251 Adelaide Street Raymond Terrace - Planning Proposal

4 August 2017 (Gateway Submission)

Proposed amendment to Port Stephens Local Environmental Plan 2013

Rezoning of part Lot 232 DP 593512, 251 Adelaide Street, Raymond Terrace

PORT STEPHENS COUNCIL

FILE NUMBERS

Council: PSC2014-02010

Department: To be provided at Gateway Determination.

SUMMARY

Subject land:	Part of 251 Adelaide Street Raymond Terrace (Lot 232, DP 593512) **(FIGURE 1)**.
Proponent:	DeWitt Consulting (on behalf of Pheonix Builders Pty Ltd)
Existing Zoning:	RU2 Rural Landscape
Existing Minimum Lot Size:	20 hectares
Proposed Zoning:	Rezone approximately 5.31 hectares of land from RU2 Rural Landscape to R2 Low Density Residential
Proposed Minimum Lot Size:	500m^2 for Zone R2 Low Density
Area of land:	5 hectares (the total area of the lot is 44.36 hectares)
Lot yield:	60 lots (Indicative)
Supporting Studies:	de Witt Consulting (2016). Planning Proposal - 251 Adelaide Street, Raymond Terrace SECA Solution (2016). Traffic Impact Statement **(ATTACHMENT 8)** Biosis (2016). Flora and Fauna Offsets Assessment **(ATTACHMENT 9)** Newcastle Bushfire Consulting (2016). Review of Bushfire Constraints **(ATTACHMENT 10)** Insite Heritage Pty Ltd (2016). Aboriginal Cultural Heritage Due Diligence Assessment **(ATTACHMENT 11)** BMT WBM (2017). Flood Assessment 251 Adelaide Street Raymond Terrace **(ATTACHMENT 12)**

BACKGROUND

The planning proposal seeks to rezone part of 251 Adelaide Street, Raymond Terrace (Lot 232, DP 593512). The parcel in its entirety is 44.36 hectares and currently zoned RU2 Rural Landscape under the Port Stephens Local Environmental Plan 2013. The planning proposal seeks to rezone five hectares to R2 Low Density Residential in order to allow the land to be developed for residential purposes.

On 1st August 2017 Council resolved to adopt the planning proposal and forward to the NSW Department of Planning and Environment for a Gateway Determination (ATTACHMENT 13).

SITE DESCRIPTION

The land subject to the planning proposal (the site) has an area of approximately five hectares and comprises part of a larger lot (44.36ha) at 251 Adelaide Street, Raymond Terrace. The site is located on the south eastern edge of Raymond Terrace and has frontage to Adelaide Street. R2 Low Density Residential zoned land and RE1 Public Recreation zoned land adjoin the site to the north. Hunter Water Corporation wastewater infrastructure is located to the south and west of the site.

The land is currently zoned RU2 Rural Landscape. It contains native vegetation and pine forest plantation. An easement exists over the site for the purposes of an Asset Protection Zone to provide bushfire protection to the residence located to the north at 204 Meredith Crescent. A powerline easement is also located immediately south of the proposed rezoning site.

Investigation of the impacts on nearby Hunter Water Corporation infrastructure has been identified as a key issue for investigation post-Gateway determination.

FIGURE 1– SITE LOCATION (page 4) identifies the subject land

PART 1 – Objective or Intended Outcomes

The planning proposal seeks to enable future appropriate residential development on the site.

PART 2 – Explanation of the provisions to be included in proposed LEP

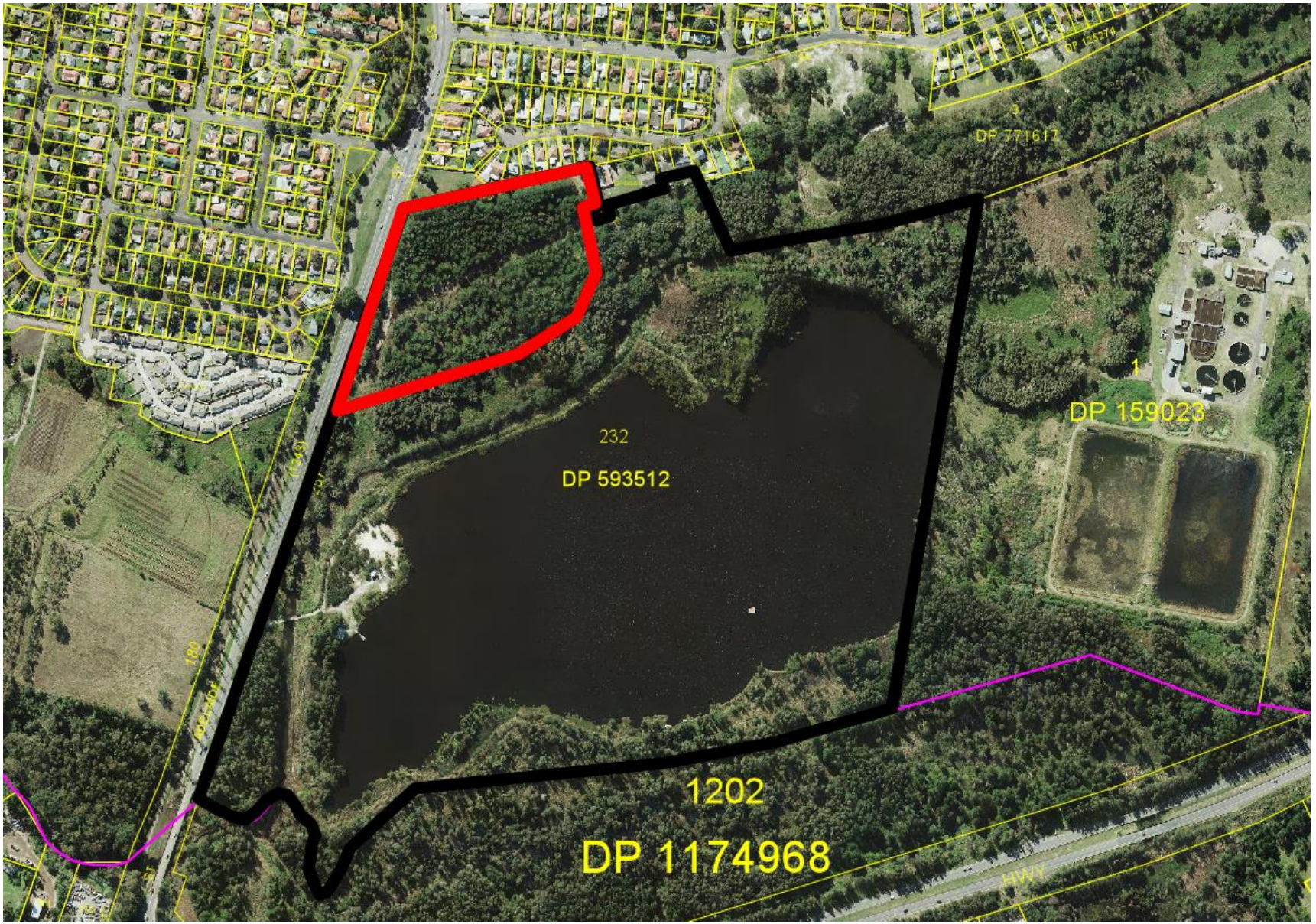
The objective of this planning proposal will be achieved by the following amendments to the Port Stephens Local Environmental Plan 2013:

- Amend Land Zoning Map Sheet LZN_ 002C for Part of Lot 232 DP593512 from RU2 Rural Landscape Zone to R2 Low Density Residential Zone in accordance with **(ATTACHMENT 2)**.

- Amend Lot Size Map Sheet LSZ_002C from 20 ha to 500 m^2 in accordance with **(ATTACHMENT 5).**

- Amend Height of Building Map Sheet HOB _ 002C – to include 9m height of building limit in accordance with **(ATTACHMENT 7).**

FIGURE 1 – SITE LOCATION (land subject to Planning Proposal is shown in red)



PART 3 – Justification for the Planning Proposal

SECTION A – Need for the Planning Proposal

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

The Planning Proposal is not the direct result of any strategic study or report.

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

This planning proposal is the only means to amend the Port Stephens Local Environmental Plan 2013 to rezone the subject site.

SECTION B – Relationship to Strategic Planning Framework

4. 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)?

Hunter Regional Plan 2036 (HRP 2036)

The Hunter Regional Plan 2036 seeks to accommodate a population increase of around 130,000 people by 2036 translating into an additional 70,000 dwellings required in the Hunter Region.

The HRP 2036 projects a population increase of 18,550 for the Port Stephens LGA. Raymond Terrace has been identified as a strategic centre with priorities such as supporting its role as the main service centre and investigating social and economic connectivity. The outcomes of this planning proposal are consistent with these priorities.

As per HRP 2036 Goal 4: “Greater housing choice and jobs” the planning proposal will provide the opportunity to utilise the site to develop additional housing stock by contributing to an increase zoned capacity for dwelling growth to 2036.

The planning proposal addresses the following Directions within the HRP 2036:

Goal 2
Direction 14: Protect and Connect Natural Areas: The proposal will have a minimal impact on ecological attributes of the site as the vegetation present is of a poor quality.

Goal 3
Direction 17 – Create Healthy Built Environments Through Good Design; Proposed future residential development on the site will be within an accessible proximity to the existing services and facilities of Raymond

Terrace. A cycleway and footpath is already in place and can be easily augmented to facilitate connectivity between future residential growth on the site and Raymond Terrace.

Direction 20 – Revitalise Existing Communities: The proposed rezoning will provide residential land in close proximity to existing urban development in Raymond Terrace. The LHRP 2036 advises that as the population of an area grows there is an increased potential to provide more social infrastructure and opportunities to enhance open spaces assisting with revitalising the existing community.

Goal 4
Direction 21 – Create A Compact Settlement: The existing access to public transport, services and infrastructure of Raymond Terrace are available to future residential development on the site. This is considered to be consistent with the intent to create and maintain a functional compact settlement pattern.

Direction 22 – Promote Housing Diversity: Providing new residential land will allow for increased housing diversity by allowing people to select the location and nature of houses in which they live.

Direction 23 – Grow Centres and Renewal Corridors: Raymond Terrace is identified by the LHRP 2036 as a strategic centre. The planning proposal will assist in growing the centre through facilitating population growth. The possible residential development of the site will not undermine the existing centre but will contribute to satisfying the demand for housing growth in the strategic centre of Raymond Terrace.

5. Is the planning proposal consistent with the local Council's Community Strategic Plan, or other local strategic plan?

Community Strategic Plan/Integrated Strategic Plan (Port Stephens 2023)

The relevant directions of the Port Stephens Integrated Planning Framework are:

- 3.3.1.9 Review and prepare statutory plans (Local Environmental Plan, Development Control Plan and Planning Proposals)
- 3.3.1.7 Prepare and review strategic land use strategies, policies and plans.

The administration of this planning proposal is consistent with actions of the Port Stephens Integrated Strategic Plan.

Port Stephens Planning Strategy (PSPS 2011)

The *Port Stephens Planning Strategy 2011* identifies Raymond Terrace as a regional centre. Mixed use development in the regional centre, including housing, is strongly encouraged. PSPS 2011 identifies Raymond Terrace as

having the highest concentration and accessibility to services in the LGA to assist disadvantaged people. The planning proposal will contribute to the increase of housing development within Raymond Terrace.

Other relevant strategies include:

Raymond Terrace and Heatherbrae Strategy 2015-2031 (RTHBS 2015)

The *Raymond Terrace Heatherbrae Strategy 2015-2031* (RTHBS 2015) seeks to achieve the vision of Raymond Terrace as a strong regional centre by providing strategic direction and implementing tangible actions.

6. Is the planning proposal consistent with applicable state environmental planning policies?

An assessment of relevant State Environmental Planning Policies against the planning proposal is provided below.

TABLE A: Relevant State Environmental Planning Policies

SEPP	Relevance	Consistency and Implications
SEPP 44 – Koala Habitat Protection	This SEPP applies to land across NSW that is greater than 1 hectare and is not a National Park or Forestry Reserve. The SEPP encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range.	SEPP 44 is addressed locally by the Port Stephens Comprehensive Koala Plan of Management (PSC CKPM). Under the CKPM Koala Habitat Mapping, the proposed R2 zone comprises *50 m buffer over cleared*. No *preferred* koala habitat occurs within the proposed R2 zone. The planning proposal is consistent with the PSC CKPM Rezoning Performance Criteria. **The proposal is consistent with this SEPP.**
SEPP 55 – Remediation of Land	This SEPP applies to land across NSW and states that land must not be developed	The proponent's Preliminary Site Investigation found the

	if it is unsuitable for a proposed use because of contamination.	potential use of contaminated fill on the broader site; however the potential area of introduced fill material does not occur in the site of the proposed rezoning. Given that no specific instance of contamination has been identified and that the areas of the site where fill has been identified are not currently proposed for redevelopment a Stage 1 Contamination Report can be prepared following Gateway determination. **The consistency of the proposal with this SEPP is to be further Investigated and established.**
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	The SEPP aims to provide for proper management and development of mineral, petroleum and extractive mineral resources.	The site contains a former quarry from which material is no longer being extracted. **The proposal is consistent with this SEPP.**
SEPP (Rural Lands) 2008	The SEPP aims to manage the economic use and development of rural lands through providing state-wide planning controls.	The planning proposal seeks to rezone 5ha of land from RU2 Rural Landscape to R2 Low Density Residential. The site is not currently used as rural land and is not considered have the agricultural potential to meet the objectives of the RU2 zone. **The proposal is not consistent with this**

		SEPP. Any inconsistency with this SEPP is of minor significance.

7. Is the planning proposal consistent with applicable Ministerial Directions?

An assessment of relevant s.117 Directions against the planning proposal is provided in the table below.

TABLE B: Relevant s.117 Ministerial Directions

Ministerial Direction	Aim of Direction	Consistency and Implications
1. EMPLOYMENT AND RESOURCES		
1.2 Rural Zones	The objective of this direction is to protect the agricultural production value of rural land.	The proposal seeks to rezone 5ha of land from RU2 Rural Landscape to R2 Low Density Residential. The proposal is not consistent with this direction, however the site is not currently used as rural land and is not considered have the agricultural potential to meet the objectives of the RU2 zone. **The proposal is not consistent with this direction. Any inconsistency with this direction is of minor significance.**
1.3 Mining, Petroleum Production and Extractive Industries	The objective of this direction is to ensure that the future extraction of State or regionally significant reserves coal, other minerals, petroleum and extractive materials are not compromised by inappropriate development.	The proposal does not seek to prohibit resource extraction and is consistent with this Direction. **The proposal is consistent with this direction.**
1.5 Rural Lands	The objectives of this direction are to protect the agricultural production value	The proposal seeks to rezone 5ha of land from RU2 Rural Landscape to

	of rural land and to facilitate the orderly and economic development of rural lands for rural and related purposes.	R2 Low Density Residential. The proposal is not consistent with this direction, however the site is not currently used as rural land and is not considered have the agricultural potential to meet the objectives of the RU2 zone. **The proposal is not consistent with this direction.**
2. ENVIRONMENT AND HERITAGE		
2.3 Heritage Conservation	The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	There are no known or identified items of environmental heritage significance or indigenous heritage significance on the site if the proposed rezoning. The Proponent submits that given the historical use of the site and its cleared nature it is not anticipated that there are any heritage items that will be adversely impacted. An Archaeological Report and consultation with Worimi Local Aboriginal Land Council can be Undertaken (if required) following a gateway determination to ensure due diligence if required. **The consistency of the proposal with this direction is to be further investigated and established.**
3. HOUSING, INFRASTRUCTURE AND URBAN DEVELOPMENT		
3.1 Residential	The objective of this	The proposal will facilitate

Zones	direction is to encourage a variety and choice of housing types to provide for existing and future housing needs, make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and minimise the impact of residential development on the environment and resource lands.	residential development that will broaden housing choice within the strategic centre of Raymond Terrace. The area proposed for rezoning is in close proximity to existing infrastructure and services and adjacent to existing residential land. **The proposal is consistent with this direction.**
3.3 Home Occupations	The objective of this direction is to encourage the carrying out of low impact small businesses in dwelling houses.	The proposal seeks to rezone a proposed area of 5ha to R2 Low Density Residential. Current provisions of R2 zoning in the PS LEP 2013 allow home occupations (as defined by the PS LEP 2013) to be carried out in a dwelling houses without the need for development consent. **The proposal is consistent with this direction.**
3.4 Integrating Land Use and Transport	The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs subdivision and street layouts achieve the sustainable transport objectives.	The area proposed for rezoning is in close proximity to the Pacific Highway, via Adelaide Street, for private vehicle use. Public transport is equally accessible with bus services to Raymond Terrace, Newcastle, Lake Macquarie and Newcastle Airport. The proposal will allow for residential development within walking distance of the services offered by Raymond Terrace, with safe pedestrian and cycleway access already

		in place and servicing adjacent residential dwellings. **The proposal is consistent with this direction.**
4. HAZARD AND RISK		
4.1 Acid Sulfate Soils	The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulphate soils.	**Consistent –** the site is nominated as Class 2 and 3 land in terms of Acid Sulfate Soils. Future development may require Acid Sulfate Soils Management Plan; however it will not impede the rezoning and reclassification of the land. **The proposal is consistent with this direction.**
4.2 Mine Subsidence and Unstable Land	The objective of this direction is to prevent damage to life, property and the environment on land identified as unstable or potentially subject to mine subsidence.	The area of the proposed rezoning is not identified as being subject to mine subsidence. **The proposal is consistent with this direction.**
4.3 Flood Prone Land	The objective of this direction are to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the *Floodplain Development Manual 2005*, and that the provisions of an LEP on flood prone land are commensurate with flood hazard and include consideration of the potential flood impacts both on and off the subject land.	The area of the proposed rezoning is within the Flood Planning Area. The area of the proposed rezoning is classified as Low Hazard Fringe, High Hazard Floodway and Low Hazard Storage as per the Port Stephens Council Flood Hazard Mapping. A Flood Assessment (BMT WBM, 2017) **(ATTACHMENT 12)** has been undertaken by the proponent. This was also reviewed by Council's Flooding Engineer who

		advised that flooding issues are capable of being addressed at the development application stage. **The proposal is not consistent with this direction. Consultation with OEH will need to be undertaken on this matter following a Gateway determination.**
4.4 Planning for Bushfire Protection	The objectives of this direction are to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, to encourage sound management of bush fire prone areas.	The land is identified as Bushfire Prone Land. Consultation with the Rural Fire Service will be required to ensure compliance with relevant bushfire planning provisions and to satisfy the requirements of this Direction. **The consistency of the proposal with this direction is to be further investigated and established.**
5. REGIONAL PLANNING		
5.1 Implementation of Regional Strategies	The objective of this direction is to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.	The Hunter Regional Plan 2036 (HRP 2036) projects a population increase of 18, 550 for the Port Stephens LGA. Raymond Terrace has been identified as a strategic centre with priorities such as supporting its role as the main service centre and investigating social and economic connectivity. As per HRP 2036 Goal 4: "Greater housing choice and jobs" the planning proposal will provide the

		opportunity to utilise the site to develop additional housing stock by contributing to an increase zoned capacity for dwelling growth to 2036 and beyond. **The proposal is consistent with this direction.**
6. LOCAL PLAN MAKING		
6.1 Approval and Referral Requirements	The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	The area of the proposed rezoning is bushfire prone land. Consultation with the NSW Fire Service will be required to ensure compliance with the relevant bushfire planning provisions and to satisfy the requirements of this direction. **The proposal is consistent with this direction.**

SECTION C – Environmental, Social and Economic Impact

8. 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?

The proposal is unlikely to have significant environmental impacts as the area proposed for the R2 –Low Density Residential contains poor quality native vegetation. The majority of the proposed R2 zone contains swamp sclerophyll forest EEC in low condition (3.78 ha), and 0.3 ha moderate-good condition. The vegetation within the proposal area may be further mapped and classified by the proponent post Gateway determination in order to offset the vegetation loss through bio-banking.

Further consideration of the potential indirect impacts to threatened species and endangered ecological communities present in close proximity to the area proposed for rezoning may be required at development application stage. It is anticipated that the impacts of development on the retained riparian buffer will be mitigated through appropriate subdivision design at development application stage.

The proposal is consistent with CKPoM Rezoning Performance Criteria as no preferred koala habitat will be impacted by the planning proposal.

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

No. There are no other likely environmental effects identified in informal guidelines, codes or policies that have been produced by Public Authorities that have not already been addressed in the State or Local strategic Framework.

An Aboriginal Cultural Heritage Assessment **(ATTACHMENT 11)** was conducted to support the planning proposal submitted by the proponent. This included an inspection of the study area with a representative of the Worimi Local Aboriginal Land Council. No Aboriginal objects, areas or potential archaeological deposits were located. Consultation with OEH will be required on this matter following a Gateway determination, and further investigations may be required.

10. Has the planning proposal adequately addressed any social and economic effects?

Social and economic benefits of the planning proposal have been identified as the following:

- Short term construction employment for construction and related industries generated by potential future development;
- Provision of additional housing stock to meet demand within the region;
- Providing housing stock within close proximity to the services of Raymond Terrace, public transport linkages and schools.

The proposal is not of a scale that will create any significant adverse social impacts.

SECTION D – State and Commonwealth interests

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

The site is located in close proximity to existing infrastructure, such as public transport, major roadways and has access to most utilities. Liaison with the relevant infrastructure, utility, service and other relevant public authorities will be guided by the Gateway Determination.

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

Consultation with relevant State and Commonwealth Agencies will be undertaken following a Gateway Determination. It is envisaged that the following agencies will be consulted with:

- Hunter Water Corporation – Potential issues regarding the proximity of the proposal area to the Raymond Terrace Wastewater Treatment works and Raymond Terrace Number 1 Wastewater Pumping Station (odour and noise modelling required to be undertaken by the proponent post Gateway determination).
- NSW Office of Environment and Heritage
- Ausgrid – the electricity easement within the proposed rezoning area.
- Rural Fire Service
- Worimi Local Aboriginal Land Council

Part 4 - Mapping

The proposed map layer amendments are included as attachments to the planning proposal as follows:

ATTACHMENT 1 – Locality Plan

ATTACHMENT 2 – Current Zoning Plan LZN_002C

ATTACHMENT 3 – Proposed Zoning Map – Map Amendment to Land Zoning Map – Sheet LZN_002C from RU2 Rural Landscape to R2 Low Density Residential zone

ATTACHMENT 4 – Current Lot Size Map LSZ_002C

ATTACHMENT 5 – Proposed Lot Size Plan – Map amendment to Lot Size Map – Sheet LSZ_002C from 20 ha lot size to 500 m^2

ATTACHMENT 6 – Current Height of Building Map Sheet HOB _ 002C

ATTACHMENT 7 – Proposed Height of Building Map – Sheet HOB _ 002C – 9 metres

Part 5 - Details of Community Consultation

Community consultation will be undertaken in accordance with the gateway determination. Due to the size of the proposal, an exhibition period of 28 days is recommended.

Notice of the public exhibition period will be placed in the local newspaper, The Examiner. The exhibition material will be on display at the following locations during normal business hours:

- Council's Administration Building 116 Adelaide Street, Raymond Terrace

The planning proposal will also be available on Council's website.

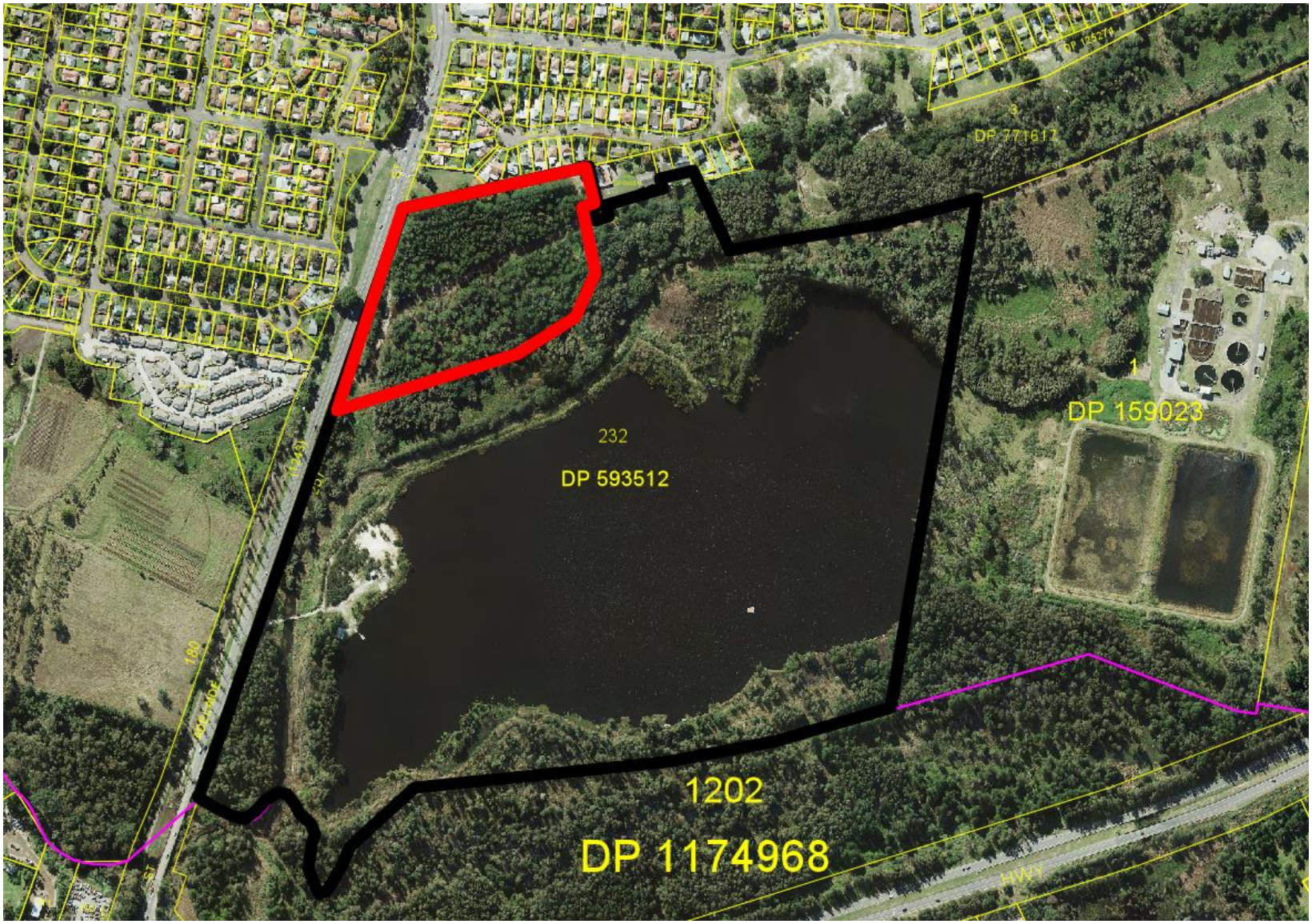
Part 6 – Project timeline

It is anticipated to complete the planning proposal in accordance with the following timeline:

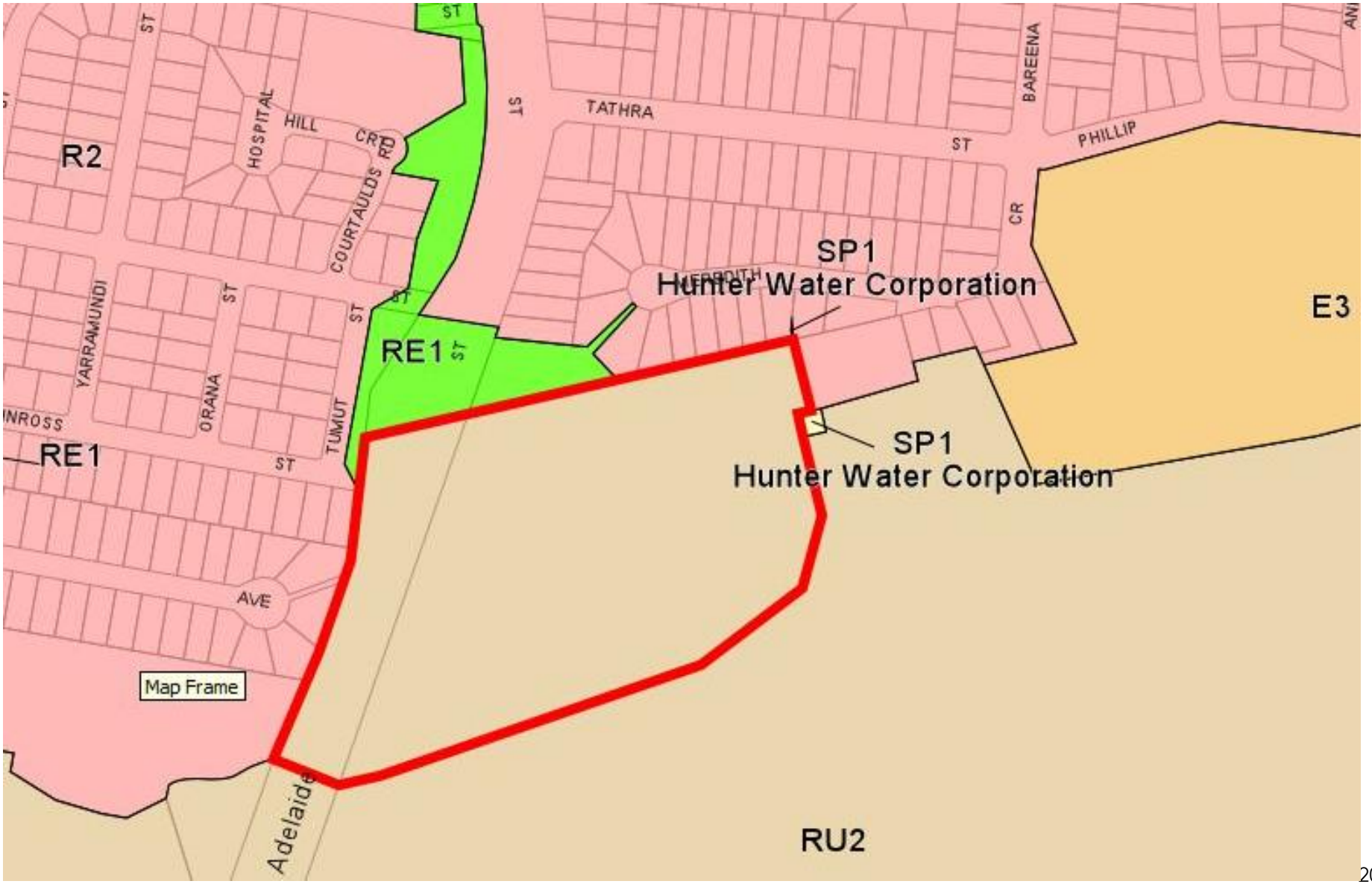
The following timetable is proposed:

	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR
Gateway Determination								
Agency Consultation								
Public Exhibition								
Council Report								
Parliamentary Counsel								

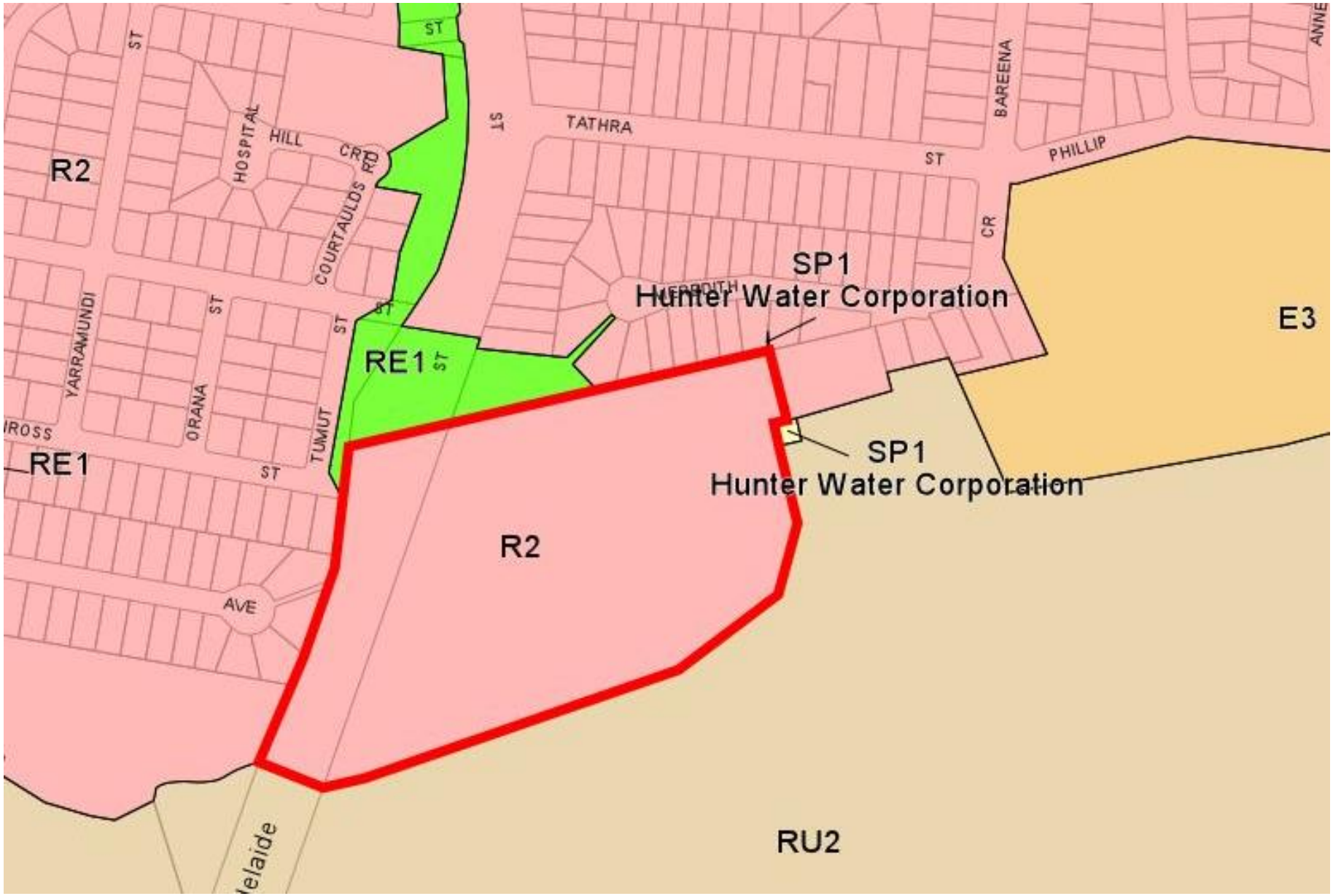
ATTACHMENT 1 – Locality Plan



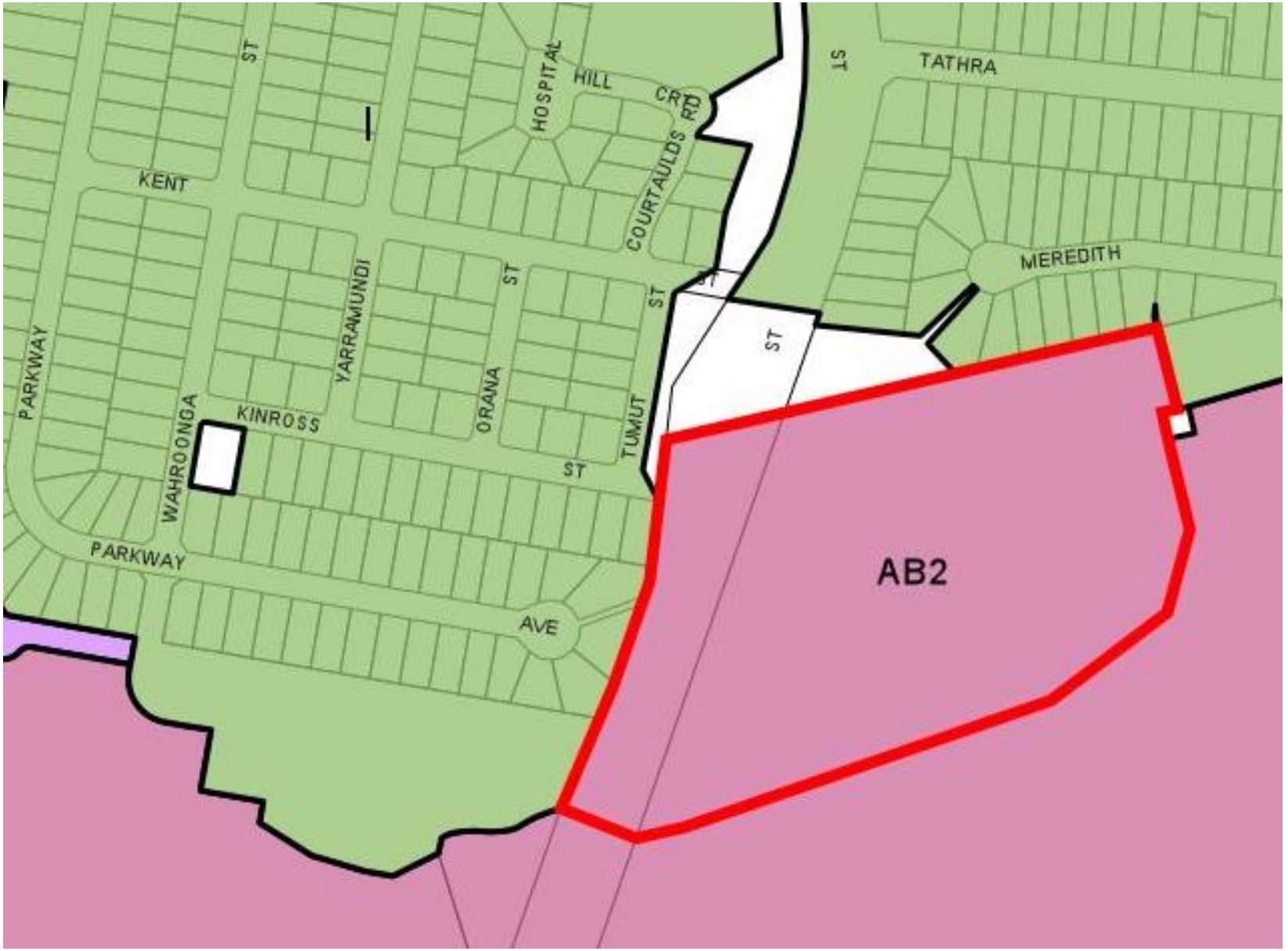
ATTACHMENT 2 – Current Zoning Map



ATTACHMENT 3 – Proposed Zoning Map



ATTACHMENT 4 – Existing Lot Size Map



ATTACHMENT 5 – Proposed Lot Size Map

ATTACHMENT 6 – Existing Height of Buildings Map

ATTACHMENT 7 – Proposed Height of Buildings Map

ATTACHMENT 8 –Traffic Impact Statement prepared by SECA Solution (2016)

SECAsolution
ACN: 164611652
Suite 10, 265 King Street
Newcastle NSW 2300
Ph: (02) 4925 7795
admin@secasolution.com.au

30 May 2016

P0598 dWC Raymond Terrance Residential TIA

de Witt Consulting
7 Canberra Street,
Charlestown NSW 2290

Attn: Mr Mark Maund

Dear Mark,

Re: Traffic Impact Statement for the proposed residential development, 251 Adelaide Street, Raymond Terrace

Further to our site visit undertaken on 27th April 2016 and a review of the provided documentation for the proposed rezoning of land to accommodate a residential development located at 251 Adelaide Street, Raymond Terrace, we provide the following traffic impact assessment.

