Bushfire Management Plan

Lots 76 and 107 Wattleup Rd, Hammond Park

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Executive Summary

Qube Hammond Link Pty Ltd (the proponent) intend to progress residential development at Lots 76 and 107 Wattleup Road, Hammond Park (herein referred to as 'the site'). Hatch, on behalf of the proponent, have prepared Amendment 2 to the *Hammond Park West Structure Plan* (SPN 110/198) comprising Lots 71, 74, 75, 303, 304 and 305 Wattleup Road (**Appendix A**). The proposed Structure Plan amendment provides for the incorporation of Lot 76 into the Structure Plan area, design modifications within the adjoining Lot 75 and further minor modifications. The proposed amendment also has regard for Lot 107 situated east of the Structure Plan area. Lot 107 is subject to the approved *Quenda Structure Plan* (SPN 110/169) but will be subdivided concurrent with the balance of the Structure Plan area incorporating design modifications generally in accordance with the existing Structure Plan (SP).

The Structure Plan layout indicates that the future development of the site will include residential, an urban road network, public open space (POS), and a primary school. This SP provides a more detailed layout for the site and is in accordance with the overriding *Southern Suburbs District Structure Plan – Stage 3, Hammond Park/Wattleup* (DSP) (City of Cockburn, 2017).

The site comprises a total area of approximately 8.1 hectares (ha) and is located approximately 24 km south of the Perth Central Business District (CBD), as shown in **Figure 1**. The site is bound by Harry Waring Marsupial Reserve to the north, and urban land to the east south and west. The lots immediately east and west have recently been cleared of standing vegetation for residential development similar to the proposed development.

The site is currently identified as a "Bushfire Prone Area" under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2017). The identification of Bushfire Prone Areas within any portion of the site requires further assessment of the bushfire hazard implications on the proposed development to be undertaken in accordance with *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 1.3* (the Guidelines) (WAPC and DFES 2017) and *Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas* (AS 3959) (Standards Australia 2018).

The purpose of SPP 3.7 is to preserve life and reduce the impact of bushfire on property and infrastructure through effective risk-based land-use planning. This BMP examines the likely long-term bushfire risk (following development), and the risk mitigation measures that will ensure the land is suitable for its intended purpose.

The majority of the site has is vegetated with Scrub and Grassland vegetation which will be removed as part of future development. Some clearing has occurred within the site. The lots immediately east and west of the site have been cleared for residential development. External to the site, Woodland, Scrub and Grassland vegetation has been identified to the north, and south and further west.

For the purpose of this assessment, a post-development vegetation classification scenario has been assumed in order to determine the likely medium-to-long-term bushfire risk posed to development within the site. As part of this, it has been assumed that all classified vegetation within the site will

be managed to a 'low threat' standard or other exclusion criteria as part of future residential development. This includes public open space (POS) areas, which will be landscaped and maintained to achieve a low threat classification, initially by the proponent and then by the City of Cockburn following handover.

The post-development scenario also assumes that the vegetation north and south of the site will remain in its current state, whilst the land immediately east and west will be developed to a low threat standard in line with the DSP and associated SPs.

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:** future development will be located in an area that will, on completion, able to achieve separation for BAL-29 development or below.
- **Siting and Design:** all future dwellings can be sited within the proposed development so that BAL-29 or less can be achieved based on the proposed Local Structure Plan.
- **Vehicular Access:** Safe vehicular access to the site will ultimately be provided through multiple public roads connecting to the east, south and west of the site, which then connects to the broader public road network. Interim temporary access may be required at the subdivision stage depending on the progress of residential development to the east and west.
- **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 proposed subdivision of the site have been outlined as part of this BMP. Following certification, the BAL ratings determined within this BMP (or as part of future stage-based BAL assessments) can be used to support future building approval processes.

The management/mitigation measures to be implemented as part of the future development of the site have been outlined in this BMP and demonstrate that the bushfire protection criteria can be satisfied following SPP 3.7 and the Guidelines. Following approval of the Local Structure Plan (SP), further detailed planning will need to be undertaken, including the preparation of subdivision applications. This BMP is intended to not only support the preparation of the SP, but to also guide future development, and identify the future planning considerations required from a bushfire perspective.

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Appendices

Appendix A

Amendment 2 to the Hammond Park West Structure Plan

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
ESA	Environmentally Sensitive Area
FDI	Fire Danger Index
FZ	Flame Zone
TEC	Threatened ecological community

Table A2: Abbreviations – Organisations

Organisations	
DBCA	Department of Biodiversity Conservation and Attractions
DWER	Department of Water and Environmental 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	
Guidelines	*Guidelines for Planning in Bushfire Prone Areas version 1.3* (WAPC and DFES 2017)
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	
AS 3959	*Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas* (Standards Australia 2018)
DSP	District Structure Plan
SP	Structure Plan
POS	Public Open Space
LPS	Local Planning Scheme

1 Proposal Details

Qube Hammond Link Pty Ltd (the proponent) intend to progress residential development at Lots 76 and 107 Wattleup Road, Hammond Park (herein referred to as "the site"), in accordance the proposed Amendment 2 to the *Hammond Park West Structure Plan* (SPN 110/198)(SP), attached as **Appendix A** and approved *Quenda Structure Plan* (SPN 110/169). The site comprises a total area of approximately 8.1 hectares (ha) and is located approximately 24 km south of the Perth Central Business District (CBD), as shown in **Figure 1**. The site and surrounding land to the east, south and west is zoned 'Development' under the Local Planning Scheme No. 3, and 'Urban' under the Metropolitan Region Scheme (MRS). Land to the north is occupied by the Harry Waring reserve and is zoned 'Parks and recreation – restricted public access' under the MRS.

The site and surrounding land is currently identified as a "Bushfire Prone Area" under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019), as shown in **Plate 1** below. The identification of Bushfire Prone Areas within any portion of the site requires further assessment of the bushfire hazard implications on the proposed development to be undertaken following *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 1.3* (the Guidelines) (WAPC and DFES 2017).

Plate 1: Areas within and surrounding the site identified as "Bushfire Prone Areas" (OBRM 2019).

1.1 Aim of this document

The objective of this BMP is to support the future residential development of the site following the SP attached in **Appendix A** and to ensure bushfire management issues (such as location, siting, vehicle access and water supply) are addressed as part of the planning and development process. This BMP addresses the requirements of SPP 3.7, the Guidelines and *Australian Standard 3959-2018 Construction of buildings in bushfire-prone areas* (AS 3959) (Standards Australia 2018).

This BMP includes:

- An assessment of classified vegetation and associated bushfire hazard levels in the vicinity of the site (within 150 m) and consideration of hazards that will exist in the post-development scenario.
- Identification of how the development will achieve the performance principles of the Guidelines by ensuring:
    - Development can be located, sited and designed to ensure that any bushfire hazard does not present an unreasonable level of risk to life and property (i.e., BAL-29 is not exceeded), supported by an indicative Bushfire Attack Level (BAL) assessment. Where applicable, this includes consideration of Asset Protection Zone (APZ) requirements.
    - Vehicular access to and egress from the development is safe if a bushfire occurs.
    - Water is available to the development to assist fire suppression so that life and property can be protected from bushfire.
- An outline of the roles and responsibilities associated with implementing this BMP.

1.2 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 1.3* (WAPC and DFES 2017)
- *Australian Standard AS 3959:2018 Construction of buildings in bushfire-prone areas* (Standards Australia 2018)

1.3 Description of the proposed development

This [technical report/addendum] of Lots 76 and 107 Wattleup Road, Hammond Park has been prepared in support of proposed Amendment 2 to the *Hammond Park West Structure Plan* (SPN 110/198) comprising Lots 71, 74, 75, 303, 304 and 305 Wattleup Road. The proposed Structure Plan amendment provides for the incorporation of Lot 76 into the Structure Plan area, design modifications within the adjoining Lot 75 and further minor modifications. The proposed amendment also has regard for Lot 107 situated east of the Structure Plan area. Lot 107 is subject to the approved Quenda Structure Plan (SPN 110/169) but will be subdivided concurrent with the balance of the Structure Plan area incorporating design modifications generally in accordance with the existing Structure Plan.

The proposed Structure Plan (SP) to be considered by the Western Australian Planning Commission (WAPC). The proposed SP provides an outline for how the structure and layout of development should be progressed for the site. The SP will assist in the coordination and provision of utility networks, transport networks, public open space, urban water management, development standards and other infrastructure development. The proposed SP is demonstrated in **Appendix A**.

Development within the site will include:

- Residential lots
- an interconnected public road network
- public open space; and
- a primary school lot.

The SP will sit under the overriding Southern Suburbs District Structure Plan – Stage 3, Hammond Park/Wattleup. (City of Cockburn, 2017). Lot 76 will form part of an SP amendment for the existing *Hammond Park West* SP (over Lots 71, 305, 304, 74 and 75 Wattleup Road) while Lot 107 is also subject to the *Quenda Estate Local Structure Plan* for Lots 107, 150 and 9510 Wattleup Road.

The proposed SP is shown in **Appendix A**.

1.4 Description of the land characteristics

Review of historical images available from 1965 (WALIA 2016) onwards shows that Lot 107 and the southern portion of Lot 76 was completely cleared of remnant vegetation between 1965 and 1974, for grazing and agricultural (market garden and orchard) purposes. Vegetation was subsequently allowed to re-establish within portions of Lot 107 from 1985. The northern portion of Lot 76 has never been cleared.

