



Biodiversity Development Assessment Report (Streamlined)

**Modification 1 Bettergrow Resources Recovery
Facility, Wetherill Park**

Prepared for

Bettergrow Pty Ltd

Final V3 / March 2021

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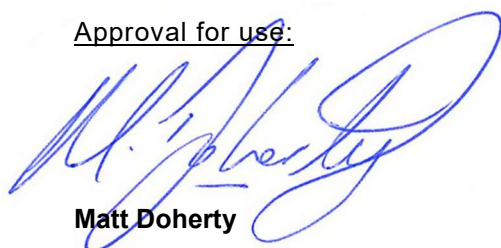
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Approval for use:



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EXECUTIVE SUMMARY

MJD Environmental has been engaged by Bettergrow Pty Ltd, to prepare a Biodiversity Development Assessment Report (BDAR) for the modification of an existing approved Resource Recovery and Recycling Facility. This assessment satisfies the streamlined assessment module criteria for small area development outlined in Section 2.2 and Appendix C of BAM (2020). The BDAR has been prepared in response to assessment of a BDAR Waiver completed by the NSW DPIE to accompany a modification to a Major project Development approval (SSD-7401-Mod-1) over land at Lot 18 DP 249417, 24 Davis Road, Wetherill Park, NSW.

The Biodiversity Assessment Methodology (BAM 2020) was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act 2016*.

The proposed Study Area is surrounded by IN1 – General Industrial to the east, west, and south with a Prospect Reservoir and Nature Reserve located to the north. The subject site comprises of native canopy and well-managed/maintained understorey. The land has undergone substantial clearing evident within the understorey. Due to the frequent slashing, the establishment of High Threat Exotics has occurred, leading to a near complete monoculture of invasive grasses within the southern area and invasive shrubs along the western boundary.

Field surveys carried out as part of the biodiversity assessment identified the following Plant Community Type (PCT):

- PCT 849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion that is commensurate with the Critically Endangered listed *Cumberland Plain Woodland in the Sydney Basin Bioregion* Ecological Community under both the BC Act of NSW and the EPBC Act of Australia. This CEEC has also been identified as a candidate Serious and Irreversible Impact (SAII).

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project. Generally, site selection has been determined based on-site topography, specifically the southern study area boundary represents the lower site elevations. It is on this basis that the area has been selected for the installation of a detention basin. Within the subject site, the basin has been located to minimise tree removal for both the structure and pipelines running out of the basin. Additionally, pipelines have been located to the greatest extent to avoid tree removal and wherever possibly involve excavation of pre-existing disturbed areas.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Impact Analysis

Assessment of the proposal has determined impacts of 755m² or 0.08ha of PCT 849 will require the retirement of 2 ecosystem credits. It should be noted that under this proposal, an additional 720m² of the same PCT will be retained.

The current method to retire credits for the proposal is likely to be via payment as a single transaction into the Biodiversity Conservation Fund.

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

CONTENTS

1	Introduction	1
1.1	Background & Description of Proposal.....	1
1.2	Aims & Objectives	1
1.3	Site Particulars.....	3
1.4	Qualifications & Licencing	3
2	Landscape Context.....	5
2.1	Landscape Features	5
2.1.1	Interim Biogeographic Regionalisation of Australia (IBRA).....	5
2.1.2	Mitchell Landscapes	5
2.1.3	Rivers, Streams, Estuaries and Wetlands	5
2.1.4	Connectivity	6
2.1.5	Areas of Geological significance and soil hazard features.....	6
2.1.6	Areas of Outstanding Biodiversity Value	6
2.2	Site Context	6
2.2.1	Native Vegetation Cover.....	6
2.2.2	Patch Size.....	6
3	Native Vegetation	8
3.1	Preliminary Vegetation Review.....	8
3.2	Methodology: Field Assessment.....	8
3.2.1	Field Survey.....	8
3.3	Results.....	9
3.3.1	Native Vegetation Extent.....	9
3.4	Vegetation Description	10
4	Vegetation Integrity Assessment.....	13
4.1	Vegetation Zone	13
4.2	Vegetation Integrity Assessment results	13
5	Threatened Species	15
5.1	Desktop Assessment.....	15
5.2	Ecosystem Credit Species.....	15
5.3	Species Credit Species	21

5.3.1	Limitations.....	25
6	Potential Prescribed Biodiversity Impacts on Threatened Species.....	26
7	Matters of National Environmental Significance.....	27
8	SEPP (Koala Habitat Protection) 2020.....	29
9	Avoid and Minimise Impacts.....	30
9.1	Biodiversity Values	30
9.2	Prescribed Biodiversity Impacts – avoidance.....	32
10	Unavoidable Impacts	33
10.1	Direct Impacts.....	33
10.2	Indirect Impacts	33
10.3	Prescribed Biodiversity Impacts – unavoidable.....	36
11	Mitigation and Managing Impacts.....	37
12	Offset Requirements for Unavoidable Impacts.....	38
12.1	Ecosystem Credits.....	38
12.2	Species Credit	38
12.3	Areas not requiring Offsets.....	38
12.4	Credit Summary.....	38
13	Conclusion	40
14	Bibliography	41

LIST OF FIGURES

Figure 1	Site and Location Map	4
Figure 2	Native Vegetation Extent.....	7
Figure 3	PCT Location.....	12
Figure 4	Offset Requirements	31

LIST OF TABLES

Table 1: Vegetation Integrity Results	14
Table 2 : Ecosystem Credit Species	15
Table 3 Ecosystem Credit Species assessed as not within PCT 849 – Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	17
Table 4 Species Credit Species	21
Table 5 Species Credit Species Habitat Assessment	22
Table 6 Direct Impacts on Native Vegetation	33
Table 7 Potential Indirect Impacts	34
Table 8 Mitigation Measures	37
Table 9 Ecosystem Credits.....	38
Table 10 Biodiversity Liability Credit Summary	39

LIST OF PLATES

Plate 1: Plot Lay out (BAM Operational Manual 2018d)	9
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APPENDICES

Appendix A	Plan of Proposal	A-1
Appendix B	BAM Plot Data	B-1
Appendix C	Assessment of Significance (EPBC Act)	C-1
Appendix D	BAM Credit Report Summary	D-1
Appendix E	Personnel Qualifications	E-2
Appendix F	SAIL Assessment	F-3

GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BC Act	Biodiversity Conservation Act 2016
BS Act	Biosecurity Act 2016
Council	Fairfield City Council
DoEE	Commonwealth Department of the Environment & Energy
DPIE	NSW Department of Planning, Industry and Environment
DPI Water	NSW Department of Primary Industries – Water
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
LGA	Local Government Area
LLS Act	Local Land Services Act
OEH	NSW Office of Environment and Heritage [former]

1 Introduction

MJD Environmental has been engaged by Bettergrow Pty Ltd, to prepare a Biodiversity Development Assessment Report (BDAR) for the modification of an existing approved Resource Recovery and Recycling Facility. This assessment satisfies the streamlined assessment module criteria for small area development outlined in Section 2.2 and Appendix C of BAM (2020). The BDAR has been prepared in response to assessment of a BDAR Waiver completed by the NSW DPIE to accompany a modification to a Major project Development approval (SSD-7401-Mod-1) over land at Lot 18 DP 249417, 24 Davis Road, Wetherill Park, NSW, hereafter referred to as 'Subject Site' (**Figure 1**).

1.1 Background & Description of Proposal

On 22 December 2017, Bettergrow received State Significant Development approval (SSD 7401) for the subject Resource Recovery and Recycling Facility on Lot 18 DP249417. The development was approved to accept and recycle up to 160,000 tonnes per annum (tpa) of garden organics, mixed food and garden organics, and hydro-excavated drill muds, and receive up to 40,000tpa of bulk landscape materials for on sale. To date, development of the site has not occurred, however Bettergrow are preparing to commence the development of the site in late 2020.

Since consent was issued in late 2017, market factors have changed and so too has the demand for the recycling of various waste streams. In order to meet this demand and changing needs of the market, Bettergrow is proposing to make modifications to the development that will provide for increased recycling capacity, the ability to process a broader range of waste streams, and also reduce the impacts to environmental amenity.

The modification is proposed to be undertaken pursuant to section 4.55(2) of the Environmental Planning & Assessment Act 1979 (NSW) (EP&A Act). Section 4.55(2) of the EP&A Act allows for a modification of a development where the consent authority is 'satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all)'.

The proposed modification seeks to remove vegetation along the western boundary, as well as a small amount of vegetation located in the south of the Study Area, to construct an extension for the existing carpark and a stormwater basin with drainage system. The works involve disturbance to an area approximately 755m² [0.08ha] that contains native canopy trees and managed disturbed groundcover.

Refer to **Figure 1** for a Site and location Map and **Appendix A** for a plan of the proposal.

1.2 Aims & Objectives

The Subject Site is mapped on the OEH *Biodiversity Values Map*, which is one of the triggers for determining whether the Biodiversity Offsets Scheme applies to the proposed impact. As such it is a requirement under the Biodiversity Conservation Act that an accredited assessor prepare and submit a Biodiversity Development Assessment Report (BDAR) to the approval authority (NSW DPIE) for assessment of the project modification.

This BDAR is based on an application of the NSW Biodiversity Assessment Methodology 2020 (BAM), which provides a framework for assessing development impact on biodiversity. A two-stage investigation path was performed in accordance with the BAM as listed below:

Stage 1 – Biodiversity Assessment; and

Stage 2 – Impact Assessment.

The site qualifies as a small area development as per Appendix 3, Table 12 of the BAM. The landholding:

- Has a minimum lot size of less than 1 hectare, specifically 930m². Therefore, a maximum area clearing limit of 1ha applies to the site.
- The area of impact is 0.08 ha and therefore below the maximum area clearing limit of 1ha applies to the site.

The proposal can therefore be assessed using Appendix C: Streamline Assessment Module – small area. The minimum report requirements for a streamline assessment are found in Appendix C of the BAM (2020).

In addition, preliminary assessment was also undertaken having regard to those threatened entities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Site Particulars

The following nomenclature has been used in this report (Refer to **Figure 1**):

- Study Area – Refers to the lot
- Subject Site – Refers to the impact area.

Locality	The Study Area is located in Wetherill Park, NSW
Land Title	Lot 18 DP 249417
LGA	Fairfield City Council
Area	Lot (Study Area) - approx. 2.02ha Subject site – 755m ² [0.08ha]
Zoning	The subject site is currently zoned as IN1 General Industrial (NSW Planning & Environment 2021).
Boundaries	The subject site is bound by frontage to Davis Road and the rear by water pipelines and bushland. The Study Area is bound by IN1 – General Industrial from both east and west.
Current Land Use	The entire Study Area is currently a recycled material depot and waste management centre.
Topography	The Study Area existing a low slope hill with the southern area of the lot becoming flooded after high rainfall. The highest point of elevation throughout the Study Area is in the north portion of the Study Area at an elevation of approximately 49m ASL.

1.4 Qualifications & Licencing

Qualifications

This BDAR has been prepared by Josh Smart and Matt Doherty (BAAS# 17044).

Field Work for the BDAR was carried out by Josh Smart of MJD Environmental (Aust) Pty Ltd.

