

# Kent Road Public School Biodiversity Development Assessment Report

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**Gardner Wetherill and Associates**

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<b>Item</b>	Biodiversity Development Assessment Report
<b>Project Name</b>	Kent Road Public School
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## Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by Gardner Wetherill and Associates to prepare a Biodiversity Development Assessment Report (BDAR) for a proposed State Significant Development Application (SSD) at Kent Road Public School, Marsfield (the Subject Site) in the Ryde City Council Local Government Area (LGA). The Subject Site (4.1 ha) is comprised of eight lots; Lot 5 DP 8612, Lot 1 DP 12030, Lot 2 DP 12030, Lot 3 DP 12030, Lot 4 DP 12030, Lot 5 DP 12030, Lot 1 DP 34283 and Lot 1 DP 782254. The proposed works associated with the SSD (Development Site) will occur in three of the eight lots located in the central northern section of the Subject Site and includes Lot 1 DP 12030, Lot 1 DP 34283 and Lot 1 DP 782254. The Development Site covers an area of 0.77 ha and is zoned SP2 - Infrastructure: Educational Establishment under the Ryde Local Environment Plan 2014 (LEP).

The State Significant Development Application (SSD 9344) involves impacts to one Threatened Ecological Community (TEC) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act); Blue Gum High Forest in the Sydney Basin Bioregion (BGHF), which is a Critically Endangered Ecological Community (CEEC). A BDAR was requested to be completed through the Secretary's Environmental Assessment Requirements (SEARs). Proposed impacts to threatened species must be assessed under the new NSW BC Act enacted on the 25 August 2017. This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2016 (BAM) established under Section 6.7 of the BC Act.

The Subject Site has historically undergone vegetation disturbance as a result of clearing. Firstly as a site for market gardens, then in 1960 for the development of Kent Road Public School. Much of the Subject Site has been landscaped and most of the current vegetation planted. Little remnant native vegetation remains, with few remnant trees scattered across the Development Site. The largest patch of remnant vegetation is located in the south-east of the Subject Site, which is outside the Development Site and is being avoided by the proposed works.

One Plant Community Type (PCT) is present within the Development Site. The PCT has been mapped as PCT 1237 - *Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion* (0.23 ha). The PCT has been split into two vegetation zones based on the broad condition types present. Vegetation zone 1 is in a Low-Moderate condition and conforms to the CEEC listing of 'Blue Gum High Forest in the Sydney Basin Bioregion', under the BC Act. Vegetation zone 2 is present in a Low condition comprised mainly of planted vegetation. Vegetation zone 2 species are not characteristic of PCT 1237, but they have been assigned to this PCT as a best-fit. As such, vegetation zone 2 does not conform to the BC Act listing of 'Blue Gum High Forest in the Sydney Basin Bioregion'.

It is noted that Blue Gum High Forest (BGHF) is also be listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as a Critically Endangered Ecological Community (CEEC). However, the condition of the vegetation representing the PCT within the Development Site does not meet the minimum condition thresholds for the listing criteria under the EPBC Act.

No threatened flora or fauna species were recorded within the Development Site.

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the Development Site and measures to minimise impacts during construction and operation of the development. Following consideration of all the above aspects, the

residual unavoidable direct impacts of the project were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit Calculator (BAMC).

A small amount of native vegetation within the Development Site will be directly impacted, resulting in the clearing of 0.23 ha of PCT 1237. The remainder of the Development Site (0.54 ha) is comprised of land classified as 'Cleared/Exotics' which are devoid of native vegetation.

A total of 4 ecosystem credits are required to offset 0.23 ha of unavoidable impacts to PCT 1237 within the Development Site. Habitat for candidate species credit species was not recorded in the Development Site, therefore, no species credits are required to offset the development.

For vegetation zone 1 - PCT 1237 in Low-Moderate condition, the BAMC generated a vegetation integrity score of 27. Three ecosystem credits are required to offset the removal of 0.17 ha of vegetation zone 1. For vegetation zone 2 - PCT 1237 in Low (Planted) condition, the BAMC generated a vegetation integrity score of 28.7. One ecosystem credit is required to offset the removal of 0.06 ha of vegetation zone 2.

Serious and Irreversible Impacts (SII) values have been considered in this assessment. BGHF is listed as a SII in the BioNet Atlas. The SII threshold for these communities are yet to be published by OEH. As such, detailed consideration of whether impacts on candidate SII are serious and irreversible is provided in the BDAR. Only a small area of degraded BGHF is to be impacted (0.17 ha).

One Matter of National Environmental Significance (MNES) was identified as potentially being adversely affected by the proposed works. The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and it is considered that this species is likely to use some of the Development Site for foraging. An assessment of the Commonwealth Significant Impact Criteria (Commonwealth of Australia 2013) was undertaken for the Grey-headed Flying-fox and concluded that the project would not have a significant impact on this species. As such, a referral to the Commonwealth is not required.

All impacts to MNES have been avoided as far as practicable and all impacts have been assessed in accordance with Commonwealth guidelines. Mitigation strategies have been put into place to manage potential impacts to MNES.

All DCP/LEP requirements have been considered. Trees removed as a consequence of Development Application approval must be replaced, in accordance with Section 6 of the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012) to effectively maintain the Urban Forest canopy (Part: 9.5 Tree Preservation). Additionally, any trees that may be retained must be clearly marked and protected as per the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012).

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## Abbreviations

Abbreviation	Description
<b>BAM</b>	Biodiversity Assessment Method
<b>BAMC</b>	Biodiversity Assessment Method Credit Calculator
<b>BC Act</b>	NSW Biodiversity Conservation Act 2016
<b>BGHF</b>	Blue Gum High Forest in the Sydney Basin Bioregion
<b>BDAR</b>	Biodiversity Development Assessment Report
<b>CEEC</b>	Critically Endangered Ecological Community
<b>DoEE</b>	Commonwealth Department of Environment and Energy
<b>DPE</b>	NSW Department of Planning and Environment
<b>EEC</b>	Endangered Ecological Community
<b>ELA</b>	Eco Logical Australia Pty Ltd
<b>EP&amp;A Act</b>	NSW Environmental Planning and Assessment Act 1979
<b>EPBC Act</b>	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
<b>FM Act</b>	NSW Fisheries Management Act 1994
<b>GIS</b>	Geographic Information System
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>LGA</b>	Local Government Area
<b>LLS</b>	Local Land Service
<b>NOW</b>	NSW Office of Water
<b>OEH</b>	NSW Office of Environment and Heritage
<b>PCT</b>	Plant Community Type
<b>SEPP</b>	State Environmental Planning Policy
<b>SSD</b>	State Significant Development
<b>STIF</b>	Sydney Turpentine-Ironbark Forest
<b>TEC</b>	Threatened Ecological Community
<b>VI</b>	Vegetation Integrity
<b>VIS</b>	Vegetation Information System
<b>WM Act</b>	NSW Water Management Act 2000

# 1. Stage 1: Biodiversity assessment

## 1.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Vivian Hamilton, Danielle Adams-Bennett and Jennie Powell. Jennie Powell is an Accredited Person under the NSW Biodiversity Conservation Act 2016 (BC Act).

This Biodiversity Development Assessment Report (BDAR) has been prepared by Eco Logical Australia on behalf of the NSW Department of Education (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 9344) for the redevelopment of Kent Road Public School, Marsfield (the Subject Site).

The contents of this BDAR complies with the minimum requirements outlined in Table 25 of the Biodiversity Assessment Methodology (BAM: OEH, 2017).

### 1.1.1 Response to SEARs

The Biodiversity Development Assessment Report (BDAR) is required by the Secretary’s Environmental Assessment Requirements (SEARs) for SSD 9344. Table 1 identifies the SEARs and relevant reference within this report.

Table 1: SEARs and Relevant Reference

Sears Item	Report Reference
12. Biodiversity Assessment	Eco Logical Australia 2018. Kent Road Public School - Biodiversity Development Assessment Report

### 1.1.2 General description of the Development Site

Kent Road Public School (Subject Site) spans across 4.1 ha and is comprised of eight lots; Lot 5 DP 8612, Lot 1 DP 12030, Lot 2 DP 12030, Lot 3 DP 12030, Lot 4 DP 12030, Lot 5 DP 12030, Lot 1 DP 34283 and Lot 1 DP 782254.

The proposed works associated with the SSD (Development Site) will occur within three of the eight lots located in the central northern section of the Subject Site and includes Lot 1 DP 12030, Lot 1 DP 34283 and Lot 1 DP 782254. The Development Site covers an area of 0.77 ha, located within in the Ryde Local Government Area (LGA) and is zoned SP2 - Infrastructure: Educational Establishment under the Ryde Local Environment Plan 2014 (LEP).

The Subject Site has historically undergone vegetation disturbance as a result of clearing. Firstly as a site for market gardens, then in 1960 for the development of Kent Road Public School. Much of the Subject Site has been landscaped and most of the current vegetation planted. Little remnant native vegetation remains, with few remnant trees scattered across the Development Site. The largest patch of remnant vegetation is located in the south-east of the Subject Site, which is outside the Development Site and is being avoided by the proposed works.

The Development Site consists mainly of cleared land including existing car parks, buildings, demountable buildings, outdoor recreation areas, other infrastructure such as covered walkways and exotic vegetation (0.54 ha). A small part of the Development Site (0.23 ha) consists of planted native vegetation and scattered remnant native trees. No Strahler streams are located within the Development Site.

One Plant Community Type (PCT) in two broad condition states is present in the Development Site and has been mapped as PCT 1237 - *Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion*.

PCT 1237 conforms to the Critically Endangered Ecological Community (CEEC) 'Blue Gum High Forest in the Sydney Basin Bioregion (BGHF)' which is listed under the BC Act. It is noted that this PCT is also listed under the EPBC Act as a Critically Endangered Ecological Community (CEEC). However, the condition of the vegetation within the Development Site did not meet the minimum condition thresholds for the listing criteria under the EPBC Act.

No threatened flora or fauna species were recorded on the Development Site

This report includes two base maps, the Site Map (Figure 1) and the Location Map (Figure 2).

### 1.1.3 Development Site footprint

The redevelopment of Kent Road Public School will cater for 1,000 primary school students. The Development Site footprint (Figure 3) includes:

- Removal/modification of existing buildings
- Construction of 3 new buildings (two 3 storey blocks and one 2 storey block) and new covered entryway with walkway connections;
- Construction of 34 new home-bases and core facilities, containing:
  - Classroom home bases;
  - Administration workplaces;
  - Staff workplaces;
  - Student canteen;
  - Special program room.
- Associated site landscaping and public domain improvements; and
- Construction of ancillary infrastructure and utilities as required (such as accessible parking).

The Development Site boundary includes both the operational and construction footprint (Figure 3) associated with all temporary construction facilities and infrastructure. All impacts within the Development Site have been calculated as a complete clearance.

### 1.1.4 Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification
- BioNet Atlas 5 km database search (OEH 2018a)
- EPBC Act Protected Matters Search Tool 5 km database search (DoEE 2018)
- The Native Vegetation of the Sydney Metropolitan Area (OEH 2016)
- Nearmap Imagery (Image Capture 21/08/2018)
- Aerial imagery (SIXMaps)
- Additional GIS datasets including soil, topography, geology and drainage
- Technical Studies: Flora & Fauna Surveys with Assessments of Significance for Kent Road Public School, Marsfield September 2018. Prepared by UBM Ecological Consultants Pty Ltd.
- Tree Risk Assessment – Kent Road Public School, Marsfield September 2018. Prepared by William Dunlop of Temporal Tree Management Pty Ltd.

