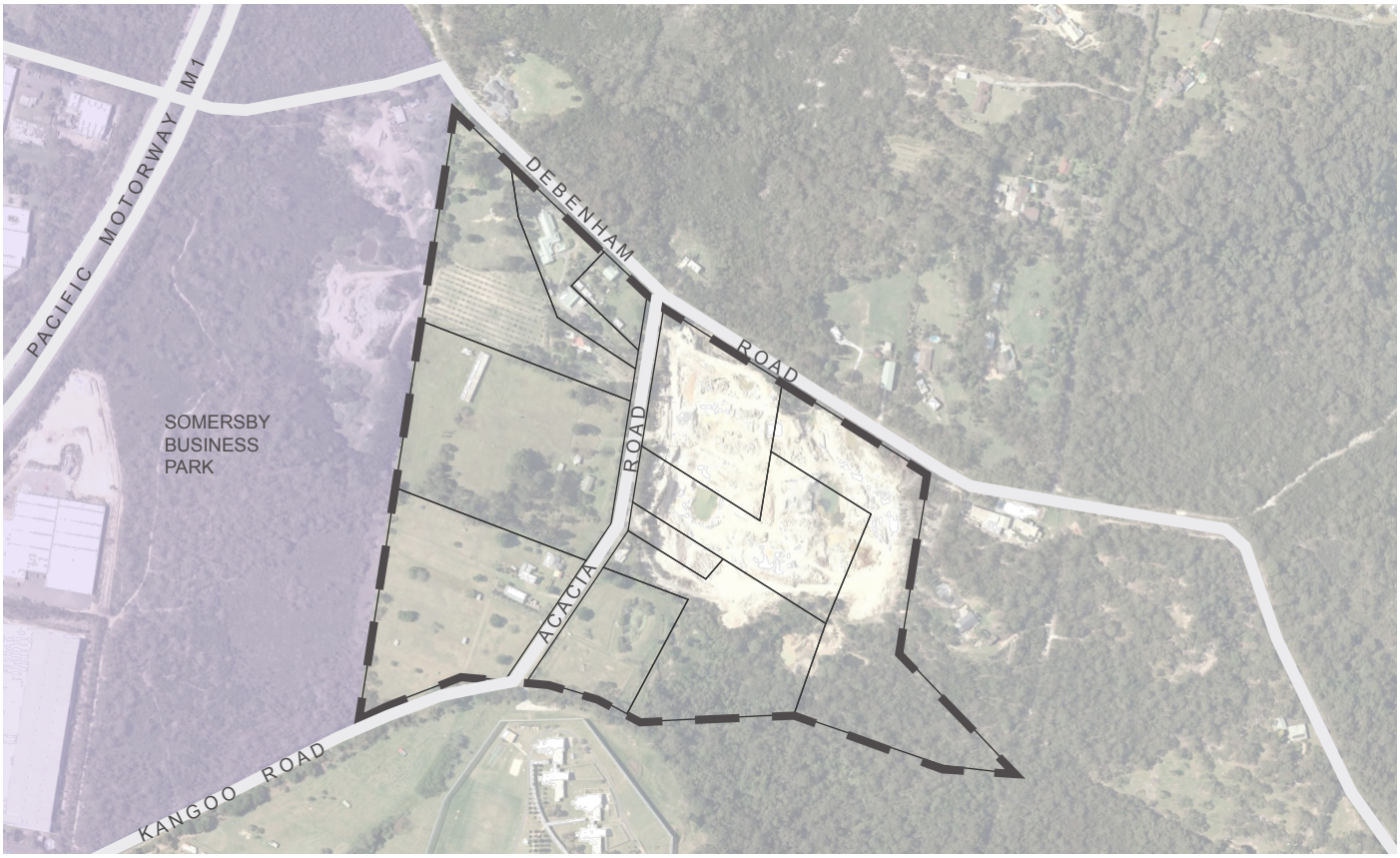
Somersby Business Park Expansion
Eastern Precinct



Planning Proposal

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paa DESIGN
architecture
planning
urban design

Peter Andrews + Associates
PTY LTD

Contents

Peter Andrews + Associates Pty Ltd
paa.design architecture planning urban design

PO Box 494 Terrigal NSW 2260
Level 1 . 56 Terrigal Esplanade Terrigal
Studio 67 Windmill Street Millers Point
P::+61 2 4385 9126
E::info@paadesign.com.au
W::www.paadesign.com.au

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1.0 INTRODUCTION

This Planning Proposal seeks the rezoning of approximately 19.95 hectares of land at Somersby to employment lands as part of an extension of the Somersby Business Park and 3.75 hectares of land to E2 Environmental Conservation. The subject site adjoins the Somersby Business Park to the east and comprises approximately 24 hectares of land in total. Refer Figures 1 and 2.

Gosford City Council recognises that some of the existing employment zoned land in the Somersby Business Park is constrained and additional employment lands are required to adequately support the growing region. An Employment Lands Investigation study was carried out in 2010 and found that the lands adjoining the Somersby Business Park represent the major opportunity for the expansion of employment lands in the Gosford Local Government Area (LGA). Somersby has a good location adjacent to major transport infrastructure. Somersby Business Park's direct access to major infrastructure and the M1 is critical to the attraction of businesses. Further investigations were undertaken in 2013 including ecological and Aboriginal heritage investigations to identify additional areas that may be suitable as part of the expansion of the Somersby Business Park. These investigations identified the site subject to this report as a possible future expansion area of the Somersby Business Park.

Preliminary environmental investigations have been undertaken for the subject site including flora and fauna, bushfire, land contamination, traffic, visual impact, hydrology and water and sewer servicing. These environmental investigations have determined an appropriate development area for employment lands on the site. The proposal seeks an IN1 General Industrial zone for the identified development area and proposes to rezone the remainder of the subject site to an appropriate zone to retain the environmental qualities. This Planning Proposal provides a summary of the proposal and explains the intended effect of the proposed instrument and sets out the justification for making the proposed instrument in accordance with the Environmental Planning & Assessment Act 1979 (EP&A Act).

2.0 SITE DESCRIPTION

The subject site incorporates ten (10) lots and is approximately 24 hectares in size as shown on Figure 2 and outlined in Table 1.

Table 1 – Study area properties

Property description	Area (ha)
Lot A DP 420575 Acacia Road	4.7ha
Lot C DP 101045 Acacia Road	4.1ha
Lot B DP 101045 Acacia Road	2.7ha
Lot 1 DP 366614 Acacia Road	0.9ha
Lot 2 DP 364929 Debenham Road	0.4ha
Lot 1 DP 522099 Acacia Road Lot 3 DP 550062 Acacia Road Lot 11 DP 618324 Acacia Road Lot 12 DP 618324 Acacia Road Lot 13 DP 618324 Debenham Road	10.9ha
Total Area	**23.7Ha**

Acacia Road runs north-south through the subject site, Debenham Road adjoins the site to the north and Kangoo Road to the south-west. The part of the site to the west of Acacia Road is generally cleared and used mostly as pastoral land. The landholdings to the east of Acacia Road are largely occupied by the sandstone quarry, which is operated by Gosford Quarry Holdings Limited. The area to the south-east is significantly vegetated (Figure 3).

The site is currently zoned RU1 – Primary Production under the Gosford Local Environmental Plan 2014 (Gosford LEP 2014) (Figure 4).

Land to the west of Acacia Road is largely cleared and relatively flat. It is primarily used for rural residential development. Land to the east of Acacia Road is largely occupied by the Gosford Quarry site, which has been altered from its natural landform. Land in the south eastern corner is densely vegetated. The site generally falls to the south-east. The highpoint of the site is in the north western corner. Another highpoint adjoins the subject site to the east. The south eastern corner is the lowest point of the site. Due to the topography, there are distant views to the south-east towards Brisbane Water and the suburbs of Point Clare, Point Frederick, East Gosford and Green Point. The site also has partial and intermittent distant views to the north-east and south south-east. Existing vegetation in the south eastern area and the periphery of the subject site, existing vegetation on adjacent properties and adjoining high points to the east provides screening and filtering of any views.

Steeper slopes on the subject site are generally associated with the quarry site and along the Debenham Road frontage. Refer Figures 5 and 6. Further, parts of the site have been mapped by Gosford Council as an immediate high risk of landslip (Figure 7).

The subject site is generally enclosed due to topography, land use and vegetation on the site and adjoining the site from the immediate surrounding areas. Therefore it is fairly well screened from the rural residential areas to the north due to topography, vegetation and stockpiling on the quarry site.

The subject site is serviced with water, electricity and telephone. There is an existing bus route that includes a bus stop on Acacia Road providing access between the subject site and the Gosford City Centre to the east and Somersby, Mangrove Mountain and Kulnura in the north-west.

3.0 SURROUNDING AREA

The area surrounding the subject site consists of the following land uses and as shown on Figures 3 and 4.

- Land zoned RU2 - Rural Landscape to the north and east comprising lots ranging in size from approximately 2 hectares to 30 hectares with some dwellings.
- Land zoned SP1 - Special Activities and SP2 - Infrastructure to the south, which incorporates the Mount Penang Gardens and the Mount Penang Detention Centre.
- Land zoned IN1 - General Industrial to the west, which forms part of the Somersby Business Park.

The Somersby Business Park is identified as a key site under the Gosford LEP 2014. A portion of the lots to the west of the subject site is identified as being constrained by ecologically significant and Aboriginal heritage lands (Figure 8). Objectives of clause 7.4 of the Gosford LEP 2014 are to protect ecologically significant land and land with Aboriginal heritage characteristics in the Somersby Business Park.

4.0 THE PROPOSAL

This Planning Proposal seeks the rezoning of land at Somersby to permit General Industrial land uses as part of an extension of the Somersby Business Park. The subject site comprises approximately 24 hectares of land in total. The subject site adjoins the Somersby Business Park to the east and the proposed rezoning would assist in providing additional employment lands to support the growing Central Coast region. It is also proposed to rezone land that is ecologically significant and has potential Aboriginal heritage characteristics for environmental conservation.

4.1 Preliminary Environmental Investigations

Preliminary environmental investigations have been undertaken for the subject site including flora and fauna, bushfire, land contamination, traffic, visual impact, hydrology and water and sewer servicing. These environmental investigations have identified the opportunities and constraints of the site, which has then determined an appropriate development area and appropriate zones.

4.1.1 Flora and Fauna

A Flora and Fauna Assessment was prepared by GHD Pty Ltd (Appendix 1) to evaluate the conservation significance of biodiversity and identify flora and fauna constraints and opportunities for the subject site. Whilst a site inspection was carried out, the assessment relies on previous flora and fauna field surveys of the site carried out as part of the Ecological and Aboriginal Heritage Report for Somersby prepared by Geolink in 2013 and a desktop review. The main findings from the Geolink report for the subject site are:

- The majority of the site (areas associated with the quarry and rural residential areas) has no ecological constraints. The vegetated south-east corner of the site is highly ecologically constrained due to threatened fauna habitat. The site also contains medium constraints (mainly associated with regrowth vegetation in road reserves) including general fauna habitat and fauna connectivity.
- Six Netted Bottlebrush (*Callistemon linearifolius*) individuals were recorded below the escarpment south of the quarry.
- There is a high probability that the Somersby Mintbush (*Prostanthera junonis*) is present in the seed bank as the site is surrounded by records of this species.
- There are no threatened ecological communities listed on the Threatened Species Conservation Act 1995 (TSC Act) or Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that occur at the site.
- There is potential habitat and a high probability that the Giant Burrowing Frog (*Heleioporus australiacus*), Red-crowned Toadlet (*Pseudophryne australis*), Eastern Pygmy Possum (*Cercartetus nanus*) and Squirrel Glider (*Petaurus norfolcensis*) occur at the site.

- Grey-headed Flying-fox (*Pteropus poliocephalus*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Greater Broad-nosed Bat (*Scoteanax rueppellii*) and Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) were recorded at the site and there is potential habitat and a high probability that a further four microchiropteran bats would occur at the site.
- The site contains important habitat features such as forage for threatened amphibians and bats, and hollow-bearing trees.

The subject site is dominated by existing cleared areas associated with the quarry and agricultural lands, planted or exotic vegetation and native vegetation. Vegetation mapped within the subject site is shown on Figure 9 and as described in Table 2.

Table 2 – Vegetation types

Vegetation type	OEH Biometric Vegetation Type	Area (ha)
Hawkesbury Peppermint Forest	Smooth-barked Apple – Sydney Peppermint – Turpentine healthy open forest on plateaux areas of the southern Central Coast, Sydney Basin.	3.0
Exposed Hawkesbury Woodland	Scribbly Gum – Hairpin Banksia – Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin.	1.2
Hawkesbury Banksia Scrub Woodland	Scribbly Gum – Hairpin Banksia – Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin.	0.2
Planted or exotic vegetation	N/A	2.9
Disturbed land	N/A	17.0

A likelihood of occurrence assessment was prepared for the broad habitats within the subject site. Six Netted Bottlebrush (*Callistemon linearifolius*) individuals were recorded below the escarpment south of the quarry (Geolink 2013). The presence of these plants was confirmed during the site inspection. Based on habitat available at the site, there is a high probability that the Somersby Mintbush *(Prostanthera junonis)* is present in the seed bank at the site within native vegetation as there are several recent local records of the species surrounding the site. There is also a moderate potential for Leafless Tongue Orchid (*Cryptostylis hunteriana*) and Spreading Guinea Flower (*Hibbertia procumbens*) to occur based on the habitats available at the site.

No threatened ecological communities or protected marine vegetation were recorded or have the potential to occur on the subject site.

The subject site contains a variety of fauna habitat features including the Woodland and the planted or exotic vegetation as follows:

- The woodland occurs in the south-east corner of the site and along the edges of the quarry. These areas contain a flowering canopy and diverse shrub layer that provide foraging habitat for nectivorous species such as birds, arboreal mammals and the threatened Grey-headed Flying-fox *(Pteropus poliocephalus)*, and foraging habitat for insectivores species including microchiropteran bats and insectivourous birds. Hollow-bearing trees are located within this part of the site. The groundcover is also generally intact and unaffected by weeds providing a potential foraging and shelter habitat for ground-dwelling mammals and reptiles. This area also contains foraging habitat for owls and other birds of prey, and potential habitat for the Red-crowned Toadlet *(Pseudophryne australis)* and Giant Burrowing Frog *(Heleioporus australiacus)* within the rocky outcrops and associated seeps and drainage lines.
- The planted or exotic vegetation provides potential foraging habitat for a range of mobile fauna. These areas also provide movement corridors for fauna accessing patches of remnant and regrowth native vegetation.

Four threatened fauna (Grey-headed Flying-fox (*Pteropus poliocephalus)*, Eastern Freetail-bat (*Mormopterus norfolkensis)*, Greater Broad-nosed Bat (*Scoteanax rueppellii)* and Eastern Bentwing Bat (*Miniopterus schreibersii)*) have been previously recorded at the site, and there is potential habitat and a high probability that the Giant Burrowing Frog (*Heleioporus australiacus)*, Red-crowned Toadlet *(Pseudophryne australis)*, Eastern Pygmy Possum (*Cercartetus nanus*) and Squirrel Glider (*Petaurus norfolcensis*) may occur at the site. There is a moderate potential for the Glossy Black Cockatoo (*Calyptorhynchus lathami*), Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*), Sooty Owl (*Tyto tenebricosa*) and four microchiropteran bats (Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Little Bentwing-bat (*Miniopterus australis*) and Southern Myotis (*Myotis macropus*)) would occur at the site.

No migratory species have been previously recorded at the site. There is potential foraging habitat and a moderate potential for four migratory species (Rainbow Bee-eater (*Merops ornatus*), Black-faced Monarch (*Monarcha melanopsis)*, Satin Flycatcher (*Myiagra cyanoleuca*) and Rufous Fantail (*Rhipidura rufifrons*)) to occur at the site. The site also provides potential habitat for aerial migratory species (such as White-throated Needletail (*Hirundapus caudacutus*)), which have a low potential of occurring.

There is one farm dam located on the subject site and several settlement/sediment retention ponds at the quarry site. The farm dam is characterised by instream reeds surrounded with native and exotic reeds and grasses. The farm dam is likely to provide habitat for common amphibians, reptiles, birds and microbats.

Ecological constraints have been categorised into three broad groups including high, medium and low as shown on Figure 10. Ecological constraints are defined as conditions within a vegetation community, habitat type or located that are considered to represent significant or important contributions towards habitat for one or more threatened species.

The majority of the site including the Disturbed Lands and Planted or Exotic Vegetation is mapped as containing low ecological constraints and is suitable for future development with minimal ecological impacts likely.

Areas considered to have high ecological constraints generally includes the areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest and should be excluded from any future development footprints. Any development in areas mapped as a high ecological constraint would need to undertake assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, populations or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. Compensatory habitat measures either through Biobanking or offsetting are likely to be required if these areas are developed.

The suggested vegetation corridor linking the quarry site and remnant native vegetation west of Acacia Road identified in the Geolink report has not been incorporated as the native vegetation west of the subject site is zoned IN1 General Industrial and is not mapped as 'Ecologically Significant and Aboriginal Heritage Lands' under Gosford LEP 2014. The nearest 'Ecologically Significant and Aboriginal Heritage Lands' mapped in Gosford LEP 2014 are about 150 metres to the south-west, therefore the suggested vegetation corridor would likely become redundant.

4.1.2 Aboriginal Archaeology

An Aboriginal Heritage Assessment was carried out by McCardle Cultural Heritage as part of the Ecological and Aboriginal Heritage Report for Somersby prepared by Geolink in 2013. It has been predicted that within the specific subject area included in this report the potential for evidence of former Aboriginal occupation is low. This is due mainly to the lack of natural watercourses on the subject site.

However, a possible rock engraving site was identified within Lot 12 DP 618324 Acacia Road adjacent the boundary with Lot A DP 420575 Acacia Road. The site lays approximately half way along the eastern boundary of Lot A DP 420575 Acacia Road and the western boundary of this Lot 12 DP 618324 Acacia Road. The rock platform shows indications of a possible Aboriginal rock engraving. This potential rock engraving site is located within the area identified as a high ecological constraint. Refer Figure 11.

4.1.3 European Archaeology

There are no known items of European Heritage identified on the subject site. Gosford LEP 2014 identifies heritage items on the adjoining site to the south on The Mount Penang parklands site as identified in the following table.

Table 3 – Heritage Items

Item Name	Address	Significance	Item No.
Administration and service buildings – maintenance store, cultural centre, administration/operations annexe and theatre, school house, Girrakool House, occasional child care, flats	Lot 10 DP 1149050	State	63
Built landscape elements – gazebo, stone walls, sculpture park	Lot 10 DP 1149050	Local	68
Dam	Lot 10 DP 1149050	Local	70
Dormitories – 'Carinya', 'Sobraon', 'Walpole', 'Vernon' and 'The Wood Building'	Lot 10 DP 1149050	State	62
Eastern bushland	Lot 10 DP 1149050	Local	76
Entry drive with perimeter brushbox and eucalypt plantings	Lot 10 DP 1149050	State	77
Mature cultural plantings	Lot 10 DP 1149050, Lot 702 DP 1128417	Local	72
Mature cultural plantings, including coral trees, brush box, camphor laurels, white poplars, hoop pines, an oak and a larch	Lot 10 DP 1149050, Lot 702 DP 1128417	Local	73
McCabe Complex—two cottages, McCabe Conference Centre	Lot 10 DP 1149050	State	66
Old pine tree group	Lot 10 DP 1149050	Local	69

Item Name	Address	Significance	Item No.
Remnant farm buildings—the barn, storage shed and dairy	Lot 521 DP 1017539	Local	61
Residential buildings—six residential cottages, deputy superintendent's cottage	Lot 10 DP 1149050	State	64
Sports field perimeter brush box and eucalypt plantings	Lot 10 DP 1149050	Local	75
Sports fields—three sports fields, sports oval	Lot 10 DP 1149050	State	67
Two groups of scribbly gums	Lot 10 DP 1149050	Local	74
White poplar avenue	Lot 10 DP 1149050	Local	71
Henry Kendall Museum (former house of Peter Fagan and Red Cow Inn)	Lot A DP 398172, Lot 12 DP 24491	Local	175

4.1.4 Bushfire Constraints

A Bushfire Protection Assessment was prepared by ABPP and attached in Appendix 2. It identifies that Asset protection zones will be required and can be accommodated on the site. Larger APZs are required adjoining the area identified as a high ecological constraint in the south-east and along the south western boundary adjoining the vegetation to the west. APZs are also required from vegetated land to the north. A 10m APZ is also required adjoining the paper road to the south. However, this would not be required if the road reserve is to be cleared in the future. Refer Figure 12.

4.1.5 Traffic and Parking

A Traffic and Parking Assessment was prepared by Varga Traffic Planning and is attached in Appendix 3. This report concludes that the proposed development would not have any unacceptable traffic implications in terms of road network capacity, and that no road improvements or intersection upgrades would be required as a consequence of the development proposal.

4.1.6 Visual and Scenic Assessment

A Visual Impact Assessment (Appendix 4) has been prepared for the subject site. It identifies that long distance views are available to and from part of the site from the east. However, the impacts are minimal as the field of vision is reduced due to the distance. Further, the land to the south-east is to be conserved and will further reduce the visual impact. The proposal will incorporate a landscaped buffer on the northern and eastern boundaries to minimise impacts on views from the adjoining rural residential land uses and minimise impacts from long distant views. Other mitigations measures are also proposed if the subject site is rezoned for employment lands.

4.1.7 Contamination

A Phase 1 Contamination Site Assessment has been prepared for the subject site (Appendix 5). The overall likelihood for significant chemical contamination to be present within the study area is considered to be low. However, the likelihood for chemical contamination on the Gosford Quarries site is considered to be moderate due to the long term historical use and storage of oils, fuels and greases, completion of maintenance activities including refuelling and operation of heavy and light vehicles. The likelihood for chemical contamination within the small area to the north-west of the Gosford Quarries site, which was noted to contain oil drums and discarded oil filters is considered to be high due to the presence of visibly stained surface soils. It is noted however, that the lateral extent of chemical contamination within this area is considered to be minimal.

4.1.8 Topography

The highpoint of the subject site is to the north-west and slopes towards the south-east. As shown on Figures 5 and 6, the steeper slopes are generally associated with the quarry site. Further, Gosford City Council has identified parts of the site as having a landslip hazard of an immediate high risk (Figure 7). The area identified as an immediate high risk includes part of the Gosford quarry site to the east and part of Lot A DP 420575 to the west.

Gosford Quarries had previously stated that the quarry had a limited economic life of approximately two years. However, it has now advised that the life of the quarry is not known at this stage as there is additional interest in its quarried product. The future development of the quarry site for industrial uses will be subject to the life of the quarry and its final land form. The final land form of the quarry site would also be subject to the quarrying of the site and the proposed final land use.

Future development of both sites for industrial land uses would be subject to a development application. Chapter 6.4 of the Gosford Development Control Plan 2013 outlines the management strategies for development in areas that are identified as having a landslip potential. This includes the preparation of geotechnical investigations / reports as part of any development application for land identified as a landslip hazard. These investigations would be undertaken at the appropriate time when development is proposed on either site.

4.1.9 Flooding and Drainage

The preliminary hydrology assessment prepared by GHD Pty Ltd (Appendix 6) estimates the catchment area of the site to be a total of 28 hectares. The catchment area is not anticipated to change for post development conditions. The majority of the site drains south-west with approximately 2 hectares in the north eastern corner draining to the north-east.

Gosford City Council mapping indicates that the subject site is outside the mapped 1% AEP flood extent. The soil landscape mapping for the subject site indicates the area to be relatively impervious with only a shallow soil profile over the underlying rock. The soils in the natural catchment condition would have had a modest water holding capacity.

The runoff coefficient for existing conditions was determined by calculating the impervious percentage of the catchment. To calculate the impervious area, the quarry was examined separately from the remainder of the catchment. By examining aerial images the impervious percentage of the catchment area outside the quarry was determined to be approximately 5%. For the quarry under existing conditions, it was assumed that the quarry has a high percentage of impervious land due to the extent of exposed sandstone. Based on observations of aerial images, the sandstone quarry had two basins with a total area of approximately 3,380m2. Following an observation of topographic data, it was determined that approximately 90% of the quarry surface area drained into the basins. Based on this calculation, it was determined that 10% of the quarry area drained to the catchment outlet and that this portion of the quarry was fully impervious.

Therefore, it was calculated that the impervious percentage of the catchment under existing conditions was 7%. Under post-development conditions, it is assumed that the catchment would be fully developed and would have a final impervious percentage of near 100%.

Taking into consideration the catchment response time, rainfall and the rate of runoff, one or more detention basins will be required at the downstream end of the catchment or alternatively on-site detention could be utilised to ensure that water leaving the site is at its pre-development rate in accordance with Gosford City Council's Development Control Plan 2013.

On-site water detention of 230m^3 per hectare is recommended to return flows to its pre-development rate. Pollutant traps should be utilised and would be designed to capture oil and grease. On-site detention should have a minimum retention time of 5 minutes for flows less than pipe full. At the catchment outlet level spreading arrangements should also be utilised to ensure downstream of the site channelised flows do not occur.

4.1.10 Water and Sewer Servicing

Preliminary investigations undertaken by GHD Pty Ltd (Appendix 7) and in discussions with Gosford City Council indicate that water and sewer servicing is feasible for the subject site if it is to be developed for employment lands.

Studies have been undertaken by Gosford City Council to identify the system upgrade works required to service the site and adjacent development areas for water. This was based on a development area of 25 hectares. Water is currently available in both Kangoo and Acacia Roads and along the north western section of Debenham Road. Gosford City Council indicated that the layout for the works may need to be reassessed but are unlikely to change significantly and would be dependent on the developable area and lot layout.

The subject site can also be serviced with sewer. It is proposed that the existing sewer main at Kangoo Road is extended along Kangoo Road and up Acacia Road to service the development. The sewer alignment is to be confirmed with further investigations and in consultation with Gosford City Council to maximise the development layout.

Given that the site generally slopes to the south-east, the majority of the developable area can be serviced by conventional gravity sewerage. The north eastern corner could be serviced by either a Gosford City Council pump station or a private pump-out sewer with short rising main to the gravity network.

4.2 Details of the Proposal

The opportunities and constraints for the subject site as determined from the environmental investigations undertaken above are shown on Figure 12 and identify:

- A developable area of approximately 19.95 hectares.
- The exclusion of the south eastern section of the subject site identified as a high ecological constraint approximately 3.75 hectares in size.
- Exposed Hawkesbury Woodland located along the north and eastern boundary of part of the site to be retained and incorporated as a buffer to the rural residential lands to the north and east.
- All future access to the employment lands should be from Acacia Road to minimise any impact on adjoining rural residential lands. This is feasible due to the ownership pattern and the majority of the lots front Acacia Road.
- APZs are required generally along the perimeter of the subject site and along the vegetated area to be retained in the south eastern section.

The Planning Proposal seeks to rezone the majority of the subject site to IN1 General Industrial in accordance with the Gosford LEP 2014 and as shown on Figure 13. The area containing the Exposed Hawkesbury Woodland along part of the northern and eastern boundary of the site is proposed to be included within the zone but it is recommended that this Woodland be retained as part of the setback and contribute to a buffer between the proposed industrial lands and the rural residential areas to the north and east. The majority of the subject site is suitable for employment lands and is able to meet the objectives of the IN1 General Industrial zone as follows:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To promote ecologically, socially and economically sustainable development.
- To ensure that retail, commercial or service land uses in industrial areas are of an ancillary nature.
- To ensure that development is compatible with the desired future character of the zone.

The south eastern section of the subject site has been identified as a high ecological constraint and therefore is not considered suitable for employment lands. It is proposed to exclude this land as employment land uses due to its ecological attributes, the possibility of Aboriginal archaeological sites in this area and the topography of this area.

This south eastern area of the subject site could be rezoned to an appropriate environmental zone such as E2 Environmental Conservation or E3 Environmental Management or alternatively be identified as ecologically significant lands on the Key Sites Map under the Gosford LEP 2014. The preferred option is to rezone this land to E2 Environmental Conservation. This shows Council's intent to conserve the land due to its environmental attributes. Any development proposal for the site would also need to consider access to this residual lot.

The topography of the subject site to be rezoned for employment lands is relatively flat with a gentle fall to the south-east. Therefore, it is proposed that the minimum lot size for the industrial zoned land is 4000m2, which is also in accordance with the adjoining land to the west that forms part of the Somersby Business Park. The land to the south-east would have the existing Gosford LEP 2014 minimum lot size for the E2 Environmental Conservation zone of 40 hectares and the height of buildings would be 8.5m. Refer Figures 14 and 15.

5.0 THE PLANNING PROPOSAL

The following addresses clause 55 of the Environmental Planning & Assessment Act 1979 as amended.

PART 1 OBJECTIVES OR INTENDED OUTCOMES

The Planning Proposal is seeking to zone the majority of the subject site to IN1 General Industrial to allow the expansion of the Somersby Business Park and provide employment opportunities. The south eastern area of the site will be zoned E2 Environmental Conservation under the Gosford LEP 2014 having regard to its environmental qualities.

The proposal will facilitate:

- The creation of employment lands and investment opportunities by providing the Somersby Business Park with additional land to expand.
- Further subdivision of the landholdings to allow a range of different industrial land uses.
- Retention of land with a high ecological constraint, which will also provide a buffer to the south-east.

The proposal is consistent with the existing character of the surrounding land including the Somersby Business Park adjoining the subject site to the west. Further, the retention of vegetated areas in the south-east and along the eastern and northern boundaries will provide a buffer with the adjoining rural residential land.

