Bushfire Hazard Level Assessment:
Local Planning Strategy: City of Wanneroo

City of Wanneroo

ecological AUSTRALIA
A TETRA TECH COMPANY

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Bushfire Hazard Level Assessment: Local Planning Strategy: City of Wanneroo
Project Number	22PER4181
Project Manager	Eva Cronin (BPAD Level 2 – 45482)
Prepared by	Eva Cronin (BPAD Level 2 – 45482)
Reviewed by	Daniel Panickar (BPAD Level 3 – 37802)
Approved by	Daniel Panickar (BPAD Level 3 – 37802)
Status	Final
Version Number	v2
Last saved on	22 May 2023

This report should be cited as 'Eco Logical Australia 2023. *Bushfire Hazard Level Assessment: Local Planning Strategy: City of Wanneroo*. Prepared for City of Wanneroo

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from City of Wanneroo (the client).

Disclaimer
This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Eco Logical Australia Pty Ltd and the client. The scope of services was defined in consultation with the client , by time and budgetary constraints imposed by the client, and the availability of reports and other data on the subject area. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information. Eco Logical Australia Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Information provided is not intended to be a substitute for site specific assessment or legal advice in relation to any matter. Unauthorised use of this report in any form is prohibited.

Template 2.8.1

Contents

1. Introduction 4

1.1 Proposal details 4
1.2 Purpose and application of the plan 4
1.3 Environmental considerations 5

2. Bushfire assessment results 9

2.1 Bushfire assessment inputs 9

2.1.1 Fire Danger Index 9
2.1.2 Vegetation classification 9
2.1.3 Topography and slope under vegetation 10

2.2 Bushfire assessment outputs 12

2.2.1 BHL assessment 12
2.2.2 Bushfire Hazard Level Assessment 12

2.3 Identification of issues arising from the BHL assessment 13

3. Assessment against the Bushfire Protection Criteria 16

3.1 Compliance 16

3.1.1 Element 1: Location 16
3.1.2 Element 2: Siting and design of development 16
3.1.3 Element 3: Vehicular Access 17
3.1.4 Element 4: Water 18

4. Conclusion 21
5. References 22
Appendix A Vegetation Classification Map Series 23
Appendix B – Classified Vegetation Photos 24
Appendix C Bushfire Hazard Level Assessment Map Series 31
Appendix D Standards for Asset Protection Zones 32
Appendix E Proposed Road Plans 35
Appendix F Vehicular access technical requirements (WAPC 2021) 36
Appendix G Water supply requirements 37

List of Figures

Figure 1: Site overview 6
Figure 2: Bushfire Prone Areas 7
Figure 3: Environmental, Biodiversity and Conservation Values Summary 8
Figure 4: Vegetation classification 11
Figure 5: Bushfire Hazard Level Assessment 14
Figure 6: Bushfire Hazard Level Assessment and DFES bushfire prone area 15

Figure 7: Existing Vehicular Access and Water Supply 19
Figure 8: Potential Upgrades to Existing Road Network 20
Figure 9: Illustrated tree canopy cover projection (WAPC 2021) 33

List of Tables

Table 1: Bushfire Hazard level assessment 12

1. Introduction

1.1 Proposal details

Eco Logical Australia (ELA) was commissioned by City of Wanneroo (CoW) to prepare a Bushfire Hazard Level (BHL) assessment to inform the development of a Local Planning Strategy (LPS) which is required under provisions of the Planning and Development (Local Planning Schemes) Regulations 2015. With respect to bushfire, the LSP is required to demonstrate that bushfire risk can be adequately addressed for areas where intensification of land use is proposed.

Recent advice obtained by the CoW from the Department of Planning, Lands and Heritage (DPLH) stated that the BHL assessment should focus on any new areas of development or areas that may be proposed for a change in intensification and/or land use in the future. In preparing the LSP, the CoW has identified that the areas most likely to be subject to an intensification of development for uses such as rural tourism, includes areas of the CoW generally described as 'north Wanneroo' which encompasses areas zoned Landscape Enhancement, Rural Resource, General Rural and Special Rural under District Planning Scheme No. 2 (hereafter referred to as the subject site, Figure 1). This BHL assessment report, therefore, specifically focuses on the subject site as requested by the CoW. ELA have been advised that other areas where development intensification will occur have already been broadly identified with some high-level planning in place (i.e. District Structure Plans).

A substantial portion of the subject site is located within a designated bushfire prone area as per the *Western Australia State Map of Bush Fire Prone Areas* (DFES 2021; Figure 2), which triggers bushfire planning requirements *under State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7; Western Australian Planning Commission (WAPC) 2015) and reporting to accompany submission of the strategic planning proposal (i.e. the LPS) in accordance with the associated *Guidelines for Planning in Bushfire Prone Areas v 1.4* (the Guidelines; WAPC 2021).

The subject site encompasses an area of approximately 36 km^2 with land tenure falling within both freehold and crown land, noting majority of land tenure within the subject site falls within freehold land (ABARES 2021). ELA assumes majority of the area has been developed prior to the adoption of SPP 3.7, the Guidelines and Australian Standard AS 3959 Construction of Buildings in Bushfire Prone Areas. Several environmental values relating to biodiversity and conservation exist within the subject site that will need to be considered alongside proposed bushfire risk management measures for future development. A high-level summary of these values and considerations is provided in Section 1.3.

This assessment has been prepared by ELA Senior Bushfire Consultant Eva Cronin (FPAA BPAD Level 2 Certified Practitioner No. BPAD45482) with quality assurance undertaken by Principal Bushfire Consultant Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802).

1.2 Purpose and application of the plan

The primary purpose of this BHL assessment is to act as a technical supporting document to support the LPS. This BHL assessment is also designed to provide guidance on how to plan for and manage the bushfire risk to the subject site through the future implementation of a range of bushfire management measures (to be documented in future Bushfire Management Plans at subsequent stages of the planning process) in accordance with the Guidelines.

© ECO LOGICAL AUSTRALIA PTY LTD

1.3 Environmental considerations

SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.

The purpose of this BHL is to provide a high-level overview of bushfire risk within the subject site, therefore, no clearing of native vegetation is proposed at this level of planning. As noted previously however, there are several environmental values related to biodiversity and conservation which exist within the subject site that will require consideration in future planning applications. These values were identified through obtaining data from the CoW and publicly available databases (SLIP) available through Landgate. The following datasets were provided to ELA by the CoW:

- Priority Local Natural Areas;
- Municipal Heritage Inventory;
- Aboriginal Heritage Site; and
- Threatened Ecological Communities (TEC).

The following datasets were sourced by ELA from publicly available databases (SLIP) through Landgate:

- Potential Black Cockatoo Foraging Habitat (DBCA-057);
- Clearing Regulations – Environmentally Sensitive Areas (DWER-046);
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019); and
- Bush Forever Areas – 2000 (DPLH-019).

A summary of the environmental, biodiversity and conservation values which exist within the subject site is depicted spatially in Figure 3. Majority of the identified environmental values within the subject site were mapped as having an Extreme BHL as depicted within the inset shown in Figure 3. Further environmental investigations may be required in these areas where bushfire management measures for future planning proposals propose modification and/or clearing of vegetation within these areas to reduce bushfire hazards. It is also critical to note that the environmental values depicted in Figure 3 were defined from desktop assessment only. It is highly likely that on-ground surveys will result in modification of the extent of these values (both increases and decreases are possible) or identification of new values which were not considered in this desktop exercise. The information provided in Figure 3 was provided to broadly inform this document and should not be used for detailed planning or environmental assessment.

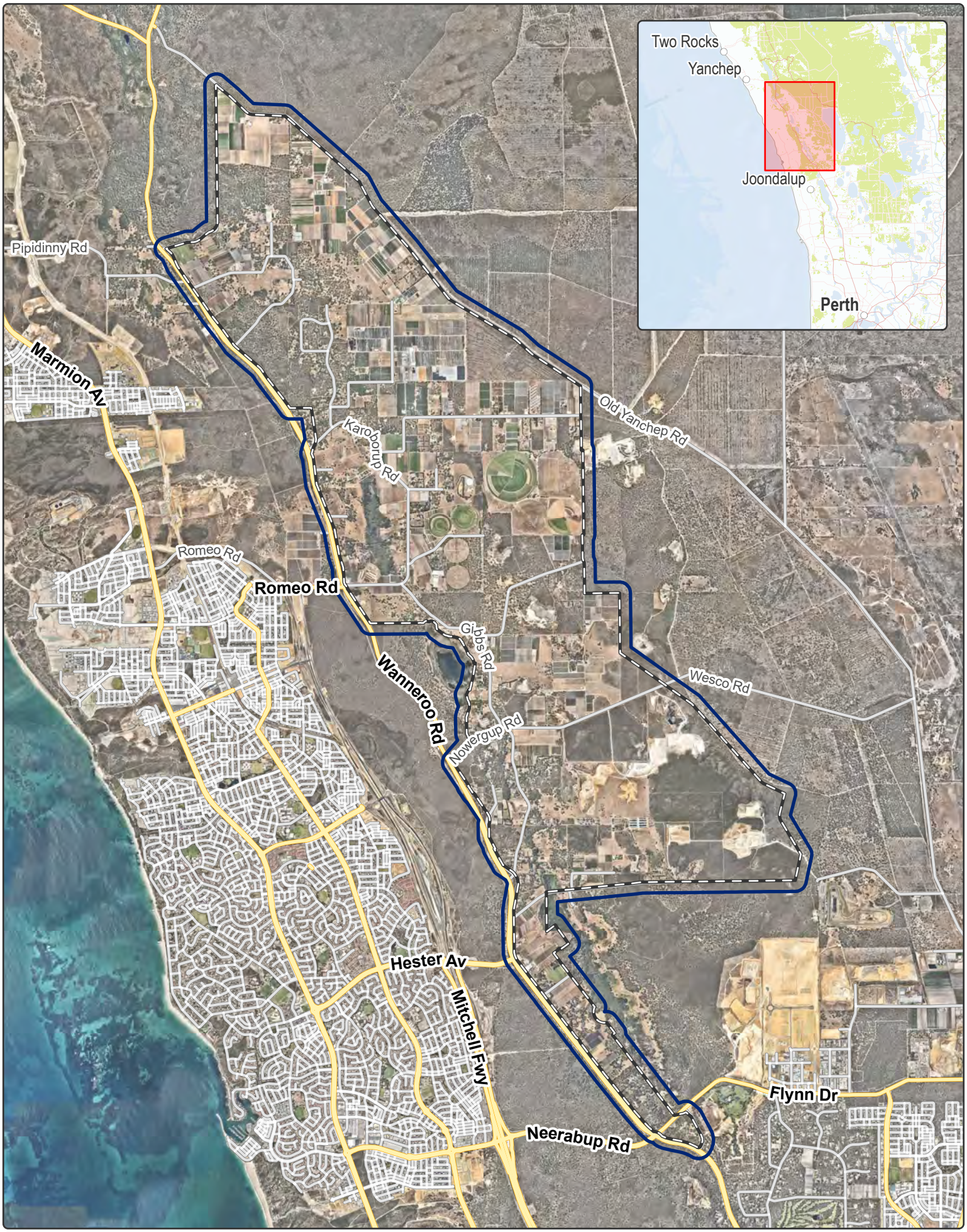


Figure 1: Site Overview

Subject site

150m site assessment

N

0 0.5 1 2

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 31/03/2023

eco logical AUSTRALIA
A TETRA TECH COMPANY

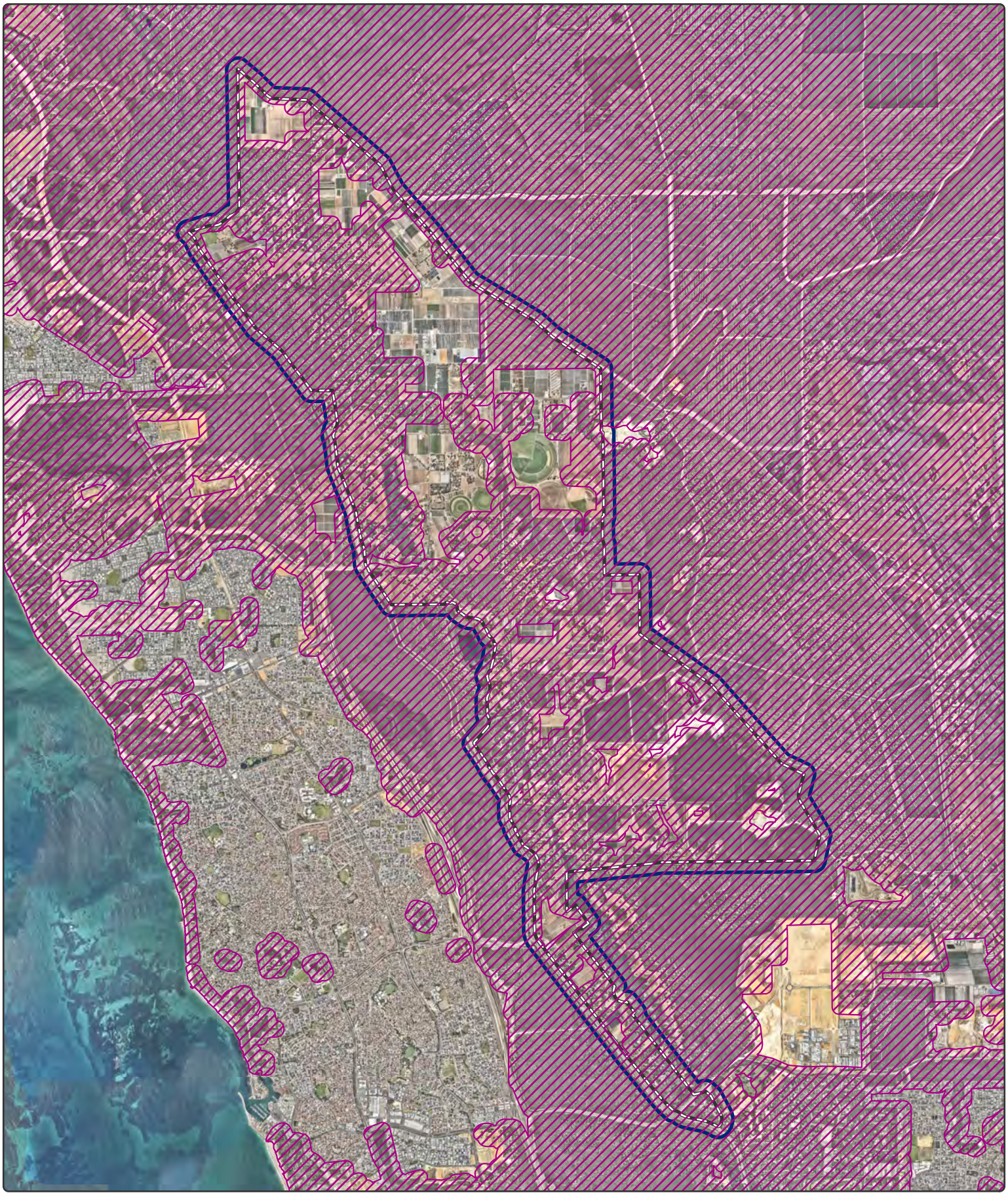


Figure 2: Bushfire Prone Areas

Subject site

150m site assessment

Bushfire Prone Mapping (DFES 2021)

0 0.5 1 2

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 4/04/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

