

18 October 2021

Oatlands Golf Club
94 Bettington Road
Oatlands, NSW 2117

Desktop Ecological Assessment for Oatlands Golf Course

Dear Elyse,

Cumberland Ecology has been contracted by Oatlands Gold Club, to provide specialist ecological services to facilitate a Seniors Living development within parts of the Oatlands Golf Course located at 94 Bettington Road, Oatlands (the 'site').

The proposed development (the 'Project') comprises the construction of a Seniors living development consisting of 193 Independent Living Units (ILUs) with parking facilities, a new clubhouse and cafe, a wellness centre and associated ancillary facilities. The current stage of works for the Project comprises an application for a Site Compatibility Certificate (SCC) under *State Environment Planning Policy (Housing for Seniors or People with a Disability) 2004*.

The purpose of this letter is to provide an ecological assessment to support the application for a SCC. Cumberland Ecology previously prepared an ecological constraints assessment of the entire site for the Oatlands Golf Club. The ecological assessment to support the SCC application has been prepared as a desktop assessment utilising the relevant field data and assessments conducted as part of the ecological constraints assessment for the entire site.

Appendix A of this letter presents the results of our assessments and a summary of the ecological constraints to development that are present in the site. Likelihood of occurrence of threatened species assessments are provided in **Appendix B**. Supporting figures showing field survey locations and the ecological values of the Project Area are provided at the end of this letter.

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If you have any questions or wish to discuss the contents of this letter further, please do not hesitate to contact me via email or at our Sydney office on (02) 9868 1933.

Yours sincerely

A handwritten signature in blue ink, reading "Gitanjali Katrak". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

Gitanjali Katrak
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APPENDIX A :

Ecological Assessment

A.1. Introduction

Cumberland Ecology was requested by Oatlands Golf Club to prepare an ecological assessment to facilitate a Seniors Living development within parts of the Oatlands Golf Course located at 94 Bettington Road, Oatlands (the 'site').

The proposed development (the 'Project') comprises the construction of a Seniors living development consisting of 193 Independent Living Units (ILUs) with parking facilities, a new clubhouse and cafe, a wellness centre and associated ancillary facilities. The area of land subject to the Project (hereafter referred to as the 'Project Area') is located towards the western to north-western parts of the site, along Bettington Road, and covers an area of approximately 1.61 ha (**Figure 1**). The current stage of works for the Project comprises an application for a Site Compatibility Certificate (SCC) under *State Environment Planning Policy (Housing for Seniors or People with a Disability) 2004*.

The purpose of this letter is to provide an ecological assessment to support the application for a SCC. Cumberland Ecology previously prepared an ecological constraints assessment of the entire site for the Oatlands Golf Club (Cumberland Ecology, 2021), data and assessments which are permitted to be utilised for this SCC assessment. This current ecological assessment to support the SCC application has been prepared as a desktop assessment utilising the relevant field data and assessments conducted previously as part of the ecological constraints assessment for the entire site.

A.1.1. Description of the Site and Project Area

A.1.1.1. The Site

The site is a golf course, occupying 41.8 ha, located in the City of Parramatta Local Government Area (LGA). Approximately 37.8 ha of the site is zoned as RE2 – Private Recreation, and an additional 4 ha of land in the northeast of the site is zoned E2 - Environmental Conservation/W1 - Natural Waterways, under the *Parramatta Local Environmental Plan 2011* (LEP).

The site is bounded by residential dwellings and a tributary of Vineyard Creek in the north, Vineyard Creek and bushland in the east, residential dwellings and Greens Avenue in the south, and Bettington Road and residential dwellings in the west. One small lot, Lot 1 DP508441 occurs within the site, though is not a part of it, and contains Oatlands House, a historic house used for functions.

Vegetation within the site is typical of a golf course in that it comprises, for the most part, mown areas of grassland dominated by exotic species, broken up by rows and patches of trees and shrubs. Trees and shrubs comprise both native and exotic planted species, as well as some remnant native and regrowth trees consistent with vegetation communities which would have historically occurred across the site. Some bushland, albeit with weedy edges, is present along the northern and eastern boundaries of the site.

A first order stream, a tributary of Vineyard Creek is present along the northern boundary of the site. Along the northern boundary of the site this tributary merges with another first order stream at the location of a large dam to become a second order stream. This second order stream then merges with Vineyard Creek to form a second order stream (upstream of the location of the merge with the second order tributary Vineyard Creek is a first order stream), which then runs along the eastern boundary of the site.

A.1.1.2. The Project Area

The Project Area is the portion of the site where the proposed development will be situated. The Project Area is located towards the western to north-western parts of the site, along Bettington Road, and covers an area of approximately 1.61 ha (**Figure 1**). It is largely comprised of the existing car park for the Oatlands Golf Course, an existing building, and adjacent areas of exotic managed grassland used for golf and overhanging canopy of planted native trees. The Project Area is bounded by Bettington Road to the west, residential development to the south and managed areas of the golf course to the north and east.

A.1.2. Relevant Legislation

A.1.2.1. Environmental Planning and Assessment Act 1979

The NSW *Environment Planning and Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW. This Act provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the consideration of the environment and biodiversity values, which is addressed in Section 1.7 and requires application of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act). This includes threatened species, communities, habitat and processes as listed under the BC Act and *Fisheries Management Act 1994* (FM Act).

A.1.2.2. State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

In 2004, the NSW state government introduced the *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* (Seniors Living SEPP). The Seniors Living SEPP is intended to help encourage development suitable for seniors and those with disabilities while maintaining the character of the local area.

An amendment to the Seniors Living SEPP introduced the concept of SCCs, which are intended to ensure that a proposed development site is generally suitable with the surrounding land uses for seniors' development. Where a Senior's Housing development is proposed on or partially on, land that adjoins land zoned primarily for urban purposes (but where the zone of the land on which the development is located doesn't otherwise permit Senior's Housing), developers must obtain an SCC from the NSW Department of Planning Industry and Environment (DPIE) before lodging a development application with Council. In such situations, whilst obtaining the SCC is mandatory, the SCC itself does not guarantee a development will be approved by the consent authority.

Oatlands Golf Club propose to develop a part of the site as Seniors Living, and therefore a SCC is required. The Application for a SCC requires consideration of a range of factors. Of relevance to ecology, if the proposed development may involve the clearing of native vegetation, the SCC Application requires consideration of the impact that the proposed development is likely to have on the conservation and management of native vegetation.

A.1.2.3. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's key piece of environmental legislation and is administered by the Commonwealth Department of Agriculture, Water and the Environment (DAWE). It is designed to protect national environmental assets, known as Matters of National Environmental Significance (MNES), which include threatened species of flora and fauna,

threatened ecological communities (TECs), migratory species as well as other protected matters. Among other things, it defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna and communities.

Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES must be referred to the Commonwealth Minister for the Environment.

A.1.2.4. Biodiversity Conservation Act 2016

The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.

A key part of the reforms is the introduction of the Biodiversity Offsets Scheme (BOS). The BOS is intended to simplify biodiversity assessment and improve biodiversity outcomes by creating consistent assessment requirements to measure the likely biodiversity loss of development proposals and gains in biodiversity value achieved at offset sites through active management.

The BOS applies to local development (assessed under Part 4 of the EP&A Act) that is likely to significantly affect threatened species or communities or that triggers threshold levels for when assessment via the BOS is required. The triggers for entry into the BOS are if a Part 4 development:

- Is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance in Section 7.3 of the BC Act;
- Exceeds the biodiversity offsets scheme threshold according to Clause 7.1 of the *NSW Biodiversity Conservation Regulation 2019* (BC Regulation), with the thresholds being:
 - The clearing of native vegetation of an area above a prescribed threshold based on the minimum lot size; or
 - The clearing of native vegetation, or other prescribed action, on land included on the Biodiversity Values Map.
- Is carried out in a declared area of outstanding biodiversity value (AOBV).

If a project triggers any of the above thresholds, assessment according to the BOS is required, which involves the preparation of a Biodiversity Assessment Development Report (BDAR) in accordance with the Biodiversity Assessment Method (BAM). Although these thresholds are not relevant to the current SCC Application, they will be required to be considered in future DAs. An assessment of whether a future development could trigger the above thresholds is provided in **Chapter 4**.

A.1.2.5. Water Management Act 2000

The primary objective of the *Water Management Act 2000* (WM Act) is to manage NSW water in a sustainable and integrated manner that will benefit current generations without compromising future generations' ability to meet their needs. Since 2018, the WM Act has been administered by Natural Resources Access Regulator

(NRAR) and establishes an approval framework for activities within waterfront land which is defined as land 40 m from the highest bank of a river, lake, wetland or estuary.

A.2. Methodology

A.2.1. Desktop Assessment

Cumberland Ecology previously prepared an ecological constraints assessment of the entire site for the Oatlands Golf Club. As part of this assessment, a desktop assessment of the ecological values present in the site was conducted in June 2021. Mapping layers from the Native Vegetation of the Sydney Metropolitan Area Version 3.1. VIS_ID 4489 (OEH, 2016) which covers the site were reviewed to determine the potential vegetation communities, including those that align to TECs. The NSW Department of Planning Infrastructure and Environment (DPIE) Biodiversity Values Map and Threshold Tool (BMAT) was also used to identify areas mapped on the Biodiversity Values Map in the site.

Database analysis was conducted for the locality using the Environment, Energy and Science (EES) BioNet Atlas (EES, 2021). The locality is defined as the area within a 10 km radius of the site. The BioNet Atlas was examined for records of any threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within the locality.

The lists generated from the databases were reviewed against available knowledge of the area, in conjunction with the abundance, distribution and age of records, to ascertain the likelihood of occurrence of threatened species. The likelihood assessment conducted for the site was revised for the Project Area and is provided in **Appendix B**.

A.2.2. Site Inspection

In order to verify the ecological values that have been mapped previously as occurring in the site, a site inspection of the site was undertaken as part of the ecological constraints assessment by Cumberland Ecology by a botanist and an ecologist on the 17th of June 2021. This included vegetation mapping, random meander flora surveys, fauna habitat assessment and waterway assessments. Further details of each of the survey methods are provided below.

The purpose of the site inspection was to form a broad overview of the ecological constraints of the site, and as such due to the area of the site and time constraints not all features such as each tree with hollows were able to be recorded. The data collected from the site inspection was reviewed with a focus on ecological values and constraints within the Project Area.

A.2.2.1. Vegetation Mapping

The vegetation within the site was ground-truthed during the site inspection to verify existing mapping of the extent of the different vegetation communities occurring, with particular reference to the occurrence and distribution of native vegetation communities and potential TECs. Where vegetation community boundaries were found to differ from the existing mapping, records were made of proposed new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs.

The resultant information was synthesised using a Geographic Information System (GIS) to create a spatial database and used to interpret and interpolate the data to produce a vegetation map of the site. This map was utilised for the assessment of the Project Area.

A.2.2.2. Random Meander Survey

During the site inspection, random meander surveys were undertaken to detect flora species present within the site. These surveys consisted of traversing all parts of the site and all vegetation communities present (**Figure 2**) with brief inspections made of each patch of vegetation.

Targeted threatened flora searches were limited during inspections of vegetation, however due to the long-term utilisation of the site as a golf course and a stringent mowing regime of the majority of the ground layer threatened flora species were considered unlikely to occur.

A.2.2.3. Fauna Habitat Assessment

A fauna habitat assessment was undertaken throughout the site during the site inspection (**Figure 2**). The assessment included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks. Structural features considered included the nature and extent of the understorey and ground stratum and extent of canopy. The survey also included an assessment of the presence of habitat features suitable for use by threatened fauna species known from the locality as indicated by database searches.

As the primary focus of the survey was vegetation mapping, recording of fauna habitat features was opportunistic, and intended to represent a broad indication of the types of habitat present. As such it is likely not all habitat features were recorded across the whole site.

A.3. Results

A.3.1. Vegetation Communities

The majority of the site has been previously cleared and currently comprises exotic dominated grassland, and a mix of remnant native trees, and planted and exotic trees and shrubs in between fairways and greens used for playing golf. A native understorey and ground layer is largely absent from the site. The exception to this is bushland areas in the northern and eastern edges of the site on steep topography not suitable for use as a golf course. Previous broad-scale mapping conducted by OEH (2013) mapped three naturally occurring native vegetation communities within the broader site. Cumberland Ecology confirmed the presence of all three of these vegetation communities during the site inspection, although refined the mapping to more accurately represent the distribution of these communities across the site. These native vegetation communities are:

- Sydney Turpentine Ironbark Forest (STIF);
- Coastal Enriched Sandstone Dry Forest (CESDF); and
- Coastal Enriched Sandstone Moist Forest (CESMF).

A further two non-naturally occurring vegetation communities have been mapped by Cumberland Ecology within the site. These communities are:

- Planted Native Vegetation; and
- Exotic Vegetation and Cleared.

No native vegetation communities have been mapped from the Project Area (and therefore a description of these communities is not provided) and the vegetation communities that occur in the Project Area comprise Planted Native Vegetation and Exotic Vegetation and Cleared land. The extent of the mapped native vegetation communities within the Project Area is detailed in **Table 3** and shown in **Figure 3**. The communities present within the Project Area are discussed in more detail in subsequent sections.

