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WESTMEAD CATHOLIC COUMMNITY EDUCATION PROJECT - BIODIVERSITY OFFSETS SCHEME WAIVER REQUEST

Dear Jessica,

The purpose of this letter is to assess the need for formal biodiversity assessments, utilising the Biodiversity Assessment Method (BAM), for the proposed State Significant Development (SSD) of Project 1 – Stage 1 of the Westmead Catholic Community Project (hereafter referred to as the 'project'). This assessment considers the entire land area covered by the project (Lot 1 DP 1095407 and Lot 1 DP 1211982), hereafter referred to as the 'subject land', with particular reference to the areas proposed to be impacted by the project.

It is expected that this letter will be included in a request for Secretary's Environmental Assessment Requirements (SEARs) to the NSW Department of Planning, Industry and Environment (DPIE), in order to request a Biodiversity Offsets Scheme (BOS) waiver for the project.

This letter has been prepared to provide information for the Planning Agency Head and the Environment Agency Head to assist them in determining whether the project is likely to have any significant impact on biodiversity values and whether a Biodiversity Development Assessment Report (BDAR) is required for the project.

Our assessment is set out below, with the BAM Waiver Request provided in **Appendix A.** Flora species lists are provided in **Appendix B,** threatened species records and likelihood of occurrence are summarised in **Appendix C,** and Figures shown in **Appendix D**.

Based on our assessment of biodiversity within the subject land, we recommend that a waiver for the preparation of a BDAR be sought from DPIE.

Yours sincerely,

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APPENDIX A :
BAM Waiver Request

A.1. Background

A.1.1. Site Description

Project 1 – Stage 1 of the Westmead Catholic Community Project (hereafter referred to as the 'project') is bound by Darcy Road to the north, Western Sydney University to the east, a rail corridor to the south and hospital housing to the west that is part of NSW Health Land. The project is located entirely within the following lots that are hereafter referred to collectively as the 'subject land' (see **Figure 1**):

- Lot 1 DP 1095407; and
- Lot 1 DP 1211982.

The subject land currently includes Parramatta Marist High School which is comprised of buildings, infrastructure and sporting fields. The subject land has been extensively modified and is largely comprised of a mixture of planted native and exotic vegetation. The western border of the subject land contains native vegetation comprised of Swamp Oak Floodplain Forest which is listed as an Endangered Ecological Community (EEC) under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Areas of Swamp Oak Floodplain Forest are situated along an unnamed modified drainage line located along the western boundary of the subject land that extends from Darcy Road in the northwest to the rail corridor in the southwest.

A.1.2. The Proposed Development

The project is a compliant development scheme that has endeavoured to be designed to minimise planning and approval risk in order to provide space for additional students as soon as possible. The project includes the demolition of existing structures where required in order to construct the following:

- Primary School Block;
- Catholic Early Learning Centre/ Admin Fitout of Existing Facility;
- Multideck Car Park and Drop Off; and
- New Parish Church/ Community Parish Centre.

The project plan is identified in **Figure 2**.

A.1.3. Assessment Requirements for State Significant Development

The project is expected to be classified as Stage Significant Development (SSD) under Clause 15 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011*, as the Capital Investment Value (CIV) exceeds $20 million for the purpose of alterations or additions to an existing school.

Section 7.9 of the BC Act requires all development applications for SSD to be accompanied by a Biodiversity Development Assessment Report (BDAR), unless both 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.

The main steps in the biodiversity assessment process for SSD are as follows:

1. The Planning Agency Head and the Environment Agency Head determines if the Biodiversity Offsets Scheme applies to the SSD and specifies the environmental assessment requirements;

2. The proponent engages an accredited person to assess the development site using the Biodiversity Assessment Method (BAM) and a BDAR is prepared;

3. The approval authority considers any serious and irreversible impacts and determines whether there are additional and appropriate measures to minimise impacts;

4. The approval authority sets an offset obligation as part of the Conditions of Approval; and

5. The proponent meets their offset obligation and begins their development.

The BAM sets out clear and repeatable methods to conduct assessment of direct and indirect impacts. The BAM is supported by the BAM Calculator, which is a web-based tool that quantifies direct impacts using 'biodiversity credits'. Two types of credits are generated by the BAM Calculator, ecosystem credits and species credits. Ecosystem credits are calculated based on variables including landscape features, native vegetation and ecosystem credit species (species that are reliably predicted by habitat surrogates). Species credits are calculated based on the number of individuals (selection of flora species) or the area of habitat (selection of flora species and all fauna species) of species credit species (species that are not reliably predicted by habitat surrogates).

The BAM includes a requirement to prepare a BDAR for the proposed development site, which must be prepared by an accredited assessor. A proponent is required to submit the BDAR as part of an Environmental Impact Statement for a SSD.

A.1.4. Waiver of requirement to prepare a Biodiversity Development Assessment Report

Section 7.9 of the BC Act indicates that there are some circumstances in which the Planning Agency Head and the Environment Agency Head may determine that a proposed development is not likely to have a significant impact on biodiversity values and as such, a BDAR is not required to be prepared. Biodiversity values are defined under the BC Act and the *Biodiversity Conservation Regulation 2017* (BC Regulation), and include:

- Vegetation integrity—being the degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state;

- Habitat suitability—being the degree to which the habitat needs of threatened species are present at a particular site;

- Threatened species abundance—being the occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site;

- Vegetation abundance—being the occurrence and abundance of vegetation at a particular site;

- Habitat connectivity—being the degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range;
- Threatened species movement—being the degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle;
- Flight path integrity—being the degree to which the flight paths of protected animals over a particular site are free from interference; and
- Water sustainability—being the degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site.