PART 2 EXPLANATION OF PROVISIONS

The proposed outcome will be achieved by:

- Amending the Gosford LEP 2014 Land Zoning Map for the subject site in accordance with the proposed zoning map shown as Figure 13.
- Amending the Gosford LEP 2014 Minimum Lot Size Map for the subject site in accordance with the proposed minimum lot size map shown as Figure 14.
- Amending the Gosford LEP 2014 Maximum Building Height map for the subject site in accordance with the maximum building height map as shown on Figure 15.

PART 3 JUSTIFICATION

Section A – Need for the planning proposal

1. Is the planning proposal a result of any strategic study or report?

Somersby Business Park is identified as Council's major business estate and accommodates a range of manufacturing and processing developments, industrial uses dependent upon large site areas, and some smaller scaled industrial and service uses in smaller more conventional industrial buildings.

Somersby Business Park was rezoned by Local Environmental Plan No 22 (LEP 22), which was gazetted on 3 July 1981 and covered an area of approximately 300 hectares located primarily on the western side of the M1 Motorway at the Gosford interchange. The majority of the land was zoned 4(a1) General Industrial, with some other areas zoned Open Space and Business. LEP 22 was a stand-alone instrument. A Plan of Management was also prepared, which further informed landuse planning outcomes, with its controls implemented through Local Environmental Plan 457 as an amendment to LEP 22. Some surplus crown land generally having frontage to Kangoo Road was included in the 4(a1) zoning upon completion of major road works associated with the then F3 construction and interchange arrangements. This forms a lineal extension of the Park to the south located between the M1 onramp, Wisemans Ferry Road and Kangoo Road.

Development within the bulk of the Park had experienced considerable difficulties predominately in relation to the presence of threatened species under the TSC Act and Aboriginal sites. In addition to threatened species, the nature of permitted development, bushfire management, Aboriginal Heritage, catchment management, riparian vegetation protection and soil erosion created further difficulties for development and were not addressed in the provisions of LEP 22 or a separate DCP. In particular, concerns regarding the impacts of development upon a threatened species, the Somersby Mintbush, led to uncertainty as to the future of development generally in the Park. In this regard Species Impact Statements that required considerable investigation and cost created disincentive for development.

To address the multiple environmental constraints relating to development, the then NSW Premiers Department, Department of Environment & Conservation and Gosford City Council, engaged consultants to undertake studies relating to Aboriginal heritage, a specific flora study for the Somersby Mintbush and a general flora and fauna study. These studies were incorporated into a Plan of Management (adopted by Council at its meeting of 12 July 2005). These strategic investigations culminated in the gazettal of LEP 457, which amended LEP 22 on 29 February 2008. Some existing vacant zoned land remains within the Business Park, however this does not represent total available land, as a percentage of this vacant land may not be available for development due to environmental constraints.

The Central Coast Regional Strategy is the lead document to guide future growth and development in the region. Somersby Business Park is identified as an employment precinct and investigations into possible expansion align with specific actions of the Strategy.

As part of the future expansion of Somersby Business Park, Council envisaged that three precincts within and adjoining the existing zoned area be the subject of strategic investigations to inform the future rezoning of additional employment lands. Council engaged consultants to prepare the Gosford City Council Employment Lands Study (ELS) in December 2010. The study was undertaken in close collaboration between Council and the then Department of Planning and Infrastructure with funding under the Planning Reform Funds and in accordance with an agreed Memorandum of Understanding.

The ELS provided an analysis of existing zoned employment (industrial zoned) lands and identified major sectors, together with the competitive strengths and weaknesses of industrial lands. The ELS focused on constraints mapping of areas to identify suitable areas for further investigations. Constraints mapping was essentially a sieve mapping exercise where aggregated constraints were mapped over particular areas to determine future opportunities. For Somersby, the ELS confirmed the three possible expansion scenarios for consideration, including the land subject to this Planning Proposal. Other options being Mount Penang Parklands and Somersby Falls Road where rezoning to IN1 General Industrial has occurred. The findings of the ELS for the subject site concluded:

> *Proposed Future Employment Lands - Acacia Road / Debenham Road (Area 2)*
> *Area 2 is located immediately opposite the Juvenile Justice centre, and adjacent to existing 4(a1) Industrial zoned area under the LEP22. This area provides a logical extension to the existing industrial development and has excellent proximity to services and access off the Central Coast Highway and the F3 Freeway. This area is proposed to be zoned RU1 Primary Production under the draft Gosford LEP 2009.*
>
> *Due to its previous and current uses this area contains very little vegetation. The existing uses on the site include rural dwellings, primary production and a quarry, which has been identified as coming towards the end of its operation. The site is relatively free of constraints with only a small steep slope on the quarry site however, this is likely to be re-contoured once the quarry has ceased its operations.*
>
> *Area 2 is a natural progression from the industrial uses to the west and Acacia Road and Debenham Road provide a physical boundary and easy access for further industrial development. This total size of this site is 23.6 ha. Concentrating additional opportunities in this location will have benefits in terms of synergies between businesses.*

Multiple constraints to development have been experienced in the Somersby Business Park. Council undertook additional environmental and ecological investigations in 2013 (Geolink) for the areas identified for the potential expansion of the industrial zone, i.e. employment lands. These investigations included threatened species and Aboriginal archaeological investigations for the subject site. Geolink's investigations identified that the subject site did have the potential for rezoning to industrial purposes.

Gosford's LEP 2014 has now been gazetted and the industrial land within Somersby Business Park is zoned IN1 General Industrial, with various minimum lot sizes. Overall, the majority of minimum lot sizes is 4000m2, however lots fronting Wisemans Ferry Road are required to be 2 hectares. There are no mapped height of buildings and floor space ratios for the Park, apart from the land zoned B5 Local Centre. Areas of ecologically and archaeological significance are mapped on the Key Site Map. Clause 7.4 of the Gosford LEP 2014 also contains specific provisions for development in the Somersby Business Park to bring forward the provisions of the existing Plan of Management.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

As outlined above, the Gosford LEP 2014 has been gazetted. The Gosford LEP 2014 did not include the rezoning of the site subject to this Planning Proposal as investigations were being carried out. The best means of achieving the intended outcome of providing additional employment lands adjoining the Somersby Business Park is to rezone the subject site IN1 General Industrial as outlined in this Planning Proposal.

Section B – Relationship to strategic planning framework

3. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

The Central Coast Regional Strategy (CCRS) is the lead document to guide future growth and development in the region. It was prepared by the then Department of Planning and released in June 2008. Its primary aim in relation to employment generation is the creation of 18,000 new jobs in the Gosford LGA, 6000 of which are to be located in Gosford Regional Centre, 9000 in other centres, and 3000 in employment lands. The key economic challenges of the CCRS include:

- Ensuring that sufficient employment lands and commercial office space is provided in appropriate locations to accommodate growth in existing and emerging industries and businesses.
- Increasing and diversifying job opportunities and increasing the level of employment self containment.
- Promoting innovation and skills development within the Region.
- Supporting and strengthening the existing employment base to help key industries achieve critical mass.
- Encouraging and investigating opportunities to diversify the Region's economy.
- Protecting existing and proposed transport corridors within the Region and to surrounding regions.
- Capitalising on the Region's position between Sydney and Newcastle.

Actions identified in the CCRS that relate to employment lands include:

- 5.1 Promote economic and employment growth in the Region to increase the level of employment self containment and achieve capacity for more than 45,000 new jobs on the Central Coast over the next 25 years.
- 5.2 LEPs are to be consistent with the Central Coast Regional Strategy, the related employment capacity targets and provide a distribution that reflects the centres hierarchy.
- 5.7 Investigate, through the preparation of LEPs, options to expand existing employment land nodes and ensure future development occurring on employment land does not result in inappropriate fragmentation of that land.
- 5.13 The NSW Government and councils are to engage with industry regarding employment land stock to ensure a sufficient supply of employment generating land in the correct locations.

Somersby Business Park is identified as an employment precinct in the CCRS and investigations into possible expansion align with specific actions of the CCRS. In particular, the proposal is to expand the Somersby Business Park to the east, which will not result in inappropriate fragmentation of land and will assist in providing employment lands in an appropriate location.

Environmental and heritage actions in the CCRS that need to be considered include:

- 6.8 Ensure LEPs facilitate conservation of Aboriginal and non-Aboriginal heritage.
- 6.9 Ensure LEPs do not rezone rural and resource lands for urban purposes or rural residential uses unless agreement from the Department of Planning is first reached regarding the value of these resources.

The proposal incorporates the protection of a possible Aboriginal site in the south eastern section of the subject site by rezoning this area E2 Environmental Conservation.

The subject site is currently zoned for rural purposes and incorporates the Gosford quarry site. Therefore, agreement will be required from the Department of Planning & Environment to rezone it for employment lands. The possible expansion of the Somersby Business Park including the subject site has been undertaken in liaison with the Department, who will determine whether the Planning Proposal proceeds further.

The Regional Economic Development and Employment Strategy (REDES) is the long-term strategy for sustainable economic development and jobs growth for the Central Coast Region. The Planning Proposal provides additional employment land, which is consistent with the following objectives of the REDES:

- *To deliver more than 45,000 new jobs by 2031, increasing the region's level of employment self-containment and providing jobs for a growing population.*
- *To encourage employment growth in key employment nodes, including strategic centres, employment lands and smaller centres.*

4. Is the planning proposal consistent with a council's local strategy or other local strategic plan?

Community Strategic Plan Gosford 2025

Gosford Council's Community Strategic Plan Gosford 2025 identifies the Gosford community's main priorities and aspirations for the future. The following outlines how the proposal will assist in meeting the objectives of the Community Strategic Plan.

Environment
B1 Diversity of the natural environment is protected and supported
B1.1 Identify and manage threats to native flora and fauna
B1.2 Identify and preserve areas of conservation value

Land in the south eastern area of the subject site has been identified as having a high ecological constraint. Ecological constraints are defined as conditions within a vegetation community, habitat type or located that are considered to represent significant or important contributions towards habitat for one or more threatened species. This area has been mapped to include Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest and should be excluded from any future development footprint. It is therefore proposed that this area be zoned to E2 Environmental Conservation, which will assist in meeting the community strategic objectives of managing threats to native flora and fauna and preserving areas for conservation.

Economy
C1 Gosford is a place that attracts people to work, live and visit
C1.1 Broaden range of business and industry sectors
C1.3 Increase and broaden the range of local jobs across existing and emerging employment sectors
C2 Gosford attracts and supports new and existing businesses and investment
C2.1 Provide tools and framework for business growth
C2.3 Grow businesses to export outside the region

The creation of jobs is an important focus for the future. A diversity of industries in the area would provide a broader foundation. It would also provide new jobs and cut the number of people required to commute to Sydney each day. The majority of the subject site is proposed to be rezoned to IN1 General Industrial, which will provide additional employment lands to assist in meeting these objectives.

The State of the City Report 2012 states that a future direction is to facilitate the development of more diversity in the economy requiring a range of actions that support the manufacturing, logistics, creative tourism, and education sectors, such as the zoning of sufficient employment lands. The proposal will rezone additional land for employment land uses increasing opportunities for the Gosford LGA in accordance with Council's strategic plan.

Gosford Biodiversity Strategy 2008

The key principles of the Biodiversity Strategy relating to the Planning Proposal is 3.3.1 Protect and Conserve Biodiversity and maintain ecological processes. This includes identifying areas of high biodiversity significance and determining appropriate conservation measures.

Part of the south eastern area of the site has been identified as a high ecological constraint. Therefore, it is proposed as part of this Planning Proposal to rezone this area to E2 Environmental Conservation. Further, a minimum lot size of 40 hectares is proposed and therefore the land will not be subject to any further subdivision.

5. Is the planning proposal consistent with applicable State Environmental Planning Policies?

State Environmental Planning Policy No 19 - Bushland in Urban Areas

When preparing draft local environmental plans for land, other than rural land, the Council shall have regard to the aims of the SEPP, and give priority to retaining bushland, unless it is satisfied that significant environmental, economic or social benefits will arise, which outweigh the value of the bushland. The proposal is to rezone the subject site from rural to an urban zone incorporating employment lands. The general aim of the SEPP is to protect and preserve bushland within the urban area because of its value to the community as part of the natural heritage, its aesthetic value and its value as a recreational, education and scientific resource. The Planning Proposal seeks to address these issues by retaining the vegetated areas that have been identified as having a high ecological constraint within an E2 Environmental Conservation zone.

State Environmental Planning Policy No 44 – Koala Habitat Protection

Geolink undertook investigations of the subject site for the potential for koala habitat. However no evidence of Koalas (scats, scratches or individuals) were found within the site, despite the use of a range of targeted survey methods during the Koala breeding season. Overall the Geolink survey results indicate the site does not comprise 'core' Koala habitat as defined in SEPP 44.

State Environmental Planning Policy No 55 – Remediation of Land

A Phase 1 Contamination Site Assessment has been prepared for the subject site (Appendix 5). The overall likelihood for significant chemical contamination to be present within the Study Area is considered to be low. However, the likelihood for chemical contamination on the Gosford Quarries site is considered to be moderate due to the long term historical use and storage of oils, fuels and greases, completion of maintenance activities including refuelling and operation of heavy and light vehicles. The likelihood for chemical contamination within the small area to the north-west of the Gosford Quarries site, which was noted to contain oil drums and discarded oil filters is considered to be high due to the presence of visibly stained surface soils. It is noted however, that the lateral extent of chemical contamination within this area is considered to be minimal.

Therefore, it is considered that the site could be made suitable for industrial land uses.

Deemed State Environmental Planning Policy - SREP No 8 - Central Coast Plateau Areas

The relevant aims of the deemed SEPP are to provide a basis for evaluating competing land uses, to direct development for non-agricultural purposes to land of lesser agricultural capability and to encourage the preparation of draft LEPs based on merits. The following tables addresses the aims, objectives and special provisions of SEPP 8 in relation to the Planning Proposal:

Table 4 – Aims, Objectives and Special Provisions of SEPP 8

Aims, Objectives, Special Provisions	Comments
2 Aims, objectives etc	
(a) to provide for the environmental protection of the Central Coast plateau areas and to provide a basis for evaluating competing land uses,	The proposal is for employment lands, which is consistent to the adjoining Somersby Business Park to the west of the subject site. A buffer zone along the north, south and eastern boundaries adjoining rural residential landholdings.
(b) to encourage the use of land having a high agricultural capability for that purpose and, as much as possible, to direct development for non-agricultural purposes to land of lesser agricultural capability,	The subject land is not identified as "prime agricultural land".
(d) to protect regionally significant mining resources and extractive materials from sterilization,	Gosford Quarry is located on part of the subject site. It has a limited life and a future industrial land use would be a suitable land use after the exhaustion of the quarry resource. Rezoning the adjoining land for employment land uses would be complementary with the quarry site.
(e) to enable development for the purposes of extractive industries in specified locations,	The rezoning of land to industrial land uses will not impact on the quarry.
(g) to protect the natural ecosystems of the region, and	The area identified as a high ecological constraint is to be conserved.
(h) to maintain opportunities for wildlife movement across the region, and	No wildlife movement corridors have been identified on the site.
(i) to discourage the preparation of draft local environmental plans designed to permit rural residential development, and	N/A
(j) to encourage the preparation of draft local environmental plans based on merits.	Strategic studies and environmental investigations show that the subject site is a logical extension to the Somersby Business Park.
11 Special provisions—draft local environmental plan applications	
(a) not impact upon the current or future use of adjoining land for existing or future agricultural uses, and	
(b) not result in an increased settlement pattern (by way of urban development, rural residential development, residential accommodation of a permanent or semi-permanent nature, community titles subdivisions or any other features that would facilitate increased settlement), and	Proposal does not incorporate any residential development.

Aims, Objectives, Special Provisions	Comments
(c) have a significant positive economic contribution to the area and result in employment generation, and	The proposal will result in employment generation.
(d) not result in any adverse environmental effect on or off the site, and	Land identified as having a high ecological constraint on the subject site will be conserved.
(e) be consistent with the strategic direction for water quality standards and river flow objectives developed through the State Government's water reform process, and	The proposal will be consistent with the strategic direction for water quality standards. Development is not proposed within riparian areas.
(f) be consistent with rural amenity (including rural industries) and not detract significantly from scenic quality, and	A Visual Impact Assessment has been carried out. The subject site is generally enclosed from view from the north, west, south west and north east generally due to topography and vegetation. The subject site
(g) not encourage urban (residential, commercial or industrial) land uses, and	The proposal is a logical extension of the Somersby Business Park and will not impact on rural lands.
(h) not require augmentation of the existing public infrastructure (except public infrastructure that is satisfactory to the council concerned and is provided without cost to public authorities), and	Investigations have indicated that appropriate infrastructure can be provided for the proposal.
(i) result in building works being directed to lesser class soils.	Building works will be directed to lesser class soils.

Note: Clauses 2(c) and (f) are repealed.

State Regional Environmental Plan No 9 – Extractive Industry (No2 – 1995)

The following table addresses the aims, objectives and special provisions of SREP No 9 in regards to the subject site and this Planning Proposal.

Table 5 – Aims Objectives and Special Provisions of SREP 9

Aims, Objectives, Special Provisions	Comments
2 Aims, objectives	
(a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance.	Gosford Quarry is located on part of the subject site.
(c) to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential.	As noted above, Gosford Quarry is located on part of the subject site to be rezoned for employment lands. It has a limited life and a future industrial land use would be a suitable land use after the exhaustion of the quarry resource. Gosford quarry had previously advised Gosford Council in 2010 that the quarry did have a limited sandstone reserve with an economic life of approximately two years. However, it has since advised that this has been extended due to the present demand for its product. Currently, the adjoining land uses include rural residential land. Rezoning of the land to the west of the quarry and the quarry site for employment lands will be more compatible with the existing quarry land use.
13 Future development controls for extraction from Schedule 1 or 2 land	
(a) council should not prepare a draft local environmental plan to prohibit development for the purpose of an extractive industry on land described in Schedule 1 or 2.	It is proposed that the south eastern area of the subject site be zoned E2 Environmental Conservation due to the identified high ecological constraint and the potential Aboriginal site. This area is generally not being quarried due to the extent of vegetation and the quarry operations are located further to the north.

State Regional Environmental Plan No 20 – Hawkesbury – Nepean River (No2 – 1997)

SREP No 20 applies to part of the subject site to the west of Acacia Road and the following addresses this SREP.

Table 6 – Aims Objectives and Special Provisions of SREP 20

Aims, Objectives, Special Provisions	Comments
3 Aim of this plan	
The aim of this plan is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.	Various investigations have been undertaken to determine appropriate areas for additional employment lands within the Gosford LGA.
6 Specific planning policies and recommended strategies	
(1) Total catchment management - Total catchment management is to be integrated with environmental planning for the catchment.	The proposal will not have a significant impact on the catchment as future development will be able to meet the development controls outlined in Gosford Council's Development Control Plan 2013 as identified in the preliminary investigations.
(2) Environmentally sensitive areas - The environmental quality of environmentally sensitive areas must be protected and enhanced through careful control of future land use changes and through management and (where necessary) remediation of existing uses. Note. Environmentally sensitive areas in the Hawkesbury-Nepean catchment are: the river, riparian land, escarpments and other scenic areas, conservation area subcatchments, national parks and nature reserves, wetlands, other significant floral and faunal habitats and corridors, and known and potential acid sulphate soils.	As identified above, any future development will be required to meet the environmental controls and will not have an impact on the environmentally sensitive areas.
(3) Water quality - Future development must not prejudice the achievement of the goals of use of the river for primary contact recreation (being recreational activities involving direct water contact, such as swimming) and aquatic ecosystem protection in the river system. If the quality of the receiving waters does not currently allow these uses, the current water quality must be maintained, or improved, so as not to jeopardise the achievement of the goals in the future. When water quality goals are set by the Government these are to be the goals to be achieved under this policy.	As previously noted, with the implementation of onsite detention basins, pre-development rates can be obtained in accordance with Gosford City Council's Development Control Plan 2013.
(4) Water quantity - Aquatic ecosystems must not be adversely affected by development which changes the flow characteristics of surface or groundwater in the catchment.	As noted above, the stormwater run-off will not increase with the development of the site with the recommended appropriate measures.
(5) Cultural heritage - The importance of the river in contributing to the significance of items and places of cultural heritage significance should be recognised, and these items and places should be protected and sensitively managed and, if appropriate, enhanced.	Aboriginal sites have not been located on this part of the subject site to be rezoned for employment lands.
(6) Flora and fauna - Manage flora and fauna communities so that the diversity of species and genetics within the catchment is conserved and enhanced.	As noted above, this part of the subject site is generally clear of vegetation.
(10) Urban development - All potential adverse environmental impacts of urban development must be assessed and controlled.	The land has been identified as being suitable for employment lands and is a logical extension of the Somersby Business Park and therefore reduces the potential environmental impacts elsewhere.
(11) Recreation and tourism - The value of the riverine corridor as a significant recreational and tourist asset must be protected.	The visual impact of the proposed development has been considered as part of the Planning Proposal. It is considered that the proposed future development of the land will be reduced due to the extent of the vegetation surrounding the subject site.
(12) Metropolitan strategy - Development should complement the vision, goal, key principles and action plan of the Metropolitan Strategy.	The proposal does meet the requirements of the Central Coast Regional Strategy by creating additional employment lands with minimal environmental impacts.

6. Is the planning proposal consistent with applicable Ministerial Direction (s.117 directions)?

The Planning Proposal is considered to be consistent with the relevant s.117 Directions for Planning Proposals as outlined in the following table.

Table 7 – s.117 Directions

s.117 Directions Objectives	Assessment of the Planning Proposal
1. Employment and Resources	
1.1 Business and Industrial Zones Objectives: (a) Encourage employment growth in suitable locations, (b) Protect employment land in business and industrial zones, an (c) Support the viability of identified strategic centres.	The investigations show that the proposal is a logical extension of the Somersby Business Park. The need to provide additional employment lands has been determined due to the constrained land identified within the existing Somersby Business Park, which has reduced the amount of developable area for employment opportunities. The proposal is in accordance with the various strategies for the Central Coast including the Central Coast Regional Strategy.
1.2 Rural Zones Objective (1) Protect the agricultural production value of rural land.	The land is isolated and is small in area and does not represent high quality agricultural land.
1.3 Mining, Petroleum Production and Extractive Industries Objective (1) Ensure that the future extraction of State or regionally significant reserves of coal, other minerals, petroleum and extractive materials are not compromised by inappropriate development.	Gosford Quarries is located on the subject site. The proposed rezoning to General Industrial will not compromise the operations of the quarry as Extractive Industry is a permissible use in the IN1 Industrial Zone. Further, Gosford Quarries Holdings Ltd in their submission to Council in respect to the exhibition of the citywide Draft LEP in 2010, stated that its site has been utilised for the extraction of dimension sandstone and crushed screened sandstone fill over the past 38 years and that the existing sandstone quarry has a limited sandstone reserve with an economic life of approximately two (2) years, although Gosford Quarries has now advised that the Quarry life has been extended due to the current demand for its products. Zoning the adjoining land and the Quarry site for employment lands is a preferred compatible land use than the existing rural residential development.
2. Environment and Heritage	
2.1 Environment Protection Zones Objective: (1) Protect and conserve environmentally sensitive areas.	The area identified as having a high ecological constraint is to be conserved under zone E2 Environmental Conservation.
2.3 Heritage Conservation Objective (1) To conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	The possible Aboriginal site is located within the constrained area and is to be conserved by rezoning this area to E2 Environmental Conservation.
3. Housing, Infrastructure and Urban Development	
3.4 Integrating Land Use and Transport Objectives: *(a) improving access to housing, jobs and services by walking, cycling and public transport, and* *(b) increasing the choice of available transport and reducing dependence on cars, and* *(c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and* *(d) supporting the efficient and viable operation of public transport services, and* *(e) providing for the efficient movement of freight.*	The proposal will provide an opportunity for additional employment lands. The subject site is located in close proximity to urban lands and is located on a public transport route.
4. Hazard and Risk	
4.4 Planning for Bushfire Protection	As outlined in the Bushfire report, APZs are to be

s.117 Directions Objectives	Assessment of the Planning Proposal
Objectives: (a) to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and (b) to encourage sound management of bush fire prone areas.	incorporated into the proposal.
5. Regional Planning	
5.1 Implementation of Regional Strategies Objective: (1) to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.	As stated above, the proposal meets the objectives of the Central Coast Regional Strategy providing additional employment lands.
6. Local Plan Making	
6.1 Approval and Referral Requirements Objective: (1) to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	Various environmental investigations have been undertaken and has determined the development is appropriate.
6.3 Site Specific Provisions Objective: (1) to discourage unnecessarily restrictive site specific planning controls.	Restrictive site specific controls are not proposed. It is envisaged that the general standards for the existing Somersby Business Park would be applied to the subject site as part of this Planning Proposal.

Section C – Environment, social and economic impact

7. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

As outlined under The Proposal, GHD has undertaken environmental investigations, which has identified that the majority of the site including the Disturbed Lands and Planted or Exotic Vegetation is mapped as containing low ecological constraints and is suitable for future development with minimal ecological impacts likely. Part of the south eastern portion of the site is identified as a high ecological constraint and this area is proposed to be conserved by rezoning this area to E2 Environmental Conservation.

8. Are there any likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

The high ecological constraint located in the south eastern section of the subject site will be conserved through the E2 Environmental Conservation zone and associated height of building and minimum lot mapping under the Gosford LEP 2014.

9. How has the planning proposal adequately addressed any social and economic effects?

The proposal will provide an opportunity for additional employment lands. The Central Coast Regional Strategy has identified a need for over 18,000 new jobs within the Gosford LGA. As previously noted, there has been a loss of developable land within the existing Somersby Business Park due to Ecologically Significant and Aboriginal Heritage Lands. Therefore, the proposal will create positive social and economic impacts for the Gosford LGA by providing the opportunity for additional jobs.

Section D – State and Commonwealth Interests

10. Is there adequate public infrastructure for the planning proposal?

The subject site is accessible from the existing roads. Public transportation is also available to the site. The traffic investigations show that the road network is adequate to support the proposed rezoning to employment lands. Appropriate infrastructure can be provided for the proposal including sewer, water and electricity.

11. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

Consultation with the relevant State and Commonwealth Public Authorities will be undertaken as part of the community consultation.

PART 4 MAPS

Maps have been prepared for the proposal and are attached as Figures 1 to 15.

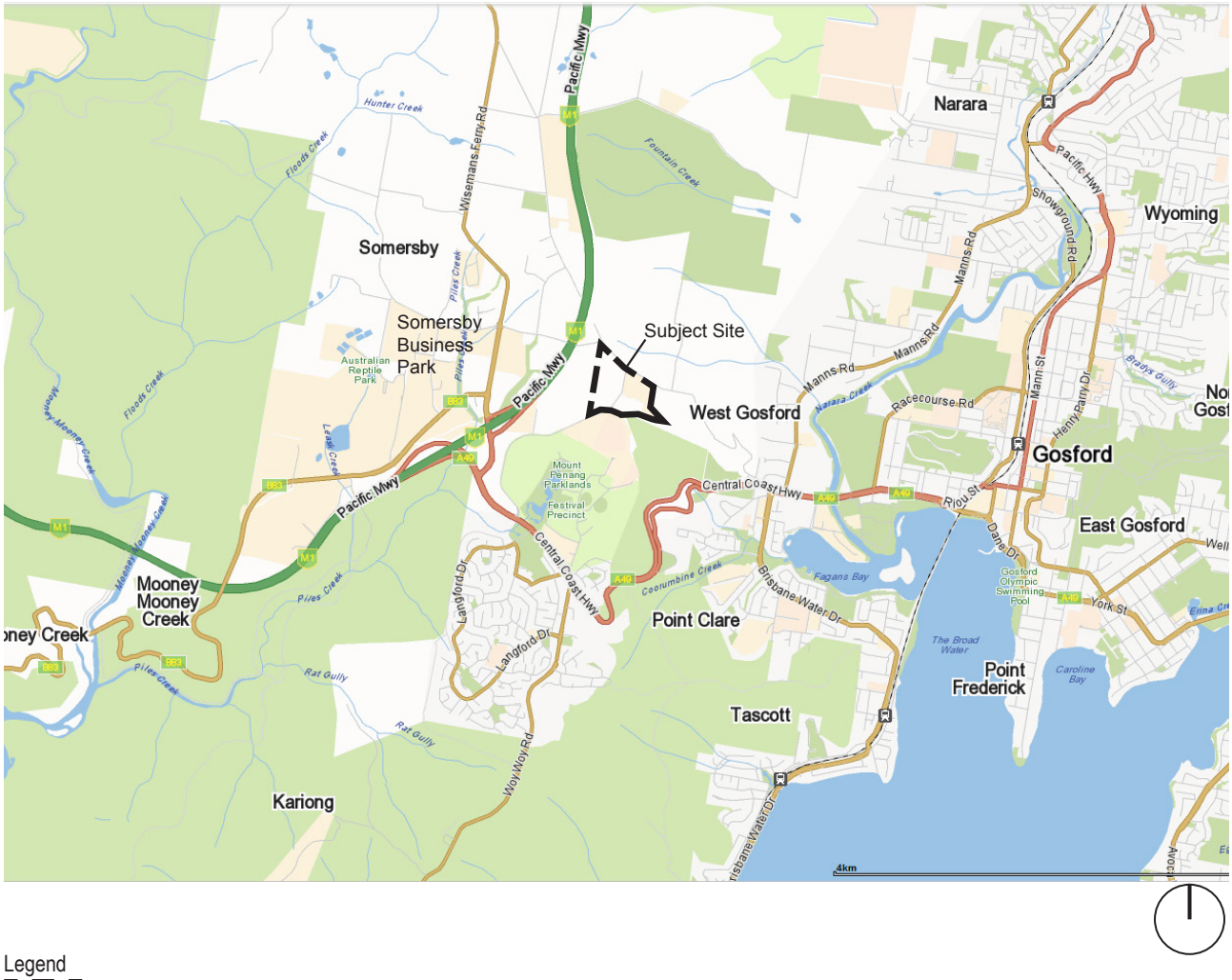
PART 5 COMMUNITY CONSULTATION

There has been no formal exhibition of the proposal, and hence no public consultation at this stage. However, the proposal has been the subject of various reports and presentations with Council Officers and Council. The Council meetings and reports dealing with the proposal are a public record.