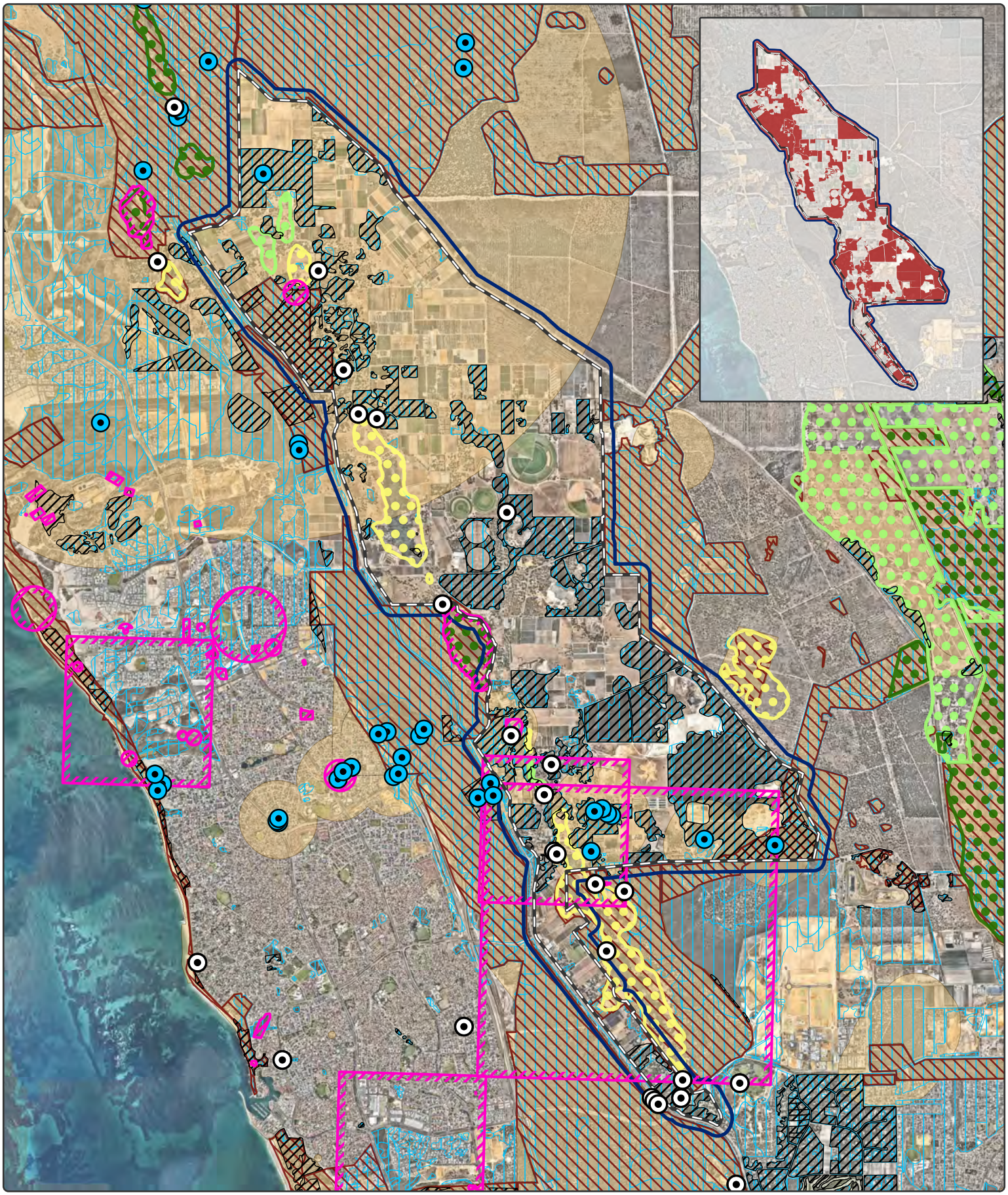


Figure 3: Constraints

- Subject site
- 150m site assessment
- Extreme BHL areas overlapping with environment datasets

Geomorphic Wetlands, Swan Coastal Plain

- Conservation
- Multiple Use
- Resource Enhancement
- Aboriginal Heritage Site
- Bush Forever Areas – 2000 (DPLH-019)
- Black Cockatoo Foraging Habitat
- Clearing Regulations – Environmentally Sensitive Areas (DWER-046)
- Priority Local Natural Areas
- Municipal Heritage
- Threatened Ecological Communities

0 0.5 1 2

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 6/04/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

2. Bushfire assessment results

2.1 Bushfire assessment inputs

The following section is a consideration of spatial bushfire risk and has been used to inform the bushfire assessment in this report.

2.1.1 Fire Danger Index

A blanket rating of FDI 80 is adopted for Western Australia, as outlined in Australian Standard (AS) 3959A: 2018 and endorsed by Australasian Fire and Emergency Service Authorities Council (AFAC).

2.1.2 Vegetation classification

Vegetation within the subject site and surrounding 150 m (the assessment area) was assessed in accordance with the Guidelines and *AS 3959: 2018 Construction of Buildings in Bushfire Prone Areas* (SA 2018) with regard given to the *Visual guide for bushfire risk assessment in Western Australia* (DoP 2016).

Vegetation within the assessment area was initially classified utilising a combination of high resolution satellite imagery, the global tree canopy height dataset published by ETH Zurich and Normalised Difference Vegetation Index (NDVI) Analysis. The DFES Map of Bushfire Prone Areas (DFES 2021) was used to further refine initial mapping to remove low threat vegetation and non-vegetated areas. Field assessments were then undertaken for selected areas within the subject site to validate the initial classifications on 16 February 2023. Further validation of AS 3959: 2018 vegetation classifications applied within the subject site was based on dataset Vegetation Complexes – Swan Coastal Plain (DBCA-046) viewed on publicly available databases (SLIP) available through Landgate.

Classified vegetation for the assessment area is depicted in Figure 4. Due to the size of the subject site, an associated vegetation classification map series has been included within Appendix A.

Areas of low threat vegetation including managed parklands, developed residential and commercial areas (i.e. market gardens), roadways and waterways have been excluded under Section 2.2.3.2 of AS3959: 2018. These exclusions have been determined by utilising aerial imagery, local knowledge of the area, the results of the field validation undertaken and certain assumptions detailed below. Some minor areas of excludable vegetation within the overall classified vegetation may have been encompassed in the broad brush vegetation assessment that may be considered low threat vegetation on detailed investigation (not completed in this study).

As this assessment has been undertaken primarily based on desktop analysis, ELA have generally adopted a conservative approach to applying vegetation classifications throughout the assessment area. As the BHL is primarily based on desktop analysis, it is important to note that classified vegetation and bushfire hazard levels may change upon more detailed analysis of smaller areas within the broader study area to support future planning applications.

Vegetation classifications are based on the following assumptions:

- All areas mapped as plantations as per data provided by the CoW have been classified as Class A Forest which includes eucalypt and pine plantations as per AS 3959: 2018. This also includes areas that may have been recently harvested or have not yet reached maturity where ELA have

applied a worst-case scenario (i.e. considering the plantation in its mature state) for the purposes of assessing bushfire risk to inform future planning;

- All market gardens, orchards and other non-curing crops within the study area have been excluded under clause 2.2.3.2 (f) based on the assumption these areas are managed to a low threat state. Field validation confirmed several of these areas do indeed appear to be managed as low threat. Please note, however, any orchards or market gardens that did not appear managed upon field validation were assessed as classifiable vegetation. Due to limitations in access given the assessment was undertaken from the public road network (i.e. no access to private or commercial properties) many market gardens and orchards were not inspected. Any market gardens and orchards that were not visually inspected are assumed as being managed and low threat for the purpose of the BHL assessment; and
- Generally, areas of grassland on private properties greater than 4,000m^2 (threshold in the CoW Firebreak Notice which removes the need fuel load management for the entirety of the property and is replaced by the requirement to maintain boundary firebreaks) were considered to be classifiable vegetation where there was no reasonable assurance that these properties are maintained in a low threat state in their entirety.

Photographs relating to each area and vegetation type are included in Appendix B.

2.1.3 Topography and slope under vegetation

Effective slope under vegetation was assessed from elevation contours reviewed during the desktop assessment from publicly available data sets. For areas within the assessment area, determination of areas of classified vegetation with a slope greater than 10 degrees was based on five metre contours. Validation of slopes in these areas through field assessments was limited due to site access being restricted to from within the public road network.

The effective slope utilised for the subsequent bushfire assessment was determined utilising the precautionary principal by selecting the highest risk slopes for BHL assessment based on potential impacts to any future developments. Slope aspect has not been assessed in this BHL assessment and future bushfire assessments for planning applications may refine slope assessments taking into consideration exact slope and aspect in relation to location of future proposed development.

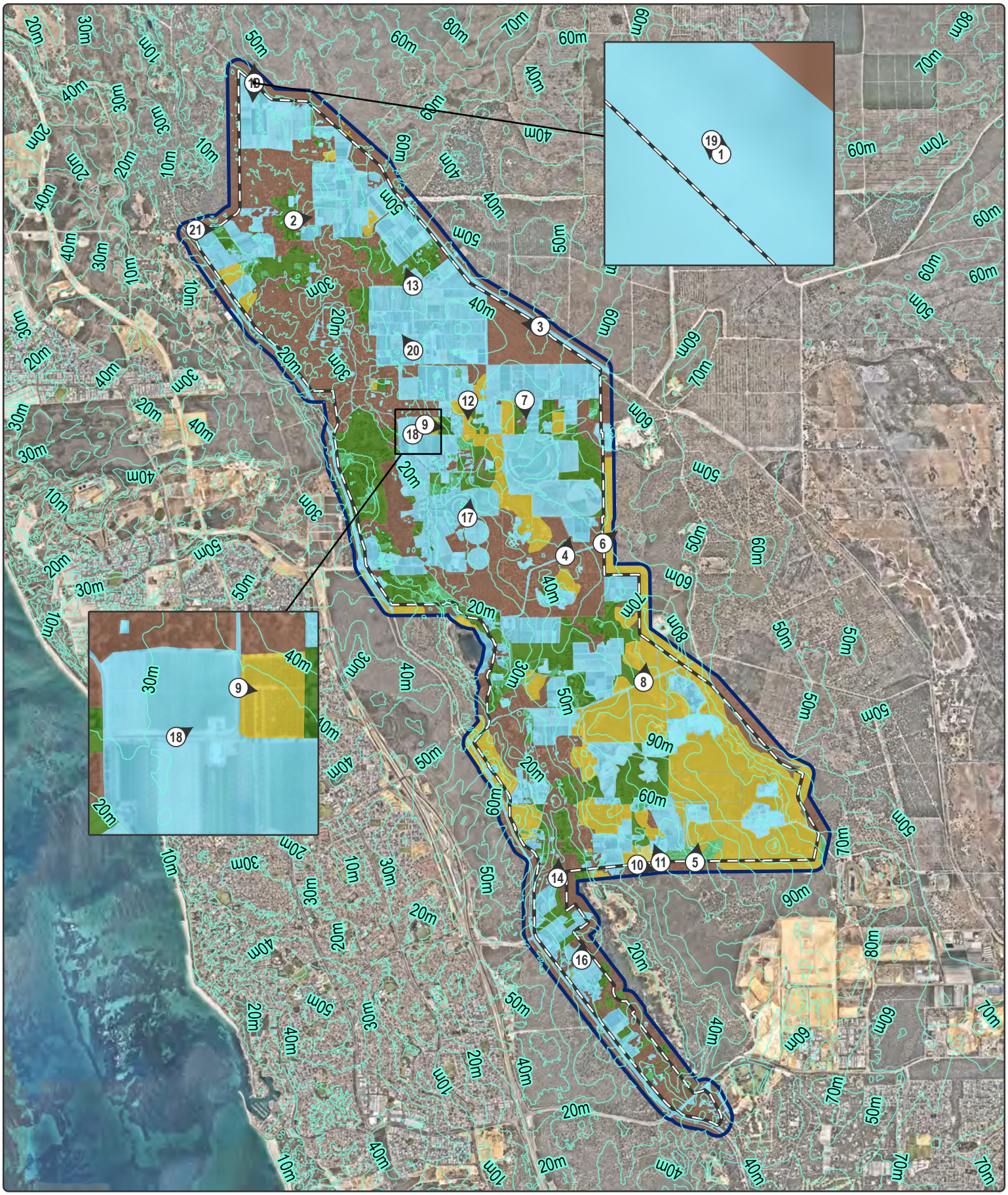


Figure 4: Vegetation Classification

2.2 Bushfire assessment outputs

A Bushfire Hazard level (BHL) assessment has been undertaken in accordance with SPP 3.7, the Guidelines and the bushfire assessment inputs in Section 2.1.

2.2.1 BHL assessment

All land located within 150 m of the classified vegetation depicted in Figure 4 is considered bushfire prone and is subject to a BHL assessment in accordance with Guidelines.

A bushfire hazard level assessment (as outlined in the Guidelines) has been completed for the subject site and incorporates the following factors:

- Vegetation class; and
- Slope under classified vegetation.

The BHL is a broad brush means of determining the potential intensity of a bushfire that may impact on the existing and future developments or infrastructure within the subject site. The BHL can be utilised for the pre-development assessment of proposals such as strategic planning proposals.

2.2.2 Bushfire Hazard Level Assessment

Table 1 contains a summary of the BHL assessment for each vegetation plot depicted in Figure 4. All land within 100 m of Extreme and Moderate BHLs has also been mapped as a Moderate hazard as per the Guidelines, and the final result is depicted in Figure 5. Due to the size of the subject site, an associated bushfire hazard level assessment map series has been included within Appendix C.

Table 1: Bushfire Hazard level assessment

Vegetation Classification	Bushfire Hazard Level
Class A Forest	Extreme
Class B Woodland	Extreme
Class D Scrub	Extreme
Class C Shrubland	Moderate
Class G Grassland	Moderate
Excluded AS 3959-2018 2.2.3.2	Low

NOTE: ANY CLASSIFIED VEGETATION WITH A SLOPE >10^{O} HAS AN EXTREME BHL.

ELA's assessment of vegetation and bushfire hazard levels has identified areas that may be bushfire prone, however are not depicted as such in the designated bushfire prone area (DFES 2021) as shown in Figure 6. Under the Office of Bushfire Risk Management (OBRM), bushfire prone area mapping standards and process, OBRM and DFES will review the map annually and this allows local governments the opportunity to include or exclude areas of vegetation into the bushfire prone map. The CoW does have the option to include and exclude areas on the DFES bushfire prone areas map based on their opinion and in discussion with OBRM/DFES, however, given broad brush nature of this assessment ELA recommends these areas are investigated further through field validation, where possible, to assist with making this determination.

2.3 Identification of issues arising from the BHL assessment

The vegetation classification and the BHL assessment has been undertaken via a desktop assessment with minor field validation of vegetation areas. Detailed assessment of site-specific vegetation classification and effective slope has not been undertaken by ELA consultants due to the high level and broad-brush nature of the scope for the BHL assessment and site access being restricted to from within the public road network.

The assessment of vegetation areas outside of the designated bushfire prone areas has been completed to provide a high-level investigation of the potential bushfire risk within the subject site (Figure 5). The BHL assessment is for strategic planning purposes and does not remove the need to complete a bushfire assessment to inform future planning requirements to address SPP 3.7 through the utilisation of bushfire management plans and bushfire attack level (BAL) assessments.

It is important to note however, that the existing planning requirements to address SPP 3.7 and the associated Guidelines are only applicable to areas designated as bushfire prone by the Fire & Emergency Services (FES) Commissioner (DFES) that are depicted in Figure 2. Whilst ELA have identified other areas that may be considered bushfire prone, these do not have formal designation and do not trigger SPP 3.7.

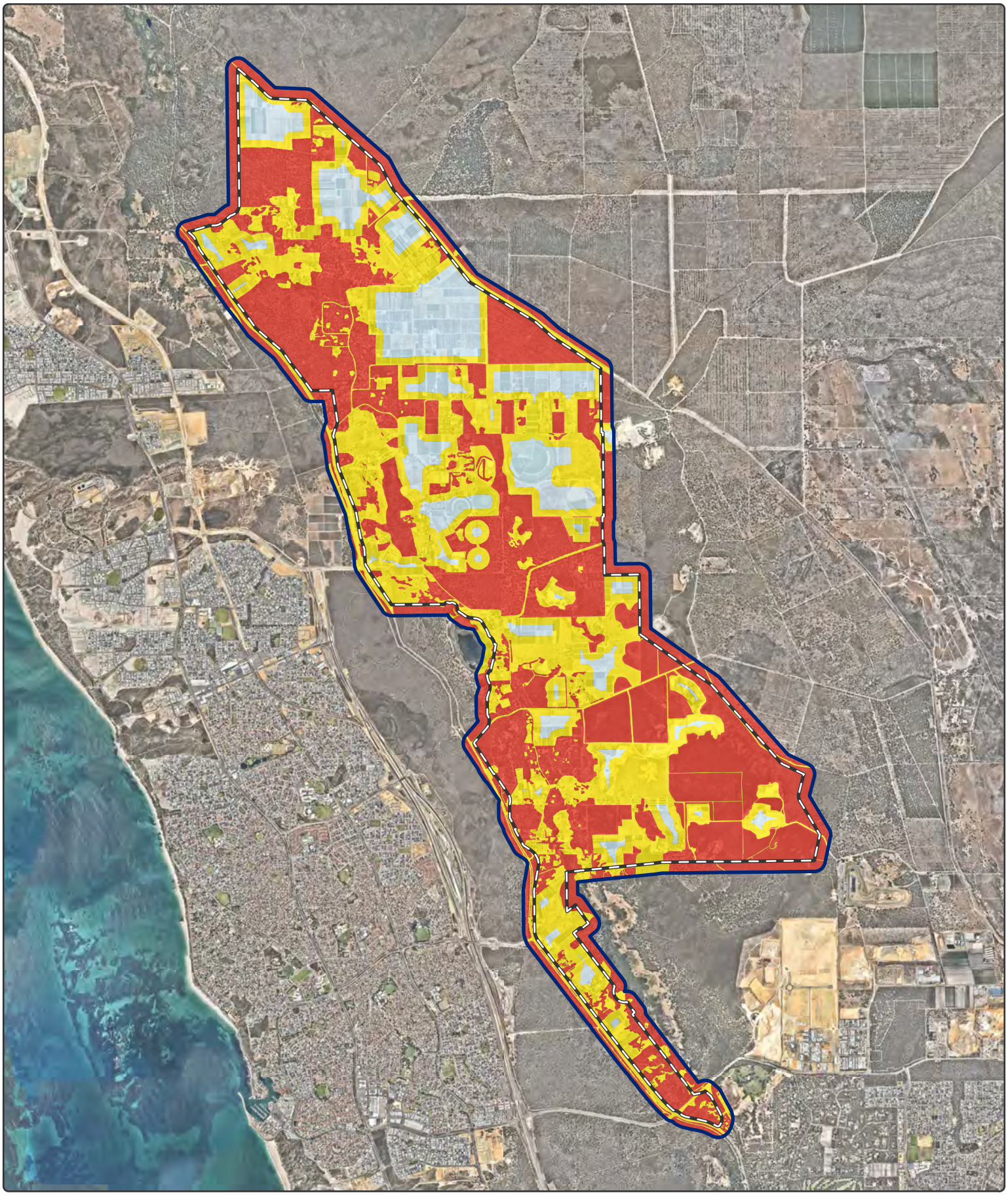


Figure 5: Bushfire Hazard Level Assessment

Subject site

150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low

0 0.5 1 2

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 31/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

