North Ryde Station Precinct, M2 Site, State Significant Development, Ecological Impact Assessment

Prepared for
NPC on behalf of UrbanGrowth NSW

29 October 2014

DOCUMENT TRACKING

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Abbreviations

ABBREVIATION	DESCRIPTION
CA	Controlled Activity
CBD	Central Business District
CEMP	Construction Environmental Management Plan
DECCW	Former Commonwealth Department of Environment, Climate Change and Water
DEWHA	Former Commonwealth Department of Environment, Water, Heritage and the Arts
DP	Deposited Plan
DCP	Development Control Plan
DGEARs	Director General Environmental Assessment Requirements
DotE	Commonwealth Department of the Environment
DP&I	Former NSW Department of Planning and Infrastructure
DSEWPAC	Former Commonwealth Department of Sustainability, Environment, Water, Populations and Communities
EECs	Endangered Ecological Communities
EIA	Ecological Impact Assessment
ELA	Eco Logical Australia
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EP&A Regulation	NSW *Environmental Planning and Assessment Regulation 2000*
ESD	Ecologically sustainable development
h	Hour
ha	Hectare
IWCMP	Integrated Water Cycle Management Plan
km	Kilometres
KTP	Key Threatening Process
LGA	Local Government Area
LEP	Local Environmental Plan

ABBREVIATION	DESCRIPTION
M2	M2 Motorway
m	Metres
mm	Millimetres
MNES	Matters of National Environmental Significance
MPC	Macquarie Park Corridor
NPWS	National Parks and Wildlife Service
NRSP	North Ryde Station Precinct
NSW	New South Wales
NoW	NSW Office of Water
NW Act	NSW *Noxious Weeds Act 1993*
OEH	Office of Environment and Heritage
P&I	NSW Planning and Infrastructure
POEO Act	NSW *Protection of the Environment Operations Act 1997*
PSO	Planning Scheme Ordinance
RMS	Roads and Maritime Services
SMCMA	Sydney Metro Catchment Management Authority
SRD SEPP	NSW *State Environmental Planning Policy (State and Regional Development) 2011*
SRW	Sandstone Ridgetop Woodland
SSD	State Significant Development
SSDA	State Significant Development Application
STIF	Sydney Turpentine-Ironbark Forest
TfNSW	Transport for New South Wales
TSC Act	NSW *Threatened Species Conservation Act 1995*
UGNSW	Urban Growth New South Wales
VMP	Vegetation Management Plan
WM Act	*Water Management Act 2000*
WSUD	Water Sensitive Urban Design
ZCAIM	Zero-Crossings Analysis Interface Module (Bat research hardware)
^{o}C	Degrees Celsius
%	Percentage

1 Introduction

1.1 OVERVIEW OF PLANNING CONTEXT

The North Ryde Station Precinct (NRSP) is located northwest of Sydney CBD and was rezoned in July 2013 to facilitate high density residential development and mixed uses. The site is located within the North Ryde Station Urban Activation Precinct which was initiated by the NSW Planning & Infrastructure (P&I) and Transport for NSW (TfNSW).

Based on the Indicative Layout Plan for the NRSP, a State Significant Development Application (SSDA) was prepared on behalf of Transport for NSW in 2012 / 2013 for superlot subdivision and early enabling works on the NRSP lands, including but not limited to the M2 Site:

- M2 Site (owned by TfNSW)
- Station Site North (owned by TfNSW)
- Station Site South (owned by Goodman)
- OSL Site (owned by Office of Strategic Lands)
- RMS Site (owned by Roads and Maritime Services (RMS).

As part of this SSDA, Eco Logical Australia (ELA) prepared an Ecological Impact Assessment (EIA) for the whole NRSP (ELA, 2012); however the SSDA application was not lodged by TfNSW.

The North Ryde Station Precinct Development Control Plan (NRSP DCP) was adopted in December 2013.

The majority of the NRSP in now under the ownership of UrbanGrowth NSW (UGNSW). UGNSW now intends to lodge an SSDA for the M2 Site only. This will reflect a modified M2 Site Masterplan and requires associated amendments to the NRSP DCP.

The SSDA will focus on the M2 site only rather than the wider NRSP. A separate application has previously been submitted for enabling works on the Station Site North and is not the subject of these proposed works on the M2 Site. ELA has reviewed their 2013 EIA to assess only the impacts that relate to the M2 site, herein the study area. The EIA has included proposed works on a new high pressure pipeline to be installed within the 'Public Reserve' off Wicks Road (referred in this report as 'Northern Bushland Park'). Jemena propose to relocate an existing gas pipeline which traverses the study area and install a new pipeline along the outer edge of the Northern Bushland Park. The EIA has been amended to include the new impacts associated with the pipeline in the Northern Bushland Park.

1.2 STUDY AREA

The study area, also referred to as the 'M2 site' is located within the NRSP, being land bound by Wicks Road, Epping Road, Delhi Road and the M2 Motorway at North Ryde (**Figure 1**). The study area is legally described as Lot 101 DP 113 1776 and has a total site area of 91,530 m^2 (**Figure 2**). An area of approximately 528 m^2 on Lot 2 DP 528 488 has been added to the study area. This land is located in the southwest corner of the study area, and has been considered in this assessment as it is proposed to adjust the boundary site for a deceleration lane off Epping Road.

Bundara Reserve is located to the south of the M2 Site on the opposite side of Epping Road. Bundara Reserve has been included in the study area to account for potential direct and indirect impacts. The 'RMS Site' is part of the study area is comprises Lot 11 DP 1017829, Lot E DP 28507 Lot 11 DP 27851 and Lot 12 DP 27851. It is approximately 0.29 ha in total. The study area is situated within the City of Ryde (Council) Local Government Area (LGA), and is located at the southern end of the Macquarie Park Corridor (MPC). There is an underground train line passing below the study area between Macquarie Park Station and Delhi Road Station.

