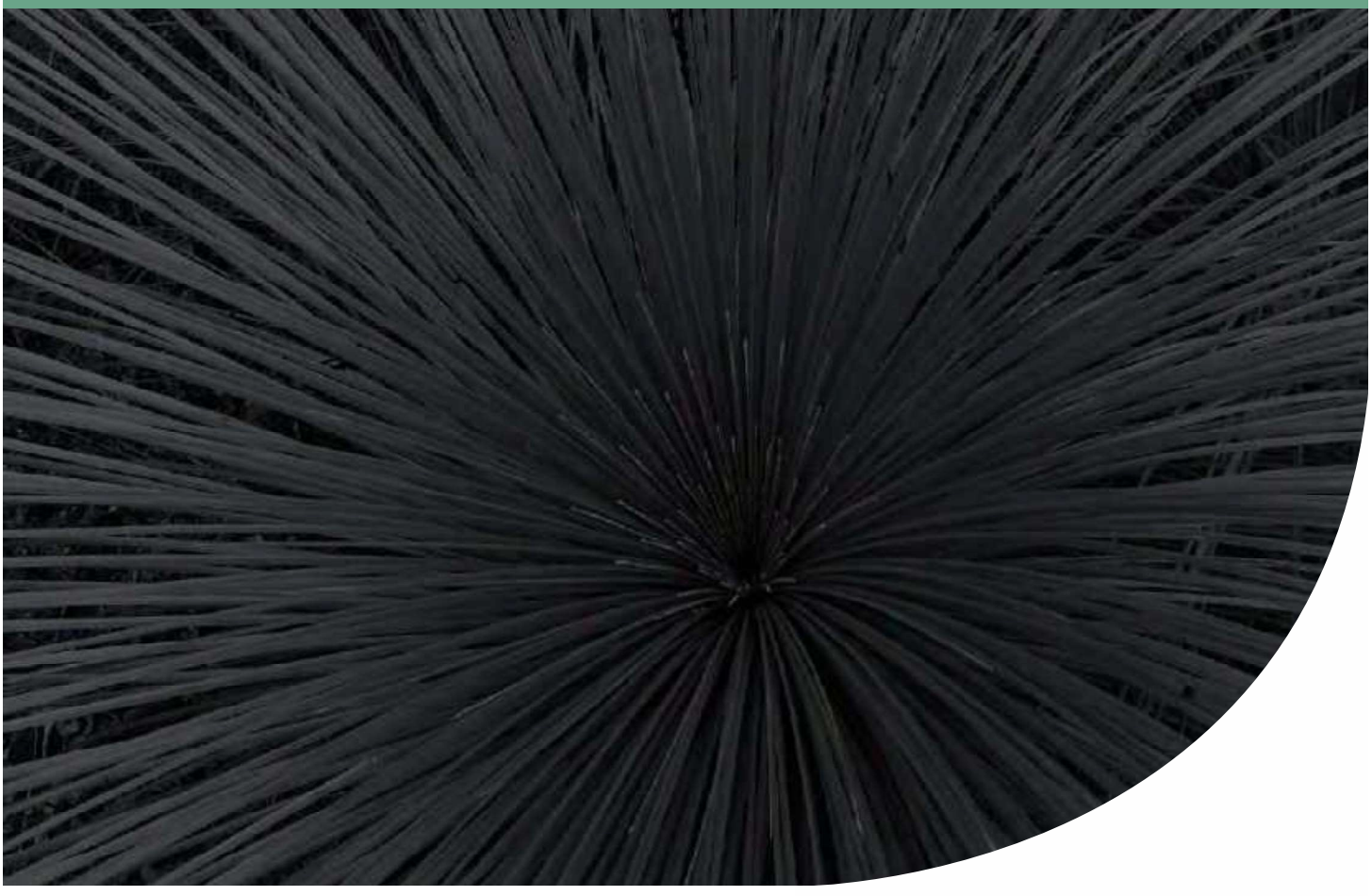
Environmental Assessment and Management Plan

Nicholson Road Forrestdale Development Support

Project No: EP20-126(02)

Prepared for Australian Islamic Colleges (Perth) Inc
July 2021



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Executive Summary

Emerge Associates (Emerge) was engaged by Australian Islamic Colleges (Perth) Inc (AIC – the proponent) to provide environmental consultancy services to support the development of an educational establishment within Lot 15, Nicholson Road, Forrestdale (herein referred to as 'the site'). The development is proposed to be constructed over the western portion of Lot 15 Nicholson Road, Forrestdale, herein referred to as the 'application area'.

The site comprises a total area of approximately 16.7 hectares (ha) and is zoned 'Rural' under the Metropolitan Region Scheme and 'General Rural' under the CoA Town Planning Scheme No.4 (TPS4). The application area covers an area of approximately 9.3 ha and is located approximately 25 km south of the Perth central business district (CBD) within the City of Armadale (CoA).

The purpose of this Environmental Assessment and Management Plan (EAMP) is to provide a synthesis of information regarding the environmental values and attributes of the site. The EAMP is the key supporting environmental document for the development application, ultimately facilitating the consideration of environmental issues by the local government and various state government agencies and authorities.

The development layout and landscaping plan has responded to site-specific environmental considerations, including the retention of higher-quality vegetation within the eastern portion of the site. This includes the largest area of fauna habitat within the site, which is also contiguous with broader areas of better condition vegetation outside of the site.

This document provides an environmental management plan to be implemented during development. The key components of this management strategy are summarised as follows:

- Acid sulfate soils: Completion of an ASS self-assessment form and if necessary (based on the outcomes of the ASS self-assessment), the preparation of an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP).
- Native vegetation: A clearing permit will need to be attained pursuant to Part V of the *Environmental Protection Act 1986* (unless a valid exemption applies) and the potential requirement for an EPBC Act referral will need to be considered. Vegetation outside of the application area will be retained and managed.
- Native fauna: Where clearing of potential black cockatoo habitat is proposed, the potential requirement for an EPBC Act referral will need to be considered. Fauna management protocols and actions will also need to be implemented prior to and during clearing activities, potentially through implementation of a Fauna Management Plan.
- Construction management: A Construction Management Plan should be prepared and include measures to ensure the protection of retained vegetation within the site including consideration of aspects such as physical protection of vegetation and management of dust and weed encroachment.
- Sewage disposal: should be designed and implemented consistent with the requirements of the *Site and Soil Evaluation* (SSE) prepared for the site (Emerge Associates 2021d) and other relevant guidelines and policy.

- Drainage strategy: The drainage strategy for the site should be documented within a drainage plan, water management plan or similar which will demonstrate how the hydrological regime will be maintained and that sewage disposal systems will not be subject to flooding or inundation in a 10% annual exceedance probability (AEP) event.
- Irrigation and fertilisation: An Irrigation and Nutrient Management Plan is recommended to outline the establishment and ongoing maintenance requirements of the playing fields. The approach will minimise any irrigation and fertiliser requirements through water-sensitive design and sensitive fertilising.
- Non-potable water: Non-potable water requirements should be provided by groundwater if possible (and through scheme water if not). A groundwater operating strategy may be required should a groundwater allocation be acquired.
- Wetlands: Wetland values will be maintained and protected through maintenance of the hydrological regime (on-site treatment and retention), managing public access to the CCW UFI 7235, sensitive and transitional landscaping, benign land uses within transitional boundary areas, locating any on-site sewage systems at least 100 m from the outer edge of any conservation category wetlands (CCWs), appropriate design of sewage treatment units and disposal areas, appropriate consideration of functional buffer requirements and the sensitive use of fertilisation in sporting and landscaped areas.
- Bushfire: Bushfire risk can be safely managed within the application area without the clearing of vegetation not located within the application area. Landscaping within the application area will be sensitively designed and managed by the proponent such that a low bushfire risk will be maintained.

This EAMP outlines the environmental management framework to be implemented across the site as part of the development process, including preparation and implementation of the following:

- Acid Sulfate Soils and Dewatering Management Plan (if required)
- Fauna Management Plan (if required)
- Construction Management Plan
- Water Management Plan (or similar)
- *Site and Soil Evaluation* (Emerge Associates 2021d)
- Irrigation Management Plan (if required)
- Nutrient Management Plan
- *Bushfire Management Plan* (Emerge Associates 2021c) including bushfire attack level (BAL) assessment.

Overall, the environmental attributes and values of the site can be suitably accommodated within the layout plan, or can be appropriately managed through the future development in line with the relevant state and local government legislation, policies and guidelines and best management practices.

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1 Introduction

1.1 Background

Emerge Associates (Emerge) was engaged by Australian Islamic Colleges (Perth) Inc (AIC – the proponent) to provide environmental consultancy services to support the development of an educational establishment within Lot 15, Nicholson Road, Forrestdale (herein referred to as 'the site'). The development is proposed to be constructed over the western portion of Lot 15 Nicholson Road, Forrestdale, herein referred to as the 'application area'.

The site comprises a total area of approximately 16.7 hectares (ha) and is zoned 'Rural' under the Metropolitan Region Scheme and 'General Rural' under the CoA Town Planning Scheme No.4 (TPS4). The application area covers an area of approximately 9.3 ha and is located approximately 25 km south of the Perth central business district (CBD) within the City of Armadale (CoA).

The location and extent of the site and application area are shown in **Figure 1**.

The proposed architectural site layout plans that have informed our understanding of the proposal and facilitated our assessment is provided in **Appendix A.**

1.2 Purpose of this report

The purpose of this Environmental Assessment and Management Plan (EAMP) is to provide a synthesis of information regarding the environmental values and attributes of the site. Specifically, this report:

- Identifies the existing environmental values and attributes of the site (**Section 2**)
- Discusses the proposal and corresponding environmental approval requirements (**Section 3**)
- Discusses how the proposed design responds to the existing environment and outlines the environmental management framework (**Section 4**).

The EAMP is the key supporting environmental document for the development application, ultimately facilitating the consideration of environmental issues by the local government and various state government agencies and authorities.

1.3 Scope of work

Emerge were engaged by the proponent to undertake an environmental assessment to document the existing environmental attributes and values of the site and ensure relevant environmental values were considered within the design and future development and operational requirements. This involved utilising a range of information sources including local and regional reports, databases, mapping and site-specific investigations (which are described in **Section 2**). The outcomes of these findings include information on the following attributes:

- Landform and soils
- Biodiversity and natural assets, including flora, vegetation and terrestrial fauna
- Hydrology
- Heritage
- Historical and existing land uses within and surrounding the site
- Bushfire hazards.

2 Existing Environment

2.1 Landform and soils

2.1.1 Topography

A survey of the site and nearby Nicholson Road was undertaken by the McMullen Nolan Group (MNG) in November and December of 2020 and is provided in **Appendix B**. The survey shows that the site is gently undulating, consistent with the dunal landforms associated with the local geology (see **Section 2.1.2**). Existing ground elevations range from 30.11 metres Australian height datum (m AHD) in the southern portion of the site atop a small rise, to 24.87 m AHD in the western portion of the site within a local depression. Topographic contours over the site and within the vicinity are shown in **Figure 2**.

2.1.2 Landform, soils and geology

Regional soil mapping has been prepared across the Armadale locality at a scale of 1:50 000 as part of a series of geological maps published by the Geological Survey of Western Australia (Jordan 1986). This mapping also outlines the expected broad level surface geology of the region.

The mapping indicates that three soil units occur within the site, as shown in **Figure 3**. These include:

- **Sand (S8)** which is described as 'white to pale grey at surface, yellow at depth, fine to medium grained, moderately sorted sub-angular to sub-rounded, minor heavy minerals, or eolian origin'. Jordan (1986) identified that in terms of land capability, the use of septic tanks is considered compatible with this soil type.
- **Sand (S10)** which is described as 'S8 over sandy clay to clayey sand of the Guildford formation'. Jordan (1986) identifies that in terms of land capability within this soil type, possible issues could exist for the use of septic tanks due to the high water table in certain areas across this broadly mapped soil unit.
- **Peat-rich sand (Sp2)** which is described as 'fine to medium-grained quartz sand with much brown to black organic material, grades of peat, of lacustrine origin'. Jordan (1986) identified that in terms of land capability within this soil type, the use of septic tanks is undesirable.

The S8 soil unit is identified as occurring across the vast majority of the site, with small portions of S10 and Sp2 soil units located in the southern portion of the site.

Land resources in the northern section of the Peel-Harvey catchment, Swan Coastal Plain, Western Australia Map (van Gool 1990) was prepared for regional and catchment land use planning purposes. The associated soil and landform mapping was prepared at a scale of 1:50 000 and identified the site as being situated on three broadly defined soil-landform 'land units'. The land units all fall within the Bassendean Dune and Sandplain System

A geotechnical investigation has been conducted within the site by STATS Australia (2020). Geotechnical investigations included excavation of twelve test pits to 2.5 m depth and infiltration testing within four of the test pits. Soil samples were collected from four test pits for laboratory analysis. The findings of the geotechnical investigations determined that the soil profile consistently comprised of sand mixtures throughout the site, with the exception of TP10, where a layer of clayey sand overlaying sand was encountered. Infiltration testing indicates that the sandy soils encountered within the site are highly permeably with an average permeability of 10.6 m/day. The location of test pits and infiltration testing locations is shown in **Figure 3**.

2.1.3 Acid sulfate soils

Acid sulfate soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state, ASS are generally present in waterlogged anoxic conditions and do not present any risk to the environment. ASS can present issues when oxidised, producing sulphuric acid, which can impart a range of impacts on the surrounding environment, infrastructure and human health. Projects involving the disturbance of ASS must therefore assess the risk associated with disturbance by considering potential impacts.

Regional ASS risk mapping indicates that the majority of the site is classified as having a moderate to low risk of ASS occurring within 3 m of the natural soil surface, as shown in **Figure 4** (DWER 2021a). A very small portion of the site to the south is classified as having a 'moderate to high risk' of ASS occurring within 3 m of the natural surface.

2.2 Biodiversity and natural assets

2.2.1 Flora and vegetation

2.2.1.1 Regional context

Native vegetation is described and mapped at different scales in order to illustrate patterns in its distribution. At a continental scale the *Interim Biogeographic Regionalisation of Australia* (IBRA) divides Australia into floristic subregions (Environment Australia 2000).

The site is contained within the Swan Coastal Plain region and within the 'SWA02' or Perth subregion. The Perth subregion is characterised by mainly banksia low woodland on leached sands with melaleuca swamps where ill-drained; and woodland of *Eucalyptus gomphocephala* (tuart), *E. marginata* (jarrah) and *Corymbia calophylla* (marri) on less leached soils (Beard 1990). This subregion is recognised as a biodiversity hotspot and contains a wide variety of endemic flora and vegetation types. Variations in native vegetation can be further classified based on regional vegetation mapping.

Heddle *et al.* (1980) mapping shows most of the site as comprising the 'Southern River' complex, with a small portion in the south west of the site mapped as comprising the 'Bassendean central and south complex'. The 'Southern River' complex is described as comprising open woodland of *Corymbia calophylla*, *Eucalyptus marginata* and *Banksia* spp. with fringing woodland of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along creek beds. The 'Bassendean central and south complex' comprises vegetation ranging from woodland of *Eucalyptus marginata*, *Allocasuarina fraseriana*, *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgelands on the moister sites.

The 'Southern River' complex was determined to have 18.4% of its pre-European extent remaining, of which 1.2% is protected for conservation purposes (Government of Western Australia 2019).

The 'Bassendean central and south complex' was determined to have 26.8% of its pre-European extent remaining, of which 1.9% is protected for conservation purposes (Government of Western Australia 2019).

2.2.1.2 Historical land use

Review of historical images available from 1953 onwards shows that the majority of the site was cleared of native vegetation between 1953 and 1961, with areas of vegetation remaining in the eastern portion of the site (Landgate 2021).

The presence of wetland features (i.e., perennial wetland-like vegetation and seasonally saturated soils occurring within low lying areas) within the site can be seen throughout the last 60 years but by 1991 these were almost entirely devoid of native vegetation. Some vegetation has since recolonised these areas, particularly near the eastern boundary of the site.

2.2.1.3 Site specific surveys and investigations

A flora and vegetation surveys were undertaken by Emerge Associates ecologists on the 16 November 2020 and 11 March 2021. The findings of the surveys have been documented within the *Lot 15 Nicholson Road, Forrestdale Detailed Flora and Vegetation Assessment* (the Flora and Vegetation Assessment) (Emerge Associates 2021b) (provided in **Appendix C**) and are summarised below.

2.2.1.4 Plant communities

Plant communities identified in the Flora and Vegetation Assessment are listed in **Table 1** and shown in **Figure 5**.

Table 1: Plant communities identified within the site

Plant community	Description	Area (ha)
BaBmSi	Low sparse to open woodland of *Banksia menziesii, B. attenuata*, *B. ilicifolia*, *Eucalyptus todtiana* and *Nuytsia floribunda* over sparse to open shrubland of *Kunzea glabrescens, Scholtzia involucrata, Acacia pulchella* var. *glaberrima, Macrozamia riedlei* and *Macarthuria australis* over sparse forbland of *Desmocladus flexuosus, Conostylis aculeata, Lyginia barbata* and *Lomandra* spp. and open grassland of **Ehrharta calycina* and **Briza maxima.*	2.17
Kg	Tall shrubland to closed tall shrubland of *Kunzea glabrescens* over sparse low shrubland of *Brachyloma preissii* and *Acacia pulchella* var. *glaberrima* (or absent) and forbland (or absent).	0.98
KgMp	Sparse woodland of *Melaleuca preissiana* over tall closed shrubland of *Kunzea glabrescens* over forbland of **Hypochaeris* spp. and grassland of **Cynodon dactylon* (or understorey layers absent).	1.06
KgSi	Tall shrubland to closed tall shrubland of *Kunzea glabrescens* over shrubland to open shrubland of *Scholtzia involucrata* over sparse forbland *Conostylis aculeata, Lyginia barbata* and *Lomandra caespitosa.*	2.41
Non-native	Heavily disturbed areas comprising weeds with occasional native shrubs and forbs and planted vegetation.	10.11

2.2.1.5 Vegetation condition

Vegetation condition was assessed across the site as part of the flora surveys, against the methods used in the *Bushland Plant Survey: A guide to plant community survey for the community* Keighery (1994). Detailed descriptions of the vegetation condition ratings are provided in the Flora and Vegetation Assessment and is shown in **Figure 6** with total coverage areas listed in **Table 2**.

Table 2: Extent of vegetation condition categories within the site

Condition category (Gibson *et al.* 1994)	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good	2.17
Degraded	4.45
Completely degraded	10.11

Based on the survey results the majority of the site supports non-native vegetation in 'completely degraded' condition. The north and eastern portions of the site have the most intact vegetation with patches of **BaBmSi** woodland in 'good' condition and adjacent patches of other communities in 'degraded' condition.

2.2.1.6 Threatened and Priority Ecological Communities

Generally, ecological communities can be described as vegetation communities that are assemblages of species that occur together in a particular type of habitat. An ecological community's structure, composition and distribution are determined by a range of environmental factors. 'Threatened ecological communities' (TECs) are ecological communities that are recognised as rare or under threat and therefore warrant special protection.

Selected TECs are afforded statutory protection at a Commonwealth level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). TECs listed under the EPBC Act are categorised as either 'critically endangered', 'endangered' or 'vulnerable'. Any action likely to have a significant impact on a TEC listed under the EPBC Act (either critically endangered or endangered TECs) requires approval from the Commonwealth Minister for the Environment.

Within Western Australia, state-listed threatened flora and TECs are statutorily protected through the *Biodiversity Conservation Act 2016* (BC Act), and licences (or similar) may be required where these values are proposed to be disturbed or modified. In addition to the BC Act, impacts to TECs are considered under the EP Act. The Environmental Protection Authority (EPA) produces environmental factor guidelines to outline how environmental factors are considered by the EPA in the environmental impact assessment. Under the flora and vegetation environmental factor guideline (EPA 2016a) TECs are considered to be significant values, and approval may be required from the EPA in order to impact a TEC.

An ecological community under consideration for listing as a TEC in Western Australia, but which does not yet meet survey criteria or has not been adequately defined, or which is rare but not currently threatened, is referred to as a 'priority ecological community' (PEC). Whilst PECs are not afforded statutory protection in Western Australia, they are considered during the approval process.

A search was conducted for threatened and priority flora that may occur or have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2021a), *NatureMap* (DBCA 2021) and DBCA's threatened and priority flora database (reference no. 26-0321FL).

A search was also conducted for TECs and PECs that may occur or have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2021a), the *weed and native flora dataset* (Keighery *et al.* 2012) and DBCA's threatened and priority ecological communities' databases (reference no. 38-0321E).