The site is bound by Bush Forever Site 392 (Harry Waring Marsupial Reserve) to the north, private landholdings intended for future urban development to the east, west and south, and Wattleup Road to the south. The location of the site is shown on **Figure 1**. Private landholdings to the west and east of the site have been recently cleared for urban residential purposes in the long-term.

Topographic contours for the site indicate that the elevation of the site ranges from 45 metres in relation to the Australian Height Datum (m AHD) on the north-eastern portion of the site, to 28 m AHD on the south-west corner of the (DoW 2008). An elevated area within the north-eastern portion of the site reaches a maximum of 47 m AHD. The topographic contours for the site and surrounding areas are shown in **Figure 1**. As part of the proposed development, it is likely that the topographic contours of the site will change significantly to accommodate engineering and service infrastructure (i.e. sewer, power, water) requirements.

More broadly, the site is located within an area where urban development is currently being progressed and connects with an existing urban road network and dissected by a rail corridor currently under construction.

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 and site-specific investigations 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 value that may be impacted
Conservation category wetlands and buffer (Geomorphic wetlands Swan Coastal Plain) (DBCA-019)	No	Not applicable
Waterways (DWER-031)	No	Not applicable
RAMSAR wetlands (DBCA-010)	No	Not applicable.
Threatened and priority flora (DBCA-036)	Potentially	The site was surveyed for threatened flora and floristic community types (FCTs). No threatened species were found during the surveys.
Threatened and priority fauna (DBCA-037)	Potentially	The site is vegetated with floristic community types known to be used by black cockatoos for foraging and breeding habitat. Four habitat trees will be removed as a result of the development. None of these trees had identified hollows. Two conservation significant species, forest red-tailed black cockatoo (vulnerable) and quenda (P4) were identified as being present on the site. One fauna species of conservation significance, Carnaby's cockatoo, was considered likely to occur
Threatened Ecological Communities (TECs) (DBCA-038)	Yes	The FCT '28 -Spearwood Banksia attenuata or Banksia attenuata – Eucalyptus woodlands' (BaBm) was identified on the site during the vegetation survey completed by Emerge Associates (2020). The BaBm vegetation within the site represents the 'Banksia Woodlands of the Swan Coastal Plain' threatened ecological community (TEC).
Bush Forever areas (DPLH-019)	Yes	Site 392 under the MRS
Clearing regulations – Environmentally Sensitive Areas (ESAs) (DWER-046)	No	The site is not mapped as an ESA. Harry Waring Marsupial Reserve to the north is mapped as an ESA.
DBCA controlled lands or waters (DBCA-011)	No	Not applicable
Swan Bioplan Regionally Significant Natural Areas 2010 (DWER-070)	No	Not applicable
Aboriginal heritage (DPLH-001)	No	Not applicable
Non-indigenous heritage (DPLH-006)	No	Not applicable

2.1 Native vegetation – modification and clearing

Removal of vegetation will be required as part of future development. The proposed removal of native vegetation is to be assessed under the EPBC Act and determine if the proposed impact is likely to be significant and requires approval under the EPBC Act.

2.2 Revegetation and landscape plans

The concept for landscaping of public open space is expected to provide low threat vegetation within the majority of POS. Management of areas of low threat vegetation in the future should include (but not limited to), and will occur as future development occurs:

- 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 in the specific context of the Guidelines and AS 3959. Appendix Two of the Guidelines provides a description for undertaking a broad level of hazard assessment using the vegetation classifications from AS 3959. The purpose is to identify at the strategic level the Bushfire Hazard Level (BHL) and the likely impact and intensity of a bushfire attack.

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 on a building or object. It measures the Bushfire Attack Level as the radiant heat level (kWm^2) over a distance of 100 m.

It also prescribes simple construction responses that can resist the determined radiant heat level at a given distance from the fire and are based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ. Bushfire risk for the site has been appropriately considered in the specific context of the Guidelines and AS 3959.

Not all vegetation is a classified 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) Any vegetation 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 vegetation.
d) Strips of vegetation less than 20 m wide (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 a 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 windbreaks.

3.1 Bushfire Hazard Level assessment

To support the proposed scheme amendment, bushfire hazard levels (BHL) within and nearby to the site have been determined in accordance with Appendix Two of the Guidelines and based on the vegetation classification detailed in **Table 2**.

In addition, and to support future development, a method 1 BAL assessment has been completed for the site to understand the BAL ratings likely to be applicable and the associated separation requirements (where applicable), based on the vegetation classification and effective slope detailed in **Table 2**. This is detailed further below.

3.1.1 Assessment inputs

Vegetation within the site and surrounding 150 m was classified in accordance with Table 2.3 of AS 3959. The classification of vegetation is based on an assessment of vegetation structure, which considers the various fuel layers of different vegetation types. For example, fuel layers in a typical forest environment can be broken down into five segments as illustrated in **Plate 2** below. These defined fuel layers are considered when determining the classification of vegetation and associated bushfire hazard levels.

Plate 2: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

An assessment of existing vegetation within the site and surrounding 150 m was undertaken on 8 September 2020 in accordance with AS 3959 and the Guidelines.

It is noted that not all land within 150 m of the site were accessible due to permission issues, and therefore some areas of vegetation were only visible from publicly accessible roads and/or from lots where permission was granted to access.

Table 2 below outlines:

- The pre-development AS 3959 vegetation classifications (and associated photo locations) are shown in **Figure 2**.
- The pre-development bushfire hazard level ratings are shown in **Figure 3**.
- The post-development AS 3959 vegetation classifications are shown in **Figure 4**.
- The post-development BAL Contour Plan is shown in **Figure 6.**

Table 2: Vegetation classification, effective slope and future management

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
1 and 2	**AS 3959 classification (Figure 2):** Woodland (Class B) Vegetation opposite the site on Wattleup Road is characterised by tall eucalypt trees with an average height of 10 m and foliage cover of 10—30%, over unmanaged grass. This vegetation is classified as Group B – Woodland.	 *Photo location 1: Vegetation south of site on 403 Wattleup Road*	 *Photo location 2: Vegetation south of site on 403 Wattleup Road*	1 and 2	**It is assumed that this vegetation will remain in its current condition with intermittent maintenance of the grass.** **AS 3959 classification (Figure 4):** Woodland (Group B) **Effective slope (Figure 5):** Upslope Downslope 0-5°
3	**AS 3959 classification (Figure 2):** Shrubland (Class C) There is a small area of vegetation west of the existing house on Lot 76 previously maintained as a garden including orchard trees and other edible plants. This vegetation has been allowed to overgrow and is characterised by non-native species with a height of 1-2 m. This vegetation is classified as Shrubland.	 *Photo location 3: Overgrown garden west of the existing house on Lot 76 Wattleup Road*	 *Photo location 4: Orchard trees and cacti with native shrubs on Lot 76*	7 and 8	Vegetation within the site will be cleared for residential development. The resultant built form will include non-vegetated area and low threat vegetation. **AS 3959 classification (Figure 4):** Exclusion 2.2.3.2(e)(f) **Effective slope (Figure 5):** Not applicable

Table 2: Vegetation classification, effective slope and future management (continued)

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
4	**AS 3959 classification (Figure 2):** Scrub (Class D) The majority of the vegetation within 150 m of the subdivision is characterised by banksia trees with an average height of 4-6 m. The understorey includes native species including grass trees, native grasses and shrubs. This vegetation has a clear surface, near-surface and elevated fuel and is classified as Class D – Scrub. The vegetation located in the north-west portion of the site is regenerating scrub. Whilst this vegetation has fewer plants above 2 m, it is sufficient to exceed shrubland classification.	 *Photo location 5: Scrub vegetation west of the site on 364 Wattleup Road*  *Photo location 7: Scrub vegetation located north of the site in Harry Waring Marsupial Reserve*	 *Photo location 6: Scrub vegetation on the northern portion of Lot 76.*  *Photo location 8: Scrub vegetation in northern portion of Lot 107*	4	Scrub to the north of the subdivision within the Harry Waring Marsupial Reserve is expected to remain and continue to revegetate. Scrub vegetation to the south and west is expected to be cleared in the future for residential development, however, the timing of this is unknown and therefore remains a bushfire hazard. The scrub vegetation within the site will be cleared and replaced with urban development including low threat vegetation and unvegetated areas. **AS 3959 classification (Figure 4):** Scrub (Class D) **Effective slope (Figure 5):** Downslope 0-5°

Table 2: Vegetation classification, effective slope and future management (continued)

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
4	*(continued)*	 *Photo location 9: Scrub vegetation in the middle portion of the site facing north-east*	 *Photo location 10: Scrub vegetation south of the site at 387 Wattleup Road*	7 and 8	The vegetation within the site will be cleared during construction and future development will result in non-vegetated areas and low threat vegetation. **AS 3959 classification (Figure 4):** Exclusion 2.2.3.2(e)(f) **Effective slope (Figure 5):** Not applicable
5 and 6	**AS 3959 classification (Figure 2):** Grassland (Class G) The site and nearby land includes areas of grasses with a height of over 100 mm. This vegetation is not managed and is classified as Group G – Grassland.	 *Photo location 11: Grassland vegetation on Lot 107*	 *Photo location 12: Grassland vegetation east of the site*	7 and 8	The vegetation within the site will be cleared during construction and future development will result in non-vegetated areas and low threat vegetation. **AS 3959 classification (Figure 4):** Exclusion 2.2.3.2(e)(f) **Effective slope (Figure 5):** Not applicable