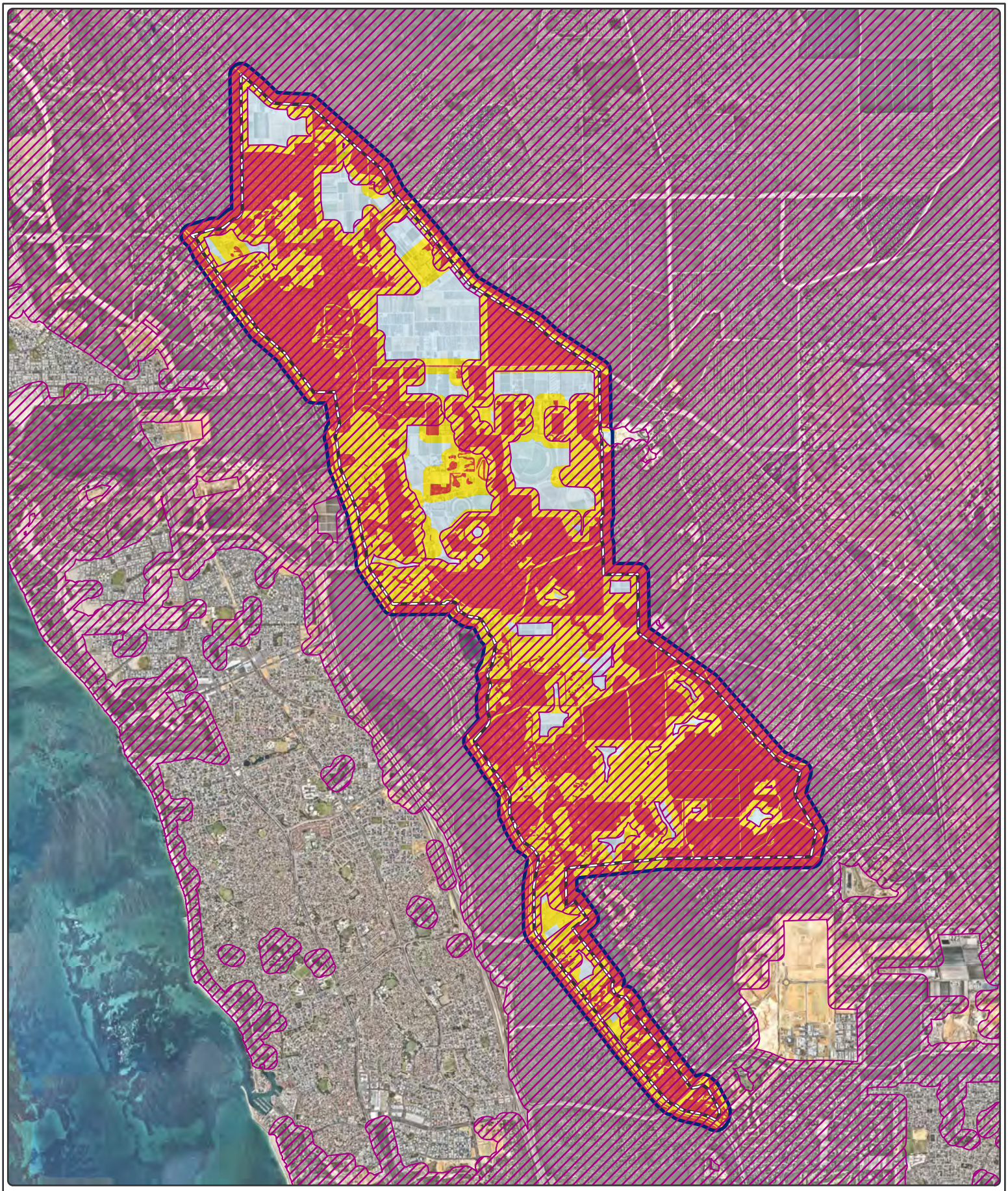


Figure 6: Bushfire Hazard Level Assessment and DFES Prone Area

Subject site
150m site assessment
Bushfire Prone Mapping (DFES 2021)

Bushfire Hazard Level (BHL)
Extreme
Moderate
Low

0 0.5 1 2
Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 6/04/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

3. Assessment against the Bushfire Protection Criteria

3.1 Compliance

The Local Planning Strategy is required to comply with policy measures 6.2 and 6.3 of SPP 3.7 and the Guidelines. Utilisation of this BHL assessment to inform the development of the LPS is expected to meet objectives 5.1-5.4 of SPP 3.7.

In response to the above requirements of SPP 3.7 and the Guidelines, a high level assessment against each of the elements within the Guidelines that are relevant to the proposal are provided below demonstrating how the intent of each element can be achieved in subsequent stages in the planning process through provision of high-level advice and broad recommendations. Information is represented spatially within Figure 7 and Figure 8, where relevant.

3.1.1 Element 1: Location

There are a number of areas within the subject site that are currently mapped as a moderate or low BHL. Future planning applications will be required to demonstrate that proposed development can be situated in areas subject to BHLs of moderate or low and proposed bushfire management measures shall commensurate the level of bushfire risk within and surrounding the site. Future planning applications should also consider the siting vulnerable or high risk land uses in areas subject to a low bushfire hazard level (post-development), where possible. When assessing planning applications, consideration should also be given to the modification or removal of vegetation required for development which may significantly reduce the BHLs mapped by ELA.

ELA note, however, the presence of significant areas of classified vegetation (resulting in an extreme BHL) within the study area and that some of these areas immediately internal to the boundaries of the subject site are also in proximity to significant fire catchments (spanning numerous kilometres) located within the broader landscape, particularly within Yanchep National Park to the north and State Forest to the East. ELA recommends future planning applications in these areas (i.e. extreme BHL areas on the boundary of the subject site) are closely scrutinised and consideration be given to requesting additional bushfire management measures beyond the prescriptive requirements in the Guidelines which may, in some instances, be appropriate for certain types of development in these areas.

3.1.2 Element 2: Siting and design of development

As lot layout/development plans are not known or proposed as part of this strategic planning proposal, Asset Protection Zones (APZs) to standards in the Guidelines (Appendix D) are unable to be prescribed at this level of planning. APZs will be defined in Bushfire Management Plans (BMPs) supporting future planning applications to ensure that all future development can be sited in areas where the potential impact of a bushfire does not exceed 29kW/m^2. Figure 3 demonstrates that a significant portion of areas within the subject site mapped as Extreme BHLs overlap with environment datasets. Development in these areas should be supported by environmental investigations/advice from a qualified environmental consultant if modification or clearing of vegetation is required for bushfire management measures. Future development which is reliant on vegetation modification or clearing to reduce bushfire risk to an acceptable level, will need to be supported by relevant environmental approvals (or advice outlining exemptions). Consideration should be given to the balance between environmental protection and development when assessing such planning applications.

As detailed in section 1.3, it is also critical to note that the environmental values considered in this report were defined from desktop assessment only. It is highly likely that on-ground surveys will result in modification of the extent of these values (both increases and decreases are possible) or identification of new values which were not considered in this desktop exercise.

3.1.3 Element 3: Vehicular Access

At the current time there are a total of 16 access points to the subject site via the existing network of primary distributor and access roads. All existing access roads that provide access to the subject site connect to the broader road network including Wanneroo Road, Old Yanchep Road, Neerabup Road and Flynn Drive all of which provide access/egress in two different directions.

The proposed road network within the subject site is not known at this stage of the planning process. Future development within the subject site will likely provide the opportunity to improve the existing road network within the subject site, parts of which do not currently achieve compliance with the Acceptable Solutions in relation to Element 3 in the Guidelines. The primary issue pertaining to existing vehicular access within the subject site is the presence of a number of existing no-through roads due to legacy issues, some of which do not provide a turn-around area at the terminus of the road, are significantly longer than 200 metres in length and/or continue as a narrow unsealed access track that travels through the bushfire hazard. The requirement for future planning applications to comply with SPP 3.7 and associated Guidelines is likely to provide an opportunity to address some of these legacy access issues, however, intensification of land use should be avoided in bushfire prone areas within the subject site where compliant vehicular access (either with acceptable solutions or through a performance-based approach) is not able to be demonstrated through future planning applications.

Existing vehicular access and egress to/from and within the subject site is depicted in Figure 7.

ELA recommend that the CoW undertake some upgrades to the existing road network within the subject site (within CoW control) to provide immediate improvements to vehicular access including:

- Providing no-through road signage at the entrance to each no through road and again at points along these roads that transition to an unsealed surface/access track;
- Establishing a road connection between the eastern terminus of Dayrell Road and Wattle Avenue West as per plans showing proposed roads provided by the CoW (Appendix E);
- Establishing a road connection between Gibbs Road and McLennan Drive as per plans showing proposed roads provided by the CoW (Appendix E); and
- Widening of the southernmost portion of Gibbs Road (no-through road portion) and Trian Road (which appear to be approximately 4 m wide and narrower in some parts) to 6 m; and
- Installing or upgrading turn-around-around areas at the terminus of certain no-through roads and no-through access tracks to standards in the Guidelines (Appendix F). These may be permanent or temporary subject to determination of potential future road connections and should be 18 m in diameter or of an alternate configuration that meets the requirements of the Guidelines.

These potential upgrades to the existing road network are depicted in Figure 8. Additionally, ELA recommends that the CoW investigate the potential opportunity for establishing the following road connections as a matter of priority to improve current access and egress within the subject site:

- Existing eastern end of Walding Road to the northern end of Delich Road;
- Existing eastern end of McLennan Drive to southern end of Cutler Road;
- Existing northern end of Safari Way to Old Yanchep Road to the north east; and
- Existing western end of Wattle Avenue West to eastern end of Wattle Avenue East.

Establishing public gazetted roads in these areas would provide a more desirable bushfire safety outcome and improve compliance of the existing road network within the subject site, however, Emergency Access Ways (EAWs) may need to be considered as a temporary solution (noting length of some of these EAWs may not achieve compliance with the Guidelines) where this is not possible at the current time. ELA recommends consideration is given to development of these roads or EAWs within a single stage where compliance with the Guidelines is unable to be achieved at each stage of development involving extension of the existing road network (i.e. results in creation of longer no-through-roads).

3.1.4 Element 4: Water

The subject site is not connected to a reticulated water supply at the current time, therefore, no Water Corporation hydrants are located within the subject site. A 50,000 L water tank dedicated for firefighting is located on Emerald Drive (southern corner of Jade Loop) with water supply in the tank supplemented by a bore after each use. The tank has a powered pump to keep the tank full during use. ELA is not aware of what materials this tank and any exposed pipes and fittings are constructed from, however, recommend these components are upgraded where not constructed from non-combustible material (tank) and metal (pipes and fittings). Other sources of firefighting water supply within the subject site include standpipe hydrants on a few private properties including Benara Nurseries on Safari Place, Carabooda. ELA has been advised, however, that water supply to fill fire appliances at Benara Nurseries is slow and the condition of standpipe hydrants and water pressure on other private properties is unconfirmed. Nearby additional water sources located outside the subject site include a water tank and booster at the Wanneroo Raceway with the next closest hydrant at Quinns Rocks Fire Station located on Hidden Valley Retreat, Clarkson.

Where a reticulated water supply in accordance with the Water Corporations Design Standard DS 63 Water Reticulation Standard is not expected to be extended to the subject site as part of future planning, the provision of a strategic network of water tanks that comply with the Guidelines (Appendix G) will be required to support future development within the subject site. As lot layout is unknown, the required number of tanks (and volume) is unable to be determined at this stage of planning, however, ELA strongly recommend the CoW consult with DFES to determine if the existing water supply is suitable to meet the current needs within the subject site.

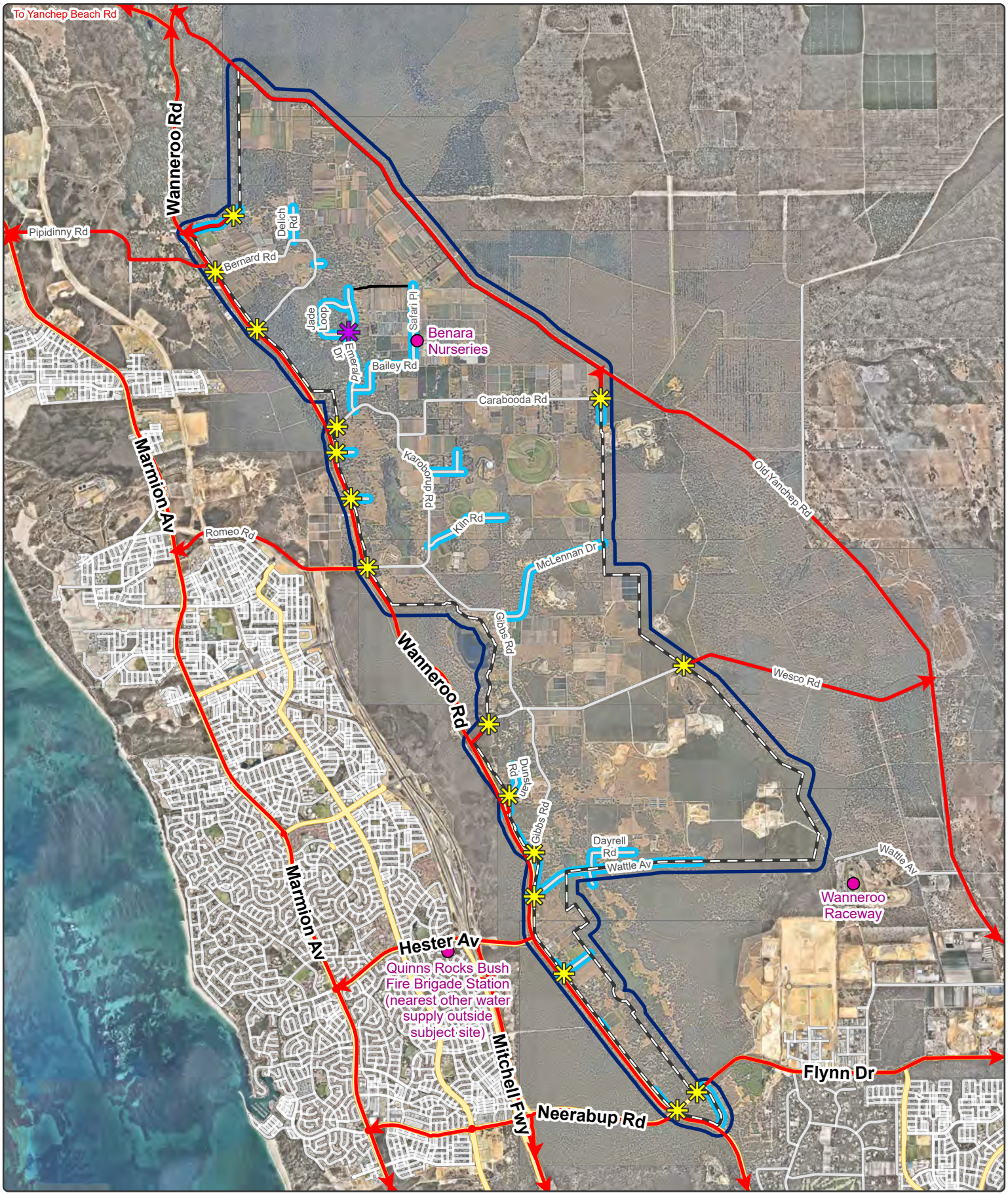


Figure 7: Existing Vehicular Access and Water Supply

- Subject site
- 150m site assessment
- Access point
- Existing firefighting water tank
- Points of interest
- Access / egress route
- Primary distributor
- Access road
- Emergency access way
- No through road

0 0.5 1 2
Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 4/04/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