PART 6 PROJECT TIMELINE

The following provides an anticipated project timeline for the proposal.

Principal Steps	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Anticipated commencement date (date of Gateway determination)												
Anticipated timeframe for the completion of required studies including consultation with government agencies												
Public exhibition period												
Consideration of submissions												
Consideration of a proposal post exhibition												
Anticipated timing for making of the plan												



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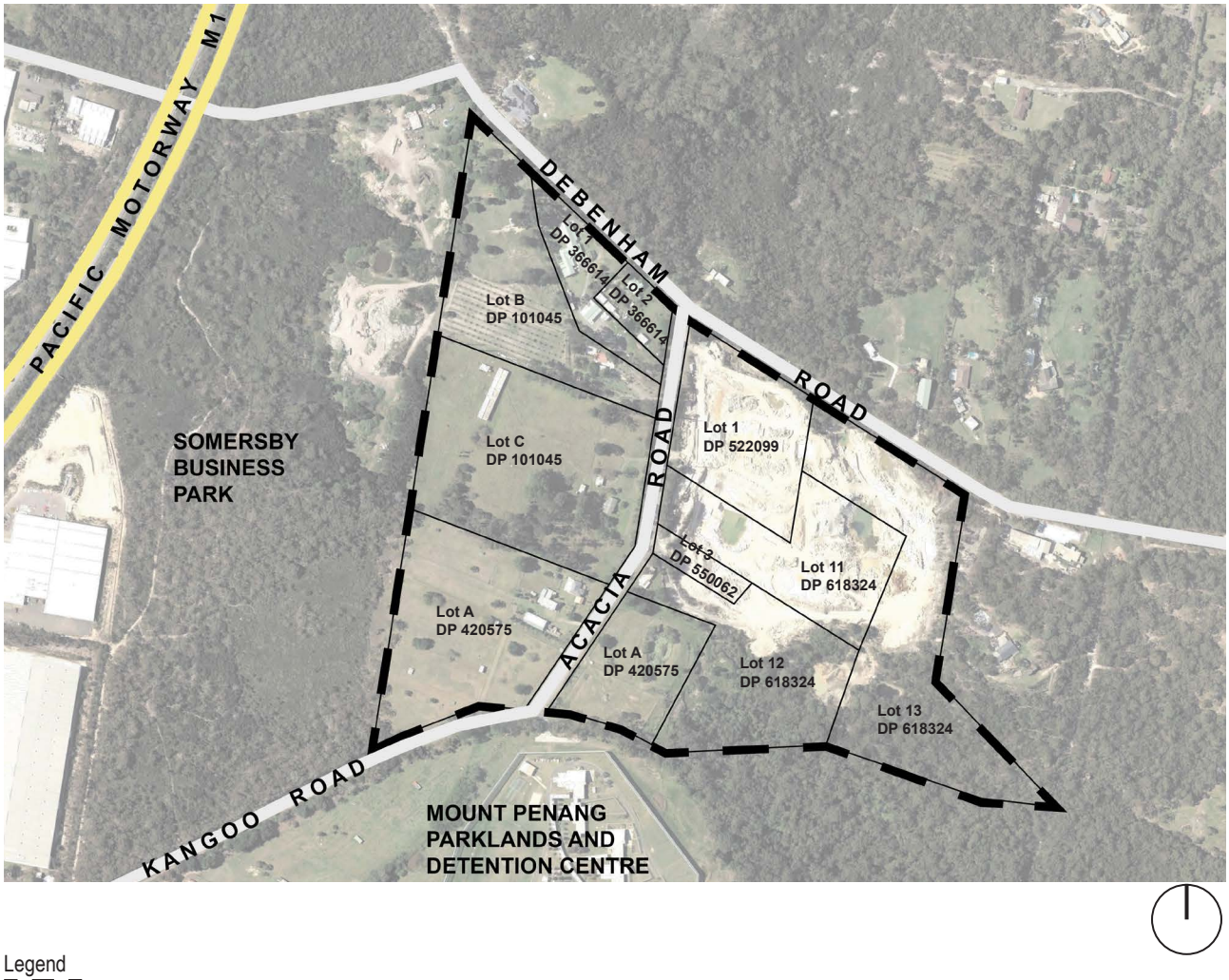
Subject Site

Figure 1 – Locality Plan
Source: Whereis.com



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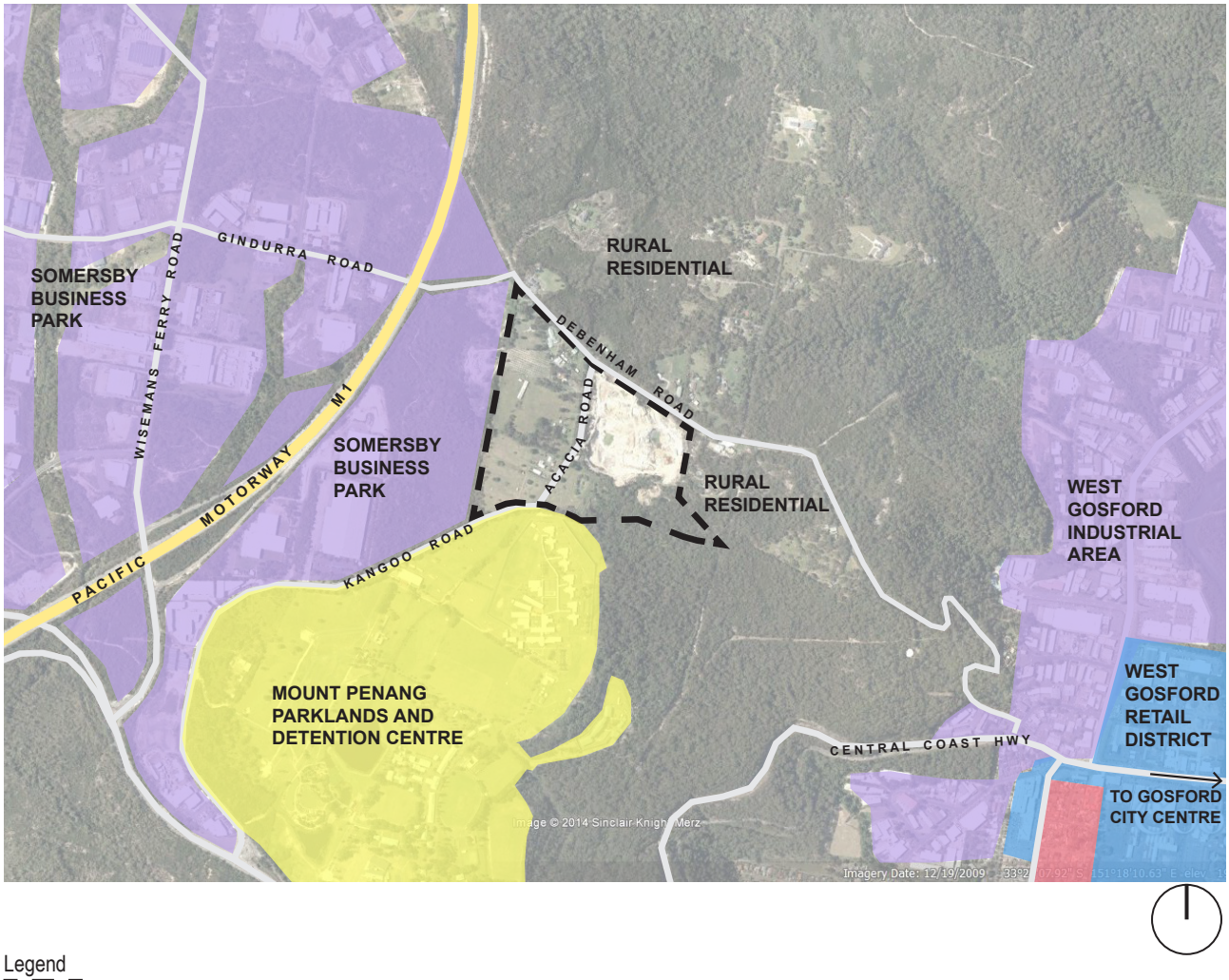
Subject Site

Figure 2 – Subject Site
Source: Base Google Earth Pro



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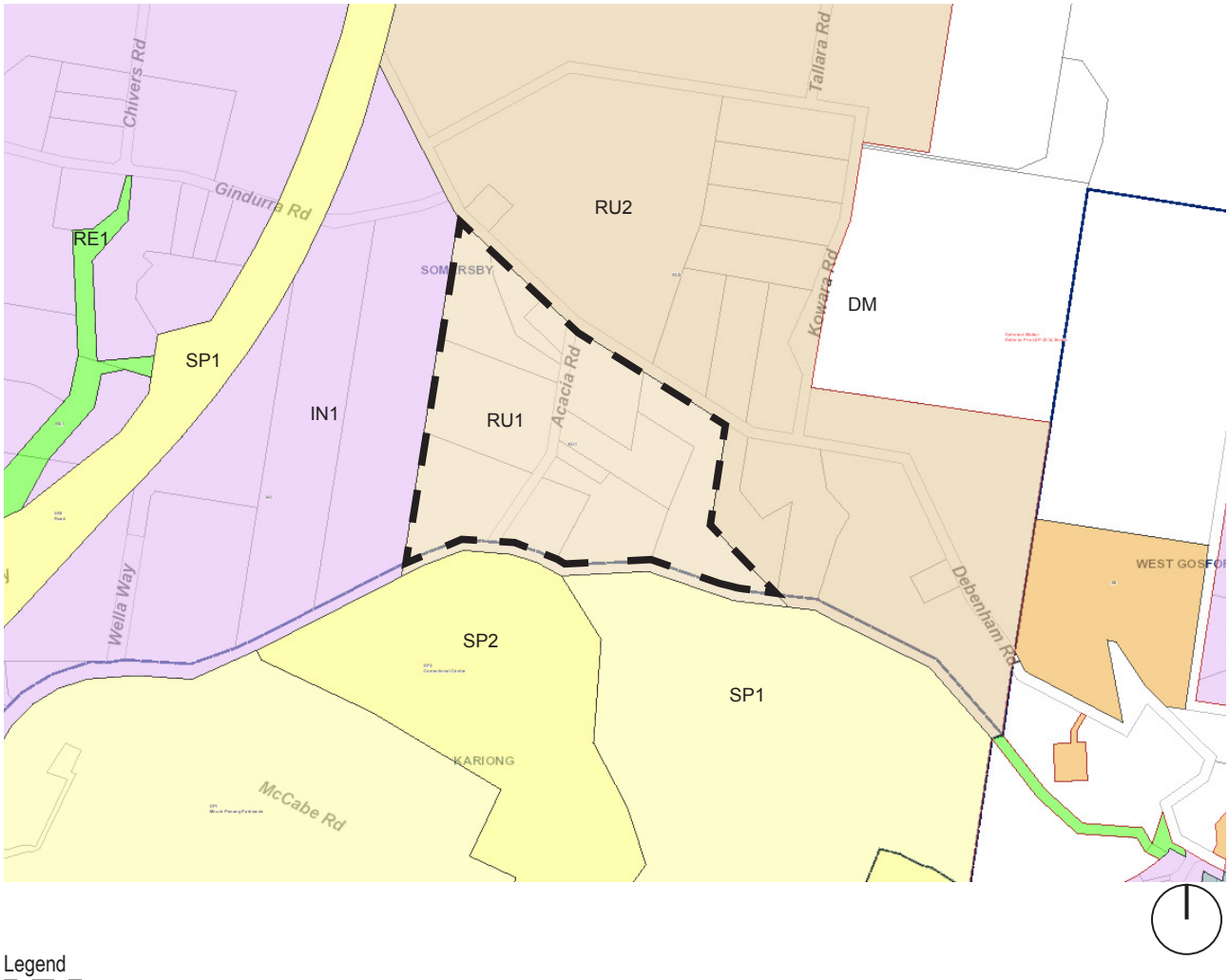
- Subject site
- Industrial
- Retail
- Special uses
- Residential

Figure 3 – Contextual Analysis
Source: Base Google Earth Pro



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	Subject Site	
	IN1	General Industrial
	RE1	Public Recreation
	RU1	Primary Production
	RU2	Rural Landscape
	SP1	Special Activities
	SP2	Infrastructure
	DM	Deferred Matter

Figure 4 – Existing Zone Plan
Source: Gosford City Council

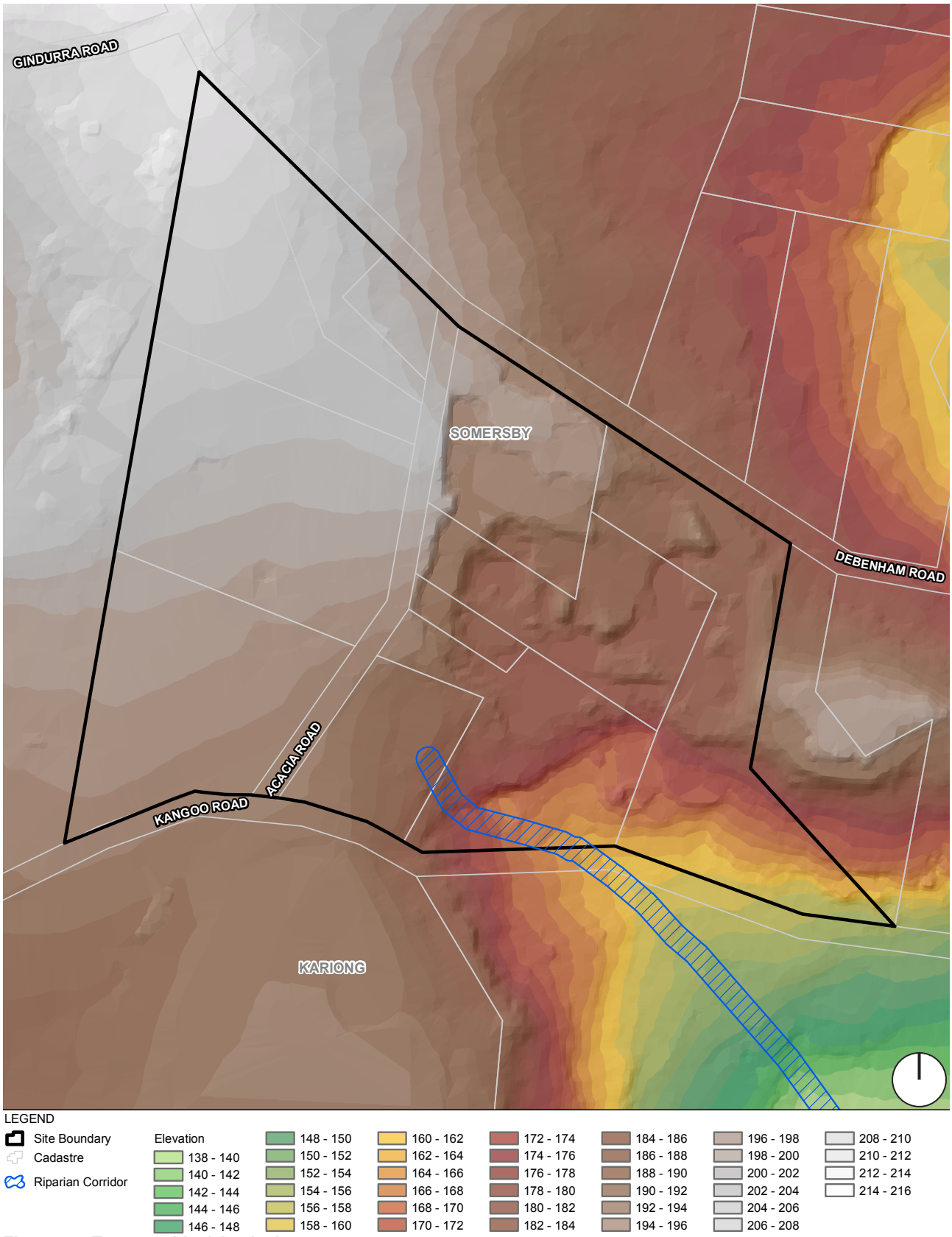


Figure 5 – Topographical Analysis
Source: GHD

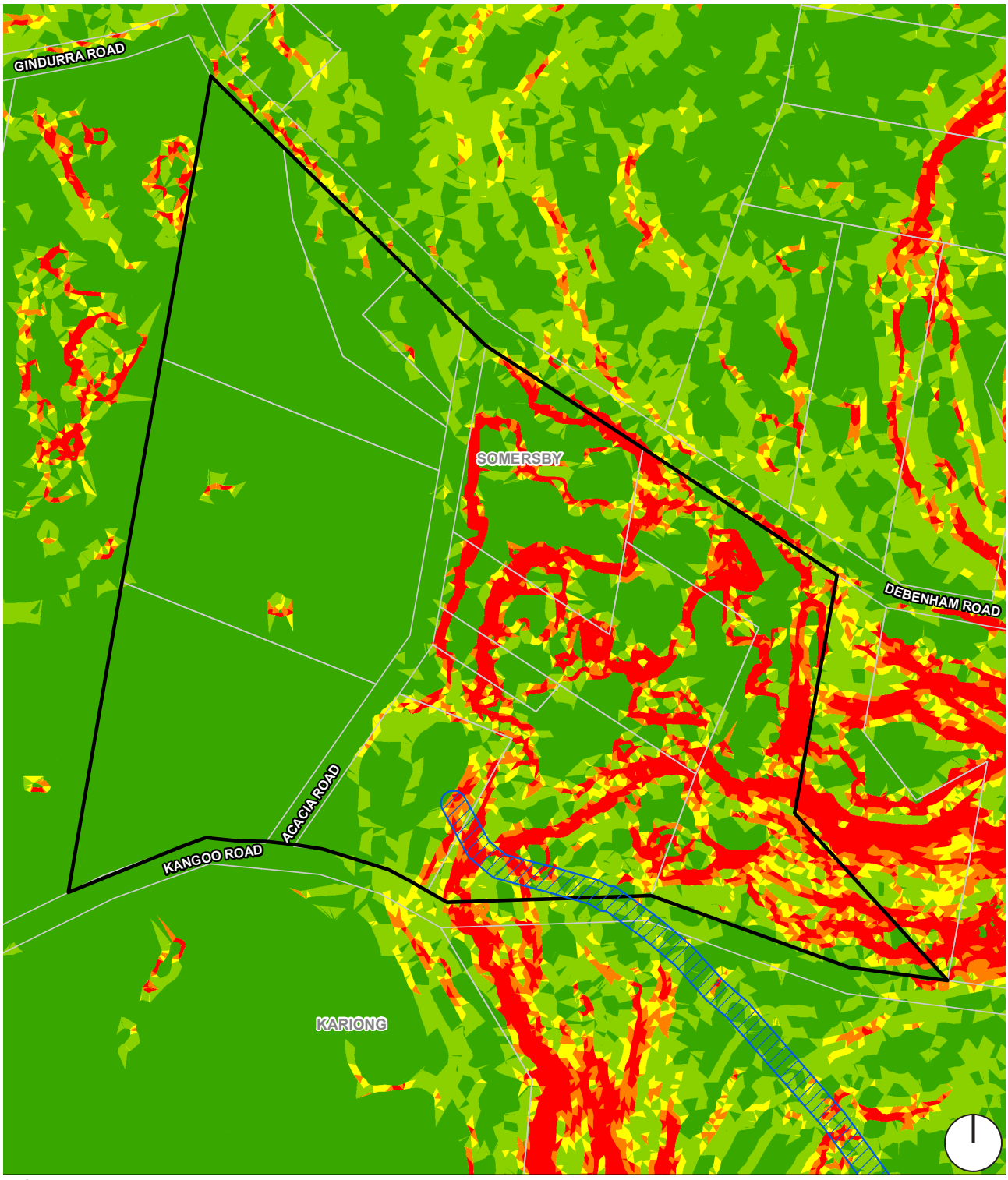
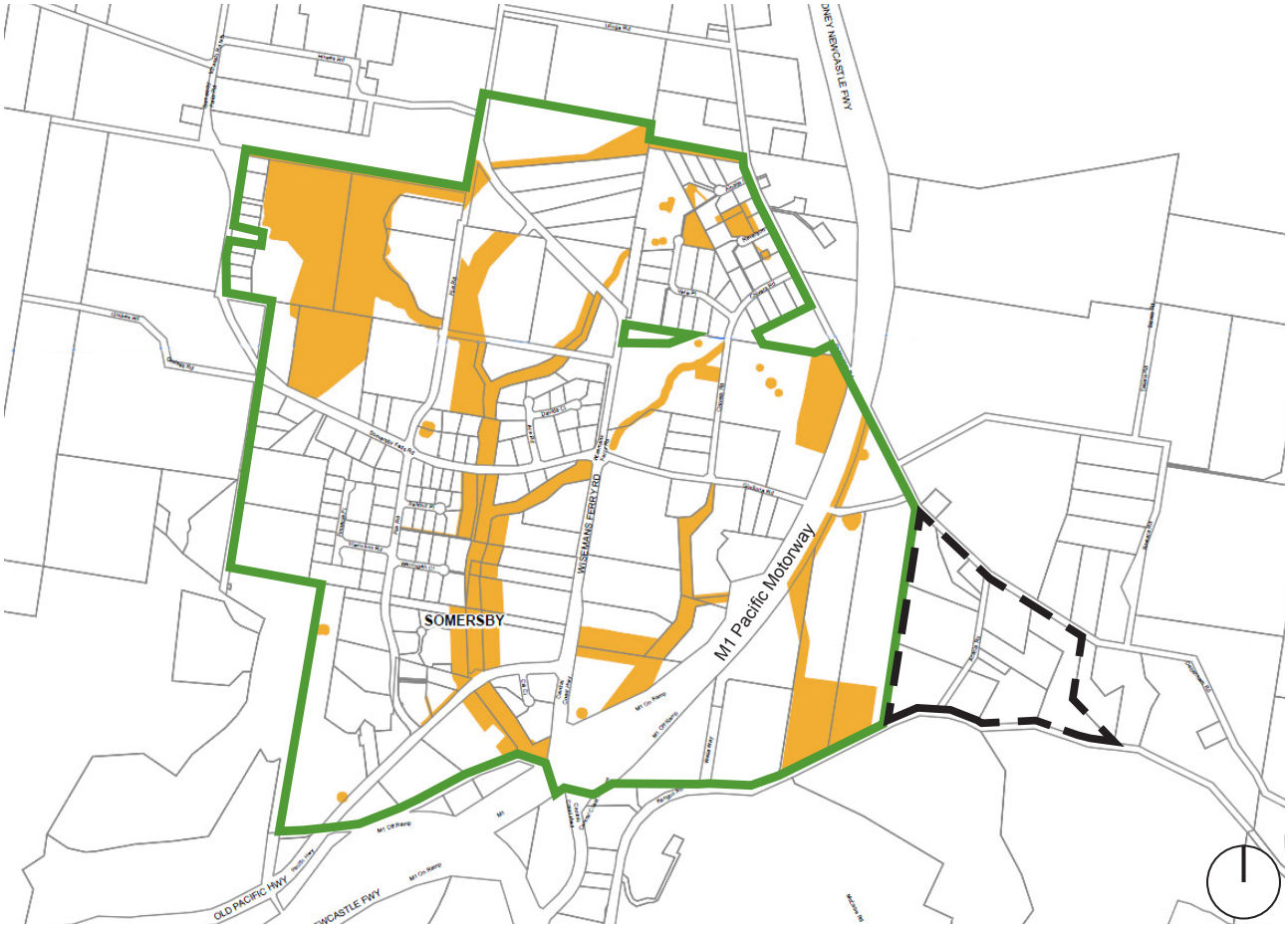


Figure 6 – Slope Analysis
Source: GHD

Figure 7 – Landslip Map Acacia Road
Source: Gosford City Council



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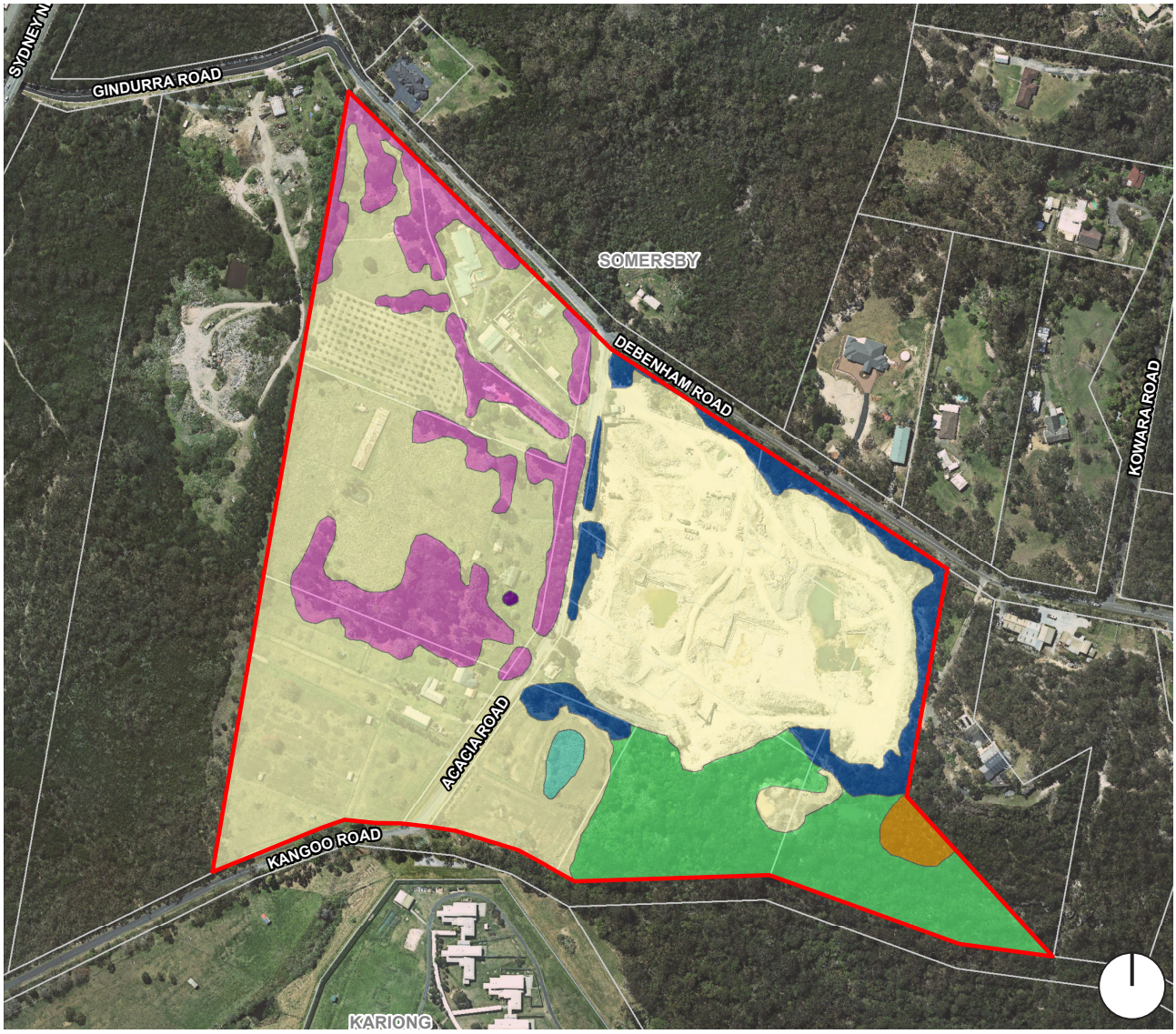
Subject Site