This traffic impact assessment has been prepared in accordance with the Austroads Guidelines and Section 2.3 of the RMS Guide to Traffic Generating Developments. Section 2.3 of the RMS Guide to Traffic Generating Developments provides a structure for reporting, covering the key issues to be addressed in determining the impact of traffic associated with a development. This format and checklist ensures that the most significant matters associated with a Development Application are considered by the road authority, be they the RMS or Council.

This report has also taken into consideration the Port Stephens Council Development Control Plan 2014.

The project area and the local road network is shown below in Figure 1.

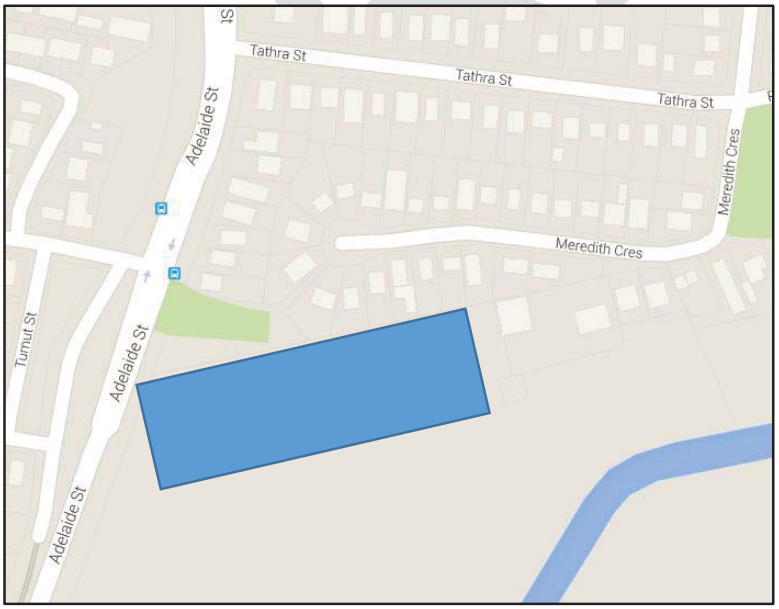


Figure 1 Project Area and local road network

A summary of the key considerations and issues for the project are as follows:

Item	Comment
Existing Situation	
2.1.1 Site Location and Access	The subject site was previously a quarry however it has been vacant for a considerable time. Located on the south east edge of Raymond Terrace, as shown below, there is no formal access currently available however access is proposed from Adelaide Street to the west of the site.  *Figure 2. Location of the subject site.*
2.2.1 Road Hierarchy	The main road through the locality is Adelaide Street which provides an important connection between Raymond Terrace and the Pacific Highway to the north and south. Previously functioning as part of the Pacific Highway it now carries local traffic as well as regional traffic from the various towns and villages to the north west of Raymond Terrace. North of William Bailey Street, Adelaide Street forms part of the state road network carrying a wide range of vehicles up to an including B-double combinations. South of William Bailey Street, and in the locality of the subject site, Adelaide Street functions as a local collector road. Port Stephens Council is the road authority. Adjacent to the subject site, Adelaide Street provides a single lane of travel in each direction with a width of approximately 12.5 metres. To the north of the site the road widens with a painted median and turn lanes which provide access to the various side roads and improved safety for road users. At the intersection of Adelaide Street and Tathra Street, a right turning lane is provided on the southern approach from Adelaide Street. Street lighting and kerb and guttering is provided along the majority of the length of the roadway. The posted speed limit along Adelaide Street varies from 70 km/hr on the approach to Raymond Terrace reducing to 50 km/hr adjacent to the site. There is a sealed shoulder allowing for kerbside parking along both sides of Adelaide Street adjacent to the site. Restrictions associated with road widening, driveways and intersections are in place to the north of the site in conjunction with residential development.

Item	Comment
	There are no pedestrian footpaths along Adelaide Street adjacent to the site although to the north there is a footpath on the eastern side of the roadway. Adelaide Street connects with the broader regional road network via a two lane circulating roundabout approximately 1km to the south. Tathra Street is a local road servicing a residential area. It has a sealed pavement in the order of 12 meters wide allowing for travel in both directions and on-street parking adjacent to dwellings on both sides of the roadway. Street lighting and kerb and guttering is provided along the length of the roadway along with a footpath along its northern side. Tathra Street connects with Adelaide Street via a T-intersection allowing for all turn movements with Adelaide Street having priority. To its eastern end Tathra Street becomes Phillip Road. Meredith Crescent is a cul-de-sac with a width in the order of 8 metres and a turning head to provide for large vehicles There are no pedestrian footpaths provided along its length however there is kerb and guttering and street lighting. At the end of Meredith Crescent there is a shared pathway which connects to Adelaide Street along the northern boundary of a small park. Both Meredith Crescent and Tathra Street have a speed limit of 50km/hr. Meredith Crescent connects with Tathra Street at a cross road with Bareena Street and Phillip Road. Tathra Street and Phillip Road have priority with stop-sign control on Meredith Crescent and Bareena Street.
2.2.2 Roadworks	None noted in the general vicinity of site. A review of the Port Stephens Council web site indicates that there is no capital roadworks planned in the vicinity of the subject site. With the exception of regular road maintenance, there are no requirements to upgrade the road within the general locality of the subject site.
2.2.3 Traffic Management Works	There are no planned traffic management works within the general locality of the subject site.
2.2.4 Pedestrian and Cycling Facilities	A pedestrian footpath is provided along Adelaide Street to the north of the site as well as along Tathra Street. There is a marked pedestrian crossing across Adelaide Street to the north of the site which provides connection to the shared pathway through to Meredith Crescent as well as the bus stops on Adelaide Street. A review of the Port Stephens Council Bicycle Routes map (2014) shows a shared pathway located along Adelaide Street on the approach to Raymond Terrace from Heatherbrae. This pathway provides connection within the vicinity of the subject site and to the Raymond Terrace town centre.
2.2.5 Public Transport	The area is serviced by public transport with regular bus services operating along Adelaide Street as well as Tathra Street and Phillip Road (Route 141 Town Service). Local buses provide services between Raymond Terrace and Newcastle, Newcastle Airport, Nelsons Bay and East Maitland. The majority of these services are provided by Hunter Valley Buses. Bus routes servicing the site are:

<table>
<tr><th>Item</th><th>Comment</th></tr>
<tr><td></td><td>

Route 135: Nelson Bay to Raymond Terrace (Twice Daily by Port Stephens Coaches)
Route 140: Newcastle to Lakeside Shops
Route 141: Raymond Terrace Town Service

Bus stops are located on Adelaide Street to the immediate north of the site with a shelter provided on the eastern side of the road. Bus stops are also provided on Phillip Road to the north of the Meredith Crescent intersection.

The nearest railway station is located at Hexham some 10km from the subject site. This station is serviced by the Hunter Line and provides regular services between Newcastle and Scone or Dungog.
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<tr><td>2.3 Traffic Flows</td><td></td></tr>
<tr><td>2.3.1 Daily Traffic Flows</td><td>
As part of the project work, Seca Solution collected traffic data at the intersection of Adelaide Street and Tathra Street to determine the current peak hour traffic flows. These surveys were undertaken on Wednesday 27th April 2016 during the typical morning peak period (between 7.45am and 9:00am). The peak hour was determined as being between 8am and 9am.

The peak 2-way traffic flows along Adelaide Street south of Tathra Street are summarised below:

Table 1. Summary of peak hour traffic flows along Adelaide Street
<table>
<tr><th>Roadway</th><th>2-way Peak Hour Flows (veh/hr)</th><th>Northbound (veh/hr)</th><th>Southbound (veh/hr)</th></tr>
<tr><td>Adelaide Street (south of Tathra Street)</td><td>1170</td><td>563</td><td>607</td></tr>
</table>
Allowing the mid-block flow per lane of an undivided urban road to be 900 vph in the peak hour Adelaide Street is operating well within its current capacity. The peak hour flows per direction for a Level of Service (LoS) C is 600 vehicles with LoS D at 900 vehicles per hour. Thus Adelaide Street is currently operating at the upper limit of LoS C.

RMS guidelines indicate that peak hours typically represent around 10% of the daily traffic flows. This would indicate that the daily traffic flows along Adelaide Street (to the south of Tathra Street), could be in the order of 11,700 vehicles per day.
</td></tr>
<tr><td>2.3.2 Daily Traffic Flow Distribution</td><td>Daily traffic flows would be reasonably balanced over the day. In the morning peak, there is a slight bias in traffic travelling southbound towards the M1 Pacific Motorway whilst northbound traffic has a destination towards local shopping and commercial elements within the Raymond Terrace Town Centre.</td></tr>
<tr><td>2.3.3 Vehicle Speeds</td><td>No speed surveys were completed as part of the survey work, however observations on the site indicate that drivers typically travel at the posted speed limit along Adelaide Street due to interactions with intersections and driveways.</td></tr>
<tr><td>2.3.4 Existing Site Flows</td><td>The project area is a disused quarry which has been unused for a considerable period. It therefore generates no traffic flows.</td></tr>
</table>

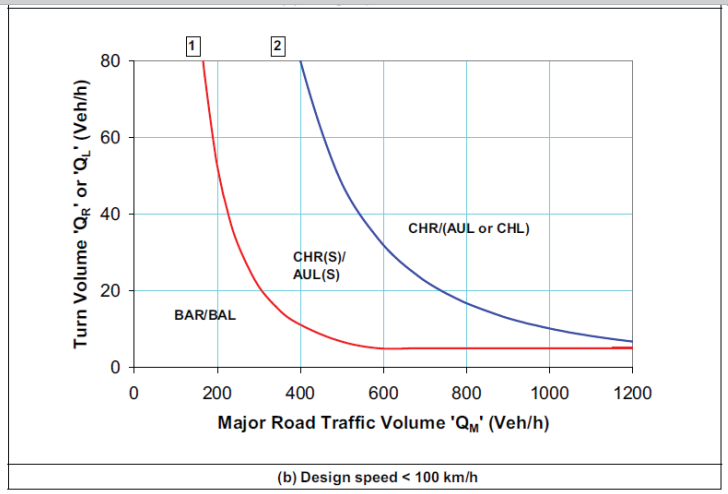
Item	Comment
2.3.5 Heavy Vehicle Flows	Observations on site indicate that there is a reasonable volume (6%) of heavy vehicle movements along Adelaide Street in the vicinity of the site with heavy vehicles flows primarily consisting of local deliveries and buses towards the Raymond Terrace Town Centre and construction trucks and similar medium sized trucks outbound towards the Pacific Highway. Adelaide Road in this locality does not encourage through movements for heavy vehicles with the majority of heavy vehicles (outside of Raymond Terrace) travelling along the Pacific Highway or via William Bailey Drive and Seaham Road for destinations to the west.
2.3.6 Current Road Network Operation	Observations on site during the morning peak periods show that the road network in the vicinity of the subject site operates to an acceptable standard, with minimal delays and congestion. The design of the local roads historically catered for much higher traffic volumes than those currently using this thoroughfare.
2.4 Traffic Safety and Accident History	A review of accident data provided by the RMS indicates that in the past five years there has only been 2 accidents in the general locality of the subject site. One, involving a cyclist in 2012, was at the corner of Adelaide Street and Kemp Street whilst the other, on Tathra Street in 2014, involved a vehicle reversing from a driveway. The local roads are typically well laid out allowing for good visibility on the approaches to the intersections. As such, it is considered that the road layout provides an acceptable level of traffic safety.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	The sealed verge along the site frontage on Adelaide Street allows vehicles to stop however there is little demand for on street parking due to the lack of development along this part of the road. To the north, parking is restricted in places to provide additional width to accommodate turn lanes. On street parking is generally permitted along the local roads in the vicinity of the subject site with normal restrictions associated with driveways and intersections.
2.5.2 Off-street Parking Provision	There is no off street parking provided within the vicinity of the site except that associated with individual dwellings.
2.5.3 Parking Demand and Utilisation	There is minimal demand for parking observed with most dwellings able to provide off street parking for residents and only a small number of additional vehicles parked on street adjacent to some dwellings.
2.5.4 Set down or pick up areas	None noted in the vicinity of the subject site.
2.6 Public Transport	
2.6.1 Rail Station Locations	The nearest railway station is located at Hexham some 10 km to the south of the proposed development (via the Pacific Highway).
2.6.2 Bus Stops and Associated Facilities	There are bus stops located on both sides of Adelaide Street less within 150 meters of the subject site. The bus stop on Adelaide Street southbound has seating and a shelter. Bus stops are also located on Phillip Road near the Meredith Crescent intersection.
2.6.3 Pedestrians	Pedestrians are accommodated on the footpath along Adelaide Street (north of the site). There is a pedestrian crossing across Adelaide Street immediately to the north of the site providing connection between the bus stops as well as to the shared pathway through to Meredith Crescent.
2.7 Other Proposed Developments	No other significant developments are noted in the local area.

Item	Comment
3.1 The Development	
3.1.1 Nature of Development	The proposal is for the rezoning of land to provide a residential subdivision to accommodate between 150 and 200 dwellings. These will be a mix of single dwelling houses with some townhouses and dual occupancy sites. Access is proposed onto Adelaide Street with an internal road network designed to meet the design requirements of Port Stephens Council.
3.1.2 Access and Circulation Requirements	Access to the subject site will be from Adelaide Street on the west side of the site. This is the only frontage with access to the road network. Access to individual lots will be the subject of individual DAs for dwellings. The layout of the site will allow for all vehicles to be able to enter, circulate within the site and exit in a forward direction.
3.2 Access	
3.2.1 Driveway Location	The specific location of the vehicle access along Adelaide Street will be determined as part of the DA stage of the development. Individual driveways to each lot will be the subject of individual DAs.
3.2.2 Sight Distances	The access to the site shall be located to satisfy the minimum sight distances as specified by the RMS Road Design Guide. The posted speed limit changes along the site frontage from 70 km/hr to 50 km/hr. As the access point has not been determined an assessment has been made for the posted speed limit of 70 km/hr. For this speed limit, the proposed access would need to provide a minimum sight distance (SISD) of 130 meters. Adelaide Street offers a straight and level alignment in this location. A review of the potential site location indicated that the site would be able to achieve the required sight distance, subject to the final design.
3.2.3 Service Vehicle Access	As a residential subdivision the only need for regular servicing of the site would be for waste collection by council refuge truck. Kerbside collection would be undertaken which is consistent with other waste collection in the area. The occasional need for deliveries to individual dwellings can be managed within the adjacent roadway.
3.2.4 Queuing at entrance to site	There are no queues anticipated at the site entrance with traffic able to enter the site freely. Any minor delays and queuing associated with vehicles leaving the site in the morning peak will be contained within the site and will not impact on the broader road network.
3.2.5 Comparison with existing site access	There is no existing access between the site and Adelaide Street. Informal tracks have been developed within the site with informal access off Adelaide Street. The new access point will be designed and constructed in accordance with the requirements of Port Stephens Council and the RTA Road Design Guide.
3.2.6 Access to Public Transport	The site will be connected to the existing footpath network along Adelaide Street which includes connection with local bus stops to the north of the site. This will be detailed in the DA stage of the development.
3.3 Circulation	
3.3.1 Pattern of circulation	All vehicles shall be able to enter and exit the site in a forward direction. The internal road will be designed in accordance with Council's requirements which will ensure that vehicles can circulate throughout the site in a safe and appropriate manner.
3.3.2 Road width	All internal roads shall be designed in accordance with Council's design requirements.
3.3.3 Internal Bus Movements	No internal bus movements are anticipated for this development however the internal roads will be designed to accommodate the swept path of larger vehicles eg waste trucks.
3.3.4 Service Area Layout	There is no requirement anticipated for a service area within the site

<table>
<tr><th>Item</th><th>Comment</th></tr>
<tr><td>3.4 Parking</td><td></td></tr>
<tr><td>3.4.1 Proposed Supply</td><td>All parking will be accommodated within the site and will have no impact on the local road network. Parking for individual sites will be determined in conjunction with individual DAs.</td></tr>
<tr><td>3.4.2 Authority Parking</td><td>Port Stephens Council DCP specifies the following parking rates for single dwellings, dual occupancies and semidetached dwellings:
1 space for each one or two-bedroom dwelling;
2 spaces for each dwelling with three or more dwellings</td></tr>
<tr><td>3.4.3 Parking Layout</td><td>The car park layouts shall be designed in accordance with the Port Stephens Council DCP.</td></tr>
<tr><td>3.4.4 Parking Demand</td><td>The parking demand will be subject to the final development.
All parking demand will be able to be accommodated within the site with parking provided at the rates specific in the DCP.</td></tr>
<tr><td>3.4.5 Service Vehicle Parking</td><td>The site will require minimal servicing.
There is no requirement for parking associated with waste collection by kerb side pickup. Any other service parking can be accommodated within the subdivision road network.</td></tr>
<tr><td>3.4.6 Pedestrian and Bicycle Facilities</td><td>Pedestrian and cycling facilities will be developed in accordance with the Council DCP.</td></tr>
<tr><td colspan="2">Traffic Assessment</td></tr>
<tr><td>4.1 Traffic Generation</td><td>The project may see the development of between 150 and 200 lots catering for a mix of low density dwellings with some dual occupancy or town house sites. The RMS TDT2013/04a Guide to Traffic Generating Developments Updated Traffic Surveys provides guidance on the traffic generating rates for low density residential dwellings.
The guide indicates a daily trip rate of 7.4 vehicles per dwellings in regional areas with 0.71 trips per dwelling in the AM peak and 0.78 trips per dwelling in the PM peak. A summary of the peak hour and daily traffic movements generated by the development is given below:

<table><tr><th>Lots</th><th>AM trips</th><th>PM trips</th><th>Daily trips</th></tr><tr><td>150-200</td><td>107-142</td><td>117-156</td><td>1110-1480</td></tr></table>
Overall the proposed development would generate between 107 and 142 vehicle movements in the AM peak and between 117 and 156 vehicles movements in the PM peak with between 1110 and 1480 vehicle movements per day, equally split between inbound and outbound trips.</td></tr>
<tr><td>4.1.1 Daily and Seasonal Factors</td><td>Limited daily and seasonal variation in traffic movements associated with the development other than normal variation between work days (Monday to Friday) and weekends.</td></tr>
<tr><td>4.1.2 Pedestrian Movements</td><td>Pedestrian movements associated with the development would primarily be associated with people accessing the bus facilities on Adelaide Street. The Raymond Terrace Town Centre is over a kilometre from the subject site and not likely to appeal as a pedestrian destination.</td></tr>
<tr><td>4.2 Traffic Distribution and Assignments</td><td>All traffic is expected to access Adelaide Street and then travel either south towards the Pacific Highway or north towards to town centre or Seaham Road and west from Raymond Terrace.
It is considered that 80% of the trips in the AM peak would be outbound and 20% inbound with the reverse in the PM peak.</td></tr>
<tr><td>4.2.1 Origin / destinations assignment</td><td>It is considered that the majority of traffic will have an origin/destination south from the site however there will be a significant number also</td></tr>
</table>

Item	Comment
	travelling north along Adelaide Street. A traffic split of 40% northbound, 60% southbound has been applied to this assessment. Based upon surveys undertaken at the intersection of Adelaide Street and Tathra Street, 56% of traffic turned left out of Tathra Street to travel south whilst the balance of traffic, 44% turned north onto Adelaide Street. This reflects a similar origin and destination to the traffic movements generated by this development.
4.3 Impact on Road Safety	It is considered that the proposed development will have an acceptable impact upon the local road network in the vicinity of the subject site. The local roads are well laid out, and the intersection of Adelaide Street and the development will be designed in accordance with current design standards to provide sheltered turn lanes in a manner similar to surrounding intersections. The sight lines approaching the access to the subdivision would satisfy the minimum requirements under the RTA Road Design Guide.
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	The proposed development will increase the two-way flows on Adelaide Street by up to 142 vph during the AM peak with 156 vph in the PM peak. Allowing for the increased traffic associated with this development, Adelaide Street would operate at LoS D, with less than 700 vehicle per hour per direction. This is within the capacity of the existing road. Based on the traffic distribution and assignment above, the development could increase the daily traffic flows along Adelaide Street (to the south of the site) by: • 666-888 vehicles per day -an increase of between 6.7-7.5% of the current daily traffic flow. Traffic flows north of the site would be less than this.
4.4.2 Peak Hour Impacts on Intersections	The key intersection will be the access into the site that will provide for all turning movements. This will be a T-intersection designed to provide a sheltered right turn lane consistent with others in the vicinity. A review of the Austroads *Guide to Road Design Part 4A-Unsignalised and Signalised Intersections* confirms that allowing for the peak hour movements on Adelaide Street and the turn movements associated with the development a CHR type intersection is appropriate.

Item	Comment
	 Source: Amdt and Troutbeck (2006) Figure 4.9: Warrants for turn treatments on the major road at unsignalised intersections Allowing for these additional peak hour vehicle movements, it is considered that there would be no significant change in the delays and congestion for the existing road users. Adelaide Street historically functioned as the Pacific Highway carrying much higher traffic movements than those currently using this road. The additional traffic would have a minimal impact upon the operation of the various intersections both up stream and down and as demonstrated is considered to be within the capacity of the local road network.
4.4.3 Impact of Construction Traffic	All construction work will be contained within the site with minimal impact upon the external road network. There will be a requirement for construction machinery to access the site and traffic associated with workers. The site will require the movement of heavy vehicle into and out of the site which would need to be safely managed. A Construction Traffic Management Plan shall be prepared as part of the Construction Certificate stage of the project. Given the size of the site, it is considered that parking for construction staff would be contained within the site with minimal impact on existing road users.
4.4.4 Other Developments	No other significant developments occurring in the immediate locality of the subject site.
4.5 Public Transport	
4.5.1 Options for improving services	None required. The development is located close to existing bus routes. There is adequate spare capacity to cater for any increase in demand for these services.
4.5.2 Pedestrian Access to Bus Stops	Pedestrian access will be required to the local bus stops which can be provided by footpaths which connect the subject site to the existing path on Adelaide Street.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	To be detailed in the DA stage of the project.
4.6.2 Improvements to External Road Network	None required as the existing road network has adequate capacity to cater for the additional flows.
4.6.3 Improvements to Pedestrian Facilities	As noted above in 4.5.2.

Item	Comment
4.6.4 Effect of Recommended Works on Adjacent Developments	No impact as no adjacent developments.
4.6.5 Effect of Recommended Works on Public Transport Services	Nil.
4.6.6 Provision of LATM Measures	None required.
4.6.7 Funding	No external road upgrades required. Construction of access to be funded by the development.

Conclusion

From the site work undertaken and the review of the development proposal against the requirements of the RMS Guide to Traffic Generating Developments and the Austroads Guides, it is considered that the proposed development can be accommodated within the local road network and should have no objections raised on traffic grounds. The additional traffic movements generated by the development will have a minimal impact on the surrounding road network and a new site access with sheltered right turn lane can operate with minimal delay or congestion.

Please feel free to contact me on 4925 7795, should you have any queries.

Yours sincerely

Sean Morgan
Director

Attachment A: Site Photos

Photo 1 – View along Adelaide Street showing typical cross section with subject site to left in distance

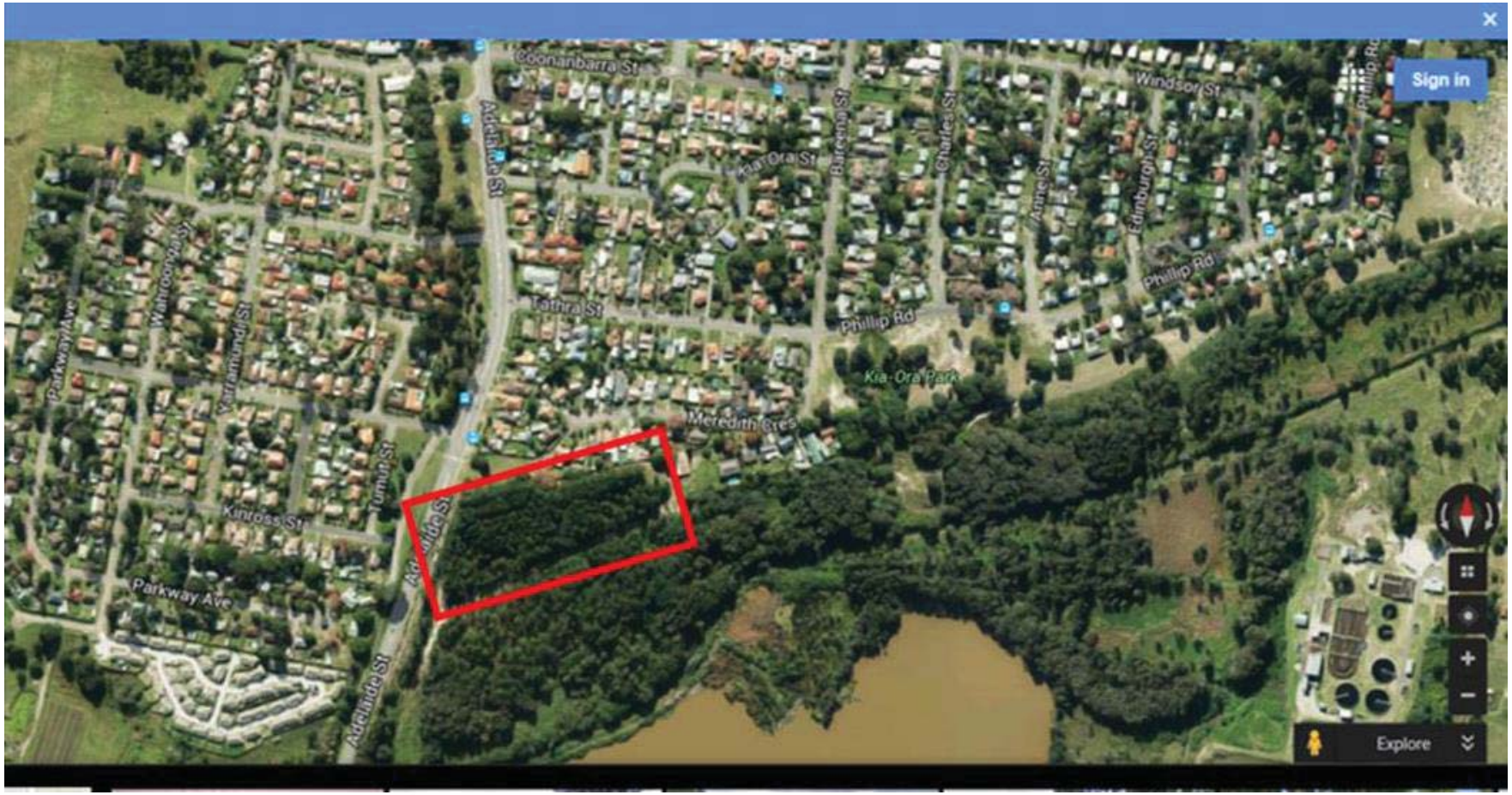
Photo 2 – View along Adelaide Street with site to right of photo

Photo 3 – Shared pathway between Meredith Crescent and Adelaide Street in the park to the north of the site

Photo 4 – Bus stop on Adelaide Street with site to the rear of photo

Photo 5 – Mid-block pedestrian crossing across Adelaide Street

Attachment B: Site Plan



Attachment C: RMS Accident Data

Detailed Crash Report - sorted

Transport for NSW — Centre for Road Safety

Crash No. / Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Natural Lighting																				S F
Hunter Region		**Port Stephens LGA**				**Raymond Terrac**								**Adelaide St**						
811375 P	19/09/2012	Wed	07:45	at KENT ST		TJN	STR	Fine	Wet	50	2	CAR	M49	E in KENT ST	10	Turning right	I	0	1	
E49413249				Daylight		RUM:	13	Right near				P/C	M42	N in ADELAIDE ST		Proceeding in lane				
Hunter Region		**Port Stephens LGA**				**Raymond Terrace**								**Tathra St**						
1028895 P	12/06/2014	Thu	10:25	at NUMBER 21 HN		2WY	STR	Fine	Dry	50	2	CAR	M49	N in TATHRA ST	10	Reverse from drive	I	0	1	
E54931304				Daylight		RUM:	47	Emerging from drive				M/C	F46	W in TATHRA ST	10	Proceeding in lane				

Report Totals: Total Crashes: 2 Fatal Crashes: 0 Injury Crashes: 2 Killed: 0 Injured: 2

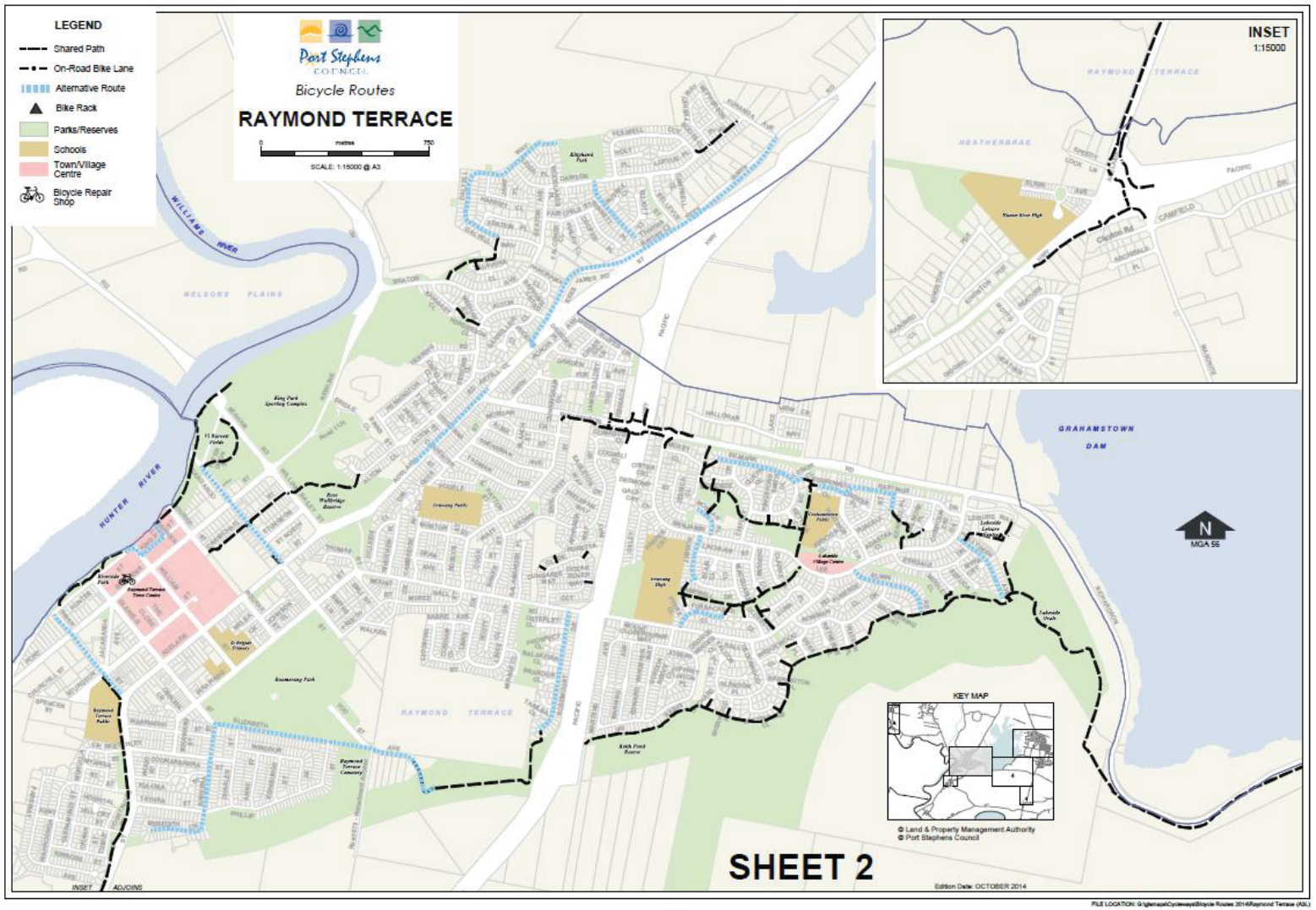
Crashid dataset Tathra Street, Raymond Terrace - 1st July 2010 to 2016*

Note: Ordered by: Crash Date.

