstrate any change in the assessed BAL or other management measures documented in this BMP, which may occur as a result of changes in building location, vegetation class or bushfire management approach.

5.3.9 Compliance with annual firebreak notice

The developer/land manager and prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice requirements (refer to Appendix 6).

6. Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future subdivision and DAs where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent subdivision and DAs are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.4 and 6.5 respectively) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions to meet the performance requirements of the Guidelines. Future BMPs are to include the following detailed information:

- proposed lot layout (subdivision stage)
- detailed landscaping design (subdivision stage)
- post-development classified vegetation extent, effective slope and exclusions (subdivision stage)
- BAL contour map demonstrating that proposed development areas will achieve BAL–29 or lower (subdivision stage)
- width and alignment of compliant APZs (subdivision stage, only if applicable)
- confirmation of how bushfire management will be addressed during development staging (subdivision stage)
- proposed approach to fuel management or AS 3959 application in response to on-site POS or easements (subdivision stage)
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development in accordance with acceptable solution A3.1 (subdivision stage)
- water supply provisions with regards to reticulated water (subdivision stage)
- provisions for notification on Title for any future lots with a rating of BAL–12.5 or greater as a condition of subdivision (subdivision stage)
- compliance requirements with the current City annual firebreak notice (subdivision stage)
- acceptable solutions assessment against the bushfire protection criteria (subdivision stage)
- proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation (subdivision stage).

Implementation of the BMP applies to the developer, prospective landowners and the City/Shire to ensure bushfire management measures are adopted and implemented on an ongoing basis. A bushfire responsibilities table is provided in Table 5 to drive implementation of all bushfire management works associated with this BMP.

Table 5: Responsibilities for implementation and management of the bushfire measures

Implementation/management table	
Developer – prior to issue of titles	
No.	Implementation action
	Establish PAW in non-vegetated and/or low threat state, to achieve exclusion in accordance with AS 3959 Clauses 2.2.3.2 (e) and (f)
1	Construct the public roads to the standards stated in the BMP.
2	Construct the temporary turnaround to the standards stated in the BMP.
3	Extend reticulated water supply, from surrounding development, throughout the project area, in accordance with Water Corporations Design Standard 63 requirements including provision of all required street hydrants.
Developer – until sale of lot	
No.	Implementation action

Implementation/management table	
1	If lot creation is staged, maintain on-site staging buffers to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm.
2	Maintain all lots in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm.
3	Comply with the relevant local government annual firebreak notice issued under s33 of the Bush Fires Act 1954, including establishment and maintenance of boundary firebreaks.
Developer - until ceded to City (City thereafter)	
No.	Management action
1	Maintain PAW and road reserves in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm. The management of these road reserves is to be by the developer until ceded to the City (the City thereafter).
Landowner/occupier – prior to building construction and ongoing	
No.	Management action
1	Maintain entirety of lot in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm, until developed to a permanent low fuel state.
2	If required by the City, individual lot BAL assessment prior to issuing of building permits.
3	Adopt bushfire construction measures relevant to the applicable BAL rating, where required by the National Construction Code
4	Comply with the relevant local government annual firebreak notice issued under s33 of the Bush Fires Act 1954, including establishment and maintenance of boundary firebreaks.
Local government – ongoing management	
No.	Management action
1	Upon handover by the Developer, maintain excluded areas of roads reserves and PAW in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm.

7. References

Department of Fire and Emergency Services (DFES) 2018, Map of Bush Fire Prone Areas, [Online], Government of Western Australia, available from: https://maps.slip.wa.gov.au/landgate/bushfireprone/ [10/11/2018].

Department of Fire and Emergency Services (DFES) 2017, GL-11: DFES Site Planning and Fire Appliance Specifications, Government of Western Australia, Perth.

Standards Australia (SA) 2009, Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas, Standards Australia, Sydney.

Western Australian Planning Commission (WAPC) 2015, State Planning Policy 3.7 Planning in Bushfire-Prone Areas, Western Australian Planning Commission, Perth.

Western Australian Planning Commission (WAPC) 2017, Guidelines for Planning in Bushfire-Prone Areas, Western Australian Planning Commission, Perth.

Appendix 1
Georeferenced site photographs

Georeferenced site photographs

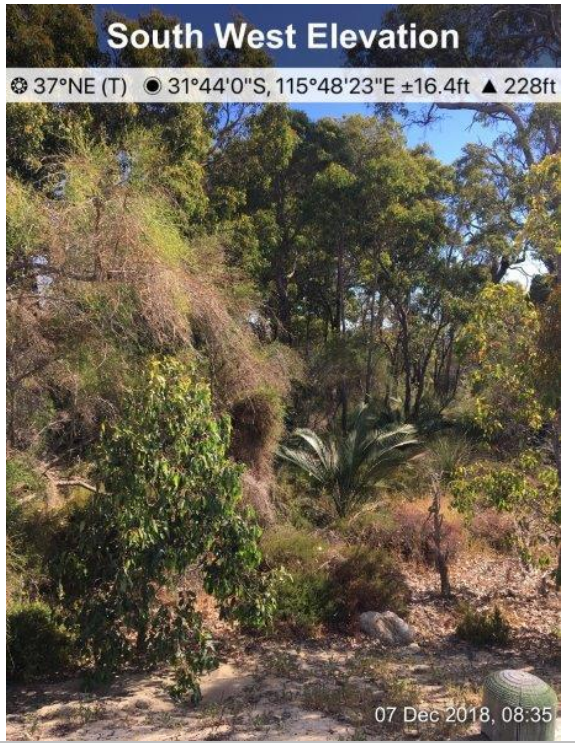
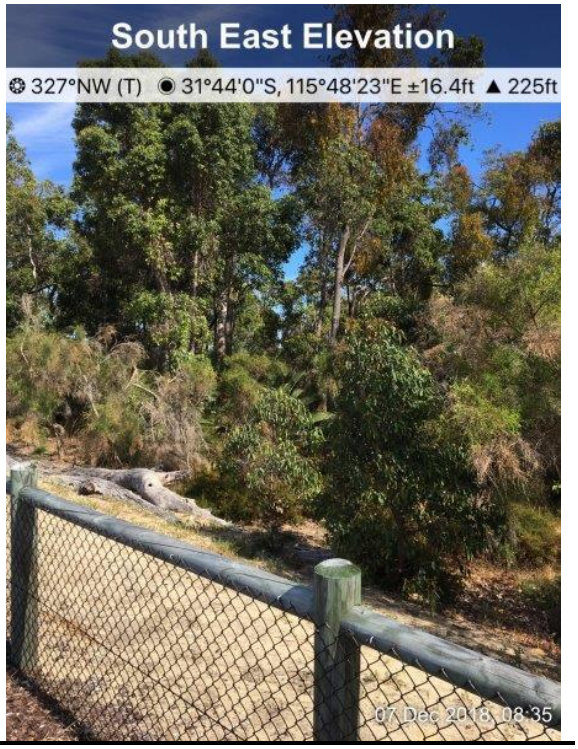
Photo ID: 1 **Plot number:** 1 **Existing vegetation classification or exclusion clause:** Class A Forest **Proposed vegetation classification or exclusion clause:** Class A Forest **Description / justification for classification:** Dominated by eucalypts greater than 10 m in height with a multi-tiered fuel profile **Effective slope:** Downslope >0-5 degrees	
Photo ID: 2 **Plot number:** 1 **Existing vegetation classification or exclusion clause:** Class A Forest **Proposed vegetation classification or exclusion clause:** Class A Forest **Description / justification for classification:** Dominated by eucalypts greater than 10 m in height with a multi-tiered fuel profile **Effective slope:** Downslope >0-5 degrees	