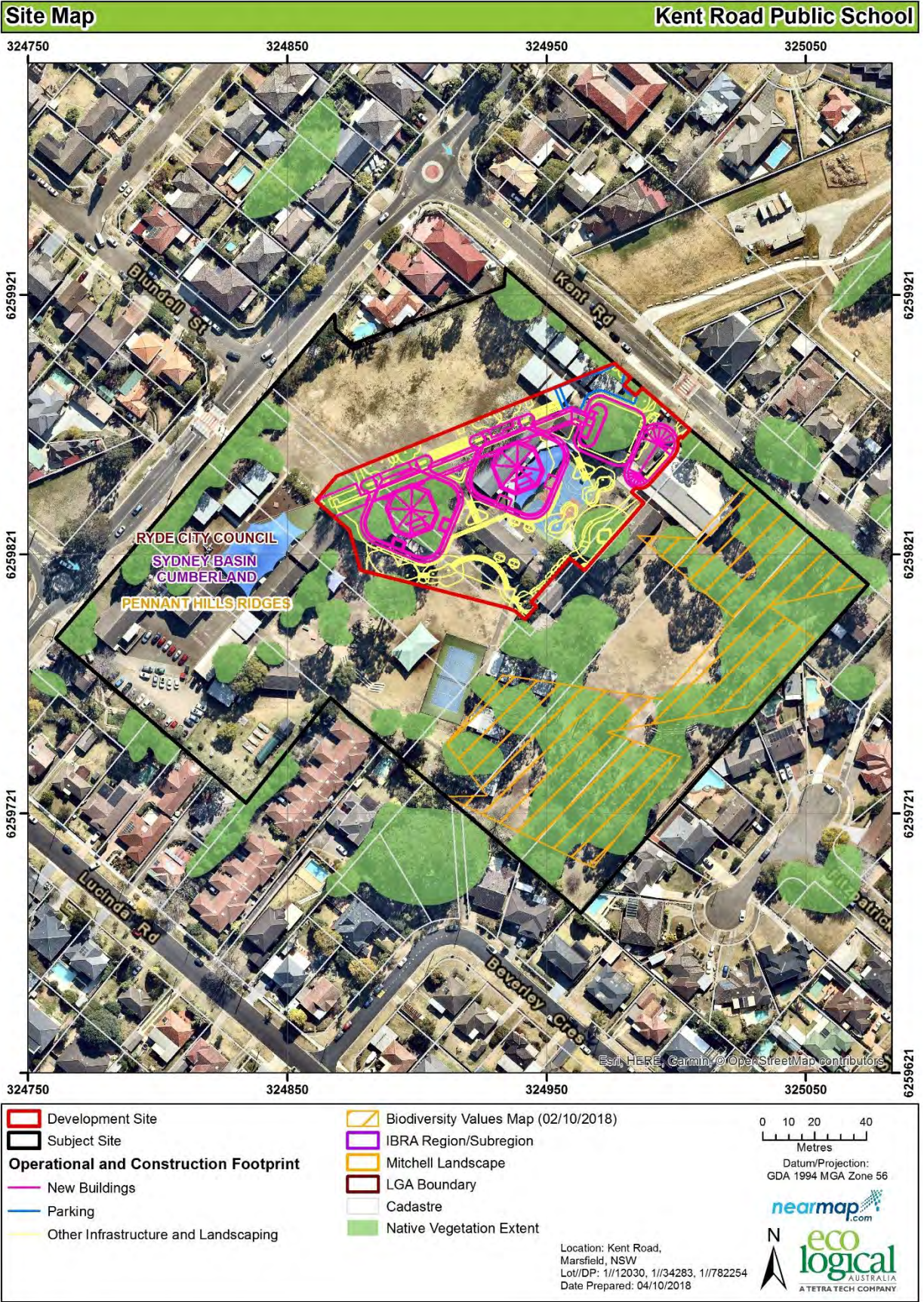


Figure 1: Site Map

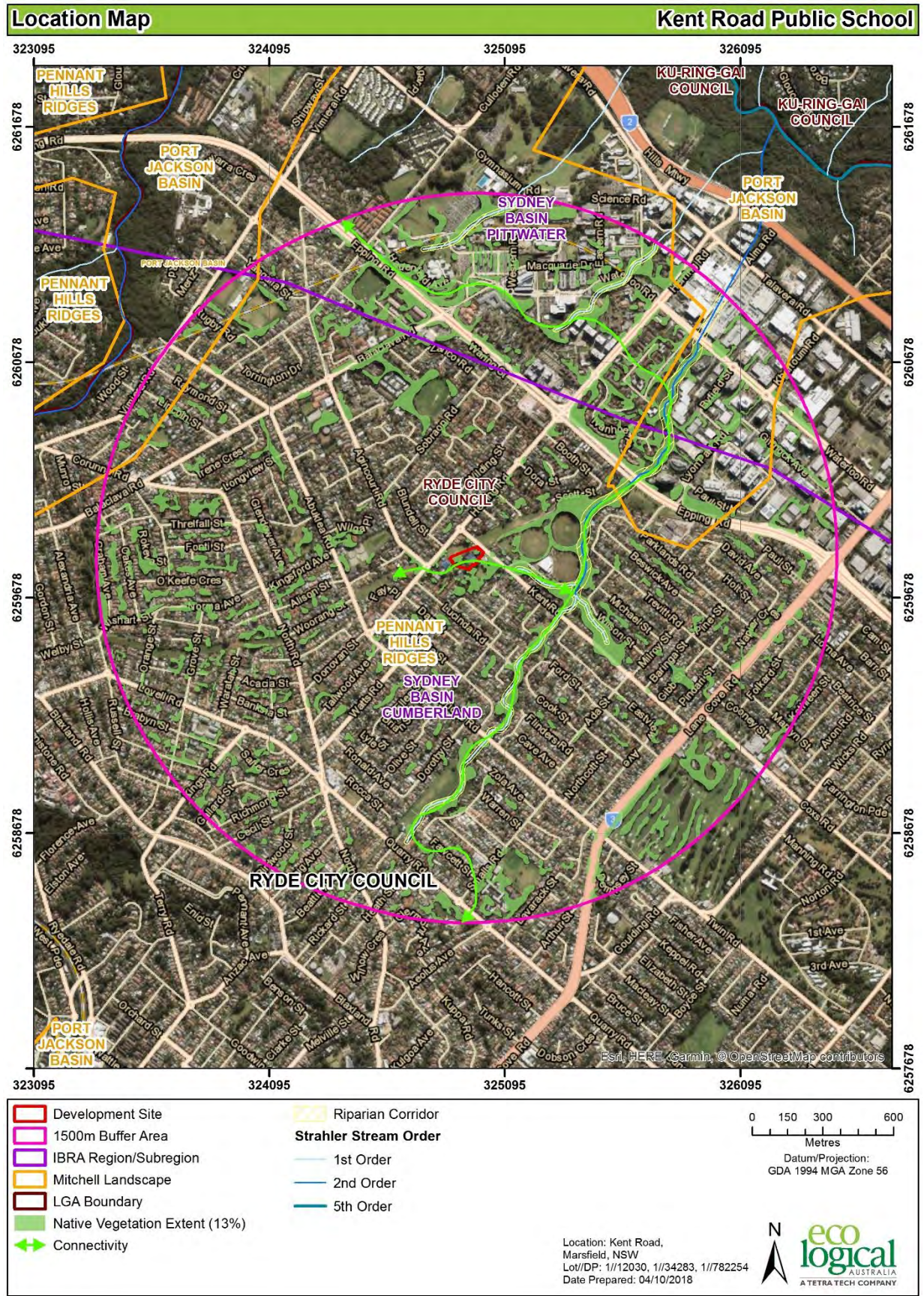


Figure 2: Location Map

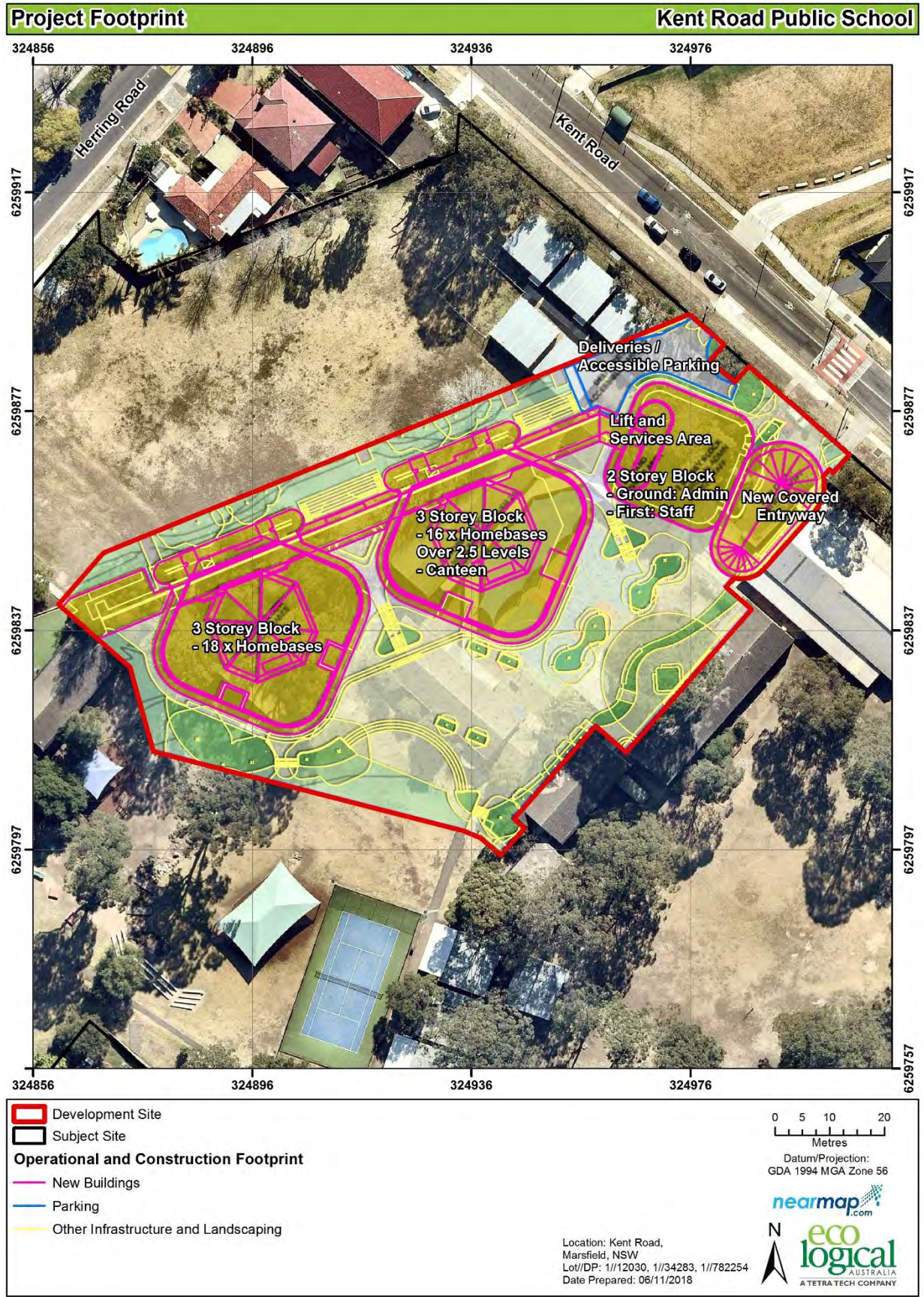


Figure 3: Project Footprint

## 1.2 Legislative context

Table 2: Legislative context

Name	Relevance to the project
<b>Commonwealth</b>	
<b>Environment Protection and Biodiversity Conservation Act 1999</b>	<p>The EPBC Act 1999 establishes a process for assessing the environmental impact of activities and developments where "Matters of National Environmental Significance" (MNES) may be affected. If an activity has the potential for a significant impact, the activity will require approval from the Commonwealth under Part 9 of the EPBC Act 1999.</p> <p>One MNES has been identified on or near the Development Site. This report assesses impacts to MNES in section 2.7.1 and concludes that the development is not likely to have a significant impact on MNES.</p>
<b>NSW</b>	
<b>Environmental Planning and Assessment Act 1979</b>	The proposed development is a state significant development and is to be assessed under Part 4 of the EP&A Act.
<b>Biodiversity Conservation Act 2016</b>	<p>The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.</p> <p>Section 7.9 of the BC Act states that an application for state significant development must be accompanied by a Biodiversity Development Assessment Report unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values. Additionally, the proposed development requires submission of a Biodiversity Development Assessment Report (i.e. this report) as detailed in the SEARs for the SSD.</p> <p>This report satisfies these requirements.</p>
<b>Biosecurity Act 2015</b>	The project will impact on areas that contain weeds listed as High Threat Weeds under the Act that require removal and or management to limit their spread.
<b>Fisheries Management Act 1994</b>	The objects of the Fisheries Management Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The Act requires approval for dredging (s201), harm to marine vegetation (s205) and blocking of fish passage (s219) in certain circumstances. The proposed development does not involve any of these activities. Further, section 4.41(1)(b) of the EP&A Act 1979 states that permits for these activities are not required for state significant development. Therefore, no further approval under the FM Act is required.
<b>Local Land Services Amendment Act 2016</b>	The LLS Act does not apply to this development.
<b>Water Management Act 2000</b>	The objects of the Water Management Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The Act requires approval for water use (s89), water management works (s90) and for controlled activities on waterfront land (s91). The proposed development does not involve any of these activities. Further, section 4.41(1)(g) of the EP&A Act 1979 states that such approvals are not required for state significant development. Therefore, no further approval under the Water Management Act is required.
<b>Planning Instruments</b>	
<b>SEPP Coastal Management 2018</b>	The Development Site is not located within the SEPP Coastal Management 2018 area.

Name	Relevance to the project
<b>SEPP 44 – Koala Habitat Protection</b>	SEPP 44 - Koala Habitat does not apply to the Ryde LGA. In addition, SEPP 44 does not apply as the native vegetation on site does not contain Feed trees as listed in Schedule 2 Feed Trees.
<b>City of Ryde Local Environment Plan 2014</b>	The Development Site is zoned SP2 - Infrastructure: Educational Establishment under the City of Ryde LEP.
<b>City of Ryde Development Control Plan (DCP) 2014</b>	<p>The City of Ryde DCP has been reviewed for additional provisions that may relate to the Development Site.</p> <p>Trees removed as a consequence of Development Application approval must be replaced, in accordance with Section 6 of the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012) to effectively maintain the Urban Forest canopy (Part: 9.5 Tree Preservation).</p> <p>Any trees that may be retained must be clearly marked and protected as per the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012).</p>

## 1.3 Landscape features

### 1.3.1 IBRA regions and subregions

The Development Site and Assessment Area fall within the Sydney Basin IBRA region and Cumberland Plain subregion (Figure 1).

### 1.3.2 Mitchell Landscapes

The Development Site falls within the Pennant Hills Rydges Mitchell Landscapes as outlined in Table 3 and as shown on Figure 1 and Figure 2 respectively.

**Table 3: Mitchell Landscapes (DECC 2002)**

Mitchell landscape	Description
<b>Pennant Hills Ridges</b>	88% cleared. Rolling to moderately steep hills on horizontal Triassic shales and siltstones. General elevation 10 to 90m, local relief 60m. Deep red texture-contrast soils on narrow hillcrests, red and brown to yellow texture-contrast soils on slopes becoming slightly harsher in drainage lines. Tall open forest of Sydney blue gum ( <i>Eucalyptus saligna</i> ), Turpentine ( <i>Syncarpia glomulifera</i> ), Blackbutt ( <i>Eucalyptus pilularis</i> ), white stringybark ( <i>Eucalyptus globoidea</i> ), Grey ironbark ( <i>Eucalyptus paniculata</i> ), Forest oak ( <i>Allocasuarina torulosa</i> ) and Rough-barked apple ( <i>Angophora floribunda</i> ). Rainforest elements in protected moist gully heads with Sweet pittosporum ( <i>Pittosporum undulatum</i> ), cheese tree ( <i>Glochidion ferdinandi</i> ), Sandpaper fig ( <i>Ficus coronata</i> ) and Black wattle ( <i>Callicoma serratifolia</i> ).

