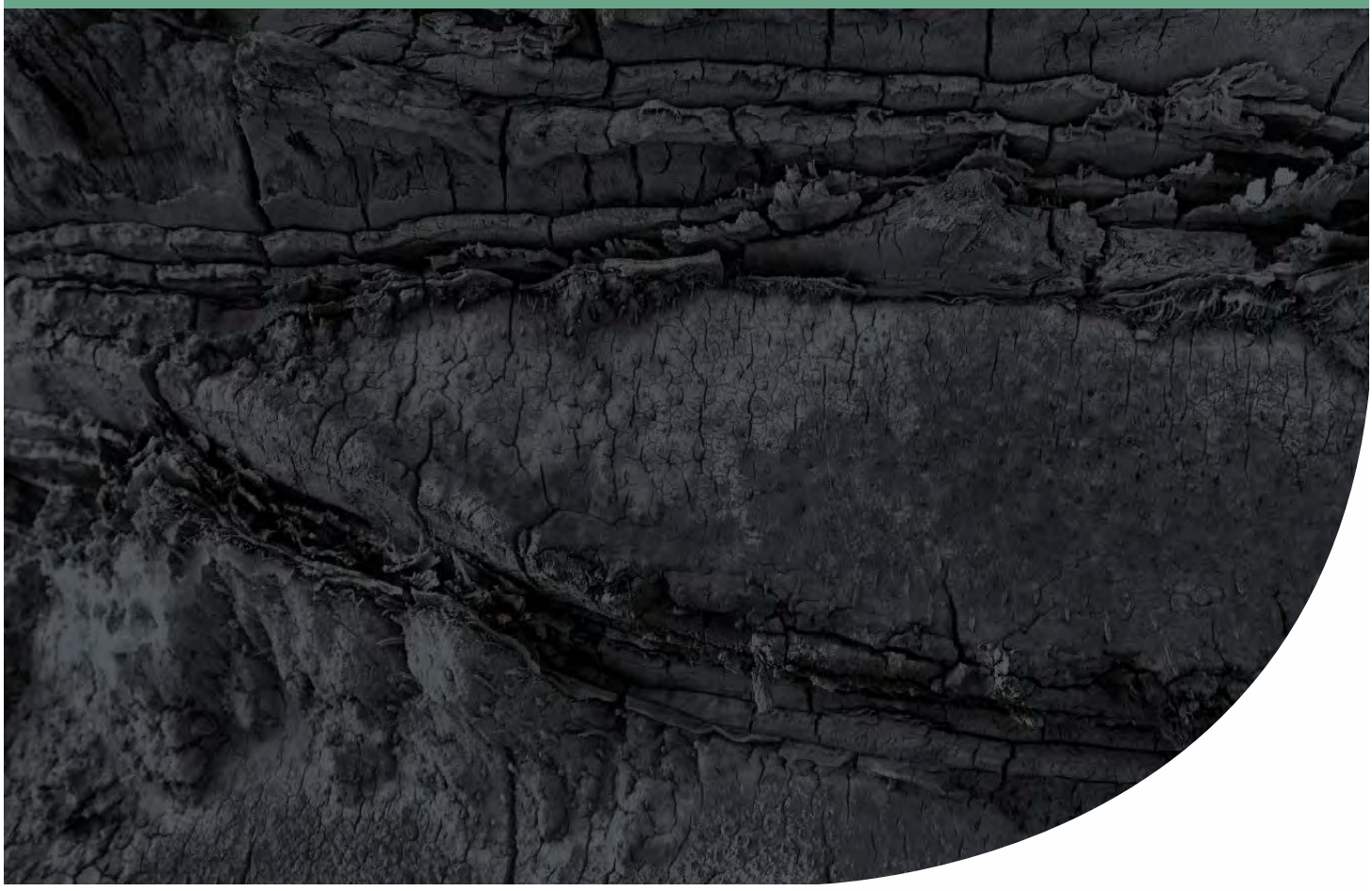
Bushfire Management Plan

Area 3 Middle Swan Brickworks Local Structure Plan

Project No: EP19-105(44)

Prepared for Hesperia Pty Ltd
May 2023



Document Control

Doc name:	Bushfire Management Plan Area 3 Middle Swan Brickworks Local Structure Plan				
Doc no.:	**EP19-105(44)--080 BRB**				
Version	**Date**	**Author**		**Reviewer**	
1	September 2021	Bianca Bertelli	BRB	Dana Elphinstone	DAE
	Report issued for client comment.				
A	July 2022	Pascal Scholz	PPS	Jason Hick	JDH
				Dana Elphinstone	DAE
	Report updated to incorporate updated local structure plan.				
B	May 2023	Pascal Scholz	PPS	Anthony Rowe	AJR
	Report updated to incorporate updated local structure plan.				

Disclaimer:

This document has been prepared in good faith and is derived from information sources believed to be reliable and accurate at the time of publication. Nevertheless, it is distributed on the terms and understanding that the author is not liable for any error or omission in the information sources available or provided to us, or responsible for the outcomes of any actions taken based on the recommendations contained herein. It is also expected that our recommendations will be implemented in their entirety, and we cannot be held responsible for any consequences arising from partial or incorrect implementation of the recommendations provided.

This document has been prepared primarily to consider the layout of development and/or the appropriate building construction standards applicable to development, where relevant. The measures outlined are considered to be prudent minimum standards only based on the standards prescribed by the relevant authorities. The level of bushfire risk mitigation achieved will depend upon the actions of the landowner or occupiers of the land and is not the responsibility of the author. The relevant local government and fire authority (i.e. Department of Fire and Emergency Services or local bushfire brigade) should be approached for guidance on preparing for and responding to a bushfire.

Notwithstanding the precautions recommended in this document, it should always be remembered that bushfires burn under a wide range of conditions which can be unpredictable. An element of risk, no matter how small, will always remain. The objective of the Australian Standard AS 3959-2018 is to “prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes” (Standards Australia 2018). Building to the standards outlined in AS 3959 does not guarantee a building will survive a bushfire or that lives will not be lost.

Executive Summary

Hesperia Pty Ltd (the proponent) is progressing structure planning over Lot 9000 Cranwood Crescent, Viveash (herein referred to as 'the site') in the City of Swan. The site is 10.9 hectares in area and located approximately 17 km north-east of the Perth Central Business District. The site includes a 5.40 hectare portion of the existing Middle Swan Brickworks site. As a result of the existing brickworks infrastructure, the site is almost entirely covered with sealed surfaces, sedimentation ponds and hardstand areas. It is bounded by a developing residential subdivision (WAPC Subdivision Approval reference #158848) and Eveline Road to the north, the Midland Bricks industrial hardstand areas to the north-east, Jack Williamson Park to the east and Cranwood Crescent and existing urban development to the south and west. The site is currently zoned 'Urban' under the *Metropolitan Region Scheme* and 'Industrial' under the City of Swan *Local Planning Scheme No.17*. A scheme amendment request to the City of Swan *Local Planning Scheme No. 17* to rezone the site from 'Industrial' to 'Residential' has been lodged.

The site is comprised of industrial uses associated with the Middle Swan Brickworks, which is in the process of being decommissioned. The lodged local planning scheme amendment proposal is intended to facilitate future residential development following the decommissioning of a portion of the Middle Swan Brickworks in alignment with the proposed Local Structure Plan provided in **Appendix A.**

The site is located within a 'bushfire prone area' under the state-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management (OBRM 2021). The identification of a site within an area declared as bushfire prone necessitates a further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

The purpose of this BMP is to assess the bushfire hazards, both within and nearby the site, and identify the 'management' strategies required to ensure the development of the land is consistent with the intent of SPP 3.7 - *to preserve life and reduce the impact of bushfire on property and infrastructure.*

This BMP has followed the requirements of SPP 3.7 to identify bushfire risk and the bushfire protection measures that will make the land suitable for its intended purpose. As part of this, a Bushfire Attack Level (BAL) assessment involving the classification and condition of vegetation within 150 m of the site has been undertaken.

As part of assessing the long-term bushfire risk to the site, vegetation classifications have been detailed for the pre and post-development scenario (in accordance with AS 3959) in order to inform a bushfire attack level (BAL) assessment. The following bushfire hazards were identified as applicable to the site following residential development (post-development):

- Forest (Class A) vegetation to the south-east of the site, north of Muriel Street.

To consider the likely bushfire risk applicable to future development at the site, the post-development vegetation classification scenario has been considered in which all existing classified vegetation within the site will be removed or managed to a 'low threat' standard. Forest vegetation outside the site has been assumed to remain the same post-development of the site.

Compliance Assessment

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for each of the applicable bushfire protection criteria outlined in the Guidelines. This includes:

- **Location**: Results of the bushfire attack level (BAL) assessment demonstrate that the future development (i.e. residential dwellings) can be located in an area (within future lots) that will, on completion, achieve BAL–29 or below (predominantly BAL- 12.5 and BAL-LOW).
- **Siting and Design**: All future habitable buildings can be sited within the proposed development so that BAL-29 or less can be achieved based on the local structure plan. Asset Protection Zones are achieved for all lots through management of residential lots, non-vegetated areas and low threat vegetation in the design including within lots, roadways and public open space.
- **Vehicular Access**: The local structure plan provides for connections to Surrey Way and Eveline Road to the north, which further connects onto Great Northern Highway providing egress to the north and south, and multiple connections to Cranwood Crescent to the west and south.
- **Water**: the development will be provided with a permanent and reticulated water supply to support onsite firefighting requirements.

The management/mitigation measures to be implemented through the future subdivision of the site have been outlined as part of this BMP. Following certification, the BAL ratings indicated within this BMP (or as part of future stage-based BAL assessments) can be used to support future building approval processes.