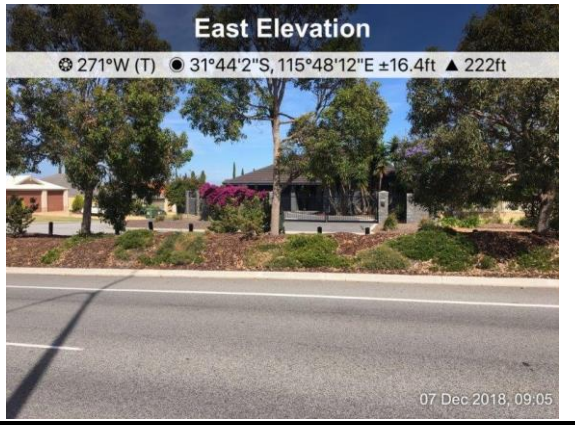
Photo ID: 3 **Plot number:** 1 **Existing vegetation classification or exclusion clause:** Class A Forest **Proposed vegetation classification or exclusion clause:** Class A Forest **Description / justification for classification:** Dominated by eucalypts greater than 10 m in height with a multi-tiered fuel profile. **Effective slope:** Downslope >0-5 degrees	
Photo ID: 4 **Plot number:** 6 **Existing vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Proposed vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Description / justification for classification:** non-vegetated roads and low threat vegetation comprising slashed grass, mulched road verge and sparse shrubs. **Effective slope:** N/A	
Photo ID: 5 **Plot number:** 6 **Existing vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Proposed vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Description / justification for classification:** non-vegetated roads/paths and low threat vegetation comprising slashed grass, mulched road verge and sparse shrubs. **Effective slope:** N/A	
Photo ID: 6 **Plot number:** 6 **Existing vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Proposed vegetation classification or exclusion clause:** Excluded under Clause 2.2.3.2 (e) and (f) **Description / justification for classification:** non-vegetated roads/paths and low-threat vegetation comprising slashed grass, mulched road verge and sparse shrubs. **Effective slope:** N/A.	

Photo ID: 7

Plot number: 6

Existing vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Proposed vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Description / justification for classification: non-vegetated road/path and low threat areas comprising manicured lawns and managed gardens.

Effective slope: N/A.

Photo ID: 8

Plot number: 6

Existing vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Proposed vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Description / justification for classification: non-vegetated road/path, and low threat areas comprising manicured lawns and managed gardens.

Effective slope: N/A.

Photo ID: 9

Plot number: 6

Existing vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Proposed vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Description / justification for classification: non-vegetated road/path, and low threat areas comprising manicured lawns and managed gardens.

Effective slope: N/A.

Photo ID: 10

Plot number: 6

Existing vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Proposed vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Description / justification for classification: low threat vegetation comprising slashed grass, mulched road verge and sparse shrubs.

Effective slope: N/A.

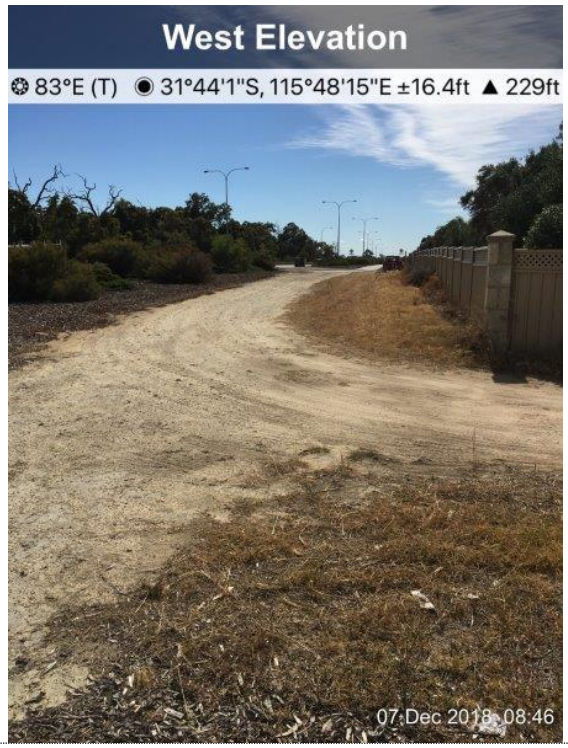


Photo ID: 11

Plot number: 4

Existing vegetation classification or exclusion clause: Class G grassland

Proposed vegetation classification or exclusion clause: Excluded under Clause 2.2.3.2 (e) and (f)

Description / justification for classification: Vegetation to be cleared and modified to a low threat state through development of the project area.

Effective slope: N/A.

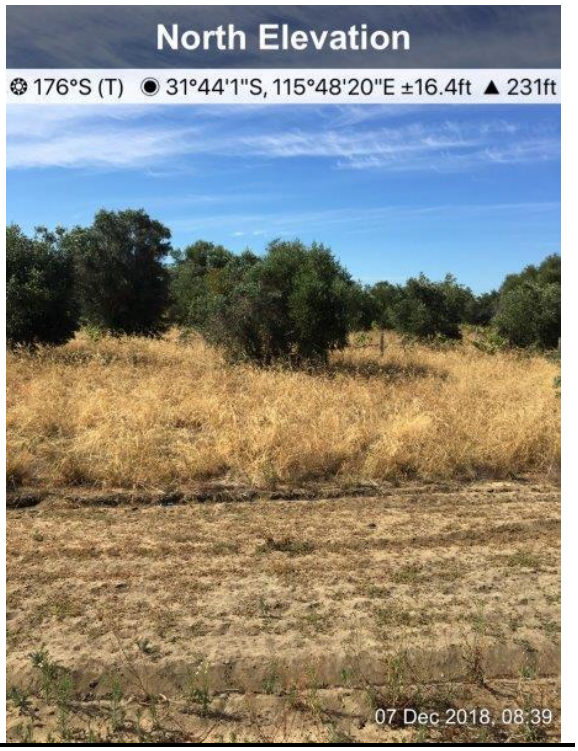
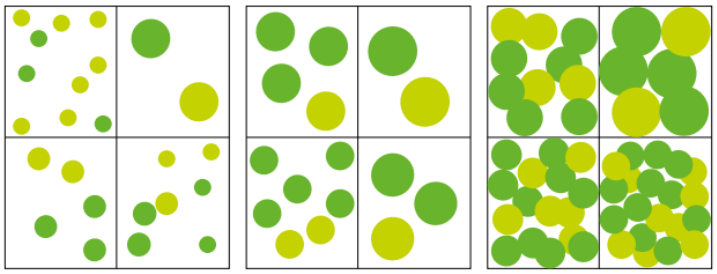