Somersby Business Park

Ecologically significant and Aboriginal heritage lands

Figure 8 – Key Sites
Source: Gosford City Council



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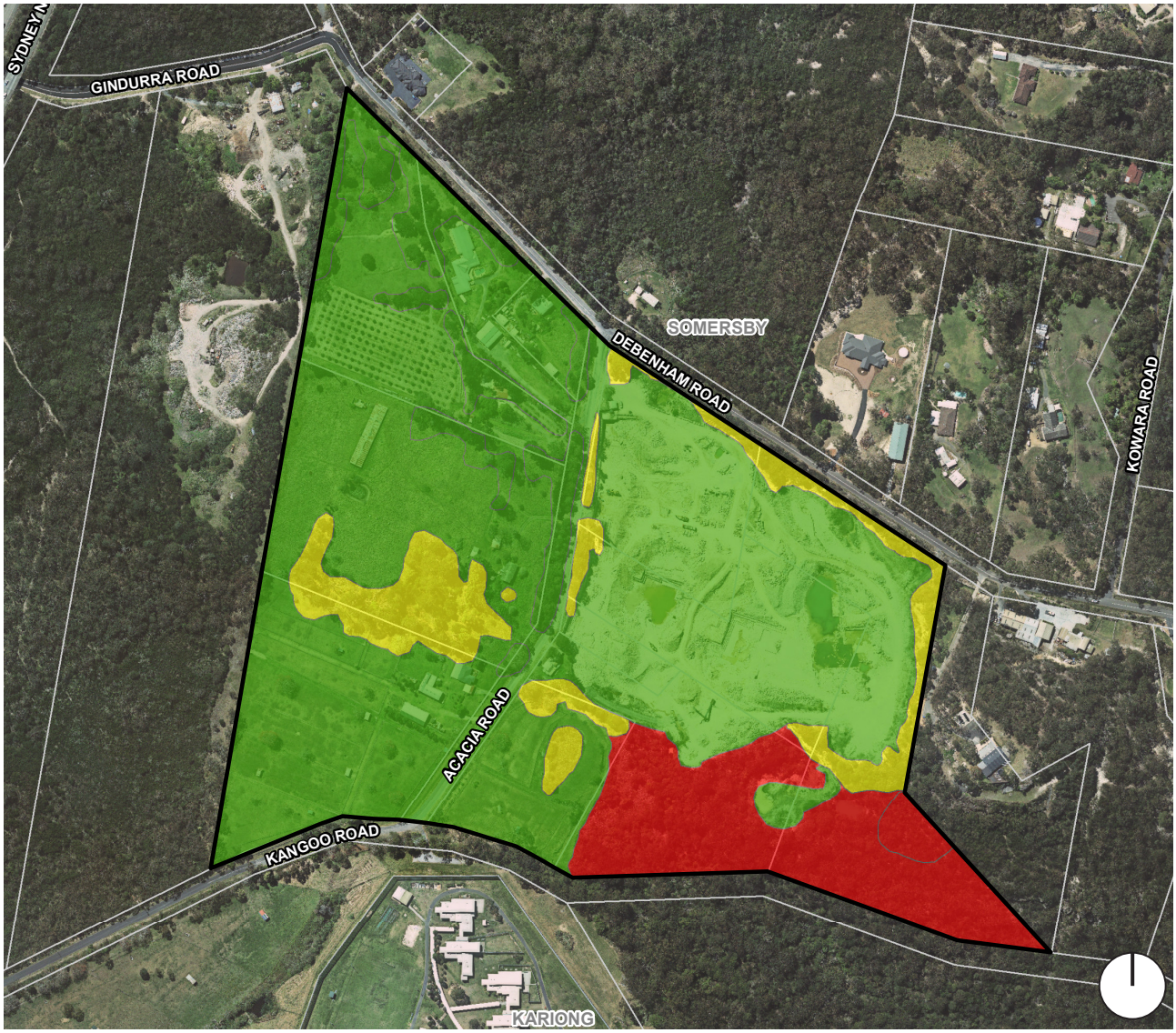
- Subject Site
- Disturbed land
- Exposed Hawkesbury Woodland
- Farm Dam
- Hawkesbury Banksia Scrub Woodland
- Hawkesbury Peppermint Forest
- Planted and Exotic Vegetation
- Planted and Exotic Vegetation

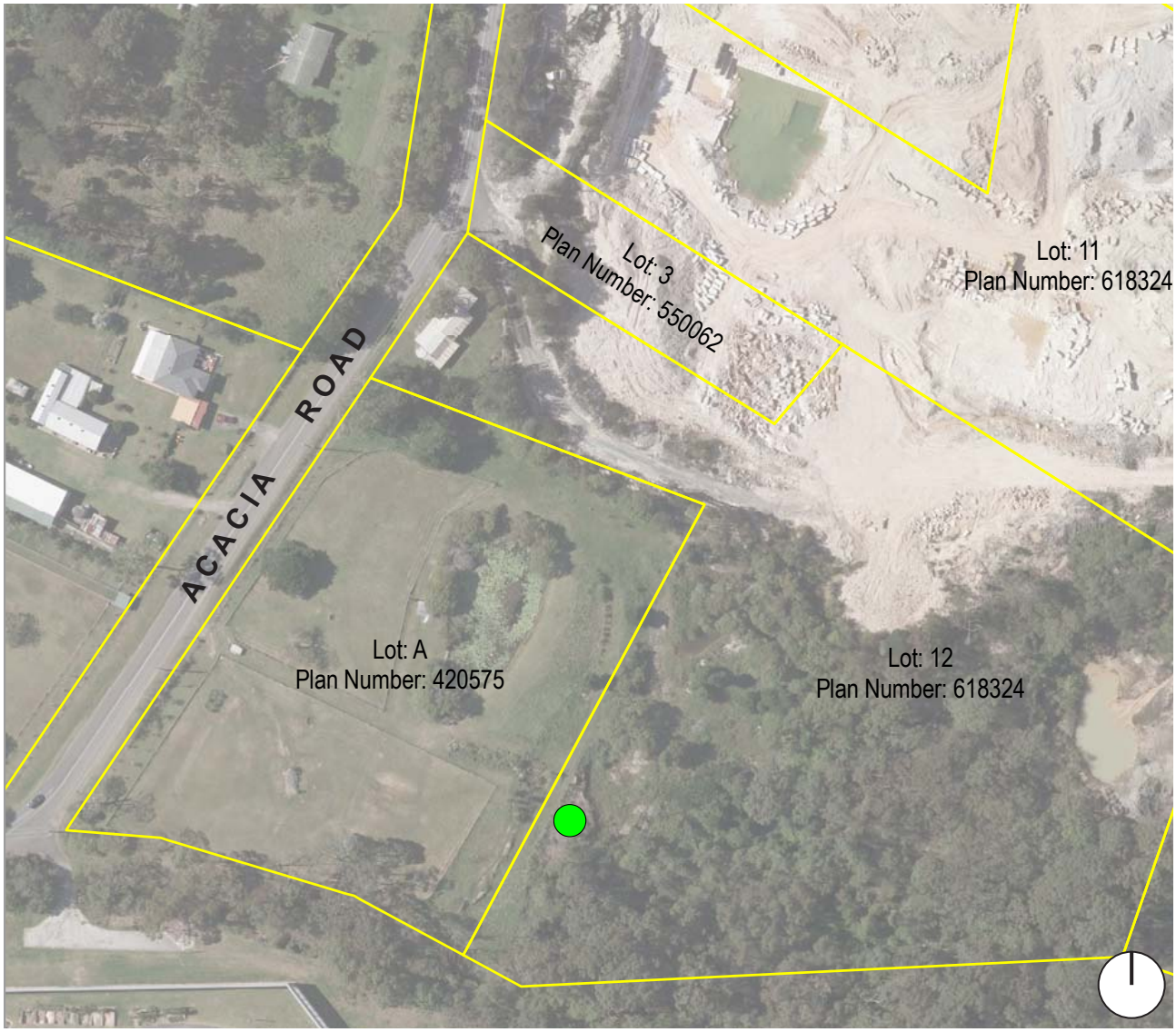
Figure 9 – Vegetation Communities
Source: GHD



Legend

- Subject site
- High ecological constraint
- Medium ecological constraint
- Low ecological constraint

Figure 10 – Ecological Constraints
Source: GHD



Legend

Subject site

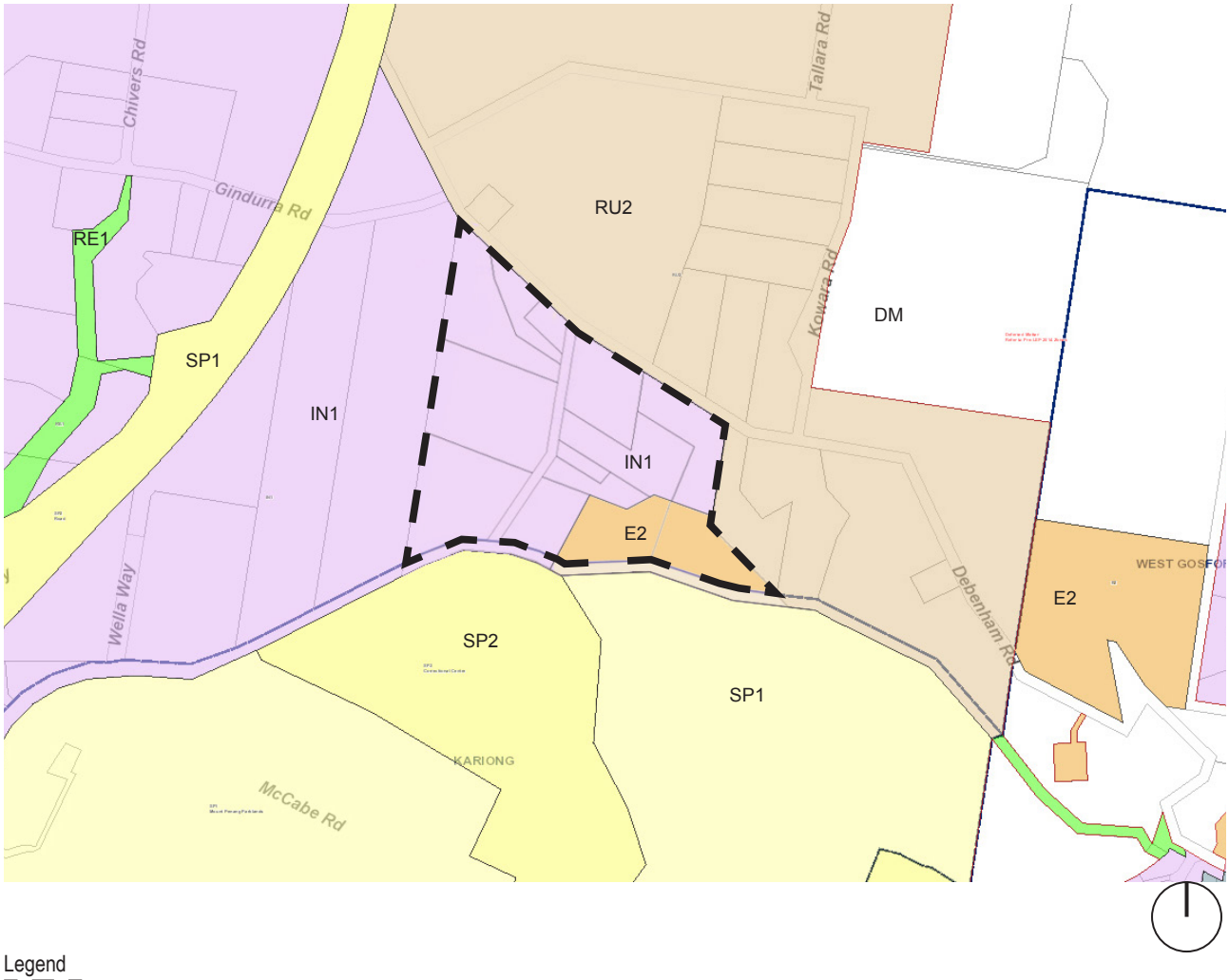
Potential Aboriginal Site

Figure 11 – Aboriginal Heritage
Source: GeoLINK Ecological and Aboriginal Heritage Report

Legend

- Subject site
- Developable area
- Constrained area
- Exposed Hawkesbury Woodland
- APZ setback
- Farm dam

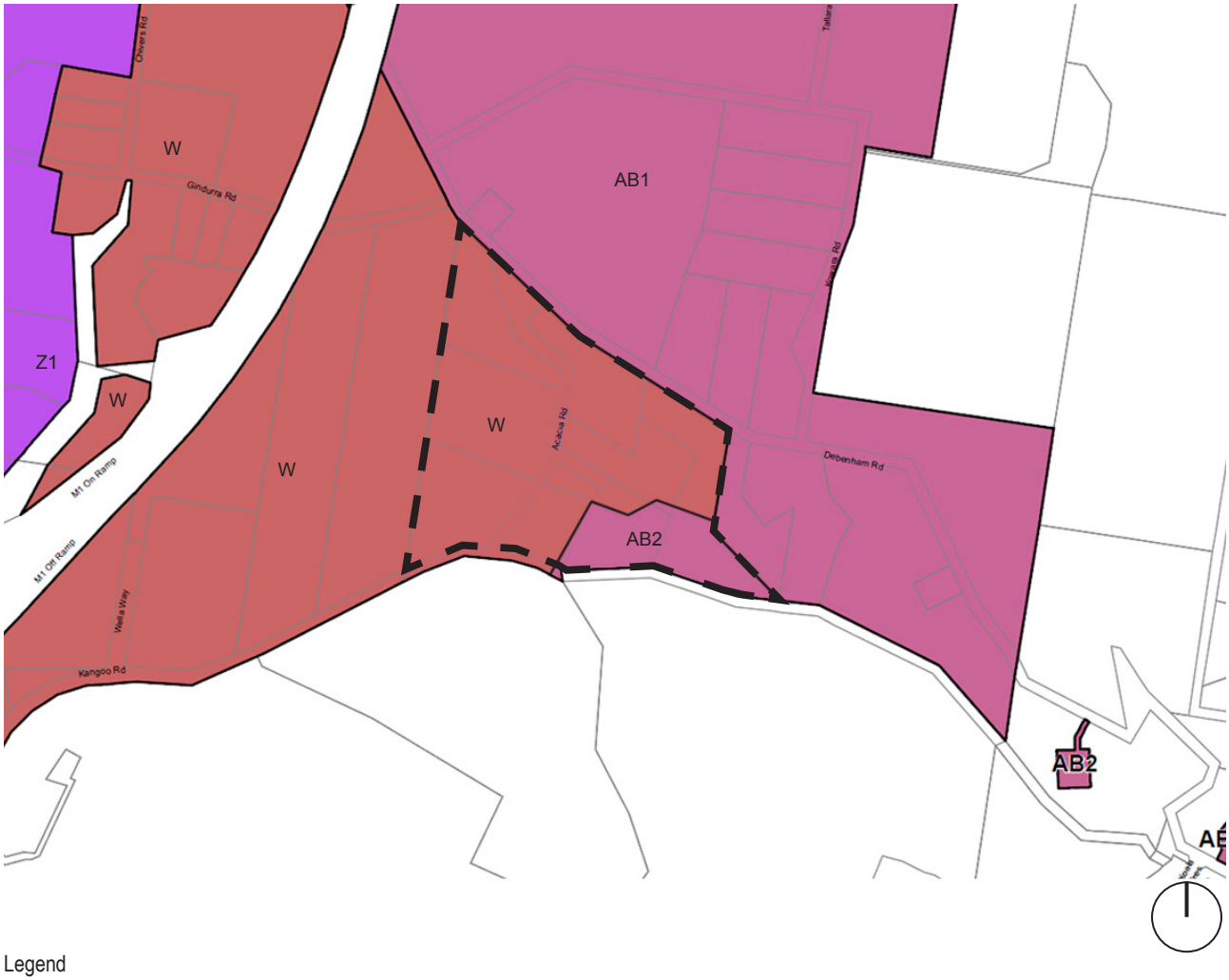
Figure 12 – Opportunities and Constraints Plan
Source: Base Google Earth Pro 2014



Legend

	Subject Site	
E2	Environmental Conservation	
IN1	General Industrial	
RE1	Public Recreation	
RU2	Rural Landscape	
SP1	Special Activities	
SP2	Infrastructure	
DM	Deferred Matter	

Figure 13 – Proposed Zone Plan
Source: Base: Gosford City Council



Legend

- Subject Site
- W — 4000m²
- Z1 — 20,000m² (2 ha)
- AB1 — 200,000m² (20 ha)
- AB2 — 400,000m² (40 ha)

Figure 14 – Proposed Minimum Lot Sizes
Source: Base - Gosford City Council

Figure 15 – Maximum Building Height
Source: Base - Gosford City Council

Appendix 1

Flora and Fauna Assessment

GHD Pty Ltd

August 2014

Peter Andrews and Associates Pty Ltd

Somersby Business Park Extension

Flora and Fauna Assessment

August 2014

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1. Introduction

This flora and fauna assessment has been prepared by GHD Pty Ltd (GHD) for Peter Andrews and Associates Pty Ltd to evaluate the conservation significance of biodiversity and identify flora and fauna constraints and opportunities for the Somersby Business Park Extension (referred to in this report as 'the proposal'). In particular, the assessment addresses threatened species, populations and communities (and their habitats) listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act), *Fisheries Management Act 1994* (FM Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.1 Background

The existing Somersby Business Park accommodates a range of manufacturing, processing and general industrial areas. Investigations are underway in order to facilitate expansion of the eastern precinct of Somersby Business Park that is comprised of Lot 1/DP366614, Lot2/DP364929, Lot 1/DP522099, Lot3/DP550062, Lot 11/DP618324, Lot 12/DP618324, Lot 13/DP618324, Lot A/DP420575, LotB/DP101045 and Lot C/DP101045 (the site). This flora and fauna assessment will be incorporated into the planning proposal to progress the rezoning of the site.

1.2 Site description

The site is situated within the eastern precinct of Somersby Business Park on the south west corner of Acacia Road and Debenham Road, approximately 5 km west of Gosford City Centre on the NSW central coast (Figure 1-1). Currently the majority of the site consists of a sandstone quarry operated by Gosford Quarry Holdings Limited (GQH).

The site is situated on the erosional Sydney Town soil landscape that is characterised by undulating to rolling low hills and moderately inclined slopes on quartz sandstone (Hawkesbury Sandstone and Terrigal formation: Narrabeen Group) along the edge of the Somersby Plateau. The proposal is located on an elevated plateau and no watercourse or riparian areas occur at the site.

The majority of the site has previously been cleared and primarily used as a quarry or for rural residential purposes or agriculture involving large-scale vegetation clearing. The vegetation in adjacent areas indicates that prior to clearing the dominant vegetation on the site is likely to have consisted of Hawkesbury Scrub and Woodland (as described in section 3.3.3), consistent with the remanent and regrowth vegetation in the southeast of the site. The vegetation in the southeast of the site is of particular biodiversity value where it is contiguous with the adjoining remnant and regrowth native vegetation. Other vegetation remaining on the site consists of various horticultural species for hobby farms and landscaping.

1.3 Definitions

For the purpose of this report the following definitions apply:

- The 'site' refers to the area that would be directly impacted by the proposal.
- The 'study area' encompasses the site and the area that may be indirectly impacted by the proposal.
- The 'locality' is the area within a 10 km radius of the site.

1.4 Aim

The aim of this flora and fauna assessment is to:

- Document the existing environment and biodiversity values of the site.
- Evaluate the conservation significance of site biodiversity values, including identification of the known occurrence or likely occurrence of threatened biota listed under the TSC Act or Matters of National Environmental Significance (MNES) listed under the EPBC Act.
- Identify flora and fauna constraints and opportunities on site with respect to proposed future use based on desktop searches only.Provide mapping to demonstrate ecological distribution and constraints.
- Provide a preliminary assessment of the potential for direct and indirect impacts on biodiversity values and the potential for a significant impact on threatened biota and MNES of the proposed future use of the site.
- Recommend mitigation measures that could be incorporated into future development plans to avoid or minimise impacts on threatened biota (as relevant).
- Identify the likely need (or otherwise) for further survey, assessment and approvals under the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act) or EPBC Act as relevant at the Development Application stage.

1.5 Scope and limitations

This report has been prepared by GHD for Peter Andrews and Associates Pty Ltd and may only be used and relied on by Peter Andrews and Associates Pty Ltd for the purpose agreed between GHD and Peter Andrews and Associates Pty Ltd.

GHD otherwise disclaims responsibility to any person other than Peter Andrews and Associates Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

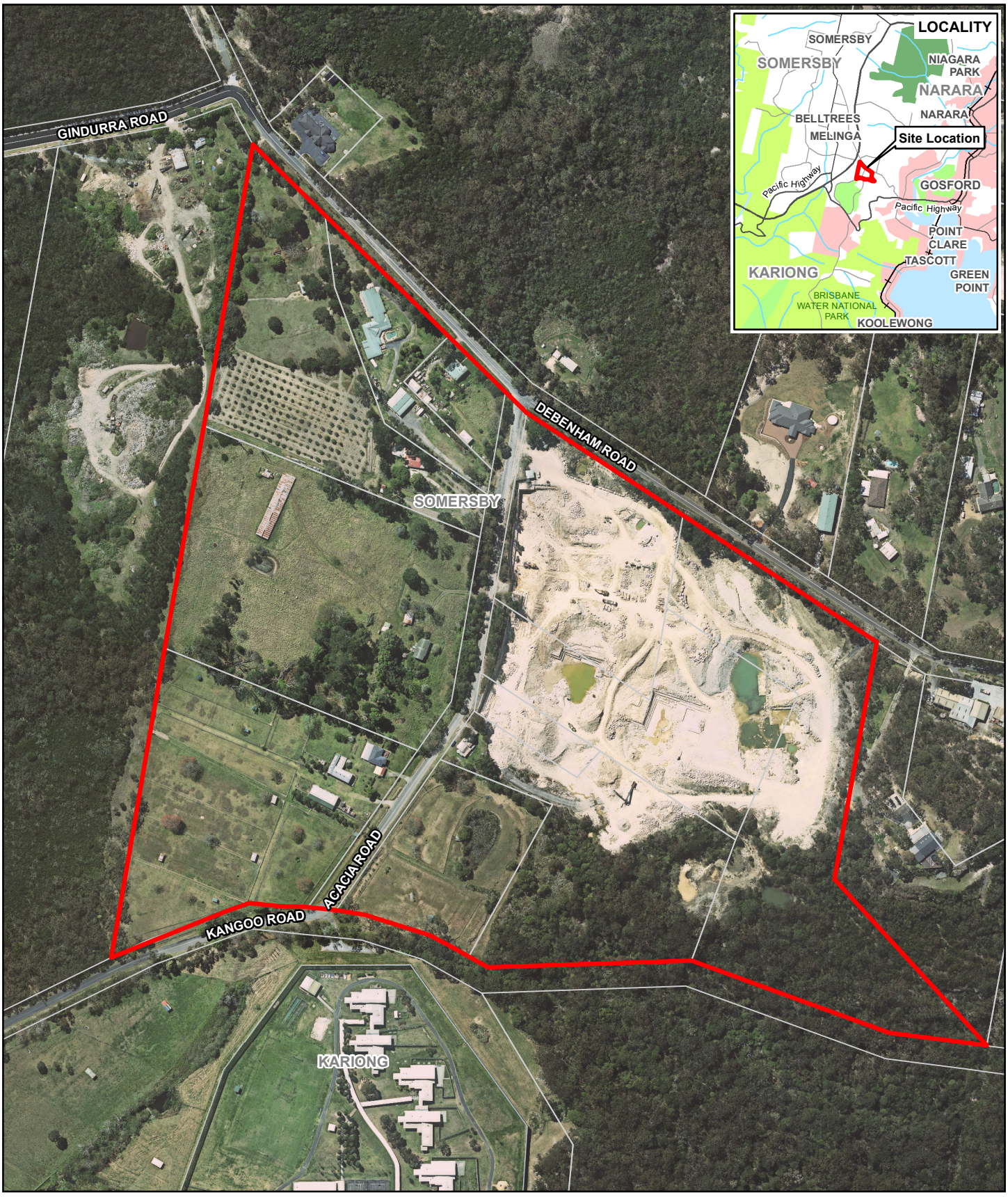
GHD has prepared this report on the basis of information provided by Peter Andrews and Associates Pty Ltd and others (including government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of threatened vegetation and threatened species and their habitat/s) may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This flora and fauna assessment has been prepared to identify ecological constraints and opportunities to accompany a planning proposal. Detailed design for the site is not available at this stage and as such it is outside GHD's scope to prepare assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, population or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. A general discussion of biodiversity impacts is undertaken in section 4.



LEGEND

- Site Boundary
- Cadastre

Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

N

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
Flora and Fauna Assessment

Job Number 22-17271
Revision 0
Date 17 Jul 2014

Proposal Location

Figure 1-1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E001_SiteLocation_0.mxd

Data source: LPI: DTDB & DCDB 2012; GCC: Aerial Imagery 2014; Geoscience Australia: 250k Topographic Data Series 3 2006. Created by: fmackay

2. Methodology

The methodology undertaken in order to complete the tasks outlined in the scope for this report, involved the following activities:

- Desktop review and database searches
- Site inspection
- Results analysis
- Assessment of impact
- Mapping

2.1 Desktop review

A desktop review was undertaken to help determine the conservation significance of the site and to identify threatened ecological communities, flora and fauna that occur or could potentially occur at the site. The following database and documentation was reviewed prior to the field investigations to target survey effort accordingly:

- Department of the Environment (DotE) Protected Matters Search Tool (PMST) for relevant matter of national environmental significance (MNES) listed under the EPBC Act (7 April 2014, buffered at 10 km).
- The NSW Office of Environment and Heritage (OEH) Wildlife Atlas database (OEH, 2014) for threatened species listed under the TSC Act (within a 10 km radius of the site).
- Department of Primary Industries (DPI) Threatened and Protected Species Records Viewer for threatened species listed under the FM Act previously recorded within the Gosford local government area (LGA).
- Review of the species and community profiles in the Species Profile and Threats (SPRAT) and Threatened Species Profile databases.
- Geolink (2013) Ecological and Aboriginal Heritage Report Somersby Industrial Park, which includes field surveys of the proposal site.

Database search results are presented in section 3.2 (refer Appendix A).

2.2 Site inspection

A site inspection was undertaken to confirm the previous Geolink (2013) findings and included the following:

Flora

- Assessment of vegetation type, condition and conservation significance, including identification of threatened ecological communities listed under the TSC or EPBC Act (if present).
- Identification of flora species, including targeted searches for threatened flora in areas of potentially suitable habitat (if present) and identification of noxious weeds.

Fauna

- Fauna habitat assessment, including identification of resources of potential relevance for threatened fauna (e.g. particular feed trees, hollow-bearing trees, water bodies etc.), connectivity and evidence of fauna activity such as diggings, scats or whitewash to assess the value of habitat resources within the study area and to assess the potential for threatened fauna species to occur.
- Identification and mapping of hollow-bearing trees and other habitat resources (if present).
- Bird surveys, including sightings or call identification.
- Active searches around farm dams or depressions and groundcover (logs, rocks, leaf litter etc.) for amphibians and reptiles.
- Recording of opportunistic sightings or call identification of diurnal birds, mammals, reptiles and frogs.

Aquatic habitat

- Rapid assessment of any aquatic habitats, including assessment of flow characteristics, in-stream vegetation (if present), bed substrate, visual assessment of water quality, and potential habitat for threatened biota.

2.2.1 Limitations

The current survey relies heavily on previous flora and fauna field surveys of the site and was not designed to detect all species present at the site, rather to provide an overall 'snapshot' assessment of the ecological values on site. Given the duration and timing of the field survey it is likely that some species that utilise the site (permanently, seasonally or transiently) were not detected. Habitat assessments, the results of previous surveys and reports and database results were utilised to determine the likelihood of threatened and migratory species occurring in the proposal site.

Site conditions (including the presence of threatened species of flora and/or fauna) may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2.2.2 Likelihood of occurrence of threatened species

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the study area. The likelihood of threatened and migratory biota occurring in the study area was assessed based on presence of records from the locality, species distribution and habitat preferences, and quality of potential habitat present in the study area. This assessment was further refined following the field surveys to incorporate the nature and condition of habitats available within the proposal site. The results of this assessment are provided in Appendix B.

Table 2-1 provides a key to the definitions of likelihood of occurrence in the study area of threatened biota known or likely to occur in the locality.

Table 2-1 Key to likelihood of occurrence for threatened species

Likelihood	Definition
Known	Species recorded within the site.
High	Presence of potential high value habitat (e.g. breeding and foraging habitat; important movement corridors).
Moderate	Presence of potential medium value habitat (e.g. disturbed breeding conditions; constrained foraging habitat; movement corridors).
Low	Presence of potential low value habitat (e.g. disturbed conditions; isolated small habitat area; fragmented movement corridors).
Unlikely	Species or community previously recorded within a 10 km radius of the study area but no suitable habitat recorded.

2.3 Legislative considerations

This flora and fauna assessment has been prepared to inform the ecological constraints and opportunities to accompany a planning proposal. Detailed design for the site is not available at this stage and as such it is outside GHD's scope to prepare assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, population or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. A general discussion of biodiversity impacts is undertaken in section 4.

3. Results

3.1 Database search results

3.1.1 Threatened ecological communities

The desktop assessment indicated that 21 threatened ecological communities (TECs) were known or predicted to occur within the Hunter Central Rivers Catchment Management Authority (CMA) at the time of the search(refer to Appendix A).

3.1.2 Endangered populations

Six endangered populations previously recorded within the Hunter CMA subregion are listed in Appendix A.

3.1.3 Threatened flora

The Atlas of NSW Wildlife database identified 14 threatened flora species listed under the TSC Act previously recorded in the locality (Figure 3-1). The PMST search identified 24 threatened flora species listed under the EPBC Act as potentially occurring in the locality.

Threatened flora species known or considered likely to occur, based on habitat present, are discussed in more detail in section 3.3.4.

3.1.4 Threatened fauna

A search of the Atlas of NSW Wildlife database identified 31 threatened fauna species (15 bird, two amphibians, one reptile and 13 mammal species) listed under the TSC Act as having been previously recorded in the locality (Figure 3-2). The PMST search identified 17 threatened fauna species (not including marine species such as whales, dolphins sharks and albatross) listed under the EPBC Act as potentially occurring in the locality, including four bird species, seven mammal species, one reptile and three frog species (see Appendix B).

Threatened fauna species known or considered likely to occur, based on habitats observed, are discussed in more detail in section 3.3.6.

3.1.5 Migratory species

The PMST search identified 19 migratory fauna species (not including marine species such as whales, dolphins sharks and albatross) listed under the EPBC Act as potentially occurring in the locality (see Appendix B).

3.1.6 Other matters of national environmental significance

The PMST search also reported the following matters protected by the EPBC Act are known or predicted to occur in the locality:

- Commonwealth lands: 11
- Listed marine species: 45
- Whales and other cetaceans: 1

There were no world heritage properties, national heritage places, wetlands of international importance, Great Barrier Reef Marine Park, Commonwealth marine areas, Commonwealth heritage places, critical habitats, Commonwealth reserves or listed threatened ecological communities identified within 10 km of the site.

A number of marine species (such as whales, sharks, dolphins and albatross) appear on the PMST search; however these species are not relevant to this assessment as no marine habitats occur within or adjacent to the site. Marine species are therefore not considered further in this report.

A copy of the EPBC Act PMST report is provided in Appendix B.

3.2 Literature review

Geolink (2013) Ecological and Aboriginal Heritage Report for Somersby Industrial Park. Report prepared for Gosford City Council.