Table 1 Vegetation communities recorded within the Project Area

Vegetation Community	Approximate Area (ha)
Planted Native Vegetation	0.02
Exotic Vegetation and Cleared	1.59
Total	1.61

A.3.1.1. Planted Native

BC Act Listing: Not listed

EPBC Act Listing: Not listed

This vegetation community consists of a rich array of native species which naturally occur in NSW (**Photograph 1**), predominately trees, that have been planted for landscaping purposes, for the large part as windrows to separate fairways, and also to border the boundary of the Project Area and wider site. A large number of species have been utilised in the wider site, including locally indigenous species (though mostly occurring in habitats they would not naturally occupy) such as *Corymbia eximia* (Yellow Bloodwood), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus sideroxylon* (Mugga Ironbark) and non-locally indigenous species not native to Sydney such as *Lophostemon confertus* (Brush Box) and *Eucalyptus microcorys*. However, the occurrence of this community in the Project Area is limited to largely overhanging canopy in the north to north-west parts of the Project Area, occupying a total 'drip zone' area of 0.02 ha.

Photograph 1 Planted Native species to the north of the car park



A.3.1.2. Exotic and Cleared

Areas that have not been covered by mapping polygons in **Figure 3** consist of exotic vegetation, cleared areas such as tracks, and developed areas such as buildings and car parks.

These areas also include native species that are not native to NSW and not considered native vegetation as per the definition utilised in the BAM from the NSW *Local Land Services Act 2016*:

A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible.

Native species not indigenous to NSW within the site predominately consist of *Corymbia citriodora*, which is commonly planted within the golf course. Exotic species include *Schinus molle* var. *areira* (Pepper Tree), *Fraxinus* spp., and *Liquidambar styraciflua* (American Sweetgum).

All open grassy areas of the golf course including fairways, greens, and the areas beneath trees between fairways are dominated by exotic grass species including *Cenchrus clandestinus* (Kikuyu) and *Stenotaphrum secundatum* (Buffalo Grass) as well as the native species *Cynodon dactylon* (Couch), (**Photograph 2**).

While the status of *Cynodon dactylon* has been changed from Exotic to Native by the Royal Botanic Gardens, the change from exotic to native is still highly debated/contested by botanists as the grass species is cosmopolitan and occurs widely throughout the world. Furthermore, because of its low growth form, this species was and is a commonly used species for landscaping areas, particularly golf courses where low growing grass varieties are extensively grown. Within the Project Area *Cynodon dactylon* commonly occurred within modified fairways suggesting that it is an introduced species. For this reason, this species is considered to be an exotic/introduced species within the Project Area and wider site.

The Project Area is dominated by Exotic and Cleared areas, comprising the existing car park and adjacent areas of golf course, comprising approximately 1.59 ha (see **Figure 3**).

Photograph 2 Exotic grassland and pathways to the north of the existing car park



A.3.2. Fauna Habitat Assessment

The majority of the site is relatively open beneath trees, without dense occurrences of shrubs and tall ground layer species, and without fallen timber, and as such lacks habitat complexity required to support high species richness of fauna species.

The Project Area provides minimal habitat for native fauna species as it comprises predominantly sealed surfaces of the car park that is entirely devoid of habitat features for fauna, and adjacent areas of exotic grassland. While the existing building within the Project Area has the potential to provide roosting habitat for microbat species within small gaps in the roof cavities, the likelihood is considered to be low as the building is currently utilised and well maintained.

The areas of exotic grassland and exotic trees/shrubs, although containing some vegetation, would provide only extremely limited foraging habitat for common, urban adapted bird species. While some areas of Planted Native Vegetation are within the Project Area, this largely comprises only overhanging canopy vegetation. This canopy cover may provide some highly marginal foraging habitat for native bird species, but due to its direct proximity to Bettington Road and existing cleared areas, its value is minimal. The arboricultural assessments to date indicate that the majority of the trees within the Project Area will be retained with only one tree (Tree 8) potentially being removed based on final setbacks.

While some habitat features such as hollow bearing trees or fallen logs were recorded within the site, none of these features are located within the Project Area (**Figure 4**).

A.3.3. Threatened Flora and Fauna Species

A total of 16 threatened flora species and 46 threatened fauna species listed under the BC Act and/or EPBC Act have been recorded from the locality. An additional four fauna species listed as Migratory under the EPBC Act have also been recorded from the locality.

No threatened species have been recorded from the overall site. However previous assessments (Cumberland Ecology 2021) indicated that some habitat for threatened species is present in bushland in the north-east of the site. That notwithstanding, no suitable habitat to support threatened species is considered to be present in the Project Area due to its long history of disturbance and degradation associated with its use as a golf course.

While the scattered occurrences of planted and exotic vegetation in the Project Area may provide some foraging resources for highly mobile threatened species, such as microbats and the Grey-headed Flying Fox, this is considered to be highly minimal and any occurrence of these species within the Project Area is considered to be limited to fly-overs or fly-throughs as part of a wider foraging range. Similarly, the existing building within the Project Area is considered unlikely to support any roosting microbats as the building is currently utilised and well maintained.

Due to the highly modified nature of the site, being hardstand areas of the carpark and buildings and modified grounds of a golf course, the Project Area does not contain suitable habitat to support threatened flora species and therefore no threatened flora species are considered likely to occur.

A.4. Ecological Assessment

This section provides a summary of the potential impacts associated with future development of the Project Area as well as a discussion of the regulatory requirements and ecological constraints to future development present within the subject land as identified by the desktop assessment and site inspection. This assessment summarises and builds on the assessment provided in the previous desktop ecological assessment of the site conducted by Cumberland Ecology (Cumberland Ecology 2021).

For the purpose of this analysis, the Project Area (~1.61 ha) has been assessed for potential impacts of future development.

A.4.1. Threatened Ecological Communities

No listed under the BC Act or the EPBC Act are present in the Project Area or will be impacted by the Project.

A.4.2. Threatened and Migratory Species

As outlined previously, although several threatened flora and fauna species, listed under the BC Act and/or EPBC Act have potential to occur in areas of bushland in the wider site, the limited habitats within the Project Area are not considered suitable to support any threatened flora species and are considered to be highly sub-optimal for threatened fauna species. The highly limited fauna habitats within the Project Area consist only of exotic plantings and some partial canopy vegetation of planted native trees that are likely to be dominated by urban adapted/disturbance tolerant species.

Similarly, due to the highly modified nature of the Project Area, occurrence of any migratory species is likely to be limited to fly-overs only.

A.4.3. Assessment Requirements

This section provides an overview of the likely assessment requirements for any future development of the subject land.

