AMENDED PLANNING PROPOSAL

1310 NAVAL COLLEGE ROAD , WORROWING HEIGHTS

1 JUNE 2018
SA7429
FINAL
PREPARED FOR RMI GROUP PTY LTD

URBIS

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

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Overview

This report has been prepared on behalf OF RMI Group to initiate the preparation of an amendment to Shoalhaven Local Environmental Plan 2014 (SLEP 2014). The amendment relates to 1310 Naval College Road, Worrowing Heights (Lot 1752 in DP28785) and proposes the following:

- Rezoning the site to R2 Low Density Residential to allow for residential development;
- Amending Schedule 1- Additional Permitted Uses to allow for the development of a hotel and uses complementary to the proposed hotel, including restaurant, bar and function centre;
- Amending the minimum size for subdivision
- Establishing a site specific maximum height control of 14m;
- Establishing maximum gross floor area for future uses on the site.

This report has been prepared to assist Shoalhaven City Council (Council) to prepare a Planning Proposal for the SLEP 2014 amendment of the site in accordance with Section 3.33 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Background

This Planning Proposal is an amendment to one previously submitted in respect of the site. The previous Planning Proposal was to rezone the site from RU2 Rural Landscape to SP3 Tourist under SLEP 2014. The previous Planning Proposal also proposed to increase the Height of Buildings development standard to 18 metres.

Subsequent to the lodgement of the previous Planning Proposal, Council undertook a strategic planning investigation into the Worrowing Heights Precinct. The Worrowing Heights Strategic Directions Report and Precinct Plan (WHPP) was adopted by Council in February 2018.

The proponent was subsequently advised to submit an amended Planning Proposal for the site; one that considers the recently adopted WHPP and the context of the surrounding locality.

Proposed SLEP 2014 Amendment

This Planning Proposal has been prepared to enable the redevelopment of the site for a hotel, residential and other accompanying uses through the preparation of a site-specific amendment to SLEP 2014. A concept design that sets out a proposed envelope and indicative building footprint, to inform this Planning Proposal, is attached at **Appendix A.**

Under SLEP 2014, the site is currently zoned RU2 Rural Landscape. The existing height control applicable to the site permits development to 11 metres.

The Planning Proposal can be achieved by the following amendments to SLEP 2014 as it relates to the site:

- amending the *Shoalhaven LEP, 2014 Land Zoning Map-Sheets LZN_20C* and *LZN_020D* to show the zoning of the site as R2- Low Density Residential (as shown in Part 4, **Figure 12**).
- amend the *Shoalhaven LEP, 2014 Height of Buildings Map-Sheet HOB_020C and HOB_020D* to provide for a maximum building height of 9m on the site (as shown in Part 4, **Figure 13**);
- amending the *Shoalhaven LEP, 2014, Minimum Lot size map- Sheets LSZ_020C and LSZ_020D* and to provide a minimum lot size for subdivision within the site as 500m^2 (as shown in Part 4, **Figure 14)**
- amending the *SLEP 2014 Clauses Map-Sheets CLS_020C* and *CLS_020D* to refer to the additional permitted uses in Schedule 1.19 (as shown in Part 4, **Figure 15**)
- insert an additional clause to Schedule 1 Additional Permitted Uses of the *Shoalhaven LEP, 2014,* as below:

19 Use of certain land at 1310 Naval College Road, Worrowing Heights

(1) This clause applies to land identified as "Schedule 1.19" on the Clauses Map, being Lot 1752 in DP 28785

(2) *Development for the purposes of residential accommodation, tourist and visitor accommodation, food and drink premises, recreation facilities (indoor), recreation facilities (outdoor) and retail premises is permitted with development consent in conjunction with the Tourist and Visitor accommodation developed on the land to which this clause applies.*

(3) Development for the purposes of tourist and visitor accommodation and residential accommodation to a maximum height of 14m is permitted with development consent

(4) Notwithstanding any other provision of this plan the maximum gross floor area of tourist and visitor accommodation and associated activities and residential accommodation permitted under this clause is as follows:

	Land Use	***Total GFA***
i.	*Tourist and Visitor accommodation*	*6650m²*
ii.	*Food and Drink premises*	*275m²*
iii.	*Function Centre*	*350m²*
iv.	*Day spa*	*200m²*
v.	*Retail premises*	*150m²*
vi.	*Residential Accommodation*	*10,000m²*

Planning Outcomes

The site presents an opportunity to develop high quality tourist accommodation and associated land uses that will bring employment and generate further investment in the Shoalhaven region.

The site is largely clear of vegetation and has minimal environmental constraints. It has excellent road access to the recently upgraded Naval College Road. The access to the site, topography of the surrounding area and the surrounding pattern of subdivision will serve to screen the majority of future development from the road, minimising the potential visual impacts.

The Planning Proposal will facilitate the development of an integrated tourist and residential precinct. The establishment of residential uses on the site is consistent with the outcomes contained in the Worrowing Heights Precinct Plan. The proposal provides for approximately 100 new dwellings within walking distance of local retail and health services at the existing Vincentia Marketplace. This will encourage the development of a walkable, sustainable community.

The future development of the site would result in a number of direct economic benefits, during the construction stage and ongoing employment opportunities during the operation of the proposed hotel, accompanying restaurant, and function centre. The development of a 100 room hotel will fulfil a need for large scale accommodation in the area, and serve to diversify the tourist and visitor base by meeting a current demand of group tour operators.

Following our analysis of the site and its surrounding context, and the applicable State and local planning policies, it is demonstrated that there is clear planning merit to the Planning Proposal. It is therefore recommended that this Planning Proposal be considered by Shoalhaven Council and that Council resolve to forward it to DPE for Gateway Determination in accordance with the EP&A Act to prepare the necessary LEP amendment.

1. INTRODUCTION

1.1. OVERVIEW

This report and Planning Proposal have been prepared by Urbis Pty Ltd on behalf of RMI Group Pty Ltd (the proponent) to initiate an amendment of *Shoalhaven Local Environmental Plan 2014* (SLEP 2014) in relation to a site at 1310 Naval College Road, Worrowing Heights (the site).

The intended outcome of the Planning Proposal is to rezone the land to facilitate tourist and residential uses on the site.

The proponent intends in future to lodge a development application for a four-storey hotel with associated restaurant, bar, pool, function centre, day spa and laundromat. The proposal also includes two four- storey residential apartment buildings.

The Planning Proposal seeks to amend SLEP 2014 as follows:

- Rezone the site from RU2 Rural Landscape to R2 Low Density;
- Amend the minimum lot size for subdivision to 500m^2
- Insert a clause into Schedule 1 to allow a maximum building height control of 14m on the site for tourist and visitor accommodation, residential accommodation and associated uses including:
  - Restaurant
  - Conference facilities
  - Pool
  - Day spa; and
  - Laundromat
- Under Schedule 1 limit the maximum gross floor areas (GFAs) for the tourist and visitor accommodation, residential accommodation and associated uses on the land.

1.2. BACKGROUND

This Planning Proposal is an addendum to one previously submitted for the site in 2016. The relevant background is described below.

1.2.1. Previous Development Approval

A development application (DA14/1391) was approved on 19 May 2015 by Shoalhaven City Council (Council) for the construction of an 80 bed two storey motel with manager's residence and parking for 93 vehicles at the site. In determining the development application, Council resolved (MIN15.290) that should the proposed development proceed, that Council investigate and consider the rezoning of the precinct.

The development application (DA) was submitted under the Shoalhaven Local Environmental Plan 1985 on land zoned 1(b) (Rural "B" (Arterial and Main Road Protection) Zone). The gazettal of the Shoalhaven Local Environmental Plan 2014 (SLEP 2014) changed the zone to RU2 Rural Landscape, under which hotel or motel accommodation and serviced apartments are prohibited.

The proponent now seeks to develop a larger hotel and residential apartment building. The proposal is prohibited under SLEP 2014 and a Planning Proposal is required to facilitate the development. The development consent DA14/391 has not been commenced.

1.2.2. Previous Planning Proposal

In May 2016 a preliminary Planning Proposal for the site was lodged with Council by JBA Urban Planning Consultants. This sought to rezone the site to SP3 Tourist and increase the maximum height of buildings to 18 metres under SLEP 2014.

On 18 July 2016, Shoalhaven Council Development Committee resolved to defer a decision on this proposal and undertake a strategic planning exercise for the broader Worrowing Heights precinct. As the approved development at 1310 Naval College Road had not proceeded, Council had not previously commenced this investigation.

In September 2016, Locale Consulting Pty Ltd (Locale) commenced a strategic review on Council's behalf of the Worrowing Heights precinct. On 13 February 2018 Council's Development Committee resolved to adopt the Worrowing Heights Precinct Plan (WHPP) and Strategic Directions Report as exhibited, with minor changes ((MIN18.79).

At the same meeting Council resolved 'to defer consideration of the Planning Proposal for 1310 Naval College Road, Worrowing Heights, to enable the matter to be discussed with the proponent.' Following a subsequent meeting with Council on 13 March 2018, the proponent was advised to submit an amended Planning Proposal for the site; that considers the recently adopted WHPP and the context of the surrounding locality.

1.3. REPORT STRUCTURE

The Planning Proposal has been prepared in accordance with section 3.35 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act) and the relevant guidelines prepared by the NSW Department of Planning and Environment (DPE) including *A Guide to Preparing Local Environmental Plans* and *A Guide to Preparing Planning Proposals*. It includes the following:

- Description of the site and its context;
- Overview of the strategic context of the site;
- Summary of the local planning controls;
- An overview of the key elements of the Planning Proposal.
- Statement of the objectives and intended outcomes of the proposal;
- Explanation of the provision of the proposal;
- Justification for the proposal;
- Mapping to accompany the proposal;
- Description of the community consultation process expected to occur regarding the proposal; and
- An approximate project timeline.

The Planning Proposal is accompanied by plans and reports to provide a comprehensive analysis of the site opportunities and constraints. It is noted that the supporting reports were prepared in respect of the previous more intensive Planning Proposal and have not been updated to reflect the amended scheme.

- **Appendix A** - Architectural Plans prepared by Styletec design and building solutions.
- **Appendix B** – Traffic Assessment prepared by Apex Engineers
- **Appendix C** – Flora and Fauna Assessment prepared by Biosis
- **Appendix D** – Bushfire Assessment prepared by Australian Bushfire Assessment Consultants
- **Appendix E** – Economic Study prepared by Hill PDA.
- **Appendix F** – Visual Impact Assessment prepared by Clouston Associates
- **Appendix G** – Hydraulic Assessment prepared by DBA Hydraulics
- **Appendix H** – Electrical Capacity Report prepared by Northrop

2. SITE & SURROUNDING CONTEXT

2.1. SITE LOCATION

The site is at 1310 Naval College Road, Worrowing Heights located within the Shoalhaven Local Government Area (LGA), approximately 20 kilometres south east of the Nowra CBD.

The site is currently zoned RU2 Rural Landscape. The land to the north of the site on the opposite side of Naval College Road is zoned B2 Local Centre and R2 Low Density Residential.

The site is situated close to the area's natural attractions and is only 2km west of Jervis Bay, as shown in Figure 2. The site is approximately 5km north of the Booderee National Park. Lands to the south east form part of the Jervis Bay National Park.

The site's location and context are shown in Figures 1 and 2.

Figure 1 – Aerial Photo

Figure 2 – Site Context

2.2. SITE CHARACTERISTICS AND CONTEXT

The site is legally described as Lot 1752 in DP28785, has an area of 30,700m² and is irregular in shape.

It has an 18m eastern frontage to Naval College Road. This frontage forms a 'neck' like access to the site. The site widens approximately 50m south of the street frontage to approximately 100m.

The site is largely cleared with no significant vegetation. Existing development on the site consists of residential dwellings and associated farm storage structures. The site is not currently used for active agricultural uses. There is a small cluster of trees located at the southern portion of the site. The site has a fall of approximately 5m from the north west to the south east and a fall of approximately 5m from the west boundary to the east. The narrow frontage to Naval College Road limits the visibility of the site from the streetscape.

The subdivision pattern means that four properties adjoin the site, however as described below and shown in Figure 3, only two residential dwellings are located in proximity to the site boundary.

North No.1308 Naval College Road to the north, dwelling within 10m of the site boundary;

East: No.1312 Naval College Road to the east; dwelling within 10m of the site boundary

West: No.1284 Naval College Road; residential dwelling situated 80m away from site boundary

South: No.233 The Wool Road

On the opposite side of Naval College Road to the north of the site is the Bayswood residential housing estate and the Vincentia Marketplace retail centre, this is approximately 100m from the site.

Figure 3 – Subdivision pattern surrounding the site

Worrowing Heights is an urban fringe area currently undergoing significant transformation. The southern side of Naval College Road is predominantly rural in nature, and adjacent properties to the south and west of the site are managed rural land. The surrounding lots vary in vegetation with some fully cleared, while others still feature dense vegetation. In contrast, the Bayswood Residential estate north of Naval College Road is an urban locality centred around the Vincentia Marketplace. The Bayswood Estate is a masterplanned estate first developed in 2008 and being delivered in stages.

The area to the south has features typical of the rural landscape, although a number of lots in the vicinity of the site now operate non-agricultural uses. The corner of The Wool Road and Naval College Road is cleared and is used by the local school. Adjoining the site southern boundary at 233 The Wool Road is the Jervis Bay Veterinary Clinic. A property on Naval College Road to the north-west operates a child care business.

2.3. ACCESS AND SURROUNDING ROAD, RAIL AND BUS NETWORK

Vehicle access to the site is via Naval College Road, just west of the intersection with Moona Creek Road. Naval College Road forms part of the link between Princes Highway and Jervis Bay. It runs north-south and connects with Princes Highway approximately 13km to the north. To the south -east, approximately 500m from the site, is the intersection of Naval College Road and Wool Road. Wool Road is a major north-south link between Vincentia and Naval College Road.

The local road network has recently been upgraded to cater for the Bayswood Residential Estate development and Vincentia Marketplace. Additional lanes and two roundabouts have been constructed on Naval College Road, one at the northern end of the Bayswood Estate and another at the entry to the Vincentia Marketplace shopping centre.

2.3.1. Bus services

Nowra Coaches operates bus route 732 (and 733) which connects the Bay and Basin Suburbs of the Shaolhaven with Nowra CBD and the train station at Bomaderry. This route includes a stop at Vincentia Marketplace within 100m of the site. This service runs six times a day on week days and twice a day on weekends.

2.3.2. Train

Bomaderry Railway station is located 30km to the north of the site. Bomaderry is the first stop on the South Coast train line which has regular services via Wollongong to Sydney.

3. EXISTING PLANNING CONTROLS

This section provides a summary of the existing local planning controls that apply to the site under the current legislative framework.

3.1. SHOALHAVEN LOCAL ENVIRONMENTAL PLAN 2014

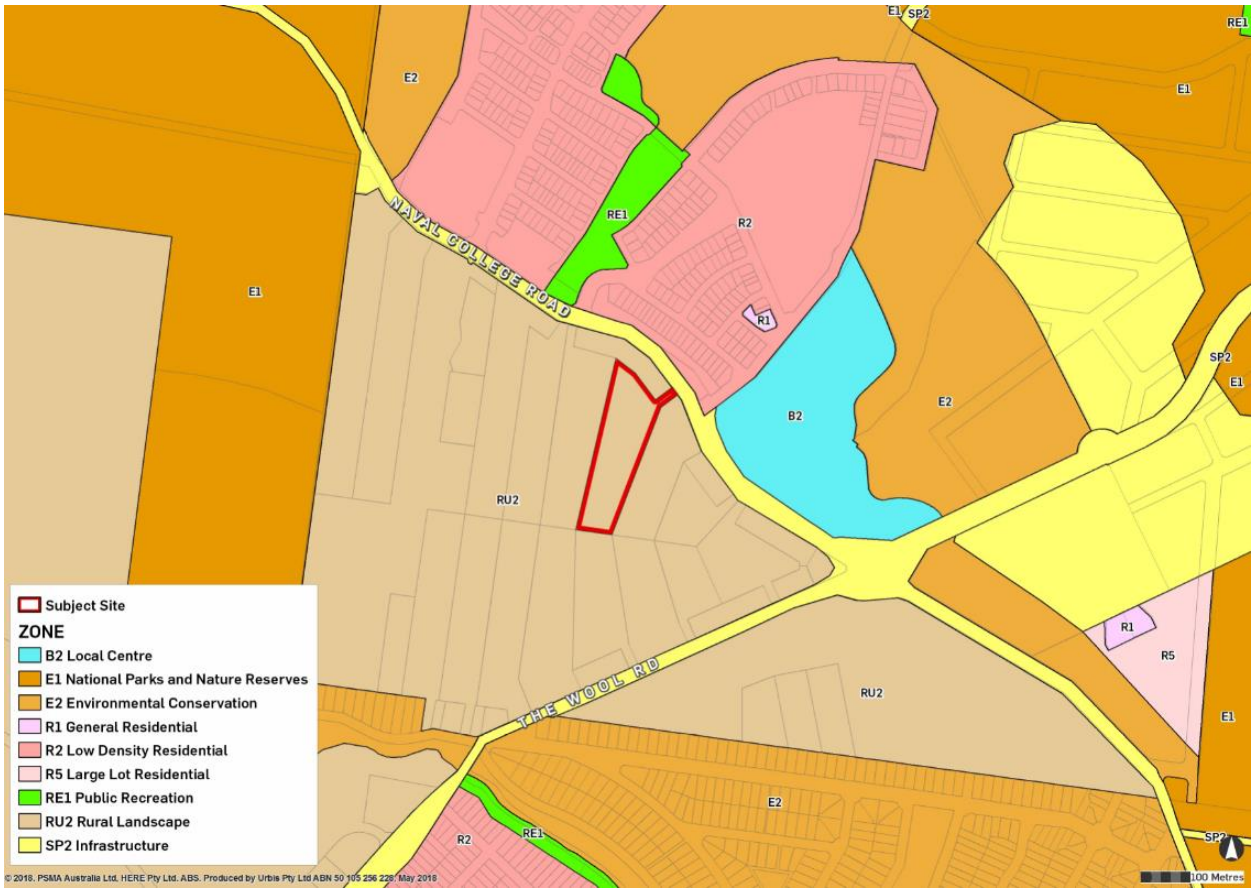
The principal statutory planning instrument applying to the site is SLEP 2014.

3.1.1. Zoning and Permissibility

The site is zoned RU2 (Rural Landscape) under the SLEP 2014. As illustrated in Figure 4 below, the land south of Naval College Road and surrounding the site has the same RU2 zoning. Despite the RU2 zoning, the site is not actively used for agricultural uses.

Land to the north of Naval College Road within the Bayswood Residential Estate is zoned R2 Low Density Residential and the Vincentia Marketplace is zoned B2 Local Centre.

Figure 4 – Existing Zoning Map



The existing zoning controls applying to the site are summarised in Table 1 below:

Table 1 – Summary of Existing Zoning Controls

Control	RU2 Rural Landscape
Zone Objectives	• To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. • To maintain the rural landscape character of the land.

Control	RU2 Rural Landscape
	• To provide for a range of compatible land uses, including extensive agriculture.
Permitted without consent	Extensive agriculture; Forestry; Home occupations
Permitted with consent	Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Crematoria; Depots; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Food and drink premises; Freight transport facilities; Funeral homes; Group homes; Hazardous industries; Helipads; Home-based child care; Home businesses; Home industries; Information and education facilities; Marinas; Markets; Mooring pens; Moorings; Offensive industries; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Tourist and visitor accommodation; Veterinary hospitals; Water recreation structures; Water supply systems
Prohibited	Hotel or motel accommodation; Pubs; Serviced apartments; Any other development not specified in item 2 or 3

3.1.2. Maximum Height of Buildings and Floor Space Ratio

SLEP 2014 does not prescribe building heights, therefore Clause 4.3(2A) of SLEP 2014 applies. Clause 4.3(2A) states:

If the Height of Buildings Map does not show a maximum height for any land, the height of a building on the land is not to exceed 11 metres.

The maximum height of building on the site is therefore 11 metres as shown on Figure 2.

Figure 5 – Existing Height of Buildings Map

There is no maximum floorspace ratio (FSR) specified for the site. There is also no maximum FSR identified in the adjacent Bayswood Estate. Within the Bayswood Estate density is controlled by the maximum height of building control of 9m, and through the application of design criteria contained within the Shoalhaven Development Control Plan 2014.

3.1.1. Minimum Lot Size

Presently, a minimum lot size control of 40ha applies to the subject site (see below). This is reflective of the existing Rural Landscape zoning. This proposal seeks to amend this minimum lot size map to facilitate the intended development outcome. Within the Bayswood Estate the minimum lot size for subdivision is 500m^2.

Figure 6 – Existing Minimum Lot Size Map

3.2. SHOALHAVEN DEVELOPMENT CONTROL PLAN 2014

Shoalhaven Development Control Plan (DCP) 2014 was prepared under the EP&A Act. DCP 2014 is a consolidation of various subject matter and site specific DCPs previously prepared for the LGA and came into effect on 22 October 2014. When assessing Development Applications (DAs), Council must consider the relevant provisions of Shoalhaven DCP 2014 as required under Section 4.15 of the EP&A Act.

Of relevance to the future development applications on the site and for tourism uses, DCP 2014 provides guidance on matters including:

Chapter 1 – Introduction

- Development Application Process – Section 9

Generic Chapters

G1 Site Analysis, Sustainable Design and Building Materials in Rural, Coastal and Environmental Areas

- G2 Sustainable Stormwater Management and Erosion/Sediment Control
- G3 Landscaping Design Guidelines
- G4 Tree and Vegetation Management
- G5 Threatened Species Impact Assessment
- G7 Waste minimisation and Management Controls
- G11 Subdivision of Land

- G14 Other Residential Accommodation
- G15 Tourist and Visitor Accommodation
- G17 Business, Commercial and Retail Activities
- G21 Car Parking and traffic
- G22 Advertising Signs and Structures

The controls contained within the DCP provide an effective framework for development assessment, including future tourism and residential development on the site.

4. INDICATIVE DEVELOPMENT OUTCOME

4.1. INDICATIVE CONCEPT SCHEME

The Planning Proposal seeks to facilitate the development of a masterplanned tourist facility and residential community. The hotel will have an associated restaurant, bar, function centre, pool, day spa and laundromat with underground carparking.

An indicative massing scheme for the site has been prepared by Styletec**, refer Appendix A.** It is noted that the indicative massing is based on the various technical investigations progressed to inform this Planning Proposal. It provides a representation of how the site could be developed in future; but is not intended to lock in a design. The indicative scheme has been based on the following principles:

- to provide a high quality masterplanned tourist facility and residential site;
- to provide an accommodation offering is suitable for the group tour market;
- to provide low-scale built form, sympathetic to the site's rural surrounds, sensitively sited to minimise the potential visual impacts of the development from the surrounding area;
- provide perimeter planting and landscaping to provide a sense of a resort within a bushland setting ensure the development integrates well with the adjoining development to the north; and
- provide separate pedestrian and vehicle access to and within the site, with the emphasis on maximising environmental and recreational space.

A numeric overview of the indicative concept the Planning Proposal would enable is provided in Table 1.

Table 2 –Numeric overview of indicative concept

Land Use Component	Total
Site Area	30,700m²
Height	14m
Indicative Hotel yield	100 rooms
Indicative Residential apartment yield	100 apartments

The hotel building would be located on the north east part of the site with the entrance lobby oriented towards a porte cochere driveway at ground level. The ground floor would house the following amenities for the hotel:

- restaurant / bar
- function rooms
- day spa
- swimming pool

Above the podium would be three storeys comprising 100 rooms for a 4 star hotel. The proposal would also provide a level of basement car parking that would be the hotel in a partially below ground basement.

Two separate four storey buildings would be provided on the western end of the site that would accommodate 100 residential apartments. There would be separate basement carparking for residents.

This arrangement is one representation of how residential development could be delivered on the site. The building typology could evolve to a townhouse or villa style development.

A preliminary GFA allocation for the various land uses on the site is provided in Table 3. It is intended that these amounts would set a maximum permissible GFA that would then be embedded in SLEP 2014.

Table 3 – Proposed maximum GFAs by land use

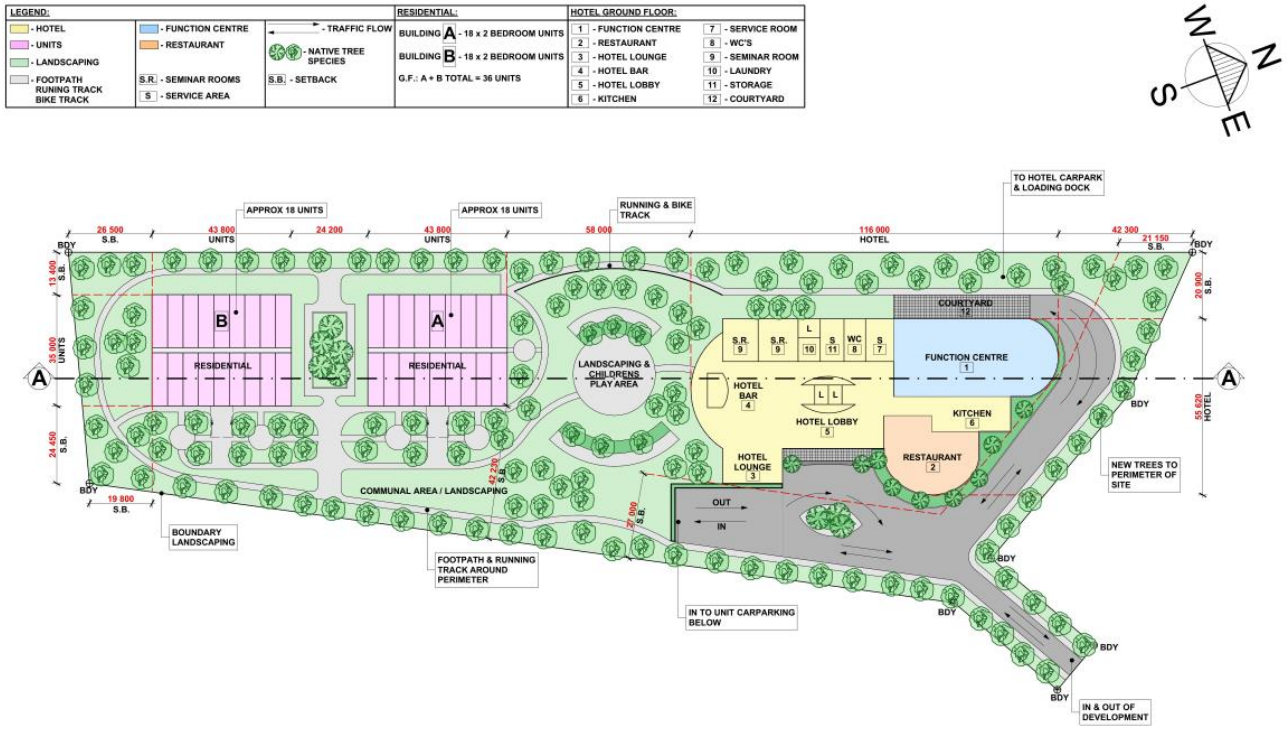
Land Use	Total GFA
Tourist and visitor accommodation	6650m^2
Food and drink premises	275m^2
Function centre	350m^2
Day spa	200m^2
Retail premises	150m^2
Residential accommodation	10,000m^2

These urban design principles are expressed in the plans for the indicative development scheme provided in the figures below and in the complete set at **Appendix A.**

Figure 7 – Perspective of Proposed Hotel

Figure 8 – Indicative site layout

Figure 9 – Indicative Ground Floor Plan



4.2. RELEVANT CONSIDERATIONS

4.2.1. Future Use of the Land

It is proposed to rezone the site to the R2 Low Density Residential zone, allowing for a range of permissible uses.

The objectives of the R2 Low Density Residential zone are:

- To provide for the housing needs of the community within a low density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To provide an environment primarily for detached housing and to ensure that other development is compatible with that environment.

The following land uses are permitted with development consent:

> *Bed and breakfast accommodation; Boarding houses; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Child care centres; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Flood mitigation works; Group homes; Health consulting rooms; Home-based child care; Home businesses; Home industries; Jetties; Neighbourhood shops; Places of public worship; Recreation areas; Respite day care centres; Roads; Sewerage systems; Water supply systems*

This zoning is considered appropriate for the site as it would provide consistency with the zoning in place within the Bayswood Estate. However, it is noted that *'tourist and visitor accommodation'* is not permissible within the R2 Low Density Residential zone. Uses normally associated with tourist accommodation, such as restaurants, conference and recreation facilities are also not permitted.

The intent of the proposal is to deliver a hotel facility and accompanying residential development with a range of services to cater for guests' day to day needs. The proximity of the site to the Vincentia Marketplace means visitors staying at the hotel and residents of the site will be able to access local facilities and services, consistent with the objectives of the zone.

This Planning Proposal therefore proposes that the sited be rezoned to R2 Low Density Residential, and that additional permitted uses be added to Schedule 1 of SLEP 2014 as it relates to the site to enable the hotel. ancillary uses and residential accommodation. These are described in Section 7 - Explanation of Provisions of this report.

4.2.2. Built Form

Indicative building layouts have been prepared, demonstrating how the land could be developed for hotel, tourism and residential purposes in future. Building setbacks and the amount of landscaped area has been provided in accordance with SDCP 2014.

The concept design includes a four-storey hotel facility, with restaurant, function centre and day spa use integrated within the same building envelope. The concept design also shows two, four storey residential buildings located in the south west portion of the site.

The Planning Proposal proposes to increase the height limit on the subject site to 14m, 3m higher than the current maximum building height of 11m permitted under Clause 4.3(2A) of SLEP 2014. The maximum building height currently allowed under SLEP 2014 range from 3m on neighbouring E2 and RE1 zones; 9m on neighbouring R1, R2 and B2 zones; and 11m on neighbouring RU2 zones under Clause 4.3(2A).

The retention of the height of buildings maximum at 11 metres would effectively limit development on the site to a three-storey building form. To deliver an economically viable tourist development over three storeys would mean that an increased proportion of the site would be built upon. This would be a sub optimal environmental and amenity outcome. It would potentially increase the amount of vegetation clearance required, as well as reduce the amount of open space available on the site.

The proposed height increase to 14m will enable the development of a 100 room hotel development that optimises and fulfils the development potential of the site. It will allow a hotel of a scale suitable to the site whilst also preserving significant open space and providing amenity for future guests and residents.

4.2.3. Traffic and Access

A Traffic Assessment Report has been prepared by Apex Engineers (**refer Appendix B**). This report was prepared in respect of the original Planning Proposal for the site, which proposed a larger hotel and serviced apartments.

The anticipated traffic generation was 1,800 daily trips, based on the development operating at full capacity. The Apex report found that the surrounding road network had the capacity to absorb these estimated flows. The expected trip generation and parking requirements for the amended Planning Proposal are likely to be less than those described in this assessment.

An indicative road and parking layout has been shown on the concept plans. The amended Planning Proposal retains the existing site access from Naval College Road. Guest and resident vehicles would then be directed into the basement carpark located near the southern boundary of the site.

The car park requirements of Shoalhaven DCP 2014 are summarised at Table 2. The proposal would seek to provide a compliant provision of car parking during detailed design, to be submitted during the DA stage of the proposal.

Table 4 – Shoalhaven DCP car parking requirements

Land Use type	Standard	Parking requirement
Hotel	1 space per room plus 1 space per employee and/or manager.	102 spaces + 1 x number of employees anticipated
Multi Dwelling Housing Attached Dwellings Integrated Housing Residential Flat Buildings	1.5 spaces per medium dwelling (56-85m^2) 2 spaces per dwelling of 86m2 or greater. The above parking rate includes visitor spaces.	164 spaces

A future application for development approval would be submitted with an updated traffic impact assessment. This assessment would resolve the design of the access road, provide a compliant provision of car parking, and provided updated assessment of trip generation and impacts arising from the development. This traffic assessment would be prepared in accordance with the requirements set out in the Shoalhaven Council Development Control Plan 2014, G21- Car Parking and Traffic

4.2.4. Vegetation

A flora and fauna assessment has been prepared by Biosis in respect of the previous Planning Proposal (**Appendix C**). The assessment considers the ecological values of the site and within 60m of the site boundary. The site is predominantly cleared with vegetation consisting of scattered patches of mature trees located in the south to south west of the site. The report found that there are no endangered populations or ecological communities listed under the Environment Protection and Biodiversity Conservation Act 1999, or Threatened Species Act 1995 within the study area.

One threatened orchid, Pretty Beard Orchid, was recorded on the property to the west. This area forms part of a proposed Asset Protection Zone (APZ) for future development on the site. The site does contain potential habitat for this threatened species, though none were recorded within the site.

The primary impacts arising from the previous proposal were found to be the removal of large trees from the site, and the potential spread of noxious weeds and soil borne pathogens resulting from the construction works. Recommendations to reduce these impacts include the retention of habitat within the proposed APZs and retention of hollow bearing trees where possible.

The Biosis Report concludes that the proposal will not result in significant impacts to flora and fauna. It is noted this conclusion was made in respect of the previous Planning Proposal, however the assessment is considered sufficient to allow for the amended Planning Proposal to proceed to gateway determination. A future application for development approval would be submitted with an updated flora and fauna impact assessment.

4.2.5. Bushfire

The site is bushfire affected and a Bushfire assessment in respect of the previous Planning Proposal has been prepared by Australian Bushfire Assessment Consultants (refer **Appendix D**). An appropriate asset protection zone will be required around the future development. The bushfire assessment identifies a 45 metre wide APZ easement area in order for future development to comply with the specifications and requirements of the NSW Rural Fire Service Planning for Bushfire Protection 2006.

The APZ will be contained within the neighbouring properties to the west and south of the site. We understand that the subject landowners have agreed in principle to the APZ. A deed agreement would be lodged with the DA to confirm the APZ arrangements.

4.2.6. Economic

An Economic Impact Study prepared by Hill PDA (refer **Appendix E**) accompanies this amended Planning Proposal. The economic assessment considers the existing supply and demand for tourist accommodation within the Shoalhaven, the impact of the Planning Proposal on the supply of accommodation, and the potential economic impacts arising from the construction and operation of a tourism facility on the site. The assessment was prepared in respect of the previous Planning Proposal for the site. Notwithstanding this, the report is of relevance for the assessment it provides of the existing supply of and future demand for tourist accommodation within the Shoalhaven.

The Hill PDA assessment of the current state of tourism accommodation in the Shoalhaven is that available accommodation predominantly consists of small scale (less than 20 rooms), independently owned facilities. Commercial accommodation is concentrated in Huskisson, with two large waterfront caravan parks, three motels and a range of B&Bs and hosted accommodation properties. The Jervis Bay area does not currently have any hotels, motels or serviced apartments which are of a suitably significant scale to cater for large groups of both domestic and international tourists. In addition, the existing stock is relatively aged, with the offerings not necessarily commensurate with current day expectations.

The share of domestic tourists in the Shoalhaven who stay in hotels, motels and serviced apartments is below the rate recorded for the South Coast Region. The availability of suitable accommodation may be a contributing factor limiting the market share. Tourism operators have identified the need for large scale group accommodation options, to cater for international visitors participating in activities such as a dolphin watching at Jervis Bay.

The Hill PDA report identifies that visitor numbers, both domestic and international, are predicted to increase to the South Coast region. The increase tourist visitation would be likely to result in increased demand for commercial accommodation options. However, in the absence of suitable accommodation, the Shoalhaven may not benefit from the economic impacts of this growth.

The Planning Proposal will provide large scale accommodation in an area currently under-served by similar accommodation. The proposed development will provide a quality, 4 star offering, which is different to the alternative accommodation currently on offer. The proposal will not compete directly with existing local accommodation providers, but will complement the existing offering, and potentially capture the large group tour market.

4.2.7. Visual Amenity

A Landscape Character and Visual Impact Assessment (LCVIA) was prepared by Cloustons (refer **Appendix F).** We note that the LCVIA was completed in respect of the previous Planning Proposal for the site, which proposed an 18m building height. The expected impacts from the 14m building height are therefore anticipated to be less than those described below.

The LCVIA assessed the area surrounding the site as a landscape with the capacity to absorb change. Existing development in this area is characterised as relatively low density with maximum two-storey developments. It is a predominantly rural landscape, however the LCVIA notes that the proposal should not be viewed as standout development within an untouched environment. The Planning Proposal should be recognised as an additional built form within a surrounding area that has the capacity for change.

The assessment of potential visual impacts of the previous scheme concluded:

- The site has a 'relatively limited visual catchment' with the topography of the site and existing bush land located within and surrounding the site moderating the expected impacts of the proposal;
- The proposal is not likely to have a high visual impact on any of the landscape character zones;
- The Planning Proposal will have a moderate impact, as well as altering some of its distinguishable landscape characteristics on the amenity value of the Rural Development zone;

4.2.8. Services

The site is an established area and has access to a range of existing services. Initial investigations of service capacity were undertaken in respect of the original Planning Proposal and the findings described below.

Water and Sewer Capacity

DBA Hydraulics undertook an assessment of the anticipated sewer, domestic water and fire services demand generated by the original Planning Proposal (**Appendix G**). This assessment was not informed by an understanding of the capacity of Council infrastructure to support the previous Planning Proposal.

The WHPP includes discussion on the availability of water and sewer infrastructure in the Worrowing Heights Precinct. It identifies:

- that water supply is provided to the eastern side of Naval College Road with the Worrowing Heights Precinct; and
- that the Shoalhaven Water Development Servicing Plan (DSP) does not currently provide for potential urban development on the southern side of Naval College Road (i.e. the precinct).

It is noted that consultations undertaken with Shoalhaven Water pre -date the adoption of the WHPP and that since this time that the DSP may have been revised to allow for urban development within the precinct. Further discussions will therefore be held with Council and Shoalhaven Water to understand the capacity of Council infrastructure to support the project requirements.

Electrical Services Capacity

Northrop provided a review of electrical services and capacity required by the original proposal (**Appendix H**). Northrop calculates that the Electrical Maximum Demand for the previous Planning Proposal would be 1819.9 Amps per phase. The proposal would require two Padmount Kiosk Substations subject to design and Endeavour Energy Approval.

The Huskisson Zone Substation is located on Lot 1754 Naval College Road, adjacent the site. It is understood that an application has been made to Endeavour Energy to understand the ability of the substation to support the proposed demand. The outcomes of this consultation were not available to inform the amended Planning Proposal.

The proponent will continue to engage with the relevant agencies and service providers through the formal exhibition process, following gateway determination.

4.3. PUBLIC BENEFIT

The Planning Proposal will deliver significant public benefit, including:

- Construction and operation of the future development will provide jobs, both direct and indirect
- The development of a large scale hotel facility will benefit the local tourism industry and will provide ongoing employment opportunities,
- Visitor spending associated with hotel guests would be generated in the local economy, supporting local businesses and local jobs.
- The Planning Proposal will act as a catalyst and anchor for the Worrowing Estate development.

5. PLANNING PROPOSAL ASSESSMENT

This Planning Proposal has been prepared in accordance with Section 3.33 of the EP&A with consideration of DPE's *A guide to preparing Planning Proposals* (August 2016).

Accordingly, the proposal is discussed in the following parts:

- **Part 1** – A statement of the objectives and intended outcomes.
- **Part 2** – An explanation of the provisions that are to be included in the proposed LEP.
- **Part 3** – The justification for the Planning Proposal and the process for the implementation.
- **Part 4** – Mapping.
- **Part 5** – Details of community consultation that is to be undertaken for the Planning Proposal.
- **Part 6** – Project timeline.

Discussion for each of the above parts is outlined in the following sections.

6. PART 1 - OBJECTIVES & INTENDED OUTCOMES

This section identifies the objectives and intended outcomes of the Planning Proposal.

6.1. OBJECTIVES

The objective of this Planning Proposal is to amend the zoning, height control and minimum lot size for subdivision of SLEP 2014 to facilitate the development of a hotel, associated tourist uses and residential development on the site.

6.2. INTENDED OUTCOMES

The intended outcome of the Planning Proposal is to facilitate the development of the site, as outlined in Section 4. Development concept plans for the site have been developed, providing for a hotel and residential apartment buildings development consistent with the proposed uses and maximum height sought as part of the Planning Proposal.

The intended outcomes of the Planning Proposal are to:

- Enable hotel, and associated complementary tourism uses in a location highly accessible to natural attractions (i.e. proximity to Jervis Bay and Booderee National Park)
- Provide a location for large-scale group accommodation in the Jervis Bay area to fulfil an identified market need for tourism operators;
- Provide a location for conference, events and functions to encourage diversification in the Shoalhaven tourism market;
- Facilitate residential expansion in proximity to the Vincentia Marketplace; providing an opportunity for the delivery of a compact, pedestrian oriented residential development within walking distance of local retail services;
- Capitalise on infrastructure investments in road and retail nearby (Vincentia Market place development, and upgrades to Naval College Road); and
- Facilitate a high quality tourism and residential development that successfully integrates with the emerging context of a rural area experiencing urban transition.

7. PART 2 - EXPLANATION OF PROVISIONS

The section provides an explanation of how the objectives or intended outcomes are to be achieved by means of new controls on development imposed through an LEP amendment. Note that in the SLEP 2014 mapping the site is split between two map sheets, hence the requirement to amend two map sheets.

7.1. LAND USE ZONE

It is proposed that the site be rezoned to R2 – Low Density Residential. This outcome will be achieved by:

- amending the *SLEP 2014 Land Zoning Map-Sheets LZN_20C* and *LZN_020D* to show the zoning of the site as R2- Low Density Residential (as shown in Part 4, **Figure 12**).

7.2. BUILDING HEIGHT

It is proposed to:

- amend the *SLEP 2014 Height of Buildings Map-Sheet HOB_020C and HOB_020D* to provide for a maximum building height of 9m on the site (as shown in Part 4, **Figure 13**);

7.3. MINIMUM LOT SIZE

It is proposed to amend the minimum lot size for subdivision to 500m^2 on the site. This will be achieved by:

- amending the *SLEP, 2014, Minimum Lot size map- Sheets LSZ_020C and LSZ_020D* to provide a minimum lot size for subdivision on the site of 500m^2 (as shown in Part 4, **Figure 14)**

7.4. DEVELOPMENT DENSITY

In order to provide certainty about the future built form on the site it is intended through the Schedule 1 notation to provide maximum total gross floor areas (GFA) for the proposed tourist and visitor accommodation, residential accommodation and associated uses on the land. The proposed maximum GFA amounts have been derived from the indicative concept for the site and are shown in the table at Section 7.5 below.

7.5. ADDITIONAL PERMITTED USES

To enable the proposed uses on the site it is proposed to:

- insert an additional clause to Schedule 1 Additional Permitted Uses of the *Shoalhaven LEP, 2014,* as below:

19 Use of certain land at 1310 Naval College Road, Worrowing Heights

(5) This clause applies to land identified as "Schedule 1.19" on the Clauses Map, being Lot 1752 in DP 28785

(6) *Development for the purposes of residential accommodation, tourist and visitor accommodation, food and drink premises, recreation facilities (indoor), recreation facilities (outdoor) and retail premises is permitted with development consent in conjunction with the Tourist and Visitor accommodation developed on the land to which this clause applies.*

(7) Development for the purposes of tourist and visitor accommodation and residential accommodation to a maximum height of 14m is permitted with development consent.

(8) Notwithstanding any other provision of this plan the maximum gross floor area of tourist and visitor accommodation and associated activities and residential accommodation permitted under this clause is as follows:

	Land Use	***Total GFA***
vii.	*Tourist and Visitor accommodation*	*6650m²*
viii.	*Food and Drink premises*	*275m²*
ix.	*Function Centre*	*350m²*
x.	*Day spa*	*200m²*
xi.	*Retail premises*	*150m²*
xii.	*Residential Accommodation*	*10,000m²*

8. PART 3 - JUSTIFICATION

8.1. NEED FOR THE PLANNING PROPOSAL

8.1.1. Q1 - Is the planning proposal a result of any strategic study or report?

No. This Planning Proposal has been proposed by the landowner and relates to land that is currently underutilised. The site has been identified as a possible location for future tourist accommodation facilities in due to its strategic proximity to natural attributes, the economic demand for tourist accommodation in Jervis Bay, and the changing nature of the land uses in the vicinity of the site.

The lodgement of the original Planning Proposal for the site initiated a strategic planning process by Shoalhaven Council for the site and surrounding area. The relationship of this proposal to the resultant WHPP and Strategic Directions Report, 2017 and the broader strategic planning framework is discussed at **Section 8.2**.

8.1.2. Q2 - Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

A Planning Proposal is the only means of achieving the objectives and intended outcomes for the site as the proposed uses are prohibited within the existing RU2 zone. The options for the future of the site are as follows:

Do nothing

If no action is taken to rezone the land, the proponent could enact the existing development consent DA341/ 2015 on the site, which would result in the development of the smaller scale motel and tourism development. This is not preferred as the scale of the proposal is not consistent with the development potential and the proponent's aspirations for the site.

With regard to the rezoning of the subject site, the only way to permit the types of development being sought is to amend SLEP 2014; by amending Schedule 1 to insert additional permitted uses for the site; by amending the land use table for the RU2 zone currently applying to the site, or rezoning the site to a zone which permits the development. Each is considered below.

Option 1 – Retain current zoning and amend Schedule 1 to permit the proposed development sought for the site.

This option is not considered appropriate as an alternative zoning option exists.

Option 2 – Retain the current zoning and amend the land use table.

The site is zoned RU2 Rural Landscape and does not permit the land use sought, being hotel accommodation and serviced apartments. One option is to amend the land use tables for the zone to permit the desired land uses. This option is not preferred because such land uses would not be in keeping with the objectives of the zone.

Option 3 – Rezone the site to SP3 Tourist or B4 Mixed Use

Hotel accommodation and serviced apartments are prohibited in the RU2 Rural Landscape zone. However, hotel accommodation and serviced apartments are permitted with consent in the SP3 Tourist and B4 Mixed Use zones. Rezoning to SP3 Tourist is an option because that zone's land use table already permits the types of land uses being sought.

The objectives of the SP3 Tourist zone include:

- To provide for a variety of tourist-oriented development and related uses.
- To enable compatible residential and recreational uses.
- To provide for dwelling houses that form an integral part of tourist-oriented development.