Table 2: Vegetation classification, effective slope and future management (continued)

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
5 and 6	**(continued)**	 *Photo location 13: Grassland vegetation located on residential lot east of site*	 *Photo location 14: Grassland vegetation located south-west of site*	5 and 6	The external vegetation will not be modified in these areas. Therefore, the vegetation remains Grassland. **AS 3959 classification (Figure 4):** Grassland **Effective slope (Figure 5):** Upslope and Downslope 0-5°
		 *Photo location 15: Grassland vegetation located on southern portion Lot 76*	 *Photo location 16: Grassland vegetation located north of the existing dwelling on Lot 76*		

Table 2: Vegetation classification, effective slope and future management (continued)

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
7	**AS 3959 classification (Figure 2):** Exclusion 2.2.3.2(e) The lots to the east and west of the site have been cleared of standing vegetation and are to be developed as residential land.	 *Photo location 17: Non-vegetated land east of site*  *Photo location 19: Non-vegetated land west of site*	 *Photo location 18: Non-vegetated land west of site*  *Photo location 20: Existing buildings and non-vegetated areas on Lot 76*	7	It is assumed that areas currently identified as non-vegetated will remain so as part of current and proposed land uses. Future development of the site will result in cleared areas being developed as public roads and residential/ public use buildings or areas. **AS 3959 classification (Figure 4):** Exclusion 2.2.3.2(e) **Effective slope (Figure 5):** Not applicable

Table 2: Vegetation classification, effective slope and future management (continued)

Pre development				Post development	
Plot no.	**AS 3959 vegetation classification (see Figure 3)**	**Site photo/s (location points shown in Figure 2)**		**Plot no.**	**AS 3959 vegetation classification and effective slope (see Figure 4 and Figure 5)**
8	**AS 3959 classification (Figure 2):** Exclusion 2.2.3.2(f) Vegetation along the driveway and around the dwelling located east of the site is considered a low threat. The road reserve along Wattleup Road has been landscaped along the developing residential land east of the site and is considered low threat.	 *Photo location 21:*	 *Photo location 22: Landscaped road reserve located east of the site*	8	It is expected that this vegetation will continue to be managed in a low threat state. **AS 3959 classification (Figure 4):** Exclusion 2.2.3.2(f) **Effective slope (Figure 5):** Not applicable

3.1.2 Post-development assumptions

The BAL assessment, to determine the predicated BAL ratings, has assumed the following:

- **Designated FDI**: 80
- **Flame temperature**: 1090 K
- **Vegetation classification**: Woodland (Class B), Scrub (Class D) and grassland (Class G) (see **Figure 4**)
- **Effective slope beneath classified vegetation**: flat/upslope or downslope 0-5° (see **Figure 5**)
- **Setback distances**: as per Table 2.4.3 in AS 3959 with the relevant distances used to inform the BAL contour plan provided in **Figure 6** and summarised in
- Table 3.

In addition to the above, the following key assumptions have informed this assessment:

- All vegetation within the site will be cleared as part of the development of the site and maintained in a minimal fuel condition in perpetuity (in accordance with the proposed subdivision plan, attached as **Appendix A**).
- Recently cleared land to the east and west will remain in a non-vegetated or low threat condition as it is developed into a residential area and in perpetuity.
- Areas of public open space will be formally landscaped (low threat AS 3959 cl.2.2.3.2(f)) and maintained in perpetuity. This will include the provision of turf areas and managed garden beds, picnic/BBQ facilities, pedestrian/cycle network and all age play spaces. The specific design elements will be determined, in consultation with the City as part of implementing the subdivision. Management of this area as a minimum will include:
  - Where remnant trees are retained, these will be low pruned to 2 m from the ground.
  - Regular removal of weeds, dead material, fallen branches and built up leaf litter. This would be based on typical maintenance requirements.
  - Where grass/turf is present, this will be regularly cut so that the grass is maintained at or below 100 mm in height.

  These areas will be maintained by the developer initially for at least two years (or as agreed with the City of Cockburn) and following handover acceptance by the City will be maintained by the City of Cockburn in a low threat state. Landscape treatments and management are discussed further in **Section 5.1.2**.
- The lot designated for a primary school has sufficient space to achieve a building setback of BAL-LOW to BAL-12.5 construction standard. This site will be maintained in a low threat condition to ensure surrounding residential land can achieve the required BAL ratings, regardless of when the school is developed.
- All vegetation within the Harry Waring Marsupial Reserve to the north will be retained in its current state.

3.1.3 Assessment outputs

The BAL assessment for the site has been undertaken based on the assumed post-development classified vegetation (see **Figure 4** and **Table 2**) and effective slope (**Figure 5**).

Table 3 provides a summary of the setback distances from the identified classified vegetation necessary to achieve the indicated BAL ratings, with the BAL Contour Plan (**Figure 6**) being a visual representation of these distances. The setback distances are based on the distances outlined in Table 2.4.3 of AS 3959.

Table 3: Setback distances for BAL ratings based on post-development vegetation classifications (Figure 3) and effective slope, as determined by the method 1 BAL assessment and Table 2.4.3 of AS 3959.

Post development plot number (see Figure 4)	Vegetation classification (see Figure 4)	Effective slope (see Figure 5)	Distance to vegetation	BAL Rating (see Figure 6)
1	Woodland (Class B)	Downslope 0-5°	< 13 m	BAL-FZ
			13 - < 17 m	BAL-40
			17 - < 25 m	BAL-29
			25 - < 35 m	BAL-19
			35 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
2	Woodland (Class B)	Upslope	<10 m	BAL-FZ
			10-14 m	BAL-40
			14-<20 m	BAL-29
			20-<29 m	BAL-19
			29-<100 m	BAL-12.5
			> 100 m	BAL-LOW
4	Scrub (Class D)	Downslope 0-5°	< 11 m	BAL-FZ
			11 - < 15 m	BAL-40
			15 - < 22 m	BAL-29
			22 - < 31 m	BAL-19
			31 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW

Table 3: Setback distances for BAL ratings based on post-development vegetation classifications (Figure 3) and effective slope, as determined by the method 1 BAL assessment and Table 2.4.3 of AS 3959. (continued)

Post development plot number (see Figure 4)	Vegetation classification (see Figure 4)	Effective slope (see Figure 5)	Distance to vegetation	BAL Rating (see Figure 6)
5	Grassland (Class G)	Downslope 0-5°	< 7 m	BAL-FZ
			7 - < 9 m	BAL-40
			9 - < 14 m	BAL-29
			14 - < 20 m	BAL-19
			20 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW
6	Grassland (Group G)	Flat/upslope	< 6 m	BAL-FZ
			6 - < 8 m	BAL-40
			8 - < 12 m	BAL-29
			12 - < 17 m	BAL-19
			17 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW

4 Identification of bushfire hazard issues

From a bushfire hazard management perspective, the key issues requiring management include:

- Provision of appropriate separation distances from permanent bushfire hazards within and surrounding the site, including areas of Scrub vegetation associated with Harry Waring Marsupial Reserve to the north, and bushfire-prone vegetation south of Wattleup Road, to ensure a BAL rating of BAL-29 or less can be achieved at future built form.
- Potential for a bushfire hazard to arise within the site by inadequate maintenance until development or by the placement of temporary materials. Fuel management will be required within portions of the proponent's landholding that are proposed for future urban development in accordance with the SP, to minimise the impacts of temporary bushfire hazards on dwellings within the site.
- Ensure future public open space is appropriately designed and managed to achieve low threat standards where indicated (see **Figure 4**), in accordance with AS 3959 and the requirements of the City of Cockburn.
- Uncertainty regarding the timing of subdivision development, final development layout, the timing of freeway construction and timing of vegetation clearance external to the site.
- Ensure appropriate access is provided.
- Ensure that vulnerable use is adequately located.
- Ensure the provision of appropriate water supply and associated infrastructure for fire-fighting purposes.

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, an acceptable solution and/or performance-based system of control is adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines (WAPC and DFES 2017). The 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 residential development within 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: Summary of bushfire protection criteria and compliance statement

Bushfire protection criteria	Intent	Method of compliance	Proposed bushfire management strategies	Compliance Statement
		Acceptable solution		
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.	A1.1 Development location	Strategic planning through the District Structure Scheme and land use zoning has identified the site as suitable for urban development. The BAL contour plan (see **Figure 6**) indicates that future development within the site will be able to achieve a BAL rating of BAL-29 or less. As part of a future subdivision, development can be designed to ensure habitable buildings achieve BAL-29 or less through in-lot setbacks or the location of public roads. Further planning at the subdivision application stage will inform the proposed lot layout for the site. The land designated for a primary school can achieve a BAL-LOW rating.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 1: Location.
Element 2: Siting and design	To ensure the siting and design of development minimises the level of bushfire impact.	A2.1 Asset Protection Zone	The post-development vegetation classification (**Figure 4**) identifies permanent bushfire hazards to the north. Vegetation to the south and east may be removed for future urban development, however this vegetation has been considered as a hazard for the purpose of this assessment. Separation from the permanent bushfire risks has been accommodated through the strategic placement of public roads and public open space (used for recreation purposes) that will be developed to typical urban standards and will achieve a low-threat standard under AS 2959. Maintenance of these areas will be routine and ongoing, initially by the proponent and then by the City of Cockburn. This is discussed in **Section 5.1.2**. All lots can achieve a BAL 29 or less in accordance with Element 2.1.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 2: Siting and design.

Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance Acceptable solution	Proposed bushfire management strategies	Compliance Statement
Element 3: Vehicular access	To ensure vehicular access serving a subdivision/ development is available and safe during a bushfire event.	A3.1 Two access routes	The proposed amendment to the SP will result in development that is dependent on surrounding land for access to provide acceptable vehicular access at the subdivision approval stage. The proposed SP layout is interdependent with the surrounding SP layouts demonstrated in **Figure 7.** Safe vehicular access to the site will ultimately be provided through multiple public roads proposed under the various SPs that will form the broader public road network. In the interim whilst these roads remain unconstructed, primary access to the site will be provided through a single public road providing access to the east and west via Wattleup Road. An Emergency Access Way may be required in the interim to facilitate two-way access. This will depend on the progress of roads connecting to the site at the time of subdivision approval.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 3: Vehicular access.
		A3.2 Public road	All new internal roads can and will comply with the minimum standards outlined in Appendix Four of the Guidelines (WAPC and DFES 2017), which includes a minimum 6 m-wide trafficable surface.	
		A3.3 Cul-de-sac (including dead-end-road)	If development is staged, temporary cul-de-sacs should be provided until the broader public road network is fully developed. Where required, they will be provided with suitable turn-around areas for emergency service vehicles.	
		A3.4 Battle-axe	Not applicable. No battle-axe properties are proposed.	
		A3.5 Private driveway longer than 50 m	Not applicable. No private driveways longer than 50 m are proposed based on the density of residential development.	
		A3.6 Emergency access way	Not applicable. No emergency access ways are proposed. Future subdivision development may require Emergency access ways as a temporary measure to meet the acceptable solutions where cul-de-sac or dead-end roads are required for interim access.	
		A3.7 Fire service access routes (perimeter roads)	Future development within the site will be provided with appropriate vehicular access, as outlined above.	
		A3.8 Firebreak width	The landowner/proponent is responsible for providing firebreaks until residential development is progressed in accordance with future subdivision approval. Firebreaks are to be provided in accordance with the City of Cockburn Fire Control Order.	

Table 4: Summary of bushfire protection criteria and compliance statement (continued)

Bushfire protection criteria	Intent	Method of compliance Acceptable solution	Proposed bushfire management strategies	Compliance Statement
Element 4: Water	To ensure water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Reticulated areas	The site will connect with a reticulated water supply and will include fire hydrants installed by the developer to meet the specifications of Water Corporation (Design Standard DS 63) and DFES. Fire hydrants on land zoned for residential purposes are required to be sited at or within 200 m of residential dwellings (Class 1a). The Water Corporation will be responsible for all hydrant maintenance and repairs.	Based on the outlined management measures, future development would be able to comply with and meet the intent of Element 4: Water

5.1 Additional management strategies

5.1.1 Future approval considerations

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

The measures to be implemented through this structure plan and associated future subdivision process have been outlined as part of this BMP and can be used to support future planning and development approval processes. A revised BMP is likely to be required to support any future subdivision applications, particularly if the development layout detail is different to that outlined within this document and will need to respond to the subdivision design.

5.1.2 Landscape management

5.1.2.1 Within the site

It is expected and assumed that the proposed subdivision and development of the site will result in the removal of all classified vegetation within the site. Clearing/management of this vegetation will be undertaken by the proponent, either in accordance with an approved Clearing Permit issued under the *Environmental Protection Act 1986* or under an exemption from a Clearing Permit through future subdivision approvals issued for this area under the *Planning and Development Act 2005*.

The proposed landscape treatments and management measures to be implemented within various portions of the site (including POS areas, and the proposed primary school site) are yet to be determined. It is expected that all POS and the primary school site will be landscaped in accordance with section 2.2.3.2 of AS3959 to achieve low threat vegetation and non-vegetated area.

Any hazard management should be implemented prior to and during the bushfire season (November to May) each year, and may include one or a combination of the below:

- Removal of all vegetation; or
- Where remnant trees are retained, these will be low pruned to 2 m from the ground and any understorey species removed.
- Regular removal of weeds, dead material, fallen branches and built up leaf litter.
- Where the grass is present, this will be regularly cut so that the grass is maintained at or below 100 mm in height.

POS Areas

All POS areas within the site, as shown in **Appendix A**, will be landscaped to a low threat standard (AS 3959 cl.2.2.3.2(f)) and actively managed to support recreational uses. Landscape plans will be prepared by the proponent for all POS areas and will be subject to approval by the City of Cockburn as a condition of subdivision approval. Specifically, model subdivision condition R4 is anticipated to be applied to any future subdivision approval, which states:

Arrangements being made for the proposed public open space to be developed by the landowner/ applicant to a minimum standard and maintained for two summers through the implementation of an approved landscape plan providing for the development and maintenance of the proposed public open space in accordance with the requirements of Liveable Neighbourhoods and to the specifications of the local government. (Local Government)

The proponent is committed to the detailed landscape designs achieving a low threat vegetation standard in POS areas, in accordance with AS 3959. It is anticipated that this will include landscape design features such as turf and managed garden beds, retained of individual mature trees, picnic/BBQ facilities, a pedestrian/cycle network and all-ages play spaces.

The maintenance of these POS areas will be the responsibility of the proponent during the initial establishment period (typically two years), following which the long-term maintenance responsibilities will transfer to the City of Cockburn following handover. These maintenance works will ensure the low threat standard of POS areas is maintained.

The proponent is committed to achieving a low threat vegetation standard within these areas of POS. Notwithstanding this, the City of Cockburn will maintain control of the landscaping process through the future subdivision approval issued under the *Planning and Development Act 2005*, given they will be the clearing authority for the associated subdivision approval condition, which provides a statutory mechanism for the City to ensure a low threat vegetation standard is achieved within future POS areas.

In addition, prior to handover to the City, Section 33 of the *Bushfire Act 1954* provides a statutory mechanism for the Minister or local government to enforce on a private landholder or state agency a requirement to maintain land such as not to be conducive to the outbreak of a bushfire or the spread or extension of a bushfire. As such, this provides another statutory mechanism that could be enacted by the City (if required) against the proponent to ensure that POS areas are/continue to be maintained to a low threat vegetation classification under AS 3959.

Primary school lot

The area designated for the primary school has been cleared. Management of the primary school site will be the responsibility of the proponent whilst they maintain ownership of the land. Once the land is ceded to the Department of Education, they will be responsible for its ongoing management. As outlined above, the City has additional statutory mechanisms to enforce landowners to maintain their land to suitable low fuel conditions under Section 33 of the *Bushfires Act 1954*, if required.

5.1.2.2 Surrounding the site

Private landholdings surrounding the site are assumed to be managed by the applicable landowners in accordance with the relevant Firebreak Notices, in perpetuity.

Harry Waring Marsupial Reserve

The Harry Waring Marsupial Reserve will remain in its current condition, presenting a retained bushfire hazard which has been addressed in the subdivision design.

5.1.3 City of Cockburn Fire Control Order

The City of Cockburn Control Order provides requirements for reducing fire hazard on land within the City. The City is able to enforce this notice in accordance with Section 33 of the *Bush Fires Act 1954*.

Lots over 4,047 m^2 are required to:

- Construct a firebreak (as defined within section 3 of the Fire Control Order) immediately inside all external property boundaries, this includes those adjacent to roads, drains, rail reserves and any public open space reserves
- Remove all dead vegetation surrounding and over all habitable structures to a radius of 3 metres except living trees, shrubs, maintained grass and gardens under cultivation.

Until the subdivision is progressed within the site, the proponent will be required to comply with the Fire Control Order, including the maintenance of minimum 3 m-wide perimeter firebreaks (or as agreed with the City).

All landowners of future lots will be required to comply with the Fire Control Order as published, which for all lots less than 4,047 m^2 requires landowners to:

- Have all flammable materials such as dry grass and weeds slashed, mown or trimmed down by other means to a maximum height of 50 mm across the entire property for the duration of this firebreak time; and
- Remove all dead vegetation.

5.1.4 Vulnerable or high-risk land uses

A primary school is proposed within the central portion of the site, which is identified as a vulnerable land use based on the definitions of SPP 3.7 and the Guidelines.

Policy measure 6.6 of SPP 3.7 requires any proposal relating to a vulnerable land use subject to a BAL rating of BAL-12.5 or greater, to address the applicable policy provisions, and at the development application stage, this may include the preparation of a bushfire management plan and an emergency evacuation plan.

The primary school will be able to construct all buildings within the area subject to a BAL rating of BAL-LOW. Accordingly, policy measure 6.6 will not apply to the primary school.

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 Cockburn provides bushfire safety advice to residents available from their website https://www.cockburn.wa.gov.au/Health-Safety-and-Rangers/Fire-and-Emergency-Management. 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.