### 1.3.3 Rivers and streams

The Development Site does not contain any rivers or streams.

### 1.3.4 Wetlands

The Development Site does not contain any wetlands.

### 1.3.5 Connectivity features

The main connectivity link is located outside the Development Site running south-west to north-east along Shrimptons Creek, then continuing north-west after Shrimptons Creek is diverted by industrial buildings (Figure 2). The vegetation within the Development Site connects to this link in an east-west direction. Vegetation within the Development Site is fragmented and connectivity of vegetation is

disrupted from continuing westwards beyond 250 m by roads and residential dwellings. The vegetation within the Development Site is considered to be of low value on a local and broader scale. The Development Site is unlikely to support or form part of flyway for migratory species but could provide opportunistic perching/resting habitat.

### 1.3.6 Areas of geological significance and soil hazard features

The Development Site does not contain areas of geological significance and soil hazard features.

### 1.3.7 Site context

#### 1.3.7.1 Method applied

The site based method has been applied to this development.

#### 1.3.7.2 Percent native vegetation cover in the landscape

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from SIX Maps (LPI 2015) and Nearmap (imagery captured within the Development Site on 21/08/2018). The results of this analysis are shown in Table 4.

**Table 4: Percent native vegetation cover in the landscape**

Area within the Development Site (ha)	Area within the 1,500 m buffer area (ha)	Cover within the 1,500 m buffer area (%)
0.23	101.42	13%

#### 1.3.7.3 Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the Development Site. The patch size area class is  $\geq 100$  ha.

## 1.4 Native vegetation

### 1.4.1 Survey effort

Vegetation survey was undertaken within the Development Site on 26 September 2018 by Danielle Adams-Bennett and Vivian Hamilton to determine the PCTs present. Danielle and Vivian have completed the BAM accreditation course. Native vegetation extent within the Development Site is mapped in Figure 2.

Two full-floristic plots were undertaken to identify PCTs on the Development Site in accordance with the BAM (Table 5 and Figure 5). These plots also included the collection of vegetation integrity survey plots to determine the condition of PCTs and stratify them into vegetation zones based on the same PCT and similar broad condition type.

It should be noted that due to the developed nature of the Development Site, the placement of biometric plots was difficult. The vegetation plot for zone 2 has been collected outside the Development Site. This was due to restrictions in being able to configure a plot within the Development Site which would reasonably represent the PCT and condition without including significant areas of cleared lands (such as carpark surfaces). The plot used in the assessment has been placed in a location (within the Subject Site) to best represent the vegetation zone. This also included modifying the 20m x 20m full floristic plot into a 40m x 10m plot to reduce the inclusion of cleared lands. Use of this plot is a

conservative approach and overestimates the vegetation integrity score, thus resulting in a higher ecosystem credit requirement.

**Table 5: Full-floristic and vegetation integrity plots**

Veg Zone	PCT ID	PCT Name	Condition	Area (ha)	Plots required	Plots surveyed
1	1237	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	Low-Moderate	0.17	1	1
2	1237	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	Low (Planted)	0.06	1	1
Total				0.23	2	2

#### 1.4.2 Plant Community Types present

ELA assessed and determined all the native vegetation within the Development Site to comprise one native vegetation community PCT 1237 - *Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion*. PCT 1237 varied in its condition and was stratified into two vegetation zones (Table 6 and Figure 4). Vegetation zone 1 is a low to moderate condition of the PCT. Vegetation zone 2 is a low condition comprising of native planted species that are not characteristic of this community, but was assigned to PCT 1237 based on best-fit.

Justification for the selection of PCT 1237 occurring on the Development Site was based on analysis of characteristic species and is provided Table 7 and 1.4.2.1. Due to the degraded nature of native vegetation and limited number of native species present, a quantitative vegetation analysis tool was considered impractical to define the PCT. Hence additional information including soil type, geographic location, surrounding vegetation and landscape position were also utilised.

**Table 6: Plant Community Types and Vegetation Zones**

Veg Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within Development Site (ha)	Percent cleared
1	1237	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.17	90%
2	1237	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.06	90%

Table 7: PCT selection justification

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance
1237	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	<p>PCT 1237 is known to occur within the Cumberland Plain IBRA subregion and Ryde LGA in which the Development Site is located.</p> <p>The Development Site is located in the Pennant Hills Rydges Mitchell Landscape. PCT 1237 is known to occur along ridgelines.</p> <p>The Development Site is located within the Glenorie soil landscape which is underlain by Wianamatta Group Ashfield Shale and Bringelly Shale formations. PCT 1237 is associated with the occurrence of soils derived from Wianamatta shale.</p>	<p><i>Eucalyptus saligna</i>, <i>Eucalyptus paniculata</i>, <i>Angophora costata</i>, <i>Angophora floribunda</i>, <i>Syncarpia glomulifera</i> and <i>Allocasuarina torulosa</i> present within canopy. The mid-storey was absent and contained planted native shrubs such as <i>Pittosporum undulatum</i>.</p>

#### 1.4.2.1 PCT Selection Justification

In determining the PCTs for the Development Site, various attributes were considered in combination to assign vegetation to the best-fit PCT. Attributes included dominant species in each stratum, community composition, soils and landscape position. Reference was made to the PCT descriptions in the BioNet Vegetation Classification, the final scientific determination and other published documents describing the vegetation community.

The majority of the Development Site was highly modified and predominantly composed of buildings, paths, maintained lawns, gardens and planted trees. Vegetation mapping available for the Development Site (OEH, 2016) has mapped the vegetation as Urban Exotic/Native. Some areas of vegetation outside the Development Site (within the Subject Site) have also been mapped as Blue Gum High Forest. Parts of the Development Site are consistent with this mapping.

OEH has provided recent advice that all vegetation native to NSW must be assigned to a PCT. As such, while a proportion of the Development Site consists of planted native species which do not contain the characteristic species of a local vegetation community (mixture of local and non-local indigenous species), for this assessment, the PCT assigned to this community was based on a best-fit from the native vegetation present within the Development Site. It is noted that the species are not characteristic species for this community.

Justification of PCT 1237 within the Development Site is based on the composition of species in the canopy and understory. Native tree species (planted and remnant) of this PCT in the Development Site included remnant *Eucalyptus saligna* (Blue Gum) and *Eucalyptus paniculata* (Grey Ironbark). The condition of this PCT is highly disturbed resulting from historical clearing with a midstorey that has been modified with areas containing planted native and exotic shrubs for landscaping. The ground-layer species diverges considerably from the species originally present in this PCT, due to past land clearing and landscaping within the Development Site.

Two full-floristic and vegetation integrity survey plots were undertaken within this PCT in accordance with the BAM. Characteristic tree species *Eucalyptus saligna* (Blue Gum) and *Eucalyptus paniculata* (Grey Ironbark) were present within the plot undertaken for vegetation zone 1. The understory was modified due to landscaping and the use of the area for recreation. The vegetation zone contained planted native shrubs that were not characteristic species of Blue Gum High Forest such as *Callistemon*

*citrinus* (Crimson Bottlebrush). The understorey was absent of native groundcovers with the exception of planted *Lomandra longifolia*. This community was observed within the Development Site in similar condition with a cleared/modified understorey usually characterised by lawn or mulched gardens areas.

The native vegetation mapped as PCT 1237 in vegetation zone 1 is considered to be in low to moderate condition due to historical clearing, presence of exotic species and landscaping (i.e. mulched areas). Within this vegetation zone, the understorey is represented by planted species. There is a high level of modification of this PCT, with parts restricted to characteristic canopy species. However, the vegetation still contributes to the local occurrence of this PCT and is considered to be of moderate conservation significance.

Areas of planted native vegetation were assigned to this PCT as vegetation zone 2. This is primarily based on adjacent vegetation, because the species present in this zone are not characteristic for this PCT. The assignment of this vegetation zone to a PCT is a requirement of OEH as noted above. It is most likely that PCT 1237 would have occurred in this area c.1750. The native tree species (planted) included *Corymbia citriodora* (Lemon-scented Gum), *Corymbia maculata* (Spotted Gum), *Corymbia eximia* (Yellow Bloodwood), *Callistemon viminalis*, *Eucalyptus botryoides* (Bangalay), *Melaleuca quinquenervia*, *Lophostemon confertus* (Brush Box), and *Grevillea robusta* (Silky Oak). Due to the planted nature of this community in carparks and other landscaped areas, the understorey was predominantly absent with the exception of planted shrubs or groundcovers and/or areas of lawn

#### 1.4.2.2 Threatened Ecological Communities Justification

Threatened Ecological Communities within the Development Site are mapped on Figure 6.

BioNet Vegetation Classification lists PCT 1237 as potentially comprising the TEC, 'Blue Gum High Forest in the Sydney Basin Bioregion' listed as critically endangered under the BC Act and EPBC Act.

Only vegetation zone 1 is consistent with the BC Act listed Blue Gum High Forest and is based on the presence of diagnostic species in the upper and lower stratum, vegetation structure, similar vegetation mapped in the locality and characteristic soil of Blue Gum High Forest. Vegetation zone 2 has been determined not to conform to the BC Act listing of Blue Gum High Forest as this vegetation zone is comprised of planted natives that are not characteristic of the CEEC.

While vegetation zone 1 has been subject to historical clearing and the original extent of the remnant vegetation has mostly been cleared for development, a review of aerial imagery from 1943 (SixMaps) reveals that patches of vegetation within the Development Site are likely to have been present in 1943, and persist today. Characteristic tree species listed by NSW Scientific Committee 2011 for BGHF and observed within the Development Site and surrounding Subject Site included, *Eucalyptus saligna* (Blue Gum), *Eucalyptus paniculata* (Grey Ironbark), *Angophora floribunda* (Rough-barked Apple) and *Angophora costata* (Sydney Red Gum).

Occurrences of the Blue Gum High Forest of the Sydney Basin Bioregion ecological community are considered to be part of the nationally listed ecological community (under the EPBC Act) if they are greater than one (1) hectare in size and:

- have a canopy cover greater than 10%; or
- have a canopy cover less than 10% and occur in areas of native vegetation in excess of five (5) hectares.

Although the Blue Gum High Forest within the Development Site had a canopy cover greater than 10%, it was below the 1 ha size threshold. As such, it does not meet the EPBC Act listing of the CEEC.

### 1.4.3 Vegetation integrity assessment

A vegetation integrity assessment using the BAM Credit Calculator (BAMC) was undertaken and the results are outlined in Table 8.

It is noted that even though vegetation zone 2 consists of planted species that are not characteristic of PCT 1237, the diversity of species planted is skewing the composition and structure scores so that they are slightly higher. The resulting vegetation integrity score for vegetation zone 2 is subsequently higher than that of vegetation zone 1 (which is more characteristic of PCT 1237 and in better condition). This gives a false impression that vegetation zone 2 is a better example of PCT 1237 compared to vegetation zone 1 and this is considered a “perverse outcome”.

**Table 8: Vegetation integrity**

Veg Zone	PCT ID	Condition	Ancillary Code	Impact Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	1237	Low-Moderate	CEEC	0.17	14.3	36.7	37.3	27
2	1237	Low (Planted)	CEEC	0.06	24	40.4	24.4	28.7

### 1.4.4 Use of local data

Use of local data instead of benchmark integrity scores is not proposed.