For a waiver to be applied for future development at a site, it needs to be demonstrated that the above listed biodiversity values will not be significantly impacted.

A.2. Methods

A.2.1. Database Analysis

Database searches were conducted to identify threatened species, populations, that occur within the locality using the NSW Office of Environment and Heritage (OEH) BioNet Atlas database (OEH 2019a). The BioNet Atlas search facility was used to generate records of threatened flora and fauna species and populations listed under the BC Act within the search area. The number, age, and location of such records were considered to provide an indication of the species that could have the potential to occur on or around the subject land.

A.2.2. GIS Mapping

A desktop analysis was completed to identify whether any vegetation communities were present on or nearby the subject land. To do this, the subject land was plotted against the broad scale mapping compiled by the OEH for the Sydney Metropolitan area (OEH 2016). A vegetation map of the subject land was then produced based upon observations of vegetation during the surveys.

The results from the OEH BioNet Atlas search were downloaded and plotted onto an aerial image corresponding to the subject land. This subsequently displayed any threatened species within the locality to determine the potential for the species to be present within the subject land.

A.2.3. Site Inspection

A Cumberland Ecology botanist and ecologist surveyed the subject land on Tuesday, 15 October 2019. The subject land was inspected by traversing all vegetated areas of the subject land to verify existing vegetation mapping, with reference to Plant Community Types (PCTs) known to occur within the locality.

A.2.3.1. Random Meander Surveys

A random meander survey was undertaken within the subject land, where occurring flora species were recorded. The random meander survey also included targeted threatened species surveys for threatened flora species previously recorded within 5km of the subject land (the 'locality'). Notes and photographs were taken documenting vegetation and habitat features throughout the subject land.

A.2.3.2. Fauna Habitat Assessment

A fauna habitat assessment was conducted within the subject land, which included consideration of important indicators of habitat condition and complexity, including the occurrence of microhabitats such as tree hollows, human-made structures and the nature and extent of the understorey, ground stratum and canopy of vegetation. Any incidental vertebrate fauna species that were heard calling or were observed during the surveys were recorded and listed in the total species list for the subject land.

A.3. Key findings

A.3.1. Vegetation of the subject land

The vegetation within the subject land is likely to have been planted after 1943 as determined from review of historical imagery, (see **Figure 3),** which shows the majority of the subject land as cleared land**.** Generally, the composition, structure and function of vegetation within the subject land and the surrounding landscape have been altered significantly and do not resemble any naturally occurring PCTs. The subject land is predominantly an artificial landscape with planted garden beds and planted trees situated throughout the campus. Subsequently, most of the woody vegetation within the subject land predominately forms a single mapping unit of 'Urban Exotic/Native vegetation' as described below and as shown in **Figure 4**.

Areas along the western boundary of the subject land contain the EEC Swamp Oak Floodplain Forest, situated along a modified unnamed drainage line that extends beyond the subject land to the south-west. The Swamp Oak Floodplain Forest within and adjacent to the subject land is considered to align to PCT 1234 Swamp oak swamp forest fringing estuaries of the Sydney Basin and South East Corner Bioregion.

A.3.1.1. Swamp Oak Floodplain Forest

The vegetation within the western boundary of the subject land is comprised of a patch of Swamp Oak Floodplain Forest that surrounds a modified drainage line. The majority of this community extends outside of the subject land with only a narrow linear strip present with the subject land that is almost entirely outside of existing campus fencing. One small section is present within campus fencing to the west of the campus entrance road (see **Figure 4** and **Photograph 1**). **Photograph 2** identifies an area characteristic of this community located outside of campus fencing.

The canopy of this community is dominated by *Casuarina glauca* (Swamp Oak) with scattered occurrences of *Casuarina cunninghamiana subsp. cunninghamiana* (River Oak), *Eucalyptus tereticornis* (Forest Red Gum) and *Cinnamomum camphora* (Camphor Laurel). Small trees and shrubs present within this patch of vegetation include *Melaleuca decora*, *Melaleuca styphelioides* (Prickly-leaved Tea Tree), *Pittosporum undulatum* (Sweet Pittosporum), *Ligustrum lucidum* (Large-leaved Privet) and regrowth canopy species. The ground layer of this patch of vegetation includes *Cenchrus clandestinus* (Kikuyu Grass), *Dianella caerulea* (Blue Flax-lily), *Bromus catharticus* (Prairie Grass), *Nassella neesiana* (Chilean Needle Grass) and *Conyza bonariensis* (Flaxleaf Fleabane).