Prior to undertaking the field survey, information on the habitat preferences of threatened and priority flora species and communities identified from database searches was reviewed. This was compared to existing environmental information available for the site, such as geomorphology, soils, regional vegetation and historic land use, to identify species and communities for which habitat may occur in the site.

The database search results identified 16 TECs and six PECs occurring or potentially occurring within a 10 km radius of the site. Based geomorphology, soils and regional vegetation patterns, one TEC and three PECs were considered to have potential to occur in the site:

- 'Banksia woodlands of the Swan Coastal Plain' TEC which is listed as 'endangered' under EPBC Act.
- 'Banksia dominated woodlands of the Swan Coastal Plain IBRA region' PEC (P3).
- 'Low lying *Banksia attenuata* woodlands and shrublands' PEC (P3).
- '*Banksia ilicifolia* woodlands' PEC (P3).

The following TECs and PECs were identified within the site:

- 'Banksia woodlands of the Swan Coastal Plain' TEC.
- 'Banksia woodlands of the Swan Coastal Plain' PEC.
- 'Low lying *Banksia attenuata* woodlands and shrublands' PEC.

The structure, composition and patch size of the southeastern area of plant community **BaBmSi** indicates that it represents the Commonwealth listed 'banksia woodlands of the Swan Coastal Plain' TEC. The northern two areas of plant community **BaBmSi** do not meet the patch size criteria to be considered as part of the 'banksia woodlands of the Swan Coastal Plain' TEC.

DBCA's *Priority Ecological Community* list indicates that the description, area and condition thresholds that apply to the Commonwealth-listed TEC of the same name also apply to the 'banksia woodlands of the Swan Coastal Plain' PEC (DBCA 2021). Therefore, a total of 0.6 ha of this PEC occurs within the site.

There is no conservation advice for the State listed 'low-lying *Banksia attenuata* shrublands and woodlands' (PEC). However, DBCA has historically applied 'good' condition as a threshold for the identification of PEC vegetation. On this basis, 2.17 ha of the PEC exists within the site.

No other TECs or PECs occur within the site. The locations of the TECs and PECs within the site are shown in **Figure 7**.

2.2.1.7 Significant flora

Certain flora species that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth level, flora species may be listed as 'threatened' pursuant to the EPBC Act and any action likely to have a significant impact on a listed threatened species requires approval from the Commonwealth Minister for the Environment.

At a State level, plant species may also be classed as 'threatened' under the BC Act. Species which are potentially rare or threatened, or meet the criteria for near threatened, or have recently been removed from the threatened species list are classed as 'priority' flora species. However, priority flora species are not afforded statutory protection.

No threatened or priority flora species were recorded within the site during the November and March flora surveys conducted by Emerge Associates (2021b). The surveys were undertaken in mid-November (late within the main flowering season) and early March, and so some annual or geophytic species that flower earlier in the main flowering season may not have been visible at the time of the survey.

2.2.2 Terrestrial fauna

A *Basic Fauna Assessment* was undertaken within the site in March 2021 by Emerge Associates (2021a). Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and secondary evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted. An opportunistic fauna species list was compiled and fauna habitat values were described, with particular reference to conservation significant fauna species with potential to occur within the site.

2.2.2.1 Habitat

Four fauna habitats were identified within the site. The descriptions of these habitats are detailed within the *Basic Fauna Assessment and Targeted Black Cockatoo Assessment* (Emerge Associates 2021a) (provided in **Appendix D**) and summarised below. The locations and extent of the habitats are shown in **Figure 8**.

The highest fauna habitat values within the site are associated with **woodland - upland** habitat in the northern and south eastern portions of the site. In particular where this vegetation remains in good condition (as mapped by Emerge Associates (2021b)), it provides a cover of native trees and shrubs, dense ground cover and contains microhabitats such as logs, rocks and leaf litter.

The **woodland – wetland** habitat occurs within the eastern portion of the site, and contains dense mid-storey vegetation with minimal understorey vegetation or microhabitat providing limited cover for ground-dwelling species. **Shrubland** habitat occurs in the northern and eastern portions of the site, and whilst it is degraded and lacks contiguous vegetation cover, does provide limited cover for ground-dwelling species.

The **predominantly cleared area** is located over the remainder of the site where historical clearing has occurred.

2.2.2.2 Conservation significant fauna

No conservation significant fauna species were recorded within the site. It is considered likely that one threatened species and possible that four threatened, one migratory, seven priority and one other specially protected species may occur in the site based on habitat requirements.

The fauna species that are considered to potentially occur within the site include:

- *Calyptorhynchus baudinii* (Baudin's cockatoo) (endangered)
- *Calyptorhynchus latirostris* (Carnaby's cockatoo) (endangered)
- *Leioproctus douglasiellus* (a short-tongued bee) (endangered)
- *Neopasiphae simplicior* (a short-tongued bee) (endangered)
- *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo) (vulnerable)
- *Falco peregrinus* (Peregrine falcon) (other specially protected)
- *Apus pacificus* (Pacific swift) (migratory)
- *Idiosoma sigillatum* (Swan Coastal Plain shield-backed trapdoor spider) (priority 3)
- *Leioproctus contrarius* (a short-tongued bee) (priority 3)

- *Lerista lineata* (Perth slider) (priority 3)
- *Neelaps calonotos* (Black-striped snake) (priority 3)
- *Synemon gratiosa* (Graceful sunmoth) (priority 4)
- *Isoodon fusciventer* (Quenda) (priority 4)
- *Notamacropus irma* (Western brush wallaby) (priority 4)

2.2.2.3 Black cockatoo habitat

A *Targeted Black Cockatoo Assessment* (Emerge Associates 2021a) has been undertaken for the site and is provided in **Appendix D** and summarised below.

Foraging habitat

Black cockatoos feed on the fruit and seeds of a range of native and non-native plants species. 'Foraging habitat' is defined as vegetation that contains plant species known to be foraged on by black cockatoos.

The *Targeted Black Cockatoo Assessment* (Emerge Associates 2021a) defines foraging habitat within the site as either primary or secondary as follows:

- Primary foraging habitat refers to vegetation with historical and contemporary records of regular consumption by black cockatoos and includes native and non-native species.
- Secondary foraging plants are defined as plants that black cockatoos have occasionally been recorded consuming, or that based on their limited extent or agricultural origin, should not be considered a sustaining resource.

The site currently supports:

- 2.82 ha of foraging habitat for Carnaby's cockatoo (comprising of 1.10 ha of primary and 0.38 ha of secondary foraging plants) (**Figure 9**)
- 2.07 ha of foraging habitat for Baudin's cockatoo (comprising of 1.17 ha of secondary foraging plants) (**Figure 10**)
- 0.11 ha of foraging habitat for Forest red-tailed black cockatoo (comprising of 0.002 ha of primary and 0.09 ha of secondary foraging plants) (**Figure 11**)**.**

Breeding habitat

The site lies within the known breeding range of the forest red-tailed black cockatoo only. No hollows suitable for breeding by black cockatoos were observed in the habitat trees within the site. Therefore, the site does not currently support breeding habitat for black cockatoos. While all of the habitat trees within the site have the potential to form hollows in the future, it will likely take many years for hollows to form that are suitable for use by black cockatoos.

Roosting

No roosting was recorded in the site during the survey and the *BirdLife Australia* dataset does not include any roosts in the site and so there is no reason to suspect that roosting occurs in the site. Nevertheless, the site contains tall trees and groups of tall trees that have the potential to provide roosting habitat for black cockatoos.

2.2.3 Bush Forever

The Government of Western Australia's Bush Forever policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of *Bush Forever* is to protect comprehensive representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of WA 2000). *Bush Forever* sites are representative of regional ecosystems and habitat and have a key role in the conservation of Perth's biodiversity.

No *Bush Forever* sites occur within the site. Bush Forever Site 345 (Forrestdale Lake and Adjacent Bushland, Forrestdale) lies directly adjacent to the east and southern boundaries of the site. Bush Forever Site 344 (Dennis De Young Reserve and Gibbs Road Swamp Bushland, Banjup/Forrestdale) is located to the north west of the site. The locations of Bush Forever Sites 344 and 345 are shown in **Figure 12**.

2.2.4 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The movement of fauna and the exchange of genetic material between vegetation remnants improve the viability of those remnants by allowing greater access to breeding partners and food sources, refuge from disturbances such as fire and maintenance of genetic diversity of plant communities and populations. Ecological linkages are ideally continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australia Local Government Association (WALGA), have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004).

One biodiversity linkage (No. 52) occurs over the north eastern corner of the site, extending to the south east and north west and intersecting with another ecological linkage (No. 57). These ecological linkages connect areas of Bush Forever and wetlands located in the wider local area, such as Forrestdale Lake. The locations of theses linkages are shown in **Figure 12**.

Review of aerial imagery indicates that the vegetation within the eastern portion of the site is connected to extensive areas of native vegetation within the wider local area.

2.2.5 Environmentally sensitive areas

'Environmentally sensitive areas' (ESAs) are prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and have been identified to protect native vegetation values of areas surrounding significant, threatened or scheduled flora, vegetation communities or ecosystems. Exemptions under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* do not apply within ESAs.

The entirety of the site is mapped within a large ESA that extends to the north, west, south and east of the site (**Figure 12**).

2.3 Hydrology

2.3.1 Groundwater

The site is within the Perth Groundwater Management Area and the City of Armadale subarea. Information on the regional groundwater resources obtained from DWER (2021b) indicates that the site is underlain by a multi-layered aquifer system comprised of the following resources:

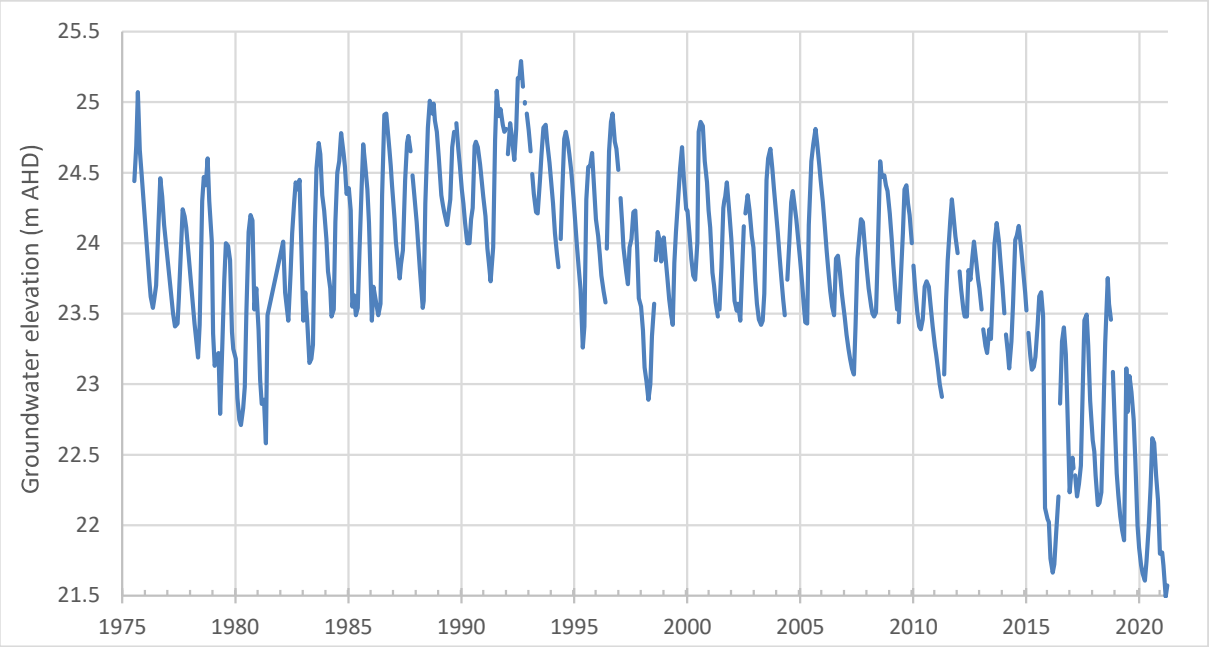
- Perth - Superficial Swan
- Perth - Leederville
- Perth – Yarragadee North

Regional groundwater elevation contours indicated that the historical maximum groundwater elevation within the site is approximately 25 m AHD (based on the 2001 assessment) and the minimum groundwater level (measured May 2003) was approximately 22 m AHD (DWER 2021c). Based on these groundwater contour datasets (shown in **Figure 14**) the groundwater levels within the site are expected to be relatively consistent, exhibiting minimal groundwater gradient.

A long term DWER groundwater monitoring bore is located within the road reserve located adjacent to the northern boundary of the site (monitoring bore JM36 – reference 61610440) (DWER 2021d). JM36 has been regularly monitored (monthly) for groundwater elevations since 1975 with monitoring ongoing. The vicinity of the bore to the site and low groundwater gradient within the site area indicate that the elevation data from JM36 can be adopted for the site with a reasonably high level of confidence. The location of JM36 is shown in **Figure 14**.

From review of the JM36 groundwater monitoring data (see **Plate 1**) it is evident that groundwater levels had been relatively steady from 1982 to 2008. A historic peak of around 25.3 m AHD was reached in 1992, with seasonal peaks generally reaching 24.5 – 24.8 m AHD over this steady period. From approximately 2010 onwards the groundwater levels can be seen to decline sharply, particularly in the period following 2015. The most recent groundwater season (2020) exhibited the lowest minimum and maximum groundwater elevations measured within the 46 years of monitoring with elevations of 21.50 m AHD and 22.58 m AHD respectively.

Plate 1: Groundwater monitoring bore JM36 (DWER 2021d)



2.3.2 Surface water

The *Hydrography Linear* dataset (DWER 2020) does not show any waterways, drains or flow paths within the site. The dataset shows that there is a major drain located approximately 90 m to the north west of the site (see Figure 13). The drain runs through multiple wetlands within the wider catchment and drains to Forrestdale Lake at a location approximately 1 km to the north of the site. A perennial swamp is mapped to the south of the site, associated with wetland UFI 7237.

Given the underlying sandy soils present within the site (see **Section 2.1.2**), it is expected that rainfall is infiltrated locally and directly through the soil profile, or within the localised depressions.

2.3.3 Wetlands

Wetlands are areas which are permanently, seasonally or intermittently waterlogged or inundated with water. Naturally occurring wetland features are common across the Swan Coastal Plain and can contain fresh or salty water, which may be flowing or still.

The DBCA maintains the *Geomorphic Wetlands of the Swan Coastal Plain* database, which categorises geomorphic wetland features into specific management categories based on their attributes and management objectives. The three management categories are described in **Table 3**.

Table 3: Management categories defined in the Geomorphic Wetlands of the Swan Coastal Plain (DBCA 2020)

Management category	Description of wetland	Management objectives
Conservation (CCW)	Support high levels of attributes	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state owned land. Protection provided under environmental protection policies.
Resource enhancement (REW)	Modified or degraded but still supporting substantial attributes and functions	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple use (MUW)	Few remaining important wetland attributes and functions but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

A review of the *Geomorphic Wetlands, Swan Coastal Plain* (DBCA 2020) dataset indicates that an MUW (UFI 16021), is the only mapped wetland within the application area, while a small portion of conservation category wetland (CCW) UFI 7235 is situated within the broader eastern portion of the site.

There are also a number of mapped wetlands surrounding and within vicinity of the site which are of relevance and include the CCWs:

- UFI 7090 (located 70 m to the north west)
- UFI 7233 (located adjacent to the northern site boundary)
- UFI 7237 (located 10 m to the south of the site).

Wetlands of national or international significance may be afforded special protection under Commonwealth or international agreements. The following lists of important wetlands were checked as part of this assessment:

- *Ramsar List of Wetlands of International Importance* (DBCA 2017)
- *A Directory of Important Wetlands in Australia* (DBCA 2018)

No Ramsar or listed 'important wetlands' occur in the site. The Ramsar listed 'Forrestdale & Thomsons Lakes' (number 35, associated with CCW UFI 7479) is located 480 m to the north east of the site and 650 from the application area. This Ramsar site is also listed as an important wetland. In addition, an 'important wetland' ('Gibbs Road Swamp System') is located directly to the north of the site and to the west of the site. The Gibbs Road Swamp System is an extensive, but fragmented wetland system covering approximately 750 ha between Armadale Road and Rowley Road (which include CCWs UFI 7233 and UFI 7090).

The location of mapped wetlands is shown in **Figure 13**.

Flora and vegetation survey undertaken by Emerge Associates (2021b) (discussed in **Section 2.2.1**) confirmed the presence of a wetland landform and common native wetland vegetation throughout the central portion of the site. However, the identified wetland landform (associated with the mapped MUW UFI 7236) running through the centre of the site is largely in 'completely degraded' condition. The small area of CCW UFI 7235 near the eastern edge of the site also supports common wetland vegetation, although in degraded condition.

2.3.4 Public drinking water source areas

Public Drinking Water Source Areas (PDWSAs) are proclaimed by the Department of Water to protect identified drinking water sources, including surface water and groundwater sources (DoW 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947* as Water Reserves, Catchment Areas or Underground Water Pollution Control Areas. PDWSAs provide the population with the majority of its drinking water supplies and can be vulnerable to contamination from a range of land uses. Once an area is identified as a PDWSA, consideration needs to be given to the intended land use and associated activities to ensure that they are appropriate in meeting the water protection quality objectives of the area.

The site is not located within a proclaimed PDWSA.

2.3.5 Sewage sensitive areas

Sewage sensitive areas are proclaimed under the *Government Sewerage Policy* (DPLH 2019) to protect groundwater and surface water systems. A review of the *Government Sewerage Policy* dataset (DPLH 2021a) indicates the entire site is identified as a sewage sensitive area and is associated with both category A 'Estuary catchments on the Swan and Scott Coastal Plains' and F 'Within 1km of significant wetlands', as shown in **Figure 15**.

2.4 Heritage

2.4.1 Aboriginal heritage

The Aboriginal Heritage Inquiry System (AHIS) is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* by the Department of Planning, Lands and Heritage, containing information on Registered Aboriginal Heritages Sites and Other Heritage Places throughout Western Australia.

In accordance with the *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013), a search of the AHIS online database (DPLH 2021) was undertaken which did not identify any Registered Aboriginal Heritage Sites or Other Heritage Places within the site.

2.4.2 Non-indigenous heritage

A desktop search of the Australian Heritage Database (DAWE 2021), the State Heritage Office database (Heritage Council 2021) and the City of Armadale Local Heritage Survey (CoA 2020a) has indicated there are no registered heritage sites located within the site.

2.5 Land use considerations

2.5.1 Historical and existing land uses

Review of historical images available from 1953 onwards shows that the majority of the site was cleared of native vegetation between 1953 and 1961, with areas of vegetation remaining in the eastern portion of the site (Landgate 2021). The presence of wetland features within the site can be seen throughout the last 60 years but by 1991 these were almost entirely devoid of native vegetation. Some vegetation has since recolonised these areas, particularly near the eastern boundary of the site. The remainder of the site remains cleared.

A residential dwelling and larger ancillary buildings resembling tin-roofed sheds were constructed within the site prior to 1965. The ancillary buildings were removed or destroyed during the period between 1991 and 2011. Some stockpiling and subsequent spreading of imported soil can be seen occurring from January to June 2016. This area appears to have been used sporadically for vehicle laydown from this time.

2.5.2 Potential site contamination

A review of the DWER *Contaminated Sites Database* (DWER 2021e) indicates that the site is not registered as a contaminated site pursuant to the *Contaminated Sites Act 2003*, nor are there any registered sites within an adjacent one-kilometre radius.

2.5.3 Surrounding land uses

Under the MRS, the land surrounding the site to south and west is zoned 'Parks and Recreation, Bush Forever', the land to the east is zoned 'Rural, Bush Forever' and the land to the north is zoned 'Rural', 'Rural, Other Regional Roads' and 'Rural Bush Forever'. The MRS zoning within the vicinity of the site is shown in **Figure 16**.

Under the TPS4, the land surrounding the site is zoned 'Rural Living' to the west, north and east. The land to the south, north west and north east of the site is zoned 'Parks and Recreation Regional'.

A 500 m poultry buffer area intercepts the north western corner of the site, as shown in the *Special Control Area Map 1* of TPS4 (CoA 2005). The buffer extends within the site by a distance of approximately 90 m. The site is situated within a 'Wetland Protection Areas – Groundwater Environmental Management Areas', as shown in the *Special Control Area Map 2* of TPS4 (CoA 2005). The site is also designated as a 'Development Area' under the *Special Control Area Map 3* of TPS4 (CoA 2005).

The *Special Control Area Map 1, Map 2 and Map 3* are provided in **Appendix A**, the extent and vicinity of the poultry farm and associated poultry farm buffer is shown in **Figure 16**.