A.4.3.1. NSW BC Act Assessment Requirements

Currently, assessment of ecological impacts for future development applications within the subject land are required to be in accordance with the BC Act. If future developments were to be assessed under Part 4 (Local Development) of the *Environment Planning and Assessment Act 1979* (EP&A Act), it is necessary to determine whether the project triggers the Biodiversity Offset Scheme (BOS). For a project to trigger the BOS, it would need to be considered as likely to significantly affect threatened species, which can occur as follows:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the Test of Significance in Section 7.3 of the BC Act; or
- It exceeds the BOS native vegetation clearing threshold; or
- It is carried out in an area mapped on the Biodiversity Values Map; or
- It is carried out in a declared Area of Outstanding Biodiversity Value (AOBV)

If any of these criteria are triggered, then the project triggers entry into the BOS. Assessment under the BOS requires an assessment following the Biodiversity Assessment Method (BAM) by an accredited BAM assessor and the preparation of a Biodiversity Assessment Report (BDAR). Each criterion is considered separately below.

A.i. Test of Significance

If future proposed development is likely to significantly affect threatened species or ecological communities, or their habitats, according to the Test of Significance in Section 7.3 of the BC Act, then it triggers entry to the BOS and associated offset requirements. Based on the results of the site inspection and supporting desktop assessments, no threatened entities are present or considered likely to occur, and therefore no Test of Significance has been undertaken. As such, it is unlikely that a significant impact would occur to threatened entities due to the poor quality of the habitats present.

A.ii. Clearing Threshold

According to the second criterion, the project would trigger entry into the BOS if removal occurred of any native vegetation equal to or greater than 0.5 ha and would require application of the avoid, mitigate and offset hierarchy outlined within the BC Act. Native vegetation within the Project Area is limited to planted natives, mainly in the form of overhanging canopy. Even if all areas of planted natives within the Project Area are removed or modified (e.g. trimming of overhanging branches), the total area of impact is below the allowed area threshold. Therefore, the Project will not trigger the BOS via the clearing threshold.

A.iii. Biodiversity Values Map

A review of the Biodiversity Values Map (BVM) indicates that although some small areas of the site are included on the map, there are no areas on the BVM in the Project Area (**Figure 5**). Therefore, the BOS will not be triggered by this mechanism.

A.iv. Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value (AOBV) have been mapped as occurring in the site or Project Area. Therefore, the project will not trigger entry into the BOS via this criterion.

A.4.3.2. NSW WM Act Assessment Requirements

Under the WM Act approval is required for carrying out a 'controlled activity' that takes place on 'waterfront land' to ensure that the activity to ensure negative impacts upon waterfront land and other water users are avoided or minimised and generally requires planting of a vegetated riparian zone around the mapped waterbody.

The definition of waterfront land as per the WM Act is: *"the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river...where the prescribed distance is 40m or (if the regulations prescribe a lesser distance...) that lesser distance"*.

The review of aerial imagery of the subject site and prior assessments determined that while waterfront land is present within the wider site (**Figure 5**), the Project Area does not contain any waterbodies nor does it lie within riparian buffers around waterbodies. The Project Area, therefore, does not constitute waterfront land as defined by the WM Act and no further ecological requirements under the WM Act are relevant to the Project Area.

A.4.3.3. Commonwealth EPBC Act Assessment Requirements

Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES must be referred to the Commonwealth. The assessments of the Project Area have determined that no EPBC Act listed TECs occur within the Project Area. Furthermore, due to the highly modified conditions, the Project Area is not considered to comprise suitable habitat for Threatened or Migratory species listed under the EPBC Act. As the Project is considered unlikely to have any significant impacts on MNES entities, a referral to the DAWE is not warranted.

A.5. Conclusion

This ecological assessment provided an ecological investigation of the Project Area to determine the ecological constraints to the proposed development and to support an application for an SCC.

The Project Area contains no remnant native vegetation and consists primarily of sealed areas in the carpark, a building and adjacent areas of exotic grassland in the golf course. Some planted native trees are located in close proximity to the Project Area with canopy overhanging into the Project Area. While removal/retention of these trees is subject to further arboricultural assessment, the assessment conducted to date indicate that only one tree (Tree 8) within the Project Area may potentially be removed, with the remainder of trees (planted and exotic) being retained. No TECs are present and there is virtually no habitat for native flora and fauna species. No threatened species are considered likely to occur or would be impacted by the Project.

The Project does not trigger the BOS via any mechanism, does not contain waterfront land as identified by the WM Act or habitat for MNES. While any future DA will still need to be supported by an appropriate ecological assessment document, the requirement for a BDAR to support future DAs is not considered to be warranted and a Flora and Fauna Assessment is considered appropriate to support any future DAs.

A.6. References

- Cumberland Ecology. 2021. Ecological Constraints Analysis - Oatlands Golf Club. Cumberland Ecology Pty Ltd, Epping, NSW.
 EES. 2021. BioNet Atlas. <http://www.bionet.nsw.gov.au/> 2020).
 OEH. 2013. Remnant Vegetation Mapping of the Cumberland Plain, NSW.
 OEH. 2016. The Native Vegetation of the Sydney Metropolitan Area - VIS_ID 4489. Office of Environment and Heritage, Sydney.

APPENDIX B :

Likelihood of Occurrence Assessment



Table 2 Likelihood of Occurrence – Threatened Flora

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Campanulaceae	<i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i>			X	1	Currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks. Known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone.	Unlikely to occur. This species is no longer considered extinct as the original species was a misidentification and specimens formerly attributed to <i>Hypsela sessiliflora</i> are now known to be <i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i> , a common and non-threatened species.
Campanulaceae	<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E	-	1	Found in disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. Typically occurs in damp, disturbed sites (with natural or human disturbance of various forms), typically amongst other herbs rather than in the open. There are 13 known sites, two of which are in northern Sydney (Thornleigh and Mt Ku-Ring-Gai) with the remainder in western Sydney (Rookwood, Chullora, Bass Hill,	Unlikely to occur. No suitable ground cover and shrub layer habitat present. Very few local records and not recorded during Cumberland Ecology surveys.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						Bankstown, Georges Hall, Campsie, South Granville and Greenacre). There are likely to be more sites than those listed here.	
Convolvulaceae	<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	V	-	98	Species occurs scattered along the east coast reaching a northern limit at Wamberal Lagoon. Found in intertidal saltmarshes and more rarely on sea cliffs. It typically forms pure, matted stands over small areas where it occurs.	Unlikely to occur. No suitable saline habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys.
Dilleniaceae	<i>Hibbertia spanantha</i>	Julian's Hibbertia	CE	CE	1	Known to occur only as 3 populations restricted to 3 suburbs, Turrumurra, Macquarie Park, and Beecroft, within the Lane Cove River Catchment. It grows in sandy to light clay soils, occurs in dry and wet sclerophyll forests, and co-occurs with <i>Eucalyptus resinifera</i> , <i>Corymbia gummifera</i> , <i>Eucalyptus pilularis</i> , and <i>Angophora costata</i> .	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys.
Dilleniaceae	<i>Hibbertia superans</i>		E	-	44	Grows in ridgetop woodlands on sandstone from Castle Hill to South Maroota. Most occurrences are near the shale/sandstone boundary. It occurs in both open woodland and	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys. The Project Area is also