Photo ID: 12 **Plot number:** 3 **Existing vegetation classification or exclusion clause:** Exclusion 2.2.3.2 (b) **Proposed vegetation classification or exclusion clause**: Exclusion 2.2.3.2 (b) **Description / justification for classification:** Vegetation within Lot 108, directly west of the project area comprises grassland vegetation that is <1 ha in area and not within 100 m of any other vegetation being classified **Effective slope:** N/A	
Photo ID: 13 **Plot number:** 3 **Existing vegetation classification or exclusion clause:** Exclusion 2.2.3.2 (b) **Proposed vegetation classification or exclusion clause:** Exclusion 2.2.3.2 (b) **Description / justification for classification:** Vegetation within the Pinjar Road reserve, to the west of the project area comprises predominantly managed scrub vegetation that is <1 ha in area and not within 100 m of any other vegetation being classified **Effective slope:** N/A	
Photo ID: N/A **Plot number:** 2 **Existing vegetation classification or exclusion clause:** Class B Woodland (Banksia woodland) **Proposed vegetation classification or exclusion clause:** Class B Woodland (Banksia woodland) **Description / justification for classification:** Banksia woodland within Caporn Park. Imagery provided is from *Google street view* and was taken at the corner of Caporn Street and Wells Street, looking west. **Effective slope:** N/A	

Appendix 2
APZ standards (Schedule 1; the Guidelines, WAPC 2017)

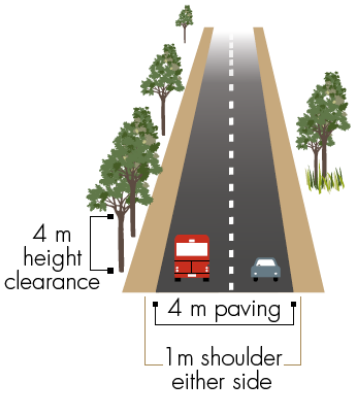
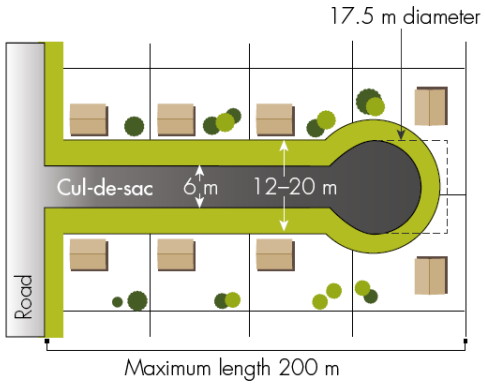
Schedule 1: Standards for Asset Protection Zones

- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.



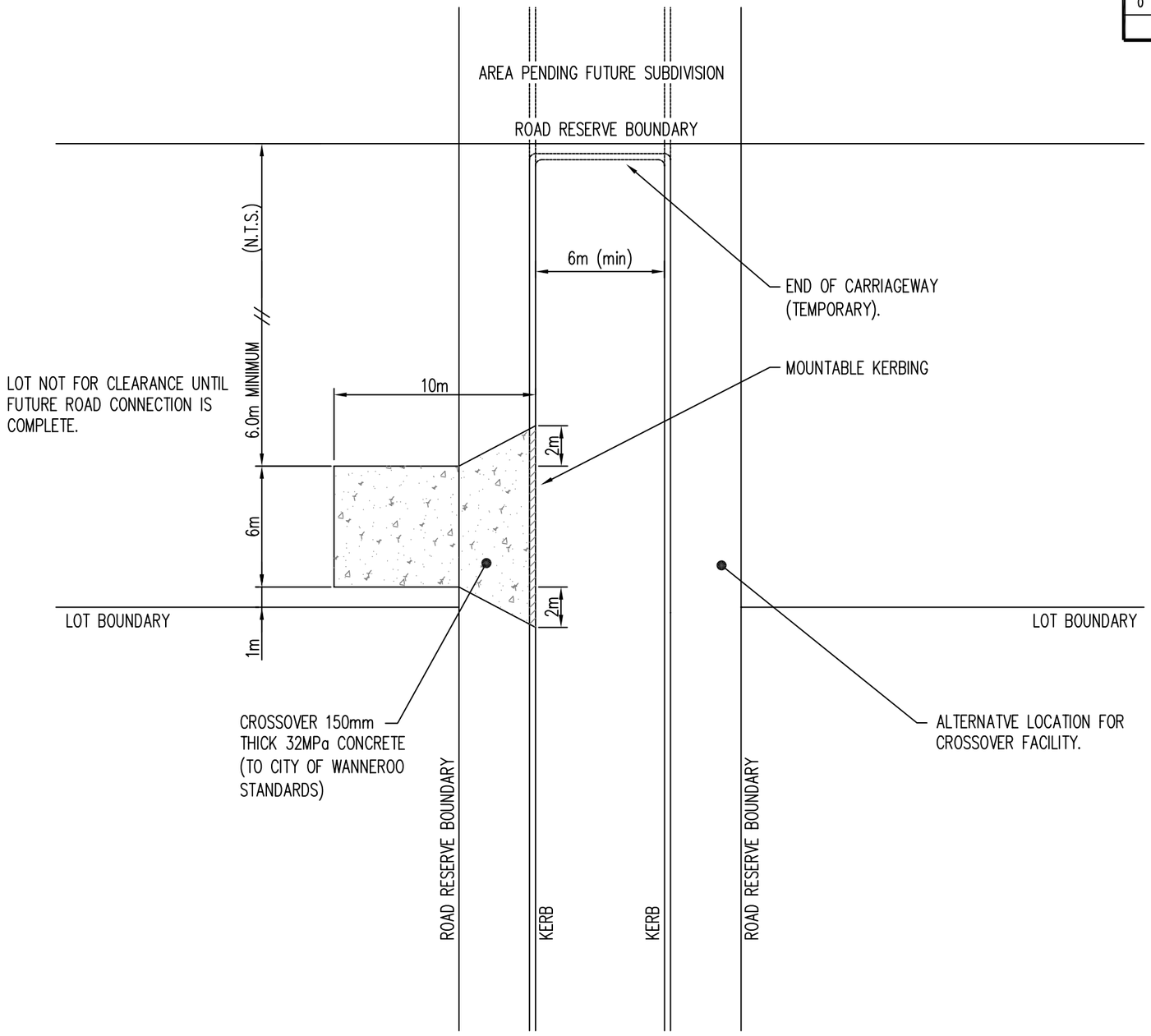
- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m^2 in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Appendix 3
Vehicular access technical standards
(the Guidelines, WAPC 2017)

Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services. Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them. 
Cul-de-sac (including a dead-end road)	
Acceptable solution A3.3	A cul-de-sac and/ or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/ or will need to be demonstrated by the proponent), the following requirements are to be achieved: • Requirements in Table 1, Column 2 • Maximum length: 200 metres (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than eight lots are serviced and the emergency access way is no more than 600 metres) • Turn-around area requirements, including a minimum 17.5 metre diameter head.
Explanatory note E3.3	In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. In some instances it may be possible to provide an emergency access way between cul-de-sac heads to a maximum distance of 600 metres, so as to achieve two-way access. Such links must be provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency. A cul-de-sac in a bushfire prone area is to connect to a public road that allows for travel in two directions in order to address Acceptable Solution A3.1. 