Table of Contents

List of Tables

List of Plates

Figures

Appendices

List of Abbreviations

Table A1: Abbreviations – General terms

General terms	
AHD	Australian Height Datum
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BHL	Bushfire Hazard Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
CCW	Conservation category wetland
ESA	Environmentally Sensitive Area
FDI	Fire Danger Index
FZ	Flame Zone
TEC	Threatened ecological community

Table A2: Abbreviations – Organisations

Organisations	
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity Conservation and Attractions
DoW	Department of Water (now known as Department of Water and Environment Regulation)
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
OBRM	Office of Bushfire Risk Management
WAPC	Western Australian Planning Commission

Table A3: Abbreviations – Legislation and policies

Legislation	
AS 3959	Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas
Guidelines	*Guidelines for Planning in Bushfire Prone Areas version 1.4* (DPLH & WAPC 2021)
SPP 3.7	State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015)

Table A4: Abbreviations – Planning and building terms

Planning and building terms	
MRS	Metropolitan Regional Scheme
POS	Public Open Space
LPS	Local Planning Scheme

1 Proposal Details

1.1 Background

Hesperia Pty Ltd (the proponent) is progressing structure planning over Lot 9000 Cranwood Crescent, Viveash (herein referred to as 'the site') in the City of Swan (CoS) to facilitate future residential development. The site is 10.9 hectares (ha) in area and located approximately 17 km north-east of the Perth Central Business District. The site includes a 5.40 ha portion of the existing Middle Swan Brickworks site. As a result of existing brickworks infrastructure, the site is almost entirely covered with sealed surfaces, sedimentation ponds and hardstand areas. It is bounded by a developing residential subdivision (WAPC Subdivision Approval reference #158848) and Eveline Road to the north (presently undergoing extension to connect to the Great Northern Highway), the Midland Bricks industrial hardstand areas to the north-east, Jack Williamson Park to the east, and Cranwood Crescent and existing urban development to the south and west. The site is currently zoned 'Urban' under the Metropolitan Region Scheme (MRS), as shown in **Plate 1**, and 'Industrial' under the CoS LPS No.17, as shown in **Plate 2**. A scheme amendment request to the CoS LPS No. 17 to rezone the site from 'Industrial' to 'Residential' has been lodged.

The site is comprised of industrial uses associated with the Middle Swan Brickworks, which is in the process of being decommissioned. The lodged LPS amendment proposal is intended to facilitate future residential development following the decommissioning of a portion of the Middle Swan Brickworks in alignment with the Local Structure Plan provided in **Appendix A.**

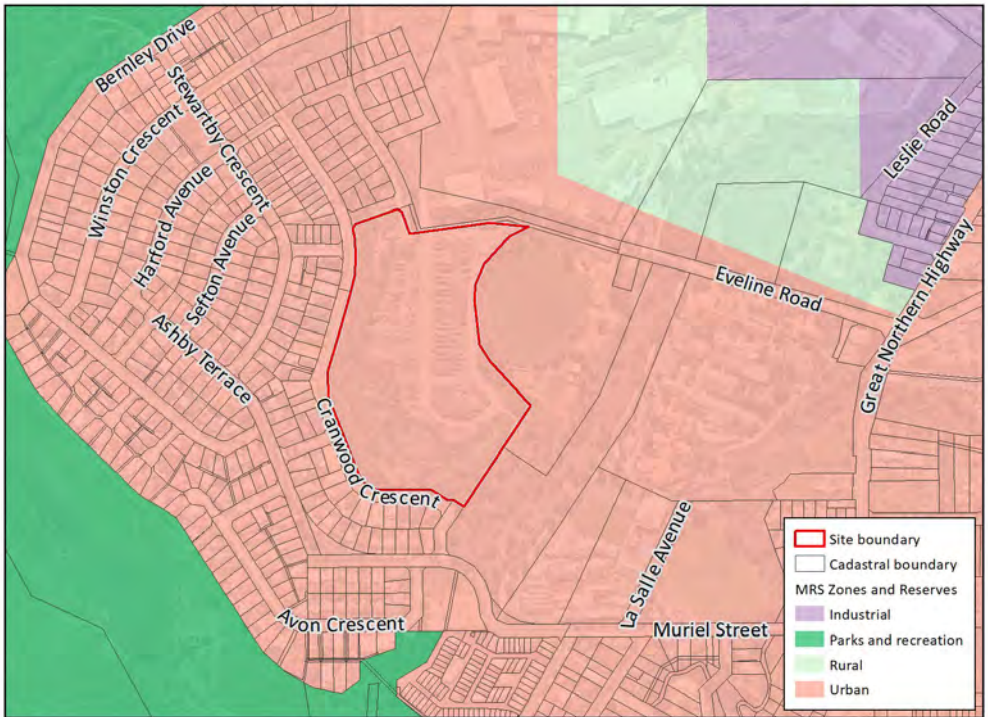


Plate 1: Metropolitan Region Scheme (MRS) zones and reserves within and surrounding the site

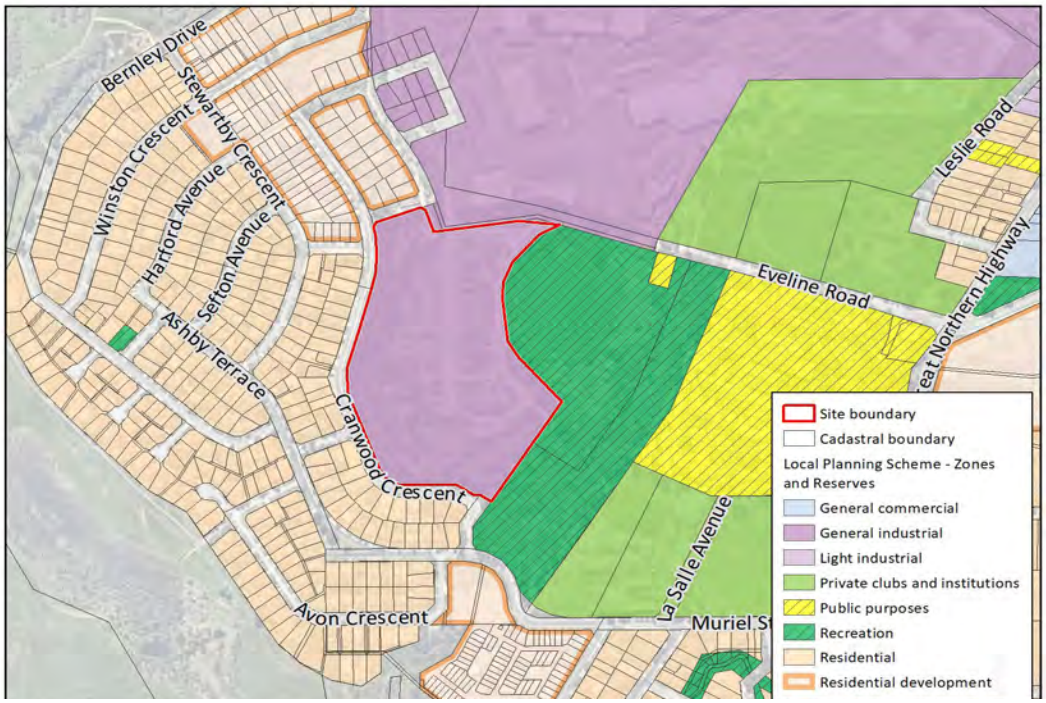


Plate 2: City of Swan Local Planning Scheme No.17 zones and reserves within and surrounding the site

The site is currently located within a 'bushfire prone area' under the state-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management (OBRM 2021) as shown in **Plate 3**. The identification of a site within an area declared as bushfire prone necessitates a further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

The purpose of SPP 3.7 and its policy intent is to preserve life and reduce the impact of bushfires on property and infrastructure through effective risk-based land use planning. Importantly, it is risk-based, requiring a methodical approach to identify and evaluate the hazards and provide the treatments to ameliorate these hazards to an acceptable level. SPP 3.7 requires that the determining authority give consideration to the precautionary principle (clause 6.11 in SPP 3.7) and they must be satisfied that the potential for significant adverse impacts can be adequately reduced or managed. In particular:

> *SPP 3.7 does not require that there be no increase at all in the threat of bushfire to people property or infrastructure. Rather, as is seen in clause 2 of SPP 3.7, the intention of the policy is to 'implement effective, risk¬based land use planning and development to preserve life and* ***reduce the impact of bushfire on property and infrastructure'****.* (emphasis added) [1]

[1] Harmanis Holdings No. 2 Pty Ltd and Western Australian Planning Commission [2019] WASAT 43 (Harmanis).

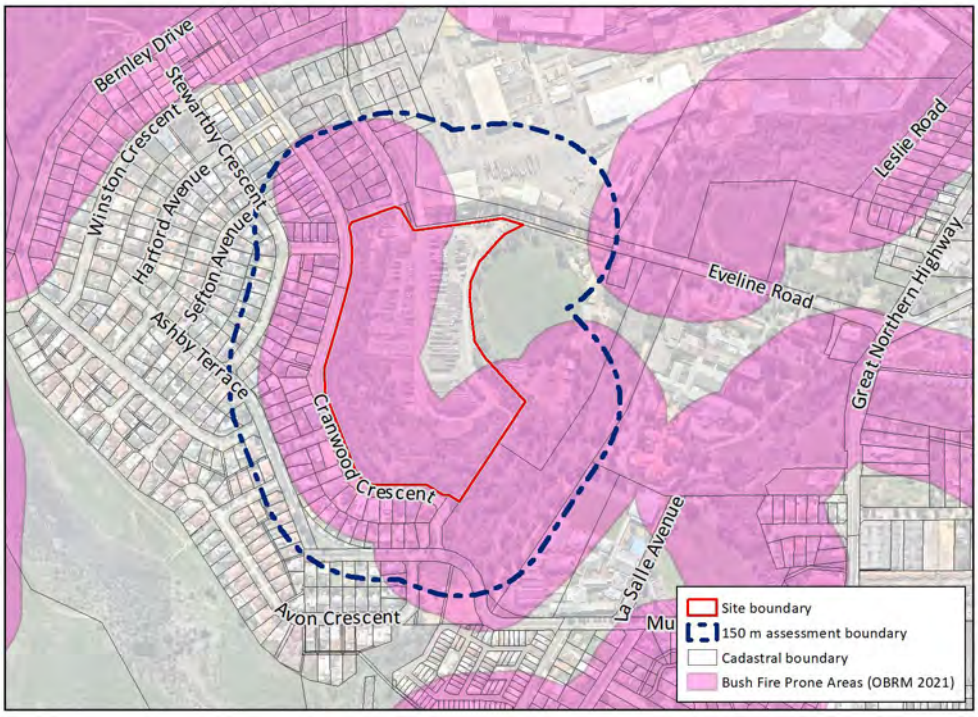


Plate 3: Areas within and surrounding the site are identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).

1.2 Aim of this report

The purpose of this BMP is to assess bushfire hazards both within the site and nearby and demonstrate that the threat posed by any identified hazards can be appropriately mitigated and managed. This BMP has been prepared to support the proposed structure plan of the site and addresses the requirements of SPP 3.7 (WAPC 2015), the Guidelines (DPLH & WAPC 2021) and (AS 3959) (Standards Australia 2018). The document includes:

- An assessment of the existing classified vegetation in the vicinity of the site (within 150 m) and consideration of bushfire hazards that will exist in the post-development scenario (**Section 3**).
- Commentary on how the future development can achieve the bushfire protection criteria outlined within the Guidelines including an indication of BAL ratings likely to be applicable to future dwellings (**Section 5**).
- An outline of the roles and responsibilities associated with implementing this BMP (see **Section 6**).