The rezoning of the site to SP3 Tourist would facilitate the proposed development which is principally a tourist-oriented development that aligns with the objectives of the SP3 zone. However, it is noted that feedback received from Council in respect of the original Planning Proposal was that LGA did not require

additional land zoned exclusively for tourism related purposes. Similarly, rezoning the site to B4 Mixed Use is inconsistent with the surrounding land uses and has the potential to compete with the local centre at Vincentia Marketplace.

Rezoning the site to R2 Low Density Residential and amending Schedule 1 to allow additional permitted uses is considered the best way to achieve the objectives and intended outcome of the proposed development. Making provision in Schedule 1 for the increase in the maximum height of buildings to 14m for a hotel or residential accommodation also preserves an overarching height of building control of 9m. The outcome for the site is a zoning and height of buildings control on the site that is consistent with the likely surrounding zoning and future land uses.

8.2. RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

DPE's Planning Circular (PS 16-004) notes that a key factor in determining whether a proposal should proceed to Gateway determination should be its strategic merit and site specific merit. It is considered that the Planning Proposal meets these tests as outlined in the following sections.

8.2.1. Q3 - Is the planning proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

a) Does the proposal have strategic merit?

The strengthened strategic merit test criteria require that a Planning Proposal demonstrate strategic merit against (at least one of) the following three criteria:

1. *Consistent with the relevant district plan, or corridor/precinct plans applying to the site, including any draft regional, district or corridor/precinct plans released for public comment*
2. *Consistent with a relevant local council strategy that has been endorsed by the Department.*
3. *Responding to a change in circumstances, such as the investment in new infrastructure or changing demographic trends that have not been recognised by existing planning controls.*

The Planning Proposal demonstrates strategic merit through its consistency with the objectives and actions of the applicable strategic plans and policies discussed below.

NSW State Plan 2021

The New South Wales State Plan sets the strategic direction and goals for the NSW Government across a broad range of services and infrastructure. The Plan nominates one of the key challenges for the State as being economic growth and building the infrastructure that drives the economy and improves people's lives.

The development of the site is consistent with the State Plan as it will provide new tourist accommodation that will promote economic growth and drive the tourist market of the region.

The Planning Proposal demonstrates strategic merit in relation to Criteria 1 and 3 above as set out below.

Table 5 – Strategic Plan Merit Test

Criteria	Planning Proposal Response
Consistent with the relevant district plan, or corridor/precinct plans applying to the site, including any draft regional, district or corridor/precinct plans released for public comment.	The intended outcome of the Planning Proposal is to facilitate the redevelopment of the site to accommodate a tourist development. In doing so, the proposal will respond to the key priorities and directions which underpin the following strategic planning documents: • South Coast Regional Strategy 2007 • Illawarra-Shoalhaven Regional Plan 2015 (ISRP) • Jervis Bay Settlement Strategy (JBSS) The key Priorities of relevance to the Planning Proposal are outlined below:

Criteria	Planning Proposal Response	
	Priorities	**Planning Proposal**
	South Coast Regional Strategy 2007	
		The South Coast Regional Strategy applies to the period 2006–31 and covers the local government areas of Shoalhaven, Eurobodalla and Bega Valley. The strategy sets out a clear and certain land use plan for the South Coast, which balances the demands for future growth with the need to protect and enhance environmental values.
	Tourism is a "key growth opportunity sector" with tourism being an increasingly important component of the regional economy	The planning proposal is consistent with the strategy and will encourage growth in the tourism economy.
	Tourist accommodation sector is likely to come under pressure in the future having regard for significant demand for temporary or tourist accommodation in the Region	The Planning Proposal is consistent with the strategy by providing much needed accommodation to support the growing tourism industry.
	Illawarra-Shoalhaven Regional Plan 2015 (ISRP)	
		The ISRP addresses the provision of suitable land for employment and housing needs over the next 20 years. The ISRP Includes the LGAs of Wollongong, Shellharbour, Kiama and Shoalhaven.
	a prosperous Illawarra-Shoalhaven	The Planning Proposal will provide increased tourist accommodation that will grow the tourism sector, diversify the economy in Shoalhaven and importantly grow local jobs.
	a region with communities that are strong, healthy and well-connected	This Planning Proposal supports the development of Vincentia as regional centre.
	a region that protects and enhances the natural environment.	This Planning Proposal supports the protection of the natural environment, by proposing the rezoning of relatively environmentally unconstrained land.

Criteria	Planning Proposal Response	
	The importance of tourism in Jervis Bay	This Planning Proposal supports tourism in the area by providing for tourism uses including accommodation.
	The Vincentia district, is identified as a regional centre of the broader Bay and Basin area and a location to provide future housing and business services.	This Planning Proposal supports the development of Vincentia as regional centre. Overall, the PP is not inconsistent with the broad goals of the ISRP.
	Jervis Bay and more specifically land adjoining the precinct has "high environmental value" and contains a "biodiversity corridor	The biodiversity values of the subject land have been investigated and documented, demonstrating options available for the future development of the area. The suitability for the land for future development has been demonstrated.
	Priorities	**Planning Proposal**
	Jervis Bay Settlement Strategy 2003 (JBSS)	
	The JBSS was adopted by Council in 2003 and prepared to provide direction and guidance for the future development of the Jervis Bay Region to 2023. The JBSS was also endorsed by the NSW Government. The Strategy identified the Nayswood Estate site as a district centre in the settlement hierarchy for the region.	
	The vision for the Bay and Basin is "to maintain and enhance the marine, estuarine and natural resources by providing balanced future living and visiting opportunities which are environmentally, socially and economically sustainable"	This planning proposal would provide for tourism and residential development, on relatively environmentally unconstrained land. This will contribute to the sustainability of the community, economy and environment in the Shoalhaven and is considered to be largely consistent with the overall direction provided by the JBSS
	The broad principle for Worrowing Heights is to investigate "the possibility of limited development that also provides for the protection and management of the habitat corridor in the locality".	While the JBSS does not identify the site for future urban expansion or potential tourist development, further expansion of Vincentia is constrained by the National Park to the west, north and east. The identification of the Worrowing Heights Precinct for urban expansion is considered a logical response to the natural constraints upon other available land.

Criteria	Planning Proposal Response	
		The Planning Proposal protects and will maintain the nearby habitat corridor. This Planning Proposal would allow residential and tourism development within the larger precinct, and is therefore considered to be largely consistent with the overall direction provided by the JBSS.
	Vincentia identified as a Regional Centre in the Illawarra-Shoalhaven Regional Plan.	This Planning Proposal would support the development of Vincentia as a regional centre.
Consistent with a relevant local council strategy that has been endorsed by the Department.	N/A	
Responding to a change in circumstances, such as the investment in new infrastructure or changing demographic trends that have not been recognised by existing planning controls.	N/A	

b) Does the proposal have site-specific merit?

In addition to meeting at least one of the strategic merit criteria, a Planning Proposal is required to demonstrate site-specific merit against the following criteria:

Table 6 – Site-Specific Merit Test

Criteria	Planning Proposal Response
Does the planning proposal have site specific merit with regard to: *the natural environment (including known significant environmental values, resources or hazards)?*	The site is not identified as having high biodiversity value and the supporting flora and fauna assessment has found that development of the site will not adversely impact ecological values either on the site or on the surrounding land. Furthermore, the site is relatively flat, with no environmental constraints or hazards of such significance that would preclude the redevelopment of the site.
Does the planning proposal have site	The Planning Proposal has site-specific merit with regard to existing, approved and future uses in the vicinity of the site as follows:

Criteria	Planning Proposal Response
specific merit with regard to: *the existing uses, approved uses and likely future uses of land in the vicinity of the land subject to a proposal?*	The Vincentia Marketplace is a logical focal point for urban expansion and increased densities, and the rezoning of the site is an orderly extension of that process. The precinct is an area in transition, with a range of non-rural uses in proximity to the site. The southern side of Naval College has begun to fragment with the area no longer strictly agricultural with rural lots used for urban purposes or for residential accommodation. The Council led Strategic planning exercise for the Worrowing Heights precinct recognises that the site is within an area undergoing change; Tourist accommodation uses were previously permissible in the area. There is an existing development consent (DA14/1391) approved on 19 May 2015 for a 80 bedroom motel facility. This approval, although granted under a superseded planning framework, evidences Council support for the concept of tourist and motel facilities on the site. This consent is still valid and could be acted on by the proponent. The site is within 100m walk of the Vincentia Marketplace, which provides a range of retail and commercial facilities and leisure and entertainment opportunities for convenient access by tourists and visitors staying at the site. The Planning Proposal seeks to logically locate a high quality resort, accommodation, restaurant and recreation destination, in proximity to services and infrastructure provided by the Vincentia Marketplace and within easy reach of the natural attractions of the Jervis Bay region. The indicative built form layout indicates how the site can accommodate the future hotel and serviced accommodation development without incurring visual, environmental or amenity impacts on the surrounding area. The indicative plans provide Council and the community with certainty on the scale of the redevelopment anticipated on the site.
Does the planning proposal have site specific merit with regard to: *the services and infrastructure that are or will be available to meet the demands arising from the proposal and any proposed financial arrangements for infrastructure provision?*	As discussed in Section 4.2.8, Northrop have undertaken a full review of available services infrastructure and conclude all utilities are available at the site. Confirmation that the electrical network has capacity to accommodate the proposal and any works required to upgrade the Huskisson Zone Substation will be confirmed at the gateway stage.

8.2.2. Q4 - Is the planning proposal consistent with a council's local strategy or other local strategic plan?

Shoalhaven City Council's Community Strategic Plan, Shoalhaven 2023 (CSP)

Shoalhaven Community Strategic Plan – Shoalhaven 2023 (CSP) was adopted by Council in May 2013. The CSP identifies objectives and strategies for prosperity in Shoalhaven and creating opportunities for growth to existing services in the future. The Planning Proposal is consistent with this Strategic Plan. Specifically, the Planning Proposal satisfies Objective 3.2 and corresponding strategy 3.2.1 and 3.2.2 as detailed below:

3.2 An economy that supports and is supported by growing, diverse and changing communities

3.2.1 Encourage the development of a range of tourist facilities and accommodation which meet the future needs of Shoalhaven's visitors

3.2.2 Advocate for improved employment outcomes and educational facilities, programs and opportunities that help retain young people, attract new workers and improve work opportunities for the unemployed

The Planning Proposal is consistent with the CSP as the development of a hotel and tourist facility will increase the range and availability of accommodation to service tourists to the Shoalhaven. The hotel will also provide direct operational employment opportunities as well as an increase in associated tourism related employment opportunities.

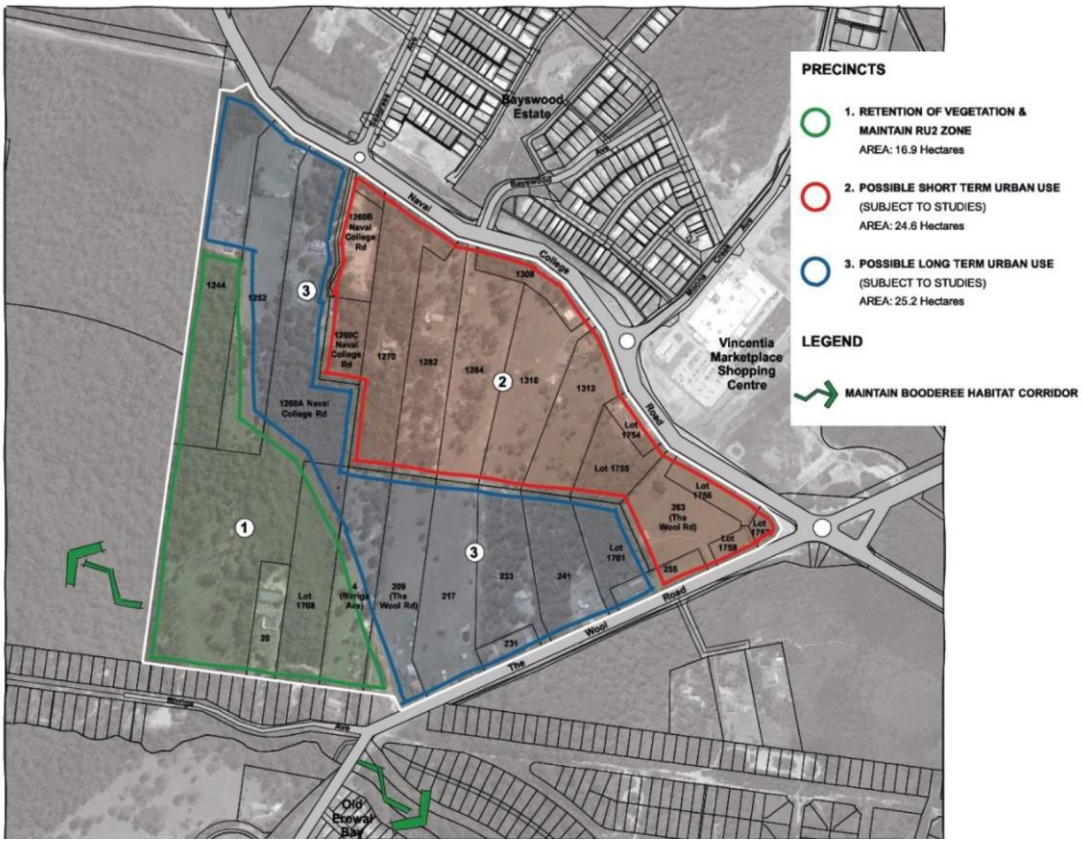
Worrowing Heights Precinct Plan 2017 (WHPP)

The Worrowing Heights Strategic Directions Report and Precinct Plan (WHPP) has been defined based on the area currently zoned RU2 Rural Landscape under Shoalhaven LEP 2014 around 1310 Naval College Road. It covers an area of approximately 67 hectares on the north - western corner of the intersection of The Wool Road and Naval College Road, Worrowing Heights. The location of the site within the precinct is indicated in Figure 10 below.

Figure 10 – Worrowing Heights Precinct Area

The WHPP was prepared to provide a strategic planning framework for the precinct and its potential future land use that integrates with the surrounding area. The WHPP identifies four potential options for the future development of the precinct. In February 2018, Option 3 was recommended to Council to be progressed, as shown in Figure 11 below.

Figure 11 – Worrowing Heights Precinct Plan- Option 3



Source: Worrowing Heights Precinct Plan Strategic Directions Report May 2017

Option 3 identifies the early release of land in the northern part of the Precinct which fronts Naval College Road, including the site. This area adjoins the existing urban areas of Baywood Estate and the Vincentia Marketplace Shopping Centre. The land is identified for early release as it has minimal environmental constraints and is most readily able to support urban purposes in the short-term.

The densely vegetated south-western corner of the precinct is identified to remain zoned RU2 and protected due to its environmental significance. The release of more environmentally sensitive land will be staged across the medium to long term.

The proposed zoning is R1, which the report suggests is appropriate to provide supply to meet the medium to long term demand for residential land in the Bay and Basin area. In respect of building form, the report states that the location, landform and character of the precinct support the retention of the maximum Height Of Buildings at 11m. However, the report also note that tourism uses are permissible within the R1 zone. This shows strategic recognition of the need to accommodate tourism uses within the precinct. It also recognises the importance of encouraging and supporting tourism uses within the Shoalhaven LGA.

The Planning Proposal is considered consistent with the WHPP for the following reasons:

- Timing: Progressing the Planning Proposal for 1310 Naval College Road now is consistent with the timeframes for development identified in the Strategic Directions Report, which identifies this part of the precinct as suitable for urban investigation in the period 2017-2020.
- Zoning and land use: The Strategic Directions report recommends R1 as an appropriate zoning to provide for residential growth and provide for tourism uses. The proposed R2 zoning on the site with additional permitted uses allows for the tourist related land uses that the proponent wishes to develop on the site.
- Height: The Strategic Directions report acknowledges the importance of providing for tourism related uses within the precinct. While not consistent with the recommended height limit of 11m, the increase in height to 14m will accommodate these uses and fulfil this strategic intent.

- Location: the site is in proximity to the Vincentia Marketplace. The WHPP comments that the extension of urban development in this area is logical given the access to retail, entertainment and commercial services. The early release of land in this part of the Precinct will link the development into existing road infrastructure and the services at Vincentia Marketplace.

South Coast NSW Destination Management Plan (DMP)

The South Coast Region Destination Management Plan (DMP) has been prepared by the South Coast Regional Tourism Organisation to set the framework and strategic direction for the development and management of tourism and the broader visitor economy on the South Coast for the period 2013 to 2020.

The primary goal of the South Coast Region DMP is to increase visitor expenditure within the South Coast Region. The Objectives are to:

- Encourage and facilitate development that will take the Visitor Economy forward, be sustainable and deliver quality year-round visitor products and experiences;
- Ensure that the infrastructure and services needed to meet the needs and expectation of visitors and facilitate and support the growth of the Visitor Economy are in place;
- Provide a diversity of quality attractions, activities and visitor experiences;
- Protect and preserve the natural, historic, cultural and lifestyle assets of the South Region which form the basis for visitation (ie the appeal of the destination) and influence with how visitors react to and bond with the area;
- Provide directions for market development and diversification; and
- Build effective partnerships between all levels of government, the tourism sector, regional businesses and the South Coast community.

The DMP positions Shoalhaven City as the 'heart, soul and essence of the South Coast' with Shoalhaven to remain the most popular destination in NSW outside of Sydney. The key priorities outlined to develop Shoalhaven under the DMP include:

- Retain and strengthen existing markets;
- Continue to build event markets – targeting sporting events, business events, functions and weddings;
- Build special interest and activity based markets;
- Build the cruise market; and
- Work with export-ready operators to grow the international FIT and group markets

The Planning Proposal is consistent with the key priorities of the DMP as it will facilitate the development of a high quality four star hotel with the capacity to accommodate large tour groups The proposed scale of the development will mean that the operator will be able to tap into new tourism markets including events, package tour groups, corporate functions/ and conferences. The ability to attract these tourist markets will diversify the tourism base in the Shoalhaven and promote year round visitation to the region.

Shoalhaven Tourism Masterplan 2012-2017

The Masterplan provides the framework for advancing the local tourism industry and presents a number of recommendations, strategies and action plans to deliver the vision, objects and targets for tourism in Shoalhaven in the period 2012-2017. The masterplan informs the Shoalhaven priorities under the South Coast NSW DMP.

Shoalhaven City Council has set a target of increasing expenditure from visitors from $678 million in 2011 to $1 billion by 2020. To achieve this target, visitation needs to increase by 47.5% from 2011 to 2020, equating to a compound growth rate of 4.42% per annum.

The master plan identifies Huskisson as the primary tourism hub and potential for tourism development at the Vincentia shopping centre site. The masterplan does not identify specific outcomes for the Worrowing Heights area.

Of relevance to this Planning Proposal the desired outcomes for the Bay & Basin Precinct are:

- Jervis Bay is to retain its profile as an iconic NSW coastal destination – a marine sanctuary known for its dolphins, whales, seals and giant sting rays, crystal clear waters and pristine white sand beaches.
- retain and enhance the character and atmosphere of Huskisson as the tourist hub of the area;
- diversifying the tourism market to deliver year round visitation year;
- encouraging development that will take the industry forward, be sustainable and deliver quality visitor products and experiences;
- ensuring that the infrastructure and services needed to meet the needs and expectation of visitors and facilitate and support the growth of the tourism sector are in place

Specific findings in relation to the availability of tourist accommodation are:

- Shoalhaven lacks a large branded 4-4.5 star hotel and resort style properties; and
- There is a need for additional serviced apartment accommodation the Shoalhaven

The Planning Proposal will increase the availability and provision of tourist accommodation in the Shoalhaven. It will provide tourist accommodation in a strategic location close to popular Jervis Bay attractions. The hotel will provide an opportunity to cater for a different tourist market, being larger tour groups, which are currently not catered for in the area. In conjunction with this, the hotel will also provide function space, which has the potential to attract conference groups, diversifying the tourism market to encourage out of peak season visitation. The Planning Proposal consistent with the key priorities of the Masterplan.

8.2.3. Q5 - Is the planning proposal consistent with applicable State Environmental Planning Policies?

The Planning Proposal's consistency with current State Environmental Planning Policies (SEPPs) is summarised in **Table 8**. The Planning Proposal's consistency with Regional Environmental Plans (REPs) for the Sydney and Greater Metropolitan Regions, which are deemed SEPPs, is summarised in **Table 9**.

Table 7 – Consistency with State Environmental Planning Policies

State Environmental Planning Policy	Comment / Consistency
SEPP (Educational Establishments and Child Care Facilities) 2017	Not applicable.
SEPP Amendment (Child Care) 2017	Not applicable.
SEPP (State and Regional Development) 2011	Not applicable.
SEPP (Sydney Drinking Water Catchment) 2011	Not applicable.
SEPP (Urban Renewal) 2010	Not applicable.
SEPP (Affordable Rental Housing) 2009	Not applicable.
SEPP (Western Sydney Parklands) 2009	Not applicable.
SEPP (Exempt and Complying Development Codes) 2008	Not applicable.
SEPP (Western Sydney Employment Area) 2009	Not applicable.
SEPP (Rural Lands) 2008	The site is zoned RU2 Rural Landscape and the provisions of SEPP Rural Lands 2008 therefore apply. Clause 7 of the SEPP outlines the rural planning principles

State Environmental Planning Policy	Comment / Consistency
	that apply to rural lands under the SEPP. The proposal is considered consistent with the objects of the SEPP and the Rural Planning principles for the following reasons: • The site operates as a lifestyle block and is not currently used for productive agriculture activities; • The rezoning of the site from RU2 Rural landscape will therefore not adversely impact on sustainable agricultural economic activities in a rural area • The rezoning of the site for tourism and residential uses is consistent with the Worrowing Heights Precinct Plan; which identifies the site and surrounding land for future urban use in the time period 2017-2020. A planning proposal proposing to change the minimum lot size must be consistent with the Rural Subdivision Principles listed in State Environmental Planning Policy (Rural Lands) 2008. Clause 8 of the SEPP outlines the rural subdivision principles. The proposal is considered consistent with the Rural Planning principles for the following reasons: • The site is land in a location that has been identified for future urban development under the WHPP in the time period 2017-2020, therefore foreshadowing the future subdivision of the precinct; • The site operates as a lifestyle block and is not currently used for productive agriculture activities; • The proposed minimum lot size of 500m^2 is consistent with that in place within the Bayswood Estate to the north of the site; • The locality is not considered exclusively rural as surrounding lots are being used for non-agricultural uses or large lot residential development with little productive value. The proposal to change the minimum lot size for subdivision will not result in rural land fragmentation.
SEPP (Kosciuszko National Park – Alpine Resorts) 2007	Not applicable.
SEPP (Infrastructure) 2007	Not applicable.
SEPP (Miscellaneous Consent Provisions) 2007	Not applicable.
SEPP (Mining, Petroleum Production and Extractive Industries) 2007	Not applicable.

State Environmental Planning Policy	Comment / Consistency
SEPP (Sydney Region Growth Centres) 2006	Not applicable.
SEPP (State Significant Precincts) 2005	Not applicable.
SEPP (Building Sustainability Index: BASIX) 2004	Not applicable.
SEPP (Housing for Seniors or People with a Disability) 2004	Not applicable.
SEPP (Penrith Lakes Scheme) 1989	Not applicable.
SEPP (Kurnell Peninsula) 1989	Not applicable.
SEPP No. 1 Development Standards	Not applicable.
SEPP No. 14 Coastal Wetlands	Not applicable.
SEPP No. 19 Bushland in Urban Areas	Not applicable
SEPP No. 21 Caravan Parks	Not applicable.
SEPP No. 26 Littoral Rainforests	Not applicable.
SEPP No. 30 Intensive Agriculture	Not applicable.
SEPP No. 33 Hazardous and Offensive Development	Not applicable.
SEPP No. 36 Manufactured Home Estates	Not applicable.
SEPP No. 44 Koala Habitat Protection	Not applicable.
SEPP No. 47 Moore Park Showgrounds	Not applicable.
SEPP No. 50 Canal Estate Development	Not applicable.
SEPP No. 52 Farm Dams and Other Works in Land and Water Management Plan Areas	Not applicable
SEPP No. 55 Remediation of Land	The site has been most recently used for agricultural grazing and prior to this was predominantly forested. The site is likely to be capable of being made suitable for the proposed land use. Due to the low risk of site contamination it is requested that a Stage 1 Contamination Assessment be a condition of the Gateway determination.
SEPP No. 62 Sustainable Aquaculture	Not applicable.
SEPP No. 64 Advertising and Signage	Not applicable.
SEPP No. 65 Design Quality of Residential Apartment Development	Not applicable.
SEPP No. 70 Affordable Housing (Revised Schemes)	Not applicable.

State Environmental Planning Policy	Comment / Consistency
SEPP Coastal Management 2018	The site is not located within a coastal management zone identified under the *Coastal Management Act 2016* and therefore SEPP Coastal Management 2018 technically does not apply. However, in pre lodgement advice issued in respect of the original planning proposal, Council requested that the proposal address the former SEPP 71 (Coastal Protection) due to the context of the site. The planning proposal is considered consistent with the aims and matters for consideration under SEPP Coastal Management 2018 for the following reasons: The site is not located within a coastal management zones; The planning proposal will have no impact on the amenity of or public access to and along the coastal foreshore; The planning proposal will not facilitate development that will be visible from the coastal foreshore and will therefore not impact on the visual amenity and scenic qualities of the coast. The planning proposal is therefore considered consistent with SEPP Coastal Management.

Table 8 – Consistency with Regional Environmental Plans

Regional Environmental Plan	Comment
Sydney REP No. 8 – Central Coast Plateau Areas	Not applicable.
Sydney REP No. 9 – Extractive Industry	Not applicable.
SREP No. 16 – Walsh Bay	Not applicable.
SREP No. 20 – Hawkesbury-Nepean River	Not applicable.
SREP No. 24 – Homebush Bay Area	Not applicable.
SREP No. 26 – City West	Not applicable.
SREP No. 30 - St Marys	Not applicable.
SREP No. 33 – Cooks Cove	Not applicable.
Sydney (SREP) (Sydney Harbour Catchment) 2005	Not applicable.
Greater Metropolitan REP No. 2 – Georges River Catchment	Not applicable.

Regional Environmental Plan	Comment
Willandra Lakes REP No. 1 – World Heritage Property	Not applicable.
Murray REP No. 2 – Riverine Land	Not applicable.

8.2.4. Q6 - Is the planning proposal consistent with applicable Ministerial Directions (s.9.1 directions)?

The Planning Proposal's consistency with applicable section 9.1 Ministerial Directions is outlined in **Table 6.**

Table 9 – Section 9.1 Compliance Table

Ministerial Direction	Comment
1. Employment and Resources	
1.1 Business and Industrial Zones	N/A
1.2 Rural Zones	Direction 1.2 seeks to protect the agricultural production value of rural land. The planning proposal is not inconsistent with this direction. Refer to discussion in respect of SEPP (Rural Lands) 2008 at Section 8.2.3.
1.3 Mining, Petroleum Production and Extractive Industries	N/A
1.4 Oyster Aquaculture	N/A
1.5 Rural Lands	Ministerial Direction (S. 177) 1.5 Rural Lands requires this Planning Proposal give consideration to the consistency of the Rural Lands SEPP. The planning proposal is not inconsistent with this direction. Refer to discussion in respect of SEPP (Rural Lands) 2008 at Section 8.2.3.
2. Environment and Heritage	
2.1 Environmental Protection Zones	N/A
2.2 Coastal Protection	Whilst the site is located just outside the coastal zone it was considered that due to the context of the site it was reasonable to address this Direction. The PP is not inconsistent with the Coastal Design Guidelines 2003 as it will not impact on the scenic amenity of the coast. The PP is therefore not inconsistent with this direction.
2.3 Heritage Conservation	N/A
2.4 Recreation Vehicle Areas	N/A
2.5 Application of E2 and E3 Zones and Environmental	N/A

Ministerial Direction	Comment
Overlays in Far North Coast LEPs	
3. Housing, Infrastructure and Urban Development	
3.1 Residential Zones	The proposed development will make efficient use of the existing services and infrastructure available in proximity to the site. New housing on the complement the existing and future vision for the site and adjoining local centre.
3.2 Caravan Parks and Manufactured Home Estates	N/A
3.3 Home Occupations	
3.4 Integrating Land Use and Transport	The PP is consistent with this direction as the site is located within pedestrian reach of retail and commercial services at Vincentia Marketplace. This will promote walkability, reduce car dependency and increase the viability of public transport services.
3.5 Development Near Licensed Aerodromes	N/A
3.6 Shooting Ranges	N/A
4. Hazard and Risk	
4.1 Acid Sulphate Soils	Acid sulphate soils investigations and analysis will accordingly be undertaken as part of any future development of the land in accordance with the requirements of SLEP 2014. The Planning Proposal is consistent with this direction.
4.2 Mine Subsidence and Unstable Land	N/A
4.3 Flood Prone Lane	N/A
4.4 Planning for Bushfire Protection	The site is mapped as bushfire prone land. An assessment of bushfire risk has been undertaken by Australian Bushfire Assessment (**Appendix D**). It is proposed to consult with the proposed to consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination and prior to undertaking community consultation. The Planning Proposal is consistent with this direction.
5. Regional Planning	
5.1 Implementation of Regional Strategies	The PP is considered consistent with the Illawarra-Shoalhaven Regional Plan as discussed in Section 8.2.1. The Planning Proposal is consistent with this direction.
5.2 Sydney Drinking Water Catchments	N/A
5.3 Farm Land of State and Regional Significance on the NSW Far North Coast	N/A

Ministerial Direction	Comment
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	N/A
5.8 Second Sydney Airport: Badgerys Creek	N/A
5.9 North West Rail Link Corridor Strategy	N/A
5.10 Implementation of Regional Plans	The PP is considered consistent with the Illawarra-Shoalhaven Regional Plan as discussed in Section 8.2.1 The Planning Proposal is therefore consistent with this direction.
6. Local Plan Making	
6.1 Approval and Referral Requirements	Noted.
6.2 Reserving Land for Public Purposes	N/A
6.3 Site Specific Provisions	This Planning Proposal seeks to rezone the site to an existing zone already applying in the Shoalhaven LEP, R2 General Residential. It seeks to provide additional site specific provisions to allow additional permitted uses, height and density of development on the site. This approach, while inconsistent with the direction is considered appropriate. The application of additional development controls in this manner preserves the integrity of land use zones within the LEP and provides certainty about the future development on the site.
7. Metropolitan Planning	
7.1 Implementation of A Plan for Growing Sydney	N/A
7.2 Implementation of Greater Macarthur Land Release Investigation	N/A
7.3 Parramatta Road Corridor Urban Transformation Strategy	N/A
7.4 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	N/A

7.5 Implementation of Wilton Priority Growth Area Interim Land use and Infrastructure Implementation Plan	N/A

8.3. ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACT

8.3.1. Q7 - 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 site is cleared of vegetation and the proposal would not impact on areas of biodiversity in the local area. A flora and fauna assessment has been prepared by Biosis in respect of the previous Planning Proposal (**Appendix C**) to assess the ecological values within the site and within 60 metres of the site. The report found that there are no endangered populations or ecological communities listed under the EPBC Act or TSC Act within the study area. As such, there is no anticipated impact on critical habitat or threatened species, populations or ecological communities, or their habitats.

8.3.2. Q8 - Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

A preliminary assessment of the likely environmental effects of the Planning Proposal is provided in Section 4.2 of this report.

There are a range of other environmental matters that will be required to be considered as part of future development. These may include water management (quantity and quality). It is noted that the WHPP identifies that a detailed investigation into the presence of Aboriginal cultural heritage within the Worrowing Heights Precinct has not been undertaken. The requirement for an Aboriginal Cultural Heritage Assessment of the site will be determined the site following the gateway approval.

8.3.3. Q9 - Has the planning proposal adequately addressed any social and economic effects?

This report has addressed the economic impacts of the proposal at Section 4.2.6. Future development proposals on the site would be assessed against matters outlined in the EP& A Act, this may include considering a social impact assessment.

8.4. STATE AND COMMONWEALTH INTERESTS

8.4.1. Q10 - Is there adequate public infrastructure for the planning proposal?

An initial investigation into services provision has been undertaken and is described at Section 4.2.7. The capacity of services infrastructure to support the rezoning of the site will be further investigated after Gateway determination.

8.4.2. Q11 - What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway determination?

The Gateway Determination will advise the public authorities to be consulted as part of the Planning Proposal process. Any issues raised will be incorporated into this Planning Proposal following consultation in the public exhibition period.

9. PART 4 - MAPPING

The following LEP maps are included in the Planning Proposal.

Table 10 – Summary of LEP Mapping Amendments

Shoalhaven Local Environmental Plan 2014	Amendments
Land Zoning Map– Sheets LZN_20C and LZN_020D	• Rezone the site to R2 – Low Density Residential
Height of Buildings Map-Sheet HOB_020C and HOB_020D	• To provide a maximum height of buildings on the site of 9m
Lot Size Map- Sheets LSZ_020C and LSZ_020D	• To provide a minimum lot size for subdivision within the site of 500m^2
Clauses Map-Sheets CLS_020C and CLS_020D	• To refer to additional permitted uses for the site in Schedule 1.19

Figure 12 – Proposed Zoning Map

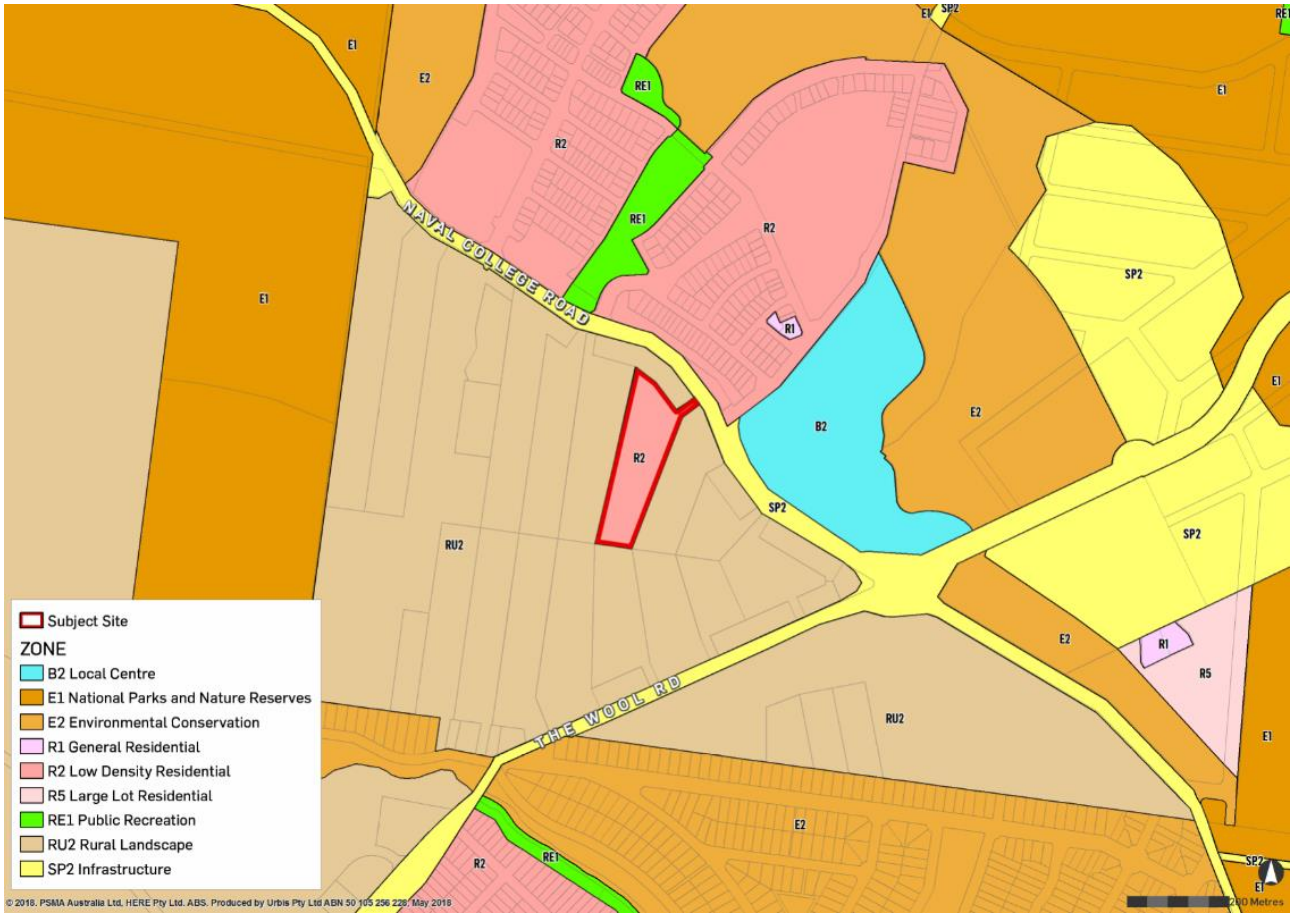


Figure 13 – Proposed Height of Buildings Map

Figure 14 – Proposed Lot Size Map

Figure 15 – Proposed Local Clauses Map

10. PART 5 - COMMUNITY CONSULTATION

Division 3.4 of the EP&A Act requires the relevant planning authority to consult with the community in accordance with the gateway determination. It is anticipated that the Planning Proposal will be publicly exhibited for at least 28 days in accordance with DP&E's *A Guide to Preparing Local Environmental Plans*.

At a minimum, the notification of the public exhibition of the Planning Proposal is expected to involve:

- A public notice in local newspaper(s);
- Notification on the Shoalhaven Council website; and
- Written correspondence to owners and occupiers of adjoining and nearby properties and relevant community groups.

11. PART 6- PROJECT TIMELINE

It is anticipated that the LEP amendment will be completed within 9-12 months. An indicative project timeframe is provided below. The timeframe assumes that the Planning Proposal for the site is progressed independently of the land contained within the Worrowing Heights Precinct Plan.

Table 11 – Indicative Project Timeline

Stage	Timeframe and/or Date
Consideration by Shoalhaven Council	June 2018
Planning Proposal referred to DPE for Gateway Determination	August 2018
Gateway Determination by DPE	August 2018
Commencement and completion of public exhibition period	Dates are dependent on Gateway determination. Anticipated timeframe for public exhibition is 28 days.
Consideration of submissions	6 weeks
Consideration of the Planning Proposal post-exhibition	6 weeks
Submission to DPE to finalise the LEP	To be determined
Gazettal of LEP Amendment	To be determined

12. CONCLUSION

The Planning Proposal seeks to rezone the site to R2- Low Density Residential zone, and allow additional permitted uses on the site, to facilitate hotel accommodation and associated tourist facilities. The Planning Proposal has strategic merit because it:

- proposes a R2 – Low Density Residential zoning that is consistent with the strategic planning framework envisaged for the Worrowing Heights Precinct and the zoning regime in place for the adjacent Bayswood Estate;
- is in a strategic location close to the area's tourist attractions and local services;
- enables the provision of tourist accommodation, which is in demand within the Shoalhaven LGA,
- provides an opportunity to deliver accommodation for large tour groups, which is currently not available within the Shoalhaven LGA;
- will facilitate residential development in proximity to existing local services at Vincentia Marketplace;
- provides an opportunity to develop an 'anchor' site within a changing precinct identified for urban expansion;

The Planning Proposal has been prepared in accordance with the Department's Guidelines for the Preparation of Planning Proposals.

The preliminary investigations have demonstrated both the capability of the land to be used for future hotel accommodation and associated tourist uses without significant constraint.

It is recommended that the Planning Proposal is advanced by Shoalhaven Council and advanced to Gateway Determination, allowing for progress per statutory process and stakeholder engagement, including public notification and referral to relevant agencies.

DISCLAIMER

This report is dated 1 June 2018 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd's (**Urbis**) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of The Client (**Instructing Party**) for the purpose of Planning Proposal (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

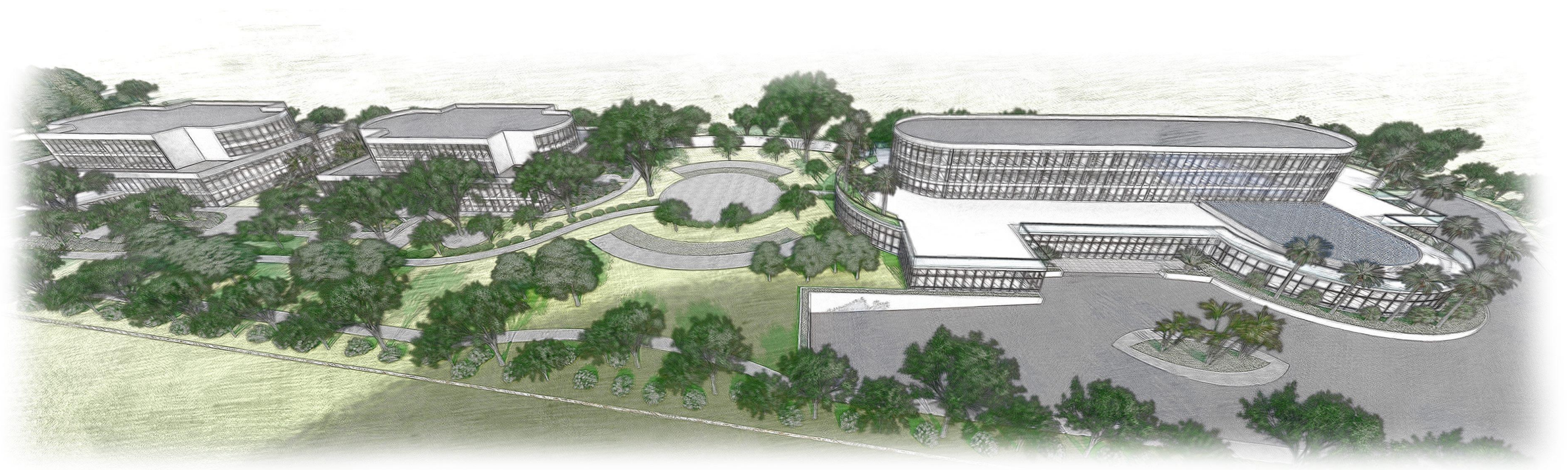
Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A ARCHITECTURAL PLANS

rmi

GROUP



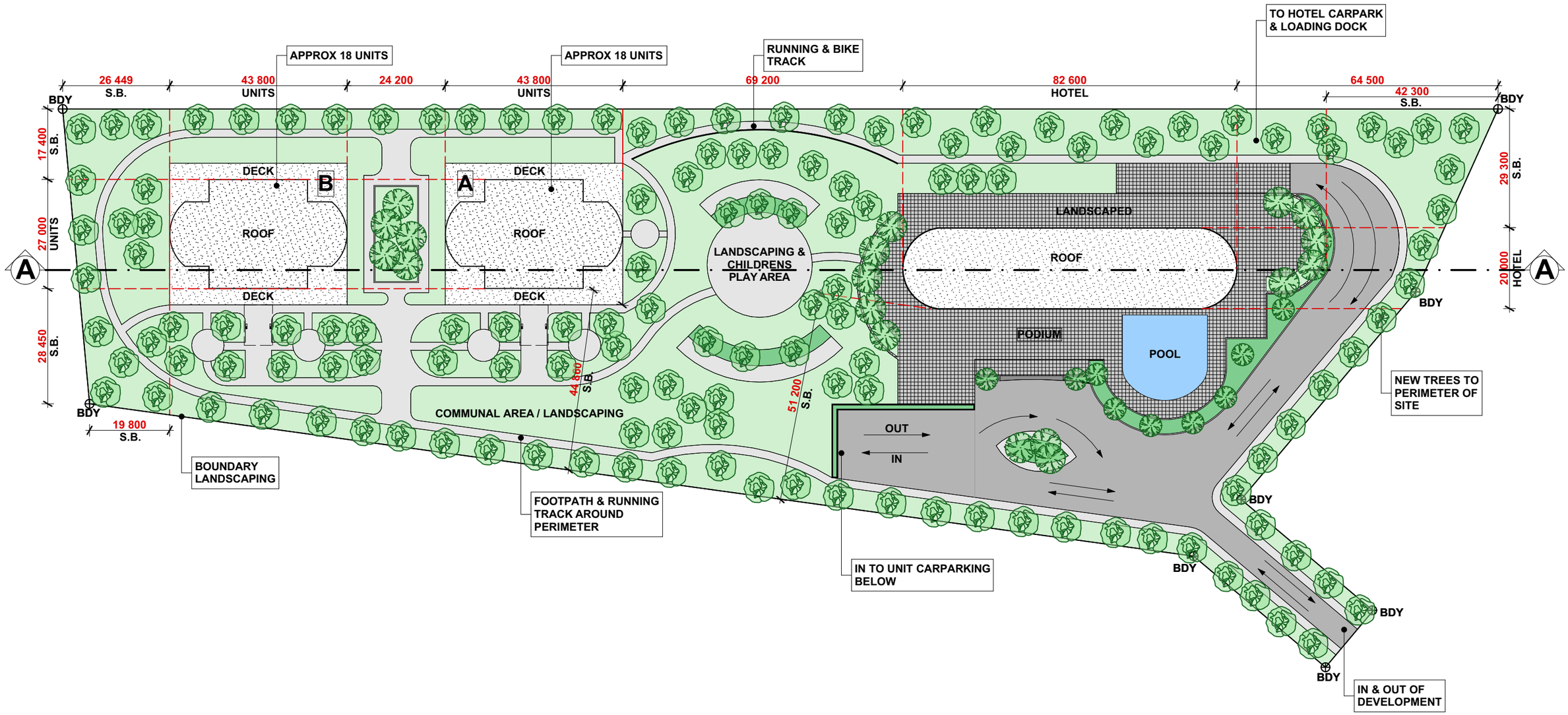
PROPOSED RESIDENTIAL + HOTEL DEVELOPMENT

1310 NAVEL COLLEGE ROAD WORROWING HEIGHTS

designed by - STYLTEC design & building solutions

LEGEND:

- HOTEL	- FUNCTION CENTRE	- TRAFFIC FLOW
- UNITS	- RESTAURANT	- NATIVE TREE SPECIES
- LANDSCAPING		
- FOOTPATH RUNING TRACK BIKE TRACK	S.R. - SEMINAR ROOMS	S.B. - SETBACK
	S - SERVICE AREA	



SITE PLAN **RMI HOTEL + APARTMENTS**

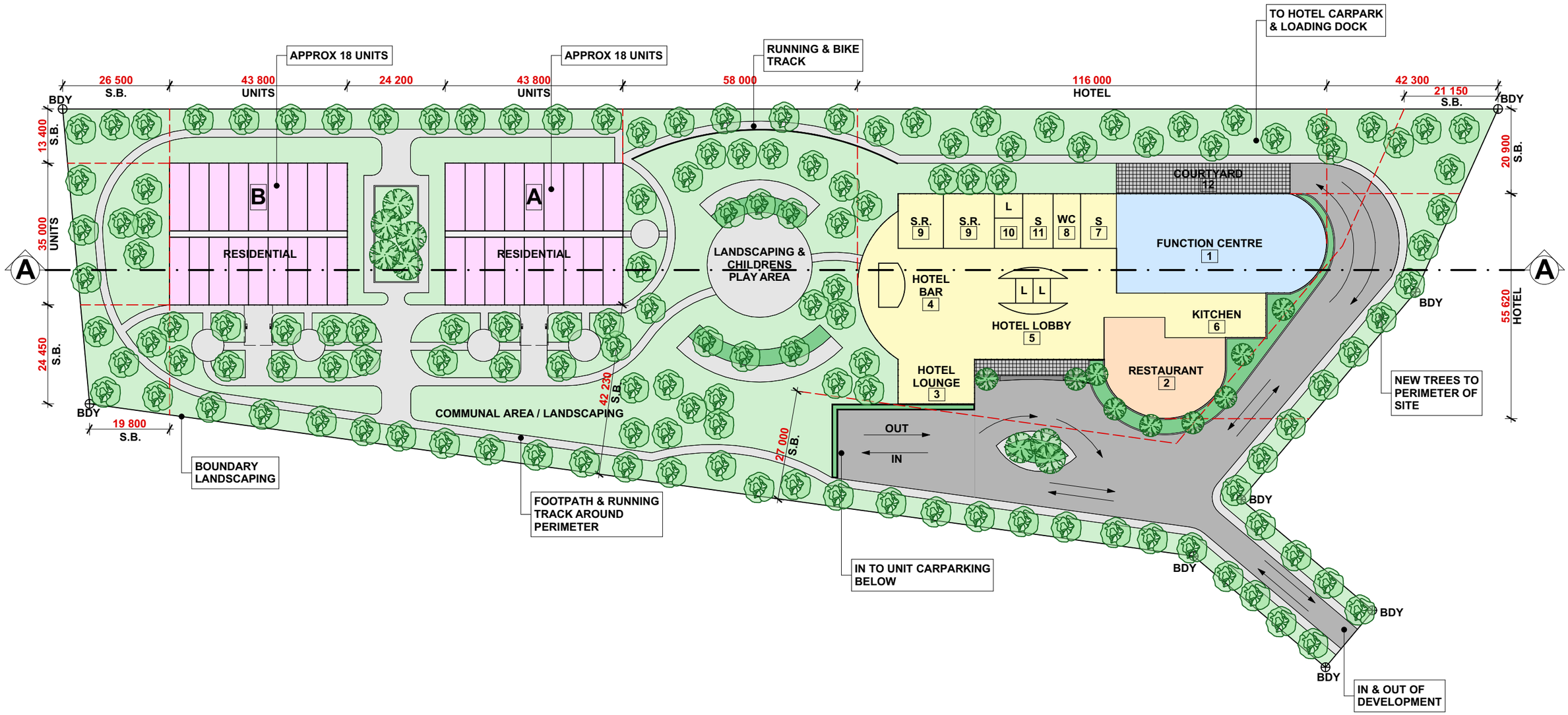
SCALE 1:1000

DESIGNER
STYLTEC BUILDING & DESIGN SOLUTIONS
10 MACQUARIE STREET ROSEBERY 2018
T: - 83381282
M: - 042630071
E:- styltec@hotmail.com

CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	SITE PLAN:
RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	01
				CHECKED BY	D.S.		