Appendix 4
Temporary turn around/ crossover facility plans and track circulation plan

No.	REVISION	BY	DATE	AUTH
0	ISSUED	G.S.	10/2006	



NOTES:

THE LOCATION OF THE CROSSOVER MUST SATISFY THE MINIMUM SETBACK REQUIREMENT TO THE FOLLOWING INFRASTRUCTURE ITEMS AS SPECIFIED IN THE CITY'S GUIDELINES FOR THE DEVELOPMENT AND SUBDIVISION OF LAND – SECTION WD 11.06:

* TELSTRA PITS OR POWER DOMES
* STREET TREES
* STORMWATER DRAINAGE SIDE ENTRY PIT
* POWER, STREET LIGHT OR STREET SIGN POLE
* PRAM RAMPS
* BIN PAD

SCALE: 1:250 — 2.5 0 2.5 5 7.5 10 12.5 SCALE IN METRES

DATUM: N/A

GRID: N/A

SURVEYED: N/A

CHECKED: Elias Ayad 1/11/2006
COORDINATOR INFRASTRUCTURE DEVELOPMENT

DESIGNED: C.O.W.

AUTHORISED: Rob Korenhof 1/11/2006
MANAGER INFRASTRUCTURE PLANNING

DRAWN: C.O.W.

APPROVED: Dennis Blair 1/11/2006
DIRECTOR INFRASTRUCTURE

CROSSOVERS AND VERGE

RESIDENTIAL
TEMPORARY TURN/AROUND CROSSOVER FACILTY

STANDARD

CITY OF WANNEROO
INFRASTRUCTURE

FILE No.

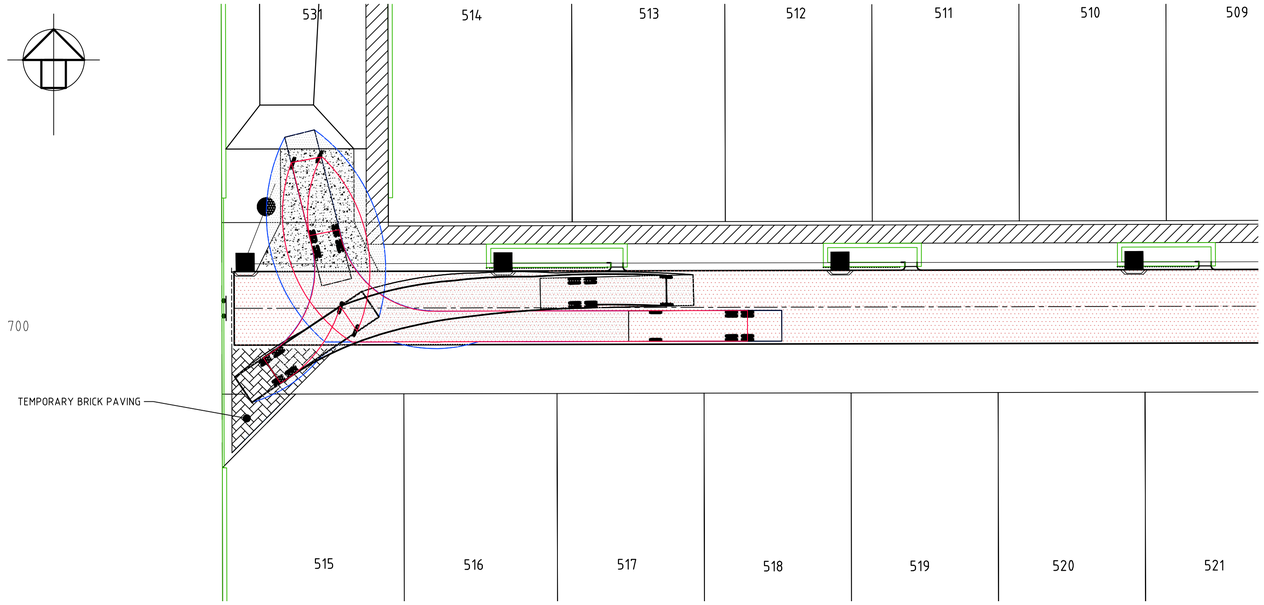
PROJECT No.

DRAWING No. TS 07-14-0

SHEET

REVISION

ORIGINAL DRG. SIZE A3

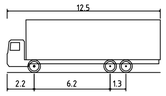


LEGEND

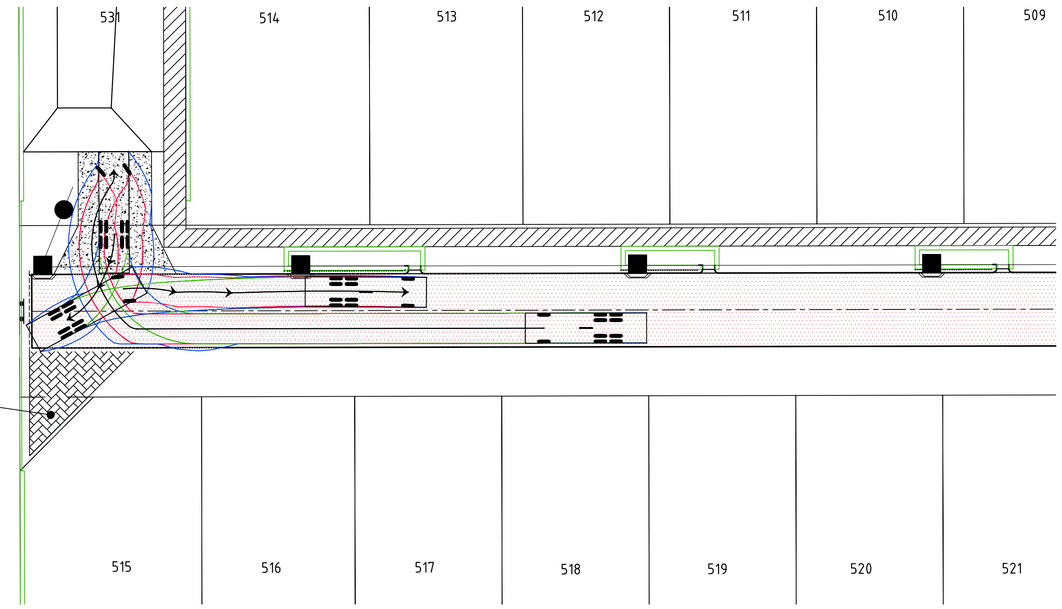
- PROPOSED PAVEMENT
- EXISTING ROAD
- PROPOSED MOUNTABLE KERB
- PROPOSED SEMI-MOUNTABLE KERB
- PROPOSED REINFORCED FLUSH EDGE BEAM
- PROPOSED BARRIER KERB
- EXISTING CONCRETE FOOTPATH
- PROPOSED CONCRETE FOOTPATH
- PROPOSED CONCRETE TURNAROUND
- PROPOSED CHEVRON BOARD
- PROPOSED / EXISTING RETAINING WALL

TURNING MOVEMENT

12.5m FIRE TRUCK
SCALE 1:250

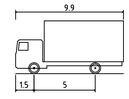


Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



TURNING MOVEMENT

9.9m SERVICE VEHICLE
SCALE 1:250



Service Vehicle (9.9 m)	
Overall Length	9.900m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock-to-lock time	6.90s
Curb to Curb Turning Radius	12.500m

1:250 AT A1

0 2.5m 5m 10m 15m

WARNING

BEWARE OF UNDERGROUND SERVICES

The location of underground cables are approximate only and their exact position should be checked on site. No guarantee is given that all existing cables and services are shown. Locate all underground cables and services before commencement of work. Refer to Worksafe Regulation 3.21.