1.3 Statutory policy and framework

The following key legislation, policies and guidelines are relevant to the preparation of a bushfire management plan:

- *Bush Fires Act 1954*
- *Fire and Emergency Services Act 1998*
- *Planning and Development Act 2005* and associated regulations
- *Building Act 2011* and associated regulations
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)
- *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (DPLH & WAPC 2021)
- *Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas* (Standards Australia 2018)

1.4 Description of the proposed development

A Local Structure Plan has been prepared for the proposed 'Residential' area, as shown in **Appendix A**. The Local Structure Plan intends to demonstrate how the site can be developed within the context of the relevant environmental considerations and provides and outline how the structure and layout of development should be progressed for the site.

Development within the site will include:

- residential lots
- an interconnected public road network
- public open space.

1.5 Description of the land characteristics

Publicly available topographical contours (Landgate 2021) indicate that the topography across the site varies between 8 m AHD within the central portion of the site to 17 m AHD along the western boundary. Topographic contours are shown in **Figure 1.**

The western portion of the site supports remnant native vegetation in 'degraded' condition (Emerge Associates (2020b)) comprising native trees over non-native shrubs and grasses, extending over 4.56 ha. The remainder of the site comprises a 5.40 ha portion of the existing Middle Swan Brickworks site. As a result of existing brickworks infrastructure, this portion of the site is almost entirely covered with sealed surfaces, sedimentation ponds and hardstand areas, with small areas of non-native vegetation.

A review of historical aerial imagery indicates that portions of the site have been cleared since 1953 with the exception of the patch of remnant vegetation within the western portion of the site adjoining the oval, and tree lines along the boundary of the site. Some additional tree planting has occurred since the initial clearing along Eveline Road to the north of the site and surrounding the perimeter of Jack Williamson's oval.

2 Environmental Considerations

In accordance with the *Bushfire Management Plan – BAL Contour* template prepared by the Department of Planning, Lands and Heritage (2018), this BMP has considered whether there are any environmental values that may require specific consideration through either protection, retention or revegetation. To support this, a review of publicly available databases has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases. A summary of the search results has been provided in **Table 1**.

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases and site-specific information)

Key environmental feature:	Yes / no / potentially occurring within the site	If yes / potentially, describe the value that may be impacted
Conservation category wetlands and buffer (Geomorphic wetlands Swan Coastal Plain) (DBCA-019)	No	No geomorphic wetlands are mapped as occurring within the site. The Swan River Estuary Conservation Category Wetland (CCW) (UFI# 14,356) occurs approximately 450 m to the north of the site.
Waterways (DWER-031)	No	No natural waterways are identified within the site. The Swan River occurs approximately 450 m to the north of the site.
RAMSAR wetlands (DBCA-010)	No	Not applicable. No RAMSAR wetlands were identified within the site.
Threatened and priority flora (DBCA-036)	No	A flora and vegetation assessment completed by Emerge Associates (2020b) determined that the majority of the site does not provide suitable habitat for threatened or priority flora, due to the high level of historical disturbance. No threatened or priority flora were recorded within the site during the field study.
Threatened and priority fauna (DBCA-037)	Potentially	A fauna survey completed by Emerge Associates (2020a), determined that the site contains fauna habitat for a number of threatened and priority species. No listed conservation significant species were directly or indirectly (from secondary evidence) recorded during the field survey. The likelihood that the site would provide important habitat for these species is low, as the majority of habitat within the site is in relatively poor condition and limited in extent.
Threatened Ecological Communities (TECs) (DBCA-038)	No	The flora and vegetation assessment completed by Emerge Associates (2020b) did not identify any threatened or priority ecological communities within the site, nor was it considered likely for any to occur within the site due to the high level of historical disturbance.
Bush Forever areas (DPLH-019)	No	No Bush Forever Sites are located within the site. Bush Forever Site 302 'Swan River and Jane Brook, Ashfield to Upper Swan' is located approximately 430 m to the north of the site which extends further to the east and west of the site, associated with the Swan River.

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases and site-specific information) (continued)

Key environmental feature:	Yes / no / potentially occurring within the site	If yes / potentially, describe the value that may be impacted
Clearing regulations – Environmentally Sensitive Areas (ESAs) (DWER-046)	No	No ESAs occur within the site. One large ESA is located to the north of the site following the general orientation of the Swan River watercourse. The ESA appears to be associated with the Conservation Category Wetland (CCW) 'Swan River Estuary' (UFI 14,356) which extends over 53.96 ha to the north, east and west of the site.
DBCA controlled lands or waters (DBCA-011)	No	Not applicable. No DBCA controlled lands or waters are identified within the site. It is noted that the Swan River Reserve which adjoins the northern boundary is under Crown land tenure for Landscape Protection.
Swan Bioplan Regionally Significant Natural Areas 2010 (DWER-070)	No	Not applicable.
Aboriginal heritage (DPLH-001)	Yes	The site is adjacent to the boundary of the registered Aboriginal Heritage Site 'Swan River' (ID 3536). While the site intersects with the boundaries of the Registered Heritage Sites; 'Turtle Swamp', 'Blackadder and Woodbridge Creek' and 'Jane Brook' and 'Bishop Road Camp', their actual physical location is not within the site.
Non-indigenous heritage (DPLH-006)	No	There are no non-indigenous heritage sites identified within the site.

2.1 Native vegetation – modification and clearing

Within the site

A large portion of the site is almost entirely covered in sealed surfaces, sedimentation ponds and hardstand areas as a result of existing brickworks infrastructure. Numerous existing planted and naturally regrown trees in the western portion of the site were determined to comprise amenity and environmental values and were assigned a 'high' retention value; therefore, opportunities to retain some of this vegetation within proposed residential lots have been considered in the local structure plan. It is envisaged that all existing classified vegetation to be retained within future residential lots in the western portion of the site will be managed to a low threat standard.

Some clearing of vegetation within the site will be required for bushfire management purposes as part of implementing this BMP, specifically to enable the proposed urban development and associated buildings to meet the relevant siting requirements of the Guidelines. It is envisaged that all clearing of vegetation within the site will be exempt from requiring a clearing permit under Schedule 6 of the *Environmental Protection Act 1986* (EP Act) in accordance with a future subdivision approval under the *Planning and Development Act 2005*. Additionally, a clearing permit will not be required where other exemptions pursuant to the EP Act or Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (where outside and ESA) exist, such as those associated with a building licence or Section 33 of the *Bush Fires Act 1954*.

Outside the site

The residential subdivision area to the north of the site was granted Development Approval by the West Australian Planning Commission on the 4th of August 2020, Ref #158848), therefore it has been assumed that the vegetation in this area will remain cleared and managed to a low threat standard, as detailed in the BMP that supports the subdivision application (Emerge Associates 2019). No other areas of native vegetation outside the site are proposed to be modified or cleared by the proponent as part of the proposed development; therefore, all other vegetation outside the site is assumed to remain in its existing condition.

2.2 Revegetation and landscape plans

At this stage, no revegetation is proposed within the site. Areas identified as Public Open Space and any retained vegetation will be managed to a low threat condition in accordance with clause 2.2.3.2 of AS3959.

Management of areas of low threat vegetation should include, but not limited to:

- Regular mowing/slashing of grass to less than 100 mm in height (where present).
- Irrigation of grass and garden beds (where required).
- Regular removal of weeds and built up dead material (such as fallen branches, leaf litter etc.).
- Low pruning of trees (branches below 2 m in height removed where appropriate/applicable).
- Application of ground/surface covers such as mulch or non-flammable materials as required/applicable.

3 Bushfire Assessment Results

Bushfire risk for the site has been appropriately considered both in context to the site and potential impact upon the site using AS 3959 and the Guidelines.

The objective of AS 3959 is to reduce the risk of ignition and loss of a building to bushfire. It provides a consistent method for determining a radiant heat level (radiant heat flux) as a primary consideration of bushfire attack. AS 3959 measures the Bushfire Attack Level (BAL) as the radiant heat level (kW/m^2) over a distance of 100 m. AS 3959 also prescribes deemed-to-satisfy construction responses that can resist the determined radiant heat level at a given distance from the fire. It is based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

A BAL contour plan has been prepared in accordance with Appendix Three of the Guidelines and Method 1 of AS 3959 to determine the BAL ratings likely to be applicable to future buildings. This has been based on the vegetation classifications and the effective slope under the vegetation, with the result presented on the BAL contour plan, as shown in **Figure 5**.

3.1 Assessment inputs

This bushfire attack level (BAL) assessment was undertaken in accordance with Method 1 of AS 3959. Vegetation classifications and effective slope post-development have been detailed in **Figure 3** and **Figure 4**, respectively. A BAL Contour Plan has been prepared based on the developed condition of the site in accordance with Appendix Three of the Guidelines and is provided as **Figure 5**.

3.1.1 Assumptions

The BAL assessment is based on the following assumptions:

- **Designated FDI**: 80
- **Flame temperature**: 1090 K
- **Effective slope** beneath classified vegetation: flat/upslope (**Figure 4**)
- Public open space within the site will be managed in order to achieve a low threat classification in accordance with Section 2.2.3.2 of AS 3959. Management may include:
  - Clearing of vegetation.
  - Regular maintenance including removal of weeds and dead material.
  - Where remnant trees are retained, these will be low pruned to 2 m from the ground.
  - Application of ground covers such as mulch or non-flammable materials.
  - Where grass/turf is present, this will be regularly cut so that the grass is maintained at or below 100 mm in height.
- All classified vegetation within the site will be removed as part of future subdivision works. Future subdivision will be developed with a combination of non-vegetated land and low threat vegetation within future residential lots managed in perpetuity. Where trees are to be retained within future lots in the western portion of the site, these will be managed to a low threat standard. All classified forest vegetation surrounding the site will remain in its existing state in the future, and will, therefore, remain a bushfire risk to the site.

- Areas outside the site within private landholdings that have been identified as a low threat will continue to be managed and/or considered to achieve low threat (in accordance with Section 2.2.3.2 of AS 3959) based on the existing maintenance regimes.
- The proponent has entered into an agreement with the City of Swan that the existing Jack Williamson Oval and associated bund to the east of the site will be upgraded and achieve low threat in accordance with clause 2.2.3.2(f) of AS 3959. All classified grassland vegetation will be removed and the post-development condition of this area will include a combination of turf, low planting (in garden beds) and mulch as part of the POS and will be managed to low threat in perpetuity.