Photograph 1 Swamp Oak Floodplain Forest within campus fencing of the subject land

Photograph 2 Swamp Oak Floodplain Forest outside of campus fencing of the subject land

A.3.1.2. Urban Exotic/Native

The Urban Exotic/Native vegetation within the subject land is comprised of garden beds and rows of trees of primarily planted origin. Common canopy tree species planted throughout the areas mapped as Urban Exotic/Native vegetation include *Eucalyptus microcorys* (Tallowood), *Corymbia citriodora* (Lemon-scented Gum), *Corymbia maculata* (Spotted Gum), *Pinus radiata* (Radiata Pine), *Cinnamomum camphora* (Camphor Laurel) and *Platanus x acerifolia* (London Plane). Small trees and shrubs present throughout this area of vegetation include *Melaleuca bracteata* (Black Teach-tree), *Acacia fimbriata* (Fringed Wattle), *Callistemon viminalis* (Weeping Bottlebrush) and *Grevillea* 'robyn gordon'. Groundcover species present within this area of vegetation include *Cynodon dactylon* (Common Couch), *Dianella caerulea* (Blue Flax-lily), *Ehrharta erecta* (Panic Veldtgrass) and *Lomandra longifolia* (Spiny-headed Mat-rush). Representative photographs of this community are provided in **Photographs 3-4** below.

Photograph 3 *Pinus radiata* (Radiata Pine) within Urban Exotic/Native Vegetation in the south of the subject land

Photograph 4 Urban Exotic/Native Vegetation of the subject land outside campus buildings

A.3.2. Fauna Habitat

The primary habitat for native fauna within the subject land is the native and exotic plantings throughout the campus. This vegetation may fall within the foraging range of a range of native fauna species, including threatened species. The foraging resources of the subject land would be expected to be utilised occasionally and opportunistically by birds, bats and arboreal mammals. Nectivorous and frugivorous species may utilise the native and exotic vegetation within the subject land to feed on blooms and fruit, whilst insectivorous species such as Microchiropteran bats may forage for insects throughout the canopy layer. No hollow-bearing trees or nests were observed within the subject land, ruling out the possibility of breeding habitat for hollow nesting and roosting species.

A modified drainage line is present in the west of the subject land that offers potential habitat for aquatic species such frogs. The drainage line contains limited fringing vegetation and is considered to provide minimal habitat for common frog species known to occur in the locality (see **Figure 4** and **Photograph 5**).

Photograph 5 Modified drainage line located along the western boundary of the subject land

A.3.3. Threatened Communities and Species

A.3.3.1. Threatened Ecological Communities

As the vegetation identified as Urban Exotic/Native within the subject land is comprised of a combination of exotic and native species of planted origin situated within a highly artificial context, it is not considered to conform to any Threatened Ecological Communities listed under either the BC Act or the Commonwealth EPBC Act known from the locality.

The vegetation within the western boundary of the subject land is situated along a modified drainage line, but is floristically consistent with Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, which is listed as an EEC under the BC Act and the EPBC Act. The Swamp Oak Floodplain Forest present within the subject land is considered to conform to the BC Act listing for the community following a comparison to the community's final determination (NSW Scientific Committee 2019) but not the EPBC Act listing due to the small patch size (less than 2 ha) and containing an exotic dominated understorey (DOEE 2018). Although areas of this community conforming to the BC Act listed EEC are present within the subject land, no direct or indirect impacts to this vegetation are anticipated as a result of the project.

A.3.3.2. Threatened Flora

No existing records of threatened flora species are present on the subject land; however two *Eucalyptus scoparia* (Wallangarra White Gum) and one *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) of planted

origins were recorded (see **Figure 4**). Neither of these species are endemic to the Sydney region and are occasionally planted as a landscape specimens. *Eucalyptus scoparia* (Wallangarra White Gum) is endemic to the Tenterfield region in northern NSW and is listed as Endangered under the BC Act and as Vulnerable under the EPBC Act. *Eucalyptus nicholii* (Narrow-leaved Black Peppermint) is endemic to the New England Tablelands and is listed as Vulnerable under the BC Act and EPBC Act.

Threatened flora species are known to occur within the locality (see **Appendix C**). Due to the lack of nearby records and the highly developed and artificial nature of the subject land, it is considered unlikely that any threatened flora species would occur within the subject land.

A.3.3.3. Threatened Fauna

A limited number of threatened fauna species are known to occur within the locality of the subject land (see **Appendix C**). A review of the BioNet Atlas records of threatened fauna species within 5 km of the subject land includes no individuals previously recorded within the subject land. Threatened fauna that would be expected to utilise the foraging resources within the subject land and immediate surrounds include highly mobile, aerial species such as The Grey-headed Flying-fox (*Pteropus poliocephalus*), the Powerful Owl (*Ninox strenua*) and Microchiropteran bats. The Grey-headed Flying Fox is listed as Vulnerable under the BC Act and the EPBC Act whilst the Powerful Owl is listed as Vulnerable under the BC Act.

There are many records of Grey-headed Flying-fox within the locality as there is a breeding camp (i.e. Parramatta Park) located approximately 1.2 km to the east of the subject land, which is well within foraging range of the species (Department of the Environment and Energy 2015). Grey-headed Flying-fox individuals from this camp as well as other camps in Sydney are likely to fly over the subject land in search of foraging resources such as nectar and pollen (OEH 2019e). Whilst Grey-headed Flying-foxes are likely to forage within the subject land, it does not contain a roosting camp.