Porters Creek is located in the north of the study area in the area marked 'Public Reserve' in **Figure 2**, draining east along Wicks Road toward the Porters Creek catchment area and Lane Cover River to the north. This area is referred to as the 'Northern Bushland Park' within the NRSP DCP.

The Porters Creek Catchment Area, Lane Cove National Park and Bundara Reserve are addressed for indirect impacts from the proposal within this report.

1.3 THE PROPOSED DEVELOPMENT

Staged development is sought for:

Concept Proposal

- Subdivision of the site into 13 development lots, 4 public open space lots and 2 public road lots.
- Allocation of maximum gross floor area on the development lots of 238,919sqm with the buildings to be the subject of the subsequent detailed applications for consent
- Allocation of maximum GFA of 2500sqm for a community facility on public open space Lot 103 with the building to be the subject of a subsequent detailed application for consent.

Stage 1 Works (Section 83B(3)(b) Works)

- Site preparation works including:
  - Demolition and site clearing and vegetation removal.
  - Remediation works.
  - Bulk earthworks and grading.
  - Protection of exposed soils following earthworks via seeding / planting.
- Works associated with roads and intersections:
  - Signalised intersection of Waterloo Road and Wicks Road including pedestrian crossing.
  - Extension of Waterloo Road through the M2 Site to Epping Road to create a Spine Road.
  - A left-in intersection for the M2 Site on Epping Road.
- Construction and upgrade to pedestrian pathway and cycleway networks, including:
  - Pedestrian/cycle bridge across Delhi Road to the North Ryde Station. The colour of the bridge is to be resolved during detailed design.

  - Shared ways for pedestrian and cycleway connectivity along the Spine Road and around the central open space from Wicks Road to the pedestrian/cycle bridge.

- Establishment of the following areas of open space on the Public Land open space lots:
  - Northern Bushland Park.
  - Community Linear Park.
  - Central public open space.
  - Plaza space.
- The enabling works for the subsequent construction of a community facility building.
- Drainage and Water Sensitive Urban Design (WSUD) works, including:
  - Stormwater drainage and water quality infrastructure.
  - Porters Creek culvert.
  - Rehabilitation of riparian zone along the Porters Creek within the Northern Bushland Park.
- Public domain works, including:
  - Civil works, trenching in road corridors with provision of utility infrastructure for electricity, gas, potable water, sewer and telecommunications.
  - Open space embellishment.
  - Street planting and installation of furniture.
  - Street lighting along all new roads.
  - Public art installation.
- Location of signage on the pedestrian bridge on the Public Land

The project also includes the following associated works:

- Delhi Road footpath connection and landscape works to the site frontage.
- Epping Road footpath upgrade and landscape works to the site frontage.
- Wicks Road footpath upgrade and landscape works to the site frontage, intersection upgrade and stormwater and drainage augmentation works at the Wicks/Waterloo road intersection.
- Water main from the M2 Site, under Epping Road and along Ryrie Street to connect to Cox's Road.
- Sewer main from the Wicks and Waterloo Roads intersection along Wicks Road.
- An electricity feeder main from Macquarie Park substation along Waterloo Road into the M2 Site.
- Electricity feeder main/s from Top Ryde substation along a number of local roads into the M2 Site.

The proposed allotment subdivision plan is shown in **Figure 2**.

Works within the Northern Bushland Park:

The proposed works within the Northern Bushland Park will involve the removal of the existing gas pipeline and the installation of the new pipeline at an alternate location. The new pipeline will involve an impact area of approximately 5 m wide and up to 150 m long. The impact area includes sufficient space to install a 150 mm diameter pipe and stockpiling of equipment and soils. Sections of the pipe will be laid within a trench at a depth between 1 to 2 m. The proposed pipeline alignment will trench across an existing watercourse and rock outcrop. These areas will involve rock breaking and concrete infill after completion of the works. A Vegetation Management Plan (VMP) will be implemented within the Northern Bushland Park following the completion of the works.