STYLTEC

LEGEND:			RESIDENTIAL:	HOTEL GROUND FLOOR:	
- HOTEL	- FUNCTION CENTRE	- TRAFFIC FLOW	BUILDING A - 18 x 2 BEDROOM UNITS	1 - FUNCTION CENTRE	7 - SERVICE ROOM
- UNITS	- RESTAURANT	- NATIVE TREE SPECIES	BUILDING B - 18 x 2 BEDROOM UNITS	2 - RESTAURANT	8 - WC'S
- LANDSCAPING			G.F.: A + B TOTAL = 36 UNITS	3 - HOTEL LOUNGE	9 - SEMINAR ROOM
- FOOTPATH RUNING TRACK BIKE TRACK	S.R. - SEMINAR ROOMS	S.B. - SETBACK		4 - HOTEL BAR	10 - LAUNDRY
	S - SERVICE AREA			5 - HOTEL LOBBY	11 - STORAGE
				6 - KITCHEN	12 - COURTYARD

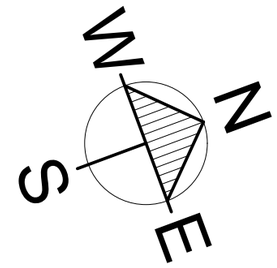


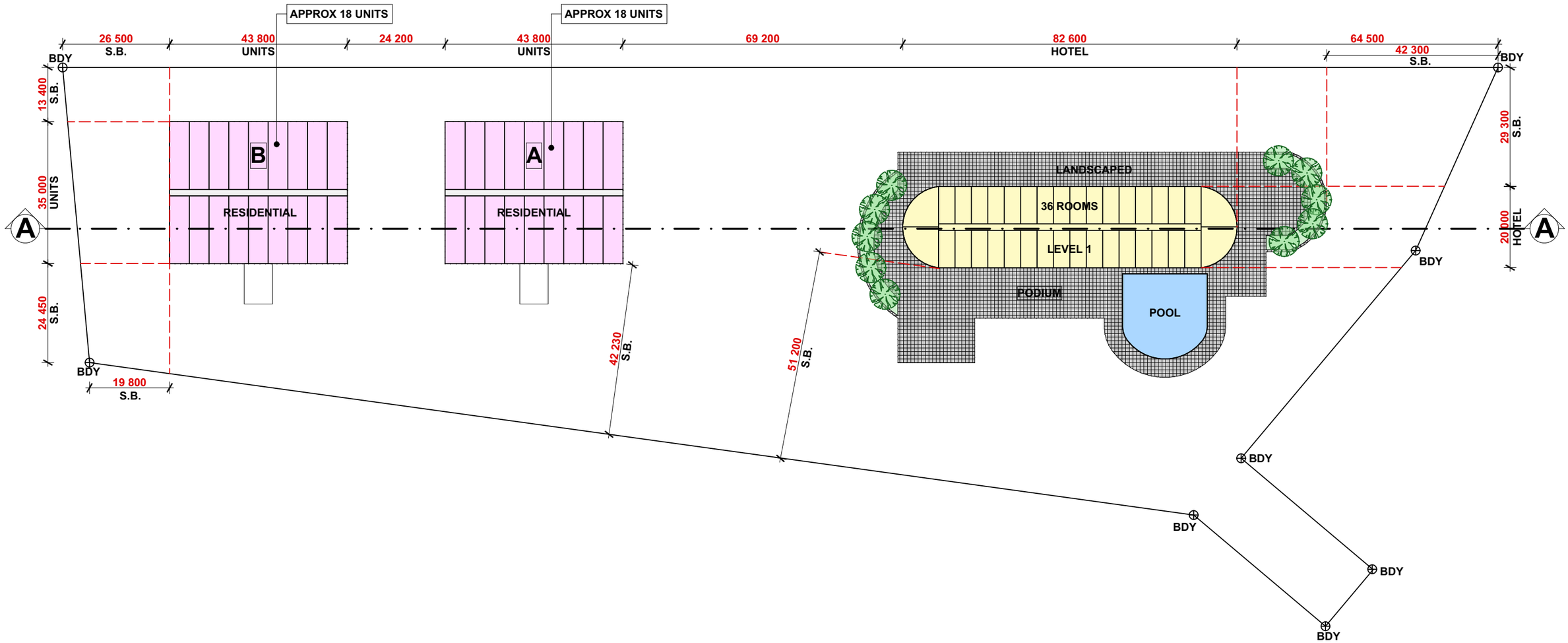
GROUND FLOOR PLAN **RMI HOTEL + APARTMENTS**

SCALE 1:1000

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 г.	JOB NO	01/11/2017	TITLE	GROUND FLOOR PLAN:	
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	05	STYLTEC
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.			

LEGEND:	RESIDENTIAL:	HOTEL:	PODIUM:
- HOTEL - UNITS - FUNCTION ROOM - RESTAURANT - BASEMENT CAR PARK	BUILDING A - 18 x 2 BEDROOM UNITS BUILDING B - 18 x 2 BEDROOM UNITS LEVEL 1: A + B TOTAL = 36 UNITS	LEVEL 1 - 36 ROOMS MIN. (35-40) m2 EACH	LEVEL 1 POOL AREA LANDSCAPED AREA





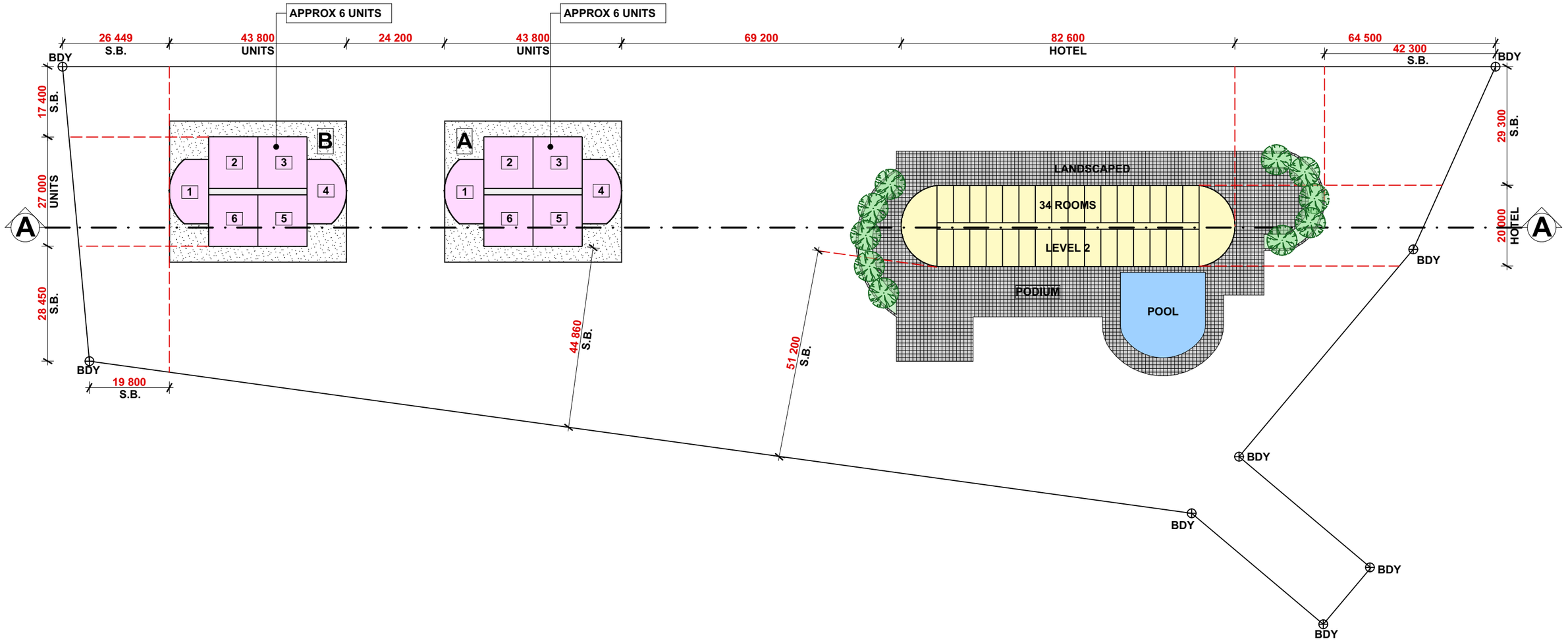
FIRST FLOOR - LEVEL 1 **RMI HOTEL + APARTMENTS**

SCALE 1:1000

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 г.	JOB NO	01/11/2017	TITLE	FIRST FLOOR LEVEL 1:
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	06
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.		

STYLTEC

LEGEND:	RESIDENTIAL:	HOTEL:
- HOTEL - UNITS - FUNCTION ROOM - RESTAURANT - BASEMENT CAR PARK	BUILDING A - 18 x 2 BEDROOM UNITS BUILDING B - 18 x 2 BEDROOM UNITS LEVEL 2: A + B TOTAL = 12 UNITS	LEVEL 2 - 34 ROOMS MIN. (35-40) m2 EACH



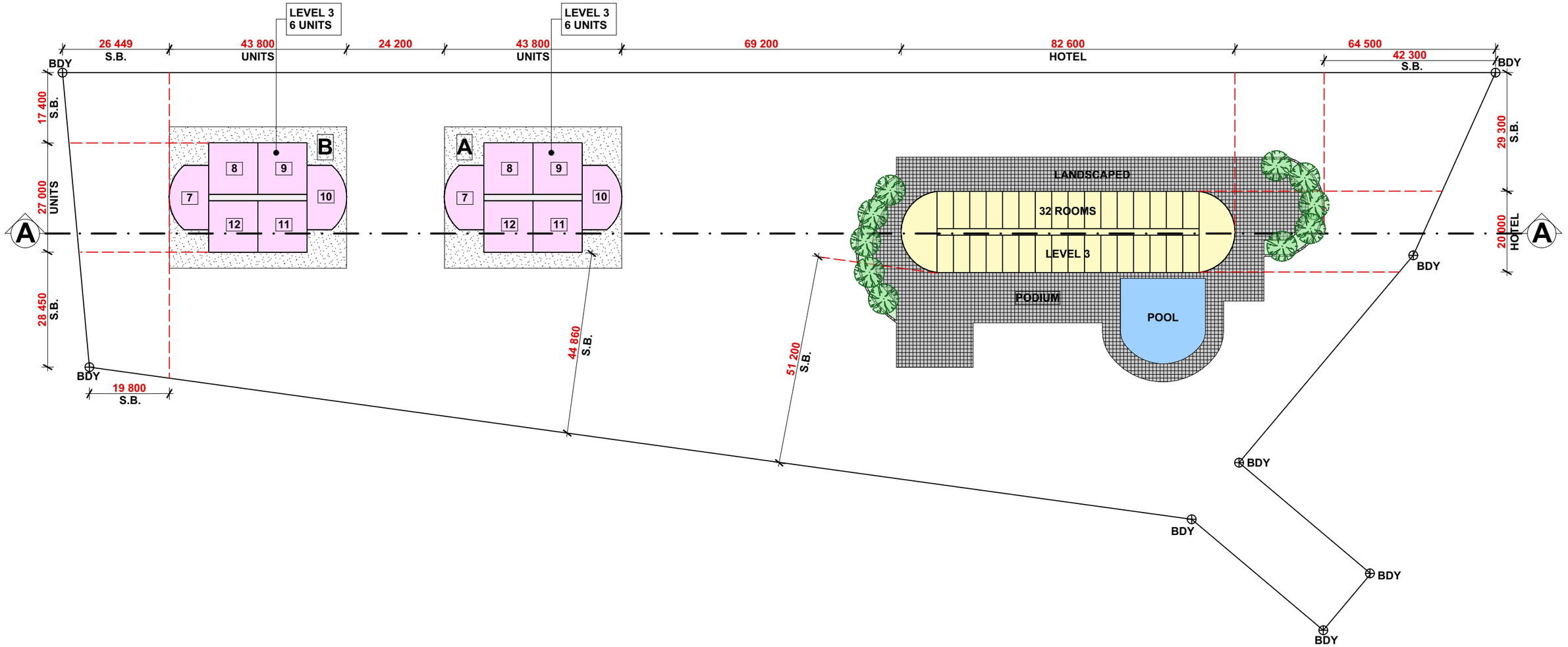
SECOND FLOOR - LEVEL 2 **RMI HOTEL + APARTMENTS**

SCALE 1:1000

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	SECOND FLOOR LEVEL 2:
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	07
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.		

STYLTEC

LEGEND:	RESIDENTIAL:	HOTEL:
- HOTEL - UNITS - FUNCTION ROOM - RESTAURANT - BASEMENT CAR PARK	BUILDING A - 18 x 2 BEDROOM UNITS BUILDING B - 18 x 2 BEDROOM UNITS LEVEL 3: A + B TOTAL = 12 UNITS	LEVEL 3 - 32 ROOMS MIN. (35-40) m2 EACH



THIRD FLOOR - LEVEL 3 **RMI HOTEL + APARTMENTS**

SCALE 1:1000

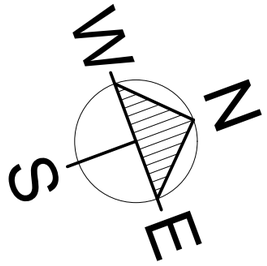
DESIGNER
STYLTEC BUILDING & DESIGN SOLUTIONS
10 MACQUARIE STREET ROSEBERY 2018
T: - 83381282
M: - 042630071
E:- styltec@hotmail.com

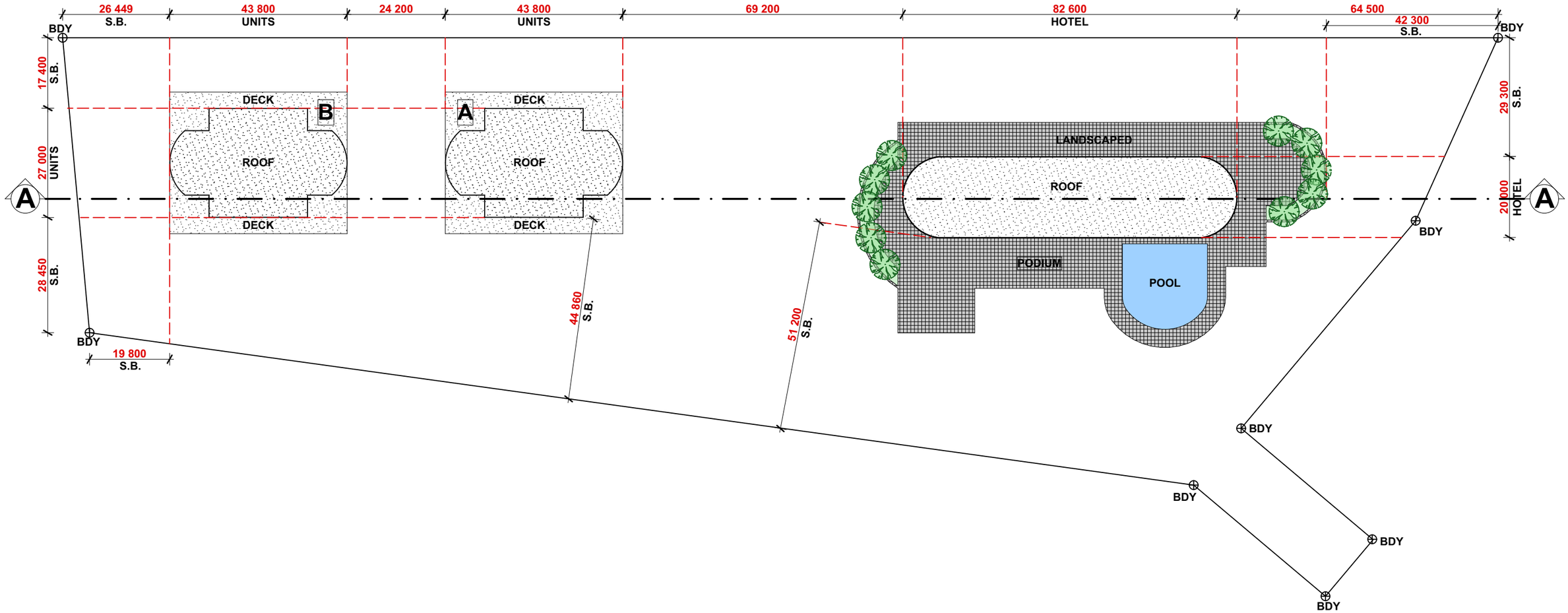
CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	THIRD FLOOR LEVEL 3:
RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	08
				CHECKED BY	D.S.		

STYLTEC

LEGEND:

- HOTEL
- UNITS
- FUNCTION ROOM
- RESTAURANT
- BASEMENT CAR PARK





ROOF PLAN **RMI HOTEL + APARTMENTS**

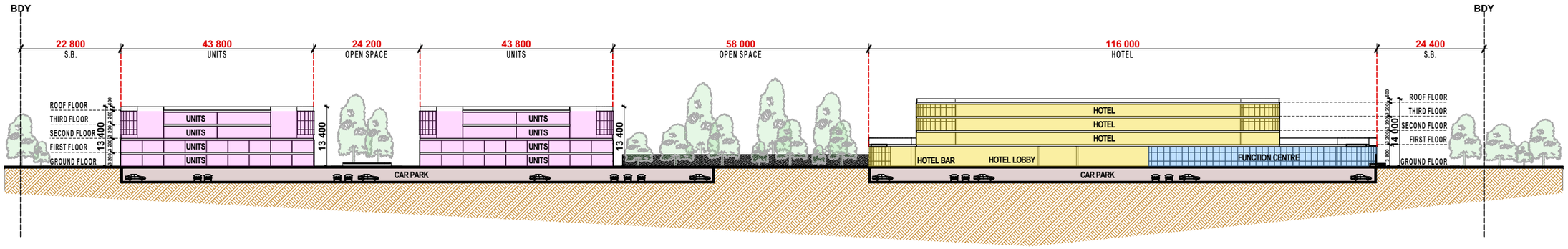
SCALE 1:1000

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	ROOF PLAN:
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	09
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.		

STYLTEC

LEGEND:

- HOTEL
- UNITS
- FUNCTION ROOM
- RESTAURANT
- BASEMENT CAR PARK



SECTION: A-A **RMI HOTEL + APARTMENTS**

SCALE 1:1000

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 г.	JOB NO	01/11/2017	TITLE	SECTION A-A:
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:	1:1000	DRAWN BY	D.C.	SHEET NO	14
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.		

STYLTEC

PERSPECTIVE 6 **RMI HOTEL + APARTMENTS**

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RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:		DRAWN BY	D.C.	SHEET NO	25
				CHECKED BY	D.S.		

STYLTEC

PERSPECTIVE 7 **RMI HOTEL + APARTMENTS**

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CLIENT

RMI GROUP

PROPOSED PROJECT

PROPOSED RESORT
LOT 1752 DP 28785,
1310 Naval College Road
Worrowing Heights N.S.W. 2540

DATE:	30.5.2018 г.	**JOB NO**	01/11/2017	**TITLE**	**PERSPECTIVE 7:**
SCALE:		**DRAWN BY**	D.C.	**SHEET NO**	26
		CHECKED BY	D.S.		

STYLTEC

PERSPECTIVE 8 **RMI HOTEL + APARTMENTS**

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CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	PERSPECTIVE 8:
RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:		DRAWN BY	D.C.	SHEET NO	27
				CHECKED BY	D.S.		

STYLTEC

PERSPECTIVE 9 **RMI HOTEL + APARTMENTS**

DESIGNER		CLIENT	PROPOSED PROJECT	DATE:	30.5.2018 r.	JOB NO	01/11/2017	TITLE	PERSPECTIVE 9:	STYLTEC
STYLTEC BUILDING & DESIGN SOLUTIONS	T: - 83381282 M: - 042630071	RMI GROUP	PROPOSED RESORT LOT 1752 DP 28785, 1310 Naval College Road Worrowing Heights N.S.W. 2540	SCALE:		DRAWN BY	D.C.	SHEET NO	28	
10 MACQUARIE STREET ROSEBERY 2018	E:- styltec@hotmail.com					CHECKED BY	D.S.			

PERSPECTIVE 10 **RMI HOTEL + APARTMENTS**

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RMI GROUP

PROPOSED PROJECT

PROPOSED RESORT
LOT 1752 DP 28785,
1310 Naval College Road
Worrowing Heights N.S.W. 2540

DATE:	30.5.2018 r.	**JOB NO**	01/11/2017	**TITLE**	**PERSPECTIVE 10:**	**STYLTEC**	
SCALE:		**DRAWN BY**	D.C.	**SHEET NO**	29		
		CHECKED BY	D.S.				

APPENDIX B TRAFFIC ASSESSMENT

APEX ENGINEERS

APEX Engineers

Traffic and Parking Specialists

www.apexengineers.com.au

March 2016

Attention: Roads and Traffic Unit at Shoalhaven City Council

TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED HOTEL DEVELOPMENT AT 1310 NAVAL COLLEGE ROAD, WORROWING HEIGHTS NSW 2540

APEX Engineers have been engaged by iArchitecture to provide a traffic impact assessment, for the planning submission stage, for the proposed hotel development at 1310 Naval College Road in Worrowing Heights, NSW.

This technical note is prepared to address, from a strategic point of view, the anticipated traffic and parking related issues pertaining to the above mentioned proposal (for the purposes of the initial planning submission). In particular, this technical note will provide;

- A review of the site area in relation to existing land uses, traffic and parking conditions in the immediate vicinity;
- A review of the current operational characteristics of the traffic network in the vicinity of the subject development and any relevant constraints/opportunities for the subject development;
- An indication of the anticipated traffic generation and distribution levels expected from the subject proposal;
- Recommendations in relation to the required turn treatments at the proposed site access location, off Naval College Road; and
- A review of sight distance availability at the proposed site access location;
- An indication of the statutory on-site parking provision and other parking/loading/access design requirements applicable to the subject proposal.

It is noted that during the preparation of this technical note, reference has been made to the following documents;

1) The traffic and stormwater assessment report prepared by allen, price & associates (dated 18th June 2014, ref: 25513 – 100MJPmrf);
2) Guide to Traffic Generating Developments (RMS, 2002);
3) Trip Generation Manual (Institute of Transportation Engineers, 9th Edition);
4) Traffic Report for the Proposed Vincentia District Centre Project Approval Application (Masson Wilson Twiney, April 2008);
5) Austroads Guide to Road Design – Part 4A: Signalised and Unsignalised Intersections; and
6) Shoalhaven Council Development Control Plan (2014).

1 BACKGROUND AND EXISTING CONDITIONS

The subject proposal relates to construction of a building, which includes a hotel and serviced apartment components, at 1310 Naval College Road in Worrowing Heights. It is noted that, at these early stages of the development, the detailed floor plans or floor area figures are not available. However, the proposed hotel is anticipated include 120 rooms while the proposed serviced apartment component will include 180 x 2 bedroom units.

The subject site is located fronting Naval College Road, opposite Vincentia town centre. To the north of the subject site, on the opposite side of Naval College Road, exits a number of rural residential dwellings. Apart from the above, the immediate site vicinity is characterised mainly by rural, undeveloped land. However, it is acknowledged that a number of developments are currently occurring within the vicinity of the subject site, in particular, the Vincentia town centre, upgrade of Moona Creek Road and the Naval College Road/Moona Creek Road intersection.

The following figure illustrates the location of the subject site in aerial view.

Figure 1: Location of the subject site

1.1 Naval College Road

Naval College Road at the frontage of the subject site includes one travel lane in each direction. When travelling southeast bound (from Princes Highway to Vincentia), Naval College Road includes an 80km/hr speed limit on a meandering road through thick bushland for approx. 13 km. The roundabout intersection between Naval College Road and Seagrass Avenue, located approx. 500m to the northwest of the subject site, alerts the drivers travelling southeast bound on Naval College Road of upcoming Vincentia town centre. Therefore, the actual speed of vehicles travelling southbound, will likely be less than the posted speed limit of 80 km/hr, for the section of Naval College Road that lies between Naval College Road/Seagrass Avenue intersection and Vincentia town centre.

From a strategic point of view, most of the traffic entering and exiting the proposed site, is likely to utilise the section of Naval College Road that connects to Princes Highway (since approx. 15km to the south east of the subject site, Naval College Road terminates at Booderee National Park).

When travelling northwest bound (from Vincentia towards Princes Highway), Naval College Road includes a speed limit of 80 km/hr. However, it is noted that the roundabout intersection of Naval College Road with The Wool Road is located approx. 550m to the southeast of the subject site, along Naval College Road. This roundabout is deemed to alert northbound drivers about the upcoming Vincentia town centre (since the traffic turning towards Naval College Road from The Wool Road will experience a posted speed limit of 70 km/hr on The Wool Road). Therefore, the drivers will likely adopt lower speeds than the maximum posted speed limit, along this section of Naval College Road. Furthermore, the Naval College Road/Moona Creek Road intersection is currently being upgraded and this upgrade will also have implications on traffic travelling to and from the proposed site.

As is evident from the above discussion, the traffic at the subject site frontage is likely to include speeds which are less than the posted maximum speed limit of 80 km/hr. This is mainly due to the subject site being located in a transition zone from rural to urban land.

The following figure summarises the above discussed characteristics of Naval College Road.

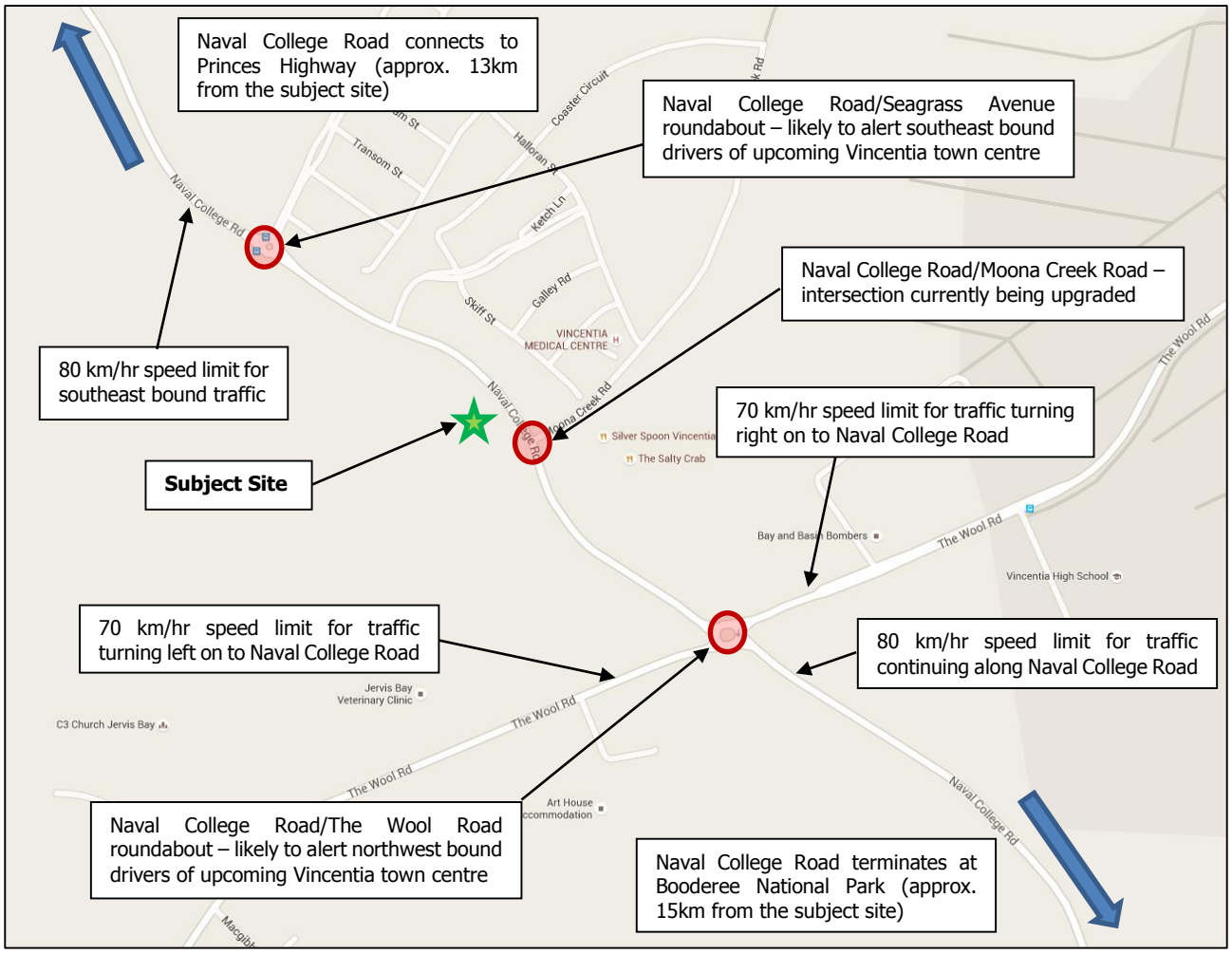


Figure 2: Traffic characteristics of Naval College Road within the site vicinity

1.2 Public Transport Service Accessibility

The Vincentia town centre area is serviced by Nowra Coaches. It operates bus route 732 (and 733) which runs five times a day on week days and two times a day on weekends. The route connects Nowra, Falls Creek, Tomerong, Woollamia, Huskisson, Vincentia, Old Erowal Bay, Sanctuary Point and Basin View.

Given the limited accessibility to public transport services, most patron and staff trips are anticipated to be via private transport modes. The staff members who are local residents can utilise public transport services to access the site – although not to a significant extent due to the limited frequency of the bus serivces.

2 ANTICIPATED TRAFFIC GENEATING POTENTIAL OF THE PROPOSAL

Given the rural nature of the subject site vicinity, in light of lack of alternative transport modes, private vehicle trips are likely to be the predominant means of accessing the site in future by both staff and patrons. Accordingly, the anticipated traffic generating potential for the overall proposal has been calculated using established trip rates.

The RMS Guide to Traffic Generating Developments (2002) document does not stipulate any specific trip rates for hotel or serviced apartment land uses. Subsequently, an internet search was undertaken for hotel and serviced apartment trip generation rates in NSW Australia. However, hotel or serviced apartment trip generation rates specific to NSW or Australia were not readily available in public domain. Therefore, the trip generation rates for hotel land uses, stipulated by the ITE Trip Generation Manual has been adopted for both the hotel and serviced apartment components of the proposed development, as shown in **Table 1** below.

Table 1 below summarises the peak hour and daily vehicle trip generation estimates for each component of the proposed development.

Table 1: Peak and daily trip generation estimates for the subject proposal

Landuse Component	**Quantum**	**Trip Generation Rate**			**Trips Generated**	
		Peak hour	**Daily**	**Reference Document**	**Peak hour**	**Daily**
Hotel	120 rooms	0.6 trips per room	6 trips per room*	Trip Generation Manual (ITE, 9th Edition)	72 trips/hour	720 trips/day
Serviced apartments	180 x 2 bedroom residential units	0.6 trips per unit	6 trips per unit*		108 trips/ hour	1.080 trips/day
Total Trips					***180 trips/ peak hour***	***1,800 trips/day***

*the daily trip generation rate was estimated by assuming that the peak hour trip generation rate represents 10% of the daily trips (typical).

As can be seen from the above table, the proposed development is likely to generate 180 peak hour and 1,800 daily trips. It is noted that the above established trip quanta can be considered to be quite conservative and robust – particularly since they assume hotel and serviced apartment operations at their capacity (not likely to be true for most of the time in reality).

2.1 Anticipated Traffic Distribution

The above derived peak hour traffic volumes have been further divided into in and out trips, for a typical peak hour period, as indicated in the table below.

Table 2: Anticipated in and out trips during a typical AM peak hour

Landuse Component	Peak hour trips (veh/hour)	Expected in and out split		Assumptions and justification	Expected in and out trips	
		% In	% Out		In (veh/hour)	Out (veh/hour)
Hotel	72	50%	50%	There will be a mix of staff/delivery/servicing and patron trips	36	36
Serviced apartments	108	50%	50%		54	54
Total Trips					***90***	***90***

Based on the above derived peak hour in and out traffic levels for the subject proposal, the anticipated traffic distributions have been established through a number of assumptions as follows;

- **The peak hour trips for typical hotel/serviced apartment type developments are** likely to include approximately even split of north and southbound trips on Naval College Road. The above assumption justified since the traffic generated from the proposed overall development is likely to include (1) staff and service/delivery trips, (2) trips by patrons entering the hotel/serviced apartments for check in, (3) trips by patrons exiting the hotel/serviced apartments for check out, and (4) local trips by patrons already lodging at the hotel/serviced apartments. The items (1) and (4) above, are likely to generate traffic that will turn right into and right out from the proposed site (since most staff members will likely reside in the local area – such as Vincentia area, also the patrons who are already staying at the proposed premise would undertake sightseeing trips towards Jervis Baya and Booderee National Park). The items (2) and (3) above are likely to predominantly generate left in and left out trips to and from the subject site, since most patrons are likely to visit the site from non-local areas which are accessed through Princes Highway.

Accordingly, a left and right turn split of 50%/50% has been assumed for the traffic generated from the proposed development, when entering and exiting the subject site from and to Naval College Road.

The following table outlines the detailed traffic splits anticipated at the access location intersection of the subject site with Naval College Road (NCR) for a typical peak hour period.

Table 3: Anticipated in and out trip directions during a typical peak hour

Landuse Component	Peak hour trips (veh/hour)	Trips entering the site (veh/hour)			Trips exiting the site (veh/hour)		
		Total In	Right in from NCR	Left in from NCR	Total Out	Right out from the site	Left out from the site
Hotel	72	36	18 (50%)	18 (50%)	36	18 (50%)	18 (50%)
Serviced apartments	108	54	27 (50%)	27 (50%)	54	27 (50%)	27 (50%)
Total Trips (veh/hour)	***180***	***90***	***45***	***45***	***90***	***45***	***45***

Figure 3 below illustrates the above established turn movement levels to and from the subject site during a typical peak hour period.

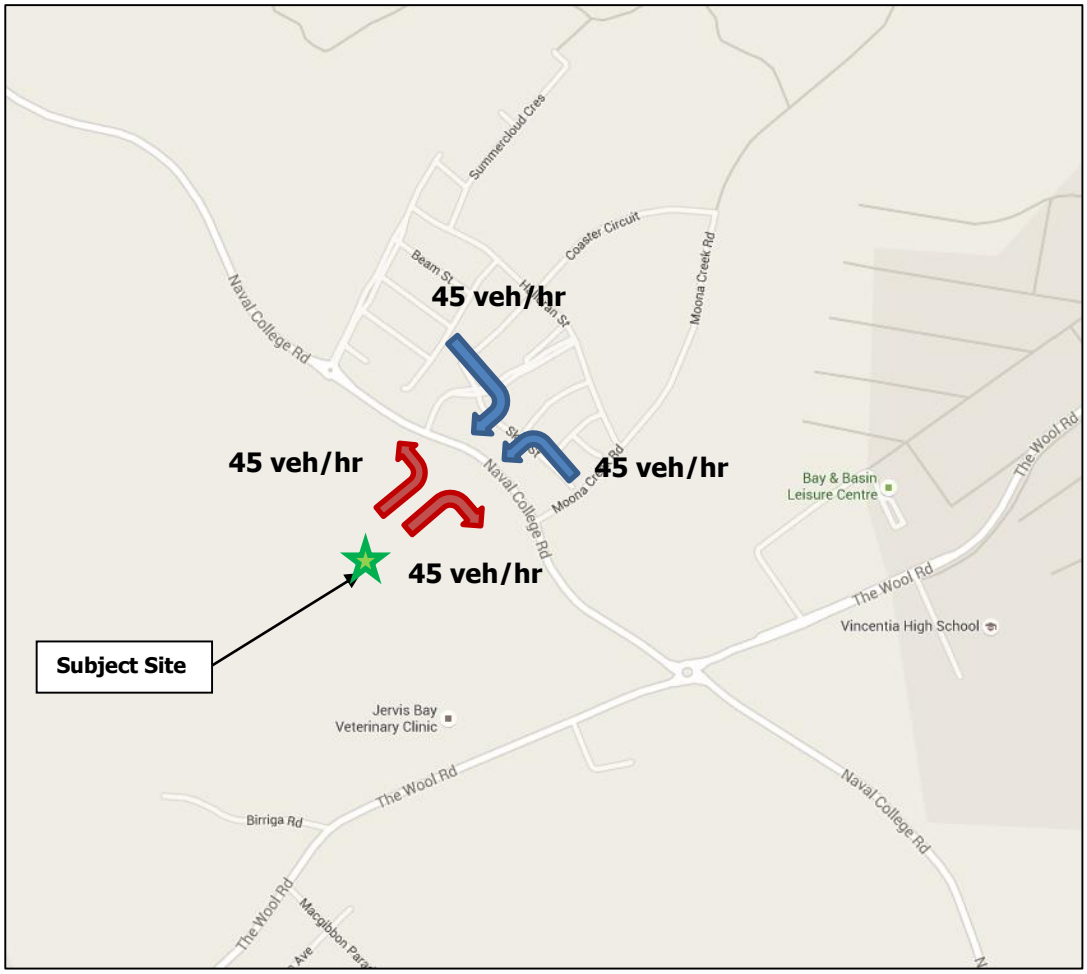


Figure 3: Typical peak hour turn movements

2.2 Projected Future Baseline Traffic Flows

The forecast traffic volumes in Naval College Road for the post-development scenario of the Vincentia District Centre project, is presented in the Traffic Report prepared by Masson Wilson Twiney. The Thursday PM peak traffic flows presented in the above mentioned report is illustrated below.

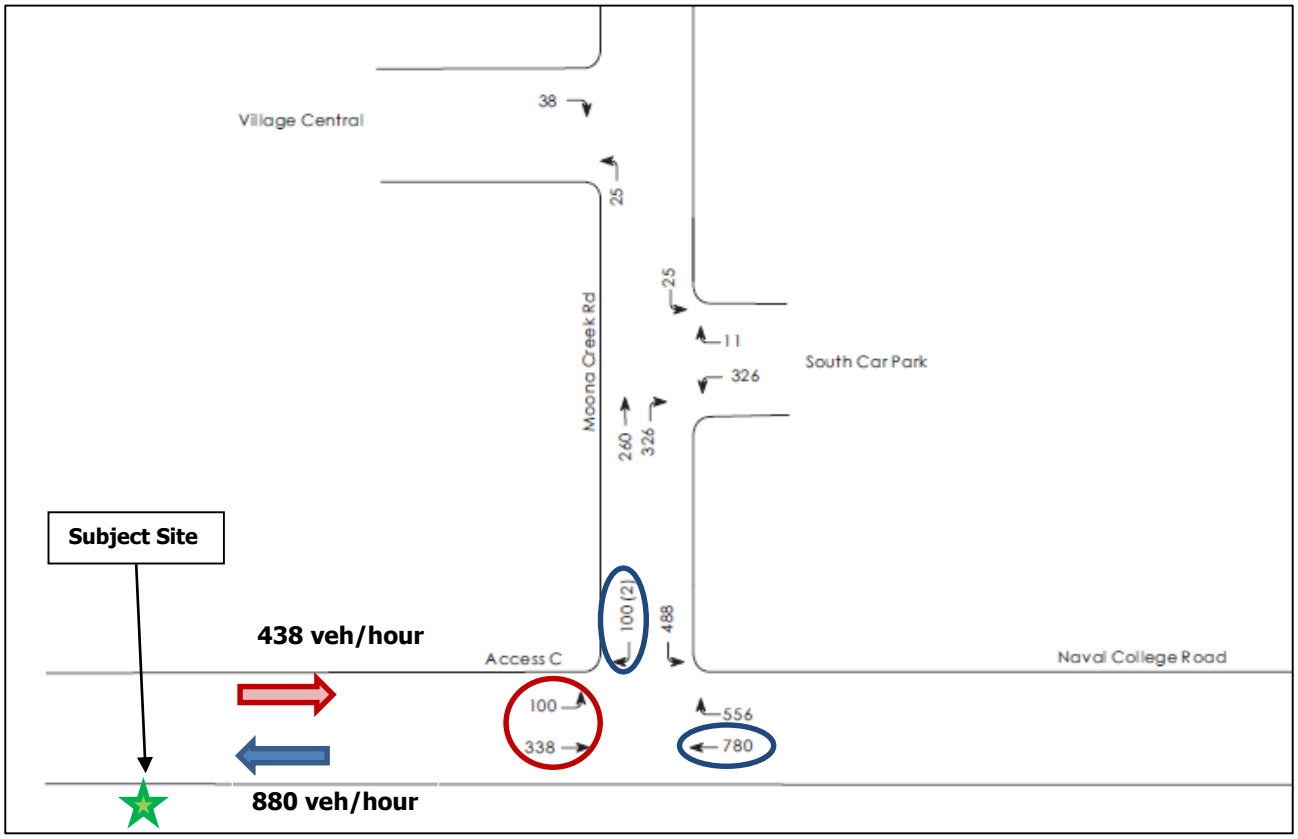


Figure 4: PM peak hour through movements along Naval College Road for the post construction scenario of Vincentia District Centre project

As can be seen from the above figure, the post development scenario of Vincentia District Centre project, will generate 880 and 438 vehicle trips during a typical PM peak hour period towards north and south respectively, along Naval College Road at the subject site frontage.

It is noted that for conservative assessment purposes, it has been assumed that the general peak hour period for traffic generation by the proposed development, during worst case scenario, will overlap with the peak traffic period for the Naval College Road (i.e. Thursday PM peak). Therefore, the worst case peak period for traffic volumes at the site access location with the Naval College Road can be conservatively analysed.

2.3 Anticipated Peak Hour Trips (Baseline + Post Construction)

The number of anticipated peak hour trips for the post construction scenario of the subject proposal has been established by adding the trips generated by the development on to the trips calculated for the future baseline scenario (once the Vincentia District Centre project is completed). The following figure illustrates the final trips obtained for the worst case peak hour period (Thursday PM peak) for the post construction scenario.