The Powerful Owl occupies a territory of up to 4000 ha and may occasionally and opportunistically hunt for arboreal mammal prey species such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) within the subject land as part of a larger foraging range (OEH 2019g); however the Urban Exotic/Native vegetation within the subject land would not be expected to support an abundance of prey species as no hollow-bearing trees are present. Nonetheless, the Powerful Owl may utilise the limited foraging values within the subject land to hunt for prey such as Ring-tailed Possums (*Pseudocheirus peregrinus*), which may have the potential to occur.

Microchiropteran bats are also known to forage for insects in urban areas and would be expected to occasionally and opportunistically access the foraging resources within the subject land. Species anticipated to frequent the subject land include but are not limited to the following:

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*);
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*); and
- Greater Broad-nosed (*Scoteanax rueppellii*).

All of these species are listed as Vulnerable under the BC Act. The subject land does not contain suitable breeding or refuge habitat for any of these species as the subject land lacks hollow-bearing trees and man-made structures considered suitable for roosting (OEH 2019f, b, c, d) . Man-made structures are present, but are well maintained and lack appropriate entry points.

A.4. Impact Assessment

A.4.1. Impacts to Vegetation and Habitat

The approximate area of impact relating to the project is shown in **Table 1** below and on **Figure 5**. It is anticipated that the project will result in the removal of 0.42 ha of Urban Exotic/Native planted vegetation, comprising a combination of native and exotic trees, shrubs and groundcovers. No Swamp Oak Floodplain Forest is anticipated to be impacted directly or indirectly by the Project.

Table 1 Areas of vegetation and land to be impacted within the subject land

Vegetation Community	Subject Land (ha)	Impact Area (ha)
Swamp Oak Floodplain Forest	0.27	0.00
Urban Exotic/Native Vegetation	4.83	0.42
Cleared	0.19	0.03
Total	5.30	0.45

A.4.2. Biodiversity Values Assessment

The BC Act and the BC Regulation list a suite of biodiversity values that are relevant to assessments that must take place under the BC Act. To demonstrate that the project will not impact upon biodiversity, **Table 2** systematically comments upon the relevance of each value.

Table 2 Biodiversity values assessment

Biodiversity Value	Assessment within subject land
BC Act - Part 1 Section 1.5 (2)	
(a) vegetation integrity—being the degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state,	Based on a review of historical aerial imagery from 1943, showing the subject land as mostly cleared land, the vegetation has been significantly altered from its original state. Based upon the results of floristic surveys, it has been concluded that the existing vegetation of the subject land is largely comprised of planted Urban Exotic/Native Vegetation within garden beds and in rows. The majority of Urban Exotic/Native Vegetation within the subject land is considered likely to have been planted since the school campus was built in 1965 and does not conform to a naturally occurring plant community type (PCT) Areas of Swamp Oak Floodplain Forest considered to conform to the BC Act listing for the community are present; however, no impacts are anticipated as a result of the project. Although conforming to an EEC listed under the BC Act, this vegetation is considered to have been

Biodiversity Value	Assessment within subject land
	altered from a near natural state as it exists along a modified drainage line that was relatively unvegetated in 1943. With consideration of the above, the composition, structure and function of vegetation within the subject land and the surrounding landscape are considered to have been altered significantly from a natural state.
(b) habitat suitability—being the degree to which the habitat needs of threatened species are present at a particular site,	As discussed above, the subject land has little potential to provide habitat for threatened species other than highly mobile, aerial species. Threatened species with the highest likelihood to utilise the subject land include the Grey-headed Flying-fox, the Powerful Owl and Microchiropteran bats. These highly mobile species may occasionally and opportunistically utilise the limited foraging resources of the subject land as part of a larger foraging range.
(c) biodiversity values, or biodiversity-related values, prescribed by the regulations.	See below.
BC Regulation - Part 1 Clause 1.4	
(a) threatened species abundance—being the occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site,	No threatened species were observed during the site inspection. Only highly mobile, aerial threatened species would be expected to utilise the foraging resources of the subject land occasionally and opportunistically. Approximately 0.27 ha of the BC Act listed EEC Swamp Oak Floodplain is present within the subject land; however, all areas of the community will be avoided by the project.
(b) vegetation abundance—being the occurrence and abundance of vegetation at a particular site,	As described above, the subject land has been largely cleared and predominately comprised of scattered plantings of exotic and native species. Areas of Swamp Oak Floodplain Forest in the west contain dense areas of vegetation; however, all such areas are proposed to be retained by the project. As a result, the project will result in the clearing of Urban Exotic/Native Vegetation comprised of garden bed plantings and rows of planted trees.
(c) habitat connectivity—being the degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range,	The subject land may marginally contribute to habitat connectivity throughout the largely cleared and artificial landscape that dominates the locality. Trees within the subject land and its immediate surroundings may function as stepping stone habitat for highly mobile fauna, providing a degree of habitat connectivity between the small parks and reserves of such as Yana Yirabana Reserve and Parramatta Park.
(d) threatened species movement—being the degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle,	As above, the subject land does not contribute to the movement of threatened species other than highly mobile, aerial species. Impacts associated with the project would not be expected to have any impact on the lifecycle of such species.