Geolink completed an ecological assessment of the site as part of a broader assessment examining ecological constraints within the Somersby Business Park (utilising local consultants Stephen Bell and Michael Murray). Geolink (2013) reported the following ecological constraints at the site:

- The majority of the site (areas associated with the quarry and rural residential areas) have no ecological constraints. The vegetated south-east corner of the site is highly ecologically constrained due to threatened fauna habitat. The site also contains medium constraints (mainly associated with regrowth vegetation associated with road reserves) including general fauna habitat and fauna connectivity.
- Six Netted Bottlebrush (*Callistemon linearifolius*) individuals were recorded below the escarpment south of the quarry.
- There is a high probability that the Somersby Mintbush (*Prostanthera junonis*) is present in the seed bank as the site is surrounded by records of this species.
- There are no threatened ecological communities listed on the TSC Act or EPBC Act that occur at the site.
- There is potential habitat and a high probability that Giant Burrowing Frog (*Heleioporus australiacus*), Red-crowned Toadlet (*Pseudophryne australis*), Eastern Pygmy Possum (*Cercartetus nanus*) and Squirrel Glider (*Petaurus norfolcensis*) occur at the site.
- Grey-headed Flying-fox (*Pteropus poliocephalus*), Eastern Freetail-bat (*Mormopterus norfolkensis)*, Greater Broad-nosed Bat (*Scoteanax rueppellii*) and Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) were recorded at the site and there is potential habitat and a high probability that a further four microchiropteran bats would occur at the site.
- The site contains important habitat features such as forage for threatened amphibians and bats, and hollow-bearing trees.
- The site is noted to occur within:
  - An OEH key fauna habitat and corridor
  - Climate change corridor
  - Central Coast Regional Strategy Indicate green corridor
  - Rural Fire Service bushfire prone land
  - State Regional Environment Plan 8 - Prime Agricultural Land

3.3 Field survey

3.3.1 Field team and survey effort

One ecologist undertook the field survey in conjunction with a site visit undertaken by the contaminated lands, planning and architect specialists on the 11 April 2014.

3.3.2 Weather conditions during surveys

Weather conditions experienced during the survey were mild with low rainfall (Table 3-1) and a strong westerly wind.

Table 3-1 Weather records for Gosford (source: BoM 2014)

Date	Day	Temperature (°C)		Wind	Rain (mm)
		Maximum	Minimum	Speed and direction (km/h)	
11-04-2014	Friday	28.3	18.4	W 44	3.0

3.3.3 Flora results

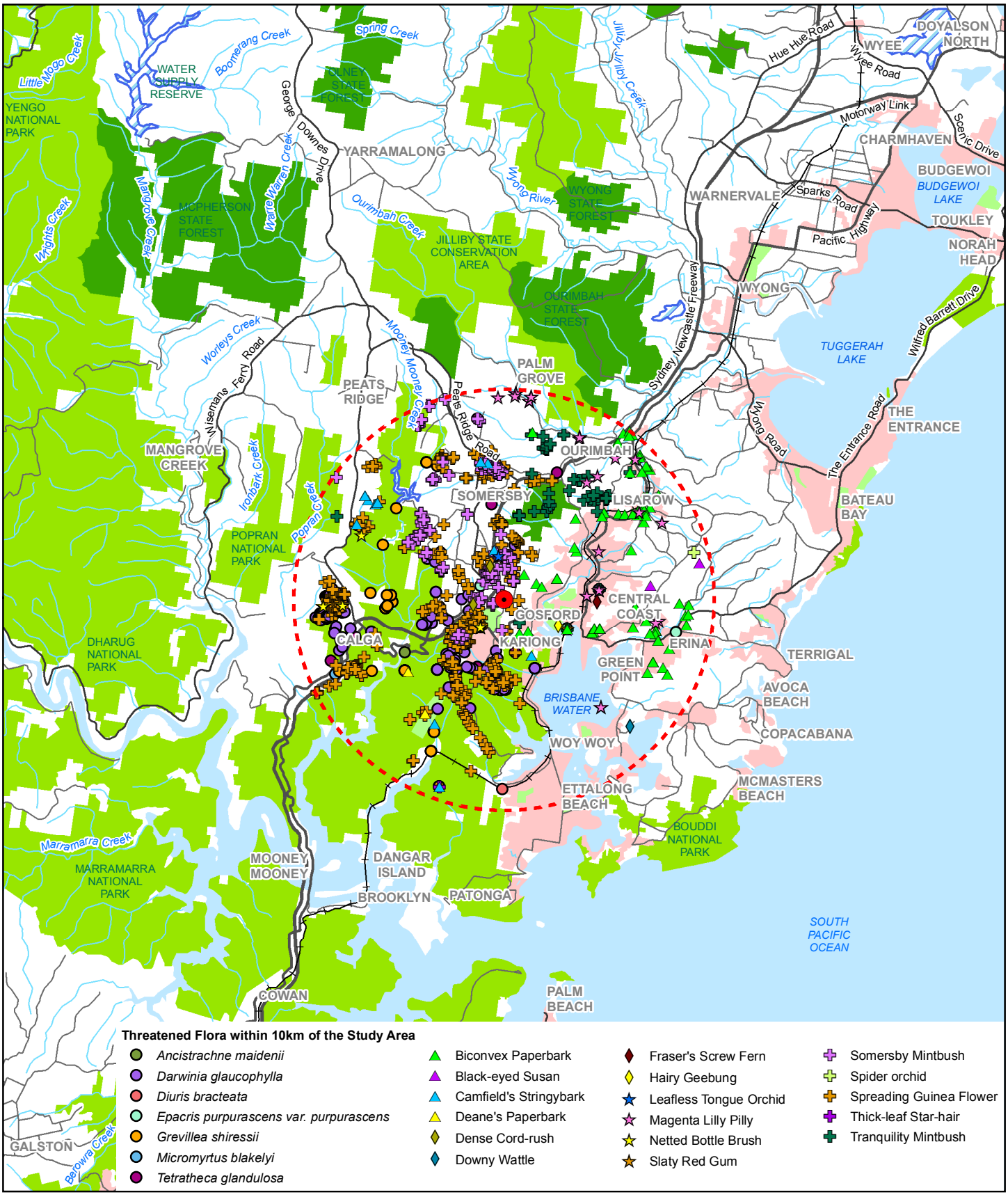
Vegetation types

The proposal site is dominated by existing cleared areas associated with the quarry and agricultural land, planted or exotic vegetation, and native vegetation consistent with Exposed Hawkesbury Woodland, Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest as mapped by Geolink (2013).

Vegetation communities mapped within the proposal site are shown on Figure 3-3 and are described below. Native vegetation types are labelled with the corresponding OEH Biometric Vegetation Type (OEH 2011). *Biometric Vegetation Types provide a standardised means for identification and description of vegetation communities in NSW.*

Table 3-2 Vegetation communities at the proposal site

Vegetation type (Geolink 2013)	OEH Biometric Vegetation Type	TSC Act status	FM Act status	EPBC Act status
Hawkesbury Peppermint Forest	Smooth-barked Apple - Sydney Peppermint - Turpentine heathy open forest on plateaux areas of the southern Central Coast, Sydney Basin	Not listed	Not listed	Not listed
Exposed Hawkesbury Woodland	Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin	Not listed	Not listed	Not listed
Hawkesbury Banksia Scrub Woodland	Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin	Not listed	Not listed	Not listed
Planted or exotic vegetation	NA	Not listed	Not listed	Not listed
Disturbed land	NA	Not listed	Not listed	Not listed



LEGEND

- Dual Carriageway
- Principal Road
- Secondary Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Built Up Area
- Recreation Area
- State Forest
- National Park
- 10km Buffer
- Site Location

Paper Size A4

0 1 2 4 6 8

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
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Threatened Flora previously recorded in the Locality (OEH 2014)

Job Number 22-17271
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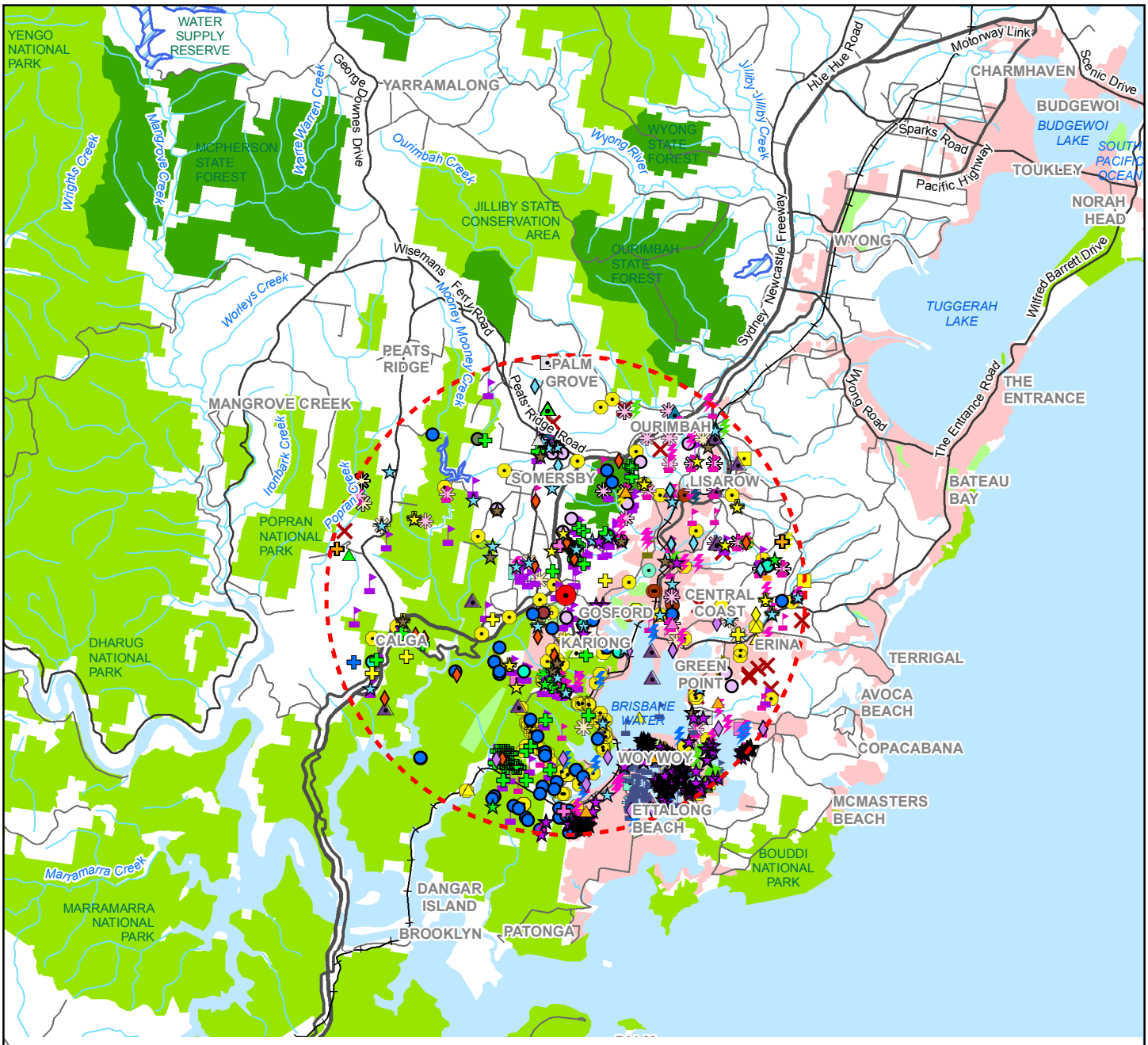
Figure 3-1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E002_OEHThreatFlora_0.mxd

Data source: Geoscience Australia: 250k Topographic Data Series 3 2006; OEH: Threatened Species Records, May 2014. Created by: fmackay



Threatened Fauna within 10km of the Study Area

- Australasian Bittern
- Barking Owl
- Black Bittern
- Black-breasted Buzzard
- Black-winged Petrel
- Bush Stone-curlew
- Eastern Bentwing-bat
- Eastern Chestnut Mouse
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Eastern Osprey
- Eastern Pygmy-possum
- Eastern Quoll
- Flesh-footed Shearwater
- Gang-gang Cockatoo
- Giant Barred Frog
- Giant Burrowing Frog
- Glossy Black-Cockatoo
- Gould's Petrel
- Greater Broad-nosed Bat
- Green Turtle
- Green and Golden Bell Frog
- Green-thighed Frog
- Grey-crowned Babbler
- Grey-headed Flying-fox
- Koala
- Large-eared Pied Bat
- Little Bentwing-bat
- Little Eagle
- Little Lorikeet
- Little Tern
- Long-nosed Potoroo
- Masked Owl
- Painted Honeyeater
- Pale-headed Snake
- Parma Wallaby
- Pied Oystercatcher
- Powerful Owl
- Red-crowned Toadlet
- Regent Honeyeater
- Rosenberg's Goanna
- Scarlet Robin
- Sooty Owl
- Sooty Oystercatcher
- Southern Myotis
- Spotted-tailed Quoll
- Square-tailed Kite
- Squirrel Glider
- Stuttering Frog
- Superb Fruit-Dove
- Swift Parrot
- Terek Sandpiper
- Turquoise Parrot
- Varied Sittella
- White-fronted Chat
- Yellow-bellied Glider

LEGEND

- Dual Carriageway
- Principal Road
- Secondary Road
- Minor Road
- Railway
- Watercourse
- Waterbody
- Built Up Area
- Recreation Area
- State Forest
- National Park
- 10km Buffer
- Site Location

Paper Size A4

0 1 2 4 6 8

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
Flora and Fauna Assessment

Job Number 22-17271
Revision 0
Date 17 Jul 2014

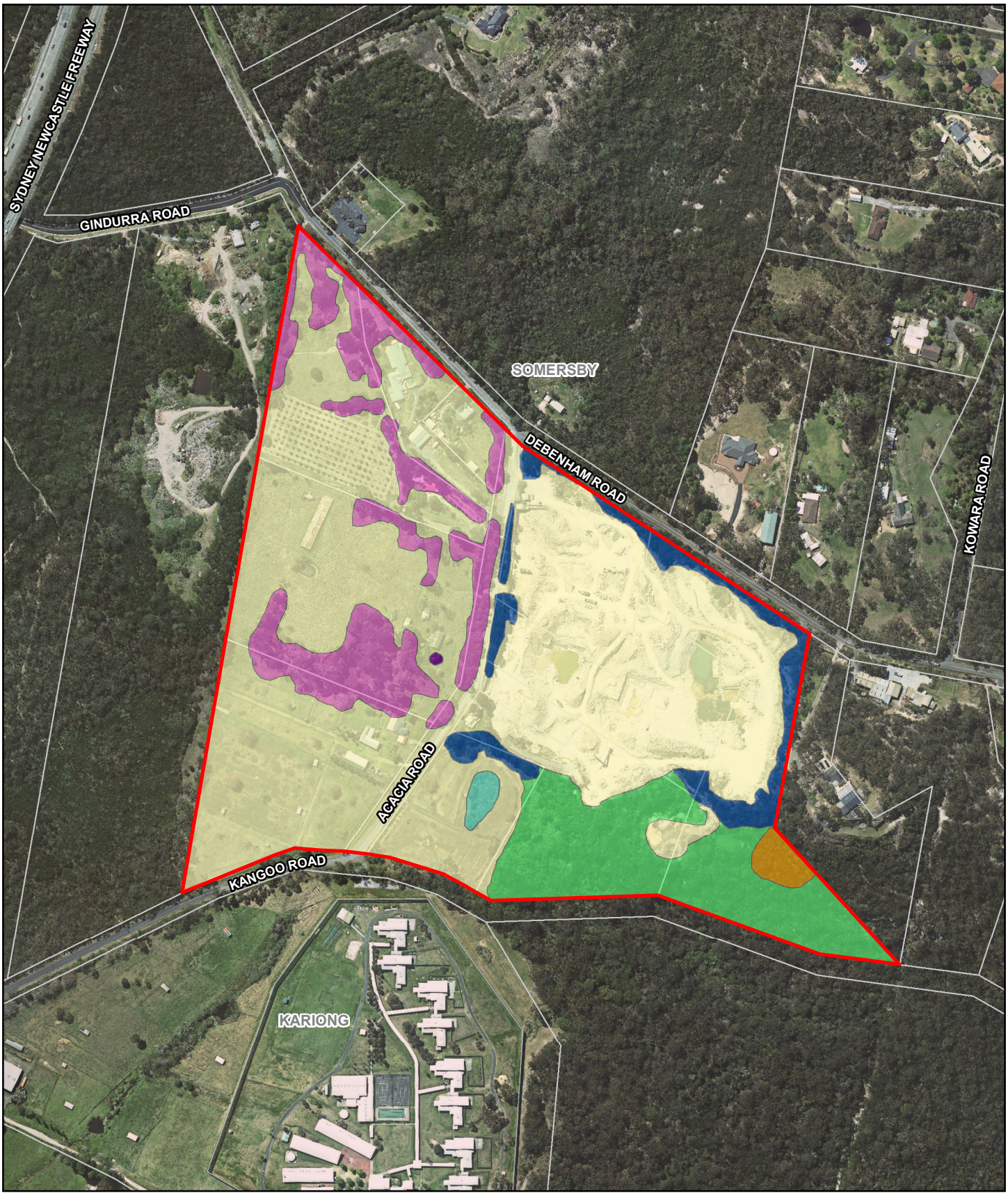
Threatened Fauna previously recorded in the Locality (OEH 2014)

Figure 3-2

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E003_OEHThreatFauna_0.mxd

Data source: Geoscience Australia: 250k Topographic Data Series 3 2006; OEH: Threatened Species Records, May 2014. Created by: fmackay



LEGEND

- Site Boundary
- Cadastre

Vegetation

- Disturbed Land
- Exposed Hawkesbury Woodland
- Farm Dam
- Hawkesbury Banksia Scrub Woodland
- Hawkesbury Peppermint Forest
- Planted and Exotic Vegetation
- One Planted and Exotic Vegetation

Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

N

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
Flora and Fauna Assessment

Vegetation Communities within the Proposal Site

Job Number	22-17271
Revision	0
Date	17 Jul 2014

Figure 3-3

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E004_VegetationMapping_0.mxd

Data source: LPI: DTDB & DCDB 2012; GCC: Aerial Imagery 2014; Geoscience Australia: 250k Topographic Data Series 3 2006. Created by: fmackay

Hawkesbury Peppermint Forest

This vegetation community occurs on the sheltered slopes in the southwest corner of the site. The canopy is dominated by Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*) and Scribbly Gum (*Eucalyptus haemastoma*). There is a tall understorey layer including Forest Oak (*Allocasuarina torulosa*), Black Wattle (*Callicoma serratifolia),* Hairpin Banksia (*Banksia ericifolia*) and Flaky-barked Tea-tree (*Leptospermum trinervium*). The grassy groundcover includes Bracken (*Pteridium esculentum*), Blue Flax-lily (*Dianella caerulea)*, Tall Saw-sedge (*Gahnia clarkei*), Spiny-headed Matt-rush (*Lomandra longifolia*) and Black Bog Rush (*Schoenus melanostachys).*

Hawkesbury Peppermint Forest covers approximately 3.0 hectares (ha) of the site as shown in Figure 3-3 and in Plate 3-1.

Plate 3-1 Hawkesbury Peppermint Forest

Exposed Hawkesbury Woodland

This vegetation community occurs on the exposed hillslopes at the site, in both the southeast corner of the site and the fringing vegetation surrounding the quarry. The canopy is dominated by Scribbly Gum, Smooth-barked Apple and Red Bloodwood (*Corymbia gummifera*). The dense shrub layer includes Hairpin Banksia, Fern-leaved Banksia (*Banksia oblongifolia*), Needlebush (*Hakea teretifolia*), Flaky-barked Tea-tree, Conesticks (*Petrophile pulchella*) and Sweet Wattle (*Acacia suaveolens*). The grassy groundcover includes Wiry Panic (*Entolasia stricta),* Brown's Lovegrass (*Eragrostis brownii)* and Grass Tree *(Xanthorrhoea media).*

Exposed Hawkesbury Woodland covers approximately 1.2 ha of the site as shown in Figure 3-3 and Plate 3-2.

Plate 3-2 Exposed Hawkesbury Woodland

Hawkesbury Banksia Scrub Woodland

This vegetation community occurs in a small exposed area in the southeast corner of the site. The canopy is dominated by Scribbly Gum. The dense shrub layer includes Hairpin Banksia, Needlebush, Conesticks and Sweet Wattle (*Acacia suaveolens*). The grassy groundcover includes Wiry Panic, *Cyathochaeta diandra* and Grass Tree.

Hawkesbury Banksia Scrub Woodland covers approximately 0.2 ha of the site as is shown in Figure 3-3 and Plate 3-3.

Plate 3-3 Hawkesbury Banksia Scrub Woodland

Planted or Exotic Vegetation

Planted or exotic vegetation occur in association with road verges, agricultural land and rural residential areas. Species include Radiata Pine (*Pinus radiata*), Coral Tree (*Erythrina* sp.), Silky Oak (*Grevillea robusta*) and various horticultural species.

Planted or Exotic vegetation covers approximately 2.9 ha of the site as is shown in Figure 3-3 and Plate 3-4.

Plate 3-4 Planted or Exotic Vegetation

Disturbed Land

The majority of the site has been previously cleared of native vegetation for the quarry, agriculture or rural residential purposes. There is generally no canopy or shrub layer. The groundcover (where present) is dominated by exotic grasses and weeds including Fireweed (*Senecio madagascariensis)*, Whisky Grass (*Andropogon virginicus*), Purpletop (*Verbena bonariensis*), Kikuyu Grass (*Pennisetum clandestinum*) and White Clover (*Trifolium repens)*.

Disturbed land covers approximately 17.0 ha of the site and is shown in Plate 3-5 and Plate 3-6 and in Figure 3-3.

Plate 3-5 Disturbed land associated with the quarry

Plate 3-6 Disturbed land associated with agricultural land

Noxious and environmental weeds

The *Noxious Weeds Act 1993* provides for the declaration of noxious weeds throughout NSW. Landowners and occupiers must control noxious weeds according to the control category specified in the Act.

The site contains numerous exotic flora species, of which two are declared as noxious weeds in the Gosford LGA. These are Lantana *(Lantana camera)* and Pampas Grass *(Cortaderia* sp.*)* which are both Class 4 noxious weeds (DPI, 2014). Both are present in low density associated with disturbed edges of native vegetation. Weeds declared as Class 4 noxious weeds are to be controlled in accordance with a Management Plan published by the Local Control Authority, which in this case is Gosford City Council.

The site also contains high levels of exotic grasses and environmental weeds associated with agricultural areas and disturbed margins of native vegetation including Radiata Pine, Coral Tree, Fireweed, Whisky Grass, Purpletop, Kikuyu Grass and White Clover.

3.3.4 Conservation significance

Threatened flora species

The Atlas of NSW Wildlife database identified 14 threatened flora species listed under the TSC Act previously recorded in the locality. The PMST search identified 24 threatened flora species listed under the EPBC Act as potentially occurring in the locality.

A 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the proposal site. This was further refined following field surveys. The likelihood of threatened flora occurring in the study area was assessed based on presence of records from the locality, species distribution and habitat preferences, and quality of potential habitat present in the study area. The results of this assessment are provided in Appendix B.

Six Netted Bottlebrush (*Callistemon linearifolius*) individuals were recorded below the escarpment south of the quarry (Geolink 2013). The presence of these plants was confirmed during the site inspection. Based on habitat available at the site, there is a high probability that the Somersby Mintbush (*Prostanthera junonis*) is present in the seed bank within native vegetation as there are several recent local records of the species in adjacent areas. There is also a moderate potential for Leafless Tongue Orchid (*Cryptostylis hunteriana*) and Spreading Guinea Flower (*Hibbertia procumbens*) to occur based on the habitats available at the site (Table 3-3).

Table 3-3 Threatened flora known or with potential to occur at the site

Species	TSC Act status	EPBC Act status	Likelihood of occurrence
Netted Bottlebrush	V	Not listed	Present
Somersby Mintbush	E	E	High
Leafless Tongue Orchid	V	V	Moderate
Spreading Guinea Flower	E	Not listed	Moderate

Threatened ecological communities

No TECs listed on the EPBC Act or TSC Act were recorded within the proposal site or have potential to occur.

Protected marine vegetation

No protected marine vegetation (including seagrass, mangroves and saltmarsh) were recorded at the proposal site or have the potential to occur.

3.3.5 Fauna results

Fauna species

Two common native wetland birds (Purple Swamphen (*Porphyrio porphyria*) and Dusky Moorhen (*Gallinula tenebrosa*) were recorded at the farm dam during the site inspection. The site had been previously comprehensively surveyed by Geolink (2013) who recorded 48 birds, six ground-dwelling mammals, four arboreal mammals, five reptiles, 13 microbats and the Grey-headed Flying-fox (*Pteropus poliocephalus*).

Fauna habitats

The site contains a variety of fauna habitat features as discussed below.

- Woodland: including Hawkesbury Peppermint Forest, Exposed Hawkesbury Woodland and Hawkesbury Banksia Scrub Woodland vegetation types.
- Planted or exotic vegetation.
- Disturbed lands.

These habitat types are described below with particular reference to the threatened fauna species that occur or which could potentially occur at the site.

Woodland

Woodland (see Plate 3-7) occurs in the southeast corner of the site and along the edges of the quarry. These areas contain a flowering canopy and diverse shrub layer that provide foraging habitat for nectivorous species such as birds, arboreal mammals and the threatened Grey-headed Flying-fox, and foraging habitat for insectivores species including microchiropteran bats and insectivorous birds. Resin producing species such as Red Bloodwood also occur and provide potential foraging habitat for gliders, including the threatened Squirrel Glider (*Petaurus norfolcensis*). There are dense areas of Hairpin Banksia which provide potential foraging habitat for the threatened Eastern Pygmy Possum (*Cercatetus nanus*) (Plate 3-7).

The site contains a low density of hollow-bearing trees that would provide potential denning habitat for a range of arboreal mammals, microbats, owls, hollow-dependant birds and reptiles (Plate 3-8).

The groundcover is intact and generally unaffected by weeds, with high structural diversity including fallen hollow logs, woody debris and leaf litter that would provide potential foraging and shelter habitat for ground-dwelling mammals and reptiles.

The site contains potential foraging habitat for owls and other birds of prey including the threatened Powerful Owl (*Ninox strenua*).

There are no wetlands or riparian areas; however potential habitat for Red-crowned Toadlet (*Pseudophryne australis*) and Giant Burrowing Frog (*Heleioporus australiacus*) occur within the rocky outcrops and their associated seeps and drainage lines (Plate 3-9.

Plate 3-7 Hairpin Banksia forage habitat

Plate 3-8 Small trunk hollow in woodland habitat

Plate 3-9 Potential frog habitat

Planted or exotic vegetation

Planted and exotic vegetation occurs throughout the rural residential and agricultural areas of the site. It provides potential foraging habitat for a range of mobile fauna including birds and microbats. These areas also provide movement corridors for fauna accessing patches of remnant and regrowth native vegetation (see Plate 3-10).

Plate 3-10 Planted and exotic vegetation

Disturbed land

This habitat type includes cleared areas such as the existing quarry and access tracks, and cleared rural residential and agricultural areas. These areas are dominated by exposed earth, exotic grasses and weeds and provide little habitat for native fauna (Plate 3-11).

Plate 3-11 Habitat provided by disturbed areas

3.3.6 Conservation significance

Threatened species

The Atlas of NSW Wildlife database identified 31 threatened fauna species (15 bird, two amphibians, one reptile and 13 mammal species) listed under the TSC Act as having been previously recorded in the locality. The PMST search identified 17 threatened fauna species (not including marine species such as whales, dolphins sharks and albatross) listed under the EPBC Act as potentially occurring in the locality, including (refer to Appendix B for full list):

- Four bird species
- Seven mammal species
- One reptile
- Three frog species

Those species identified as having a 'moderate' or 'high' possibility of occurring or those 'known' to occur within the proposal site are subject to a general discussion of potential impacts associated with development in section 4.

Four threatened fauna (Grey-headed Flying-fox, Eastern Freetail-bat, Greater Broad-nosed Bat and Eastern Bent-wing Bat) have been previously recorded at the site, and there is potential habitat and a high probability that Giant Burrowing Frog, Red-crowned Toadlet, Eastern Pygmy Possum and Squirrel Glider may occur at the site. There is a moderate potential for Glossy Black Cockatoo (*Calyptorhynchus lathami*), Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*), Sooty Owl (*Tyto tenebricosa*) and four microchiropteran bats (Large-eared Pied Bat (*Chalinolobus dwyeri*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) Little Bentwing-bat (*Miniopterus australis*) and Southern Myotis (*Myotis macropus*)) would occur at the site (Table 3-4).

The full list of threatened fauna, including their conservation status, habitat requirements, previous records and likelihood of occurrence is presented in Appendix B.