3.1.2 Vegetation classification

All vegetation within 150 m of the site was classified in accordance with Clause 2.2.3 of AS 3959. Each distinguishable vegetation plot is described in **Table 2** and shown in **Figure 2**. This classification is a conservative assessment of the vegetation which includes areas that should be managed to a low threat under the City of Swan Fire Hazard Reduction Notice.

Not all vegetation is classified as a bushfire risk. Vegetation and ground surfaces that are exempt from classification as a potential hazard are identified as a low threat under Section 2.2.3.2 of AS 3959. Low threat vegetation includes the following:

a) Vegetation of any type that is more than 100 m from the site.
b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.
c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified.
d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.
e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings, and rocky outcrops.
f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves, and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and wind breaks.

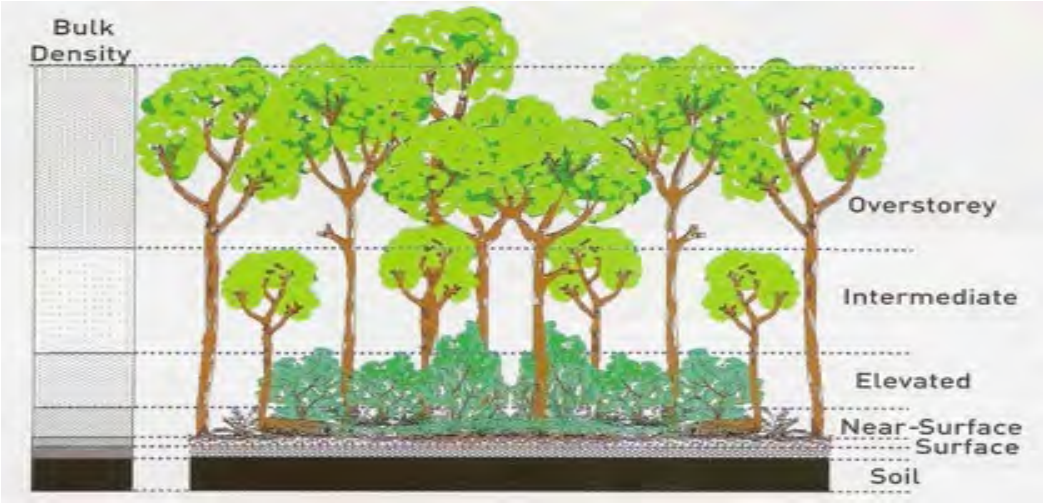


Plate 4: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

Table 2: Vegetation classification, bushfire hazard rating and future management

Pre-development (Figure 2)			Post development (Figure 3 and Figure 4)	
Plot	**AS 3959 classification**	**Site photo/s (location points shown in Figure 2)**	**Plot**	**AS 3959 classification, effective slope and assumptions**
1	AS 3959 classification (Figure 2): Forest (Class A) Forest vegetation was identified within the southern portion and along the western boundary of the site along Cranwood Crescent. Forest vegetation within the site is characterised by a mixture of native and planted vegetation, including areas of marri and planted non-native *Eucalyptus* spp., growing to a height of > 15 m, with native and non-native understorey species. This vegetation has a foliage cover greater than 30%.	 Photo location 1: Forest vegetation within the western portion of the site along Cranwood Crescent  Photo location 2: Forest vegetation (background) within the north-western portion of the site along Cranwood Crescent  Photo location 3: Forest vegetation within the southern portion of the site  Photo location 4: Forest vegetation within the eastern portion of the site	5	AS 3959 classification (Figure 3): Low threat (exclusion clause 2.2.3.2(f)) **Effective slope (**Figure 4**):** Not applicable The forest vegetation along the western site boundary along Cranwood Crescent will be modified and managed to achieve a low threat standard within future residential lots in perpetuity. Additionally, a small portion of forest vegetation in the eastern portion of the site will be modified and managed within the proposed POS areas. This management will involve the removal of vegetation from the understorey and intermediate fuel layers, in addition to elevated fuel layers where appropriate/required.
			4	AS 3959 classification (Figure 3): Non vegetated area (exclusion 2.2.3.2(e)) **Effective slope (**Figure 4**):** Not applicable The remaining forest vegetation not identified for retention within future residential lots will be removed as part of the proposed development to form future residential lots and roads and has been identified as non-vegetated.

Table 2: Vegetation classification, bushfire hazard rating and future management (continued)

Pre-development (Figure 2)			Post development (Figure 3 and Figure 4)	
Plot	**AS 3959 classification**	**Site photo/s (location points shown in Figure 2)**	**Plot**	**AS 3959 classification, effective slope and assumptions**
2	AS 3959 classification (Figure 2): Forest (Class A) Forest vegetation has been identified to the south and south-east of the site and is characterised by native and non-native Eucalyptus spp. growing to a height of 8 - > 15 m with more than 30% foliage cover and minimal understorey growth. Understorey vegetation consists of non-native grasses and occasional native shrubs in the understorey.	 Photo location 5: Forest vegetation to the south of the site  Photo location 6: Forest vegetation to the south-east of the site  Photo location 7: Forest vegetation to the south-east of the site  Photo location 8: Forest vegetation to the south-east of the site	2a and 2b	AS 3959 classification (Figure 3): Forest (Class A) **Effective slope (**Figure 4**):** Flat/upslope (Plot 2a) Downslope 0-5 (Plot 2b) The forest vegetation located to the south and south-east of the site abutting Jack Williamson Park is assumed to be unmanaged and remain forest (Class A) classification. These areas of vegetation will, therefore, remain a bushfire risk to the site.

Table 2: Vegetation classification, bushfire hazard rating and future management (continued)

Pre-development (Figure 2)			Post development (Figure 3 and Figure 4)	
Plot	**AS 3959 classification**	**Site photo/s (location points shown in Figure 2)**	**Plot**	**AS 3959 classification, effective slope and assumptions**
3	AS 3959 classification (Figure 2): Grassland (Class G) Grassland vegetation has been identified to the east of the site. The areas of grassland vegetation to the east of the site contain surface and near-surface fuel loads, containing non-native grass species that are unmanaged. The vegetation on the oval to the south-west is no longer used as a sports ground and grows to over 10 cm in height. Emerge has visited the area numerous times and observed the oval in various states of management. Whilst some evidence of management was observed in these images, at the time of the site inspection it was classified as unmanaged grassland.	 Photo location 9: Grassland vegetation to the east of the site within Jack Williamson's Park  Photo location 10: Grassland vegetation to the east of the site within Jack Williamson's Park  Photo location 11: Grassland vegetation to the east of the site within Jack Williamson's Park  Photo location 12: Grassland vegetation to the east of the site within Jack Williamson's Park	3	AS 3959 classification (Figure 3): Low threat (exclusion clause 2.2.3.2(f)) **Effective slope (**Figure 4**):** Not applicable The proponent has entered into an agreement with the City of Swan that the existing Jack Williamson Oval and associated bund will be upgraded and achieve low threat in accordance with clause 2.2.3.2(f). The post-development condition of this area will include a combination of turf, low planting (in garden beds) and mulch as part of the POS and will be managed to low threat in perpetuity.

Table 2: Vegetation classification, bushfire hazard rating and future management (continued)

Pre-development (Figure 2)			Post development (Figure 3 and Figure 4)	
Plot	**AS 3959 classification**	**Site photo/s (location points shown in Figure 2)**	**Plot**	**AS 3959 classification, effective slope and assumptions**
5	AS 3959 classification (Figure 2): Low threat vegetation (exclusion 2.2.3.2(f)) Low threat vegetation has been to the northwest of the site within a managed park with cleared understorey and managed ground cover (photopoints 13 and 14). Low threat vegetation north of the site is associated with single rows of trees that have been identified as windbreaks (photo points 15 and 16). Low threat vegetation to the west of the site is associated with areas of managed grassland, which is irrigated and regularly cut to less than 10 cm.	 Photo location 13 – managed vegetation to the north of the site (behind the fence)  Photo location 14 – managed vegetation to the north of the site (behind fence)  Photo location 15 – managed vegetation to the north east of the site  Photo location 16 – managed vegetation to the north of the site	5	AS 3959 classification (Figure 3): Low threat vegetation (exclusion 2.2.3.2(f)) **Effective slope (**Figure 4**):** Not applicable The maintenance regimes for all existing low threat vegetation surrounding the site is assumed to continue in the long-term based on current land uses and management arrangements, in accordance with the requirements of the City of Swan.

Table 2: Vegetation classification, bushfire hazard rating and future management (continued)

Pre-development (Figure 2)			Post development (Figure 3 and Figure 4)	
Plot	**AS 3959 classification**	**Site photo/s (location points shown in Figure 2)**	**Plot**	**AS 3959 classification, effective slope and assumptions**
4	AS 3959 classification (Figure 3): Non-vegetated area (exclusion 2.2.3.2(e)) Non-vegetated areas such as existing roads, driveways, existing dwellings and areas of mineral earth within and surrounding the site have been excluded in accordance with Clause 2.2.3.2(e) of AS 3959. Areas associated with developed residential land may contain areas of low threat vegetation. This has been mapped as non-vegetated for ease of reference.	 *Photo location 17: non-vegetated brickworks within the central portion of the site*  *Photo location 18: non-vegetated area to the east of the site.*	4	AS 3959 classification (Figure 3): Non-vegetated area (exclusion clause 2.2.3.2(e)) **Effective slope (**Figure 4**):** N/A Areas within and external to the site that have been identified as non-vegetated will remain non-vegetated when converted to public roads and/or residential land uses as part of the proposed development of the site.

3.1.3 Assessment outputs

3.1.3.1 Bushfire attack level assessment

The BAL assessment completed for the site indicates that a BAL rating of BAL-29 or less can be achieved at future habitable buildings based on the indicated spatial layout; this is dependent on the requirement for setbacks provided by the internal road network, specifically along the eastern and southern boundaries of the site, see **Figure 5**.

Table 3 provides a summary of the setback distances necessary from classified vegetation to achieve the indicated BAL ratings, with the BAL Contour Plan (**Figure 5**) being a visual representation of these distances. The setback distances are based on the post-development classified vegetation (**Figure 3**) and effective slope (**Figure 4**), and are taken from Table 2.5 of AS 3959.