Crash self reporting, including self reported injuries began in Oct 2014. Trends from 2014 are expected to vary from previous years. More unknowns are expected in self reported data. For further information ref to Data Manual or report provider.

Rep ID: DCR02 **Office:** Hunter **User ID:** gillettj Page 1 of 1 Generated: 28/04/2016 09:06

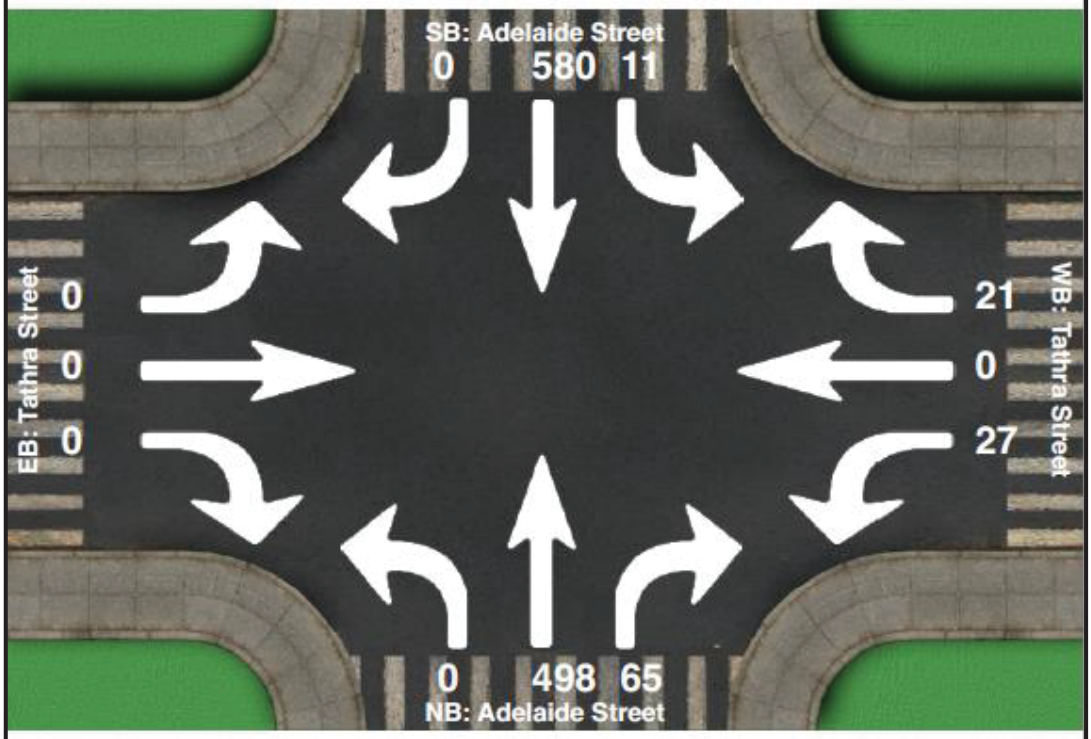
Attachment D: Cycle Routes



Attachment E: Survey Data

Intersection Peak Hour

Location: Adelaide Street at Tathra Street, Raymond Terrace
GPS Coordinates:
Date: 2016-04-27
Day of week: Wednesday
Weather:
Analyst: Ct



Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	11	580	0	27	0	21	0	498	65	0	0	0	1202
Factor	0.55	0.90	0.00	0.75	0.00	0.66	0.00	0.88	0.74	0.00	0.00	0.00	0.92
Approach Factor	0.91			0.71			0.90			0.00			

ATTACHMENT 9 – Flora and Fauna Offsets Assessment prepared by Biosis (2016)

Flora and fauna and offsets assessment: Proposed rezoning at Adelaide Street, Raymond Terrace.

FINAL REPORT

Prepared for de Witt Consulting

6 December 2016

Biosis offices

NEW SOUTH WALES

Newcastle
Phone: (02) 4911 4040
Email: newcastle@biosis.com.au

Sydney
Phone: (02) 9101 8700
Email: sydney@biosis.com.au

Wollongong
Phone: (02) 4201 1090
Email: wollongong@biosis.com.au

QUEENSLAND

Brisbane
Phone: (07) 3831 7400
Email: brisbane@biosis.com.au

TASMANIA

Hobart
Phone: (03) 8686 4821
Email: hobart@biosis.com.au

VICTORIA

Ballarat
Phone: (03) 5304 4250
Email: ballarat@biosis.com.au

Melbourne (Head Office)
Phone: (03) 8686 4800
Fax: (03) 9646 9242
Email: melbourne@biosis.com.au

Wangaratta
Phone: (03) 5721 9453
Email: wangaratta@biosis.com.au

Document information

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Prepared by:	Stefan Rose Amy Rowles
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Document control

Version	Internal reviewer	Date issued
Draft version 01	Samuel Luccitti	02/12/16
Final version 01	-	07/12/16

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- Chris Xistouris, Pheonix Builders
- Mark Maund, de Witt Consulting
- Department of the Environment and Energy for access to the Protected Matters Search Tool of the Australian Government
- NSW Office of Environment and Heritage for access to the BioNet Atlas of NSW Wildlife.

Biosis staff involved in this project were:

- Stefan Rose, Brian Wilson & Amy Rowles (field assessment)
- Sarah Allison (background research)
- Lauren Harley and James Shepherd (mapping)
- Stefan Rose (BioBanking assessment)

Contents

Tables

Figures

Glossary

AoS	Assessment of Significance (7 part test)
APZ	Asset Protection Zone
BBAM	BioBanking Assessment Methodology
CBD	Central Business District
CKPoM	Comprehensive Koala Plan of Management
DEE	Department of the Environment and Energy
DPE	Department of Planning and Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
KTP	Key Threatening Process
LEP	Local Environment Plan
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
NW Act	*Noxious Weeds Act 1993*
OEH	NSW Office of Environment and Heritage
Offset area	The terrestrial part of Lot 232 proposed for use to obtain biodiversity offsets
SEPP 44	State Environmental Planning Policy No. 44 – Koala Habitat Protection
SIS	Species Impact Statement
Study area	The area comprising the entire Lot 232 in which both the subject site and offset area are located
Subject site	The area of impact for the proposed residential development rezoning, i.e. the development site,
TSC Act	*Threatened Species Conservation Act 1995*

Summary

Biosis Pty Ltd was commissioned by de Witt Consulting to undertake a flora and fauna assessment to support a planning proposal to rezone the north-western corner of Lot 232, DP 593512 at 251 Adelaide Street, Raymond Terrace (the subject site or development site) for residential development and to conserve the remaining area surrounding the lake (old sand quarry) as a biodiversity offset area. The study area (i.e. the area comprising both the subject site and proposed offset area) is located in the Port Stephens Local Government Area (LGA) approximately 2 kilometres south of Raymond Terrace town centre and approximately 17 kilometres north of the Newcastle central business district (CBD).

The subject site is a minor part of the study area which includes areas likely to be directly or indirectly affected by the residential development. The remainder of the study area is proposed as a potential biodiversity offset site. This assessment approach has been undertaken to allow for assessment of both the subject site as well as any additional areas in the broader study area which are likely to be affected by the proposal, either directly or indirectly. Identified constraints will be used to guide detailed design, with an emphasis on avoiding impacts where feasible.

The study area encompasses 44.36 hectares of which 5.31hectares is proposed for rezoning for residential development (subject site). A major portion of the study area is occupied by a large artificial lake, formed as part of previous sand mining within the property. Native vegetation surrounding the lake provides terrestrial habitat for a range of species and is intended to be rezoned for environmental protection and included in an offset area.

Ecological values

Key ecological values identified within the subject site include:

- 0.3 ha of native swamp forest vegetation in moderate-good condition.
- 3.78 ha of native derelict pine forest with regenerating native swamp forest elements in low condition.
- One Threatened ecological community (TEC), *Swamp Sclerophyll Forest on Coastal Floodplains* and *Freshwater Wetlands on Coastal Floodplain,* corresponding to the swamp forest vegetation community.
- Potential marginal foraging habitat for three threatened fauna species – Eastern Bentwing-bat, Little Bentwing-bat and Grey-headed Flying Fox (threatened biota).

Key ecological values identified within the offset area include:

- 11.32 ha of native swamp forest vegetation in moderate-good condition.
- 2.47 ha of cleared, highly disturbed habitat with regenerating native swamp forest elements in low condition.
- 1.67 ha of freshwater wetland habitat.
- Two TECs.
- Potential foraging or breeding/roosting habitat for nine threatened fauna species (threatened biota), including Koala.
- A large freshwater lake with fringing wetland and swamp forest vegetation.

- Contribution to surrounding values, including connectivity of site to native vegetation mainly east and south of the study area.

Recommendations

The primary measure for the development to minimise impacts to ecological values on the site is to minimise and confine removal of native vegetation and habitat, thus avoiding disruption to the habitat linkage to the south of the subject site and protecting water quality in the offset area due to runoff from the site. To retain these values they need to be incorporated into the design process.

Vegetation losses are unavoidable for the development as proposed and the quantity and type of offsets required has been determined by the BioBanking Assessment Methodology (BBAM) (OEH 2014).

An offset strategy for the study area is proposed that fully balances the ecosystem credits required to compensate for residual impacts related to native vegetation clearing within the subject site with like-for-like credits available within the boundaries of the proposed offset area. This strategy has been determined objectively by the BBAM and the BioBanking Credit Calculator.

In summary, the ecosystem credit balance in relation to the proposed development within the study area is:

- 99 ecosystem credits required for loss of the swamp forest vegetation community from the subject site.
- 104 ecosystem credits created for management of like-for-like swamp forest vegetation of the same community in an offset area.

This gives a surplus or buffer of 5 ecosystem credits for the vegetation type impacted.

Government legislation and policy

An assessment of the project against key biodiversity legislation and policy is provided and summarised below.

Legislation / Policy	Relevant ecological feature on site	Permit / approval required
Environment Protection and Biodiversity Conservation Act 1999	Grey-headed Flying-fox foraging habitat located within the study area, including minor elements of potential foraging habitat in the subject site. No additional Matters of National Significance or their habitat were located or expected to occur within the subject site.	Significant impact unlikely. No further assessment or referral required.

Legislation / Policy	Relevant ecological feature on site	Permit / approval required
Threatened Species Conservation Act 1995	Two Threatened Ecological Communities (TEC), *Swamp Sclerophyll Forest on Coastal Floodplains* and *Freshwater Wetlands on Coastal Floodplains* occur within the study area, but only the former occurs within the subject site and will be impacted by the proposal. The subject site contains minor elements of potential foraging habitat for the following listed threatened species: Grey-headed Flying-fox, Eastern Bentwing-bat and Little Bentwing-bat. The offset area also contains habitat for several threatened waterbird species and two threatened frog species, but this habitat would not be impacted by the proposed subdivision.	Due to predicted impacts on the TEC, an AoS has been undertaken for • *Swamp Sclerophyll Forest on Coastal Floodplains* (see Appendix 4). Although potential minor foraging habitat occurs in the subject site for • Eastern Bentwing-bat • Little Bentwing-bat • Grey-headed Flying-fox more extensive areas of superior quality habitat occur in the adjoining offset area, therefore significant impacts on these species are unlikely. No further assessment has been carried out.
Environmental Planning & Assessment Act 1979	A threatened ecological community occurs within the subject site.	Impacts to the threatened ecological community present within the study area have been assessed through an AoS.
State Environmental Planning Policy No 44	SEPP44 applies to the current project as the subject site exceeds more than one hectare, is located within the Port Stephens Local Government Area and a development application will be made (SEPP 44, Section 6). However, no part of the subject site is mapped as Core or Preferred Koala Habitat according to SEPP44 or *Port Stephens Comprehensive Koala Plan of Management* (CKPoM) and no evidence of current Koala activity was recorded in the study area. The main areas of important habitat for this species and those mapped by the CKPoM as Preferred Habitat occurs in the offset area with buffer areas north and south of the lake. These areas are not affected by the proposal.	As no Preferred Koala habitat will be impacted by the proposed rezoning, no further assessment or action in relation to SEPP44 or the CKPoM is required. The proposal is compliant with the Performance Criteria for Rezoning Requests specified in Appendix 2 of the CKPoM. The area to the south of the subject site in the offset area would serve as a corridor facilitating movement of the species through the site and to adjoining habitat.
National Parks & Wildlife Act 1974	The project does not require the removal vegetation within a National	No permits or approvals are required under the current scope of works.

Legislation / Policy	Relevant ecological feature on site	Permit / approval required
	Park.	
Native Vegetation Act 2003	The project may require removal of a small area of native vegetation.	The local Hunter offices of Local Land Services should be contacted to ascertain any requirements for further approval for removal of native vegetation pursuant to the Act.
Noxious Weeds Act 1993	The following noxious weeds are present within the study area: • Annual Ragweed • Crofton Weed • Fireweed Pampas Grass	Control requirements for these noxious listed weeds are outlined in Table 22.

Note: Guidance provided in this report does not constitute legal advice.

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by de Witt Consulting to undertake a terrestrial flora and fauna assessment and BioBanking assessment of 251 Adelaide Street (Lot 232 DP 593512), Raymond Terrace. The study area is defined as the entire area of Lot 232, which is proposed for rezoning (Figure 1).

The study area comprises a development area within Lot 232 proposed for rezoning for residential development (the subject site or development site), with the remainder of the Lot proposed to be rezoned for Environmental Conservation as an offset area (Figure 2).

1.2 Scope of assessment

The objectives of this investigation are to:

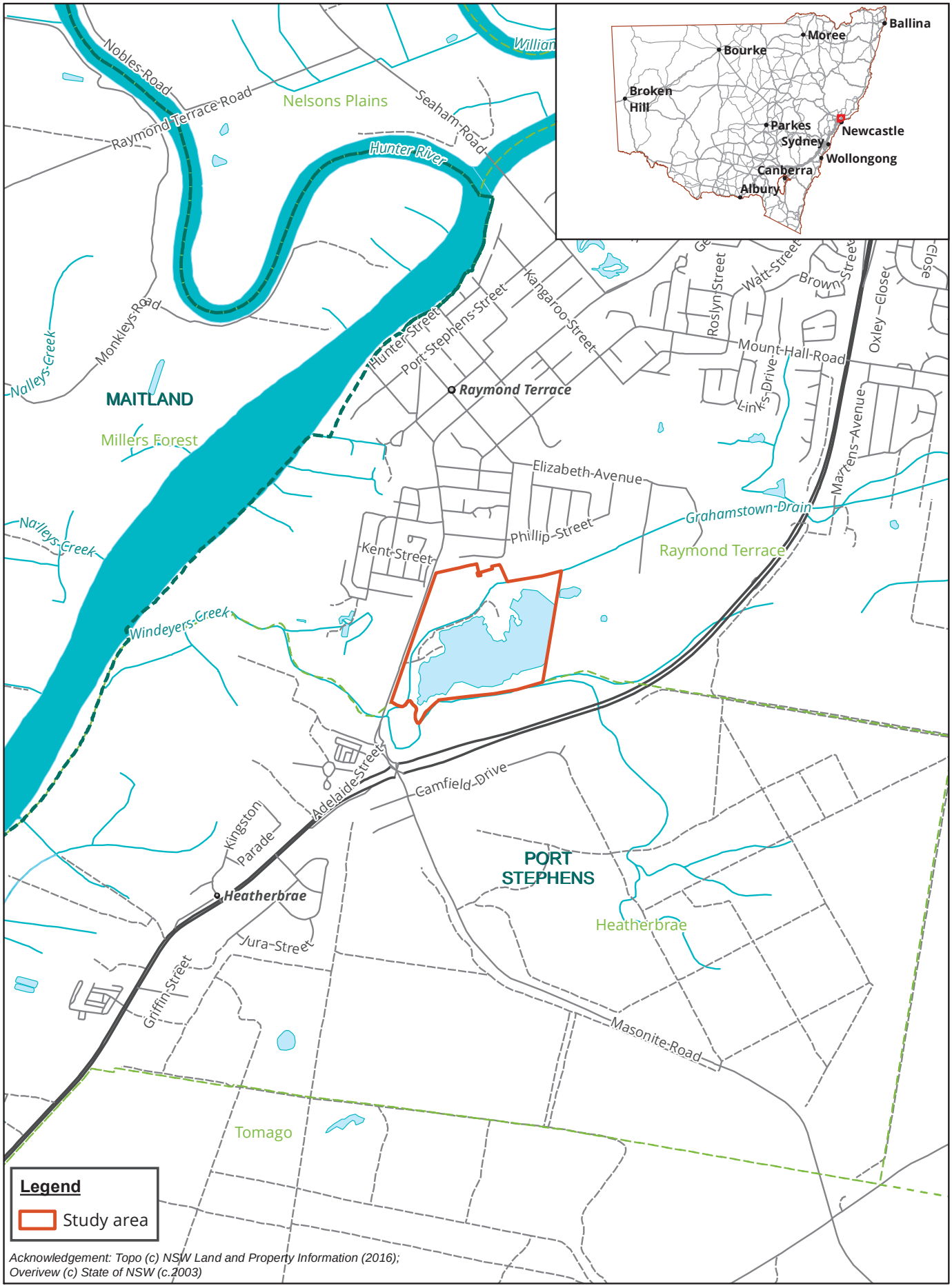
- Describe the vascular flora (ferns, conifers, flowering plants) and vertebrate fauna (birds, mammals, reptiles, frogs, fish) habitat within the study area.
- Map native vegetation and other habitat features within the study area.
- Undertake a BioBanking Assessments as per the BBAM (OEH 2014) and including credit calculations of biodiversity credits required to compensate for impacts to biodiversity associated with development of the subject site and biodiversity credits to be generated by the creation of an offset area within the remaining portion of the study area.
- Review the implications of relevant biodiversity legislation and policy.
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Recommend any further assessments of the site that may be required (such as targeted searches for threatened biota).

1.3 Location of the study area

The study area is located directly adjacent to the southern end of Raymond Terrace township and approximately 17 kilometres north of the Newcastle CBD (Figure 1). It encompasses approximately 44.36 hectares of private land and is currently zoned RU2 - Rural Landscape under the *Port Stephens Local Environmental Plan 2013*.

The study area is within the:

- Sydney Basin Bioregion
- Hunter River Basin (Hunter River catchment)
- Hunter / Central Rivers Catchment Management Area (CMA)
- Port Stephens Local Government Area (LGA).



Acknowledgement: Topo (c) NSW Land and Property Information (2016); Overivew (c) State of NSW (c.2003)

Figure 1: Location of the study area, NSW

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Matter: 23223
Date: 29 November 2016,
Checked by: SR, Drawn by: LH, Last edited by: lharley
Location:P:\23200s\23223\Mapping\

0 250 500 750 1,000
Metres
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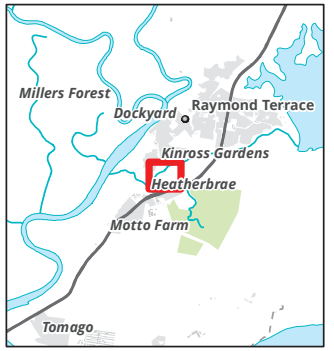
Scale 1:25,000 @ A4, GDA 1994 MGA Zone 56



Legend

- Study area
- Development site

Figure 2: Area proposed for residential development (subject site)

0 30 60 90 120 150

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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23223_F2_ProposedResidentialDev

2 Methods

2.1 Literature and database review

In order to provide a context for the study area, information about flora and fauna from within 5 kilometres (the 'locality') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- NSW BioNet - *the database for the Atlas of NSW Wildlife*, Office of Environment and Heritage (OEH) (TSC Act).
- PlantNET (The Royal Botanic Gardens and Domain Trust, (2013)) for Rare or Threatened Australian Plants (RoTAP).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2013 (BA).

Other sources of biodiversity information:

- OEH Vegetation Information System (VIS) mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer (OEH 2016b), Three mapping studies were reviewed:
  - VIS Map 2225: *Vegetation Survey, Classification and Mapping of the Lower Hunter and Central Coast* (LHCCREMS 2003).
  - VIS Map 2227: *The Vegetation of the Central Hunter Valley, New South Wales* (Peake 2006).
  - VIS Map 3855: *Hunter Native Vegetation Mapping* (Roff et al. 2011).
- NSW Department of Primary Industries (DPI) *Noxious Weeds Act, 1993* (NW Act) listed weeds for the Port Stephens Council LGA (DPI 2016).

The following reports were also reviewed:

- Environmental Due Diligence Report – Phase 1 Environmental Site Assessment – 251 Adelaide Street, Raymond Terrace 2324. ERM 2011.
- NSW Scientific Committee final determinations for threatened biodiversity.

2.2 Site investigation

2.2.1 Flora assessment

A preliminary flora assessment was undertaken within the proposed development area on 22 April and 28 June 2016 to map vegetation communities and identify ecological constraints (Biosis 2016). This was supplemented by a full flora field assessment across the study area on 11 and 12 October 2016 using a combination of 20 x 50 metre plots and transects in accordance with the NSW BBAM (OEH 2014). Random meanders were used to identify and map the boundaries of vegetation types present within the study area. The appropriate number of vegetation survey plots/transects were completed within each vegetation zone in both the subject site and proposed offset area according to the BBAM (Figure 3). No targeted surveys for threatened flora species were undertaken, since none were considered likely to occur in the subject site, given the nature and condition of habitat available.

General classification of native vegetation in NSW used in this report is based on the classification system in Keith (2004) which uses three groupings of vegetation: vegetation formation, vegetation class and vegetation type, with vegetation type the finest grouping. The grouping referred to in this report is vegetation type.

A list of flora species was compiled for each vegetation type. Records of threatened flora species will be submitted to OEH for incorporation into the BioNet Wildlife Atlas.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

2.2.2 Fauna assessment

The study area was investigated on 22 April, 28 June and 10-11 October 2016 to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for threatened biota and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

Fauna records will be submitted to OEH for incorporation into the NSW BioNet Wildlife Atlas.

2.2.3 Permits and licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by the Office of Environment and Heritage under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 March 2017). Fauna survey was conducted under approval 11/355 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2017).

2.3 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, ephemeral status of waterbodies and migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The current flora and fauna assessment was conducted in autumn, winter and spring, which is an optimal time for survey, covering a range of seasons. The fauna survey was limited to a habitat assessment and opportunistic observations, with no trapping or nocturnal surveys carried out.

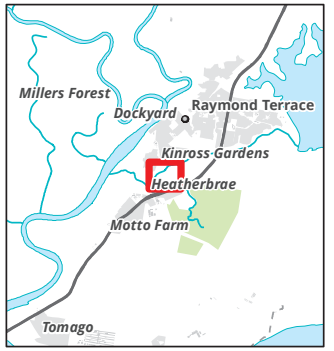
Database searches, and associated conclusions on the likelihood of species to occur within the study area, are reliant upon external data sources and information managed by third parties.

2.4 Mapping

A preliminary site plan for a proposed rezoning area (Masterplan SK2) was supplied by Pheonix Builders and Aerial photography by Near Maps (2016).

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files containing the relevant flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.



Legend

- Study area
- Development site
- Biobanking quadrat
- Biobanking transect

Vegetation communities

- Swamp Sclerophyll Forest EEC
- Swamp Sclerophyll Forest (Low condition)
- Freshwater Wetlands EEC
- Cleared/slashed exotic vegetation

Figure 3: Field survey techniques and ecological features of the study area

0 30 60 90 120 150

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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3 Legislative context

This section provides an overview of key biodiversity legislation and government policy considered in this assessment. Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

3.1 Commonwealth

3.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Nine Matters of NES are identified under the EPBC Act:

- world heritage properties
- national heritage places
- wetlands of international importance (also known as 'Ramsar' wetlands)
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- a water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, activities that have potential to result in significant impacts on Matters of NES must be referred to the Commonwealth Minister for the Environment for assessment.

Matters of NES relevant to the current project include nationally threatened species and ecological communities, migratory species and Ramsar wetlands. An assessment of potential impacts to all Matters of NES under the provisions of the EPBC Act is provided in Section 4.9.5.

3.2 State

3.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act was enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community. The EP&A Act is administered by the NSW Department of Planning and Environment (DP&E).

The EP&A Act provides the overarching structure for planning in NSW and is supported by other statutory environmental planning instruments. Sections of the EP&A Act of primary relevance to the natural environment are outlined further below.

Assessment of Significance (Part 1, Section 5A)

Section 5A of the EP&A Act is an integral part of environmental impact assessment and requires proponents and consent authorities to consider if a development will have a significant effect on threatened species, populations or communities listed under the TSC Act and FM Act. The objective of the Assessment of Significance (AoS) (formally known as the "7-part test") is to improve the standard of, and make transparent, the considerations given to threatened species, populations and ecological communities, and their habitats, and Section 5A (and Section 94 of the TSC Act) outlines seven factors that must be taken into account. Typically, where any AoS determines that a development will result in a significant effect to a threatened species, population or community, a Species Impact Statement is required.

Note that these provisions would not apply if a formal BioBanking Statement were being sought.

State Environmental Planning Policies (Part 3, Division 2)

State Environmental Planning Policies (SEPPs) are environmental planning instruments under the EP&A Act that outline policy objectives relevant to State or regional environmental planning issues. There are over 65 SEPPs; however, only those relevant to the proposed development have been considered and are detailed below.

SEPP No. 14 – Coastal Wetlands

The study area is not within the catchment of any mapped SEPP 14 wetland. SEPP 14 would not be relevant to any development proposal.

SEPP No. 44 – Koala Habitat Protection

SEPP No. 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range and to reverse the current trend of koala-population decline. It applies to areas of native vegetation greater than one hectare and in councils listed in Schedule 1 to the SEPP.

The study area is located within the Port Stephens LGA, a Schedule 1 listed Council. Therefore SEPP No. 44 is relevant to the current assessment and is discussed further in Section 4.9.4.

SEPP No. 71 – Coastal Protection

This policy applies to development of land within the coastal zone which is defined as extending from approximately one kilometre inland of any coastline, bay, estuary, lake or lagoon three nautical miles out to the edge of the State's coastal waters. The study area is not within the coastal zone according to Map 1 of the Greater Metropolitan Region relating to the NSW Coastal Protection Act 1979. SEPP 71 would not be relevant to development within the study area.

Local Environment Plans (Part 3, Division 4)

Local Environment Plans (LEP) are created by Councils in consultation with their community and guide planning decisions for LGAs. They apply either to the whole or part of a LGA and make provision for the protection or utilisation of the environment through zoning of land and development controls.

The study area is subject to the *Port Stephens Local Environmental Plan* (LEP) 2013 and is currently zoned RU2 Rural Landscape.

The objectives of RU2 zoning are to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base.

- maintain the rural landscape character of the land.
- provide for a range of compatible land uses, including extensive agriculture.

3.2.2 Threatened Species Conservation Act 1995

The TSC Act is the key piece of legislation providing for the protection and conservation of biodiversity in NSW through the listing of threatened species, populations and communities, key threatening processes and critical habitat for threatened species, populations and communities. Impacts to threatened species, populations and communities are assessed under Section 5A of the EP&A Act (see above).

Threatened species, populations and communities listed under the TSC Act are discussed in Section 4.9.1 together with an assessment of whether the project will result in a significant effect to these threatened species, populations and communities, with AoS provided in Appendix 5.

As noted above, this assessment pathway would not apply if a formal BioBanking Statement were being sought.

3.2.3 Native Vegetation Act 2003

The NV Act provides for, encourages and promotes the management of native vegetation on a regional basis and regulates the clearing of native vegetation on land in NSW. Under the NV Act no clearing of native vegetation is allowed except in accordance with prior development consent from the relevant Council or under a Property Vegetation Plan (PVP) approved by the relevant Catchment Management Authority.

Port Stephens is one of the LGAs to which the NV Act applies. The lot on which the study area occurs is currently zoned RU2 Rural landscape, which is one of the zones to which the Act applies. Requirements under the Act are discussed further in section 4.9.2.

A BioBanking Statement, if sought, would not exempt approval for native vegetation clearing under NV Act.

3.2.4 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. The NW Act aims to reduce the negative impact of weeds on the economy, community and environment of NSW by:

- Establishing control mechanisms to prevent the establishment of significant new weeds in NSW.
- Preventing, eliminating or restricting the spread of particular significant weeds in NSW.
- Effectively managing widespread significant weeds in NSW.

Plants declared as noxious weeds are currently listed under Noxious Weeds (Weed Control) Order 2014 published in the NSW Government Gazette No. 23. The NW Act is supported by a number of regulations and is administered by the DPI.

Noxious weeds are discussed further in Section 4.9.3.

4 Results

The ecological features of the study area are described below and mapped in Figure 3.

4.1 Landscape context

The study area occurs on low-lying, mostly flat land, most of which is swampy. The land slopes upwards very slightly towards the north-western corner of Lot 232, where the subject site is proposed.

The study area consists of disturbed native and exotic vegetation surrounding a large artificial freshwater lake. The subject site occurs on the most highly disturbed part of the study area, consisting predominantly of a derelict Slash Pine plantation with some regenerating native elements.

The remainder of the vegetation throughout the terrestrial parts of the study area consists of disturbed swamp forest or freshwater wetland vegetation that has been disturbed and is regenerating from previous sand quarry operations. Areas of cleared, slashed or weedy vegetation associated with the previous quarry operations occur mainly in the central and south-western parts of the study area. A slashed powerline easement also occurs throughout the subject site and along the western boundary of the study area.

Outside of the study area, land use is residential along its northern boundary, residential or rural to the west and undeveloped predominantly native vegetation to the south and east.

The study area was found to occur on low-lying, swampy land on Quaternary Sand deposits (Hawley *et al*. 1994).

The study area is directly linked to bushland consisting of swamp forest, with varying degrees of disturbance, to the south and east which provides connectivity to bushland facilitating the movement of fauna throughout the landscape. Figure 2 shows the connectivity of the study area to larger adjoining bushland areas.

4.2 Flora and fauna

Species recorded during the flora assessment are listed in Table A.1 of Appendix 1 (flora). Unless of particular note, these species are not discussed further. A list of threatened biota recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area. No threatened flora species were recorded within the study area during the field investigations.

Two Endangered Ecological Communities (EECs) were recorded within the study area during the field assessment:

- *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* was recorded in both the subject site and offset area.
- *Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* was recorded in the offset area only.

During the site investigation four noxious weeds as defined by DPI for the Port Stephens LGA were recorded. These noxious weeds are listed in section 4.9.3.

Pine tree plantations on the coast typically offer little habitat for native fauna, so apart from habitat for some birds the subject site portion of the study area is considered to be poor quality fauna habitat.

While many of the pine trees had a diameter at breast height (dbh) of 30 centimetres or greater, as is typical of such trees, they contained no visible hollows. No nests were present, but there was extensive evidence in the form of chewed-up cones, of Yellow-tailed Black-cockatoos feeding on the pine cones and several Yellow-tailed Black-cockatoos were seen or heard within the site during the habitat assessment.

The *Freshwater wetlands on Coastal Floodplains* EEC and *Swamp Sclerophyll Forest on Coastal Floodplains* EEC which occur predominantly outside the subject site provide a greater variety of habitat features for local fauna. The waterbody itself, including fringing vegetation, also provides good habitat for native waterbirds, including threatened species. These are listed in section 4.4.

The Broad-leaved Paperbark trees, Coastal Banksias, Swamp Oak, Red Ash and wattles in the subject site offer some fauna habitat, particularly during peak flowering periods, when nectivores comprising birds and the Grey-headed Flying-foxes could forage on the abundant paperbark trees with diameters up to 50 centimetres. This area was also favoured by small birds.

The native vegetation scattered through the derelict Slash Pine Plantation also offers some habitat. The high level of weed invasion has resulted in dense understorey vegetation in some areas, also attractive to small birds.

Common fauna species observed within the study area during the habitat assessment were:

Birds

- Spangled Drongo
- Eastern Whipbird
- Willy Wagtail
- Grey Fantail
- Welcome Swallow
- Rainbow Lorikeet
- Silvereye
- Superb Blue Wren
- Superb Fairy Wren
- Eastern Yellow Robin
- Golden Whistler
- Brown Gerygone
- Australian Magpie
- Australian Raven
- Australasian Darter
- Purple Swamphen
- Pacific Black Duck
- Chestnut Teal
- Golden Whistler
- Eastern Spinebill

- Masked Lapwing
- Red Wattlebird

A glimpse of an unidentified bird of prey was also recorded, however no bird of prey nests were observed in the study area.