DIAL 1100
BEFORE YOU DIG

12/09/2019 4:19:39 PM
E:\Project Delivery (PD)\3.0 Projects\3.4 Civil\2017\PC17184 - 10 Caporn Street, Sinagra\2.0 Design\06 Drawings\Acad\PC17184-CI-360.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	DA	12.09.19

PERTH OFFICE
P: +61 8 6336 9299
F: +61 8 6336 9288
E: enquire@peritasgroup.com.au
74 GOODWOOD PARADE
BURSWOOD WA 6100
P.O. BOX 134
BURSWOOD WA 6100

CLIENT: PACIFIC LAND PTY LTD

PROJECT: 10 CAPORN STREET SINAGRA

DRAWING TITLE: TRACK CIRCULATION PLAN

SCALE	AS SHOWN	FILE	–
HORIZONTAL	–	DESIGN	DA
VERTICAL	–	DRAWN	DA
SURVEY DATUM	AHD	CHECKED	OO
WAPC No	157862	DATE	SEPT 19
CADFILE NAME	PC17184	DRAWING No.	CI-360
REV.	_A		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....

Appendix 5
GL-11: DFES site planning and fire appliance specifications

Revised: May 2017
Valid: September 2019
Authorised: Manager Built Environment Branch

GL-11: DFES SITE PLANNING AND FIRE APPLIANCE SPECIFICATIONS

PURPOSE:

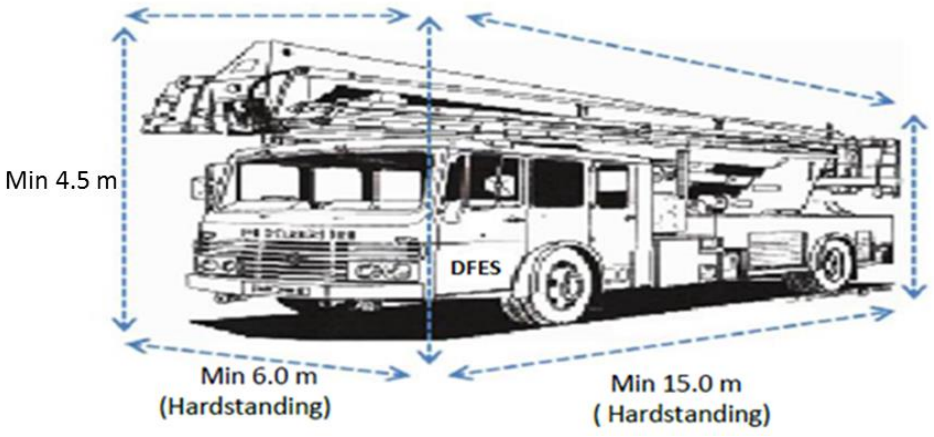
To provide guidance to building designers so that adequate access to and around developments is provided to meet Department of Fire and Emergency Services (DFES) operational requirements, requirements of the Building Code of Australia and applicable Australian Standards.

INTRODUCTION:

Fire appliance weights and turning radii mentioned are subject to change as a result of the introduction of new vehicles and/or to account for changes to existing vehicles.

Requirements	
Minimum Gross Operational weight	30 Tonne
Minimum Overhead Clearance	4.5 m
Minimum Width of Fire Appliance Accessway	3.5 m
Minimum Width of Perimeter Vehicular Access for Large Isolated Building	6.0 m
Minimum Lateral Clearance	2.0 m
Hardstanding	6.0 m wide x 15.0 m
Minimum Turning Circle Kerb / Kerb	24.0 m
Minimum Turning Circle Wall/ Wall	28.0 m
Maximum Dead-end	45.0 m
Maximum Gradient	1:15

Figure 1. Typical parked aerial fire appliance without front and rear jacks extended



COMMENT:

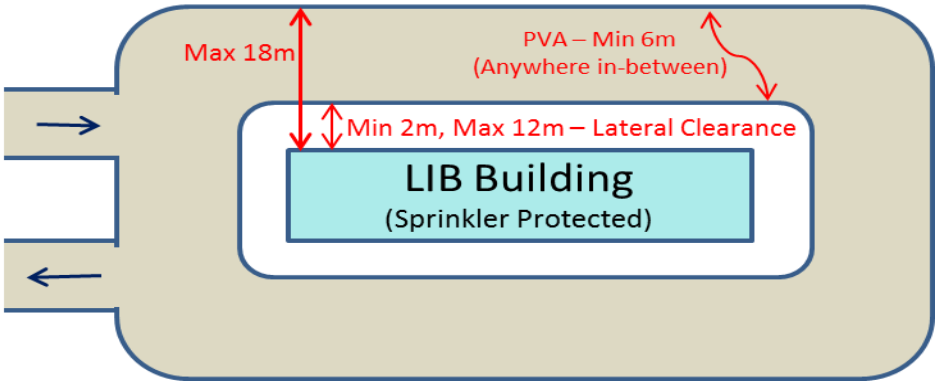
A. Hardstanding, Fire Appliance Accessway and Perimeter Vehicular Access (PVA) of a Large Isolated Building (LIB)

In general, the minimum width of the hardstanding space required shall be 6m and the minimum length shall be 15m (see Figure 1 and 2). Hardstanding and fire appliance accessway shall be provided in accordance with the BCA and shall be designed and constructed in accordance with AS2419.1.

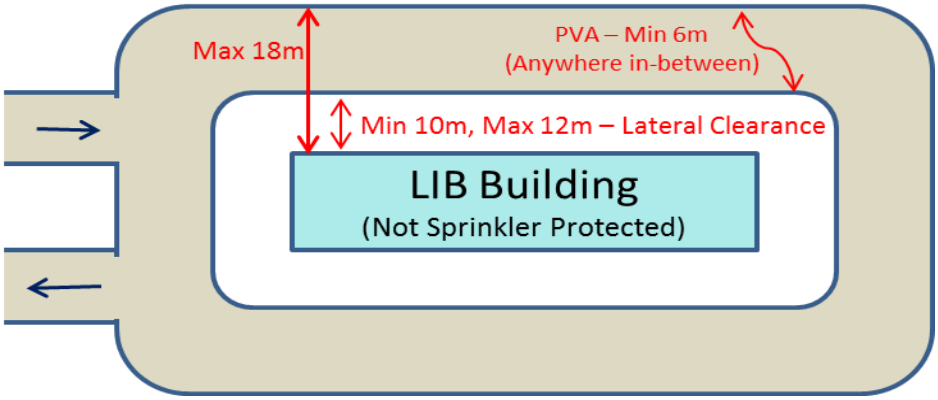
The fire appliance accessway shall have a minimum width of 3.5m. However, for a LIB, the entire PVA (capable of providing fire appliance access and passage from a public road), shall have a minimum width of 6m throughout (with no part of its furthest boundary more than 18m from the building). The 6m wide PVA is to be confirmed clear at all times and shall be constructed as hardstanding to allow fire brigade appliances to be positioned appropriately, depending on operational requirements.