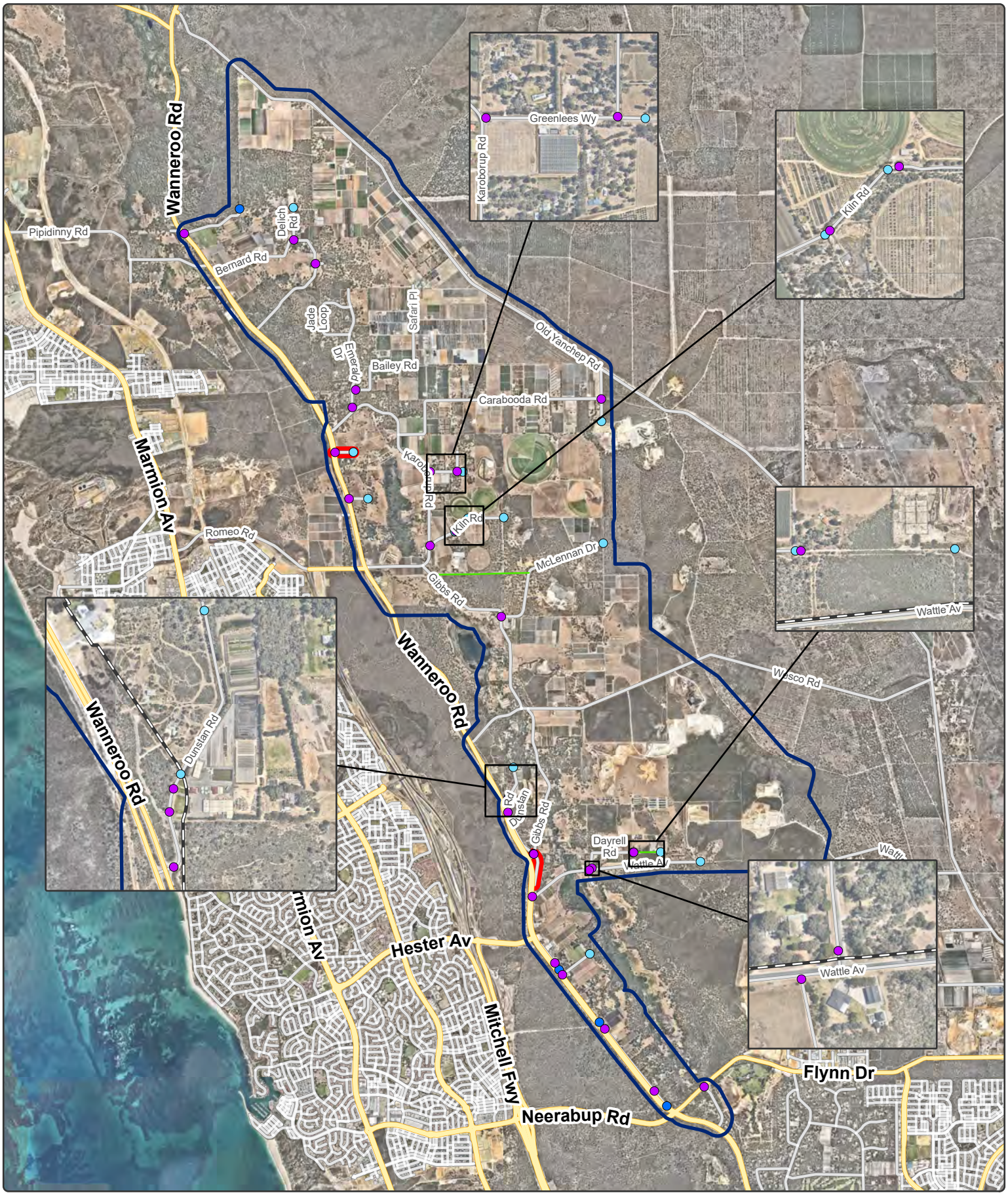


Figure 8: Potential Upgrades to Existing Road Network

- Subject site
- 150m site assessment
- Primary Distributor
- Access Road
- Road Upgrade
- Proposed Road Connections
- Upgrade turn-around area
- Install turn-around area
- No-through road signage

0 0.5 1 2
Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 6/04/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

4. Conclusion

The bushfire hazard level assessment undertaken for the City of Wanneroo has shown that there is a significant bushfire risk present within the subject site due to significant areas of native vegetation present within the site and the broader landscape as well as access legacy issues associated with the existing public road network within the subject site. Utilisation of this BHL assessment for assessment of future planning applications (in conjunction with more detailed assessments supporting individual applications) will provide the local government with a preliminary understanding of the potential bushfire risk associated with each application and provide decision makers the tools to apply the requirements of SPP 3.7.

Under the provisions of SPP 3.7, only new planning applications that lie within the designated bushfire prone areas are required to address the bushfire protection criteria and relevant documentation. As such, there may be areas within the City of Wanneroo where no bushfire planning is required which are actually exposed to a level of risk that may warrant a planning response.

This assessment has been prepared according to the current version of SPP 3.7 and the associated Guidelines applicable at the time this Bushfire Hazard Level Assessment was prepared. Any new future planning applications that trigger bushfire planning requirements under SPP 3.7 and the associated Guidelines will be required to respond to the requirements of the said policy and guidelines that are in effect at that time.

The BHL assessment presented in this report will be incorporated into the updated City of Wanneroo LPS as requested by the WAPC.

5. References

City of Wanneroo (CoW). Firebreaks, 2023, [Online]. Available from: Firebreaks - City of Wanneroo

Department of Agriculture, Water and the Environment (ABARES), 2021, *Land tenure of Australia 2010-11 to 2015-16, [Online],* Australian Government, available from: Land tenure of Australia Web Map - DAFF (agriculture.gov.au)

Department of Fire and Emergency Services (DFES), 2021, *Map of Bush Fire Prone Areas, [Online]*, Government of Western Australia, available from: http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx

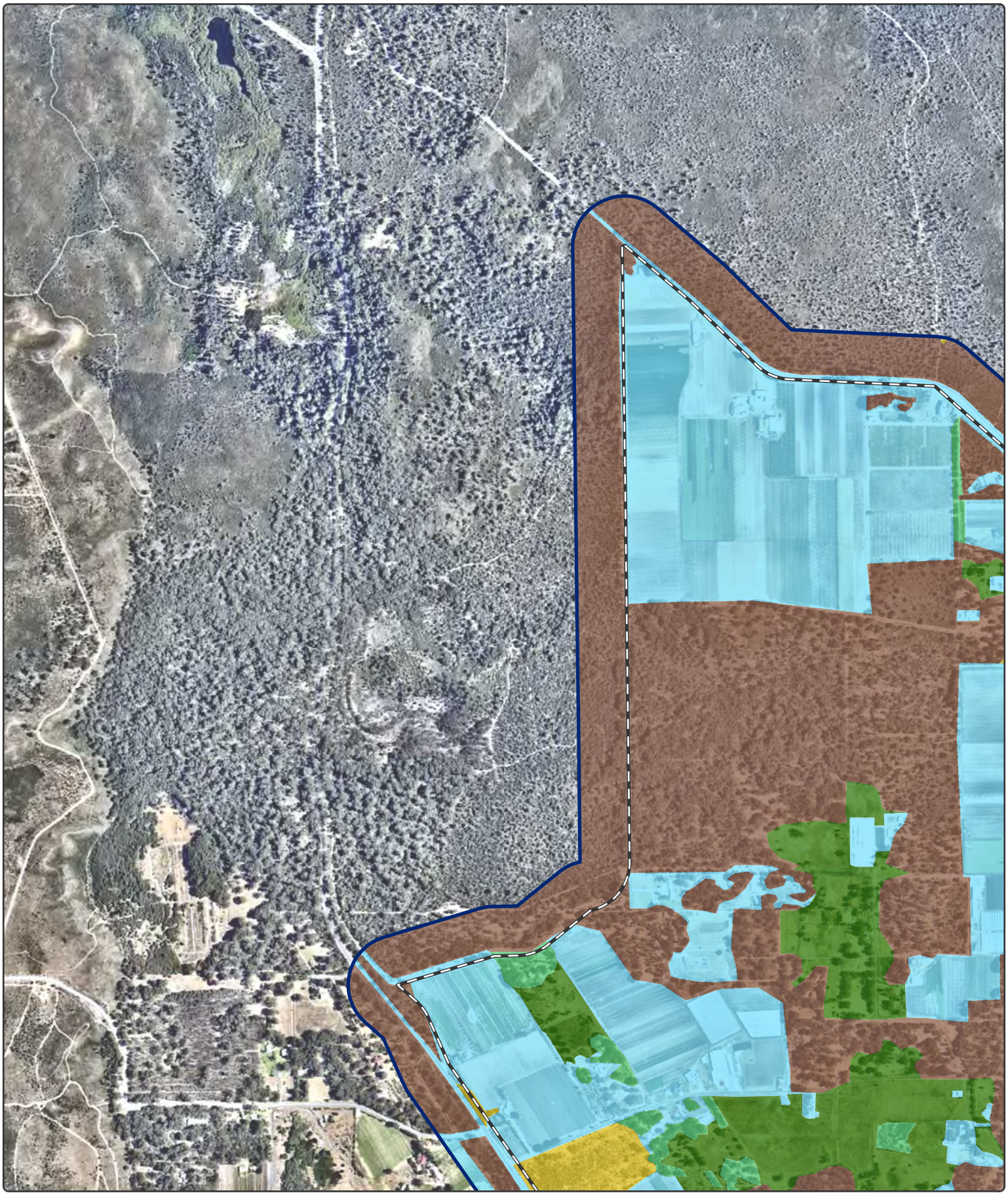
Department of Planning (DoP), 2016, *Visual guide for bushfire risk assessment in Western Australia*. DoP, Perth.

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

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

Western Australian Planning Commission,2021, *Guidelines for Planning in Bushfire Prone Areas Version 1.4 (including appendices),* WAPC, Perth.

Appendix A Vegetation Classification Map Series



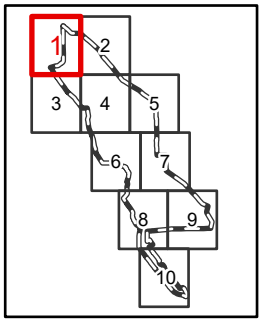
City of Wanneroo (North) Vegetation Classification - Map 1

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

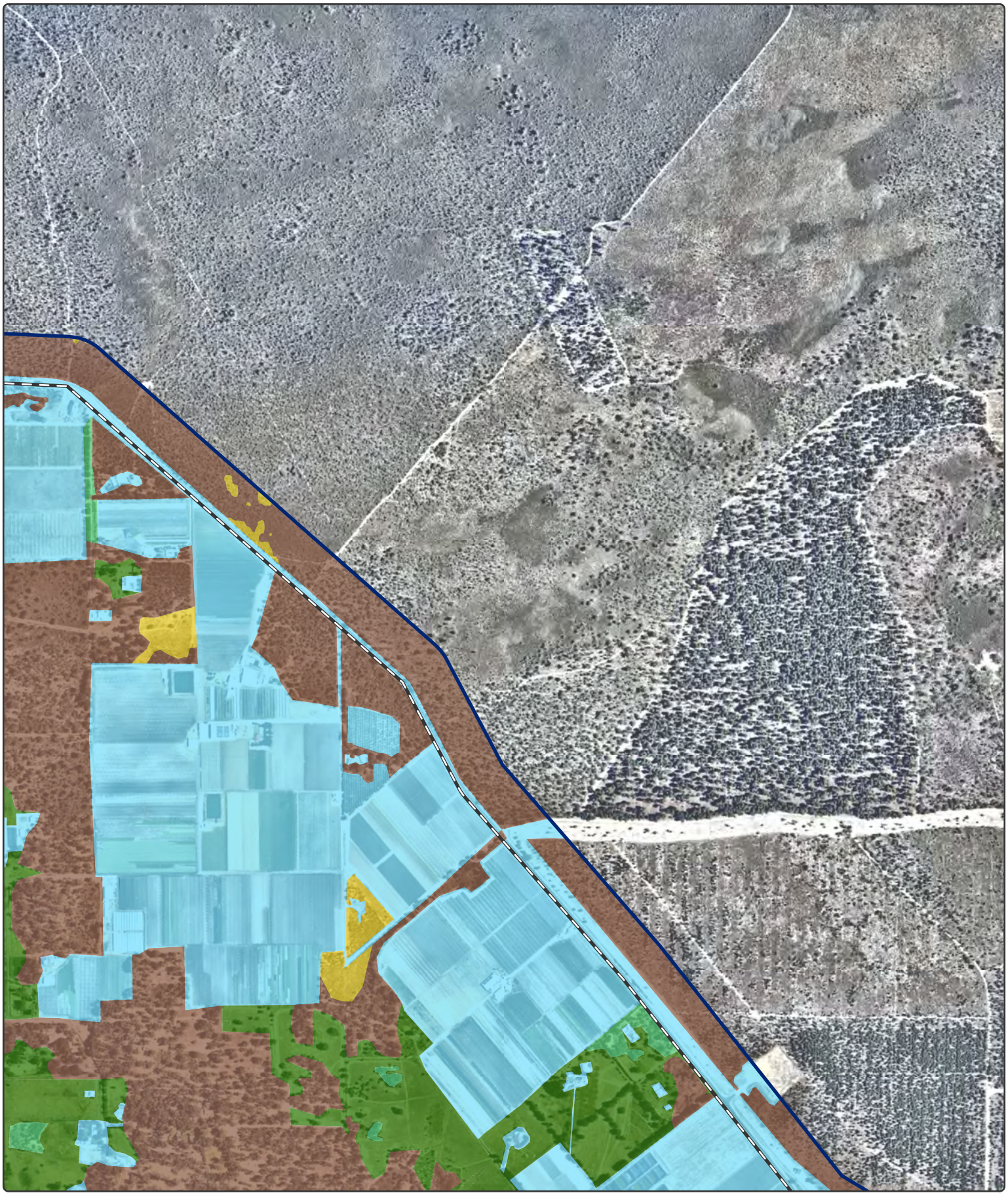
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



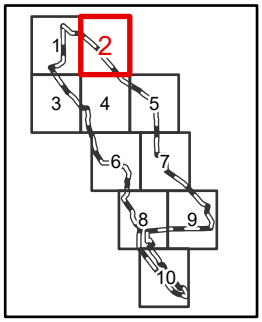
City of Wanneroo (North) Vegetation Classification - Map 2

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



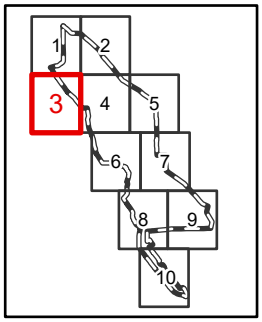
City of Wanneroo (North) Vegetation Classification - Map 3

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

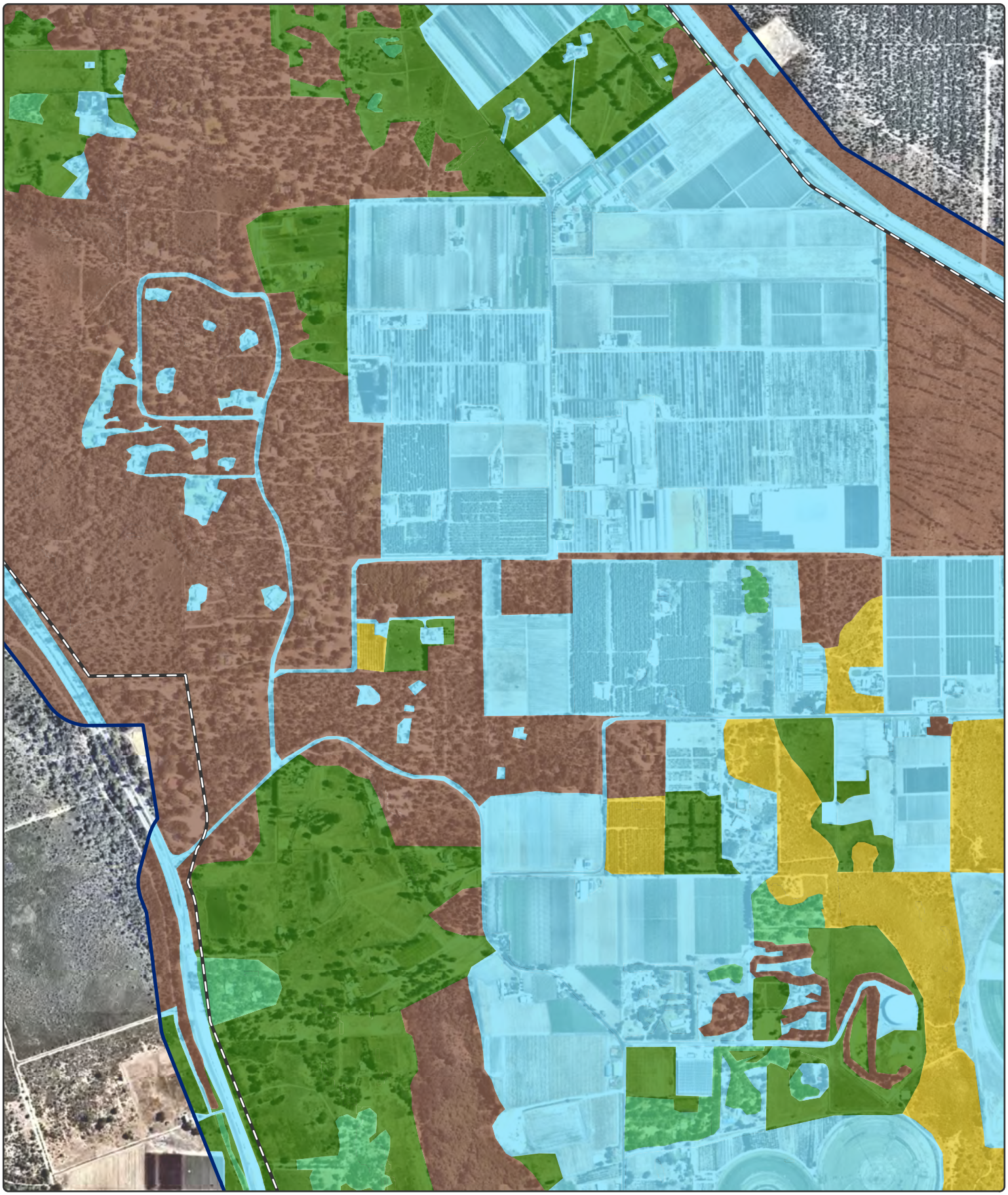
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