Figure 4: Plant Community Types

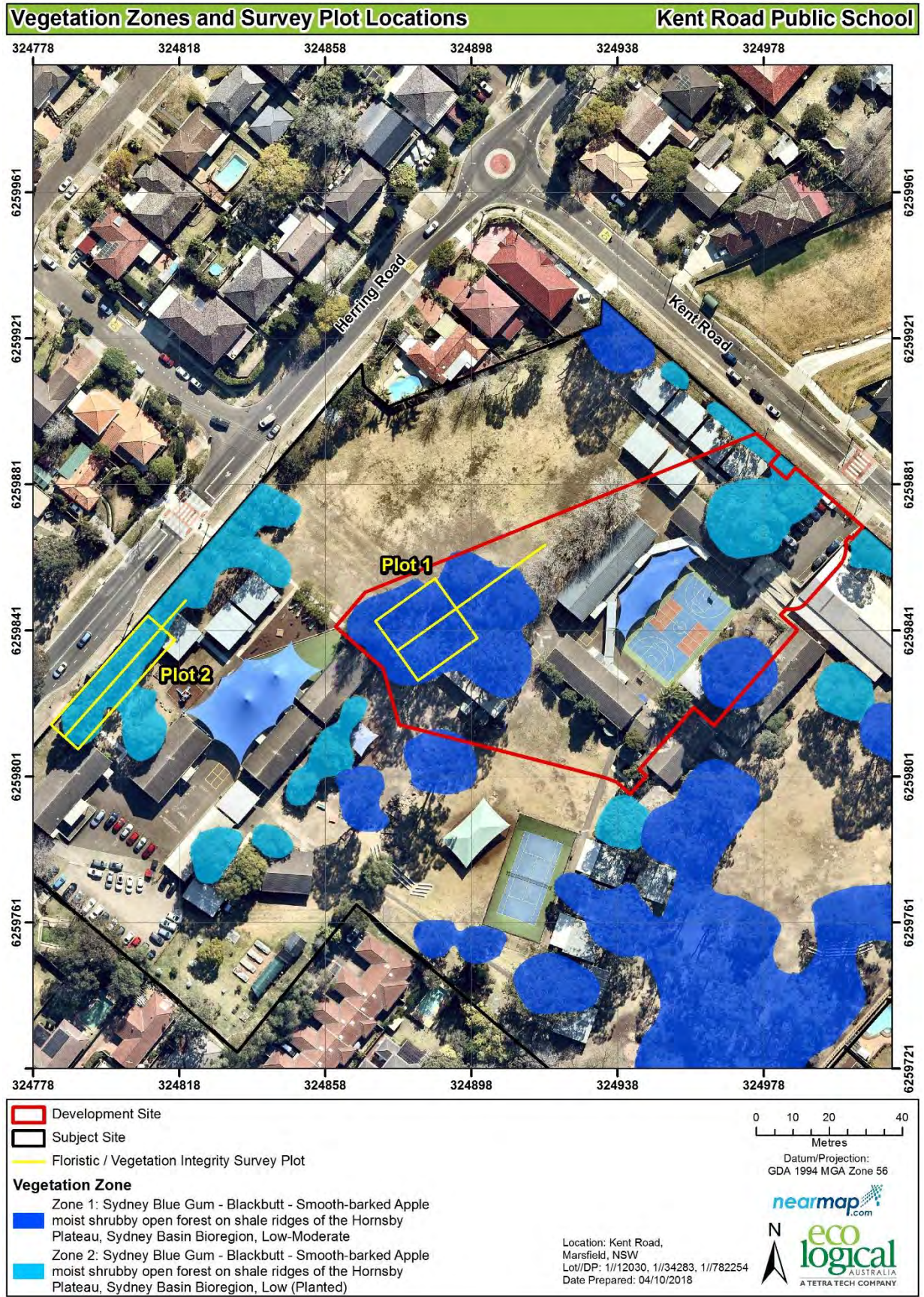


Figure 5: Vegetation Zone and Survey Plot Locations

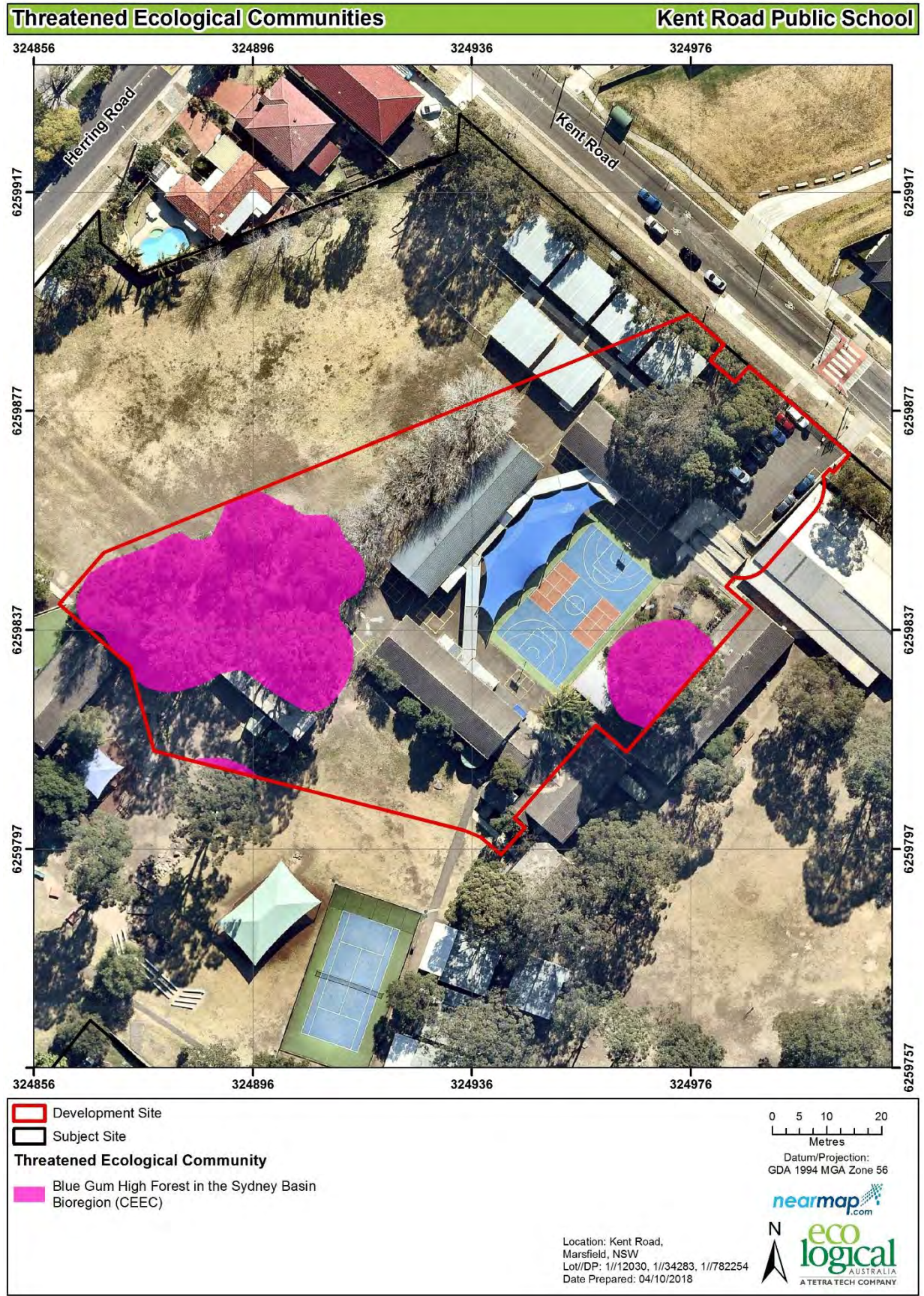


Figure 6: Threatened Ecological Communities

## 1.5 Threatened species

### 1.5.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the Development Site, their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 9.

**Table 9: Predicted ecosystem credit species**

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
<b>Anthochaera phrygia</b>	Regent Honeyeater (Foraging)	N/A	High	CE	CE
<b>Artamus cyanopterus</b>	Dusky Woodswallow	N/A	Moderate	V	Not Listed
<b>Callocephalon fimbriatum</b>	Gang-gang Cockatoo (Foraging)	N/A	Moderate	V	Not Listed
<b>Calyptrorhynchus lathamii</b>	Glossy Black-Cockatoo (Foraging)	N/A	High	V	Not Listed
<b>Daphoenositta chrysoptera</b>	Varied Sittella	N/A	Moderate	V	Not Listed
<b>Dasyurus maculatus</b>	Spotted-tailed Quoll	N/A	High	V	E
<b>Falsistrellus tasmaniensis</b>	Eastern False Pipistrelle	N/A	High	V	Not Listed
<b>Glossopsitta pusilla</b>	Little Lorikeet	N/A	High	V	Not Listed
<b>Hieraaetus morphnoides</b>	Little Eagle (Foraging)	N/A	Moderate	V	Not Listed
<b>Lathamus discolor</b>	Swift Parrot (Foraging)	N/A	Moderate	E	CE
<b>Miniopterus australis</b>	Little Bentwing-bat (Foraging)	N/A	High	V	Not Listed
<b>Miniopterus schreibersii oceanensis</b>	Eastern Bentwing-bat (Foraging)	N/A	High	V	Not Listed
<b>Mormopterus norfolkensis</b>	Eastern Freetail-bat	N/A	High	V	Not Listed
<b>Ninox connivens</b>	Barking Owl (Foraging)	N/A	High	V	Not Listed
<b>Ninox strenua</b>	Powerful Owl (Foraging)	N/A	High	V	Not Listed
<b>Petaurus australis</b>	Yellow-bellied Glider	Hollow bearing trees Hollows >25cm diameter	High	V	Not Listed
<b>Phascolarctos cinereus</b>	Koala (Foraging)	N/A	High	V	V

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
<b>Pteropus poliocephalus</b>	Grey-headed Flying-fox (Foraging)	N/A	High	V	V
<b>Ptilinopus superbus</b>	Superb Fruit-Dove	N/A	Moderate	V	Not Listed
<b>Saccolaimus flaviventris</b>	Yellow-bellied Sheath-tail-bat	N/A	High	V	Not Listed
<b>Scoteanax rueppellii</b>	Greater Broad-nosed Bat	N/A	High	V	Not Listed
<b>Tyto novaehollandiae</b>	Masked Owl (Foraging)	N/A	High	V	Not Listed

## 1.6 Species credit species

### 1.6.1 Candidate Species credit species

Species credit species predicted to occur at the Development Site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 10. An assessment of those species credit species identified has been undertaken to determine likelihood of those species to occur based on the absence of necessary habitat components or habitat constraints, in accordance with BAM sections 6.4.1.10 and 6.4.1.17. For those species that have been excluded, the justification is also provided.

**Table 10: Candidate species credit species**

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
<b>Anthochaera phrygia</b>	Regent Honeyeater (Breeding)	N/A	High	CE	CE	This is a dual credit species, and only a species credit species when mapped as an important area. The Development Site is not within the draft mapped important areas (Simpson - OEH 2018, pers comm., 26 September)
<b>Callocephalon fimbriatum</b>	Gang-gang Cockatoo (Breeding)	N/A	High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. Although the survey period spans from October to January, breeding pairs remain close to breeding sites around 2 weeks prior to breeding season. During survey in the last week of September, no birds or nests were observed within the Development Site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
<b>Calyptrorhynchus lathamii</b>	Glossy Black-Cockatoo (Breeding)	N/A	High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain larger patches of intact vegetation or trees with large hollows that are suitable for the species to utilise the site.
<b>Cercartetus nanus</b>	Eastern Pygmy-possum		High	V	Not Listed	Habitat present is substantially degraded such that this species is unlikely to utilise the Development Site. No individuals have been recorded within 5km of the Development Site.
<b>Chalinolobus dwyeri</b>	Large-eared Pied Bat	Cliffs Within 2km of rocky areas containing caves, overhangs, escarpment, outcrops, or crevices, or within 2km of old mines or tunnels	Very High	V	V	Habitat features associated with this species are not present on the Development Site. There is no suitable breeding habitat such as caves, overhangs, mines or culverts present for the species to utilise the site. No individuals have been recorded within 5km of the Development Site.
<b>Galium australe</b>	Tangled Bedstraw	N/A	High	E	Not Listed	Tangled Bedstraw has been recorded historically in the Nowra (Colymea) and Narooma areas and is extant in Nadgee Nature Reserve, south of Eden. Records in the Sydney area are yet to be confirmed. The habitat present is substantially degraded that this species is unlikely to utilise the Development Site. No individuals have been recorded within 5km of the Development Site.
<b>Grammitis stenophylla</b>	Narrow-leaf Finger Fern	N/A	Moderate	E	Not Listed	The habitat present is substantially degraded such that this species is unlikely to utilise the Development Site.
<b>Hibbertia spanantha</b>	Julian's Hibbertia	N/A	N/A	CE	CE	The habitat present is not suitable for this species such that this species is unlikely to utilise the Development Site.
<b>Hieraaetus morphnoides</b>	Little Eagle (Breeding)	N/A	Moderate	V	Not Listed	This is a dual credit species, and only a species credit species when

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						specific habitat constraints are present for breeding. The Development Site does not contain suitable breeding habitat. Little Eagles rarely nest in isolated trees and no nests were observed during field surveys.
<b>Lathamus discolor</b>	Swift Parrot (Important foraging areas)		Moderate	E	CE	This is a dual credit species, and only a species credit species when mapped as an important area. The Development Site is not within the draft mapped important areas (Simpson - OEH 2018, pers comm., 26 September)
<b>Litoria aurea</b>	Green and Golden Bell Frog	Semi-permanent/ ephemeral wet areas Within 1km of wet areas, Swamps, Waterbody	High	E	V	Habitat features associated with this species are not present on the Development Site. The Development Site does not contain suitable waterbodies for this species to utilise the site.
<b>Miniopterus australis</b>	Little Bentwing-bat (Breeding)	N/A	Very High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain breeding habitat that is suitable for the species to utilise the site (such as a cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding).
<b>Miniopterus schreibersii oceanensis</b>	Eastern Bentwing-bat (Breeding)	N/A	Very High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain breeding habitat such as caves, tunnels, mines or culverts. Potential suitable foraging habitat is available within the Development Site.
<b>Myotis macropus</b>	Southern Myotis	Hollow bearing trees Within 200 m of riparian	High	V	Not Listed	Habitat features associated with this species are not present on the Development Site. While there are hollow-bearing trees within the Development Site, they are not located within 200m of waterways

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		zone Other Bridges, caves or artificial structures within 200 m of riparian zone				with pools 3m wide or greater for which this species is dependent upon for foraging. As such, the habitat within the Development Site is unlikely to be suitable for foraging or breeding.
<b>Ninox connivens</b>	Barking Owl (Breeding)	N/A	High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain suitable breeding habitat. No suitable sized hollow-bearing trees are present and no nests were observed during survey.
<b>Ninox strenua</b>	Powerful Owl (Breeding)	N/A	High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain suitable breeding habitat. No large tree hollows are present within the Development Site.
<b>Phascolarctos cinereus</b>	Koala (Breeding)	N/A	High	V	V	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. Habitat present is substantially degraded such that this species is unlikely to utilise the site for breeding.
<b>Pommerhelix duralensis</b>	Dural Woodland Snail	Other Leaf litter and shed bark or within 50m of litter or bark Rocky areas Within 50m of rocks Fallen /standing dead timber including W ithin 50m of logs or bark	High	E	E	The Development Site is located outside of the species range and habitat present is substantially degraded such that this species is unlikely to utilise the site for breeding. No individuals have been recorded within 5km of the Development Site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
<b>Pseudophryne australis</b>	Red-crowned Toadlet	N/A	Moderate	V	Not Listed	Habitat features associated with this species are not present on the Development Site. The Development Site does not contain suitable drainage lines for this species to utilise the site.
<b>Pteropus poliocephalus</b>	Grey-headed Flying-fox (Breeding)	N/A	High	V	V	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain any breeding habitat (camps) that are suitable for the species to utilise. Potential suitable foraging habitat is available within the Development Site.
<b>Syzygium paniculatum</b>	Magenta Lilly Pilly	N/A	Moderate	E	V	Habitat features associated with this species are not present on the Development Site. No individuals were observed within the Development Site during survey. It is noted that an individual of this species has been planted outside the Development Site.
<b>Tetratheca glandulosa</b>	Tetratheca glandulosa	N/A	High	V	Not Listed	It was determined that the habitat is substantially degraded such that this species is unlikely to utilise the Development Site.
<b>Tyto novaehollandiae</b>	Masked Owl (Breeding)	N/A	High	V	Not Listed	This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Development Site does not contain habitat such as trees with large hollows that are suitable for the species to utilise the site for breeding. No individuals have been recorded within 5km of the Development Site within the last 20 years.

