TRAVERS BUSHFIRE & ECOLOGY

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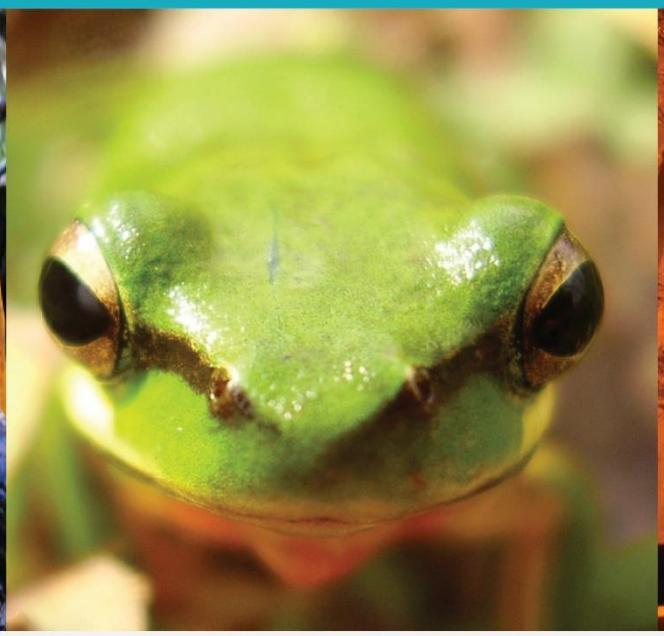

BIODIVERSITY ASSESSMENT REPORT

Proposed Development

Lot 10 and 11, DP 271141

14 Distribution Drive

Orchard Hills

30 June 2021

(REF: 21TMX02)

BIODIVERSITY ASSESSMENT REPORT

Proposed Residential Development

Lot 10 and 11, DP 271141, 14 Distribution Drive, Orchard Hills

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Date:	30/06/21
File:	21TMX02

Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person, including the client, then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be interpreted without reference to the entire report.

The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

LIST OF ABBREVIATIONS

APZ	asset protection zone
BAM	Biodiversity Assessment Method (2020)
BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act (2016)*
BC Reg	*Biodiversity Conservation Regulation (2017)*
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BPA	bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
CM Act	*Coastal Management Act 2016*
DAWE	Department of Agriculture, Water and the Environment.
DCP	development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEH from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy (superseded by DAWE)
DPIE	NSW Department of Planning, Industry and Environment
EEC	endangered ecological community
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act (1979)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act (1999)*
FM Act	Fisheries Management Act
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
LLS Act	*Local Land Services Act (2013)*
NES	national environmental significance
NPW Act	*National Parks and Wildlife Act (1974)*
NRAR	Natural Resources Access Regulator (NSW)
NSW DPI	NSW Department of Industry and Investment
OEH	Office of Environment and Heritage (superseded by DPIE from August 2019)
PCT	plant community type
PFC	projected foliage cover
RFS	NSW Rural Fire Service
ROTAP	rare or threatened Australian plants
SAII	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	species impact statement
SULE	safe useful life expectancy
TEC	threatened ecological community
TPZ	tree preservation zone
TSC Act	*Threatened Species Conservation Act (1995)* – superseded by the *Biodiversity Conservation Act (2016)*
VMP	vegetation management plan

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1. INTRODUCTION

Travers bushfire & ecology has been engaged to undertake a biodiversity assessment report for the purposes of a BDAR waiver in relation to the State Significance Development (SSD) proposal within Lot 10 and 11, DP 271141, at 14 Distribution Drive, Orchard Hills within the Penrith City Council local government area (LGA). The extent of this entire lot is shown in Figure 1 and will hereafter be referred to as the 'study area'.

The proposal shall be assessed under the *Biodiversity Conservation Act* (*BC Act*), 2016.

Figure 1 – Study area. Source: Nearmap (2021).

The proponent of the SSD proposal is Mr Ben Caporale of TMX, at 68 Moncur Street, Woollahra, NSW, 2025. His contact details are;

- Email: ben.caporale@tmx.global
- Phone: 0409 853 224

1.1 Purpose

Biodiversity assessment required for an SSD is described in Section 7.9 of the *BC Act*. Clause 2 of section 7.9 of this Act indicates that an application for development consent for an SSD:

- *is to be accompanied by a biodiversity development assessment report unless the Planning Agency Head and the Environment Agency Head determine that the*

proposed development is not likely to have any significant impact on biodiversity values.

The purpose of this Biodiversity Assessment Report is to determine whether the SSD proposal is likely to have any significant impact on biodiversity values. Under Section 1.5 of the *BC Act*, biodiversity values are defined as:

- vegetation integrity, being the degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state
- habitat suitability, being the degree to which the habitat needs of threatened species are present at a particular site

Also, Section 1.4 of the *Biodiversity Conservation Regulation 2017* lists biodiversity values that are not included in the *BC Act.* The listed biodiversity values are described as:

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

In addition, Section 1.6 of the Biodiversity Conservation Regulation lists the following additional biodiversity impacts:

- the impacts of development on the following habitat of threatened species or ecological communities:
    - karst, caves, crevices, cliffs and other geological features of significance,
    - rocks,
    - human made structures,
    - non-native vegetation,
- the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,
- the impacts of development on movement of threatened species that maintains their lifecycle,
- the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),
- the impacts of wind turbine strikes on protected animals,
- the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.

1.1.1 Terminology

Throughout this report the terms development footprint and study area are used. It is important to have a thorough understanding of these terms as they apply to the assessment.

Development footprint means the area directly affected by the proposal. It has the same meaning as “subject land” defined below.

Study area is the portion of land that encompasses all surveys undertaken and is usually all land contained within the designated property boundary. The study area extends as far as is necessary to assess all important biodiversity values known and likely to occur within the subject land and includes the development footprint and any additional areas which are likely to be affected by the proposal, either directly or indirectly.

Direct impacts are those that directly affect the habitat and individuals. They include, but are not limited to, death through clearing, predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.

Indirect impacts occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.

1.2 Site description

1.2.1 Site overview

Table 1.1 provides an overview the planning, cadastral and topographical details of the study area.

Table 1 – Site features

Location	Lot 10 and 11, DP 271141; 14 Distribution Drive, Orchard Hills
Location description	The site is located approximately 2.5 km south-west of St Clair Post Office. The site is surrounded on the western and eastern sides by existing industrial estates, and by the rural residential properties to the north and south.
Area	10.74 ha
Local government area	Penrith City Council
Zoning	IN1 – General Industrial
Grid reference MGA-56	294009E 6255037N
Elevation	Approximately 36–37 m AHD
Topography	Very flat, no notable topographical features within the study area

Catchment and drainage	The site is effectively flat but is tiered such that there is a smaller southern tier that drops down to the main area in the north. The site drains to the north, west and east into constructed swales.
Existing land use	Vacant land

1.2.2 Landscape features

Table 1.2 examines the landscape features of the proposed development site in accordance with the BAM.