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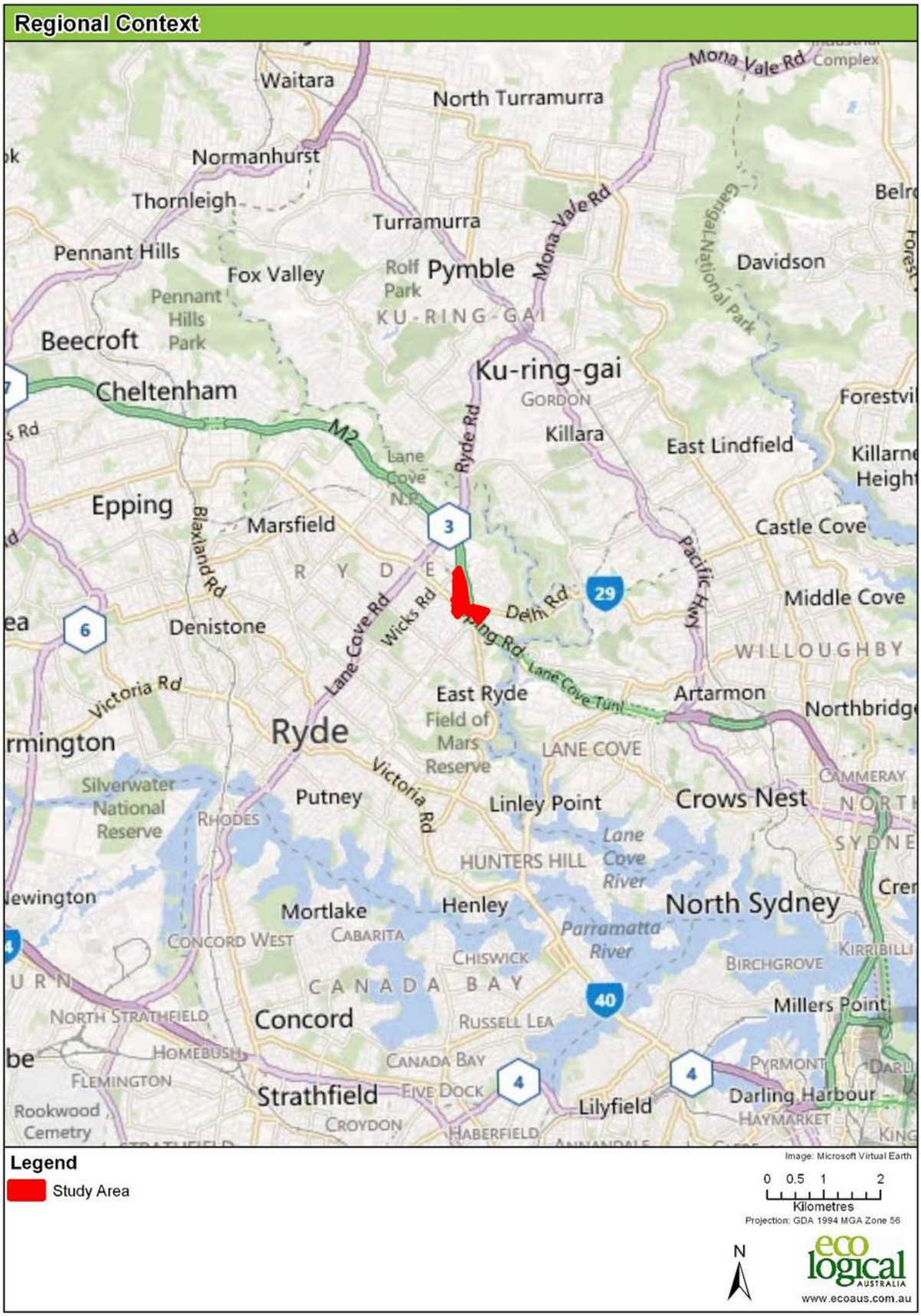