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						heathland and appears to have a preference for disturbed areas, such as along the edges of tracks.	outside of the known range of the species by approximately 5 km.
Elaeocarpaceae	<i>Tetratheca glandulosa</i>		V	-	1	Restricted to the Baulkham Hills, Gosford, Hawkesbury, Hornsby, Kuring-gai, Pittwater, Ryde, Warringah, and Wyong Local Government Areas. It is associated with shale-sandstone transitional areas, where shale overlays sandstone, generally in ridgetop and upper slope areas. It occurs in a variety of vegetation types including heath and scrub, and open forests and woodlands.	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys.
Ericaceae (Epacridoideae)	<i>Epacris purpurascens</i> var. <i>purpurascens</i>		V	-	78	<i>Epacris purpurascens</i> var. <i>purpurascens</i> occurs in sclerophyll forest, scrubs and swamps, from Gosford and Sydney districts in the Central Coast botanical subdivision. It is found in a large array of habitat types, though mostly in areas with a strong shale influence.	Unlikely to occur. No suitable sclerophyll forest, swamp and scrub habitat present. Although a high number of local sightings recorded, no sightings were recorded during Cumberland Ecology surveys.
Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>		V	-	2	Locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also	Unlikely to occur. Project Area does not contain associated communities. Groundcover in vegetated areas is degraded and exotic-dominated. Not recorded

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	during Cumberland Ecology surveys.
Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>	Dillwynia tenuifolia Sieber ex D.C. in the Baulkham Hills local government area	E		1		Unlikely to occur. Project Area is not within Baulkham Hills Local Government Area.
Fabaceae (Mimosoideae)	<i>Acacia pubescens</i>	Downy Wattle	V	V	6	Occurs on alluviums, shales and at the intergrade between shales and sandstones. Occur in open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	Unlikely to occur. No associated vegetation communities found within the Project Area. Limited records within the locality and not recorded during Cumberland Ecology surveys.
Myrtaceae	<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	-	3	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm.	
Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	5	Species occurs naturally from Forster in the north to Jervis Bay in the south. It is found in rainforest on sandy soils or on sand dunes at low altitude in coastal areas. It is most commonly associated with littoral and gallery rainforest types. The species is extensively cultivated as an ornamental plant.	Unlikely to occur. No suitable habitat present. While the species occurs within the wider Site as planted individuals in the Planted Native community, however they occur in a non-natural setting in which they would not naturally occur.
Proteaceae	<i>Macadamia integrifolia</i>	Macadamia Nut	V	-	1	Not known to occur naturally in the wild in NSW.	Unlikely to occur. Not known to naturally occur in NSW and local record represents a planting.
Rhamnaceae	<i>Pomaderris prunifolia</i>	<i>P. prunifolia</i> in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E	-	5	This listing is for an endangered population which occurs in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas. Within these areas it has only been recorded recently at Rydalmere. It occurs in association with creeks on sandstone and in gullies on shale soils.	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded during Cumberland Ecology surveys.
Thymelaeaceae	<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V	V	6	Occurs on ridge tops and upper slopes in open forest and woodland on sandy soils derived from	Unlikely to occur. No suitable habitat present. Limited records within the locality and not recorded

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Zannichelliaceae	<i>Zannichellia palustris</i>	-	E	-	5	<p>sandstone, on shale/lateritic soils, and on shale/sandstone transition soils.</p> <p>Grows in fresh or slightly saline stationary or slowly flowing water. Flowers during warmer months. NSW populations behave as annuals, dying back completely every summer. In NSW, known from the lower Hunter and in Sydney Olympic Park.</p>	<p>during Cumberland Ecology surveys.</p> <p>Unlikely to occur. No suitable saline stationary or slowly flowing water habitat present. Very few local sightings recorded. Not recorded during Cumberland Ecology surveys.</p>

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered, X = Extinct in the wild.

Table 3 Likelihood of Occurrence – Threatened and Migratory Fauna

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Amphibia							
Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	15980	Marshes, dams, stream sides, particularly those containing bulrushes or spikerushes; unshaded water bodies free of Gambusia form optimum habitat; vegetation and/or rocks are needed for sheltering.	Unlikely to occur. Potential habitat such as dams and ponds fringed with rushes not present within Project Area.
Myobatrachidae	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V	-	4	Has a distribution restricted to the Sydney Basin, from Pokolbin in the north, Nowra to the south, and Mt Victoria in the Blue Mountains to the west. It inhabits ephemeral drainage lines below sandstone ridges that often have shale caps, in open forests on Hawkesbury and Narrabeen Sandstones. The species utilises dense vegetation and debris besides water in the breeding season. Outside of breeding season the species is found under	Unlikely to occur. No leaf litter and suitable sandstone habitat found within the Project Area. Limited records within the locality.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						rocks, logs, and leaf litter nearby to breeding areas.	
Aves							
Accipitridae	<i>Circus assimilis</i>	Spotted Harrier	V	-	4	Occurs throughout mainland Australia except in densely forested or wooded habitats of the coast, escarpment, and ranges. It inhabits open grassy woodland, shrubland, and grassland. It nests in trees and preys on terrestrial mammals, birds, and reptiles, and will occasionally consume carrion.	Unlikely to occur. No suitable habitat due to the lack of grassy woodland and shrubland, within the Project Area. Limited number of records within the locality and no nests recorded during Cumberland Ecology survey.
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	M	325	Found in coastal habitats and around terrestrial wetlands, including rivers, swamps, lakes and the sea.	Unlikely to occur. No suitable habitat present and no nests were recorded during Cumberland Ecology survey within the Project Area. As the wider site contains some suitable foraging habitat due to proximity to dam and presence of drainage line any potential occurrence is limited to a fly-over/fly through the Project Area as