The PVA shall be able to accommodate the entry and manoeuvring of a longer fire aerial appliance. Any PVA provided in very close proximity to a structure restricts appliance manoeuvrability, in particular negotiating corners. This problem is especially exacerbated where longer fire aerial appliances are deployed.

Where the LIB is sprinkler protected, the PVA shall be located at least 2m from, but not more than 12m away throughout, from the external wall or façade (including any overhead obstruction) of the building.



Where the LIB is not sprinkler protected, DFES believes that a minimum distance of 10 metres should exist between the subject structures (LIB) and the near side of the PVA. Detailed explanation is available on the DFES website in 'Technical Note 03/16 Perimeter Vehicular Access – Large Isolated Buildings'.



B. Loading

The perimeter vehicular access required to serve a building shall be constructed to withstand the load of a 30 tonne fire appliance.

DFES accepts only all-weather pavements such as asphalt/bituminous concrete and concrete paving. The use of crushed rock and compacted gravel (or the like) for the surface of the hardstanding is NOT considered appropriate and is not permitted. The accessway must be able to maintain its integrity at all times.

C. Obstruction

Hardstanding, which is specially designated for the operation of the fire appliance and located adjacent to a tank, hydrant or booster, should be marked with appropriate signage (lettering size shall not be less than 20cm) to prevent unauthorised parking of other vehicles. It should be highlighted with contrasting colours (preferably yellow) to the background for better visibility and easy identification by responding fire fighters. Reflective material may also be used to demarcate the hardstanding space. This will help fire fighters to readily locate it when responding to a fire incident at night (see Figure 2).

D. Mountable Kerb as part of Fire Appliance Accessway

All kerbs constructed as part of the lane for fire appliance accessway should be no higher than 100 mm or be of the mountable type.

Mountable kerbs at each lane entrance for fire appliance accessway (or where there is no kerbing the edge of the adjacent road surface), shall have "Emergency Access Lane – No Parking", painted with a red and white striped band indicating the full width of the entry point. Measures should be put in place to ensure that the entrance and exit to the lane shall not be obstructed nor used as designated public parking and shall be cleared of any obstruction at all times.

If it is outside of a normal road, clear prominent lane edge markings, entrance markings and exit markings should be provided. A sign displaying the wording "Fire Appliance Access – Keep Clear" of appropriate weather resistant material shall be suspended from mild steel chain between steel bollards at each entrance/exit to the lane or attached to other suitable adjacent fence or structure.

E. Fire Brigade Booster Assembly Cabinet

For fire brigade booster assembly, the cabinet shall be facing and located in a position such that a fire brigade pumping appliance can be positioned on a hardstand located at least 2m, but not more than 8m away (and not more than 4.5m for booster assembly provided with Storz coupling connection).

Placement of the Booster Cabinet must facilitate rapid recognition and connection by arriving fire appliance(s). It shall be at the front, within sight of the main entrance to the main building, open facing the roadway and not be concealed from view from the arriving fire appliance(s). Please ensure that the road (where used as a hardstand) is neither obstructed, nor used as designated vehicle parking area.

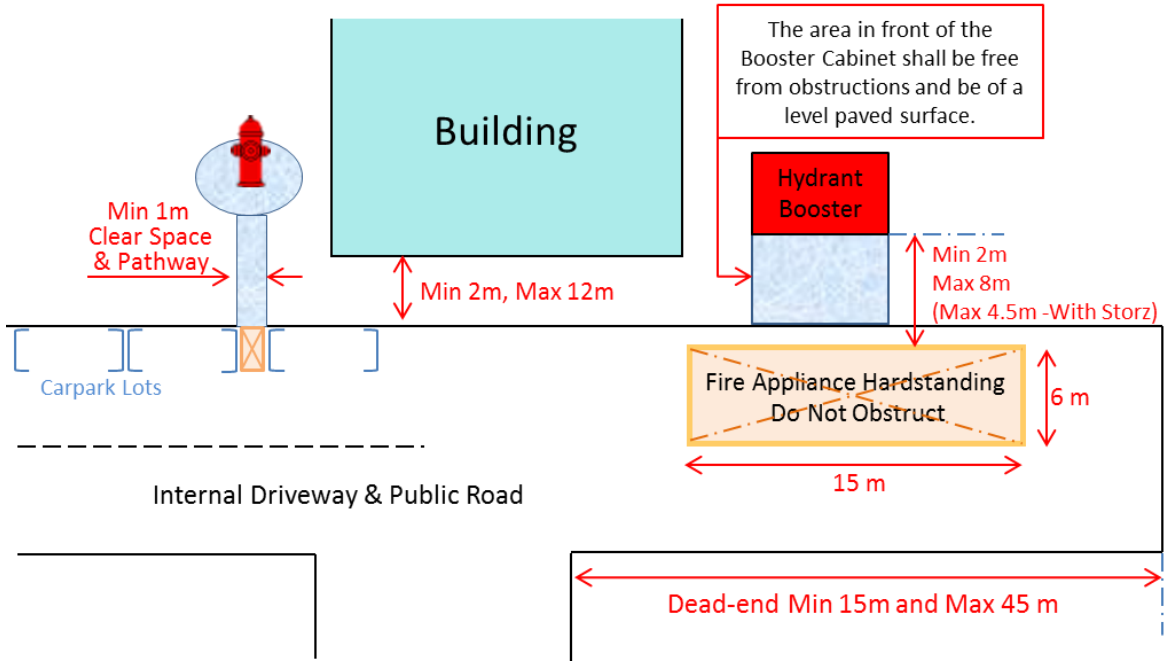
Booster, hydrant and hard suction cabinet/enclosure shall be of sufficient size to house all equipment and be of a design that facilitates access to and handling of the equipment with ease. Cabinets or enclosures shall contain only firefighting equipment, must be of weather proof, anti-vandal construction and be provided with a square taper (budget key) locking device.

F. External On-site Feed Hydrant

Hydrants shall be adequately supported and prominently located along the fire appliance accessway such that every part of the accessway is within an unobstructed distance of 20 m from any hydrant.

For any Hydrant that is hidden from view (for example due to parked vehicles), DFES requires that appropriate signage is provided and secured (at an appropriate height) to a fence, wall or pole, to inform attending crews of the hydrant location. A clear space of 1m must be provided around the hydrant and protected by bollards to prevent accidental damage (where necessary). DFES requires that 1m separation is provided in-between the car park lots and a suitable paved pathway, in between plants and bushes (walls or other features should not impede the pathway), leading to the hydrant.