Refer to **Appendix F** for personnel qualifications.

Licencing

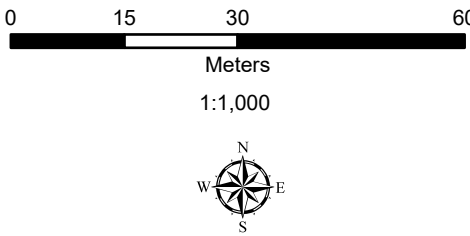
Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 30 November 2020).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2021).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2021).



24 DAVIS ROAD, WETHERILL PARK
FIGURE 1: SITE AND LOCATION

- Legend
- Site
 - Cadastral Boundaries



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Aerial: NearMap (2020) | Data: MJD Environmental,Borg (2021), NSW Spatial Services (2020) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/02/2021| Version 1 | GIS\20076 - Bettergrow Wetherill Park | This plan should not be relied upon for critical design dimensions.

STAGE 1 BIODIVERSITY ASSESSMENT

2 Landscape Context

2.1 Landscape Features

The following section provides a description of the landscape features within the Study Area and surrounding 1,500m buffer as outlined in Section 4 of the BAM (2020).

2.1.1 Interim Biogeographic Regionalisation of Australia (IBRA)

Bioregion

The subject site occurs wholly within the Sydney Basin Bioregion. The Sydney Basin Bioregion comprises of Mesozoic sandstones and shales; dissected plateaus: forest, woodlands and heaths: The soils are primarily skeletal soils, sands and podzolic (Thackway & Cresswell 1995).

Subregion

The Study Area occurs within the Cumberland subregion.

2.1.2 Mitchell Landscapes

The Subject Site occurs wholly within the Sydney Basin Cumberland – Cumberland Plain

Low rolling hills and valleys in a rain shadow area between the Blue Mountains and the coast on horizontal Triassic shales and lithic sandstones forming a down-warped block on the coastal side of the Lapstone monocline. Intruded by a small number of volcanic vents and partly covered by Tertiary river gravels and sands (Hawkesbury-Nepean Terrace Gravels landscape). Quaternary alluvium along the mains streams. General elevation 30 to 120m, local relief 50m. and sometimes affected by salt in tributary valley floors. Pedal uniform red to brown clays on volcanic hills. Red and brown texture-contrast soils on crests grading to yellow harsh texture-contrast soils in valleys. Woodlands and open forest of Grey Box (*Eucalyptus moluccana*), Forest Red Gum (*Eucalyptus tereticornis*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Thin-leaved Stringybark (*Eucalyptus eugenioides*), Cabbage Gum (*Eucalyptus amplifolia*) and Broad-leaved Apple (*Angophora subvelutina*). Grassy to shrubby understory often dominated by Australian Boxthorn (*Bursaria spinosa*), poorly drained valley floors often salt affected with Swamp Oak (*Casuarina glauca*) and Paperbark (*Melaleuca* sp.).

2.1.3 Rivers, Streams, Estuaries and Wetlands

The Study Area is situated within the Georges River catchment in the Fairfield City region and is located south of Prospect Reservoir between Wetherill Park and Pemulwuy. The Study Area sits 10 km north west of Georges River.

No streams occur within the Study Area.

2.1.4 Connectivity

The Study Area facilitates little habitat connectivity with limited vegetation within the southern area of the Subject site. This corridor runs westward connecting to a small patch of vegetation that then runs northbound to the vegetation surrounding Prospect Reservoir. Further corridors can be found further west, however, these become severely fragmented with animals depending on rural crop cover and pastures to move from area to area. The vegetation and canopy cover within the Study Area is tenuous due to high disturbance within the understorey and across the land as a result of the industrial use. A landscape buffer on the southern Study Area boundary provides tenuous connectivity to the west.

2.1.5 Areas of Geological significance and soil hazard features

No karsts, caves, crevices or cliffs or other areas of geological significance occur in or adjacent to the subject site.

A review of the Acid Sulphate Soils Risk mapping (Naylor et al 1998) records indicate the site has not been assessed for ASS.

2.1.6 Areas of Outstanding Biodiversity Value

There are no Areas of Outstanding Biodiversity Values within the 1,500m buffer or in the general locality of the Study Area.

2.2 Site Context

The site context was assessed for the subject site and wider area via desktop assessment of Aerial Photograph Interpretation (API) using GIS Software and site visit. Site context considerations included native woody cover and patch size in accordance with Section 3 of the BAM (2020).

2.2.1 Native Vegetation Cover

The native vegetation cover of the subject land and 1,500m buffer was carried out by API of high-quality aerial photography using GIS Software (Map Info), and local vegetation mapping data *Cumberland Plain West - VIS 4207* (2018).

Native vegetation cover has been assessed as 12%.

Refer to **Figure 2**.

2.2.2 Patch Size

A patch is defined in the BAM as:

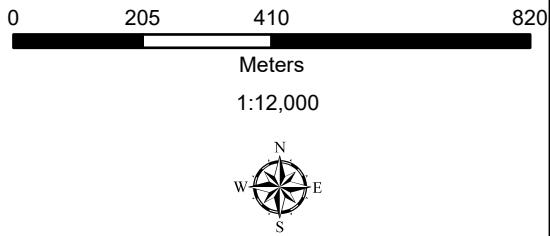
an area of intact native vegetation that occurs on the subject land. The patch may extend onto adjoining land beyond the footprint of the subject land, and for woody ecosystems, includes native vegetation separated by ≤ 100 metres from the next area of intact native vegetation. For non-woody vegetation, this gap is reduced to ≤ 30 metres.

Patch size for the Study Area has been assessed using the methods outlined above in Section 4.3.2 and it has been determined that the patch size is greater than 100ha.



24 DAVIS ROAD, WETHERILL PARK
FIGURE 2: NATIVE VEGETATION EXTENT

- Legend
- 1st Order Stream
 - 2nd Order Stream
 - Site
 - Native Vegetation within 1500m of Site
 - 1500m Buffer from Site



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Aerial: NearMap (2020) | Data: MJD Environmental,Borg (2021), NSW Spatial Services (2020) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 17/02/2021| Version 1 | GIS/20076 - Bettergrow Wetherill Park | This plan should not be relied upon for critical design dimensions.

3 Native Vegetation

3.1 Preliminary Vegetation Review

A desktop analysis of vegetation within the Study Area and its surrounds were informed by large-scale vegetation mapping projects and aerial photography to determine potential Plant Community Types (PCT) occurring within the Study Area, they include:

- *Cumberland Plain West (VIS 4207)*;
- GIS analysis including - Aerial Photograph Interpretation (API) and consultation of topographic map (Scale 1:25,000) layers for the Study Area; and

3.2 Methodology: Field Assessment

All vegetation survey methods have been carried in accordance with the following documentation and methods:

- *Biodiversity Assessment Methodology (BAM)*: Office of Environment and Heritage (OEH), October 2020;
- *Biodiversity Assessment Method Operational Manual- Stage 1* Office of Environment and Heritage (OEH), May 2018; and
- *Biodiversity Assessment Method Operational Manual- Stage 2* Office of Environment and Heritage (OEH), October 2020
- *NSW Guide to Surveying Threatened Plants* Office of Environment and Heritage (OEH), February 2016

3.2.1 Field Survey

Field assessments of the vegetation were carried out within the subject land on 10th February 2021 by Josh Smart. The field surveys were carried out in accordance with Biodiversity Assessment Methodology (BAM 2020).

The following methods were used to inform the vegetation survey associated with the BDAR:

- Broad vegetation identification, delineation and stratification into vegetation zones carried out by detailed random meander methods (Cropper 1993);
- One plots/transect based full floristic data as per Section 4 of the BAM were collected within a restricted area resulting in alternative plot perimeter, however, the equal plot size was still achievable recording the following;
 - Identification of all flora species to genus where identification attributes were present
 - Composition, Structure attributes within 10m x 40m plot; and
 - function attributes within the 20x50m plot
- Collection of subject site landscape attributes that included, landform, aspect, soil type, detailed descriptions of the vegetation condition, current land use and the current impacts.

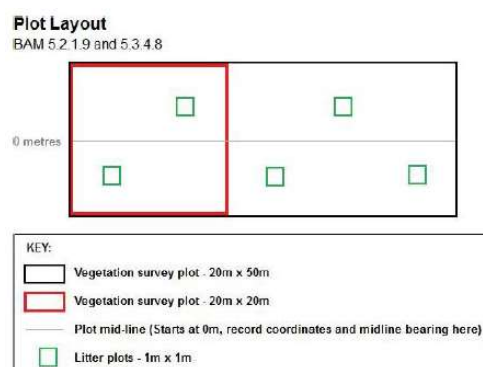


Plate 1: Plot Lay out (BAM Operational Manual 2018d)

3.3 Results

3.3.1 Native Vegetation Extent

The subject site is 755m² [0.08ha] in size which includes disturbed native and exotic vegetation. The extent of native vegetation has been interpreted using API and ground truthing during field survey works. (Refer to **Figure 3**).

The vegetation within the subject site has been modified and the understorey managed. The current land use has resulted in the modification of the structure of native vegetation within the subject site the extent that vegetation representative of the assigned Plant Community Type (PCT) is defined predominantly by canopy and limited groundcover floristics. The ground throughout the subject site is often bare exposed topsoil with exotic and native grassy and herbaceous species.

Identification of PCTs within the subject site were determined using:

- Occurrence within the Sydney IBRA bio-region;
- Vegetation formation and class;
- Landscape position; and
- Dominant species noted during field data collected from the full floristic plots/transects established in accordance.

As discussed above determining the appropriate PCT for the subject site relied upon canopy and limited groundcover floristic indicators coupled with geographic location. On this basis, one PCT was identified within the subject site as follows:

- **PCT 849: Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion**

This PCT was selected due to the dominance of *Eucalyptus moluccana* and the presence of *Eucalyptus tereticornis* in the canopy. Additionally, the subject area lies within the Cumberland Plains sub-region and comprises of small undulating hills.

This PCT is commensurate with the Critically Endangered listed *Cumberland Plain Woodland in the Sydney Basin Bioregion* Ecological Community under both the BC Act of NSW and the EPBC Act of Australia. This Critically Endangered Ecological Community (CEEC) has also been identified as a matter for consideration for Serious and Irreversible Impact (SII).

3.4 Vegetation Description

PCT 849 – Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion



Plate 2: PCT 849 – Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion

Vegetation Formation	KF_CH3 Grassy Woodlands
Vegetation Class	Coastal Valley Grassy Woodlands
Area	1474m ² [0.15 ha]
Vegetation Zone:	Vegetation Zone VZ1:849_Low
Description	The vegetation community is the dominant and only plant community observed within the subject site. The community is observed to be in a highly disturbed formation with native canopy species and a very limited understorey, including a very scarce groundcover comprising a mixture of native and exotic grassy and herbaceous species as well as large areas of exposed topsoil. The canopy comprises of juvenile to mature native trees including <i>Eucalyptus moluccana</i> (Grey Box), <i>Corymbia maculata</i> (Spotted Gum) and <i>Eucalyptus tereticornis</i> (Forest Red Gum). The mid-storey and shrub layer are very limited comprising of mature <i>Melaleuca styphelioides</i> (Prickly-leaved Paperbark), <i>Callistemon citrinus</i> (Lemon-scented Bottlebrush) and other shrubs that had been identified

to be planted and are non-indigenous to the PCT with some being classed as exotic. This includes *Abelia x grandiflora*, *Acmena* sp. (Dwarf cultivar) and *Spiraea cantoniensis* (Reeve's spiraea).