Table 2 – Landscape features

Patch size	5–24 ha
IBRA bioregions and subregions	Sydney Basin bioregion – Cumberland subregion
NSW landscape region and area (ha)	Cumberland Plain
Cleared areas	Approximately 10.74 ha of land within the study area is cleared
Connectivity features	There is very poor connectivity to the development footprint. There is existing industrial development to the west and east, while rural residential properties exist to the north and south of the study area. These rural properties consist of large areas of cleared grassy pasture with sparsely scattered trees.
Geology and soils	Geology; Wianamatta Shales across approximately 85% of the study area. Fine-grained Quaternary in the north-western corner. Soils; Kurosols (Natric) across 40% of the south-eastern portion of the site. Hydrosols across 60% of the north-western portion of the site.

1.2.3 Zoning

The site is currently zoned IN1 under the Penrith LEP of 2010 (Figure 2) which is for general industrial use.

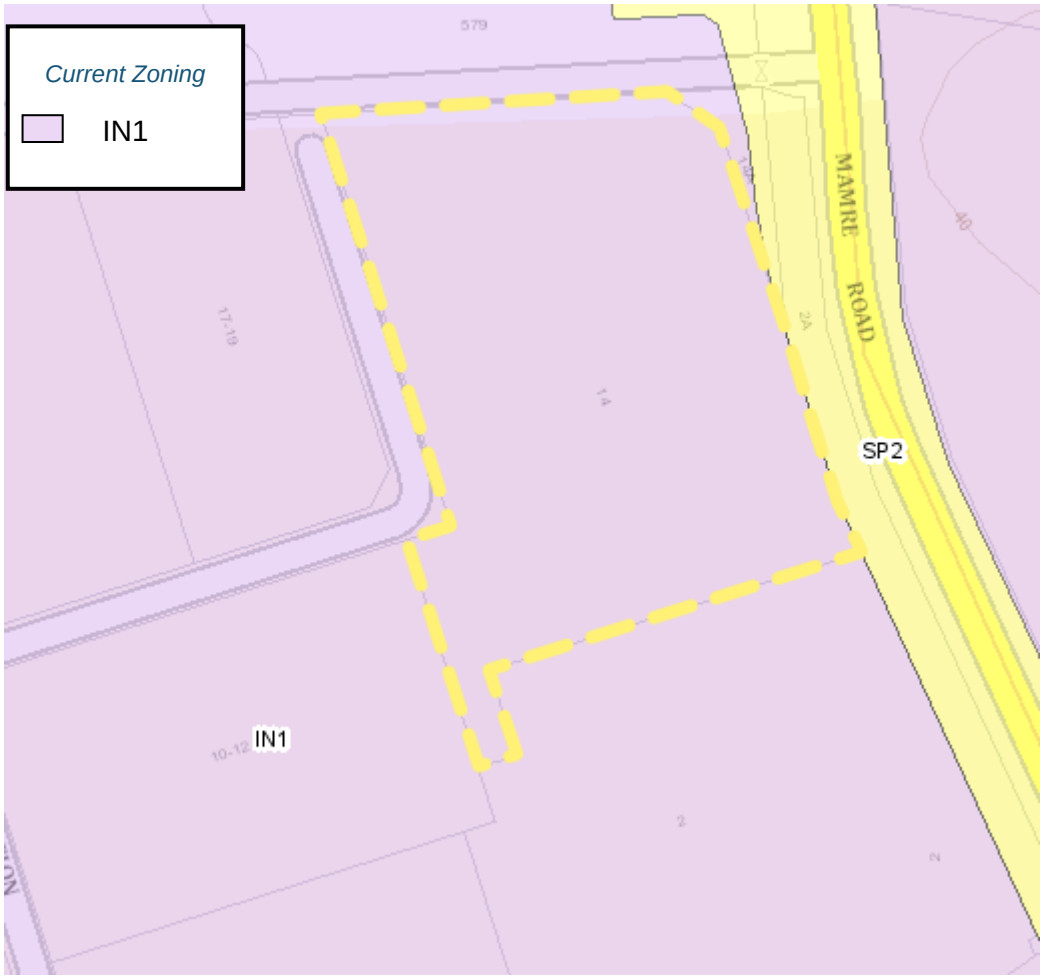

Figure 2 – Zoning

(Source: Planning Portal, 2021)

1.2.4 Proposed development

The proposed development consists of an industrial facility, adjacent to the recently constructed warehouse facility of SSD-9429 (sit plan is shown on Figure 3). The proposed development would be operated by Snack Brands Australia, concurrently with the neighbouring site.

This proposal involves:

- a new purpose-built industrial food manufacturing facility (approximately 20,225 m^2 of Gross Floor Area (GFA)) at 14 Distribution Drive, Orchard Hills; and
- an adjustment to the operations of the existing warehouse and distribution facility at 2 Distribution Drive, Orchard Hills, to include industrial food manufacturing.