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
							part of a wider foraging range
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	6	Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Unlikely to occur. No suitable habitat present and no nests were recorded during Cumberland Ecology survey within the Project Area. As the wider site contains some suitable foraging habitat due to proximity to dam and presence of drainage line any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V	M	4	Found in littoral and coastal habitats and terrestrial wetlands. They generally are found in coastal areas though will travel inland along major water courses. They visit a wide range of wetland habitats including inshore waters, reefs, bays, coastal cliffs, estuaries,	Unlikely to occur. No suitable habitat present and no nests were recorded during Cumberland Ecology survey within the Project Area. As the wider site contains some suitable foraging habitat due to

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						mangrove swamps, broad rivers, reservoirs, large lakes, and water holes. They feed on fish over clear, open water, and nest in trees or dead trees, generally within one kilometre of the ocean.	proximity to dam and presence of drainage line any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck	V	-	1	This species occurs primarily in south-eastern and south-western Australia and occurs as a vagrant elsewhere. It breeds in large, temporary swamps created during flood events in the Bulloo and Lake Eyre's basins and along the Murray-Darling river system. During inland droughts the species disperses to wetlands in the Murray River basin, and occasionally to coastal areas. The species prefers permanent freshwater swamps and creeks heavy with shrub, sedge, and rush growth. It rests in dense cover during the day, usually in deep water and feeds at dusk and dawn on algae, seeds, and vegetative parts of aquatic	Unlikely to occur. No suitable habitat due to absence of open wetlands and swamps. Almost no records within the locality and no nests recorded during Cumberland Ecology survey.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						sedges and grasses. It nests generally during October to December in dense vegetation near to the water level.	
Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail		V, M	20	Species is almost exclusively aerial, and is found commonly overhead of wooded areas and heathland. Is less commonly found overhead of grassland and swamps.	Unlikely to occur. No suitable habitat present. As this species is an aerial forager, any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	7	Occurs in freshwater wetlands, and more rarely, estuarine wetlands. It favours wetlands with tall, dense vegetation, and forages in shallow water up to a depth of 0.3m. It nests in deep vegetative cover over shallow pools.	Unlikely to occur. Limited suitable habitat found within the Project Area due to lack of wetlands with tall, dense vegetation. Limited records within the locality.
Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V	-	3	Inhabits terrestrial and estuarine wetlands, generally in areas containing permanent water and dense vegetation. The species can occur in flooded grassland, woodland, rainforest, and mangroves. It	Unlikely to occur. Limited suitable habitat found within the Project Area due to lack of wetlands and high human activity. Limited records within the locality.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						feeds on frogs, reptiles, fish, and invertebrates such as snails, dragonflies, shrimp and crayfish. It roosts during the day on the ground amongst dense reeds or within trees. It nests in branches overhanging water.	
Artamidae	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	18	Occurs from Atherton Tableland in Queensland, down to Tasmania and west to the Eyre Peninsula in South Australia. In NSW it occurs from the coast to the western slopes of the Great Dividing Range and farther west. It breeds primarily on the western slopes of the Great Dividing Range in woodland and open dry forest. The species often occurs in eucalypt woodland and forest, though is also found in shrubland and heathland. It forages both above and below the canopy primarily for invertebrates, though will	Unlikely to occur. No suitable habitat present and no nests were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						occasionally consume nectar, fruit and seed.	
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	2	Occurs within a variety of forest and woodland types. Usually frequents forested areas with old growth attributes required for nesting and roosting purposes. Also utilises less heavily timbered woodlands and urban fringe areas to forage, but appears to favour well timbered country through which it habitually flies as it moves about.	Unlikely to occur. Not recorded during Cumberland Ecology surveys, limited suitable habitat is found within the Project Area.
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E	-	3	Occurs within a variety of forest and woodland types. Usually frequents forested areas with old growth attributes required for nesting and roosting purposes. Also utilises less heavily timbered woodlands and urban fringe areas to forage, but appears to favour well timbered country through which it habitually flies as it moves about.	Unlikely to occur. Project Area does not occur within the Hornsby and Ku-ring-gai Local Government Areas.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Cacatuidae	<i>Calyptorhynchus lathamii</i>	Glossy Black Cockatoo	V	-	1	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m ASL in which stands of She-Oak species, particularly Black She-oak (<i>Allocasuarina littoralis</i>), Forest She-oak (<i>A. torulosa</i>) or Drooping She-oak (<i>A. verticillata</i>) occur.	Unlikely to occur. Few mature Allocasuarina feed trees present within the Project Area and no suitable roosting/sheltering habitat present.
Laridae	<i>Sternula albifrons</i>	Little Tern	E	M	6	Migratory bird which spends part of the year in eastern Asia and breeds in the north, east, and south-east Australian coasts from Shark Bay in Western Australia to the gulf of St Vincent in South Australia. Within NSW it occurs mainly north of Sydney, although occurs in small numbers south to Victoria. It is an almost exclusively coastal species, preferring sheltered environments, though has been known to occur several kilometres from the sea in harbours, inlets, and rivers. It nests in small colonies in low	Unlikely to occur. Few local records exist and no suitable habitat is found within the Project Area.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						dunes or on sandy beaches above the high tide mark.	
Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	1	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises : <i>E. microcarpa</i> , <i>E. punctata</i> , <i>E. polyanthemos</i> , <i>E.</i>	Unlikely to occur. Limited number of records within the locality. No suitable foraging habitat present due to lack of mistletoes and modified habitats of Project area do not provide suitable roosting or sheltering habitat.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						<p><i>moluccana</i>, <i>Corymbia robusta</i>, <i>E. crebra</i>, <i>E. caleyi</i>, <i>Corymbia maculata</i>, <i>E. mckieana</i>, <i>E. macrorhyncha</i>, <i>E. laevopinea</i>, and <i>Angophora floribunda</i>. Nectar and fruit from the mistletoes <i>A. miquelii</i>, <i>A. pendula</i>, <i>A. cambagei</i> are also eaten during the breeding season.</p>	
Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E		250	<p>Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. Two isolated sub-populations of White-fronted Chats are currently known</p>	<p>Unlikely to occur. No suitable habitat found within the Project Area. Although there are considerable sightings recorded in the locality, the Project Area is surrounded by urbanised land which the birds are unlikely to fly over.</p>

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						from the Sydney Metropolitan Catchment Management Authority (CMA) area; one at Newington Nature Reserve on the Parramatta River and one at Towra Point Nature Reserve in Botany Bay. These sub-populations are separated from each other by 25 km of urbanised land, across which the Chats are unlikely to fly.	
Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat	V	-	250	This is a gregarious species generally found foraging on bare or grassy ground in wetland areas, alone or in pairs. They feed on insects, mainly flies and beetle caught on the ground or close to. It occupies foothills and slopes up to 1000 m ASL, though in coastal areas is predominately found in areas of salt marsh, and occasionally in low shrubs bordering wetland areas.	Unlikely to occur. No suitable foraging habitat found within the Project Area. Although there are considerable sightings recorded in the locality, the Project Area is surrounded by urbanised land which the birds are unlikely to fly over..
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	2	Inhabits eucalypt forests and woodlands, especially those containing rough-barked	Unlikely to occur. Limited number of records within the locality and limited