Biodiversity Value	Assessment within subject land
(e) flight path integrity—being the degree to which the flight paths of protected animals over a particular site are free from interference,	The project is not anticipated to exceed the height of existing structures throughout the subject land. Subsequently the project is not expected to impact upon free-flying animals (threatened or otherwise) by interfering with flight paths.
(f) water sustainability—being the degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site**.**	The subject land is adjacent to an unnamed drainage line that is fed from Darcy Road in the north. The subject land also includes a small section of the unnamed drainage line that abuts a small section of the campus' entrance road in the west. The project is unlikely to result in impacts to water bodies or hydrological processes assuming that adequate sediment control measures are followed.

A.5. Conclusion

The project is considered highly unlikely to have significant impacts upon defined biodiversity values as impacts are limited to highly modified areas. The project is anticipated to impact ~0.42 ha area of Urban Exotic /Native planted vegetation that does not conform to any recognised PCT. This area of vegetation may comprise potential and marginal foraging habitat within the broad habitat ranges of highly mobile native fauna including threatened species such as the Grey-headed Flying Fox, Microchiropteran bats and the Powerful Owl. No areas of the BC Act listed EEC Swamp Oak Floodplain are anticipated to be impacted by the project as it is located outside of the proposed area of works.

When assessing impacts to potentially occurring threatened species from the project, there is limited justification for considering impacts to threatened species with the detail required under the BAM. The project may result in a small reduction of marginal foraging habitat for highly mobile, aerial threatened species. Nevertheless, when assessing impacts likely from the project in its current form, there is very little likelihood of significant impacts to threatened species.

On the basis of our investigations, we believe that the preparation of a BDAR is not necessary due to the low likelihood of impacts to biodiversity. Therefore, we recommend that a waiver for the preparation of a BDAR be sought from DPIE for the proposed project, constituting an SSD.

A.6. References

Department of the Environment and Energy. 2015. National Flying-fox Monitoring Viewer. Canaberra, ACT.

DOEE. 2018. Conservation advice (incorporating listing advice) for the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.

NSW Scientific Committee. 2019. Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions - endangered ecological community listing. NSW Office of Environment and Heritage, Hurstville.

OEH. 2016. The Native Vegetation of the Sydney Metropolitan Area - VIS_ID 4489. Office of Environment and Heritage, Sydney.

OEH. 2019a. BioNet Atlas. Office of Environment and Heritage.

OEH. 2019b. Eastern Coastal Free-tailed bat - profile.

OEH. 2019c. Eastern False Pipistrelle – Profile. Hurtsville, NSW Office of Environment and Heritage.

OEH. 2019d. Greater Broad-nosed Bat – profile. Office of Environment and Heritage, Hurstville.

OEH. 2019e. Grey-headed Flying-fox - profile. NSW Office of Environment and Heritage., Hurstville.

OEH. 2019f. Large Bent-winged Bat - profile. Office of Environment and Heritage, Hurstville.

OEH. 2019g. Powerful Owl - profile. Office of Environment and Heritage, Hurstville.

APPENDIX B :
Flora Species List

Table 3 Flora species list

Family	Scientific Name	Common Name	Exotic	BC Act Status	EPBC Act Status	High Threat Weed	Urban Exotic/Native	Swamp Oak Floodplain Forest
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	*				X	
Apiaceae	*Foeniculum vulgare*	Fennel	*				X	
Apocynaceae	*Araujia sericifera*	Moth Vine	*			Yes	X	X
Apocynaceae	*Parsonsia straminea*	Common Silkpod						X
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	*			Yes	X	
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm	*				X	
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	*			Yes	X	
Asteraceae	*Ageratina adenophora*	Crofton Weed	*			Yes	X	
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	*			Yes	X	X
Asteraceae	*Cirsium vulgare*	Spear Thistle	*				X	
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	*					X
Asteraceae	*Cotula australis*	Common Cotula					X	
Asteraceae	*Lactuca serriola*	Prickly Lettuce	*				X	
Asteraceae	*Onopordum acanthium* subsp. *acanthium*	Scotch Thistle	*				X	X
Asteraceae	*Senecio madagascariensis*	Fireweed	*				X	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	*				X	
Asteraceae	*Taraxacum officinale*	Dandelion	*				X	
Basellaceae	*Anredera cordifolia*	Madeira Vine	*			Yes		X
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	*				X	X
Brassicaceae	*Brassica fruticulosa*	Twiggy Turnip	*				X	X
Brassicaceae	*Lepidium africanum*	Common Peppercress	*				X	
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	*			Yes		X
Casuarinaceae	*Casuarina cunninghamiana* subsp. *cunninghamiana*	River Oak					X	X
Casuarinaceae	*Casuarina glauca*	Swamp Oak					X	X
Chenopodiaceae	*Chenopodium album*	Fat Hen	*				X	
Chenopodiaceae	*Einadia nutans*	Climbing Saltbush					X	X
Commelinaceae	*Tradescantia fluminensis*	Wandering Jew	*			Yes	X	
Convolvulaceae	*Convolvulus erubescens*	Pink Bindweed						X
Convolvulaceae	*Dichondra repens*	Kidney Weed						X
Convolvulaceae	*Ipomoea indica*	Morning Glory	*			Yes	X	
Cupressaceae	*Cupressus sempervirens*	Italian Cypress	*				X	
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge					X	