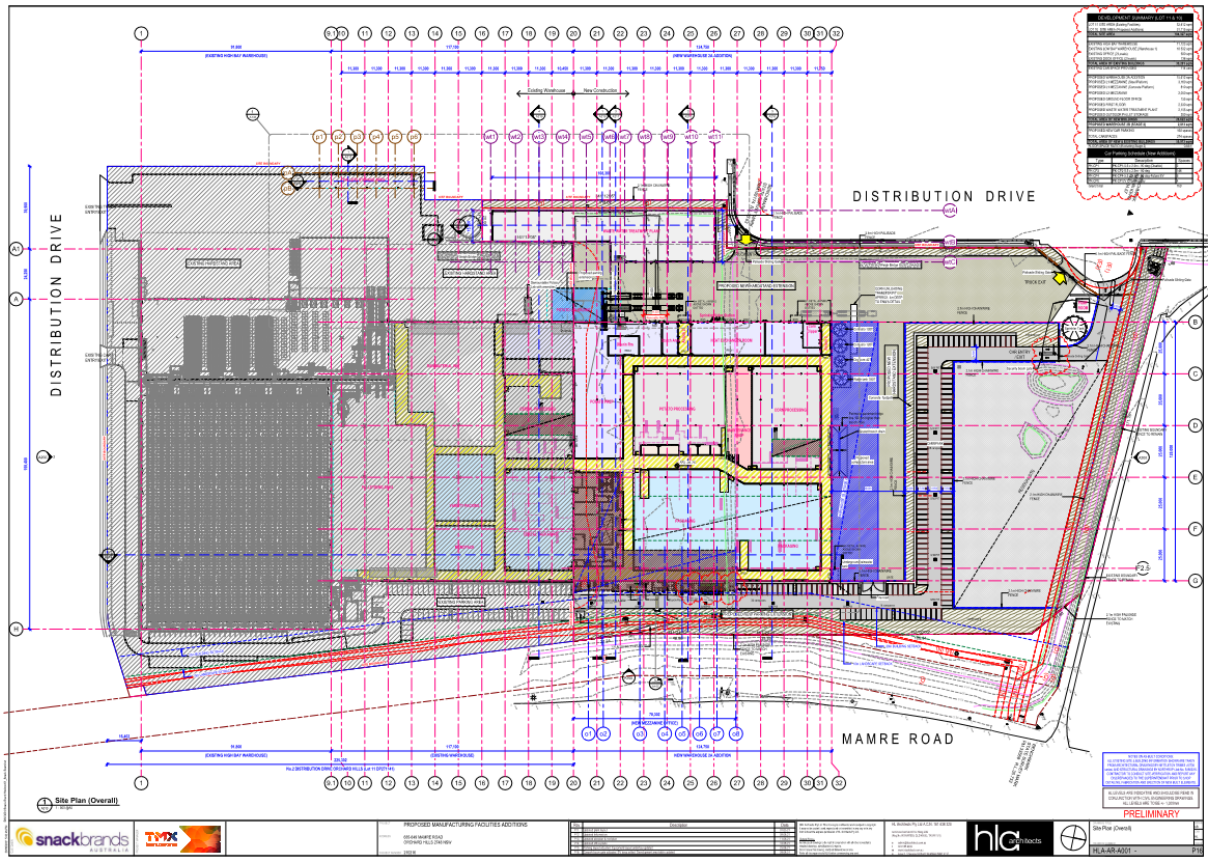

Figure 3 – Site Plan

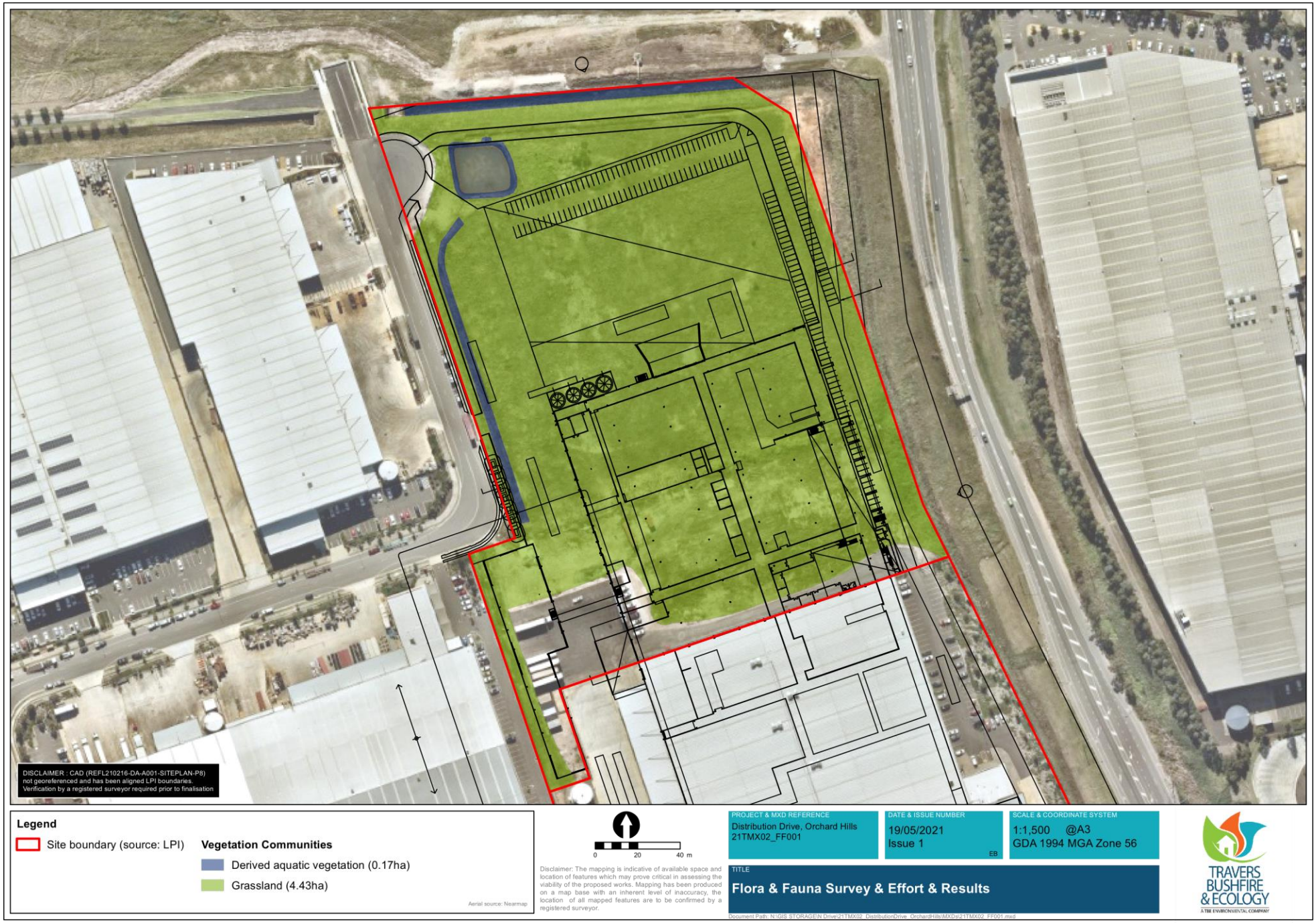

Figure 4 – Flora & fauna survey effort & results

2. IMPACTS ON BIODIVERSITY VALUES

Figure 2-1 shows that Biodiversity Values Land is mapped to the south of the proposed development area within Lot 11 DP271141 (No. 2 Distribution Drive). This mapped area is currently occupied by the existing facility, and no vegetation or other habitat features are present.