Table 3-4 Threatened fauna known or with potential to occur at the site

Species	TSC Act status	EPBC Act status	Likelihood of occurrence
Grey-headed Flying-fox	V	V	Present
Eastern Freetail-bat	V	Not listed	Present
Greater Broad-nosed Bat	V	Not listed	Present
Eastern Bent-wing Bat	V	Not listed	Present
Giant Burrowing Frog	V	V	High
Red-crowned Toadlet	V	Not listed	High
Eastern Pygmy Possum	V	Not listed	High
Squirrel Glider	V	Not listed	High
Glossy Black Cockatoo	V	Not listed	Moderate
Powerful Owl	V	Not listed	Moderate
Masked Owl	V	Not listed	Moderate
Sooty Owl	V	Not listed	Moderate
Large-eared Pied Bat	V	V	Moderate
Eastern False Pipistrelle	V	Not listed	Moderate
Little Bentwing-bat	V	Not listed	Moderate
Southern Myotis	V	Not listed	Moderate

Migratory species

The PMST search identified 43 migratory fauna species listed under the EPBC Act as potentially occurring in the locality (see Appendix B). These comprise:

- Seven migratory terrestrial bird species
- 11 migratory wetland bird species
- 16 migratory marine bird species
- 9 migratory marine species (excluding birds)

No migratory species have been previously recorded at the site. Based on an assessment of the nature and condition of habitats available in the proposal site, there is potential foraging habitat and a moderate potential for four migratory species (Rainbow Bee-eater (*Merops ornatus*), Black-faced Monarch (*Monarcha melanopsis)*, Satin Flycatcher (*Myiagra cyanoleuca*) and Rufous Fantail (*Rhipidura rufifrons*)) to occur at the site (Table 3-4). The site also provides potential habitat for aerial migratory species (such as White-throated Needletail (*Hirundapus caudacutus*) which have a low potential of occurring. The full list of migratory fauna, including their conservation status, habitat requirements, previous records and likelihood of occurrence is presented in Appendix B.

Table 3-5 Migratory species with potential to occur at the site

Species	TSC Act status	EPBC Act status	Likelihood of occurrence
Rainbow Bee-eater	Not listed	Migratory	Moderate
Black-faced Monarch	Not listed	Migratory	Moderate
Satin Flycatcher	Not listed	Migratory	Moderate
Rufous Fantail	Not listed	Migratory	Moderate

3.3.7 Aquatic habitat and species

Habitat assessment

There are no wetlands, creeks or riparian areas at the site. There is one farm dam within an agricultural area (Plate 3-11) and several settlement/ sediment retention ponds at the quarry site. The farm dam is characterised by instream reeds including *Eleocharis sphacelata* and surrounded with native and exotic reeds and grasses including *Juncus usitatus,* Umbrella sedge *(Cyperus eragrostis)* and Paspalum *(Paspalum dilatatum).* The farm dam is likely to provide habitat for common amphibians, reptiles and birds and microbats.

Plate 3-12 Farm dam habitat

3.3.8 Conservation significance

A search of the DPI Threatened and Protected Species Records Viewer for records of threatened and protected aquatic species listed under the FM Act and EPBC Act within the Hunter/Central Rivers catchment did not reveal any records. Furthermore a review of species profiles for threatened species listed under the FM Act and EPBC Act indicates that there is no suitable habitat for threatened aquatic species at the site, and based on an assessment of habitat requirements for threatened aquatic species listed under the FM Act and EPBC Act, none are considered likely to occur (Appendix B).

4. Impact assessment

4.1 Approach

This flora and fauna assessment has been prepared to identify ecological constraints and opportunities to accompany a planning proposal. Detailed design for the site is not available at this stage and as such it is outside GHD's scope to prepare assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, population or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. A general discussion of biodiversity impacts is undertaken below.

Table 4-1 outlines the areas of vegetation types at the proposal site.

Table 4-1 Vegetation types at the proposal site

Vegetation type (Geolink 2013)	OEH Biometric Vegetation Type	TSC Act status	FM Act status	EPBC Act status	Area (ha)
Hawkesbury Peppermint Forest	Smooth-barked Apple - Sydney Peppermint - Turpentine heathy open forest on plateaux areas of the southern Central Coast, Sydney Basin	Not listed	Not listed	Not listed	3.0
Exposed Hawkesbury Woodland	Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin	Not listed	Not listed	Not listed	1.2
Hawkesbury Banksia Scrub Woodland	Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin	Not listed	Not listed	Not listed	0.2
Planted or exotic vegetation	NA	Not listed	Not listed	Not listed	2.9
Disturbed land	NA	Not listed	Not listed	Not listed	17.0

4.2 Ecological constraints

Ecological constraints have been categorised into three broad groups: high, medium and low. Ecological constraints are defined as conditions within a vegetation community, habitat type or location that are considered to represent significant or important contributions towards habitat for one or more threatened species.

4.2.1 High ecological constraints

The areas considered to involve high ecological constraints within the proposal site contain identified habitat for threatened flora and fauna as follows (refer to Appendix B for habitat requirements for each of these listed species):

- Known habitat for six Netted Bottlebrush plants in the Hawkesbury Peppermint Forest south of the quarry.
- Known habitat for Grey-headed Flying-fox, Greater Broad-nosed Bat, Eastern Bentwing-bat and Eastcoast Freetail-bat in the Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest south of the quarry.
- Potential habitat for Eastern Pygmy Possum, Squirrel Glider, Red-crowned Toadlet, Giant Burrowing Frog in the Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest south of the quarry. These species have a high probability of occurring in these areas.
- Potential habitat for Glossy-black Cockatoo, Powerful Owl, Masked Owl, Sooty Owl, Large-eared Pied-bat, Eastern False Pipistrelle, Little Bentwing-bat, Southern Mytois, Rufous Fantail, Rainbow Bee-eater, Satin Flycatcher and Black-faced Monarch in the Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest south of the quarry. These species have a moderate probability of occurring in these areas.

It is recommended that areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest are excluded from any future development footprints. Any development in areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest would require assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, populations or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. Compensatory habitat measures either through Biobanking or offsetting are likely to be required.

These areas identified with high ecological constraints correspond to the high ecological constraints outlined by Geolink (2013) and area shown in Figure 4-1.

4.2.2 Medium ecological constraints

Fauna habitat and movement corridors can provide linkages between areas of remnant and regrowth vegetation to support the movement of mobile fauna (including threatened species such as Squirrel Glider and Eastern Pygmy Possum) between stepping stones of suitable habitat. Areas mapped as Exposed Hawkesbury Woodland and the vegetation corridor linking the quarry site and remnant native vegetation west of Acacia Road are categorised with medium ecological constraints as they provide potential forging habitat and movement corridor for mobile fauna such as birds, bats and arboreal mammals.

Although the vegetation corridor linking the quarry site and remnant native vegetation west of Acacia Road contains a mixture of native and exotic species and environmental weeds, it currently provides habitat for foraging and movement for fauna to the native vegetation west of the proposal site. It is noted however that land to the west is zoned industrial under the approved Somersby Industrial Park Plan of Management (Connell Wagner 2005) and is likely to be removed for future development.

There is a farm dam west of the quarry site that provides potential foraging habitat for native birds, bats, reptiles and amphibians. It is recommended that this area is excluded from any future development footprints.

4.2.3 Low ecological constraints

Areas mapped as Disturbed Lands and Planted or Exotic Vegetation (with the exception of the fauna movement corridor and farm dam outlined above) are considered to have low ecological constraints and represent the areas for future development which are unlikely to have significant ecological impacts. These include the quarry site, rural residential and agricultural lands. These areas identified with low ecological constraints correspond to the low ecological constraints outlined by Geolink (2013) and are shown in Figure 4-1.

4.3 Indirect ecological impacts

Indirect ecological impacts occur as a consequence of development whereby changes to the environment have an impact on natural systems as outlined below.

4.3.1 Impacts to surface water

Potential sources of impacts to surface water within the site include:

- Runoff from areas cleared of vegetation.
- Runoff from soil stockpiles.
- Runoff from hardstand areas, including roads and site facilities.
- Leakage or spillage of chemicals from vehicles.
- Refuelling bays and fuel, oil and grease storages.

Potential water quality impacts may be associated with runoff from disturbed areas, including vegetation clearing areas, construction lay down areas and access roads if risks are not effectively managed and appropriate mitigation measures implemented. Concentrated and/or altered water movement within the construction footprint may increase the potential for sediment and contaminant mobilisation and transport.

Soil and erosion protection measures and techniques would require implementation prior to, during and at the completion of construction.

4.3.2 Sediment, dust and runoff

There are sensitive environmental receptors adjacent to the proposal, including intact native vegetation. Potential indirect impacts on terrestrial flora and fauna from construction activities are likely to include dust and vehicle exhaust emissions generated from construction vehicles and equipment. A construction environmental management plan (CEMP) would be required for the proposed works to include measures to mitigate the risk and severity of these impacts as far as possible.

4.3.3 Weed invasion and edge effects

‘Edge effects’ is a term that refers to changed environmental conditions at the interface of intact vegetation and cleared areas. Edge effects may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants, increased predation of native fauna or avoidance of habitat by native fauna. Edge effects are likely to result from clearing of vegetation within the proposal site and would continue to affect vegetation and habitats in adjoining areas.

Construction may increase the degree of weed infestation through dispersal of weed propagules (seeds, stems and flowers) into areas of native vegetation via erosion (wind and water) and via workers shoes and clothing and through construction vehicles.

4.3.4 Pests and pathogens

Construction activities have the potential to introduce or spread pathogens such as Phytophthora (*Phytophthora cinnamomi*), Myrtle Rust (*Uredo rangelii*) and frog chytrid fungus *Batrachochytrium dendrobatidis* throughout the proposal site.

A 'clean on entry, clean on exit' policy would need to be implemented during construction activities to prevent the spread of these pathogens. Hygiene measures including decontamination of personnel and plant equipment prior to entering the proposal site would need to be developed as part of the CEMP if any frog habitat is being cleared. These measures would need be developed with reference to OEH hygiene protocol for the control of disease in frogs (DECC 2008).

4.3.5 Noise, vibration, traffic and lighting

Construction collisions with wildlife (such as amphibians) within the proposal site would be possible, particularly during initial vegetation clearing. Pre-clearance surveys would be undertaken during vegetation clearing and fauna exclusion fencing would be installed for the duration of construction to reduce this potential impact.

Artificial lighting during construction (such as night-time security lighting) can potentially discourage habitat use where diffuse light penetrates into adjoining areas of vegetation. The foraging regimes of some nocturnal native animals can be disrupted by lighting and make them vulnerable to predation by cats, dogs and foxes. The eyesight of nocturnal species (such as owls and amphibians) is hindered by bright lights, and where they are affected by this, they become more susceptible to predation. Such lighting should be designed as 'down lights' wherever practicable and be directed inwards so as to not spill into adjoining areas of intact vegetation.

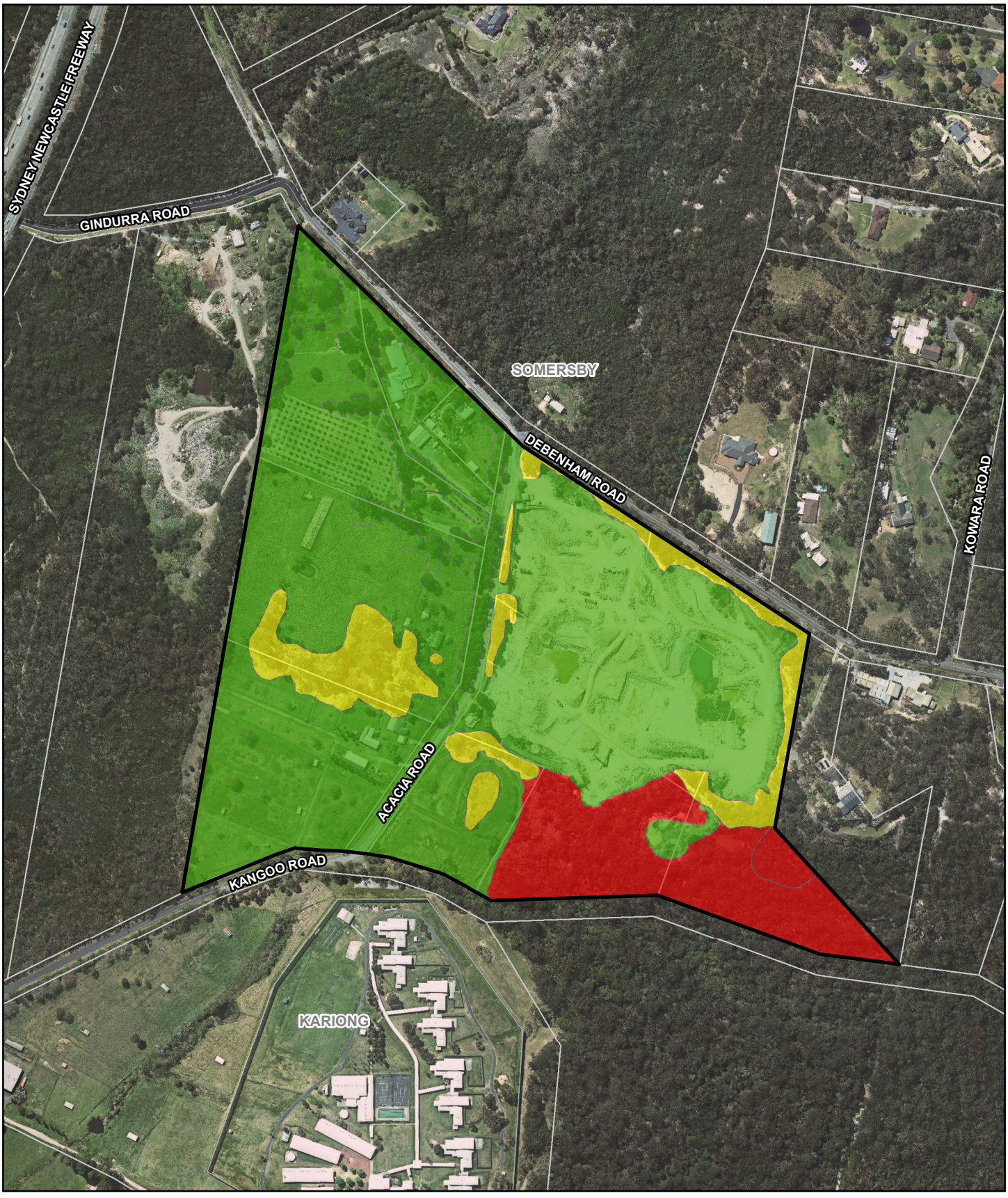
Construction noise and vibration also have the potential to impact fauna. This would not be a novel impact and is likely to have a minor effect on native fauna in habitat adjoining the proposal site.

4.3.6 Key threatening processes

A threatening process is something that threatens, or could potentially threaten, the survival or evolutionary development of a species, population or ecological community. Development at the site has the potential to introduce or increase Key Threatening Processes (KTP) listed under the TSC Act and/or EPBC Act as outlined below.

Table 4-2 Key threatening processes

KTP	Status	Comment
Clearing of native vegetation	EPBC Act TSC Act	Clearing of native vegetation has occurred historically within and around the site and any further clearing of native vegetation would increase this KTP.
Infection of native plants by *Phytophthora cinnamomi*	EPBC Act TSC Act	Construction activities have the potential to introduce the root-rot fungus *Phytophthora cinnamomi* into the site, which could lead to dieback of vegetation.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	EPBC Act TSC Act	Construction activities have the potential to spread amphibian chytrid fungus further around the site, which could lead to death of local frogs.
Invasion, establishment and spread of *Lantana camara*	TSC Act	*Lantana camara* is present in low abundance within the proposal site. Construction activities have the potential to spread *Lantana camara* within and surrounding the site, which could lead to the further invasion of this species into native plant communities.
Invasion of native plant communities by exotic perennial grasses	TSC Act	Exotic perennial grasses are present in high abundance within the proposal site. Construction activities have the potential to spread exotic perennial grasses within and surrounding the site, which could lead to the further invasion of these species into native plant communities.



LEGEND

- Site Boundary
- Cadastre
- High Ecological Constraint
- Medium Ecological Constraint
- Low Ecological Constraint

Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

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GHD

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
Flora and Fauna Assessment

Job Number	22-17271
Revision	0
Date	17 Jul 2014

Ecological Constraints

Figure 4-1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E005_EcologicalConstraints_0.mxd

Data source: LPI: DTDB & DCDB 2012; GCC: Aerial Imagery 2014; Geoscience Australia: 250k Topographic Data Series 3 2006. Created by: fmackay, tmorton

5. Recommendations to avoid or mitigate impacts

Development at the site should be planned within the hierarchy of aiming to avoid ecological impacts, then mitigate any ecological impacts that cannot be avoided, and if required compensate for ecological impacts either through offsetting or biobanking.

5.1 Impact avoidance

Impact avoidance is usually achieved at the design phase of a project and includes placement of infrastructure and access points so as to minimise impact on identified biodiversity values.

The majority of the site is mapped as containing low ecological constraints and is suitable for future development with minimal ecological impacts.

It is recommended that areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest are excluded from any future development footprints. Any development in areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest would need to undertake assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, populations or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. Compensatory habitat measures either through Biobanking or offsetting are likely to be required if these areas are developed.

Additionally it is recommended that the farm dam west of the quarry is excluded from any future development footprints as it provides potential fauna forage habitat.

5.2 Mitigation of impacts

Mitigation measures are taken in order to reduce the impact on identified biodiversity values where avoidance is not possible.

The proposal is likely to be required to consider and minimise potential indirect ecological impacts on threatened and migratory fauna habitats. A CEMP would need to be prepared to formalise management actions for native flora and fauna (and their habitats) and provide additional details on implementation.

It is recommended that the CEMP include:

- An erosion and sediment control plan, which would require:
  - Installation of erosion and sediment control measures prior to construction.
  - Regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure their ongoing functionality.
  - Stockpiles to be restricted to identified construction compounds, in areas of cleared land and exotic grassland and managed to ensure no offsite impacts of dust generation or sedimentation.
  - Immediate removal offsite of excavated fill materials not required for backfilling.
- A Flora and Fauna Management Plan developed as a sub plan to the CEMP. This would include detailed site-specific and species-specific mitigation measures and management protocols to be implemented before, during and post construction to further avoid or reduce impacts on threatened biodiversity.

The CEMP should also contain all relevant measures specific to threatened species and MNES including:

- Measures to minimise water quality impacts.
- Measures to minimise flora and fauna (particularly threatened and migratory fauna) habitat removal (if relevant).
- Measures to minimise invasion of weeds and increased edge effects.
- Measures to minimise the chance of mortality of native fauna, including development of a pre-clearance protocol prior to clearing of native vegetation.
- Measures to minimise chance of increasing the prevalence of amphibian chytrid fungus.

5.2.1 Further survey assessments and approvals

Once a development footprint has been approved, assessments of significance would be required in accordance with Section 5A of the EP&A Act for threatened species, populations or ecological communities (or their habitats) listed on the TSC Act with a moderate to high likelihood of occurrence.

Similarly assessments of significance would be required in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES with a moderate to high likelihood of occurrence.

It is noted that impacts to the majority of threatened species and MNES identified in this report as known or potentially occurring at the site could be avoided if the highly constrained areas outlined in section 4.2 are avoided during the design phase.

6. Conclusion

This flora and fauna assessment has been prepared by GHD for Peter Andrews and Associates Pty Ltd to evaluate the conservation significance of site biodiversity values and identify flora and fauna constraints and opportunities for the Somersby Business Park Extension.

Six Netted Bottlebrush plants were recorded below the escarpment south of the quarry (Geolink 2013). The presence of these plants was confirmed during the site inspection. Based on habitat available at the site, there is a high probability that the Somersby Mintbush is present in the seed bank at the site within native vegetation as there are several recent local records of the species surrounding the site. There is also a moderate potential for Leafless Tongue Orchid and Spreading Guinea Flower to occur based on the habitats available at the site.

Four threatened fauna (Grey-headed Flying-fox, Eastern Freetail-bat, Greater Broad-nosed Bat and Eastern Bent-wing Bat) have been previously recorded at the site, and there is potential habitat and a high probability that Giant Burrowing Frog, Red-crowned Toadlet, Eastern Pygmy Possum and Squirrel Glider may occur at the site. There is a moderate potential for Glossy Black Cockatoo, Powerful Owl, Masked Owl, Sooty Owl and four microchiropteran bats (Large-eared Pied Bat, Eastern False Pipistrelle, Little Bentwing-bat and Southern Myotis) would occur at the site.

No migratory species have been previously recorded at the site. Based on an assessment of the nature and condition of habitats available in the proposal site, there is potential foraging habitat and a moderate potential for four migratory species (Rainbow Bee-eater, Black-faced Monarch, Satin Flycatcher and Rufous Fantail) to occur at the site. The site also provides potential habitat for aerial migratory species (such as White-throated Needletail) which have a low probability of occurring.

The majority of the site is mapped as containing low ecological constraints (refer to Figure 4-1) and is suitable for future development with minimal ecological impacts likely.

It is recommended that areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest are excluded from any future development footprints (refer Figure 3-3). Any development in areas mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest would need to undertake assessments of significance in accordance with Section 5A of the EP&A Act for threatened species, populations or ecological community, or their habitats listed on the TSC Act and assessments of significance in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DotE 2013) for MNES. Compensatory habitat measures either through Biobanking or offsetting are likely to be required if these areas are developed.

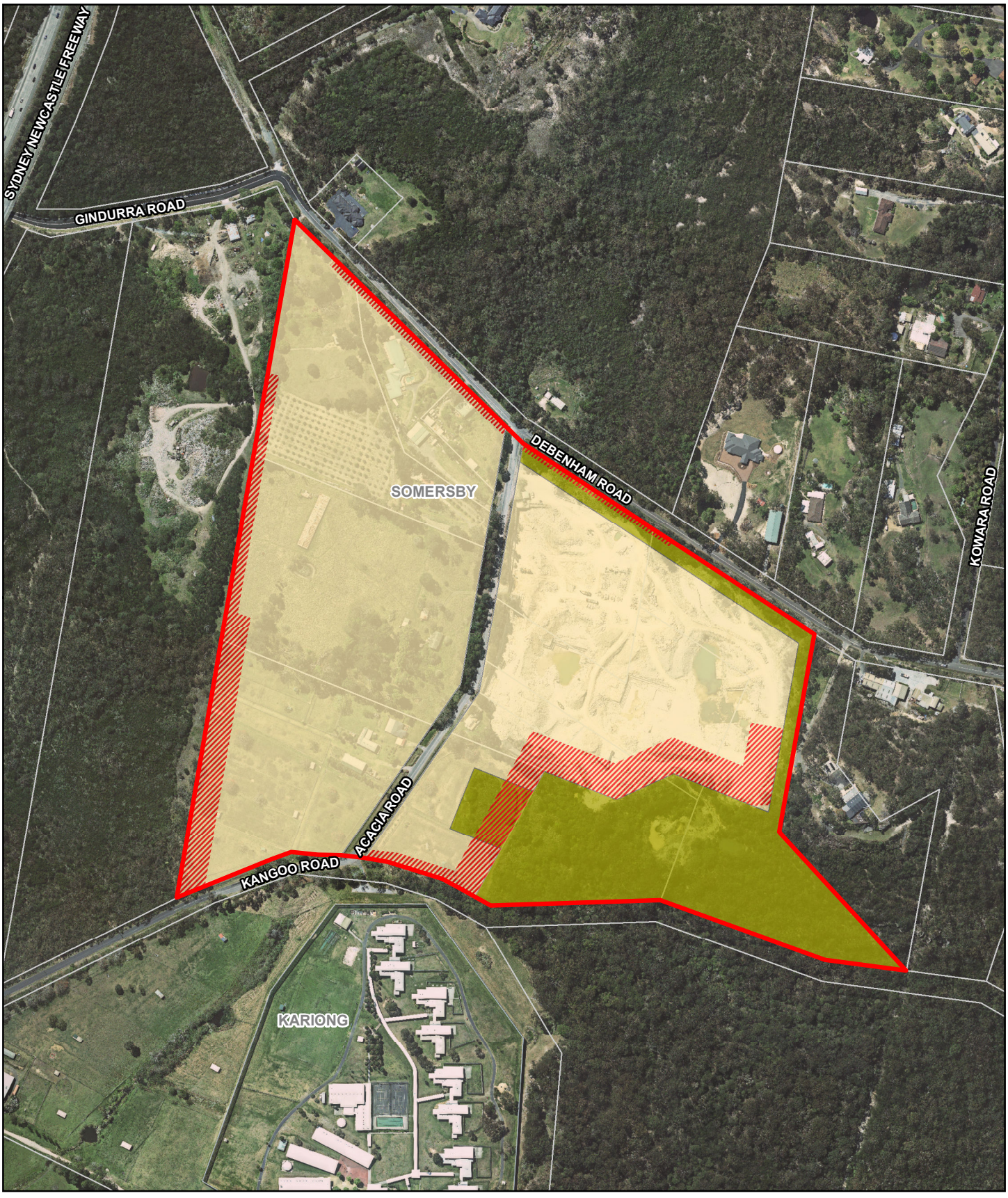
Additionally it is recommended that the farm dam west of the quarry is excluded from any future development footprints it provides potential fauna forage habitat. The existing vegetation corridor linking the site to native vegetation west of the site does not need to be retained as this land west of the site is likely to be removed for future development.

6.1 Outcomes of discussion with Gosford City Council

Discussions were undertaken with Gosford City Council in July 2014. It was determined that the south-eastern portion of the study area (mapped as Hawkesbury Banksia Scrub Woodland and Hawkesbury Peppermint Forest containing High Ecological Constraints) would be precluded from development. It is understood that this may be achieved through zoning to a conservation zone such as E2 – Environmental Conservation or through the application of a management zone as part of a modification of the existing Somersby Industrial Park Plan of Management (Connell Wagner 2005).

The preferred development layout showing developable area and non-developable area is shown Figure 6-1. This development layout includes the following features:

- Developable area of approximately 18.76 hectares.
- Exclusion of the south eastern section of the site identified as a high ecological constraint (as shown on Figure 6-1).
- Asset Protection Zones (APZs) are required with the larger APZs adjoining the south eastern section and the vegetated area to the west.



LEGEND

- Cadastre
- Site Boundary
- APZ Setback
- Developable area
- Undevelopable area

Paper Size A4

0 20 40 80 120 160

Metres

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

N

GHD

Peter Andrews and Associates Pty Ltd
Somersby Business Park Expansion
Flora and Fauna Assessment

Job Number	22-17271
Revision	0
Date	17 Jul 2014

Preferred Development Layout

Figure 6-1

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com **W** www.ghd.com.au

G:\22\17271\GIS\Maps\Deliverables\Flora and Flora Assessment\2217271_E006_PreferredDevelopment_0.mxd

Data source: LPI: DTDB & DCDB 2012; GCC: Aerial Imagery & Development Layout, 2014. Created by: fmackay, tmorton

7. References

Bureau of Meteorology (BOM) 2014 Daily Weather Observations Available online http://www.bom.gov.au/climate/dwo/201311/html/IDCJDW2097.201311.shtml

Department of Primary Industries (DPI) 2014 *Noxious Weed Declarations*, accessed 05 May 2014, http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed/noxious-app-application

Department of the Environment (DotE) 2013 *Significant Impact Guidelines 1.1 Matters of National Environmental Significance.*

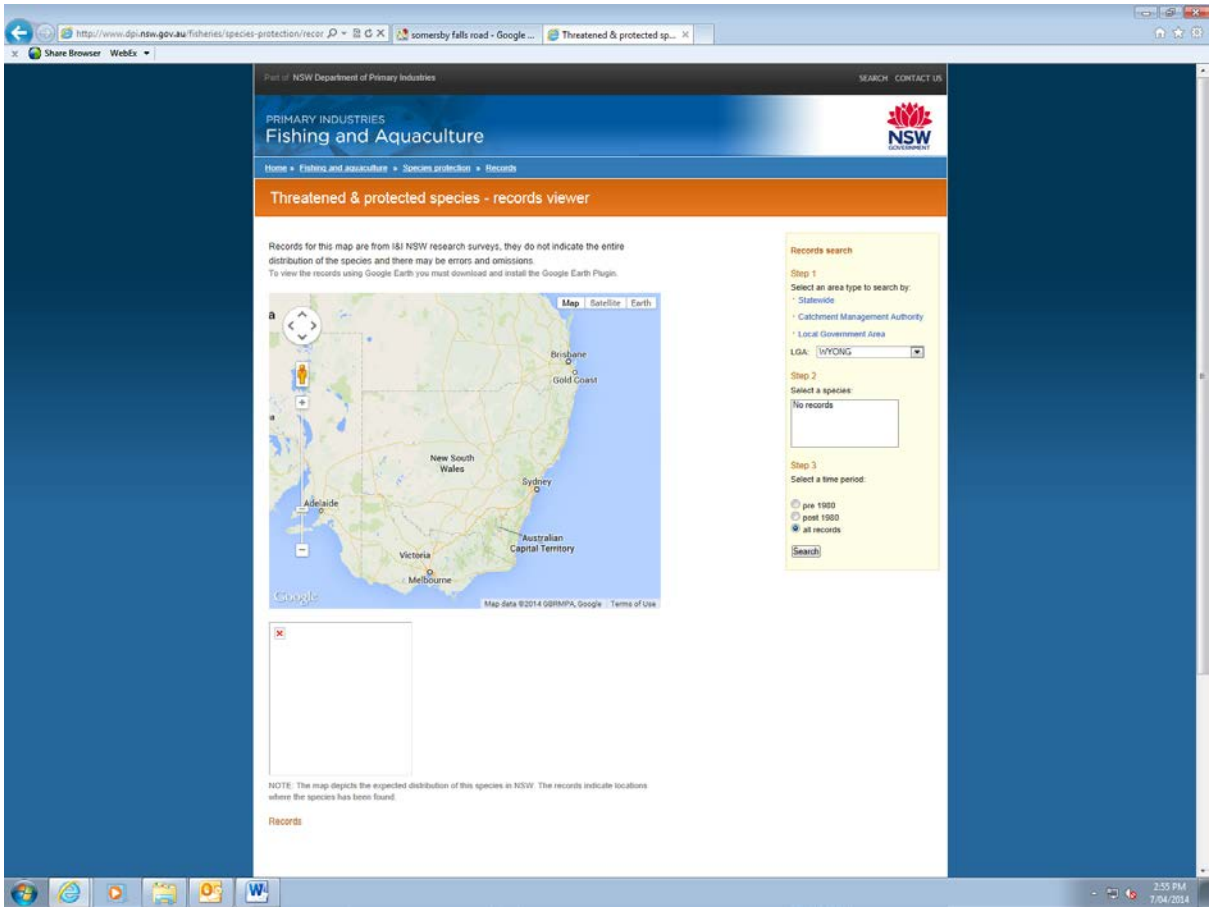
Geolink 2013 Ecological and Aboriginal Heritage Report Somersby Industrial Park. Report prepared for Gosford City Council.