Table 3: Setbacks required from classified vegetation in order to achieve BAL-29

Plot number (Figure 3)	Vegetation classification (Figure 3)	Effective slope (Figure 4)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL rating (Figure 5)
2a	Forest (Class A)	Flat/upslope	< 16 m	BAL-FZ
			16 - < 21 m	BAL-40
			21 - < 31 m	BAL-29
			31 - < 42 m	BAL-19
			42 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
2b	Forest (Class A)	Downslope 0-5°	< 20 m	BAL-FZ
			20 - < 27 m	BAL-40
			27 - < 37 m	BAL-29
			37 - < 50 m	BAL-19
			50 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW

4 Identification of Bushfire Hazard Issues

From a bushfire hazard management perspective, the key issues that are likely to require management and/or consideration as part of the future building permit process include:

- Provision of appropriate separation distance from bushfire hazards surrounding the site (to the east and south), to ensure a BAL rating of BAL-29 or less can be achieved at future habitable buildings (built form). The minimum setback distances required have been provided in **Table 3**.
- Ensuring that site landscaping is designed, implemented and managed to achieve low threat standards to reduce the risk of fires starting onsite.
- Provision of appropriate vehicular access to ensure that when development within the site is fully constructed, egress to at least two different destinations will be available to residents, visitors, future workers and emergency personnel.
- Provision of appropriate water supply and associated infrastructure.

These issues are considered further in **Section 5**.

5 Assessment against the Bushfire Protection Criteria

This BMP provides an outline of the mitigation strategies that will ensure that as development progresses within the site, an acceptable solution can be adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines. The applicable bushfire protection criteria identified in the Guidelines and addressed as part of this BMP are:

- Element 1: Location of the development
- Element 2: Siting and design of the development
- Element 3: Vehicular access
- Element 4: Water supply.

As part of future development, it is likely that an 'acceptable solution' will be able to address the intent of all four bushfire protection criteria as part of future subdivision of the site. A summary of how this can be achieved and an associated compliance statement for each has been provided in **Table 4.**

Table 4: Assessment against the bushfire protection criteria

Bushfire protection criteria	Proposed bushfire management strategies
Element 1: Location	
A1.1 Development location	The permanent bushfire hazards to future built form are associated with the forest (Class A) vegetation external to the site to the east and south. The residential areas have been located adjacent to roads which provide appropriate setbacks to this vegetation according to the distances set out in **Table 3**, such that future residential built form will not exceed BAL-29. Based on the BAL Contour Plan (see **Figure 5**), the majority of the proposed residential areas can achieve separation for BAL-29 construction or lower, compliant with A1.1. Part of proposed residential cells in the southern portion of the site are subject to a incursion of BAL-FZ/BAL-40; however, future lots can be appropriately sized such that future habitable dwellings can be located to achieve BAL-29 or less (through public road,/public open space and/or the application of an in-lot setback from the lot boundary and restrictive covenant over the BAL-FZ and BAL-40 portion of the lots). The proposed structure plan complies with A1.1.
Element 2: Siting and design	
A2.1 Asset Protection Zone	One of the most important bushfire protection criteria measures influencing the safety of people and property is to create an Asset Protection Zone (APZ) around buildings. The APZ is a low fuel area immediately surrounding a building and can include non-flammable features such as irrigated landscapes, gardens, driveways, and roads. All future lots for residential development will be required to be maintained an APZ. The APZ for each lot includes neighboring lots managed to a low-fuel state, public roads, footpaths, cultivated garden and managed parklands. The site is suitably sized to accommodate the minimum separation distances outlined in **Table 3** required to achieve BAL-29 or less for future habitable buildings from classified vegetation surrounding the site. APZs surrounding future buildings will be managed in accordance with the requirements of Schedule 1 of the Guidelines '*Standards for Asset Protection Zones'.* Any remaining vegetation within the APZs in this portion of the site will be managed to a low threat standard in accordance with AS 3959, compliant with A2.1.

Table 4: Assessment against the bushfire protection criteria (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 3: Vehicular access	
A3.1 Public roads	Existing public roads within the site and surrounds, as well as proposed new public roads, can and will comply with the minimum standards outlined in Appendix Four of the Guidelines and with A3.1 (Table 6, Column 1) or as agreed with the City of Swan, and includes a minimum 6 m-wide trafficable surface, compliant with A3.1.
A3.2a Multiple access routes.	The proposed vehicle access is shown in **Figure 6**. The Local Structure Plan (**Appendix A**) includes connections to Eveline Road to the north, which further connects onto Great Northern Highway providing egress to the north and south, and multiple connections to Cranwood Crescent to the west and south. There are multiple connections to the existing public road network providing access routes for the site compliant with A3.2a.
A3.2b Emergency access way	Not applicable. Given the proposed development plan provides for egress to at least two different destinations, emergency access ways are not required as part of the proposed development of the site.
A3.3 Through-roads	All proposed roads are through-roads, compliant with A3.3.
A3.4a Perimeter roads	A public perimeter road, meeting the requirements contained in Appendix Four of the Guidelines (Table 6, Column 1), provides separation between the proposed lots and classified vegetation east and south-east of the site, compliant with A3.4a.
A3.4b Fire service access route	Not applicable. Future development within the site will be provided with appropriate vehicular access, as outlined above, and therefore fire service access routes are not required.
Element 4: Water	
A4.1 Identification of future water supply	Fire response services require ready access to an adequate water supply for firefighting. The site is located in an area serviced by reticulated water as evidenced by Water Corporation data on Locate (WCORP-002 and WCORP-070). The site will connect to the reticulated water supply and will include fire hydrants installed by the developer to meet the specifications of Water Corporation and DFES, compliant with A4.1

Table 6: Vehicular access technical requirements

TECHNICAL REQUIREMENTS	1 Public roads	2 Emergency access way[1]	3 Fire service access route[1]	4 Battle-axe and private driveways[2]
Minimum trafficable surface (metres)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (metres)	N/A	6	6	6
Minimum vertical clearance (metres)	4.5			
Minimum weight capacity (tonnes)	15			
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Maximum grade sealed road[3]		1:7 (14.3%)		
Maximum average grade sealed road		1:10 (10%)		
Minimum inner radius of road curves (metres)		8.5		

Notes:
[1] To have crossfalls between 3 and 6%.
[2] Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.
[3] Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle.

Plate 5: Excerpt of Table 6 from The Guidelines

5.1 Additional management strategies

5.1.1 Future approval considerations

The BAL assessment is a conservative and cautious assessment of the potential bushfire risk posed to future habitable buildings within the site based on the proposed management of vegetation and assumptions outlined in **Section 3c**.

Once the structure plan and subdivision approval has been granted, the creation of lot titles and building licences will be required before the dwelling construction can commence. This BMP and the indicative BAL ratings (see **Figure 5**) can be used to inform the construction requirements for future dwellings.

This BMP may be used to support future subdivision applications assuming the layout, vehicle access, and vegetation assumptions remain the same.

5.1.2 Landscape Management

5.1.2.1 Within the site

All land within the site is assumed to be developed to a non-vegetated or low threat standard in accordance with AS 3959.

Where vegetation is to be managed to a low threat standard within the site, this should occur in accordance with Section 2.2.3.2 of AS 3959 and the City of Swan Firebreak Notice/s. The areas of vegetation that will undergo management will predominantly include retained trees within future residential lots along Cranwood Crescent and within POS in the eastern portion of the site.

5.1.2.2 Surrounding the site

Classified forest vegetation external to the site is expected to remain in its current condition and remain a permanent hazard.

The private residential landholdings surrounding the site should be managed by the applicable landowners in accordance with the *City of Swan Firebreak Notice* in perpetuity. Areas of non-vegetated and low threat land are assumed to continue to be managed in accordance with current arrangements.

5.1.3 City of Swan Firebreak Notice

The City of Swan releases a Firebreak Notice on an annual basis to provide a framework for bushfire management within the City. The City of Swan is able to enforce this notice in accordance with Section 33 of the *Bush Fires Act 1954*. In addition, Section 33.1(b) also provides the City with additional power to direct landowners to undertake works to remedy conditions conducive to the outbreak or spread of bushfire

Until development is progressed within the site, existing landowners are required to comply with the Firebreak Notice, including the maintenance of minimum 3 m-wide perimeter firebreaks (or as agreed with the City of Swan).

Once development progresses within the site, future landowners should refer to the *City of Swan Firebreak Notice*, to determine the measures required for compliance.

5.1.4 Vulnerable or high-risk land uses

There is no known vulnerable or high-risk land uses proposed for the site. Any future vulnerable or high-risk land use will be required to meet the requirements of SPP 3.7, which will be dealt with at detailed subdivision and/or development application stages.

5.1.5 Public education and preparedness

Community bushfire safety is a shared responsibility between individuals, the community, government and fire agencies. DFES has an extensive Community Bushfire Education Program including a range of publications, a website and Bushfire Ready Groups. The DFES publication '*Prepare. Act. Survive.'* (DFES 2014) provides excellent advice on preparing for and surviving the bushfire season. Other downloadable brochures are available from http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/pages/publications.aspx

The City of Swan provides bushfire safety advice to residents available from their website https://www.swan.wa.gov.au/Services-support/Emergency-management/Fire/Fire-breaks-hazard-reduction. Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in high-risk areas in addition that that provided in this BMP.

Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in addition to that provided in this BMP.

6 Responsibilities for Implementation and Management of Bushfire Measures

Table 5 outlines the responsibilities of the landowner/developer and the City of Swan associated with implementing this BMP at the **local structure plan stage** with reference to ongoing bushfire risk mitigation measures for existing land uses (through compliance with the *City of Swan Firebreak Notice*) or future mitigation measures to be accommodated as part of the future structure planning process. These responsibilities will need to be considered as part of the subsequent development and implementation process.