The groundcover diversity was also very limited comprising very little foliage cover. The dominant ground cover is the exotic grass species *Panicum repens* (Torpedo Grass). Other exotic grass species that were also detected includes *Bromus catharticus* (Prairie Grass) and *Chloris gayana* (Rhodes Grass). Native grasses and sedges species detected within the area were minimal and were limited to *Rytidosperma tenuius* and *Cyperus gracilis* (Slender Flat-sedge), Native forbs included *Dichondra repens* (Kidney Weed), *Arthropodium milleflorum* (Pale Vanilla Lily), *Wahlenbergia gracilis* (Sprawling Bluebell), *Ranunculus lappaceus* (Buttercup), *Oxalis perennans*, *Commelina cyanea*, *Euchiton sphaericus* and *Atriplex semibaccata* (Creeping Saltbush). Other exotic groundcover species occurring within the subject site include; *Bidens pilosa* (Cobbler's Pegs), *Conyza* spp., *Verbena rigida* (Purple Top), *Richardia humistrata*, *Plantago lanceolata* (Lamb's Tongue), *Sida rhombifolia* (Paddy's Lucerne), *Chlorophytum comosum* and *Sonchus oleraceus* (Sow thistle). Native vines/crawlers include *Desmodium varians* and *Glycine tabacina*. Exotic vines were limited to the high-threat *Araujia sericifera* (Moth Vine).

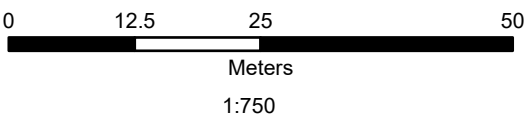
Some areas along the western boundary were completely infested by *Olea europaea* subsp. *cuspidata* and the non-local native *Acacia saligna* that originates from Western Australia. These areas have been mapped as "Exotic".

Species relied upon for Id of vegetation type	<i>Eucalyptus moluccana</i> , <i>Eucalyptus tereticornis</i> and <i>Corymbia maculata</i>
Threatened Ecological Community	Yes, TEC
%cleared of PCT	93% cleared (Bionet 2018)
Justification of assigning PCT	The PCT assignment of 849 to the vegetation within the subject site is based on the follow key attributes: ▪ Key diagnostic species within the canopy ▪ The Study Area is located within the Cumberland IBRA sub-region and located on the SB Cumberland Plain NSW Landscape (Mitchell 2002). This landscape has an association with the lithology noted in the PCT description.



24 DAVIS ROAD, WETHERILL PARK
FIGURE 3: PLANT COMMUNITY TYPE LOCATIONS

- Legend**
- Site
 - Cadastral Boundaries
 - PCT 849 – Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (CEEC, SAIL)
 - Exotic Vegetation



Aerial: NearMap (2020) | Data: MJD Environmental,Borg (2021), NSW Spatial Services (2020) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 16/03/2021| Version 2 | GIS/20076 - Bettergrow Wetherill Park | This plan should not be relied upon for critical design dimensions.

4 Vegetation Integrity Assessment

Native vegetation identified as PCT 849 within the subject site was categorised into a single vegetation zone based on the general condition of vegetation, observation of distinct change or variation in the vegetation based on general attributes such as vegetation age, observable disturbance (past and present), exotic species presences and any structural difference in the stratum present were used to delineate the subject site into a vegetation zone with the remaining area identified as non-native vegetation.

The subject site has been delineated into one vegetation zone:

- PCT 849: Low

The following table provides a brief description of the vegetation zone justifying the categorisation.

A single full floristic plot was conducted. The number of plots carried out are in accordance with the minimum required plots per area as outlined in **Table 3** of the BAM (2020).

4.1 Vegetation Zone

Vegetation Zone: VZ1_849_Low			
PCT 849: <i>Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion</i>			
Commensurate with the Critically Endangered listed <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> Ecological Community under both the BC Act of NSW and the EPBC Act of Australia. This CEEC has also been identified as a Serious and Irreversible Impact (SAIL).			
Zone Area (ha)	0.08 (755m ²)	Survey Effort	1 BAM Plot
The vegetation assigned to VZ1 -849_Low describes the area as a disturbed managed area comprising native canopy trees, with very limited mid storey and a mixture of native and exotic groundcover. The trees are native, of which some are diagnostic species for the nominated PCT.			
			

4.2 Vegetation Integrity Assessment results

A total of 31 plant species were identified within one plot comprising 17 native species and 14 exotic species. The results of the plot field data and a flora species list can be found in **Appendix B** and **Appendix C**.

The plot data from the vegetation plot was entered into the BAM-C calculator and the results of the vegetation integrity assessment is summarised in **Table 1**.

Table 1: Vegetation Integrity Results

Vegetation Zone	No. of Plots	Composition condition Score	Structure Condition Score	Function Condition score	Vegetation Integrity Score (V.I)
VZ1_849_Low	1	32.5	41.6	57.4	42.7

- As outlined in section 9.2.1 of the BAM biodiversity offset credits are required for native vegetation where the vegetation integrity score:
 - is ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community; or
 - is ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community; or
 - is ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

Biodiversity offsets are required for the vegetation zone as the vegetation integrity score is >15 due to the PCT being commensurate with the Cumberland Plains critically endangered ecological community.

5 Threatened Species

5.1 Desktop Assessment

A review of threatened species information was undertaken to provide context and understanding of biodiversity values occurring within the subject site. Information reviewed included:

- Online database searches involving a 10-km buffer around the Study Area to provide potentially occurring threatened flora and fauna and migratory species under both the BC Act and EPBC Act:
 - NSW Bionet (accessed 15th February 2021 and continually during BDAR production)
 - Commonwealth Protected Matters of National Significance search tool (accessed 15th February 2021)
- BioNet Vegetation Classification – Threatened species associated with known PCTs to occur within the Study Area.

5.2 Ecosystem Credit Species

Ecosystem Credit Species are reliably predicted to occur by vegetation surrogates and landscape features. An assessment of the habitat suitability for each predicted species was undertaken to determine the presences or potential utilisation of the subject site as part of their home range. These species are presented in **Table 2**.

Table 2 : Ecosystem Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Present
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	Yes #
<i>Artamus cyanopterus cyanopterus</i>	Ducky Woodswallow	V		Yes
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V		Yes
<i>Chthonicola sagittata</i>	Speckled Warbler	V		No
<i>Circus assimilis</i>	Spotted Harrier	V		No
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V		No
<i>Daphoenositta chrysoptera</i>	Varied Sitella	V		Yes
<i>Dasyurus maculatus</i>	Spotted-tail Quoll	V	E	No
<i>Glossopsitta pusilla</i>	Little Lorikeet	V		No
<i>Grantiella picta</i>	Painted Honeyeater	V	V	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	V		Yes
<i>Hieraaetus morphnoides</i>	Little Eagle	V		Yes
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Yes #
<i>Lophoictinia isura</i>	Square-tailed Kite	V		Yes
<i>Melanodryas cucullata cucullata</i>	Hooded Robin	V		No
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	V		No
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V		Yes

Scientific Name	Common Name	BC Act	EPBC Act	Habitat Present
<i>Miniopterus australis</i>	Little Bent-winged Bat	V		Yes
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		Yes
<i>Neophema pulchella</i>	Turquoise Parrot	V		No
<i>Ninox connivens</i>	Barking Owl	V		Yes
<i>Ninox strenua</i>	Powerful Owl	V		Yes
<i>Petroica boodang</i>	Scarlet Robin	V		No
<i>Petroica phoenicea</i>	Flame Robin	V		No
<i>Phascolarctos cinereus</i>	Koala	V	V	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Yes
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V		Yes
<i>Stagonopleura guttata</i>	Diamond Firetail	V		No
<i>Tyto novaehollandiae</i>	Masked Owl	V		Yes

Key:

V = Vulnerable
E = Endangered
mapped on important area maps

CE = Critically Endangered

* Dual Credit Species

Not

Table 3 Ecosystem Credit Species assessed as not within PCT 849 – Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion

Scientific Name	Common Name	Habitat requirement	Habitat Constraint as per BAM Predicted Species Report
<i>Chthonicola sagittata</i>	Speckled Warbler	This species usually requires large, relatively undisturbed areas. This species also requires a largely native groundcover consisting of tussock grasses alongside a sparse shrub layer and an open canopy. The subject site lies within an extremely small fragment of vegetation in a hostile environment. Additionally, the vegetation within the subject site lacks a predominantly native groundcover layer with little presence of tussock grasses. On this basis, it is unlikely the species occurs within the subject site.	N/A
<i>Circus assimilis</i>	Spotted Harrier	This species is usually found in open grassy woodland including Acacia and mallee remnants. Additionally, this species preys on bandicoots, bettongs, and rodents. Although rodents may be in the area, bandicoots and bettongs are likely to be absent to the subject site due to hostility. Furthermore, due to the absence of acacias and mallee vegetation structure, it is likely this species does not forage nor inhabit the area surrounding the subject site.	N/A
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	This species is usually found in open woodlands with the presence of saltbushes and acacias and a high presence of fallen timber which is an important habitat component for foraging. Due to the subject site entailing no fallen timber, lack of acacias and native grasses, it is unlikely for this species to occur within the subject zone.	N/A
<i>Dasyurus maculatus</i>	Spotted-tail Quoll	This species requires denning habitat, cover and wood debris such as hollow logs. Furthermore, these animals require large parcels of land to forage and hunt upon. Due to the size of the subject site, the lack of cover and woody debris coupled with the absence of denning habitat it is unlikely this animal could inhabit the area.	N/A

Scientific Name	Common Name	Habitat requirement	Habitat Constraint as per BAM Predicted Species Report
<i>Glossopsitta pusilla</i>	Little Lorikeet	This species feeds mostly on the nectar and pollen produced by Eucalyptus, Angophora and Melaleuca species. Furthermore, this species nests within small – medium hollows within proximity to viable feeding areas. The subject site does contain a moderate canopy of Eucalyptus species which will not be impacted upon; however the subject site does lack in hollow-bearing trees. The vegetation within the subject site could only be utilised as foraging potential and does not benefit this species in regard to potential breeding area.	N/A
<i>Grantiella picta</i>	Painted Honeyeater	This species occurs in Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forest. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> and requires presence of mistletoes at a density greater than five mistletoes per hectare. No mistletoe was observed within the subject site, as such this is considered a habitat constraint, and is unlikely to occur within this vegetation.	Yes
<i>Melanodryas cucullata cucullata</i>	Hooded Robin	This species is usually found inhabiting eucalyptus, acacia, or mallee open woodlands. It requires a structurally diverse with a moderate presence of tall, native grasses and dead tree stumps from where they predate from. The subject site lacks the presence of acacia species native to the area and mallee structures. Furthermore, the subject site lacks tall grasses and dead tree stumps. It is highly unlikely the subject site is visited by this species due to not entailing the recommended habitat.	N/A
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	This species is usually found in box-ironbark forests that include species such as Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>) and Forest Red Gum (<i>E. tereticornis</i>). The subject site lacks most of the listed species, except for <i>Eucalyptus tereticornis</i>. <i>E. tereticornis</i> is present throughout the subject site, however, it is not the dominant. Furthermore, due to the small subject site size and the home ranges necessary (>5 hectares) it is unlikely that this species would visit the area for foraging.	N/A