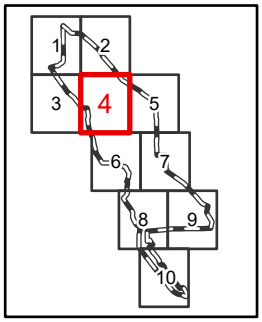
City of Wanneroo (North) Vegetation Classification - Map 4

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



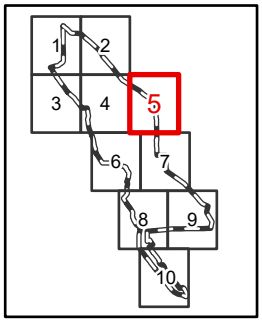
City of Wanneroo (North) Vegetation Classification - Map 5

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

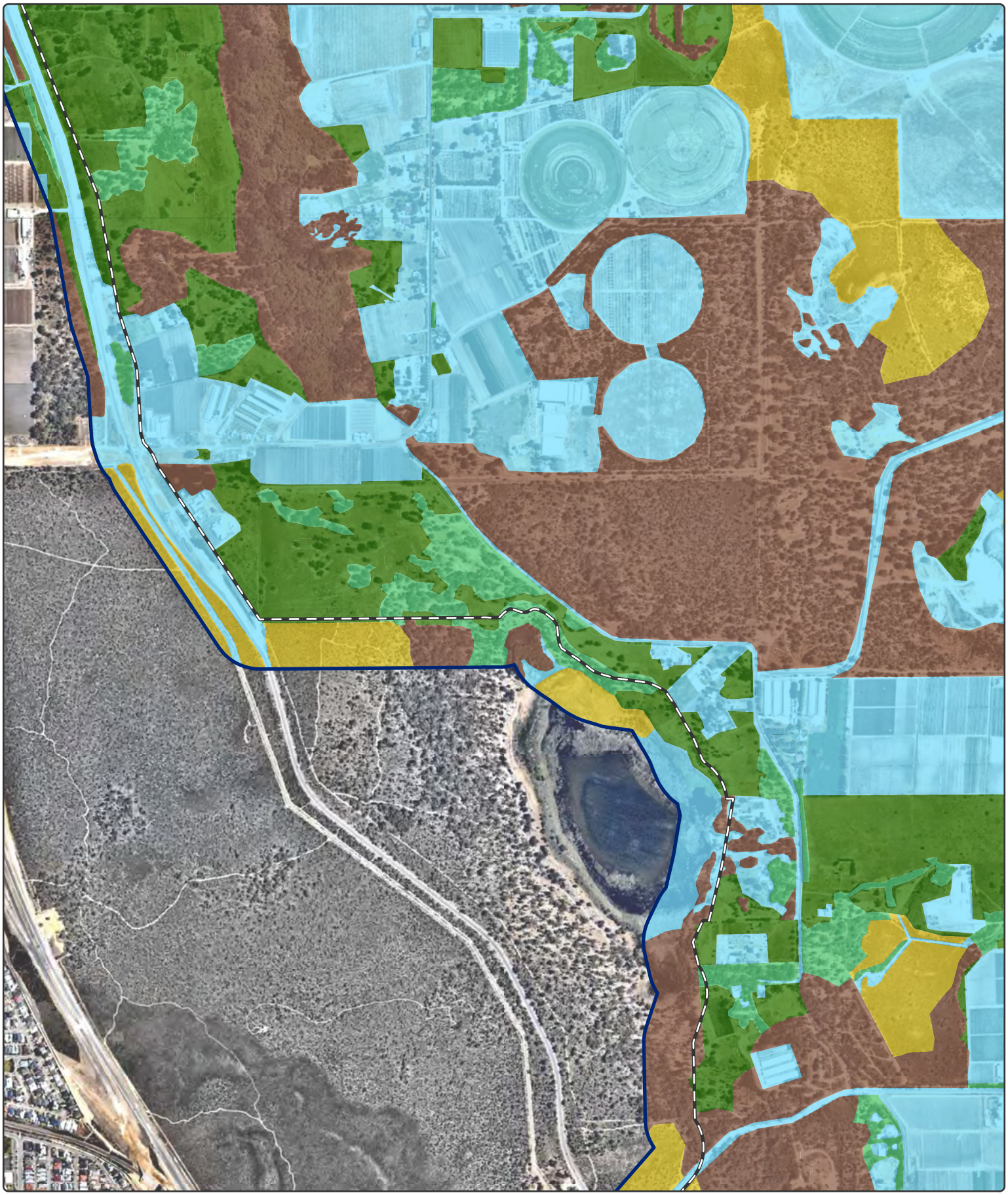
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



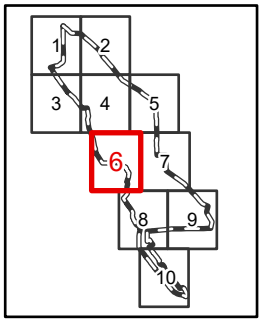
City of Wanneroo (North) Vegetation Classification - Map 6

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

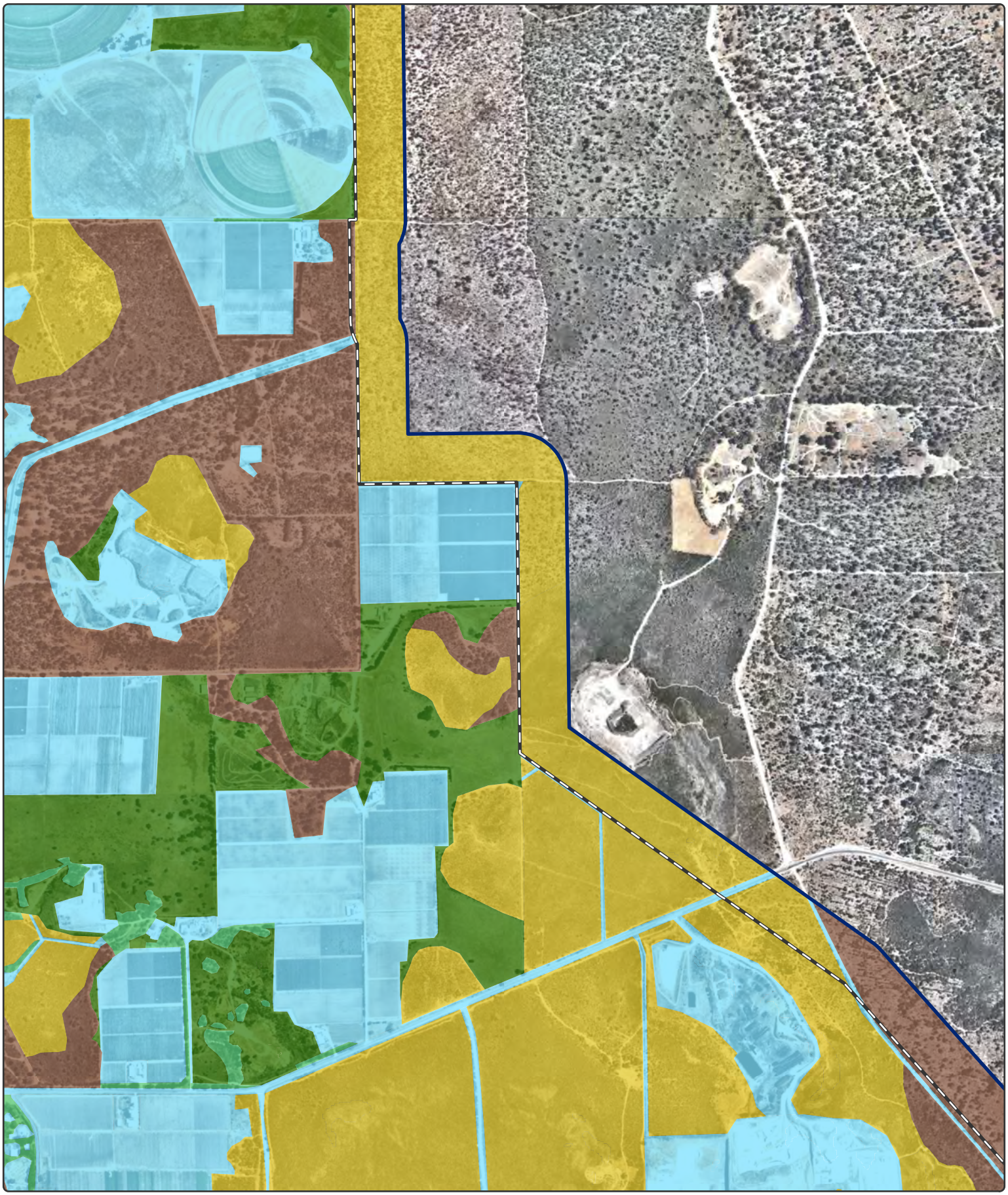
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



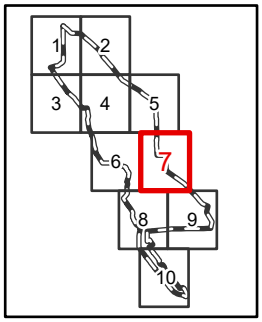
City of Wanneroo (North) Vegetation Classification - Map 7

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

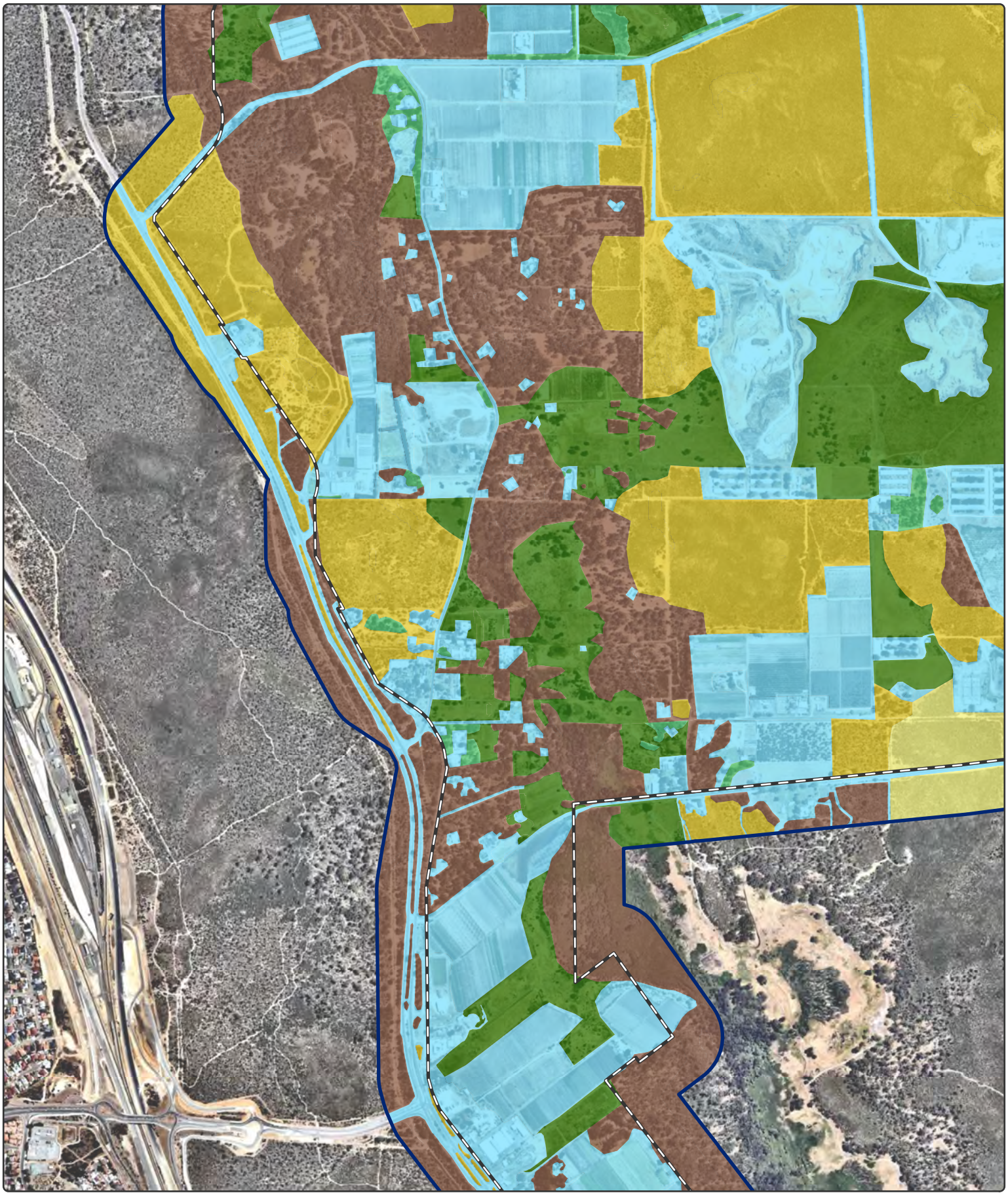
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



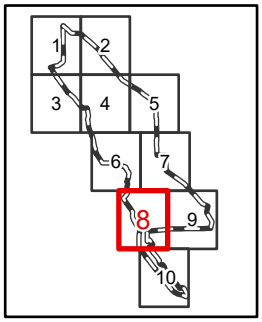
City of Wanneroo (North) Vegetation Classification - Map 8

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class C shrubland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

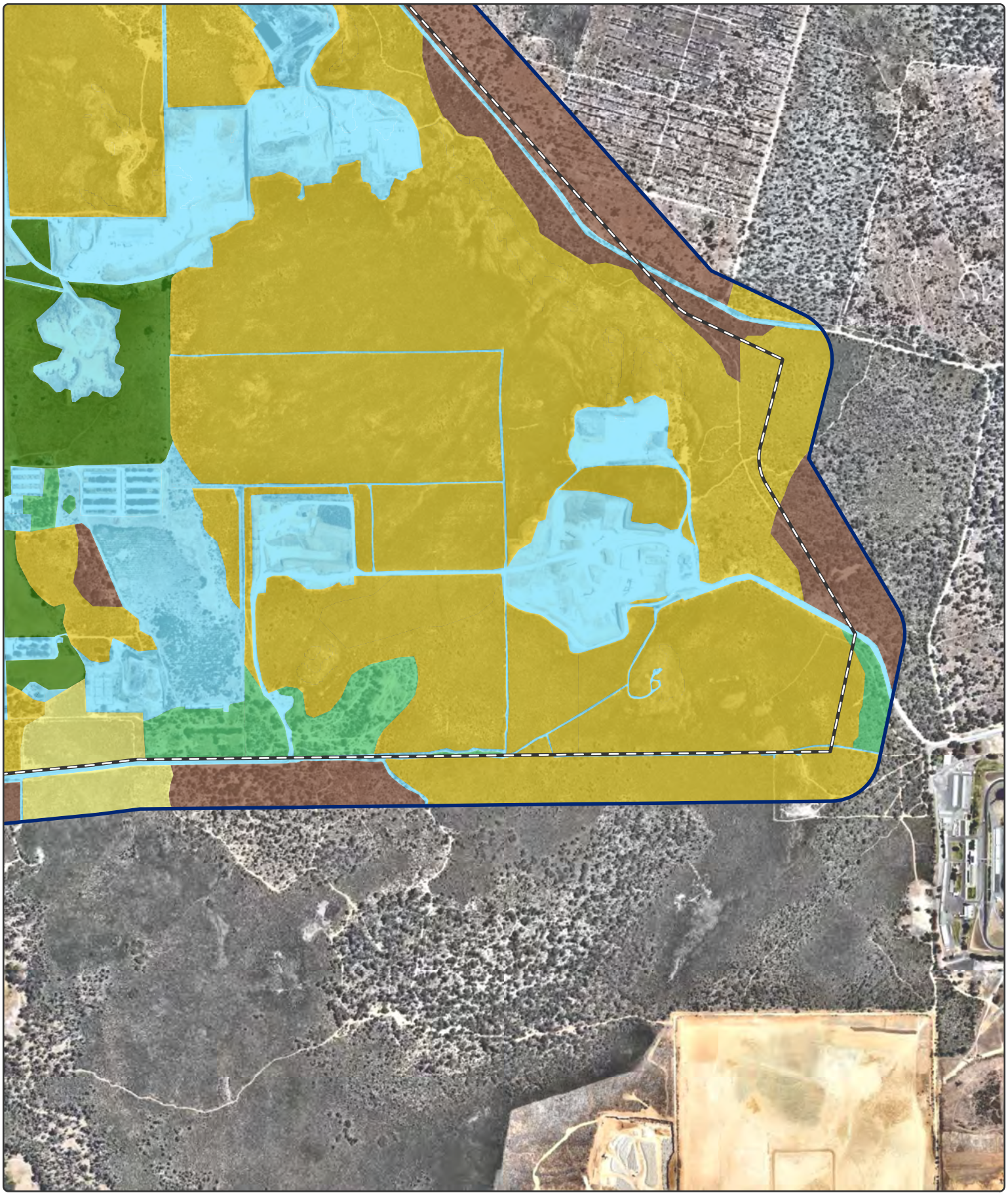
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



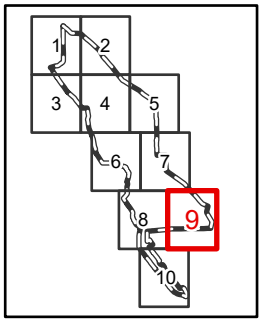
City of Wanneroo (North) Vegetation Classification - Map 9

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class C shrubland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



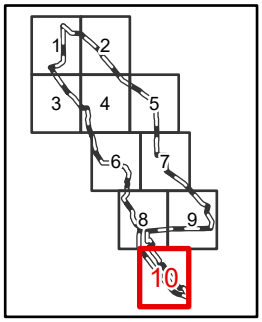
City of Wanneroo (North) Vegetation Classification - Map 10

Subject site

150m site assessment

Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

Appendix B – Classified Vegetation Photos

Vegetation Classification or Exclusion Clause	Class A Forest

Photo Point 1

Predominant classified vegetation is comprised of forest vegetation with a foliage cover greater than 30%. The area is dominated by Eucalypts with understorey comprised of shrubs and exotic grasses.