*Table 5: Responsibilities for the implementation of the BMP at the **structure planning** stage*

Management Action	
No.	**Developer**
1	Provide a copy of this BMP to the relevant decision makers to support approval of the proposed structure plan.
2	If required, prepare a new/revised BMP in accordance with SPP 3.7, the Guidelines and AS 3959 to support future subdivision applications, based on the proposed subdivision concept plan and in consideration of existing bushfire hazards or those that will be present following development. In addition, if the assumptions regarding the treatment of the public open space and public road reserves change as part of future detailed design stages, a revised BMP will be required.
3	Comply with the City of Swan fire control notice/s as published and/or in accordance with directions given by the local government.
4	Where applicable, as part of the subdivision process, make spatial provisions for: • A suitable public road network that provides egress to at least two different destinations and meets the technical requirements of Table 6 within Appendix Four of the Guidelines (or as updated), or as otherwise determined by a bushfire consultant and relevant approval authority. • Where possible, avoid no through roads and battle-axe access legs as part of the spatial layout. If these are proposed as part of future development, they will need to be justified from a planning/development perspective and consistent with the minimum requirements outlined in Appendix Four of the Guidelines (or as updated), or as otherwise determined by a bushfire consultant and relevant approval authority. • Ensure future habitable buildings are able to be located in an area subject to BAL-29 or less. The minimum separation distances between habitable buildings and classified vegetation to achieve BAL-29 should be in accordance with Table 3 in this BMP or as specified in subsequent BAL assessments. These separation distances can be accommodated through locating public roads and/or managed public open space between the habitable building and classified vegetation and/or ensuring proposed residential lots are adequately sized to ensure BAL-29 is not exceeded at the future dwelling and use of in-lot setbacks).

Table 6 outlines the responsibilities of the landowner/developer and the City of Swan associated with implementing this BMP at the **subdivision stage** with reference to ongoing bushfire risk mitigation measures for to be accommodated as part of the future structure planning process. If a new BMP is prepared for subdivision, that document will override the responsibilities in **Table 6**, below.

*Table 6: Responsibilities for implementation of this BMP at the **subdivision** stage*

Management Action		Timing
No.	Developer	
1	Reticulated water supply and hydrants are to be installed as part of subdivision development in accordance with standard Water Corporation requirements unless otherwise agreed.	Subdivision works
2	As part of future subdivision works, all classified vegetation is to be removed from the site or modified to achieve a low threat standard in accordance with section 2.2.3 of AS3959. Public open space is be maintained to a low threat standard in perpetuity.	Subdivision works
3	Install the public roads to the standards outlined in Appendix Four of the Guidelines or as agreed with the City. Public road reserves should be designed and maintained to achieve low threat in accordance with Section 2.2.3.2 of AS 3959. Construct roads to ensure all development has two access routes at all stages of subdivision.	Subdivision works
4	Confirm BAL ratings for all lots designated as bushfire prone at the time titles are created, based on the BAL Contour Plan and/or in accordance with a BAL assessment if the site conditions are different.	To support the creation of lot titles.
5	For each new lot created within areas exposed to a BAL rating exceeding BAL-LOW, lodge a Section 165 Notification on the Certificate of Title in order to alert purchasers and successors in title of the existence of the overarching BMP and the requirements associated with meeting AS 3959 construction standards. This should be based on the outcomes of the BAL certification process.	To support the creation of lot titles.
6	For the residential land subject to BAL-40 or above, a restrictive covenant to the benefit of the local government, pursuant to section 129BA of the Transfer of Land Act 1893, is to be placed on the certificate(s) of title of the proposed lot(s) advising of the existence of a restriction on the use of the land within areas that have been assessed as BAL- 40 or BAL-FZ.	To support the creation of lot titles.
7	Where relevant**, certify BAL ratings for the lots designated bushfire prone within the *Map of Bush Fire Prone Areas* at the time lot titles are created, based on the BAL Contour Plan (see **Figure 5**) and/or in accordance with a revised BAL assessment if the vegetation classifications are different to those identified within this BMP (in particular if vegetation classifications change as a result of the detailed landscape design and assumptions regarding the retained vegetation). The certified BAL ratings can then be submitted to the City of Swan to support future building licenses. **The developer may choose to certify BAL ratings, or may leave this for future lot owners to complete at the time of building licence**	Prior to issue of building licenses.

7 Applicant Declaration

7.1 Accreditation

This assessment report has been prepared by Emerge Associates who have a number of team members who have undertaken Bushfire Planning and Design (BPAD) Level 1 and Level 2 training and are Fire Protection Association of Australia (FPAA) accredited practitioners. Emerge Associates have been providing bushfire risk management advice for more than 10 years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

7.2 Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Signature:

Name: Anthony Rowe

Date: 25/05/2023

BPAD Accreditation: Level 3 BPAD no. 36690

8 References

8.1 General references

The references listed below have been considered as part of preparing this document.

Department of Fire and Emergency Services (DFES) 2014, *Prepare. Act. Survive.*, Perth. August 2014.

Department of Planning, Lands and Heritage, and Western Australian Planning Commission, (DPLH & WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas Version 1.4*, Perth, Western Australia.

Emerge Associates 2019, *Bushfire Management Plan - Proposed Subdivision - Cranwood Crescent, Viveash*, EP19-101(25)--009 SCM, Version 1.

Emerge Associates 2020a, *Technical Memorandum - Fauna Assessment Part Lots 23 Winston Crescent and 73 Eveline Road, Middle Swan*, EP19-105(26)--036 RAW, Version 1.

Emerge Associates 2020b, *Technical Memorandum - Flora and Vegetation Assessment Part Lots 23 Winston Crescent and 73 Eveline Road, Middle Swan*, EP19-105(07)--035 RAW, Version 1.

Gould, J., McCaw, W., Cheney, N., Ellis, P. and Matthews, S. 2007, *Field Guide: Fuel Assessment and Fire Behaviour Prediction in Dry Eucalypt Forest*, CSIRO and Department of Environment and Conservation, Perth, Western Australia.

Office of Bushfire Risk Management (OBRM) 2021, *Map of Bush Fire Prone Areas*, Landgate, https://maps.slip.wa.gov.au/landgate/bushfireprone/.

Standards Australia 2018, *AS 3959:2018 Construction of buildings in bushfire-prone areas*, Sydney.

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

8.2 Online references

Landgate 2020, *Map Viewer*, viewed July 2022, https://www0.landgate.wa.gov.au/maps-and-imagery/interactive-maps/map-viewer

Office of Bushfire Risk Management (OBRM) 2021, *Map of Bush Fire Prone Areas*, viewed July 2022, https://maps.slip.wa.gov.au/landgate/bushfireprone/

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Figures

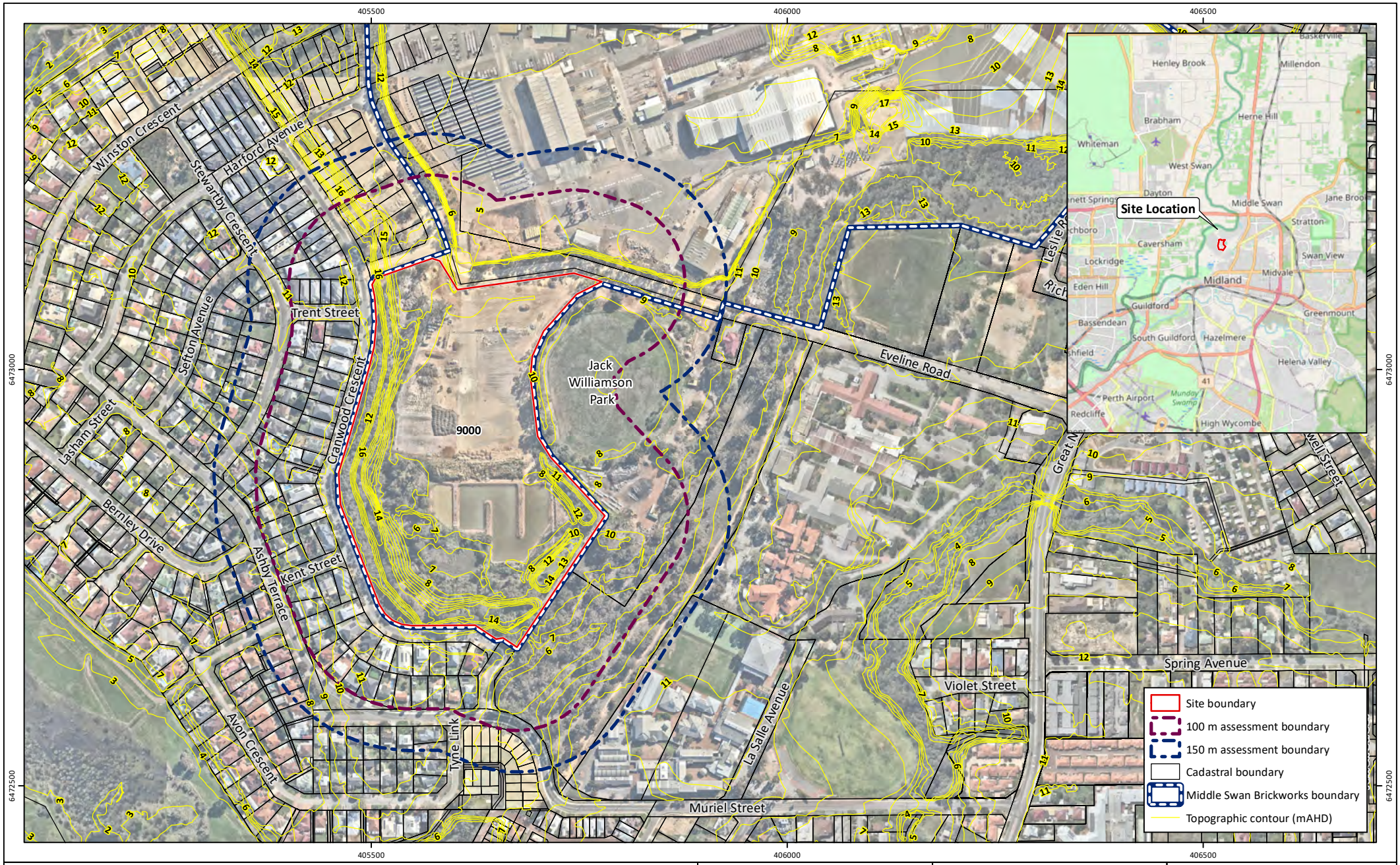

Figure 1: Site Plan and Topographic Contours

Project: Bushfire Management Plan
Local Structure Plan Area 3 Middle Swan Brickworks
Client: Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F238c

Drawn:	GAR
Date:	19/05/2023
Checked:	PPS
Approved:	TB
Date:	19/05/2023

N

0 100 200
Metres

Scale: 1:6,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Figure 2: **Existing Site Conditions – AS 3959 Vegetation Classifications**

Project:	Bushfire Management Plan Local Structure Plan Area 3 Middle Swan Brickworks
Client:	Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F239c

Drawn:	GAR
Date:	19/05/2023
Checked:	PPS
Approved:	TB
Date:	19/05/2023

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Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