Scientific Name	Common Name	Habitat requirement	Habitat Constraint as per BAM Predicted Species Report
<i>Neophema pulchella</i>	Turquoise Parrot	This species usually occurs on the western slopes of the Great Dividing Range. It feeds on grasses and seeds and requires dead, hollow trees for breeding. The subject site lacks a well-developed groundcover due to frequent maintenance. Furthermore, the subject site lacks hollow-bearing trees as well as dead trees. Due to the location of the subject site in relation to this species main distribution along with the absence of necessary tree habitat, it is highly unlikely this species would visit the subject site.	N/A
<i>Petroica boodang</i>	Scarlet Robin	This species requires an abundance of logs and fallen timber which are important components of its habitat. Due to the lack of any woody debris from frequent maintenance within the subject site, it is unlikely that this species forages nor breeds within the subject site.	N/A
<i>Petroica phoenicea</i>	Flame Robin	This species is usually found in open eucalyptus woodlands dominated by a tall, native grass groundcover and require woody debris for foraging and hunting. The subject site lies within an extremely small fragment of vegetation in a hostile environment. Additionally, the vegetation within the subject site lacks a predominantly native groundcover layer with little presence of tussock grasses and has a complete absence of woody debris.	N/A
<i>Phascolarctos cinereus</i>	Koala	This species usually forages from Eucalyptus species. Whilst Eucalyptus species are abundant throughout the subject site and are the majority of the vegetation, the hostility of the subject site hinder easy access for this species to enter the area. Furthermore, no records of this species exists on OEH Bionet Search within 10km of the subject site.	N/A

Scientific Name	Common Name	Habitat requirement	Habitat Constraint as per BAM Predicted Species Report
<i>Stagonopleura guttata</i>	Diamond Firetail	This species is usually found in grassy eucalyptus forests with an abundance of grassy herbs and grasses in which they forage upon. This species also requires dense shrubs in which they build nests in. The subject site lacks a predominantly grass understorey, furthermore, the lack of native shrubs hinder this bird from breeding within the subject site.	N/A

5.3 Species Credit Species

Species Credit Species are species that cannot be reliably predicted to use an area based on habitat surrogates. Due to the categorisation of this development application as a 'small area' BDAR – (Refer to Appendix C of the BAM (2020)), the following candidate species do not require any further survey unless they are deemed at a risk of a SAIL. According to Appendix C of the BAM (2020) Species Credit Species that are likely to occur within the subject site must only be surveyed if they are at risk of a SAIL.

The conditions of vegetation and habitat within the subject site can be assessed by an accredited assessor to have sufficient site degradation of the key habitat constraints associated with species credits species, therefore is unlikely to utilise the subject site and not requiring further assessment. These species are presented in **Table 4** and a habitat assessment for species credit species in **Table 5**.

Due to the categorisation of this development application as a 'small area' BDAR – (Refer to Appendix C of the BAM (2020)), the following candidate species presented in **Table 4** do not require any further survey.

Table 4 Species Credit Species

Scientific Name	Common Name	BC Act	EPBC Act	Survey Period	SAIL
<i>Acacia pubescens</i>	Downy Wattle	V	V	All year	No
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Juniper-leaved Grevillea	V	-	All year	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	V			No
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population		E	-	November - February	No
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail			All year	No
<i>Petaurus norfolcensis</i>	Squirrel Glider			All year	No
<i>Pimelea spicata</i>	Spiked Rice-flower	E	E	All year	No
<i>Pultenaea pedunculata</i>	Matted Bush-pea	E	-	September - November	No

Key:

V = Vulnerable E = Endangered CE = Critically Endangered

Table 5 Species Credit Species Habitat Assessment

Scientific Name	Common Name	Habitat requirement	Habitats present on development site	Species requires further assessment
Flora				
<i>Acacia pubescens</i>	Downy Wattle	This species occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Soils usually include alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. The vegetation within the subject site is a dry open woodland with canopy species that are known to occur the Cumberland Plains Endangered Ecological Community. The subject site has a highly disturbed groundcover comprising large areas of exposed topsoil and very scarce presence of native groundcover species. Although further survey is not required under BAM 2020, due to the small size of the site a 5m electric blanket targeted flora survey was conducted over the site for this species. This species was not recorded.	Unlikely	No
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Juniper-leaved Grevillea	Species often grows on reddish clay to sandy soils with some shale influence. Associated canopy species include <i>Eucalyptus tereticornis</i>, <i>E. moluccana</i>, <i>E. crebra</i>, <i>E. fibrosa</i> and <i>E. eugenioides</i>. Potential presence of this species was thought due to the location within the Cumberland Plain EEC as well as <i>E. tereticornis</i> and <i>E. moluccana</i> being abundant throughout the vegetation zone. However, the subject site is frequently cleared/mowed as well as a complete subject site walkover during fieldwork proved this species was not present.	Unlikely	No

Scientific Name	Common Name	Habitat requirement	Habitats present on development site	Species requires further assessment
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population		This species usually grows in vine thickets and open shale woodlands. Due to records being found within the proximity of the subject site (10km OEH Bionet Search), this species was likely to occur within the open woodland vegetation zone. A detailed parallel survey effort throughout the whole vegetation area proved that this species is not present within the subject site.	Unlikely	No
<i>Pimelea spicata</i>	<i>Pimelea spicata</i>	This species is found throughout the Cumberland Plain environment within well-structured clay soils. It is associated with Grey Box communities. The presence of <i>Themeda triandra</i> and <i>Bursaria spinulosa</i> are good indicators for this species. The subject site entails a vegetation zone that is dominated by Grey Box trees. However, the groundcover has been frequently mowed, hindering the proper establishment and growth of native groundcover species. Additionally, a detailed parallel survey effort throughout the whole vegetation area proved that this species is not present within the subject site.	Unlikely	No
<i>Pultenaea pedunculata</i>	<i>Pultenaea pedunculata</i>	Associated species in the Sydney area include <i>Eucalyptus moluccana</i>, <i>E. fibrosa</i>, <i>E. crebra</i>, <i>E. longifolia</i> and <i>Melaleuca decora</i>. The subject site entails a vegetation zone that is dominated by Grey Box trees. However, the groundcover has been frequently mowed, hindering the proper establishment and growth of native groundcover species. Additionally, a detailed parallel survey effort throughout the whole vegetation area proved that this species is not present within the subject site.	Unlikely	No
Birds				
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	In New South Wales, this species is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large	Unlikely (foraging /Breeding)	No

Scientific Name	Common Name	Habitat requirement	Habitats present on development site	Species requires further assessment
		emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts. Nests are large structures built from sticks and lined with leaves or grass. Although the subject site lies within close proximity to the Prospect Reservoir, the subject site does not comprise suitable breeding or foraging habitat in the form of large stags. Furthermore, no presence of large stick nests were observed during preliminary ecological surveys.		
Marsupials				
<i>Petaurus norfolcensis</i>	Squirrel Glider	Inhabits mature or old growth Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstory. Require abundant tree hollows for refuge and nest sites. No records exist on the OEH BioNet Atlas using a 10km search radius of the locality. No hollow-bearing trees are located within the subject site and the subject site exists in a hostile environment leading it to be unlikely this species could reach the area without traversing by ground which would be extremely unlikely.	Unlikely	No
Gastropods				
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	Inhabits Cumberland Plain Woodlands. Usually found hiding under bark, leaf litter and logs as well as loose clumps around grass tussocks. The subject site lacks litter of barks or leaves and an absence of logs. Rubbish throughout the subject site was flipped during field work however, it is unlikely this species can survive within this vegetation zone due to lack of cover.	Unlikely	No

Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats left by mammals;
- Scratch marks made by various types of arboreal animals;
- Nests made by various guilds of birds;
- Feeding scars on Eucalyptus trees made by Gliders;
- Whitewash, regurgitation pellets and prey remains from Owls;
- Aural recognition of bird and frog calls;
- Skeletal material of vertebrate fauna; and
- Searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, and diggings).

No secondary or incidental observations were detected within the subject site. It is assumed that due to the subject site's hostile location and surrounding fencing, that many terrestrial and arboreal animals would struggle to reach and utilise the subject site.

5.3.1 Limitations

Limitations associated with this assessment report are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

In these instances, a precautionary approach has been adopted; whereby 'assumed presence' of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Seasonality & Conditions

The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for nomadic and opportunistic species.

Data Availability & Accuracy

The collated threatened flora and fauna species records provided by NSW Bionet are known to vary in accuracy and reliability. This is usually due to the reliability of information provided to the National Parks and Wildlife Service (NPWS) for collation and/or the need to protect specific threatened species locations. During the review of threatened species records sourced from OEH Atlas of NSW Wildlife, consideration has been given to the date and accuracy of each threatened species record in addition to an assessment of habitat suitability within the subject site.

Similarly, EPBC Protected Matters Searches provide a list of threatened species and communities that have been recorded within 10 km of the Study Area, or which have suitable habitat within the wider area, and are subject to the same inherent inaccuracy issues as the State derived databases.

In order to address these limitations in respect to data accuracy, threatened species records have only been used to provide a guide to the types of species that occur within the locality of the Study Area. Consequently, BAM assessment and the results of surveys conducted within the subject site and surrounds have been used to assess the likelihood of occurrence of threatened species, populations, and ecological communities to occur therein.

6 Identify Prescribed Additional Biodiversity Impacts

6.1 Habitat for threatened entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

There are no occurrences of karst, caves, crevices, rock outcrops or cliffs within the subject land.

Human made structures

No human made structures are present within the subject site, however, there are multiple human-made structures within the immediate surroundings within the Study Area.

Non-native vegetation

The subject site contains non-native vegetation in the form of both managed and non-managed exotic groundcover species including grasses and herbaceous species.

6.2 Habitat Connectivity

The vegetation within the southern boundary of the Subject Site does create a small corridor towards the vegetation located to the west of the Study Area.

6.3 Water bodies, water quality and hydrological processes that sustain threatened entities.

The subject site does not occur within proximity to any streams, rivers, or wetlands. Prospect Reservoir occurs to the immediate north however, drainage within the site flows to the south to the street. It is highly unlikely this proposal will impact on any threatened species.

6.4 Wind turbine strikes

Not applicable to this proposal.

6.5 Vehicle strikes

Vehicles do enter and exit the Study Area which does include moving within proximity to the vegetation within the Subject Site.