### 1.6.2 Targeted surveys

The assessment of the species credit species identified, and the likelihood of those species to occur based on necessary habitat components or habitat constraints, determined that the Development Site either lacked the habitat features required, or habitat was in such a degraded condition that none of the species credit species were likely to utilise it. Due to the absence of suitable habitat components and constraints within the Development Site, targeted surveys were not conducted. However, general

surveys were conducted for conspicuous species and incidental/opportunistic data was collected for any threatened flora and fauna.

Weather conditions during survey are outlined in Table 11.

**Table 11: Weather conditions**

Date	Rainfall (mm)	Minimum temperature OC	Maximum temperature OC
26/09/2018	9.2	10.8	16.7

#### 1.6.2.1 Survey results

No threatened flora or fauna species were recorded within the Development Site.

Two hollow-bearing trees were identified within the Development Site. One hollow located in an *Eucalyptus pilularis* (Blackbutt) was approximately lorikeet sized and the other smaller hollow located in an *Eucalyptus saligna* (Sydney Blue Gum), approximately microbat sized.

It is noted that two threatened flora species *Eucalyptus scoparia* (Wallangarra White Gum) and *Syzygium paniculatum* (Magenta Lilly Pilly) which are listed under the BC Act and EPBC Act were found within close proximity of the Development Site (to the south-east). Based on the known ranges for these species, the historical land use of Kent Road Public School and records of these species in Ryde LGA, it is likely that they have been cultivated/planted within the Subject Site.

#### 1.6.3 Use of local data

The use of local data is not proposed.

#### 1.6.4 Expert reports

Expert reports have not been prepared as part of this BDAR.

## 2. Stage 2: Impact Assessment

### 2.1 Avoiding impacts

The Development Site contains small and fragmented patches of degraded native vegetation. The development footprint has been located to avoid and minimises impacts on native vegetation as outlined in Table 12 and Table 13.

#### 2.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat

**Table 12: Locating a project to avoid and minimise impacts on vegetation and habitat**

Approach	How addressed	Justification
<b>locating the project in areas where there are no biodiversity values</b>	The project has been located within the lot to minimise impacts on areas with the highest biodiversity value.	<p>The Development Site is predominantly located in areas containing little biodiversity values.</p> <p>Areas of cleared land, exotic vegetation and existing infrastructure containing no biodiversity values have been selected for the majority of the project. The Development Site has been designed to avoid impacts to remnant vegetation to the south-east of the Subject Site. The area of native vegetation to be impacted is in a low-moderate condition (vegetation zone 1 - 0.17 ha) and low planted condition (vegetation zone 2 - 0.06 ha). The remaining 0.54 ha of impact occurs in areas of Cleared/Exotics.</p>
<b>locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition</b>	The Development Site has been designed to avoid impacts to remnant vegetation and threatened species habitat.	<p>Native vegetation within the Development Site is predominantly comprised of planted native trees in low condition, with some vegetation comprising remnants of the BGHF CEEC (vegetation zone 1 - 0.17 ha). However, the occurrence of the listed CEEC is in a degraded condition. Vegetation integrity scores for the PCTs range between 27 and 28.7 for the PCT 1237 vegetation zones. The placement of the Development Site minimises removal of vegetation from the south-east of the Subject Site which contains higher quality vegetation and higher quality potential threatened species habitat.</p>
<b>locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species</b>	The project has been located to avoid removal of vegetation in high threat categories. The project has been located to minimise the removal of habitat for species in high threat categories.	<p>Native vegetation within the Development Site is predominantly comprised of planted native trees in low condition (vegetation zone 2 - 0.06 ha), and areas of low to moderate condition BGHF (vegetation zone 2 - 0.17 ha). The project has been placed</p>

Approach	How addressed	Justification
		to avoid a larger patch of BGHF to the south-east of the Development Site.  While the development cannot avoid impacts to all areas of BGHF, these impacts have been minimised. A total area of 0.17 ha of BGHF will be cleared.
<b>locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained</b>	The Development Site footprint does not impact on connectivity values surrounding the Development Site.	The Development Site is located within a fragmented landscape. Land surrounding the development has been heavily developed. The project has been located to maintain all current connectivity between areas of vegetation. Removal of vegetation within the Development Site will not disrupt the small link of vegetation connecting to Shrimptons Creek in the east. Given the proposed development will utilise an area of already highly developed land and fragmented native vegetation, the movement of species and genetic material between areas of adjacent or nearby habitat will be maintained.

### 2.1.2 Designing a project to avoid and minimise impacts on vegetation and habitat

**Table 13: Designing a project to avoid and minimise impacts on vegetation and habitat**

Approach	How addressed	Justification
<b>reducing the clearing footprint of the project</b>	The project has been designed to reduce the clearing footprint of the project.	The Development Site footprint has been strategically designed to avoid areas of higher biodiversity (such as to the south-east of the Subject Site) and is primarily located within Cleared/Exotics comprised of existing development such as buildings, carparks and exotics (0.54 ha). A small area of disturbed native vegetation and planted vegetation will be impacted (0.23 ha).
<b>locating ancillary facilities in areas where there are no biodiversity values</b>	Ancillary features are located in areas where there are minimal biodiversity values.	The Development Site predominantly utilises Cleared/Exotics with no biodiversity values (0.54 ha). There will be a small impact (0.23 ha) to areas containing low biodiversity value, however this has been minimised as far as practicable. Ancillary features avoid remnant vegetation within the Subject Site.
<b>locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that</b>	All vegetation within the Development Site has a relatively low vegetation integrity score.	Ancillary features are predominantly located in areas of Cleared/Exotics and where native vegetation has a low to moderate vegetation integrity score (27 to 28.7).

Approach	How addressed	Justification
have a lower vegetation integrity score)		
locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC)	Ancillary features are not located in areas containing habitat for species in high threat status categories but will impact a CEEC in low to moderate condition.	Ancillary features will be located in areas that impact vegetation with high threat status (i.e., CEEC), however this vegetation is degraded, and following avoidance where practical, only a small amount will be impacted (vegetation zone 1 - 0.17 ha)
providing structures to enable species and genetic material to move across barriers or hostile gaps	The development has been designed to maintain a vegetated corridor enabling movement of species and genetic material.	The project has been designed to retain quality vegetation in the south-east of the Subject Site. The Development Site has been designed so that it does not impact on any corridors. Existing vegetated corridors will be maintained with connectivity running east towards Shrimptons creek. This will allow for the continued movement of species and genetic material across the landscape. Given that no corridors will be impacted, additional structures are not necessary.
making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the Development Site.	Proponent to protect remaining vegetation outside of the Development Site footprint.	The proponent will demarcate all areas outside the Development Site boundary to be retained as no go areas to avoid impacts occurring to remaining native vegetation within the Subject Site.

### 2.1.3 Prescribed biodiversity impacts

The list of potential prescribed biodiversity impacts as per the BAM and an assessment of whether threatened species or ecological communities are affected is provided below in Table 14.

**Table 14: Prescribed biodiversity impacts**

Prescribed biodiversity impact	Description in relation to the Development Site	Assessment of threatened species or ecological communities potentially affected
Occurrences of karst, caves, crevices and cliffs	None occur within the Development Site.	N/A
Occurrences of rock	No rock outcrops or scattered rocks occur within the Development Site.	N/A
Occurrences of human made structures	The Development Site is located in a heavily urbanised area and contains human made structures.	Consideration was given to the buildings/structures within the Development Site that could potentially be utilised as roosting resources by microchiropteran bats (microbats) including: <i>Miniopterus australis</i> (Little Bentwing-bat), <i>Miniopterus schreibersii oceanensis</i> (Eastern Bentwing-bat), <i>Mormopterus norfolkensis</i> (Eastern Freetail-bat) and <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail-bat). While there are weep holes located along the sides of the

Prescribed biodiversity impact	Description in relation to the Development Site	Assessment of threatened species or ecological communities potentially affected
		buildings large enough to be used by microbats, they are large enough to also accommodate other fauna such as rats. The weep holes are also located close to the ground and allow predators such as rats, cats and snakes to gain access to the space. It is unlikely that they are suitable roosting spaces due to their size and exposure. There were no unoccupied buildings/structures, nor any other obvious gaps where microbats might be able to gain access to building cavities. Buildings and structures also exhibited no characteristic staining indicative of microbat use.
<b>Occurrences of non-native vegetation</b>	The removal of non-native vegetation will be required within the Development Site.	While <i>Pteropus poliocephalus</i> (Grey-headed Flying Fox) forages on non-native plant species, none of the exotics present within the Development Site are likely to provide foraging habitat. The species utilised by the Grey-headed Flying Fox within the Development Site (natives and planted natives) are already captured under the ecosystem credit species.
<b>Hydrological processes that sustain and interact with the rivers, streams and wetlands</b>	None occur within the Development Site.	N/A
<b>Proposed development for a wind farm and use by species as a flyway or migration route</b>	The proposed development does not involve wind farm development.	N/A

After consideration of the potential prescribed biodiversity impacts, no further assessment has been undertaken as it is considered that the development does not contain any prescribed biodiversity impacts.

## 2.2 Assessment of impacts

### 2.2.1 Direct impacts

The development includes direct impacts on:

- native vegetation impacts are outlined in Table 15 and Table 16
- one threatened ecological community outlined in Table 17
- two hollow-bearing trees

Direct impacts including the final project footprint (construction and operation) are shown on Figure 7.

**Table 15: Direct impacts to native vegetation**

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1237	Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin Bioregion	Sydney Hinterland Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	0.23

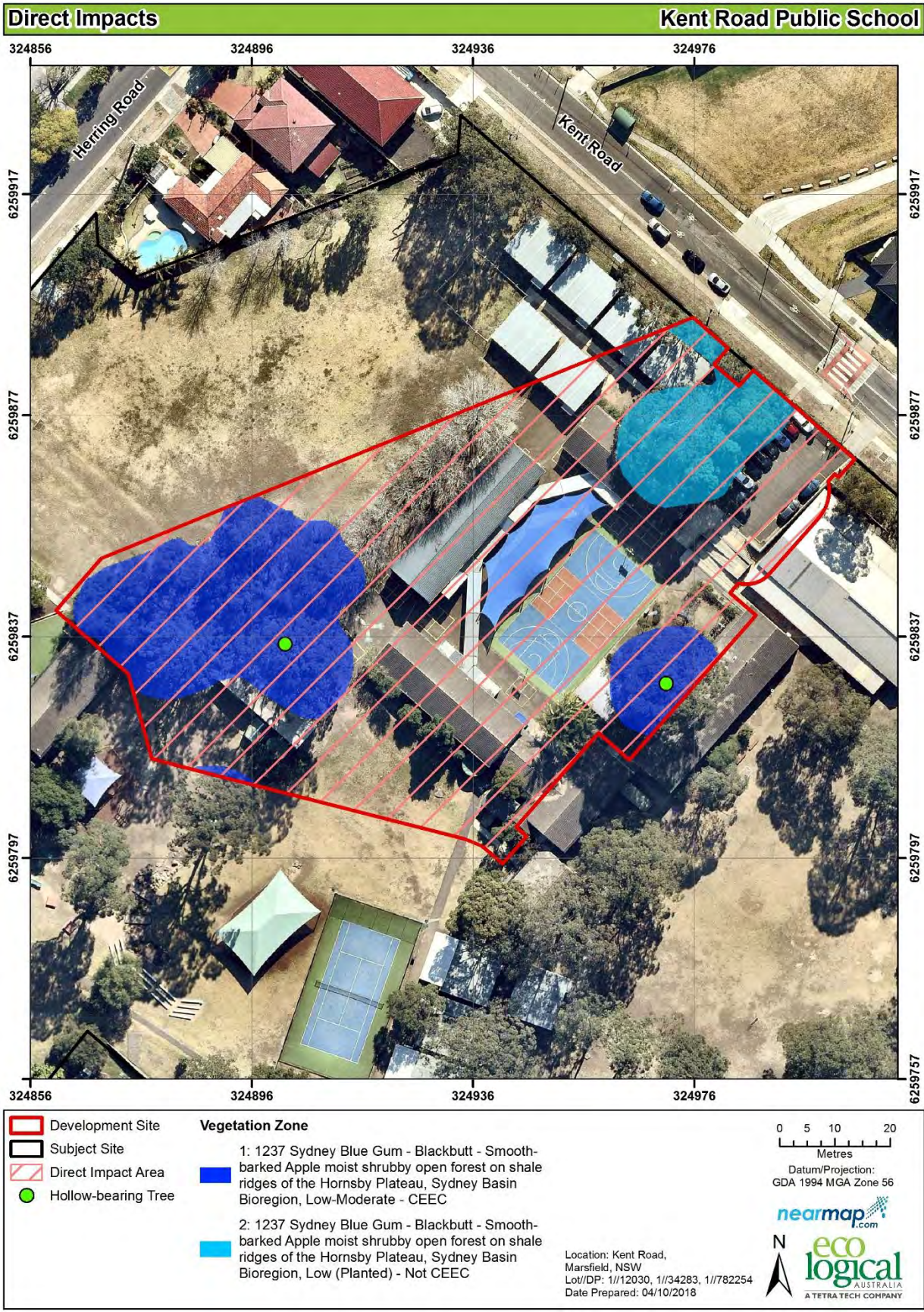


Figure 7: Direct impacts

Table 16: Direct impacts to vegetation zones

PCT ID	Veg zone	PCT Name	Condition	Direct impact (ha)
1237	1	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion (BGHF)	Low-Moderate	0.17 ha
1237	2	Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion	Low (Planted)	0.06 ha

Table 17: Direct impacts on threatened ecological communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Direct impact (ha)	Listing status	Name	Direct impact (ha)
1237	CEEC	Blue Gum High Forest	0.17	CEEC	Blue Gum High Forest in the Sydney Basin Bioregion	N/A

### 2.2.2 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 18. The future vegetation integrity score of 0 for the 0.23 ha portion of the Development Site reflects the clearing of the native vegetation identified within the Development Site.