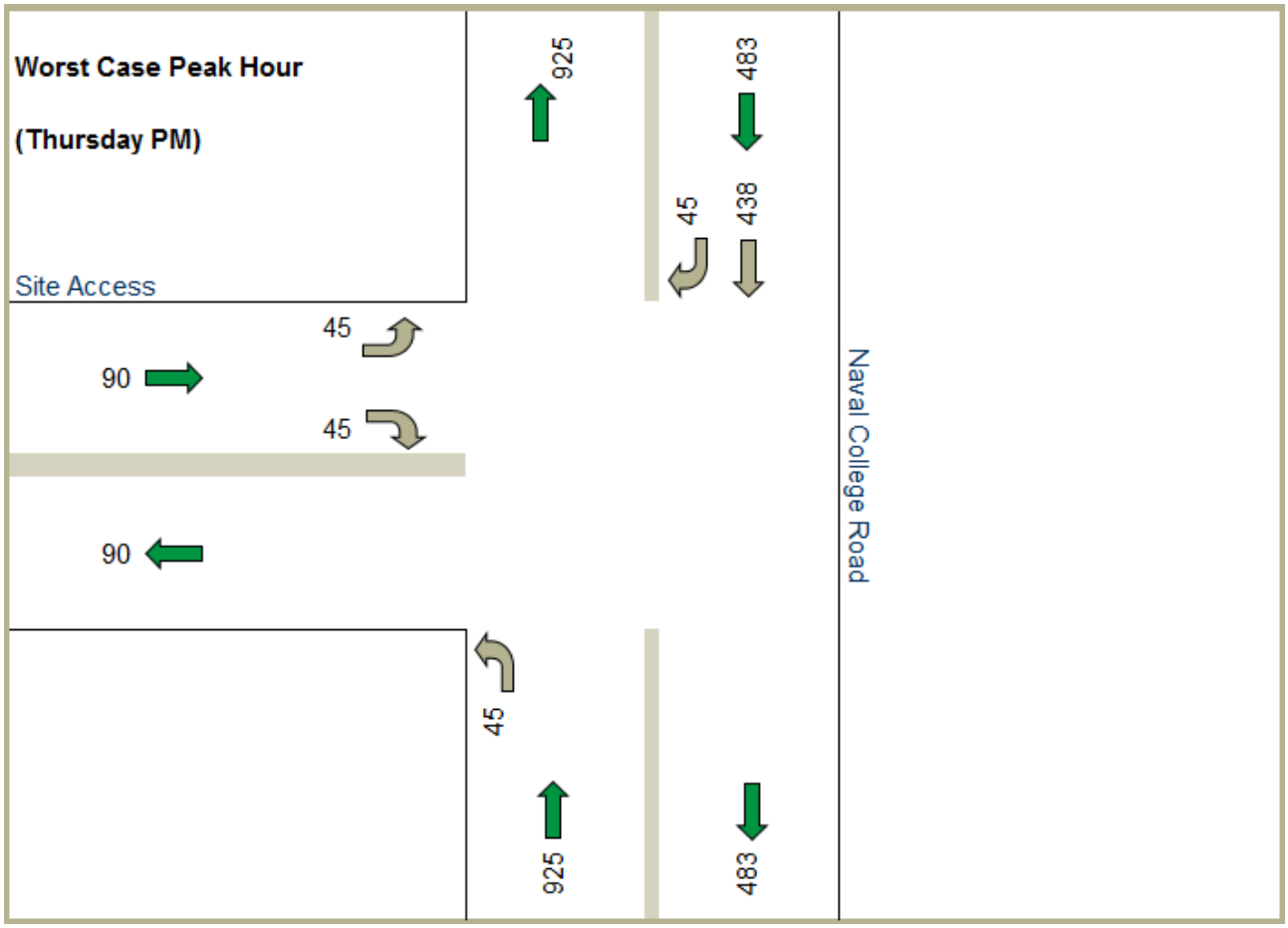


Figure 5: Typical peak hour movements at the site access intersection with Naval College Road for the ultimate development scenario

2.4 Required Access Intersection Design

Based on the above derived peak hour traffic generations and distributions for the subject proposal, the required access design/turn treatment has been chosen based on the warrants presented in *Austroads Guide to Road Design – Part 4A: Signalised and Unsignalised Intersections.*

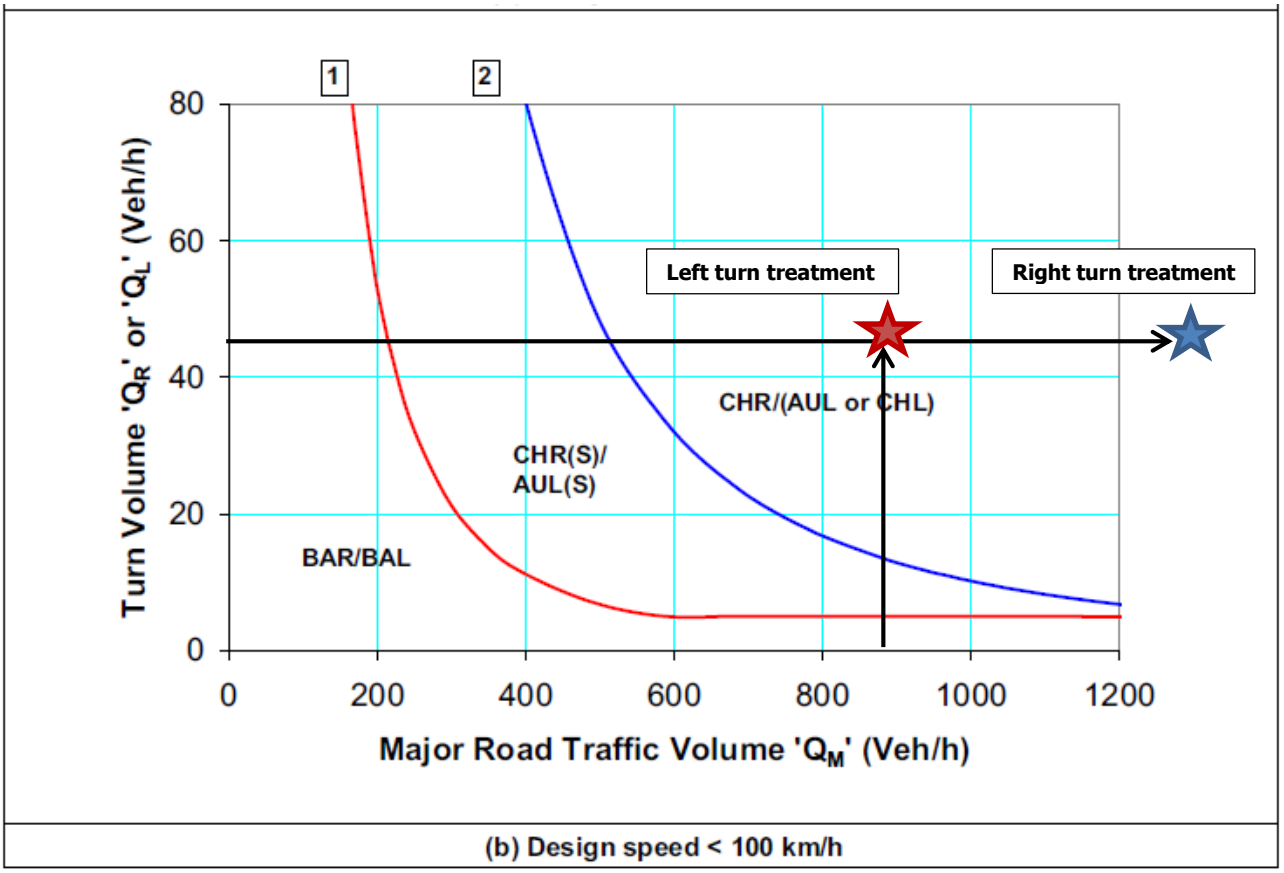


Figure 6: Required left and right turn treatments

The required right and left turn treatments have been identified as follows;

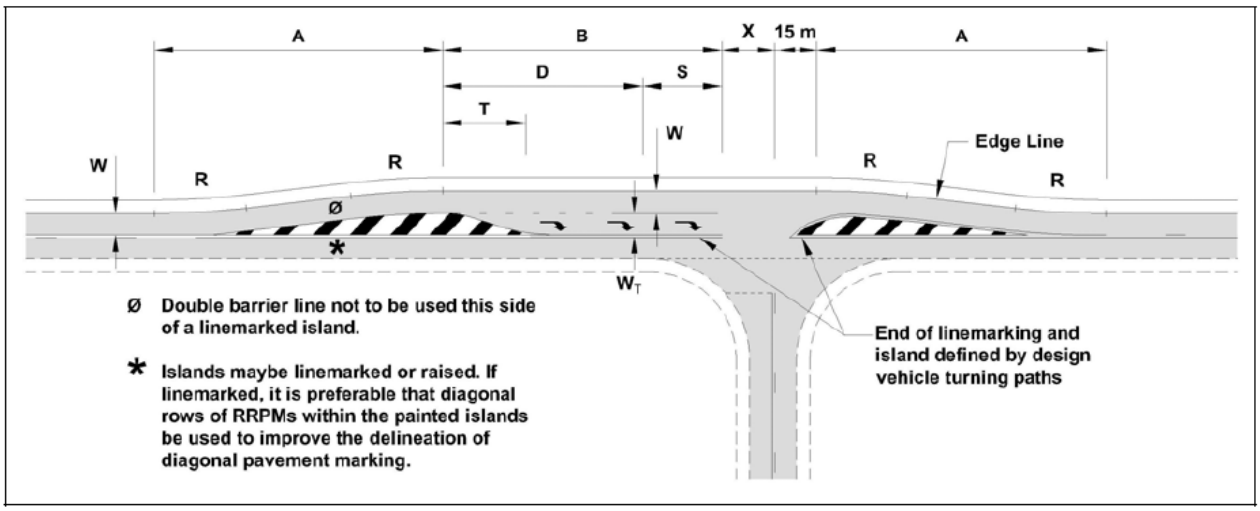
- **Right turn** – during the worst case peak period, a total of 45 vehicles turn right into the site from the Naval College Road. With a Q_M parameter of 1,363 veh/hr (note that for the right turn treatments, Q_M parameter includes through traffic volumes in both directions and left turn traffic volumes), the above identified quantum of right turn movements require a CHR (channelised right turn lane) treatment (see **Figure 6** above).

- **Left turn** – during the worst case peak period, a total of 45 vehicles turn left into the site from the Naval College Road. With a Q_M parameter of 880 veh/hr along Naval College Road, the above identified quantum of left turn movements require either an auxilliary or a channelised or auxilliary left turn treatment (see **Figure 6** above).

2.4.1 Required Channlised Right Turn (CHR) Treatment

The following figure illustrates a typical CHR treatment design (excerpt from *Austroads Guide to Road Design – Part 4A: Signalised and Unsignalised Intersections).*

Each of the geometric design parameters, indicated in the figure below, will be established through detailed SIDRA intersection modelling outputs during the DA stage of this development, upon receipt of confirmation that the above established traffic generation and traffic distribution figures are satisfactory by Shoalhaven Council.



Notes:

1. An alternative to the double white line on the offside edge of the right-turn slot is a 1.0 m painted median. The 1.0 m median is particularly useful when the major road is on a tight horizontal curve and oncoming vehicles track across the centreline. Provision of this median will require the dimension 'A' to be increased.
2. A raised concrete median on the minor road may be used with this treatment to minimise 'corner cutting', particularly for higher turning volumes.
3. The dimensions of the treatment are defined below and values of A, D, R and T are shown in Table 7.2:

W = Nominal through lane width (m) (including widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy.

W_T = Nominal width of turn lane (m), including widening for curves based on the design turning vehicle. Desirable minimum = W, absolute minimum = 3.0 m.

B = Total length of auxiliary lane including taper, diverge/deceleration and storage (m).

D = Diverge/deceleration length including taper. Adjust for grade using the 'correction to grade' factor (Section 5)

T = Physical taper length (m) and is given by:

$$T = \frac{0.33VW_T}{3.6}$$

S = Storage length (m) should be the greater of:

1. the length of one design turning vehicle or
2. (calculated car spaces –1) x 8 m (*Guide to Traffic Management – Part 3: Traffic studies and analysis* (Austroads 2009h), or use computer program e.g. aaSIDRA).

V = Design speed of major road approach (km/h)

X = Distance based on design vehicle turning path, typically 10–15 m

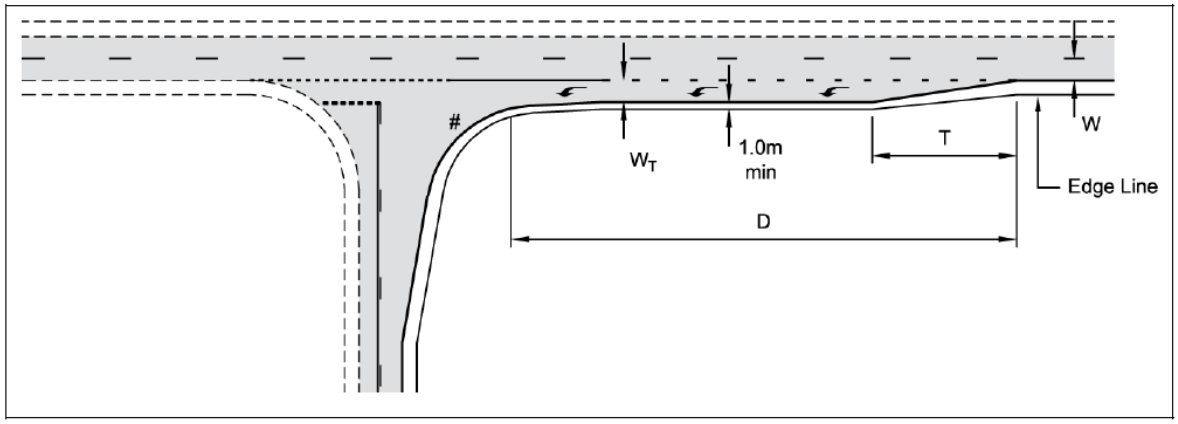
Source: Based on QDMR (2006)

Figure 7: Typical CHR design

2.4.2 Required Auxilliary Left Turn (AUL) Treatment

The following figure illustrates a typical AUL treatment design (excerpt from *Austroads Guide to Road Design – Part 4A: Signalised and Unsignalised Intersections*).

Each of the geometric design parameters, indicated in the figure below, will be established through detailed SIDRA intersection modelling outputs during the DA stage of this development, upon receipt of confirmation that the above established traffic generation and traffic distribution figures are satisfactory by Shoalhaven Council.



Notes:

1. # For setting out details of the left-turn geometry, use to vehicle turning path software or templates.
2. Approaches to left-turn slip lanes can create hazardous situations between cyclists and left-turning motor vehicles. Treatments to reduce the number of potential conflicts at left-turn slip lanes are given in this guide.
3. The dimensions of the treatment are defined thus:

W = Nominal through lane width (m) (incl. widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy.

W_T = Nominal width of turn lane (m) (incl. widening for curves based on the design turning vehicle) = 3.0 m minimum.

D = Diverge/deceleration length including taper – Table 5.2. (Adjust for grade using the 'correction to grade' in Table 5.3).

T = Physical taper length (m) given by:

$$T = \frac{0.33VW_T}{3.6}$$

V = Design speed of major road approach (km/h).

Figure 8: Typical AUL design

2.4.3 Considerations for Turn Treatment Design

It is noted that for the above mentioned turn treatment upgrades at the proposed site access location, off Naval College Road, will require additional road reserve width. However, it is acknowleddged that the road reserve of Naval College Road at this location includes a width of 30m – thus providing sufficient width for the proposed turn treatment upgrades.

3 SIGHT DISTANCE AVAILABILITY

The level of sight distance available, along the Naval College Road, at the proposed site access point, has been investigated in this section. The sight distance considered for the proposed access location is the Safe Intersection Sight Distance (SISD), which is the minimum distance which should be provided on the major road at any intersection (as per *Austroads Guide to Road Design – Part 4A: Signalised and Unsignalised Intersections*).

Considering the 80 km/hr speed limit of Naval College Road at the site frontage (although as discussed previously, in reality, the vehicles will indeed travel at speeds lower than the posted speed limit) and adopting a conservative driver reaction time of 2 seconds, a SISD requirement of 181m is established from Table 3.2 of the Austroads Guide.

Figure 9: SISD availability at the proposed site access location

As can be seen from the above figure, the required SISD of 181m can be obtained for either side of Naval College Road, at the proposed site access location. However, this would require removal of some roadside vegetation which are located within the areas outlined in Blue colour in the above figure.

4 CAR PARKING PROVISION ASSESSMENT

The statutory parking provision requirements applicable to the proposed development has been established using the parking rates outlined in Chapter G21 of the Shoalhaven Development Control Plan 2014. **Table 6** below illustrates the statutory parking provision requirements relevant for the subject proposal, based on two distinct land use components.

Table 4: Statutory parking provision requirement for the subject proposal

Landuse Component	**Quantum**	**Statutory Parking Rate**	**Required Parking Provision**
Hotel	120 rooms	1 space per room plus 1 space per employee and/or manager	120 spaces + 1 x number of employees anticipated
Serviced apartments	180 x 2 bedroom residential units	1 space per accommodation unit comprising one of two bedrooms and 1.5 spaces per accommodation unit comprising three or more bedrooms plus 1 space for site manager.	181 spaces (180 spaces for apartment units + 1 space for the site manager)
Total Parking Provision Requirement			***301 + 1 x no. of hotel employees***

As determined in the above table, the overall proposal should provide a total of 301 car spaces along with additional car spaces to match the number of fulltime employees of the proposed hotel component. The detailed designs of the proposed on-site car parking areas will be submitted during the DA stage of this proposal.

4.1 Other Considerations

In addition to the above identified provision of on-site car parking spaces, the final design of the parking area for the subject development should include the following considerations;

- Provision of access for the largest anticipated design vehicle (most likely to be a large rigid vehicle/passenger shuttle bus);
- Provision of sufficient manoeuvrability conditions (determined through swept path analysis) for the largest design vehicle within the car parking area; and
- Provision of on-site parking/loading/unloading/servicing areas for all service, delivery and shuttle vehicles.

The above considerations will be incorporated in to the final DA stage design of the proposal.

5 CONCLUSIONS

The above assessment has been undertaken at a strategic level, for the purpose of planning stage submission of the subject proposal. The only information available at this stage is the anticipated development quantum. Based on the above assessment, the following can be concluded;

- The proposed development is likely to generate 180 peak hour and 1,800 daily trips;
- Based on the identified peak period right and left turn movements at the proposed site access location off Naval College Road, turn treatments will be required for right and left turns (channelized right turn lane and an auxiliary left turn lane);
- There is sufficient road reserve at the site frontage (30m), for the above mentioned turn treatment upgrades;
- The required safe intersection sight distance of 181m can be obtained for either side of Naval College Road, at the proposed site access location. This would require removal of some roadside vegetation which are located along the western side of Naval College Road; and
- The overall proposal should provide a total of 301 car spaces along with additional car spaces to match the number of fulltime employees of the proposed hotel component.

Should Council require further information in relation to the above assessment, do not hesitate to contact the undersigned.

Supun Perera

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APPENDIX C FLORA AND FAUNA ASSESSMENT

Flora and fauna assessment: Planning proposal for new uses as a hotel and serviced apartments at Worrowing Heights

Final report

Prepared for iarchitecture on behalf of RMI Group

5 April 2016

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- NSW Office of Environment and Heritage for access to the BioNet Atlas of NSW Wildlife.
- NSW Department of Primary Industries for access to the Threatened and protected species – records viewer.
- BirdLife Australia for access to the New Atlas of Australian Birds 1998-2015.

Biosis staff involved in this project:

- Ashleigh Pritchard (mapping)

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Glossary

AoS	Assessment of Significance
APZ	Asset Protection Zone
CBD	Central Business District
DBH	Diameter at Breast Height
DoE	Commonwealth Department of the 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*
HBT	Hollow-bearing Tree
KTP	Key Threatening Process
LEP	Local Environment Plan
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
NW Act	*Noxious Weed Act 1993*
OEH	NSW Office of Environment and Heritage
SEPP 44	State Environmental Planning Policy No. 44 – Koala Habitat Protection
SIS	Species Impact Statement
study area	The broader area of direct and indirect impacts including the subject site and surrounding APZ. A 60 m buffer around Lot 1752 has been surveyed to allow for flexibility in design within the property. The APZ areas therefore encompass part of properties located at 1750 (DP28785), 1751 (DP28785), 1753 (DP28785), 1762 (DP28785), 1763 (DP28785) and Lot 2 (DP581199).
subject site	The area of direct impact for the proposed works which is located within Lot 1752.
TSC Act	*Threatened Species Conservation Act 1995*

Summary

Biosis Pty Ltd was commissioned by iarchitecture on behalf of their client, RMI Group, to undertake a flora and fauna assessment for a Planning Submission for new uses as a Hotel and Serviced Apartments with Ancillary facilities at Lot 1752, Naval College Road, Worrowing Heights.

The subject site, defined by the extent of proposed works, is approximately 3.09 hectares and is surrounded by the study area which includes adjacent areas likely to be directly or indirectly affected by the proposal. This extends up to 60 metres around the property boundary to allow for assessment of the proposed bushfire Asset Protection Zones (APZ). Identified constraints should be used to guide the detailed design phase of the project, with an emphasis on avoiding impacts where feasible.

The study area encompasses at total of 9.69 hectares, of which 1.88 ha is native vegetation located within the APZ surrounding the property. The remaining area consists of exotic closed grassland with paddock trees and planted vegetation associated with three residential dwellings.

Ecological values

Key ecological values identified in the study area include:

- A population of the threatened flora species, Pretty Beard Orchid *Calochilus pulchellus*. The population is located within the western APZ. The study area also contains habitat for an additional three threatened flora species and 15 threatened fauna species.
- 17 large habitat trees are located within the subject site and will be removed. These trees provide a stepping stone for dispersing fauna and form a part of the regional wildlife corridor.
- 41 trees throughout the broader study area (both within the subject site and surrounding APZs) have been identified as potentially containing hollows. Hollows are small in size and not considered to be suitable for large hollow-nesting fauna however do contain habitat for microbats.
- 1.88 ha of native vegetation. Native vegetation located in the APZ forms part of a habitat corridor mapped by Shoalhaven City Council.

There are no threatened ecological communities within the study area.

Government legislation and policy

An assessment of the proposal against key biodiversity legislation and policy is provided and summarised in the table over page.

Recommendations

The primary measure for the development to minimise impacts to ecological values on the site is to minimise removal of native vegetation and habitat within the APZs, avoid disruption to the habitat linkage throughout the locality and avoid removal of the Pretty Beard Orchid habitat (and individuals) and important hollow-bearing trees.

Some vegetation loss will be unavoidable for the proposal however this will not result in a significant impact to threatened flora and fauna. Additional recommendations have been provided in Section 5.

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
Environment Protection and Biodiversity Conservation Act 1999	The following species have a medium or greater likelihood of occurring within the study area: • Eastern Australian Underground Orchid *Rhizanthella slateri* • Leafless Tongue Orchid *Cryptostylis hunteriana* • Bauer's Midge Orchid *Genoplesium baueri* • Grey-headed Flying-Fox. No additional Matters of National Environmental Significance or their habitats were located within the subject site.	A Significant Impact Criteria assessment has been completed for the Eastern Australian Underground Orchid, Leafless Tongue Orchid and Bauer's Midge Orchid, which conclude that the proposal will not result in a significant impact to these species' given that no groundcover vegetation is proposed to be removed in areas of habitat. An assessment is not recommended for Grey-headed Flying-fox (refer to Table 4) as impacts are considered to be negligible. Referral under the provisions of the EPBC Act is not recommended.
Threatened Species Conservation Act 1995	No Threatened Ecological Communities are present. The study area contains habitat for four threatened flora species and 15 threatened fauna species. The Pretty Beard Orchid has been recorded within the western APZ.	Biosis has undertaken assessments under Section 5A of the EP&A Act for the following species (refer to Table 4 for rationale): • Pretty Beard Orchid • Eastern Australian Underground Orchid • Leafless Tongue Orchid • Bauer's Midge Orchid • Eastern False Pipistrelle *Falsistrellus tasmaniensis* • Eastern Freetail-bat *Mormopterus norfolkensis* • Greater Broad-nosed Bat *Scoteanax rueppellii.* The proposal will not result in a significant impact to the above species and a Species Impact Statement (SIS) is not considered necessary.
Environmental Planning & Assessment Act 1979	Threatened species occur.	Impacts to the threatened species and communities present or likely to occur have been assessed through undertaking AoS (7-part tests) as detailed above.
State Environmental Planning Policy (SEPP) No. 14 Coastal Wetlands	An area of SEPP 14 wetland occurs to the north of the study area in Jervis Bay National Park.	iarchitecture will need to demonstrate that the proposal has considered the downstream environmental impacts of any works.
State Environmental Planning	SEPP 44 should be considered as the	A Koala Plan of Management is not

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
Policy No. 44	study area exceeds more than one hectare, is located within the Shoalhaven Local Government Area and a development application will be made (SEPP 44, Section 6). The study area does not meet the feed tree requirements of the SEPP and does not constitute Potential Koala habitat or Core Habitat.	required for the current proposal.
SEPP No. 71 Coastal Protection	The proposal is not within the mapped SEPP 71 Coastal Protection zone.	No further consideration is required.
National Parks & Wildlife Act 1974	The proposal does not require the removal vegetation within a National Park.	No permits or approvals are required under the current scope of works.
Native Vegetation Act 2003	Native vegetation will be removed; therefore consent under the Native Vegetation Act is required.	Approval to clear native vegetation will be required.
Noxious Weeds Act 1993	The following noxious weeds are present: • Fireweed *Senecio madagascariensis* • Giant Parramatta Grass *Sporobolus fertilis*	Fireweed is listed as Class 4 Locally Controlled Weed, meaning that *'the plant must not be knowingly distributed'.* Giant Parramatta Grass is listed as Class 3 Regionally Controlled Weed, meaning that *'the plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed'.* Land owners have an obligation under the Noxious Weeds Act 1993 to control all noxious weeds on their land according to the specified control class.

1 Introduction

1.1 Project background

Biosis Pty Ltd (Biosis) was commissioned by iarchitecture on behalf of their client, RMI Group, to undertake a flora and fauna assessment at Lot 1752, Naval College Road, Worrowing Heights and the surrounding bushland that will form part of the proposed Asset Protection Zones (APZ).

Iarchitecture (on behalf of RMI Group) received development application (DA) approval from Shoalhaven City Council in May 2015 to complete Stage 1 of the motel development at Lot 1752, which included the establishment of an adjacent APZ at Lot 1750, Naval College Road, Worrowing Heights (DA14/1391). As part of the Stage 1 application, EcoLogical completed a flora and fauna assessment of the motel site at Lot 1752 (EcoLogical 2014). Biosis was subsequently engaged to assess hollow-bearing tree occupancy (Biosis 2014) and impacts to threatened orchid species at the APZ site at Lot 1750 (Biosis 2015a and Biosis 2015b).

iarchitecture is now in the process of preparing a Planning Submission for new uses as a Hotel and Serviced Apartments with Ancillary facilities which is being developed with international firm, Bakh Design. The new plan, provided on 5 November 2015, will expand the site use to include serviced apartments in the northern portion and two hotel blocks in the southern portion. The new design requires the extension of APZ areas further into the neighbouring southern and eastern properties.

Given the change in the extent of the project, Biosis has reviewed the work previously completed and undertaken a subsequent field inspection to assess the direct and indirect impact of the proposal to threatened species populations ad ecological communities likely to occur in the study area. The new study area includes the proposed development (within Lot 1760) with a buffer of 60 metres of around the property to assess impacts resulting from APZ areas.

1.2 Scope of assessment

The objectives of this investigation are to:

- Review databases relating to ecological issues relevant to the study area to ensure the previous findings are still relevant. These databases will include but are not limited to; the Office of Environment and Heritage (OEH) Atlas of NSW Wildlife and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool.
- Conduct a field survey to include:
  - Assessment/confirmation of the ecological values present within the new development footprint.
  - Assessment of the ecological values present within the required APZs, including a full flora and fauna assessment of bushland located within 60 metres of proposed buildings.
  - Establish suitable access pathways to minimise impacts (including clearance) to native vegetation and important habitats.
- Assess the overall impacts and discuss mitigation options relevant to the proposal. Recommended mitigation measures will align with those adopted by Council in the Stage 1 DA approval.

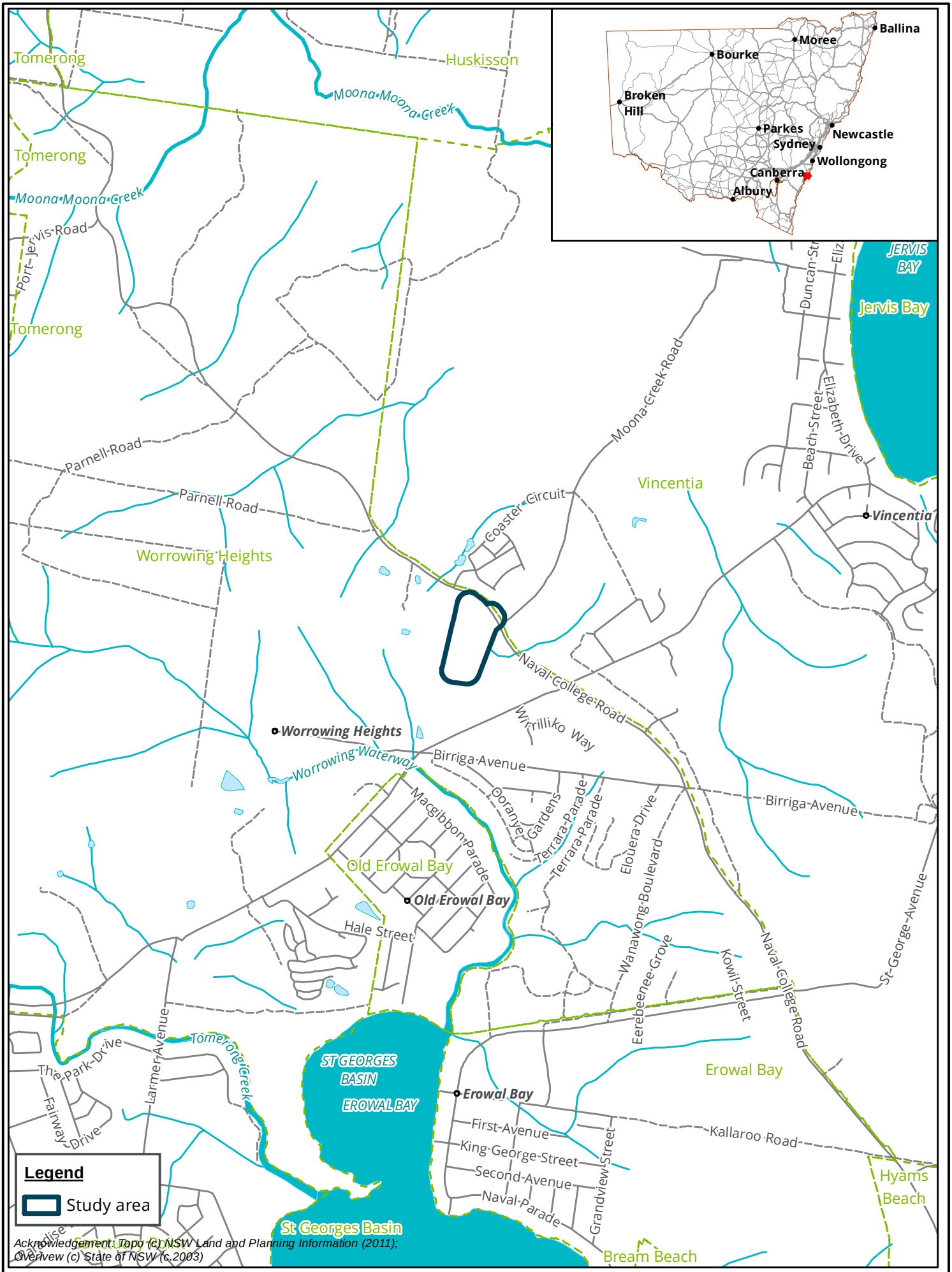
- Identify the implications of State and Commonwealth biodiversity legislation and local policy and planning approvals relevant to the project.

1.3 Location of the study area

The study area is located approximately 2 kilometres west of the township of Vincentia and approximately 22.5 kilometres south of the Nowra Central Business District (CBD; Figure 1). the property (subject site) encompasses 3.09 hectares of private land while the study area encompasses 9.69 hectares of private land and the adjacent road reserves. The property is currently zoned RU2 Rural Landscape, while the road reserve is zoned SP2 Infrastructure.

The study area is within the:

- Sydney Basin Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion
- Southern Rivers Catchment Management Authority Region
- Jervis IBRA subregion
- City of Shoalhaven Local Government Area (LGA)
- Wandanadian Coastal Plains Mitchell Landscapes



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Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Figure 1 Location of the study area at Worrowing Heights, NSW

Matter: 20464
Date: 08 December 2015,
Checked by: KJR, Drawn by: ANP, Last edited by: apritchard
Location:P:\20400s\20464\Mapping\

0 250 500 750 1,000
Metres
N

Scale 1:25,000 @ A4, GDA 1994 MGA Zone 56

Figure 2 Location of the subject site within the study area at Worrowing Heights

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Acknowledgements: Imagery (c) Nearmap 2014
Topo (c) NSW Land and Planning Information (2012)

Matter: 20464
Date: 10 December 2015,
Checked by: KJR, Drawn by: ANP, Last edited by: apritchard
Location:P:\20400s\20464\Mapping\
20464_F2_Overview

0 10 20 30 40 50
Metres
Scale 1:1,500 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

2 Methods

2.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1992, Harden 1993, Harden 2000, Harden 2002). All doubtful species names were verified with the online Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 1.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the Commonwealth *Department of Environment* (DoE) (DEWHA 2009). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only. Common and scientific names are included in the fauna list in Appendix 2.

2.2 Literature and database review

In order to provide a context for the study area, information about flora and fauna from within 10 kilometres (the 'locality') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- DoE 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, 2015) for Rare or Threatened Australian Plants (RoTAP).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015.

Other sources of biodiversity information:

- Relevant vegetation mapping, including:
  - OEH Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer.
  - Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (SCIVI) (Tozer et al. 2010).
  - Shoalhaven City Council SOE Maps – Vegetation (SCC, 2004).
  - South Coast Regional Conservation Plan (SCRCP) (DECCW 2010).

The following reports were also reviewed:

- Clark S, deLacey C, Chamberlain S 2004. Using environmental variables and multivariate analysis to delineate preferred habitat for *Cryptostylis hunteriana*, the Leafless Tongue Orchid, in the Shoalhaven Local Government Area, NSW. Cunninghamia 8(4): 467-76.

- DEWHA 2008. Approved Conservation Advice for Cryptostylis hunteriana). Department of Environment, Water, Heritage and the Arts. Canberra.
- DoE 2013b. Survey Guidelines For Australia's Threatened Orchids: Guidelines For Detecting Orchids Listed As 'Threatened' Under The Environment Protection and Biodiversity Conservation ACT 1999, Canberra.
- Jones D L 2006. Native Orchids of Australia: including territories, New Holland, Sydney.
- NSW Scientific Committee 2011. Final determination for Pterostylis ventricosa an orchid - critically endangered species listing (accessed 16 November 2015: http://www.environment.nsw.gov.au/determinations/pterostylisventricosaFD.htm).
- OEH 2014b. Threated Species Profile – Leafless Tongue Orchid (accessed 16 November 2015: http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10187).
- OEH 2014d. Threated Species Profile – Pterostylis ventricosa (accessed 16 November 2015: http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20162).

2.3 Site investigation

2.3.1 Flora assessment

The flora assessment was undertaken on 18 November 2015 using a combination of 20 x 20 metre quadrats, transects, spot locations and random meanders to determine the vegetation types present within the study area.

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.

Targeted surveys were undertaken for the following species:

- Bauer's Midge Orchid
- Eastern Australian Underground Orchid
- Leafless Tongue Orchid
- Pretty Beard Orchid

Targeted surveys for threatened orchids were undertaken in two stages. Stage 1 involved identifying and mapping vegetation, using a handheld GPS, with ecological features previously associated with the presence of locally occurring threatened orchids. Stage 2 involved targeted searches within the identified areas for the presence of threatened orchids. Due to the relatively small area of impact, survey technique for threatened orchids was undertaken using intensive spot survey technique. This involved a systematic search of identified habitat areas within the study area. Observations of other orchid species or genera were noted.

Surveys were completed during a period of optimal detection and included consultation with local experts to confirm appropriate reference populations within the locality and local flowering responses to seasonal

conditions within the Shoalhaven area. Visual confirmation that a threatened orchid reference population was flowering was also undertaken on the same day as survey of the study area, where possible (Section 4, DoE 2013a).

Targeted survey and habitat mapping for the four threatened orchids within the western part of the study area was undertaken on the 22 January 2015 (Biosis 2015) and for the Eastern Australian Underground Orchid and Pretty Beard Orchid within the rest of the study area on 18 November 2015. Additional survey for Leafless Tongue Orchid and Bauer's Midge Orchid was undertaken throughout the remainder of the property following confirmation of flowering at a nearby reference site on 21 January 2016.

Pretty Beard Orchid

Habitat surveyed for Pretty Beard Orchid included areas where soils were of higher moisture content, in open woodland vegetation with an open cover of low sedges or grasses. Areas where vegetation had been removed, was adjacent to woodland or fence lines, and with similar ecological features, were also intensively surveyed. Specimens of fertilized or over mature *Calochilus* flowers recorded were sampled and studied under dissection microscope to key out microscopic features.

Eastern Australian Underground Orchid

OEH (2014a) indicates the lifecycle and habitat requirements for Eastern Australian Underground Orchid are still poorly understood. Locally populations within the Shoalhaven LGA, occur within vegetation containing flora in the Myrtaceae family, and in areas of accumulated leaf litter. DOE (2013) indicates detection of Eastern Australian Underground Orchid is highest within October and November. Habitat surveyed for Eastern Australian Underground Orchid was based on previous published threatened species profiles and discussion with Mr Alan Stephenson (pers comm, 16 November 2015). Habitat areas were surveyed where Scribbly Gum *Eucalyptus sclerophylla* is present and the ground layer supported an accumulated layer of leaf mould. Areas between trees, within canopy drip lines, were also surveyed. Survey techniques around the base of Scribbly Gum involved the manual disturbance of leaf mould down to the upper organic layers of the soil, out to approximately one metre from the base of the tree. Areas within drip lines of Scribbly Gum involved manual disturbance of 0.5 metres x 0.5 metres, to a similar depth, where leaf mould, lacking vegetation cover, occurred between trees.

Bauer's Midge Orchid and Leafless Tongue Orchid

Habitat features mapped for Leafless Tongue Orchid and Bauer's Midge Orchid were identified by the combination of several factors, including:

- Open woodland supporting low densities of grassy groundcover.
- Low accumulations of leaf litter (Bauer's Midge Orchid).
- The presence of associated *Cryptostylis* species.
- Slight but consistent slope, with obvious moisture retention without waterlogging.

The original survey for these species was undertaken on 22 January 2015 over the western APZ of the study area. Following the motel design change in 2015, additional areas of APZ to the north, and south were again surveyed for the species on 21 January 2016. Areas of potential habitat were traversed using a 2 m parallel transect survey method to ensure all areas were adequately inspected DOE (2013).

2.3.2 Fauna assessment

A number of field surveys have been undertaken within the property and the adjoining APZ areas to determine its values for fauna.

Table 1 Fauna survey dates and weather condtions

Survey	Date	Weather conditions	Reference
Habitat assessment	31 March 2014	Temperature 23°C and no rainfall.	EcoLogical 2014
Hollow-bearing tree occupancy assessment	10 November 2014	Temperature range between 16.8°C to 21.6°C and 0.2 mm of rainfall.	Biosis 2014
Habitat assessment	18 November 2015	Temperature range between 17.7°C to 31.6°C and no rainfall.	Current assessment

Habitat assessments were undertaken to determine the types and qualities of fauna habitats 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.

The hollow-bearing tree occupancy assessment was undertaken within the property boundary of Lot 1752 to confirm identified hollow-bearing trees and determine potential occupancy. An assessment of the potential impacts was completed by Biosis (2014).

Records of fauna detected by Biosis will be submitted to OEH for incorporation into the NSW BioNet Wildlife Atlas.

2.3.3 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 2016). Fauna survey was conducted under approval 11/355 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2016).

2.4 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.

All surveys have been undertaken doing the optimal survey periods for target species. It is noted however that targeted survey for Eastern Australian Underground Orchid, while conducted within a season for optimal detection, is limited by the cryptic habit of the species (that is, it grows underground). Therefore a conservative evaluation for the likelihood of occurrence has been undertaken in line with national survey guidelines which state that assessment will 'assume that an orchid species known from the region is present on a site unless a robust evaluation has been undertaken to support the case that the species is absent' (DOE 2013a).

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.

2.5 Mapping

The concept development plan was provided by iarchitecture on 5 November 2015. The current assessment has been based on this design. Aerial imagery used in the report was obtained from NearMap and dated 3 August 2014.

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.

3 Results

A summary of the ecological features of the study area is provided below, and mapped in Figure 3 and Figure 4.

Species recorded during the flora and fauna assessment are listed in Appendix 1 (flora) and Appendix 2 (fauna). 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 the appendices, along with an assessment of the likelihood of their occurrence within the study area.

3.1 Landscape context

The proposed development site (Lot 1752) is predominantly cleared of native vegetation with current land uses being agricultural and residential, consisting of a single dwelling in the north-east along with several large sheds and associated farming infrastructure. Surrounding the property, in APZ areas, are patches of bushland of varying levels of disturbance. The property to the east (Lot 1753) has been cleared of native vegetation and contains a small dwelling in the northern portion, as well as some isolated paddock trees. The property to the west (Lot 1752) contains areas of native vegetation where trees and groundcover flora species persist. Finally, the properties located to the north (Lot 1751) and south (Lots 1763 and 1762) contain stands of native bushland.

3.2 Habitat connectivity

The study area occurs as a fragmented rural-residential property within a landscape of R2 Low Density Residential zoned land, B2 Local Centre zoned land to the north and associated with the Bayswood development; arterial and rural roads; and a large expanse of native bushland located within a mix of RU2 Rural Landscape, Environmental Conservation and Management zones (E2 and E3) as well as National Park estate.

Three properties located within the APZ area of the development: Lot 1752, 1762 and 1763 are mapped on the Shoalhaven City Council biodiversity map as 'Biodiversity – habitat corridor'. This corridor extends to the south through to Erowal Bay village and to the west and north-west to Jervis Bay National Park. The Bayswood development prevents connectivity through to the north, while Naval College Road and The Wool Road present a barrier to small ground-dwelling fauna. These features are likely to be negotiated by more mobile species including birds, some bats and arboreal mammals. In this modified landscape, paddock trees and landscaped gardens provide important 'stepping stones' for dispersal.

For this reason, it is important that canopy trees are retained in APZ areas.

3.3 Flora and fauna

Species recorded during the flora assessment are listed in Table A.1 of Appendix 1. 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.

Species recorded during the fauna assessment are listed in Table of Appendix 2. 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.

3.4 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 clearing for pasture, stock grazing and low density residential housing.

The subject site is mainly cleared land and supports paddock trees with an understorey dominated by exotic pasture species. Paddock trees within the subject site contain hollows able to support native fauna. A range of ecological features within the larger study area, surrounding the subject site also include areas of native vegetation (Red Bloodwood - scribbly gum heathy woodland) which provides accumulated woody debris and leaf litter to the north and south, and one dam to the east. The ecological features are outlined below, divided by the vegetation communities they occur in (refer also to Figure 3).

Table 2 Vegetation communities of the study area

PCT 1083 Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion	
Extent within study area	Approximately 1.88 hectares of this vegetation type (equivalent to SR594) was recorded within the current study area, predominantly as narrow linear patches along the northern and southern edges, as well as isolated patches to the west of the subject site.
Description including fauna habitat	This community is found predominantly on sandstone plateaux in the Shoalhaven LGA, on sandy loam soils derived from Hawkesbury or Nowra Sandstone and the Berry geological formation (Tozer et al 2010). The canopy within the study area contains mostly Red Bloodwood *Corymbia gummifera*, Hard-leaved Scribbly Gum *Eucalyptus sclerophylla,* and Thin-leaved Stringybark *E. eugenoides* with Red Mahogany *E. scias* subsp. *callimastha* and young Turpentine *Syncarpia glomulifera* also present. A tall dense mid-storey of Black She-oak *Allocasuarina littoralis* dominated in several areas. In other more open woodland areas, taller midstorey species Broad-leaved Geebung *Persoonia levis* and Tick Bush *Kunzea ambigua* were sporadically present within an open and diverse groundcover that included Mountain Devil *Lambertia formosa*, Wiry Panic *Entolasia stricta,* Myrtle Wattle *Acacia myrtifolia, Cyathochaeta diandra, Hibbertia empetrifolia, Pultenaea retusa* and *Comesperma ericinum.* Some areas were wetter and are obviously subject to periodic inundation. These areas were dominated by *Gahnia radula.* This community supports a variety of habitat features for fauna species, including small pipe hollows, shrubby understorey and abundant coarse woody debris. Due to past logging practices hollows are limited in extent and size with no hollow suitable for larger fauna species. A complete hollow-bearing tree inventory has been provided in Appendix 2.
Condition	The community is generally in moderate condition with low levels of exotic species recorded. Exotic species include mainly pastoral grasses and annual weeds in areas of recent soil disturbance. The patch in the south eastern corner of the study area included areas where informal tracks were present and where vegetation had been cleared along the fence line. Regenerating species within these areas were mostly locally occurring native shrubs and grasses. Two patches of highly modified vegetation were mapped within the north-western and south-western corners of the study area. The north-western patch has a managed understorey that mostly consisted of turf grass. The south-western patch had been cleared and mostly consisted of a monoculture of young Tantoon *Leptospermum polygalifolium.*

PCT 1083 Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion	
	The remnant patches vary in condition within the western section, and areas between them have been subject to slashing, grazing and pasture improvement.
Associated soils and landscape position	Soils recorded at the site were silty to loam sands, generally moist at the time of field survey. The study area is generally divided by a slight rise through the middle of the subject site running generally in a north-west to south-east alignment and generally less than a 1 in 10 m gradient across the study area.
Threatened ecological community	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed
Threatened species habitat	The vegetation contained areas of habitat for four threatened terrestrial orchid species: • Pretty Beard Orchid • Eastern Australian Underground Orchid • Leafless Tongue Orchid • Bauer's Midge Orchid. Areas of habitat identified within these patches were consistent with the descriptions within Section 2.3.1 Pretty Beard Orchid was previously recorded and confirmed present in the western part of the study area within the APZ of Lot 1752 (Bain, D. OEH. pers com. 10 February 2015). Targeted searches on 22 January 2015 and 21 January 2016 for Leafless Tongue Orchid, Bauer's Midge Orchid, and Eastern Australian Underground Orchid did not locate these species. For additional orchid species recorded refer to Biosis 2015. Targeted searches on 18 November 2015 for Pretty Beard Orchid and Eastern Australian Underground Orchid did not record these species. Other orchid species recorded included Copper Beard Orchid *Calochilus campestris*, Bonnet Orchid *Cryptostylis erecta*, Large Tongue Orchid *Cryptostylis subulata*, and an over mature *Thelymitra* species (identified by the remaining column arrangement). This vegetation community provides a wide variety of habitat features for threatened fauna species, particularly those species reliant upon tall spring flowering canopy vegetation (Grey-headed Flying-fox *Pteropus poliocephalus* and Gang-gang Cockatoo *Callocephalon fimbriatum*). The feed tree species of the Glossy Black Cockatoo *Calyptorhynchus lathami*, *Allocasuarina littoralis* was recorded in dense clusters in the portion of woodland in the southern APZ. Hollow-bearing trees suitable for threatened microbats (particularly Greater Broad-nosed Bat *Scoteanax rueppellii* and Southern Myotis *Myotis macropus*) were present. Foraging habitat for these species is also located within and adjacent to the open forest habitat.