Vegetation Classification or Exclusion Clause	Class A Forest

Photo Point 2

Predominant classified vegetation is comprised of forest vegetation with a foliage cover greater than 30%. The area is dominated by Eucalypts with understorey comprised of shrubs and exotic grasses.



Vegetation Classification or Exclusion Clause	Class A Forest

Photo Point 3

This area is mapped as plantation according to data supplied by the City of Wanneroo. Class A Forest vegetation classification has been adopted considering the tree species in this area at maturity. AS 3959: 2018 Class A Forest vegetation classification applies to Pine and Eucalypt Plantations.



Vegetation Classification or Exclusion Clause	Class A Forest
Photo Point 4 Predominant classified vegetation is comprised of forest vegetation with a foliage cover greater than 30%. The area is dominated by Eucalypts with understorey comprised of shrubs and exotic grasses.	

Vegetation Classification or Exclusion Clause	Class B Woodland
Photo Point 5 Predominant classified vegetation is comprised of woodland vegetation with a foliage cover of approximately 10% to 30%. The area is dominated by sparse Eucalypts. The understorey is comprised exotic grasses and some shrubs. ELA has adopted a Class B Woodland given the sparse distribution of shrubs and trees in this area.	

Vegetation Classification or Exclusion Clause	Class D Scrub
Photo Point 6 (background) Predominant classified vegetation is comprised of scrub less than 6 m in height with foliage cover greater than 30%.	

Vegetation Classification or Exclusion Clause	Class D Scrub
Photo Point 7 Predominant classified vegetation is comprised of scrub less than 6 m in height with foliage cover greater than 30%.	
Vegetation Classification or Exclusion Clause	**Class D Scrub**
Photo Point 8 (background) Predominant classified vegetation is comprised of scrub less than 6 m in height with foliage cover greater than 30%.	
Vegetation Classification or Exclusion Clause	**Class D Scrub**
Photo Point 9 This area comprises a mango plantation that did not appear to be well managed at the time of field validation. ELA have, therefore, adopted a conservative approach and classified this area as Class D – Scrub.	

Vegetation Classification or Exclusion Clause	Class C Shrubland
Photo Point 10 (background) Predominant classified vegetation is comprised of shrubs less than 2 m in height with foliage cover greater than 30%.	
Vegetation Classification or Exclusion Clause	**Class C Shrubland**
Photo Point 11 Predominant classified vegetation is comprised of shrubs less than 2 m in height with foliage cover greater than 30%.	
Vegetation Classification or Exclusion Clause	**Class G Grassland**
Photo Point 12 (foreground) Predominant classified vegetation is comprised of grassland with foliage cover from overstorey less than 10%.	

Vegetation Classification or Exclusion Clause	Class G Grassland
Photo Point 13 Predominant classified vegetation is comprised of grassland with foliage cover from overstorey less than 10% (left side of image).	
Vegetation Classification or Exclusion Clause	**Class G Grassland**
Photo Point 14 (foreground) Predominant classified vegetation is comprised of grassland with foliage cover from overstorey less than 10%.	
Vegetation Classification or Exclusion Clause	**Excluded AS 3959: 2018 2.2.3.2 (e) & (f)**
Photo Point 15 This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).	

Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 16

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 17

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 18 (foreground)

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 19

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 20

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



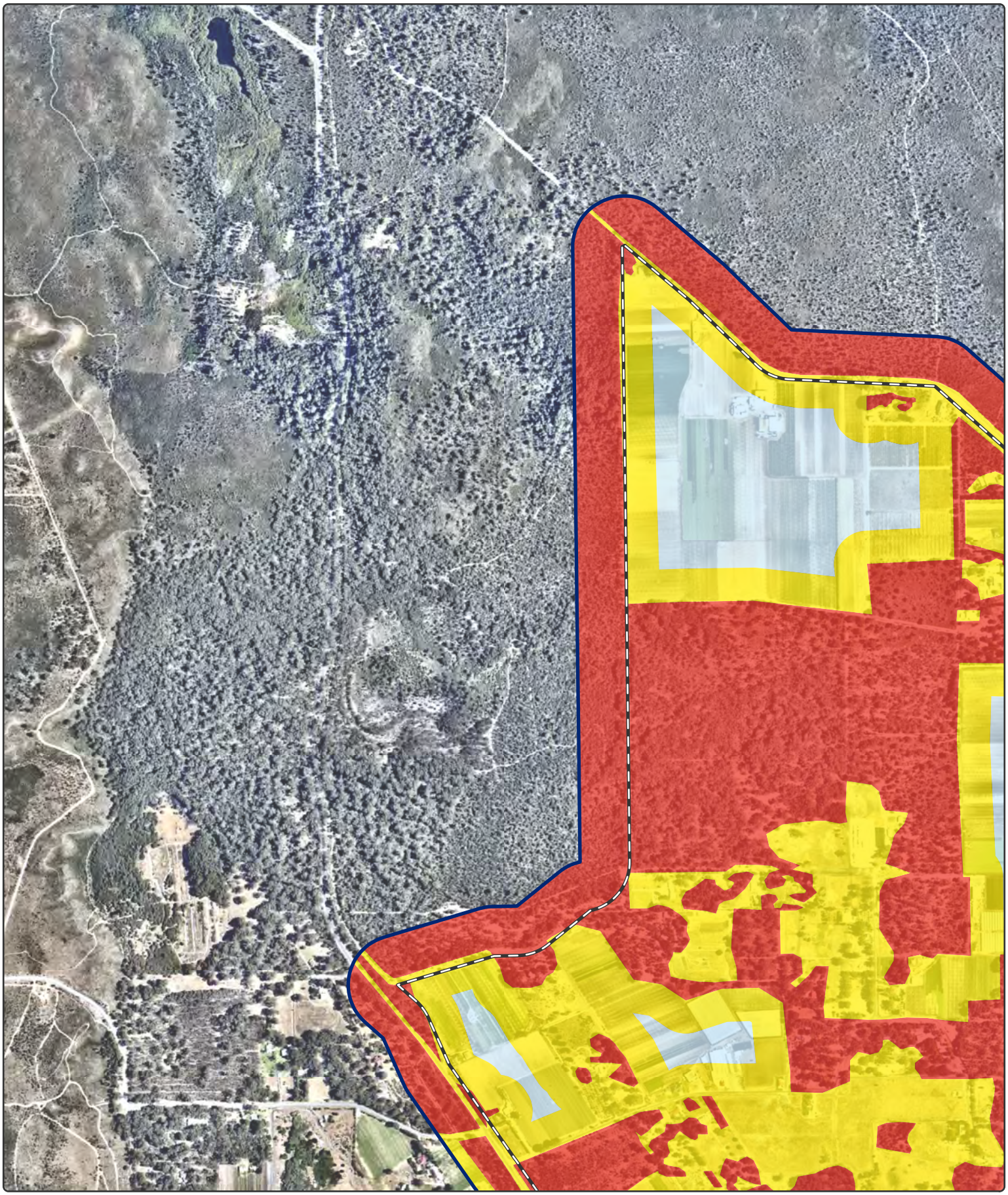
Vegetation Classification or Exclusion Clause	Excluded AS 3959: 2018 2.2.3.2 (e) & (f)

Photo Point 21

This area has been excluded under 2.2.3.2 (e) and (f) of AS 3959: 2018. The area comprises non-vegetated areas such as roads as well as vegetation regarded as low threat due to factors such as flammability, moisture content and fuel load (i.e. orchards, reticulated lawns and market gardens).



Appendix C Bushfire Hazard Level Assessment Map Series



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 1

Subject site

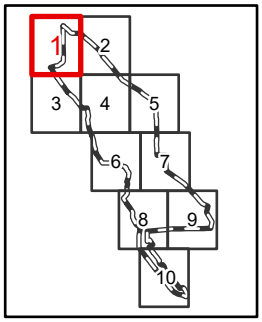
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

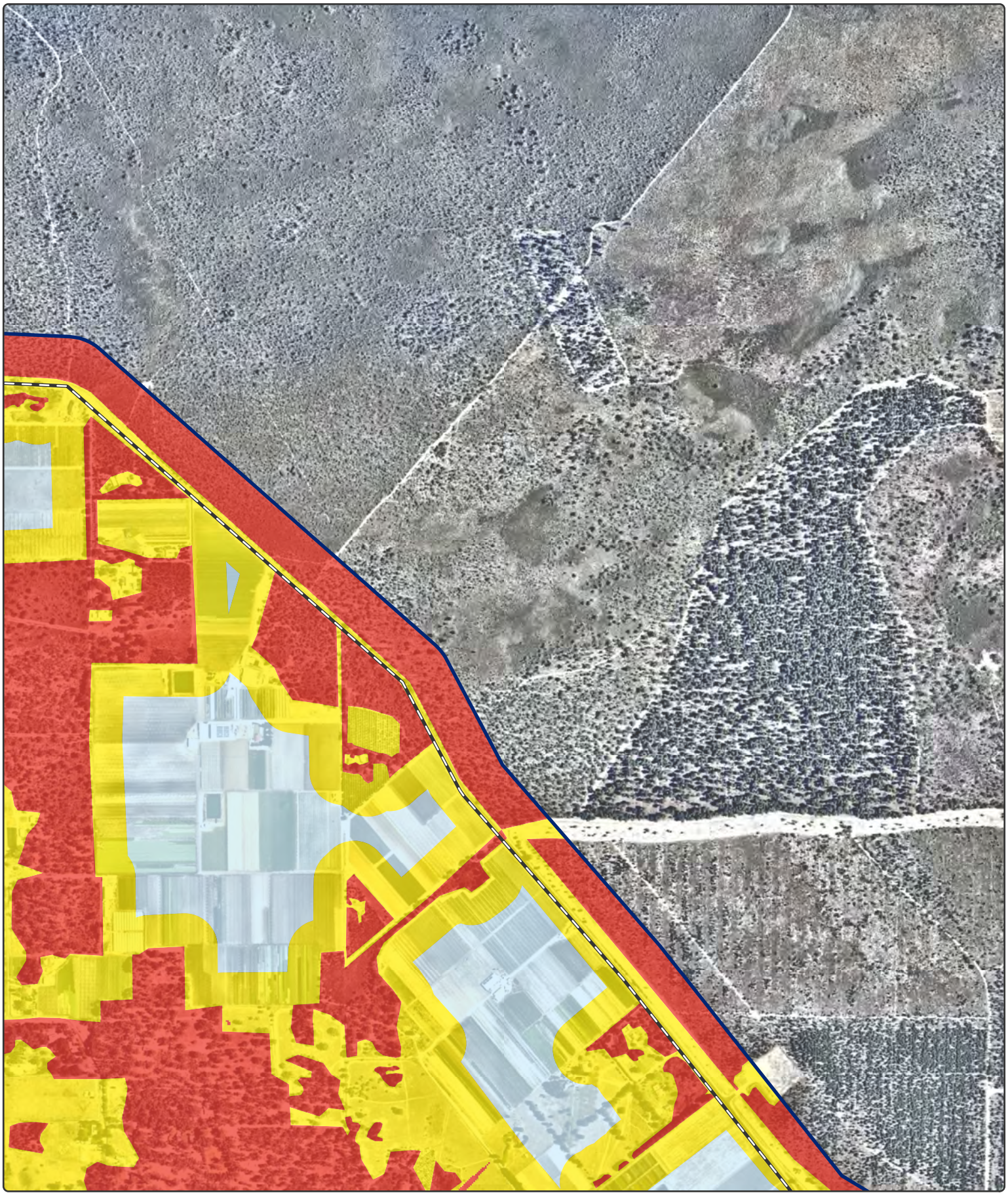
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 2

Subject site

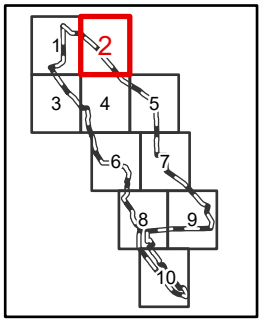
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

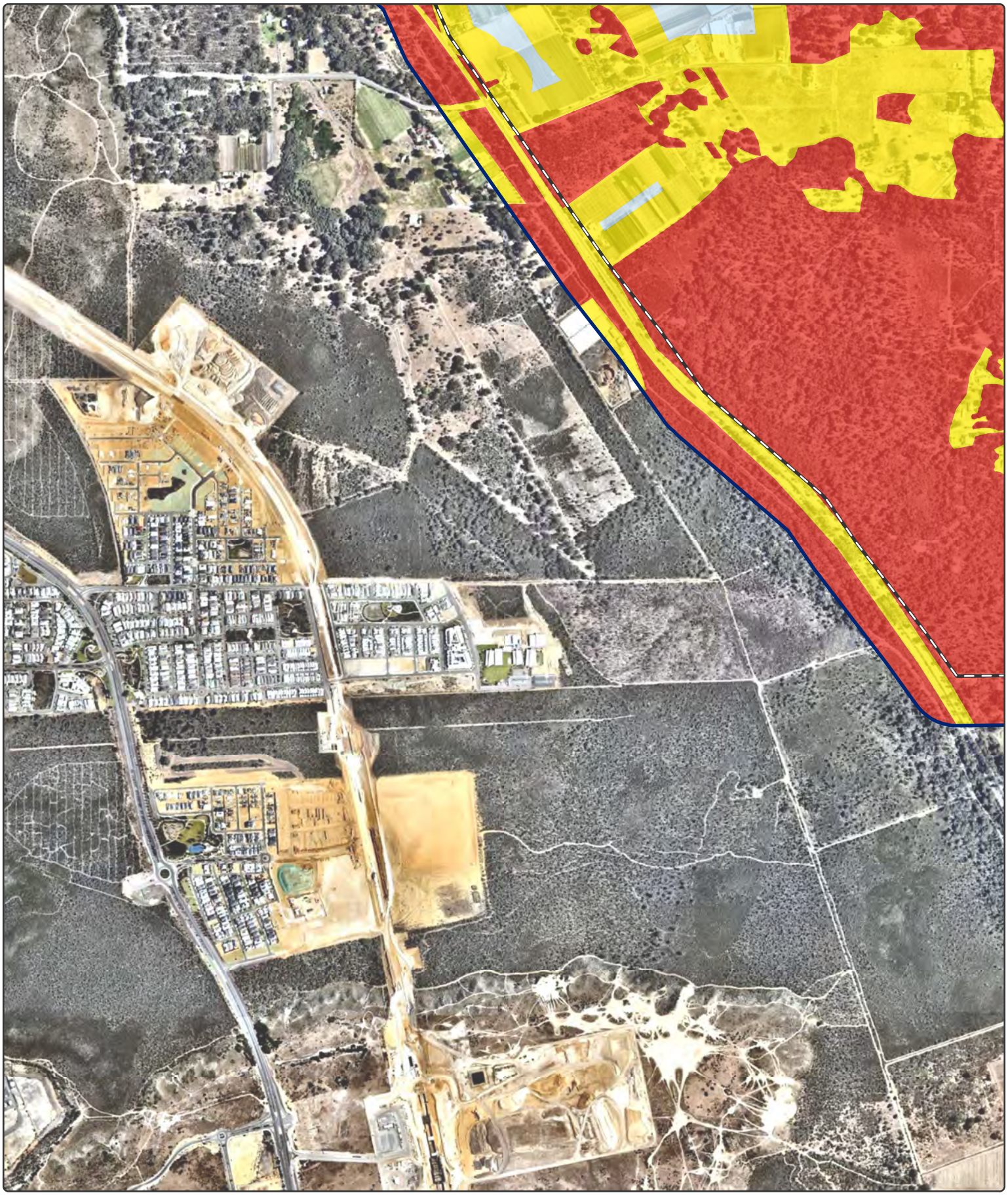
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 3