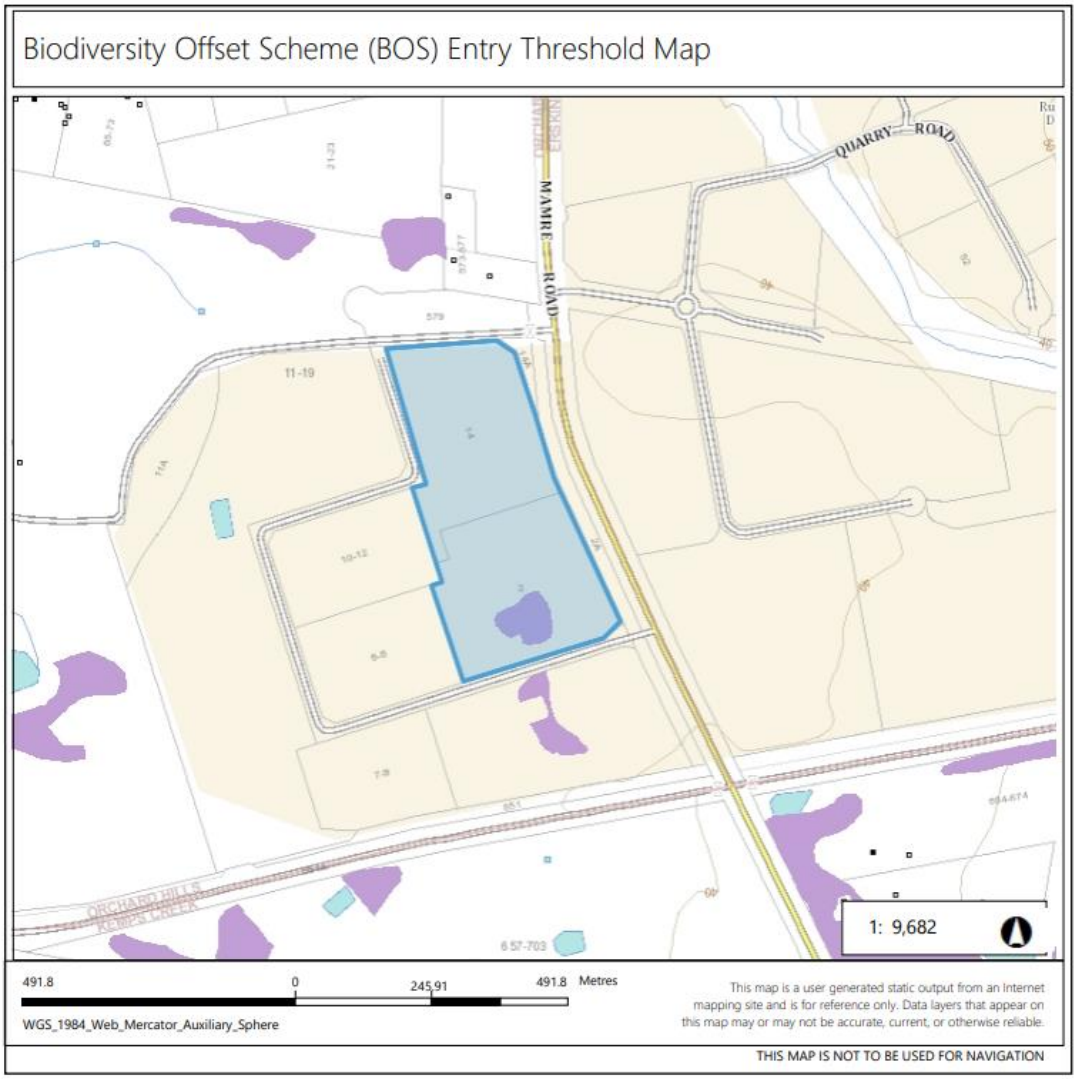

Figure 5 – Biodiversity Values Map

2.1 Vegetation Abundance

Aerial imagery shows that the entire site was previously cleared and devoid of any vegetation from September 2017. All currently existing vegetation is therefore derived following this date.

Figure 6 – Aerial imagery of the site dated 5 Sept 2017

Site inspection on 18 May 2021 found the following vegetation within the development footprint:

Grassland

This occupies the majority of the site, and is dominated by exotic grasses including *Chloris virgata, Chloris gayana, Cenchrus clandestina, Paspalum* spp., *Setaria parviflora, Eragrostis curvula* and *Panicum maximum.* Exotic forbs are also abundant and include *Trifolium repens, Plantago lanceolata, Sonchus oleraceus, Hypochaeris radicata, Cirsium vulgare, Modiola caroliniana, Medicago* sp. and *Conyza bonariensis.* Few native ground cover species are present except *Cynodon dactylon.* There are a few isolated shrubs such as exotic/non-native *Acacia saligna, A. podalyriifolia, Lycium ferocissimum* and *Genista* spp., plus the occasional native *A. parramattensis* and *A. falcata.*

Derived aquatic vegetation

This vegetation occurs within the constructed drainages and as fringing vegetation surrounding the stormwater dam. It is comprised of a mix of exotic and native species. Exotic species include *Cyperus eragrostis, Myriophyllum aquaticum* and *Alternanthera philoxeroides.* Native species include *Typha orientalis, Persicaria decipiens, Juncus usitatus, Schoenoplectus mucronatus* and *Marsilea hirsuta.*

Photo 1 – grassland in the south of the development footprint, looking north.

Photo 2 – occasional non-native and exotic shrubs within grassland vegetation in the north of the development footprint

***Photo 3 – grassland in the north-west of the development footprint, looking south-east*.**

Photo 4 – artificial dam in the north-west corner of the site, with fringing vegetation.

Photo 5 – derived aquatic vegetation within the northern drainage line

Photo 6 – derived aquatic vegetation within the western drainage line

2.2 Vegetation Integrity

All existing vegetation is derived and highly disturbed. The general absence of native species from the grassland areas indicates that this vegetation has very low to no vegetation integrity.

Vegetation surrounding the dam and along the drainage lines has slightly higher vegetation integrity, with a greater abundance of native species. This vegetation and the associated waterbodies may provide marginal habitat for Green and Golden Bell Frog (GGBF), although due to the previous disturbance on site and the isolation of this habitat from other areas potential habitat, it is very unlikely that GGBF would use this habitat. GGBF is assessed in further detail within Appendix 3.

As the vast majority of the vegetation present is exotic and there are a few native species present, it is not considered that vegetation on site provides sufficient vegetation integrity to warrant detailed assessment.

2.3 Threatened Species Abundance

A detailed consideration of GGBF potential habitat within the study area, potential core breeding habitat in the nearby locality and local records has been provided in Appendix 3. This includes a Test of Significance in accordance with Section 7.3 of the *BC Act.* From this it can be summarised that:

- The study area does not likely support GGBF breeding and shelter habitat in the absence of use of other localised habitat areas used for core breeding;
- The study area is now surrounded by recently constructed industrial development providing a barrier to the other potential breeding locations that remain.
- The other local breeding opportunities that do exist are not likely to support core habitat for a local population;
- There are no local or recent records to suggest that a population persists in the locality.

It is therefore concluded that the study area is not of any likely of importance or use to GGBF and a viable local population is not likely present to warrant any further survey or assessment.