Mammals

- Eastern Grey Kangaroo

Reptiles

- Red-bellied Black Snake
- Blue-tongued Lizard
- Eastern Water Skink

Large dragonflies were also observed near the northern margin of the lake.

Although the subject site does not contain any of the preferred food trees for Koala, the Broad-leaved Paperbark and Swamp Oak are both listed as tree species that may be important to Koalas in the Port Stephens Comprehensive Koala Plan of Management (CKPoM) (Port Stephens Council 2002). The main listed feed tree in the study area according to both SEPP44 and the CKPoM, Swamp Mahogany *Eucalyptus robusta,* occurs outside the subject site only. A few Swamp Mahogany trees were recorded in the central eastern section of the study area near Adelaide Street.

The Port Stephens CKPoM map indicates patches of preferred habitat with buffer areas on both the northern and southern side of the lake. The site currently allows movement across the site and would act as a corridor, however the dense patches of lantana and other weeds in many areas would make movement more difficult.

The study area appears to be largely devoid of tree hollows, reducing the likelihood of occurrence of hollow-dwelling arboreal mammals. Only one possible small hollow in a dead stag along the edge of Grahamstown Drain to the south of the subject site was observed. Although leaf litter and fallen branches were present no hollow logs were observed.

A list of threatened fauna recorded or predicted to occur in the local area is provided in Appendix 2, along with an assessment of the likelihood of the species occurring within the study area.

4.3 Vegetation communities and fauna habitat

The vegetation and fauna habitat throughout the majority of the study area has been modified by past disturbances which have included a pine plantation and an abandoned sand quarry.

The study area supports a range of ecological features including areas of native vegetation (swamp forest and freshwater wetlands), including areas of regenerating native vegetation currently in low condition, cleared and weedy areas scattered trees and a large artificial lake. The ecological features are outlined below, divided by the vegetation communities they occur in (refer also to Figure 3).

Table 1 Vegetation communities of the study area

Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	
PCT ID	1717

Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	
Biometric vegetation type ID	HU931
Extent within study area	Approximately 11.71 hectares of this PCT in moderate-good condition was recorded within the study area, the majority of this occurring in the offset area. A further 6.25 hectares of this PCT was recorded in the study area in low condition. This occurred in the form of pine plantations with regenerating native species; or previously cleared and regenerating land from the abandoned sand quarry. The low condition variant of this PCT occurred in both the development and offset areas, with a slightly greater area in the development area.
Survey effort	Four plot/transects were completed in this PCT (Figure 3) – one in the development area and three in the offset area.
Condition	The community was recorded in two condition classes with different vegetation zones in the assessment: • 'Moderate to Good' condition with some recruitment of exotic species due to surrounding land use and associated past or ongoing impacts. The Ancillary Code used for this vegetation zone was 'Medium' (Plate 1). • 'Low' condition consisting of either pine plantations with regenerating native paperbarks and Swamp Oaks which occurred mostly in the subject site (Plate 2), or previously cleared and regenerating land associated with the abandoned sand quarry consisting of bare or weedy areas with a distinct presence of regenerating native overstorey species for this PCT, particularly Swamp Oak and paperbark.
Characteristic species used for identification of PCT	The overstorey species recorded within the community that align with the dominant species listed as characterising this PCT (Sivertsen *et al*. 2011; Somerville 2009) are Swamp Oak *Casuarina glauca,* Broad-leaved Paperbark *Melaleuca quinquenervia* ,Swamp Mahogany *Eucalyptus robusta* , Cheese Tree *Glochidion ferdinandi,* Bordered Panic *Entolasia marginata* , Tall Saw Sedge *Gahnia clarkei* , Blady Grass *Imperata cylindrica* , Spiny-headed Mat-rush *Lomandra longifolia* and Blue Flax-lily *Dianella caerulea.*
Justification of evidence used to identify the PCT	Apart from species composition, the stated distribution and habitat information for the PCT as given in the OEH VIS Community Profile Report is highly consistent with the geographic location, habitat and floristics of the PCT at Raymond Terrace. The PCT is described as 'Myrtaceous Swamp Open Forests with a mid-stratum of small trees. The ground stratum is dense and dominated by wet-loving grasses and graminoid species. This community is common on coastal floodplains and poorly drained lowlands from the Broadwater to Failford. It mainly occurs on unconsolidated sediments at elevations below 50m. More isolated examples occur as far south as Macmasters Beach.' Common weed species within the PCT are stated as being Lantana *Lantana camara;* Cassia *Senna pendula;* Carpet Grass *Axonopus fissifolius;* Flatweed *Hypochaeris radicata;* Whisky Grass *Andropogon virginicus* and Crofton Weed *Ageratina adenophora*. All of these weed species were recorded within the PCT. The study area is within one of the potential IBRA subregions, Mitchell Landscapes and LGAs in which the PCT is stated as occurring. In summary, the PCT appears to be a good match for the vegetation community that occurs in the study area.
Threatened ecological community status	Commonwealth EPBC Act: Not listed NSW TSC Act: *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and SE corner bioregions* (Endangered).

Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	
Plate 1: PCT 1717 – Moderate-good condition	
Plate 2: PCT 1717 – Low condition	

***Phragmites australis* and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion**	
PCT ID	1071
Biometric vegetation type ID	HU673
Extent within study area	Approximately 1.67 hectares of this PCT was recorded within the study area as several separate patches, all within the offset area. None of the PCT occurred in the subject site.

Phragmites australis and *Typha orientalis* coastal freshwater wetlands of the Sydney Basin Bioregion	
Survey effort	Two plot/transects were used in this PCT (Figure 3).
Condition	The community is generally in moderate to good condition with some recruitment of exotic species due to surrounding land use and associated edge impacts. Moderate-Good was the condition used in the credit calculator with no Ancillary Code.
Characteristic species used for identification of PCT	The key ground cover species recorded within the community that align with the dominant species listed as characterising this PCT according to the VIS Classification Profile are Common Reed *Phragmites australis* and Water Primrose *Ludwigia peploides* subsp. *montevidensis.* Another dominant species characterising the PCT, Broadleaf Cumbungi *Typha orientalis* appeared to be absent from the study area, but may have failed to disperse to the area and is likely to occur when the community attains greater maturity.
Justification of evidence used to identify the PCT	Apart from species composition, the stated distribution and habitat information for the PCT as given in the OEH VIS Community Profile Report is highly consistent with the geographic location, habitat and floristics of the PCT at Raymond Terrace. The key matching characteristics are its landscape position of man-made water bodies, drainage lines and depressions across a wide variety of environments. It includes modified former wetlands such as Hexham Swamp. It also occurs in original form in wide variety of situations associated with coastal plains, valleys, lagoons and other sites of poor drainage. The drainage depressions in the study area are most likely to be man-made rather than natural or original, and are a consequence of the history of landuse of the site as a sand quarry.
Threatened ecological community status	Commonwealth EPBC Act: Not listed NSW TSC Act: *Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (Endangered).
Plate 3: PCT 1071 – Moderate-good condition	

4.4 Threatened biota

Threatened biota includes all flora and fauna species, populations and ecological communities listed under the EPBC Act and TSC Act. Lists of threatened biota recorded or predicted to occur within five kilometres of the study area are provided in Appendix 1 (flora) and Appendix 2 (fauna). An assessment of the likelihood of these species occurring in the study area, and an indication of where within the subject site (i.e. which habitats or features of relevance to the species), is included.

No areas of critical habitat for flora or fauna have been declared within the study area.

Known habitats for migratory species have been considered and are addressed in Appendix 2.

A summary of those threatened fauna species and ecological communities recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 2 below, with a further indication of likely presence in the subject site.

Table 2 Summary of threatened biota likely to occur in the study area

Species / community name	Subject site	Offset area	Habitat of value within the study area
Eastern Bentwing-bat	Yes*	Yes*	Possible marginal foraging habitat only occurs in the subject site. More extensive areas of foraging habitat occur in the offset area.
Little Bentwing-bat	Yes*	Yes*	Possible marginal foraging habitat only occurs in the subject site. More extensive areas of foraging habitat occur in the offset area.
Grey-headed Flying-fox	Yes*	Yes*	Dense stands of *Melaleuca* trees mainly in the offset area provide an important foraging resource during peak flowering times for a camp that is known to occur in the locality. This resource is much more limited in the subject site.
Koala	No	Yes	The subject site is likely to be too modified for the Koala to occur, but suitable feed trees and good connectivity occurs in the offset area south of the subject site.
Varied Sittella	No	Yes	Potentially suitable habitat occurs in the paperbark forests of the offset area only.
Australasian Bittern	No	Yes	Wetlands with permanent water and rushes occur around the edges of the lake in the offset area only.
Osprey	No	Yes	The required habitat of open water for foraging for the Osprey occurs in the offset area only.
Wallum Froglet	No	Yes	The most likely areas of suitable habitat occur within paperbark swamp around the fringes of the lake within the offset area only.
Green and Golden Bell Frog	No	Yes	Some of the fringing vegetation around the lake in the offset area may provide suitable habitat for this species.

Species / community name	Subject site	Offset area	Habitat of value within the study area
Swamp Sclerophyll Forest on Coastal Floodplains	Yes	Yes	A total of 11.62 hectares of this TEC in moderate-to-good condition occurs in the study area, of which 0.30 hectares is present in the subject site, The community is heavily invaded by lantana and other weeds in many parts of the study area, particularly in the subject site.
Freshwater wetlands on Coastal Floodplains	No	Yes	A total of 1.67 hectares of this TEC in moderate-to-good condition occurs in the study area, all within the offset area. The community is regenerating from past sand mining disturbance and relatively species-poor, but not heavily invaded by weeds.

*Foraging resources only.

Given that an area of habitat for the Swamp Sclerophyll Forest on Coastal Floodplains TEC would ultimately be removed due to the proposed rezoning, an AoS for this ecological community has been carried out (Appendix 4). As noted previously, this is not required if a BioBanking Statement were to be applied for.

Although it has been determined that three threatened fauna species; Eastern Bent-wing Bat, Little Bent-wing Bat and Grey-headed Flying fox could forage in the limited resources within the subject site , there is no breeding or roosting habitat and the species are more likely to utilise the more extensive and better quality habitat of the offset area. Likewise for the Koala, superior foraging and connecting habitat and feed trees occur in the offset area. Hence, no AoSs have been completed for these species.

4.5 Biobanking calculation – subject site

Site values and results from the field and desktop investigations were entered into the BioBanking Credit Calculator (version 4.0) according to the BBAM as described below.

4.5.1 Landscape value

The subject site occurs entirely within the NSW North Coast IBRA bioregion and Hunter subregion. Most of the inner assessment circle is located within the Hunter IBRA subregion (Figure 4), however the majority of the southern half of the outer assessment circle is located within the Karuah Manning subregion. The Hunter subregion is the subregion used in this assessment.

The subject site occurs entirely within the Sydney-Newcastle Barriers and Beaches Mitchell Landscape, which is the Mitchell Landscape used in this assessment.

The smallest inner and outer assessment circles (100 hectare and 1000 hectare) were used, as the 1000 hectare assessment circle was sufficient to fit the study area. The assessment circles were both centered on the centre of the subject site.

Mapping of native vegetation within the assessment circles was undertaken using the *Greater Hunter Native Vegetation Mapping* (Roff et al. 2011) data, which is the most up-to-date and comprehensive local vegetation mapping study. The extent of native vegetation cover before development within both the outer and inner assessment circles was determined as the sum of areas of each of the native vegetation map units within each assessment circle.

To determine the extent of native vegetation cover after development, the extent of vegetation required for removal was subtracted from the extent of native vegetation cover before development. For the purpose of

these calculations it was assumed that all vegetation would be cleared from the subject site. Table 3 provides a summary of the extent of native vegetation cover within the inner and outer assessments circles, before and after development. The removal of native vegetation due to the development has not altered the range into which the before and after development areas fall for the outer assessment circle, but for the inner assessment circle, the value falls from 11-15% before development to 6-10% after development.

Table 3 Extent of native vegetation cover before and after development

Assessment Circle	Before Development		After Development	
	Area (ha)	Per cent	Area (ha)	Per cent
Outer assessment circle	100.3	10.0	100.3	10.0
Inner assessment circle	13.2	13.2	10.2	10.2

The subject site does not support any of the following:

- An area identified as being part of a state significant biodiversity link.
- A riparian buffer 50 metres either side of a 6th order stream.
- A riparian buffer 50 metres around an important wetland or estuarine area.
- An area identified as being part of a regionally significant biodiversity link.
- A riparian buffer 20 metres either side of a 4th or 5th order stream,

Therefore, the proposed development will not impact on any state significant or regionally significant biodiversity links.

The subject site was assessed as being part of one connective link, with native vegetation to the south of the proposed development area providing connectivity with native vegetation that extends via expanses of vegetation to the east of the subject site, connecting via this link with native vegetation to the west of the development area, including native vegetation to the west of Adelaide Street (Figure 4). The connecting native vegetation was assessed as:

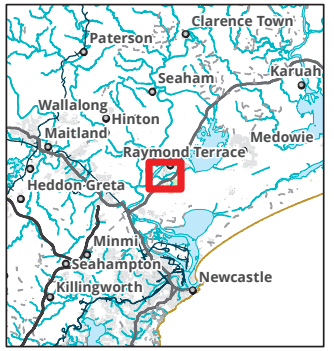
- >5-30 metres width.
- Overstorey Projective Foliage Cover at Benchmark both before and after development.
- Mid-storey/ground cover Projective Foliage Cover at <50% Benchmark both before and after development.
- Patch size was calculated by GIS using the rules for connecting native vegetation. None of the native vegetation mapped to the south of the Pacific Highway is considered connected due to the presence of the four-lane highway (defined as a hostile barrier). Accordingly, patch size was calculated as 55.8 hectares.

4.5.2 Vegetation zones

The PCT recorded within the subject site was stratified into two vegetation zones based on condition, as summarised in Table 4. Their distribution is shown in Figure 5.

Table 4 Vegetation zones mapped within the study area

Vegetation zone	Plant community type [Ancillary Code]	Vegetation formation	Vegetation class	Biometric Vegetation Type	Area (ha)
1	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Moderate/Good_Medium]	Forested Wetlands	Coastal Swamp Forests	HU931	0.30
2	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Low condition]	Forested Wetlands	Coastal Swamp Forests	HU931	3.78
TOTAL					**4.08**



Legend

- Study area
- Development site
- Assessment circles
- Native vegetation within the assessment circles

Figure 4: Biobanking Assessment circles – development site

0 140 280 420 560 700

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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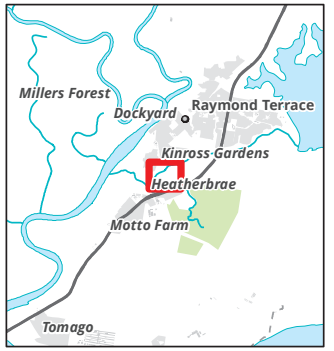
Matter: 23223
Date: 29 November 2016,
Checked by: SR, Drawn by: LH, Last edited by: lharley
Location:P:\23200s\23223\Mapping
23223_F4_BiobankAssessCircles_DevSite



Legend

- Study area
- Development site

Vegetation Zone

- Vegetation Zone 1 - Swamp Sclerophyll Forest EEC
- Vegetation Zone 2 - Swamp Sclerophyll Forest (Low condition)
- Non-native vegetation - Cleared/ slashed exotic vegetation

Figure 5: Vegetation zones – development site

0 30 60 90 120 150

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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Matter: 23223
Date: 29 November 2016,
Checked by: SR, Drawn by: LH, Last edited by: lharley
Location:P:\23200s\23223\Mapping
23223_F5_VegZones_DevSite

4.5.3 Geographic / habitat features

An assessment of the occurrence of geographic habitat features, in accordance with Section 12 of the Credit Calculator Operational Manual (OEH 2016c) was undertaken, along with a determination of whether impacts to these habitat features will result from the proposed development. The species generated by the calculator associated with the BBAM, along with the results of this assessment, are outlined in Table 5.

Table 5 Assessment of geographic habitat features within the study area

Common name	Scientific name	Feature	Impact	Justification
Biconvex Paperbark	*Melaleuca biconvexa*	Swamps, swamp margins or creek edges	Yes	Swamps and swamp margins occur within the study area.
Eucalyptus parramattensis* subsp. *decadens	*Eucalyptus parramattensis* subsp. *decadens*	Land within northern section of sub-region, associated with poorly drained sand deposits within 10km radius of Kurri Kurri in Wyong CMA subregion	No	The land is not within 10km of Kurri Kurri in Wyong CMA subregion.
Maundia triglochinoides	*Maundia triglochinoides*	Swamps or shallow fresh water on clay	No	The study area does not occur on clay.
Charmhaven Apple	*Angophora inopina*	Land within 5 km of Wallaroo Nature Reserve in Upper Hunter CMA subregion	No	The study area is not within 5 km of Wallaroo Nature Reserve in Upper Hunter CMA subregion.
Zannichellia palustris	*Zannichellia palustris*	Land containing freshwater bodies	Yes	The study area contains a freshwater body.
Large-eared Pied Bat	*Chalinolobus dwyeri*	Land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels.	No	The study area does not contain escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels.

Common name	Scientific name	Feature	Impact	Justification
Common Planigale	*Planigale maculata*	Rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas	No	No rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas occur in the study area.
Wallum Froglet	*Crinia tinnula*	Land within 40 m of swamps, wet or dry heaths or sedge grasslands	Yes	The study area occurs within 40 m of a swamp.
Pale-headed Snake	*Hoplocephalus bitorquatus*	Land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber	Yes	The study area is within 40 m of a watercourse, does not contain hollow-bearing trees or loose bark but does contain abundant fallen timber.
Black Bittern	*Ixobrychus flavicollis*	Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation	Yes	The study area occurs within 40 m of freshwater wetlands, including areas of permanent water associated with the lake, dense vegetation and some emergent aquatic vegetation.
Black-necked Stork	*Ephippiorhynchus asiaticus*	Land within 40 m of freshwater or saline wetlands (eg saltmarsh, mangroves, mudflats, swamps, billabongs, floodplains, watercourse pools, wet heathland and/or farm dams)	Yes	The study area occurs within 40 m of swamps.

Common name	Scientific name	Feature	Impact	Justification
Broad-billed Sandpiper	*Limicola falcinellus*	Intertidal mudflats or sandflats within inlets, bays	No	The study area does not contain intertidal mudflats or sandflats within inlets, bays.
Comb-crested Jacana	*Irediparra gallinacea*	land within 40 m of permanent wetlands with a good surface cover of floating vegetation	No	The study area is within 40 m of permanent wetlands with a good surface cover of floating vegetation.
Eastern Osprey	*Pandion cristatus*	Land within 40 m of fresh/brackish/saline waters of larger rivers or creeks; estuaries, coastal lagoons, lakes and/or inshore marine waters	Yes	The study area is within 40 m of a freshwater lake.
Australasian Bittern	*Botaurus poiciloptilus*	Land east of Cessnock in Hunter CMA subregion	No	The study area is not east of Cessnock in Hunter CMA subregion.
Green-thighed Frog	*Litoria brevipalmata*	Land within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter	Yes	The study area occurs within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter.
Green and Golden Bell Frog	*Litoria aurea*	land within 100 m of emergent aquatic or riparian vegetation	Yes	The study area occurs within 100 m of emergent aquatic or riparian vegetation.

4.5.4 Ecosystem credit species

A list of ecosystem credit species predicted to occur within the study area, based on the PCTs present and generated by the calculator associated with the BBAM (OEH 2014) is provided in Table 6. These species are all assumed to occur within the study area for the purpose of the calculation.

Table 6 Ecosystem credit species included in the credit calculation

Common Name	Scientific Name	Threatened species Offset Multiplier
Australian Painted Snipe	*Rostratula australis*	1.3
Black-tailed Godwit	*Limosa limosa*	2.6
Blue-billed Duck	*Oxyura australis*	1.3
Freckled Duck	*Stictonetta naevosa*	1.3
Little Lorikeet	*Glossopsitta pusilla*	1.8
Squirrel Glider	*Petaurus norfolcensis*	2.2
Swift Parrot	*Lathamus discolor*	1.3
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	2.2

The species with the highest Threatened Species (TS) offset multiplier is the Black-tailed Godwit with TS offset multiplier value of 2.6. However, given the quality of habitat in the subject site, most of the species in Table 6 are not considered likely to occur in the subject site, but could occur in the offset area (Appendix 2).

4.5.5 Species credit species

A list of species credit species (flora and fauna) predicted to occur within the study area, based on the PCT present, is provided in Table 7. The potential for each species to occur within the study area was assessed in accordance with Appendix 1 and Appendix 2 (based on results from previous and current field investigations and an assessment of the habitat available in the study area) and Section 6.5 of the BBAM (OEH 2014). While some of these species have potential to occur in the offset area, as discussed in section 4.4, none of the species credit species listed below are likely to occur in the subject site, since the habitat is considered to be 'substantially degraded' (OEH 2014). Therefore, species credits are not included as part of this assessment.

Table 7 Potential species credit species considered for inclusion in the credit calculation

Common Name	Scientific Name	Assessed as occurring in subject site?
Australasian Bittern	*Botaurus poiciloptilus*	No
Biconvex Paperbark	*Melaleuca biconvexa*	No
Black Bittern	*Ixobrychus flavicollis*	No
Black-eyed Susan	*Tetratheca juncea*	No
Black-necked Stork	*Ephippiorhynchus asiaticus*	No

Common Name	Scientific Name	Assessed as occurring in subject site?
Brush-tailed Phascogale	*Phascogale tapoatafa*	No
Charmhaven Apple	*Angophora inopina*	No
Eastern Pygmy-possum	*Cercartetus nanus*	No
Green and Golden Bell Frog	*Litoria aurea*	No
Green-thighed Frog	*Litoria brevipalmata*	No
Koala	*Phascolarctos cinereus*	No
Narrow Goodenia	*Goodenia macbarronii*	No
Pale-headed Snake	*Hoplocephalus bitorquatus*	No
Regent Honeyeater	*Anthochaera phrygia*	No
Rough Doubletail	*Diuris praecox*	No
Small Flower Grevillea	*Grevillea parviflora subsp. parviflora*	No
Tall Knotweed	*Persicaria ealatior*	No
Trailing Woodruff	*Asperula asthenes*	No
Wallum Froglet	*Crinia tinnula*	No
-	*Zannichellia palustris*	No

4.5.6 Vegetation transect / plot details

A summary of the data collected from the BioBanking plots / transects for the BioBanking credit calculation is provided in Appendix 3.

4.5.7 Management Zones

Two management zone have been delineated (Table 8), corresponding to each vegetation zone. The zones are shown in Figure 5. For both Management Zones, it is assumed that the vegetation within the zones will be completely cleared for rezoning and ultimate development.

Table 8 Impacts within the Management Zones

Vegetation Zone	Plant Community Type	Level of impact	Management Zone	Area (ha)
1	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. (Moderate-Good_Medium condition)	Total vegetation clearing	MZ1	0.30

Vegetation Zone	Plant Community Type	Level of impact	Management Zone	Area (ha)
2	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. (Low condition)	Total vegetation clearing	MZ2	3.78

All vegetation within Vegetation Zone 1 will be cleared, with all site attribute scores set to zero. Corresponding site attribute scores following development are provided in Table 9 (MZ1) and Table 10 (MZ2).

Table 9 Site attributes scores for vegetation within Vegetation Zone 1 (MZ1)

Site attribute	Current score (0-3)	Score with development (0-3)
Native plant species	2	0
Native over-storey cover	3	0
Native mid-storey cover	3	0
Native ground cover (grasses)	1	0
Native ground cover (shrubs)	0	0
Native ground cover (other)	3	0
Exotic plant cover	1	0
Number of trees with hollows	0	0
Overstorey regeneration	3	0
Total length of fallen logs	3	0
TOTAL SITE VALUE SCORE	**71.33**	**0**

Table 10 Site attributes scores for vegetation within Vegetation Zone 2 (MZ2) – low condition

Site attribute	Current score (0-3)	Score with development (0-3)
Native plant species	1	0
Native over-storey cover	0	0
Native mid-storey cover	2	0
Native ground cover (grasses)	0	0
Native ground cover (shrubs)	0	0
Native ground cover (other)	0	0

Site attribute	Current score (0-3)	Score with development (0-3)
Exotic plant cover	0	0
Number of trees with hollows	0	0
Overstorey regeneration	2	0
Total length of fallen logs	3	0
TOTAL SITE VALUE SCORE	**26.67**	**0**

4.5.8 Threatened species survey results

No threatened species were recorded during the field surveys and for the purposes of this assessment, no species credit species are assessed in the credit calculation as occurring within the subject site. The potential presence of threatened flora species in the subject site is discounted by its 'substantially degraded' condition and the coverage of this area during field surveys.

A number of fauna species were rated as having a moderate or high likelihood of occurring in the habitats available within the entire study area (Appendix 2), but threatened species likely to occur within the subject site would be far fewer due to the predominantly low condition and 'substantially degraded' nature of the habitat within most of that area, assessed in section 4.4. For the purposes of this assessment, it can be validly assumed that if any threatened fauna species happened to occur or utilise the marginal habitats of the subject site, it would be in response to the limited foraging resources in the marginal habitat of the subject site only, and there would be sufficient alternative habitat of superior quality within the adjoining offset area. No species credits were calculated for this assessment.

4.5.9 Biodiversity credit requirements

A summary of the ecosystem credit requirements as determined by the credit calculator (version 4.0) is given in Table 11. The BioBanking Credit Report (Appendix 5) gives the offset options, consisting of either the same or closely related PCTs that can be used to offset the PCT impacted. The offsets must be located within the Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs. In this case, the same PCT can be offset within the same lot (the study area) in which the development is proposed.

Table 11 Credit summary – Ecosystem credits required

PCT	Area (ha)	Ecosystem Credits required	Red Flag
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Moderate/Good_Medium condition]	0.30	17	Yes
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Low condition]	3.78	82	No
TOTAL	**4.08**	**99**	

4.5.10 Red Flag issues

Being an EEC, any impacts on PCT 1717 would trigger a Red Flag under the BBAM. If a BioBanking Statement were being sought, an application for a red flag variation would need to be made to the Chief Executive of OEH, with an assessment against relevant determinations set out in Section 9.2.4.1 and Section 9.2.6 of the BBAM (OEH 2014). The Chief Executive of OEH must determine that the viability of biodiversity values in the red flag area is low or not viable, and its contribution to regional biodiversity values is low depending on the following:

(a) The condition of the vegetation

(b) The size of the area of biodiversity values and its isolation

(c) Current or proposed tenure and zoning under any relevant planning instrument

(d) Current and proposed surrounding land use, and

(e) Whether mechanisms and funds are available to manage low viability sites such that their viability is improved over time.

In this case, it is a very minimal portion of the subject site consisting of the PCT in Moderate-Good condition (0.30 ha) that would trigger a Red Flag. The majority of the vegetation to be impacted is the Low condition form of the PCT, and does not trigger a Red Flag. The PCT is completely offset in the offset area, and abundant alternative off-site areas of this PCT occur on adjacent land. Given these considerations, it is concluded that the viability biodiversity values of the red flag area and its contribution to regional biodiversity values is low. Accordingly, any application for a red flag variation for a BioBanking Statement with reference to the above considerations would be likely to be successful.

4.6 BioBanking calculation – offset site

Site values and results from the field and desktop investigations for a BioBank site in relation to the part of the study area that is intended to serve as an offset to the development were entered into the BioBanking Credit Calculator (version 4.0) according to the BBAM as described below.

4.6.1 Landscape value

The offset site occurs within the NSW North Coast IBRA bioregion and the Hunter subregion. The Hunter subregion covers the entire offset site and is the subregion used in this assessment.

The offset area occurs entirely within the Sydney-Newcastle Barriers and Beaches Mitchell Landscape, which is the Mitchell Landscape used in this assessment.

The smallest inner and outer assessment circles (100 hectare and 1000 hectare) were used, as the 1000 hectare assessment circle was sufficient to fit the study area. The assessment circles were both centered on the centre of the offset site (Figure 6).

Mapping of native vegetation within the assessment circles was undertaken using the *Greater Hunter Native Vegetation Mapping* (Roff et al. 2011) data, which is the most up-to-date and comprehensive local vegetation mapping study.

The extent of native vegetation cover before and after offset for both outer and inner assessment circles was determined as the sum of areas of each of the native vegetation map units listed above. The area of native vegetation required for removal on the subject site was subtracted from the extent of native vegetation

mapped prior to development for calculation of the area of native vegetation in the outer assessment circle. It was assumed that the area of native vegetation to be offset would not change before and after offset.

Table 12 Extent of native vegetation cover before and after development

Assessment Circle	Before Development		After Development	
	Area (ha)	Per cent	Area (ha)	Per cent
Outer assessment circle	154.1	15.4	154.1	15.4
Inner assessment circle	26.7	26.7	26.7	26.7

The study area does not support any of the following:

- An area identified as being part of a state significant biodiversity link.
- A riparian buffer 50 metres either side of a 6th order stream.
- A riparian buffer 50 metres around an important wetland or estuarine area.
- An area identified as being part of a regionally significant biodiversity link.
- A riparian buffer 20 metres either side of a 4th or 5th order stream,

Therefore, the proposed offset site will not affect any state significant or regionally significant biodiversity links.

The offset site was assessed as being part of one connective link, connecting well to native vegetation to the east of the offset site. The most limiting connecting link is off-site to the west, on the opposite side of Adelaide Street where two narrow connections occur via separate links, one at the northern and one at the southern end of the offset area.

The connecting native vegetation was assessed as:

- >5-30 metres width.
- Overstorey Projective Foliage Cover at Benchmark both before and after Biobank.
- Mid-storey/ground cover Projective Foliage Cover at <50% Benchmark both before and after Biobank.
- Patch size was calculated by GIS using the rules for connecting native vegetation. None of the native vegetation mapped to the south of the Pacific Highway (south of the study area) is considered connected due to the presence of the four-lane highway (defined as a hostile barrier). Accordingly, patch size was calculated as 55.8 hectares.

4.6.2 Vegetation zones

The two PCTs recorded within the offset site were stratified into three vegetation zones based on condition, as summarised in Table 13. Their distribution is shown in Figure 7.

Table 13 Vegetation zones mapped within the offset site

Vegetation zone	Plant community type [Ancillary Code]	Vegetation formation	Vegetation class	Biometric Vegetation Type	Area (ha)
1	PCT 1717: *Broad-leaved*	Forested	Coastal	HU931	11.32

Vegetation zone	Plant community type [Ancillary Code]	Vegetation formation	Vegetation class	Biometric Vegetation Type	Area (ha)
	Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast. [Moderate/Good_Medium]	Wetlands	Swamp Forests		
2	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Low condition]	Forested Wetlands	Coastal Swamp Forests	HU931	2.47
3	PCT 1071: *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion.* [Moderate/Good_Medium]	Freshwater Wetlands	Coastal Freshwater Lagoons	HU673	1.67
TOTAL					**15.46**

Legend

- Study area
- Development site
- Assessment circles
- Native vegetation within the assessment circles

Figure 6: Biobanking Assessment circles – offset area

0 140 280 420 560 700

Metres

Scale: 1:14,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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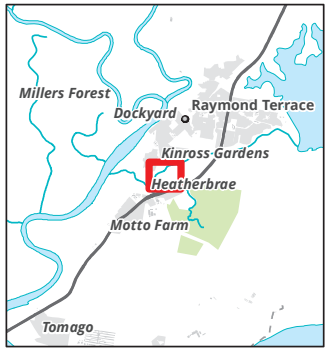
Matter: 23223
Date: 29 November 2016,
Checked by: SR, Drawn by: LH, Last edited by: lharley
Location:P:\23200s\23223\Mapping
23223_F6_BiobankAssessCircles_OffsetSite



Legend

- Study area
- Development site

Vegetation Zone

- Vegetation Zone 1 - Swamp Sclerophyll Forest EEC
- Vegetation Zone 2 - Swamp Sclerophyll Forest (Low condition)
- Vegetation Zone 3 - Freshwater Wetlands EEC
- Non-native vegetation - Cleared/ slashed exotic vegetation

Figure 7: Vegetation zones – offset area

0 30 60 90 120 150

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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Matter: 23223
Date: 29 November 2016,
Checked by: SR, Drawn by: LH, Last edited by: lharley
Location:P:\23200s\23223\Mapping
23223_F7_VegZones_OffsetArea

Acknowledgements: Imagery © Nearmap 2015; Basemap © Land and Property Information 2016

4.6.3 Geographic / habitat features

An assessment of the occurrence of geographic habitat features, in accordance with Section 12 of the Credit Calculator Operational Manual (OEH 2016c) was undertaken, along with a determination of whether these habitat features will be affected in the proposed offset site. The species generated by the calculator associated with the BBAM, along with the results of this assessment are outlined in Table 14.

Table 14 Assessment of geographic habitat features within the offset site

Common name	Scientific name	Feature	Impact	Justification
Biconvex Paperbark	*Melaleuca biconvexa*	Swamps, swamp margins or creek edges	Yes	Swamps and swamp margins occur within the study area.
Eucalyptus parramattensis* subsp. *decadens	*Eucalyptus parramattensis* subsp. *decadens*	Land within northern section of sub-region, associated with poorly drained sand deposits within 10km radius of Kurri Kurri in Wyong CMA subregion	No	The land is not within 10km of Kurri Kurri in Wyong CMA subregion.
Maundia triglochinoides	*Maundia triglochinoides*	Swamps or shallow fresh water on clay	No	The study area does not occur on clay.
Zannichellia palustris	*Zannichellia palustris*	Land containing freshwater bodies	Yes	The study area contains a freshwater body.
Large-eared Pied Bat	*Chalinolobus dwyeri*	Land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels.	No	The study area does not contain escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels.
Common Planigale	*Planigale maculata*	Rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas	No	No rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas occur in the study area.