2.6 Bushfire hazard

The site and surrounding areas have been identified as bushfire prone under the state-wide *Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM 2019), as shown in **Figure 15.**

The identification of a site within an area declared as bushfire prone necessitates that further assessment of the determined bushfire risk of the proposed development is 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). This will be addressed through the preparation of a site-specific *Bushfire Management Plan* (BMP) that is currently being prepared for the site. The BMP will ensure that any bushfire risk is appropriately managed through the layout of the development and the implementation of appropriate construction standards where necessary.

All areas within the site and surrounding 150 m have been assessed for the presence of bushfire prone vegetation and have been classified as per Table 2.5 of AS 3959 (Standards Australia 2018) to determine the associated bushfire hazard rating levels and bushfire risk.

Whilst the majority of the site has historically been cleared, bushfire hazards within the site exist predominantly within the eastern and northern portions associated with native vegetation. The majority of this vegetation (i.e., the vegetation falling outside of the application area) will be retained as development occurs within the site.

Additional to the bushfire hazards within the site, a large amount of native vegetation is present within the vicinity of the site. A large portion of this is associated with the Bush Forever sites 344 and 345 and CCW UFI 7233 (see **Figure 12**). These areas have received forest, scrub or grassland classifications and are discussed further in the BMP.

Bushfire management associated with the development is discussed in **Section 4.7**.

3 Proposal

3.1 Proposed development

The proposed development layout has been prepared for the application area on behalf of the Proponent by the Marocchi Group and is included in **Appendix A**. A landscape plan has been prepared for the application area on behalf of the Proponent by Propagule and is included in **Appendix E**.

A key feature of the site is an existing power transmission easement that runs in a south-north direction and approximately bisects the site. The overarching development layout of the site has been prepared such that there has been no requirement to move this infrastructure. Due to this, development has been located on one half of the site only. Based on an initial assessment of the environmental values (discussed in the previous sections), the development footprint was positioned on the portion of the site that corresponded to the lower value and more degraded environmental values.

The development layout and landscape plan incorporates the inputs from a multi-disciplinary project team and the outcomes of a range of site-specific technical studies and investigations (discussed in **Section 2**), and proposes the following development:

- Schooling facilities including kindergarten, primary and high school.
- Ancillary facilities including a place of worship, a head office, a library, a gym and maintenance facilities.
- Playing fields including covered courts, a soccer field and a large oval.
- Various outdoor areas and pathways
- Various car parking and drop off/pick up locations
- Nature play and outdoor learning nodes
- Best practice waterwise approach to irrigation
- Soft landscaped transitions to the surrounding landform
- Planting with locally indigenous species within landscaped areas
- Nutrient up-taking stormwater basins
- Retention of the existing bushland to the east of the application area
- On-site sewage treatment and disposal systems

Specific design considerations to respond to identified environmental values are discussed in detail in **Section 4**.

3.2 Planning approvals

We understand that the development application facilitating development of the proposal will be submitted to the City for consideration, with assessment and final approval to be provided through the joint development assessment panel (JDAP).

3.3 Environmental approvals

3.3.1 Native Vegetation Clearing Permit

A Native Vegetation Clearing Permit pursuant to Part V of the *Environmental Protection Act 1986* will be sought from DWER to facilitate construction of the proposed development. The application will necessitate the clearing of 1.66 ha of native vegetation.

Through the clearing permit process, DWER will assess the proposed clearing in accordance with the ten clearing permit principles as specified in Schedule 5 of the EP Act, and provide a final determination as to the suitability of clearing. This will include any conditions that may be attached to the permit in order to ensure clearing is undertaken in a manner which minimises impacts to the environment.

3.3.2 Environment Protection and Biodiversity Conservation Act 1999

Any proposed action which is considered likely to result in a 'significant' impact upon threatened species and ecological communities identified by the Department of Agriculture, Water and the Environment (DAWE) as Matters of National Environmental Significance (MNES), should be referred to DAWE.

In accordance with the provisions of the EPBC Act, the proponent will consider whether potential future impacts to MNES habitat within the site will require referral to the DAWE, prior to any clearing being undertaken within the site to facilitate future development proposed in the development layout.

4 Environmental Assessment and Management Framework

This section outlines how the development layout has accommodated the environmental attributes and values associated with the site and details the environmental management considerations required. The environmental considerations discussed in this section have been informed by the Environmental Management and Improvement Strategy guidelines detailed within Local Planning Policy PLN 2.7 *Environmental Management and Improvement Policy for Development of Constrained Land* (CoA 2020b). While PLN 2.7 pertains to rural residential development, the environmental values and outcomes outlined within the policy remain relevant to the proposed development and so have been considered within the environmental framework for the site. The objectives of the Environmental Management and Improvement Strategy guidelines as per PLN 2.7 are to:

- Rehabilitate the land to improve the condition of land, wetlands (and their buffers), surface waters (man-made and natural and their buffers) and groundwater;
- Control and reduce nutrient inputs to the land and exports from the land;
- Enhance the provision of habitat for flora and fauna on the land;
- Protect and rehabilitate wetlands (and their buffers) and remnant vegetation
- Enhance and protect the landscape amenity and rural character of the locality; and,
- Maintain and manage the land to achieve the above outcomes over the long term.

Only those environmental values and attributes that require specific consideration based on their presence within the site, and/or applicable legislation and policy requirements are assessed.

4.1 Acid sulfate soils

4.1.1 Policy framework, site context and management objectives

DWER, through the planning approvals process, ensures ASS are adequately managed during the land use planning and development process. The objective of the DWER's ASS policy framework is to manage ASS appropriately to prevent the release of metals, nutrients and acidity into the soil and groundwater system that may adversely affect the natural and built environment and human health.

The principal management objective for acid sulfate soils within the site is to ensure that any future development that may disturb acid sulfate soils is appropriately managed to avoid impacts on the environment.

4.1.2 Design considerations for acid sulfate soils

ASS management does not require any spatial consideration within the development layout, and any ASS risk can be appropriately managed through future environmental management.

Reticulated sewage services will not be available for the site and so sewage treatment and disposal will occur on-site. As such, a deep sewer network and sewage pump station will not be required. It is also understood that sand fill (likely cut from the site) will be used fill low lying areas to provide the final site levels. Based on the absence of any excavation requirements for deep sewer and the use of fill to provide finished site levels, it is unlikely that any significant or long duration dewatering will need to occur, if at all.

4.1.3 Acid sulfate soils management requirements

Any dewatering required during construction is likely to be localised and short in duration. If dewatering is to occur to such an extent and/or duration that requires a dewatering licence from DWER, then the applicant will prepare an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP) prior to works to inform the management of ASS, with implementation of identified monitoring and treatment completed during and following works as required.

4.2 Flora and vegetation

4.2.1 Policy framework and management objective

In the context of environmental impact assessment, the EPA objective for flora and vegetation is '*to protect flora and vegetation so that biological diversity and ecological integrity are maintained*'.

Where a proposal may potentially impact upon flora and vegetation values, the following mitigation hierarchy has been applied to minimise potential impacts:

1. **Avoid** impacts
2. **Minimise** impacts
3. **Offset** impacts.

The EPBC Act also provides protection for listed 'threatened' species. Any proposed action which is considered likely to result in a 'significant' impact upon these species, identified as Matters of National Environmental Significance (MNES), should be referred to the Commonwealth DAWE. Based on the considerations outlined below the impact of the proposal is unlikely to be considered significant.

4.2.2 Design considerations for flora and vegetation

Consistent with the EPA mitigation hierarchy, impacts to the contiguous vegetation within the site which includes the 'Banksia woodlands of the Swan Coastal Plain' TEC has been avoided. The avoidance of impacting the highest environmental values within the site has been achieved through positioning of the proposed development to the west of the existing transmission line as shown in the development layout (**Appendix A**).

The area to the east of the transmission line (i.e., outside of the development footprint) which is to be avoided encompasses the majority of existing native vegetation, including 0.6 ha of the 'Banksia woodlands of the Swan Coastal Plain' TEC/PEC and 0.79 ha of the 'Low lying Banksia attenuata woodlands and shrublands' PEC (P3) area.

While the most significant environmental values have been avoided there is some amount of existing native vegetation located within the proposal which will be required to be cleared. The areas and characteristics of the vegetation to be cleared is summarised below and is detailed within the Flora Assessment (Emerge Associates 2021b), which is provided in **Appendix C**.

The most significant vegetation within the application area is a disconnected patch of the BaBmSi plant community that has been identified as a 'Low lying Banksia attenuata woodlands and shrublands' PEC has the potential to be impacted by works within the application area and will need to be cleared. The patch covers an area of 0.87 ha and is in a 'Good' condition.

Locations of plant communities, their condition and TEC/PEC locations are shown in relation to the application area in **Figure 5**, **Figure 6** and **Figure 7** respectively.

No threatened flora have been identified during floristic surveys (described in **Section 2.2.1**).

The Proponent has committed to an endemic landscaping approach and long term weed eradication program to protect the values of the retained vegetation located to the east of the application area, as outlined in the landscape plan (**Appendix E**).

4.2.3 Flora and vegetation management requirements

Due to constraints associated with levels and generally degraded condition of the vegetation, no retention of vegetation is possible within the application area.

However, all vegetation outside of the application area will be retained. During the development of the project, impacts to the vegetation outside of the application area will be avoided through:

- Preparation of a Construction Management Plan (or similar) which is likely to include:
  - Temporary fencing delineating the construction work area from the remainder of the site to ensure retained vegetation is not impacted.
  - Management measures to minimise impacts from dust or weed encroachment (including dieback) during construction including the cleaning of all machinery prior to site entry and the provision of water carts if required.

The clearing of native vegetation values (or any identified threatened flora) will be considered through the clearing permit process regulated by DWER, as discussed in **Section 3.3.1**.

Further to the retention of the highest value native vegetation, the landscape plan for the site has endeavoured to retain existing trees (29 trees retained), will provide endemic vegetation planting and the proponent has committed to a long term weed eradication programme, thereby protecting a reinforcing the retained vegetation.

4.3 Terrestrial fauna

4.3.1 Policy framework and management objectives

In the context of environmental impact assessment, the EPA's objective for terrestrial fauna is *'to protect fauna so that biological diversity and ecological integrity are maintained'.* The application of the mitigation hierarchy should be applied to avoid or minimise impacts to terrestrial fauna where possible.

The EPBC Act also provides protection for listed 'threatened' species, including black cockatoos, for which the site contains foraging and potential breeding habitat. Any proposed action which is considered likely to result in a 'significant' impact upon these species, identified as Matters of National Environmental Significance (MNES), should be referred to the Commonwealth DAWE. As discussed in **Section 3.3.2**.

4.3.2 Design considerations for terrestrial fauna

The Fauna Report (Emerge Associates 2021a) found that in the potential fauna habitat within the site is generally of a low quality and that the site is likely to be primarily utilised by common and widespread native species without specific habitat requirements. Notwithstanding, some fauna habitat values have been identified, specifically those associated with black cockatoos and these are discussed in **Section 2.2.2**.

A large portion of these habitat values have been avoided through locating the development footprint to the west of the transmission line. Due to this approach the main body of existing native vegetation, which is contiguous with the adjacent bushland to the east and includes all three identified habitat trees, is avoided.

The black cockatoo habitat values that are located within the application are that have the potential to be impacted by construction works include:

- A total of 0.88 ha of foraging habitat for Baudin's cockatoo (comprising of 0.53 ha of secondary foraging plants)
- A total of 1.63 ha of foraging habitat for Carnaby's cockatoo (comprising 0.46 ha of primary foraging plants and 0.23 ha of secondary foraging plants).
- A total of 0.11 ha of foraging habitat for forest red-tailed black cockatoo (comprising of 0.09 ha of secondary foraging plants).

4.3.3 Terrestrial fauna management requirements

The preparation and implementation of a Fauna Management Plan is recommended, which will include fauna trapping and relocation. This may include:

- A pre-clearing fauna inspection to identify potential fauna interactions, including an inspection of trees for hollows and signs of use.
- A fauna trapping program to capture and translocate small to medium sized (translocatable) native fauna, if such fauna is present and translocation is practical.

- A fauna spotter will be present during clearing to direct and manage works to avoid impacts to fauna wherever possible and translocate small to medium sized (translocatable) native fauna, if such fauna is present and translocation is practical.

Vegetation will also be retained within the balance of the site and native flora species incorporated into landscaping to provide functional fauna habitat (see **Appendix E**).

As discussed, all vegetation outside of the application area will be retained. During the development of the project, impacts to the vegetation outside of the application area will be avoided through:

- Preparation of a Construction Management Plan (or similar) which is likely to include:
  - Temporary fencing delineating the construction work area from the remainder of the site to ensure retained vegetation is not impacted.
  - Management measures to minimise impacts from dust or weed encroachment (including dieback) during construction including the cleaning of all machinery prior to site entry and the provision of water carts if required.

4.4 Hydrology

4.4.1 Policy framework and management objective

The *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008) endorse the promotion of integrated water cycle management and application of water sensitive urban design (WSUD) principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies.

The *Government Sewerage Policy* (DPLH 2019) provides guidance on the manner in which sewage should be managed within developments and is of particular note as the site is situated within a sewage sensitive areas and on-site sewage disposal is proposed.

Based on the values identified, the principal management objective for hydrology in the site will be to ensure that surface water is appropriately infiltrated and treated, thereby maintaining the existing hydrological regime and underlying groundwater aquifers. And that sewage is treated and disposed of on-site in a manner such that the environment and people are protected.

4.4.2 Design considerations for hydrology

All stormwater generated from future development within the site (e.g. internal roads, buildings and areas of hardstand) will be treated and retained on site. At source infiltration will ensure that the quantity and quality of water recharged to the underlying aquifer subsequently receiving environments such as the surrounding wetlands, will be maintained as per the existing regime.

Sewage will be treated and disposed via on-site sewage systems that will be specifically designed and implemented based on the identified site conditions and as discussed in the *Site and Soil Evaluation* (SSE) prepared for the site (Emerge Associates 2021d).

4.4.3 Hydrological management requirements

The use of retention and infiltration structures in the stormwater strategy will help to maximise recharge to the superficial aquifer where possible, thereby maintaining the local hydrological regime.

The SSE for the site has been prepared to assess and guide the on-site management of sewage (Emerge Associates 2021d). The SSE demonstrates that the site has the capacity to treat and dispose of sewage on-site in a manner that will not adversely impact public safety or the environment. Development of the sewage system in accordance with the SSE and the relevant guidelines and policies (as described within the SSE) will ensure that any risk to the environment or people is mitigated. This will include demonstration that any sewage disposal treatment units or disposal area are located in areas that are not subject to inundation or flooding in the 10% annual exceedance probability (AEP) rainfall event.

The drainage strategy for the proposal should be documented within a drainage plan, water management plan or similar which will demonstrate how the hydrological regime will be maintained and sewage disposal systems will not be subject to flooding or inundation in a 10% AEP event.

A key component of the development is sourcing a non-potable water supply for irrigation of playing fields and landscaped areas. Following a preliminary assessment, the use of groundwater is considered to be the most suitable source for the development. Abstraction of groundwater from the superficial aquifer is therefore the proposed source of non-potable supply for the development. The proponent is currently investigating the potential for a transfer of a groundwater allocation from within the fully allocated superficial aquifer. If it is not possible for a groundwater allocation or other alternative water source to be acquired, scheme water will be utilised for irrigation purposes.

It is recommended that the following management plans are prepared in relation to the turf establishment period and the ongoing management of the irrigation system across the site:

Irrigation and Nutrient Management Plan: will outline the establishment and ongoing maintenance requirements of the playing fields, including:

- Soil nutrient testing prior to turf grass establishment.
- Soil nutrient testing and plant tissue analysis during establishment and for ongoing maintenance.
- Use of controlled release fertilisers with low phosphorus.
- A fertiliser program that is a “little and often” approach and is matched to turf growth and health.
- Controlled irrigation practices using soil moisture sensors to ensure water and nutrients do not go below the active rootzone of the turf.

Groundwater Operation Strategy: is a possible condition of any acquired groundwater licenced allocation and would outline the operation of the irrigation system and associated monitoring, including:

- Number and location of production bores required to supply the development.
- Expected draw rates (flows and volumes), times of operation (hours, days, seasons etc.).
- Ongoing monitoring of groundwater levels across the site to determine impacts to surrounding vegetation.

- Contingency measures should negative impacts be identified.
- Reporting requirements.

4.5 Wetlands

4.5.1 Policy framework and management objective

The EPA's *Environmental Factor Guideline for Inland Waters* (EPA 2018) states the objective for the management of wetlands is "to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected".

Therefore, the focus of this factor and its objective is:

- the significant impacts the alteration of the hydrological regime will have on water dependent ecosystems and other environmental values.
- how the discharge of waste is minimised.
- how any discharge of waste, or use of land or water, will significantly impact on water quality, the local hydrological regime, and the environmental values inland waters support.

The *Guidance Statement No. 33. Environmental Guidance for Planning and Development* (GS 33) (EPA 2008) provides planning guidance for the management and protection of wetlands and recommends a generic minimum buffer distance of 50 m.

The *Government Sewerage Policy* (DPLH 2019) outlines how the management of on-site sewage disposal should be conducted in order to protect the surrounding environment. This includes consideration of significant wetlands (i.e., CCWs) and their protection through the stipulation of design and setback requirements.

The site is situated within a Special Control Area designated as a 'Wetland Protection Areas – Groundwater Environmental Management Area' (CoA 2005) (see **Appendix A**).

The Wetland Protection Area designation is intended to:

"*…highlight the environmental significance of these resources, the opportunities for the enhancement or rehabilitation of wetland functions, and to provide a basis for the avoidance and/or minimisation of degradation associated with any development in the vicinity of these areas*" (CoA 2005).

The objectives of the Wetland Protection Area designation have informed the wetland management responses within the site and these are outlined in the following sections.

4.5.2 Design considerations for wetlands

The presence of a multiple use wetland (MUW) within the site does not require a specific spatial response within the development layout as this category contains few wetland attributes and are suitable for development if hydrological considerations are addressed appropriately.

In comparison, conservation category wetlands (CCWs) are afforded protection through various state policies and guidelines ((WRC 2001), (WAPC 2006), (EPA 2016b) and (EPA 2016c)).

As discussed in **Section 2.3.3** and shown in **Figure 12**, there are multiple CCWs are mapped within and within the vicinity of the site. As recommended by GS 33, a generic 50 m buffer has been applied to the outer edge of all CCWs within the vicinity of the site and is shown in **Figure 18**. The generic wetland buffers intercept the site in three locations. These identified areas have been considered to ensure that the values of the wetlands are maintained and protected through appropriate buffer areas and land use management.

CCW UFI 7233

It is evident from comparison of the mapped wetland extent and the site conditions, visible in aerial photography (see **Figure 18**) that the extent of UFI 7233, viewed at the site-scale is likely not accurate. The mapped wetland is shown as overlaying the existing Oxley Road while avoiding some contiguous vegetation to the south west. However, the mapped extent of the wetland has been considered for this assessment.

The generic 50 m buffer associated with CCW UFI 7233 extends within the site to a maximum depth of approximately 50 m and width of approximately 290 m and within the application area by a depth of approximately 24 m and width of 50 m. The buffer area that incurs within this site is a minor portion of the overall generic wetland buffer area applied to UFI 7233 which extends to the north and east by approximately 1,000 m and 800 m respectively.

The land uses within the generic wetland buffer area predominantly comprise of cleared pasture and residential housing to the north and intact vegetation to the east. Within the site, the generic wetland buffer area comprises of predominantly intact vegetation regrowth and includes the northern entryway. Immediately to the north of the site, the buffer area (and mapped wetland) covers Oxley Road.

The discontinuity provided by Oxley Road (and firebreaks to the north and south of Oxley Road) serves as a readily identifiable physical and distinct 'hard edge' of the wetland which would aid in monitoring and maintenance, as recommended in GS 33 (EPA 2008). Based on this, it is recommended that the southern extent of the UFI 7233 wetland and buffer areas be defined at the northern extent of Oxley Road.

CCW UFI 7235

A generic 50 m buffer associated with CCW UFI 7235 extends within the site by up to approximately 71 m (being located in the site), across a width of up to 170 m and does not intercept the application area. The buffer area that incurs within this site is a small, but significant portion of the overall generic wetland buffer area applied to UFI 7235 which extends to the east by approximately 230 m.

The land uses within the generic wetland buffer area predominantly comprise of intact vegetation and a residential dwelling. Within the site, the generic wetland buffer area comprises of predominantly intact vegetation and a firebreak located along the eastern site boundary.