Figure 1: Location of the study area in the regional context

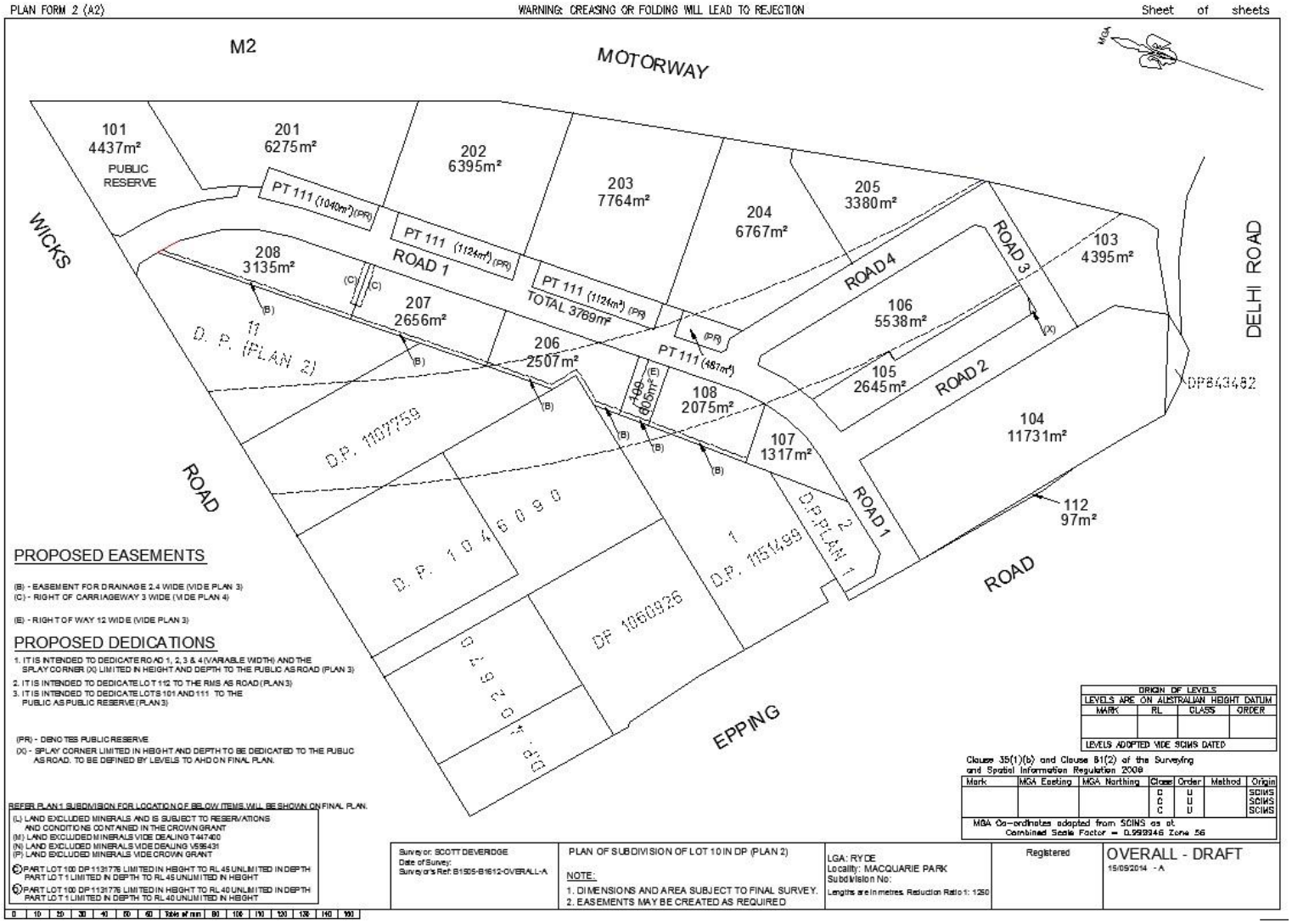

Figure 2: Allotment Subdivision Plan for the M2 Site (figure provided by NCP)

2 Legislation

2.1 COMMONWEALTH LEGISLATION

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The primary objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to 'provide for the protection of the environment, especially those aspects of the environment that are Matters of National Environmental Significance.'

Environmental approvals under the EPBC Act are required for an 'action' that is likely to have a significant impact on Matters of National Environmental Significance (known as 'MNES') including:

- World Heritage Areas
- National Heritage Places
- Ramsar wetlands of international importance
- Nationally listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- Nuclear actions
- Great Barrier Reef Marine Park.

In addition, the EPBC Act confers jurisdiction over actions that have a significant impact on the environment:

- Where the actions affect, or are taken on, Commonwealth land; and
- Are carried out by a Commonwealth agency (even if that significant impact is not on one of the eight matters of 'national environmental significance').

An 'action' is considered to include a proposal, development, undertaking, activity or series of activities.

MNES relevant to the study area are nationally listed threatened species and ecological communities and listed migratory species. Matters of NES that were recorded or have the potential to be present or use the study area are listed in **Appendix A** and are assessed in **Appendix F**. Actions considered as likely to have a significant impact on MNES, as defined in the *EPBC Act Policy Statement 1.1 – Significant Impact Guidelines* (DEWHA 2009), require the preparation and submission of a referral.

2.2 STATE LEGISLATION AND PLANNING POLICIES

2.2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW. The Act establishes a framework for plan making and development assessment. The proposal is being assessed as 'State Significant Development' (SSD) under Part 4, Division 4.1 of the EP&A Act, through declaration of the North Ryde Station Precinct (NRSP) under the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) State Significant Development – Identified Sites.

2.2.2 Environmental Planning and Assessment Regulation 2000

The Director General's Environmental Assessment Requirements (DGEARs) issued for the M2 site on 19 February 2014 by NSW Planning and Environment (P&E) require an Environmental Impact Statement (EIS) to be prepared in accordance with Schedule 2 of the NSW *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

Schedule 2 provides a detailed description of EIS information requirements, including requirements for description of the environment likely to be affected by the development and measures proposed to mitigate any adverse effects of the development (Clause 7, Schedule 2). The principles of ecologically sustainable development (ESD), *precautionary principle, inter-generational equity, conservation of biological diversity and ecological integrity* and *improved valuation, pricing and incentive mechanisms* are outlined in Clause 7(4) of Schedule 2 and are considered in this assessment.

In addition, the DGEARs require the following assessment to be made in relation to biodiversity:

- *"Provide a biodiversity assessment of any potential impacts on Bundara Reserve, with particular regard to its Sydney Turpentine Ironbark Forest vegetation community which is listed as critically endangered under the Environmental Protection and Biodiversity Conservation Act 1999 and endangered under the Threatened Species Conservation Act 1995.*
- *Provide a biodiversity assessment of any potential impacts on the Lane Cove River National Park particularly those areas within the Porters Creek catchment downstream of the site.*
- *Biodiversity assessments should be prepared in accordance with the Guidelines for developments adjoining land and water managed by the Department of Environment Climate Change and Water (June 2010), if relevant".*

2.2.3 State Environmental Planning Policy (State and Regional Development) 2011

The M2 site is located within the NRSP, which is listed as State Significant Development – Identified Site (SSD) under Section 12 of Schedule 2 of the SRD SEPP, provided it is for the following purposes:

- *"(a) a principal subdivision establishing major lots or public domain areas, or*
- *(b) the creation of new roadways and associated works"*.

2.2.4 Water Management Act 2000

Controlled activities are proposed within 40 m of Porters Creek on waterfront land, these activities are associated within the clearing of vegetation, revegetation and open space passive recreation walkways. Under Section 89J(g) of the EP&A Act, a controlled activity approval under Section 91 of the *Water Management Act 2000* (WMA Act) for these activities does not require authorisation from the NSW Office of Water (NoW), as the proposal is being assessed as SSD.

2.2.5 Threatened Species Conservation Act 1995

The NSW *Threatened Species Conservation Act 1995* (TSC Act) aims to protect and encourage the recovery of threatened species, populations and ecological communities listed under the Act. Generally, the interactions between the TSC Act and the EP&A Act require consideration of whether a development (Part 4 of the EP&A Act), or an activity (Part 5 of the EP&A Act), is likely to significantly affect threatened species, populations, ecological communities or their habitats. **Appendix A** details the threatened species, populations and ecological communities relevant to this assessment.

2.2.6 Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* (NW Act) defines the roles of government, councils, private landholders and public authorities in the management of noxious weeds. The Act sets up categorisation and control actions for the various noxious weeds, according to their potential to cause harm to our local environment.

Under this Act, noxious weeds have been identified for LGAs and assigned Control Categories (e.g. 1, 2, 3, 4 and 5). Part 3 provides that occupiers of land (this includes owners of land) have responsibility for controlling noxious weeds on the land they occupy.