Subject site

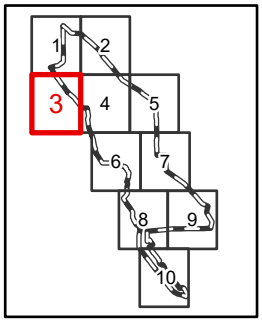
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

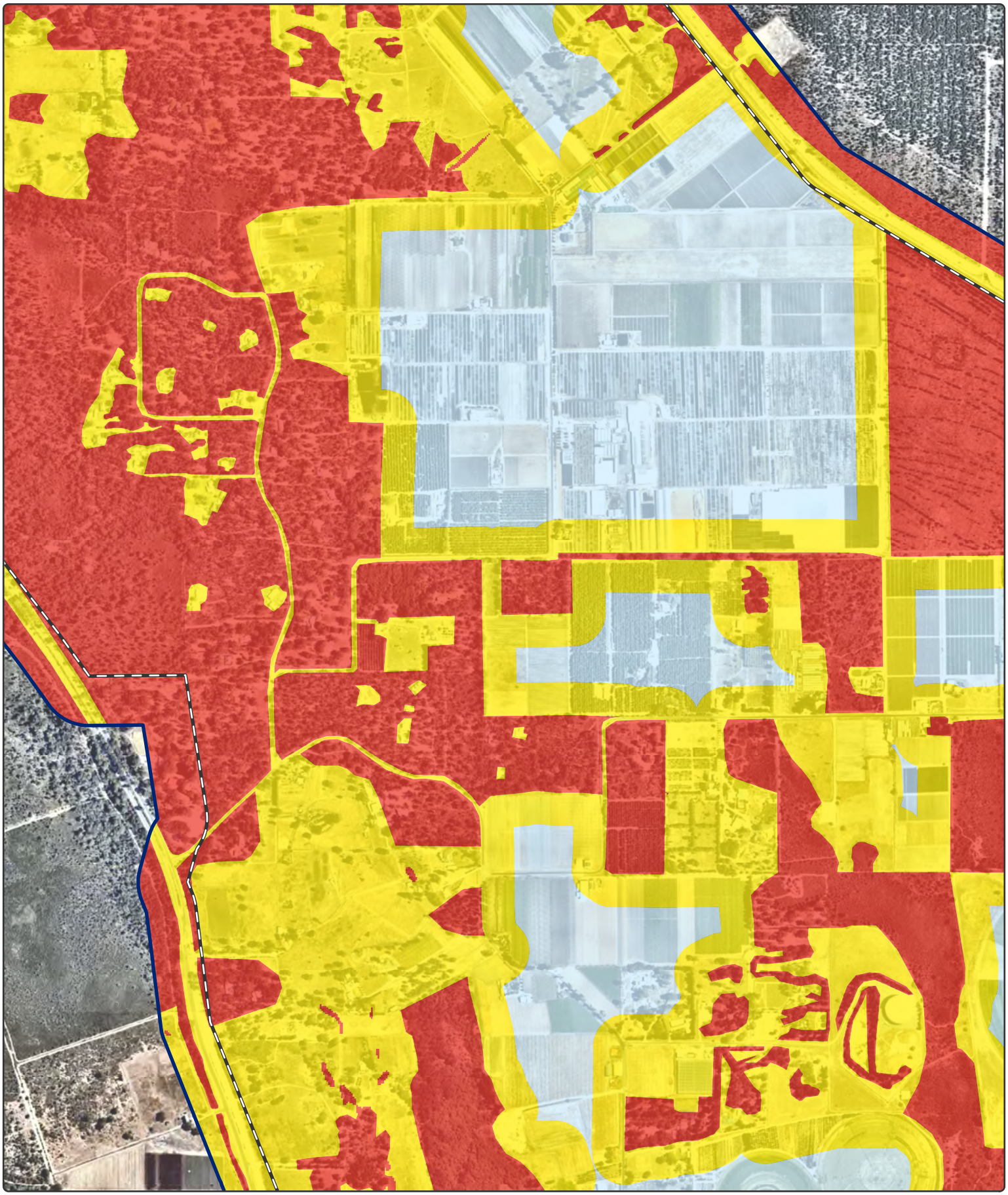
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 4

Subject site

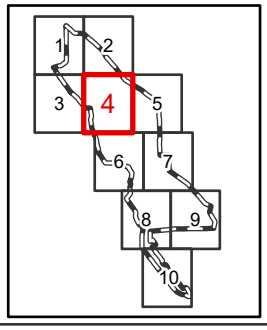
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 5

Subject site

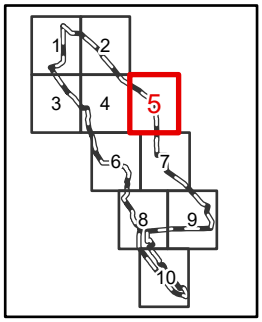
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

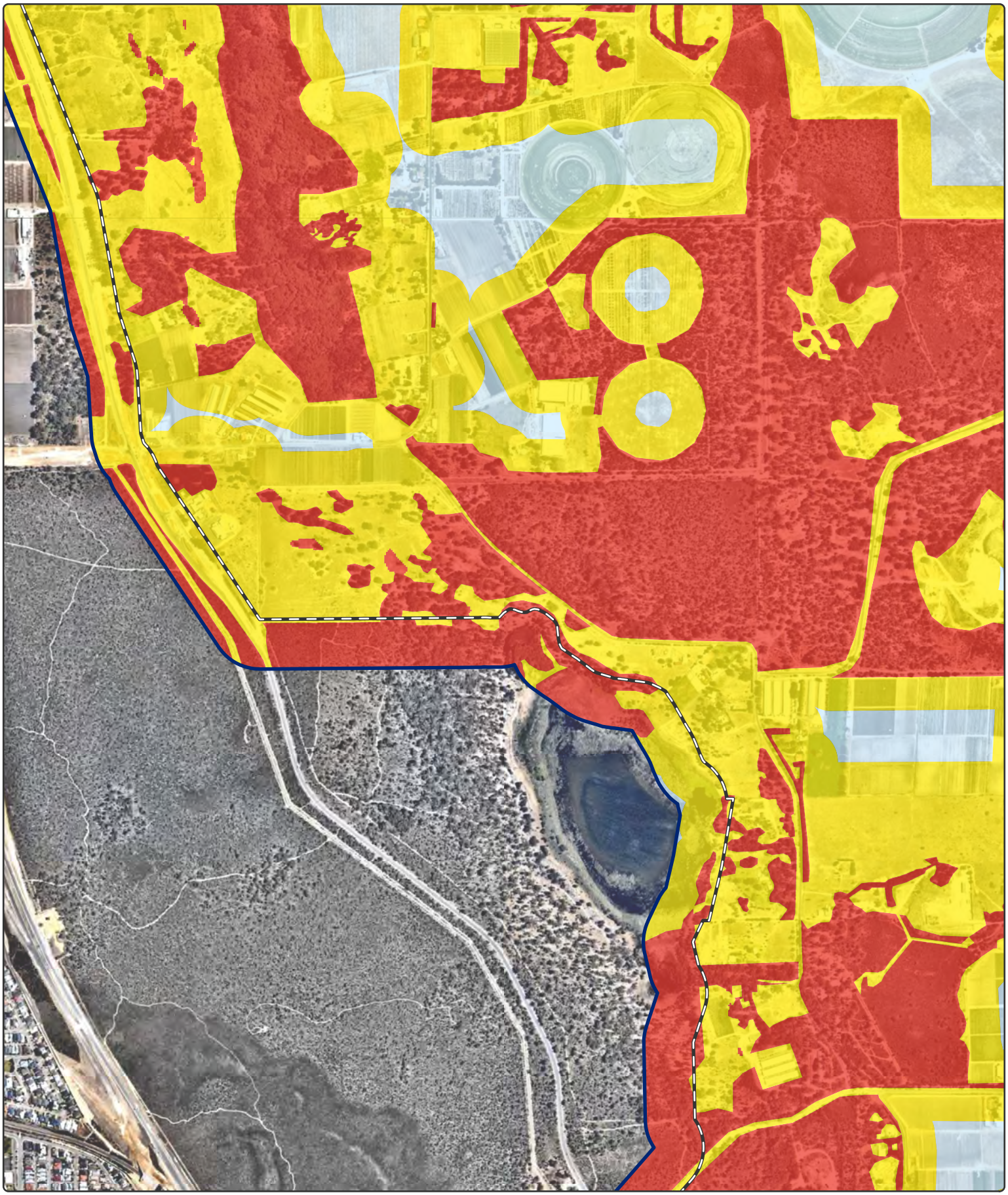
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 6

Subject site

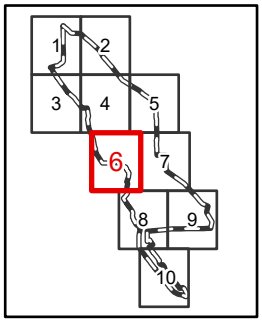
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

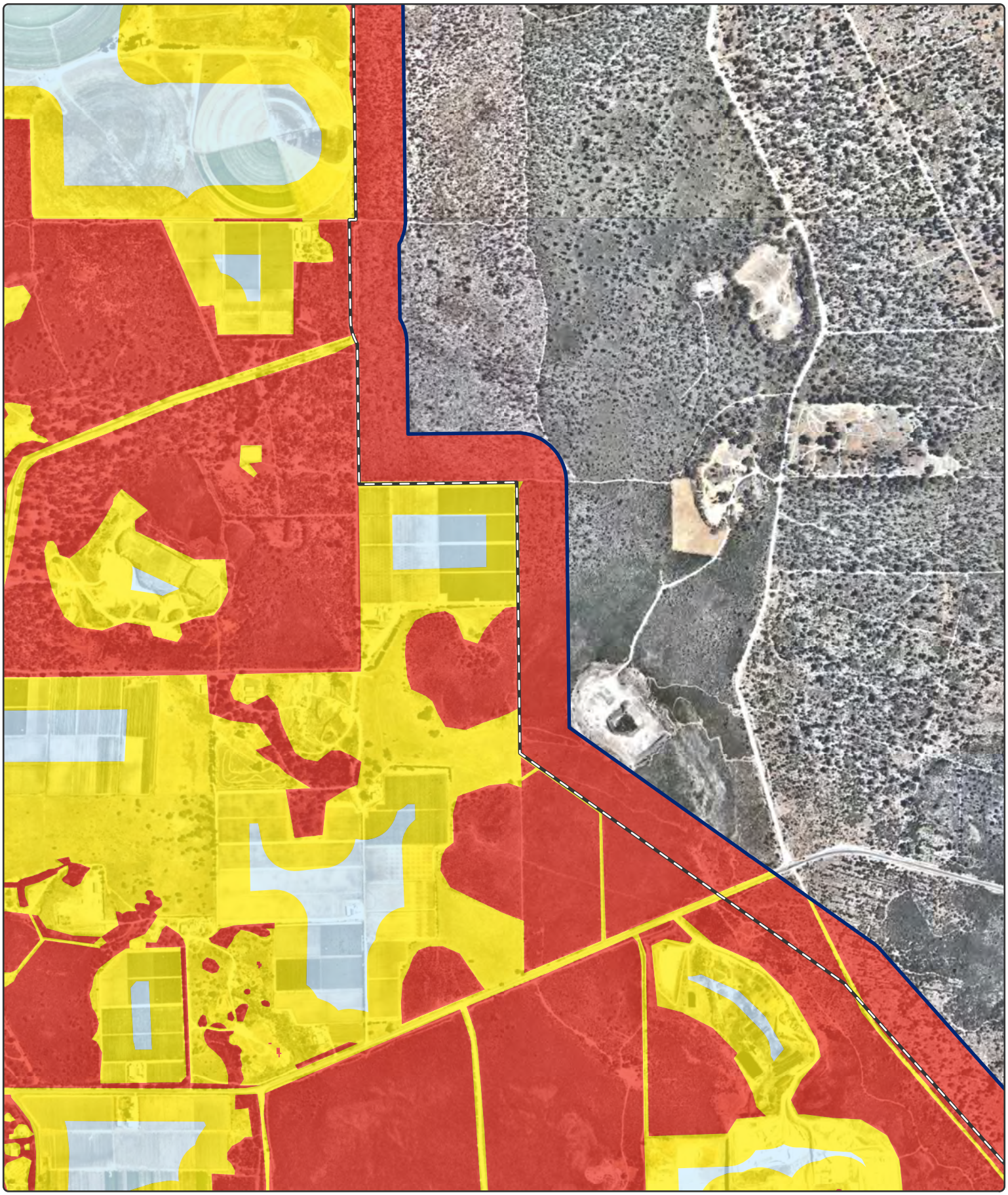
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 7

Subject site

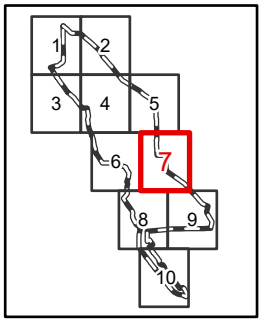
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

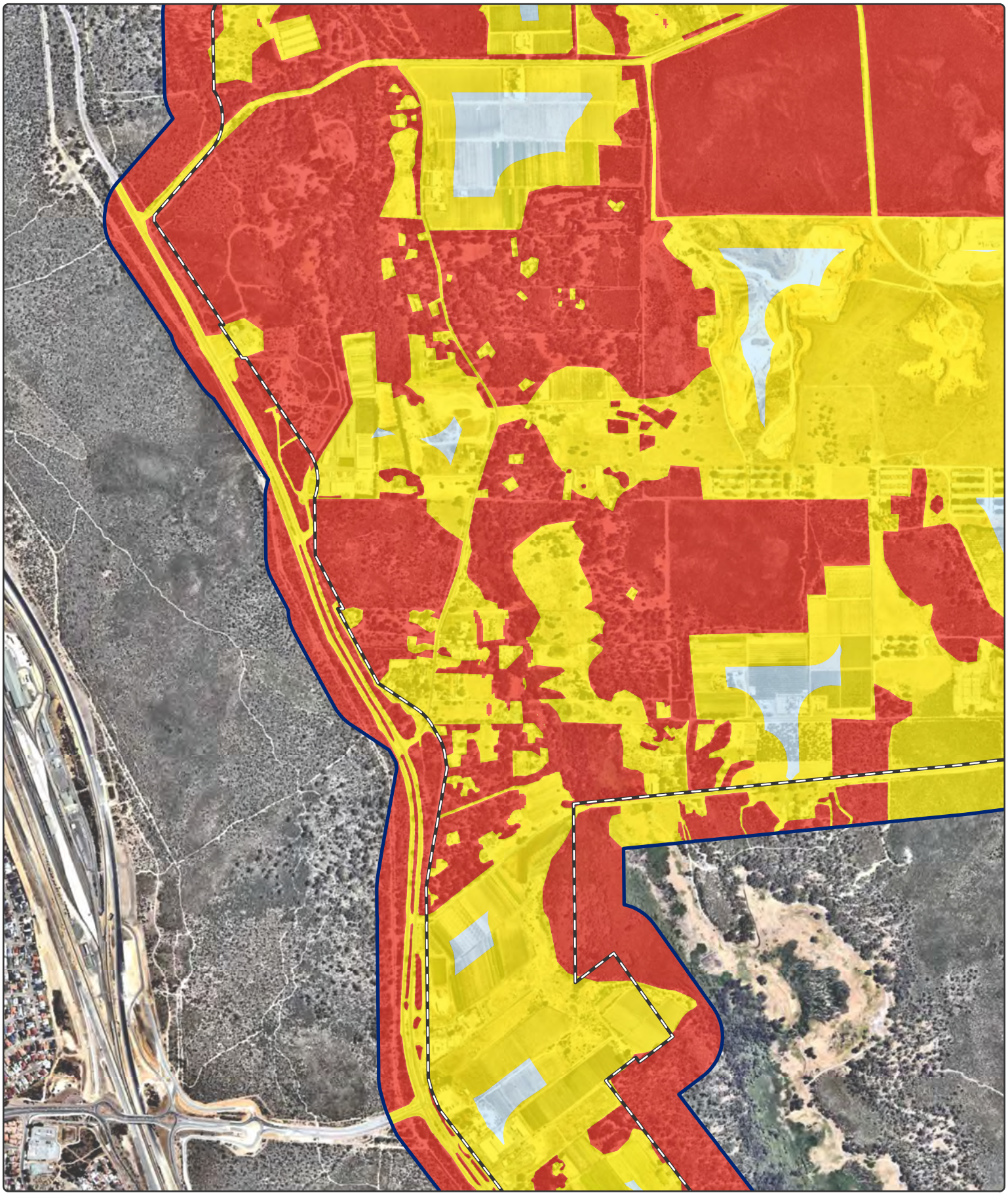
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 8

Subject site

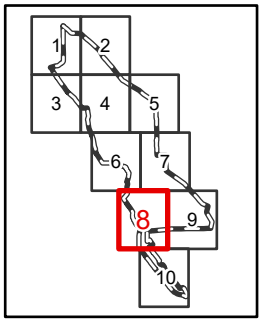
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