PCT 1083 Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion

Plate 1 Red Bloodwood - Scribbly Gum heathy woodland (located in the southern APZ)

Closed exotic grassland with scattered paddock trees	
Extent within study area	Approximately 7.81 ha of this vegetation type was recorded within the current study area, predominantly within the subject area and along the adjacent areas to along the northern and southern edges of the subject site. This vegetation type has generally been grazed for a period of time and is likely to have undergone some form of pasture improvement with exotic pasture species. The area also includes three dwellings, a section of Navel College Road and a farm dam.
Description including fauna habitat	This vegetation was characterised as being made up of exotic pasture species with scattered paddock trees. Exotic pasture included Rye Grass *Lolium* sp., Sweet Vernal Grass *Anthoxanthum odoratum* and White Clover *Trifolium repens.* Scattered paddock trees included Red Bloodwood, Hard-leaved Scribbly Gum, Thin-leaved Stringybark, Red Mahogany and Turpentine. Fauna habitat features are limited in the exotic grassland; although opportunistic species including Australian Magpie *Cracticus tibicen*, Willie Wagtail *Rhipidura leucophrys*, Laughing Kookaburra *Dacelo novaeguineae* and Welcome Swallows *Hirundo neoxena* were recorded foraging in these areas in small flocks. A farm dam is located in the eastern APZ and provide habitat for ducks and aquatic species. Minimal emergent or floating vegetation is available however for amphibians.
Condition	The community is generally in poor condition with low levels of native species recorded. Exotic species were dominant within these areas and included mainly pastoral grasses and annual weeds. These areas lacked any woody debris or leaf litter build up.
Associated soils and landscape position	Soils recorded at the site were silty to loam sands, generally moist at the time of field survey. The study area is generally divided by a slight rise through the middle of the subject site running generally in a north-west to south-east alignment and generally less than a 1 in 10 m gradient across the study area.
Threatened ecological community	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed
Threatened species habitat	No limiting threatened flora or fauna species habitat occurs within this community, however the Little Eagle *Hieraaetus morphnoides* and Square-tailed Kite *Lophoictinia isura* are known to forage in farmland adjacent to woodland and occur within the locality. The Southern Myotis *Myotis macropus* may forage over the farm fam for small fish.

Closed exotic grassland with scattered paddock trees

Plate 2 Closed exotic grassland with scattered paddock trees

Figure 3 Vegetation mapping and fauna habitat features of the study area at Worrowing Heights, NSW

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Acknowledgements: Imagery (c) Nearmap 2014
Topo (c) NSW Land and Planning Information (2012)

Matter: 20464
Date: 05 April 2016,
Checked by: KJR, Drawn by: ANP, Last edited by: lharley
Location:\\br-data-01\matters\20400s\20464\Mapping\20464_F3_Vegetation

0 10 20 30 40 50
Metres
Scale 1:1,500 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

3.5 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 ten kilometres of the study area are provided in Appendix 1 (flora) and Appendix 2 (fauna). Previous records of threatened biota within the locality are shown in Figure 5 (flora) and Figure 6 (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.

3.5.1 Threatened flora

One threatened orchid, the Pretty Beard Orchid is known to occur within the western APZ area of Lot 1752.

In January 2015, Biosis mapped areas of habitat for Pretty Beard Orchid and Eastern Australian Underground Orchid throughout the western APZ area within Lot 1752 (Figure 4).

In addition, targeted surveys have been undertaken for the above species throughout the remaining study area during peak flowering season (during the current assessment in November 2015). No additional individuals of Pretty Beard Orchid or Eastern Australian Underground Orchid were identified.

Plate 3 Pretty Beard Orchid located at nearby reference sites during targetd surveys to confirm timing of flowering and detectability showing habitat on the left and an individual on the right

Targeted surveys for the Leafless Tongue Orchid and Bauer's Midge Orchid were undertaken during the peak flowering season confirmed by their detection at nearby reference sites during the optimal flowering season (Plate 4). No individuals were located within the study area.

Plate 4 Bauer's Midge Orchid (left) and Leafless Tongue Orchid (right) located at nearby reference sites during targetd surveys to confirm timing of flowering and detectability

Figure 4 Threatened orchid habitat occurring in the study area

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Acknowledgements: Imagery (c) Nearmap 2014
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Matter: 20464
Date: 16 February 2016,
Checked by: KJR, Drawn by: ANP, Last edited by: apritchard
Location:P:\20400s\20464\Mapping\
20464_F4_Orchid Habitat

0 10 20 30 40 50
Metres
Scale 1:1,500 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

3.5.2 Threatened fauna

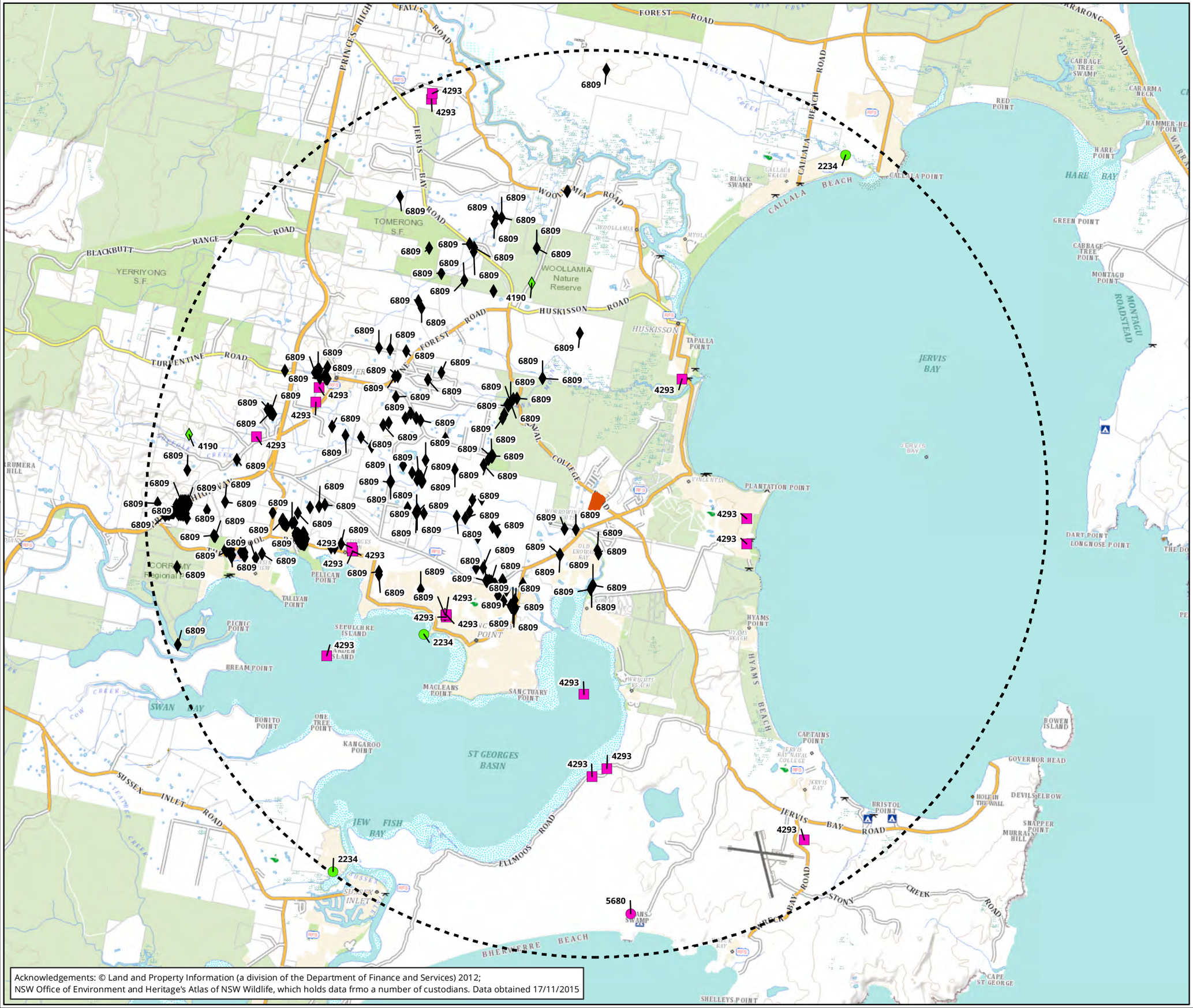
The following threatened fauna species were are considered to have a medium or higher likelihood of occurring in the study area based on available habitats both within the development footprint (although limited) and the surrounding APZ areas containing bushland:

- Gang-gang Cockatoo *Callocephalon fimbriatum*
- Glossy Black-Cockatoo *Calyptorhynchus lathami*
- Microbats including:
  - Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*
  - Eastern False Pipistrelle *Falsistrellus tasmaniensis*
  - Eastern Freetail-bat *Mormopterus norfolkensis*
  - Greater Broad-nosed Bat *Scoteanax rueppellii*
  - Southern Myotis *Myotis macropus*
- Grey-headed Flying-fox *Pteropus poliocephalus*
- Little Eagle *Hieraaetus morphnoides*
- Little Lorikeet *Glossopsitta pusilla*
- Forest owls including:
  - Masked Owl *Tyto novaehollandiae*
  - Powerful Owl *Ninox strenua*
- Square-tailed Kite *Lophoictinia isura*
- Turquoise Parrot *Neophema pulchella*
- Varied Sittella *Daphoenositta chrysoptera*

Area of habitat and furtehr assessment requriements have been discussed in Section 4.1.1 and 4.2.

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 considered and addressed in Appendix 2. No ecologically significant proportion of migratory species occurs within the study area.



Acknowledgements: © Land and Property Information (a division of the Department of Finance and Services) 2012;
NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data frmo a number of custodians. Data obtained 17/11/2015

Legend

▨ Study area

⬚ Search area

Threatened Flora

Pterostylis ventricosa*

13657 - Calochilus pulchellus*

● 2234 - Wilsonia backhousei

◆ 4190 - Eucalyptus sturgissiana

■ 4293 - Syzygium paniculatum

4386 - Caladenia tessellata*

4415 - Cryptostylis hunteriana*

4464 - Genoplesium baueri*

● 5680 - Galium australe

◆ 6809 - Melaleuca biconvexa

7000 - Rhizanthella slateri*

7779 - Prasophyllum affine*

* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale

Figure 5 Threatened flora species recorded within ten kilometres of the study area

0 800 1,600 2,400 3,200 4,000

Metres

Scale: 1:80,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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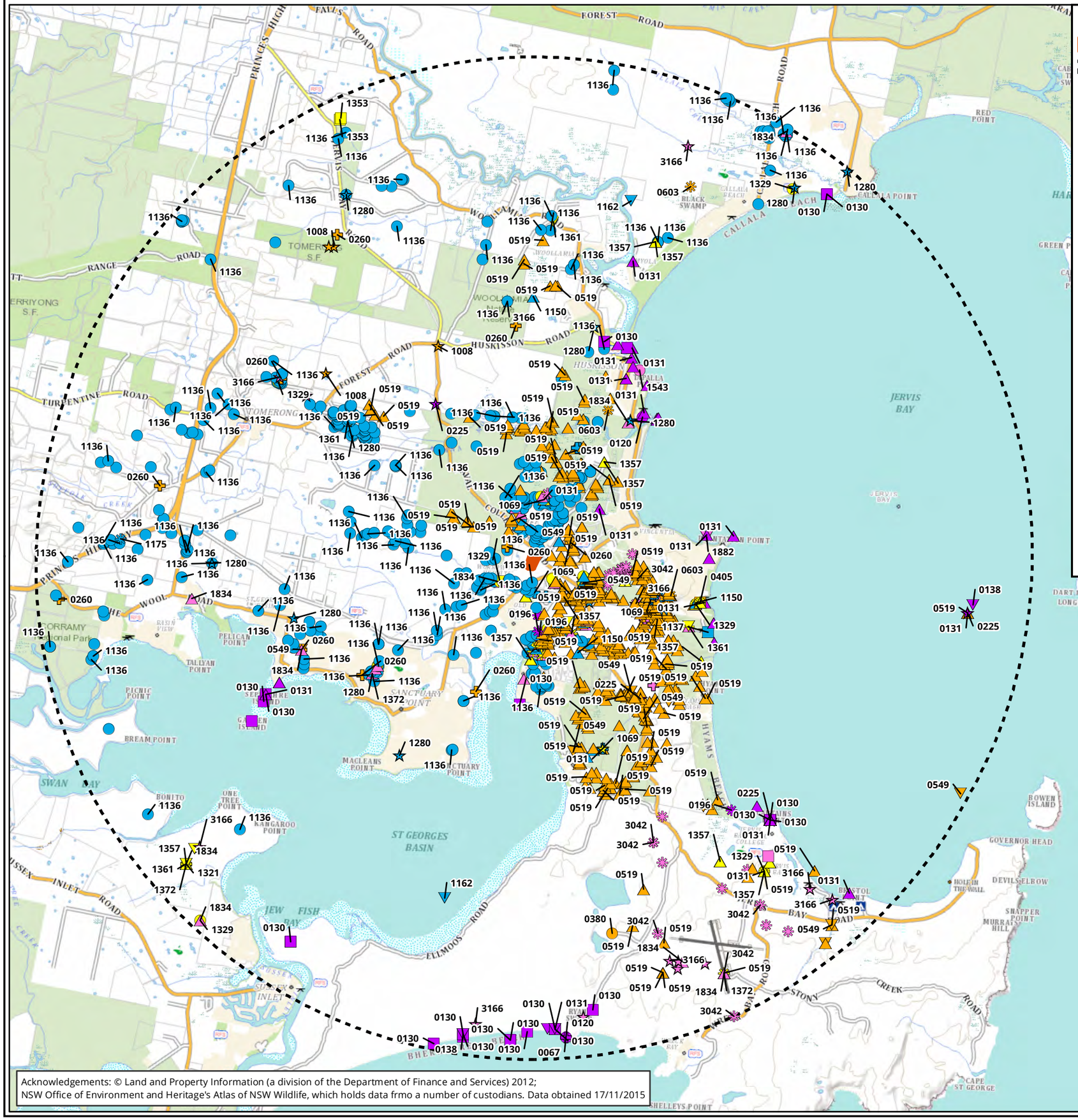
Matter:
Date: 08 December 2015,
Checked by: 17/11/2015, Drawn by: ANP, Last edited by: apritchard
Location:P:\20400s\20464\Mapping
20464_F5_ThrFlora



Legend

Study area

Search area

Threatened Fauna

- 0067 - Little Shearwater
- 0120 - Sooty Tern
- 0130 - Pied Oystercatcher
- 0131 - Sooty Oystercatcher
- 0138 - Hooded Plover
- 0196 - Black Bittern
- 0225 - Little Eagle
- 0230 - Square-tailed Kite*
- 0246 - Barking Owl*
- 0248 - Powerful Owl*
- 0250 - Masked Owl*
- 0260 - Little Lorikeet
- 0265 - Glossy Black-Cockatoo*
- 0268 - Gang-gang Cockatoo*
- 0302 - Turquoise Parrot*
- 0380 - Scarlet Robin
- 0405 - Olive Whistler
- 0519 - Eastern Bristlebird
- 0549 - Varied Sittella
- 0603 - Regent Honeyeater
- 1008 - Spotted-tailed Quoll
- 1069 - White-footed Dunnart
- 1136 - Yellow-bellied Glider
- 1137 - Squirrel Glider
- 1150 - Eastern Pygmy-possum
- 1162 - Koala
- 1175 - Long-nosed Potoroo
- 1280 - Grey-headed Flying-fox
- 1321 - Yellow-bellied Sheathtail-bat
- 1329 - Eastern Freetail-bat
- 1353 - Large-eared Pied Bat
- 1357 - Southern Myotis
- 1361 - Greater Broad-nosed Bat
- 1372 - Eastern False Pipistrelle
- 1455 - New Holland Mouse
- 1466 - Eastern Chestnut Mouse
- 1543 - New Zealand Fur-seal
- 1710 - Southern Brown Bandicoot (eastern)
- 1834 - Eastern Bentwing-bat
- 1882 - Australian Fur-seal
- 3042 - Giant Burrowing Frog
- 3166 - Green and Golden Bell Frog
- 8913 - Eastern Ground Parrot*
- 9924 - Sooty Owl*

* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale

Figure 6 Threatened fauna species recorded within ten kilometres of the study area

0 800 1,600 2,400 3,200 4,000

Metres

Scale: 1:80,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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Matter:
Date: 08 December 2015,
Checked by: 17/11/2015, Drawn by: ANP, Last edited by: apritchard
Location:P:\20400s\20464\Mapping
20464_F6_ThrFauna

4 Biodiversity legislation and government policy

This section provides an assessment of the project against key biodiversity legislation and government policy.

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.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

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.

Matters of NES relevant to the project are summarised in Table 3 with Appendix 4 outlining Significant Impact Criteria assessments against the *Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DoE, 2013) for matters of NES likely to be impacted by the proposal.

Table 3 Assessment of the project against the EPBC Act

Matter of NES	Project specifics	Significant Impact Criteria assessment findings
Threatened species (flora and fauna)	Eight flora species and 24 fauna species have been recorded or are predicted to occur in the locality. Due to the proximity to the coastline, eight records are forse marine or pelagic species. An assessment of the likelihood of these species occurring in the study area is provided in Appendix 1 (flora) and Appendix 2 (fauna).	The majority of EPBC Act listed species identified are not likely to occur within the study area and development is unlikely to constitute a significant impact. Eight fauna species are restricted to the aquatic marine environment and are not considered relevant to the study area. The following species have a medium or greater likelihood of occurring within the study area: • Eastern Australian Underground Orchid • Leafless Tongue Orchid • Bauer's Midge Orchid • Grey-headed Flying-Fox A significant impact to the Grey-headed Flying-fox is considered negligible. A Significant Impact Criteria assessment has been completed for the Eastern Australian Underground Orchid, Leafless Tongue Orchid and Bauer's Midge Orchid, which conclude that the proposal will not result in a significant impact to these species' given that no groundcover vegetation is proposed to be removed in areas of habitat.
Threatened ecological communities	There are no EPBC Act TECs within the study area.	N/A
Migratory species	Thirty-four migratory species have been recorded or are predicted to	Again, given the proximity to the coastline, 19 of these species are restricted to the aquatic marine

Matter of NES	Project specifics	Significant Impact Criteria assessment findings
	occur in the locality (Appendix 2).	environment. While some of the remaining species would be expected to use the study area on occasions, some may do so regularly and others may be resident, the study area does not provide important habitat for an ecologically significant proportion of any of these species.
Wetlands of international importance (Ramsar sites)	There are 12 Ramsar sites in NSW, the closest being the Towra Point Nature Reserve on the Kurnell Peninsula in Sydney and the Ginini Flats Wetland Complex in the ACT.	The study area does not flow directly into a Ramsar site and the development is not likely to result in a significant impact.

On the basis of criteria outlined in the relevant *Significant Impact Guidelines* (DEWHA, 2009) it is considered unlikely that a significant impact on a Matter of NES would result from the proposed action.

4.2 State

4.2.1 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 Act is administered by the NSW Department of Planning and Infrastructure

Sections of the EP&A Act of primary relevance to the natural environment are considered further below in relation to the current proposal.

Assessment of Significance (Section 5A)

Section 5A of the EP&A Act 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. Section 5A (and Section 9A of the TSC Act) outlines seven factors that must be taken into account in an Assessment of Significance (formally known as the "7-part test"). Where any Assessment of Significance (AoS) determines that a development will result in a significant effect to a threatened species, population or community a Species Impact Statement (SIS) is required.

Table 4 summarises the potential for the proposed development to have a significant effect on the threatened biota deemed to have a medium or greater likelihood of occurrence within the study area (refer to Section 3.5) and determines the need for an AoS under Part 1, Section 5A of the EP&A Act. Two species, Leafless Tongue Orchid and Bauer's Midge Orchid, were originally rated a high and medium likelihood of occurrence respectively, however neither was detected during targeted survey. The likelihood of occurrence has therefore been reduced to low, however an AoS has still been completed as suitable habitat will be modified as part of the APZs.

4.2.2 Threatened Species Conservation Act 1995

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened biota: key threatening processes: and critical habitat for threatened biota.

Native vegetation within the study area is not a TEC, however does contain habitat and known records of threatened flora or fauna species. Impacts to the threatened biota must be assessed through the AoS process under Section 5A of the EP&A Act. Refer to Table 4 below as well as Appendix 3 for AoS's undertaken for the project.

Habitat critical to the survival of an endangered or critically endangered species, population, or ecological community can be identified under the TSC Act and listed on the Register of Critical Habitat kept by the OEH. The study area does not contain declared 'critical habitat'. Provided that removal of threatened species habitat is avoided, a licence to harm/pick/damage habitat of a threatened species, population or community or damage critical habitat is required.

Table 4 Potential for impacts to threatened biota listed on the EPBC Act and/or TSC Act

Name	EPBC Act	TSC Act	Habitat values within study area	Assessment of Impacts on Threatened Species* Is there potential for the proposed action to:			Impact Assessment Required?
				Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation or isolation of limiting habitat?	
Pretty Beard Orchid		E1	The study area contains 0.51 hectares of habitat in the form of Red Bloodwood – Scribbly Gum heathy woodland located in Lot 1752.	**Yes**	No	No	**Yes**
Eastern Australian Underground Orchid	EN	V	The study area contains 1.00 hectares of habitat in the form of Red Bloodwood – Scribbly Gum heathy woodland.	**Yes**	No	No	**Yes**
Leafless Tongue Orchid	VU	V	The study area contains 0.47 hectares of habitat in the form of Red Bloodwood – Scribbly Gum heathy woodland.	No	No	**Potentially – modification of habitat within the APZ**	**Yes**
Bauer's Midge Orchid	EN	E1	The study area contains 0.47 hectares of habitat in the form of Red Bloodwood – Scribbly Gum heathy woodland.	No	No	**Potentially – modification of habitat within the APZ**	**Yes**
Eastern Bentwing-bat		V	No roosting habitat is present however the species is know to forage in a variety of habitats and may utilise the woodland and open grasslands on occasion.	No	No	No	No
Eastern False Pipistrelle		V	Foraging and roosting habitat occurs in the woodland within the southern APZ area.	**Potentially**	**Yes**	No	**Yes**
Eastern Freetail-bat		V	Foraging and roosting habitat is present in the woodland and paddock trees of the study area.	**Potentially**	**Yes**	No	**Yes**
Gang-gang		V	Foraging habitat occurs within all habitats of the	No	No	No	No

Name	EPBC Act	TSC Act	Habitat values within study area	Assessment of Impacts on Threatened Species* Is there potential for the proposed action to:			Impact Assessment Required?
				Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation or isolation of limiting habitat?	
Cockatoo			study area containing flowering or fruiting canopy species. No breeding hollows are present.				
Glossy Black-Cockatoo		V	Preferred feed tree, *Allocasuarina litoralis* occurs in the southern portion. No breeding hollows are present.	No	No	No	No
Greater Broad-nosed Bat		V	Foraging and roosting habitat is present in the woodland and paddock trees of the study area.	**Potentially**	**Yes**	No	**Yes**
Grey-headed Flying-fox	VU	V	Foraging habitat occurs within all habitats of the study area containing flowering or fruiting canopy species. No known roosts occur in the study area.	No	No	No	No
Little Eagle		V	May forage in the farmland of the study area (closed exotic grassland). No nests were located.	No	No	No	No
Little Lorikeet		V	May forage in tree canopies of woodland habitats of the study area.	No	No	No	No
Masked Owl		V	Foraging habitat occurs in the southern APZ within in the woodland habitat. May also forage in open habitats on the fringe of the woodland.	No	No	No	No
Powerful Owl		V	Foraging habitat occurs in the southern APZ within in the woodland habitat. May also forage in open habitats on the fringe of the woodland.	No	No	No	No
Southern Myotis		V	Foraging habitat is present over the farm dam located in Lot 1753.	No	No	No	No
Square-tailed Kite		V	May forage in the farmland of the study area (closed exotic grassland). No nests were located.	No	No	No	No

Name	EPBC Act	TSC Act	Habitat values within study area	Assessment of Impacts on Threatened Species* Is there potential for the proposed action to:			Impact Assessment Required?
				Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation or isolation of limiting habitat?	
Turquoise Parrot		V	May forage in tree canopies of woodland habitats of the study area.	No	No	No	No
Varied Sittella		V	Foraging habitat associated with the rough-barked tree species of the woodland habitat.	No	No	No	No

*This table has been adapted from the *Threatened Species Assessment Guidelines – The Assessment of Significance* (DECC, 2007)

An AoS has been prepared for the following threatened biota deemed likely to be subject to negative impacts:

- Eastern Australian Underground Orchid
- Leafless Tongue Orchid
- Bauer's Midge Orchid
- Hollow-roosting microbats

Assessments are provided in Appendix 3. They indicate that a significant impact is not likely to result from the proposal. A Species Impact Statement is therefore not required.

4.2.3 Local Environment Plans (Part 3 Division 4)

Local Environment Plans (LEP) apply either to the whole, or part of, a local government area and make provision for the protection or utilisation of the environment through zoning of land.

The study area is subject to the Shoalhaven Local Environment Plan (SLEP 2014) and is zoned RU2 Rural Landscape. The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To maintain the rural landscape character of the land.
- To provide for a range of compatible land uses, including extensive agriculture.

According to the SLEP 2014, eco-tourist facilities are permitted with consent, however hotel or motel accommodation is prohibited within the RU2 zone.

4.2.4 State Environmental Planning Policies (Part 3 Division 2)

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state wide issues. SEPPs relevant to the current development are:

SEPP No. 14 Coastal Wetlands

The study area is located south of an area mapped as SEPP 14 located within the Jervis Bay National Park. No SEPP 14 wetlands are located within the study area. The farm dam located within Lot 1753 forms as the top of a tributary that eventually drains into this wetland. Although this tributary has been highly modified following the Bayswood development, iarchitecture will need to demonstrate that the proposal has considered impacts to SEPP 14 wetlands and will also need to provide an outline of safeguards and rehabilitation measures regarding off-site drainage.

SEPP No. 44 Koala Habitat Protection

SEPP 44 applies to areas of native vegetation greater than one hectare and in councils listed in Schedule 1 to the SEPP. Shoalhaven City Council is listed in this Schedule and the study area is greater than one hectare. Therefore SEPP 44 must be considered.

On the basis of the criteria for determination of Potential Koala Habitat and Core Koala Habitat, the study area does not support any feed trees listed within the SEPP, nor was there any evidence of Koala detected during the field survey. Therefore the study area does not contain Potential or Core Koala Habitat in accordance with SEPP 44 and a Plan of Management is not required.

SEPP No. 71 Coastal Protection

SEPP 71 applies to development within 100 metres below mean high water mark of the sea, a bay or an estuary. The study area is not mapped within 100 metres of the sea, therefore this SEPP does not apply.

4.2.5 Native Vegetation Act 2003

The NV Act provides for, encourages and promotes the management of native vegetation on a regional basis.

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.

4.2.6 Noxious Weeds Act 1993

Two declared noxious weeds listed under Noxious Weed (Control Order) 2014 (NSW DPI 2014) for the Shoalhaven City Council LGA were recorded within the study area.

- One Class 3 noxious weed, Giant Parramatta Grass *Sporobolus fertilis,* requires that 'the plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed'.
- One Class 4 weed, Fireweed *Senecio madagascariensis*, requires that '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'.

Treatment for the noxious weeds listed above is recommended within NSW DPI (2011).

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 iarchitecture 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. Under the current proposal, up to 1.88 hectares of native vegetation is proposed to be partially removed as part of the APZ; however there may be the potential to substantially decrease this area.

The results of this flora and fauna assessment should therefore be used to inform the design of the development. The design phase of the project 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 6 below.

Table 5 Ecological values, impacts and recommendations

Ecological value (Figure 3 and Figure 4)	Impacts	Recommendations
Paddock trees	Removal of nesting habitat	Avoid tree removal during peak breading season, between August and January. If clearing works are undertaken in spring, a qualified ecologist should inspect the study area prior to tree felling to provide recommendations that ensure no bird nests or possum dens are harmed during the process. Should any fauna be discovered or injured, a suitably qualified wildlife carer would be contacted. Contact details for WIRES should be kept on site.
	Removal or disturbance of potential roosting or nesting habitat for threatened hollow-dwelling fauna.	The removal of all hollow-bearing trees should be completed under the supervision and guidance of a qualified ecologist. The two-stage tree removal process should be used to allow fauna to vacate hollows and relocate naturally. Stage 1 is to involve the clearing of non-habitat vegetation and knocking of the tree. Stage 2 is to be undertaken 24hrs later and involves the careful lowering of each branch containing a hollow. Once the hollow is on the ground, the ecologist will inspect for fauna and relocate individuals to a safe location. Tree hollows removed for the proposal should be salvaged and relocated within adjacent bushland.
Noxious weeds	Potential spread of noxious weeds as a result of the proposed works.	Recommendations for the control of noxious weeds in the study area have been provided in Section 4.2.6 which has been developed from local and regional control plan, and the DPI Guidelines for each species.
Native vegetation occurring within APZ	Partial clearing or disturbance of up to 1.88 ha of Red Bloodwood - Scribbly Gum heathy woodland.	The following measures to minimise the removal of vegetation in APZs should be considered: 1. Reduce the area of clearing by applying the 10/50 Vegetation Clearing Code of Practice around proposed buildings rather than around the property. This can be

Ecological value (Figure 3 and Figure 4)	Impacts	Recommendations
		done following the completion of final detailed design. 2. Retain all canopy trees and trim branches rather than removing trees (where possible). 3. Retain all ground-cover including woody debris at the base of trees to a height of 30cm to avoid removal of Eastern Australian Underground Orchid habitat. Where avoidance has not been feasible, Biosis recommends minimising impacts by storing soil/fill, other materials, machinery or fuel within the existing clearings and only removing vegetation that is required for the actual pipeline.
	Potential spread of soil borne pathogens resulting from the construction works.	Ensure all machinery and equipment is washed and free of any soil prior to entering the study area. Ensure excavated soil is not distributed around the study area and that all machinery and equipment is washed and free of soil before being moved off site.
Pretty Beard Orchid and Eastern Underground Orchid habitat	Injury or death of individuals and degradation of habitat	The Biosis threatened orchid assessment for Lot 1750 (Biosis 2015b) provided recommendations for the appropriate management options for the APZ within this lot. These recommendations were then a condition of the Stage 1 approval. The following is a summary of proposed management actions: • Permanent fencing of the area shown in the Biosis report (2015b) and in Figure 7. • Annual to bi-annual manual slashing of woody vegetation within the permanently fenced areas in the period between January and May. • Bush fire hazard reduction burns (if permitted) should be undertaken at time periods no less than five years apart. • A vegetation management plan (VMP) should be prepared to guide vegetation slashing, weed control and revegetation/restoration in the area that has been permanently fenced to alleviate current threats by exotic plants and to preserve threatened orchids at the subject site.
***Allocasuarina litoralis* clusters within APZ**	Removal or disturbance of up to impacts to 1.88 ha of Red Bloodwood - Scribbly Gum heathy woodland containing foraging habitat for the Glossy Black Cockatoo.	Where feasible, retain *Allocasuarina litoralis* clusters from within Red Bloodwood - Scribbly Gum heathy woodland in the southern and northern APZ.
Habitat connectivity	Removal of large habitat trees that facilitate fauna dispersal and form part of a habitat corridor (Section 3.2).	Where feasible, retain those large isolated habitat trees (with a DBH of >30 cm) within the study area and surrounding APZ.
Other threatened flora and fauna	Unexpected threatened flora or fauna are located during construction.	Should unexpected threatened flora or fauna be located at any time during the proposed activities, all works should cease immediately in the area to prevent any further harm to the animal or plant, a suitably qualified ecologist should be contacted to determine if further assessment is required.

Figure 7 Impact avoidance, minimisation and mitigation

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Acknowledgements: Imagery (c) Nearmap 2014
Topo (c) NSW Land and Planning Information (2012)

Matter: 20464
Date: 10 December 2015,
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Location:P:\20400s\20464\Mapping\
20464_F7_Methods

0 10 20 30 40 50
Metres
Scale 1:1,500 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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6 Conclusion

This report is an assessment of the potential impact of the new Hotel and Serviced Apartments Planning Proposal including ancillary facilities at Lot 1752, Naval College Road, Worrowing Heights on biodiversity values in accordance with the EP&A Act, the TSC Act and the EPBC Act.

No endangered populations or ecological communities listed under the EPBC Act or TSC Act were recorded during the field surveys.

The study area contains habitat for threatened species, with one threatened orchid, Pretty Beard Orchid, recorded in the proposed western APZ. An additional 18 threatened fauna species are considered to have a medium likelihood of occurrence in the study area based on the habitat assessments undertaken in the field. Given the fragmented landscape and the presence of threats, the majority of these species are highly mobile and likely to use the study area for dispersal and foraging purposes only.

The following provides a summary of the potential impacts resulting from the proposed development:

- Removal of large paddock trees, including hollows, from within the development footprint.
- Potential spread of noxious weeds and soil borne pathogens resulting from the construction works.
- Partial clearing or disturbance of up to 1.88 ha of Red Bloodwood - Scribbly Gum heathy woodland including clusters of Glossy Black Cockatoo feed trees and threatened orchid species.

To mitigate the above residual impacts of the proposal, recommendations have been included in Section 5 of this report, including exclusion fencing, recommendations regarding appropriate hygiene protocols for vegetation clearing and plant, supervision of habitat clearance and information on biodiversity values to be included in site inductions and pre-start meetings (refer to Table 5 for full details regarding proposal safeguards).

Biosis has completed AoSs for the Pretty Beard Orchid, Eastern Australian Underground Orchid, Leafless Tongue Orchid, Bauer's Midge Orchid and four hollow-roosting microbats as detailed in Appendix 3 and a Significant Impact Criteria assessment for the Eastern Australian Underground Orchid in Appendix 4.

Overall, the project is considered unlikely to result in a significant impact to any threatened species, populations or communities listed under the EPBC or TSC Acts. A referral to the Commonwealth Minister of the Environment or preparation of a Species Impact Statement are not required.

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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	**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
	Acacia myrtifolia	Myrtle Wattle
	Acacia terminalis	Sunshine Wattle
	Acacia ulicifolia	Prickly Moses
	Actinotus minor	Lesser Flannel Flower
	Allocasuarina littoralis	Black She-oak
	Amperea xiphoclada	Broom Spurge
	Anisopogon avenaceus	Native Oat Grass
*	*Anthoxanthum odoratum*	Sweet Vernal Grass
	Aotus ericoides	
*	*Axonopus fissifolius*	Narrow-leaf Carpet Grass
	Banksia spinulosa	Hairpin Banksia
	Bauera rubioides	Dog Rose
*	*Bidens pilosa*	Hitchhikers
	Billardiera scandens	Hairy Apple Berry
	Boronia pinnata	
	Boronia polygalifolia	Dwarf Boronia
	Bossiaea ensata	Sword Bossiaea

Status	Scientific name	Common name
	Bossiaea heterophylla	Variable Bossiaea
	Bothriochloa macra	Red-leg Grass
*	*Bromus catharticus*	Prairie Grass
	Burchardia umbellata	Milkmaids
	Calochilus campestris	Copper Beard Orchid
	Cassytha glabella	
	Caustis flexuosa	Curly Wig
	Comesperma ericinum	Pyramid Flower
	Commelina cyanea	Scurvy Weed
	Conyza bonariensis	Flax-leaved Fleabane
	Corymbia gummifera	Red Bloodwood
	Cryptostylis erecta	Bonnet Orchid
	Cryptostylis subulata	Large Tongue Orchid
	Cyathochaeta diandra	
	Cynodon dactylon	Couch Grass
	Dampiera stricta	
	Dianella caerulea	Blue Flax-lily
*	*Digitaria sp.*	
	Dodonaea triquetra	Hop Bush
*	*Echinochloa crus-galli*	Barnyard Grass
*	*Ehrharta erecta*	Panic Veldt Grass
	Entolasia stricta	Wiry Panic
	Eucalyptus eugenioides	Thin-leaved Stringbark
	Eucalyptus resinifera	Red Mahogany
	Eucalyptus scias subsp. callimastha	Large-fruited Red Mahogany
	Eucalyptus sclerophylla	Hard-leaved Scribbly Gum
	Gahnia radula	
	Gonocarpus teucrioides	Raspwort
	Goodenia bellidifolia	
	Haemodorum corymbosum	Narrow-leaved Geebung
	Hakea laevipes	
	Hibbertia empetrifolia	
	Hibbertia riparia	Erect Guinea-flower
	Hypericum japonicum	
*	*Hypochaeris radicata*	Flatweed
	Kunzea ambigua	Tick Bush

Status	Scientific name	Common name
	Lagenophora stipitata	Blue Bottle Daisy
	Lambertia formosa	Mountain Devil
	Lepidosperma spp.	
	Leucopogon juniperinus	Prickly Beard-heath
	Lindsaea linearis	Screw Fern
	Lomandra obliqua	
	Lomatia ilicifolia	Holly Lomatia
	Microlaena stipoides	Weeping Grass
	Mirbelia rubiifolia	Heathy Mirbelia
	Mitrasacme polymorpha	Flatweed
	Patersonia sericea	Silky Purple-flag
*	*Pennisetum clandestinum*	Kikuya
	Persoonia levis	Broad-leaved Geebung
	Persoonia linearis	Narrow-leaved Geebung
	Petrophile pedunculata	Conesticks
	Philotheca hispidula	
*	*Phytolacca octandra*	Inkweed
	Pimelea linifolia	Slender Rice-flower
	Platylobium formosum	Handsome Flat Pea
	Platysace linearifolia	
	Pteridium esculentum	Bracken
	Ptilothrix deusta	
	Pultenaea daphnoides	Large-leaf Bush-pea
	Pultenaea retusa	Notched Bush-pea
	Scaevola ramosissima	Snake Flower
	Schoenus paludosus	
**(4)	*Senecio madagascariensis*	Fireweed
	Solanum americanum	Blackberry Nightshade
**(3)	*Sporobolus fertilis*	Giant Parramatta Grass
	Syncarpia glomulifera	Turpentine
	Thelymitra sp.	
	Thysanotus juncifolius	Fringe Lily
	Tricoryne elatior	Yellow Rush-lily
*	*Trifolium repens*	White Clover
*	*Verbena officinalis*	Common Verbena
	Viola sieberiana	

Status	Scientific name	Common name
	Xanthosia tridentata	Rock Xanthosia

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 (DoE; accessed on 17/11/2015).

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. • Sufficient good quality habitat is present in study area. • Study area is within species natural distributional range (if known). • Species has been recorded within 10 km or from the relevant catchment/basin.
Medium	• Records of terrestrial biota within 10 km of the study area. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• Marginal habitat present (low quality & extent). • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded. • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in study area. • No records within 10 km of the study area.

Table A.2 Threatened flora species recorded / predicted to occur within ten kilometres of the study area

Scientific name	Common name	Conservation status		Most recent record	Other Sources	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC					
Caladenia tessellata	Thick Lip Spider Orchid	VU	E1	1931/#		Low	Habitat associated with the occurrence of this species not present.	*Caladenia tessellata* is found in the following Catchment Management Regions Sydney Metropolitan, Southern Rivers, Hawkesbury/Nepean, and Hunter/Central Rivers. Currently known from three disjunct areas: Braidwood on southern tablelands, Ulladulla on the south coast and three populations in Wyong area on the Central Coast. It is generally found in grassy, dry sclerophyll forests/woodland, particularly those associated with clay loam, or sandy soils. However, there is one population at Braidwood in lowland on stony soil. This species only grows in very dense shrubbery in coastal areas. Flowers appear between September and November, but generally late September or early October in extant southern populations.
Calochilus pulchellus	Pretty Beard Orchid		E1	2014	D. Bain (OEH) pers com 2015	**High - recorded previously**	Found within one location within the site. All other *Calochilus* found within study area	*Calochilus pulchellus* is endemic to New South Wales. It is known from the Sydney Basin Bioregion, where a total of less than 30 adult plants have been recorded in three sites over a range of 40 km on the South Coast of NSW, at altitudes from 20-560 m above sea level. All currently known sites are within the Shoalhaven

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
							were Copper Beard Orchid.	Local Government Area. Occurrence in small, widely separated colonies is not unusual in the genus. The cryptic nature of the species, with a single leaf above ground for only a few months and a flowering stem lasting a few days or a week, makes detection difficult for most of the year. It is likely that additional scattered individuals and small colonies exist within the area of occurrence.
Cryptostylis hunteriana	Leafless Tongue Orchid	VU	V	2012/#	A. Stephenson (pers com)	Low	Moderate quality habitat is present. Associated species Bonnet and Large Tongue Orchid recorded. Not detected during targeted survey. Due to the presence of habitat an AoS has still been completed.	This species typically grows in swamp-heath on sandy soils chiefly in coastal districts but has also been recorded on steep bare hillsides. Within the Central Coast bioregion, this species has been recorded within Coastal Plains Smooth-barked Apple Woodland and Coastal Plains Scribbly Gum Woodland. This species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla, E. sieberi, Corymbia gummifera* and *Allocasuarina littoralis*; appears to prefer open areas in the understorey of this community and is often found in association with the *Cryptostylus subulata*. It occurs in the following Catchment Management Regions Hawkesbury/Nepean, Hunter/Central Rivers,

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
								Northern Rivers and Southern Rivers. Inconsistent flowring times Dec-February; Jan-February (in Victoria).
Eucalyptus sturgissiana	Ettrema Mallee		V	1975		Low	Habitat associated with the occurrence of this species not present.	The Ettrema Mallee is mostly restricted to the Northern Budawang Range in Morton National Park, with a few occurrences on the nearby coastal plain. Usually grows as an emergent in low shrub-heath. Grows on sandy, swampy soils.
Galium australe	Tangled Bedstraw		E1	2002		Low	Habitat associated with the occurrence of this species not present.	In NSW Tangled Bedstraw has been found in moist gullies of tall forest, *Eucalyptus tereticornis* forest, coastal Banksia shrubland, and Allocasuarina nana heathland.. Known from the Towamba Valley near Bega, and Lake Yarrunga near Kangaroo Valley.
Genoplesium baueri	Bauer's Midge Orchid	EN	E1	2012/#		Low	Moderate quality habitat is present. Not detected during targeted survey. Due to the presence of habitat an AoS has still been	This terrestrial orchid species grows in open sclerophyll forest or moss gardens on sandstone. Typically the habitat is a drier heathy forest. The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
							completed.	from just over 200 plants across 13 sites.
Melaleuca biconvexa	Biconvex Paperbark	VU	V	2014/#		Low	Conspicuous species easily recognised, not recorded during survey.	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Catchment regions include: Hunter/Central Rivers, Hawkesbury/Nepean, Southern Rivers, and Northern River Catchments. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Flowering occurs over just 3-4 weeks in September and October.
Prasophyllum affine	Jervis Bay Leek Orchid	EN	E1	2010/#		Low	Habitat associated with the occurrence of this species not present.	Jervis Bay Leek Orchid is currently known from three areas south-east of Nowra on South Coast. These are Kinghorne Point, Wowly Gully near the town of Callala Bay, and near the township of Vincentia. Grows on poorly drained clay soils that support low heathland and sedgeland communities. Flowers are followed by a fleshy seed capsule. Plants retreat into subterranean tubers after fruiting, so are not visible above-ground.
Pterostylis gibbosa	Illawarra Greenhood	EN	E1	#		Negligible	Habitat associated with the occurrence	Known from a small number of populations in the Hunter region, the Illawarra region and the Shoalhaven region.

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
							of this species not present.	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. Near Nowra, the species grows in an open forest of *Corymbia maculata, E.tereticornis* and *E. paniculata*. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.
Pterostylis ventricosa			E4A	2013		Low	Habitat associated with the occurrence of this species not present.	*Pterostylis ventricosa* is known at St Georges Basin and three populations at Sussex Inlet, south of Nowra on the NSW south coast. Surveys carried out at various times between 2007 to 2010 estimate a total population of about 1,200 plants.
Rhizanthella slateri	Eastern Australian Underground Orchid	EN	V	2001/#		**Medium**	Cryptic species, very difficult to detect. Targeted surveys were conducted without	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra (Hawkesbury/ Nepean, Hunter/Central Rivers, and Southern Rivers Catchment). Habitat

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
							recording presence. There is a medium likelihood that the species is present within Red Bloodwood – Scribbly Gum heathy woodland.	requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers October to November.
Syzygium paniculatum	Magenta Lilly Pilly	VU	E1	2011/#		Negligible	Habitat associated with the occurrence of this species not present.	Subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea. Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. The species occurs in the following Catchment Authority Regions - Hunter/Central Rivers, Hawkesbury/Nepean, Sydney Metropolitan, and Southern Rivers.