Euphorbiaceae	*Chamaesyce prostrata*	Red Caustic Weed	*		X	
Euphorbiaceae	*Ricinus communis*	Castor Oil Plant	*	Yes		X
Fabaceae (Caesalpinioideae)	*Senna pendula var. glabrata*		*		X	
Fabaceae (Faboideae)	*Erythrina crista-galli*	Cockspur Coral Tree	*	Yes	X	
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine			X	
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla				X
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	*		X	X
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	*		X	
Fabaceae (Faboideae)	*Vicia sativa*	Common vetch	*		X	
Fabaceae (Mimosoideae)	*Acacia decora*	Western Silver Wattle				X
Fabaceae (Mimosoideae)	*Acacia fimbriata*	Fringed Wattle			X	
Fabaceae (Mimosoideae)	*Acacia implexa*	Hickory Wattle				X
Fumariaceae	*Fumaria muralis subsp. muralis*	Wall Fumitory	*		X	X
Iridaceae	*Dietes grandiflora*		*		X	
Lamiaceae	*Stachys arvensis*	Stagger Weed	*		X	
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	*	Yes	X	X
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush			X	X
Lomandraceae	*Lomandra 'tanika'*	Mat-rush			X	
Malaceae	*Cotoneaster glaucophyllus*		*			X
Malaceae	*Eriobotrya japonica*	Loquat	*		X	
Malvaceae	*Hibiscus rosa-sinensis*	Chinese Hibiscus	*		X	
Malvaceae	*Malva parviflora*	Small-flowered Mallow	*		X	
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	*		X	X
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	*		X	
Meliaceae	*Melia azedarach*	White Cedar			X	X
Moraceae	*Morus alba*	White Mulberry	*		X	X
Myrtaceae	*Angophora floribunda*	Rough-barked Apple				X
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle				X
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush				X
Myrtaceae	*Callistemon viminalis*	Weeping Bottlebrush			X	
Myrtaceae	*Corymbia citriodora*	Lemon-scented Gum	*		X	
Myrtaceae	*Corymbia maculata*	Spotted Gum				X
Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum				X
Myrtaceae	*Eucalyptus fibrosa*	Red Ironbark			X	
Myrtaceae	*Eucalyptus leucoxylon subsp. leucoxylon*		*		X	
Myrtaceae	*Eucalyptus microcorys*	Tallowood				

Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V		X		
Myrtaceae	*Eucalyptus paniculata*	Grey Ironbark						
Myrtaceae	*Eucalyptus scoparia*	Wallangarra White Gum	E	V		X		
Myrtaceae	*Eucalyptus siderophloia*	Grey Ironbark					X	
Myrtaceae	*Eucalyptus sideroxylon*	Mugga Ironbark				X		
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum				X	X	
Myrtaceae	*Kunzea ambigua*	Tick Bush	P				X	
Myrtaceae	*Leptospermum petersonii*	Lemon-scented Teatree				X		
Myrtaceae	*Melaleuca bracteata*	Black Tea-tree				X		
Myrtaceae	*Melaleuca decora*					X	X	
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree				X	X	
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	*		Yes	X		
Oleaceae	*Fraxinus spp.*		*			X		
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	*		Yes	X	X	
Oleaceae	*Ligustrum sinense*	Small-leaved Privet	*		Yes	X		
Oxalidaceae	*Oxalis corniculata*	Creeping Oxalis	*			X		
Phormiaceae	*Dianella caerulea*	Blue Flax-lily				X	X	
Pinaceae	*Pinus radiata*	Radiata Pine	*		Yes	X		
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn					X	
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum				X		
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*			X	X	
Poaceae	*Arundo donax*	Giant Reed	*		Yes		X	
Poaceae	*Austrostipa rudis*						X	
Poaceae	*Bromus catharticus*	Praire Grass	*			X	X	
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*				X	
Poaceae	*Cynodon dactylon*	Common Couch				X		
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	*		Yes	X		
Poaceae	*Eragrostis curvula*	African Lovegrass	*		Yes	X		
Poaceae	*Imperata cylindrica*	Blady Grass					X	
Poaceae	*Nassella neesiana*	Chilean Needle Grass	*		Yes		X	
Poaceae	*Poa annua*	Winter Grass	*			X		
Poaceae	*Themeda triandra*						X	
Polygonaceae	*Acetosa sagittata*	Rambling Dock	*		Yes	X		
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*				X	
Proteaceae	*Grevillea robusta*	Silky Oak					X	
Proteaceae	*Grevillea 'robyn gordon'*					X		

Rubiaceae	*Galium aparine*	Goosegrass	*		X	
Solanaceae	*Cestrum parqui*	Green Cestrum	*	Yes	X	X
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush	*		X	
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	*		X	X
Ulmaceae	*Celtis sinensis*	Japanese Hackberry	*		X	
Verbenaceae	*Lantana camara*	Lantana	*	Yes	X	
Verbenaceae	*Verbena bonariensis*	Purpletop	*		X	

Key: E = Endangered, V = Vulnerable, P = Protected

APPENDIX C :