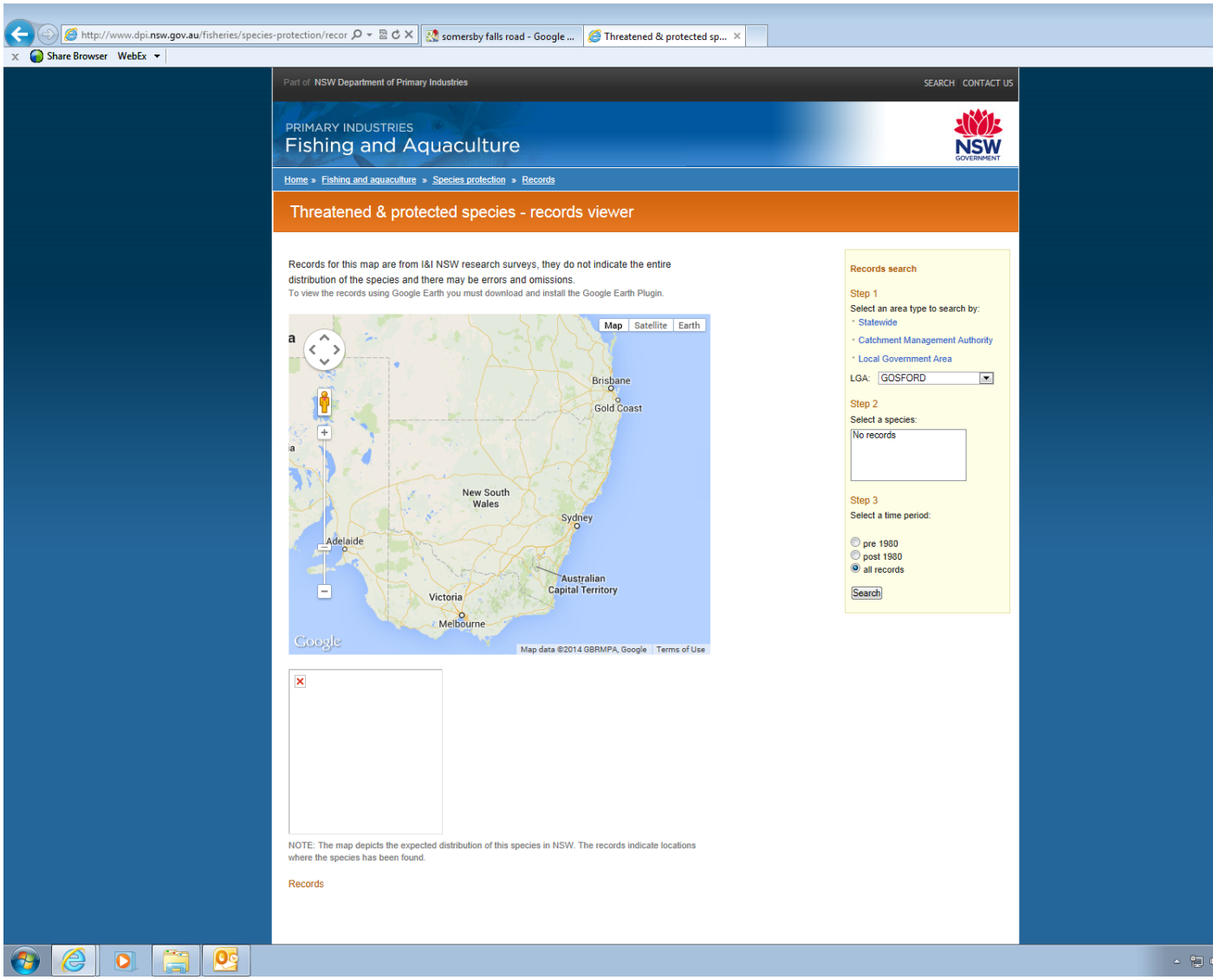
Office of Environment and Heritage (OEH) Biometric Vegetation Types Database (2011) Available online http://www.environment.nsw.gov.au/vegetation/eoam/index.htm

Office of Environment and Heritage (OEH) 2014 NSW Atlas of NSW Wildlife threatened species and communities database. Date accessed 7 April 2014

Appendices

Appendix A - Database searches


Part of NSW Department of Primary Industries
SEARCH CONTACT US
PRIMARY INDUSTRIES
Fishing and Aquaculture
NSW GOVERNMENT
Home » Fishing and aquaculture » Species protection » Records
Threatened & protected species - records viewer
Records for this map are from I&I NSW research surveys, they do not indicate the entire distribution of the species and there may be errors and omissions.
To view the records using Google Earth you must download and install the Google Earth Plugin.
Map | Satellite | Earth
Brisbane
Gold Coast
New South Wales
Sydney
Adelaide
Australian Capital Territory
Victoria
Melbourne
Google
Map data ©2014 GBRMPA, Google Terms of Use
NOTE: The map depicts the expected distribution of this species in NSW. The records indicate locations where the species has been found.
Records
Records search
Step 1
Select an area type to search by:
Statewide
Catchment Management Authority
Local Government Area
LGA: WYONG
Step 2
Select a species:
No records
Step 3
Select a time period:
pre 1980
post 1980
all records
Search


http://www.dpi.nsw.gov.au/fisheries/species-protection/recor
somersby falls road - Google ...
Threatened & protected sp...
Share Browser
WebEx
Part of NSW Department of Primary Industries
SEARCH
CONTACT US
PRIMARY INDUSTRIES
Fishing and Aquaculture
NSW GOVERNMENT
Home » Fishing and aquaculture » Species protection » Records
Threatened & protected species - records viewer
Records for this map are from I&I NSW research surveys, they do not indicate the entire distribution of the species and there may be errors and omissions.
To view the records using Google Earth you must download and install the Google Earth Plugin.
Map
Satellite
Earth
Brisbane
Gold Coast
New South Wales
Sydney
Adelaide
Australian Capital Territory
Victoria
Melbourne
Google
Map data ©2014 GBRMPA, Google
Terms of Use
NOTE: The map depicts the expected distribution of this species in NSW. The records indicate locations where the species has been found.
Records
Records search
Step 1
Select an area type to search by:
Statewide
Catchment Management Authority
Local Government Area
LGA:
GOSFORD
Step 2
Select a species:
No records
Step 3
Select a time period:
pre 1980
post 1980
all records
Search

Australian Government

Department of the Environment

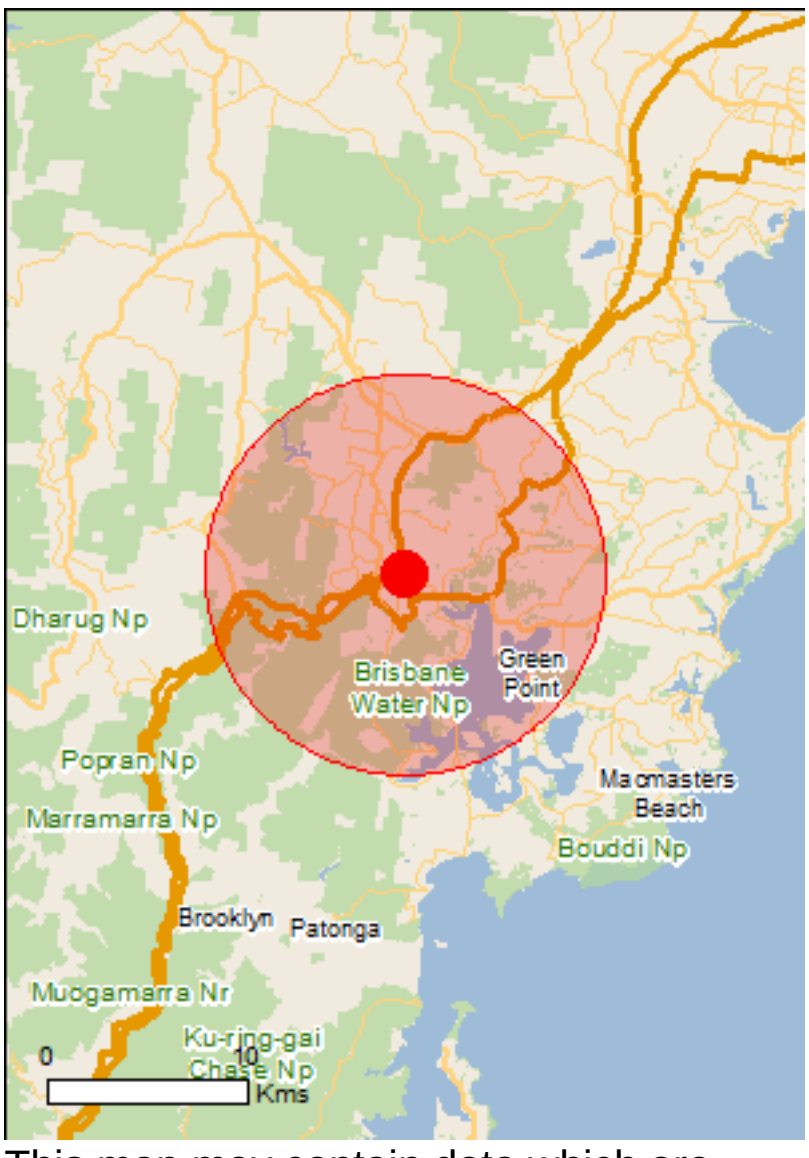
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

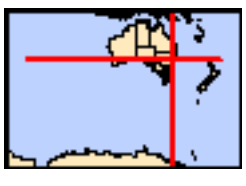
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 07/04/14 15:20:48



Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	66
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	11
Commonwealth Heritage Places:	None
Listed Marine Species:	45
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	17
State and Territory Reserves:	8
Regional Forest Agreements:	1
Invasive Species:	51
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus		
Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora epomophora		
Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi		
Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis		
Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans		
Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni		
Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area
Asterolasia elegans		
[56780]	Endangered	Species or species habitat may occur within area
Astrotricha crassifolia		
Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat likely to occur within area
Baloskion longipes		
Dense Cord-rush [68511]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus camfieldii		
Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Genoplesium baueri		
Yellow Gnat-orchid [7528]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat likely to occur within area
Grevillea shiressii [19186]	Vulnerable	Species or species habitat likely to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Micromyrtus blakelyi [6870]	Vulnerable	Species or species habitat may occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat likely to occur within area
Prostanthera askania Tranquillity Mintbush, Tranquility Mintbush [64958]	Endangered	Species or species habitat likely to occur within area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat likely to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Pocket-less Brush Cherry, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or

Name	Status	Type of Presence
		related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Charadrius bicinctus		
Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour may occur within area
Heteroscelus brevipes		
Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis		
Eastern Curlew [847]		Foraging, feeding or related behaviour known to occur within area
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus		
Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - ERINA GRES DEPOT
Defence - TS HAWKESBURY

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour may occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew [847]		Foraging, feeding or related behaviour known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
[Thalassarche impavida](#)		
Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
[Thalassarche melanophris](#)		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
[Thalassarche salvini](#)		
Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche steadi](#)		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Mammals		
[Dugong dugon](#)		
Dugong [28]		Species or species habitat may occur within area
Reptiles		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
[Sousa chinensis](#)		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

Places on the RNE		[Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
[Blackwall Mount Ornithological Area](#)	NSW	Indicative Place
[Brisbane Water National Park (1981 boundary)](#)	NSW	Registered
[Mooney Mooney Creek Site](#)	NSW	Registered
[Rileys Island and Pelican Island Nature Reserves](#)	NSW	Registered
Indigenous		
[Bulgandry Aboriginal Site](#)	NSW	Registered
[Howe Aboriginal Area](#)	NSW	Registered

Name	State	Status
Mooney Mooney Aboriginal Area	NSW	Registered
Narara Area	NSW	Registered
Staples Lookout Area	NSW	Registered
Historic		
Brisbane Water County Council Building (former)	NSW	Indicative Place
Creighton Funeral Parlour	NSW	Indicative Place
Gosford Hills Landscape Conservation Area	NSW	Indicative Place
Gosford Showground	NSW	Indicative Place
Mulholland Farm	NSW	Indicative Place
Gosford Courthouse	NSW	Registered
The Grange	NSW	Registered
Wyoming Cottage and Helys Grave	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Brisbane Water	NSW
Jilliby	NSW
Palm Grove	NSW
Pelican Island	NSW
Popran	NSW
Rileys Island	NSW
Saratoga Island	NSW
Unnamed FMZ2	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine,		Species or species

Name	Status	Type of Presence
Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding		Species or species

Name	Status	Type of Presence
Pine [20780]		habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Brisbane Water Estuary	NSW

Coordinates

-33.41856 151.30205

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions.
Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).

Search criteria : Licensed Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Entities in selected area [North: -33.35 West: 151.22 East: 151.32 South: -33.45] returned a total of 1,229 records of 45 species.
Report generated on 7/04/2014 2:46 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3042	*Heleioporus australiacus*		Giant Burrowing Frog	V,P	V	36	
Animalia	Amphibia	Myobatrachidae	3116	*Pseudophryne australis*		Red-crowned Toadlet	V,P		41	
Animalia	Reptilia	Varanidae	2287	*Varanus rosenbergi*		Rosenberg's Goanna	V,P		1	
Animalia	Aves	Procellariidae	0955	*Pterodroma nigripennis*		Black-winged Petrel	V,P		1	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		1	
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		5	
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3		4	
Animalia	Aves	Cacatuidae	0265	*^^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		18	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		3	
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*		Swift Parrot	E1,P,3	E	1	
Animalia	Aves	Psittacidae	0302	*Neophema pulchella*		Turquoise Parrot	V,P,3		1	
Animalia	Aves	Strigidae	0248	*Ninox strenua*		Powerful Owl	V,P,3		5	
Animalia	Aves	Tytonidae	0250	*Tyto novaehollandiae*		Masked Owl	V,P,3		1	
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*		Sooty Owl	V,P,3		4	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	E	2	
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*		Grey-crowned Babbler (eastern subspecies)	V,P		1	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		3	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		1	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	21	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	9	
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*		Eastern Pygmy-possum	V,P		16	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P		1	
Animalia	Mammalia	Potoroidae	1175	*Potorous tridactylus*		Long-nosed Potoroo	V,P	V	2	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	2	
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*		Eastern Freetail-bat	V,P		6	
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*		Large-eared Pied Bat	V,P	V	1	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		6	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*		Little Bentwing-bat	V,P		14	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*		Eastern Bentwing-bat	V,P		18	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*		Southern Myotis	V,P		4	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*		Greater Broad-nosed Bat	V,P		6	
Plantae	Flora	Dilleniaceae	2544	*Hibbertia procumbens*		Spreading Guinea Flower	E1,P		370	
Plantae	Flora	Elaeocarpaceae	6205	*Tetratheca glandulosa*			V,P		5	
Plantae	Flora	Ericaceae	7752	*Epacris purpurascens var. purpurascens*			V,P		1	
Plantae	Flora	Lamiaceae	9885	*Prostanthera askania*		Tranquility Mintbush	E1,P	E	7	
Plantae	Flora	Lamiaceae	9884	*Prostanthera junonis*		Somersby Mintbush	E1,P	E	413	
Plantae	Flora	Myrtaceae	4007	*Callistemon linearifolius*		Netted Bottle Brush	V,P,3		4	
Plantae	Flora	Myrtaceae	4028	*Darwinia glaucophylla*			V,P		148	
Plantae	Flora	Myrtaceae	4067	*Eucalyptus camfieldii*		Camfield's Stringybark	V,P	V	12	
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*		Biconvex Paperbark	V,P	V	4	
Plantae	Flora	Myrtaceae	4248	*Melaleuca deanei*		Deane's Paperbark	V,P	V	1	
Plantae	Flora	Orchidaceae	4415	*^^Cryptostylis hunteriana*		Leafless Tongue Orchid	V,P,2	V	1	
Plantae	Flora	Poaceae	4746	*Ancistrachne maidenii*			V,P		1	
Plantae	Flora	Proteaceae	5400	*Grevillea shiressii*			V,P	V	25	
Plantae	Flora	Restionaceae	10608	*Baloskion longipes*		Dense Cord-rush	V,P	V	2	

Appendix B – Likelihood of occurrence assessment

Threatened Biota Habitat Table

Databases Searched

Office of Environment and Heritage (OEH) (2014a) Threatened species profiles- threatened ecological communities known or predicted to occur within the Hunter CMA subregion.

Department of the Environment (DoE) (2014) EPBC PMST Online Search 7 March 2014 - 10 km buffer.

Department of Primary Industries (DPI) (2014) Records viewer search for threatened and protected aquatic species - Hunter/Central Rivers CMA.

Office of Environment and Heritage (OEH) (2014b) NSW Wildlife Atlas Search - threatened species results within a 10 km buffer

Note: Marine species which are restricted to marine environments only (such as whales, dolphins, sharks and seabirds) are excluded from the Likelihood of Occurrence Table as there is no marine habitat in the proposal site.

Likelihood of Occurrence

Matters considered in determining the likelihood of occurrence include:

- Known natural distributions including prior records (database searches) and site survey results.
- Geological/ soil preferences.
- Specific habitat requirements (e.g. aquatic environs, seasonal nectar resources, tree hollows etc).
- Climatic considerations (e.g. wet summers; snow fall).
- Home range size and habitat dependence.
- Topographical preferences (e.g. coastal headlands, ridgetops, midslopes, gilgai, wetlands).

The likelihood of occurrence scale is defined as follows:

Likelihood of Occurrence Scale

Scale	Description
Known	Species known to occur within the site (e.g. breeding and foraging habitat; foraging habitat; movement corridors). Detected on or immediately adjacent to the site.
High	Presence of high value suitable habitat (e.g. breeding and foraging habitat; important movement corridors). Not detected.
Moderate	Presence of medium value suitable habitat (e.g. disturbed breeding conditions; constrained foraging habitat; movement corridors). Not detected.

Scale	Description
Low/Unlikely	Presence of low value suitable habitat (e.g. disturbed conditions; isolated small habitat area; fragmented movement corridors). Not detected.
None	No suitable habitat or corridors linking suitable habitat present. Not detected.

Impact Consequence

Matters considered in determining impact consequence include:

- The listed status of the threatened biota (i.e. critically endangered, endangered, vulnerable)
- The quantum of historical records within the locality.
- The quantum of historical records within the region.
- The impact on habitat area relative to local and regional abundance.
- The location of the impact site relative to the extant distribution of the threatened biota.
- The habitat area impact/ avoidance within the site relative to the species home range/ area occupied within the locality.

The impact consequence scale is defined as follows:

Impact Consequence Scale

Scale	Description
1	Cause the extinction of threatened biota over its extant range or at a local level (e.g. loss of an important population)
2	Substantially contribute to the extinction of threatened biota over its extant range or at a regional level by significantly impacting an important population
3	Contribute to the extinction of threatened biota at a local level
4	Contribute to the decline of threatened biota through impacts on populations not regarded as important
5	Minimal impact (e.g. partial loss of unoccupied suitable habitat; marginal increase in fragmentation)

Risk Analysis

The matrix created by the two variables provides a risk rating for the proposed project, as follows:

Threatened Biota Risk Analysis Matrix

Likelihood of Occurrence Scale	Impact Consequence Scale				
	5	4	3	2	1
Known	M	M	H	H	H
High	L	M	M	H	H
Moderate	L	L	M	M	H
Low	L	L	L	M	M
None	L	L	L	L	L

L = Low M = Medium H = High

Threatened biota identified as having a risk analysis score exceeding low (i.e. medium and high) are regarded as having the potential to be adversely impacted by the project. A medium to high risk is considered to have the potential for a direct adverse impact on threatened biota or effect its recovery potential. The impacts on these species therefore must be assessed through the preparation of a seven part test of significance.

Endangered ecological communities (EEC) known or predicted to occur in the locality, community description and presence/absence in the proposal site.

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence at proposal site	Impact consequence	Risk
EECs							
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions		EEC	-	Occurs on landward side of mangrove stands in intertidal zones along the shores of estuaries and lagoons that are permanently or intermittently open to the sea. Characterised by *Baumea juncea, Juncus kraussii, Sarcocornia quinqueflora, Sporobolus virginicus, Triglochin striata, Isolepis nodosa, Samolus repens, Selliera radicans, Suaeda australis* and *Zoysia macrantha*, with occasional scattered mangroves occurring throughout the saltmarsh. Saltpans and tall reeds may also occur.	**Absent** from the proposal site.	Nil	Nil
Coastal Upland Swamp in the Sydney Basin Bioregion		EEC		Occurs in the eastern Sydney Basin from the Somersby district in the north to the Robertson district in the south. In the north is occurs on the Somersby-Hornsby plateaus, in the south it occurs on the Woronora plateau. Occurs primarily on impermeable sandstone plateaus in the headwater valleys of streams and on sandstone benches with abundant seepage moisture.	**Absent** from the proposal site.	Nil	Nil
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		EEC	-	Occurs in coastal areas subject to periodic flooding with standing fresh water for at least part of the year. Typically on silts, muds or humic loams below 20 m elevation in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes. Structure and composition varies spatially and temporally depending on the water regime, though is usually dominated by herbaceous plants and has few woody species.	**Absent** from the proposal site.	Nil	Nil

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence at proposal site	Impact consequence	Risk
Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion		CEEC		Restricted to a small area on the Bouddi Peninsula on the NSW Central Coast south of Kincumber and the Gosford LGA. Occurs on gently undulating areas on sandy soils of the Erina soil landscape, derived from sandstones of the Triassic Narrabeen group (OEH 2012).	**Absent** from the proposal site.	Nil	Nil
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions		EEC	CEEC	Occurs along the NSW coast, usually within 2 km of the ocean on a variety of substrates. Variable structure and composition, typically with closed canopy. Generally rainforest species with vines a major component.	**Absent** from the proposal site.	Nil	Nil
Low woodland with heathland on indurated sand at Norah Head		EEC		Occurs only near Norah Head, east of Wilfred Barrett Drive, within the Wyong LGA, on the Central Coast of NSW. Occurs on indurated (hardsetting) sand with a range of local variation in drainage conditions. Restricted to swales behind higher aeolian dunes (OEH 2012).	**Absent** from the proposal site.	Nil	Nil
Lower Hunter Spotted-Gum Ironbark Forest in the Sydney Basin Bioregion		EEC		Restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley. Remnants occur within the Local Government Areas of Cessnock, Maitland, Singleton, Lake Macquarie, Newcastle and Port Stephens but may also occur elsewhere within the bioregion. Outliers are also present on the eastern escarpment of Pokolbin and Corrabare State Forests on Narrabeen Sandstone. Occurs principally on Permian geology in the central to lower Hunter Valley. The community is strongly associated with, though not restricted to, the yellow podsolic and solodic soils of the Lower Hunter soil landscapes of Aberdare, Branxton and Neath.	**Absent** from the proposal site.	Nil	Nil
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions		EEC		Occurs along the NSW coast, usually within 2 km of the ocean on a variety of substrates. Variable structure and composition, typically with closed canopy. Generally rainforest species with vines a major component.	**Absent** from the proposal site.	Nil	Nil

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence at proposal site	Impact consequence	Risk
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions		EEC	-	Occurs on flats, drainage lines and river terraces of coastal floodplains where flooding is periodic and soils generally rich in silt, lack deep humic layers and have little or no saline (salt) influence. Occurs south from Port Stephens in the NSW North Coast, Sydney Basin and South East Corner bioregions. Characterised by a tall open canopy layer of eucalypts with variable species composition.	**Absent** from the proposal site.	Nil	Nil
Swamp Oak Floodplain forest of the NSW North Coast, Sydney basin and South East Corner Bioregions		EEC	-	Typically occurs below 20m above sea level on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes on coastal floodplains of NSW. Associated with grey-black clay-loams and sandy loams, saline or sub-saline groundwater. Structure variable from open forests to scrubs or reedlands with scattered trees. Canopy dominated by Casuarina glauca (north of Bermagui) or Melaleuca ericifolia (south of Bermagui). Understorey characterised by frequent occurrences of vines, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter.	**Absent** from the proposal site.	Nil	Nil
Swamp Sclerophyll forest on Coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions		EEC	-	Usually occurs below 20m above sea level (sometimes up to 50m). Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised by open to dense tree layer of eucalypts and paperbarks, with trees up to or higher than 25 m. Includes areas of fern land and tall reed or sedge land, where trees are sparse or absent.	**Absent** from the proposal site.	Nil	Nil
Sydney Freshwater Wetlands in the Sydney Basin Bioregion		EEC		Sydney Freshwater Wetlands are a complex of vegetation types largely restricted to freshwater swamps in coastal areas, occurring on sand dunes and low-nutrient sandplains along coastal areas in the Sydney Basin bioregion, varying considerably with fluctuating water levels and seasonal conditions. Characteristic species include sedges and aquatic	**Absent** from the proposal site.	Nil	Nil

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence at proposal site	Impact consequence	Risk
				plants such as Baumea species, *Eleocharis sphacelata, Gahnia* species, *Ludwigia peploides ssp. montevidensis* and *Persicaria* species. Areas of open water may occur where drainage conditions have been altered, with patches of emergent trees and shrubs also occurring. This community group has been extensively cleared and filled, with remaining remnants often small and disturbed (OEH 2010).			
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregion		EEC		Occurs on a range of substrates in the NSW North Coast, Sydney Basin and South East Corner bioregions. The community is found on a range of substrates, although stands on sandstone are infrequent and small.	**Absent** from the proposal site.	Nil	Nil
Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion		EEC		Largely restricted to coastal sands on the Umina, Woy Woy and Ettalong Sandplain, a beach ridge system within the Gosford LGA. Occurs on sandy soils of the Woy Woy Soil Landscape (OEH 2012).	**Absent** from the proposal site.	Nil	Nil

Threatened flora known or predicted from the locality, habitat associated and likelihood of occurrence.