2.3 LOCAL PLANNING INSTRUMENTS

2.3.1 Ryde Local Environmental Plan 2010

The *Ryde Local Environmental Plan 2010* (RLEP 2010) makes local environmental planning provisions for land in Ryde. It creates a broad framework of controls for the future development of all land in the City of Ryde including the study area which is zoned B4 Mixed Use, RE1 Public Recreation and R4 High Density Residential.

Clause 6.9 of the RLEP 2010 states that development consent must not be granted to development within the North Ryde Station Precinct unless a Development Control Plan has been prepared.

2.3.2 North Ryde Station Precinct Development Control Plan 2013

The *North Ryde Station Precinct Development Control Plan 2013* (NRSP DCP) has been prepared pursuant to Section 74C of the EP&A Act. The draft Subdivision Plan proposed in this SSDA remains generally consistent with the Vision for the NRSP:

> *"The vision for the Precinct is for a "Transit Oriented Development" which has direct access to North Ryde Station on the Epping to Chatswood Rail Link, and which is connected, accessible, permeable and has a high base population density. The Precinct's development will encourage greater activity around the railway station through the inclusion of suitable land uses to encourage greater use of the public transport network".*

One of the key principles for the study area is creating the opportunity to rehabilitate the riparian corridor adjacent to Porters Creek. Guidelines are established in Section 8.6 of NRSP DCP for the preparation of a Vegetation Management Plan for this rehabilitation of this area. Section 8.6.4 states:

> *"The VMP is to be prepared in accordance with relevant guidelines and based on standard vegetation management actions including:*
>
> *a. Collection of seed from any native vegetation proposed to be cleared at the site;*
>
> *b. Weed control;*
>
> *c. Management of fire for conservation;*
>
> *d. Management of human disturbance;*
>
> *e. Retention of regrowth and remnant native vegetation;*
>
> *f. Replanting or supplementary planting where natural regeneration will not be sufficient;*
>
> *g. Retention of dead timber;*

h. Erosion control; and

i. Retention of rocks.

The VMP is to ensure the rehabilitation and regeneration of the Porters Creek vegetated riparian corridor (being 30 metres wide on either side of the creek measured from top of bank), taking into account Council's priority creek rehabilitation works.

The VMP is to provide for a minimum 2 year monitoring and maintenance period for the rehabilitated riparian area and other revegetation following final planting.

A 30m buffer is to be provided from the top of the nearest bank of Porters Creek to any future development."

2.4 GUIDELINES

To assess impacts on threatened species, this report uses *Guidelines for Threatened Species Assessment* (DEC & DPI 2005). An assessment of the potential impacts of the proposal has been made (**Appendix E**). Key thresholds, under these guidelines include:

- *Whether or not the proposal, including actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts will maintain and improve biodiversity values*
- *Whether or not the proposal is likely to reduce the long-term viability of a local population of the species, population or ecological community*
- *Whether or not the proposal is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction*
- *Whether or not the proposal will adversely affect critical habitat.*

3 Methods

3.1 DATA AND LITERATURE REVIEW

3.1.1 Data reviewed

A number of key datasets, mapping, and mapping interpretation guidelines were reviewed to determine ecological values and constraints within the study area. These included:

- NPWS Wildlife Database (Atlas of NSW Wildlife) (OEH 2014). 10 km radius search area (accessed 9 April 2014)
- EPBC Act Protected Matters Search Tool (DotE 2014). 10 km radius search area (accessed 9 April 2014).
- Sydney Metro CMA (SMCMA) Native Vegetation Mapping (DECC 2009a).
- Sydney Metro CMA Vegetation Community Profiles (DECC 2009b).
- NPWS Vegetation of the Cumberland Plain – Vegetation & Core Habitat Mapping (NSW NPWS 2002a).
- *Native Vegetation Interpretation Guidelines for Western Sydney Vegetation* (NSW NPWS 2002b)
- Department of Primary Industries (2014) Online search for noxious weeds in Ryde City Council (Accessed 10 April 2014).

High resolution aerial photographs of the study area were also used to investigate the extent of vegetation cover and landscape features in the area.

3.1.2 Previous studies on the site

A number of flora and fauna surveys conducted in the study area were reviewed for records of threatened vegetation communities and flora and fauna species occurring within the study area. These flora and fauna assessments and surveys are listed below:

- *Ecological Assessment for SSDA, North Ryde Station Precinct.* Prepared for Transport for NSW. (Eco Logical Australia 2012)
- *Monitoring Survey for Red-crowned Toadlet, M2 site* (Biosphere Environmental Consultants 2006a)
- *Flora and Fauna Survey near corner of Wicks Road and Epping Roads, Macquarie Park* (Ambrose Ecological Services 2007)
- *Assessment of the Ecological values of TIDC's M2 and Bundara Reserve Sites* (ELA 2008)
- *Assessment of the weed management area and Red-crowned Toadlet habitat along the M2 site boundary, North Ryde* (ELA 2009)
- *Ryde Flora and Fauna Study 2008 (Biosphere Consultants).*

3.2 ASSESSMENT OF SPECIES, POPULATIONS AND COMMUNITIES LIKELY TO OCCUR IN THE STUDY AREA

Threatened and migratory species from key datasets and literature reviewed were combined to produce a list of threatened and migratory species that may possibly occur within the study area ("subject species") which can be found in **Appendix A**. Likelihood of occurrences for threatened species, populations and communities in the study area were then made based on location of database records, the likely presence or absence of suitable habitat in the study area, and knowledge of the species' ecology, to limit the list of threatened species to potentially "affected species" (those that were defined as "yes", "likely" or having "potential" to occur in the study area per the terms described in **Appendix A.**

3.3 FIELD SURVEY

Field data collected during the whole of NRSP field survey in 2011 remains adequate. This report has been updated to describe only the field survey information relevant to the current study area.