Common name	Scientific name	Feature	Impact	Justification
Wallum Froglet	*Crinia tinnula*	Land within 40 m of swamps, wet or dry heaths or sedge grasslands	Yes	The study area occurs within 40 m of a swamp.
Pale-headed Snake	*Hoplocephalus bitorquatus*	Land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber	Yes	The study area is within 40 m of a watercourse, does not contain hollow-bearing trees or loose bark but does contain abundant fallen timber.
Black Bittern	*Ixobrychus flavicollis*	Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation	Yes	The study area occurs within 40 m of freshwater wetlands, including areas of permanent water associated with the lake, dense vegetation and some emergent aquatic vegetation.
Black-necked Stork	*Ephippiorhynchus asiaticus*	Land within 40 m of freshwater or saline wetlands (eg saltmarsh, mangroves, mudflats, swamps, billabongs, floodplains, watercourse pools, wet heathland and/or farm dams)	Yes	The study area occurs within 40 m of swamps.
Broad-billed Sandpiper	*Limicola falcinellus*	Intertidal mudflats or sandflats within inlets, bays	No	The study area does not contain intertidal mudflats or sandflats within inlets, bays.
Comb-crested	*Irediparra gallinacea*	land within 40 m of permanent wetlands with a good surface cover	No	The study area is within 40 m of permanent wetlands with a good surface cover of floating vegetation.

Common name	Scientific name	Feature	Impact	Justification
Jacana		of floating vegetation		
Eastern Osprey	*Pandion cristatus*	Land within 40 m of fresh/brackish/saline waters of larger rivers or creeks; estuaries, coastal lagoons, lakes and/or inshore marine waters	Yes	The study area is within 40 m of a freshwater lake.
Australasian Bittern	*Botaurus poiciloptilus*	Land containing brackish or freshwater wetlands	Yes	The study area contains freshwater wetlands.
Green-thighed Frog	*Litoria brevipalmata*	Land within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter	Yes	The study area occurs within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter.
Green and Golden Bell Frog	*Litoria aurea*	land within 100 m of emergent aquatic or riparian vegetation	Yes	The study area occurs within 100 m of emergent aquatic or riparian vegetation.

4.6.4 Ecosystem credit species

A list of ecosystem credit species predicted to occur within the study area, based on the PCTs present and generated by the calculator associated with the BBAM (OEH 2014) is provided in Table 15. An assessment of the likelihood of these species occurring in the study area is provided in Appendix 2.

Table 15 Ecosystem credit species included in the credit calculation

Common Name	Scientific Name	Threatened species Offset Multiplier
Australian Painted Snipe	*Rostratula australis*	1.3
Barking Owl	*Ninox connivens*	3.0
Black-tailed Godwit	*Limosa limosa*	2.6
Blue-billed Duck	*Oxyura australis*	1.3
Bush Stone-curlew	*Burhinus grallarius*	2.6
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	2.2
Eastern Freetail-bat	*Mormopterus norfolkensis*	2.2
Eastern Grass Owl	*Tyto longimembris*	1.3
Freckled Duck	*Stictonetta naevosa*	1.3
Gang-gang Cockatoo	*Callocephalon fimbriatum*	2.0
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	1.8
Greater Broad-nosed Bat	*Scoteanax rueppellii*	2.2
Little Eagle	*Hieraaetus morphnoides*	1.4
Little Lorikeet	*Glossopsitta pusilla*	1.8
Magpie Goose	*Anseranas semipalmata*	1.3
Spotted Harrier	*Circus assimilis*	1.4
Spotted-tailed Quoll	*Dasyurus maculatus*	2.6
Squirrel Glider	*Petaurus norfolcensis*	2.2
Swift Parrot	*Lathamus discolor*	1.3
Varied Sittella	*Daphoenositta chrysoptera*	1.3
White-fronted Chat	*Epthianura albifrons*	0.8
Yellow-bellied Glider	*Petaurus australis*	2.3
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	2.2

The species with the highest Threatened Species (TS) offset multiplier is the Barking Owl with TS offset multiplier value of 3.0.

4.6.5 Species credit species

The list of species credit species (flora and fauna) predicted to occur within the study area, based on the PCTs present, is the same as that obtained for the development site calculation and is presented in Table 7. Since it was determined that no species credit species are likely to be impacted in the development site and therefore require no special offsets due to the development, no species credits are considered for this calculation.

4.6.6 Vegetation transect / plot details

A summary of the data collected from the BioBanking plots / transects for the BioBanking credit calculation is provided in Appendix 3.

4.6.7 Management Zones

Three management zone have been delineated (Table 16), corresponding to each vegetation zone. The zones are shown in Figure 7. For all Management Zones, it is assumed that the default minimum management actions required for a BioBank site will be applied to obtain the respective biodiversity credits for each zone. A list of the standard management actions required to obtain ecosystem credits at a BioBank site is provided below:

- Management of grazing for conservation
- Weed control
- Application of ecological fire management
- Management of human disturbance
- Retention of regrowth and remnant native vegetation
- Replanting or supplementary planting where natural regeneration will not be sufficient
- Retention of dead timber
- Erosion control
- Retention of rocks

Table 16 Management Zones within the Offset Area

Vegetation Zone	Plant Community Type	Management Zone	Area (ha)
1	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. (Moderate-Good_Medium condition)	MZ1	11.32
2	PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. (Low condition)	MZ2	2.47
3	PCT 1071: *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion.* (Moderate-	MZ3	1.67

Vegetation Zone	Plant Community Type	Management Zone	Area (ha)
	Good_Medium condition)		

4.7 Management zone scores

4.7.1 Assessment of changes in landscape attribute values for the BioBank site

BioBanking the site will not result in any change in the landscape attribute values for the as the following landscape attributes will remain the same before and after BioBanking:

- Percent native vegetation cover within both the outer and inner assessment circles will not change as most of the vegetation of the BioBank site is considered to be native vegetation prior to BioBanking.
- Connectivity value will not change as the existing surrounding development drives the connectivity attribute score.
- Strategic location of the BioBank site will not change.

4.7.2 Averted loss

The native vegetation within the BioBank site has been assessed as having a low risk of decline in the near future as quarrying activities have been abandoned, the site is fenced and mostly inaccessible and it is not likely to be subject to clearing of native vegetation or other disturbances.

4.7.3 Assessment of changes in biodiversity values for management zones within the BioBank site

Default changes in biodiversity values for management zones actions are detailed for MZ1 in Table 17, MZ2 in Table 18 and MZ3 in Table 19.

Table 17 Changes in biodiversity value scores for Offset Management Zone 1

Site attribute	Current score (0-3)	Averted loss score (0-3)	Default Increased Score (0-3)	Score with management (0-3)
Native plant species:	1	1	1.5	1.5
Native over-storey cover:	3	3	3	3
Native mid-storey cover:	2	2	3	3
Native ground cover (grasses):	3	2	3	3
Native ground cover (shrubs):	1	1	2	2
Native ground cover (other):	3	2	3	3
Exotic plant cover:	2	1.5	3	3
Number of trees with hollows:	0	0	0	0
Overstorey regeneration:	3	2	3	3
Total length of fallen logs:	3	2	3	3
Totals	**66.22**	**7.22**	**82.00**	**82.00**

Table 18 Changes in biodiversity value scores for Offset Management Zone 2

Site attribute	Current score (0-3)	Averted loss score (0-3)	Default Increased Score (0-3)	Score with management (0-3)
Native plant species:	1	1	1.5	1.5
Native over-storey cover:	1	1	2	2
Native mid-storey cover:	1	1	2	2
Native ground cover (grasses):	3	2	3	3
Native ground cover (shrubs):	0	0	1	1
Native ground cover (other):	0	0	1	1
Exotic plant cover:	2	1.5	3	3
Number of trees with hollows:	0	0	0	0
Overstorey regeneration:	2	1.5	3	3
Total length of fallen logs:	0	0	0	0
Totals	**30.00**	**2.39**	**56.44**	**56.44**

Table 19 Changes in biodiversity value scores for Offset Management Zone 2

Site attribute	Current score (0-3)	Averted loss score (0-3)	Default Increased Score (0-3)	Score with management (0-3)
Native plant species:	3	3	3	3
Native over-storey cover:	3	3	3	3
Native mid-storey cover:	3	3	3	3
Native ground cover (grasses):	0	0	1	1
Native ground cover (shrubs):	0	0	0	0
Native ground cover (other):	1	1	2	2
Exotic plant cover:	3	2	3	3
Number of trees with hollows:	0	0	0	0
Overstorey regeneration:	3	2	3	3
Total length of fallen logs:	0	0	0	0
Totals	**88.37**	**7.36**	**93.02**	**93.02**

4.7.4 Threatened species survey results

No threatened species were recorded during the field surveys and for the purposes of this assessment, no species credit species are assessed in the credit calculation as occurring within the proposed offset area, even though a number of fauna species were rated as having a moderate or high likelihood of occurring in the habitats available within the offset area (Appendix 2). However, since it was determined that no species credits require offsetting as a result of the development, no species credits were calculated for this assessment.

4.7.5 Biodiversity credits created by the offset area

A summary of the ecosystem credits that could potentially be created by the offset area as determined by the credit calculator is given in Table 20. The BioBanking Credit Report (Appendix 5) indicates that the offset area provides the appropriate matching PCT types to offset the PCTs that would be impacted in the subject site, and is located within the Hunter IBRA subregion, which is the same subregion as the proposed development.

Table 20 Credit summary – Ecosystem credits created in the offset area

PCT	Area (ha)	Ecosystem Credits created
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Moderate/Good_Medium condition]	11.32	82
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* [Low condition]	2.47	22
PCT 1071: *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion* [Moderate/Good_Medium condition]	1.67	8
TOTAL	**15.46**	**112**

4.8 Overall BioBanking credit balance for the rezoning proposal in the study area

Of the PCTs recorded within the study area, the subject site would only impact PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast.* This occurs in both Moderate-Good and Low condition within both the subject site and the offset site. Therefore, the impacts due to the development as determined by the BBAM only need to be offset by one PCT in the offset area. This PCT can be in either Moderate-Good and Low condition if sufficient ecosystem credits are created in the offset area by standard management actions. Since no species credits are considered to be required due to the development, no additional management actions are required.

A summary of the credits required due to the development, and those potentially created in the offset area are given in Table 21.

Table 21 Credit balance – Ecosystem credits required and created in the study area

PCT	Area (ha)		Ecosystem Credits		Credit balance
	Removed from Subject site	Available in offset site	Required by Subject site	Created in offset site	
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. [Moderate/Good_Medium condition]	0.30	11.32	17	82	-
PCT 1717: *Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast*. [Low condition]	3.78	2.47	82	22	-
TOTAL PCT 1717	**4.08**	**13.79**	**99**	**104**	**5 credit surplus**

The summary shows that ecosystem credits required by the subject site can be fully offset within the remainder of the study area (the offset area) by a like-for-like PCT with a surplus of 5 credits for the PCT that would be impacted. The calculations were based on the assumptions that total removal of vegetation would occur from within the development footprint, and that standard management actions would be applied within the offset area to obtain the ecosystem credits potentially capable of being created.

The offset area also contains a relatively small area of PCT 1071: *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion* which would not be impacted by the proposed rezoning. A total of 8 ecosystem credits of the PCT are available in the offset area, but are not required for offsetting of credits from the subject site.

4.9 Other Assessment Requirements

4.9.1 TSC Act

Two Threatened Ecological Communities (TEC), *Swamp Sclerophyll Forest on Coastal Floodplains* and *Freshwater Wetlands on Coastal Floodplains* occur within the study area, but only the former occurs within the subject site. The subject site contains minor elements of potential foraging habitat for Grey-headed Flying-fox, Eastern Bentwing-bat and Little Bentwing-bat.

The offset area also contains habitat for several threatened waterbird species and two threatened frog species, but this habitat would not be impacted by the proposed subdivision.

Due to predicted impacts on the TEC, an AoS has been undertaken for

- *Swamp Sclerophyll Forest on Coastal Floodplains* (see Appendix 4).

Although potential minor foraging habitat occurs in the subject site for

- Eastern Bentwing-bat
- Little Bentwing-bat
- Grey-headed Flying-fox

more extensive areas of superior quality habitat occur in the adjoining offset area, therefore significant impacts on these species are unlikely and no further assessment is required.

4.9.2 Native Vegetation Act 2003

It has been determined that the majority vegetation within the subject site classified as low condition vegetation is not native vegetation as defined by the Act (no native overstorey and understorey <50% native cover), therefore the NV Act is not relevant to most of the vegetation clearing within this area.

The small area of vegetation in moderate-to-good condition to be cleared would qualify as native vegetation. Therefore, the Hunter Local Land Services office should be consulted for advice as to whether the NV applies to clearing the small area of native vegetation at this site.

4.9.3 Noxious Weeds Act 1993

Declared noxious weeds for Port Stephens Local Control Authority area identified in the study area from the current investigations are summarised in Table 22 together with the legal control requirements by landowners for these weeds on their land under the NW Act.

Table 22 Noxious weeds within the study area

Common Name	Class	Control Requirements
Annual Ragweed	5	Restricted Plant *The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with*
Crofton Weed	4	Locally Controlled Weed *The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed*
Fireweed	4	Locally Controlled Weed *The plant must not be sold, propagated or knowingly distributed*
Pampas Grass	3	Regionally Controlled Weed *The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed*

Treatment for the noxious weeds listed above is recommended within Department of Premier and Cabinet Weed Control Order (Department of Premier and Cabinet 2011).

4.9.4 State Environmental Planning Policy 44 - Koala Habitat Protection

SEPP 44 is relevant to the current proposal, but its assessment requirements locally are addressed in the Port Stephens LGA by the Port Stephens Comprehensive Koala Plan of Management (CKPoM) (Port Stephens Council 2002).

In accordance with the Guidelines for Koala Habitat Assessments in the CKPoM, the following steps have been carried out:

- Step 1 Preliminary Assessment

The CKPoM mapping shows the subject site as *Link over Cleared* as a result of nearby mapped patches of Preferred Koala Habitat. While the site itself is not currently cleared land it has been cleared in the past and it does not currently provide Koala habitat.

None of the preferred koala food trees listed in the CKPoM are present on the site.

The subject site is 5.3 hectares in area so in accordance with the procedures in the CKPoM, Step 4 is the next relevant step.

- Step 4 Assessment of the Proposal

Under this step and since the project is a rezoning proposal, the Performance Criteria for Rezoning Requests (Appendix 2 of the CKPoM) are the relevant performance criteria. They are addressed below.

a) *Not result in development within areas of Preferred Koala Habitat or defined Habitat Buffers*;

   Preferred Koala Habitat appears to be present within some parts the study area, but not the subject site. The subject site is not within areas of Preferred Koala Habitat or defined habitat buffers.

b) *Allow for only low impact development within areas of Supplementary Koala Habitat and Habitat Linking Areas;*

   The subject site is mapped as *Link over Cleared* which is the lowest condition habitat linking area type. The proposed rezoning would permit some form of residential development in this area. Residential development in compliance with the Performance Criteria is expected to be low impact development at this site.

c) *Minimise the removal of any individuals of preferred koala food trees wherever they occur on the site.*

   No preferred Koala food tree species occur on the subject site.

d) *Not result in development which would sever koala movement across the site. This should include consideration of the need for maximising tree retention on the site generally and for minimising the likelihood of impediments to safe/unrestricted koala movement.*

   With the subject site being located on the southern edge of the urban area of Raymond Terrace township, the only Preferred Koala Habitat near the site is at the southern end of the study area. Although potential exists, there is very little incentive or opportunity for Koalas to move through the subject site to access good koala habitat areas.

   The subject site is not likely to sever Koala movement through the area. Retention of trees or planting of locally indigenous tree species, as part of the landscaping of the area post construction may be possible. Such landscaping could include Koala food tree species however this may bring any Koalas that are attracted to the site into conflict with cars and dogs, so may be counter-productive.

It should be noted that the NSW Department of Planning and Environment (DPE) has proposed amendments to SEPP 44. Submissions on the proposed changes are currently being sought until 16 December 2016 and will be considered before the changes are finalised.

The key changes in the proposed amended SEPP relate to the:

- definitions of koala habitat;
- list of tree species;
- list of councils; and
- development assessment process.

In particular, the proposed changes include:

- Replacement of the definitions of core koala habitat and potential koala habitat with definitions that identify the characteristics of plant communities which make up koala habitat and if there is evidence that koalas are present.
- These definitions will be supported by an updated list of tree species that reflects current scientific knowledge. None of the additional trees proposed for listing occur within the subject site.
- Port Stephens Council will be retained in the list of councils to which the SEPP applies.
- The proposed amendment of SEPP 44 will streamline the development assessment process. The updated process will require an applicant to establish whether a site contains koala habitat following an assessment of the vegetation as described in the guidelines.

DPE will also transfer the strategic planning outcomes in SEPP 44 to the Local Planning Directions under section 117 of the *Environmental Planning and Assessment Act 1979*.

Assuming the changes are adopted as planned with little amendment, the lack of potential or actual Koala habitat within the subject site is unlikely to change the conclusions made above.

4.9.5 EPBC Act

Potentially relevant Matters of NES as identified in the Protected Matters Report are summarised in Appendix 6. Following consideration of the likelihood of occurrence of threatened species and ecological communities listed under the Act (Appendices 1 and 2), only Grey-headed Flying-fox is considered likely to occur in the study area for foraging only. No camps or roosting/breeding habitat for the species occur in the study area.

EPBC Act Migratory Species recorded within 5 kilometres of the study area are summarised in Appendix 6. Some of the species listed could visit the wetland and aquatic habitats available within the offset area, but none are likely to be impacted by removal of habitat in the subject site.

No other Matters of NES are likely to be impacted by the proposal.

It is concluded that no significant impact will occur on any Matters of NES listed by the Act, therefore no referral under the Act is required.

5 Ecological impacts and recommendations

This section identifies the potential impacts of proposed development on the ecological values of the study area and includes recommendations to assist de Witt Consulting and Pheonix Builders to design a development to minimise impacts on biodiversity.

The principal means to reduce impacts on biodiversity values within the study area will be to minimise removal of native vegetation and habitat. The hierarchy of Avoid, Minimise and Mitigate has been followed prior to addressing the residual impacts by offsetting.

The proposed development has:

- Largely avoided the highest quality habitat within the study area by confining the proposed residential rezoning area to the low condition habitat of the pine forest plantation in the north-western corner of the lot and some areas of cleared, weedy vegetation.
- Minimised the area of impact on the areas of highest habitat value by careful design of the development footprint to impact almost entirely on low condition habitat of cleared, weedy land.
- Mitigated the impact on connectivity by retaining a 90 metre band of Moderate-Good condition vegetation between the subject site and the lake.

Under the current proposal, 4.08 hectares of vegetation would ultimately be removed or modified for an Asset Protection Zone (APZ), of which only 0.30 hectares is in moderate-good condition according to the BBAM definition.

The results of this flora and fauna assessment has been used to inform the design of the development. The design phase of the project, including management of the offset area, is critical to determining specifics of how ecological values will be incorporated and managed within the development.

A summary of potential implications of development of the study area and recommendations to minimise impacts during the design phase of the project is provided in Table 23 below.

Table 23 Ecological values, impacts and recommendations

Ecological value	Impacts	Recommendations		
		Avoid	Minimise and mitigate	Offset
Native vegetation including trees	4.08 ha of mostly low condition native vegetation in the form of derelict pine plantation with regenerating elements of swamp forest vegetation will be cleared as an ultimate result of the rezoning proposal. Only 0.30 ha of this vegetation is in moderate-good condition as defined by the BBAM. The swamp forest community is a listed EEC under the NSW TSC Act. The majority of the area of EEC vegetation will be retained within the offset area. Habitat for a Freshwater wetland EEC occurs adjacent to the proposed rezoning area.	Risk of impacts to the EECs in the adjoining retained habitat of the offset area can be managed by implementing appropriate safeguards in further planning and carrying out the clearing and construction works including: • Minimising clearing of native trees and vegetation as far as possible. • Confining the area of clearing to the actual impact footprint by barriers or temporary fencing.	• Identify the locations of the EECs in the adjoining offset area (Figure 3) as 'No Go' zones in the project CEMP during the site induction. This should include discussion of the implications of the TSC Act should there be an incident that impacts on the EECs. • Install appropriate exclusion fencing to the boundary of the retained native vegetation in the offset area with the area to be cleared where there is some potential for accidental encroachment. Include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area'.	• Rezone the offset area for Environmental Conservation, place under an appropriate protective covenant and manage the area according to the requirements of a BioBank site.
Hollow-bearing trees	Few hollow bearing trees were recorded in the entire study area and few, if any, would be impacted in the subject site .	• Carry out a pre-clearing inspection of potential hollow-bearing or habitat trees within the clearing area by a qualified fauna ecologist.	• A qualified and experienced fauna ecologist/ spotter-catcher should attend the site during vegetation clearing and rescue/ relocate any displaced or injured fauna.	• No offsets of hollow-bearing trees are likely to be required, unless occupied trees are identified during the pre-clearing inspection.
Water bodies (freshwater lake and associated	Sedimentation and pollution of waterbodies, wetlands and	• Confine clearing operations to the development footprint	• Apply current best-practice sedimentation, siltation and	• Not applicable.

Ecological value	Impacts	Recommendations		
		Avoid	Minimise and mitigate	Offset
drainage lines, wetlands, soaks, etc.)	drainage lines in the offset area due to runoff from the subject site	itself using fencing and barriers as described above.	pollution controls (silt fences, detention basins etc.) to minimise silt and sediment entering waterways during construction and operation of the subdivision area.	
Plant diseases	Risk of introduction of plant pathogens, particularly Root-rot fungus *Phytophthora cinnamomi* or Myrtle rust fungus into the study area	• Do not transport soil (fill) that has not been certified as disease-free into the subject site	• Decontaminate / wash down all vehicles, machinery and tools before working on site and follow all relevant plant pathogen management protocols.	• Not applicable.

6 Conclusion

This report is an assessment of the potential impact of a rezoning proposal on biodiversity values within a parcel of land, and the opportunities for avoiding, minimising and mitigating and offsetting the impact in accordance with the EP&A Act, the TSC Act, the EPBC Act and the BBAM.

The proposed activities that will result in impacts to biodiversity include:

- Removal of an area of native vegetation mostly in low condition constituting a degraded and regenerating form of the EEC *Swamp Sclerophyll Forest on Coastal Floodplains* to accommodate the rezoning proposal.
- Minor removal of potential low quality fauna habitat within the subject site.

No threatened flora of fauna species or endangered populations listed under the EPBC Act or TSC Act were recorded during the field surveys.

Two of the vegetation communities mapped by Biosis within the study area are consistent with the final determinations for the EECs *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* and *Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* under the TSC Act. Only *Swamp Sclerophyll Forest on Coastal Floodplains* occurs within the subject site, with a total of approximately 4.08 hectares (0.3 hectares in moderate-good condition and 3.78 hectares in low condition according to the BBAM definition) that would be removed as a consequence of the proposed rezoning.

For the reasons outlined in the Assessment of Significance, the proposed works, as currently designed, are deemed to not have a significant impact on the EEC *Swamp Sclerophyll Forest on Coastal Floodplains*.

Were the proposal to go ahead a number of safeguards to avoid, minimise and mitigate the above impacts have been included in Section 5 of this report including maximising retention and conservation of native vegetation, recommendations to maintain water quality in the offset area and recommendations regarding appropriate hygiene protocols for vegetation clearing and plant (refer to Table 23 for full details regarding proposal safeguards).

Following field investigations, the only EPBC Act listed threatened species determined to have a moderate likelihood of occurrence within the subject site is the Grey-headed Flying-fox.

This species plus the Eastern Bentwing-bat and Little Bentwing-bat as listed under the TSC Act are considered to have some potential to occur in the subject site due to the presence of minor foraging resources. However, more extensive and better quality resources occur in the offset area. An additional six threatened fauna species listed under the TSC Act are considered to have potential to occur in the offset area only.

Since no significant impact would occur on any threatened entity known of considered likely to occur in the subject site, no Species Impact Statement (SIS) is required.

Likewise, no referral under the EPBC Act is required.

An offset strategy proposed for the study area would fully balance the residual impacts of ecosystem credits required for native vegetation cleared from the subject site with like-for-like credits available within the offset area. This was determined by the BBAM and the BioBanking Credit Calculator with 99 credits required for the development and 104 credits of the same PCT available in the offset area, representing a surplus of 5 credits.

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Appendices

Appendix 1 Flora

A1.1 Flora species recorded from the study area

Notes to tables:

EPBC Act: CR – Critically Endangered EN – Endangered VU – Vulnerable	**TSC Act:** E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V1 – vulnerable (Part 1, Schedule 2) *Codes identify the Legal Status of threatened biota within NSW under the TSC Act and the OEH Sensitive Species Data Policy (SSDP).*
Non-indigenous species # – Native species outside natural range ** – noxious weed species declared under the Noxious Weeds Act: N3 – Class 3 N4 – Class 4 N5 – Class 5	**Noxious weed status:** State prohibited species (Class 1) Regionally prohibited species (Class 2) Regionally controlled species (Class 3) Regionally restricted species (Class 4) Restricted plant (Class 5)

Table A.1 Flora species recorded from the study area

Status	Scientific name	Common name	Subject site	Offset area
Native Species				
	Acacia binervata	Two-veined Hickory	x	
	Acacia falcata	Falcate Wattle		x
	Acacia irrorata subsp. *irrorata*	Green Wattle	x	
	Acacia longifolia subsp. *longifolia*	Sydney Golden Wattle	x	x
	Acacia podalyriifolia	Queensland Silver Wattle	x	
	Acmena smithii	Lilly Pilly	x	
	Alphitonia excelsa	Red Ash	x	x
	Astroloma pinifolium	Pine Heath	x	
	Banksia integrifolia	Coastal Banksia	x	
	Baumea rubiginosa			x
	Blechnum indicum	Swamp Water Fern		x
	Bolboschoenus sp	Marsh club-rush		x

Status	Scientific name	Common name	Subject site	Offset area
	Breynia oblongifolia	Coffee Bush	x	
	Callistemon salignus	Willow Bottlebrush	x	
	Calochlaena dubia	Rainbow Fern	x	
	Carex appressa	Tall Sedge		x
	Casuarina glauca	Swamp Oak	x	x
	Cayratia clematidea	Native Grape		x
	Cheilanthes sieberi	Mulga Fern	x	
	Commelina cyanea	Native Wandering Jew	x	x
	Cyathea australis	Rough Treefern		x
	Cymbopogon refractus	Barbed Wire Grass	x	
	Cynodon dactylon	Common Couch	x	x
	Cyperus flaccidus	Lax Flat-sedge		x
	Dillwynia retorta	A Parrot Pea	x	
	Drosera peltata	A Sundew	x	
	Eleocharis gracilis			x
	Entolasia marginata	Bordered Panic	x	x
	Eragrostis brownii	Brown's Lovegrass		x
	Eucalyptus robusta	Swamp Mahogany		x
	Gahnia clarkei	Tall Saw-sedge	x	
	Glochidion ferdinandi	Cheese Tree	x	x
	Goodenia bellidifolia	-	x	
	Grevillea robusta	Silky Oak	x	
	Hypolepis muelleri	Harsh Ground Fern	x	x
	Imperata cylindrica var. *major*	Blady Grass	x	
	Isachne globosa	Swamp Millet		x
	Isolepis inundata			x
	Juncus usitatus			x
	Kennedia rubicunda	Dusky Coral Pea		x
	Leucopogon juniperinus	Prickly Beard-heath	x	
	Ludwigia peploides subsp.	Water Primrose		x

Status	Scientific name	Common name	Subject site	Offset area
	montevidensis			
	Melaleuca quinquenervia	Broadl-eaved Paperbark	x	x
	Melaleuca styphelioides	Prickly-leaved Tea Tree		x
	Monotoca elliptica	Tree Broom Heath	x	
	Oplismenus aemulus	Basket Grass		x
	Pandorea pandorana	Wonga Wonga Vine	x	
	Parsonsia straminea	Common Silkpod	x	x
	Persicaria decipiens	Slender Knotweed		x
	Persicaria strigosa	Spotted Knotweed	x	x
	Persoonia lanceolata	Lance Leaf Geebung	x	
	Philydrum lanuginosum	Woolly Frogsmouth		x
	Phragmites australis	Common Reed	x	x
	Pteridium esculentum	Bracken	x	x
	Phyllanthus gunnii	Scrubby Spurge	x	
	Pittosporum undulatum	Sweet Pittosporum	x	x
	Pultenaea flexilis	Graceful Bush-pea	x	
	Schoenoplectus validus	-	x	
	Sporobolus creber	Slender Rat's Tail Grass	x	
	Themeda australis	Kangaroo Grass		x
	Viola hederacea	Native Violet	x	x
		Exotic species		
	Acetosa sagittata	Rambling Dock		x
N4	*Ageratina adenophora***	Crofton Weed		x
	Anagallis arvensis	Scarlet Pimpernel		x
N5	*Ambrosia artemisiifolia***	Annual Ragweed	x	
	Andropogon virginicus	Whisky Grass	x	x
	Axonopus fissifolius	Carpet Grass	x	x
	Bidens pilosa	Cobblers Pegs	x	x
	Cinnamomum camphora	Camphor Laurel	x	x
	Conyza bonariensis	Fleabane	x	x
N3	*Cortaderia selloana***	Pampas Grass	x	x

Status	Scientific name	Common name	Subject site	Offset area
	Cotoneaster glaucophyllus	Cotoneaster	x	
	Cupressus sp.	Cypress	x	
	Cyperus eragrostis	Umbrella Sedge		x
	Ehrharta erecta	Panic Veldtgrass	x	
	Eragrostis curvula	African Lovegrass	x	
	Erythrina x sykesii	Coral Tree	x	
	Galinsoga parviflora	Potato Climber		x
	Galium aparine	Goosegrass		x
	Gamochaeta coarctata	Cudweed		x
	Geranium sp.	Cultivated Geranium	x	
	Harpephyllum caffrum	Kaffir Plum	x	
	Hypochaeris radicata	Catsear	x	x
	Ipomoea indica	Morning Glory		x
	Jacaranda mimosifolia	Jacaranda	x	
	Lagerstroemia indica	Crepe Myrtle	x	
	Lantana camara	Lantana	x	x
	Ligustrum sinense	Small-leaved Privet	x	x
	Macadamia tetraphylla	Macadamia	x	
	Medicago polymorpha	Burr Medic		x
	Megathyrsus maximus	Guinea Grass	x	
	Melinis repens	Red Natal Grass	x	x
	Nandina domestica	Japanese Sacred Bamboo	x	
	Nephrolepis cordifolia	Fishbone Fern	x	
	Ochna serrulata	Mickey Mouse Plant	x	x
	Olea europaea subsp. *cuspidata*	African Olive	x	
	Panicum maximum	Guinea Grass		x
	Paspalum dilatatum	Paspalum		x
	Paspalum urvillei	Vasey Grass		x
	Pennisetum clandestinum	Kikuyu Grass		x
	Pinus elliottii	Slash Pine	x	

Status	Scientific name	Common name	Subject site	Offset area
	Plantago lanceolata	Lamb's Tongues		x
	Rosa rubiginosa	Sweet Briar	x	x
	Schefflera sp.	Umbrella Tree	x	
	Schinus areira	Pepper Tree	x	
N4	*Senecio madagascariensis***	Fireweed	x	x
	Senna pendula	Cassia	x	x
	Setaria parviflora	Pigeon Grass	x	
	Sida rhombifolia	Paddy's Lucerne	x	x
	Solanum mauritianum	Wild Tobacco	x	x
	Solanum nigrum	Blackberry Nightshade	x	x
	Sonchus oleraceus	Common Sowthistle		x
	Syagrus romanzoffiana	Cocos Palm	x	x
	Richardia humistrata	-	x	
	Tradescantia fluminensis	Trad	x	
	Trifolium repens	White Clover		x
	Verbena bonariensis	Purpletop		x

A1.2 Threatened flora species and ecological communities

The following table includes a list of the threatened flora species and ecological communities that have potential to occur within the study area. The list of species is sourced from the NSW BioNet Wildlife Atlas and the Protected Matters Search Tool (DEE; accessed on 18/04/2016).

Examples of criteria for determining the likelihood of occurrence for threatened biota as a guide for writing the rationale for likelihood have been listed below.

Likelihood of occurrence	Potential criteria
High	• Species/ecological communities recorded in study area during current or previous assessment/s. • Aquatic species recorded from connected waterbodies in close proximity to the study area during current or previous assessment/s. • Sufficient good quality habitat is present in study area or in connected waterbodies in close proximity to the study area (aquatic species). • Study area is within species natural distributional range (if known). • Species has been recorded within five kilometres or from the relevant catchment/basin.
Medium	• Records of terrestrial biota within five kilometres of the study area or of aquatic species in the relevant basin/neighbouring basin. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within five kilometres of the study area or for aquatic species, the relevant basin/neighbouring basin. • Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in study area • Habitat for aquatic species not present in connected waterbodies in close proximity to the study area. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Table A.2 Threatened flora species recorded, or predicted to occur, within 5 kilometres of the study area

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Commersonia prostrata	Dwarf Kerrawang	EN	E1	2000	Low	Habitat is marginal and study area is too degraded.	Ground hugging shrub with populations sparsely distributed in the Southern Highlands, Southern Tablelands and the North Coast. Grows in gullies, along drainage lines and in disturbed areas in a variety of communities including Coastal Freshwater Wetlands of the Sydney Basin Bioregion, New England Dry Sclerophyll Forests, Temperate Montane Grasslands and Subalpine Grasslands. Grows in sand or peat soils.
Cryptostylis hunteriana	Leafless Tongue Orchid	VU	V	#	Low	No nearby records and habitat is maginal.	Orchid with a distribution spanning from Gibraltar Range National Park southwards to the coastal area near Orbost in Victoria. Grows in a variety of communities including Sydney Coastal Dry Sclerophyll Forests, Coastal Heath Swamps, New England Dry Sclerophyll Forests and Sydney Coastal Heaths. Grows in sandy soils.
Eucalyptus parramattensis **subsp. *decadens***		VU	V	2010	Negligible	Habitat is unsuitable.	Small to medium sized tree, growing in two metapopulations, the Kurri Kurri meta-population spans from Cessnock - Kurri Kurri in the north to Mulbring - Abedare in the south and the Tomago Sandbeds meta-population spans Salt Ash and Tanilba Bay in the north to Williamtown and Tomago in the south. Grows on wet sites subject to periodic inundation in Coastal Swamp Forests. Grows in deep, low nutrient sandy soils.
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	VU	V	2006	Negligible	Habitat is unsuitable.	Low spreading to erect shrub sporadically distributed throughout the Sydney Basin, most notably in the Picton, Appin and Bargo regions, in the Cessnock - Kurri Kurri area

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							and isolated populations from Putty to Wyong and Lake Macquarie. Grows in Shale Sandstone Transition Forest, Kurri Sand Swamp Woodland, *Coymbia maculata* - *Angophora costata* Open Forest in the Dooralong Area, Sydney Sandstone Ridgetop Woodland at Wedderburn and Cooks River/Castlereagh Ironbark Forest at Kemps Creek. Grows in sandy or light clay soils including tertiary alluviums over thin shales and lateritic ironstone gravels.
Persicaria elatior	Tall Knotweed	VU	V	2010	Low	Potential habitat is available, but species was not detected during surveys.	Erect herb found growing in south-eastern NSW at Mount Dromedary, Moruya State Forest near Turlinjah, Upper Avon River catchment north of Robertson, Bermagui and Picton Lakes. Also grows in northern NSW around Raymond Terrace near Newcastle and Cherry Tree and Gibberagee State Forests in the Grafton area. Grows in damp places usually on the margins of waterbodies and in swamp forests in a variety of communities including Coastal Floodplain Wetlands, Coastal Swamp Forests, Eastern Riverine Forests, Coastal Freshwater Lagoons and Coastal Heath Swamps.
Phaius australis	Southern Swamp Orchid	EN	E1	#	Low	Potentially suitable habitat is present, but not detected	Terrestrial orchid with a distribution spanning from Queensland to Coffs Harbour in north-east NSW. Grows in coastal areas in swamps dominated by Broad-leaved Paperbark *Meleuca quinquenervia* and swampy forest situated at sea level in Coastal Dune Dry Sclerophyll Forests, Coastal Floodplain Wetlands, Coastal Swamp Forests, Wallum Sand Heaths, Dry Rainforests, Littoral Rainforests, North Coast Wet Sclerophyll Forests and Northern Escarpment Wet Sclerophyll Forests.