The generic buffer for UFI 7235 covers an area of existing native vegetation that the proponent has committed to retain. The retention of native vegetation within the generic 50 m wetland buffer area is considered to be sufficient to protect and maintain the values of the wetland.

CCW UFI 7237

A generic 50 m buffer associated with CCW UFI 7237 extends within the site and application area by a depth of up to approximately 39 m and a width of up to 230 m. The buffer area that incurs within this site is a minor portion of the overall generic wetland buffer area applied to UFI 7237 which extends to the south by approximately 580 m.

The land uses within the generic wetland buffer area predominantly comprise of cleared pasture within the northern portion, vegetation regrowth within the southern portion and Nicholson Road to the west. Within the site, the generic wetland buffer area comprises of cleared pasture and includes the existing south western entryway/driveway and firebreaks to the north and south of the site boundary.

The existing entryway configuration has been maintained and accommodated within the development layout (with an entryway proposed in the same location). The proposed entryway will provide the recommended distinct 'hard edge' to the wetland buffer and would clearly define the northern extent of the buffer area.

On-site sewage disposal

As on-site sewage disposal is proposed for the site, consideration of the location of any sewage systems should be given to ensure that wetlands are not impacted. This should be ensure through appropriate design of sewage treatment and disposal systems and provision of the setbacks and other requirements as stipulated within the *Government Sewerage Policy* (DPLH 2019).

4.5.3 Wetland management requirements

The identified generic wetland buffer areas have been considered within the environmental management framework for the site. The development approach for the site has included provision of a soft transition to the surrounding retained vegetation and wetlands which includes planting of endemic species, thereby protecting and reinforcing vegetation values (see **Appendix E**). The land uses proposed along the site boundaries are predominantly carparking, landscaped areas and internal roads which generally maintain the locations of existing internal driveways. These land uses are considered to be relatively benign with respect to any impacts on wetland values.

As per the general drainage strategy for the site any runoff from the entry roads and car parks will be treated and retained within the site and will not be discharged into the wetland. This approach will maintain the existing hydrological regime and ensure that no surface water pollutants enter the wetland from the development.

An SSE has been prepared for the site by Emerge Associates (2021d) which describes the requirements and capacity of the site to accommodate sewage treatment and disposal on-site. As identified in the SSE, any on-site sewage treatment units and disposal areas will be located at least 100 m from the outer edge of any CCW, consistent with the requirements of the *Government*

Sewerage Policy (DPLH 2019). The provision of this setback and the other requirements outlined in the SSE will ensure that sewage is disposed of in a manner that protects the adjacent wetlands.

While there are no wetlands located within the application area, during the development of the project impacts to the wetland areas will be minimised through:

- Preparation of a Construction Management Plan which is likely to include:
  - Temporary fencing prior to construction/clearing works surrounding the existing vegetation which is to be retained. This will encompass the CCW to the east of the site (UFI 7235) and ensure riparian vegetation is retained.
  - Induction for personnel that outlines locations and extent of vegetation to be retained (including UFI 7235) and how access to this area must be restricted.
  - Management measures to minimise impacts from dust or weed encroachment during construction.

Ongoing management of the CCWs will consider:

- Maintaining the natural hydrological regime, through implementation of the drainage strategy.
- Managing public access to the CCW UFI 7235 to minimise the potential for people to impact on the environmental values of the CCW.
- Planting of species appropriate to the soil and hydrological conditions present, such as those described in the landscape plan for the site. The exact species selection will be determined as part of future discussions between the proponent, the City of Armadale and DBCA.

4.6 Surrounding land use considerations

4.6.1 Policy framework and management objective

As discussed in **Section 2.5.3,** the site is situated within Special Control Areas designated as 'Wetland Protection Areas – Groundwater Environmental Management Area', 'Development Area' and partially within a 500 m poultry buffer area.

The Wetland Protection Area designation is discussed in **Section 4.5**, and the Development Area designation provisions (i.e., due planning and consideration of the environmental matters outlined in PLN2.7), has informed the environmental framework for the site and is discussed in **Section 4**.

Guidance Statement No. 3. Separation Distances between Industrial and Sensitive Land Uses (EPA 2005) provides guidance on recommended buffer distances for various industrial and sensitive land uses. The recommended buffer for poultry farms is indicated to be between 300 m and 1000 m, depending on the size of the operation.

4.6.2 Design considerations for surrounding land uses

The 500 m poultry buffer extends within the site by approximately 90 m and covers an entryway, the place of worship, a carpark and a minor portion of a primary school building. From review of aerial photography, the poultry operation in question appears to consistent of six barns and other ancillary buildings. The total footprint of the barns amounts to approximately 0.6 ha, which could be considered as a small to moderate sized operation.

The place of worship, which is situated within the buffer area, is expected to have a lower frequency of occupancy than a traditional residential dwelling or place of work and so is considered to be less sensitive to the impacts of poultry farming (e.g., odour, noise). The buffer area extends by approximately 8 m into the primary school building footprint, which given the small overlap and the distance from poultry operations, is not considered significant.

4.6.3 Surrounding management requirements

No specific management is considered necessary in response to the 500 m poultry farm buffer.

4.7 Bushfire management

4.7.1 Policy framework and management objective

State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015) stipulates that any development proposal which occurs partly or wholly within a bushfire prone area is required to be accompanied by a bushfire management plan (BMP).

4.7.2 Design considerations for bushfire management

A BMP has been prepared to support the preparation of the development layout (Emerge Associates 2021c). The BMP has demonstrated that bushfire risk can be safely managed without the clearing of any of the vegetation surrounding the application area.

While planting of endemic species has been proposed within the site to protect and reinforce the surrounding environmental values, these plants will be managed by the proponent and will have a low bushfire risk.

Further discussion in regards to bushfire risk is provided in the BMP (Emerge Associates 2021c).

4.7.3 Bushfire management requirements

Landscaping within the site will be sensitively designed and managed by the proponent such that a low bushfire risk will be maintained.

5 Conclusions

This EAMP has been prepared on behalf of the proponent to support development of the educational facilities within a portion of Lot 15 Nicholson Road, Forrestdale.

The development layout and landscaping plan has responded to site-specific environmental considerations where possible, including the retention of higher-quality vegetation within the eastern portion of the site. This includes the largest contiguous area of fauna habitat within the site, which also provides a linkage to larger areas of better condition vegetation outside of the site.

This document provides an environmental management strategy to be implemented across the site during development. The key components of this management strategy are summarised as follows:

- Acid sulfate soils: Completion of an ASS self-assessment form and if necessary (based on the outcomes of the ASS self-assessment), the preparation of an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP).
- Native vegetation: A clearing permit will need to be attained pursuant to Part V of the *Environmental Protection Act 1986* (unless a valid exemption applies) and the potential requirement for an EPBC Act referral will need to be considered. Vegetation outside of the application area will be retained and managed.
- Native fauna: Where clearing of potential black cockatoo habitat is proposed, the potential requirement for an EPBC Act referral will need to be considered. Fauna management protocols and actions will also need to be implemented prior to and during clearing activities, potentially through implementation of a Fauna Management Plan.
- Construction management: A Construction Management Plan should be prepared and include measures to ensure the protection of retained vegetation within the site including consideration of aspects such as physical protection of vegetation and management of dust and weed encroachment.
- Sewage disposal: should be designed and implemented consistent with the requirements of the SSE prepared for the site (Emerge Associates 2021d) and other relevant guidelines and policy.
- Drainage strategy: The drainage strategy for the site should be documented within a drainage plan, water management plan or similar which will demonstrate how the hydrological regime will be maintained and that sewage disposal systems will not be subject to flooding or inundation in a 10% AEP event.
- Irrigation and fertilisation: An Irrigation and Nutrient Management Plan is recommended to outline the establishment and ongoing maintenance requirements of the playing fields. The approach will minimise any irrigation and fertiliser requirements through water-sensitive design and sensitive fertilising.
- Non-potable water: Non-potable water requirements should be provided by groundwater if possible (and through scheme water if not). A groundwater operating strategy may be required should a groundwater allocation be acquired.
- Wetlands: Wetland values will be maintained and protected through maintenance of the hydrological regime (on-site treatment and retention), managing public access to the CCW UFI

7235, sensitive and transitional landscaping, benign land uses within transitional boundary areas, locating any on-site sewage systems at least 100 m from the outer edge of any CCWs, appropriate design of sewage treatment units and disposal areas, appropriate consideration of functional buffer requirements and the sensitive use of fertilisation in sporting and landscaped areas.

- Bushfire: Bushfire risk can be safely managed within the application area without the clearing of vegetation not located within the application area. Landscaping within the application area will be sensitively designed and managed by the proponent such that a low bushfire risk will be maintained.

Overall, the environmental attributes and values of the site can be suitably accommodated within the layout plan, or can be appropriately managed through the future development in line with the relevant state and local government legislation, policies and guidelines and best management practices.

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Figures

Figures
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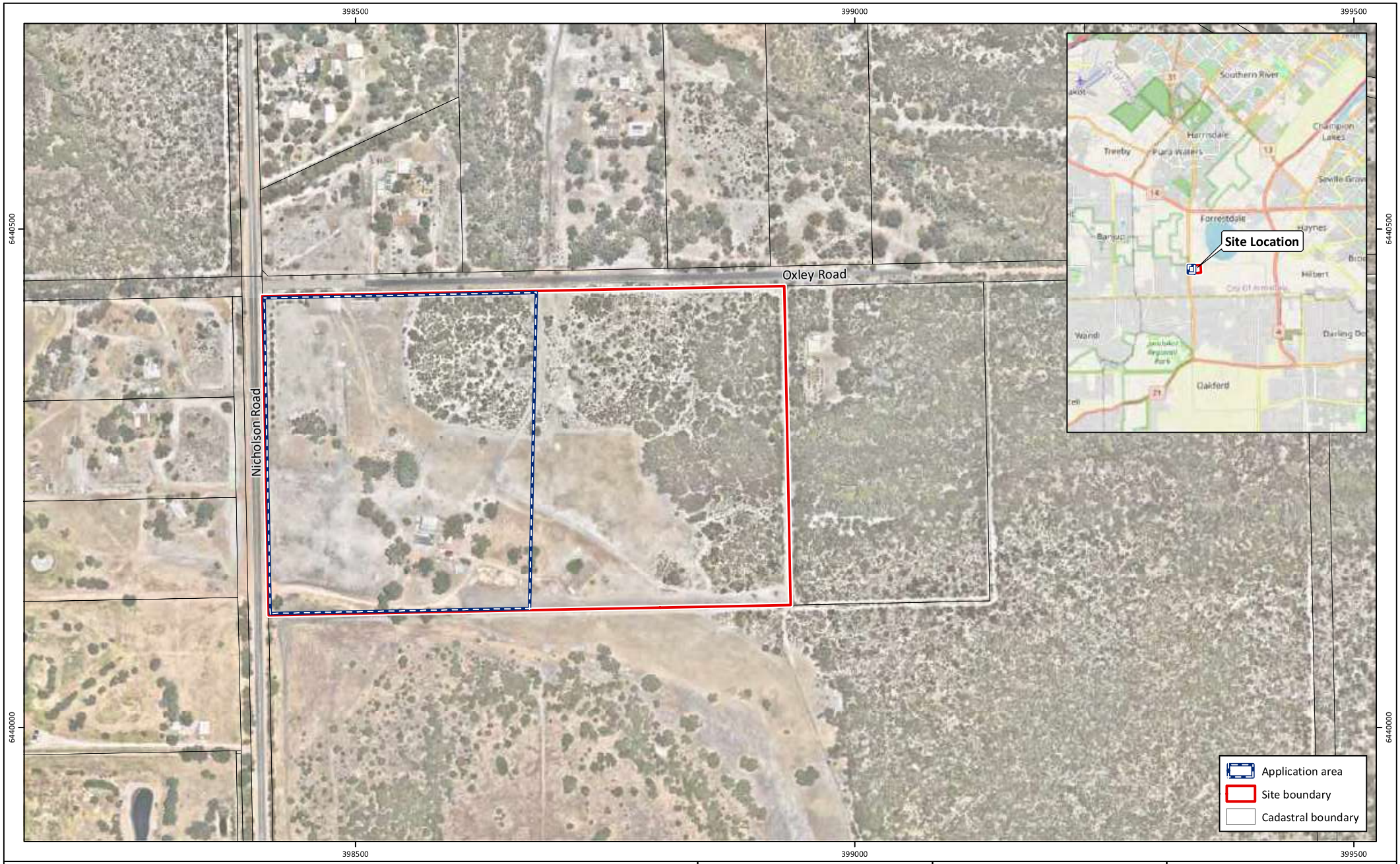

Figure 1: Site Location

Project:	Environmental Assessment and Management Plan Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F34

Drawn:	GAR
Date:	25/06/2021
Checked:	MGB
Approved:	JDH
Date:	01/07/2021

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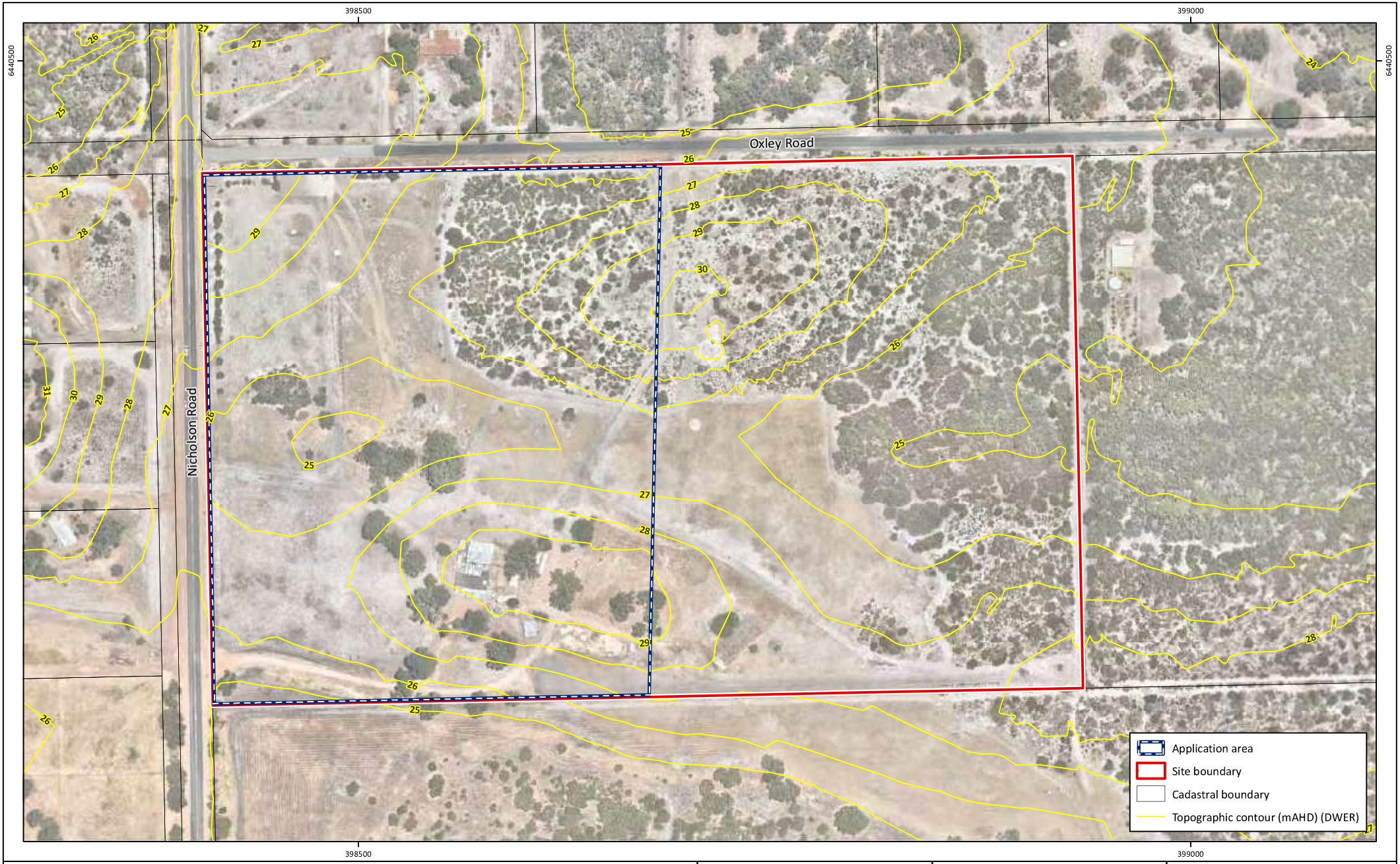

Figure 2: Topography

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F35
Drawn: GAR
Date: 25/06/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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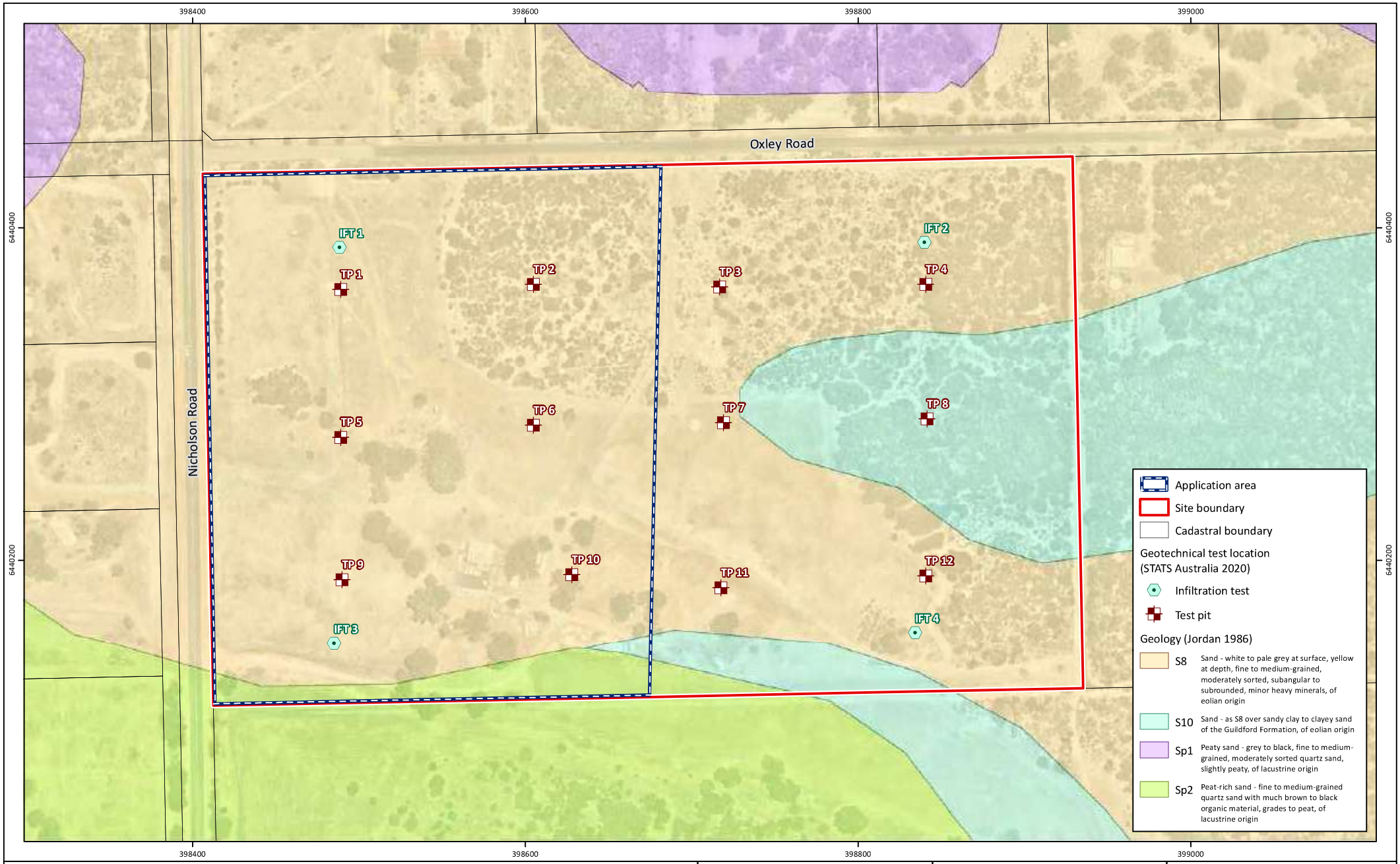