Table 18: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Impact Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	1237	Low-Moderate	0.17	27	0	-27
2	1237	Low (Planted)	0.06	28.7	0	-28.7

### 2.2.3 Indirect impacts

The indirect impacts of the development are outlined in Table 19.

### 2.2.4 Prescribed biodiversity impacts

The development does not have any prescribed biodiversity impacts.

### 2.2.5 Mitigating and managing impacts

Measures proposed to minimise impacts at the Development Site before, during and after construction are outlined in Table 20.

Table 19: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
<b>sedimentation and contaminated and/or nutrient rich run-off</b>	Construction	Runoff during construction works	Confined to Development Site with sediment fencing	During heavy rainfall or storm events	During rainfall events	Short-term impacts
<b>noise, dust or light spill</b>	Construction	Noise and dust created from machinery. Light spill during night works.	Noise, dust and light spill likely to carry beyond Development Site boundary.	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
<b>inadvertent impacts on adjacent habitat or vegetation</b>	Construction	Damage to adjacent habitat or vegetation	Adjacent vegetation	Daily, during construction works	Throughout construction period	Short-term impacts
<b>transport of weeds and pathogens from the site to adjacent vegetation</b>	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
<b>vehicle strike</b>	Construction / Operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within access road and Development Site	Daily, during both construction and operational phases.	Throughout life of project	Short-term impacts
<b>trampling of threatened flora species</b>	Construction / operation	No threatened flora present	N/A	N/A	N/A	N/A
<b>bush rock removal and disturbance</b>	Construction / operation	No bush rock present	N/A	N/A	N/A	N/A
<b>increase in predatory species populations / pest animal populations</b>	Construction / operation	Negligible likelihood of impact occurring because only a small degraded area of native vegetation will be removed	N/A	N/A	N/A	N/A
<b>Rubbish dumping</b>	Construction / operation	Illegal dumping by local residents/ construction crews	Potential for rubbish to spread via wind into adjacent areas	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
<b>increased risk of fire</b>	Construction / Operation	Unlikely	N/A	N/A	N/A	N/A

Table 20: Measures proposed to minimise impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
<b>Displacement of resident fauna</b>	Minor	Negligible	Pre-clearance survey of trees to be removed and identification/location of habitat trees by a suitably qualified ecologist.  Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practise methods.	Relocation of fauna in a sensitive manner	Prior to and during clearing works	Project Manager / Ecologist
<b>timing works to avoid critical life cycle events such as breeding or nursing. Timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting</b>	Minor	Negligible	Avoid clearing works in later winter/spring during breeding/nesting period for birds	Impacts to fauna during nesting/nursing avoided	During clearing works	Project Manager
<b>instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events</b>	Moderate	Minor	Pre-clearance survey of trees to be removed and identification/location of habitat trees by a suitably qualified ecologist. Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practise methods. Any tree removal is to be undertaken by a suitably qualified and insured arborist. Any trees that may be retained must be clearly marked and protected as per the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012). These trees must be clearly delineated as a No Go zone.	Habitat trees recorded in trees that will be retained will be clearly marked. Any fauna utilising habitat within the Development Site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	Prior to and during clearing works	Project Manager Ecologist
<b>installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move</b>	Minor	Negligible	Any trees removed that have hollows/hollow trunks/fissures should be retained as ground fauna habitat and/or used as replacement hollows and attached to trees within the within the Development Site/Subject Site. If it is impractical to use salvaged hollows as replacement tree hollows, compensatory	Replacement of habitat features removed	Prior to and during clearing works	Project Manager/ Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
from the impacted site, e.g. nest boxes			nest boxes should be installed within vegetation to be retained.			
clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	Moderate	Minor	Any trees that may be retained must be clearly marked and protected as per the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012). These trees must be clearly delineated as a No Go zone.	Vegetation to be retained outside of the Development Site will not be disturbed/impacted	Demarcation of vegetation to be set up prior to any works occurring on site and to remain throughout duration of construction works	Project Manager
sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Minor	Negligible	Appropriate controls are to be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways.  Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work.	Erosion and sedimentation will be controlled	For the duration of construction works	Project Manager
noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Minor	Negligible	Timing of construction works should be planned to occur outside of the spring breeding season for microbat species and nesting birds.  Daily timing of construction activities is recommended in accordance with Table 1 of Interim Noise Guidelines (2009)  Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm No work on Sunday or public holidays	Noise impacts associated with the development will be managed in accordance with guidelines	For the duration of construction works	Project Manager
adaptive dust monitoring programs to control air quality	Minor	Negligible	Dust suppression measures will be implemented during construction works to limit dust on site  Commence revegetation as soon as practicable to minimise areas likely to create dust	Mitigate dust created during construction activities	For the duration of construction works	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	<p>Vehicles, machinery and building refuse should remain only within the Development Site and not impinge on the areas of retained native vegetation. Weed management to be undertaken in retained vegetation following construction works.</p> <p>Weeds present within the Development Site listed under the NSW <i>Biosecurity Act 2015</i> and Greater Sydney Regional Strategic Weed Management Plan should be managed. Weeds present include:</p> <ol style="list-style-type: none"> <li>1. <i>Ehrharta erecta</i> (Panic Veldtgrass)</li> <li>2. <i>Eragrostis curvula</i> (African Love Grass)</li> <li>3. <i>Ochna serrulata</i> (Mickey Mouse Plant)</li> <li>4. <i>Stenotaphrum secundatum</i> (Buffalo Grass)</li> </ol>	Prevent spread of weeds or pathogens	For the duration of construction works	Project Manager
staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	<p>All staff working on the development to undertake an environmental induction as part of their site familiarisation. This induction will include items such as:</p> <ol style="list-style-type: none"> <li>1. Importance of No Go zones</li> <li>2. Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and noxious weeds)</li> <li>3. What to do in case of environmental emergency (chemical spills, fire, injured fauna)</li> <li>4. Key contacts in case of environmental emergency</li> </ol>	All staff entering the Development Site are fully aware of the presence of native vegetation adjacent to the site what to do in case of any environmental emergencies	To occur for all staff entering/working at the Development Site. Site briefings should be updated based on phase of the work and when environmental issues become apparent.	Project Manager
development control measures to regulate activity in vegetation and habitat adjacent to development including controls on pet ownership, rubbish disposal, wood collection, fire management and	Minor	Negligible	Temporary fencing to be placed around the perimeter of the Development Site to prevent impacts to adjacent vegetation.	Protect vegetation and habitat adjacent to Development Site.	During operational phase	Client

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
<b>disturbance to nests and other niche habitats</b>						
<b>making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the Development Site</b>	Minor	Negligible	<p>Trees removed as a consequence of Development Application approval must be replaced, in accordance with Section 6 of the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012), to effectively maintain the Urban Forest canopy (Part: 9.5 Tree Preservation).</p> <p>Landscaping in the Development Site is to use locality derived native species and those found within the PCTs present.</p>	Areas within the Development Site will be landscaped using appropriate species and trees removed must be replaced.	Throughout construction and following completion of construction activities	Project Manager

### 2.2.6 Serious and Irreversible Impacts (SII)

The Development Site contains one Serious and Irreversible Impact (SII) candidate entity identified in Table 21 and shown on Figure 8. Detailed consideration of whether impacts on candidate TECs are serious and irreversible has been assessed against section 10.2.2 of the BAR and is included in Table 22.

**Table 21: Candidate Serious and Irreversible Impacts**

Species / Community	Common Name	Principle	Direct impact area (ha)	Threshold
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest in the Sydney Basin Bioregion	Principle 1, 2 and 3	0.17 ha	Not yet published

**Table 22: Evaluation of an impact on a TEC**

Impact Assessment Provisions 10.2.2.1	Assessment
a. the action and measures taken to avoid the direct and indirect impact on the potential entity for an SII	The development has been designed to occupy as small a building footprint as possible, with multiple levels incorporated into the building design. The development has also been situated within a section of the Subject Site containing low biodiversity values. The majority of impacts will occur in areas already developed and the BGHF that is being impacted, occurs in a degraded form.
b. the area (ha) and condition of the TEC to be impacted directly and indirectly by the proposed development. The condition of the TEC is to be represented by the vegetation integrity score for each vegetation zone.	The development will remove 0.17 ha of BGHF in a degraded condition with a vegetation integrity score of 27.
c. the extent to which the impact exceeds the threshold for the potential entity.	Thresholds for BGHF have not yet been published.
d. the extent and overall condition of the potential TEC within an area of 1,000 ha, and then 10,000 ha, surrounding the proposed development footprint.	Within the Subject Site, 0.87 ha of BGHF will be retained. In addition to what has been mapped within the Subject Site, there is an estimated 5.18 ha of BGHF within an area of 1,000 ha, in a high-very high disturbed condition (SMCMA, 2016). The removal of 0.17 ha represents approximately 2.8% of the mapped BGHF extent within 1,000 ha. Within 10,000 ha of the Development Site there is an estimated 115.56 ha of BGHF in a medium-very high disturbed condition (SMCMA, 2016). The exception is approximately 7.56 ha of BGHF that has been mapped with a low disturbance condition. The removal of 0.17 ha represents approximately 0.15% of the mapped BGHF extent within 10,000 ha.
e. an estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration.	Within the Development Site, the proposal will reduce the extant area of BGHF by 0.17 ha. Considering the very small area and degraded quality of BGHF to be removed, it is considered that the development will have a negligible impact on the extant area and overall condition of the TEC on a broad scale with a loss of 2.8% within 1,000 ha of the Development Site and 0.15% within 10,000 ha of the Development Site.
f. an estimate of the area of the potential TEC that is in the reserve system within the IBRA region and the IBRA subregion	Within both the IBRA subregion and IBRA region, there is approximately 10.85 ha of BGHF mapped as located in the reserve system (Dalrymple-Hay Nature Reserve).
g. the development, clearing or biodiversity certification proposal's impact on:	
(i) abiotic factors critical to the long-term survival of the potential TEC; for example, will the impact lead to a reduction of groundwater levels or substantial alteration of surface water patterns;	The development will not impact abiotic factors critical to the long-term survival of the TECs.

Impact Assessment Provisions 10.2.2.1	Assessment
<b>will it alter natural disturbance regimes that the TEC depends upon, e.g. fire, flooding etc.?</b>	
<b>(ii) characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of under-storey species or harvesting of plants</b>	The development will not impact characteristic and functionally important species outside of the proposed impact area.
<b>(iii) the quality and integrity of an occurrence of the TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the TEC</b>	The development has the potential to assist the spread of invasive flora in BGHF that will be retained within Subject Site and adjacent area. This potential impact will be controlled during the construction phase. The development will not have additional impacts to the quality and integrity of the occurrence of BGHF outside of the proposed impact area.
<b>h. direct or indirect fragmentation and isolation of an area of the TEC</b>	The development will not cause direct or indirect fragmentation or isolation of any area of BGHF. The impact occurs on already isolated fragments of degraded BGHF.
<b>i. the measures proposed to contribute to the recovery of the TEC in the IBRA subregion.</b>	In its current form, the proposed development does not contribute to the recovery of these TECs in the IBRA subregion