Future residents of the site are able to access additional bushfire information via the above sources, or through contacting the City of Cockburn or DFES directly. In the case of a bushfire in the area, advice would be provided to residents by DFES, Department of Biodiversity, Conservation and Attractions and/or the City of Cockburn on any specific recommendations to responding to the bushfire, including evacuation if required. It is recommended that future residents should make themselves aware of their responsibilities with regard to preparing for and responding to a potential bushfire that may impact them, their family/dependents and their property (regardless of the applicable BAL rating).

6 Responsibilities for Implementation and Management of Bushfire Measures

Table 5 outlines the future responsibilities of the landowner/developer and the City of Cockburn associated with implementing this BMP with reference to ongoing bushfire risk mitigation measures for existing land uses (through compliance with the *City of Cockburn 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

Management action	Timing
Developer/landowner	
Provide a copy of this BMP to the relevant decision makers to support approval of the proposed local structure plan.	To support the local structure plan approval process.
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 layout and in consideration of bushfire hazards that will be present following development.	To support each future subdivision application.
Make spatial provision for all public roads to be installed to the standards outlined in Appendix Four of the Guidelines (including providing a minimum 6m trafficable surface with 4.5m vertical clearance) and ensure two access ways (either public road or temporary emergency access ways) are provided at all times for each subdivision stage.	To support each future subdivision application
Comply with the *City of Cockburn Fire Control Order* as published.	Ongoing, as required

7 Applicant Declaration

7.1 Accreditation

This BMP has been prepared by Emerge Associates who have been providing bushfire risk management advice for more than six 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: Dana Elphinstone

Company: Emerge Associates

Date: 8 December 2021

BPAD Accreditation: BPAD no. 52565

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 Water (DoW) 2008, *LiDAR Elevation Dataset, Swan Coastal Plain*, Perth.

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.

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.

Western Australian Planning Commission and Department of Fire and Emergency Services (WAPC and DFES) 2017, *Guidelines for Planning in Bushfire Prone Areas Version 1.3*, Western Australia. December 2017.

8.2 Online references

Landgate 2020, *Locate V5*, viewed November 2020, https://maps.slip.wa.gov.au/landgate/locate/

Landgate 2020, *Map Viewer*, viewed December 2021, https://www0.landgate.wa.gov.au/maps-and-imagery/interactive-maps/map-viewer

Office of Bushfire Risk Management (OBRM) 2019, *Map of Bush Fire Prone Areas*, viewed November 2020, https://maps.slip.wa.gov.au/landgate/bushfireprone/

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Figures

Figure 1: Site Location and Topographic Contours

Figure 2: Existing Conditions - AS 3959 Vegetation Classifications

Figure 3: Pre-Development Site Conditions - Bushfire Hazard Level

Figure 4: Post Development Site Conditions – AS 3959 Vegetation Classifications

Figure 5: Post Development Site Conditions – Effective Slope

Figure 6: Post Development Site Conditions – Bushfire Attack Level Contours

Figure 7: Vehicle Access Plan

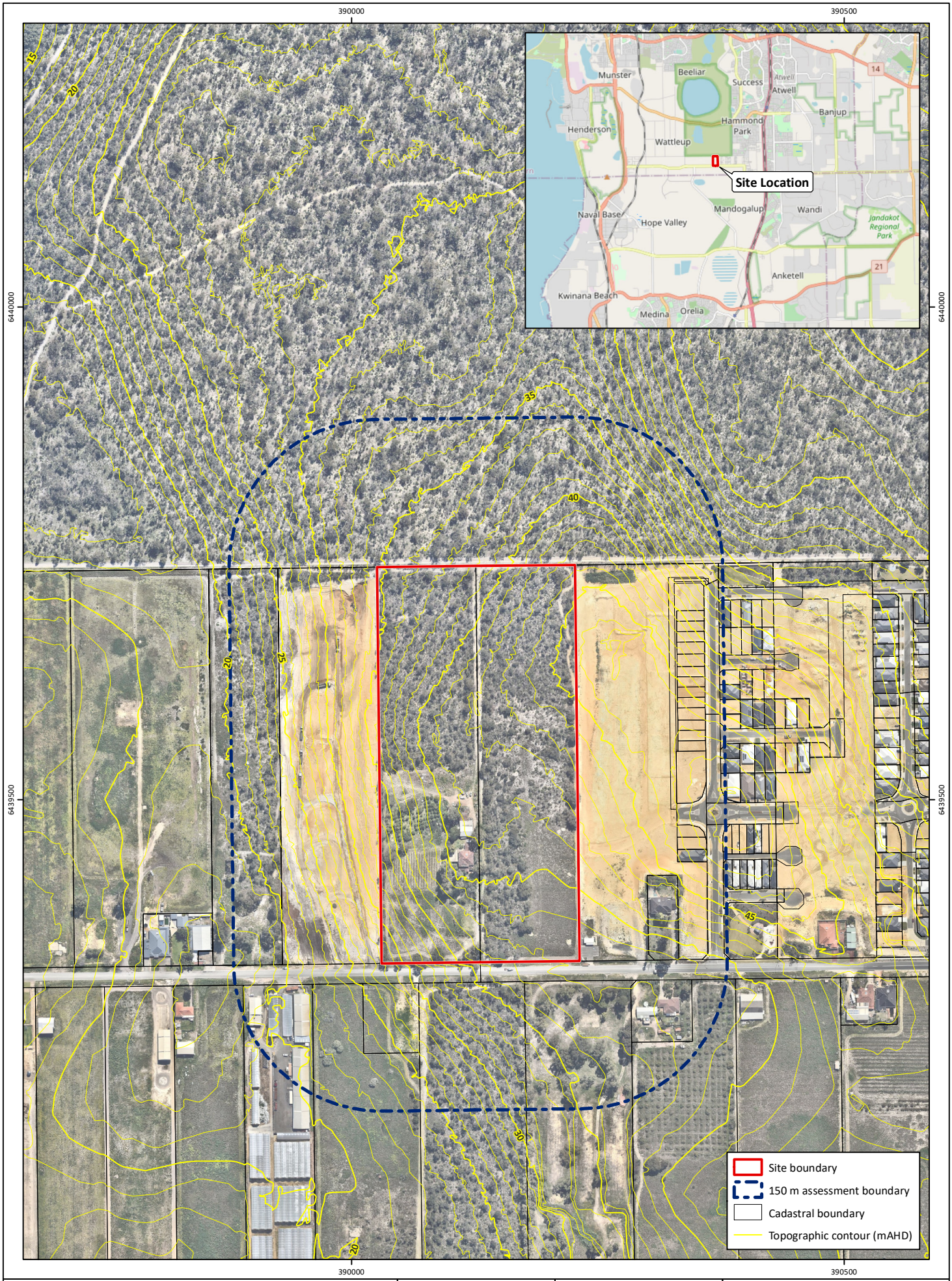

Figure 1: Site Location and Topography

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park
Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F15