Figure 3: Geology and Soils

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F36
Drawn: GAR
Date: 25/06/2021
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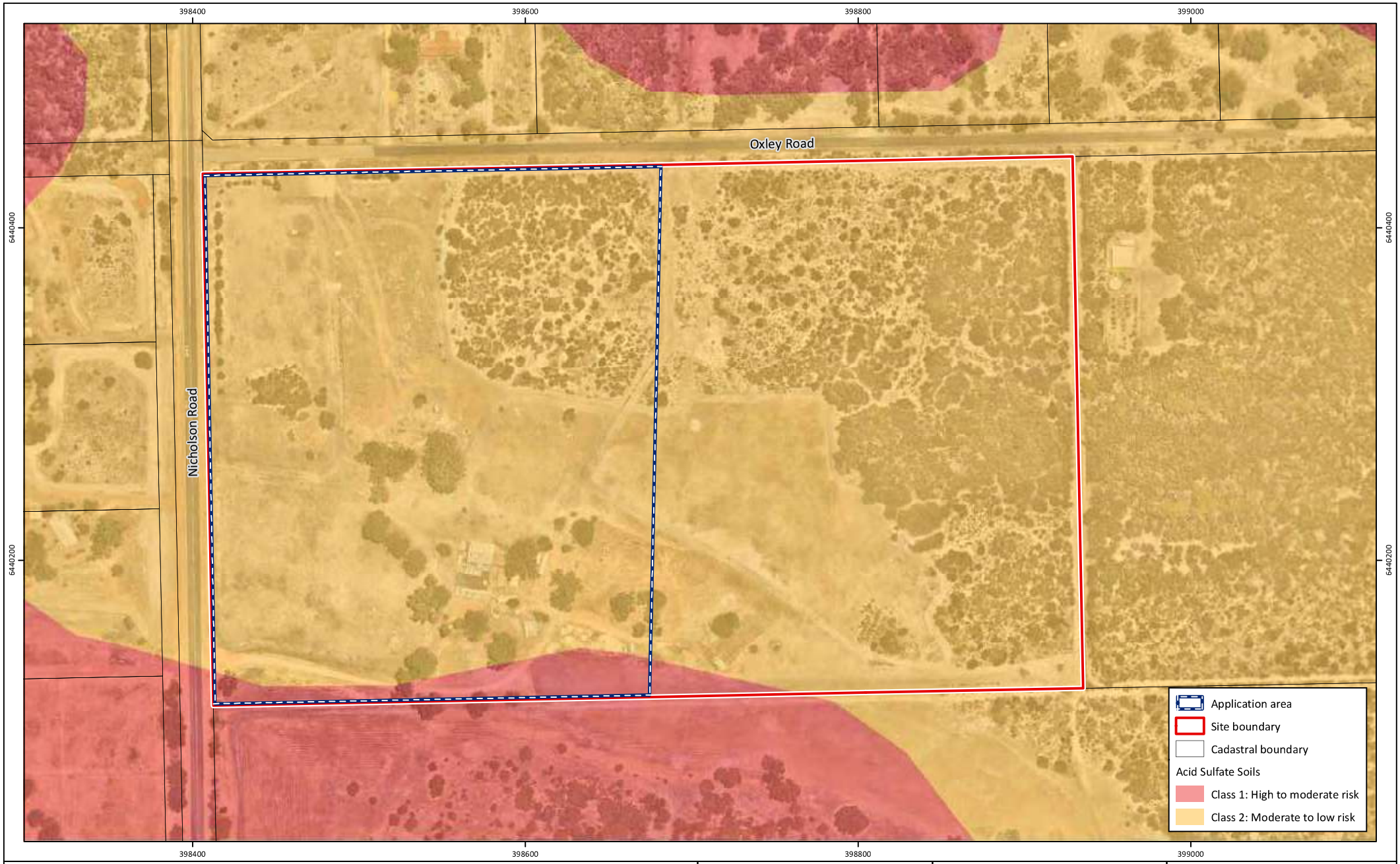

Figure 4: Acid Sulfate Soil Risk Mapping

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F37
Drawn: GAR
Date: 25/06/2021
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Date: 01/07/2021

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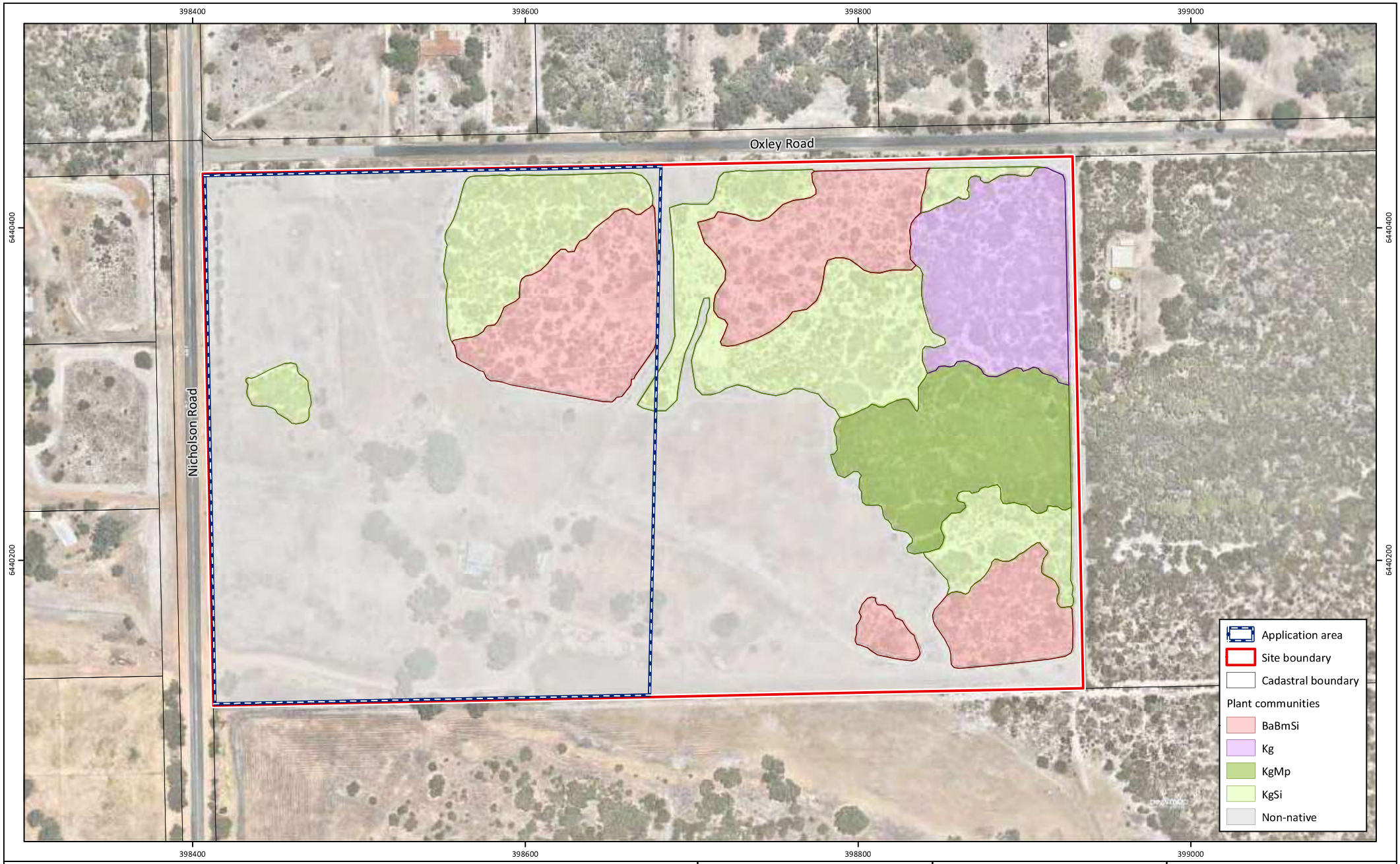

Figure 5: Plant Communities

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F38
Drawn: GAR
Date: 25/06/2021
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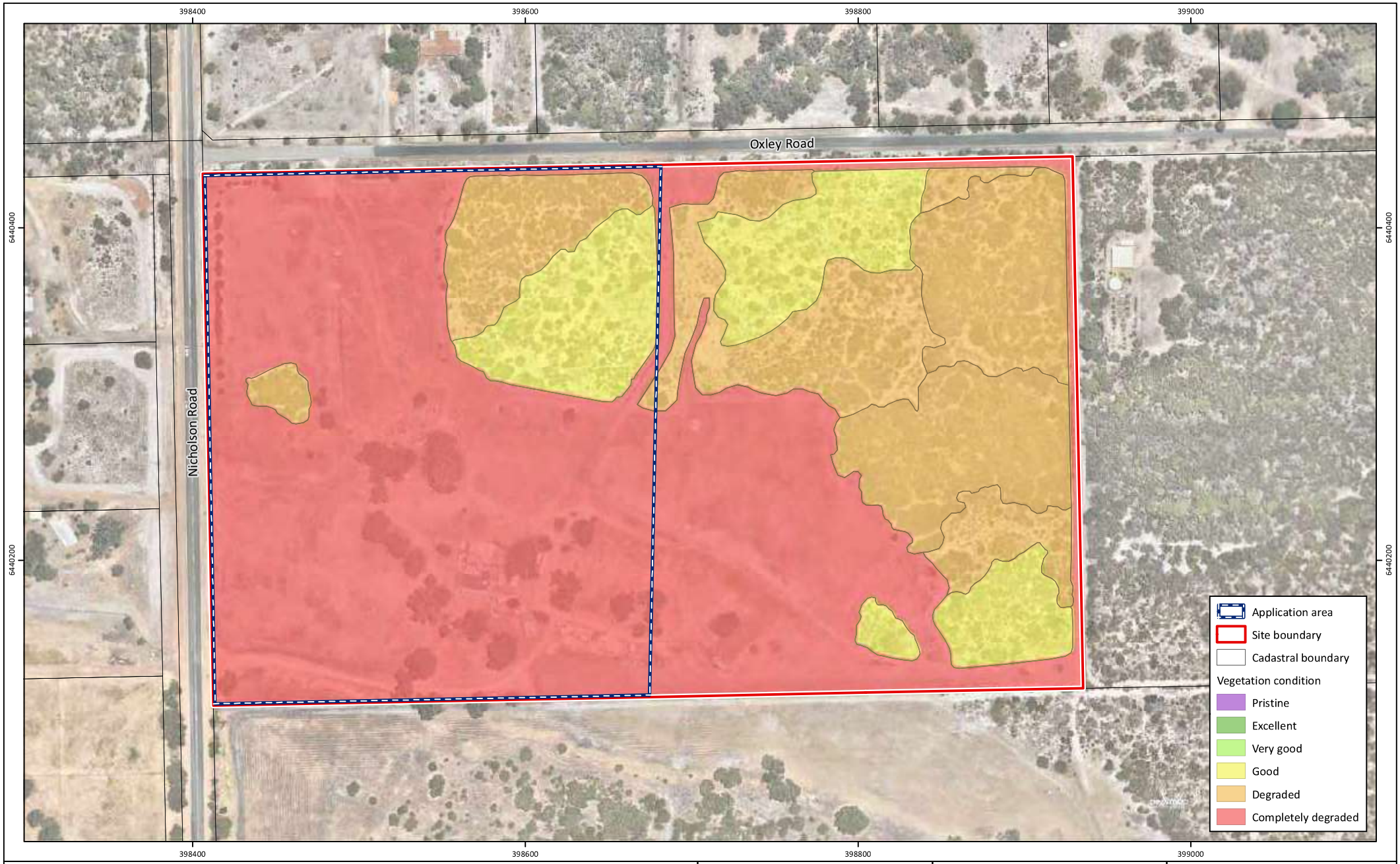

Figure 6: Vegetation Condition

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F39
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Date: 25/06/2021
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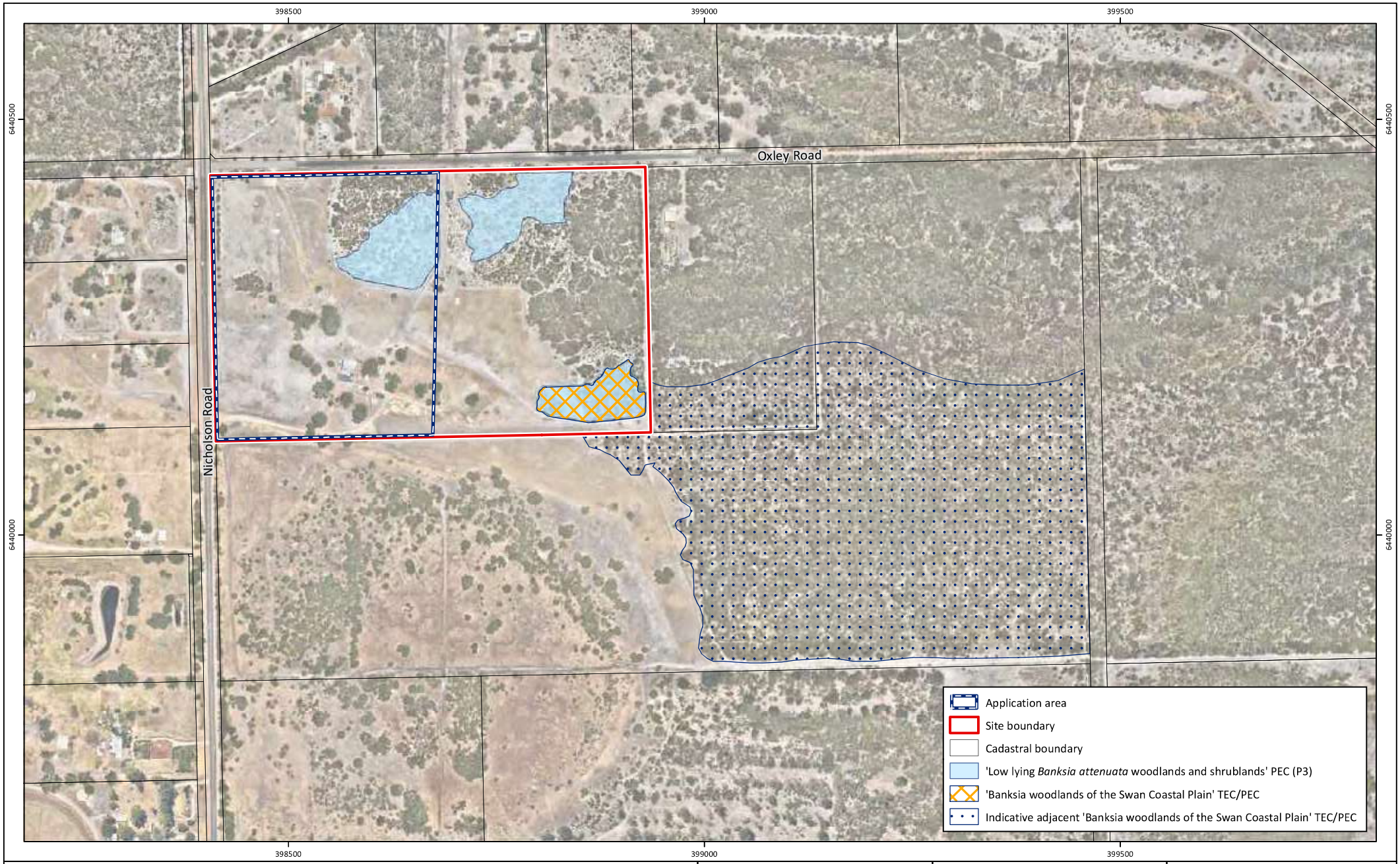

Figure 7: Threatened and Priority Ecological Communities

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
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Drawn: GAR
Date: 25/06/2021
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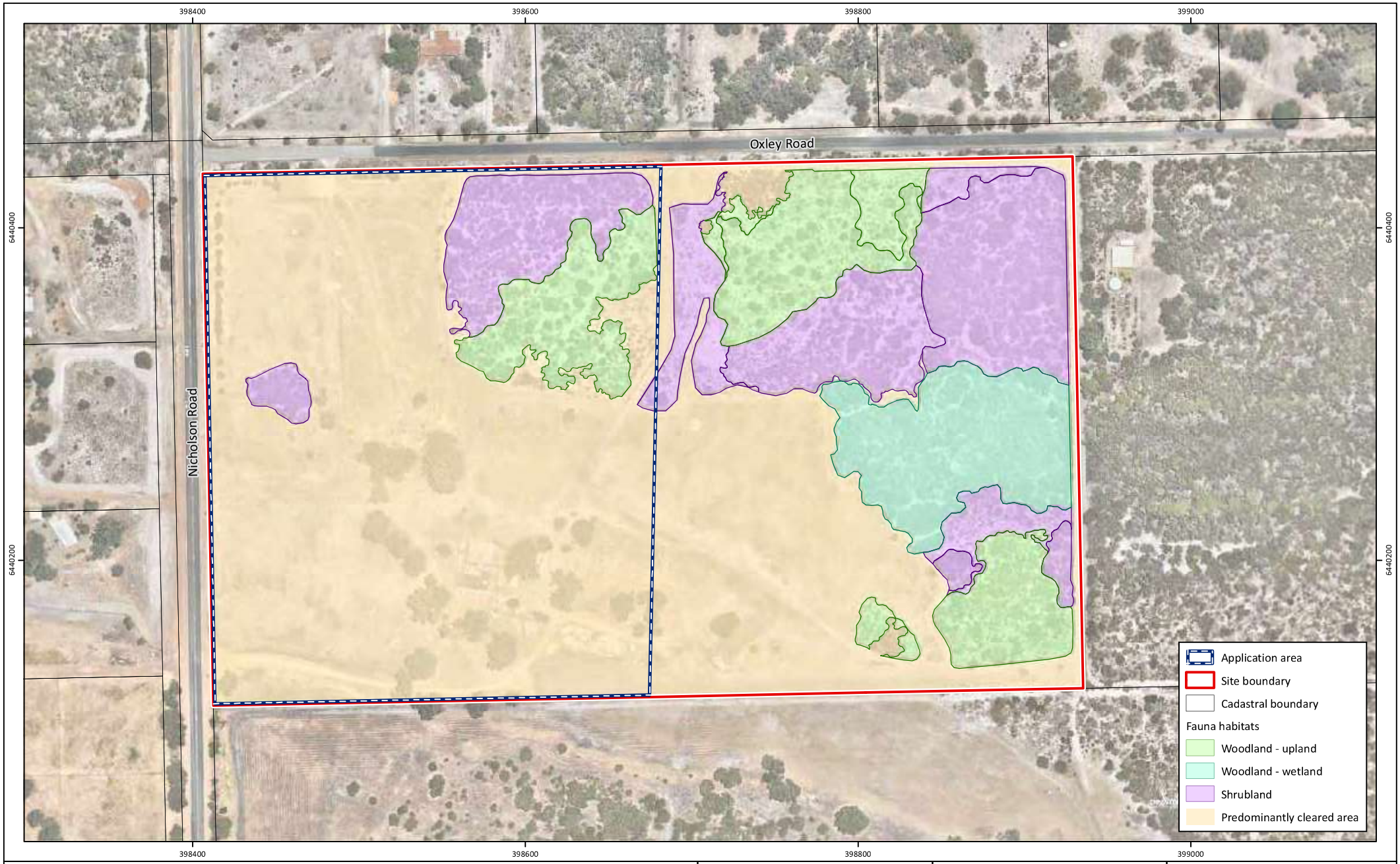