7 Matters of National Environmental Significance

An EPBC Act Protected Matters Search (accessed 15-2-2021) was undertaken to generate a list of those Matters of National Environmental Significance (MNES) from within 10 km of the Study Area. An assessment of those MNES relevant to biodiversity has been undertaken in accordance with EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DoE, 2013). The Matters of National Environmental Significance protected under national environment law include:

- Listed threatened species and communities;
- Listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- World heritage properties;
- National heritage places;
- The Great Barrier Reef Marine Park;
- Nuclear actions; and
- A water resource, in relation to coal seam gas development and large coal mining development.

Listed Threatened Species and Communities:

A total of 50 threatened species and 7 threatened ecological communities listed under the EPBC Act have been recorded on the protected matters search. A likelihood of occurrence assessment for these MNES has been completed in **Appendix C**.

Threatened Species

Ten threatened birds, seven mammals, three frogs, and twenty-seven plants were recorded on the protected matters search. Of these, no species were considered to have the potential to utilise the habitats within the subject site

Formal targeted surveys carried out as part of the BAM methodology, did not record any of the above species, and no habitat on the subject site is critical to their survival.

This assessment concluded that the proposal is unlikely to impact the listed threatened species.

One Threatened Ecological Communities listed under the EPBC Act have been recorded within the subject site;

- Cumberland Plain Woodland in the Sydney Basin Bioregion is commensurate with the EPBC Act Listed CEEC *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*

A likelihood of occurrence assessment for this MNES has been **Appendix C**.

This assessment concluded that the proposal within the Subject Site is unlikely to impact the listed threatened entities.

Listed Migratory Species:

The protected matters search nominated 16 migratory species or species habitat that may occur with the 10km Study Area buffer search area. No listed migratory species were observed within the subject site. The assessment contained in **Appendix C** concluded that, no habitat within the subject site or Study Area is critical to their survival. Therefore, it is unlikely that the proposal over the subject site will impact migratory species.

Wetlands of International Significance (declared Ramsar wetlands):

The subject site is not a wetland of international significance or declared Ramsar wetland. No wetlands of international importance were nominated within a 10 km radius of the Study Area.

Commonwealth Marine Areas:

The subject site is not part of a Commonwealth Marine Area and is not in close proximity to any such area.

World Heritage Properties:

The subject site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The subject site is not a National Heritage area and is not in close proximity to any such area.

Great Barrier Reef Marine Parks:

The subject site is not part of or within close proximity to any Great Barrier Reef Marine Park.

Nuclear Actions:

The proposal over the subject site is not and does not form part of a Nuclear action.

Water Resources in relation to Coal Mining and CSG:

The proposal over the subject site is related to residential development and as such is not or does not form part of a coal mining and/or CSG proposal.

Summary - In summary, the proposed action is unlikely to have an impact to MNES assessed in this report based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

8 SEPP (Koala Habitat Protection) 2020

The *State Environmental Planning Policy (Koala Habitat Protection) 2020* commenced on 30 November 2020 to replace and repeal the *State Environmental Planning Policy (Koala Habitat protection) 2019* (2019 Koala SEPP).

The Koala SEPP 2020 replicates the objectives and provisions of SEPP 44, which was in force from 1995 through to 2019.

Assessment of potential koala habitat under SEPP 2020 requires the following steps be undertaken:

- (a) Identification of 'potential Koala habitat' within the site area to be impacted; if the total tree cover contains 15% or more of the Koala food tree species listed in Schedule 2 of SEPP 44 then it is deemed to be 'potential Koala habitat'. Identification of 'potential Koala habitat' requires the determination of the presence of 'core Koala habitat';
- (b) Identification of 'core Koala habitat' within the area to be impacted. 'Core Koala habitat' is defined as an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (females with young), recent sightings and historical records of a Koala population;
- (c) Identification of 'core Koala habitat' will require that a plan of management must accompany the application;
- (d) If the rezoning of lands, other than to environmental protection, involves potential or core Koala habitat then the Director of planning may require a local environmental study be carried out.

Tree species listed in Schedule 2 of the SEPP as a 'Koala Feed Tree Species' do not occur at greater than 15% of tree cover anywhere within the subject site. Only a few individual *Eucalyptus tereticornis* occur within the subject site all of which are to be retained under this proposal. No koala records occur within a 2.5km radius of the site, nor within 10km.

Additionally, investigations did not detect Koalas or signs of Koalas within the subject site. Therefore, the vegetation within the subject site does not constitute Potential or Core Koala Habitat. On this basis, no further considerations of the SEPP apply.

9 Avoid and Minimise Impacts

9.1 Biodiversity Values

Site Selection

The Study Area is a recycled material depot and waste management centre comprising of little vegetation within the southern area and along the western border (subject site). The areas of native vegetation predominantly comprise native canopy trees and a well-managed exotic understorey.

Site selection has been determined based on-site topography, specifically the southern study area boundary represents the lower site elevations. It is on this basis that the area has been selected for the installation of a detention basin. Within the subject site, the basin has been located to minimise tree removal for both the structure and pipelines running out of the basin. Additionally, pipelines have been located to the greatest extent to avoid tree removal and wherever possibly involve excavation of pre-existing disturbed areas.

Vegetation to be removed along the western study area boundary displayed the highest disturbance levels. This area also contained the greatest frequency of weeds including High Threat Exotics. Based on observation of on site and neighbouring activities, importation dispersal of weeds by vehicle is likely to be the primary catalyst for this.

Under this proposal, the remaining 720m² of PCT 849, located within the south-east of the Study Area, will be retained. It should be noted, however, that this area does have High Threat Exotics established within the understorey.

Refer to **Figure 1** showing the development footprint as the subject site.



24 DAVIS ROAD, WETHERILL PARK
FIGURE 4: IMPACTS REQUIRING OFFSETS

- Legend**
- Site
 - Cadastral Boundaries
 - Impacts Requiring Offsets (CEEC, SAIL)
 - Impacts Not Requiring Offsets
 - Areas Not Impacted

0 12.5 25 50
Meters
1:750



Aerial: NearMap (2020) | Data: MJD Environmental, Borg (2021), NSW Spatial Services (2020) | Datum/Projection: GDA 2020 MGA Zone 56 | Date: 16/03/2021 | Version 2 | GIS/20076 - Bettergrow Wetherill Park | This plan should not be relied upon for critical design dimensions.

9.2 Prescribed Biodiversity Impacts

The avoidance and minimisation of prescribed biodiversity impacts is a critical component of the BAM, as many of these biodiversity values are difficult to quantify, replace or offset.

The BC regulation (clause 6.1) identified actions that are prescribed as impacts to be assessed under the biodiversity offset scheme. Where these items occur, they have been addressed below.

9.2.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

N/A

Human-made structures

N/A

Non-native vegetation

Non-native vegetation occurs in the form of High Threat Exotics (HTE), low-threat weeds and garden escapes/plantings. The proposal will remove these weeds and maintain both native and exotic understorey vegetation outside of the impact area along the south-eastern boundary of the Study Area. No HTEs were identified as constituting habitat for threatened species.

9.2.2 Habitat Connectivity

The subject site is an existing disturbed small parcel of land with native canopy and a managed understorey. The development proposal will remove 15 juveniles to semi-mature *Myrtaceae* species including *Corymbia maculata*, *Eucalyptus moluccana* and *Melaleuca sp.* Currently these trees are situated among other native canopy trees forming a patch of vegetation within the southern limit of the Study Area and to a lesser extent along the western boundary. The removal of these trees is expected to impact connectivity across the landscape on a very minor scale for the movement of mobile threatened species. Notably tree removal in the southern portion of the subject area has been designed to minimise the number of trees to be removed and maintain trees around the proposed basin, therefore pre-existing tenuous east to west connectivity will be maintained across the southern study area.

9.2.3 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

No mapped streams occur within the Study Area. Additionally, no watercourses were observed during the onsite inspection. The proposal is to establish a small basin with respective pipeline within the southern area of the Study Area. The basin is required as part of stormwater management on the Study Area. Detention and release will not occur in a vegetation community that requires significant water to sustain the community and secondly will not release into such areas.

9.2.4 Wind Turbine Strikes

N/A

9.2.5 Vehicle Strikes

There is expected to be a small increase in vehicular movements into, around or out of the Study Area under this proposal. However, due to the site presenting as an industrial site, with existing frequent vehicle movements and speed limits currently existing along the road within the Study Area to decrease chances of vehicle strikes, it is considered that vehicle strikes within the Study Area will not increase in frequency and severity.

10 Unavoidable Impacts

The following section outlines potential direct and indirect impacts on biodiversity values and prescribed impacts associated with the proposal.

10.1 Direct Impacts

The extension of an existing carpark along with the construction of a stormwater basin with drainage system at Lot 18 DP 249417, 24 Davis Road, Wetherill Park, NSW will result in the following direct impacts:

Removal of Native Vegetation

A total of 755m² [0.08ha] of native vegetation will be removed as part of the proposal. The following table provides an overview of the area to be cleared and the current and future vegetation integrity score (V.I).

Note: Fifteen (15) native canopy trees and seven (7) subcanopy tree and associated understorey is to be removed within the subject site.

Table 6 Direct Impacts on Native Vegetation

Vegetation Zone	Condition	Threatened Ecological Community	Area (ha)	Current V.I Score	Future V.I Score
849: Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion					
VZ1	849_Low	Critically Endangered Cumberland Plain Woodlands of the Sydney Basin Bioregion Ecological Community	0.08	42.7	0

Candidate Species Credit Species and SAI

As part of the biodiversity assessment, it has been determined the proposal will:

- Not impact any threatened species listed as a candidate Serious and Irreversible Impact entity in accordance with *Guidance to assist a decision-maker to determine a serious and irreversible impact* (OEH 2017b);
- **Will** impact the Critically Endangered Cumberland Plain Woodland of the Sydney Basin Bioregion Ecological Community that is listed as a candidate Serious and Irreversible Impact entity in accordance with *Guidance to assist a decision-maker to determine a serious and irreversible impact* (OEH 2017b). Assessment has been prepared in **Appendix F**; and
- Will not impact candidate Species Credit Species as no observations of these species were recorded during formal surveys within the subject land.
- No hollow-bearing trees are to be removed under this proposal.

10.2 Indirect Impacts

The extension of an existing carpark along with the construction of a stormwater basin with drainage system at Lot 18 DP 249417, 24 Davis Road, Wetherill Park, NSW may result in the following indirect impacts described in **Table 7**.

Table 7 Potential Indirect Impacts

Impact	Extent	Frequency/duration	Duration	Threatened species or TEC likely to be affected	Consequence of the impact on bioregional persistence of the threatened species, TEC and/or habitat
Inadvertent impacts on adjacent habitat or vegetation	Limited	Unlikely – construction stage	During & post construction	- Potential foraging habitat for the Squirrel Glider and White-bellied Sea-eagle and other ecosystem threatened fauna species. - Potential habitat for <i>Acacia pubescens</i>, <i>Grevillea juniperina</i> subsp. <i>juniperina</i>, <i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> – endangered population, <i>Pultenaea pedunculata</i> and <i>Pimelea spicata</i>. - Potential impacts upon the CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	- Minor risk of disturbance of genetic exchange between flora species - Minor risk of disturbance to retained vegetation - Minor risk of loss/disturbance to fauna habitat (foraging habitat). - Minor risk of injury or mortality of fauna during clearing
Reduced viability of adjacent habitat due to edge effects	Limited	Unlikely – construction stage	Post construction	- Threatened flora and fauna - Potential impacts upon the CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	The immediate adjacent vegetation of the subject site to the east is managed and comprises an exotic and native groundcover due to historic clearing and current land management practices. The likelihood of the vegetation reducing in viability will be minor due its highly disturbed formation such as lack of vegetation at all strata levels and existing weed incurrence. - Minor disturbance to native flora and fauna habitat along the boundary of the subject site - Increased edge effect may have a minor impact on accessibility to native vegetation for threatened species.