Drawn:	GAR
Date:	18/09/2020
Checked:	DAE
Approved:	DAE
Date:	11/12/2020

N

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

emerge ASSOCIATES

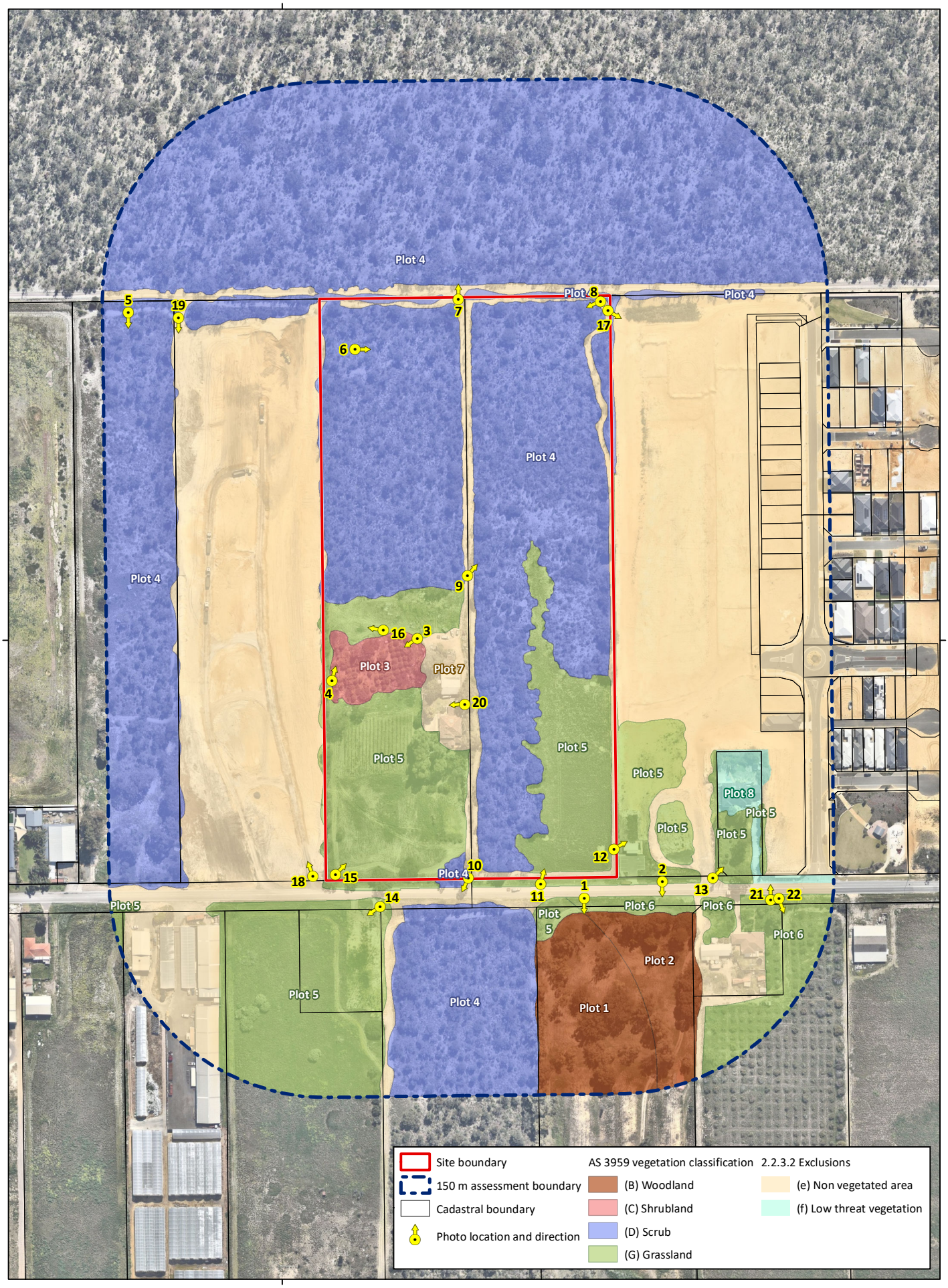

Figure 2: **Pre Development Conditions: AS 3959 Vegetation Classification**

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park

Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F16

Drawn:	GAR
Date:	18/09/2020
Checked:	DAE
Approved:	DAE
Date:	11/12/2020

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Metres

Scale: 1:3,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

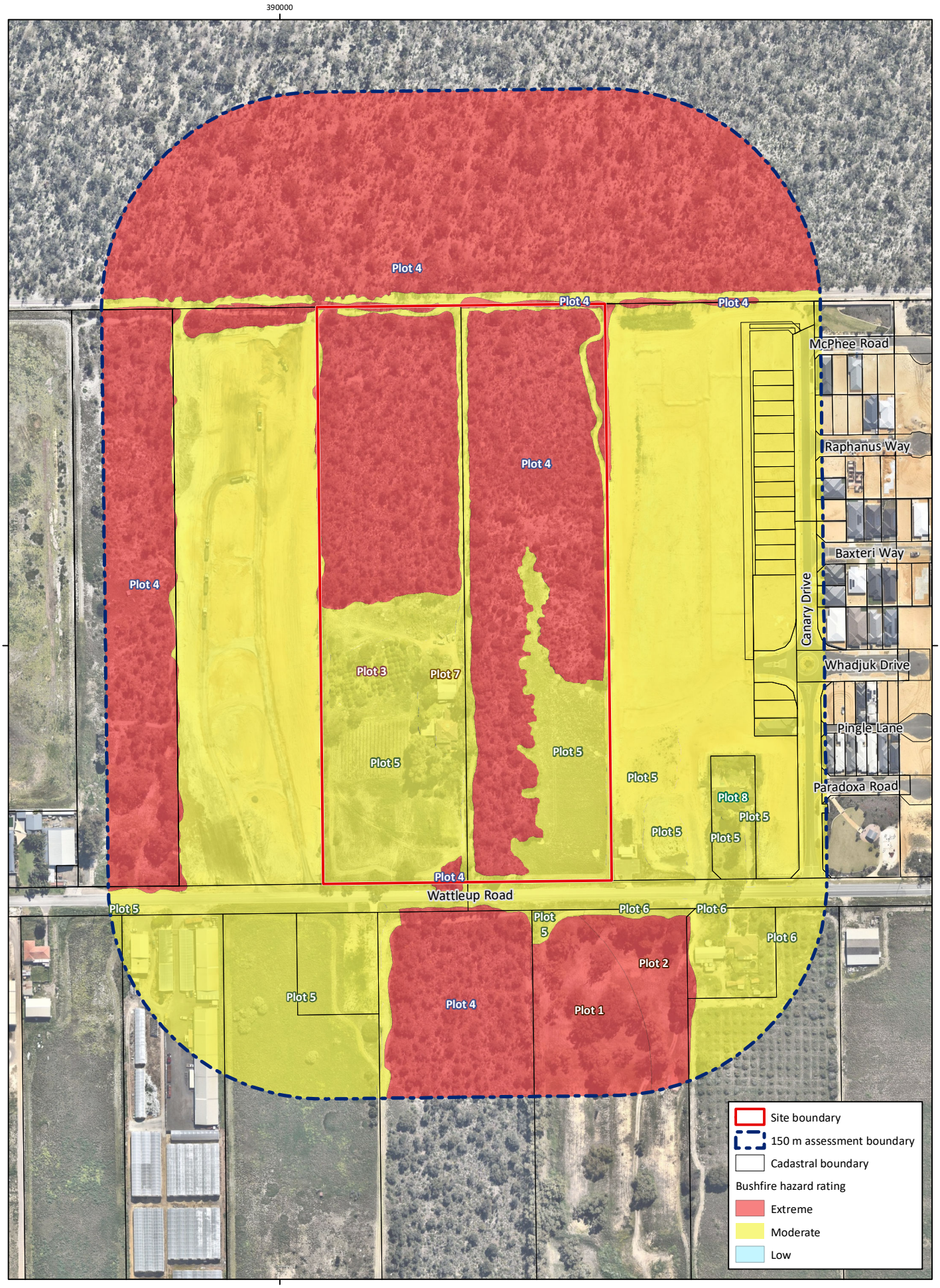

Figure 3: **Pre-Development Conditions: Bushfire Hazard Level**

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park

Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F17

Drawn:	GAR
Date:	18/09/2020
Checked:	DAE
Approved:	DAE
Date:	11/12/2020

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Scale: 1:3,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

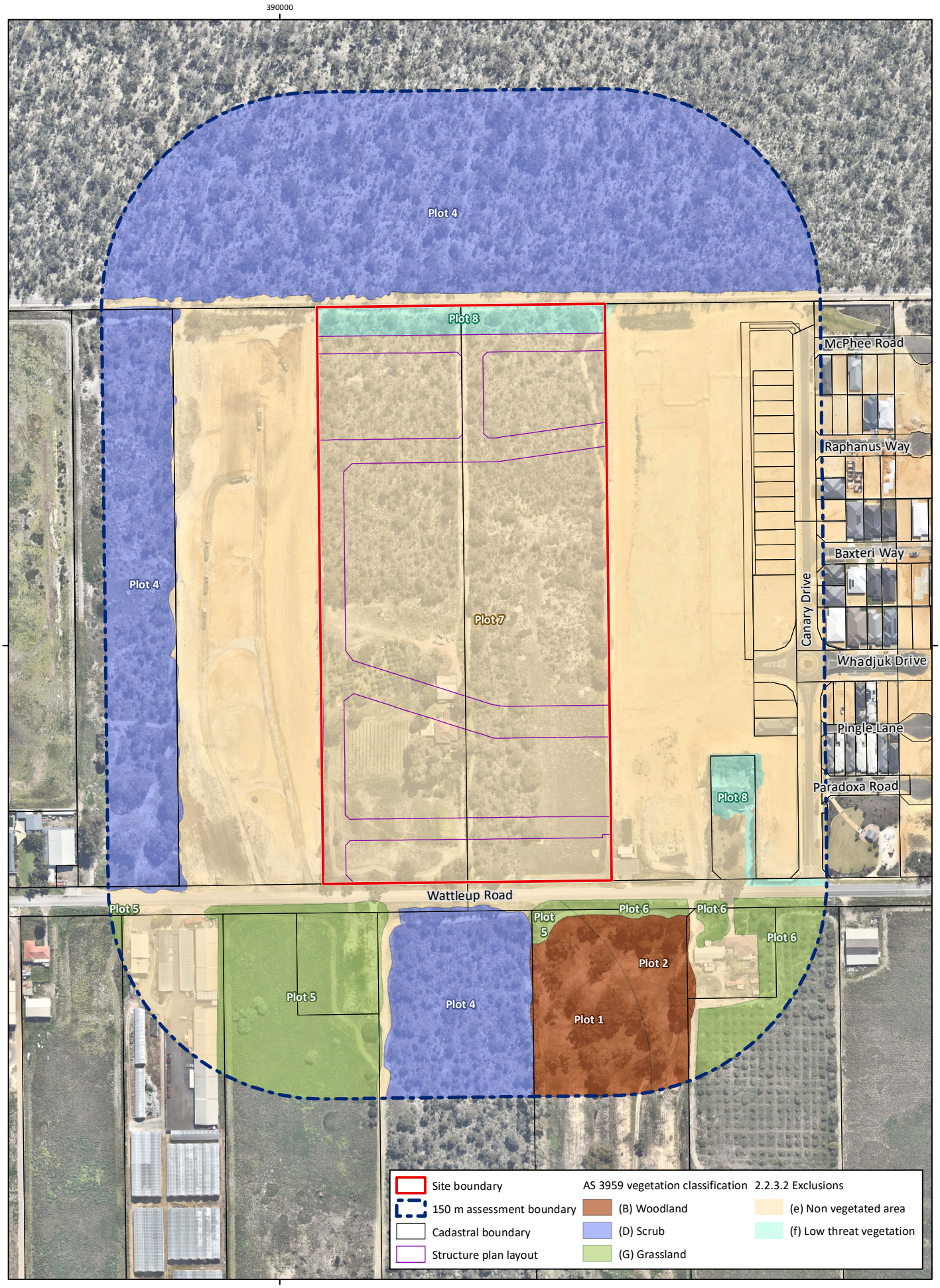

Figure 4: **Post Development Conditions: AS 3959 Vegetation Classification**

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park

Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F18a

Drawn:	GAR
Date:	08/12/2021
Checked:	DAE
Approved:	DAE
Date:	08/12/2021

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Scale: 1:3,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