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	habitat present due lack of suitable tree species.
Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V	-	2	Lives in mature and regrowth dry eucalypt forests and woodlands. Occasionally found in mallee, or wetter forests, or in wetlands and tea-tree swamps. The understorey is usually open and grassy with few scattered shrubs. Habitat usually contains abundant logs and fallen timber. It breeds on ridges, hills and foothills of the Great Dividing Range, Western Slopes, and in eastern coastal regions. The species predominately inhabits forests and woodlands though some individuals may disperse to more open habitats following breeding. In Autumn and Winter the predominate habitat is open grassy woodlands, grasslands, or grazed paddocks with scattered trees. Birds pounce	Unlikely to occur. Limited number of records within the locality and limited habitat present due high human activity, lack of logs and fallen timber.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						on insects and other invertebrates from low perches, though occasionally forage in the shrub and canopy layer.	
Petroicidae	<i>Petroica phoenicea</i>	Flame Robin	V	-	1	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. Ground layer of the breeding habitat is dominated by native grasses with shrub layer either sparse or dense. Often nests near the ground and are built in sheltered sites e.g. shallow cavities in trees, stumps or banks.	Unlikely to occur. Limited number of records within the locality and limited habitat present due high human activity, lack of ground and shrub layers.
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	6	Forages mostly in the canopy of open Eucalyptus forest and woodland, on Eucalypt species, and species of <i>Angophora</i> , <i>Melaleuca</i> , and other trees. Riparian habitats are ideal for the species due to higher productivity of flowering feed species. Isolated trees in	Unlikely to occur. No suitable habitat present and no nests were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable foraging habitat so any potential

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						paddocks and roadside remnants, along with urban trees can help sustain populations of the species. The species roosts in tree tops, often some distance from food trees, though prefers to nest in close proximity to feed areas. The species nests in hollows with a small entrance (3 cm) and at a height of between two and fifteen metres. Often nest trees are in riparian areas, and include trees of species like <i>Allocasuarina</i> spp.	occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E	CE	7	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	Unlikely to occur. No suitable habitat present within the Project Area. Limited records within the locality.
Psittacidae	<i>Polytelis swainsonii</i>	Superb Parrot	V	V	1	Species occurs only in south-eastern Australia. In NSW it occurs predominately west of the Great Divide, on inland	Unlikely to occur. Limited number of records within the locality and absence of large river habitat present.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						slopes and adjacent plains. It breeds in areas along large inland river systems, and inhabits forests and woodlands dominated by eucalypts, especially River Red Gum (<i>Eucalyptus camaldulensis</i>), and box eucalypts such as the Yellow Box (<i>Eucalyptus melliodora</i>). It forages predominately in box gum woodlands.	
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	E	E, M	3	Inhabits fringes of shallow inland wetlands, swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	Unlikely to occur. No suitable habitat present within the Project Area due to lack of large permanent shallow wetland area. Limited records within the locality.
Scolopacidae	<i>Calidris canutus</i>	Red Knot		E, M	14	Summer migrant from the Northern Hemisphere where it breeds. In NSW it mainly occurs on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours, sandflats, and sandy beaches, of sheltered coasts. It is occasionally found closer to	Unlikely to occur. No suitable habitat present within the Project Area due to lack of shallow wetland area. Limited records within the locality.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						the open ocean, and rarely in terrestrial saline and freshwater swamps. It forages near the water's edge on worms, bivalves, gastropods, crustaceans, and echinoderms. It roosts on sandy beaches, spits, islets, and mudflats close to feeding grounds in open areas.	
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE, M	332	Occurs around coastal areas and is widespread inland. The species occupies mainly intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and around non-tidal swamps. They forage for invertebrates at the edges of shallow waters. The species generally roosts in dunes and sandy areas.	Unlikely to occur. Although substantial local sightings recorded, no suitable habitat present within the Project Area or wider Site due to lack of large shallow sandy wetland areas..
Scolopacidae	<i>Calidris tenuirostris</i>	Great Knot	V	CE, M	1	In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. It has also been observed inland at Tullakool,	Unlikely to occur. Limited number of records within the locality and no suitable habitat present within the Project Area.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						Armidale, Gilgandra and Griffith.	
Scolopacidae	<i>Limicola falcinellus</i>	Broad-billed Sandpiper	V	M	1	Inhabits NSW during its non-breeding season and occurs in coastal areas from Ballina to Shoalhaven Heads. Preferred habitat is within sheltered areas of the coast including estuarine mudflats, salt marshes, freshwater lagoons and sewerage farms.	Unlikely to occur. Very few sightings recorded locally, no suitable habitat present within the Project Area due to lack of estuarine mudflats, salt marshes and sewerage farms and not recorded during Cumberland Ecology surveys.
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	V	M	10	Breeds in the Northern Hemisphere and migrates south for summer. Largest populations in Australia are on the north coast. Generally sporadic through the rest of the country including some inland records, though predominately found in coastal areas. It forages on the shores of intertidal mud and sand flats, banks of mud, sand, or shell-grit, and along the shores of inland lakes and other wetlands. They roost on banks	Unlikely to occur. Few sightings recorded locally and no suitable habitat present within the Project Area due to lack of intertidal mud and sand flats, banks of mud, sand, shell-grit, wetlands.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						of sand, mud, and shell, along with beaches in sheltered areas, and saltflats behind mangroves, and occasionally among low vegetation such as saltmarsh.	
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew		CE, M	28	Breeds in the Northern Hemisphere and spends the non-breeding season in all states of Australia in coastal areas and rarely inland. In NSW it is distributed along all coastal areas but it mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River and Richmond River. It occupies lakes, inlets, bays, and estuarine habitat. It is mainly found in intertidal mudflats and sometimes saltmarsh. It forages at the edge of shallow water and roosts on sandy spits and islets especially on dry beach sand.	Unlikely to occur. Although some sightings recorded locally, no suitable estuarine habitat present within the Project Area.
Scolopacidae	<i>Xenus cinereus</i>	Terek Sandpiper	V	M	1	Breeds in the Northern Hemisphere. In the non-breeding season within	Unlikely. Project Area is not located on the coast and does not contain coastal