Impact	Extent	Frequency/duration	Duration	Threatened species or TEC likely to be affected	Consequence of the impact on bioregional persistence of the threatened species, TEC and/or habitat
Transport of weeds and pathogens from the site to adjacent vegetation	Immediate surrounds	Initial development stages	During construction particularly adjacent to the boundary	- All flora. - Potential impacts upon the CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	- Mortality and degradation of adjacent vegetation from disease - Minor increase in weed presences, that will restrict native flora establishment and colonisation and native fauna movements; - Minor risk of establishment of high threat weed that would degrade threatened flora species and native vegetation - Loss of fauna habitat
Rubbish Dumping	Unknown	Unknown	Construction and Operational	- Threatened flora and fauna - Potential impacts upon the CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	Minor increase in rubbish dumping into adjacent native vegetation and habitat
Erosion and sediment impacts to adjacent vegetation	Unknown	Infrequent pending mitigation measures	Construction	- Threatened flora and fauna - Potential impacts upon the CEEC <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	Minor increase of erosion and sedimentation into adjacent native vegetation if not mitigated properly.

10.3 Assessment of Prescribed Biodiversity Impacts

10.3.1 Habitat for Threatened Entities

Karst, caves, crevices, cliffs, rocks, and other geological features of significance

These geological features are not present in the Study Area.

Human-made structures or non-native vegetation

Non-native vegetation occurs in the form of high Threat Weeds. The proposal will remove these weeds and maintain native vegetation outside of the impact area along the southern boundary of the Study Area.

10.3.2 Habitat connectivity

The development will result in the removal of 755m² [0.08ha] of native vegetation which will reduce connectivity between areas of habitat surrounding the subject site on a very minor scale. The subject site is an existing disturbed small parcel of land with native canopy and a managed understorey. The development proposal will remove 15 juvenile to semi-mature *Myrtaceae* species including *Corymbia maculata*, *Eucalyptus moluccana* and *Melaleuca sp.* Currently these trees are situated among other native canopy trees forming a patch of vegetation within the southern limit of the Study Area and to a lesser extent along the western boundary. The removal of these trees is expected to impact connectivity across the landscape on a very minor scale for the movement of mobile threatened species. Notably tree removal in the southern portion of the subject area has been designed to minimise the number of trees to be removed and maintain trees around the proposed basin, therefore pre-existing tenuous east to west connectivity will be maintained across the southern study area.

Impacts of the development on movement of threatened species that maintain their life cycle

The proposed development will result in the removal of 755m² [0.08ha] of native vegetation that may be relied upon by threatened species to maintain their life cycle. Any threatened species that were assessed to potentially use the subject site due to habitat suitability (primarily foraging) are generally highly mobile species, that can utilise connectivity in the locality through retained vegetation to the west and north of the subject site. Thus, it is unlikely the proposal will have a significant impact on movement of highly mobile threatened species that maintain their life cycle in the locality or their movement through the landscape.

10.4 Water bodies, Water Quality and Hydrological Processes that Sustain Threatened Entities

No mapped streams occur within the Study Area. Additionally, no watercourses were observed during the onsite inspection. The proposal is to establish a small basin with respective pipeline within the southern area of the subject site. The basin is required as part of stormwater management on the study area. Detention and release will not occur in a vegetation community that requires significant water to sustain the community and secondly will not release into such areas.

10.4.1 Wind turbine strikes

Not applicable to this proposal.

10.4.2 Vehicle strikes

There is expected to be a small increase in vehicular movements into, around or out of the Study Area under this proposal. However, due to the pre-existing utilisation of the study area as a current industrial use site with frequent vehicle movements such increase in vehicle movement under this proposal is considered to be minor.

11 Mitigation and Managing Impacts

The following section outlines general mitigation measures required to manage impacts associated with the development proposal. All mitigation measures propose to manage impacts that include techniques, timing, frequency, and responsibility for implementing each measure.

Table 8 Mitigation Measures

Mitigation Measures	Responsibility	KPI	Timing	Corrective Action
Direct Impacts				
Vegetation Clearing				
Vegetation removal works are to occur outside core breeding periods for species known to use habitat within the subject site.	Project ecologist in consultation with project manager	Work's plan indicates tree clearing areas during optimal months	Spring to Summer where possible	Cease site works, revert to KPI
Pre-clearance survey of tree to be removed	Project Ecologist	Tree pre-clearance survey completed maximum one week prior to removal. No breeding fauna observed at time of clearing.	Prior to commencement of works for each stage	Cease site works, revert to KPI
Indirect Impacts				
Weeds, disease, and edge effects				
Equipment and vehicles entering the Subject Site for construction purposes are cleaned of foreign soil and seed prior to entering the Subject site.	Contractors	Best practice hygiene protocols followed, No visible foreign material, certification available upon request	Prior to machinery arriving to the Study Area	Non-compliance due to foreign material present, Refer to KPI
Noise and light Impacts				
Limit construction works to daylight hours to reduce impacts from light and noise	Construction contractor	No construction works to occur from dusk till dawn.	During construction works	Cease site works and refer to KPI
All machinery is correctly maintained and operator as per operation manual	Construction contractor	No excessive noise of machinery due to poor maintenance or faulty parts	During construction works	Cease site works and refer to KPI
Dust Impacts				
Vehicles/machinery to observe 10km/h speed limit on Study Area	Contractors	No excessive dust	For the duration of subject site works	Reassess KPI and control measures if excessive dust continues
Prescribed Biodiversity Impacts				
Erosion and sediment controls enacted in accordance with construction environment management plan (CEMP) to limit impacts on retained vegetation	Construction Contractor	CEMP followed & modified as needed	Prior to commencement of works, for duration of subject site works	Cease site works, Refer to KPI
Vehicle strikes on threatened fauna within the Study Area	Construction contractor	Implementing slow speed limits for vehicles entering and exiting the Study Area. No construction works to occur from dusk till dawn.	Prior to commencement of works, for duration of subject site works	Cease site works and refer to KPI

12 Offset Requirements for Unavoidable Impacts

A summary of offset liabilities for the extension of a carpark and the construction of a stormwater basin with drainage system are provided below:

An offset is required for all impacts of development on PCTs that are associated with:

- a vegetation zone that has a vegetation integrity score ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community, or
- a vegetation zone that has a vegetation integrity score of ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or
- a vegetation zone that has a vegetation integrity score ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

Biodiversity offsets are required for the vegetation zone as the vegetation integrity score is >15 due to the PCT being commensurate with the Cumberland Plains Critically Endangered Ecological Community

12.1 Ecosystem Credits

The PCT 849 – Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion is commensurate with the Critically Endangered listed Cumberland Plain Woodland in the Sydney Basin Bioregion Ecological Community under both the BC Act of NSW and the EPBC Act of Australia. This CEEC has also been identified as a potential candidate for Serious and Irreversible Impact (SAIL).

Table 9 Ecosystem Credits & Class

Vegetation Zone	PCT ID	Commensurate with TEC	SAIL	Trading Group	Habitat (HBT) Credits	Area (ha)	Vegetation Integrity Score (V.I) loss	Ecosystem Credits Required
VZ1_849_low	849	Yes, Cumberland Plain Woodland in the Sydney Basin Bioregion	Yes	Cumberland Plain Woodland in the Sydney Basin Bioregion	No	0.08	42.7	2

12.2 Species Credit

No Species Credit Species were observed during targeted surveys/site inspection, and no habitat for species listed as SAIL is present within the site, therefore no species credits are required.

12.3 Areas not requiring Offsets

There is 174m² of exotic groundcover that will be impacted by the proposal. As this vegetation does not align with native vegetation, they do not require offsetting or further assessment.

12.4 Credit Summary

The following **Table 10** displays the required Biodiversity Offset Liability based on the BAM-c, BAM Credit Calculator and **Figure 4** depicts offset requirements. Refer to **Appendix E** for the BAM Credit Report.

Table 10 Biodiversity Liability Credit Summary

Ecosystem Credits	Offset Credits required
PCT 849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	2

The current method to retire credits for the proposal is likely to be via payment as a single transaction into the Biodiversity Conservation Fund.

13 Conclusion

MJD Environmental has been engaged by Bettergrow Pty Ltd, to prepare a Biodiversity Development Assessment Report (BDAR) for the modification of an existing approved Resource Recovery and Recycling Facility. This assessment satisfies the streamlined assessment module criteria for small area development outlined in Section 2.2 and Appendix C of BAM (2020). The BDAR has been prepared in response to assessment of a BDAR Waiver completed by the NSW DPIE to accompany a modification to a Major project Development approval (SSD-7401-Mod-1) over land at Lot 18 DP 249417, 24 Davis Road, Wetherill Park, NSW.

The Biodiversity Assessment Methodology (BAM 2020) was used as the assessment method, to establish impacts on threatened species and threatened ecological communities in the locality under the *Biodiversity Conservation Act 2016*.

The proposed Study Area is surrounded by IN1 – General Industrial to the east, west, and south with a Prospect Reservoir and Nature Reserve located to the north. The subject site comprises of native canopy and well-managed/maintained understorey. The land has undergone substantial clearing evident within the understorey. Due to the frequent slashing, the establishment of High Threat Exotics has occurred, leading to a near complete monoculture of invasive grasses within the southern area and invasive shrubs along the western boundary.

Field surveys carried out as part of the biodiversity assessment identified the following Plant Community Type (PCT):

- PCT 849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion that is commensurate with the Critically Endangered listed *Cumberland Plain Woodland in the Sydney Basin Bioregion* Ecological Community under both the BC Act of NSW and the EPBC Act of Australia. This CEEC has also been identified as a candidate Serious and Irreversible Impact (SII).

Impact Avoidance & Mitigation

A package of avoidance and mitigation measures have been described in this BDAR associated with the project. Generally, site selection has been determined based on-site topography, specifically the southern study area boundary represents the lower site elevations. It is on this basis that the area has been selected for the installation of a detention basin. Within the subject site, the basin has been located to minimise tree removal for both the structure and pipelines running out of the basin. Additionally, pipelines have been located to the greatest extent to avoid tree removal and wherever possibly involve excavation of pre-existing disturbed areas.

All measures have been incorporated into the design (avoidance) in the first instance with mitigation measures assessed for the construction phases of the project.

Under this proposal, the remaining 720m² of PCT 849 within the Study Area will be retained.

Impact Analysis

Assessment of the proposal has determined impacts of 755m² or 0.08ha of PCT 849 will require the retirement of 2 ecosystem credits.

The current method to retire credits for the proposal is likely to be via payment as a single transaction into the Biodiversity Conservation Fund.