2.4 Habitat Suitability

As the site has previously been cleared it provides very low to no potential habitat for threatened species. The only species with any potential to utilise the site is GGBF: vegetation surrounding the dam and along the drainage lines may provide marginal habitat for this species. A detailed assessment for GGBF is provided in Appendix 3, and concludes that as GGBF are not likely to be present. Therefore the proposal will not cause a significant impact on any threatened species, including GGBF.

2.5 Habitat Connectivity

The site is isolated on all aspects from any areas of native vegetation or habitat by existing roads, buildings, hardstand and open paddocks. Likewise, the site does not contribute any connectivity values within the landscape. Figure 1 shows local connectivity relative to the study area.

2.6 Threatened Species Movement

The site does not contribute any connectivity values within the landscape and as such does not contribute to the movement of threatened species across the landscape. The proposal will therefore not impact on the threatened species movement.

2.7 Flight Path Integrity

The site is not significant for the flight paths of species that have been recorded in the locality as it already occurs in a highly fragmented landscape and most flying species are likely to utilise South Creek that occurs to the west of the site. Threatened microbats that may forage in the area are not likely to be impeded by the proposal.

Therefore, the proposal is not likely to significantly impact on the ability of flying species to move throughout the locality.

2.8 Water Sustainability

All waterbodies and drainage lines on site are artificial and are not of any likely importance for threatened species. The site is of sufficient distance from natural waterways to avoid impacts (700 m), and it is expected that stormwater management will be conducted to avoid impacts to water quality, water bodies and hydrological processes.

2.9 Prescribed Impacts

The following potential impacts on biodiversity values as a result of the proposal are prescribed (as per clause 6.1 of the *BC Reg*) as biodiversity impacts to be assessed under the biodiversity offsets scheme:

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

  These features are absent from the site.

- Rocks,

  There are no large rocks within the site.

- Human made structures,

  There are no human-made structures suitable to provide habitat for any threatened species.

- Non-native vegetation,

  Non-native vegetation covers the vast majority of the site. Vegetation in the dam and drainage lines provide marginal habitat for GGBF. Appendices 3 & 4 provides a detailed assessment of GGBF and has concluded that this vegetation is not of any likely importance or use to GGBF and a viable local population is not likely present to warrant any further survey or assessment. The remaining vegetation, which is

managed exotic grassland, does not provide any potential habitat for threatened species.

- Connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,

  As noted above, the site does not contain any connective values between different areas of habitat suitable for use by threatened species.

- Movement of threatened species that maintains their lifecycle,

  The site is isolated on all aspects from any areas of native vegetation or habitat by existing roads, buildings, hardstand and open paddocks. The site is not of any likely importance for threatened species, including GGBF (Appendix 4). As such, the proposal will not impact the movement of any threatened species.

- Water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),

  As stated in Section 2.8, all waterbodies and drainage lines on site are artificial and are not of any likely importance for threatened species. The site is of sufficient distance from natural waterways to avoid impacts (700 m), and it is expected that stormwater management will be conducted to avoid impacts to water quality, water bodies and hydrological processes.

- Wind turbine strikes on protected animals,

  The proposal does not involve wind turbines and therefore there will be no impact from wind turbine strikes.

- Vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community

  The proposal is unlikely to increase the chance of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community. Internal roads within the development footprint will have a low speed limit and therefore vehicle strikes will be very unlikely.

3. CONCLUSION

Travers bushfire & ecology has completed a biodiversity assessment report (BAR) for the purposes of a BDAR waiver request in relation to the State Significance Development (SSD) proposal within Lot 10 and 11, DP 271141, at 14 Distribution Drive, Orchard Hills within the Penrith City Council local government area (LGA).

In summary, this assessment has found:

- The site is highly disturbed and previously completely cleared (Figure 1)
- All vegetation present is derived and almost entirely comprised of exotic species
- The study area provides vegetated stormwater drains and a dam providing potential frog breeding habitat. Detailed assessment of Green and Golden Bell Frog provided in Appendix 3 and Appendix 4 (including a Test of Significance) concludes that the study area is not of any likely importance or use to Green and Golden Bell Frog and a viable local population is not likely present to warrant any further survey or assessment.

Based on this assessment, it is concluded that the proposal will not cause a significant impact on biodiversity values including threatened species. As such, a BDAR waiver request should be granted for the proposal.

Appendix 1. STAFF QUALIFICATIONS AND EXPERIENCE

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
George Plunkett (Botanist)	• Biodiversity Assessment Method (BAM) Assessor (Accredited Assessor no. BAAS19010) • PhD – Plant systematics, ecology and evolution • Bachelor of Science (Honours) – Ecology / Botany, University of New England (UNE), NSW • Four-wheel drive vehicle operation • Senior First Aid Certificate	George has 12 years of experience as a plant taxonomist, flora ecologist and botanist, including a PhD in plant systematics, ecology and evolution, and has a very well-developed understanding of the Australian flora.	• 2017-Current: Botanist, Travers bushfire & ecology • 2016-2017: Research Botanist, UNE • 2010-2011: Research Botanist, UNE • 2008-2009: Plant Ecologist, Ecotone Flora Fauna Consultants	• High-quality report writing • Application of the BAM and BOS • Highly experienced in botanical survey and ecological analysis • Plant identification and taxonomy • Flora and fauna assessment • Threatened species, ecological communities and endangered population surveys and analysis • Habitat tree analysis and assessment • Noxious weed identification • Tree assessment
Michael Sheather-Reid (Managing Director)	• Bachelor of Natural Resources (Hons), University of New England • BioBanking Assessor • Engineering Assistant – CAD Drafting • MUSIC Modelling – Stormwater quality and quantity modelling (RMIT) • Bush Regeneration II Certificate, Ryde TAFE • NSW WorkCover OHS Construction Induction • Chemical Handling Certificate, Ryde TAFE	Michael has a wealth of experience in environmental consulting and on ground management of bushland, wetland and riparian habitats having undertaken environmental assessment, ecological consultancy and restoration in both the private and public sectors for over 22 years.	• 2007- Current: Senior Ecologist, Travers bushfire & ecology • 2004 -2007: Senior Ecologist, Conacher Travers Pty Ltd • 2002-2004: Project Manager, Urban Bushland Management Projects Pty Ltd • 1999-2002: Project Manager Sustainable Vegetation Management Pty Ltd • 1995-1999: Managing Director Sheather-Reid & Associates Pty Ltd • 1996-1997: NSW Landcare Liaison Officer, Australian Conservation Foundation • 1992-1995: Environmental Officer, Dept. Land & Water Conservation • 1990-1992: Scientific Officer Dept. of Water Resources	• Ecological assessment • Rezoning studies • Biodiversity offset planning • Restoration management and coordination • Biotic and soil translocation • Watercourse assessment • Project ecologist services • *EPBC Act* referrals • Controlled Activity Approvals • Vegetation management plans
Sandy Cardow (GIS officer)	• Bachelor of Science (Biological Sciences) (Macquarie University)	Sandy has over twenty years of experience in Spatial Information (Geographic Information Systems (GIS)), which includes preparation of mapping in local government roles and has completed a Bachelor of Science (Biological Sciences).	• 2017 – Current: GIS Officer, Travers bushfire & ecology • 2014 – 2017: GIS Consultant, Forestry Corp. NSW • 2005 – 2011: GIS Analyst, Forests NSW • 2002 – 2005: GIS Data Librarian, Forests NSW • 2000 – 2002: GIS Operator, Forests NSW • 2000 – 2002: GIS Data Import / Export Officer, Forests NSW • 1999 2000: GIS Project Officer DECC • 1998 – 1999: GIS Support Officer DECC • 1998 – 1999: Wildlife Atlas Data Entry Officer DECC	• Geographic Information Systems • Data management and analysis • Spatial databases and database administration • GPS • Cartography • Natural resource management • Client liaison