Figure 2. Markings for Fire Brigade Hardstanding



All gateways within a fence that forms part of a fire appliance accessway shall have a sign post displaying the wording "Fire Appliance Access – Keep Clear". It shall be provided at all entrances to the accessway. The sign shall be displayed prominently and the size of lettering shall not be less than 75mm.

G. Overhead Clearance

The overhead clearance of fire appliance accessway shall be at least 4.5m high for the passage of fire appliances (see Figure 3). Please note that the overhead clearance refers to entrance gate, conveyor belts, bridges, connecting buildings, etc. Please note that there shall not be any undercover areas/canopies/roof overs/verandahs/awnings, etc. as part of the accessway.

H. Lateral Clearance

Perimeter vehicular access shall be positioned so that the nearer edge, external wall or façade of the building (including any overhead obstruction) shall be not less than 2m, but not more than 12m away, measured horizontally (see Figure 3a). A desired lateral clearance of 1m shall be required for fire appliance accessway between any object/encroachments (see Figure 3b).

Nb. If an aerial fire appliance is located within 2m from a building, it falls outside its safe working limit (i.e. the inclination of the ladder would be too steep) and if the aerial fire appliance is located more than 12m from the building, the effective reach of the aerial ladder is reduced.

Figure 3a. Overhead and lateral clearance for Perimeter Vehicular Access (PVA)

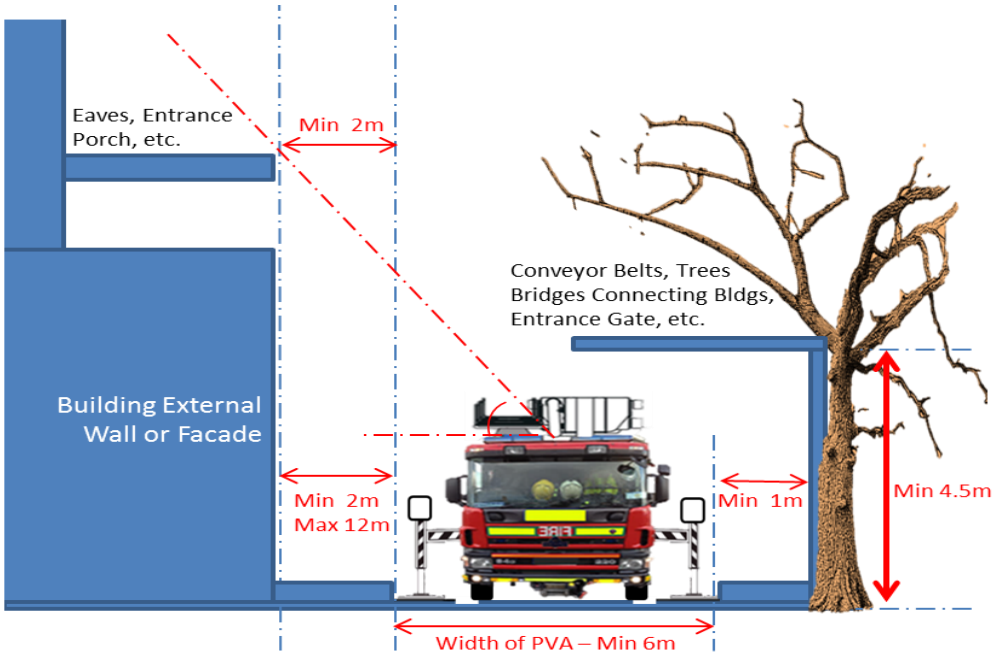
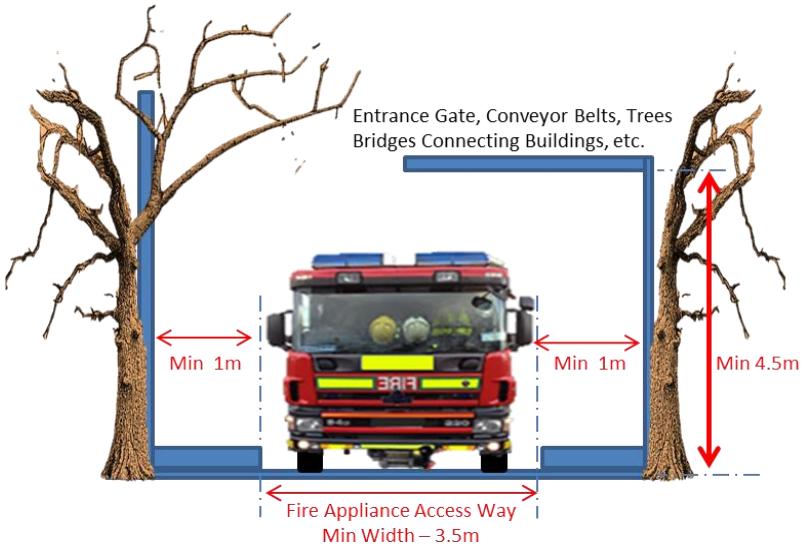
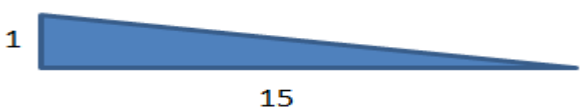


Figure 3b. Overhead and lateral clearance for Fire Appliance Accessway



I. Gradients of Accessway

Hardstanding and perimeter vehicular access shall be laid on level ground or if on an incline, the gradient shall not exceed 1:15.