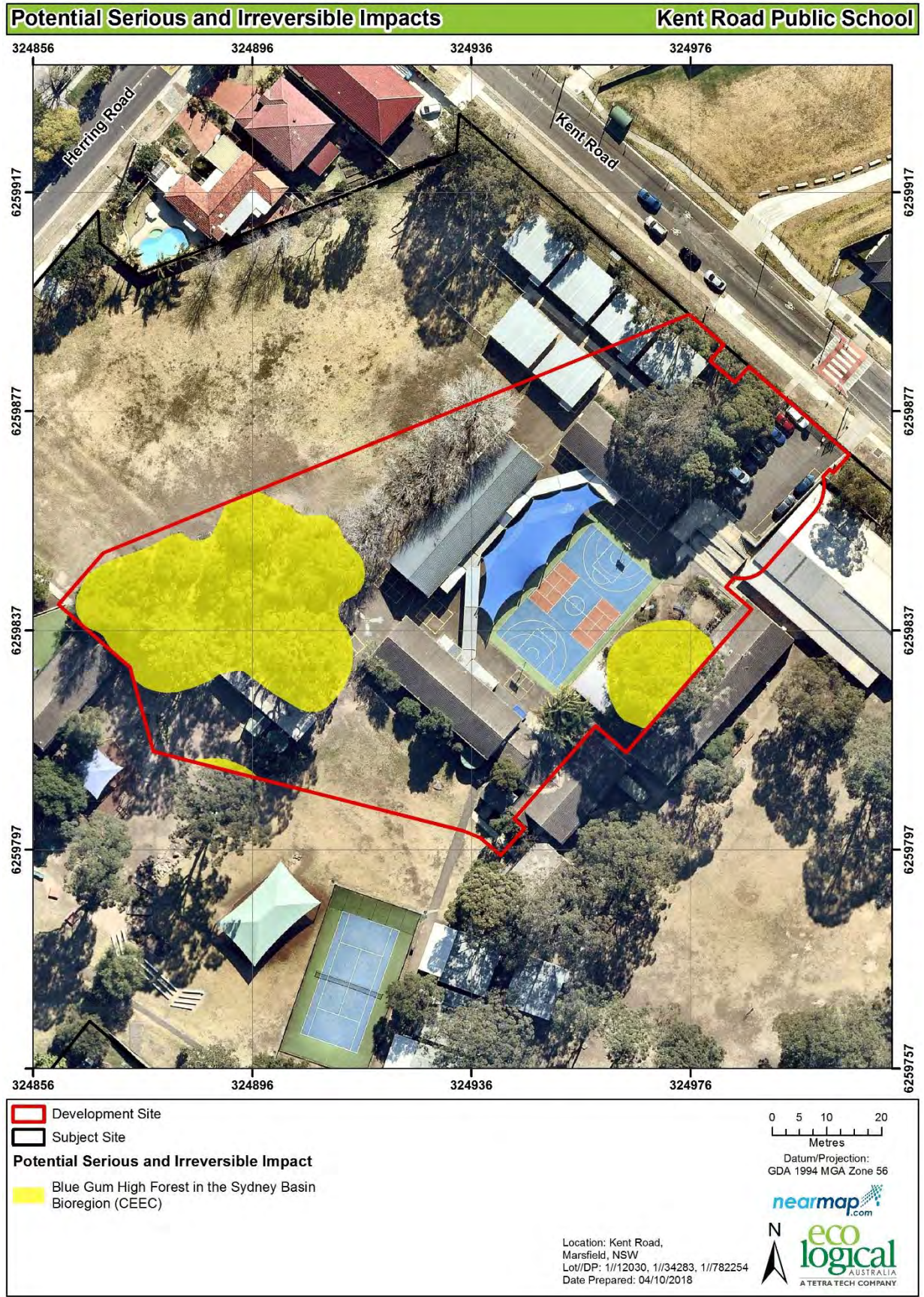


Figure 8: Potential Serious and Irreversible Impacts

## 2.3 Risk Assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures (Section 2.2.5, Table 20) have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 23, Table 24 and Table 25, respectively, and the risk assessment outcome is presented in Table 26.

**Table 23: Likelihood criteria**

Likelihood criteria	Description
<b>Almost certain (Common)</b>	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
<b>Likely (Has occurred in recent history)</b>	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
<b>Possible (Could happen, has occurred in the past, but not common)</b>	The event could occur. There is likely to be an event on average every five to twenty years.
<b>Unlikely (Not likely or uncommon)</b>	The event could occur but is not expected. A rare occurrence (once per one hundred years).
<b>Remote (Rare or practically impossible)</b>	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

**Table 24: Consequence criteria**

Consequence category	Description
<b>Critical (Severe, widespread long-term effect)</b>	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
<b>Major (Wider spread, moderate to long term effect)</b>	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
<b>Moderate (Localised, short-term to moderate effect)</b>	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
<b>Minor (Localised short-term effect)</b>	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
<b>Negligible (Minimal impact or no lasting effect)</b>	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Table 25: Risk matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Remote
<b>Critical</b>	Very High	Very High	High	High	Medium
<b>Major</b>	Very High	High	High	Medium	Medium
<b>Moderate</b>	High	Medium	Medium	Medium	Low
<b>Minor</b>	Medium	Medium	Low	Low	Very Low
<b>Negligible</b>	Medium	Low	Low	Very Low	Very Low

Table 26: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
sedimentation and contaminated and/or nutrient rich run-off	Construction	Medium	Low
noise, dust or light spill	Construction	Medium	Low
inadvertent impacts on adjacent habitat or vegetation	Construction	Low	Very Low
transport of weeds and pathogens from the site to adjacent vegetation	Construction	Medium	Low
vehicle strike	Construction / operation	Low	Very Low
trampling of threatened flora species	Construction / operation	Very Low	Very Low
bush rock removal and disturbance	Construction / operation	Very Low	Very Low
increase in predatory species populations	Construction / operation	Very Low	Very Low
increase in pest animal populations	Construction / operation	Very Low	Very Low
rubbish dumping	Construction / operation	Low	Very Low
increased risk of fire	Construction / operation	Very Low	Very Low

## 2.4 Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered and addressed in Section 2.2.5 and no further impacts are required to be addressed.

## 2.5 Impact Summary

### 2.5.1 Serious and Irreversible Impacts (SAIL)

As discussed in Section 2.2.6, as the threshold for a SAIL on BGHF has not yet been published by the OEH, it cannot be determined with certainty if the proposed development will have a SAIL. Only a small area (0.17 ha) of BGHF in a degraded nature will be removed within the Development Site.

### 2.5.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 27 and shown on Figure 9.

**Table 27: Impacts to native vegetation that require offset.**

PCT ID	Veg Zone	PCT Name	Vegetation Class	Vegetation formation	Direct impact (ha)	Vegetation integrity score
1237	1	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</i>	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby sub-formation)	0.17	27
1237	2	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion (Moderate condition)</i>	North Coast Wet Sclerophyll Forests	Wet Sclerophyll Forests (Shrubby Sub-formation)	0.06	28.7

### 2.5.3 Impacts not requiring offset

There are no impacts that do not require offsets.

### 2.5.4 Areas not requiring assessment

Areas were present within the Development Site that were classified as 'Cleared/Exotics'. These areas were cleared of all native vegetation (including buildings and recreation areas that will be demolished as part of the proposal) and included areas of exotic vegetation (0.54 ha). These areas were not consistent with any listed PCT, nor did they contain any threatened species, hence further assessment under the BAM was not required. Areas not requiring assessment are shown on Figure 10.

### 2.5.5 Credit summary

A summary of the credit report generated by the BAMC is outlined in Table 28. A total of 4 ecosystem credits are required for impacts to PCT 1237. No candidate species credit species or likely habitat was recorded within the Development Site; hence no species credits are required to offset the development. The full biodiversity credit report exported from the BAMC is included in Appendix D.

**Table 28: Ecosystem credits required**

PCT ID	Veg Zone	PCT Name	Vegetation Formation	Direct impact (ha)	Credits required
1237	1	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion (Low condition)</i>	Wet Sclerophyll Forests (Shrubby Sub-formation)	0.17	3
1237	2	<i>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion (Moderate condition)</i>	Wet Sclerophyll Forests (Shrubby Sub-formation)	0.06	1

## 2.6 Offset options

There are a number of options that can be utilised to offset the required ecosystem credits. These include retiring matching biodiversity credits either through establishing a Biodiversity Stewardship Agreement (offset) on land owned by The Department of Education, through purchasing matching credits on the open market, making a payment to the Biodiversity Conservation Trust, or funding biodiversity actions for individual species or communities. However, this last option has some limitations. Due to the small scale of the project, it is likely that making a payment to the Biodiversity Conservation Trust will be the easiest option to retire credits for this redevelopment.

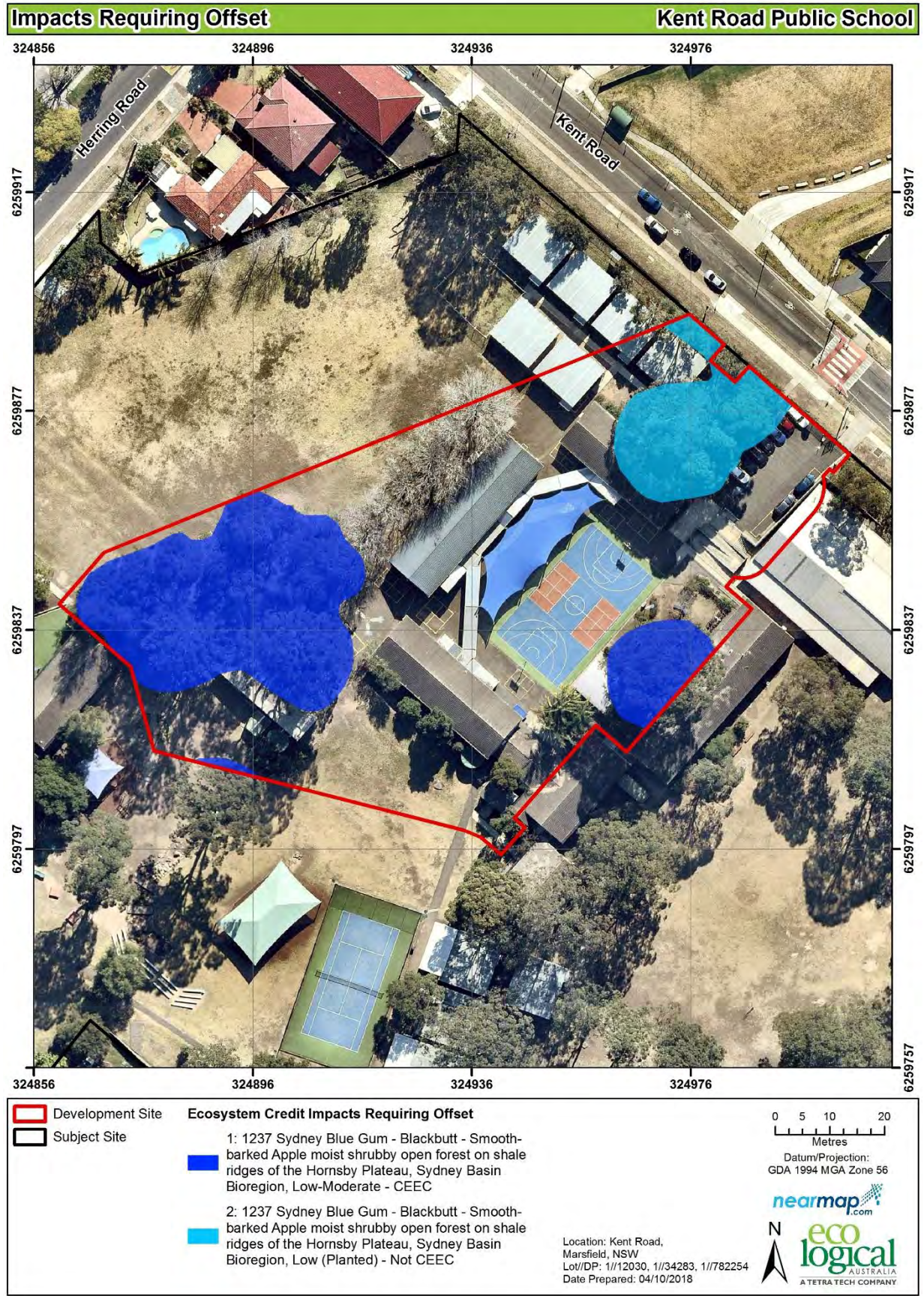


Figure 9: Impacts Requiring Offset

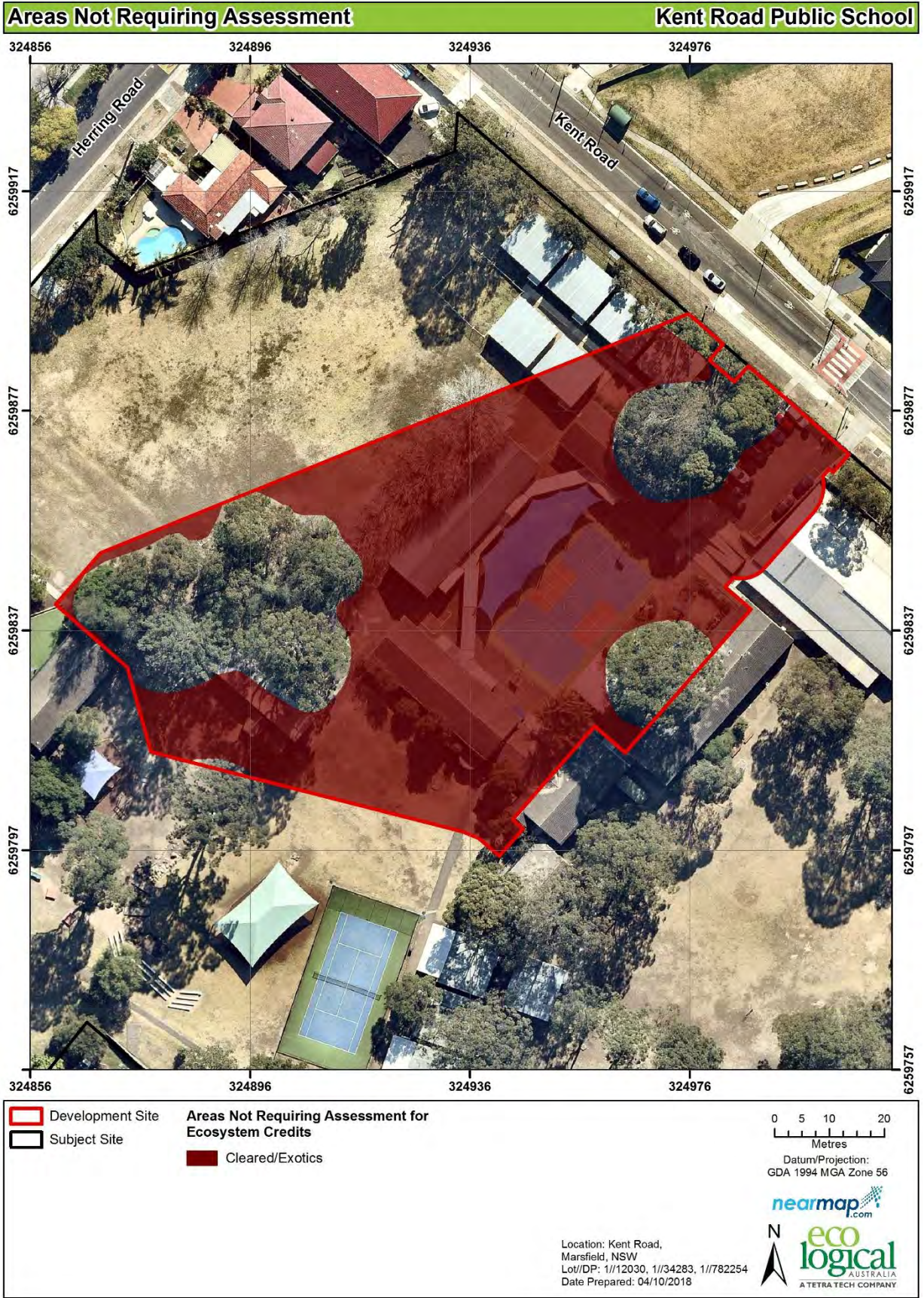


Figure 10: Areas Not Requiring Assessment

## 2.7 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential impacts on “Matters of National Environmental Significance” (MNES) in accordance with the EPBC Act have been addressed in section 2.7.1. Matters relating to Ryde Council planning instruments have been addressed in section 2.7.2.