A preliminary assessment under the EPBC Act determined the proposed action is unlikely to have an impact to MNES based on the assessment criteria set out in relevant Commonwealth policies and advices as at the time of this assessment.

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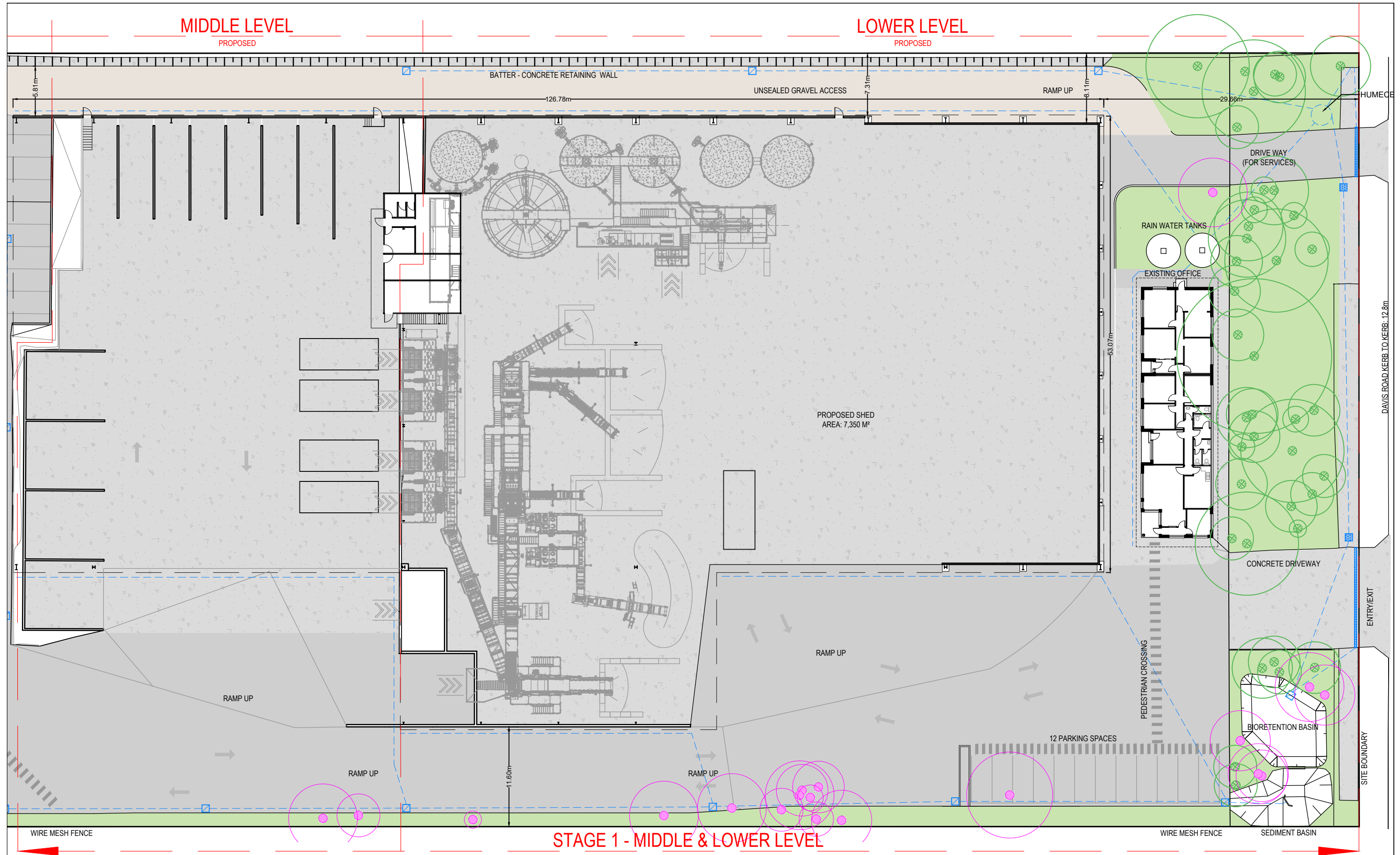
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Appendix A

Plan of Proposal

MIDDLE LEVEL
PROPOSED

LOWER LEVEL
PROPOSED



STAGE 1 - MIDDLE & LOWER LEVEL

01 PROPOSED STAGE 1 - MIDDLE & LOWER LEVEL
SCALE: 1:200 (A1)

LEGEND:



EXISTING TREE & CANOPY
TO BE RETAINED



EXISTING TREE & CANOPY
TO BE REMOVED



PROPOSED STORM WATER
PIPES AND DRAIN PITS

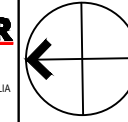
NOTES:

TOTAL SITE AREA: 20,280m²
TOTAL ROOFED AREA: 11,450m²

ISSUE	DESCRIPTION	DATE	DRAWN	AUTH
B	Development Application	25-02-2021	DC	MD/UB
A	Development Application	01-02-2021	DC	MD/UB



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PROJECT
PROPOSED BETTERGROW RESOURCE
RECOVERY FACILITY

LOCATION
24 DAVIS ROAD
WETHERILL PARK NSW 2164

DRAWING
PROPOSED STAGE 1 - MIDDLE & LOWER
TREE REMOVAL PLAN

SCALE
1:200 @ A1, 1:400@A3

PROJECT NUMBER
2020/04

DRAWING NUMBER
DA009

STAGE
DA

ISSUE
B

Appendix B BAM Plot Data

Plot Info							Composition						Structure (%)						Function										
Plot	PCT	Condition Class	Vegetation Zone	Easting	Northing	Bearing	Tree	Shrub	Grass	Forbs	Ferns	Other	Tree	Shrub	Grass	Forbs	Ferns	Other	Lge Tree	Hollow bearing tree	Litter Cover (%)	Logs	Tree Stem 5-10	Tree Stem 10-20	Tree Stem 20-30	Tree Stem 30-50	Tree Stem 50-80	Tree Regen	B-1pp (%)
B01	849	849_Low	VZ1	305685.67	6254022.81	92	3	3	2	6	-	2	58	8.1	0.4	1.1	-	0.2	2	-	29	-	1	1	1	1	2	-	11.2

Species List – Flora

Family	Scientific Name	Common Name
Anthericaceae	Arthropodium milleflorum	Pale Vanilla-lily
	*Chlorophytum comosum	Spider Plant
Apocynaceae	*Araujia sericifera	Moth Vine
Asteraceae	*Bidens spp.	Cobblers Pegs
	*Conyza spp.	A Fleabane
	Euchiton sphaericus	Star Cudweed
	*Sonchus oleraceus	Common Sowthistle
Campanulaceae	Wahlenbergia gracilis	Sprawling Bluebell
Caprifoliaceae	*Abelia x grandiflora	
Celastraceae	*Euonymus fortunei	Fortune's spindle
Chenopodiaceae	Atriplex semibaccata	Creeping Saltbush
Commelinaceae	Commelina cyanea	Native Wandering Jew
Convolvulaceae	Dichondra repens	Kidney Weed
Cyperaceae	Cyperus gracilis	Slender Flat-sedge
Fabaceae – Faboideae	*Acacia saligna	Golden wreath wattle
	Desmodium varians	Slender Tick-trefoil
	Glycine tabacina	Variable Glycine
Malvaceae	*Sida rhombifolia	Paddy's Lucerne
Myrtaceae	Acmena spp.	
	Callistemon citrinus	Crimson Bottlebrush
	Corymbia maculata	Spotted Gum
	Eucalyptus moluccana	Grey Box
	Eucalyptus tereticornis	Forest Red Gum

	Melaleuca styphelioides	Prickly-leaved Tea Tree
Oleaceae	* <i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive
Oxalidaceae	Oxalis perennans	
Plantaginaceae	* <i>Plantago lanceolata</i>	Lamb's Tongues
Poaceae	* <i>Bromus catharticus</i>	Prairie Grass
	* <i>Chloris gayana</i>	Rhodes Grass
	* <i>Panicum repens</i>	Torpedo Grass
	<i>Rytidosperma tenuius</i>	A Wallaby Grass
Ranunculaceae	<i>Ranunculus lappaceus</i>	Common Buttercup
Rosaceae	* <i>Spiraea cantoniensis</i>	Reeves' meadowsweet
Rubiaceae	* <i>Richardia humistrata</i>	
Verbenaceae	* <i>Verbena rigida</i>	Veined Verbena

* = non-native species

(V) = listed as Vulnerable under the BC & EPBC Act

Appendix C

Assessment of Significance (EPBC Act)

EPBC Act Assessment of Significance – Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

An assessment of significance has been prepared for the *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*, listed as Critically Endangered under the EPBC Act. Under the EPBC Act, an action is considered likely to have a significant impact on a critically endangered community if there is a real chance or possibility that it will:

- Reduce the extent of an ecological community
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- Adversely affect habitat critical to the survival of an ecological community
- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- Interfere with the recovery of an ecological community.

These impact criteria are assessed in below.

Impact Criteria	Comment
Reduce the extent of an ecological community	The development will remove an area of managed vegetation within and adjacent to this ecological community. This small scale and minor modification of vegetation is unlikely to significantly reduce the extent of this community in the locality.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest within the Study Area exists as a patch of 0.15ha in size. This development will further fragment this patch by removing 0.08ha of both native and High Threat Exotic vegetation within the patch. As such, it is unlikely to substantially affect the condition of the remnant due to its poor condition.
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest under the EPBC Act. The habitat within the Study Area is not considered to be critical to the survival of the community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	The development will result in the minor removal of canopy remnant trees belonging to this CEEC within the Subject Site, and as such will not modify or destroy abiotic factors necessary for the ecological community's survival.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposal will remove an area of managed native and exotic vegetation. Due to the small size of the impact, it is unlikely to substantially modify the species composition of the local occurrence of the community in the areas to be retained or result in a decline or loss of functionally important species. The project does not involve actions that would substantially change the existing disturbance regime such as the intensity or frequency of fires or flora or fauna harvesting.

Impact Criteria	Comment
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	The development is unlikely to result in an increase in the establishment, density, or diversity of exotic flora. Due to High Threat Exotics already established throughout this ecological community within the Study Area, the proposal will in fact remove and decrease the abundance of exotic/weed species. However, mitigation measure recommended as part of this ecological assessment is the establishment of a planted control line in the eastern site boundary to control movement of weed and propagules.
Interfere with the recovery of an ecological community	A final recovery plan has not been prepared for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest in accordance with the requirements of the EPBC Act. A final recovery plan has been prepared for vegetation communities on the Cumberland Plain under the <i>Threatened Species and Conservation Act 1995</i> and the <i>EPBC Act C74</i> (DECCW 2010). This draft plan includes reference to Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest. The proposed upgrade will not interfere with the recovery actions identified in this plan.

Appendix D BAM Credit Report Summary

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00024235/BAAS17044/21/00024236	20076 - Bettergrow Wetherill Park	22/02/2021
Assessor Name	Report Created	BAM Data version *
Matt Doherty	19/03/2021	37
Assessor Number	BAM Case Status	Date Finalised
BAAS17044	Finalised	19/03/2021
Assessment Revision	Assessment Type	
1	Major Projects	

* 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.