The 2011 field survey occurred over two periods. The first field survey focussed on validating vegetation communities and recording flora species present, with an assessment for fauna habitat also conducted. It was conducted by two ELA ecologists, Bruce Mullins (Scientific Licence SL 100243) and Danielle Bennett, on the 27 July 2011 over approximately 16 person hours. The second field survey targeted nocturnal fauna species (threatened microbat species, frogs, and nocturnal birds) within parts of the study area identified during the first survey period as likely to support such fauna. It was conducted by two ELA ecologists, Dr Enhua Lee and Danielle Bennett, on 5 and 6 October 2011 over approximately 16 person hours. Only a portion of this survey effort was within the study area, the remaining time was spent within the other NRSP sites (as listed in **Section 1.1**).

During the first survey period, traverses of the study area were undertaken, with survey effort focussing on areas where remnant vegetation and potential fauna habitat were present, to collect site-specific data pertaining to the vegetation communities and habitat values for threatened flora and fauna potentially occurring in the study area (see **Appendix A** for list of potentially occurring species, populations and communities). All visible vascular flora, fauna species and traces / evidence of fauna species, were recorded. Flora species were identified to the lowest taxonomic level possible. Hollow-bearing trees were recorded and two Biobanking plots were undertaken in the study area to assist in determining offset requirements for the potential removal of vegetation (**Figure 3**).

During the second survey period, one echolocation recorder equipped with zero crossings analysis interface module (ZCAIM) devices was set at the northern end of the M2 Site (**Figure 3**). The recorder was used for two nights with time-delayed recording from around dusk and left to record overnight. Echolocation data were sent to Anna Lloyd (independent bat call analysis expert) for analysis. Analysis assigned bat calls to four levels of confidence as per Mills *et al.* (1996): definite, probable, possible, and unknown. Definite calls were calls of bat species that were not in doubt, probable calls those calls of bat species with a low probability of confusion with species of similar calls, possible calls were calls of bat species with a medium to high probability of confusion with species of similar calls, and unknown calls were calls of bat species which could not be identified to even a species group.

Stag watching was also undertaken during the second survey period within the study area for one night (6 October), totalling 0.67 person hours. Further, spotlighting and frog call detection were conducted over two nights during the second survey period totalling 3.5 person hours within the study area for the survey period (**Figure 3**).

Temperatures were cool during the field survey with some rain experienced leading up to the second survey in October and some rain falling during the survey on the 6 October (although the station at Riverview Observatory in Lane Cove did not register any rain on this date; **Table 1** and BOM 2011). **Table 1** shows the weather conditions during and leading up to the survey periods.

Additional field surveys were undertaken on 24 April and 28 August 2014. The April survey was conducted within the area of Lot 2 DP 528488 proposed for the Epping Road left-turn deceleration lane and Spine Road road reserve to validate the vegetation community and record flora species present, with an assessment for fauna habitat also conducted. The temperature was warm (11.3 ^{o}C at 9 am), with no rain. No further field survey of this heavily disturbed site is required.

The field survey conducted in August included an assessment of both terrestrial and aquatic habitats within the Northern Bushland Park off Wicks Road (**Figure 2**). The survey included a general traverse within the impact area and a description of the potential impacts on terrestrial and aquatic environments associated with the proposed works. Potential fauna habitat (i.e. hollow-bearing trees and culverts) were recorded using a hand-held GPS unit. It should be noted that field surveys were conducted during overcast weather conditions. As such, inaccuracies of up to +/- 15 m were noted during GPS recording. Field work was undertaken during light rainfall; although periods of moderate rainfall occurred prior and following the site inspection. Overall, 14.6 mm was recorded on 28 August (**Table 1**).

Aquatic assessment was conducted from desktop review and supplemented by field assessment conducted by the terrestrial ecologists. A review of relevant guidelines and policies included:

- *Guidelines for laying pipes and cables in watercourses on waterfront land* (NSW Office of Water – NOW). This project is considered to be a State Significant Development (SSD) under Part 4 of the *Environmental Planning & Assessment Act 1979*, and is therefore exempt from obtaining a Controlled Activity Approval under the *Water Management (WM) Act 2000*. However, the development application will likely be referred to the NOW's Stakeholder Liaison Unit for assessment and input into NOW's requirements in accordance with the WM Act principles and objectives and guidelines for riparian corridors on waterfront land.
- *Key Fish Habitat mapping* (NSW Fisheries) to determine necessary permits and potential impacts to aquatic habitats that are important to the sustainability of the recreational/commercial fishing industries, the maintenance of fish populations and the survival and recovery of threatened aquatic species. SSDs are not exempt from the NSW *Fisheries Management Act 1994* (FM Act) if located on known Key Fish Habitat, including dredging and reclamation works (e.g. excavation into bed or banks), and temporary or permanently obstructing fish passage.
- Database review for aquatic species listed as threatened species or populations under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), NSW *Threatened Species Conservation Act 1995* (TSC Act) and FM Act.