Scientific name	Common name	Conservation status		Most recent	Other Sources	Likely occurrence	Rationale for likelihood	Habitat description*
Thesium australe	Austral Toadflax	VU	V	#		Negligible	Habitat associated with the occurrence of this species not present.	Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. *Thesium australe* is a root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. It is often found in damp sites in association with *Themeda australe*, but also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.
Wilsonia backhousei	Narrow-leafed Wilsonia		V	2009		Negligible	Habitat associated with the occurrence of this species not present.	In NSW *Wilsonia backhousei* is found in the Southern Rivers and Sydney Metropolitan Catchment Area, specifically on the coast between Mimosa Rocks National Park and Wamberal north of Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully, and Parramatta. This species is salt tolerant and is found in intertidal saltmarshes and, more rarely, on seacliffs

* - 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

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Fauna species recorded from the study area

Below is a list of fauna species recorded from the study area during the present assessment and a list of significant fauna species recorded or predicted to occur within ten kilometres of the study area.

Notes to table:

EPBC Act:	**TSC Act:**
EX - Extinct	C1 – critically endangered
CR - Critically Endangered	E1 – endangered species (Part 1, Schedule 1)
EN - Endangered	E2 – endangered population (Part 2, Schedule 1)
VU - Vulnerable	E4 – presumed extinct (Part 4, Schedule 1)
CD - Conservation dependent	V1 – vulnerable (Part 1, Schedule 2)
* - introduced species	

Table A.3 Vertebrate fauna recorded from the study area (current assessment)

Status	Scientific Name	Common Name	Observation Type
Birds			
	Acanthiza lineata	Striated Thornbill	Observed
	Acanthiza pusilla	Brown Thornbill	Observed
	Acanthorhynchus tenuirostris	Eastern Spinebill	Observed
	Anthochaera carunculata	Red Wattlebird	Observed
	Anthochaera chrysoptera	Little Wattlebird	Observed
	Cacatua galerita	Sulphur-crested Cockatoo	Observed
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	Heard
	Chenonetta jubata	Australian Wood Duck	Observed
	Corvus coronoides	Australian Raven	Heard
	Cracticus tibicen	Australian Magpie	Observed
	Dacelo novaeguineae	Laughing Kookaburra	Observed & Heard
	Eolophus roseicapillus	Galah	Observed
	Eopsaltria australis	Eastern Yellow Robin	Observed
	Gerygone albogularis	White-throated Gerygone	Heard
	Grallina cyanoleuca	Magpie-lark	Heard

Status	Scientific Name	Common Name	Observation Type
	Hirundo neoxena	Welcome Swallow	Observed
	Lichenostomus chrysops	Yellow-faced Honeyeater	Observed
	Malurus cyaneus	Superb Fairy-wren	Heard
	Philemon corniculatus	Noisy Friarbird	Observed & Heard
	Platycercus elegans	Crimson Rosella	Observed
	Psophodes olivaceus	Eastern Whipbird	Observed
	Rhipidura albiscapa	Grey Fantail	Observed & Heard
	Rhipidura leucophrys	Willie Wagtail	Observed & Heard
	Strepera graculina	Pied Currawong	Heard
	Trichoglossus haematodus	Rainbow Lorikeet	Heard
	Vanellus miles	Masked Lapwing	Observed
Mammals			
*	*Bos taurus*	European cattle	Observed
*	*Canis lupus familiaris*	Dog	Observed
	Vombatus ursinus	Common Wombat	Scat
	Wallabia bicolor	Swamp Wallaby	Scat
Reptiles			
	Lampropholis delicata	Dark-flecked Garden Sunskink	Observed
	Lampropholis guichenoti	Pale-flecked Garden Sunskink	Observed

A2.2 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 (DoE; accessed on 17/ 11/2015).

Notes to table:

#	species predicted to occur by the DoE 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
2015	recorded during current survey

Likelihood of occurrence	Potential criteria
High	• Species recorded in study area during current or previous assessments. • Sufficient good quality habitat is present in study area. • Study area is within species natural distributional range (if known). • Species has been recorded within ten kilometres.
Medium	• Records of terrestrial species within ten kilometres of the study area. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s). • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.
Negligible	• Habitat not present in study area. • No records within ten kilometres of the study area.

Table A.4 Threatened fauna species recorded, or predicted to occur, within ten 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							
Arctocephalus forsteri	New Zealand Fur-seal		V	2008	Negligible	Not applicable	Marine mammal; not assessed.
Arctocephalus pusillus doriferus	Australian Fur-seal		V	1997	Negligible	Not applicable	Marine mammal; not assessed.
Cercartetus nanus	Eastern Pygmy-possum		V	2015	Low	Habitat is present within the woodland habitat of the southern APZ; however presence in the study area would be rare given fragmented landscape.	Patchily distributed from the coast to the Great Dividing Range and as far as Pillaga, Dubbo, Parkes and Wagga Wagga on the western slopes. Inhabits rainforest through to sclerophyll forest and tree heath. Banksias and myrtaceous shrubs and trees are a favoured food source. Soft fruits are eaten when flowers are unavailable and it also feeds on insects. Will often nest in tree hollows, but can also construct its own nest. Because of its small size it is able to utilise a range of hollow sizes including very small hollows. Individuals will use a number of different hollows and an individual has been recorded using up to 9 nest sites within a 0.5 ha area over a 5 month period. It is mainly solitary, and each individual uses several nests. Home ranges of males are generally less than 0.75 ha, and those of females are smaller.
Chalinolobus dwyeri	Large-eared Pied Bat	VU	V	2005/#	Low	Species would utilise habitats associated with sandstone	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

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						escarpments to the west of the study area.	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	2013/#	Low	Foraging and dispersal habitat occurs in the southern portion in the open forest habitat.	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. Breeding occurs from May to August.
Dugong dugon	Dugong		E1	1993	Negligible	Not applicable	This is a marine species.
Eubalaena australis	Southern Right Whale	EN	E1	2010	Negligible	Not applicable	This is a marine species.

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
Falsistrellus tasmaniensis	Eastern False Pipistrelle		V	2007	**High**	Foraging and roosting habitat is present in the woodland and paddock trees of the study area. Species has been recorded in the locality previously on 16 occasions.	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.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	EN	E1	1991/#	Low	Marginal habitat is present within the woodland habitat of the southern APZ. Species is rare in the locality and has only been recorded once.	This species prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burn from time to time. A mosaic of post fire vegetation is important for this species.
Megaptera novaeangliae	Humpback Whale	VU	V	1997	Negligible	Not applicable	This is a marine species.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat		V	2007	**Medium**	Foraging habitat is present in the woodland and paddock trees of the study area. Species	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,

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						has been recorded in the locality previously on 36 occasions. No breeding or roosting habitat is present.	buildings, and bridges. They occur in a broad range of habitats including 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	2013	**High**	Foraging and roosting habitat is present in the woodland and paddock trees of the study area. Species has been recorded in the locality previously on 19 occasions.	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	2007	**Medium**	Species may forage over dam located in Lot 1753 on occasion. No suitable hollow-bearing trees for roosting next to waterbodies.	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 australis	Yellow-bellied Glider		V	2015	Low	Trees within the development	Restricted to tall native forests in regions of high rainfall along the coast of NSW. Bago Plateau: Preferred habitats

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						footprint occur as isolated paddock trees. No feed marks were observed on trees on inspected within the APZ. Local population present however, presence in the study area would be rare given fragmented landscape.	are productive, tall open sclerophyll forests where mature trees provide shelter and nesting hollows. Critical elements of habitat include sap-site trees, winter flowering eucalypts, mature trees suitable for den sites and a mosaic of different forest types. Live in family groups of 2-6 individuals which commonly share a number of tree hollows. Family groups are territorial with exclusive home ranges of 30-60 ha. Very large expanses of forest (>15,000 ha) are required to conserve viable populations.
Petaurus norfolcensis	Squirrel Glider		V	1999	Low	Marginal habitat is present within the woodland habitat of the southern APZ. Species is rare in the locality and has only been recorded once.	Generally occurs in dry sclerophyll forests and 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.
Phascolarctos cinereus	Koala	VU	V	2002/#	Low	Less than 15% of feed trees are present which does not constitute as potential koala habitat under SEPP 44.	Pittwater LGA and Hawks nest: 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. haemostoma* 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

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							semi-arid country they are usually discrete and around 100 ha.
Potorous tridactylus	Long-nosed Potoroo	VU	V	2001/#	Low	Population reintroduced into Jervis Bay in October 2014. Some habitat present in southern APZ however unlikely to occur due to fragmented surrounding habitat.	Cobaki Lakes and Tweed Heads West population: Occurs from Queensland to Victoria, normally within 50 km of the coast. Inhabits coastal heath and wet and dry sclerophyll forests. Generally found in areas with rainfall greater than 760 mm. Requires relatively thick ground cover where the soil is light and sandy. Known to eat fungi, arthropods, fleshy fruit, seeds and plant tissue. It is solitary and sedentary, buts tends to aggregate in small groups. It has two breeding seasons, one in late winter-early spring and the other in late summer.
Pseudomys gracilicaudatus	Eastern Chestnut Mouse		V	2010	Low	Local population present that occurs mainly in dense, wet heath and swamps. Disturbances in groundcover vegetation likely to present the species from occurring.	Occurs from Queensland to Jervis Bay. In NSW the Eastern Chestnut Mouse is mostly found in heathland and is most common in dense, wet heath and swamps, but also occurs in open woodlands and dry sclerophyll forests with a grassy understorey. Density of the ground layer is a determining factor , and it is often found in areas burnt within the last four years. The species is sedentary, with home ranges of less than 0.5 ha. It relies on a variety of food sources, including fungi, seeds, insects and stems.
Pseudomys novaehollandiae	New Holland Mouse	VU		2009/#	Low	Habitat is present within the woodland habitat of the southern APZ; however presence in	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

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						the study area would be rare given fragmented landscape.	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	2013/#	**High**	Foraging habitat occurs within all habitats of the study area containing flowering or fruiting canopy species. No known roosts occur in the study area,	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.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat		V	2007	Low	Species has only been recorded in the locality on one occasion. Foraging and roosting habitat is present in the woodland and paddock trees of the study area.	Found throughout NSW. They have been reported from southern Australia between January and June. Reported from a wide range of habitats throughout eastern and northern Australia, including wet and dry sclerophyll forest, open woodland, acacia shrubland, mallee, grasslands and desert. They roost in tree hollows in colonies of up to 30 (but more usually two to six) and have also been observed roosting in animal burrows, abandoned Sugar Glider nests, cracks in dry clay, hanging from buildings and under slabs of rock. It is high-flying, making it difficult to detect. It forages above the canopy of eucalypt forests, but comes

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							lower to the ground in mallee or open country.
Scoteanax rueppellii	Greater Broad-nosed Bat		V	2011	**Medium**	Foraging and roosting habitat is present in the woodland and paddock trees of the study area. Species has been recorded in the locality previously on 12 occasions.	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-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.
Sminthopsis leucopus	White-footed Dunnart		V	2009	Low	Marginal habitat is present within the woodland habitat of the southern APZ; however presence in the study area would be rare given fragmented landscape.	The White-footed Dunnart is found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. They shelter in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, large grass clumps such as provided by Grass Trees Xanthorrhoea sp. and Macrozamias and rock crevices.
Birds							
Anthochaera phrygia	Regent Honeyeater	CE	E4A	2002/#	Low	Species is a rare visitor to the locality and few feed trees are present.	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. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female.
Callocephalon fimbriatum	Gang-gang Cockatoo		V	2015	**High**	Foraging habitat present in canopy trees, particularly those located in APZ areas. No large hollows suitable for breeding.	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.
Calyptorhynchus lathami	Glossy Black-Cockatoo		V	2015	**Medium**	Foraging habitat present in Allocasuarina trees within APZ occurring in Lot 1761 and Lot 1762. No large hollows suitable for breeding.	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.
Daphoenositta chrysoptera	Varied Sittella		V	2010	**Medium**	Foraging habitat associated with the Stringybarks and Red Mahogany of the woodland habitat in the southern APZ area.	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

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							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 uses a fork or tree in successive years.
Dasyornis brachypterus	Eastern Bristlebird	EN	E1	2015/#	Low	No habitat occurs within the development footprint. Habitat occurs in the bushland occurring in the northern and southern APZ areas. Given the surrounding disturbances of these areas, the species is considered to use the APZs on rare occasions when moving through the landscape.	Found in coastal woodlands, dense scrub and heathlands, particularly where it borders taller woodlands.
Diomedea exulans	Wandering Albatross	VU	E1	2000	Negligible	Pelagic species; habitat not present in study area.	A marine, pelagic and aerial species. Versatile feeders in pelagic and shelf waters. Breed on subantarctic and Antarctic islands.
Glossopsitta pusilla	Little Lorikeet		V	2015	**Medium**	Uncommon in the locality however, may	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range in NSW,

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						forage in tree canopies of woodland habitats of the study area. No suitable breeding habitat.	extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Mostly occur in dry, open eucalypt forests and 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.
Haematopus fuliginosus	Sooty Oystercatcher		V	2014	Negligible	Shorebird; habitat not present in study area.	The Sooty Oystercatcher is found on undisturbed tidal rocks on ocean shores and islands. Occasionally it is observed on sandspits and mudflats. It forages on exposed rock or coral at low tide for limpets and mussels. The Sooty Oystercatcher breeds in spring and summer almost exclusively offshore or on isolated promontories
Haematopus longirostris	Pied Oystercatcher		E1	2014	Negligible	Shorebird; habitat not present in study area.	An intertidal forager found on undisturbed sandy beaches and spits, tidal mudflats and estuaries. Its food supply (beach macroinvertebrates) have been negatively affected by human impacts. The Pied Oystercatcher is restricted to the littoral zone of beaches and estuaries, nesting on the ground above the tideline. A pair will re-nest in the same spot each year, rarely shifting their territory. Occasionally the Pied Oystercatcher is found in paddocks near the coast.
Hieraaetus morphnoides	Little Eagle		V	2011	**Medium**	Highly mobile species that may forage in closed exotic grasslands. No nesting habitat was	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland,

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						observed in the form of platform nests.	woodland and forests.
Ixobrychus flavicollis	Black Bittern		V	2008	Low	Rare in the locality and no suitable habitat is present.	The Black Bittern is found along the coastal plains within NSW, although individuals have rarely being recorded south of Sydney or inland. It inhabits terrestrial and estuarine wetlands such as flooded grasslands, forests, woodlands, rainforests and mangroves with permanent water and dense waterside vegetation. The Black Bittern typically roosts on the ground or in trees during the day and forages at night on frogs, reptiles, fish and invertebrates. The breeding season extends from December to March. Nests are constructed of reeds and sticks in branches overhanging the water.
Lathamus discolor	Swift Parrot	EN	E1	#	Low	Rare winter visitor to the locality. May forage on canopy species of the woodland habitat of the APZ areas.	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*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
Lophoictinia isura	Square-tailed Kite		V	2015	**High**	Highly mobile species that may forage in closed exotic	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

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						grasslands. No nesting habitat was observed in the form of platform nests.	*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 habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.
Neophema chrysogaster	Orange-bellied Parrot	CE	E4A	#	Negligible	Species not previously recorded in locality and typically restricted to Tasmania, Victoria and South Australia (however was recorded in Sydney in 2004).	A single breeding population of fewer than 200 individuals occurs in a narrow coastal strip of south-west Tasmania. Adult birds depart Tasmania for the mainland in February. The first adults begin leaving the mainland for Tasmania in September with the last birds having departed by November. It is a coastal species inhabiting saltmarshes, sedgeplains, coastal dunes, pastures, shrublands and moorlands, generally within 10 km of the coast. Critical winter habitat for the species includes natural saltmarshes dominated by *Sarcocornia quinqueflora* (Beaded Glasswort) and *Sclerostegia arbuscula* (Shrubby Glasswort), as well as the associated grassy or weedy pastures. Historical records indicate that the Orange-bellied Parrot was formerly more abundant and widespread in NSW than it is now, however the species' distribution continues to extend into south-eastern NSW where suitable habitat is still available.
Neophema pulchella	Turquoise Parrot		V	2001	**Medium**	Uncommon in the locality however, may forage in tree canopies of the	Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs. Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies. Nest in hollow-

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						woodland habitats of the study area.	bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies that are moist.
Ninox connivens	Barking Owl		V	2000	Low	Uncommon in the locality however, may forage at the edges of the woodland adjacent to closes exotic grassland. No suitable breeding hollows occur in the study area.	Generally found in open forests, woodlands, swamp woodlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country. Territories are typically 2000 ha in NSW habitats.
Ninox strenua	Powerful Owl		V	2015	**High**	Local population present with 90 previous records. Foraging habitat occurs in the woodland habitat of the study area with several trees showing signs of arboreal mammals. No suitable breeding hollows occur 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.
Numenius madagascariensis	Eastern Curlew	CE		2014	Negligible	Habitat not present in study area.	Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal lagoons with

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							large intertidal mudflats or sandflats often with beds of seagrass.
Onychoprion fuscata	Sooty Tern		V	2013	Negligible	Shorebird; habitat not present in study area.	The Sooty Tern is a pelagic species found over tropical waters were it feeds offshore far away from land. It breeds off the coast of WA and QLD rarely venturing to the south-east of Australia.
Pachycephala olivacea	Olive Whistler		V	2002	Low	Habitat of the study area low in quality and extent for the species.	Found in a range of habitats including alpine thickets, wetter rainforest/woodlands, riparian vegetation and heaths.
Pandion cristatus	Osprey		V	2014/#	Negligible	Coastal species; habitat not present in study area.	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 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.
Petroica boodang	Scarlet Robin		V	2005	Low	Uncommon in the locality with only one previous record. During the winter season, the species may utilise the farmland habitats of	During the breeding season the Scarlet Robin is found in eucalypt forests and temperate woodlands, often on ridges and slopes. During autumn and winter it moves to more open and cleared areas. It has dispersive or locally migratory seasonal movements. The Scarlet Robin forages amongst logs and woody debris for insects which make up the majority of its diet. The nest is an open cup of plant

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						the study area for foraging.	fibres and cobwebs, sited in the fork of a tree (often a dead branch in a live tree, or in a dead tree or shrub) which is usually more than 2 m above the ground. It is conspicuous in open and suburban habitats.
Pezoporus wallicus wallicus	Eastern Ground Parrot		V	2015	Negligible	No heathland, sedgeland or on button-grass plains habitat occurs; habitat not present in study area.	Mainly found in heathland, sedgeland or buttongrass plains providing medium to dense cover.
Puffinus assimilis	Little Shearwater		V	2013	Negligible	Pelagic species; habitat not present in study area.	The Little Shearwater is pelagic marine species found in subantarctic and subtropical (occasionally tropical) waters and often seen in continental shelf waters. It breeds on subtropical and subantarctic islands.
Rostratula australis	Australian Painted Snipe	EN	E1	#	Negligible	Suitable wetland habitat not present in study area.	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.
Thalassarche cauta	Shy Albatross	VU	V	2013	Negligible	Pelagic species; habitat not present in study area.	The Shy Albatross is a marine pelagic species inhabiting sub-Antarctic and subtropical waters, spending the majority of their time at sea. Occasionally it is observed in continental shelf waters in bays and harbours.
Thinornis rubricollis	Hooded Plover	VU	E4A	2006	Negligible	Shorebird; habitat not	Prefers sandy ocean beaches, especially those that are

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
						present in study area.	broad and flat.
Tyto novaehollandiae	Masked Owl		V	2010	**Medium**	Foraging habitat occurs in the woodland habitat occurring within the southern APZ. The species may also forage in open habitats on the fringe of the woodland.	The Masked Owl may be found across a diverse range of 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 500 to 1000 ha.
Tyto tenebricosa	Sooty Owl		V	2015	Low	Suitable habitat in the form of tall old-growth forests, is not present within the study area.	The Sooty Owl is often found in tall old-growth forests, including temperate and subtropical rainforests. In NSW it is mostly found on escarpments with a mean altitude <500 m. The Sooty Owl nests and roosts in hollows of tall emergent trees, mainly eucalypts often located in gullies. Nests have been located in trees 125 to 161 cm in diameter.
Reptiles							
Chelonia mydas	Green Turtle	VU	V	2010	Negligible	Not applicable	This is a marine species.
Eretmochelys imbricata	Hawksbill Turtle	VU		2009	Negligible	Not applicable	This is a marine species.
Frogs							

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
Heleioporus australiacus	Giant Burrowing Frog	VU	V	2010/#	Low	There are no waterbodies present within the study area suitable for this species.	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water. Spends the majority of its time in non-breeding habitat 20-250m from breeding sites.
Litoria aurea	Green and Golden Bell Frog	VU	E1	2011/#	Low	The farm dam located in Lot 1753 does not contain the key habitat features to support this species, such as sheltering and basking 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 industrial sites, brick pits, landfill areas and cleared land.
Litoria littlejohni	Littlejohn's Tree Frog	VU	V	#	Low	There are no waterbodies present within the study area suitable for this species.	The species is distributed along the eastern slopes of the Great Dividing Range from Watagan State Forest near Wyong, south to Buchan in north-eastern VIC. It is not known from coastal habitats. Occurs in wet and dry sclerophyll forests and heath communities associated with sandstone outcrops between 280 and 1000 m. Littlejohn's Tree Frog prefers permanent and semi-permanent rock

Scientific name	Common name	Conservation status		Most recent	Likely occurrence	Rationale for likelihood ranking	Habitat description*
							flowing streams, but individuals have also been collected from semi-permanent dams with some emergent vegetation. Forages both in the tree canopy and on the ground, and has been observed sheltering under rocks on high exposed ridges during summer.

* - 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.

A2.3 Migratory species (EPBC Act listed)

Includes records from the following sources:

- NSW BioNet Wildlife Atlas (refer to Section 2.1)
- DoE database (accessed on 17/11/2015)
- BirdLife Australia data search

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

Table A.5 Migratory fauna species recorded or predicted to occur within ten kilometres of the study area

Scientific name	Common name	Most recent record
Actitis hypoleucos	Common Sandpiper	1996
Apus pacificus	Fork-tailed Swift	#
Ardea ibis	Cattle Egret	2004/#
Ardea modesta	Eastern Great Egret	2014/#
Ardenna pacificus	Wedge-tailed Shearwater	2010
Ardenna tenuirostris	Short-tailed Shearwater	2010
Arenaria interpres	Ruddy Turnstone	2003
Calonectris leucomelas	Streaked Shearwater	2013
Chalcophaps indica	Emerald Dove	2006
Chelonia mydas	Green Turtle	2010
Cuculus optatus	Oriental Cuckoo	#
Cuculus saturatus	Himalayan Cuckoo	#
Diomedea exulans	Wandering Albatross	2000
Dugong dugon	Dugong	1993
Eretmochelys imbricata	Hawksbill Turtle	2009
Eubalaena australis	Southern Right Whale	2010
Gallinago hardwickii	Latham's Snipe	2006/#
Hirundapus caudacutus	White-throated Needletail	2009/#
Hydroprogne caspia	Caspian Tern	1999
Megaptera novaeangliae	Humpback Whale	1997
Merops ornatus	Rainbow Bee-eater	2004/#
Monarcha melanopsis	Black-faced Monarch	2014/#
Myiagra cyanoleuca	Satin Flycatcher	2014/#

Scientific name	Common name	Most recent record
Neophema chrysogaster	Orange-bellied Parrot	#
Numenius madagascariensis	Eastern Curlew	2014
Pandion cristatus	Osprey	2014/#
Phoebetria palpebrata	Light-mantled Sooty Albatross	2012
Rhipidura rufifrons	Rufous Fantail	2014/#
Stercorarius parasiticus	Arctic Jaeger	2011
Sterna hirundo	Common Tern	2014
Symposiachrus trivirgatus	Spectacled Monarch	#
Thalassarche cauta	Shy Albatross	2013
Tringa brevipes	Grey-tailed Tattler	1991
Tursiops aduncus	Long-beaked Bottle-nosed Dolphin	2003

A2.4 Hollow-bearing trees

Table A.6 Hollow-bearing trees located within the study area

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
Lot 1750						
1	285952	6116013	*Corymbia gummifera*	-	-	Nothing recorded by EcoLogical (2014)
2	285938	6115982	Stag	-	-	Nothing recorded by EcoLogical (2014)
3	285978	6115983	*Eucalyptus eugeniodes*	-	-	Nothing recorded by EcoLogical (2014)
4	285989	6115987	Stag	-	-	Nothing recorded by EcoLogical (2014)
5	285988	6115974	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
6	285983	6115951	*Eucalyptus eugeniodes*	-	-	Nothing recorded by EcoLogical (2014)
7	285978	6115932	*Eucalyptus eugeniodes*	-	-	Nothing recorded by EcoLogical (2014)
9	285943	6115913	Syncarpia glomulifera	-	-	Nothing recorded by EcoLogical (2014)
12	285907	6115887	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
13	285917	6115891	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
15	285928	6115880	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
16	285941	6115877	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
19	285959	6115894	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
20	285875	6115837	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
23	285944	6115852	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
25	285916	6115825	*Corymbia gummifera*	-	-	Nothing recorded by EcoLogical (2014)
29	285936	6115832	*Eucalyptus haemastoma*	-	-	Nothing recorded by EcoLogical (2014)
Lot 1752						
1	285890	6116192	*Eucalyptus haemastoma*	Pipe	Small Parrots	Nothing recorded during survey (Biosis 2014)
2	285907	6116133	*Corymbia gummifera*	Trunk	Microbats	Nothing recorded during survey (Biosis 2014)
3	285913	6116116	*Corymbia gummifera*	Trunk	Large forest owls Possums Cockatoos	Nothing recorded during survey (Biosis 2014)
4	285914	6116105	*Corymbia gummifera*	Pipe	Microbats Small Gliders Parrots	Nothing recorded during survey (Biosis 2014)
				Pipe	Also suitable for: Other small forest owls Large forest birds	Possible hollow for the Boobook Owl observed in the neighboring trees (Biosis 2014)
5	285907	6116094	*Eucalyptus eugeniodes*	Pipe	Microbats	Nothing recorded during survey (Biosis 2014)
6	285895	6116085	*Eucalyptus haemastoma*	Trunk	Small forest owls Parrots Corellas Possums	Nothing recorded during survey (Biosis 2014)
				Trunk	Ground dwelling mammals	Nothing recorded during survey (Biosis 2014)
7	285890	6116084	*Corymbia gummifera*	Pipe	Microbats Small gliders Forest birds	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small Owls Owlet-nightjars	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small Gliders	Nothing recorded during survey

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
					Forest Birds Parrots	(Biosis 2014)
				Pipe	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
8	285885	6116072	*Eucalyptus haemastoma*	Pipe	Medium sized Parrots Small forest Owls Large Gliders and Possums Corellas	Brushtail Possum (Biosis 2014)
				Trunk	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
				Pipe	Small Forest Owls Large Possums Gliders	Nothing recorded during survey (Biosis 2014)
9	285900	6116056	*Corymbia gummifera*	Trunk	Microbats Small Gliders Forest Birds Parrots	Nothing recorded during survey (Biosis 2014)
				Trunk	Small Possums Ducks Corellas Small Forest Owls	Nothing recorded during survey (Biosis 2014)
				Pipe	Forest Owls Large Possums	Nothing recorded during survey (Biosis 2014)
				Pipe	Small Possums and Gliders Tree Creepers Owlet-nightjars Parrots	Nothing recorded during survey (Biosis 2014)
10	285886	6116045	*Eucalyptus haemastoma*	Trunk	Ground dwelling mammals	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats Small gliders	Nothing recorded during survey

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
					Small Forest birds	(Biosis 2014)
11	285864	6116044	*Eucalyptus haemastoma*	Trunk	Forest Owls Large Possums	Nothing recorded during survey (Biosis 2014)
12	285884	6116024	*Eucalyptus eugeniodes*	Pipe	Microbats Small Gliders Parrots	Nothing recorded during survey (Biosis 2014)
				Branch	Small Gliders Possums Treecreepers	Nothing recorded during survey (Biosis 2014)
				Trunk	Small Gliders Possums Treecreepers	Nothing recorded during survey (Biosis 2014)
				Pipe	Small Gliders Possums Treecreepers	Nothing recorded during survey (Biosis 2014)
				Pipe	Microbats/Small Gliders Possums Treecreepers	Nothing recorded during survey (Biosis 2014)
				Branch	Small Gliders Possums Treecreepers	Nothing recorded during survey (Biosis 2014)
13	285876	6115982	*Eucalyptus haemastoma*	Trunk	Small Forest Owls Large Gliders Possums Olwet-nightjar Parrots Rosella's	Nothing recorded during survey (Biosis 2014)
14	285849	6115940	*Eucalyptus eugeniodes*	Trunk	Forest Owls Large Possums Gliders Cockatoos	Nothing recorded during survey (Biosis 2014)
15	285834	6115892	*Corymbia gummifera*	Branch	Also suitable for: Rosella's Possums Gliders	Rainbow Lorikeets (Biosis 2015)
				Branch	Large Owls Possums Gliders	Nothing recorded during survey (Biosis 2014)
				Branch	Large Owls Possums Gliders Corellas	Nothing recorded during survey (Biosis 2014)
				Branch	Small Possums Gliders Rosellas	Nothing recorded during survey (Biosis 2014)

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
					Lorikeets	
16	285842	6115878	*Eucalyptus haemastoma*	Branch	Small gliders and possums Forest birds	Nothing recorded during survey (Biosis 2014)
				Trunk	Small gliders and possums Forest birds Small Parrots	Nothing recorded during survey (Biosis 2014)
17	285855	6115998	*Eucalyptus haemastoma*	Trunk	Large Owls	Nothing recorded during survey (Biosis 2014)
				Large tube	Large Parrots	Nothing recorded during survey (Biosis 2014)
				Large tube	Large Parrots	Nothing recorded during survey (Biosis 2014)
18	285853	6116014	*Eucalyptus haemastoma*	Trunk	Large Owls	Nothing recorded during survey (Biosis 2014)
				Tube hollow	Owlet-nightjar Small Owls Large Gliders Possums	Nothing recorded during survey (Biosis 2014)
19	285858	6116016	*Eucalyptus haemastoma*	Trunk	Large Possums Gliders Owls Cockatoos	Nothing recorded during survey (Biosis 2014)
				Branch	Large Possums Gliders Owls Cockatoos	Nothing recorded during survey (Biosis 2014)
				Pipe	Small Gliders Possums Parrots Rosella's	Nothing recorded during survey (Biosis 2014)
				Pipe	Parrots Small Gliders Possums	Nothing recorded during survey (Biosis 2014)
20	285851	6116014	*Eucalyptus haemastoma*	Trunk	Large Owls Possums Gliders Cockatoos	Nothing recorded during survey (Biosis 2014)
21	285840	6116039	*Syncarpia glomulifera*	Pipe	Microbats Small gliders Possums	Nothing recorded during survey (Biosis 2014)

Tree ID	Easting	Northing	Tree species	Hollow Position	Suitability	Confirmed Occupancy
22	285869	6115966	*Eucalyptus eugeniodes*	Pipe	Small gliders Possums Rosella's Owlet-nightjar's Parrots Forest birds (Treecreepers)	Nothing recorded during survey (Biosis 2014)
				Pipe	Small gliders Possums Rosella's Owlet-nightjar's Parrots Forest birds (Treecreepers)	Nothing recorded during survey (Biosis 2014)
				Trunk	Small gliders Possums Rosella's Owlet-nightjar's Parrots Forest birds (Treecreepers)	Nothing recorded during survey (Biosis 2014)
Lot 1763						
2	285928	6115752	*Corymbia gummifera*	Small to medium size pipe hollows	Microbats	Not surveyed
3	285929	6115753	*Corymbia gummifera*	Small to medium size pipe hollows	Microbats	Not surveyed
4	285950	6115796	*Eucalyptus eugenioides*	Small pipe hollows	Microbats	Not surveyed
5	285915	6115763	*Eucalyptus haemastoma*	Small to medium size pipe hollows	Microbats	Not surveyed

Appendix 3 Assessments of Significance

The following section provides for Assessments of Significance according to the seven factors outlined in Section 5A of the EP&A Act for all species listed as a medium likelihood or greater in Appendix 1 and Appendix 2.

Pretty Beard Orchid

Calochilus pulchellus is listed as Endangered under the TSC Act.

Pretty Beard Orchid is a terrestrial orchid that produces a single leaf which sheaths the flowering stem briefly at the base; the leaf is fully developed at flowering time. The flowering stems are 200-300 mm tall, bearing 1-5 flowers on pedicels 6-12 mm long. The flowers last for 2-4 days and are 25-30 mm long by approximately 20 mm wide; the sepals and petals are a pale green or greenish yellow with darker reddish longitudinal striations and the labellum hairs are a coppery red (NPWS 2014b). Flowering parts appear between later October and late November, while active growth of the leaf occurs from winter onwards.

Pretty Beard Orchid has been recorded at three sites over a range of 40 kilometres within the Shoalhaven City Council. Approximately 30 adult plants have been recorded at these sites (OEH 2014c). Habitat previously associated with the presence of Pretty Beard Orchid at Vincentia is characterised as low Scribbly Gum dominated woodland with a low wet heath understorey. The soil was observed as sandy loam overlying sandstone.

The lifecycle of the Pretty Beard Orchid is poorly understood. A review of available literature (OEH 2014c) indicates that this species may only be able to produce flowers once or twice from underground tubers and therefore could possibly be more reliant on recruitment from seed rather than vegetative persistence. To this end, areas containing populations of Pretty Beard Orchid populations are currently believed to be highly restricted in area and limited by their dispersal capacity and ability to persist without recruitment from seed.

(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.

Pretty Beard Orchid has previously been found in the western portion of the study area within Lot 1750 Naval College Road (Bain, D. OEH. pers comm. 10 February 2015). Appropriate habitat for this species was not found within the subject site during targeted searches on 18 November 2015. Habitat features within this area are characterised by exotic pasture grasses and scattered trees, with minimal native cover present. Pretty Beard Orchid was not recorded during searches of habitat within extant areas of Red Bloodwood – Scribbly Gum heathy woodland in the north and south of the study area.

The area in which the Pretty Beard Orchid was recorded will form the western APZ and include permanent fencing as shown in Figure 7. Fencing will exclude cattle from areas of Pretty Beard Orchid habitat which will reduce the potential for negative impacts such as herbivory or trampling during key life stages such as flower and seed production. Management of bushfire risk within this area will be modified to facilitate appropriate ecological conditions for the persistence of the Pretty Beard Orchid at the site. The area will be managed using 'Manual slashing and weed control" to reduce biomass within fenced areas once per year between start of January and end of June using brushcutters and conducted under the supervision of a qualified ecologist.

Additional controls will restrict access to patrons of the proposed development and construction of the proposed development will be designed in ways that landscaping planting or associated structures will not decrease the amount of sunlight within the Pretty Beard Orchid habitat.

The proposed management of Pretty Beard Orchid habitat, through permanent fencing and ongoing APZ management is likely to preserve an open woodland canopy and open groundcover of grasses, forbs and sedges. The maintenance of this area to preserve these habitat features within the western APZ is likely to provide conditions suited to Pretty Beard Orchid. Management of Pretty Beard Orchid habitat as an APZ using appropriate management techniques is considered unlikely to cause the extinction of a local population.

(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

Pretty Beard Orchid is listed as threatened species; therefore this section is not applicable to the assessment.

(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,

Not applicable to the assessment of a threatened species.

(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 development will not remove any Pretty Beard Orchid habitat. The proposed development will result in the modification of 0.51 hectares of habitat for this species through establishment and management of an APZ within Lot 1750 Naval College Road. Management of this portion of the APZ, and Pretty Beard Orchid habitat, will include permanent fencing of a total of 1.7 hectares including the 0.51 hectares of habitat and a buffer. Manual slashing using brushcutters within the APZ area, will be conducted at times outside of the vegetative and flowering period. Continual management of shrub cover will also contribute to maintaining open woodland with low groundcovers, which is a favoured habitat for this orchid species.

Areas adjacent to the APZ will continue to be used for grazing by cattle and involve ploughing and seeding of forage crops. If fertilizer is used to improve crop health, impacts are considered unlikely to be significant as the drainage for the most part is parallel to the APZ. Permanent fencing will also act as a buffer to reduce the effects of fertilizer which will increase soil nutrient status and favour weed invasion.

Pretty Beard Orchid habitat occurs as fragmented remnant patches within Lot 1750 Naval College Road. Regeneration of previous grazed and pasture improved areas between Pretty Beard Orchid habitat will be undertaken. This will include control of exotic grasses, re-instatement of ploughed surfaces (if required) and assisted natural regeneration/revegetation of locally occurring groundcovers and tree cover appropriate for APZ functioning. Undertaking these activities will contribute to a reduction in habitat fragmentation over 1.7 hectares of Pretty Beard Orchid habitat.

The number of Pretty Beard Orchid individuals known to exist is approximately 30 plants. The development proposal will maintain habitat, conservatively estimated at one plant. In context of known population

numbers this would contribute to enhancement of habitat for approximately three percent of the total number in existence.

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

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for Pretty Beard Orchid at this stage.

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

To date, no recovery plans have been prepared for Pretty Beard Orchid. The threatened species profile (OEH 2014c) for Pretty Beard Orchid lists the following activity to assist in recovery of the species:

- Advocate for the protection of the species habitat during the design and approval stages of the proposed housing and commercial development at Vincentia.
- Sites where the species occurs are accessible by recreational users who may inadvertently trample on the plants.

Design of the proposed development will be undertaken in a way that will not reduce sunlight reaching the Pretty Beard Orchid habitat and restricts access to patrons who may by chance visit the APZ area of the development. Additionally, APZ establishment and management of areas containing Pretty Beard Orchid will directly contribute to supporting the preservation of habitat to assist the survival of this species.

(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.

'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a key threatening process for this species (NSW SC 2008). The establishment of an APZ in areas of Pretty Beard Orchid is not listed as a key threatening process. APZ management controls using 'hazard reduction burns' will not be used as a method for fuel reduction within Pretty Beard Orchid habitat due to a medium likelihood that other fire sensitive orchids are present within the study area.

In addition, 'Invasion of native plant communities by exotic perennial grasses' has the potential to a negatively impact on this species through increases in groundcover height and density. Active regeneration and control of exotic grasses within 1.7 hectares that includes Pretty Beard Orchid habitat will reduce threats posed by fragmentation by grazing pasture.

This in effect will provide a positive impact which will avoid the activation and reduce the potential for key threating processes which could and currently operate in areas of Pretty Beard Orchid habitat.

Conclusion

In consideration of the above seven factors, the impact of the proposed development is not likely to impose a significant effect on the endangered species Pretty Beard Orchid as it:

- Will not compromise the viability of a 'local population' through direct or indirect impact on the species through appropriate design and considered management of Pretty Beard habitat.
- Will not involve habitat removal and modification will contribute to maintaining ecological features appropriate for the species.
- Will improve issues of fragmentation through regeneration of a 'significant area of known habitat' for the species.

- Will contribute to a reduction in KTP threatening this species within Lot 1750 Naval College Road through appropriate management controls and ongoing weed control for exotic grasses.

Consequently, there is no requirement for the preparation of a Species Impact Statement (SIS).

Eastern Australian Underground Orchid

Rhizanthella slateri is listed as Vulnerable under the TSC Act.

Eastern Australian Underground Orchid has a whitish, fleshy underground stem to 15 cm long and 15 mm diameter. The flowering heads mature below the soil surface or may extend to 2 cm above the ground. Each flower head has up to 30, tubular, purplish flowers (OEH 2014b).

It is currently known from less than 10 locations in NSW and its habitat requirements are poorly understood. To date no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest and within areas containing the Myrtaceae family.

Currently, fire regimes favoured by Eastern Australian Underground Orchid are poorly known and altered fire regimes have the potential to negatively impact this species (DoE 2014a).

This orchid is especially cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can rarely occur above ground. It is most commonly found when mulch or soil layers are disturbed. Flowers are usually present between September and November, with detection most likely between October and November (DOE 2013a).

(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.

No habitat for this species was found within the subject site, which has been modified through ongoing residential and pastoral use.

Habitat for the Eastern Australian Underground Orchid is present within remnant vegetation surrounding the subject site within the proposed APZs. The areas of sclerophyll forest containing a build up of leaf mould were surveyed randomly in areas where Scribbly Gum are present, both at the base of the trunk and at intervals within the drip line. No plants of this species were recorded. The life-cycle of this species is conducted below ground and rarely appears above the leaf litter surface, therefore without more exhaustive survey the species must be considered a medium potential of occurring within the study area habitat (DOE 2013a).

Approximately 1.00 hectares of habitat, with a medium likelihood to contain Eastern Australian Underground Orchid, is present within areas proposed to be used as APZs for the development. Management of APZs containing Pretty Beard Orchid habitat within Lot 1750 Naval College Road, will involve annual manual slashing. No hazard reduction burns are to be undertaken due to the uncertainty regarding fire regimes favourable for the species.

Additional controls for APZ management to maintain habitat for Eastern Australian Underground Orchid require that if manual removal of ground fuels is to be undertaken, only coarse woody debris and shrub cover be removed, to maintain an appropriate level of leaf mould habitat for the species.

The development will also be designed to not cause an increase in surface water run-off into habitat able to support Eastern Australian Underground Orchid within the study area.

Protection of Eastern Australian Underground Orchid habitat by installation of fencing to exclude cattle grazing within Lot 1750 Naval College road will reduce the potential for negative impacts of trampling during key life stages such as flower and seed production.

Additional controls will restrict access to patrons of the proposed development into areas of Eastern Australian Underground Orchid at key lifecycle stages to avoid damage by trampling.

The proposed management of APZs in areas of Eastern Australian Underground Orchid habitat be undertaken to preserve leaf mould and habitat conditions favourable to this species. Management of Eastern Australian Underground Orchid habitat as an APZ and adhering to other listed actions is considered unlikely to cause the extinction of a local population.

(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

An Endangered Population is a population listed under Part 2 of Schedule 1 of the TSC Act and is defined as a population that, in the opinion of the NSW Scientific Committee, is facing a very high risk of extinction in NSW in the near future.

Rhizanthella slateri population in the Great Lakes local government area is listed under Part 2 Schedule 1 of the TSC Act. The subject site is located outside of the LGA and therefore this section is not applicable to the assessment.

(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,

Not applicable to the assessment of a threatened species.

(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 development will not remove any Eastern Australian Underground Orchid habitat. The proposed development will result in the modification of 1.00 hectares of habitat for this species through establishment and management of APZ's within the study area.

Management of the APZ, and habitat for this species, will include permanent fencing and regeneration of 1.7 hectares around the habitat within 1750 Naval College Road. APZ management in areas of Eastern Australian Underground Orchid habitat will be modified to only remove coarse woody debris and maintain leaf mould to preserve ecological features favourable for the species.

Areas adjacent to the APZ within Lot 1750 Naval College Road will continue to be used for cattle grazing which will involve ploughing and seeding of forage crops. If fertilizer is used to improve crop health, the impacts are unlikely to be significant as the drainage for the most part is parallel to the APZ. Permanent fencing surrounding the habitat areas will act as a buffer and reduce the potential for excess fertilizer to increase nutrient status and favour weed invasion.

Eastern Australian Underground Orchid habitat is currently fragmented where it occurs within Lot 1750 Naval College Road. Regeneration of previously grazed and pasture improved areas between habitat remnants will be undertaken. This will include control of exotic grasses, re-instatement of ploughed surfaces (if required) and assisted natural regeneration/revegetation of locally occurring groundcovers and tree cover that are appropriate for APZ functioning. Undertaking these activities will contribute to a reduction in fragmentation of 1.7 hectares of habitat.

The number of plants previously observed within similar vegetation types within the locality is one, and the known locations within NSW are 10. With such low numbers of recorded sightings, it is expected that the proposed land management changes and restoration of disturbed areas within the APZ are likely to lead to a positive impact and maintain habitat appropriate for Eastern Australian Underground Orchid in the locality.

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

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for Eastern Australian Underground Orchid at this stage.

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

It was identified in 2008 that a national recovery plan for Eastern Australian Underground Orchid was not required (DoE 2014b) and that funding was required to improve detection methodologies. The threatened species profile for Eastern Australian Underground Orchid also lists the following activity to assist in recovery of the species: 'Protect areas of known habitat from clearing'.

The proposed change in management in areas containing habitat for Eastern Australian Underground Orchid will not clear any habitat, will modify 1.00 hectares for use as APZs, and contribute to the regeneration of 1.7 hectares of habitat.

(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 threatened species profile for Eastern Australian Underground Orchid lists the following threat to the species: 'Habitat loss due to clearing'. The proposed development will not involve permanent clearing of Eastern Australian Underground Orchid habitat and therefore will not result in the activation of this process at the site.

Fencing to protect habitat areas from grazing cattle, managing APZs to preserve leaf mould within woodland areas and regeneration of potential habitat at the subject site, will help alleviate habitat clearing threats within the locality.

Conclusion

In consideration of the above seven factors, the impact of the proposed development is not likely to impose a significant effect on the endangered species Eastern Australian Underground Orchid as it;

- Will not compromise the viability of a 'local population' through direct or indirect impact on the species during future operation.
- Will not involve habitat removal and modification will contribute to maintaining ecological features appropriate for the species.
- Will improve issues of fragmentation through regeneration of habitat within a locality known to support the species.

- Will contribute to a reduction in KTP threatening this species through appropriate design of surface water flow, APZ management controls and ongoing weed control.

Consequently, there is no requirement for the preparation of a Species Impact Statement (SIS).

Leafless Tongue Orchid *Cryptostylis hunteriana*

Leafless Tongue Orchid is listed as Vulnerable under the TSC Act.

Clark et al (2004) indicated that the Shoalhaven contains greater than 25 populations, usually varying in size from a few stems to up to 20 in size. Recent surveys conducted in the area have detected populations of up to 40 individuals. There are several records of the species surrounding the study area, particularly to the north-east ad south-east. No individuals were located within the study area following surveys undertaken in 2015 (in the western APZ) and 2016 (in the southern and portion APZs).