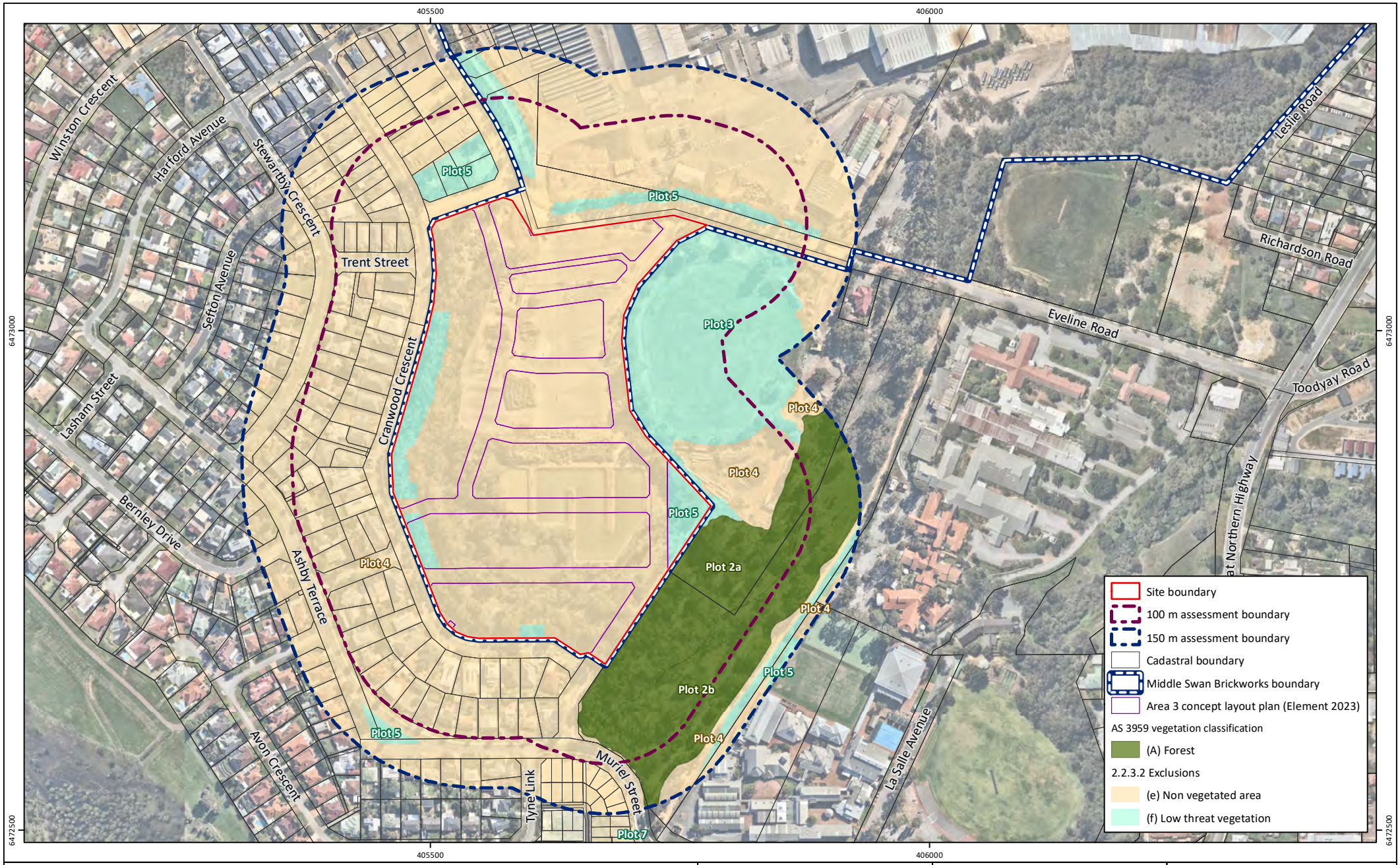

Figure 3: Post Development Site Conditions – AS 3959 Vegetation Classifications

Project:	Bushfire Management Plan Local Structure Plan Area 3 Middle Swan Brickworks
Client:	Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F240c

Drawn:	GAR
Date:	19/05/2023
Checked:	PPS
Approved:	TB
Date:	19/05/2023

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

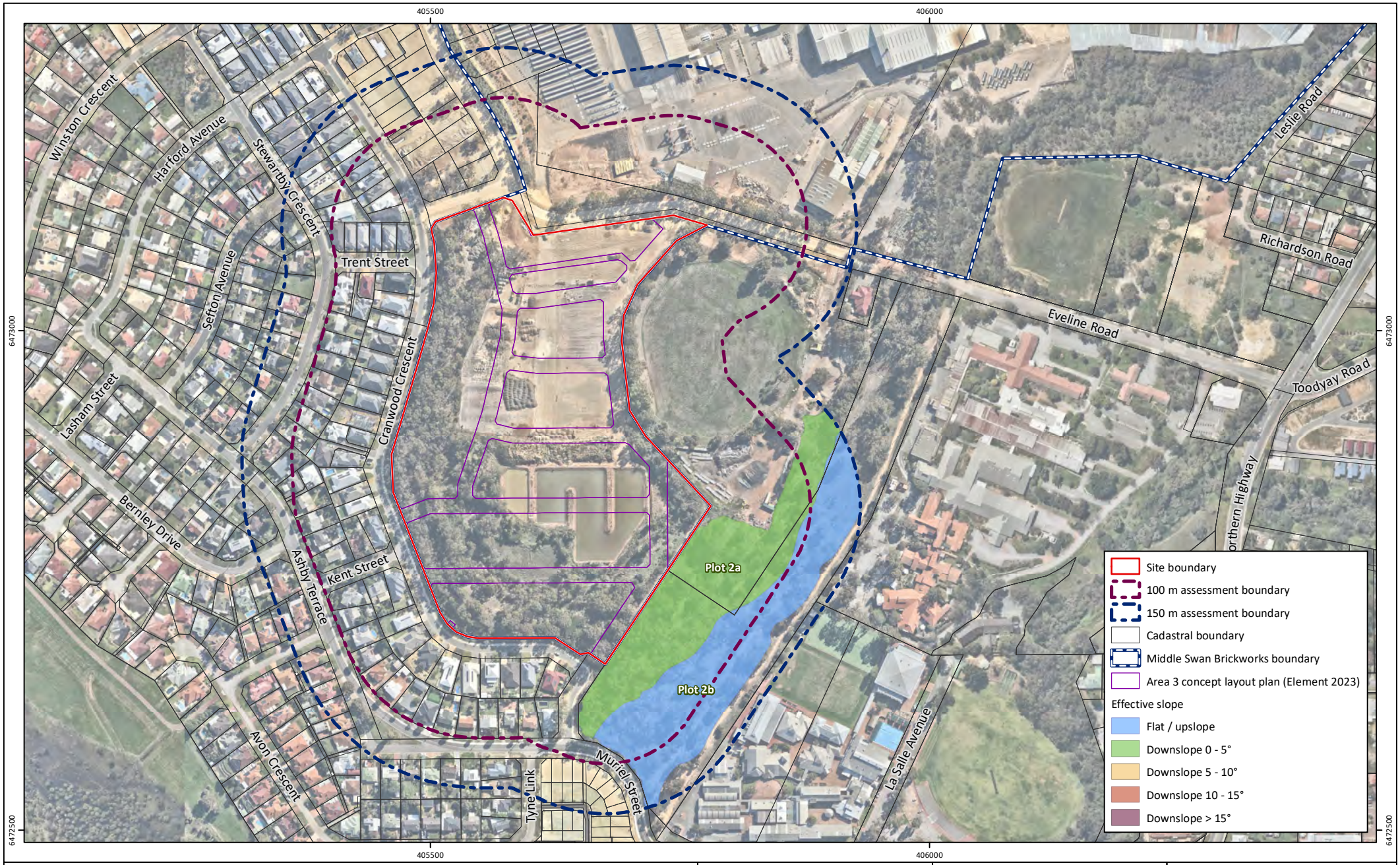

Figure 4: Post Development Site Conditions – Effective Slope

Project:	Bushfire Management Plan Local Structure Plan Area 3 Middle Swan Brickworks
Client:	Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F241c

Drawn:	GAR
Date:	19/05/2023
Checked:	PPS
Approved:	TB
Date:	19/05/2023

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

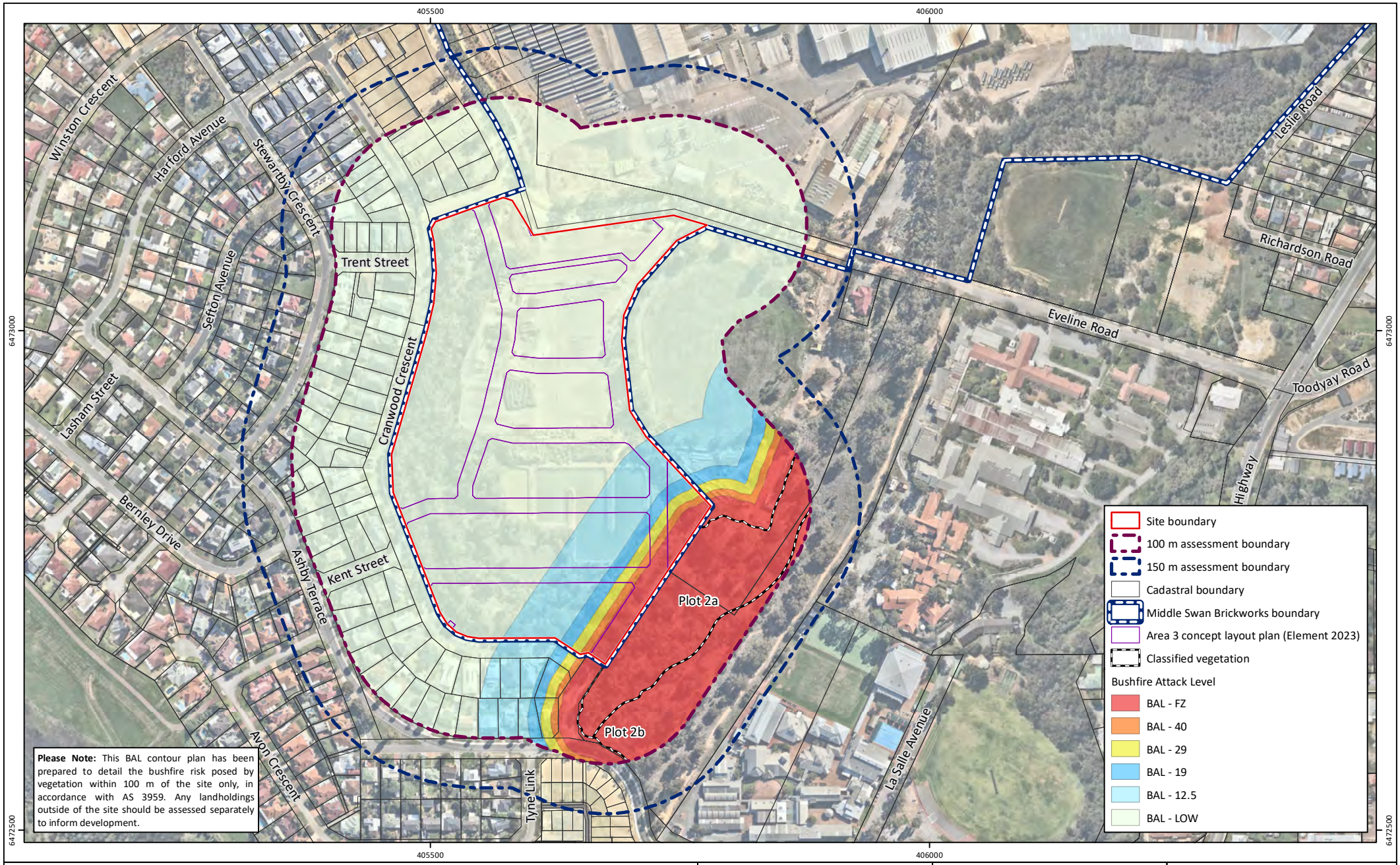

Figure 5: Bushfire Attack Level Contour Plan

Project: Bushfire Management Plan
Local Structure Plan Area 3 Middle Swan Brickworks
Client: Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F242c