Table 1: Weather observations during the two days leading up to field survey and during field survey

DATE	MINIMUM TEMPERATURE (°C)	MAXIMUM TEMPERATURE (°C)	WIND SPEED AT 9AM (km/h)	RAIN (mm)
25/06/11	6.1	18.6	Calm	0
26/06/11	5.1	17.8	Calm	0

27/06/11	6.9	16	Calm	0
3/10/11	9.2	17.2	Calm	13.5
4/10/11	9.4	18.1	Calm	0
5/10/11	8.1	19.3	Calm	0
6/10/11	11.7	18.2	Calm	0 (note 4.4mm of rainfall was recorded on the 7 October.
24/04/2014	11.4	N/A*	Calm	0
28/08/2014	10.5	18.0	2	14.6

* Note that BOM data for Lane Cove (station number 066131) did not record maximum temperature for this day.

Figure 3: Survey tracks and effort

4 Results

4.1 DATABASE AND LITERATURE REVIEW

4.1.1 Data review

A total of 45 threatened flora, 8 fungi and 72 threatened fauna species have been previously recorded within a 10 km radius of the study area, noting that the Lane Cove National Park is approximately 1 km away. Of the fauna species identified, 10 were mammals (including six micro-chiropteran bats), 34 were diurnal birds, three were nocturnal birds, 15 were migratory birds, five were amphibians, two were reptiles, and three were fish. A detailed table of the database and literature search results can be found in **Appendix A**. The locations of threatened flora and fauna species within 5 km of the study area are shown in **Figure 4** and **Figure 5** respectively.

Due to the different vegetation classifications of available vegetation community mapping, the number of vegetation communities mapped for the study area differed: two vegetation communities, Sandstone Ridgetop Woodland (SRW) and Turpentine-Ironbark Margin Forest (TIMF), were mapped by NPWS (2002a), while four communities, Coastal Sandstone Sheltered Peppermint-Apple Forest (CSSPAF), Sydney-Turpentine Ironbark Forest (STIF), Weeds and Exotics, and Urban Exotic/Native, were mapped in the SMCMA mapping (DECC 2009a) and three communities, Coastal Shale-Sandstone Forest, Urban Native and Exotic Cover and Weeds and Exotics were mapped in the SMCMA mapping (OEH 2013) (**Figure 6**).

Turpentine-Ironbark Margin Forest as mapped by NPWS (2002a) and Sydney-Turpentine Ironbark Forest as mapped by DECC and OEH (2009a, 2013) are equivalent to the Critically Endangered Ecological Community (CEEC), Sydney Turpentine Ironbark Forest (STIF; also known as Turpentine-Ironbark Forest in the Sydney Basin Bioregion), listed under both the TSC Act and EPBC Act. Under the EPBC Act, patches must be greater than 1 ha to meet the definition under the EPBC Act.

4.1.2 Literature review

Review of relevant literature found that the threatened frog species, *Pseudophryne australis* (Red-crowned Toadlet), was recorded by both Biosphere Environmental Consultants (2006a) and ELA (2009) on land adjoining the study area, with three individuals recorded by Biosphere Environmental Consultants and at least three individuals (calling males) recorded by ELA. ELA (2009) determined that the habitat present at the site was poor and unlikely to provide long term habitat for the species. No other threatened species were recorded during past flora and fauna surveys conducted in the study area.