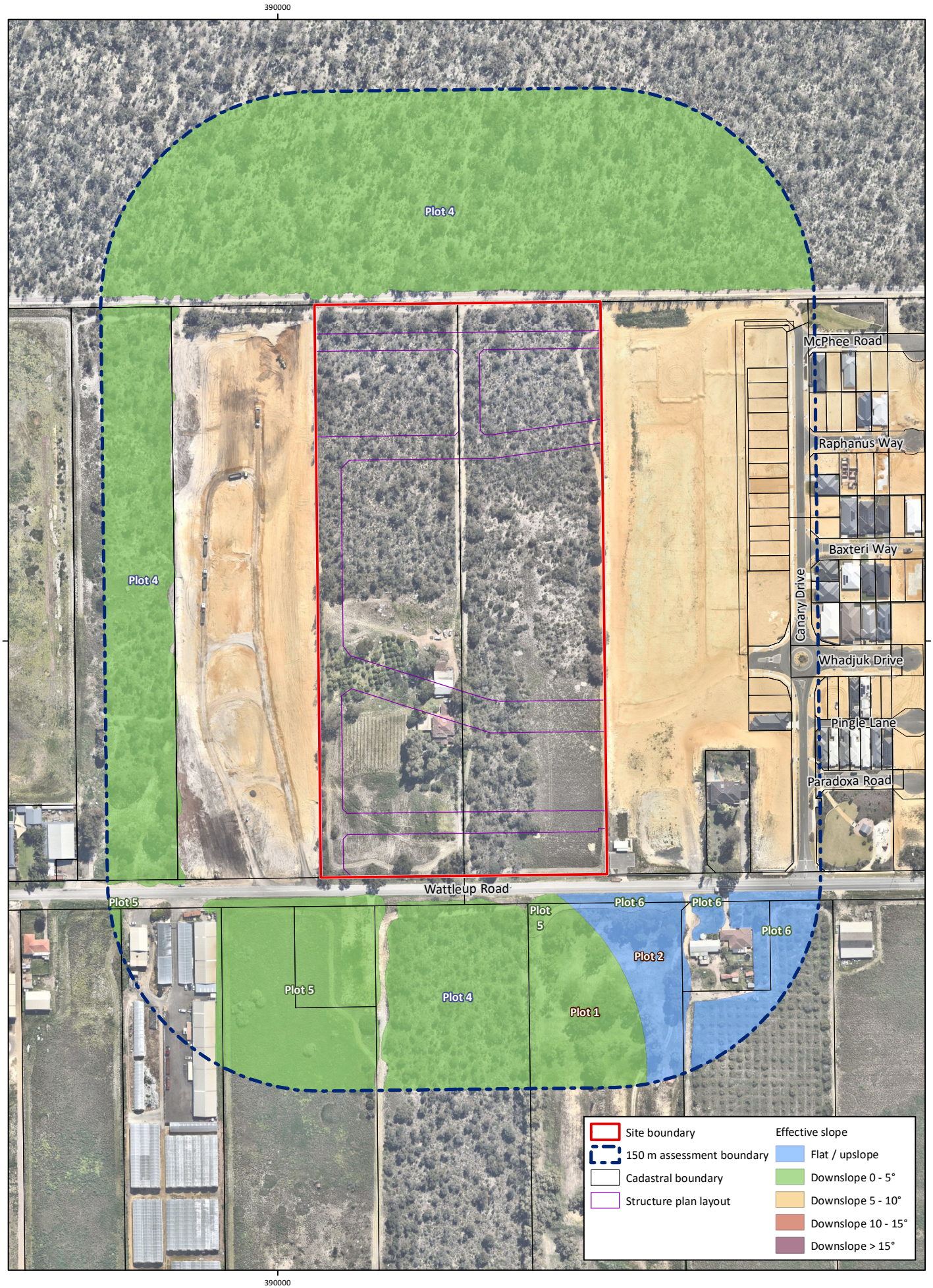

Figure 5: Effective Slope

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park

Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F19

Drawn:	GAR
Date:	18/09/2020
Checked:	DAE
Approved:	DAE
Date:	11/12/2020

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Metres

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

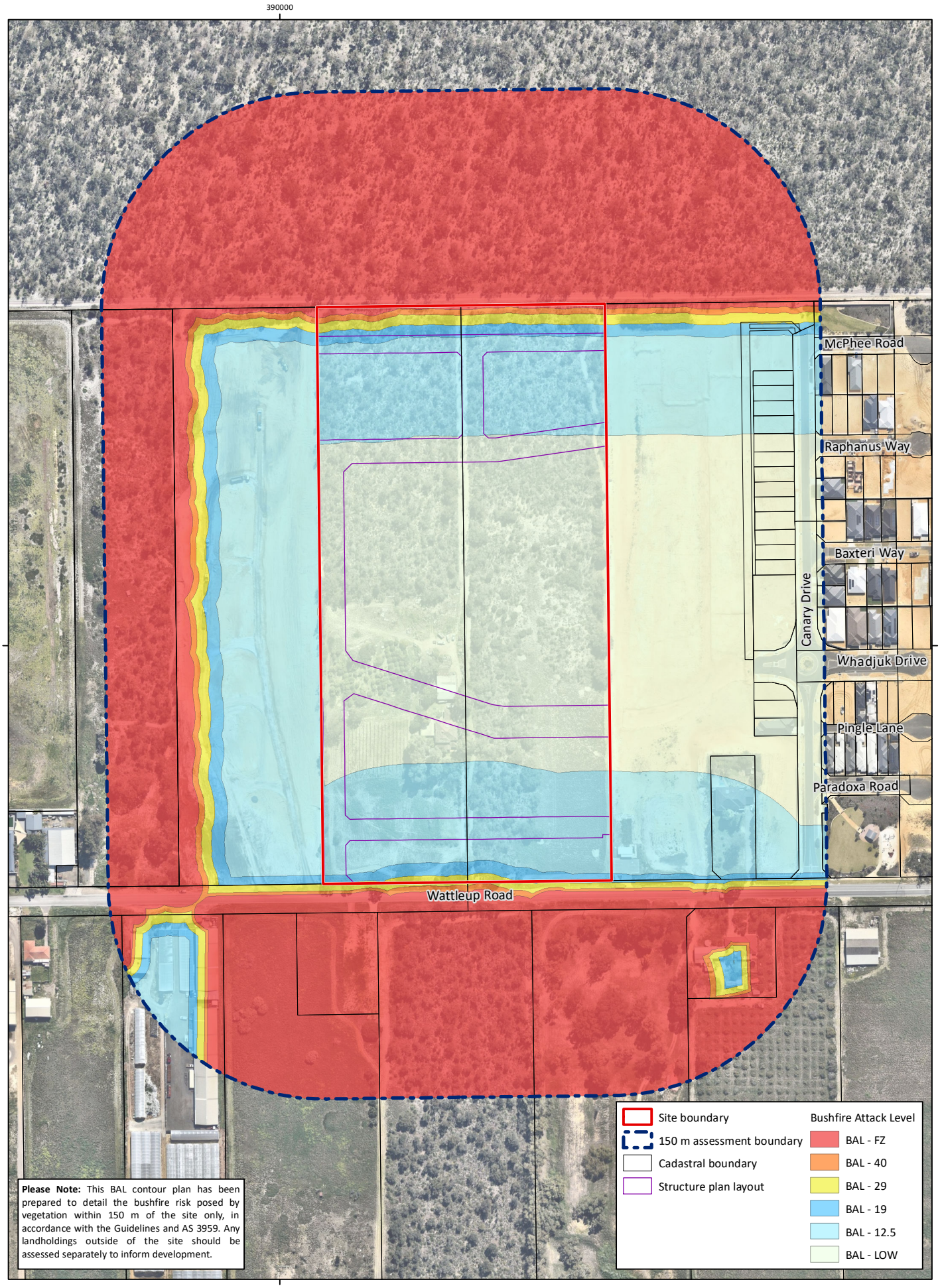

Figure 6: Bushfire Attack Level Contour Plan

Project: Bushfire Management Plan
Lots 76 and 107 Wattleup Road Hammond Park
Client: Qube Hammond Link Pty Ltd

Plan Number: EP20-085(04)--F20a
Drawn: GAR
Date: 08/12/2021
Checked: DAE
Approved: DAE
Date: 08/12/2021

N

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Metres
Scale: 1:3,500@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