Threatened Species Likelihood of Occurrence Tables

Table 4 Threatened flora likelihood of occurrence

Family	Scientific Name	Common Name	No. of Records	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Likelihood/Nature of Impacts
Apocynaceae	*Marsdenia viridiflora* subsp. *viridiflora*	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	7	E2		Nil - not encountered within the subject land.	No impacts anticipated as it does not occur within the subject land.
Campanulaceae	*Isotoma fluviatilis* subsp. *fluviatilis*		1		X	Nil - not encountered within the subject land.	No impacts anticipated as it does not occur within the subject land.
Dilleniaceae	*Hibbertia superans*		42	E1		Nil - not encountered within the subject land.	No impacts anticipated as it does not occur within the subject land.
Ericaceae	*Epacris purpurascens* var. *purpurascens*		45	V		Nil - not encountered within the subject land.	No impacts anticipated as it does not occur within the subject land.

Family	Scientific Name	Common Name	No. of Records	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Likelihood/Nature of Impacts
Fabaceae (Mimosoideae)	*Acacia pubescens*	Downy Wattle	2	V	V	Nil - not encountered within the subject land.	No impacts anticipated as it does not occur within the subject land.
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	1	V	V	Present - Recorded within the subject land.	No impacts anticipated as it is outside of the area of impact.
Myrtaceae	*Eucalyptus scoparia*	Wallangarra White Gum	0	E	V	Present - Recorded within the subject land.	No impacts anticipated as it is outside of the area of impact.

Key: E = Endangered, V = Vulnerable

Table 5 Threatened fauna likelihood of occurrence

Family	Scientific Name	Common Name	No. of Records	BC Act Status	EPBC Act Status	Likelihood of Occurrence	Likelihood/Nature of Impacts
Amphibia							
Hylidae	*Litoria aurea*	Green and Golden Bell Frog	3	E	V	Unlikely - limited records within 5 km radius of subject land.	Nil

Aves							
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	2	V	Mig.	Unlikely - limited records within 5 km radius of subject land.	Nil
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	2		Mig.	Unlikely - limited records within 5 km radius of subject land.	Nil
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	1	E		Unlikely - limited records within 5 km radius of subject land.	Nil
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	1	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Meropidae	*Merops ornatus*	Rainbow Bee-eater	2		Mig.	Unlikely - limited records within 5 km radius of subject land.	Nil
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	6	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Petroicidae	*Petroica boodang*	Scarlet Robin	1	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	2	V		Unlikely - limited records within 5 km radius of subject land.	Nil

Psittacidae	*Lathamus discolor*	Swift Parrot	7	E	CE	Unlikely - limited records within 5 km radius of subject land.	Nil
Psittacidae	*Polytelis swainsonii*	Superb Parrot	2	V	V	Unlikely - limited records within 5 km radius of subject land.	Nil
Strigidae	*Ninox connivens*	Barking Owl	3	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Strigidae	*Ninox strenua*	Powerful Owl	41	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	4		Mig.	Unlikely - limited records within 5 km radius of subject land.	Nil
Tytonidae	*Tyto novaehollandiae*	Masked Owl	3	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Tytonidae	*Tyto tenebricosa*	Sooty Owl	1	V		Unlikely - limited records within 5 km radius of subject land.	Nil
Gastropoda							
Camaenidae	*Meridolum corneovirens*	Cumberland Plain Land Snail	4	E		Unlikely - limited records within 5 km radius of subject land.	Nil