Team member (role)	Accreditations and qualifications	Experience	Employment history	Skills and expertise
Corey Mead (Contract fauna ecologist)	• Southern Cross University – B. App. Sc. • BAM Accredited Assessor (BAAS.19050) • Accredited BioBanking Assessor (No.231) • Scientific License (SI102477) • Animal Ethics Permit (TRIM V20/32969) • Bionet Sensitive Species Data License (No. 1589) • Licence to Harm Protected Animals (MWL000103525) • Possum Catch & Release Licence (MWL000103525) • Reptile Catch & Release Licence (MWL000103525) • Tre climbing techniques (AHCARB312) • Chainsaw operation • NSW NPWS – Intro to ArcView GIS • First Aid Certificate (HLTAID003) • Class C vehicle, Boat & Divers Licences • OHS General Induction (CGI00761144SEQ1) • Risk Assessment Training (Taronga Zoo) • NSW RFS – Firefighters Certificate • Report Writing – Pollack Learning Alliance • Frog, Reptile & Bat Survey, ID & Mgt Training – NSW Forestry • Anabat Techniques Training – Titley Scientific – Smiths Lake • Cert III – Building & Carpentry (assist in construction of nest boxes)	Corey has developed extensive specialist knowledge over 20 years in fauna survey techniques, threatened species target surveys, data analysis and visual and call identification of vertebrate fauna within coastal habitats of NSW. Corey has also worked alongside a number of industry recognised frog specialists including Prof Michael Mahony, Ross Wellington and Frank Lemckert. Specific habitat & assessment work on GGBF: • Expert Report – Macarthur Gardens Campbelltown • Prepared GGBF profile for Gosford City Council • Target surveys – water pipeline North Avoca pop. • Target surveys – subdivision Greendale pop. • Target surveys – reference site Davistown pop. • Target surveys / assessment – rezoning Five Dock pop. • Habitat assessment – industrial development Southerland pop. • Target surveys / assessment – Industrial Development – Erskine Park • Target surveys / assessment – Residential Development – Hamlyn Terrace • Target surveys / assessment – Bridge Development – Botany • Target surveys / assessment – Residential subdivision – Prestons • Target surveys / BAM assessment – Residential subdivision – Mardi • Target surveys / assessment – Industrial subdivision – Riverstone	• Nov 20 – Present – Contract Fauna Ecologist (*TreeHouse Ecology*) • Oct 07 – Nov 20 – Senior Fauna Ecologist (*Travers Bushfire & Ecology*) • Jan 06 – Oct 07 – Field Tech / Fauna Ecologist (*Conacher Travers Environmental Consultants*) • Feb 03 – Jan 06 – Head Reptile Keeper (*Australian Reptile Park*) • Jan 03 – Sept 05 – Visitor Services Officer (*National Parks & Wildlife Service*) • Dec 02 – Jan 03 – Marine Turtle Project Officer (*National Park & Wildlife Service*) • Aug 00 – Feb 03 – Venom Room Attendant (*Australian Reptile Park*) • Nov 99 – Feb 00 – Waste Minimisation Education Officer (*Manly Council*) • Apr 97 – Sept 00 – Environmental Education Officer (*Australian Reptile Park*)	• BAM-C fauna data and credit assessment • Remote and independent terrestrial vertebrate surveys • Threatened fauna target surveys & assessment • Large hollow relocation methods • Microbat Call Identification & active monitoring • AnalookW, Anapocket, Insight & CFC Read bat analysis software • Kaleidoscope Pro song-meter clustering & classifier analysis • Advanced song classifiers for threatened owls, frogs & gliders • Owl breeding ecology • Squirrel Glider radio-tracking surveys • Project Ecologist during habitat clearance • Habitat tree assessment / audits • Advanced reptile captive management • Fire trail audits & bushfire risk analysis • Advanced venomous snake handling & training • Education/training program development • GPS data transfer and management

Appendix 2. Flora species list

Table 3 – Flora species recorded (Appendix 1)

Family	Scientific name	Common name
TREES		
Fabaceae	*Acacia falcata*	-
Fabaceae	*Acacia parramattensis*	Sydney Green Wattle
Fabaceae	*Acacia podalyriifolia*	Queensland Silver Wattle
Fabaceae	*Acacia saligna**	Orange Wattle
Fabaceae	*Genista linifolia**	Montpellier Broom
Fabaceae	*Genista stenopetala**	Madeira Broom
Solanaceae	*Lycium ferocissimum**	African Boxthorn
Solanaceae	*Solanum linnaeanum**	Apple of Sodom
Fabaceae	*Acacia falcata*	-
Fabaceae	*Acacia parramattensis*	Sydney Green Wattle
Fabaceae	*Acacia podalyriifolia**	Queensland Silver Wattle
Fabaceae	*Acacia saligna**	Orange Wattle
GROUNDCOVERS		
Polygonaceae	*Acetosella vulgaris**	Sheep Sorrel
Asteraceae	*Aster subulatus**	Wild Aster
Poaceae	*Cenchrus clandestinus**	Kikuyu, Kikuyu Grass
Poaceae	*Chloris gayana**	Rhodes Grass
Poaceae	*Chloris virgata**	Feathertop Rhodes Grass
Asteraceae	*Cirsium vulgare**	Spear Thistle
Asteraceae	*Conyza bonariensis**	Flax-leaf Fleabane
Poaceae	*Cynodon dactylon*	Common Couch
Cyperaceae	*Cyperus brevifolius**	Mullumbimby Couch
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Poaceae	*Eragrostis curvula**	African Lovegrass
Euphorbiaceae	*Euphorbia prostrata**	Red Caustic Weed
Asteraceae	*Hypochaeris radicata**	Flatweed
Juncaceae	*Juncus usitatus*	Common Rush
Fabaceae	*Medicago* sp.*	A Medic
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Paspalum urvillei**	Vasey Grass
Polygonaceae	*Persicaria decipiens*	Slender Knotweed
Plantaginaceae	*Plantago lanceolata**	Ribwort
Asteraceae	*Senecio madagascariensis**	Fireweed
Poaceae	*Setaria parviflora**	
Malvaceae	*Sida rhombifolia**	Common Sida
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle

Family	Scientific name	Common name
Fabaceae	*Trifolium repens**	White Clover
Verbenaceae	*Verbena bonariensis**	Purpletop
AQUATICS		
Amaranthaceae	*Alternanthera philoxeroides**	Alligator Weed
Marsileaceae	*Marsilea hirsuta*	Short-fruited Nardoo
Haloragaceae	*Myriophyllum aquaticum**	Brazilian Water Milfoil
Cyperaceae	*Schoenoplectus mucronatus*	River Clubrush
Typhaceae	*Typha orientalis*	Cumbungi
* denotes species not native to NSW		

It should be noted that not all garden, cultivar or landscape species have been identified as part of this assessment.

Appendix 3. GREEN AND GOLDEN BELL FROG POTENTIAL HABITAT AND IMPACT ASSESSMENT

BACKGROUND

The study area provides vegetated stormwater drains and a dam providing potential frog breeding habitat. The following habitat assessment, review of records and test of significance has been applied with consideration to the Green and Golden Bell Frog (GGBF). GGBF is listed as endangered under state legislation and is listed as vulnerable under national legislation.

The species was formerly distributed along the NSW coast from the north coast to Victoria Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range; however they are widely separated and isolated. Populations are located around the metropolitan areas of Sydney, many of these occurring in highly disturbed areas.

Optimum habitat for GGBF as described within the OEH species profile, includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. As this description suits the study area, a detailed habitat assessment has been undertaken to inform the Test of Significance.

HABITAT ASSESSMENT

A site habitat assessment was undertaken by Senior Fauna Ecologist Corey Mead on the 8th June 2021. Corey's skills and experience relevant to GGBF is provided in Appendix 1.

The habitat assessment included a review of independent potential breeding locations within the study area in accordance with habitat criteria outlined by *Pyke & White* (1996) as well as the Draft Recovery Plan for the Green and Golden Bell Frog (*DEC* 2005). Pyke & White (1996) found that, for a site to support a breeding population of GGBF, it should contain water bodies which are still, shallow, ephemeral, unpolluted, unshaded and free of Gambusia and other predatory fish. It should have a grassy area nearby and other nearby vegetation should be no higher than woodland. The substrate of the ponds should be sand or rock, aquatic plants should be present and there should be a range of possible diurnal shelter sites, including vegetation and rocks.

Habitat value was assessed on a field proforma to quantify presence of both breeding and shelter / foraging habitat characteristics. The proforma has been prepared so that the more "yes" answers noting presence of suitable habitat features, the higher consideration of quality habitat potential. Having said this, a single aspect such as poor water quality can eliminate all breeding potential. This proforma as well as a summary of breeding potential is provided in Appendix 4.

Within the study area three separate potential breeding locations were independently assessed. These are each depicted as containing "derived aquatic vegetation" from the flora survey as shown on Figure 3. These locations are:

- 1 – The northern stormwater drainage channel;

- 2 – The western surface drain; and
- 3 – The north-western small dam

The detailed habitat assessment is provided and summarised in Appendix 4. Fundamentally, the two drainages (locations 1 & 2) would provide the most suitable potential for breeding opportunity however both of these locations are not ideal and would only support any potential for breeding where a core area of breeding habitat is otherwise present in the locality.

Location 1 is not ideal as it would receive poor quality from periodic surface stormwater flows off surrounding industrial areas. This was evident by surface oils in some pools during the site visit. Furthermore, GGBF does not typically breed in areas of flowing water, so this drainage would only be utilised following prolonged rain to clean the system, which would then settle for a long non-flow period for tadpole development, without any further periodic flows or poor quality runoff.

Location 2 would provide the best water quality however this ditch is very shallow and would be expected to dry up quickly during the warmer breeding months.

Location 3 is too deep and contains no emergent aquatic vegetation for preferred shelter.

As a result, any potential for GGBF occurrence should be in consideration to potential for surrounding core breeding habitat and with consideration also to records.

LOCAL HABITAT POTENTIAL

A review of aerial photography prior to the site habitat assessment was undertaken to determine localised dams, wetlands and other potential suitable waterbodies that may support core breeding habitat.

The next closest potential breeding area is a constructed stormwater basin 300 m to the west on the other side of the current industrial complex. Nearmap images show this was constructed only in 2017 with no prior potential. A dam approximately 600 m west, also on the other side of the recently constructed industrial complex, is located within a highly managed rural paddock with little surrounding shelter opportunity. Nearmap analysis shows this dam also periodically dries up. A likely more suitable larger dam was located approximately 1 km south, but this has recently been removed for The Yards development complex.

There may be some peripheral breeding opportunity to South Creek to the west, but these would be beyond a distance that would contribute to the study area habitat.

LOCAL RECORDS

A search of records on *BioNet* (DPIE 2021) was undertaken to identify GGBF records located out to 10km. These are shown on Figure 7 below. There are no records within 5 km of the study area. The nearest GGBF records to the east, north-east and north are from 1966, 1973 and 1993 respectively. The most recent record is from 2019 at 10 km to the WSW at Luddenham. Therefore, although GGBF would have been expected to occur historically in the locality, there are no recent records to suggest a population persists in the nearby locality.