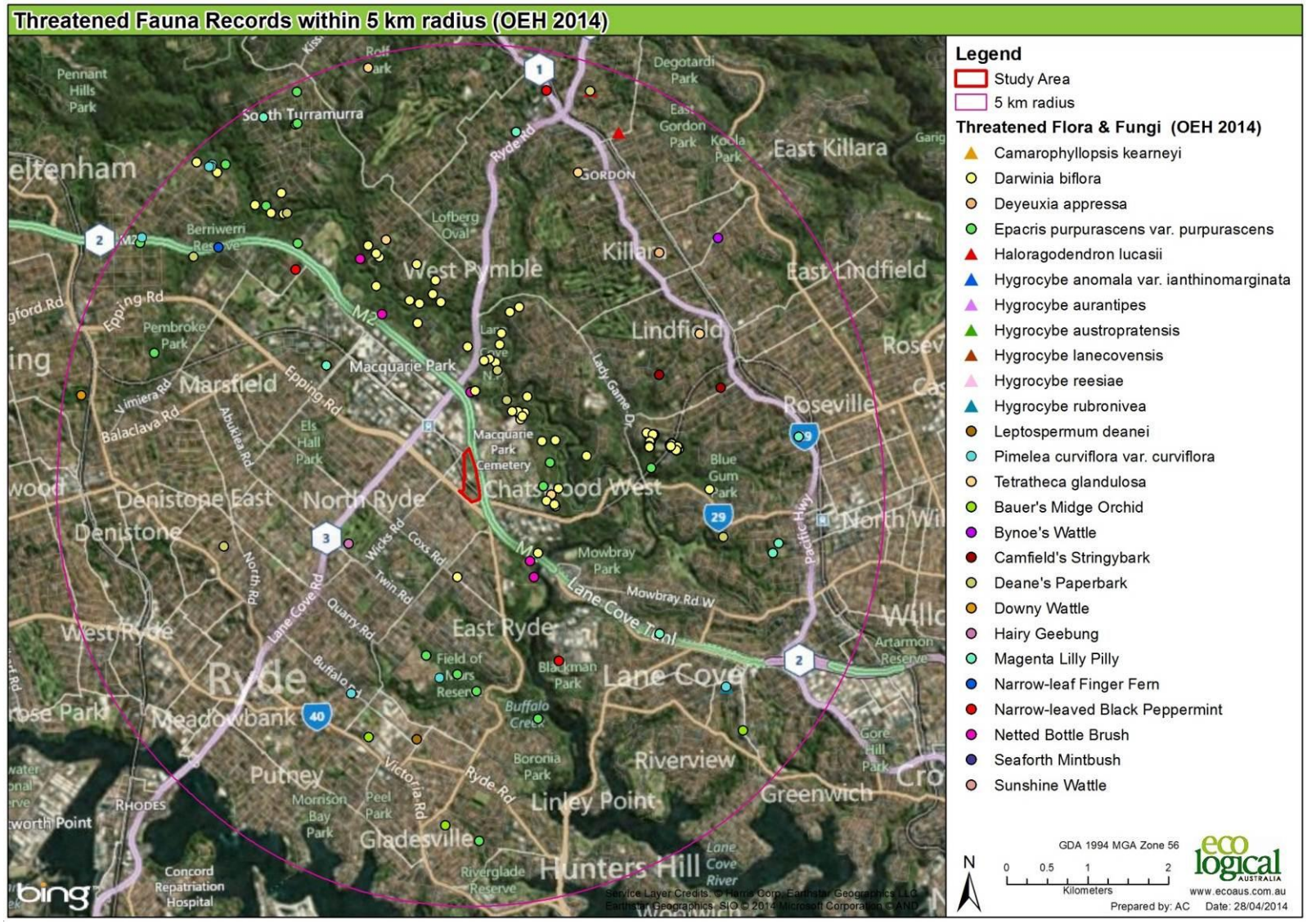

Figure 4: Locations of threatened flora species within 5 km of the study area

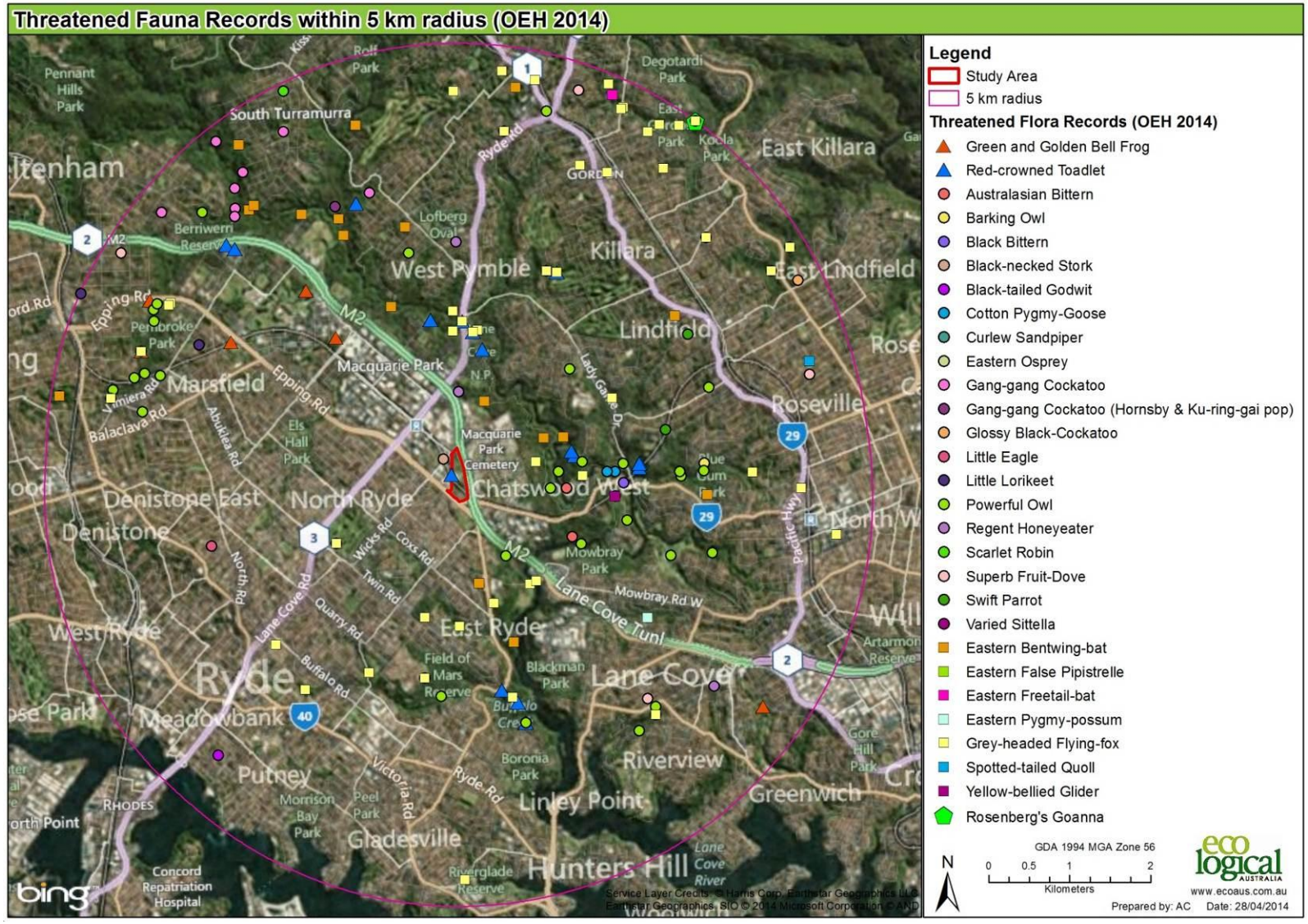

Figure 5: Locations of threatened fauna species within 5 km of the study area

4.2 VEGETATION COMMUNITIES

Field surveys identified and validated two vegetation communities in the study area:

- Sandstone Ridgetop Woodland (SRW)
- Weeds and Exotics
- Sydney Turpentine Ironbark Forest (STIF).

Figure 7 shows the locations of the vegetation communities in the study area. Descriptions of the vegetation communities are provided in the following sections.