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Tetratheca juncea	Black-eyed Susan	VU	V	#	Negligible	Habitat is unsuitable.	Small shrub confined to the northern area of the Sydney Basin bioregion and the southern area of the North Coast bioregion in the Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock Local Government Areas. Found growing at well drained sites which experience annual rainfall levels between 1000 and 1200 mm at elevations below 200 metres in swampy heath and moist forests. Usually found growing in soils from the Awaba soil landscape comprising of low nutrient sandy, skeletal soils, sandy loam soils and clay soils on sandstone or conglomerate substrates.

* - habitat descriptions have been adapted by qualified ecologists from the DoE Species Profile and Threats (SPRAT) Database, OEH Threatened Species online profiles and the NSW Scientific Committee final determinations for listed species, references within the above table are provided within the report reference list.

Appendix 2 Fauna

A.1 Threatened fauna species

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the NSW BioNet Wildlife Atlas, BirdLife Australia data search and the Protected Matters Search Tool (DEE; accessed on 08/04/2016).

Notes to table:

#	species predicted to occur by the DEE database (not recorded on other databases)
##	species predicted to occur based on natural distributional range and suitable habitat despite lack of records in the databases searched
Year	recorded on databases listed above

Likelihood of occurrence	Potential criteria
High	• Species recorded in study area during current or previous assessment/s. • Aquatic species recorded from connected waterbodies in close proximity to the study area during current or previous assessment/s. • Sufficient good quality habitat is present in study area or in connected waterbodies in close proximity to the study area (aquatic species). • Study area is within species natural distributional range (if known). • Species has been recorded within five kilometres or from the relevant catchment/basin.
Medium	• Records of terrestrial species within five kilometres of the study area or of aquatic species in the relevant basin/neighbouring basin. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within five kilometres of the study area or for aquatic species, the relevant basin/neighbouring basin. • Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in study area • Habitat for aquatic species not present in connected waterbodies in close proximity to the study area. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.
Transient/ Nomadic	• Migratory or nomadic fauna species/individuals that may occur in the study area from time to time, but are not considered resident.

Table A.3 Threatened fauna species recorded, or predicted to occur, within 5 kilometres of the study area

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bat	VU	V	#	Low	No suitable roosting habitat near by.	Occurs from the Queensland border to Ulladulla, with largest numbers from the sandstone escarpment country in the Sydney Basin and Hunter Valley. Primarily found in dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between three and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.
Dasyurus maculatus	Spotted-tailed Quoll	EN	V	#2016	Low	Suitable foraging habitat is present. Den sites are limited. The patch however is surrounded by busy roads or suburban development causing it to be fragmented from larger areas of bushland.	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha, while males have larger home ranges of between 2000 and 5000 ha.

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Falsistrellus tasmaniensis	Eastern False Pipistrelle		V	2010	Low	Foraging may occur in the area, however unlikely to roost in the study area, due to the lack of hollows.	Distribution extending east of the Great Dividing Range throughout the coastal regions of NSW, from the Queensland border to the Victorian border. Prefers wet high-altitude sclerophyll and coastal mallee habitat, preferring wet forests with a dense understorey but being found in open forests at lower altitudes. Apparently hibernates in winter. Roosts in tree hollows and sometimes in buildings in colonies of between 3 and 80 individuals. Often change roosts every night. Forages for beetles, bugs and moths below or near the canopy in forests with an open structure, or along trails. Has a large foraging range, up to 136 ha. Records show movements of up to 12 km between roosting and foraging sites.
Miniopterus australis	Little Bentwing-bat		V	2010	Moderate	Foraging likely to occur in the area, however unlikely to roost in the study area, due to the lack of suitable caves or man-made structures.	Occurs from Northern Queensland to the Hawkesbury River near Sydney. Roost sites encompass a range of structures including caves, tunnels and stormwater drains. Young are raised by the females in large maternity colonies in caves in summer. Shows a preference for well timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests. The Little Bentwing bat forages for small insects (such as moths, wasps and ants) beneath the canopy of densely vegetated habitats.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat		V	2010	Moderate	Foraging likely to occur in the area, however unlikely to roost in the study area, due to the lack of suitable caves or man-made	Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						structures.	rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands. Has a fast, direct flight and forages for flying insects (particularly moths) above the tree canopy and along waterways.
Mormopterus norfolkensis	Eastern Freetail-bat		V	2010	Low	Foraging may occur in the area, however unlikely to roost in the study area, due to the lack of hollows.	Distribution extends east of the Great Dividing Range from southern Queensland to south of Sydney. Most records are from dry eucalypt forests and woodland. Individuals tend to forage in natural and artificial openings in forests, although it has also been caught foraging low over a rocky river within rainforest and wet sclerophyll forest habitats. The species generally roosts in hollow spouts of large mature eucalypts (including paddock trees), although individuals have been recorded roosting in the roof of a hut, in wall cavities, and under metal caps of telegraph poles. Foraging generally occurs within a few kilometres of roosting sites.
Myotis macropus	Southern Myotis		V	2009	High	Likely to forage over the water body. Roost sites appeared to be absent from the study area, however suitable roosts do occur elsewhere in Raymond Terrace.	Scattered, mainly coastal distribution extending to South Australia along the Murray River. Roosts in caves, mines or tunnels, under bridges, in buildings, tree hollows, and even in dense foliage. Colonies occur close to water bodies, ranging from rainforest streams to large lakes and reservoirs. They catch aquatic insects and small fish with their large hind claws, and also catch flying insects.
Petaurus norfolcensis	Squirrel Glider		V	2013	Low	Habitat marginal and largely devoid of hollows for roosting or nesting.	Sparsely distributed along the east coast and immediate inland areas as far west as Coonabarabran in the northern part of the state and as far west as Tocumwal along the southern border of the state. Generally occurs in dry sclerophyll forests and

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							woodlands but is absent from dense coastal ranges in the southern part of its range. Requires abundant hollow-bearing trees and a mix of eucalypts, banksias and acacias. Within a suitable vegetation community at least one species should flower heavily in winter and one species of eucalypt should be smooth barked. They live in family groups of 2-10 individuals and maintain home ranges of 0.65 and 10.5 ha, varying according to habitat quality and food resource availability. Family groups occupy multiple hollows over time.
Phascogale tapoatafa	Brush-tailed Phascogale		V	1992	Low	Habitat marginal and largely devoid of hollows for roosting or nesting.	The Brush-tailed Phascogale had a scattered distribution centred around the Great Dividing Range. It prefers open forests with a sparse ground cover, but also inhabits mallee and rainforests. It feeds on insects and nectar, particularly in rough-barked trees. The Brush-tailed Phascogale will Nests and shelter in tree hollows, tree stumps and occasionally birds nests, and can use more than 40 nests in a year. Suitable tree hollows have entrances 25-40 mm wide. Females have exclusive territories of approximately 20 - 60 ha, while males have overlapping territories of up to 100 ha.
Phascolarctos cinereus	Koala	VU	V, E2	2014#	Moderate	There are a few *Eucalyptus robutsa* present in the study area, but not in the subject site. Use by local Koalas is likely to be mainly as a movement corridor.	In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include *Eucalyptus robusta, E. tereticornis, E. punctata, E. haemastoma* and *E. signata*. They are solitary with varying home ranges. In high quality habitat home ranges may be 1-2 ha and overlap, while in semi-arid country they are usually discrete and around

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							100 ha.
Pseudomys novaehollandiae	New Holland Mouse	VU		2013#	Low	Habitat is likely to be too degraded for this species.	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44 ha to 1.4 ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi, and is therefore likely to play an important role in seed dispersal and fungal spore dispersal. It is likely that the species spends considerable time foraging above-ground for food, predisposing it to predation by native predators and introduced species. Breeding typically occurs between August and January, but can extend into autumn.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	V	2012#	High	The Grey-headed flying-fox is likely to forage in the study area. The Melaleuca during peak flowering times would be an important food resource for the local camp.	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies (camps), commonly in dense riparian vegetation. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.
Scoteanax rueppellii	Greater Broad-nosed Bat		V	2010	Low	Foraging may occur in the area, however unlikely to roost in the study area,	Occurs along the Great Dividing Range, generally at 500 m but up to 1200 m, and in coastal areas. Occurs in woodland and rainforest, but prefers open habitats or natural or human-

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						due to the lack of hollows.	made openings in wetter forests. Often hunts along creeks or river corridors. Flies slowly and directly at a height of 30 m or so to catch beetles and other large, flying insects. Also known to eat other bats and spiders. Roosts in hollow tree trunks and branches.
Birds							
Anseranas semipalmata	Magpie Goose		V	2000	Low	Marginal wetland habitat	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. They are often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level. Nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.
Anthochaera phrygia	Regent Honeyeater	CE	E4A	#	Low	May visit the site on the very odd occasion to feed on Swamp Mahogany, however there are only a few individuals and would only support individuals passing through.	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises: *E. microcarpa, E. punctata, E. polyanthemos, E. mollucana, Corymbia robusta, E. crebra, E. caleyi, C. maculata, E. mckieana, E. macrorhyncha, E. laevopinea* and *Angophora floribunda*. Nectar and fruit from the mistletoes A. miquelii, A. pendula, A. cambagei are also eaten during the breeding season. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and sheoaks. Also

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female.
Botaurus poiciloptilus	Australasian Bittern	EN	E1	2000#	Moderate	Suitable habitat for this species is available around the edges of the lake, where there is some wetland habitat.	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including *Typha* spp. and *Eleoacharis* spp. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.
Calyptorhynchus lathami	Glossy Black-Cockatoo		V	2007	Low	Habitat does not contain preferred *Allocasuarina* species.	Inhabits forest with low nutrients, characteristically with key *Allocasuarina* species. Tends to prefer drier forest types. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.
Circus assimilis	Spotted Harrier		V	1987	Low	Habitat marginal, no recent records. No bird of prey nests observed in the study area.	The Spotted Harrier is found throughout Australia but rarely in densely forested and wooded habitat of the escarpment and coast. Preferred habitat consists of open and wooded country with grassland nearby for hunting. Habitat types include open grasslands, acacia and mallee remnants, spinifex, open shrublands, saltbush, very open woodlands, crops and similar low vegetation. The Spotted Harrier is more common in drier inland areas, nomadic part migratory and dispersive, with movements linked to the abundance of prey species. Nesting occurs in open or remnant woodland and unlike other harriers, the Spotted Harrier nests in trees.

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Daphoenositta chrysoptera	Varied Sittella		V	2008	Moderate	Habitat may be suitable for this species, particularly in the paperbark forest.	The Varied Sittella is a sedentary species which inhabits a wide variety of dry eucalypt forests and woodlands, usually with either shrubby understorey or grassy ground cover or both, in all climatic zones of Australia. Usually inhabit areas with rough-barked trees, such as stringybarks or ironbarks, but also in mallee and acacia woodlands, paperbarks or mature Eucalypts. The Varied Sittella feeds on arthropods gleaned from bark, small branches and twigs. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.
Dasyornis brachypterus	Eastern Bristlebird	EN	E1	#	Negligible	Habitat unsuitable and no records for the locality.	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. It occurs near the coast, on tablelands and in ranges. The Eastern Bristlebird is found in habitats with a variety of species compositions, but are defined by a similar structure of low, dense, ground or understorey vegetation.
Ephippiorhynchus asiaticus	Black-necked Stork		E1	2003	Low	Some possibility of this species visiting the lake and fringing vegetation for foraging.	Found in swamps, mangroves and mudflats. Can also occur in dry floodplains and irrigated lands and occasionally forages in open grassy woodland. Nests in live or dead trees usually near water.
Glossopsitta pusilla	Little Lorikeet		V	2013	Low	May visit the site to forage. No roosting habitat available.	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range in NSW, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Mostly occur in dry, open eucalypt forests and

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							woodlands. They feed primarily on nectar and pollen in the tree canopy. Nest hollows are located at heights of between 2 m and 15 m, mostly in living, smooth-barked eucalypts. Most breeding records come from the western slopes.
Grantiella picta	Painted Honeyeater	VU	V	#	Negligible	Habitat unsuitable	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.
Lathamus discolor	Swift Parrot	EN	E1	2007#	Low	A small amount of foraging habitat available. Only likely to visit on a rare occasion.	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
Lophoictinia isura	Square-tailed Kite		V	2010	Low	Marginal habitat. No bird of prey nests were observed in the study area.	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by *Eucalyptus longifolia, Corymbia maculata, E. elata*, or *E. smithii*. Individuals appear to occupy large hunting ranges of more than 100 km2. They require large living trees for breeding, particularly near water with surrounding woodland /forest close by for foraging

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.
Ninox strenua	Powerful Owl		V	2012	Low	No suitable nest hollows are present on the site. The lack of hollows and no evidence of ringtail possum dreys indicates that arboreal mammal abundance is low in the study are, reducing the likelihood of Powerful Owls foraging in the study area.	The Powerful Owl occupies wet and dry eucalypt forests and rainforests. It may inhabit both un-logged and lightly logged forests as well as undisturbed forests where it usually roosts on the limbs of dense trees in gully areas. Large mature trees with hollows at least 0.5 m deep are required for nesting. Tree hollows are particularly important for the Powerful Owl because a large proportion of the diet is made up of hollow-dependent arboreal marsupials. Nest trees for this species are usually emergent with a diameter at breast height of at least 100 cm. It has a large home range of between 450 and 1450 ha.
Pachyptila turtur subantarctica	Fairy Prion (southern)	VU		#	Negligible	No suitable habitat	Fairy Prions (including other subspecies) are often beachcast on the south-eastern coast of Australia, and are commonly seen offshore over the continental shelf and over pelagic waters. Observations are less common off Western Australia and Queensland than in south-eastern Australia. Beachcast birds are found along the whole coast of NSW, and the species is common offshore along the entire Victorian coast, where thousands are sometimes seen. In Tasmania, the Fairy Prion is an abundant visitor to all offshore waters. In South Australia, this species is regularly seen and often beachcast.
Pandion cristatus	Osprey		V	#	Moderate	Local Osprey may forage in the lake within the study area. No bird of prey nests	Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found 100 km inland along larger rivers. It is water-dependent, hunting for fish in clear, open water. The

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						were observed.	Osprey occurs in terrestrial wetlands, coastal lands and offshore islands. It is a predominantly coastal species, generally using marine cliffs as nesting and roosting sites. Nests can also be made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)		V	2015	Negligible	Unsuitable habitat	The Grey-crowned Babbler is found in dry, open forests, scrubby woodlands, trees bordering roads and farmland with isolated trees. The Grey-crowned Babbler is found in open forests, scrubby woodlands, trees bordering roads and farmland with isolated trees. This species favours inland plains with an open shrub layer, little ground cover and plenty of fallen timber and leaf litter. May be seen along roadsides and around farms.
Ptilinopus superbus	Superb Fruit-Dove		V	1973	Negligible	Unsuitable habitat	The Superb Fruit Dove's NSW distribution ranges from northern NSW to as far south as Moruya. It is found in rainforests, closed forests (including mesophyll vine forests) and sometimes in eucalypt and acacia woodlands where there are fruit-bearing trees. It forages in the canopy of fruiting trees such as figs and palms. Nests are constructed high in the canopy throughout September to January.
Rostratula australis	Australian Painted Snipe	EN	E1	1972#	Low	Habitat on the site may support this species, however the most recent record for the locality is 44 years old.	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, ephemeral or permanent, although they have been recorded in brackish waters.
Tyto	Masked Owl		V	2001	Negligible	Habitat is largely	The Masked Owl may be found across a diverse range of

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
novaehollandiae						unsuitable for foraging. No suitable roost or nest hollows.	wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting. It has mostly been recorded in open forests and woodlands adjacent to cleared lands. They nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometimes dead. The nest hollows are usually located within dense forests or woodlands. Masked Owls prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet. It has a large home range of between 500 to 1000 ha.
Frogs							
Crinia tinnula	Wallum Froglet		V	2011	Moderate	Paperbark swamps are present in the study area and may provide some habitat, most likely around the fringes of the lake.	The Wallum Froglet is a coastal species, confined to acid, paperbark swamps and sedge swamps of the "wallum" country. The species occurs from near Noosa in southern Queensland south to the central coast of NSW, with a disjunct population on Kurnell Peninsula. The species is a late winter breeder and males call in choruses from within sedge tussocks or at the water edge.
Litoria aurea	Green and Golden Bell Frog	VU	E1	1973#	Moderate	Some of the fringing vegetation around the lake may provide suitable habitat for this species. The channel is less likely to provide suitable habitat.	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks, although the species has also been recorded from highly disturbed areas including disused

Scientific name	Common name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							industrial sites, brick pits, landfill areas and cleared land. Breeding usually occurs in summer. Tadpoles, which take approximately 10-12 weeks to develop, feed on algae and other vegetative matter. Adults eat insects as well as other frogs, including juveniles of their own species.

* - habitat descriptions have been adapted by qualified ecologists from the DoE Species Profile and Threats (SPRAT) Database, OEH Threatened Species online profiles and the NSW Scientific Committee final determinations for listed species, references within the above table are provided within the report reference list.

A.2 Migratory species (EPBC Act listed)

Includes records from the following sources:

- NSW BioNet Wildlife Atlas
- DEE database (accessed on 18/04/2016)
- BirdLife Australia data search
- Current survey

Bold denotes species recorded in the study area during the current assessment.

Table A.4 Migratory fauna species recorded or predicted to occur within five kilometres of the study area

Scientific name	Common name	Conservation status		Most recent record
		EPBC	TSC	
Birds				
Apus pacificus	Fork-tailed Swift	Mi		#
Ardea ibis	Cattle Egret	Mi		2015#
Ardea modesta	Eastern Great Egret	Mi		#
Ardea modesta	Eastern Great Egret	Mi		2016
Calidris acuminata	Sharp-tailed Sandpiper	Mi		2001
Cuculus optatus	Oriental Cuckoo	Mi		#
Gallinago hardwickii	Latham's Snipe	Mi		2009#
Hirundapus caudacutus	White-throated Needletail	Mi		2010#
Hydroprogne caspia	Caspian Tern	Mi		1987
Merops ornatus	Rainbow Bee-eater	Mi		#
Monarcha melanopsis	Black-faced Monarch	Mi		2000#
Motacilla flava	Yellow Wagtail	Mi		#
Myiagra cyanoleuca	Satin Flycatcher	Mi		#
Pandion cristatus	Osprey	Mi	V	#
Rhipidura rufifrons	Rufous Fantail	Mi		2005#
Symposiachrus trivirgatus	Spectacled Monarch	Mi		#
Tringa nebularia	Common Greenshank	Mi		#
Insects				
Danaus plexippus	Monarch Butterfly	Mi		2014

* - habitat descriptions have been adapted by qualified ecologists from the DSEWPaC Species Profile for listed migratory species, references within the above table are provided within the report reference list.

Appendix 3 Plot and transect summary

Table A.5 Plot scores for each vegetation zone within the subject site

Red cells indicate the site attributes that are below benchmark, while blue cells represent those site attributes that are above benchmark. Non-shaded cells are within benchmark.

Benchmark details	Site attributes									
	Native plant species (no.)	Native over-storey cover %	Native mid-storey cover %	Native ground cover (grass) %	Native ground cover (shrubs) %	Native ground cover (other) %	Exotic plant cover %	Number of trees with hollows	Over-storey regen (out of 1)	Total length of fallen logs (m)
PCT 1717 (HU931)										
Benchmark values	>=24	15 to 70	10 to 60	5 to 50	5 to 30	5 to 40	-	>=0	1	>=5
Plot scores – Vegetation Zone 1 - PCT 1717_Moderate-Good										
Plot 5	15	31	13.5	2	0	40	50	0	1	24
Plot scores – Vegetation Zone 2 - PCT 1717_Low										
Plot 7	4	0	11.9	0	0	0	86	0	0.5	13
Plot 9	5	0	7	0	0	0	96	0	0.5	2
Average	**4.5**	**0**	**9.5**	**0**	**0**	**0**	**91**	**0**	**0.5**	**7.5**

Table A.6 Plot scores for each vegetation zone within the offset site

Red cells indicate the site attributes that are below benchmark, while blue cells represent those site attributes that are above benchmark. Non-shaded cells are within benchmark.

Benchmark details	Site attributes									
	Native plant species (no.)	Native over-storey cover %	Native mid-storey cover %	Native ground cover (grass) %	Native ground cover (shrubs) %	Native ground cover (other) %	Exotic plant cover %	Number of trees with hollows	Over-storey regen (out of 1)	Total length of fallen logs (m)
PCT 1717 (HU931)										
Benchmark values	>=24	15 to 70	10 to 60	5 to 50	5 to 30	5 to 40	-	>=0	1	>=5
Plot scores – Vegetation Zone 1 - PCT 1717_Moderate-Good										
Plot 2	13	26.2	12.5	10	0	36	0	0	1	102
Plot 4	9	23.5	0	18	0	16	8	0	1	32
Plot 8	11	17.5	2.5	0	2	56	60	0	1	10
Average	**11**	**22.4**	**5**	**9.3**	**0.7**	**36**	**22.7**	**0**	**1**	**48**
Plot scores – Vegetation Zone 2 - PCT 1717_Low										
Plot 3	6	2.5	1.2	10	0	0	10	0	0.5	0

Benchmark details	Site attributes									
	Native plant species (no.)	Native over-storey cover %	Native mid-storey cover %	Native ground cover (grass) %	Native ground cover (shrubs) %	Native ground cover (other) %	Exotic plant cover %	Number of trees with hollows	Over-storey regen (out of 1)	Total length of fallen logs (m)
PCT 1071 (HU673)										
Benchmark values	>=7	3 to 90	0 to 5	1 to 5	0 to 0	60 to 95	-	>=0	1	>=0
Plot scores – Vegetation Zone 3 - PCT 1071_Moderate-Good										
Plot 6	16	3.5	0.5	48	0	24	0	0	1	83

Appendix 4 Assessment of Significance

The following section provides for an Assessment of Significance according to the seven factors outlined in Section 5A of the EP&A Act for the only threatened entity that will be impacted in the subject site.

Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and SE corner bioregions

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction

Not applicable

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

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

The proposed residential development would ultimately remove about 0.3 hectare of the ecological community in moderate-good condition, and 3.78 hectares of habitat consisting of a derelict Slash Pine planation with early regenerating elements of the ecological community. This part of the community is classified as low condition by the BBAM. Overall, the habitat to be removed includes the majority of the lowest condition habitat for the community within the study area. Like-for-like habitat to offset the area removed would be provided in a managed offset area adjacent to the subject site. Given the provision of this offset, together with the presence of large areas of similar habitat on adjoining land and beyond, the local occurrence of the ecological community is unlikely to be placed at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

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

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

The proposed residential rezoning would result in the removal of about 0.3 hectare of the ecological community in moderate-good condition, and 3.78 hectares of habitat in low condition. This extent of removal represents 2.58% of the total habitat of the community in moderate-good condition within the study area, and approximately 60% of the total habitat in low condition from the site.

The design of the proposed residential rezoning footprint allows for a retained corridor of native habitat in moderate-good condition to the south of the subject site, thus maintaining connectivity with adjoining

habitat. No area of habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.

Given its current condition, and the extent of much larger areas of habitat in moderate-good condition within the proposed offset area and in adjoining land beyond the study area, the habitat to be removed has little importance to the long-term survival of the ecological community in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No currently declared critical habitat occurs in the vicinity of the study area. No assessment under this part is required.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No draft or approved Recovery Plan has been prepared for this ecological community to date. However, a targeted strategy for managing this ecological community is being been developed by OEH under the Saving Our Species program. In the interim, the following management actions have been identified for this community:

- Undertake research to determine minimum fire frequency.
- Collate existing information on vegetation mapping and associated data for this EEC and identify gaps in knowledge. Conduct targeted field surveys and ground truthing to fill data gaps and clarify condition of remnants.
- Prepare identification and impact assessment guidelines and distribute to consent and determining authorities.
- Use mechanisms such as Voluntary Conservation Agreements to promote the protection of this EEC on private land.
- Liaise with landholders and undertake and promote programs that ameliorate threats such as grazing and human disturbance.
- Enhance the capacity of persons involved in the assessment of impacts on this EEC to ensure the best informed decisions are made.
- Undertake weed control for Bitou Bush and Boneseed at priority sites in accordance with the approved Threat Abatement Plan and associated PAS actions.
- Identify and prioritise other specific threats and undertake appropriate on-ground site management strategies where required.
- Investigate the ecology of Swamp sclerophyll forest species with particular emphasis on the importance of drying and wetting cycles in maintaining ecosystem health.
- Determine location, species composition and threats to remaining remnants to assist with prioritising restoration works.
- Collect seed for NSW Seedbank. Develop collection program in collaboration with BGT - all known provenances (conservation collection).
- Investigate seed viability, germination, dormancy and longevity (in natural environment and in storage).

The proposal is consistent with these actions, in regards to management of the community in an offset area.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The following key threatening processes are potentially relevant to this proposal, with reference to the nature of the proposal and exotic species present within the study area:

- Clearing of native vegetation
- Invasion, establishment and spread of Lantana (*Lantana camara*)
- Invasion of native plant communities by exotic perennial grasses
- Invasion and establishment of exotic vines and scramblers
- Infection of native plants by *Phytophthora cinnamomi*
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae

These threatening processes can all be successfully managed or ameliorated during construction of the proposal and as part of a management plan for the offset area.

Conclusion

The removal of a small area of *Swamp Sclerophyll forest on Coastal Floodplain* in a degraded condition would not trigger a significant impact on the ecological community because of:

- The small proportion of the community removed from the study area.
- The generally poor condition of the community throughout the study area.
- Confinement of the development proposal to the lowest condition patch of the community in the study area.
- The potential to fully offset loss of the community with like-for-like habitat in an adjoining managed offset area.

Therefore, a Species Impact Statement is not required.

Appendix 5 BioBanking credit reports

BioBanking credit report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 29/11/2016 Time: 11:33:08AM Calculator version: v4.0

Development details

Proposal ID:	0024/2016/4027D
Proposal name:	Rezoning to residential - land at Raymond Terrace
Proposal address:	251 Adelaide Street Raymond Terrace NSW 2324
Proponent name:	de Witt Consulting Pty Ltd
Proponent address:	PO Box 850 Charlestown NSW 2290
Proponent phone:	02 4942 5441
Assessor name:	Stefan Rose
Assessor address:	39 Platt St Waratah NSW 2298
Assessor phone:	49684901
Assessor accreditation:	0024

Improving or maintaining biodiversity

An application for a red flag determination is required for the following red flag areas

Red flag	Reason
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Vegetation type being > 70% cleared; or it contains an endangered ecological community;

The application for a red flag determination should address the criteria set out in the BioBanking Assessment Methodology. Please note that a biobanking statement cannot be issued unless the determination is approved.

Additional information required for approval:

- ☐ Change to percent cleared for a vegetation type/s
- ☐ Use of local benchmark
- ☐ Change negligible loss
- ☐ Expert report...
- ■ Request for additional gain in site value
- ☐ Predicted threatened species not on site

■ Australian Painted Snipe	Rostratula australis
■ Black-tailed Godwit	Limosa limosa
■ Blue-billed Duck	Oxyura australis
■ Freckled Duck	Stictonetta naevosa
■ Little Lorikeet	Glossopsitta pusilla
■ Squirrel Glider	Petaurus norfolcensis
■ Swift Parrot	Lathamus discolor

- Yellow-bellied Sheathtail-bat — Saccolaimus flaviventris

☐ Change threatened species response to gain (Tg value)

Ecosystem credits summary

Plant Community type	Area (ha)	Credits required	Red flag
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	3.78	82.04	No
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	0.30	16.56	Yes
Total	4.08	99	

Credit profiles

1. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	82
IBRA sub-region	Hunter

Offset options - vegetation types	Offset options - CMA sub-regions
Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion, (HU633) Prickly-leaved Paperbark forest on coastal lowlands of the Central Coast and Lower North Coast, (HU930) Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931) Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast, (HU932) Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast, (HU937) Swamp paperbark - Baumea juncea swamp shrubland on coastal lowlands of the Central Coast and Lower North Coast, (HU944) Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley, (HU945)	Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	17
IBRA sub-region	Hunter

Offset options - vegetation types	Offset options - CMA sub-regions
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931) Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion, (HU633) Prickly-leaved Paperbark forest on coastal lowlands of the Central Coast and Lower North Coast, (HU930) Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast, (HU932) Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast, (HU937) Swamp paperbark - Baumea juncea swamp shrubland on coastal lowlands of the Central Coast and Lower North Coast, (HU944) Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley, (HU945)	Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

BioBanking credit report

This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 28/11/2016 Time: 4:41:29PM Calculator version: v4.0

Biobank details

Proposal ID:	0024/2016/4038B
Proposal name:	Rezoning to residential - offset at Raymond Terrace
Proposal address:	251 Adelaide Street Raymond Terrace NSW 2324
Proponent name:	de Witt Consulting Pty Ltd
Proponent address:	PO Box 850 Charlestown NSW 2290
Proponent phone:	02 4942 5441
Assessor name:	Stefan Rose
Assessor address:	39 Platt St Waratah NSW 2298
Assessor phone:	49684901
Assessor accreditation:	0024

Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report...
- ☐ Request for additional gain in site value

Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	13.79	104.00
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	1.67	8.00
Total	15.46	112

Credit profiles

1. Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion, (HU673)

Number of ecosystem credits created	8
IBRA sub-region	Hunter

2. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	22
IBRA sub-region	Hunter

3. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	82
IBRA sub-region	Hunter

Species credits summary

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Exclude commercial apiaries
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Exclude miscellaneous feral species
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Feral and/or over-abundant native herbivore control
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Fox control
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Slashing
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Control exotic pest fish species (within dams)
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Control of feral pigs
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Exclude miscellaneous feral species
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Feral and/or over-abundant native herbivore control
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Fox control
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion	Maintain or re-introduce natural flow regimes

Appendix 6 EPBC Act Protected Matters Report

Australian Government
Department of the Environment

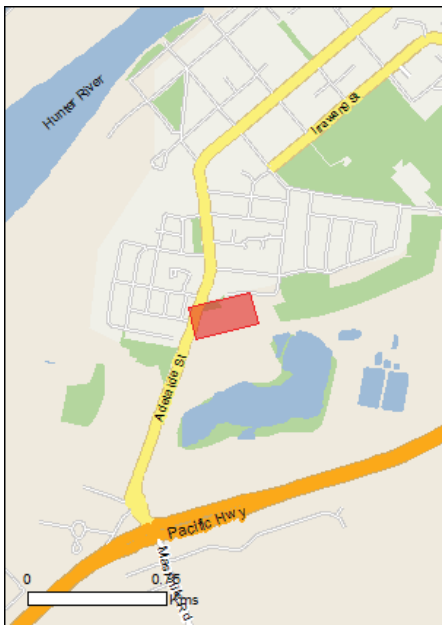
EPBC Act Protected Matters Report

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: 18/04/16 09:39:40



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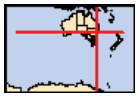


Summary

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:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	16
Listed Migratory Species:	14

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. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

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:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
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.

State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	41
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Hunter estuary wetlands	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

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.

Name	Status	Type of Presence
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely 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 may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	Endangered	Species or species

Name	Status	Type of Presence
(southeastern mainland population) [75184]		habitat likely to 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
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Tetratheca juncea		
Black-eyed Susan [21407]	Vulnerable	Species or species habitat likely 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
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat likely 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 may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur

Name	Threatened	Type of Presence within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
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 likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely 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

Name	Threatened	Type of Presence
		habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

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

Name	Status	Type of Presence 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
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		
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

Name	Status	Type of Presence
		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, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		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
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. 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
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		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
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may 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

Name	Status	Type of Presence
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

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 and National Heritage properties, Wetlands of International and National 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.

Coordinates

-32.771769 151.743618,-32.772987 151.744058,-32.773636 151.74099,-32.772355 151.740657,-32.771769 151.743618

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:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian 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
Forestry Corporation, 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

ATTACHMENT 10 – Review of Bushfire Constraints prepared by Newcastle Bushfire Consulting (2016)

Couch Family Trust T/A
Newcastle Bushfire Consulting

5 Chartley Street,
Warners Bay NSW 2282
Ph: 02 40230149

28th April, 2016

Phoenix Builders
C/- de Witt Consulting
PO Box 850
Charlestown NSW 2290

RE: REVIEW OF BUSHFIRE CONSTRAINTS 251 ADELAIDE STREET, RAYMOND TERRACE

Dear Sir or Madam,

Following my site visit at the above property I offer the below advice on Bushfire Planning Constraints:

1. In reviewing the site I have focused on the north-west corner of the site (north of the power line) as requested and the surrounding bushland.
2. The nearest bushland threat to the south is considered forest.
3. The vegetation to the north of the site is a small area of remnant vegetation on council parkland. It would be recommended to discuss with council the management of this very small area of vegetation or managing vegetation located south of the powerline easement where within 100 metres of the vegetation. It will become a non-threat if the above can occur.
4. The below asset protection zones and bushfire attack levels are measured from the southern forest vegetation. There is a varying slope within the bushland so I have measured a buffer for the differing slope transects:

   Level Slope in Forest

   a. Minimum Subdivision distance for forest – 20 metres (this is relevant for rezoning). Important note – Many councils require subdivision to BAL-29 which would be a minimum 25 metres.
   b. BAL-40 - 19 to 25 metres
   c. BAL-29 - 25 to 34 metres
   d. BAL-19 - 35 to 47 metres
   e. BAL-12.5 - 48 to 99 metres

   0 to 5 degree downslope in Forest

   a. Minimum Subdivision distance for forest – 25 metres (this is relevant for rezoning). Important note – Many councils require subdivision to BAL-29 which would be a minimum 32 metres.
   b. BAL-40 - 24 to 31 metres
   c. BAL-29 - 32 to 42 metres
   d. BAL-19 - 43 to 56 metres
   e. BAL-12.5 - 57 to 99 metres

Couch Family Trust T/A
Newcastle Bushfire Consulting

5 Chartley Street,
Warners Bay NSW 2282
Ph: 02 40230149

Note: The above minimum rezoning asset protection zones have been illustrated in the attached site constraints map. If the vegetation south of the powerline easement was cleared then the asset protection zone would be moved respectively.