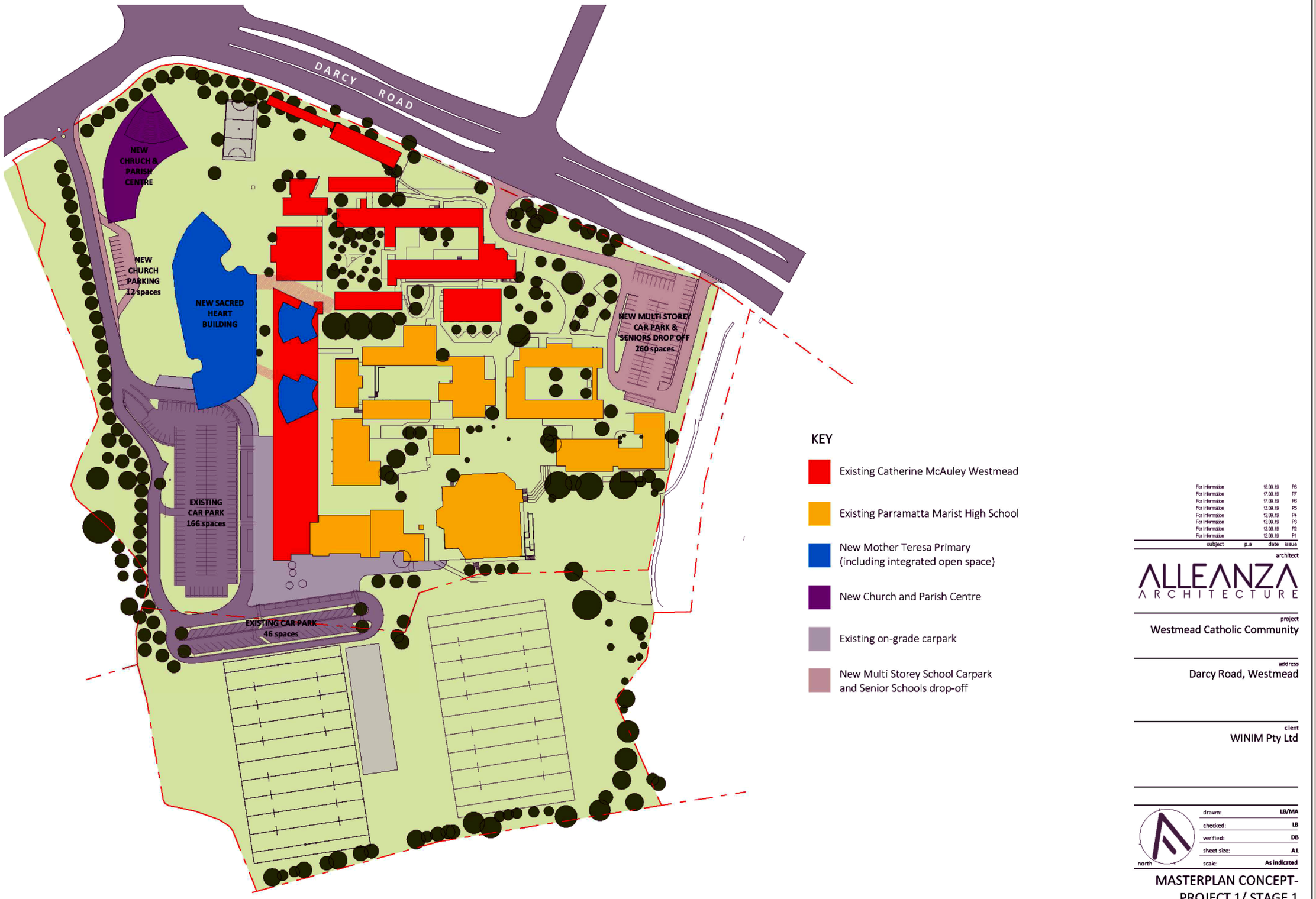
Camaenidae	*Pommerhelix duralensis*	Dural Land Snail	5	E	E	Unlikely - limited records within 5 km radius of subject land.	Nil
Mammalia							
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	3	V	E	Unlikely - limited records within 5 km radius of subject land.	Nil
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	7	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.
Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	10	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	7	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.
Phascolarctidae	*Phascolarctos cinereus*	Koala	2	V	V	Unlikely - limited records within 5 km radius of subject land.	Nil
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	649	V	V	Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.

Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	1	V	V	Unlikely - limited records within 5 km radius of subject land and no preferred habitat present.	Nil
Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	4	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.
Vespertilionidae	*Myotis macropus*	Southern Myotis	6	V		Unlikely - limited records within 5 km radius of subject land and no preferred habitat present.	Nil
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	4	V		Potential – would only utilise habitat periodically as part of a broader foraging range. No breeding habitat present.	The project may result in a minor reduction of marginal foraging habitat.

Key: E = Endangered, V = Vulnerable, M = Migratory

FIGURES

Figure 1. The subject land



I:\...\19208\Figures\Letter 220191018\Figure 2. The Project

Figure 2. The project

Image Source: Alleanza Architecture (2010). Masterplan Concept - Project 1/Stage 1. Issue P8.

Legend

Subject Land

Image Source:
SIX Maps
(dated 1943)

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship'

Coordinate System: MGA Zone 56 (GDA 94)

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0 50 100 m

I:\...\19208\Figures\Letter 2\20191018\Figure 3. Historical Imagery_Subject Land

Figure 3. Historical imagery of the subject land

Legend

- Subject Land
- Drainage Line

Vegetation Community (CE, 2019)

- Swamp Oak Floodplain Forest
- Urban Exotic/ Native
- Areas cleared since Sep 2019

Vegetation Community (OEH, 2016)

- S_FoW07: Cumberland Swamp Oak Riparian Forest
- Urban_E/N: Urban Exotic/Native

Threatened Flora Records

- *Eucalyptus nicholii*
- *Eucalyptus scoparia*

Image Source:
SIX Maps
(dated 1943)

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship';

Areas outside of subject land:
OEH (2016). The Native Vegetation of the Sydney Metropolitan Area. Office of Environment and Heritage NSW.

Coordinate System: MGA Zone 56 (GDA 94)

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0 20 40 60 80 m

I:\...\19208\Figures\Letter 2\20191018\Figure 4. Vegetation, Threatened Species and Fauna Habitat

Figure 4. Vegetation communities, threatened species and fauna habitat recorded within the subject land

Legend

- Subject Land
- Proposed Impact Area
- Drainage Line

Vegetation Community (CE, 2019)

- Swamp Oak Floodplain Forest
- Urban Exotic/ Native
- Areas cleared since Sep 2019

Vegetation Community (OEH, 2016)

- S_FoW07: Cumberland Swamp Oak Riparian Forest
- Urban_E/N: Urban Exotic/Native

Threatened Flora Records

- *Eucalyptus nicholii*
- *Eucalyptus scoparia*

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0 20 40 60 80 m

I:\...\19208\Figures\Letter 2\20191018\Figure 5. Proposed Impact

Figure 5. Proposed impact