(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.

Leafless Tongue Orchid does not appear to have well-defined habitat preferences and has been recorded from a range of communities. The larger populations typically occur in woodland dominated by Scribbly Gum *Eucalyptus sclerophylla*, Silvertop Ash *E. sieberi*, Red Bloodwood *Corymbia gummifera* and Black Sheoak *Allocasuarina littoralis*. The species appears to prefer open areas in the understorey of this community and is often found in association with Large Tongue Orchid *Cryotostylis subulata* and Tartan Tongue Orchid *Cryotostylis erecta* (OEH 2014b).

The subject site has been modified through ongoing residential and pastoral use and did not provide habitat for this species. Areas surrounding the subject site that are proposed to be managed for an APZ, supported dry sclerophyll woodland with areas of open groundcover and scattered leaf litter, which supports this species at reference locations nearby (A. Stephenson. Pers comm. 21 January 2016). Surveys completed throughout the study area in 2015 and 2016 found both Large Tongue and Tartan Tongue Orchid, however did not detect the species. Based on this, it is considered unlikely that a large viable local population occurs within the study area.

Approximately 0.47 hectares of habitat, is proposed to be managed as APZs for the development. Given that little is known about the ecology of the species, a precautionary approach has been adopted and specific controls have been recommended for the APZ areas including all vegetation management work to be undertaken outside of the flowering season and fuel reduction be undertaken manually. The development will also be designed to not cause an increase in surface water run-off into potential Leafless Tongue Orchid habitat. Given the species was not recorded and the extent of works within the APZs, management of Leafless Tongue Orchid habitat as an APZ is considered unlikely to cause the extinction of a local population.

(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

Leafless Tongue Orchid is a threatened species and therefore this section is not applicable to the assessment.

(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,

Not applicable to the assessment of a threatened species.

(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,

Up to 0.47 hectares of potential habitat for the species will be modified for the purposes of an APZ.

The area in which the study area exists is found between two important populations (north of Wool Road and Heritage Estates area), as identified within the Heritage Estates rezoning EPBC Act recommendations report (DEHWA 2007). The remnant vegetation to be modified by the proposal for an APZ, currently occurs at the edge of remnant bushland extending between the two important populations. Considering the minor scale of modification, the proposal is unlikely to result in increased fragmentation or isolation of any areas of bushland adjacent to or within the study area.

As no individuals were located following the 2015 and 2016 surveys, habitat within the study area is not considered to be important to the long-term survival of the species.

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

Critical habitat is an area of land that is crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act 1995, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for Leafless Tongue Orchid.

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

To date, no recovery plans have been prepared for Leafless Tongue Orchid. The threatened species profile for the species refers to three activities that can to assist in recovery of the species, all of which relate to management of known populations within LGAs or development of survey guidelines, which are applicable to the study area (DEC 2014).

(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 proposal will result in result in the operation of the 'Clearing of native vegetation' which is a Key Threatening Processes linked to development of land on which this species occurs.

The current design for the proposal includes the modification of up to 0.47 ha of habitat for Leafless Tongue Orchid for the purposes of an APZ. Given the species typically occurs in woodlands and appears to prefer open areas in the understory, this KTP is not considered to be exacerbated or impact the Leafless Tongue Orchid.

Conclusion

In consideration of the above seven factors, the proposed project design is not likely to impose a significant effect on the vulnerable species Leafless Tongue Orchid as:

- The proposal will not result in the direct removal of any potential habitat.
- The proposal will not involve the modification, reduction, fragmentation or isolation of a 'significant area of known habitat' for the species.

- The proposal does not significantly contribute to any KTP threatening this species within its natural range and habitats.

Consequently, there is no requirement for the preparation of a Species Impact Statement (SIS).

Bauer's Midge Orchid *Genoplesium baueri*

Bauer's Midge Orchid is listed as Vulnerable under the TSC Act.

The species prefers open forest, woodland and shrubby forest in well drained gravelly or sandy soils, with the majority of plants are found in relatively open areas. The range of Bauer's Midge Orchid extends between Port Stephens and Ulladulla however is limited to 13 sites. A known population is located to the south-east of the study area.

(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.

This species is known to be present within the locality and habitat in the form of dry sclerophyll woodland within open groundcovers was supported within the study area (OEH 2014d, A Stephenson. pers comm. 22 January 2015).

As with other orchids assessed herein, no habitat for this species was found within the subject site, which has been modified through ongoing residential and pastoral use. Habitat is present within remnant vegetation surrounding the subject site within the proposed APZs. Surveys completed throughout the study area in 2015 and 2016 did not detect the species. Therefore it is considered unlikely that a large viable local population occurs within the study area.

Approximately 0.47 hectares of habitat, is proposed to be managed as APZs for the development. Given that little is known about the ecology of the species, a precautionary approach has been adopted and specific controls have been recommended for the APZ areas including all vegetation management work to be undertaken outside of the flowering season and fuel reduction is undertaken manually. The development will also be designed to not cause an increase in surface water run-off into potential Bauer's Midge Orchid habitat. Given the species was not recorded and the extent of works within the APZs, management of Bauer's Midge Orchid habitat as an APZ is considered unlikely to cause the extinction of a local population.

(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

Bauer's Midge Orchid is a threatened species and therefore this section is not applicable to the assessment.

(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,

Not applicable to the assessment of a threatened species.

(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,

Up to 0.47 hectares of potential habitat for the species will be modified for the purposes of an APZ.

All vegetation to be modified currently occurs at the edge of larger patches of bushland that extend through to local biodiversity corridors. Therefore the proposal is unlikely to result in increased fragmentation or isolation of any areas of bushland adjacent to or within the study area.

As no individuals were located following the 2015 and 2016 surveys, habitat within the study area is not considered to be important to the long-term survival of the species.

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

Critical habitat is an area of land that is crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act 1995, the Director-General maintains a register of critical habitat. To date, no critical habitat has been declared for Bauer's Midge Orchid.

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

To date, no recovery plans have been prepared for Bauer's Midge Orchid. The threatened species profile for the species refers to three activities that can to assist in recovery of the species, all of which relate to management of known populations within LGAs or development of survey guidelines, which are applicable to the study area (DEC 2014).

(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 proposal will result in result in the operation of the 'Clearing of native vegetation' which is a Key Threatening Processes linked to development of land on which this species occurs.

The current design for the proposal includes the modification of up to 0.47 ha of habitat for Bauer's Midge Orchid for the purposes of an APZ. Given the species typically occurs in woodlands and appears to prefer open areas in the understory, this KTP is not considered to be exacerbated or impact the Bauer's Midge Orchid.

Conclusion

In consideration of the above seven factors, the proposed project design is not likely to impose a significant effect on the vulnerable species Bauer's Midge Orchid as:

- The proposal will not result in the direct removal of any potential habitat.
- The proposal will not involve the modification, reduction, fragmentation or isolation of a 'significant area of known habitat' for the species.
- The proposal does not significantly contribute to any KTP threatening this species within its natural range and habitats.

Consequently, there is no requirement for the preparation of a Species Impact Statement (SIS).

Hollow-roosting microbats

The Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis are all listed as Vulnerable under Schedule 2 of the TSC Act. These four species have been considered together for this

assessment based on their similar habitat requirements (i.e. roost in tree hollows and forage in areas of bushland).

(*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.*

All four microbats have been recorded in the locality and given the suitability of habitat and mobility of the species', it is considered likely that a viable populations occur within the locality.

The Greater Broad-nosed Bat and Eastern Freetail-bat tend to forage along gaps and edges of forests and bushland patches, usually within a few kilometres of the roost site (Churchill 2008). The Eastern Freetail-bat has been known to travel as far as 6 kilometres from its roosting site while foraging. The Eastern False Pipistrelle tends to target the largest available prey items and forages within or below the tree canopy, while the Southern Myotis forages along waterways fishing for prawns, small fish and aquatic insects.

The study area contains 1.88 hectares of native foraging habitat for the four microbats, of which up to all will be partially removed as a result of the proposal. This represents approximately 0.01% of similar habitat occurring in the locality. Foraging habitat within the study area is therefore not considered to be a limiting resource and similar habitats are located within conservation reserves surrounding the study area.

All five species use tree hollows for roosting. Hollow dependent microbats generally have a large choice of roost sites across the landscape and most bats will use several roosts regularly (Churchill 2008). The study area contains up to 41 hollows suitable for roosting microbats, of which 17 are likely to be removed as part of the proposal. Although no indirect evidence such as scats were observed or direct evidence, in hollow-bearing tree occupancy survey, it can be difficult to ascertain microbat occupancy. Nevertheless, these hollows provide an alternate roosting habitat within the locality for these species. Both the Eastern Freetail-bat and Greater Broad-nosed Bat are considered to be moderately sensitive to urbanisation, while the Eastern False Pipistrelle and Southern Myotis very sensitive and have not adapted well as well as other microbat species to the urban landscape (Threlfall *et al.* 2012). Despite this, the study area, particularly the southern APZ, contains suitable roosting habitats for all four species which may be used on occasion.

The proposal has been designed to include the retention of as many hollow-bearing trees as possible in APZs, both within the cleared areas and within more intact stands of bushland. Despite this, suitable roosting habitats are likely to be removed. As part of construction works, a pre-clearance survey to determine occupancy of hollows as well as the presence of suitably qualified a spotter / catcher present during felling is proposed to ensure no direct impact results on threatened microbats.

Given that most bats will use several roosts regularly and that the habitats within the subject site are also widely available in surrounding bushland protected in conservation reserves, it is considered unlikely that the proposal would have an adverse effect on the life cycle of the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis such that a viable local population of these species is likely to be placed at risk of extinction.

(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

There are currently no Endangered Populations listed in NSW for Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis.

(*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,

Not applicable to threatened species.

(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 proposal will involve the partial removal of 1.88 hectares of vegetation which contains both foraging habitat and roosting for the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis. In addition, a total of 17 trees containing hollows suitable for roosting will be removed. The total extent of habitat to be removed is approximately 0.01% of similar vegetation within the locality.

The APZs of the study area form part of a habitat corridor mapped by Council. The proposal will result in the removal of 17 trees located within the development footprint and adjacent to this corridor. It is anticipated that only a few canopy trees will require removal or trimming within the APZ areas. Given the high mobility of the three species, and their ability to actually use cleared corridors for foraging, the proposal would not result in habitat fragmentation or isolation for the four threatened microbats.

The area of potential foraging habitat to be removed by the proposal is 0.01% of that available in the locality. Within that habitat, microbats will use multiple roost sites throughout the year. Given the surrounding habitats, it is likely that individuals use the resources of the subject site on occasion. Due to the availability of habitat in the locality and the high mobility of the four microbats however, habitat within the subject site is considered to be of moderate importance to the long-term survival of these species in the locality.

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

To date, no critical habitat has been declared for the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis.

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

There are currently no recovery plans for the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis in NSW.

(*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.*

All four microbats are threatened by the following KTP's as listed under Schedule 3 of the TSC Act:

- Clearing of native vegetation (OEH 2001) – the proposal would involve clearing of 1.88 ha of native vegetation that provides general foraging habitat for the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis.
- Competition from feral honeybees (OEH 2002) – the proposal would involve the removal of hollow-bearing trees throughout the subject site, which could increase the level of competition with Feral Honeybees for nesting resources in the locality.
- Loss of hollow-bearing trees (OEH 2007) – the proposal would remove 17 hollow-bearing trees that provide suitable roosting habitat for both species Eastern False Pipistrelle, Eastern Freetail-bat and

Greater Broad-nosed Bat. The Eastern False Pipistrelle, Eastern Freetail-bat and Greater Broad-nosed Bat have been specifically identified in the final determination of this threatening process.

- Removal of dead wood and dead trees (OEH 2003) – the proposal would remove dead stags that provide suitable roosting habitat for the four species. The Eastern False Pipistrelle and Eastern Freetail-bat have been specifically identified in the final determination of this threatening process.

Conclusion

The proposal would have the following impacts on the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis:

- Approximately 1.88 ha of foraging habitat containing roosting habitat (in the form of four hollow-bearing trees) would be cleared.
- Increase in the impact of four KTPs.

However, the proposal is considered unlikely to result in a significant impact on a local population of the four microbats as:

- Potential foraging habitat to be removed is not considered limiting.
- Hollow-dependent microbats have a large choice of roost sites within the locality (including those in conservation areas) and most bats will use several roosts regularly.
- The species are mobile.
- Potential habitat in the surrounding area would not be fragmented or isolated.

Therefore the proposal will not result in a significant impact to the Eastern False Pipistrelle, Eastern Freetail-bat, Greater Broad-nosed Bat and Southern Myotis and a SIS is not considered necessary.

Appendix 4 Significant Impact Criteria assessments

Eastern Australian Underground Orchid

Rhizanthella slateri is listed as Endangered under the EPBC Act.

Eastern Australian Underground Orchid has a whitish, fleshy underground stem to 15 cm long and 15 mm diameter. The flowering heads mature below the soil surface or may extend to 2 cm above the ground. Each flower head has up to 30, tubular, purplish flowers (OEH 2014b, DoE 2014a, DoE 2014b).

It is currently known from less than 10 locations in NSW and its habitat requirements are poorly understood. To date no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest and within areas containing the Myrtaceae family.

Currently, fire regimes favoured by Eastern Australian Underground Orchid are poorly known and altered fire regimes have the potential to negatively impact this species (DoE 2014a).

This orchid is especially cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. It is most commonly found when mulch or soil layers are disturbed. Flowers are usually present between September and November.

An action has, will have, or is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of an important population of the species

Previously, Eastern Australian Underground Orchid has been recorded at a location within 1 kilometre of the subject site and is known from only 10 locations in NSW. Therefore any individuals recorded for this species would currently be considered an important population.

The subject site of the proposed development does not contain habitat suitable for this species.

Habitat for the Eastern Australian Underground Orchid is present within remnant vegetation surrounding the subject site. The areas of sclerophyll forest containing a build up of leaf mould were surveyed randomly in areas where Scribbly Gum are present, both at the base of the trunk and at intervals within the drip line. No plants of this species were recorded. The life-cycle of this species is conducted below ground and rarely appears above the leaf litter surface, therefore without more exhaustive survey the species must be considered a medium potential of occurring within the study area habitat (DOE 2013a).

The establishment and management of APZs within areas of Eastern Australian Underground Orchid habitat will be managed to retain leaf mould when undertaking manual removal of ground fuels within sclerophyll woodland areas and preserve habitat associated with its presence. Ongoing management of the APZs is likely to provide a positive impact to an area of habitat for this species by reducing pressure from grazing within Lot 1750 Naval College Road and regeneration of 1.7 hectares of disturbed open woodland habitat within the study area.

Adherence to management actions detailed above to avoid impacts by the proposed development is unlikely to lead to a long-term decrease in an important population for this species.

Reduce the area of occupancy of an important population

The proposed development within the subject site will not contribute to reducing the area of occupancy by an important population as no habitat for this species is present.

Indirect impacts through the establishment of APZs within remnant sclerophyll woodland will be managed to maintain leaf mould cover, by only removing coarse woody debris. Permanent fencing of 1.7 hectares of the study area will also protect habitat for Eastern Australian Underground Orchid from grazing that could reduce the area of occupancy of an important potential population.

Other management actions include the control of exotic annual and perennial grasses, and regeneration of pasture improved areas using methods appropriate for APZs functioning over 1.7 hectares, which will increase the area of potential habitat found within the locality.

Fragment an existing important population into two or more populations

The proposed development is situated within highly modified vegetation and will not directly increase fragmentation of Red Bloodwood – Scribbly Gum heathy woodland habitat for Eastern Australian Underground Orchid within the study area.

Control of exotic and perennial grasses, in conjunction with revegetation / regeneration, consistent with APZ functioning, will achieve a positive impact which will reduce fragmentation of habitat for the species within the study area over 1.7 hectares.

Adversely affect habitat critical to the survival of a species

There is no recovery plan for this species and no habitat critical for the survival of the species has been listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act.

Disrupt the breeding cycle of an important population

The proposed development will not disrupt the breeding cycle of an important population of the Eastern Australian Underground Orchid as no habitat is present within the subject site.

The establishment of APZs within the study area will be modified to retain leaf mould. Management of fine fuels will be restricted to the removal of coarse woody debris (sticks and braches only).

The proposed permanent fencing of parts of the study area will prevent trampling impacts from cattle grazing occurring, and therefore also avoid an impact that would disrupt the breeding cycle of an important population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The development proposal will not directly impact on Eastern Australian Underground Orchid habitat as none is present within the subject site.

The development proposal will modify 1.00 hectare of habitat for this species through establishment of APZs within the study area where Red Bloodwood – Scribbly Gum heathy woodland is present. The establishment of APZs will be limited to the removal of coarse woody debris to maintain a layer of leaf mould and preserve conditions favourable to Eastern Australian Underground Orchid.

APZ establishment will include the permanent fencing within 1750 Naval College Road to avoid trampling by cattle. Management actions within this fenced area will also include controlling weeds (especially pasture grasses) and revegetating / regenerating vegetation, in ways that are appropriate for a functioning APZ. This will contribute to reducing fragmentation of habitat over 1.7 hectares. Fencing will reduce the potential for weed invasion by creating buffers around the mapped habitat areas, which threaten can small pockets of high quality habitat over long periods of time.

Result in invasive species that are harmful to an endangered species becoming established in the endangered species habitat

The development proposal will not directly result in the establishment of invasive species impacting on Eastern Australian Underground Orchid habitat as landscape planting will be restricted to locally occurring species.

Establishment of APZs will involve ongoing control of weeds that have the potential to invade and negatively modify Eastern Australian Underground Orchid habitat, using methods which will limit disturbance to leaf mould layers and minimise potential impact to this species.

Installation of permanent fencing within 1750 Naval College Road will prevent cattle from directly introducing exotic grass and pasture weeds into areas of Eastern Australian Underground Orchid habitat. Control of exotic grasses and pasture weeds in areas surrounding the potential habitat will further reduce the capacity for weed seed to enter and degrade potential habitat for the Eastern Australian Underground Orchid. Weed control and regeneration of these areas with native species appropriate for inclusion within an APZ will provide added competition and reduce the capacity for exotic grasses and pasture weeds to re-establish.

Areas of the study area, adjacent to the APZ, that will continue to be used for cattle grazing, will also involve ploughing and seeding of forage crops. If fertilizer is used to improve crop health, the impacts are unlikely to be significant as the drainage for the most part is parallel to the APZ. Permanent fencing surrounding the habitat areas will act as a buffer and reduce the potential for excess fertilizer to increase nutrient status and favour weed invasion.

Overall, the proposed development, including APZ management is believed to result in neutral to positive impact by reducing the potential for exotic plants to proliferate within habitat for the species in the study area.

Introduce disease that may cause the species to decline

Plant pathogens have been shown to have the potential to indirectly cause an orchid species to decline (Phytophora Threat Abatement Plan, 2014 (DoE 2014)). The transport of plant pathogens via soil on road grading machinery, such as *Phytophthora cinnamomi* is also considered a likely vector for introduction to sensitive sites.

There is potential for the introduction of *Phytophthora cinnamomi* on tractors or their implements used to re-instate soil levels (if undertake by contractors). This vector must be managed during regeneration activities within the APZ. Wash down of machinery or tine harrows is required prior to entering site for any machinery contracted to undertake any soil management activities. This will reduce the potential for introducing disease to the subject site that may cause the species to decline.

Interferes substantially with the recovery of the species.

A national recovery plan has not been produced for the Eastern Australian Underground Orchid to date. Given that the proposed management actions are likely to improve habitat quality, it is unlikely that the proposed development of the subject site and APZ establishment and management in its current proposed design is likely to substantially interfere with recovery of the species.

Conclusion

In consideration of the above factors, the proposed development and ongoing management of the study area is not likely to impose a significant effect on the endangered species, Eastern Australian Underground Orchid as it:

- Will not permanently reduce the area of occupancy of an important population through removal of habitat or vegetation known to support this species.
- Will modify vegetation that is habitat for the species for the establishment of APZs and adhere to controls to retain habitat features favoured by the species.
- Will not destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
- Will manage the study area so as to not result in the proliferation of invasive species that are potentially harmful to this species and cause modification to its habitat.

Consequently, a Referral under the provisions of the EPBC Act is not recommended for this species.

Leafless Tongue Orchid

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of an important population of the species

Clark et al (2004) indicated that the Shoalhaven contains greater than 25 populations, usually varying in size from a few stems to up to 20 in size. Four important populations occur within the locality (DEHWA 2007) in areas to the north-east and south east of the study area. There are several records of the species that have been recorded between these areas, closer to the study area, in these directions. No individuals were located within the study area following surveys undertaken in 2015 (in the western APZ) and 2016 (in the western and southern portion APZs). Therefore it is considered unlikely that an important local population occurs within the study area and the proposal is not considered to lead to a long-term decrease in the size of an important population located beyond the study area.

Reduce the area of occupancy of an important population

Larger populations of Leafless Tongue Orchid typically occur in woodland dominated by Scribbly Gum *Eucalyptus sclerophylla*, Silvertop Ash *E. sieberi*, Red Bloodwood *Corymbia gummifera* and Black Sheoak *Allocasuarina littoralis*. The species appears to prefer open areas in the understorey of this community and is often found in association with Large Tongue Orchid *Cryotostylis subulata* and Tartan Tongue Orchid *Cryotostylis erecta* (OEH 2014b).

Habitat for the Leafless Tongue Orchid is present within remnant vegetation surrounding the subject site within the proposed APZs. Up to 0.47 hectares of potential habitat for the species will be modified for the purposes of an APZ. Considering the proposal does not require the complete removal of habitat, and groundcover will remain in tact, the proposal is not considered to significantly reduce the area of occupancy of an important population or important population located beyond the study area.

Fragment an existing important population into two or more populations

All vegetation to be modified currently occurs at the edge of larger patches of bushland that extend through to local biodiversity corridors. Individuals located in important populations beyond the study area are located to the north-east and south-east (DEHWA 2007), not in the direct line of the proposed development. Therefore the proposal is unlikely to result in increased fragmentation or isolation of any areas of bushland adjacent to or within the study area.

Adversely affect habitat critical to the survival of a species

There is no recovery plan for this species and no habitat critical for the survival of the species has been listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act. The potential habitat identified for this species within the subject site and in the study area is not considered to be habitat critical for survival of the species. Additionally, the proposed action is unlikely to significantly affect the habitat of flora and fauna species associated with Leafless Tongue Orchid which would compromise its survival at a local, regional or bioregional scale.

Disrupt the breeding cycle of an important population

Ichneumon Wasp or Orchid Dupe *Lissopimpla excelsa* is the exclusive pollinator for the Leafless Tongue Orchid (Gaskett 2011). Orchid Dupe wasp relies on a host caterpillar for its eggs to develop. Although not well studied, the literature indicates that Noctiduae moths are the most likely host (Pemberton 2010). This group of moths are very widely spread and no host specificity has previously been detected for this wasp.

Most ichneumonimid wasps require both nectar and water to survive. Water collection is usually from fog / dew drops, nectar from flowers and honeydew produced by other insects as a by-product (Jervis et al 1993). Jervis et al (1993) also proposes that flower shape is a major determinant as most ichnuemonid wasps have short tongues, and found within their research these wasps favoured feeding from the Apiaceae family.

Average capture-mark-recapture distances for male wasps have been recorded at around 100m, which has the potential to indicate the size of individual mate searching patches, with maximum recorded distances up to 625 m, limited by project sizes (Weinstein, unpublished research data). Population densities, average site abundances and site fidelity of male wasps to an area of habitat is currently unknown. The relatively common occurrence of other *Cryptostylis* species, at times within metres of leafless tongue orchid does not tend to support the hypothesis that pollinator limitation within the landscape can explain this species' rarity (when compared to results for Phillips et al 2014).

As the habitat to be modified is not occurring close to important populations, it is unlikely that a direct reduction in pollinator habitat is likely to impact these populations and habitat within the study area is likely to be important for maintenance of pollinator populations within the locality. Therefore impacts to disrupt dispersal mechanisms are unlikely to occur and the breeding cycle of the important population occurring beyond the study area is unlikely to occur.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The current design for the proposal includes the modification of 0.47 ha of habitat to allow for the maintenance of an APZ. The habitat is not considered to be high quality or limited when compared to habitats available surrounding the study area as they species was not detected in targeted surveys.

Given the area of potential habitat is a small proportion found within the locality, it is considered unlikely that the proposal will decrease the availability or quality of habitat to the extent that the species is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat

As a result of surrounding land uses, invasive species in the habitat of the of study area are mainly limited to annual and perennial herbaceous weeds that are common and abundant in disturbed areas in the locality. In areas of the study area that haven't been slashed, weed per cent cover is typically low. Given the APZ maintenance will occur on the edge of cleared areas, the proposal is not likely to result in an increase in the establishment of invasive species within intact bushland of the study area provided the safeguards are adhered to or beyond into adjacent areas that are known provide habitat for the species.

Introduce disease that may cause the species to decline

Plant pathogens have been shown to have the potential to indirectly cause an orchid species to decline (*Phytophthora cinnamomi* Threat Abatement Plan, 2014 (DoE 2014)). The transport of plant pathogens via soil on earth works machinery is also considered a likely vector for introduction to sensitive sites.

Targeted surveys did not record the species despite surveying during optimal periods when flowering had been confirmed at a nearby reference population. Therefore, introduction of a plant pathogen by the proposal action is considered unlikely to cause Leafless Tongue Orchid in the locality to decline.

Interferes substantially with the recovery of the species.

There is currently no recovery plan for the species. Taking into account the project safeguards, it is considered unlikely that the proposal will impact on any recovery actions of the Leafless Tongue Orchid.

Conclusion

Although the Leafless Tongue Orchid was not recorded within the study area, the project safeguards have been designed to retain potential habitat based on a precautionary approach. The proposal is considered to result in a significant impact to the species and a Referral under the provisions of the EPBC Act is not recommended.

Bauer's Midge Orchid

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of an important population of the species

The species prefers open forest, woodland and shrubby forest in well drained gravelly or sandy soils, with the majority of plants are found in relatively open areas (OEH 2014d). The range of Bauer's Midge Orchid extends between Port Stephens and Ulladulla however is limited to 13 sites. A known population is located to the south-east of the study area (A Stephenson. pers comm. 22 January 2015). No individuals were located within the study area following surveys undertaken in 2015 (in the western APZ) and 2016 (in the southern and portion APZs). Therefore it is considered unlikely that an important local population occurs within the study area and the proposal is not considered to lead to a long-term decrease in the size of an important population located beyond the study area.

Reduce the area of occupancy of an important population

Habitat for the Bauer's Midge Orchid is present within remnant vegetation in the form of dry sclerophyll forest with open grassy groundcovers, surrounding the subject site within the proposed APZs. Up to 0.47 hectares of potential habitat for the species will be modified for the purposes of an APZ.

The proposal does not require the complete removal of habitat and groundcover will remain intact; in addition the proposed APZ maintenance is likely to reduce competition from shrubs. Reduced competition is considered likely to maintain the area of habitat able to support the species, and therefore is unlikely contribute to reduction of an area of occupancy by an important population or important population located beyond the study area.

Fragment an existing important population into two or more populations

All vegetation to be modified currently occurs at the edge of larger patches of bushland that extend through to local biodiversity corridors. Individuals located in important populations beyond the study area are located to the north-east and south-east, not in the direct line of the proposed development. Therefore the proposal is unlikely to result in increased fragmentation or isolation of any areas of bushland adjacent to or within the study area.

Adversely affect habitat critical to the survival of a species

There is no recovery plan for this species and no habitat critical for the survival of the species has been listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act. The potential habitat identified for this species within the subject site and in the study area is not considered to be habitat critical for survival of the species. Additionally, the proposed action is unlikely to significantly affect the habitat of flora and fauna species associated with Bauer's Midge Orchid which would compromise its survival at a local, regional or bioregional scale.

Disrupt the breeding cycle of an important population

The pollinator of Bauer's Midge Orchid has not been previously studied. Other *Genoplesium* have been identified as attracting several species of Chlorophid flies (family Chlorophidae) (Bishop 1996, Bower et al 2015). Jones (2006) also indicates that Bauer's Midge Orchid is self pollinating.

Although uncertainty remains regarding this species pollinator, the distance from known populations is likely to preclude any disruption to dispersal mechanisms or the breeding cycle of the population occurring beyond the study area to the south east.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The current design for the proposal includes the modification of 0.47 ha of habitat to allow for the maintenance of an APZ. The habitat is not considered to be high quality or limited when compared to habitats available surrounding the study area as they species was not detected in targeted surveys.

Given the area of potential habitat is a small proportion found within the locality, it is considered unlikely that the proposal will decrease the availability or quality of habitat to the extent that the species is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat

As a result of surrounding land uses, invasive species in the habitat of the of study area are mainly limited to annual and perennial herbaceous weeds that are common and abundant in disturbed areas in the locality. In areas of the study area that haven't been slashed, weed per cent cover is typically low. Given the APZ maintenance will occur on the edge of cleared areas, the proposal is not likely to result in an increase in the establishment of invasive species within intact bushland of the study area provided the safeguards are adhered to or beyond into adjacent areas that are known provide habitat for the species.

Introduce disease that may cause the species to decline

Plant pathogens have been shown to have the potential to indirectly cause an orchid species to decline (*Phytophthora cinnamomi* Threat Abatement Plan, 2014 (DoE 2014)). The transport of plant pathogens via soil on earth works machinery is also considered a likely vector for introduction to sensitive sites.

Targeted surveys did not record the species despite surveying during optimal periods when flowering had been confirmed at a nearby reference population. Therefore, introduction of a plant pathogen by the proposal action is considered unlikely to cause Bauer's Midge Orchid in the locality to decline.

Interferes substantially with the recovery of the species.

There is currently no recovery plan for the species. Taking into account the project safeguards, it is considered unlikely that the proposal will impact on any recovery actions of the Bauer's Midge Orchid.

Conclusion

Although the Bauer's Midge Orchid was not recorded within the study area, the project safeguards have been designed to retain potential habitat based on a precautionary approach. The proposal is considered to result in a significant impact to the species and a Referral under the provisions of the EPBC Act is not recommended.

APPENDIX D BUSHFIRE ASSESSMENT

Australian Bushfire ASSESSMENT CONSULTANTS

- Design & Assessment of Development in Bushfire Prone Areas
- Bushfire Risk Assessment & Management Plans
- Bushfire Evacuation Plans
- Building Solutions Advice for Bushfire Prone Areas

Bushfire Assessment

In relation to

PROPOSED

RESORT

(Hotel, Serviced Apartments and Ancillary Facilities)

Lot 1752 DP28785

No. 1310 Naval College Road

Worrowing Heights

Prepared for: larchitecture (Colin Irwin)

Date: 30th March 2016

Project Ref: RMI161115

Bushfire Protection Planning & Assessment Services Pty Ltd

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TABLE of CONTENTS

1. Introduction

The following report outlines a bushfire risk assessment and compliance recommendations for a proposed resort complex development within No. 1310 Naval College Road Worrowing Heights, herein '*the subject property* '. The location of the subject property is as shown Figures 1 & 2 as follows.

Bushfire safety compliance, as referred to or recommended by this report, has been reasonably determined in accordance with the requirements of the document *NSW Planning for Bushfire Protection 2006* (herein '*PBP*').

Australian Standard 3959 - Construction of buildings in bushfire-prone areas (herein '*AS3959*') is also referred to for the purpose of determining applicable construction standards for building structures incorporated as part of the proposed development.

The NSW Rural Fire Service policy for *Evacuation Plans Fast Fact 8/07* (Feb 2012) is also referred to (as attached Appendix 1).

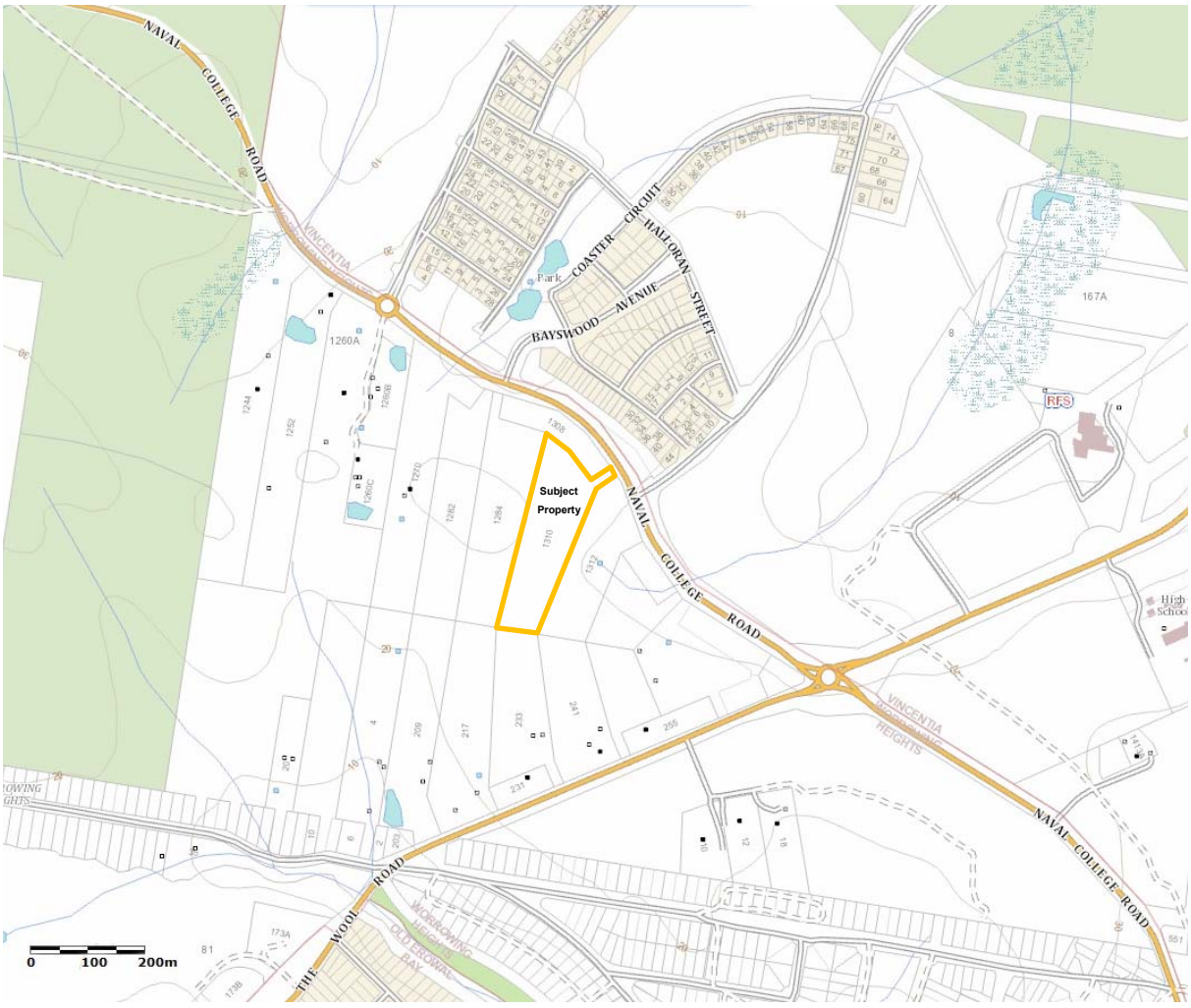

Figure 1 *(Courtesy SIX Maps / LPI - March 2016)*

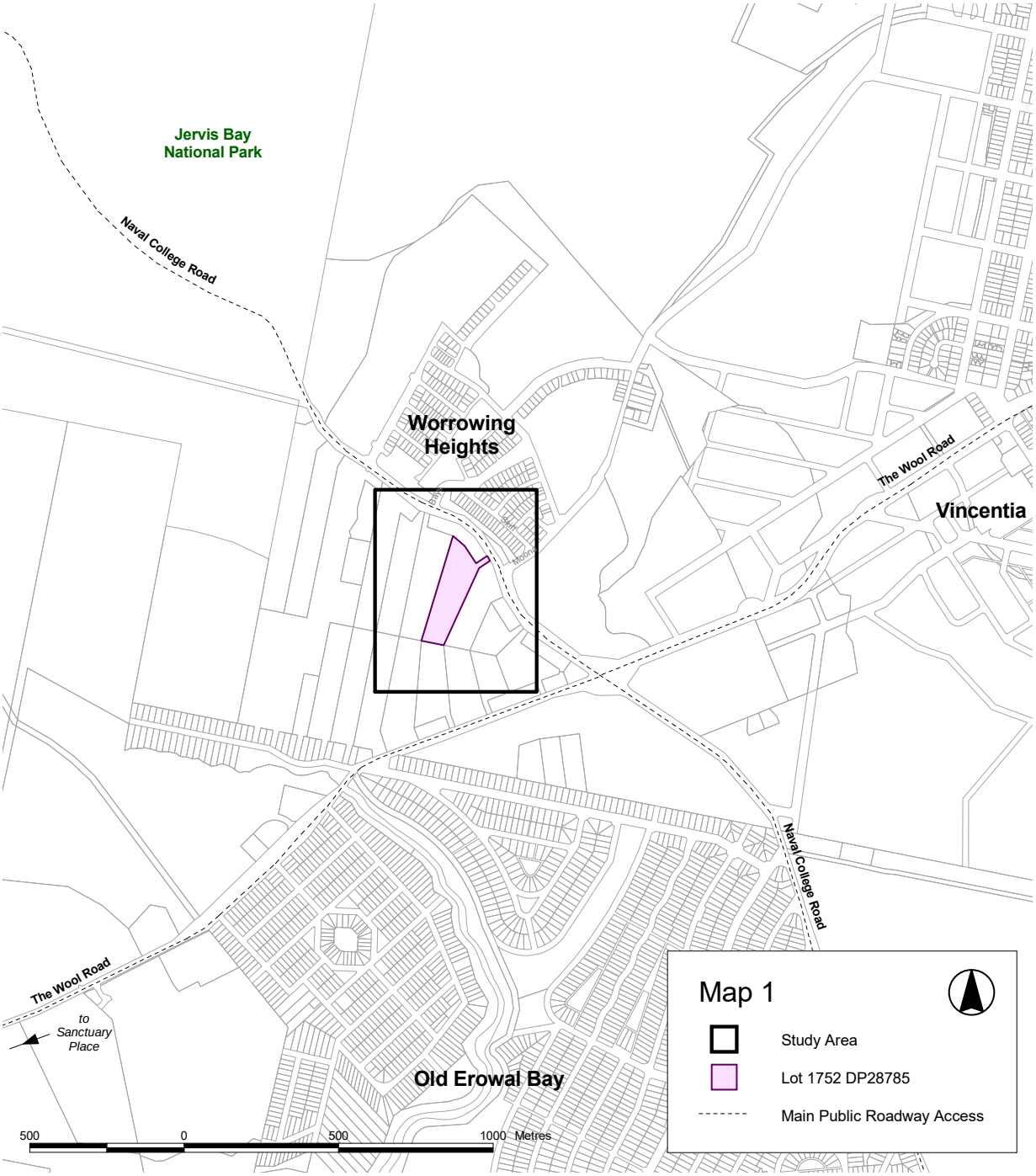
Jervis Bay
National Park
Naval College Road
Worrowing
Heights
The Wool Road
Vincentia
Naval College Road
The Wool Road
to
Sanctuary
Place
Old Erowal Bay
500
0
500
1000 Metres
Map 1
Study Area
Lot 1752 DP28785
Main Public Roadway Access

Figure 2

2. Description of the Site & Proposed Development

The total area of the subject property is approximately 31,000sqm (3.1 ha) and is identified / registered as Lot 1752 DP28785 Worrowing Heights. Formal access to the subject property is via an access handle (≈43m long x 18.5m wide / frontage) to Naval College Road.

The subject property is located with the Illawarra/Shoalhaven FDI 100 Region for the purposes of determining the potential AS3959 Bushfire Attack Level (BAL) affecting the site.

The subject property currently contains an existing residential building development and associated structures (storage sheds, garage, fencing / landscaping etc) located within the northern half of the allotment. The subject property is otherwise entired cleared and grazed, currently maintained as fenced paddocks for livestock (cattle).

Adjoining / adjacent lands to the subject property include;

- Lot 1751 DP28785, containing an existing, residential building development and being partly vegetated, to the northern boundary,
- Lot 1753 DP28785, containing existing rural residential building development and being entirely cleared and maintained as open paddock, to the eastern boundary,
- Lot 1750 DP28785, containing existing rural residential building development and being partly vegetated, to the western boundary,
- Lot 1763 DP28785, containing existing rural residential building development and being almost entirely vegetated, to the southern boundary,
- Lot 2 DP581199, containing existing rural residential building development and being entirely cleared and maintained as open paddock, adjacent to the south-western corner &
- Lot 1762 DP28785, containing existing rural residential building development and being almost entirely vegetated, adjacent to the south-eastern corner.

The above as shown Figures 2 & 6 as follows.

The subject property is connected to the existing town water main and overhead electrical supply lines servicing the Worrowing Heights area.

The subject property is currently zoned RU2 Rural Landscape, as is all other adjoining private freehold land, under the current Shoalhaven Local Environment Plan (2014). Adjacent freehold land directly to the north (opposite side of Naval College Road) is currently zoned R2 Low Density Residential (as shown Figure 4 following).

The subject property is identified as entirely affected by the 100m buffer to Category 1 bushfire vegetation by the Shoalhaven Bushfire Prone Land Map[1] as reviewed at the time of

[1] http://maps2.shoalhaven.nsw.gov.au/imaps/

this report. Figure 5 as follows shows the bushfire prone land status of the subject property (Courtesy of Shoalhaven City Council web maps service).

The proposed development of the subject property, herein '*the proposed development* ', will;

- remove the existing residential building development and all associated building structures and infrastructure,
- create a multi-storey resort complex, comprised of three separate components including hotel, serviced apartments and ancillary facilities, totalling approximately 7,300sqm in area,
- create internal roadway access sections of approximately 200m in total length, providing direct access / egress to Navel College Road.

It is also understood that a pre-determined APZ easement area has been, or will be, formally established over neighbouring Lot 1750 DP28785 in favour of the subject property and proposed development. The extent and width of the APZ easement to ensure potential vegetation within Lot 1750 DP28785 will be separated from the proposed development by at least 60m in this direction.

The proposed development as shown Figures 7-9.

Section 100B(6)(d) of the NSW Rural Fires Act identifies *a hotel, motel or other tourist accommodation* as special fire protection purpose" for the purpose of the Act.

In this regard, the specific requirements for a Special Fire Protection Purpose (herein '*SFPP*') development are considered for an assessment in accordance with PBP.