Figure 8: Fauna Habitat

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F41
Drawn: GAR
Date: 25/06/2021
Checked: MGB
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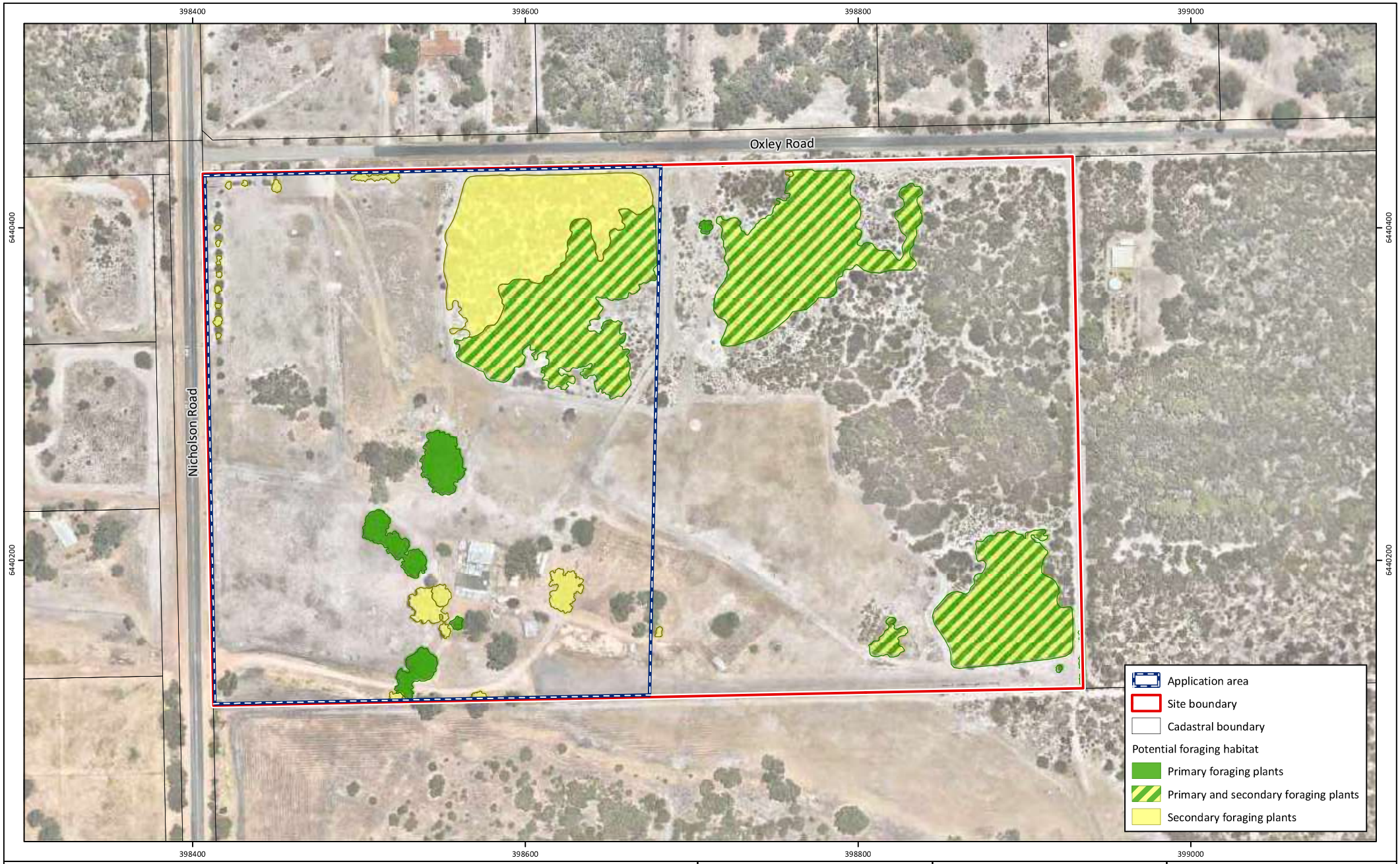

Figure 9: Potential Carnaby's Cockatoo Foraging Habitat

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F42

Drawn:	GAR
Date:	25/06/2021
Checked:	MGB
Approved:	JDH
Date:	01/07/2021

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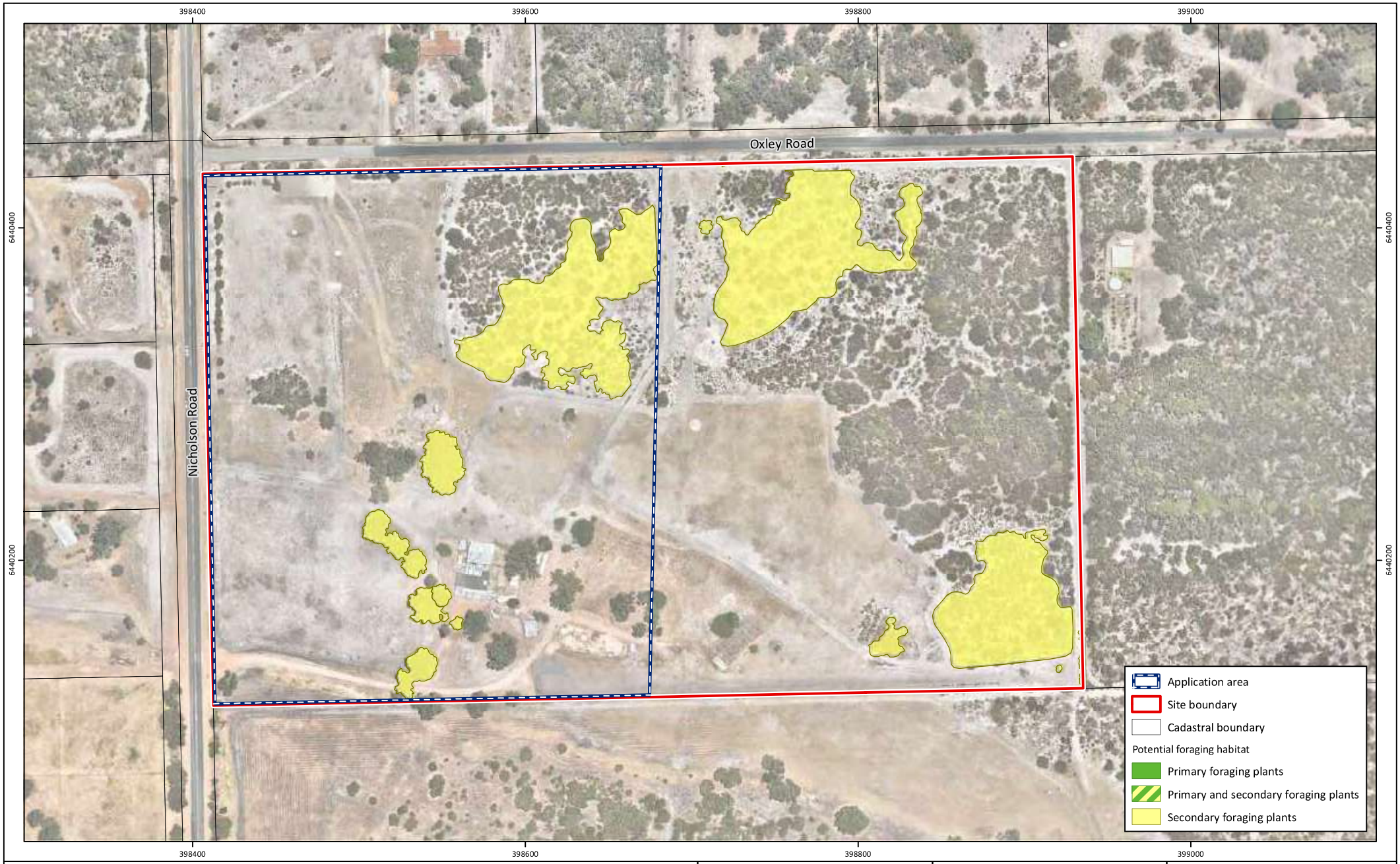

Figure 10: Potential Baudin's Cockatoo Foraging Habitat

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F43
Drawn: GAR
Date: 25/06/2021
Checked: MGB
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Date: 01/07/2021

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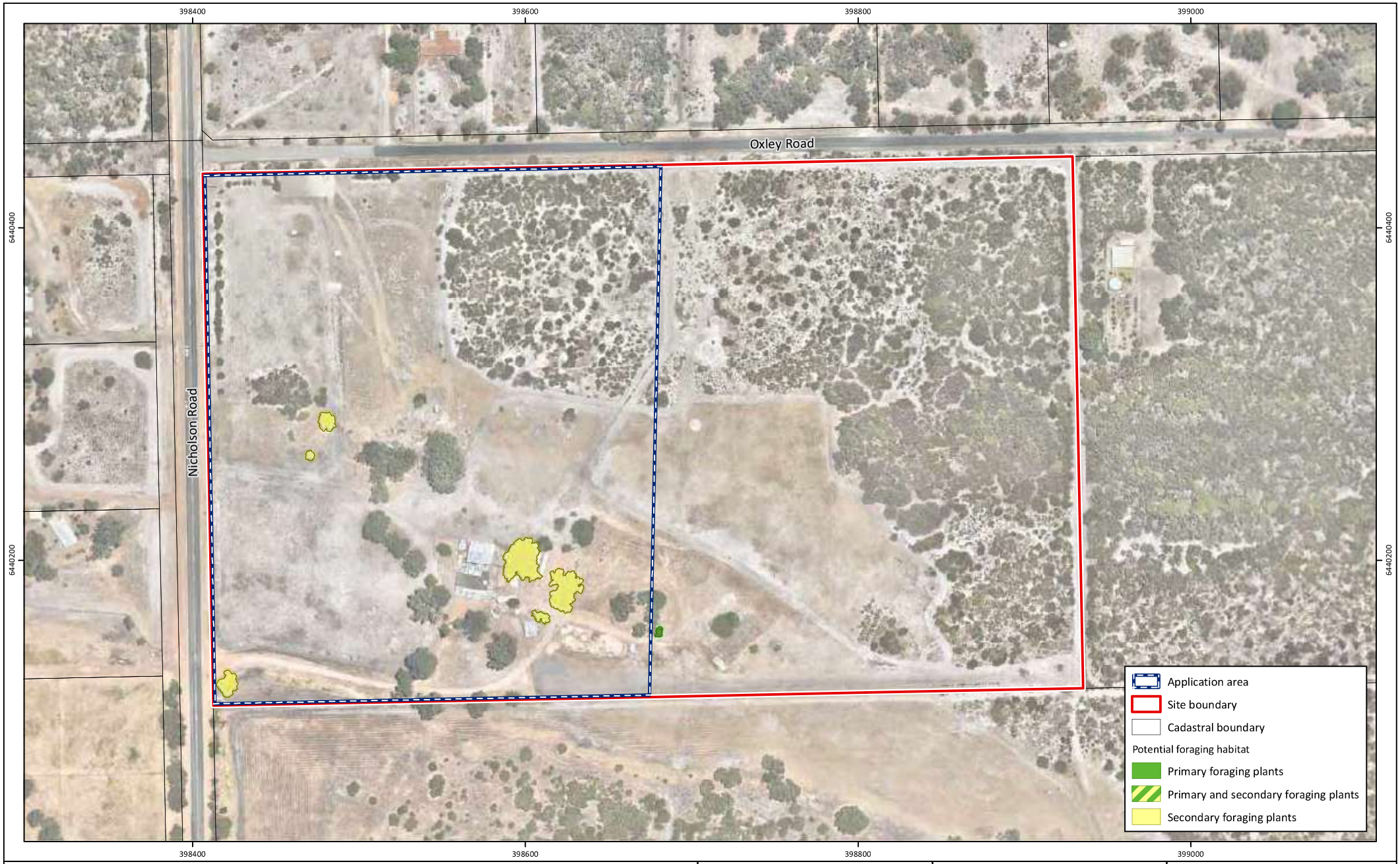

Figure 11: Potential Forest Red-tailed Black Cockatoo Foraging Habitat

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F44
Drawn: GAR
Date: 25/06/2021
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Date: 01/07/2021

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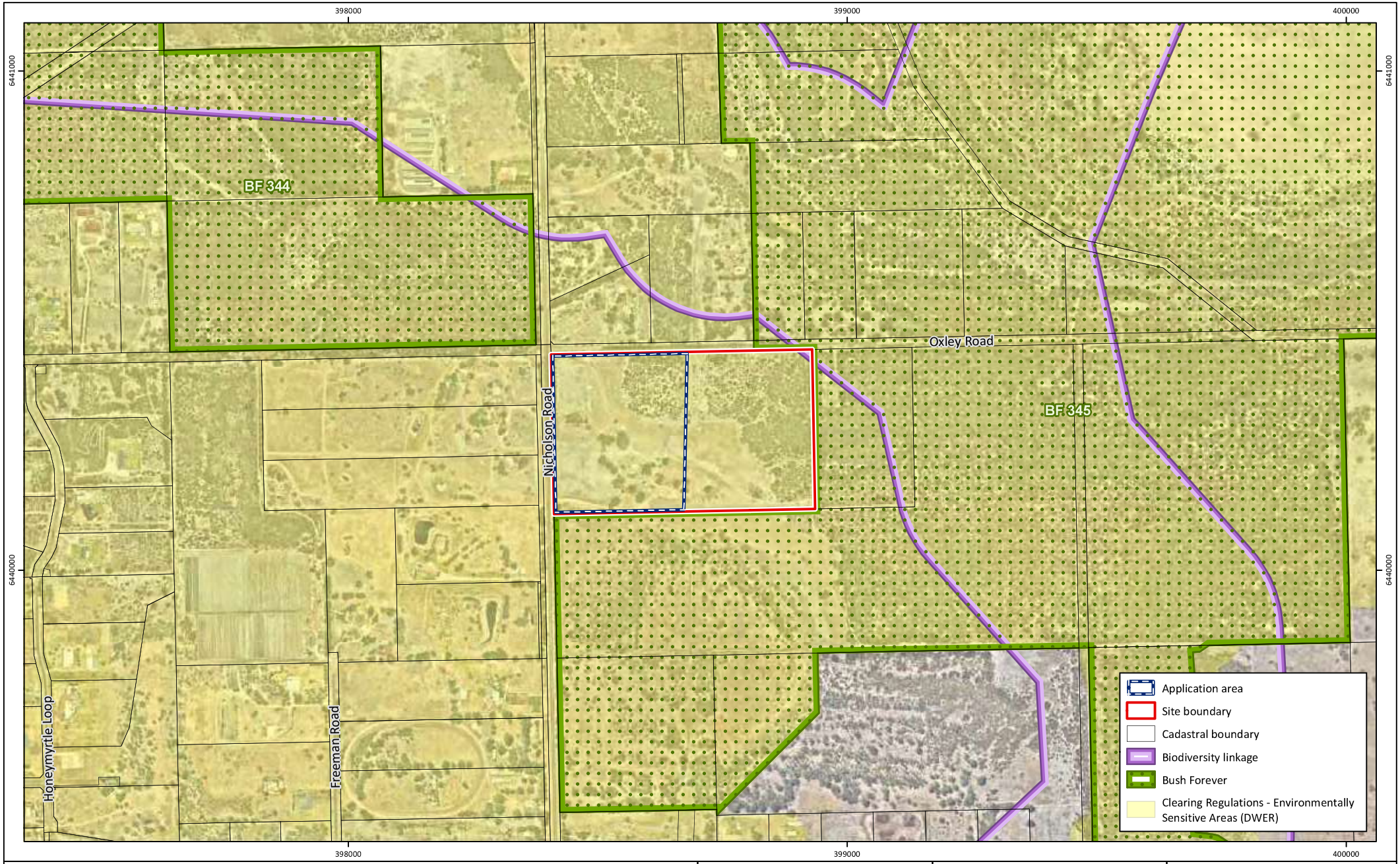

Figure 12: Environmental Assets

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F45
Drawn: GAR
Date: 25/06/2021
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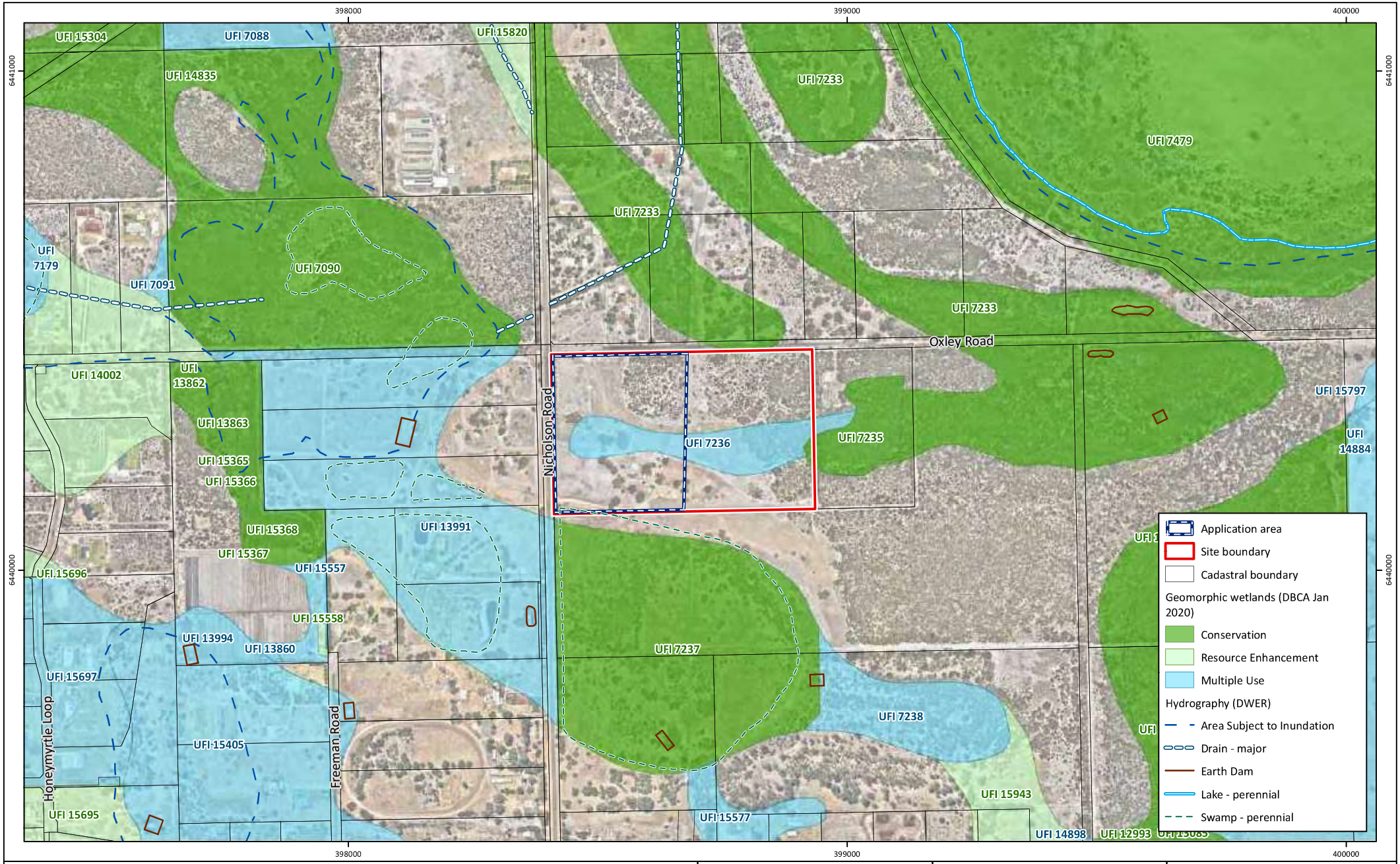

Figure 13: Hydrological Features

Project:	Environmental Assessment and Management Plan Lot 15 Nicholson Road, Forrestdale
Client:	Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F51

Drawn:	GAR
Date:	01/07/2021
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Date:	01/07/2021

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

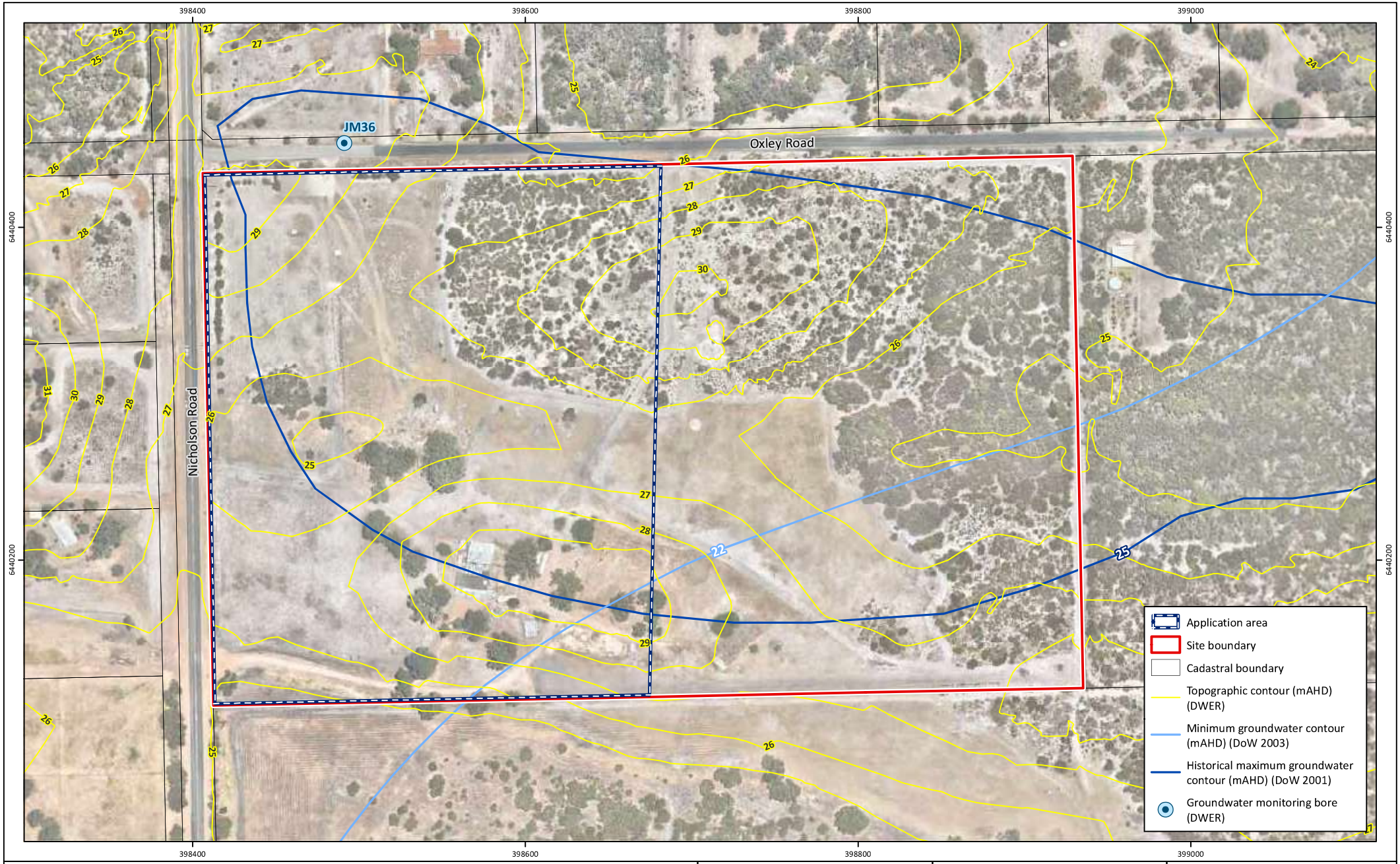

Figure 14: Groundwater Contours

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F46
Drawn: GAR
Date: 25/06/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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Metres
Scale: 1:3,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