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

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	BC Act Listing status	EPBC Act listing status	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAI	Ecosystem credits
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BAM Credit Summary Report

Cumberland shale plains woodland											
1	849_Low	Cumberland Plain Woodland in the Sydney Basin Bioregion	42.7	42.7	0.08	Critically Endangered Ecological Community	Critically Endangered	High Sensitivity to Potential Gain	2.50	TRUE	2
										Subtotal	2
										Total	2

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAI	Species credits
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Appendix E Personnel Qualifications

Name	Title	Qualifications	Roles
Matt Doherty	Director	- BAM Assessor (#BAAS17044) B. Landscape Management and Conservation (Soil and Water Management) - Bush Regeneration Cert IV	Review and approval of BDAR. BAM-C assessment
Joshua Smart	Ecologist	B. Environmental Science and Management (Honours)	Undertake BAM assessment and BDAR. Undertake BAM calculator assessment. Field work including PCT identification, vegetation mapping, and threatened flora surveys.

Appendix F SAI Assessment

The *Cumberland Plain Woodlands of the Sydney Basin Bioregion* is currently listed as a Critically Endangered Ecological Community (CEEC) that is both recognized under the Biodiversity Conservation Act 2016 of New South Wales and the Environment Protection 1999 and Biodiversity Conservation Act of Australia. Currently, only an estimated 9% of this CEEC's original extent remains intact with the remnants scattered across the Cumberland Plain (OEH, 2020). This vegetation community has been chosen to be at risk of SAI due to being evaluated against a criterion and has met with one or more principles that have been constructed in the BC Regulation (2017). The principles that apply to this CEEC, include;

- **Principle 1** - Species or ecological community currently in a rapid rate of decline, and
- **Principle 2** - Species or ecological communities with a very small population size

PCT 849 - *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*, that was detected to represent the majority of the vegetation within the Subject Site, is commensurate with this CEEC.

In accordance with Section 9.1.1. of the Biodiversity Assessment Method (2020), the SAI candidate ecological community must be assessed against each of the assessment criteria for threatened ecological communities to assess for the extent and severity of serious and irreversible impacts on the Cumberland Plain Woodlands CEEC.

(a) Evidence of reduction in geographic distribution as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)

It is unknown the estimated reduction in geographic extent of the Cumberland Plain Woodlands ecological community since 1970, however, current statistics do state that an estimated 7.8 – 9 percent of its original extent remains intact (Cumberland Conservation Network (CCN), 2018 & OEH, 2020). The remaining area of the community is severely fragmented, with more than half of the remaining tree cover mapped by Tozer (2003) occurring in patches of less than 80 ha and half of all mapped patches being smaller than 3 ha (Tozer *in litt.* October 2007).

Furthermore, PCT 849 - *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion*, that forms a part of this CEEC, has reported that PCT 849 has undergone a clearing reduction of 93 percent with only 7 percent remaining (Bionet Vegetation Classification, 2021).

(b) Extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes.

Due to the clearing and management of a majority of the remaining Cumberland Plain Woodlands, the community's vegetation composition and structure has been modified resulting in regrowth forests and woodlands within past clearing activity areas (Benson & Howell 1990a).

Due to the clearing and maintaining of the understory, in particular the removal of significant, key species such as the midstory-dominant *Bursaria spinosa subsp. spinosa* (Blackthorn) and the groundcover dominants such as *Microleana stipoides* (Weeping Grass) and *Themeda triandra* (Kangaroo Grass), it has resulted in the establishment of high-threat exotic species. One of the largest threats to the Cumberland Plain Woodlands CEEC is the invasion of exotic weeds, in particular, *Olea europaea subsp. cuspidata* (African Olive) as well as perennial grass. It should be noted that these are also listed as Key Threatening Processes under the Biodiversity Conservation Act 2016. The native species must be present to create niche environments for specialty and endemic native species to occur. For example, it is believed that two species of plants, *Swainsona monticola* and *Thesium australe*, are presumed to have gone extinct in Cumberland Plain Woodland (Benson & Howell 2002). *Thesium australe* requires the presence of *Themeda triandra* (Kangaroo Grass) which it uses as a host plant (semi-parasitic).

Due to the subject site comprising mostly of associated canopy species including *Eucalyptus moluccana* (Grey Box) and *Eucalyptus tereticornis* (Forest Red Gum), with no presence of *Bursaria spinosa* and a sparse abundance of associated groundcover species belonging to the CEEC, ecological function is expected to be low. Furthermore, the frequent maintenance of the understory within the subject site has hindered the accumulation of organic litter such as leaves and bark which create potential habitat for the *Meridolum corneovirens* (Cumberland Plain Land Snail). The subject site does contain high threat exotic, perennial grasses including *Panicum repens* (Torpedo Grass) and *Chloris gayana* (Rhode's Grass) along with a moderate invasion of African Olive along the western boundary.

The subject site already exists within a small, hostile fragmented patch of the Cumberland Plain Woodlands CEEC. It is known that a moderate amount of the same CEEC occurs within the area (Plate 1). The fragmented patch of CEEC that resides on 23-24 Davis Road, Wetherill Park, NSW, is an estimated one (1) hectare in size, however, this is believed to be inaccurate as some of the associated canopy that has been used to digitize the patch area is comprised of exotic species such as African Olive and *Acacia saligna* (Wattle species that has been introduced from Western Australia that has proven invasive). Under this proposal, approximately 755m² (0.08ha) will be cleared/removed for the development with the retainment of 720m² (0.07ha) within Lot 18 (24 Davis Road, Wetherill Park).

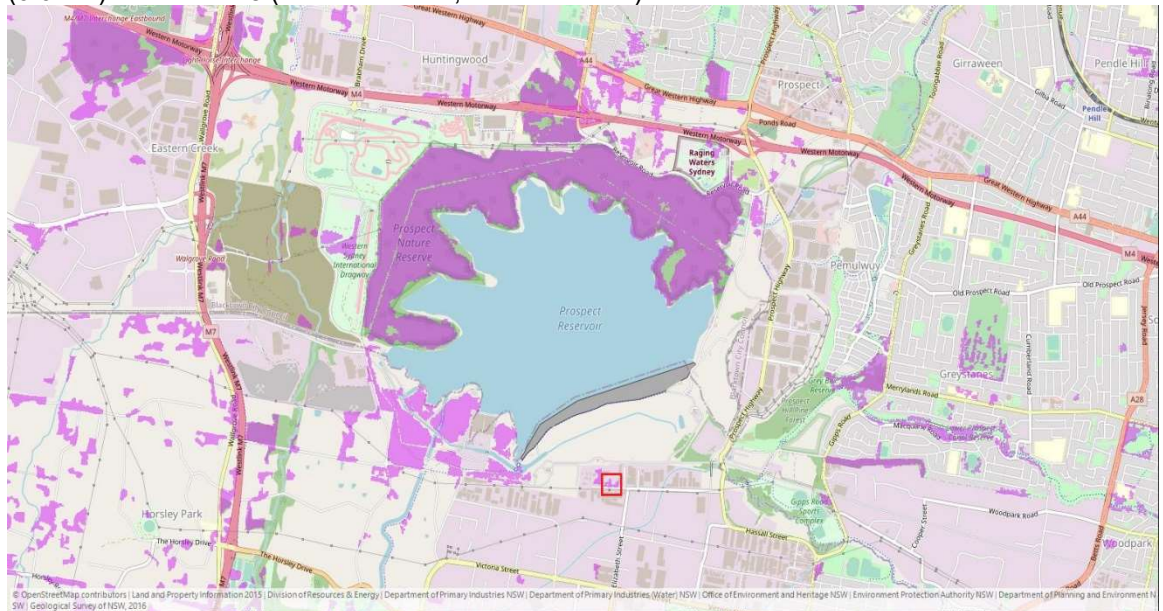


Plate 1. A map of where Cumberland Plain Woodland CEEC vegetated areas exist (Purple) within the surrounding area to the Cumberland Plain Woodland patch that exists within the subject site (Red Square).

- (c) The impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:
- in hectares
 - as a percentage of the current geographic extent of the TEC in NSW

Data and information should include direct impacts (i.e. from clearing) and indirect impacts where partial loss of the TEC is likely as a result of the proposal. The assessor should consider for example, changes to fire regime (frequency, severity), hydrology, pollutants, species interactions (increased competition, changes to pollinators or dispersal), fragmentation, increased edge effects and disease, pathogens, and parasites, which are likely to contribute to the loss of flora and/or fauna species characteristic of the TEC.

Independently conducted mapping (CCN, 2018) found that around 9,797 hectares of the CEEC (7.8%) remains. The estimated impact upon the Cumberland Plain Woodland CEEC under this proposal of 0.08ha of highly disturbed vegetation is considered minor. It includes the removal of 15 Myrtaceae plants that are associated canopy species for PCT 849 that is commensurate with this CEEC. In total, 755m² (0.08ha) of vegetated area is expected to be

disturbed under this proposal. Additionally, this includes the disturbed understory that does not constitute as remnant Cumberland Plain Woodland due to the constant disturbance and invasion of exotic perennial grasses and African Olive. Under this proposal, approximately 720m² (0.07ha) of the same CEEC is being retained within the Study Area.

In context, this proposal will remove 0.08ha of low condition Cumberland Plain Woodlands CEEC that contains no significant endemic flora species within the understory, little accumulation of litter and no creation of hollows to allow native, endemic fauna to inhabit. This proposal will reduce the total remaining estimated area of Cumberland Plain Woodlands CEEC down to 9,790ha (9,797ha subtracting the 0.075ha).

(d) The extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes of the TEC by:

- i. *estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals*
- ii. *describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:*
distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and • estimated maximum dispersal distance for native flora species characteristic of the TEC, and • other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development.

Due to the hostile environment of the Study Area coupled with the surrounding area existing within an industrial area where cement covers the majority of the ground, floral seed dispersal is considered to be extremely limited as there is no viable spots for establishment.

Additionally, due to the hostile connections existing around the patch of Cumberland Plain Woodland CEEC that resides within the Study Area, it is expected that this proposal will have no further impacts on the CEEC. Another patch of this CEEC exists to the immediate west of the Study Area. As this patch resides uphill and is distant from the subject site, it is deemed safe and will not be impacted upon under this proposal.

Conclusion

The Cumberland Plain Woodland CEEC has been severely cleared throughout the Sydney Basin since European settlement. It is estimated that only 9,797 ha (7.8%) of the CEEC still exists today. Under this proposal, approximately 755m² (0.08ha) will be removed. It is noted that the area that has been deemed to be removed under this proposal has lost most of its ecological function due to its hostile connections to the greater area hindering the recruitment of endemic flora species as well as hindering the visitation of less mobile fauna such as the Cumberland Plain Snail due to the frequent maintenance of the area to stop the accumulation of leaf and bark litter to create adequate cover. Furthermore, the CEEC that exists within the Subject Site contains moderate levels of high threat weed species that have been identified as Key Threatening Processes under the Biodiversity Conservation Act 2016. Due to these reasons, the small area of CEEC that is a candidate of SAIL, is deemed to have no impact to the remaining 9,790 ha of the CEEC and will not lead to serious and irreversible impacts to the remaining CEEC.

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