### 2.7.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where “Matters of National Environmental Significance” (MNES) may be affected. Under the Act, any action which “has, will have, or is likely to have a significant impact on a matter of MNES” is defined as a “controlled action”, and requires approval from the Commonwealth Department of the Environment (DotE), which is responsible for administering the EPBC Act (DotE 2014).

The process includes conducting an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. Significant impact guidelines (DotE 2014) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment and Likelihood of Occurrence was completed and one MNES *Pteropus poliocephalus* (Grey-headed Flying-fox) was assessed under the act (Table 29).

#### 2.7.1.1 *Pteropus poliocephalus* (Grey-headed Flying-fox)

The Grey-headed Flying-fox (GHFF) is listed as a Vulnerable species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging, and have been recorded travelling long distances on feeding forays. Fruits and flowering plants of a wide variety of species are the main food source. The species roosts in large ‘camps’ of up to 200 000 individuals. Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas (DECCW 2009).

Grey-headed Flying-fox is known from the locality to be within a close proximity of the Development Site (OEH 2017b). The vegetation within the Development Site provides potential foraging habitat. It is considered likely that this species would use the site on occasion for foraging purposes with calls recorded in/near the Development Site in 2017 (OEH 2018a). According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 6 km to the north-east of the Development Site, in Gordon (DotE 2018).

**Table 29: EPBC Act of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)**

Criterion	Assessment
<b>Criterion a: lead to a long-term decrease in the size of an important population of a species</b>	<p>The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:</p> <ul style="list-style-type: none"> <li>• Key source populations either for breeding or dispersal</li> <li>• Populations that are necessary for maintaining genetic diversity, and/or</li> <li>• Populations that are near the limit of the species range</li> </ul> <p>No important populations have been recorded within the Development Site. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range. According to the National Flying-fox Monitoring Program, no GHFF camps</p>

Criterion	Assessment
	currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 6 km to the north-east of the Development Site, within Gordon (DotE 2018).
<b>Criterion b: reduce the area of occupancy of an important population</b>	No important populations have been recorded within the Development Site. Therefore, the proposed works would not reduce the area of occupancy of an important population.
<b>Criterion c: fragment an existing important population into two or more populations</b>	No important populations have been recorded within the Development Site. The potential foraging habitat to be removed is marginal relative to adjacent potential habitat within the region. Whilst the potential foraging habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works. Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the site and across the broader locality.
<b>Criterion d: adversely affect habitat critical to the survival of a species</b>	<p>Less than 17% (0.23 ha) of the potential foraging habitat in canopy trees within the Subject Site will be removed by the proposal.</p> <p>These individual trees represent a negligible amount of potential foraging resources in the locality. Potential foraging habitat will persist in close proximity to the Development Site, within the remaining Subject Site and in large stands of high quality intact native vegetation in Lane Cove Rive National Park (approximately 2km NE from the Development Site). Given that this species is highly mobile (traveling up to 50 km to forage), it is considered unlikely that the works would adversely affect habitat critical to the survival of this species.</p>
<b>Criterion e: disrupt the breeding cycle of an important population</b>	According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 6 km to the north-east of the Development Site, within Gordon (DotE 2018). Thus, no important population of GHFF occurs within the Development Site, and the proposed works is unlikely to disrupt the breeding cycle of an important population.
<b>Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b>	The potential foraging habitat to be removed is marginal and of low quality. Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist adjacent to the Development Site and across the locality, and that this species is highly mobile, it is unlikely that the habitat to be removed would cause the species to decline. Furthermore, according to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the Development Site (DotE 2018). The nearest active GHFF camp occurs approximately 6 km to the north-east of the Development Site, within Gordon (DotE 2018). Therefore, no known GHFF roosting camps for this species will be impacted by the proposed works.
<b>Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b>	The proposed works will not result in the establishment of an invasive species that is harmful to GHFF.
<b>Criterion h: Introduce disease that may cause the species to decline</b>	The proposed works will not result in the introduction of a disease that is harmful to the GHFF.
<b>Criterion i: Interfere substantially with the recovery of the species</b>	Considering the above factors, the proposed works will not interfere substantially with the recovery of the species.
<b>Conclusion</b>	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the GHFF.

### 2.7.2 City of Ryde Development Control Plan 2014

Under the Ryde DCP 2014, any trees removed as a consequence of Development Application approval must be replaced, in accordance with Section 6 of the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012) to effectively maintain the Urban Forest canopy (Part: 9.5 Tree Preservation).

All reasonable efforts are to be undertaken to protect trees from damage during construction. Any trees that may be retained must be clearly marked and protected as per the Urban Forest Technical Manual (Tree Management Technical Manual, City of Ryde 2012). Protection measures should include:

- Clearly marking trees to remain;
- Avoiding compaction of ground around these trees (generally cause by vehicles driving through these areas);
- Avoiding stockpiling of material within the dripline of these trees;
- Tree protection zones are to be fenced off;
- Fences for tree protection zones are to be erected prior to any demolition or construction work being undertaken;
- Trees that are to remain on the site are to be protected against damage during construction. All mature trees to remain shall be clearly marked and a 1.8m high chainwire fence attached to 50 mm steel posts erected around their dripline or a minimum of 4m from the trunk where a structure is to be constructed under the canopy. A qualified arborist shall inspect the tree protection measures and issue a Compliance Certificate to indicate sufficient protection measures undertaken;
- Trenches for services shall be located outside the dripline of all trees that are being retained in the Development Site and all trees on adjoining public and private lands. At any time where a pipe is being laid within the dripline of a tree that is to be retained or on an adjoining property, a qualified arborist must be on-site to oversee the operation; and
- All roots in excess of 25mm that shall be severed, cleanly cut, be kept moist at all times and not be left exposed to the air.

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## Appendix A: Definitions

Terminology	Definition
<b>Biodiversity credit report</b>	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a Development Site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
<b>BioNet Atlas</b>	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
<b>Broad condition state:</b>	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
<b>Connectivity</b>	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
<b>Credit Calculator</b>	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
<b>Development</b>	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
<b>Development footprint</b>	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
<b>Development Site</b>	An area of land that is subject to a proposed development that is under the EP&A Act.
<b>Ecosystem credits</b>	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a Development Site and the gain in biodiversity values at a biodiversity stewardship site.
<b>High threat exotic plant cover</b>	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
<b>Hollow bearing tree</b>	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
<b>Important wetland</b>	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
<b>Local population</b>	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
<b>Local wetland</b>	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
<b>Mitchell landscape</b>	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
<b>Multiple fragmentation impact development</b>	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
<b>Operational Manual</b>	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM
<b>Patch size</b>	An area of intact native vegetation that: a) occurs on the Development Site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next

Terminology	Definition
	area of native vegetation (or $\leq 30$ m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the Development Site or stewardship site.
<b>Proponent</b>	A person who intends to apply for consent to carry out development or for approval for an activity.
<b>Reference sites</b>	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
<b>Regeneration</b>	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height $< 5$ cm within a vegetation zone.
<b>Remaining impact</b>	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
<b>Retirement of credits</b>	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
<b>Riparian buffer</b>	Riparian buffers applied to water bodies in accordance with the BAM
<b>Sensitive biodiversity values land map</b>	Development within an area identified on the map requires assessment using the BAM.
<b>Site attributes</b>	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
<b>Site-based development</b>	a development other than a linear shaped development, or a multiple fragmentation impact development
<b>Species credits</b>	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
<b>Subject land</b>	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a Development Site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
<b>Threatened Biodiversity Data Collection</b>	Part of the BioNet database, published by OEH and accessible from the BioNet website.
<b>Threatened species</b>	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.
<b>Vegetation Benchmarks Database</b>	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
<b>Vegetation zone</b>	A relatively homogenous area of native vegetation on a Development Site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
<b>Wetland</b>	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
<b>Woody native vegetation</b>	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

## Appendix B: Vegetation plot data

Table 30: Species matrix (species recorded by plot)

Stratum	Form	Species name	Common name	Exotic	High Threat Weed	Plot 1		Plot2	
						Cover (%)	Abundance	Cover (%)	Abundance
Upper	TG	<i>Acacia parramattensis</i>	Parramatta Wattle					5	4
Upper	TG	<i>Acacia prominens</i>	Gosford Wattle					2	1
Upper	TG	<i>Allocasuarina littoralis</i>	Black She-oak			8	4	5	2
Upper	TG	<i>Angophora costata</i>	Sydney Red Gum			1	1		
Mid	SG	<i>Banksia ericifolia</i>	Heath-leaved Banksia					2	1
Upper	TG	<i>Callistemon citrinus</i>	Crimson Bottlebrush			2	2		
Upper	TG	<i>Corymbia maculata</i>	Spotted Gum			5	1		
Ground	FG	<i>Cotula australis</i>	Common Cotula					0.1	10
Ground	GG	<i>Cynodon dactylon</i>	Couch					1	5
Ground		<i>Dietes</i> sp.				1	6		
Ground		<i>Ehrharta erecta</i>	Panic Veldtgrass	Y	Y			2	50
Ground		<i>Eragrostis curvula</i>	African Lovegrass	Y	Y			2	20
Upper	TG	<i>Eucalyptus botryoides</i>	Bangalay					5	1
Upper	TG	<i>Eucalyptus paniculata</i>	Grey Ironbark			10	1		
Upper	TG	<i>Eucalyptus saligna</i>	Blue Gum			20	4		
Upper	TG	<i>Eucalyptus tereticornis</i>	Forest Red Gum					20	6
Ground	OG	<i>Glycine tabacina</i>						0.1	2
Ground		<i>Hypochaeris radicata</i>	Catsear	Y				0.1	15
Ground	GG	<i>Lomandra longifolia</i>	Spiny-headed mat-rush			2	2	3	25
Ground	GG	<i>Lomandra multiflora</i>	Many-flowered Mat-rush					1	15
Upper	TG	<i>Lophostemon confertus</i>	Brush Box					17	1
Upper	TG	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark			5	3		
Mid		<i>Ochna serrulata</i>	Mickey Mouse Plant	Y	Y	0.2	1		
Mid	SG	<i>Pittosporum undulatum</i>	Sweet Pittosporum					1	1
Ground		<i>Plantago lanceolata</i>	Plantain	Y				1	10
Ground	GG	<i>Rytidosperma</i> sp.						1	20

Stratum	Form	Species name	Common name	Exotic	High Threat Weed	Plot 1	Plot2
Ground		<i>Stenotaphrum secundatum</i>	Buffalo Grass	Y	Y	15	100
Ground	GG	<i>Unknown grass</i>				5	100

Tree (TG), Shrub (SG), Grass & Grasslike (GG), Forb (FG), Fern (EG), Other (OG)

**Table 31: Vegetation integrity data (Composition, Structure and function)**

Plot location data					
Plot no.	PCT	Condition	Eastings	Northings	Bearing
1	1237	Low - Moderate	324880	6259837	55° NE
2	1237	Low	324790	6259815	40° NE

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	6	1	1	0	0	0
2	6	2	4	1	0	1

Structure (Total cover)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	49	2	2	0	0	0
2	54	2	3	0.1	0	0.1

Function												
Plot no.	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5- 9	Tree Stem 10-1 9	Tree Stem 20-2 9	Tree Stem 30-49	Tree Stem 50-79	Tree Stem 80+	Tree Regen	High Threat Weed Cover
1	1	0	44.02	0	1	1	1	1	1	1	0	0.2
2	0	0	37.4	0	0	0	1	1	1	0	0	19

## Appendix C: Plot photos



**Plate 1: Plot 1 transect start**



**Plate 2: Plot 1 transect end**



**Plate 3: Plot 2 transect start**



**Plate 4: Plot 2 transect end**

## Appendix D: Biodiversity credit report



## BAM Credit Summary Report

### Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00012512/BAAS17006/18/00012513	Kent Road Public School SSD	24/02/2018
Assessor Name	Report Created	BAM Data version *
Jennie Powell	05/10/2018	3
Assessor Number	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BAAS17006		

### Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAI	Ecosystem credits
<b>Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion</b>								
1	1237_Low_Moderate	27.0	0.2	0.25	High Sensitivity to Potential Gain	2.50	TRUE	3



# BAM Credit Summary Report

2	1237_Low_Planted	28.7	0.1	0.25	High Sensitivity to Potential Gain	2.50	TRUE	1
Subtotal								4
Total								4

## Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Candidate SAI	Species credits
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