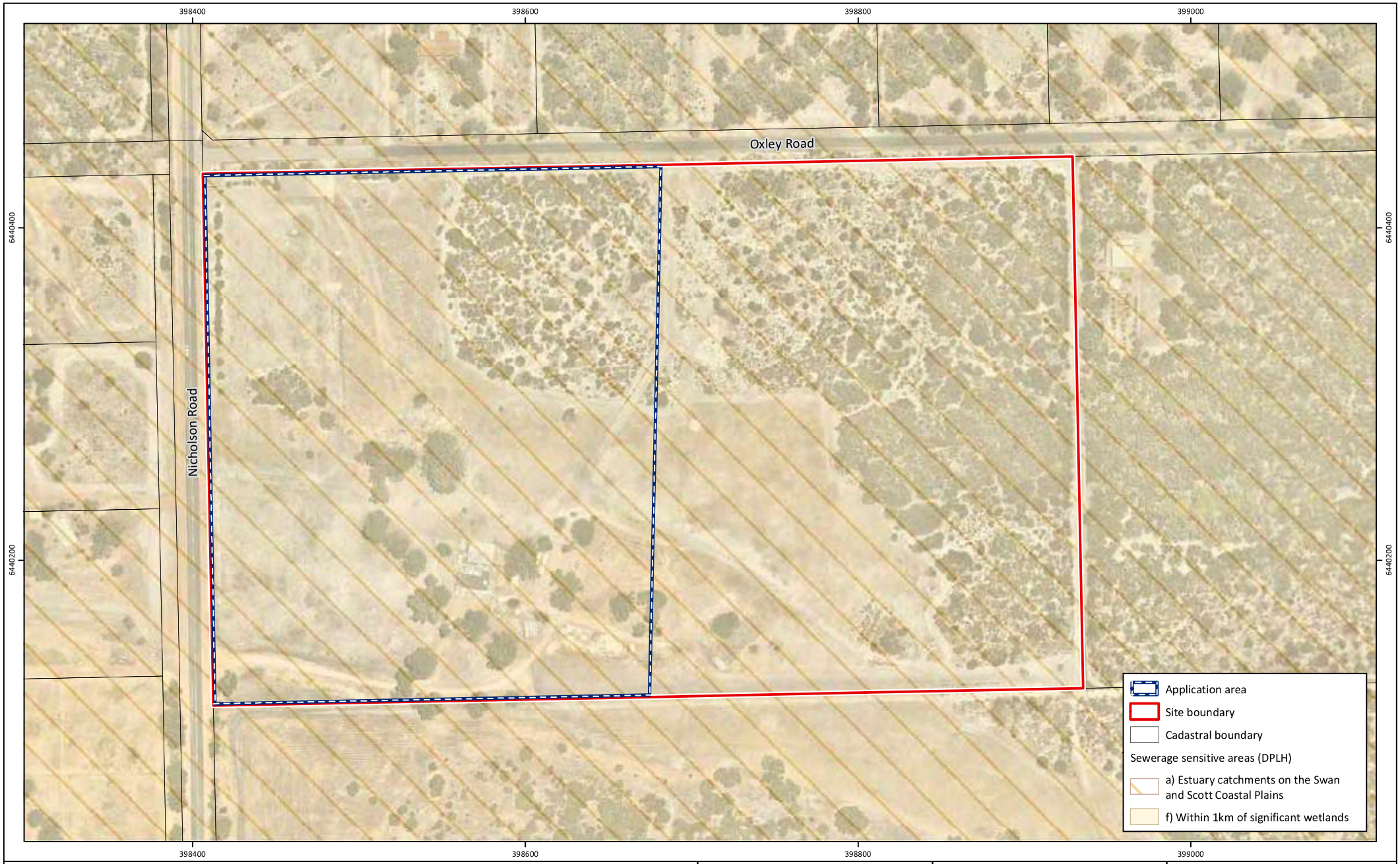

Figure 15: Sewage Sensitive Areas

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F47
Drawn: GAR
Date: 25/06/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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Metres
Scale: 1:3,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

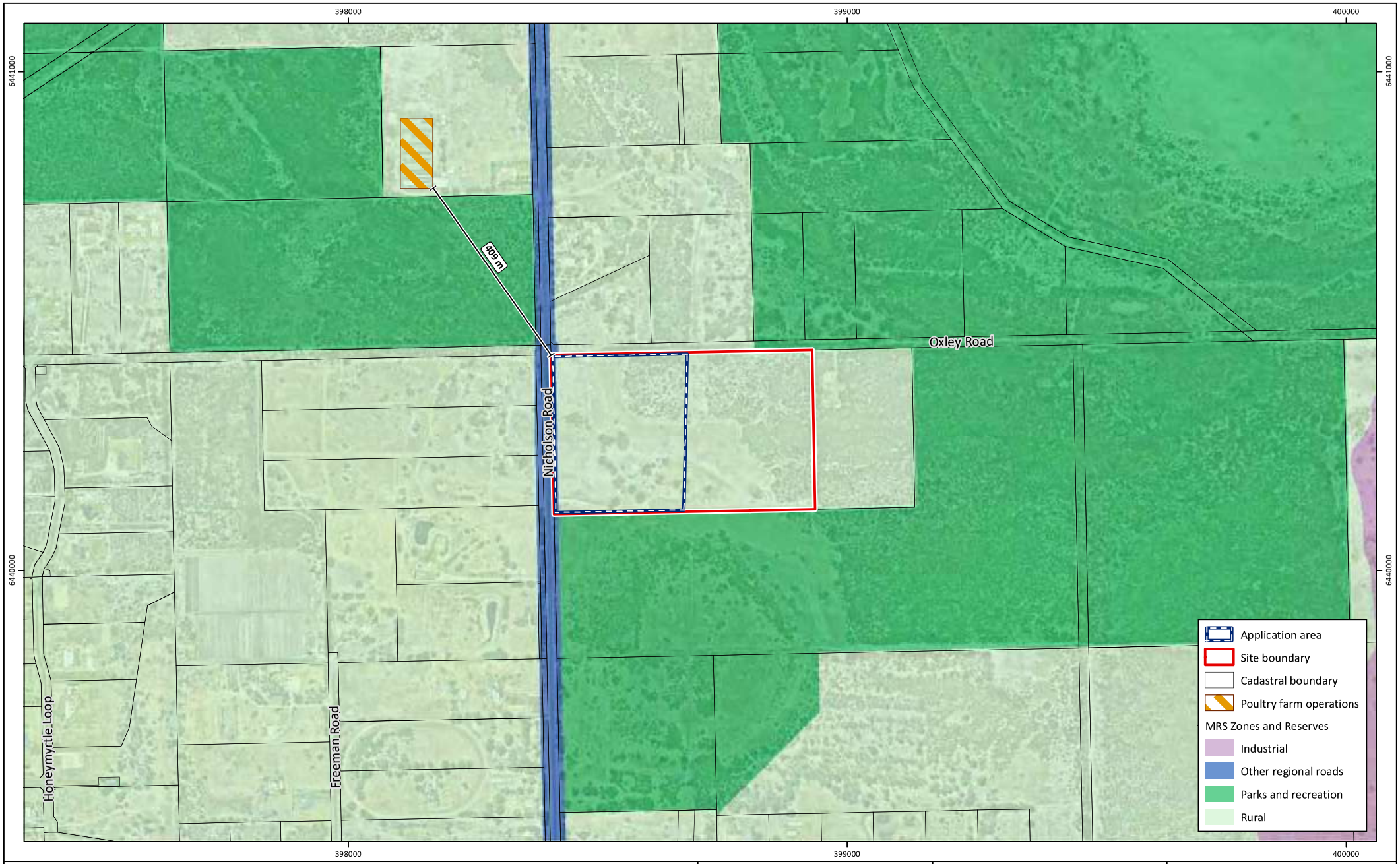

Figure 16: Surrounding Land Uses

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F50
Drawn: GAR
Date: 01/07/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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Scale: 1:10,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

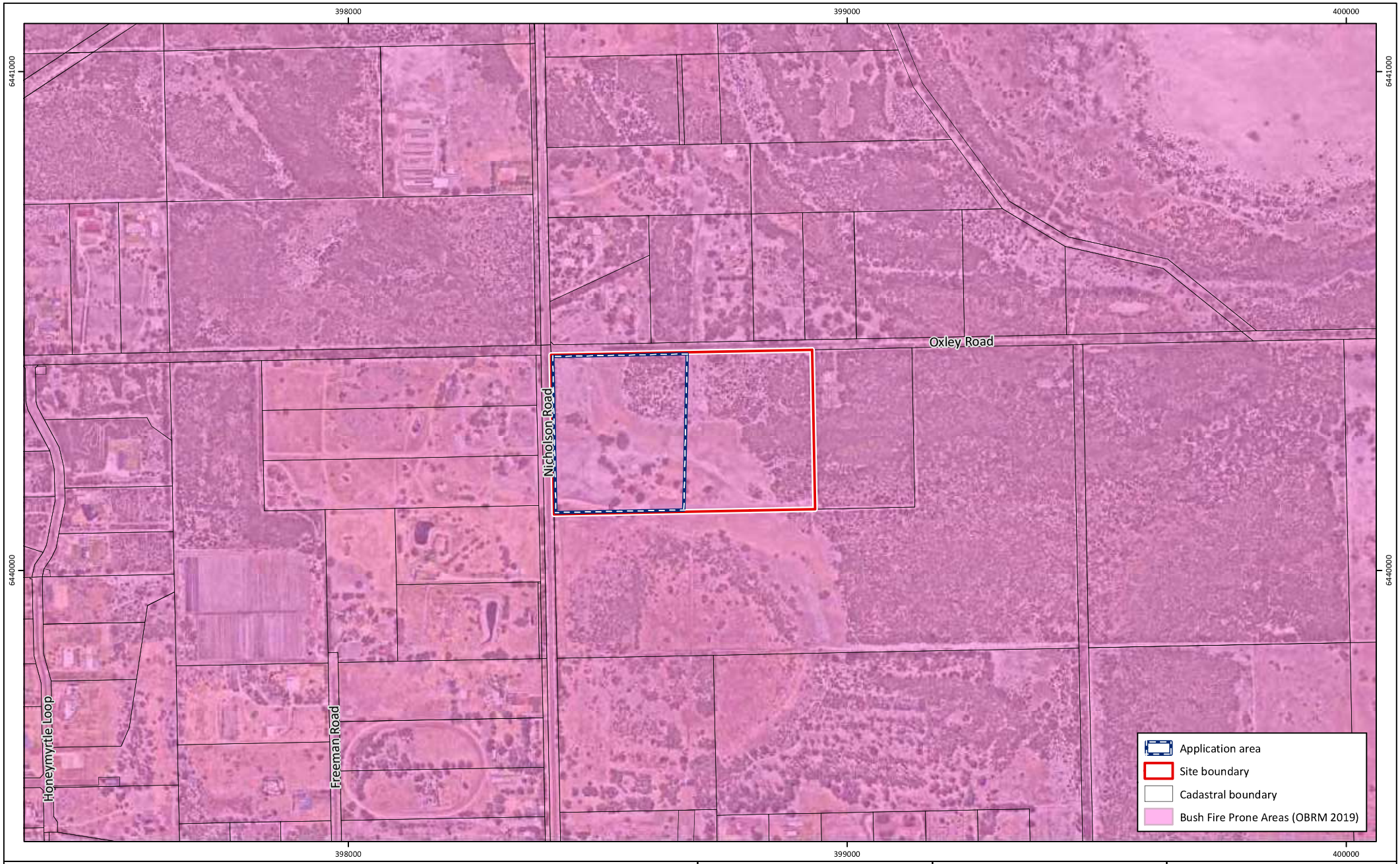

Figure 17: Bushfire Prone Areas

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F48
Drawn: GAR
Date: 25/06/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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Metres
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GDA 1994 MGA Zone 50

emerge ASSOCIATES

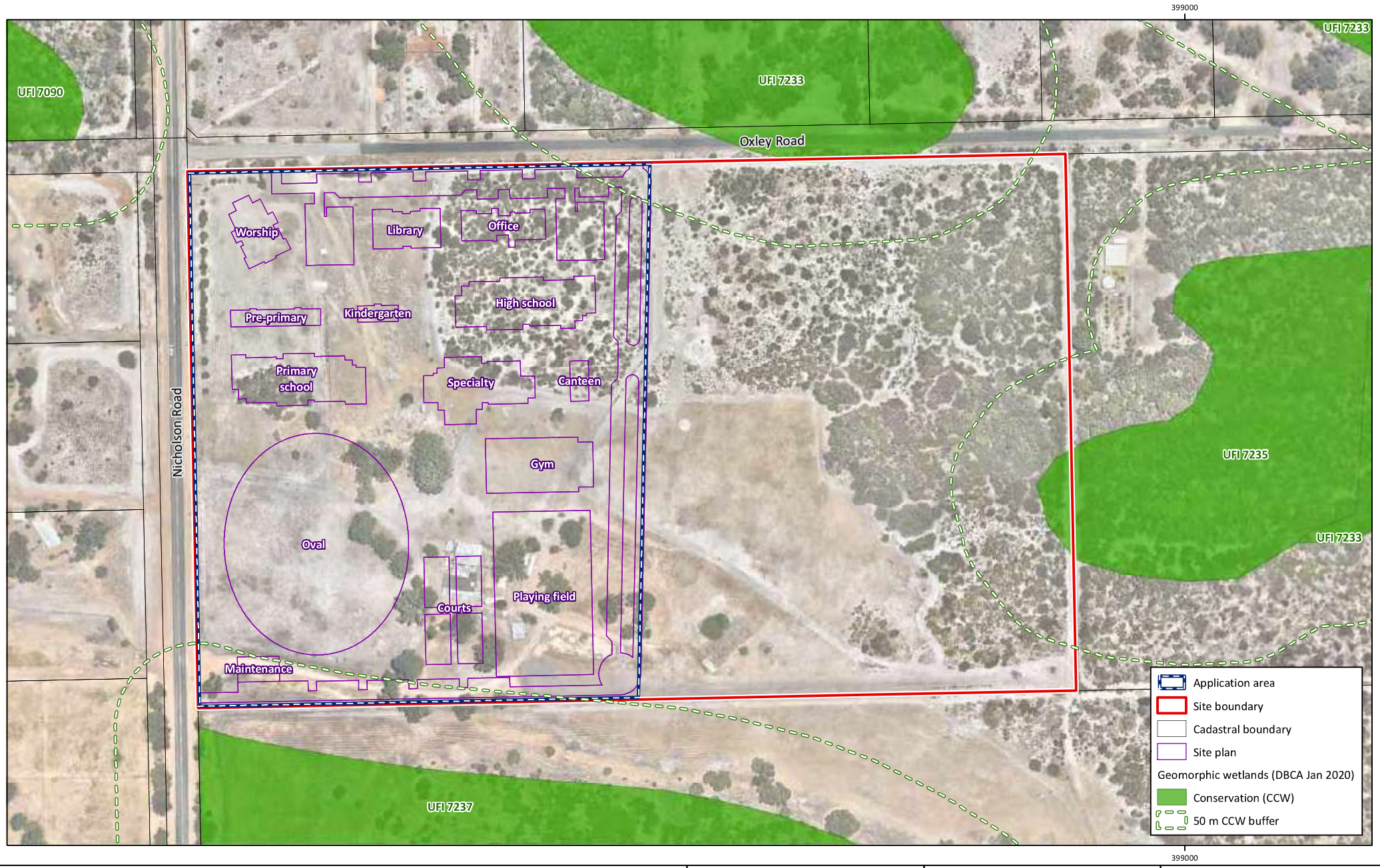

Figure 18: Generic Wetland Buffers

Project: Environmental Assessment and Management Plan
Lot 15 Nicholson Road, Forrestdale
Client: Australian Islamic College (Perth) Inc.

Plan Number:
EP20-126(02)--F49
Drawn: GAR
Date: 25/06/2021
Checked: MGB
Approved: JDH
Date: 01/07/2021

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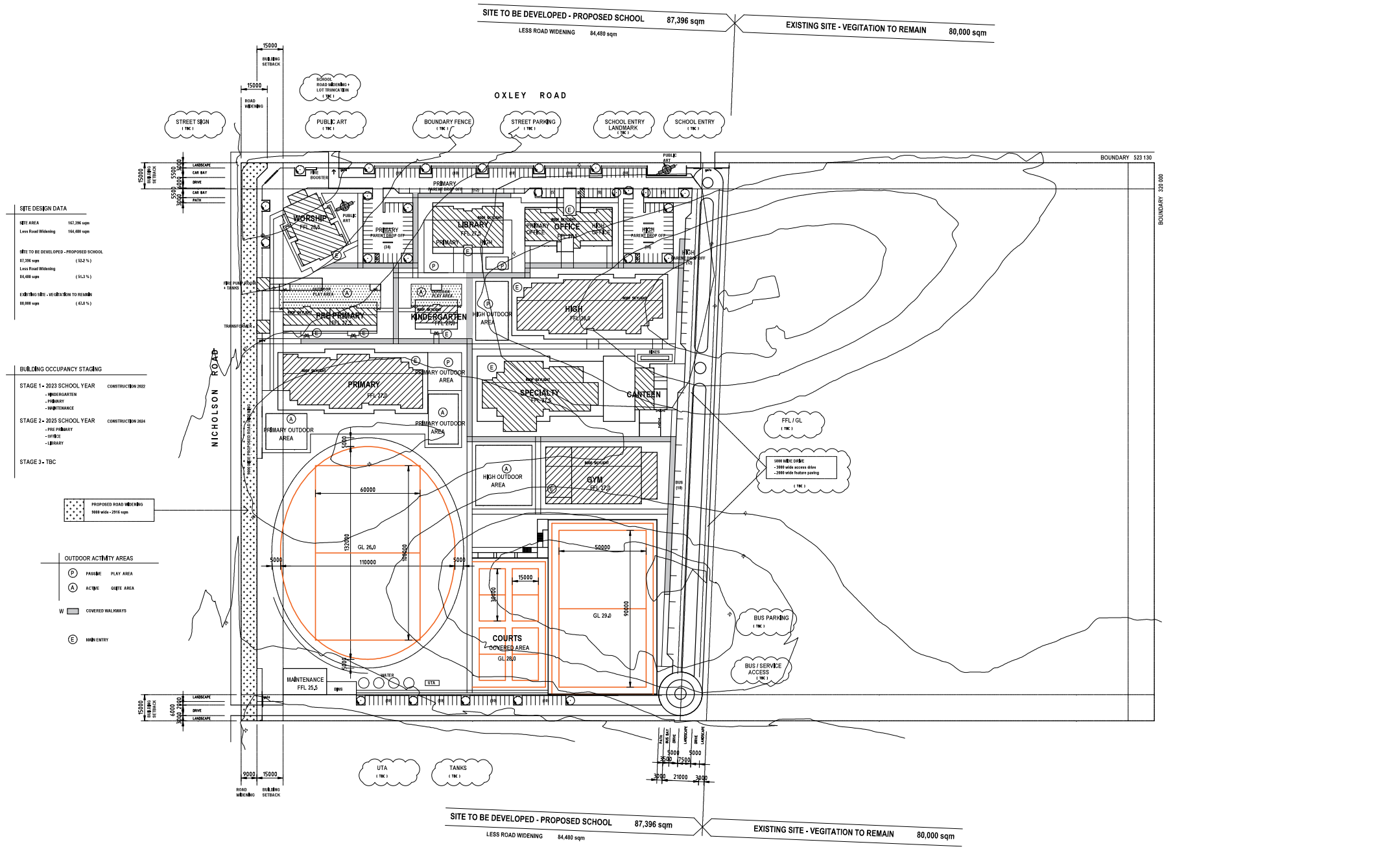
Metres
Scale: 1:3,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