Drawn:	GAR
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Approved:	TB
Date:	19/05/2023

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

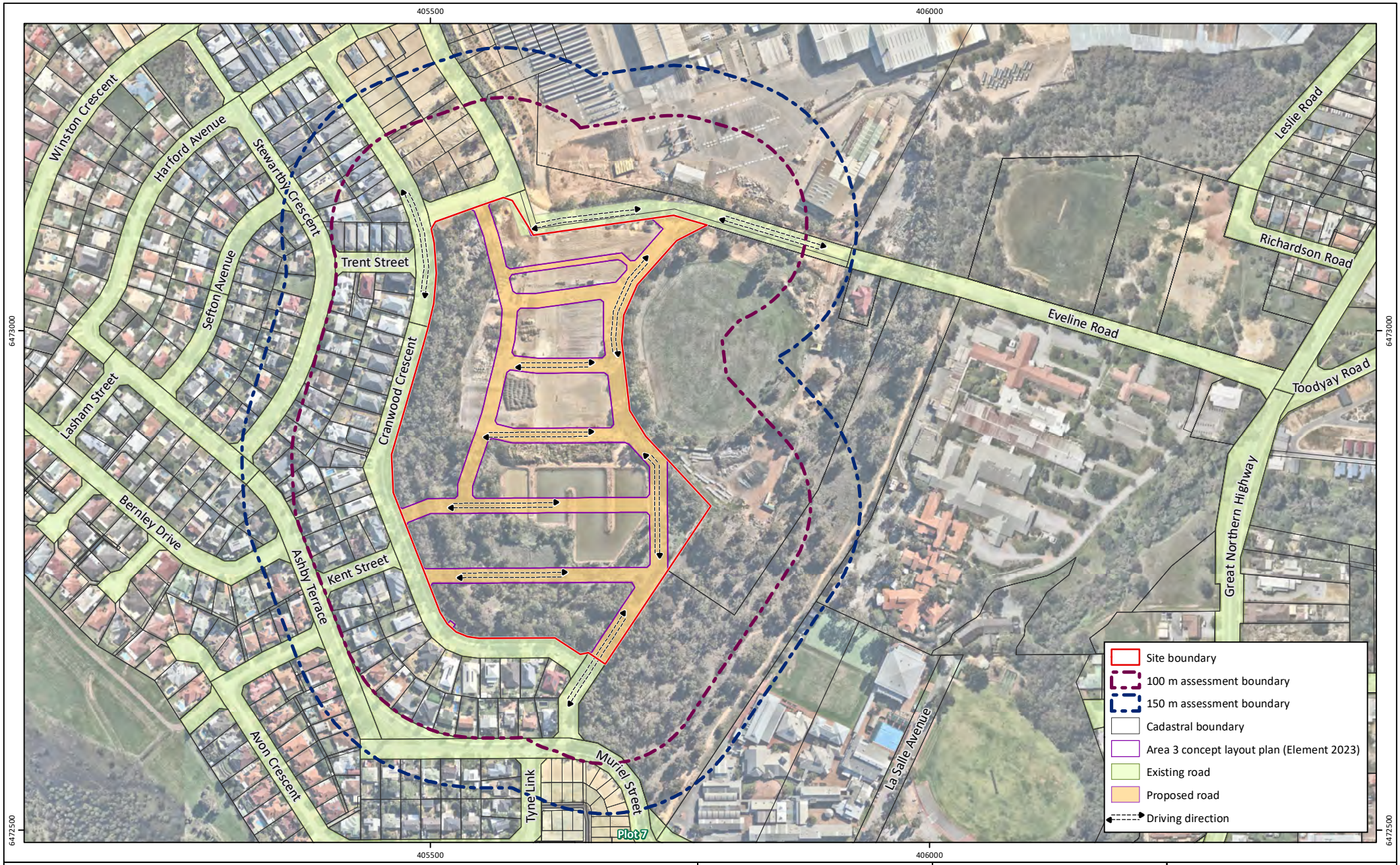


Figure 6: Vehicle Access

Project:	Bushfire Management Plan Local Structure Plan Area 3 Middle Swan Brickworks
Client:	Hesperia Pty Ltd

Plan Number:
EP19-105(44)--F243c

Drawn:	GAR
Date:	19/05/2023
Checked:	PPS
Approved:	TB
Date:	19/05/2023

N

0 100 200
Metres

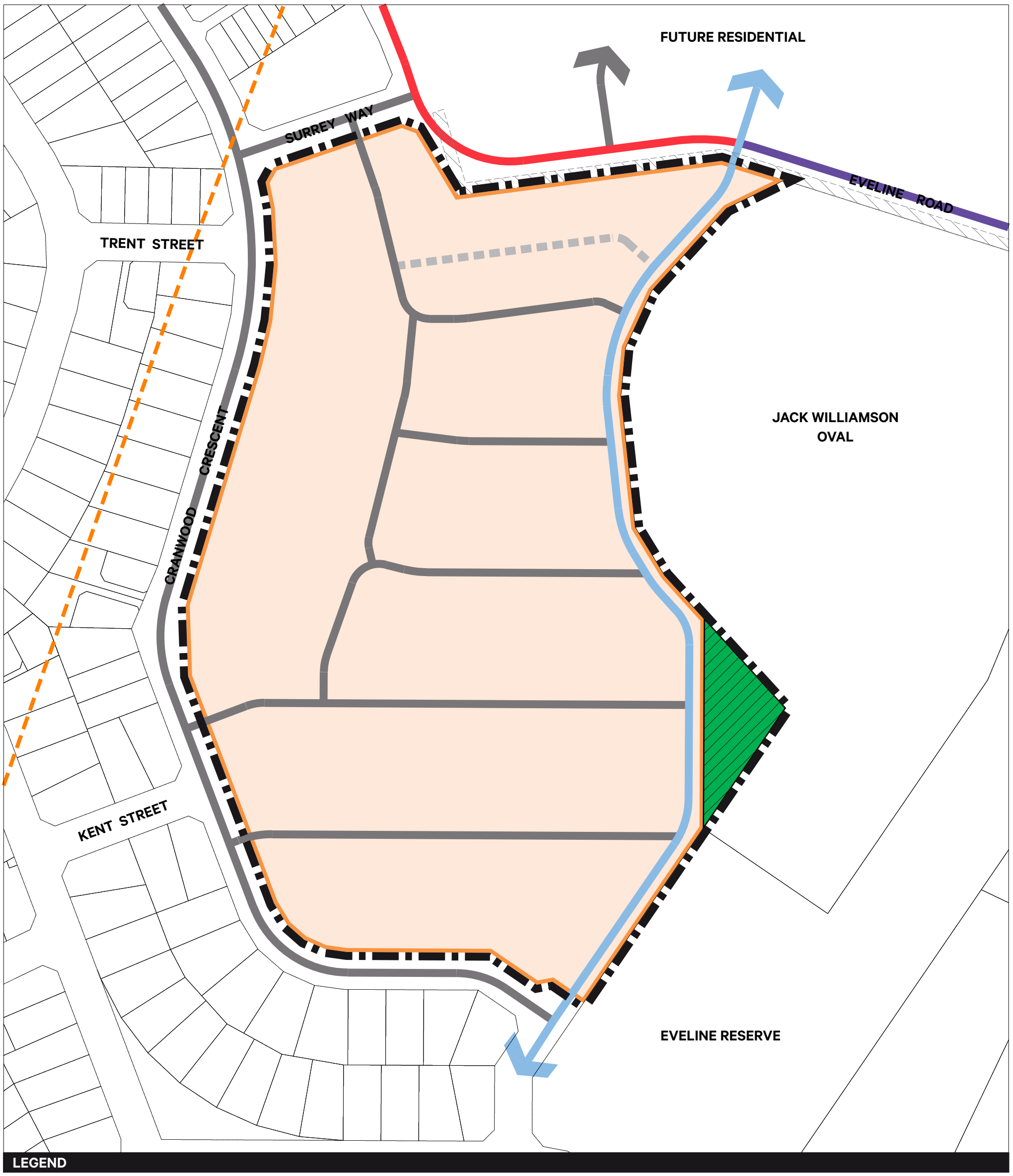
Scale: 1:5,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Appendix A

Area 3 Local Structure Plan (Element 2023)



LEGEND

Local Structure Plan Boundary

LOCAL SCHEME ZONES

Residential Development

LOCAL SCHEME RESERVES

Public Open Space

NEIGHBOURHOOD AND KEY ACCESS STREETS

Neighbourhood Connector A

Neighbourhood Connector B

Access Street C

LOCAL ACCESS STREETS (Indicative and subject to change)

Access Street D

Laneway

OTHER

Gas Pipeline Easement

ANEF 20-25

Area 3 Local Structure Plan

Lot 9000 Eveline Road, Viveash

N

0 20 40m

Date: 4 May 2023 Scale: 1:2000 @ A3

File: **21-742 ST1 1** Staff: LC CW Checked: MR

Revision: A Initial issue 24.05.22

B Amended 04.05.23

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element.

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