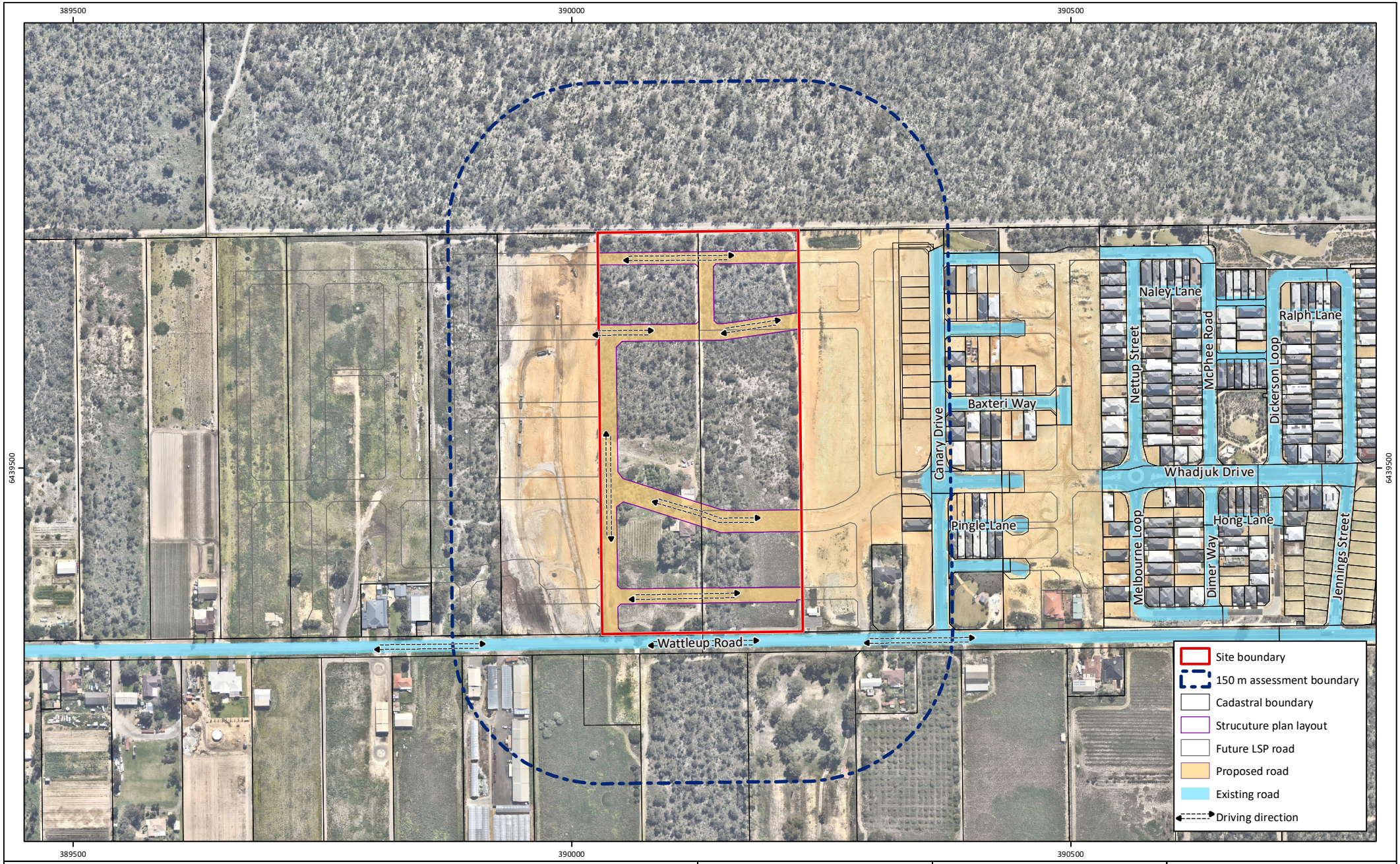

Figure 7: Vehicle Access Plan

Project:	Bushfire Management Plan Lots 76 and 107 Wattleup Road Hammond Park
Client:	Qube Hammond Link Pty Ltd

Plan Number:
EP20-085(04)--F21

Drawn:	GAR
Date:	18/09/2020
Checked:	DAE
Approved:	DAE
Date:	11/12/2020

N

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Metres

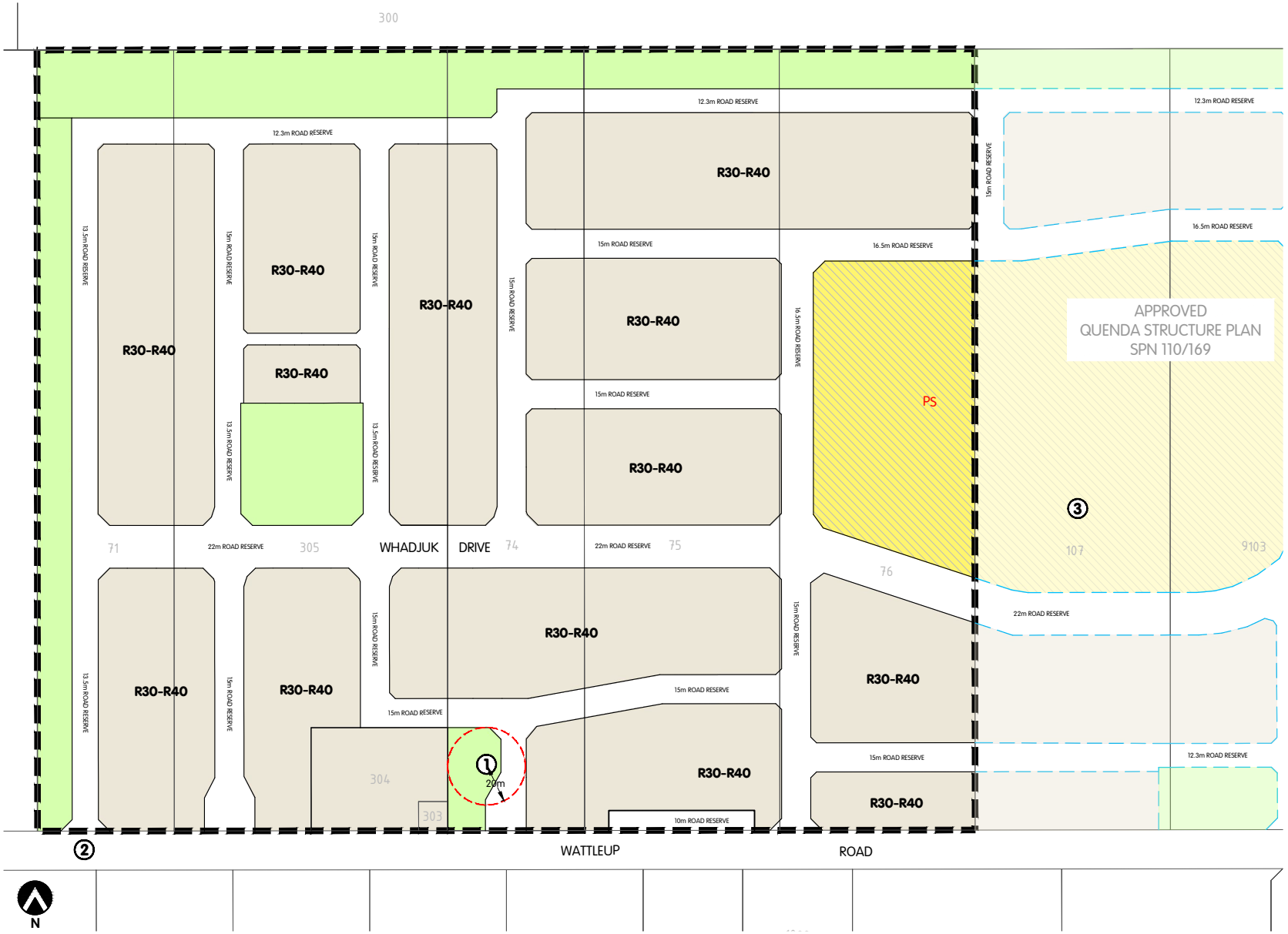
Scale: 1:5,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Appendix A

Amendment 2 to the Hammond Park West Structure Plan



LEGEND

- Structure Plan Boundary
- Indicative Boundary

Local Scheme Zones

- Residential

Local Scheme Reserves

- Local Road Reserve
- Public Open Space
- Public Purpose
- PS Primary School

Other

① Proposed WWPS & Buffer Subject to Further Discussion with Water Corporation.

② Potential Roundabout for Traffic Calming Purposes (Subject to Further Discussion with The City of Cockburn).

③ Lot 107 within QUBE ownership to be subdivided concurrent with Structure Plan area generally in accordance with SPN 110/169.

QUBE

CADASTRAL INFORMATION
SOURCE: LANDGATE
YYMMDD: 201125
DWG REF: 201125-cad.DWG
PROJECTION: PCG94

AERIAL PHOTOGRAPHY
SOURCE: NA
YYMMDD: NA

HATCH | RobertsDay

SIZE A4_1:3000

0 metres 30 60 90 120 150

R REV	INCREASE SP BOUNDARY DESCRIPTION	201211 YYMMDD	SB DRAWN	KV APPR'D

PLAN 1 - STRUCTURE PLAN MAP
Hammond West Structure Plan
City of Cockburn

JOB CODE	DRAW NO.	REV.
QUB HAMC	**RD1 003**	**R**