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
FLORA							
Acacia bynoeana	Bynoe's Wattle	E	V	Endemic to central eastern NSW, currently known from only 34 locations, many of only 1-5 plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches. Flowers September to March, and fruit matures in November.	**Unlikely.** Suitable habitat absent from site.	5	L
Acacia pubescens	Downy Wattle	V	V	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon.Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October.	**Unlikely.** Suitable habitat absent from site.	5	L
Ancistrachne maidenii		V		Restricted to northern Sydney, around St Albans - Mt White - Maroota - Berowra areas and to the Shannon Creek area south-west of Grafton. Habitat requirements appear to be specific, with populations occurring in distinct bands in areas associated with a transitional geology between Hawkesbury and Watagan soil landscapes. Grows in dry sclerophyll forest on sandstone-derived soils. Flowers in summer.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Asterolasia elegans		E	E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby LGAs, may also occur in the western part of Gosford LGA. Seven known populations. Occurs on Hawkesbury sandstone, commonly amongst rocky outcrops and boulders in sheltered forests on mid- to lower slopes and valleys.	**Unlikely.** Suitable habitat absent from site.	5	L
Astrotricha crassifolia	Thick-leaf Star-hair	V	V	Occurs near Patonga (Gosford LGA), and in Royal NP and on the Woronora Plateau (Sutherland and Campbelltown LGAs). There is also a record from near Glen Davis (Lithgow LGA). Grows on dry ridgetops to 300 m altitude, associated with very rich heath, or dry sclerophyll woodland on sandstone.	**Unlikely.** Suitable sandstone substrates not present.	5	L
Baloskion longipes	Dense Cord-rush	V	V	Dense Cord-rush has been recorded from the Kanangra-Boyd area to the Southern Tablelands but all populations are small. Populations have been recorded in Blue Mountains National Park, Kanangra-Boyd National Park, Penrose State Forest (in Hanging Rock Swamp), Morton National Park (The Vines), the Clyde Mountain area and Ballalaba (south of Braidwood).	**Unlikely.** Suitable habitat absent from site.	5	L
Caladenia tessellata		E	V	Occurs from Central Coast NSW to southern VIC. Mostly coastal but extends inland to Braidwood in southern NSW. In NSW grows in grassy dry sclerophyll woodland on clay loam or sandy soils, and less commonly in heathland on sandy loam soils (Duncan 2010).	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Callistemon linearifolius	Netted Bottle Brush	V		Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. Grows in dry sclerophyll forest on the coast and adjacent ranges.	**Present.** Six plants occur on the escarpment south of the quarry.	3	M
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences not well defined. Grows mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. Prefers open areas in the understorey and is often found in association with *Cryptostylis subulata* and *Cryptostylis erecta*. Soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. Flowers November-February.	**Moderate.** Broadly suitable habitat within proposal site	3	L
Darwinia glaucophylla		V		Occurs between Gosford and the Hawkesbury River around Calga, Kariong and Mt Kariong. Known from approximately 15 sites, several within or near to Brisbane Waters NP and one within Popran NP. Occurs entirely within the Gosford Local Government Area of the Sydney Basin Bioregion. Occurs in sandy heath, scrub and woodlands often associated with sandstone rock platforms or near hanging swamps and friable sandstone shallow soils.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Epacris purpurascens var. purpurascens		V		Occurs from Gosford in the north, Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Grows in a range of sclerophyll forest, scrubs and swamps, most of which have a strong shale soil influence.	**Unlikely.** Suitable habitat absent from site.	5	L
Eucalyptus camfieldii	Camfield's Stringybark	V	V	Occurs from Raymond Terrace to Waterfall, with populations known from Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai and the Royal NP. Occurs in exposed situations on sandstone plateaus, ridges and slopes near the coast, often on the boundary of tall coastal heaths or low open woodland. It grows in shallow sandy soils overlying Hawkesbury sandstone.	**Unlikely.** Suitable habitat absent from site.	5	L
Genoplesium baueri	Yellow Gnat-orchid	E	E	The species has been recorded from locations between Ulladulla and Port Stephens. Currently the species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments.	**Unlikely.** Suitable habitat absent from site.	5	L
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Occurs between Moss Vale/Bargo and lower Hunter Valley, with most occurrences in Appin, Wedderburn, Picton and Bargo. Broad habitat range including heath, shrubby woodland and open forest on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Grevillea shiressii		V	V	Two populations occur, both within the Gosford LGA. One occurs near Gosford, on tributaries of the lower Hawkesbury River north of Sydney (Mooney Mooney Creek and Mullet Creek). There is also a naturalised population at Newcastle. Grows along creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils.	**Unlikely.** Suitable habitat absent from site.	5	L
Haloragis exalata subsp. *exalata*	Wingless Raspwort, Square Raspwort	V	V	Square Raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Square Raspwort appears to require protected and shaded damp situations in riparian habitats. Flowers from November to January	**Unlikely.** Suitable habitat absent from site.	5	L
Hibbertia procumbens	Spreading Guinea Flower	E		Known from several locations on the Central Coast, in the Gosford and Wyong LGAs. These populations are at Bumble Hill near Yarramalong in Wyong LGA; Kulnura, Strickland State Forest, Mangrove Mountain, Somersby, Calga/Mt White and Peats Ridge in the Gosford LGA; and near Mogo Creek to the west of Mangrove Creek Dam. It has been recorded in four conservation reserves: Yengo, Popran and Brisbane Water National Parks and the non-production Strickland State Forest. Majority of known populations occur within *Banksia ericifolia–Angophora hispida–Allocasuarina distyla* scrub/heath on skeletal sandy soils. May also be found associated with 'hanging swamp' vegetation communities on sandy deposits.	**Moderate.** Broadly suitable habitat within proposal site. There are several recent local records of the species and the species may be present in the seed bank at the site.	3	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Leptospermum deanei	Deane's Tea-tree	V	V	Deane's Tea-tree has a limited distribution in the north-west suburbs of Sydney, in Hornsby, Warringah, Ku-ring-gai and Ryde LGAs. Occurs in woodland on lower hill slopes or near creeks with sandy alluvial soil or sand over sandstone.	**Unlikely.** Suitable habitat absent from site.	5	L
Melaleuca biconvexa	Biconvex Paperbark	V	V	Scattered, disjunct populations in coastal areas from Jervis Bay to Port Macquarie, with most populations in the Gosford-Wyong areas. Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	**Unlikely.** Suitable habitat absent from site.	5	L
Melaleuca deanei	Deane's Melaleuca	V	V	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. The species grows in heath on sandstone	**Unlikely.** Suitable habitat absent from site.	5	L
Micromyrtus blakelyi		V	V	Restricted to areas near the Hawkesbury River, north of Sydney. Distribution extends from north of Maroota in the north, to Cowan in the south. All known populations occur within the Baulkham Hills and Hornsby LGAs. Typically occurs within heathlands in shallow sandy soil in cracks and depressions of sandstone rock platforms.	**Unlikely.** Suitable habitat absent from site.	5	L
Pelargonium sp. striatellum *(G.W. Carr 10345)*	Omeo Stork's-bill	E	E	Omeo Storksbill Pelargonium sp. (G.W. Carr 10345), syn. P. striatellum, is a tufted perennial forb known from only 3 locations in NSW, with two on lake-beds on the basalt plains of the Monaro and one at Lake Bathurst. It has a narrow habitat that is usually just above the high-	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
				water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities.			
Pimelea curviflora var. curviflora		V	V	Confined to the coastal area of the Sydney and Illawarra regions. Populations are known between northern Sydney and Maroota in the north-west. New population discovered at Croom Reserve near Albion Park in Shellharbour LGA in August 2011. Formerly recorded around the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly.	**Unlikely.** Suitable habitat absent from site.	5	L
Prostanthera askania	Tranquillity Mintbush	E	E	Occurs over a very restricted geographic range - less than 12 km- in the upper reaches of creeks that flow into Tuggerah Lake or Brisbane Water within the Wyong and Gosford LGAs. Occurs adjacent to, but not immediately in, drainage lines on flat to moderately steep slopes formed on Narrabeen sandstone and alluvial soils derived from it. Occurs in moist sclerophyll forest and warm temperate rainforest communities with a mesic understorey. Associated with Sydney Blue Gum *Eucalyptus saligna* and Turpentine *Syncarpia glomulifera.*	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Prostanthera junonis	Somersby Mintbush	E	E	Restricted to nine populations within the Somersby Plateau in Gosford/Wyong LGAs. Grows on gently undulating country on Hawkesbury Sandstone. Inhabits open forest, low woodland and open scrub, in disturbed and undisturbed sites. Predominately found in low woodland dominated by E. haemastoma and associated ecotone areas (NSW NPWS 2000).	**High.** Suitable habitat occurs in study area and there are several recent local records of the species near the site.	3	L
Rhizanthella slateri	Eastern Underground Orchid	V	E	The species grows in eucalypt forest but no informative assessment of the likely preferred habitat for the species is available (DECC 2005b; c). Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Flowers during October and November (Harden 1993).	**Unlikely.** Suitable habitat absent from site.	5	L
Streblus pendulinus	Siah's Backbone, Sia's Backbone, Isaac Wood		E	Siah's Backbone occurs from Cape York Peninsula to Milton, south-east New South Wales (NSW), as well as Norfolk Island (ATRP 2010; Jessup 2003; The Royal Botanic Gardens and Domain Trust 2011). Siah's Backbone is found in warmer rainforests, chiefly along watercourses. The species grows in well-developed rainforest, gallery forest and drier, more seasonal rainforest (ATRP 2010).	**Unlikely.** Suitable habitat absent from site.	5	L
Syzygium paniculatum	Magenta Lilly Pilly	V	V	Occurs in a narrow coastal strip from Bulahdelah to Conjola State Forest. Grows in rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas, often in remnant littoral or gallery rainforests.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Tetratheca glandulosa		V	V	Restricted to The Hills, Gosford, Hawkesbury, Hornsby, Ku-ring-gai, Pittwater, Ryde, Warringah, and Wyong LGAs. Associated with shale-sandstone transition habitat (shale-cappings over sandstone). Occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils generally shallow, yellow, clayey/sandy loam, commonly with lateritic fragments. Vegetation varies from heath to open forest and is broadly equivalent to Sydney Sandstone Ridgetop Woodland community.	**Unlikely.** Suitable habitat absent from site.	5	L
Tetratheca juncea	Black-eyed Susan	V	V	Regarded as extinct within the Sydney area, current range from Wyong north to Bulahdelah and inland 50km to edge of Sugarloaf Range. Occurs predominately in areas of over 1000 mm annual rainfall, within dry sclerophyll forest, and sometimes heath and moist forest, with a preference for Coastal Plains Smooth-barked Apple Woodland and Coastal Plains Scribbly Gum Woodland.	**Unlikely.** Suitable habitat absent from site.	5	L

Threatened fauna known or predicted from the locality, habitat association and likelihood of occurrence in the proposal site

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
FAUNA							
Birds							
Anthochaera phrygia	Regent Honeyeater	CE	E	In NSW confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. Inhabits dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	**Unlikely.** Suitable habitat absent from site.	5	L
Botaurus poiciloptilus	Australasian Bittern	E	E	Widespread but uncommon over most NSW except the northwest. Favours permanent freshwater wetlands with tall dense reedbeds particularly *Typha* spp. and *Eleocharis* spp., with adjacent shallow, open water for foraging. Roosts during the day amongst dense reeds or rushes and feeds mainly at night on frogs, fish, yabbies, spiders, insects and snails.	**Unlikely.** Suitable habitat absent from site.	5	L
Burhinus grallarius	Bush Stone-curlew	E		Found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Restricted to SE coast and highlands south from the Hunter Valley. Spends summer in tall mountain forests and woodlands, usually heavily timbered and mature wet sclerophyll forests. Winters at lower altitudes in drier more open eucalypt forest and woodlands, particularly in coastal areas. Nests in summer in large tree hollows, often close to water, usually in tall mature sclerophyll forests with a dense understorey, and occasionally in coastal forests. Feeds on seeds, particularly Eucalyptus and Acacia, also berries, fruit and insects (Higgins 1999).	**Unlikely.** Suitable habitat absent from site.	5	L
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of *Allocasuarina* species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding site. Nests in large (approx. 20 cm) hollows in trees, stumps or limbs, usually in Eucalypts (Higgins 1999).	**Moderate**. Potential foraging habitat occurs at the site.	4	L
Daphoenositta chrysoptera	Varied Sittella	V	-	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Dasyornis brachypterus	Eastern Bristlebird	E	E	Occurs in three disjunct areas of south-eastern Australia: southern Queensland/northern NSW, the Illawarra Region and in the vicinity of the NSW/Victorian border. Habitat characterised by dense, low vegetation including heath and open woodland with a heathy understorey. The fire history of habitat is important, and the Illawarra and southern populations reach maximum densities in habitat that have not been burnt for over 15 years.	**Unlikely.** Suitable habitat absent from site.	5	L
Glossopsitta pusilla	Little Lorikeet	V	-	Occurs from coast to western slopes of the Great Dividing Range. Inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands Eucalyptus albens and E. melliodora are particularly important food sources for pollen and nectar respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially Eucalyptus viminalis, E. blakelyi and E. dealbata. Most breeding records are from the western slopes.	**Unlikely.** Suitable habitat absent from site.	5	L
Hieraaetus morphnoides	Little Eagle	V	-	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Lathamus discolor	Swift Parrot	E	E,M	Migratory, travelling to the mainland from March to October. Breeds in Tasmania from September to January. On the mainland, it mostly occurs in the southeast foraging on winter flowering eucalypts and lerps, with records of the species between Adelaide and Brisbane. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. *Eucalyptus robusta, Corymbia maculata* and *C. gummifera* dominated coastal forests are also important habitat.	**Low.** Preferred winter forage absent from the majority of the site.	5	L
Neophema pulchella	Turquoise Parrot	V		The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. It lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	**Unlikely.** Suitable habitat absent from site.	5	L
Ninox strenua	Powerful Owl	V	-	Occurs from the coast to the western slopes. Solitary and sedentary species. Inhabits a range of habitats from woodland and open sclerophyll forest to tall open wet forest and rainforest. Prefers large tracts of vegetation. Nests in large tree hollows (> 0.5 m deep), in large eucalypts (dbh 80-240 cm) that are at least 150 years old. Pairs have high fidelity to a small number of hollow-bearing nest trees and defend a large home range of 400 - 1,450 ha. Forages within open and closed woodlands as well as open areas.	**Moderate**. May forage in the proposal site occasionally as part of a wider area of occupation.	4	L
Petroica boodang	Scarlet Robin	V		In NSW, occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	**Unlikely.** Suitable habitat absent from site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW (OEH 2012). It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains (OEH 2012).	**Unlikely.** Suitable habitat absent from site.	5	L
Tyto novaehollandiae	Masked Owl	V	-	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 m. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly on terrestrial mammals but arboreal species may be taken.	**Moderate**. May forage in the proposal site occasionally as part of a wider area of occupation.	4	L
Tyto tenebricosa	Sooty Owl	V	-	Occurs in the coastal, escarpment and tablelands regions of NSW. More common in the north and absent from the western tablelands and further west. Inhabits tall, moist eucalypt forests and rainforests, and are strongly associated with sheltered gullies, particularly those with tall rainforest understorey. Roosts in tree hollows, amongst dense foliage in gullies or in caves, recesses or ledges of cliffs or banks. Nest in large (>40cm wide, 100cm deep) tree hollows in unlogged/unburnt gullies within 100m of streams or in caves.	**Moderate**. May forage in the proposal site occasionally as part of a wider area of occupation.	4	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Rostratula australis	Australian Painted Snipe	E	E	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	**Unlikely.** Suitable habitat absent from site.	5	L
Mammals							
Cercartetus nanus	Eastern Pygmy-possum	V	-	Occurs along the east coast of NSW, and inland to the Pillaga, Dubbo, Parkes and Wagga Wagga. Inhabits range of habitats from coastal heath and woodland though open and closed forests, subalpine heath and rainforest (Tulloch and Dickman 1995). Inhabits rainforest, sclerophyll forests and heath. Banksia spp. and myrtaceous shrubs and trees are favoured food sources and nesting subject sites in drier habitats. Diet mostly pollen and nectar from Banksia spp., Eucalyptus spp., Callistemon spp. and insects (Ward and Turner 2008). Nests in hollows in trees, under the bark of Eucalypts, forks of tea-trees, abandoned bird nests and Xanthorrhoea bases (Ward and Turner 2008, Tulloch and Dickman 2006).	**High.** Potential foraging habitat present at the site.	3	M

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Occurs from the coast to the western slopes of the divide. Largest numbers of records from sandstone escarpment country in the Sydney Basin and Hunter Valley (Hoye and Schulz 2008). Roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. An insectivorous species that flies over the canopy or along creek beds (Churchill 2008). In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	**Moderate**. May forage in the proposal site as part of a wider area of occupation.	4	L
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Inhabits a range of environments including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den subject sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along densely vegetated creek lines.	**Low.** Broadly suitable habitat present in the proposal site but may be restricted by the level of clearing and disturbance at and surrounding the site. No recent local records, indicating lack of local viable population.	5	L
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Occurs on southeast coast and ranges. Prefers tall (>20m) and wet forest with dense understorey. Absent from small remnants, preferring continuous forest but can move through cleared landscapes and may forage in open areas. Roosts in hollow trunks of Eucalypts, underneath bark or in buildings. Forages in gaps and spaces within forest, with large foraging range (12km foraging movements recorded) (Churchill 2008, Law et al 2008).	**Moderate**. May forage in the proposal site as part of a wider area of occupation.	4	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Miniopterus australis	Little Bentwing-bat	V	-	Occurs from Cape York to Sydney. Inhabits rainforests, wet and dry sclerophyll forests, paperbark swamps and vine thickets. Only one maternity cave known in NSW, shared with Eastern Bentwing-bats at Willi Willi, near Kempsey. Outside breeding season roosts in caves, tunnels and mines and has been recorded in a tree hollow on one occasion. Forages for insects beneath the canopy of well-timbered habitats (Churchill 2008, Hoye and Hall 2008).	**Moderate**. May forage in the proposal site as part of a wider area of occupation.	4	L
Miniopterus australis	Eastern Bentwing-bat	V		East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, *Melaleuca* swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.	**Known.** Recorded foraging at the site by Geolink (2013).	4	M
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Forages in natural and artificial openings in vegetation, typically within a few kilometres of its roost. Roosts primarily in tree hollows but also recorded from man-made structures or under bark (Churchill 2008).	**Known.** Recorded foraging at the site by Geolink (2013).	4	M
Myotis macropus	Southern Myotis	V	-	Mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water (Campbell 2011). Breeds November or December (Churchill 2008).	**Moderate**. May forage in the farm dam at the proposal site as part of a wider area of occupation.	4	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Petaurus australis	Yellow-Bellied Glider	V	-	Occurs along the east coast to the western slopes of the Great Dividing Range. Inhabits a variety of forest types but prefers tall mature eucalypt forest with high rainfall and rich soils. Relies on large hollow-bearing trees for shelter and nesting, with family groups of 2-6 typically denning together. In southern NSW its preferred habitat at low altitudes is moist gullies and creek flats in mature coastal forests. Mostly feeds on sap, nectar and honeydew.	**Unlikely**. Preferred habitat absent from proposal site.	5	L
Petaurus norfolcensis	Squirrel Glider	V		The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Required abundant tree hollows for refuge and den sites.	**High.** Potential foraging and denning habitat available.	3	M
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	Occurs from the Shoalhaven north to the Queensland border. Now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. Occurs on rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Diet consists of vegetation in adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	**Unlikely**. Preferred habitat absent from proposal site.	5	L
Phascolarctos cinereus	Koala	V	V	Occurs from coast to inland slopes and plains. Restricted to areas of preferred feed trees in eucalypt woodlands and forests. Home range varies depending on habitat quality, from < 2 to several hundred hectares.	**Unlikely**. Preferred habitat absent from proposal site. No recent local records, indicating a lack of a local	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
					viable population.		
Potorous tridactylus	Long-Nosed Potoroo	V	V	Restricted to east of the Great Dividing Range, with annual rainfall >760 mm. Inhabits coastal heath and dry and wet sclerophyll forests. Requires relatively thick ground cover and appears restricted to areas of light and sandy soil (Johnston 2008). Feeds on fungi, roots, tubers, insects and their larvae, and other soft-bodied animals in the soil.	**Unlikely**. Preferred habitat absent from proposal site.	5	L
Pseudomys novaehollandiae	New Holland Mouse	-	V	Occurs in disjunct, coastal populations from Tasmania to Queensland. In NSW inhabits a variety of coastal habitats including heathland, woodland, dry sclerophyll forest with a dense shrub layer and vegetated sand dunes (Wilson and Bradtke 1999). Populations may recolonise/ increase in size in regenerating native vegetation after wildfire, clearing and sandmining. Presence strongly correlated with understorey vegetation density, and high floristic diversity in regenerating heath (Lock and Wilson 1999).	**Low**. Preferred habitat absent from proposal site.	5	L
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Roosts in camps within 20 km of a regular food source, typically in gullies, close to water and in vegetation with a dense canopy. Forages in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, swamps and street trees, particularly in eucalypts, melaleucas and banksias. Highly mobile with movements largely determined by food availability (Eby and Law 2008). Will also forage in urban gardens and cultivated fruit crops.	**Known.** Recorded foraging at the site by Geolink (2013).	4	M
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Occurs on the east coast and Great Dividing Range. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks, typically below 500m asl. Forages in relatively uncluttered areas, using natural or man-made openings in denser habitats.	**Known.** Recorded foraging at the site by Geolink (2013).	4	M

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
				Usually roosts in tree hollows or fissures but also under exfoliating bark or in the roofs of old buildings. Females congregate in maternal roosts in suitable hollow trees (Hoye and Richards 2008, Churchill 2008).			
Frogs							
Heleioporus australiacus	Giant Burrowing Frog	V	V	Occurs along the coast and eastern slopes of the Great Dividing Range south from Wollemi National Park. Appears to exist as 2 populations with a 100km gap in records between Jervis Bay and Eden. Northern population occurs on sandy soils supporting heath, woodland or open forest. Breeds in ephemeral to intermittent streams with persistent pools. Only infrequently moves to breeding sites, most commonly found on ridges away from creeks, several hundred metres from water.	**High.** Potential habitat and several recent records from the locality, the closest of which is approximately 1.2 km north of the site.	3	M
Litoria aurea	Green and Golden Bell Frog	E	V	Formerly occurred from Brunswick Heads to Victoria, but >80% populations now extinct. Inhabits marshes, natural and artificial freshwater to brackish wetlands, dams and in stream wetlands. Prefers sites containing cumbungi (T*ypha* spp.) or spike rushes (*Eleocharis* spp.), which are unshaded and have a grassy area and/or rubble as shelter/refuge habitat nearby. *Gambusia holbrooki* is a key threat as they feed on green and Golden Bell Frog eggs and tadpoles.	**Unlikely.** Preferred habitat absent from proposal site.	5	L
Litora littlejohni	Littlejohn's Tree Frog, Heath Frog	V	V	Occurs on plateaus and eastern slopes of the Great Dividing Range south from Watagan State Forest. Occurs along permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops, hunting either in shrubs or on the ground.	**Unlikely.** Preferred habitat absent from proposal site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Mixophyes balbus	Stuttering Frog	E	V	Occurs along the east coast of Australia. Found in rainforest and wet, tall, open forest. Shelter in deep leaf litter and thick understorey vegetation on the forest floor. Feeds on insects and smaller frogs, breeding in streams during summer after heavy rain. Within Sydney Basin the species is now confined to populations in the Watagan Mountains, the southern Blue Mountains and Macquarie Pass (White 2008a). The species does not occur in areas where the riparian vegetation has been disturbed or where there have been significant upstream human impacts (Mahony et al 1997).	**Unlikely.** Broadly suitable habitat present but not known to persist in disturbed, remnant habitats.	5	L
Mixophyes iteratus	Giant Barred Frog	E	E	Occurs on the coast and ranges from south-eastern QLD to the Hawkesbury River in NSW, particularly in Coffs Harbour - Dorrigo area. Forage and live amongst deep, damp leaf litter in rainforest, moist eucalypt forest and nearby dry eucalypt forest. Breed in shallow, flowing rocky streams. Within Sydney Basin, confined to small populations in tall, wet forest in the Watagan Mountains north of the Hawkesbury and the lower Blue Mountains (White 2008b).	**Unlikely.** Broadly suitable habitat present but outside currently known distribution and not known to persist in disturbed, remnant habitats.	5	L
Pseudophryne australis	Red-crowned Toadlet	V	-	Restricted to Sydney Basin, from Nowra to Pokolbin and west to Mt Victoria. Inhabits heathland and open woodland on Hawkesbury and Narrabeen Sandstones, within 100m of ridgelines. Breeds in ephemeral feeder creeks or flooded depressions, requiring unpolluted water between 5.5 and 6.5 pH. Shelters under rocks, amongst masses of dense vegetation or leaf litter. Populations restricted to immediate vicinity of breeding areas.	**High.** Potential habitat and several recent records from the locality, the nearest of which is approximately 100 m west of the site.	3	M

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Reptiles							
Hoplocephalus bungaroides	Broad-headed Snake	E	V	The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer.	**Low.** Broadly suitable sandstone habitat available, however no exposed cliffs or rocky crevices.	5	L
Varanus rosenbergi	Rosenberg's Goanna	V	-	In NSW mainly occurs on the mid coast region from Wollemi NP to Nowra; the ACT and Goulburn regions and the South-west Slopes. Inhabits coastal heathlands, wet and dry sclerophyll forests, woodlands and mallee communities. Termite mounds are an important habitat feature: eggs are laid in the mounds in summer and incubate till spring, when the young dig themselves out. Young may return to the mound as a refuge for some months, while adults shelter in burrows dug under rocks or logs, or in rock crevices, hollow logs or even rabbit burrows (Sass 2008).	**Unlikely.** Suitable habitat absent from proposal site.	5	L

All information in this table is taken from NSW OEH and Commonwealth DoE Threatened Species profiles (OEH 2014, DoE 2014) unless otherwise stated. The codes used in this table are: CE – critically endangered; E – endangered; V – vulnerable; EP – endangered population; CEEC – critically endangered ecological community; EEC – endangered ecological community, M- migratory, Ma – marine.

EPBC Act-listed migratory fauna known or predicted from the locality, habitat association and suitable habitat present at the subject site

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Migratory Birds							
Wetland species							
Apus pacificus	Fork-tailed Swift	-	M	Recorded in all regions of NSW. Non- breeding, and almost exclusively aerial while in Australia. Occurs over urban and rural areas as well as areas of native vegetation.	**Low.** May overfly the proposal site.	5	L
Ardea alba	Great Egret	-	M	Occurs across NSW. Within NSW there are breeding colonies within the Darling Riverine Plains and Riverina regions, and minor colonies across its range including the north and north-east of the state. Reported from a wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial).	**Low.** Preferred habitat absent from proposal site.	5	L
Ardea ibis	Cattle Egret	-	M	Occurs across NSW. Principal breeding sites are the central east coast from Newcastle to Bundaberg. Also breeds in major inland wetlands in north NSW (notably the Macquarie Marshes). Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. Uses predominately shallow, open and fresh wetlands with low emergent vegetation and abundant aquatic flora. Sometimes observed in swamps with tall emergent vegetation and commonly use areas of tall pasture in moist, low-lying areas.	**Low.** Preferred habitat absent from proposal site.	5	L
Charadrius bicinctus	Double-banded Plover	-	M	Found in both coastal and inland areas; eastern and southern Australia, mainly between the Tropic of Capricorn and western Eyre Peninsula, with occasional records in northern Queensland	**Unlikely**. No suitable habitat present.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
				and Western Australia (Marchant & Higgins 1993). The greatest numbers are found in Tasmania and Victoria, but numbers diminish to the north and west of these regions (C.D.T. Minton, 2002 pers. comm.) Found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture.			
Gallinago hardwickii	Latham's Snipe		M	Occurs along the coast and west of the great dividing range. Non breeding visitor to Australia. Inhabit permanent and ephemeral wetlands up to 2000 m asl. Typically in open, freshwater wetlands with low, dense vegetation (incl. swamps, flooded grasslands and heathlands). Can also occur in saline/brackish habitats and in modified or artificial habitats close to human activity.	**Unlikely**. No suitable habitat present.	5	L
Heteroscelus brevipes	Grey-tailed Tattler	-	M	Distributed along most of the coast from the Queensland border, south to Tilba Lake and Victoria. It is more heavily distributed along coastal regions north of Sydney. The largest populations in Victoria are located at Corner Inlet, west to Westernport and Port Phillip Bays. Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats.	**Unlikely**. No suitable habitat present.	5	L
Limosa lapponica	Bar-tailed Godwit	-	M	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas (Marchant & Higgins 1993).	**Unlikely**. No suitable habitat present.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Numenius madagascariensis	Eastern Curlew	-	M	Occurs primarily along the coast; found in all states, particularly the north, east, and south-east regions including Tasmania; rarely recorded inland. Associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms (Marchant & Higgins 1993).	**Unlikely**. No suitable habitat present.	5	L
Numenius minutus	Little Curlew, Little Whimbrel	-	M	Recorded from inland Australia, and widespread but scattered records on the east coast; recorded on Lord Howe Island, Cocos-Keeling Island and Christmas Island (Higgins & Davies 1996). Prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated (Higgins & Davies 1996).Birds may also utilise grassy, open woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, which may be without vegetation for hundreds of metres, and occasionally on mudflats when nearby grasslands are unburnt, or around swamps	**Unlikely**. No suitable habitat present.	5	L
Numenius phaeopus	Whimbrel	-	M	Migrant to Australia and New Zealand, with a primarily coastal distribution. There are also scattered inland records of Whimbrels in all regions. It is found in all states but is more common in the north. Often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas	**Unlikely**. No suitable habitat present.	5	L
Pluvialis fulva	Pacific Golden Plover	-	M	Occurs along the east coast, especially along Queensland and	**Unlikely**. No	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
				New South Wales. Usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass.	suitable habitat present.		
Rostratula benghalensis	Painted Snipe		M	Most common in eastern Australia, it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern South Australia. There have not been any recent records of the Australian Painted Snipe from north-western NSW, or from a number of scattered other locations from which historical records were obtained.	**Unlikely**. No suitable habitat present.	5	L
Terrestrial species							
Haliaeetus leucogaster	White-bellied Sea-eagle	-	M	Primarily coastal but may extend inland over major river systems. Breeds close to water, mainly in tall open forest/woodland but also in dense forest, rainforest, closed scrub or remnant trees. Usually forages over large expanses of open water, but also over open terrestrial habitats (e.g. grasslands).	**Unlikely**. Preferred habitat absent from proposal site.	5	L
Hirundapus caudacutus	White-throated Needletail	-	M	Recorded along NSW coast to the western slopes and occasionally from the inland plains. Breeds in northern hemisphere. Almost exclusively aerial while in Australia. Occur above most habitat types, but are more frequently recorded above more densely vegetated habitats (rainforest, open forest and heathland) than over woodland or treeless areas.	**Low.** May overfly the proposal site.	5	L

Scientific Name	Common Name	TSC/FM Act	EPBC Act	Habitat Association	Likelihood of occurrence in the proposal site	Impact consequence	Risk
Merops ornatus	Rainbow Bee-eater	-	M	Widespread across mainland Australia. Mainly inhabits open forests and woodlands and shrublands, often in proximity to permanent water. Also occurs in cleared/semi-cleared habitats including farmland and residential areas. Excavates a nest burrow in flat/sloping ground in banks of waterways, dams, roadside cuttings, gravel pits or cliff faces. Southern populations migrate north for winter after breeding.	**Moderate.** Broadly suitable habitat present in proposal site	5	L
Monarcha melanopsis	Black-faced Monarch		M	Summer breeding migrant to south-east. Occurs along the coast of NSW. Inhabits rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating (Birds Australia 2005).	**Moderate.** Broadly suitable habitat present in proposal site.	5	L
Monarcha trivirgatus	Spectacled Monarch	-	M	The Spectacled Monarch is found in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales. It is much less common in the south. It prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	**Unlikely**. Preferred habitat absent from proposal site.	5	L
Myiagra cyanoleuca	Satin Flycatcher	-	M	In NSW widespread on and east of the Great Divide, sparsely scattered on the western slopes, very occasional records on the western plains. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, often near wetlands and watercourses. On migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Generally not in rainforests.	**Moderate.** Broadly suitable habitat present in proposal site.	5	L
Rhipidura rufifrons	Rufous Fantail	-	M	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas (Birds Australia 2008).	**Moderate.** Broadly suitable habitat present in proposal site.	5	L

All information in this table is taken from NSW OEH and Commonwealth Department of the Environment Threatened Species profiles (OEH 2013a, DoE 2013a) unless otherwise stated. The codes used in this table are: CE – critically endangered; E – endangered; V – vulnerable; EP – endangered population; CEEC – critically endangered ecological community; EEC – endangered ecological community; M - migratory.

GHD

Level 3 GHD Tower 24 Honeysuckle Drive Newcastle NSW 2300
PO Box 5403 Hunter Region Mail Centre NSW 2310
T: (02) 4979 9999 F: (02) 4979 9988 E: ntlmail@ghd.com

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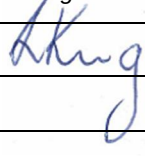
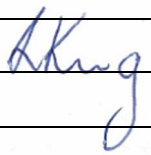
1	V Owen	L King		L King		04/08/2014

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