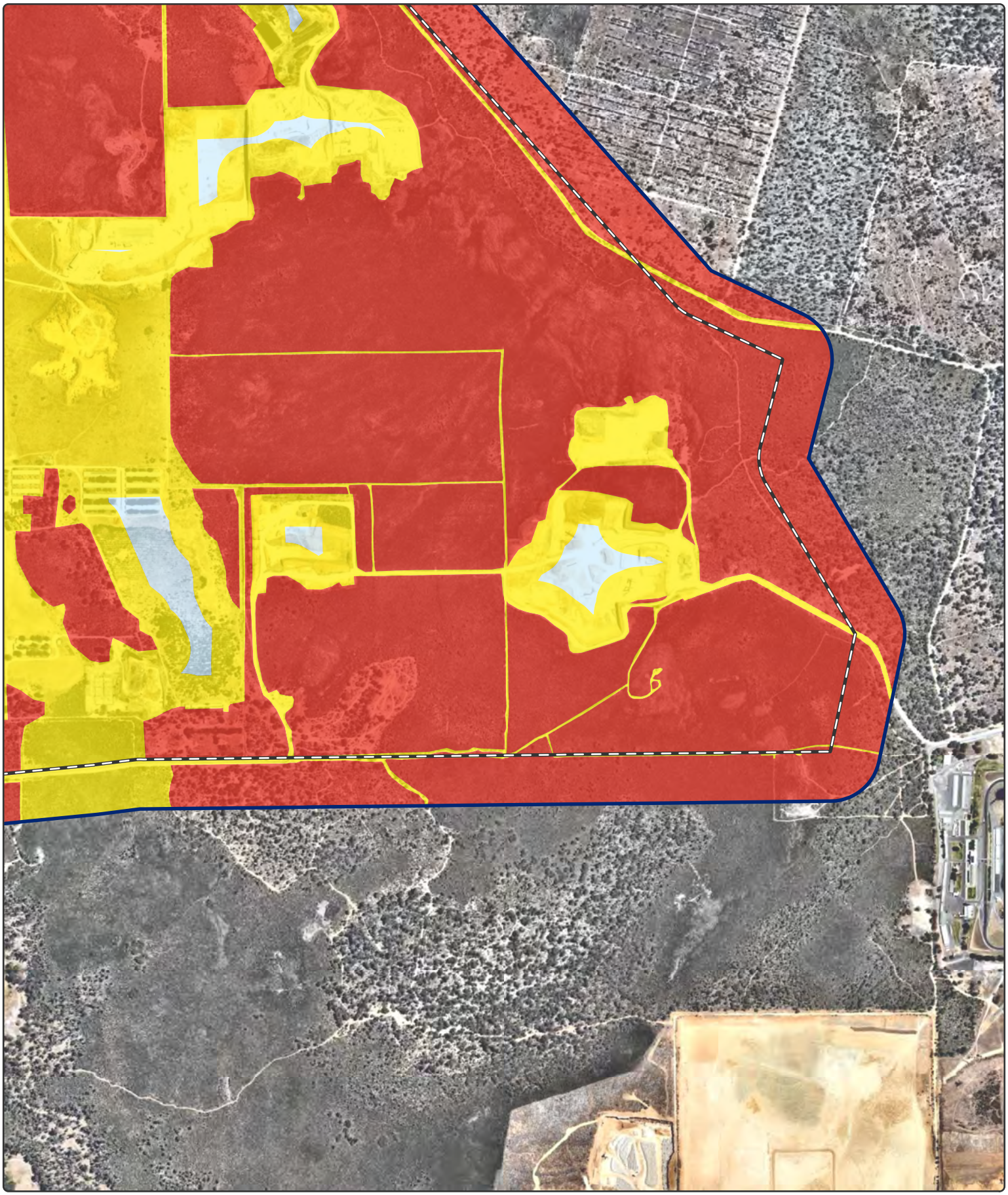
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 9

Subject site

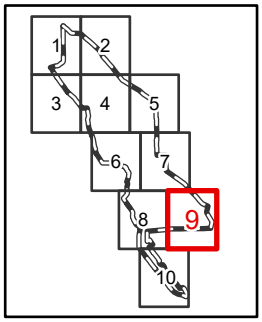
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY



City of Wanneroo (North) Bushfire Hazard Level (BHL) Assessment - Map 10

Subject site

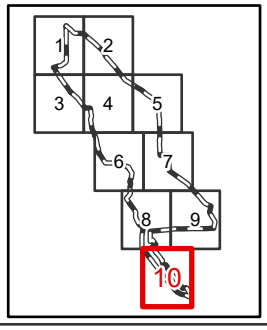
150m site assessment

Bushfire Hazard Level (BHL)

Extreme

Moderate

Low



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

22PER4181-ED Date: 10/03/2023

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

Appendix D Standards for Asset Protection Zones

The following standards have been extracted from the *Guidelines for Planning in Bushfire Prone Areas v 1.4* (WAPC 2021).

Every habitable building is to be surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:

a. Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m² (BAL-29) in all circumstances.

b. Location: the APZ should be contained solely within the boundaries of the lot on which a building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes).

c. Management: the APZ is managed in accordance with the requirements of '*Standards for Asset Protection Zones*' (below):

- Fences within the APZ:
  - Should be constructed from non-combustible materials or bushfire-resisting timber referenced in Appendix F of AS 3959.
- Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness):
  - Should be managed and removed on a regular basis to maintain a low threat state;
  - Should be maintained at <2 tonnes per hectare (on average); and
  - Mulches should be non-combustible (e.g. stone, gravel or crushed mineral earth) or wood mulch >6 millimetres in thickness.
- Trees (>6 metres in height):
  - Trunks at maturity should be a minimum distance of six metres from all elevations of the building;
  - Branches at maturity should not touch or overhand a building or powerline;
  - Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation;
  - Canopy cover within the APZ should be <15 per cent of the total APZ area; and
  - Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.

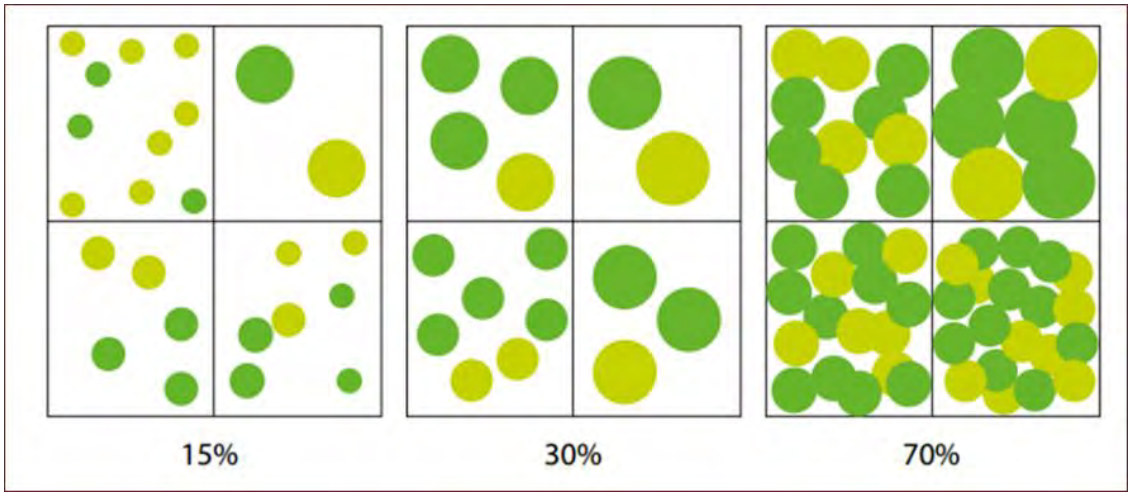


Figure 9: Illustrated tree canopy cover projection (WAPC 2021)

- Shrub and scrub 0.5 metres to six metres in height (shrub or scrub >6 metres in height are to be treated as trees):
  - Should not be located under trees or within three metres of buildings;
  - Should not be planted in clumps >5 square metres in area; and
  - Clumps should be separated from each other and any exposed window or door by at least 10 metres.
- Ground covers <0.5 metres in height (ground covers >0.5 metres in height are to be treated as shrubs):
  - Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above; and
  - Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
- Grass:
  - Grass should be maintained at a height of 100 millimetres or less, at all times; and
  - Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
- Defendable space:
  - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- LP Gas Cylinders:
  - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building;
  - The pressure relief valve should point away from the house;
  - No flammable material within six metres from the front of the valve; and
  - Must site on a firm, level and non-combustible base and be secured to a solid structure.

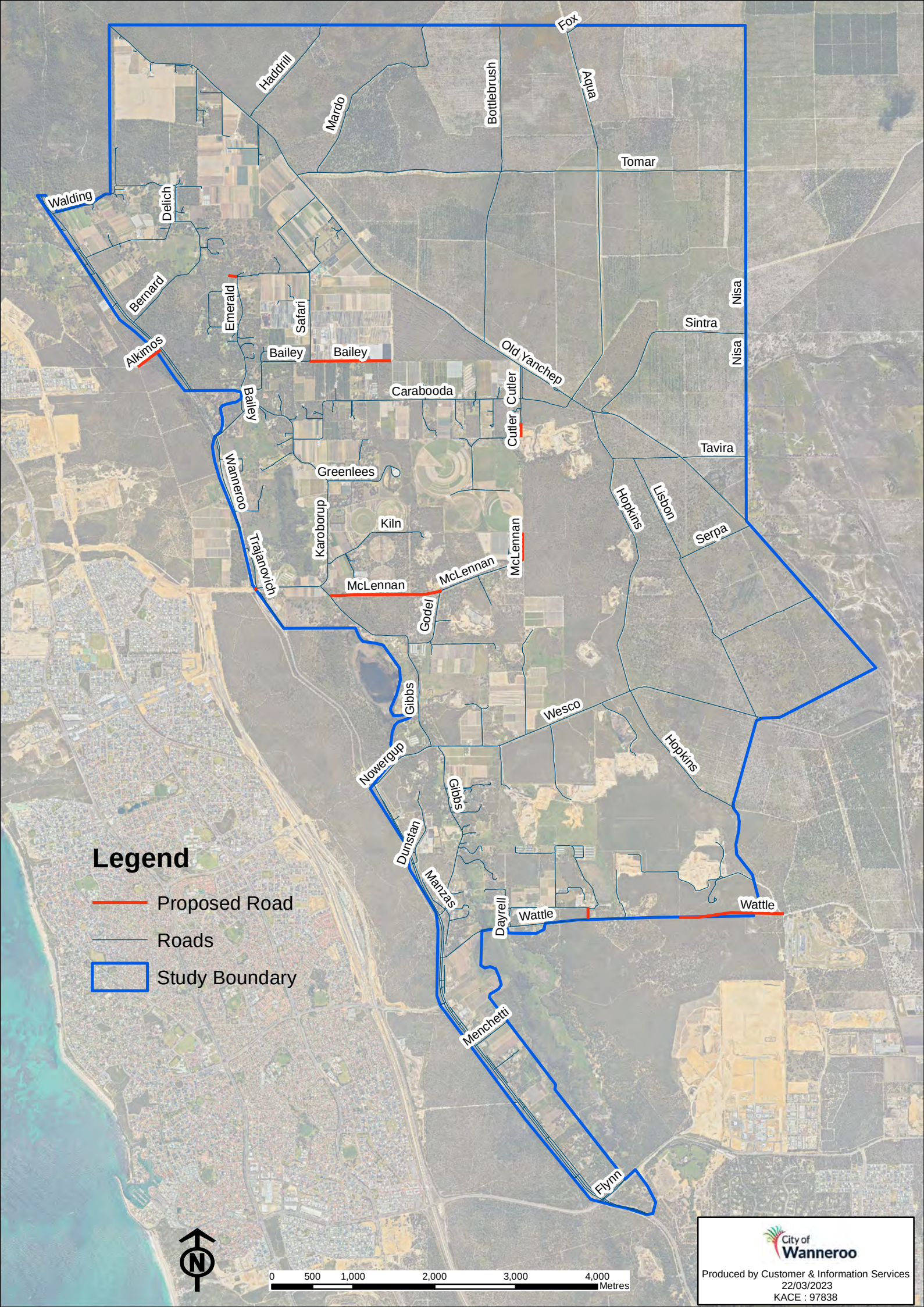
Additional notes

The Asset Protection Zone (APZ) is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level. Hazard separation in the form of using subdivision design elements or excluded and low threat vegetation adjacent to the lot may be used to reduce the dimensions of the APZ within the lot.

The APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity. The APZ may include public roads, waterways, footpaths, buildings, rocky outcrops, golf courses, maintained parkland as well as cultivated gardens in an urban context, but does not include grassland or vegetation on a neighbouring rural lot, farmland, wetland reserves and unmanaged public reserves.

- Plant flammability, landscaping design and maintenance should also be considered for trees, shrub, scrub and ground covers with the APZ. Please refer to explanatory notes 'E2 Managing an Asset Protection Zone (APZ) to a low threat state,' 'E2 Landscaping and design of an asset protection zone,' and 'E2 Plant flammability' in the Guidelines for further information relating to APZ standards.

Appendix E Proposed Road Plans


Fox
Haddrill
Mardo
Bottlebrush
Aqua
Tomar
Walding
Delich
Bernard
Emerald
Safari
Nisa
Sintra
Alkimos
Bailey
Bailey
Old Yanchep
Nisa
Carabooda
Cutler
Cutler
Bailey
Tavira
Wanneroo
Greenlees
Hopkins
Lisbon
Karoborup
Kiln
McLennan
Serpa
Trajanovich
McLennan
McLennan
Godel
Gibbs
Wesco
Hopkins
Nowergup
Gibbs
Dunstan
Manzas
Dayrell
Wattle
Wattle
Menchetti
Flynn
Legend
Proposed Road
Roads
Study Boundary
N
0
500
1,000
2,000
3,000
4,000
Metres
City of Wanneroo
Produced by Customer & Information Services
22/03/2023
KACE : 97838

Appendix F Vehicular access technical requirements (WAPC 2021)

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

[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

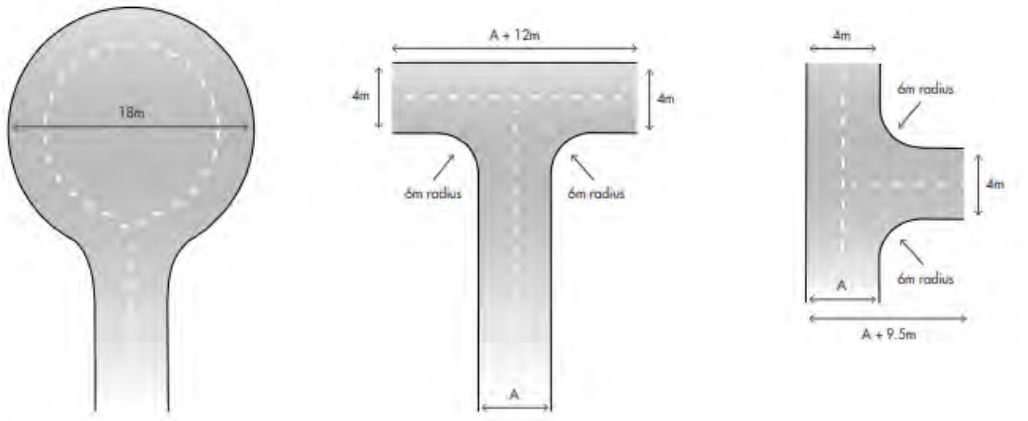


Figure 24: Turn-around area dimensions for a no-through road

Appendix G Water supply requirements

Water dedicated for firefighting should be provided in accordance with the Table below, and be in addition to water required for drinking purposes

Planning Application	Non reticulated areas
Development application	10,000L per habitable building
Structure Plan / Subdivision: Creation of 1 additional lot	10,000L per lot
Structure Plan / Subdivision Creation of 3 to 24 lots	10,000L tank per lot or 50,000L strategic water tank
Structure Plan / Subdivision: Creation of 25 lots or more	50,000L per 25 lots or part thereof Provided as a strategic water tank(s) or 10,000L tank per lot

An above-ground tank and associated stand should be constructed of non-combustible material. The tank may need to comply with AS/NZS 3500.1:2018

Below ground tanks should have a 200mm diameter access hole to allow tankers or emergency service vehicles to refill direct from the tank, with the outlet location clearly marked at the surface. The tank may need to comply with AS/NZS 3500.1:2018. An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018. If the tank is required under the BCA as part of fire hydrant installation, then the tank will also need to comply with AS 2419.

Where an outlet for an emergency service vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply.

All above-ground, exposed water supply pipes and fittings should be metal. Fittings should be located away from the source of bushfire attack and be in accordance with the applicable section below, unless otherwise specified by the local government.

Fittings for above-ground water tanks	
Commercial land uses	125mm Storz fitting.
Strategic water tanks	50mm or 100mm (where applicable and adapters are available) male camlock coupling with full flow valve.
Standalone water tanks	50mm male camlock coupling with full flow valve.
Combined water tanks	50mm male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses or buckets for extinguishing minor fires.



eco logical AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au