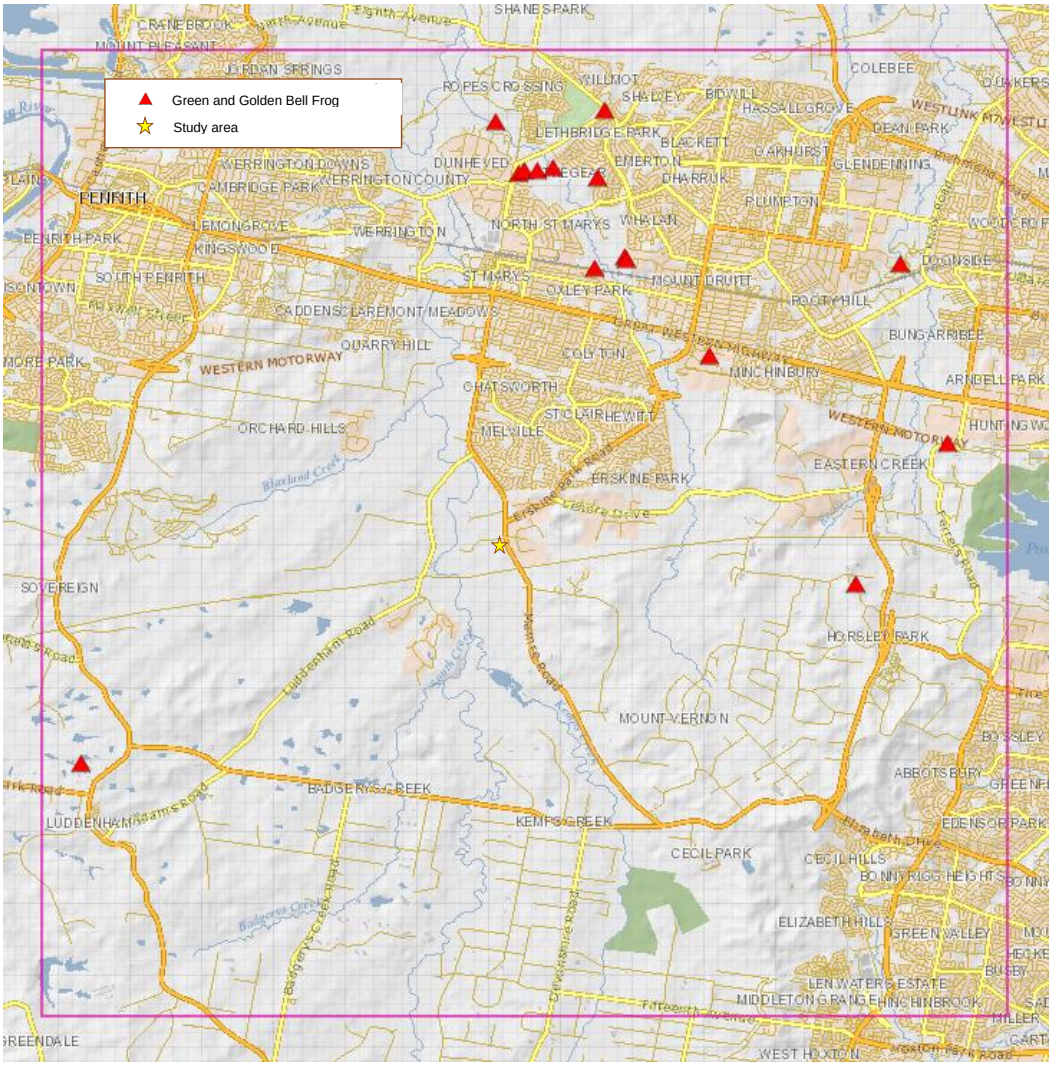

Figure 7 – BioNet records of GGBF within 10 km

BC ACT 2016 - SECTION 7.3 – TEST OF SIGNIFICANCE

Section 7.2 of the *BC Act* requires a determination as to whether a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Henceforth this is referred to as the 'test of significance'.

For the purposes of this part, development or an activity is likely to significantly affect threatened species if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in Section 7.3, or

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

(c) it is carried out in a declared area of outstanding biodiversity value.

The following test of significance has been applied specifically to the Green and Golden Bell Frog.

(d) **In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction**,

A detailed consideration to GGBF potential habitat within the study area, potential core breeding habitat in the nearby locality and local records has been provided above. From this it can be summarised that:

- The study area does not likely support GGBF breeding and shelter habitat in the absence of use of other localised habitat areas used for core breeding;
- The study area is now surrounded by recently constructed industrial development providing a barrier to the other potential breeding locations that remain.
- The other local breeding opportunities that do exist are not likely to support core habitat for a local population;
- There are no local or recent records to suggest that a population persists in the locality.

It is therefore concluded that the study area is not of any likely importance or use to Green and Golden Bell Frog and a viable local population is not likely present to warrant any further survey or assessment.

(a) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable to GGBF.

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable to GGBF.

(b) In relation to the habitat of threatened species or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The development footprint will remove the three areas containing derived aquatic vegetation totalling 0.17 ha as well as the very limited existing surrounding shelter opportunities.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No local population of GGBF is expected such that any further fragmentation of habitat would occur.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The proposed area of impact is not of high quality, of any likely breeding importance or central to the home range requirements of GGBF.

(c) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The development footprint is not within any declared area of outstanding biodiversity value. Therefore, the proposal will not have any adverse effects on any declared area of outstanding biodiversity value (either directly or indirectly).

(d) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A key threatening process is defined as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities.

The current list of key threatening processes, and whether the proposed activity is recognised as a potential threatening process to GGBF, is shown below.

Listed key threatening process consistent with threats identified to GGBF by the TBDC.	**Potential to impact on GGBF?**		
	Likely	Possible	Unlikely
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic Climate Change			✓
Clearing of native vegetation			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓

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Appendix 4. Habitat assessment proforma

Location / Area	BREEDING -Water-body Characteristics							SHELTER / FORAGING - close to water-body(s)					REFUGE
	Ephemeral and/or widely fluctuating waterbody present?	Still or slow flowing?	Shallow?	Un-polluted?	Sand or rock substrate?	Without heavy shade?	Free of Gambusia?	Grassy Areas?	Woodland or Lower with complex structure (preferred)	Clumps of aquatic Plants Present eg *Typha, Eleocharis, Juncus, Phragmites*	Terrestrial fringing or nearby tussock plants eg *Gahnia, Danthonia, Lomandra*	Other nearby shelters	Abundant shelter opportunities eg. rocks, logs, dense tussock forming veg, artificial refuse?
1. Northern Stormwater drainage channel	yes	Periodic flows	yes	no	no	yes	yes	yes	managed open grassland – no structure	yes: Typha	no: managed grasses	Very limited	no: not accessible to north
2. Western Surface Drain	yes: temporary	yes	yes	yes	no	yes	yes	yes	Managed open grassland – no structure	yes	no: managed grasses	no	no
3. North-west Dam	no	yes	no	yes	no	yes	yes: appears so	yes	Managed open grassland – no structure	Only fringing	Only fringing	no	no

Location / Area	Summary of Results (Breeding, over-wintering, diurnal roost close to breeding
1. Northern Stormwater drainage channel	Potential periodic breeding opportunity only as a satellite to core breeding elsewhere. Not suitable during follow up rainfall due to flows. Not suitable following single short rain due to obvious runoff pollutants. Shelters beyond the instream habitat are limited to absent.
2. Western Surface Drain	Potential periodic breeding opportunity only as a satellite to core breeding elsewhere. The shallow and open drain would likely only provide temporary inundation after summer rains, therefore only sufficient time for tadpole development if follow up rains occurs. Shelters beyond the instream habitat are absent.
3. North-west Dam	Low potential periodic breeding opportunity only as a satellite to core breeding elsewhere. Water is deep and aquatic plants are absent within the waterbody itself, only fringing. Shelters beyond the instream habitat are limited to absent.