Appendix A

Development layout and TPS4 Mapping

Marocchi Group (2021), CoA (2005)



A I C FORRESTDALE

PROPOSED MASTER PLAN

MAROCCHI engineering group
Suite 3, 158 Newcastle Street, Perth W.A. 6000
Tel. (08) 9328 5700

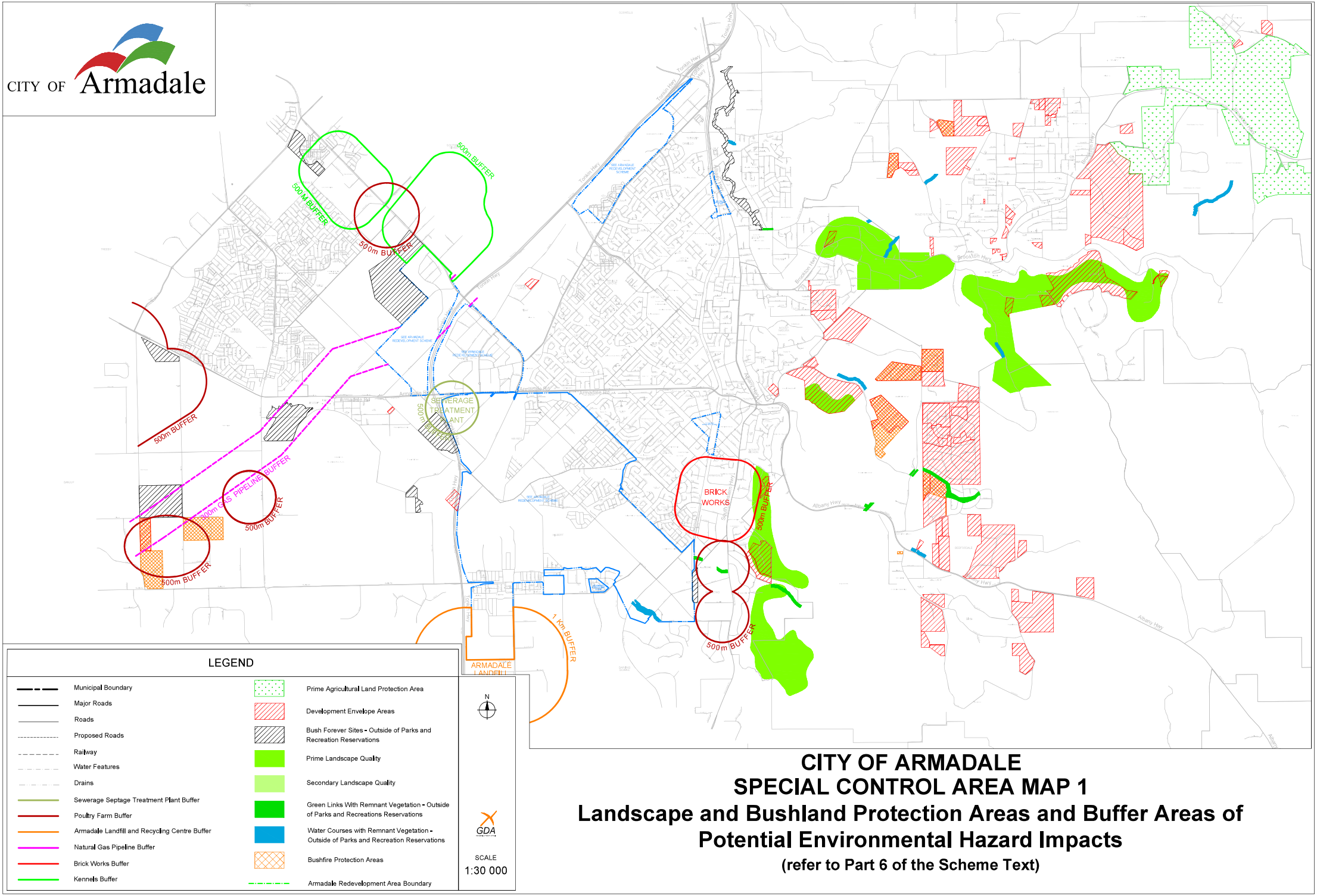
PROJECT
AUSTRALIAN ISLAMIC COLLEGE
LOT 15 (651) NICHOLSON ROAD
FORRESTDALE

SHEET
PROPOSED SITE PLAN

DRAWN NS | SCALE 1:1000 @ A1 1:2000 @ A3
DESIGNED NS | DRG No 20-371-DA01-1 | REV P2
CHECKED

REV	DATE	CHKD	DESCRIPTION
P2	28-5-2021		CLIENT + CONSULTANT REVIEW ISSUE
P1	26-5-2021		CLIENT + CONSULTANT REVIEW ISSUE
2	3-3-2021		CLIENT + CONSULTANT REVIEW ISSUE
1	23-2-2021		CLIENT + CONSULTANT REVIEW ISSUE

CITY OF Armadale



LEGEND

- Municipal Boundary
- Major Roads
- Roads
- Proposed Roads
- Railway
- Water Features
- Drains
- Sewerage Septage Treatment Plant Buffer
- Poultry Farm Buffer
- Armadale Landfill and Recycling Centre Buffer
- Natural Gas Pipeline Buffer
- Brick Works Buffer
- Kennels Buffer
- Prime Agricultural Land Protection Area
- Development Envelope Areas
- Bush Forever Sites - Outside of Parks and Recreation Reservations
- Prime Landscape Quality
- Secondary Landscape Quality
- Green Links With Remnant Vegetation - Outside of Parks and Recreations Reservations
- Water Courses with Remnant Vegetation - Outside of Parks and Recreation Reservations
- Bushfire Protection Areas
- Armadale Redevelopment Area Boundary

N

GDA

SCALE
1:30 000

CITY OF ARMADALE
SPECIAL CONTROL AREA MAP 1
Landscape and Bushland Protection Areas and Buffer Areas of Potential Environmental Hazard Impacts

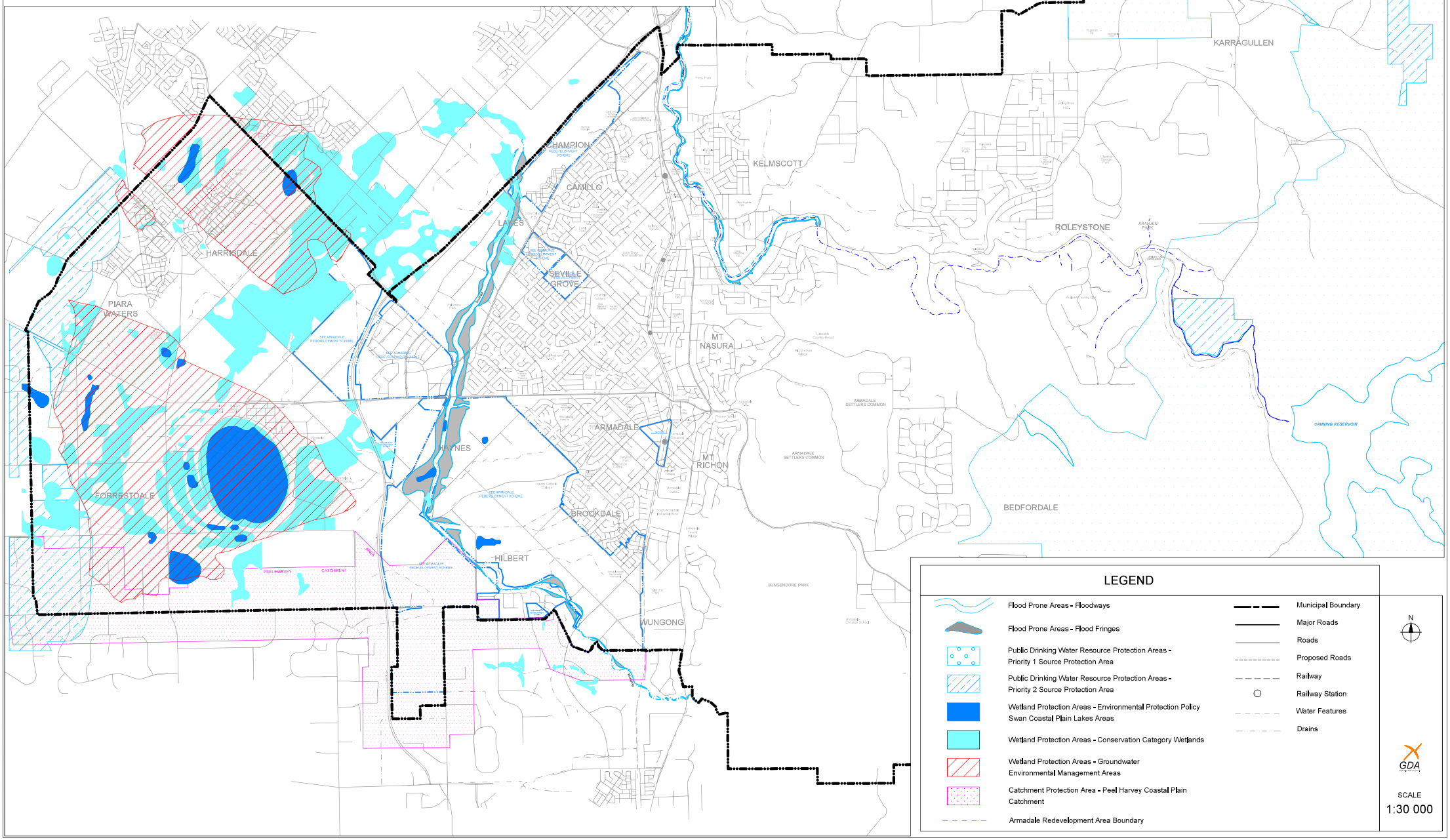
(refer to Part 6 of the Scheme Text)

CITY OF Armadale

CITY OF ARMADALE
SPECIAL CONTROL AREA MAP 2
Groundwater Protection Areas

(refer to Part 6 of the Scheme Text)

Reg 13 - Adopted Final Approval 20 September 2004



LEGEND

- Flood Prone Areas - Floodways
- Flood Prone Areas - Flood Fringes
- Public Drinking Water Resource Protection Areas - Priority 1 Source Protection Area
- Public Drinking Water Resource Protection Areas - Priority 2 Source Protection Area
- Wetland Protection Areas - Environmental Protection Policy Swan Coastal Plain Lakes Areas
- Wetland Protection Areas - Conservation Category Wetlands
- Wetland Protection Areas - Groundwater Environmental Management Areas
- Catchment Protection Area - Peel Harvey Coastal Plain Catchment
- Armadale Redevelopment Area Boundary
- Municipal Boundary
- Major Roads
- Roads
- Proposed Roads
- Railway
- Railway Station
- Water Features
- Drains

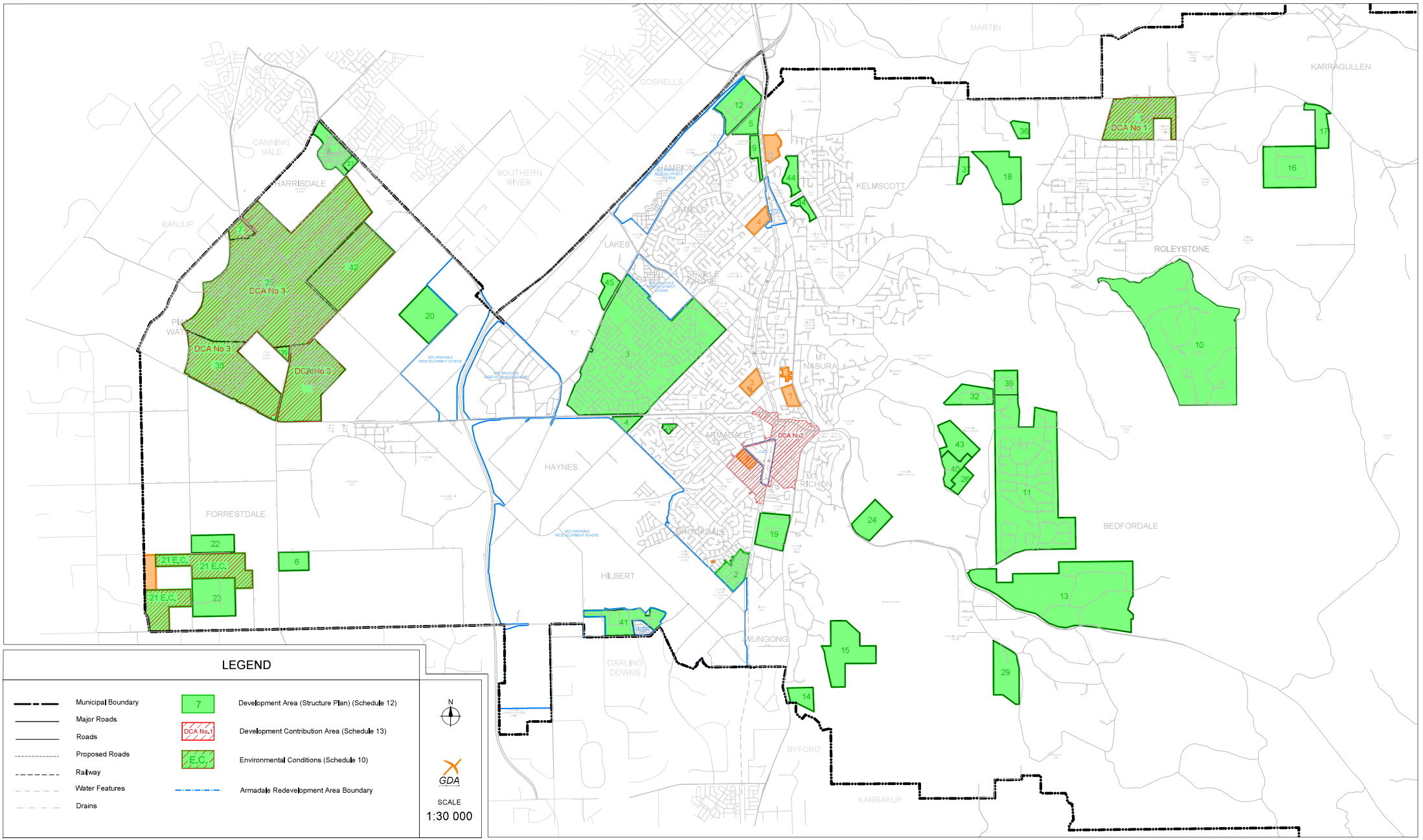
N

GDA

SCALE
1:30 000

CITY OF ARMADALE
SPECIAL CONTROL AREA MAP 3

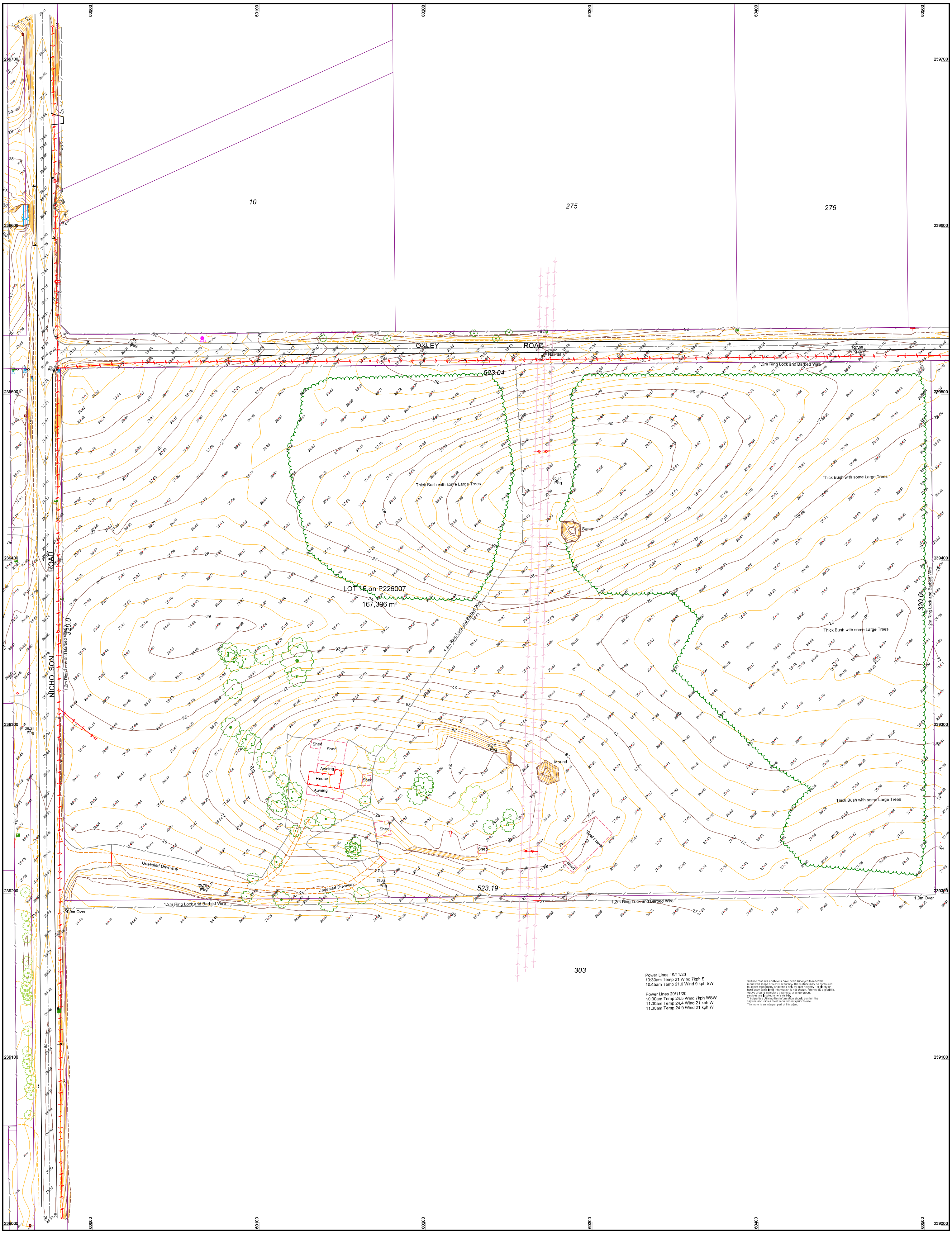
Development (Structure Planning) Areas (refer to Part 6A of Scheme Text), Development Contribution Areas (refer to Part 6B of the Scheme Text), and Environmental Conditions (refer to Part 5.6 of Scheme Text).



Appendix B

Detail Survey

McMullen Nolan Group (2021)



Rev.	Description	Drawn	Date	Checked
D	EXTENSION OF NICHOLSON ROAD	TPV	09/12/2020	MAD
C	ADDITION OF BUSH LINE	TPV	29/11/2020	MAD
B	DETAIL & CONTOUR SURVEY ENTIRE SITE	TPV	22/11/2020	MAD
A	Initial Issue	MAD	17/11/2020	MAD

ISO 9001 - AS/NZS 4801 - ISO45001
Global-Mark.com.au®

Surveyor:- TPV
Survey Date:- 09/12/2020
Precal/Cad:- SCDB
LANDGATE

651 Nicholson Road
Detail Survey
Forrestdale

CLIENT: AIC

The contents of this plan are current and correct as of the date stated within the revision panel. All consultants and persons wishing to utilise this data should satisfy themselves of this plans currency by contacting the McMullen Nolan Group.

SCALE 1:1000 @ A1
0 10 20 30 40 50 100
ALL DISTANCES ARE IN METRES
For a true to scale reproduction of this plan, plot it to A1 with the Paging Scaling set to None.

The boundaries shown on this plan were not re-established as part of this survey, therefore this plan does not guarantee their accuracy. Existing easements, encumbrance or interest are not depicted and a title search is recommended to obtain this information. Re-establishment of the cadastral boundaries is recommended for any proposed works on or near existing boundaries.

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www.mngsurvey.com.au
ABN 90 009 363 311

Project Mngr. MARK DOBSON | Datum PCG94 / AHD

103583 - DE - 001 - D
Job Number | Type | Plan Number | Revision