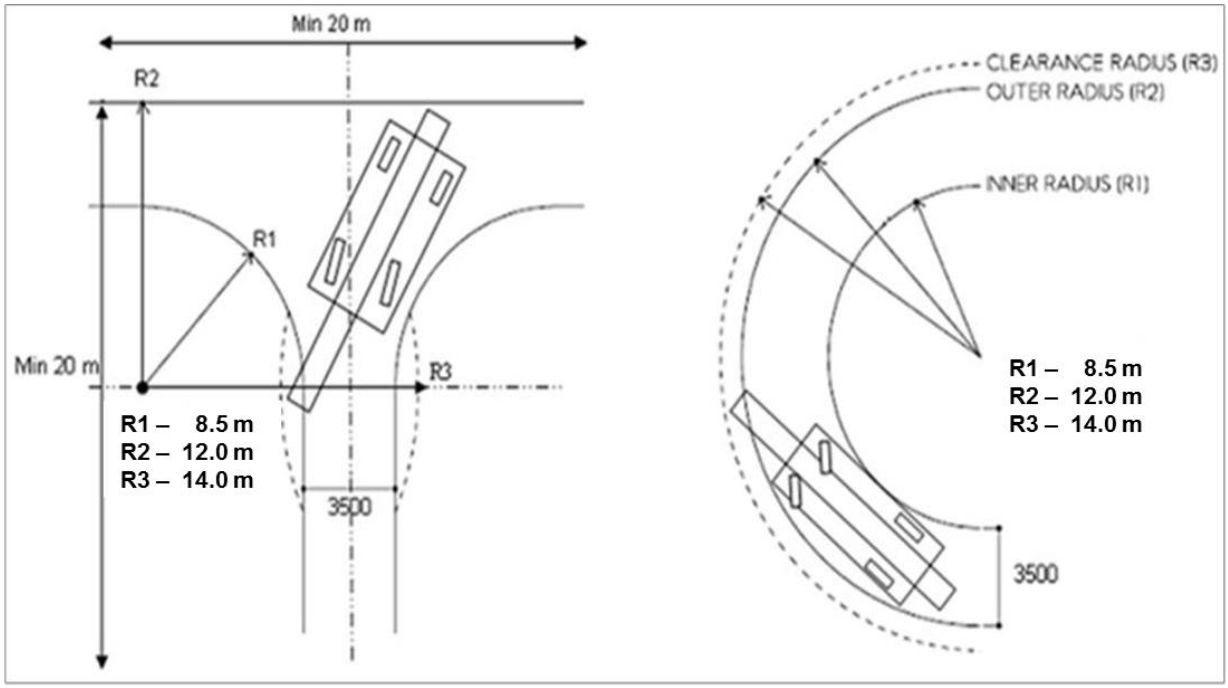


J. Turning Facilities

Fire appliance accessway dead-ends shall not exceed 45m nor be less than 15m in length. If exceeding 45m, then turning facilities at the dead-end (a turning circle or a hammerhead) must be provided as shown in Figure 4 below.

The outer radius for turning in an accessway and fire appliance access road shall comply with the requirements noted in Figure 4 below.

Figure 4. (a) Turning facility for fire appliance **(b) U-turn facility for fire appliance**



REFERENCES:

Building Code of Australia, ACT, Australia. ABCB
International Fire Engineering Guidelines, (2005 Edition), ABCB.

LEGISLATION:

Building Act 2011.
Building Regulations 2012 (as amended).

***Please note**: This is a controlled document. DFES guidelines are available on the DFES Website: www.dfes.wa.gov.au under Regulation and Compliance, Building Plan Assessment then click on Publications/Guidelines.*

Should the information provided in this guideline require further clarification, please contact DFES Built Environment Branch via email bebadmin@dfes.wa.gov.au.

Disclaimer
The information contained in this publication is provided voluntarily as a public service by the Department of Fire and Emergency Services (DFES). This publication has been prepared in good faith and is derived from sources believed to reliable and accurate at the time of publication. Nevertheless, the reliability and accuracy of the information cannot be guaranteed and DFES expressly disclaims liability for any act or omission based on reliance on the information and for any consequences whether direct or indirect, arising from such act or omission. The publication is intended to be a guide only and readers should obtain their own independent advice and make their own necessary enquiries.

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Appendix 6
City of Wanneroo Firebreak Notice
(2018-19)

FIRE BREAKS / FUEL HAZARD REDUCTION / FIRE BREAK EXAMPLES

City of Wanneroo

Under the Bushfires Act (1954), all owners and occupiers of land in Western Australia must establish and maintain fire breaks.

Fire breaks and protection measures are vital in assisting the prevention of fires spreading and to allow safer access for bushfire fighters and vehicles.

Land with an area of less than 4,000m²

- A fire break, not less than three (3) metres wide must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Land with an area of 4,000m² or more

- A fire break, not less than three (3) metres wide, must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Buildings

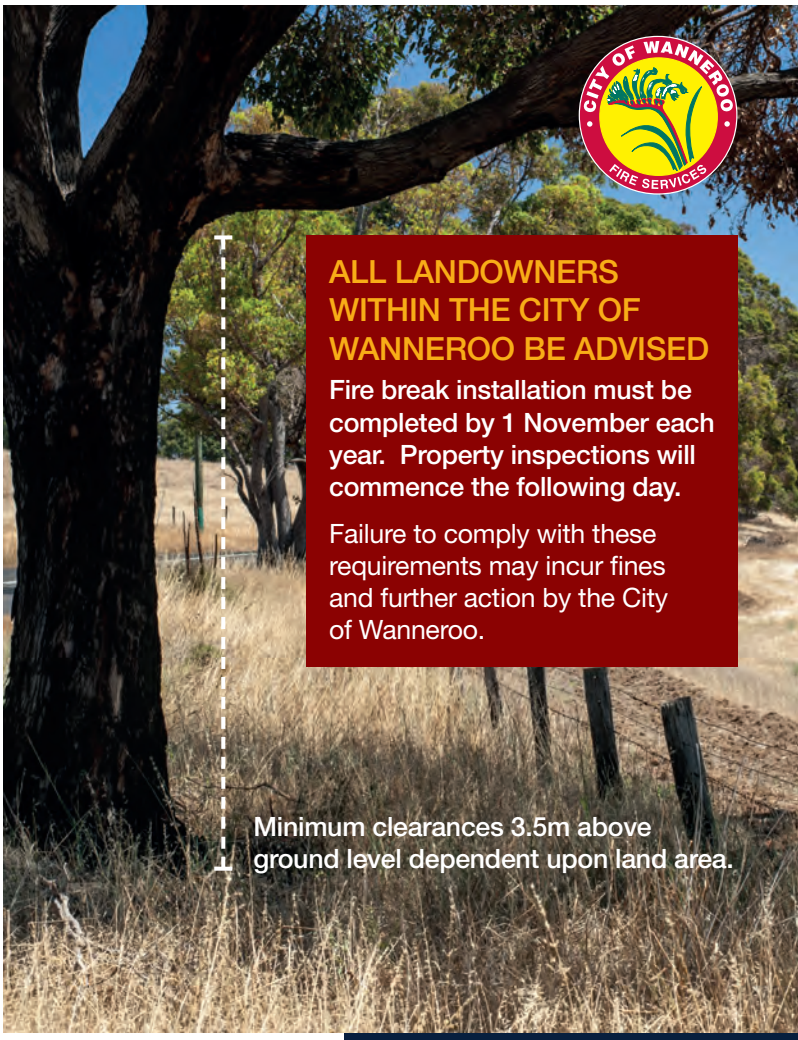
- Install and maintain a twenty (20) metre building protection zone surrounding all buildings, large hay stacks and fuel storage areas. A building protection zone includes undertaking measures such as pruning all lower tree branches to prevent fire entering the trees, ensuring three (3) metre spacing between tree canopies to prevent treetop fires spreading between trees, keeping all grasses to a height of not more than fifty (50) millimetres and storing all firewood piles more than twenty (20) metres away from the buildings.

APPLICATION TO VARY THE ABOVE REQUIREMENTS

If it is considered impracticable for any reason to implement any of the requirements of this Notice, application may be made not later than the 18th of October annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

ADDITIONAL WORKS

In addition to the requirements of this Notice, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City of Wanneroo rates record for the relevant land.




Non-compliant: no fire break installed inside boundary fence


Compliant: grass slashed to ground level


Non-compliant: mineral earth fire break showing grass/weed regrowth


Compliant: mineral earth fire break


Non-compliant: thick scrub creates a fire hazard around power poles


Compliant: cleared buffer zone around power poles