5. Planning Principles for Rezoning to Residential Land in Bush Fire Prone Areas
    a. Provision of a perimeter road with two way access which delineates the extent of the intended development;
    b. Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
    c. Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
    d. Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
    e. Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
    f. Introduction of controls on the placement of combustible materials in asset protection zones.
6. Water supply - The future hydrant supply should be designed in accordance with AS2419.1 however this would be addressed at subdivision stage.
7. Electrical and gas supplies will be located underground require no further conditions. This would be addressed at subdivision stage.
8. At the commencement of building works and in perpetuity the entire property shall be managed as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

If you have any questions regarding the above I am available for comment on 0423 923284 or 02 40230149.

Yours Sincerely
Phillip Couch

Phillip Couch GIFireE
Bach Info Science
Grad Dip Design for Bushfire Prone Areas
FPAA BPAD – Level 3 Certificate Number BPD-PA-16132
Director Newcastle Bushfire Consulting

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Couch Family Trust T/A
Newcastle Bushfire Consulting

5 Chartley Street,
Warners Bay NSW 2282
Ph: 02 40230149

ATTACHMENT 11 – Aboriginal Cultural Heritage Due Diligence Assessment (2016)

INSITE HERITAGE
PTY LTD

PO Box 98
Wangi Wangi NSW 2267
admin@insiteheritage.com.au
P 0249755818

Aboriginal Cultural Heritage Due Diligence Assessment
251 Adelaide Ave
Raymond Terrace, NSW

Prepared For
DeWitt Consulting

June 2016

Introduction

Insite Heritage Pty Ltd were commissioned by DeWitt Consulting on behalf of Phoenix Builders to provide an Aboriginal Cultural Heritage Assessment of potential impact on Aboriginal Cultural Heritage by the proposed rezoning of the site to allow for the establishment of residential and villa allotments.

The property, 251 Adelaide St Raymond Terrace (Lot 232 DP 593512), is a former quarry site. The north western portion of the lot is the subject of the proposed rezoning. The area of the rezoning proposal is approximately 7ha of the total approximately 43 ha block. The area of development relative to the total Lot is shown in Figure 1.

An AHIMS search for the study located two isolated finds located to the south of the site associated with road upgrades. An inspection of the study area was carried out with a representative of Worimi Local Aboriginal Land Council (LALC) on the 15th May 2016. No Aboriginal objects, or areas of potential archaeological deposit, were located. The survey was done in the northern section of the site and subsequently the study area was enlarged. An additional survey was not considered necessary as the additional area contained the quarry infrastructure and areas of low lying ground with dense vegetation. The initial survey results were extrapolated over the remainder of the site.

The history of quarrying on the site has reduced the archaeological potential of the site significantly. The site has been used for quarrying purposes since 1974 and this was reflected in the poorly developed soil profile on the site. The site is not considered to have archaeological potential.

The cultural heritage values assessment will be provided by the Worimi LALC and included in this report upon receipt.

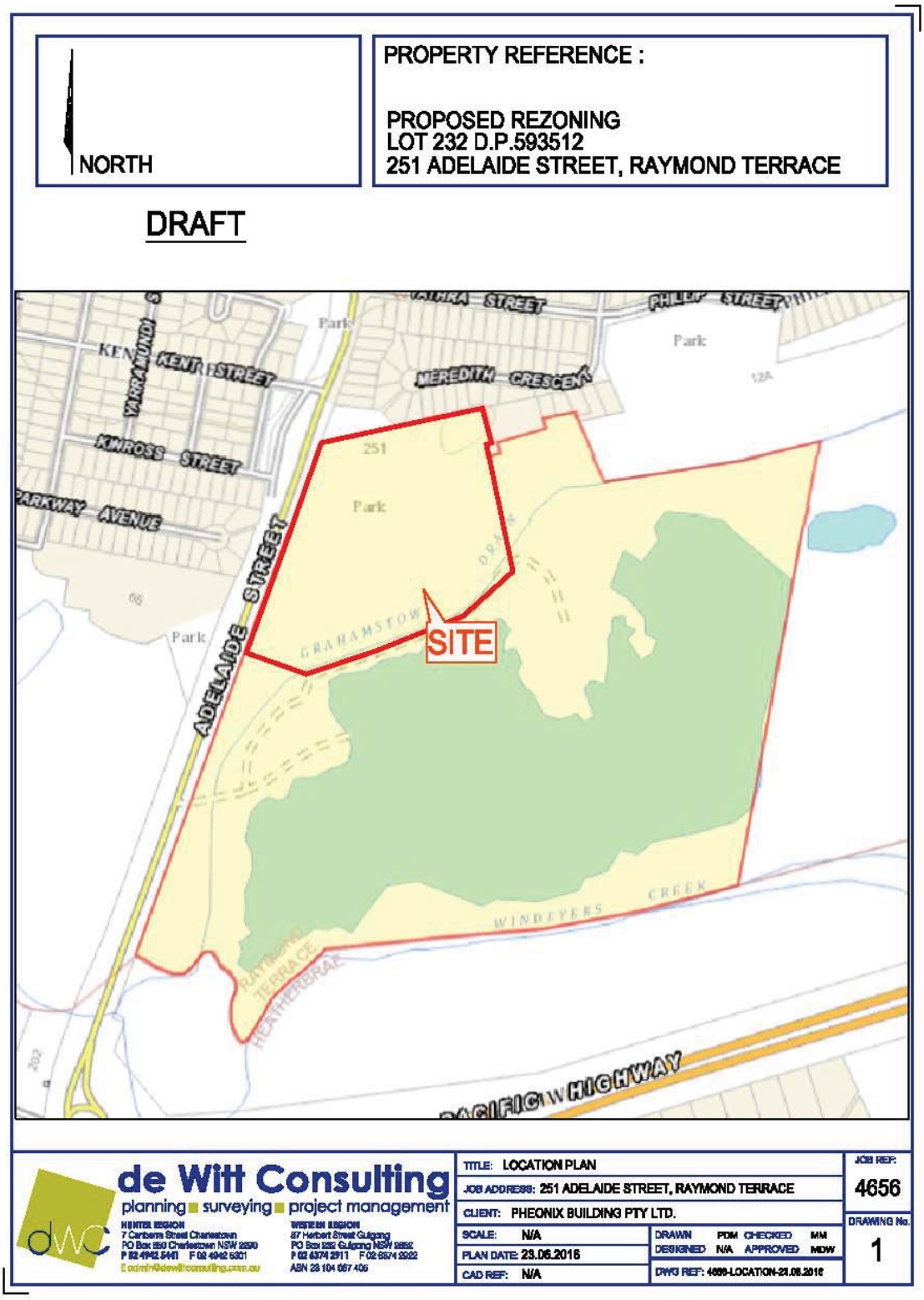


Figure 1 Location 251 Adelaide Ave Raymond Terrace

1. Introduction

DeWitt Consulting have been commissioned to prepare a rezoning application on behalf of Pheonix Builders. The rezoning of 251 Adelaide Ave Raymond Terrace, will be determined by Port Stephens Shire Council. Currently zoned RU2 (rural) the rezoning would allow the development of medium density housing. This assessment is intended to identify any potential impacts as a result of the rezoning, on Aboriginal cultural heritage and to provide recommendations regarding mitigation measures.

2. Environmental Landscape

The site is identified as flood prone land, and two tributaries to Windeyers Creek passed through the area prior to the impact of mining. Historically the site has been used for quarrying since the mid-1960's while information on the title of the land shows quarrying since at least 1974[1] the void acts as a storage area for flood waters from the Hunter River that then drains in to Windeyer Creek. The area of the rezoning has been historically quarried since the mid 1960's and is now revegetated predominately with Radiata Pine and remnant Swamp Oak forest.

The flora and fauna assessment identified a paucity of hollow bearing trees which is consistent with the size of the trees observed in the site inspection. In general the trees on site did not appear to be of sufficient age for Aboriginal modification and no evidence of cultural modification was observed. The 2004 Google Earth image clearly shows the straight line character of the planted Radiata in the north west portion of the site (Figure 2).

Figure 2 The subject area 2004 - Google Earth

The soil landscape map for the area also shows the area as disturbed (Figure 3). The soil landscape is Shoal Bay - Aeolian Pleistocene sand sheets with slope gradients generally <5% but on slopes of rolling dunes up to 15%, with local relieve generally <5m[2]. This particular soil landscape can be

[1] 2011 ERM 251 Adelaide Street Raymond Terrace, Ecological Due Diligence and BioBanking Assessment. Report to Rocla Quarry Products (p14)

[2] Murphy, C.L 1995 Soil Landscapes of the Port Stephens 1:100,000 Sheet. Published Soil Conservation Service of NSW,

archaeologically sensitive but the scale of disturbance at this site indicates that little archaeological value is likely to remain. The scale of disturbance can also in Figure 4 (Google Earth 2007).

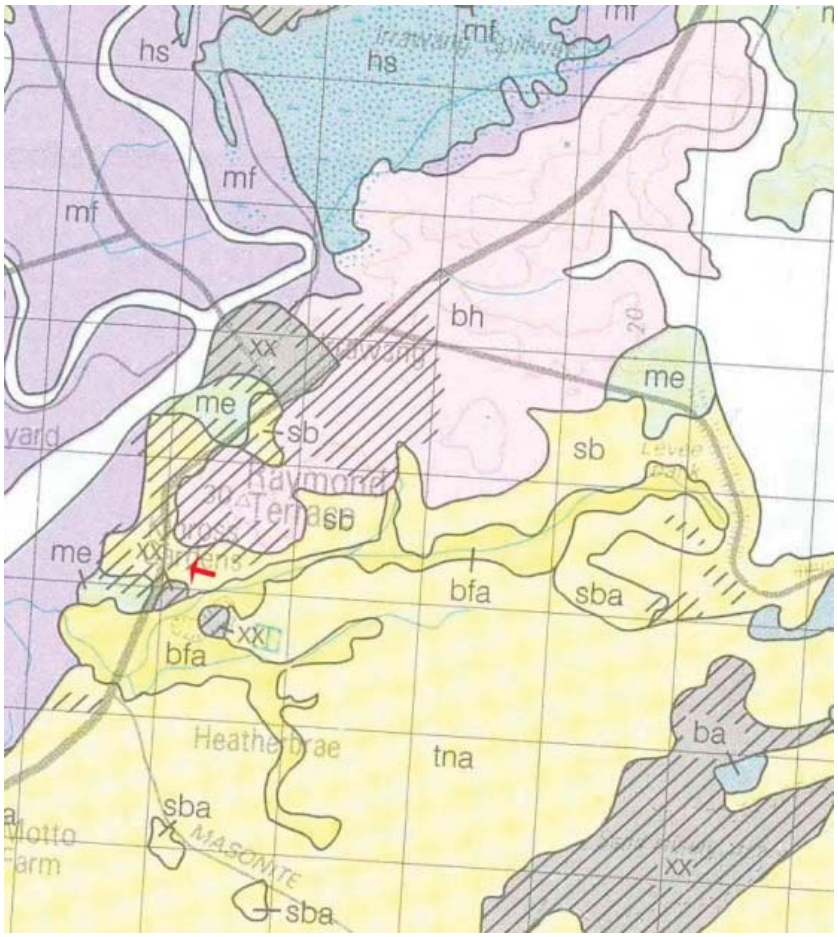


Figure 3 Soil landscape map placing the study area in a disturbed area

The southern boundary of the proposed rezoning area is bounded by the Grahamstown drain, an artificial drain constructed to take over flows upstream (Figure 4).

Figure 4 The subject site circa 2007 (Google Earth) – note the Grahamstown drain at the base of the area.

3. Archaeological Context

A search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken with a 200m buffer in order to identify any previously recorded Aboriginal archaeological sites which may be impacted by the proposed works.

The search located two sites south of the site (refer Appendix A). The sites 38-4-0238 and 38-4-0320 The sites were located in the course of the Raymond Terrace Bypass archaeological assessment in 1990. 38-4-0320 comprised 7 artefacts located in two concentrations in disturbed areas. A total of 7 artefacts were recorded made from silcrete and indurated mudstone. Six of the artefacts were flakes and the other a large core. The sites are located 40m from Windeyers Creek on intact creek terraces. 38-4-0238 comprises 14 artefacts of a variety of raw material located 5m from Windeyers Creek on a terrace.

The subject area has been subject to the excavation of a large void that would have incorporated the two arms of Windeyers Creek and the associated terraces. The Grahamstown drain has also been excavated on the southern boundary of the proposed rezoning to relieve flooding. At the time of closure the site support a floating dredge, sand wash, mooring and pontoons, office/weighbridge and staff amenities and earthmoving operations. The historical infrastructure associated with the mining of the site from the mid 1960's is not known. There is negligible potential for creek terrace to remain on the site.

The bio-banking assessment of the site prepared by ERM reviewed historical photographs of the site and found that the site had been quarried since the mid-1960s. The review found that "the north-west of the site, which has the highest potential for redevelopment to residential use ….. was

historically quarried and now appears vegetated"[3]. A site visit found that there is evidence of disturbance with a steep un-natural cut along the northern boundary and a similarly steep western margin possibly due to fill under Adelaide proposed rezoning is located on the margins of a sand quarry site. The tree cover is generally introduced (Radiata Pine) with a some remnant Swamp Oak Floodplain Forest.

Plate 1 The north- west corner of the site view east

There are two sites recorded on AHIMS to the south of the study area. The two sites are open sites located on the terrace of Windeyers Creek. There are no other archaeological records relevant to the study area.

[3] (ibid) Page 15

Figure 5 AHIMS locations relative to the study area – area in red was surveyed

The desktop assessment did not locate any Aboriginal objects. The site was inspected with Richard Kime of Worimi Local Aboriginal Land Council, on the 17th of May 2016. The inspection focused on the area marked in red (Figure 4) as this was the initial rezoning proposal area. The area has been extended to that shown in Figure 1. Additional survey was not considered necessary given the disturbance on the site, and the results of the survey extrapolated over the additional area.

No archaeological objects or areas of potential archaeological deposit.

It was noted that the soil profile appeared poorly developed unlike the top of slope in the adjacent park. The northern margins of the site with a slope of approximately 45% is clearly not natural or consistent with the soil landscape description of typical slopes (Plate 1). In addition the trees within the study area appeared to be no more than approx. 30 years old, which is consistent with the ERM assessment of sandmining in the area in the 1960's – 1970's (Plates 2&3).

Plate 2 The brown A horizon of the sandy soil in the park to the north of the study area.

Plate 3 the soil beneath pine needles, note the poorly developed humic layer

Archaeological visibility was provided by the powerline transect across the block (Plate 4). The easement provided 20% archaeological visibility (260m x 5m of easement inspected) providing 260 sqm of archaeological visibility (Plate 5). No cultural heritage objects were located.

As shown in Plates 1, 3 & 4, surface visibility was very limited by a deep cover of pine needles. Three areas of exposure within the forested areas of the site provided by exposures (total of 5 x 10m with 10% archaeological visibility) totalling 5 sqm of effective exposure (Plate 6). A total of 265 sqm of the 1.8ha included in the survey area provided the opportunity to locate heritage objects. There is no potential for modified trees given the younger age of the trees and the introduction of radiate pine.

Plate 4 The approx 45 degree slope - northern margin

Plate 5 View west across the southern end of the study area along the powerline easement

Plate 6 Surface visibility in an exposure mid section of the site

Plate 7 Typical surface visibility

Plate 8 Access track to the WWTP on the northern boundary of the study area

Cultural Heritage Impact Assessment

Based upon the historic landuse assessment (ERM 2011), and the site inspection the study area has been highly impacted by at least 40 years of sandmining. The potential for items of Aboriginal heritage to remain in- situ is very low.

Recommendations

There were sufficient sample areas of surface visibility at the time of inspection to determine that the subject area has been substantially disturbed. The soil profile was observed to be poorly developed which is consistent with a history of sandmining. Whilst overall the surface visibility was low due to the ground cover of pine needles, there were no objects found in those areas that did present the opportunity for objects to be located.

There are no constraints to the rezoning, given that the likelihood of sites of significance remaining within the study area being low.

References

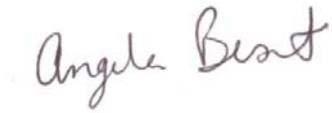
Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. NSW Office of Environment & Heritage 2010.

ERM 2011 251 Adelaide Street Raymond Terrace, Ecological Due Diligence and BioBanking Assessment. Report to Rocla Quarry Products (p14)

Murphy, C.L 1995 Soil Landscapes of the Port Stephens 1:100,000 Sheet. Published Soil Conservation Service of NSW,

Yours sincerely

Insite Heritage Pty Ltd



Angela Besant
Senior Archaeologist
Insite Heritage Pty Ltd

Appendix A– AHIMS Search

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : dewitt raymond terrace

Client Service ID : 223135

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
38-4-0238	RT 3;	AGD	56	381900	6372150	Open site	Valid	Artefact : -	Open Camp Site	1916,1983,2199,102116
	Contact	**Recorders**	Doctor.Jo McDonald,Elizabeth Rich					**Permits**		
38-4-0320	RT 5;	AGD	56	382220	6372230	Open site	Valid	Artefact : -	Open Camp Site	1983,102116
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		

Report generated by AHIMS Web Service on 29/04/2016 for Angela Besant for the following area at Lot : 232, DP:DP593512 with a Buffer of 200 meters. Additional Info : to inform and impact assessment. Number of Aboriginal sites and Aboriginal objects found is 2

Appendix B Worimi LALC report

(to be included after review)

ATTACHMENT 12 - Flood Assessment prepared by BMT WBM (2017)

BMT WBM Pty Ltd
126 Belford Street
Broadmeadow NSW 2292
Australia
PO Box 266
Broadmeadow NSW 2292

Tel: +61 2 4940 8882
Fax: +61 2 4940 8887

ABN 54 010 830 421

www.bmtwbm.com.au

Our Ref: DJL: L.N20202.005.docx

28 March 2017

Pheonix Builders Pty Ltd
PO Box 342
Earlwood NSW 2206

Attention: Chris Xistouris

Dear Chris,

RE: FLOOD ASSESMENT 251 ADELAIDE ST, RAYMOND TERRACE

This letter report provides a review of the existing flood conditions and identifies risks associated with flooding which may pose constraints on the potential for development of the disused quarry site at 251 Adelaide St, Raymond Terrace. The assessment updates previous reporting investigating different potential development footprints.

Background

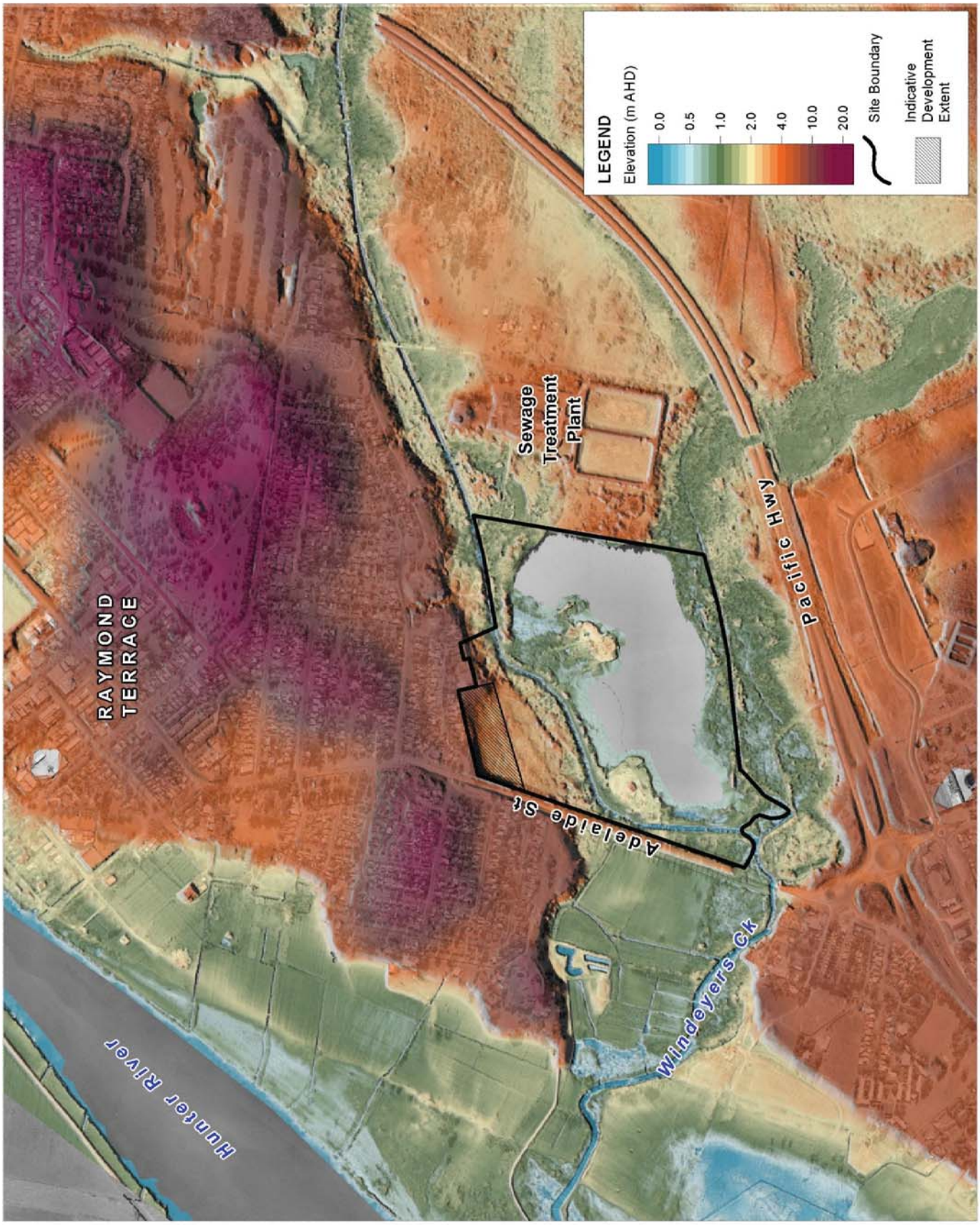
The disused quarry site at 251 Adelaide St, Raymond Terrace is located on the low-lying floodplain of Windeyers Creek, just upstream of the Hunter River. The site is positioned just south of the Raymond Terrace township and is bounded by the elevated road embankments of Adelaide Street and the Pacific Highway. A sewage treatment plant adjacent to the site is raised well above the floodplain.

Windeyers Creek is characterised by wide, low-lying swamp areas where ground levels are typically 1.0-1.5m AHD. Within the site boundary, the creek separates into two branches. The northern creek branch has been realigned into a well-defined channel running along the north and west boundaries of the site. Across the remaining site, elevations are generally below 2.5m AHD, with the exception of the north western corner of the block which is raised to around 3.0m AHD. The site boundary and local topography of the area is presented in Figure 1.

The site is subject to two flooding mechanisms:

- Backwater inundation from the wider Hunter River system; and
- Local flooding of Windeyers Creek catchment.

The site is located within the low-lying floodplain area bounded by Adelaide Street and the Pacific Highway, and provides major storage area for flooding of both Windeyers Creek and the Hunter River. There are two major flood flow paths either side of the disused quarry, being the main Windeyers Creek channel running around the north and west perimeter of the quarry lake and a secondary tributary channel along the southern perimeter. A levee is constructed along the Hunter River floodplain offering some protection from elevated water levels associated with Hunter River flood events. The proposed development at the site will be concentrated to the north-western corner, as indicated on Figure 1.



Title:
Local Topography

Figure: **1**

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Model Development

The flooding constraints applicable to the site have been defined through computer modelling of typical flood behaviour. Modelling was completed for the 1% AEP event (100yr ARI), which is typically used to define flood planning levels. The lower Hunter River model (developed by BMT WBM on behalf of Port Stephens Council) defines Hunter River design flood conditions and was utilised for this assessment.

To simulate local catchment flooding of Windeyers Creek, separate hydrologic and hydraulic models were developed.

An XP-RAFTS hydrological model was developed to simulate the rate at which rainfall runs off the catchment. The amount of rainfall runoff and the attenuation of the flood wave as it travels down the catchment are dependent on:

- The catchment slope, area, vegetation and other characteristics;
- Variations in the distribution, intensity and amount of rainfall; and
- The antecedent conditions (dryness/wetness) of the catchment.

Catchment properties were determined from the high resolution (2m grid size) Digital Elevation Model (DEM) derived from LiDAR data and aerial photography. Rainfall intensity-frequency-duration values and temporal patterns were adopted in accordance with the standard procedures outlined in AR&R (2001). An initial loss of 20mm and a continuing loss of 2.5mm/hr were adopted for this study and are within the limits recommended by AR&R for a catchment in eastern NSW.

In developing the hydraulic model, BMT WBM has applied the fully 2D software modelling package TUFLOW. The 2D model has distinct advantages over 1D and quasi-2D models in applying the full 2D unsteady flow equations. This approach is necessary to model the complex interaction between rivers, creeks and floodplains and converging and diverging of flows through structures.

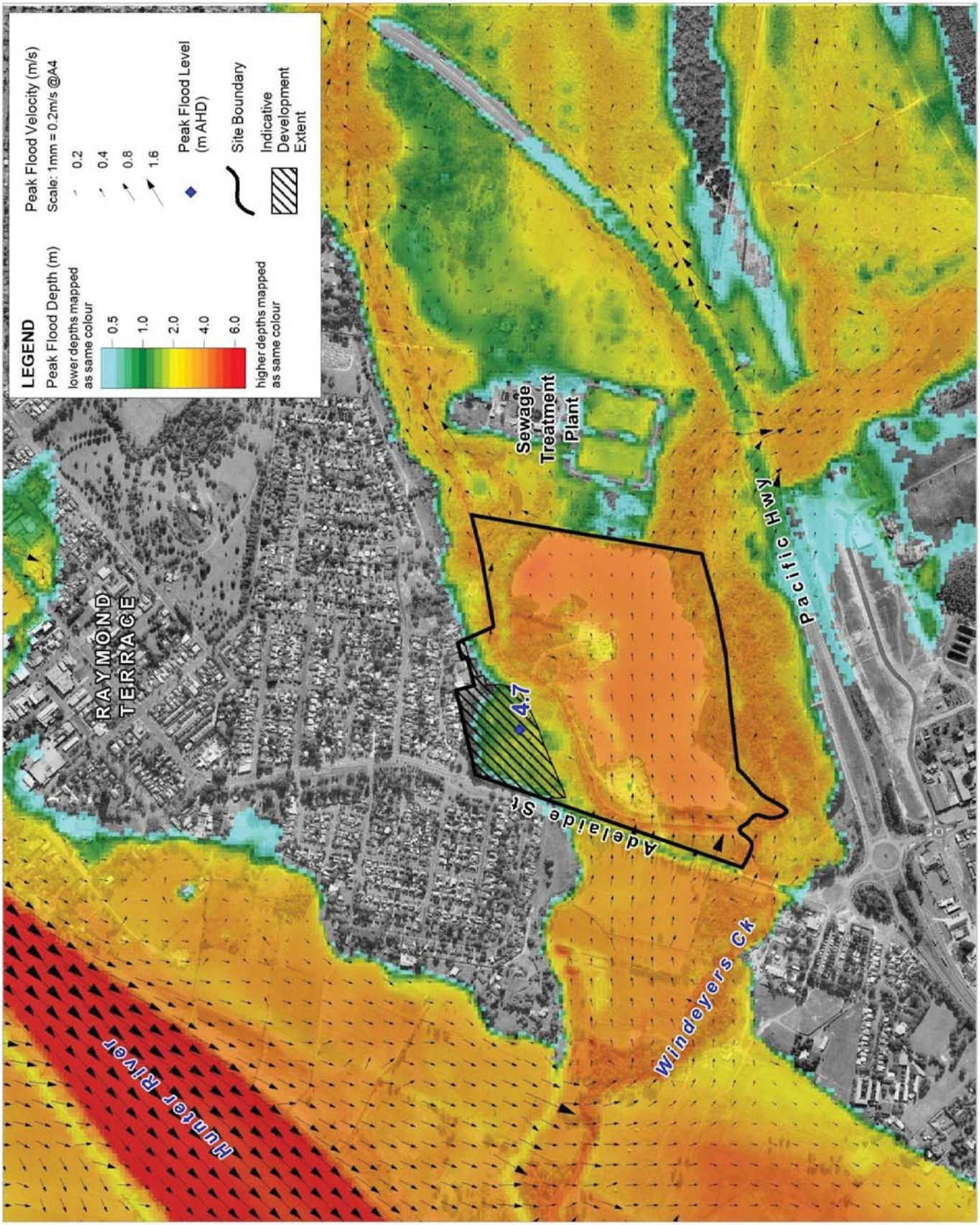
As the study area is relatively small, a high resolution model cell size (5m) was adopted, providing for an accurate representation of flow distribution over the floodplain. Key hydraulic control structures including the Pacific Highway and Adelaide Street bridges were represented as layered flow constrictions where the flow impediment influence of the abutments, piers and bridge deck is modelled. Culverts within the study area (under the Pacific Highway and through the Hunter River levee) were also included within the 2D domain as 1D structures.

Existing Flood Conditions

The inundation extents for 1% AEP flooding events including peak flood depths and velocities in the vicinity of the site are shown in Figure 2 and Figure 3 for Hunter River and Windeyers Creek flooding respectively.

The relative impacts at the site of local flooding of Windeyers Creek are far outweighed by mainstream Hunter River flooding. For the 1% AEP Hunter River flood event, there is extensive overtopping of the levee protection system, with large scale inundation extending upstream into the Windeyers Creek floodplain.

Being the dominant mechanism in terms of peak flood levels, the Hunter River flooding condition would be adopted in the derivation of flood planning levels (FPLs).



Title:

Hunter River 1% AEP Design Flood Conditions: Peak Flood Depths, Velocities and Water Levels

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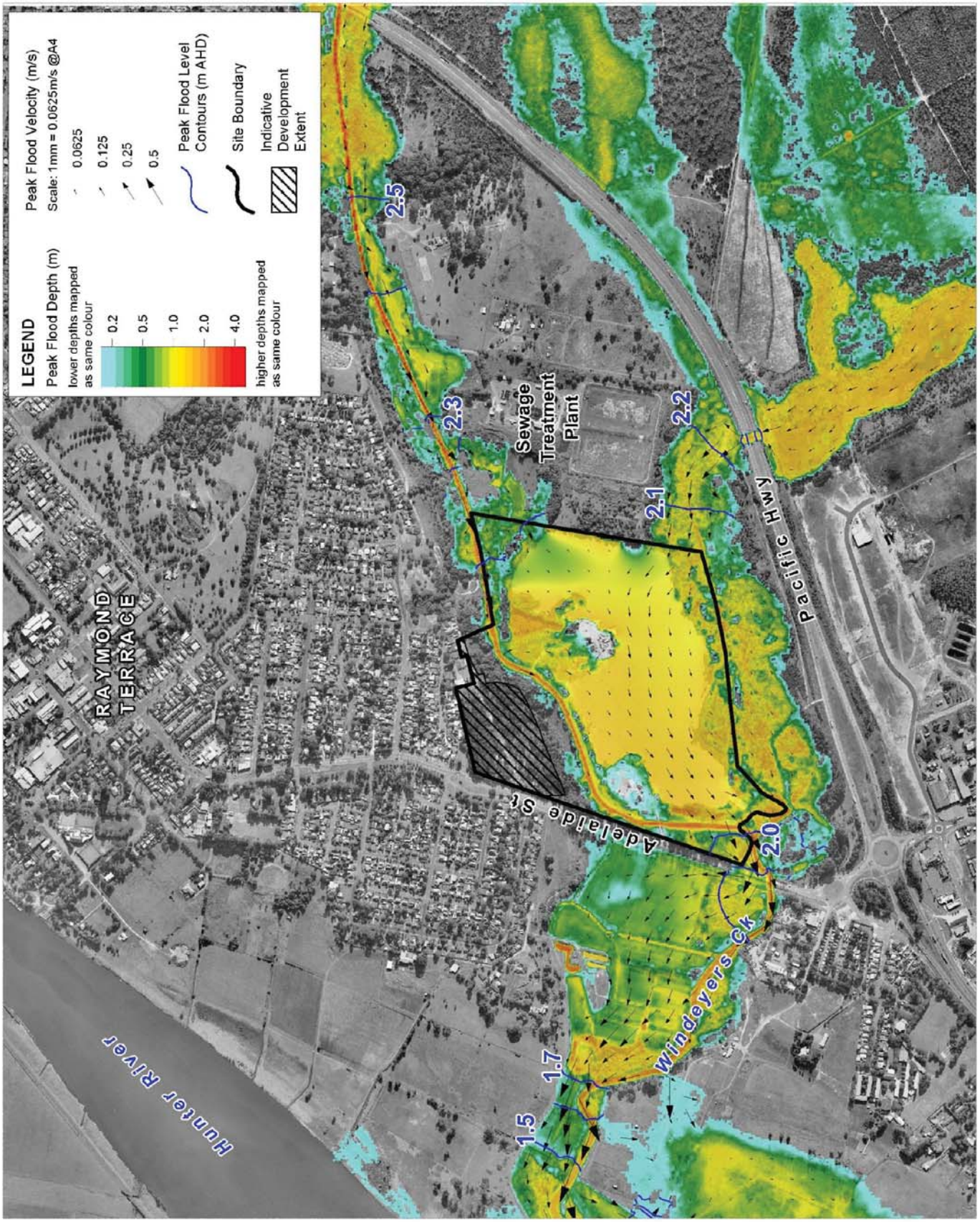

Title:

Winderyers Creek 1% AEP Design Flood Conditions: Peak Flood Depths, Velocities and Water Levels

Figure: 3

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Existing design flood conditions for each flooding mechanism are detailed below.