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						Australia it is most common in northern Australia. The two main sites it occurs in NSW are the Richmond River and Hunter River estuaries. It occurs on coastal mudflats, lagoons, creeks, and estuaries. It favours mud and sand banks near mangroves, but is also recorded around rocky pools and reefs and occasionally up to 10km inland around brackish pools. It roosts amongst mangroves or dead trees, and forages in intertidal areas.	mudflats, lagoons, creeks, and estuaries. Almost no records within the area.
Strigidae	<i>Ninox connivens</i>	Barking Owl	V	-	4	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. Nests in hollows of large, old eucalypts. Hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when loss of tree hollows decreases these prey	Unlikely to occur. No suitable habitat present and no suitably large hollows were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						populations it becomes more reliant on birds, invertebrates, and terrestrial mammals. Requires very large permanent territories in most habitats due to sparse prey densities.	part of a wider foraging range.
Strigidae	<i>Ninox strenua</i>	Powerful Owl	V	-	186	The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. It breeds and hunts in open or closed sclerophyll forests or woodlands and occasionally hunts in open habitats. Roosting during the day time occurs in dense vegetation of Eucalypts and species such as <i>Syncarpia glomulifera</i> (Turpentine), <i>Angophora floribunda</i> (Rough-barked Apple), and other species. Prey species are medium-sized arboreal mammals such as the Greater Glider, Common Ringtail Possum, and Sugar Glider. As most prey species require hollows and a shrub	Unlikely to occur. No suitable habitat present and no suitably large hollows were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable foraging habitat and species has been observed within the site by grounds staff. Potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						layer these are important habitat components also of the Powerful Owl. Nests are in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	
Tytonidae	<i>Tyto longimembris</i>	Eastern Grass Owl	V		2	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Eastern Grass Owl numbers can fluctuate greatly, increasing especially during rodent plagues.	Unlikely to occur. Very few sightings locally. Limited habitat found in the Project Area.
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V	-	2	Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of	Unlikely to occur. No suitable habitat present and no suitably large hollows were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats.	foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range..
Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	V	-	1	Occurs in coastal rainforest, including dry, subtropical, and temperate rainforests, and moist eucalypt forests. Utilises tall trees in heavily vegetated areas for day time resting. It hunts during the night for small ground or tree dwelling mammals such as the Common Ringtail Possum or Sugar Glider. The species requires very large tree hollows for nesting.	Unlikely to occur. No suitable habitat present and no suitably large hollows were recorded during Cumberland Ecology survey within the Project Area. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Gastropoda							
Camaenidae	<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E	-	1	Primarily inhabits Cumberland Plain Woodland (an endangered ecological community). This community is a grassy, open woodland with occasional dense patches	Unlikely to occur. Very low numbers of records exist within the locality. Restricted to areas of CPW which is not present within the Project Area.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						of shrubs. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish.	
Camaenidae	<i>Pommerhelix duralensis</i>	Dural Land Snail	E	E	32	Inhabits areas that are between shale-derived and sandstone-derived soils with forested vegetation that have good native cover and woody debris. Species prefers sheltering under rocks, inside curled-up bark and underneath leaf litter and light woody debris.	Unlikely to occur. Although a number of records exist within the locality, the Project Area does not contain suitable habitat.
Mammalia							
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	3	Occurs in wide variety of habitats; rainforest, open forest, woodland, coastal heath, and riparian forest. Uses hollows in trees, logs, and rock crevasses as den sites. Females have a large home range of 200-500 hectares and males a larger range of 500-4000 hectares.	Unlikely. No suitable habitat present within the Project Area due to lack of hollow trees, rock crevasses or suitable hollow logs. No evidence of species recorded in the wider Site during Cumberland Ecology survey.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	12	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Miniopteridae	<i>Miniopterus australis</i>	Little Bent-winged Bat	V		1	Inhabits moist eucalypt forest, rainforest, wet and dry sclerophyll forest, melaleuca swamps, dense coastal forests, and banksia scrub, preferring well timbered areas. Species roosts in caves, tunnels, tree hollows, stormwater drains, culverts, bridges and sometimes in buildings.	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		93	Roosts mainly in caves but also in tunnels, mines, or buildings. Non-breeding populations disperse within a 300 km range	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						of maternity caves. Hunting for moths and other insects takes place in forested areas above the canopy.	Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Molossidae	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-	9	Occur in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows but will also roost under bark or in man-made structures.	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Pseudocheiridae	<i>Petauroides volans</i>	Greater Glider		V	1	Restricted to eastern Australia, and occurring from the Windsor Tableland in Queensland south to Wombat State Forest in central Victoria. Largely restricted to eucalypt forests and woodlands. The diet is predominately comprised of eucalypt leaves,	Unlikely. No suitable habitat present within the Project Area due to lack of abundant tree hollows. Almost no local sightings recorded.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						and more rarely flowers. Highest abundances occur in tall montane forests with old trees and abundant hollows.	
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	582	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. Commonly found in gullies, close to water, in vegetation with a dense canopy.	Unlikely to occur. No camps present in the vicinity of the Project Area present and foraging habitat is highly limited. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	2	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin. Found in well-timbered areas containing gullies.	Unlikely. No suitable habitat present due to lack of gullies, caves, and Fairy Martin nests. Limited number of records within the locality.
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	7	Occurs in moist habitat with trees over 20m in height, hunting insects above or just below the tree canopy. Roosts	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited.

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						in eucalypt hollows, under bark and in buildings	Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V	-	33	Roosts close to water in caves, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish. Known from a range of habitats close to water from lakes, small creeks to large lakes and mangrove lined estuaries	Unlikely to occur. No suitable roosting or foraging habitat present. Wider site contains some potential foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as part of a wider foraging range.
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	8	Found mainly in the gullies and river systems that drain the Great Dividing Range. Usually roosts in tree hollows and buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and	Unlikely to occur. No suitable roosting habitat present and foraging habitat is highly limited. Wider site contains some suitable foraging habitat so any potential occurrence is limited to a fly-over/fly through the Project Area as

Family	Scientific Name	Common Name	BC Act	EPBC Act	Records	Habitat Requirements	Likelihood of Occurrence
						dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects. Species is not known to occur in areas of high urban density.	part of a wider foraging range.

FIGURES



Legend



Project Area



Site

Image Source:
NearMap
(dated 26-01-2021)

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



Coordinate System: MGA Zone 56 (GDA 94)

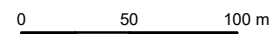


Figure 1. Location of the Site and Project Area



Legend

- Project Area
- Site
- Random Meander Surveys

Image Source:
NearMap
(dated 26-01-2021)

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

Coordinate System: MGA Zone 56 (GDA 94)



Figure 2. Survey locations



Figure 3. Vegetation Communities in the Project Area and adjacent areas of the Site



Figure 4. Fauna Habitat features in the Project Area and adjacent areas of the Site