Hunter River Flooding

Design flood conditions were developed for the Lower Hunter and Williams River System in the Williamtown / Salt Ash Flood Study Review (BMT WBM, 2012). Following on from the flood study, the Williamstown / Salt Ash Floodplain Risk Management Study (BMT WBM, 2017) was completed. The study involved further updates and refinement to modelling and provides the most recent definition of design flood conditions at the site.

The 1% AEP design conditions for Hunter River flooding were derived from adopting the following boundary conditions:

- Hunter River flow at Raymond Terrace, just downstream of the confluence with the Williams River. The Williams River inflow components were scaled to produce a peak flood level for the 1% AEP of ~4.8m AHD – consistent with the Flood Frequency Analysis for Raymond Terrace.
- Water level time series at the downstream boundaries of Newcastle Harbour and Tilligerry Creek. The time series are representative of 50% AEP design conditions.
- Local catchment inflows into the Hunter River, including the Windeyers Creek catchment, derived from 10% AEP design rainfall conditions. A 48 hour duration design storm was adopted as it was found to be the critical event for the catchment.

A water level time series along the Hunter River was extracted from the Williamtown / Salt Ash model and was applied at the boundary of the local model developed for this study. The finer cell resolution adopted in this study (5m grid compared to 40m grid in the former study) provided the necessary detail to compare development impacts as a result of filling the site.

For the 1% AEP flooding condition, inundation across the floodplain is extensive. Both the levee protection system and Adelaide Street are significantly overtopped. The storage area is filled and floodwaters breach over sections of the Pacific Highway. Typical depths across the site are within the order of 3.0-4.0m (refer to Figure 2), with the peak water level at approximately 4.7m AHD. The broader low-lying floodplain of Windeyers Creek provides for an extensive storage area of Hunter River derived floodwater. The elevated road embankments of both Adelaide Street and the Pacific Highway provide some level of control, however, extensive overtopping of both roads are expected at the 1% AEP Hunter River flood magnitude.

The main flow path traverses through the centre of the site across the lake, as indicated by the velocity vectors shown on Figure 2.

Local Catchment Flooding of Windeyers Creek

In order to gain a full appreciation of catchment derived flooding conditions, the local Windeyers Creek model was run without influence from Hunter River tailwater conditions. Past studies including the Williamtown / Salt Ash Flood Study adopted a tailwater condition of~ 1.2m AHD which is representative of the 50% AEP (2yr ARI) Hunter River water level. During coincident flooding events of the Hunter River and Windeyers Creek, the levee system offers significant protection against backwater inundation from Hunter River water levels up to around 2.0m AHD. Accordingly, the simulated flood conditions shown in Figure 3 are largely derived from the local Windeyers Creek catchment.

The Adelaide St road embankment acts as a major control for Windeyers Creek flooding with flow confined to the existing bridge opening (i.e. no local overtopping of Adelaide St). The resulting flood levels at the proposed development site are influenced by the backwater from the Adelaide St bridge. Upstream of the development site, the elevated Pacific Highway embankment also provides for a significant hydraulic control, particularly on the southern tributary of Windeyers Creek.

The extent of overbank inundation within the site boundary is generally maintained within the disused quarry lake area between the two Windeyers Creek branches, to the west of the elevated sewage treatment plant. Typical depths across the site are within the order of 0.5-1.5m, with the peak water level at 2.1m AHD. Velocity of floodwaters are generally less than 0.3m/s, with higher velocities (up to 1m/s) contained within the realigned Windeyers Creek channel along the northern boundary of the site. Due to the poorly defined nature of the southern creek branch, the main flood path along the southern boundary of the site is less distinct. Modelled floodwaters spill out of the natural creek channel onto the disused quarry area. The preferential flow path across the lake is indicated on Figure 3.

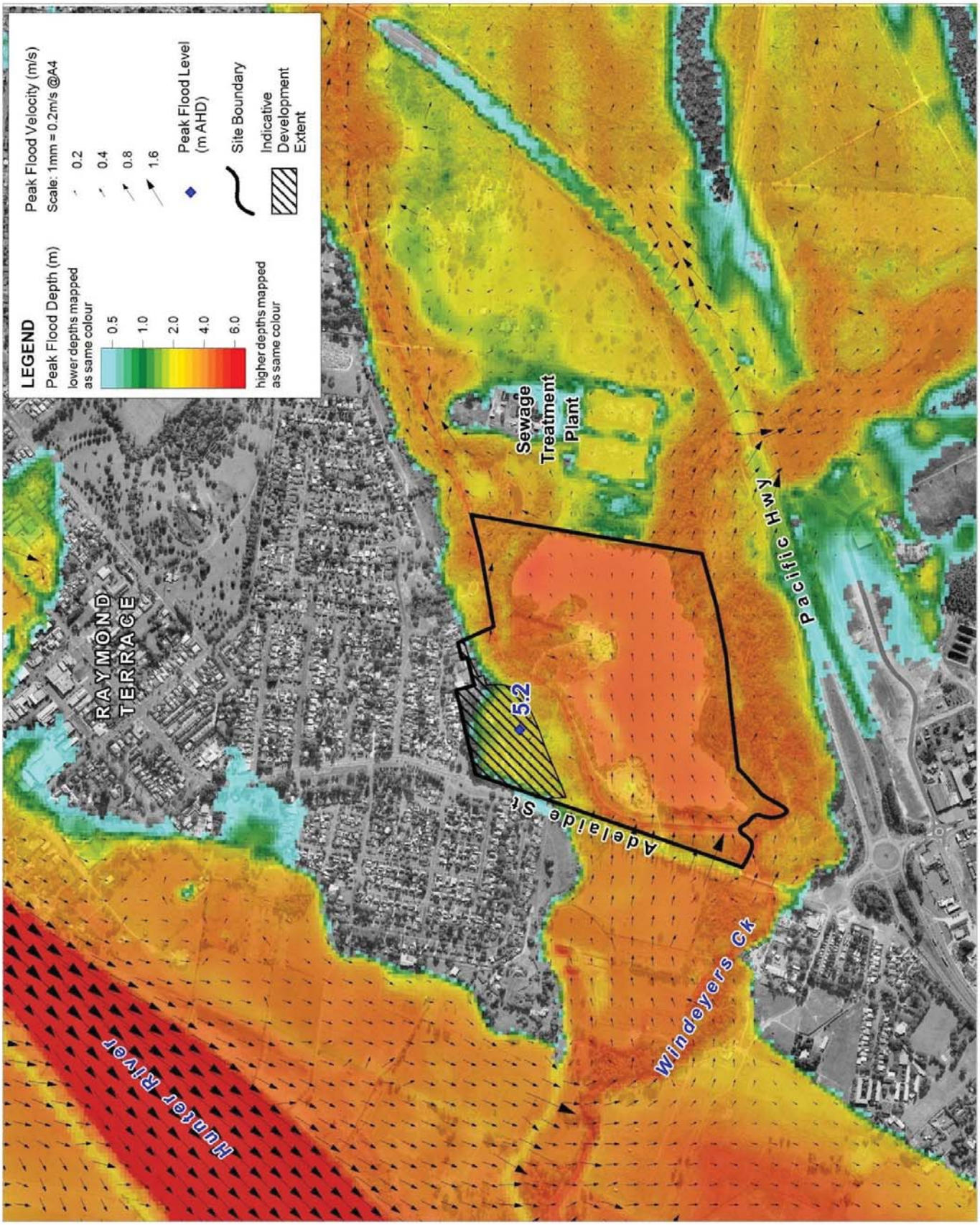
There is notable attenuation of floodwaters over the wider catchment due to the flat topography and remnant sand dunes. The local hydraulic model was developed by applying inflow boundary conditions derived from the XP-RAFTS hydrological model at selected locations. Due to the flooding behaviour of the wider floodplain, the inflows derived from the XP-RAFTS model are expected to be slightly higher than what would realistically occur as some attenuation outside the model domain is not explicitly accounted for. The results found in this study are conservative and would represent the maximum peak flood level likely across the site. Previous model results from the Williamtown Salt Ash Flood Study (WBM Oceanics, 2004) indicated that 1% AEP flooding of Windeyers Creek resulted in peak flood levels at the site of 1.9m AHD. Therefore, it is appropriate to assume that peak flood conditions in the order of 1.9-2.1m AHD should be expected at the site for the 1% AEP event.

Development Potential

In considering the impact of flood conditions on potential development, the Hunter River conditions will drive the required flood planning level (FPL). The Williamtown / Salt Ash FRMS (BMT WBM, 2017) was in part prepared to inform Council of the likely changes in flood behaviour within the study area that may arise through future climate change conditions, particularly in relation to flood planning levels. Following completion of the study, Council has adopted the 1% AEP Hunter River design event including a 0.9m sea level rise allowance and 20% increase in flow (indicative 2100 planning horizon) to define flood planning levels. A similar 20% increase in design rainfall intensity is applied to the local Windeyer's Creek catchment.

The peak flood inundation extents and depths for the 1% AEP flood planning event for Hunter River and Windeyers Creek flooding are shown in Figure 4 and Figure 5 respectively.

A summary of the simulated peak water levels for existing and flood planning conditions (2100 planning horizon) is shown in Table 1. At the site, the peak flood level for the appropriate flood planning event is 5.2m AHD. An additional allowance for freeboard is required for certain types of development. For residential development, a freeboard of 0.5m is typically required. This would provide for a FPL of 5.7m AHD for habitable floor levels at the site.



Title:

Hunter River 1% AEP 2100 SLR & 20% Rainfall Increase: Peak Flood Depths, Velocities and Water Levels

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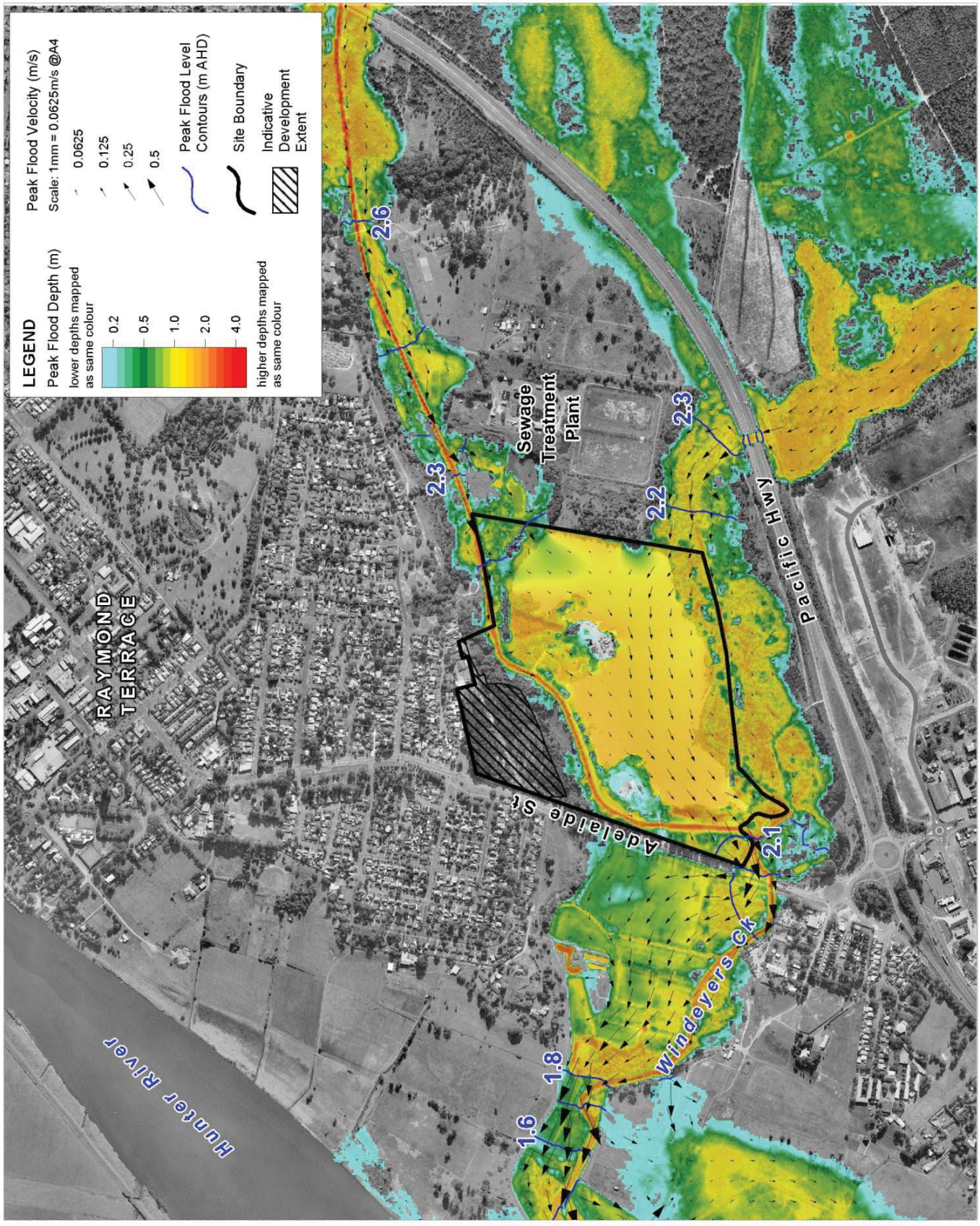

Title:

Winderyers Creek 1% AEP 20% Rainfall Increase: Peak Flood Depths, Velocities and Water Levels

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Table 1 Peak Flood Levels at 251 Adelaide St, Raymond Terrace

Flooding Mechanism	Peak flood level (m AHD)
Hunter River 1% AEP (BMT WBM, 2017)	4.7
Hunter River 1% AEP 2100 planning horizon w/ 0.9m SLR and 20% increase in flow (BMT WBM, 2017)	5.2
Windeyers Creek 1% AEP	2.1
Windeyers Creek 1% AEP 2100 planning horizon with 20% increase rainfall	2.2

As the majority of the site is elevated below 2.5m AHD, an extensive amount of fill would be required to provide flood immunity to the 1% AEP flood level and is indicative of the severity of flooding affecting the area and suggests that stringent controls would apply to any proposed development in this location. Preliminary investigation into flood constraints at the site indicated that filling of a large, central portion of the site was not viable due to potential for changes to existing flood conditions through:

- Redistribution of flow arising from works on the floodplain;
- Concentrated discharges and subsequent impact on downstream areas; and
- Increase in flood levels through impedance of overland flow paths and loss of temporary flood storage.

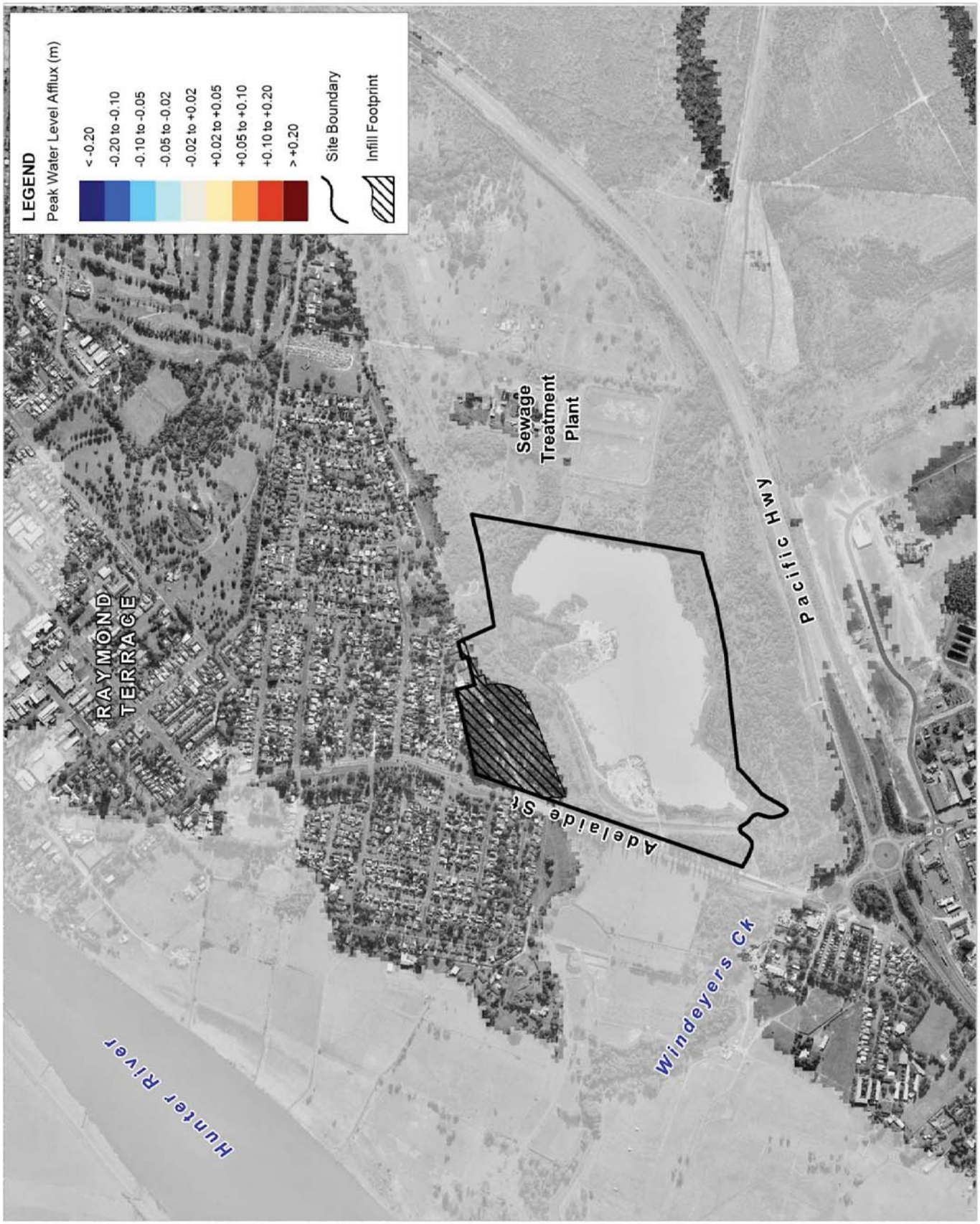
As a consequence of the preliminary investigation, this current study is focused on filling the north-western portion of the site only. The assessment will assume the parcel of land indicated as having development potential to above the peak 1% AEP flood level. This represents the exclusion of all existing flood storage within the fill footprint.

It should be noted that the proposed development extent is outside of the 1% AEP Windeyers Creek flood inundation extent (refer to Figure 5). Therefore, impacts will be assessed for Hunter River derived flooding only. This assessment is focused on identifying the opportunity for development based on the flooding constraints and potential flood impacts. The assessment has not considered other design constraints such as environmental constraints, construction practicalities, planning approvals etc.

Flood Impact Assessment

The proposed development layout is included in Appendix A for reference. Within the model the development footprint area, ground levels have been raised above the adopted FPL for habitable dwellings (i.e. 5.7m AHD).

The simulated change in peak flood level and peak flood velocity for the proposed fill footprint is shown in Figure 6 and Figure 7 respectively. In both instances, there are no significant impacts on existing flood water level and velocity distributions for the proposed fill footprint.



Title:

Flood Impact Assessment - Peak Water Level Afflux: Hunter River 1% AEP 2010 SLR & 20% Rainfall Increase

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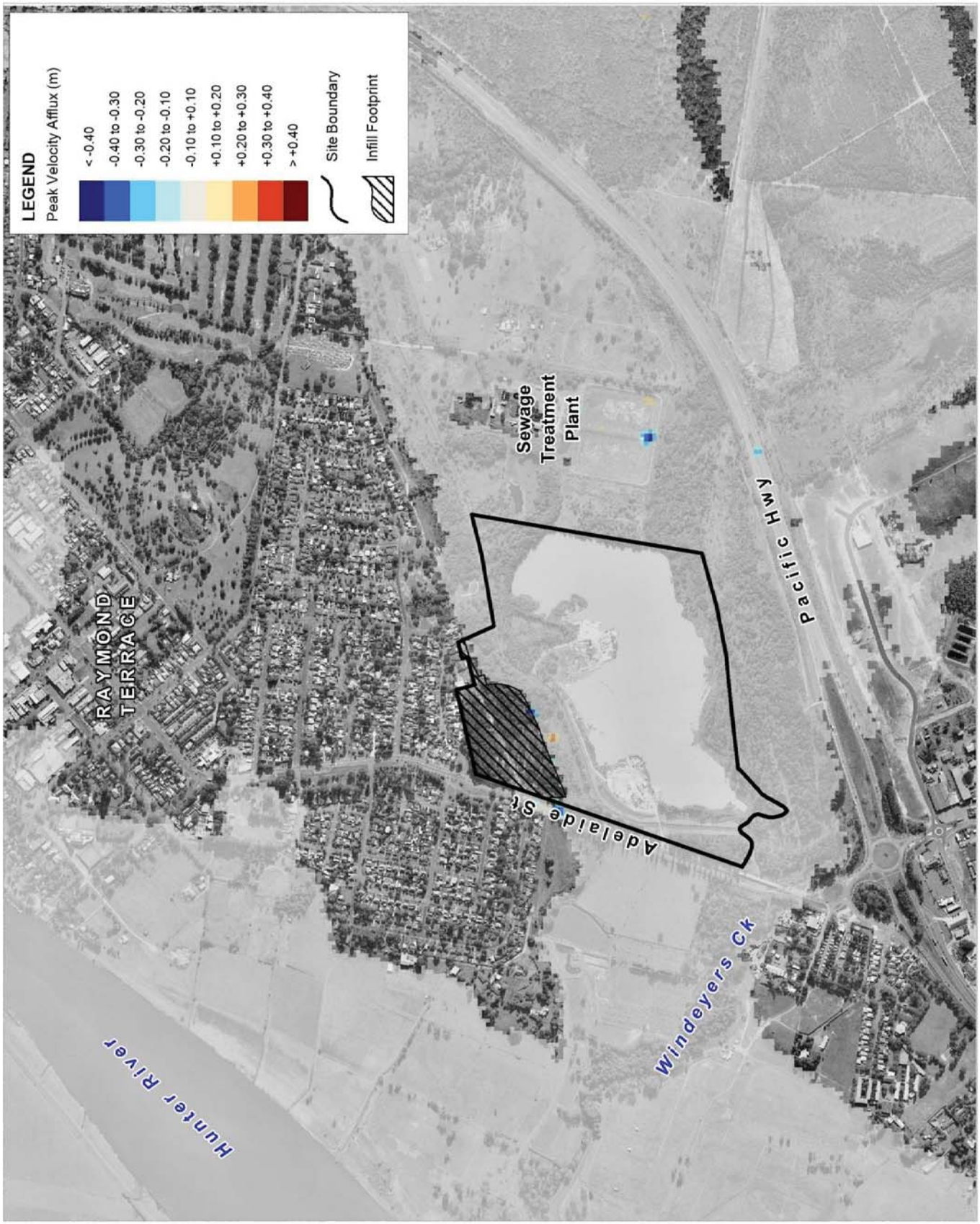

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Flood Impact Assessment - Peak Velocity Afflux: Hunter River 1% AEP 2010 SLR & 20% Rainfall Increase

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The proposed development area is located on the fringe of the 1% AEP Hunter River flood inundation extent, where velocities are minor (less than 0.1m/s) and depths are typically in the order of 1-2m. Residential development located to the north-west of the site on the opposite side of Adelaide Street (Wahroonga Street and Parkway Avenue area) is elevated well above the floodplain and offers protection to the proposed development area from Hunter River flooding. As such, the results of the flood impact assessment show that there will be negligible impact to existing 1% AEP design flood conditions at the site as a result of filling the north-western corner out of the floodplain. Increases in peak flood levels and velocities are less than 5mm and 0.05m/s. respectively.

The flood impact assessment has only considered the proposed fill footprint for the proposed dwellings (raised to the FPL). At this stage of the development design, there is no detail of the proposed access road that runs from Adelaide Street through to the development lots. The access road traverses the flood inundation area under both Hunter River and Windeyers Creek flood conditions (refer to Figure 4 and 5). The road elevations and cross drainage provisions will need to be designed to meet the objectives for access road flood immunity and minimising potential adverse impacts through elevated road profiles.

Other Considerations

In assessing the development potential site there are a number of other considerations with respect to flooding including:

- Risks to life considered for flood events up to the PMF;
- Flood warning; and
- Emergency response and flood access.

Whilst these aspects have not been considered in detail to date, the following comments are offered. The Hunter River flooding is noted as the dominant flooding mechanism and far exceeds the Windeyers Creek flooding in terms of severity. Accordingly, the design standards for any proposed development on the site is based on peak Hunter River flood levels. With regards the other design considerations noted above, it is important to note that flooding of the wider Hunter / Williams River system has a very long warning time (likely to be days), with flood waters rising slowly as a result of the large contributing catchment area. Accordingly, it is envisaged that existing formal flood warning and emergency procedures for the Hunter River would serve proposed development at the site for flood events in excess of the 1% AEP design standard.

I trust the above provides a suitable description of the opportunity and constraints for development at the subject site. Please feel free to contact the undersigned to discuss further as required.

Yours Faithfully
BMT WBM

Darren Lyons
Water & Environment Manager – Newcastle

References:

BMT WBM (2012) Williamtown / Salt Ash Flood Study Review, prepared for Port Stephens Council

BMT WBM (2017) Williamtown-Salt Ash Floodplain Risk Management Study and Plan (in preparation), prepared for Port Stephens Council

Appendix A – Proposed Development Layout

ATTACHMENT 13 – Council Report and Minutes

ITEM NO. 11 **FILE NO: 17/146423**
RM8 REF NO: PSC2014-02010

PLANNING PROPOSAL TO AMEND THE ZONING AND MINIMUM LOT SIZE AT 251 ADELAIDE STREET, RAYMOND TERRACE

REPORT OF: MICHAEL MCINTOSH - GROUP MANAGER DEVELOPMENT SERVICES
GROUP: DEVELOPMENT SERVICES

RECOMMENDATION IS THAT COUNCIL:

1) Adopt the planning proposal under the *Environmental Planning and Assessment Act 1979* (NSW) (s55) to amend the *Port Stephens Local Environmental Plan 2013* for land at 251 Adelaide Street, Raymond Terrace to:
   a) Rezone part Lot 231, DP 593512 from RU2 Rural Landscape to R2 Low Density Residential;
   b) Reduce the minimum lot size for part Lot 231, DP 593512 for land proposed to be zoned R2 Low Density Residential from 20ha to 500m^2;
   c) Apply a height of building limit for part Lot 231, DP 593512 for land proposed to be zoned R2 Low Density Residential of 9m.
2) Forward the planning proposal to the NSW Department of Planning and Environment for a gateway determination.

ORDINARY COUNCIL MEETING - 1 AUGUST 2017
MOTION

197	**Councillor Ken Jordan** **Councillor Chris Doohan** It was resolved that Council 1) Adopt the planning proposal under the *Environmental Planning and Assessment Act 1979* (NSW) (s55) to amend the *Port Stephens Local Environmental Plan 2013* for land at 251 Adelaide Street, Raymond Terrace to: a) Rezone part Lot 231, DP 593512 from RU2 Rural Landscape to R2 Low Density Residential; b) Reduce the minimum lot size for part Lot 231, DP 593512 for land proposed to be zoned R2 Low Density Residential from 20ha to 500m^2; c) Apply a height of building limit for part Lot 231, DP 593512 for land proposed to be zoned R2 Low Density Residential of 9m. 2) Forward the planning proposal to the NSW Department of Planning

	and Environment for a gateway determination.

In accordance with Section 375 (A) of the *Local Government Act 1993*, a division is required for this item.

Those for the Motion: Mayor Bruce MacKenzie, Crs Geoff Dingle, Chris Doohan, Sally Dover, Ken Jordan, John Nell and Steve Tucker.

Those against the Motion: Cr Peter Kafer.

BACKGROUND

The purpose of this report is to advise Council of a request to rezone five hectares at 251 Adelaide Street, Raymond Terrace (the site) from RU2 Rural Landscape to R2 Low Density Residential for the purposes of residential development.

A summary of the planning proposal **(ATTACHMENT 1)** is provided is below:

Proponent:	De Witt Consulting (on behalf of Phoenix Builders)
Site:	251 Adelaide Street, Raymond Terrace Part of Lot 231, DP 593512
Site Area:	Five hectares
Existing Zoning:	RU2 Rural Landscape
Recommended Zoning:	R2 Low Density Residential
Existing Minimum Lot Size:	20 hectares
Proposed Minimum Lot Size:	500m^2

The site is located on the south eastern edge of Raymond Terrace and has frontage to Adelaide Street. Adjoining land to the north and south is zoned R2 Low Density Residential and RE1 Public Recreation. Hunter Water Corporation wastewater infrastructure is located to the south and west of the site.

The site contains native vegetation and pine forest plantation. An easement exists over the site for the purpose of an Asset Protection Zone, which provides bushfire protection to the residence located to the north at 204 Meredith Crescent. A powerline easement is also located immediately south of the proposed rezoning site.

Additional information to support the planning proposal and confirm site suitability for potential residential development will be required by the proponent following a conditional gateway determination. Key issues likely to be further investigated and updated for public exhibition of the planning proposal include: bushfire, servicing infrastructure (provision of water and sewer), odour and noise modelling, further flora and fauna investigation for the purposes of entering into a bio-banking agreement, Aboriginal cultural heritage and flooding.

The proposal will assist Council in achieving further infill housing in Raymond Terrace as outlined by the Raymond Terrace and Heatherbrae Strategy. It is therefore considered that the planning proposal has sufficient merit to proceed to gateway panel on the basis that the additional investigations will be undertaken post-gateway.

COMMUNITY STRATEGIC PLAN

Strategic Direction	Delivery Program 2013-2017
Sustainable Development.	Provide Strategic Land Use Planning Services. Provide Development Assessment and Building Certification Services.

FINANCIAL/RESOURCE IMPLICATIONS

There are no financial or resource implications if Council resolves to proceed with the planning proposal.

Source of Funds	Yes/No	Funding ($)	Comment
Existing budget	No		
Reserve Funds	No		
Section 94	Yes		Future development in the form of subdivision will be subject to local infrastructure contributions in accordance with the Port Stephens Local Infrastructure Contributions Plan 2007.
External Grants	No		
Other	Yes	10,500	The proposal was categorised as Category B under Council's Fees and Charges Schedule. The Stage 1 fee of $10,500 was paid on 27th May 2014.

LEGAL, POLICY AND RISK IMPLICATIONS

Environmental Planning and Assessment Act 1979 (NSW)

Under the *Environmental Planning & Assessment Act 1979 (Part 3) (NSW),* only the Minister or Council can initiate a local environmental plan. If Council resolves to proceed with the recommendation and adopt the planning proposal, it will be forwarded to the NSW Department of Planning and Environment for a gateway determination. This will include a request for the delegation of plan making functions.

Regional Planning

The Hunter Regional Plan 2036 projects a population increase of 18,550 persons for the Port Stephens LGA. Raymond Terrace has been identified as a strategic centre with priorities, such as, as the main service centre. The outcomes of this planning proposal are consistent with these priorities.

Local Planning

The planning proposal is consistent with the Port Stephens Planning Strategy (PSPS) and the Raymond Terrace Heatherbrae Strategy.

The PSPS identifies Raymond Terrace as a regional centre. Mixed use development in the regional centre, including housing, is strongly encouraged. The planning proposal will contribute to the increase of residential housing development within Raymond Terrace. The proposal will assist Council in achieving further infill housing in Raymond Terrace as outlined by the Raymond Terrace and Heatherbrae Strategy.

Risk	**Risk Ranking**	**Proposed Treatments**	**Within Existing Resources?**
There is a risk that potential residential development within the area will impact on access to Hunter Water Corporation infrastructure located immediately adjacent to the proposal area.	Medium	Consultation will take place with the Hunter Water Corporation if a gateway determination is received.	Yes
There is a risk that potential residential development within the proposal area will be impacted by the odour and noise generated by the Hunter Water Corporation Wastewater Pumping Station located adjacent to the proposal area.	Medium	Odour and noise modelling will be undertaken if a gateway determination is received. The results of this study will be included in further consultation with Hunter Water Corporation as the infrastructure owner.	Yes

SUSTAINABILITY IMPLICATIONS
Includes Social, Economic and Environmental Implications

The planning proposal will have positive economic and social implications through the provision of an estimated 60 residential lots in close proximity to existing services, roadways, public transport as well as cycleway and pedestrian access to Raymond Terrace. Residential development in the proximity of the Raymond Terrace town centre will contribute to the utilisation of local services and support local business.

Residential development will result in the loss of vegetation and the edge effects on the identified riparian buffer. Vegetation within the proposal area has been identified as swamp sclerophyll forest of predominantly poor condition. The vegetation within the proposal area may be further mapped and classified by the proponent post gateway determination in order to offset the vegetation loss through bio-banking. It is anticipated that the impacts of development on the retained riparian buffer will be mitigated through appropriate subdivision design at development application stage.

CONSULTATION

Internal consultation has been undertaken by the Strategy and Environment Section. The objective of this consultation was to review the planning proposal submitted by the proponent prior to preparing a proposal for Council's consideration.

Internal

Natural Resources found the Flora and Fauna Offsets Assessment prepared by the proponent to be consistent with the Port Stephens Council Comprehensive Koala Plan of Management Rezoning Performance Criteria. Clarification of the quality of the swamp sclerophyll vegetation within the proposal area may be sought post gateway determination in order to inform the details of the potential offsetting strategy.

Facilities and Services reviewed the Traffic Impact Study submitted by the proponent and advised that the proposal is not expected to generate traffic beyond the capacity of the existing road network. Facilities and Services also reviewed the Flood Assessment submitted by the proponent and considered the proposal to have no significant impact on the potential flooding of surrounding areas or the flood distribution through Windeyers Creek. The local drainage issues that are within the proposal area may be addressed post Gateway Determination. Consultation with the NSW Office of Environment and Heritage will be undertaken on this matter due to inconsistency with Section 117 Ministerial Direction 4.3.

External

Consultation with Government Agencies will be undertaken in accordance with the gateway determination. It is suggested that consultation with the following agencies will take place: Hunter Water Corporation; NSW Rural Fire Service; NSW Office of Environment and Heritage; NSW Rural Fire Service; and Ausgrid.

Community

The proposal will be publically exhibited in accordance with the Gateway determination. Due to the size of the proposal, an exhibition period of 28 days is recommended to allow the community with enough time to provide input.

OPTIONS

1) Accept the recommendations.
2) Amend the recommendations.
3) Reject the recommendations.

ATTACHMENTS

1) Planning proposal - 251 Adelaide Street Raymond Terrace. (Provided under separate cover)

COUNCILLORS ROOM

Nil.

TABLED DOCUMENTS

Nil.