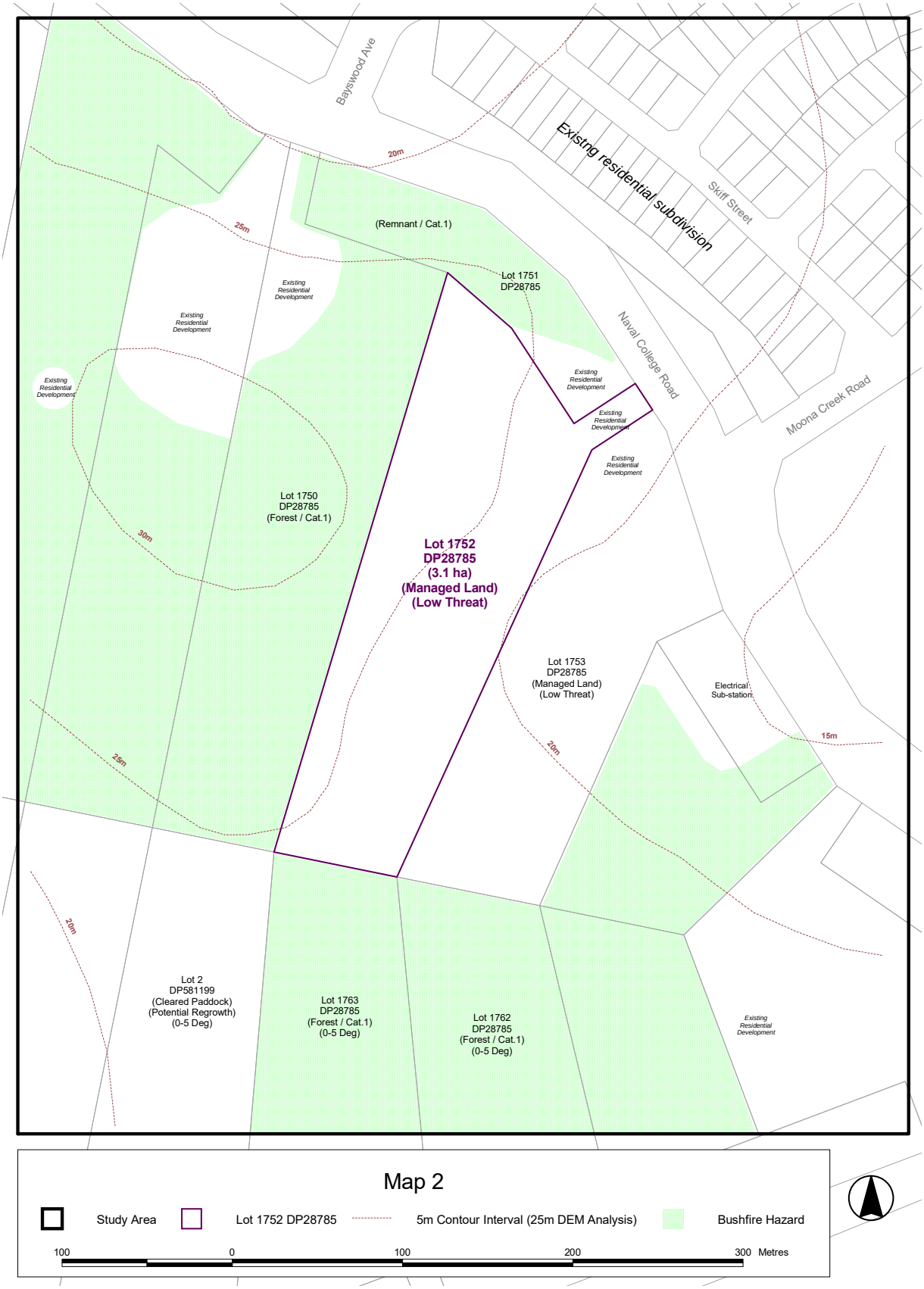
Bayswood Ave
Existing residential subdivision
Skiff Street
Naval College Road
Moona Creek Road
20m
25m
(Remnant / Cat.1)
Lot 1751
DP28785
Existing Residential Development
Lot 1750
DP28785
(Forest / Cat.1)
30m
Lot 1752
DP28785
(3.1 ha)
(Managed Land)
(Low Threat)
Lot 1753
DP28785
(Managed Land)
(Low Threat)
Electrical Sub-station
15m
Lot 2
DP581199
(Cleared Paddock)
(Potential Regrowth)
(0-5 Deg)
Lot 1763
DP28785
(Forest / Cat.1)
(0-5 Deg)
Lot 1762
DP28785
(Forest / Cat.1)
(0-5 Deg)
Map 2
Study Area
Lot 1752 DP28785
5m Contour Interval (25m DEM Analysis)
Bushfire Hazard
100 0 100 200 300 Metres

Figure 3

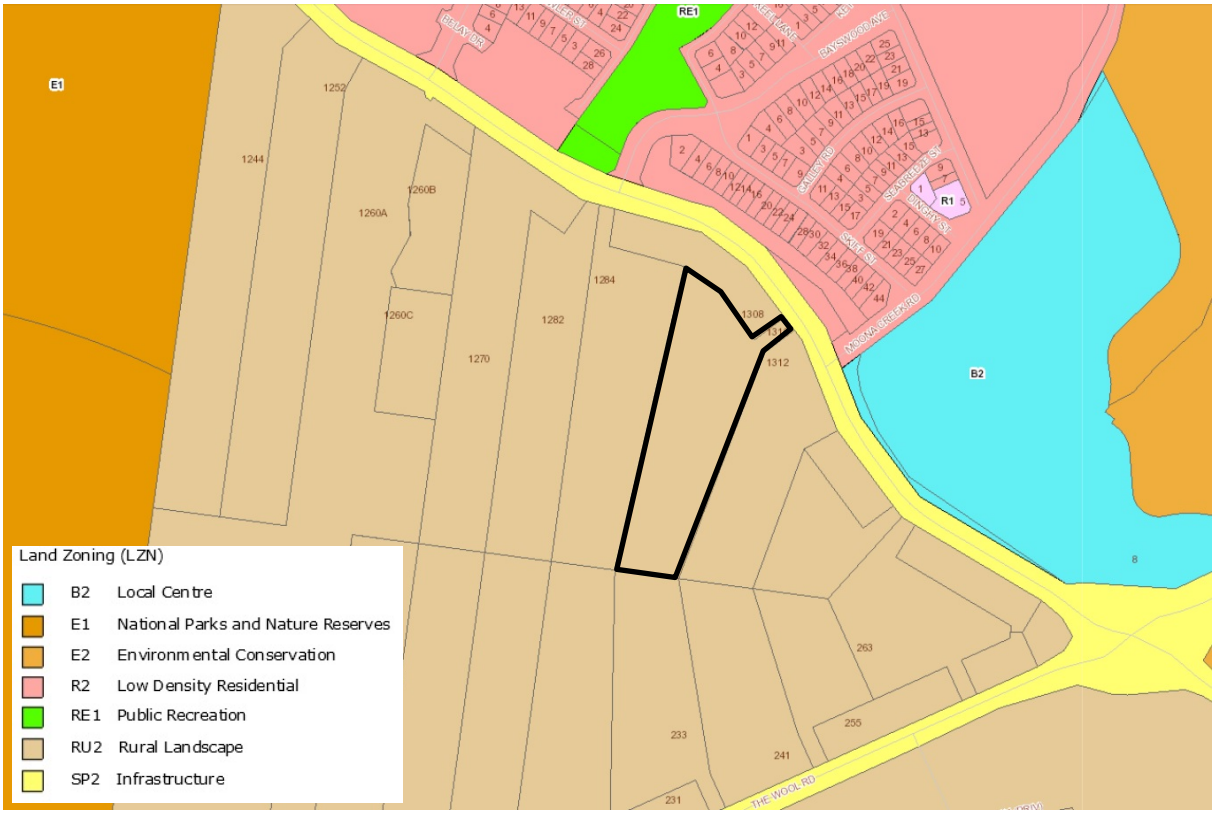

Figure 4 *(Courtesy Shoalhaven City Council, Interactive SLEP 2014 maps - http://maps2.shoalhaven.nsw.gov.au/slep2014/)*

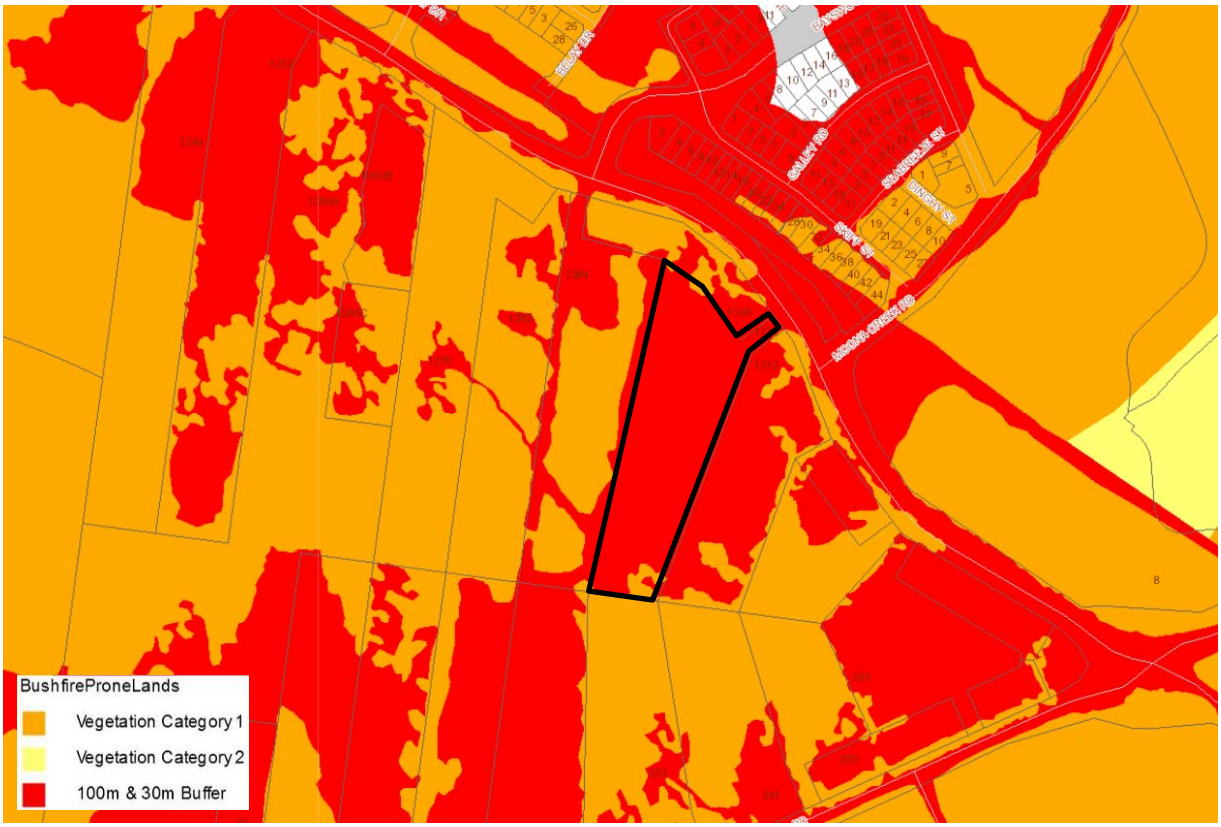

Figure 5 *(Courtesy Shoalhaven City Council, Interactive web maps - http://maps2.shoalhaven.nsw.gov.au/imaps/)*

Figure 6 as follows shows a recent aerial photo and boundary overlay of the subject property.

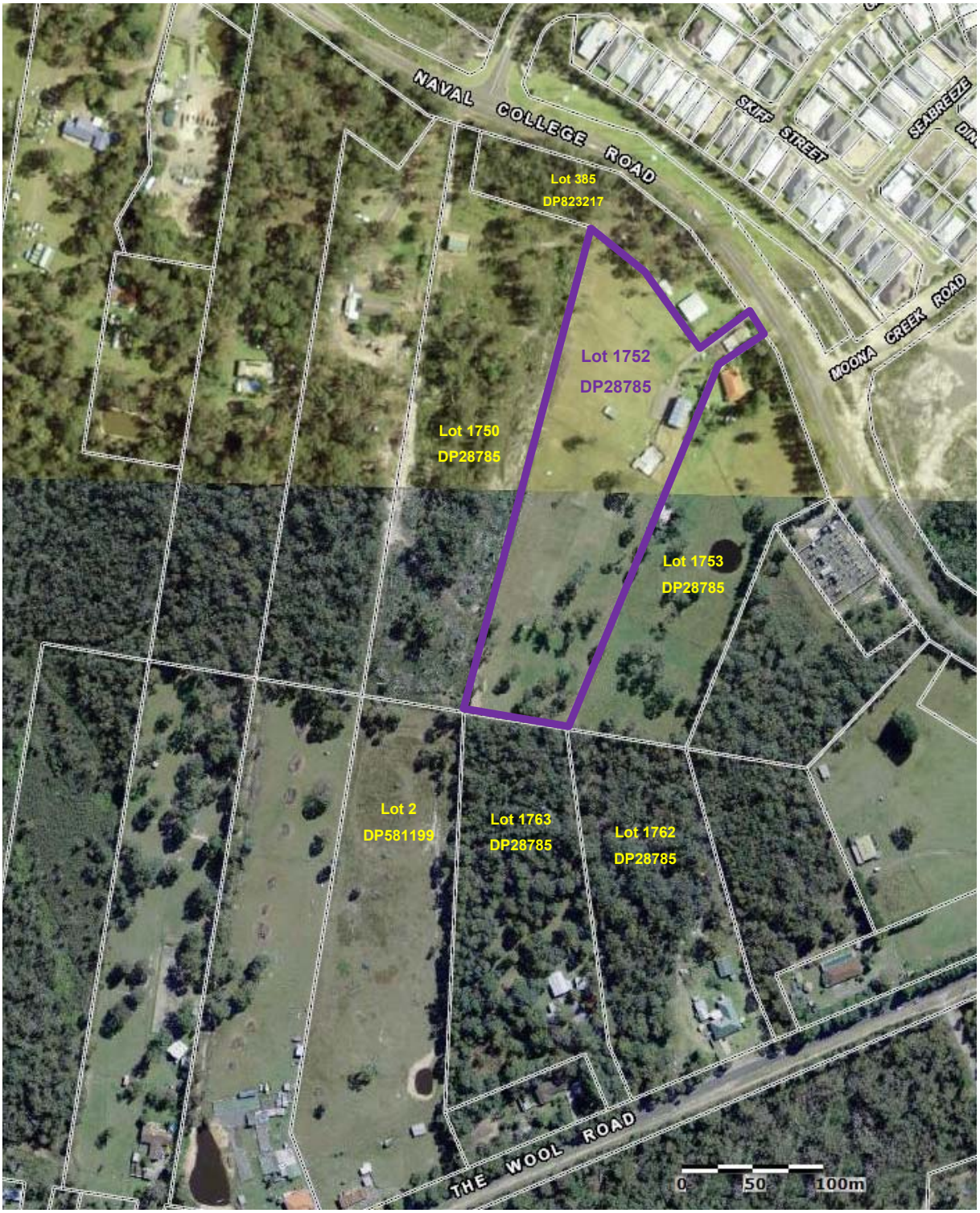

Figure 6 *(Courtesy SIX Maps / LPI - March 2016)*

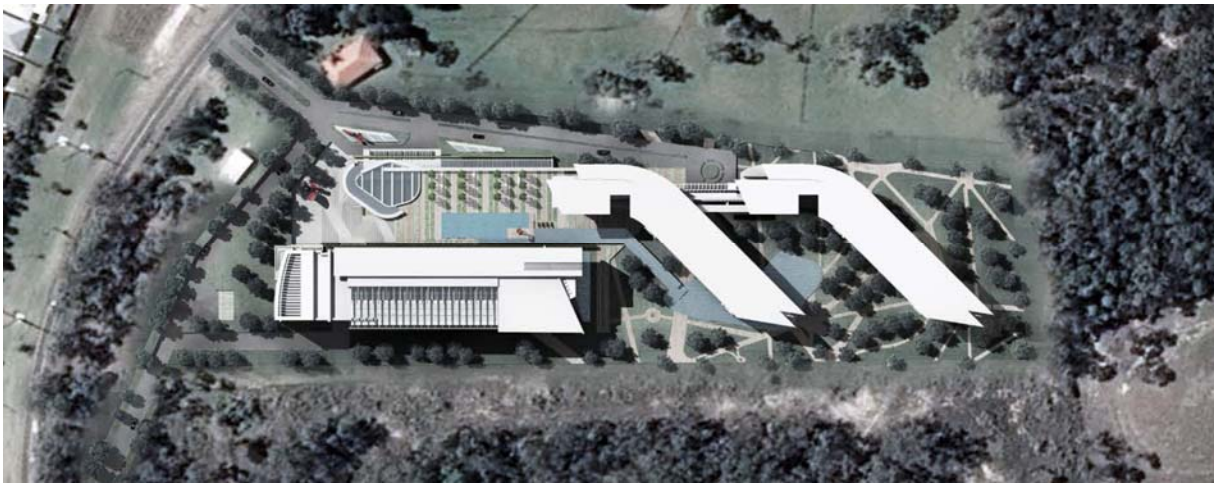

Figure 7

Figure 8

Figure 9

The following photos (taken 8/01/16) show the current extent and condition of the subject property and surrounding lands / vehicle access areas (at the time of this report).

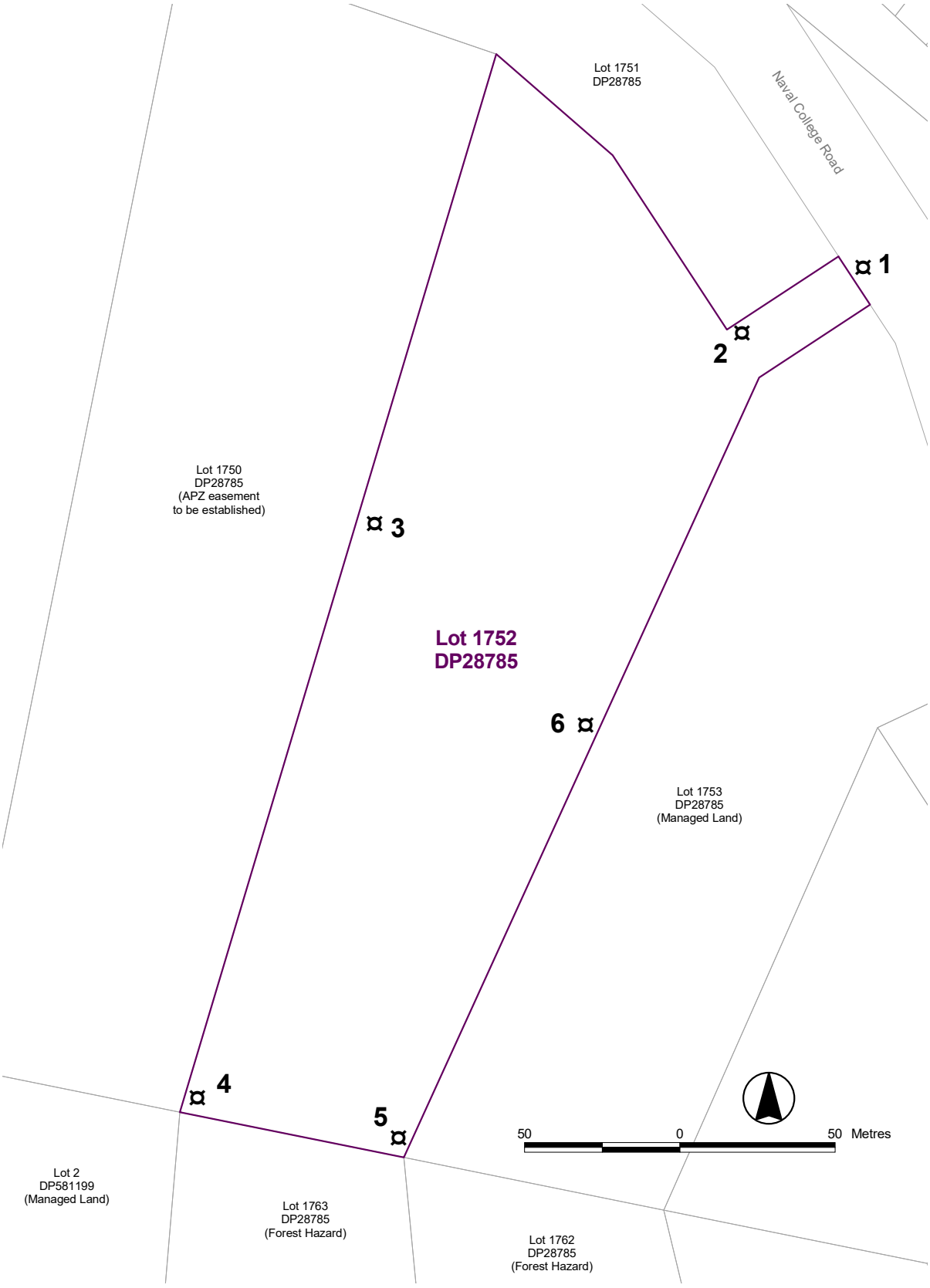

Figure 10 ***(Photo Reference Points)***

Photo 1

Photo Reference Point 1

Existing residential building within subject property.

Photo 2

Photo Reference Point 1

Primary property access point from Naval College Road.

Photo 3

Photo Reference Point 1

Looking north-west along Naval College Road.

Photo 4

Photo Reference Point 1

Looking south-east along Naval College Road.

Photo 5

Photo Reference Point 2

Looking north-east along existing property access road / towards existing residential building.

Photo 6

Photo Reference Point 2

Looking north-west towards existing residential building within neighbouring Lot 1751 DP28785.

Photo 7

Photo Reference Point 2

Looking west across subject property – cleared and managed / grazed paddock.

Photo 8

Photo Reference Point 2

Looking south-west along existing property access road into subject property.

Photo 9

Photo Reference Point 3 (west boundary)

Looking north along common boundary to neighbouring Lot 1750 DP28785.

Photo 10

Photo Reference Point 3 (west boundary)

Looking west towards neighbouring Lot 1750 DP28785.

Photo 11

Photo Reference Point 3 (west boundary)

Looking south-west towards neighbouring Lot 1750 DP28785.

Photo 12

Photo Reference Point 3 (west boundary)

Looking south along common boundary to neighbouring Lot 1750 DP28785.

Photo 13

Photo Reference Point 4 (rear / SW corner)

Looking north along common boundary to neighbouring Lot 1750 DP28785.

Photo 14

Photo Reference Point 4 (rear / SW corner)

Looking north-west towards neighbouring Lot 1750 DP28785.

Photo 15

Photo Reference Point 4 (rear / SW corner)

Looking south-west towards neighbouring Lot 2 DP581199.

Photo 16

Photo Reference Point 4 (rear / SW corner)

Looking south along boundary of neighbouring Lot 2 DP581199 and Lot 1763 DP28785.

Photo 17

Photo Reference Point 4 (rear / SW corner)

Looking east along common boundary to neighbouring Lot 1763 DP28785 / towards primary forest hazard.

Photo 18

Photo Reference Point 4 (rear / SW corner)

Looking north towards subject property / proposed development site.

Photo 19

Photo Reference Point 5 (rear / SE corner)

Looking west along common boundary to neighbouring Lot 1763 DP28785.

Photo 20

Photo Reference Point 5 (rear / SE corner)

Looking south-west towards primary forest hazard within neighbouring Lot 1763 DP28785.

Photo 21

Photo Reference Point 5 (rear / SE corner)

Looking south towards primary forest hazard within neighbouring Lot 1763 DP28785 and Lot 1762 DP28785.

Photo 22

Photo Reference Point 5 (rear / SE corner)

Looking north-east towards neighbouring Lot 1753 DP28785.

Photo 23

Photo Reference Point 5 (east boundary)

Looking south-east towards neighbouring Lot 1753 DP28785.

Photo 24

Photo Reference Point 5 (east boundary)

Looking north-east towards neighbouring Lot 1753 DP28785.

3. Classification of Vegetation

For the purposes of this report, the primary bushfire hazard within 100m and considered to be affecting the subject property and proposed development is identified as FOREST or REMNANT.

The primary bushfire hazard may reasonably persist within;

- Neighbouring Lot 1763 DP28785 (Forest to the south),
- Neighbouring Lot 1762 DP28785 (Forest to the south-east), &
- Neighbouring Lot 1750 DP28785 (Forest to the west).

To a lesser extent, remnant forest (rainforest equivalent) vegetation may also persist to the north of the subject property within Lot 1751 DP28785 (between the subject property and Naval College Road). The potential extent of persisting forest vegetation in this direction would be constrained in area (i.e. <1ha) by the proposed new internal roadway access section and pre-determined APZ area over neighbouring Lot 1750 DP28785. The above is as previously shown Figure 3.

4. Assessment of the Slope of the Land

The proposed development site is generally level, being on a gradual down slope west to east.

The subject development site and immediate surrounds do not exceed 5° slope at any point and the existing public roadway section (Naval College Road) does not reasonably exceed 5 degrees within vicinity of the subject property.

Considering the proximity of future proposed building development to potentially persisting bushfire vegetation within vicinity, the effective* slope most likely to influence the intensity of a bushfire ranges between;

- Upslope / Flat from the west aspect, &
- >0-5 Degrees down slope to the south-east to north-east.

** average slope estimated over 100m between proposed building siting and potential bushfire vegetation (hazard) likely to impact upon the subject property / development.*

Considering the proposed location of the internal roadway access sections and maximum acceptable slope gradient (as defined by PBP, <15° for sealed roadway or <10° average grade), slope within or adjacent to the subject development site will not restrict the location of new or upgraded roadways.

Contour intervals as considered by this report are based on interpolated analysis of 25m grid Digital Elevation Model (DEM). Figure 3 shows the analysis of site contour intervals (5m) within and surrounding the subject property.

5. Any Significant Environmental Features

For the purposes of this assessment, the proponent has not provided any advice nor indicated there to be any significant or identified environmental features within the subject property that are considered a constraint or may affect the proposed development.

Likewise, this assessment has not considered any past studies, surveys for the area or any documentation supplied to council in relation to any significant environmental features potentially affecting the subject property and immediate surrounds.

6. Any Threatened Species

No known threatened species have been noted, recorded or advised of as part of this assessment.

For the purposes of this assessment, the proponent has not provided any advice nor indicated there to be any known threatened species potentially affecting the subject property and immediate surrounds.

Likewise, this assessment has not considered any past studies, surveys for the area or any documentation supplied to council in relation to threatened species potentially located within the subject property or adjacent lands affected by the proposed development.

7. Any Aboriginal Relics

No known Aboriginal heritage has been noted, recorded or advised of as part of this assessment.

For the purposes of this assessment, the proponent has not provided any advice nor indicated there to be any items or issues of Aboriginal heritage potentially affecting the subject development site.

Likewise, this assessment has not considered any past studies, surveys for the area or any documentation supplied to council in relation to any items or issues of Aboriginal heritage potentially affecting the subject development site.

8. Bushfire Assessment

8.1 The extent to which the development is to provide for setbacks including Asset Protection Zones (APZ)

The site is located within the Shoalhaven Local Government Area, in the Far South Coast Fire Weather area, and is subject to an FDI rating of 100 according to Table A2.3 of *Planning for Bush Fire Protection 2006*.

For the purpose of technically establishing APZ compliance with PBP, the slope of the land (within 100 metres of the proposed development) would require a forest setback provision of between 60-70m (30m for remnant) to achieve 10kW/m^2 radiant heat flux (having regard to Table A2.6, Minimum Specifications for APZ for Special Fire Protection Purposes).

In this regard, the prescribed APZ (IPA/OPA*) or setback distances would include;

- **30m** - 40m IPA + 20m OPA from Remnant vegetation upslope or flat (level),
- **60m** - 40m IPA + 20m OPA from FOREST vegetation upslope or flat (level), &
- **70m** - 50m IPA + 20m OPA from FOREST vegetation >0-5 degrees down slope.

* *IPA - Inner Protection Area as defined Appendix 2 A2.2(vi) PBP 2006*
OPA - Outer Protection Area as defined Appendix 2 A2.2(vi) PBP 2006

Based on the current extent of forest vegetation within vicinity of the subject property, the southern extent (≈50m) of the proposed development would not fully achieve the prescribed APZ / setback. Specifically noted, the building line for the proposed development would be located <70m from potential forest vegetation within neighbouring Lot 1763 to the south, and too a much lesser extent Lot 1762 to the south-east.

Apart from the above, the minimum specified APZ setback distances are otherwise achieved in any other direction. This includes;

- ≥30m to potential remnant forest vegetation upslope to the north (within neighbouring Lot 1751 DP28785),
- ≥70m to potential forest vegetation downslope to the east (predicated upon managed land within neighbouring Lot 1753 DP28785),
- ≥60m to potential forest vegetation upslope to the west (predicated upon the pre-determined APZ easement over neighbouring Lot 1750 DP28785), &
- ≥70m to potential forest vegetation downslope to the south-west (predicated upon managed land within neighbouring Lot 2 DP581199)

The minimum specified APZ area and compliance for the proposed development is as shown Figure 9 as follows.

Recommendations for APZ compliance and maintenance are as listed section 11.0 of this report.

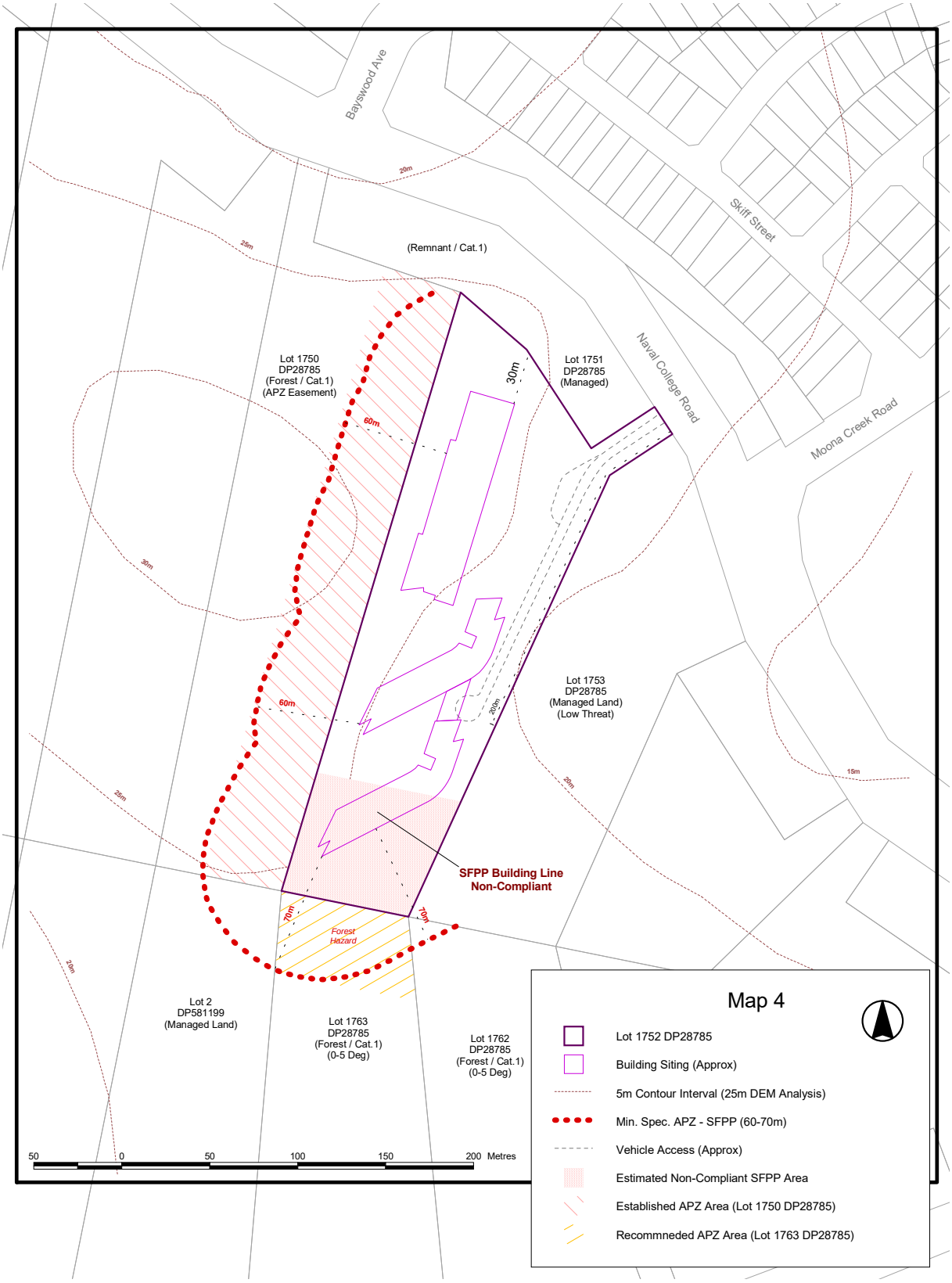
Bayswood Ave
Skiff Street
Naval College Road
Moona Creek Road
(Remnant / Cat.1)
Lot 1750
DP28785
(Forest / Cat.1)
(APZ Easement)
Lot 1751
DP28785
(Managed)
Lot 1753
DP28785
(Managed Land)
(Low Threat)
Lot 2
DP581199
(Managed Land)
Lot 1763
DP28785
(Forest / Cat.1)
(0-5 Deg)
Lot 1762
DP28785
(Forest / Cat.1)
(0-5 Deg)
30m
60m
70m
Forest
Hazard
SFPP Building Line
Non-Compliant
50 0 50 100 150 200 Metres
Map 4
Lot 1752 DP28785
Building Siting (Approx)
5m Contour Interval (25m DEM Analysis)
Min. Spec. APZ - SFPP (60-70m)
Vehicle Access (Approx)
Estimated Non-Compliant SFPP Area
Established APZ Area (Lot 1750 DP28785)
Recommneded APZ Area (Lot 1763 DP28785)

Figure 9

8.2 The siting and adequacy of water supplies for fire fighting

In terms of water supply for firefighting, reticulated / town water is currently connected to the subject property (existing residential building development) and would be available for connection to the proposed development.

A proposed plan for water supply infrastructure and on-site storage areas (as applicable) has not been considered at this time of this report. However, as advised by the proponent, the proposed development will, as a minimum, incorporate an internal ring main and firefighting outlets in accordance with AS2419, the BCA and Shoalhaven City Council requirements.

8.3 The capacity of public roads to handle increased volumes of traffic in the event of a bushfire emergency

Primary vehicle access to the subject property is direct from Naval College Road. Naval College Road is at least 12m wide at the interface / frontage to the subject property, and >7m along its overall length, and would provide safe and easy access / egress for the subject property. The roadway sections within vicinity of the subject property are currently being improved by road shoulder widening, guardrail installation, drainage works and line marking to further improve road safety and access for cyclists.

Naval College Road also currently services the larger residential subdivision / precinct of Worrowing Heights to the north of the subject property, including primary access to the Jervis Bay area, and should easily facilitate any increase in traffic volume associated with the proposed development during a bushfire event.

8.4 Whether or not public roads in the vicinity have two-way access

The proposed development will be formally accessed from Naval College Road which provides two way access.

8.5 The adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response

The proposed internal vehicle access arrangement to service the proposed development will be comprised of a primary access section, ≈200m long, via the property access handle and a secondary / alternate access section (≈200m long) to the north-west through neighbouring Lot 1752 DP28785. Both access sections will link the proposed development site to Naval College Road.

The exact design and intended construction of the primary access roadway has not been reviewed or considered at the time of this report. However, it is understood that the primary access section will be dual carriageway / single lanes, providing access in either direction, terminating between southern and middle building structures at a turning circle.

The secondary / alternate access route will be a single laneway access route.

This assessment also notes the main roadway bend of the proposed internal roadway may reasonably have an inside edge curve radius of <40m.

The primary access route would be separated by 100m or greater away from any identified bushfire hazard, and as such due to the low threat from surrounding vegetation, a single entry point to the proposed development is considered reasonable. An alternative access route would not necessarily reduce the bushfire risk to the proposed development as it would only access Naval College Road anyway.

Notwithstanding the above, this assessment acknowledges that the access arrangement for the proposed development would create a dead-end roadway access >100m from a through road. In this regard, it is recommended that a perimeter access trail or unobstructed / temporarily trafficable route is maintained around the perimeter of the subject property. By doing so, an alternate means of access is arguably facilitated, but more so emergency vehicle access to the entire area of the subject property and proposed development is provided.

The above as denoted Figure 10 as follows.

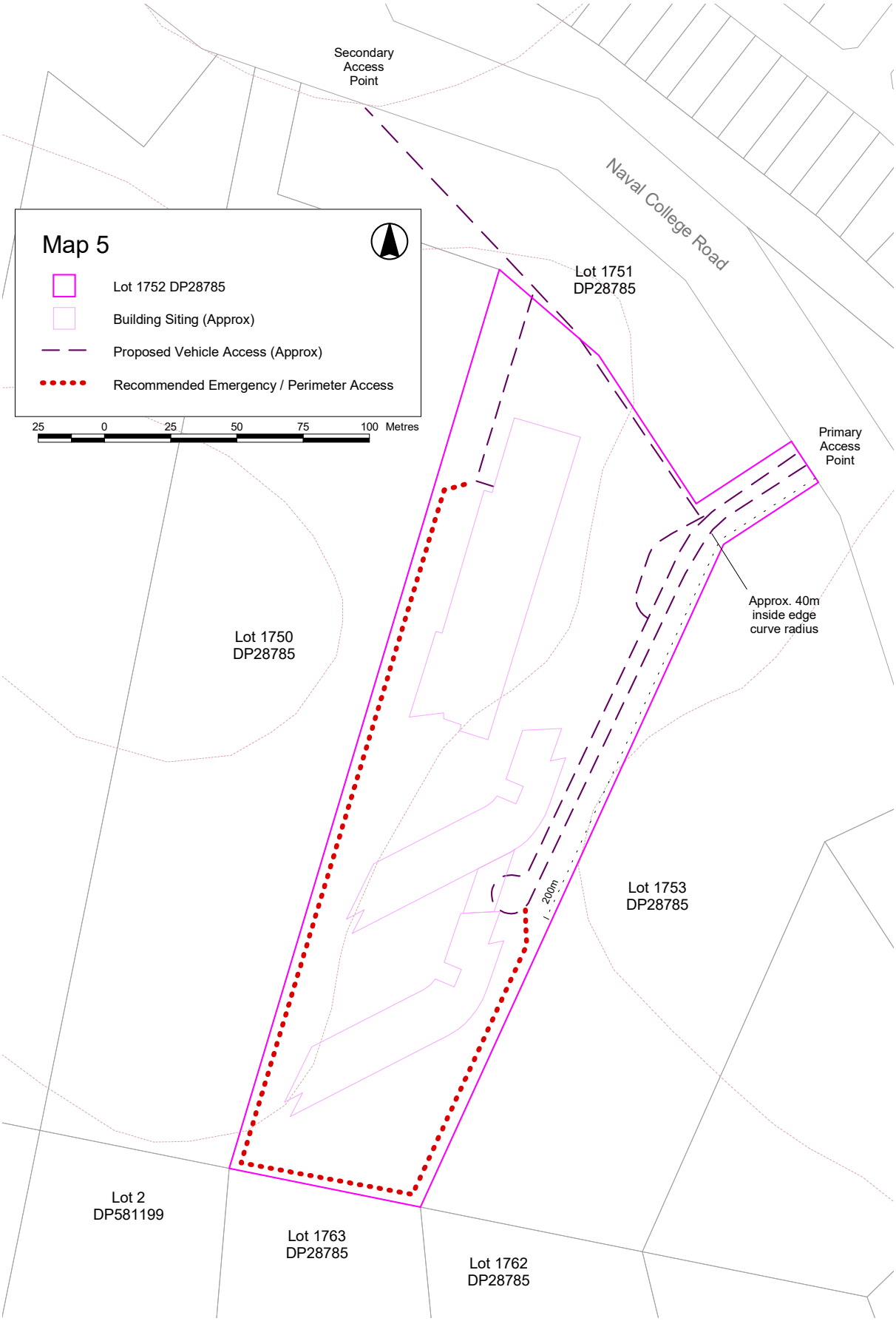
Secondary Access Point
Naval College Road
Map 5
Lot 1752 DP28785
Building Siting (Approx)
Proposed Vehicle Access (Approx)
Recommended Emergency / Perimeter Access
25 0 25 50 75 100 Metres
Lot 1751 DP28785
Primary Access Point
Approx. 40m inside edge curve radius
Lot 1750 DP28785
200m
Lot 1753 DP28785
Lot 2 DP581199
Lot 1763 DP28785
Lot 1762 DP28785

Figure 10

8.6 The construction requirements to be used for building elements in the development

Predicated upon the identified and recommended APZ areas or easements outlined by this report, the proposed development would reasonably achieve AS3959 BAL-12.5 in accordance with AS3959 Simplified assessment methodology. This being predicated upon;

- >48m separation between the building lines and forest vegetation level or upslope,
- >57m separation between the building lines and forest vegetation 0-5° downslope, or
- >29m separation between the building lines and remnant vegetation 0-5° downslope.

8.7 The adequacy of sprinkler systems and other fire protection measures to be incorporated into the development

There is no proposal nor considered any necessary requirements to install any sprinkler system as part of the proposed development for either PBP or BCA compliance (for bushfire safety purposes).

Emergency / Evacuation Planning

In consideration that the proposed development would be centrally managed, it is recommended that an Emergency / Bushfire Evacuation Plan & Procedures manual should be prepared. The Emergency Evacuation Plan should comply with Section 4.2.7 of PBP and shall address the movement / activities of occupants remaining on-site on days designated as Extreme to Catastrophic under the NSW Fire Danger Index.

The plan shall also specifically address / illustrate requirements for on-site emergency management procedures, locations & signage for a bushfire event.

The NSW Rural Fire Service Policy for Evacuation Planning is attached Appendix 2 to this report.

Services – Electricity & Gas Supply

PBP states, *during major bush fire events, the protection and preparedness of SFPP developments and their occupants may be seriously jeopardised by the loss of basic services*.

In this regard, it is recommended that all electricity and gas supply (if applicable) to the subject development comply with the relevant requirements of Section 4.2.7 of PBP.

9. Compliance: Planning for Bush Fire Protection

An assessment of how the development complies with the acceptable solutions and performance requirements within Chapter 4 of PBP

The following tables outlines how the subject development complies with PBP provisions for a Special Fire Protection Purpose development as applicable.

Derived, in part, from PBP Section 4.1.3 (Public Roadway Access) & Section 4.2.7 – Standards for Bush Fire Protection Measures for Special Fire Protection Purpose Development

Performance Criteria	Acceptable Solution	Comment
Radiant heat levels of greater than 10kW/m^2 will not be experienced by occupants or emergency services workers entering or exiting a building	***an APZ is provided in accordance with the relevant tables and figures in Appendix 2 of this document***	Can comply with the performance criteria as recommended by this report. APZ compliance predicated upon existing cleared and maintained neighbouring paddocks, pre-determined APZ over neighbouring Lot 1750 and recommended APZ easement over neighbouring Lot 1763.
	exits are located away from the hazard side of the building	
	the APZ is wholly within the boundaries of the development site	
Applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated	***mechanisms are in place to provide for the maintenance of the APZ over the life of the development***	Achievable for the proposed development and as recommended by this report.
	the APZ is not located on lands with a slope exceeding 18 degrees	
APZs are managed and maintained to prevent the spread of a fire towards the building	***in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005)*** ***(Note - a Monitoring and Fuel Management Program should be required as a condition of development consent)***	Achievable for the proposed development and as recommended by this report.
Vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters	***compliance with Appendix 5***	Achievable for the proposed development and as recommended by this report.
(4.1.3 - Public Road) *Fire fighters are provided with safe all weather access to structures (thus allowing more efficient use of fire fighting resources)*	***public roads are two-wheel drive, all weather roads***	Achieved. The proposed development does not propose nor require any new or additional public roadway sections.

Performance Criteria	Acceptable Solution	Comment
(4.1.3 - Public Road) *Public road widths and design that allow safe access for fire fighters while residents are evacuating an area*	***urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions***	Achieved. The proposed development does not propose nor require any new or additional public roadway sections.
	Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)[2]	
	the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas	
	roads are through roads. Dead end roads are not more than 200m in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end	
	traffic management devices are constructed to facilitate access by emergency services vehicles	
	there is a minimum vertical clearance to a height of four metres above the road at all times	
	curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress	
	the minimum distance between inner and outer curves is six metres	
	maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.	
	Public roads have a cross fall not exceeding 3 degrees	
	the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes)	
(4.1.3 - Public Road) *The capacity of public road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles* *Roads that are clearly sign- posted (with easily distinguishable names) and buildings/properties that are clearly numbered*	***the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating***	Achieved. The proposed development does not propose nor require any new or additional public roadway sections.

[2] *(PBP Section 4.1.3) Table 4.1 – Road widths (Medium Rigid Vehicle); 3.5 - 4.5m wide.*

Performance Criteria	Acceptable Solution	Comment
(4.1.3 - Public Road) *There is clear access to reticulated water supply* *Parking does not obstruct the minimum paved width*	***public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression***	Achieved. The proposed development does not propose nor require any new or additional public roadway sections.
	public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression	
	public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression	
	one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression	
	parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays	
	public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road	
(Internal Roadway) *Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle*	***internal roads are two-wheel drive, sealed, all-weather roads***	Achievable for the proposed development and as recommended by this report. An additional / alternate perimeter trail or trafficable route is recommended to facilitate a through road outcome in consideration of the 100m road length prescription.
	internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions	
	roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end	
	traffic management devices are constructed to facilitate access by emergency services vehicles	
	a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.	
	curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress	
	the minimum distance between inner and outer curves is six metres.	

Performance Criteria	Acceptable Solution	Comment
	maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees	
	cross fall of the pavement is not more than 10 degrees	
	roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge)	
	roads are clearly sign-posted and bridges clearly indicate load ratings.	
	the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes)	
(Reticulated water supplies) *Water supplies are easily accessible and located at regular intervals*	***access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads.***	Achievable for the proposed development and as recommended by this report.
	fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles	
	the provisions of public roads in section 4.1.3 in relation to parking are met	
(Non-reticulated water supply areas) *A water supply reserve dedicated to fire fighting purposes is installed and maintained.* *The supply of water can be an amalgam of minimum quantities for each lot in the development and be reticulated within dedicated fire fighting lines*	***10,000 litres is the minimum dedicated water supply required for fire fighting purposes for each occupied building, excluding drenching systems.***	N/A
	the provision for suitable connection for RFS and/or NSW Fire Brigades purposes in section 4.1.3 in relation to water supplies is made available.	
(Electricity Services) *location of electricity services will not lead to ignition of surrounding bushland or the fabric of buildings or risk to life from damaged electrical infrastructure.*	***electrical transmission lines are underground***	Achievable for the proposed development and as recommended by this report.
(Gas Services) *Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings*	***reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities. Metal piping is to be used***	Achievable for the proposed development and as recommended by this report.
	all fixed gas cylinders are kept clear of all flammable materials located on the hazard side of the development	

Performance Criteria	Acceptable Solution	Comment
	if gas cylinders need to be kept close to the building, the release valves must directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal	
	polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used	
(Emergency & Evacuation Planning) *An Emergency and Evacuation Management Plan is approved by the relevant fire authority for the area*	***an emergency/evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan***	Achievable for the proposed development and as recommended by this report.
	compliance with AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces' for residential accommodation'	
	compliance with AS 4083-1997 'Planning for emergencies - for health care facilities'	
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan	***an Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual***	Achievable for the proposed development and as recommended by this report.
	detailed plans of all Emergency Assembly Areas including "onsite" and "offsite" arrangements as stated in AS 3745- 2002 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted	

10. Conclusion

Predicated upon the additional APZ easement area as identified and recommended by this report, the proposed development can reasonably comply with the specifications and requirements of the NSW Rural Fire Services document Planning for Bushfire Protection 2006.

11. Recommendations

The following recommendations are to reasonably facilitate bushfire safety & protection measures for the proposed Resort Complex development within Lot 1752 DP28785, No. 1310 Naval College Road Worrowing Heights.

These recommendations are based upon the relevant PBP provisions (acceptable solutions or performance criteria where considered applicable and appropriate) for SFPP building and associated infrastructure development on a bushfire prone area.

Specific Compliance Recommendations

1. The entire area of the subject property shall be maintained as an APZ in accordance with Appendix 5 of PBP and in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005).

   Vegetation and landscape management for continued APZ compliance should consider the principals of the document ***Landscape and Building Design for Bushfire Areas,*** *by Caird Ramsay and Lisle Rudolph published November 2003*[3]*.*

2. An APZ easement, or equivalent formal agreement, shall be established over neighbouring Lot 1763 DP28785 in favour of the subject property.

   The APZ easement shall be at least 45m deep from the common boundary to the subject property, and may partly be maintained as an Outer Protection Area in accordance with PBP. Otherwise, the APZ shall be maintained in accordance with Appendix 5 of PBP and in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005).

3. All proposed internal vehicle access roadway sections to service proposed development shall comply with the requirements of Section 4.1.3 & 4.2.7 of PBP (as applicable), including;
   - o maintaining a minimum carriageway width of 6.5m on straight sections (two way) or 3.5m for single laneway access,
   - o maintaining a minimum carriageway width of 8m on any bends (two way) or 4.5m for single laneway access,
   - o being maintained for two wheel drive access, sealed and for all weather conditions,
   - o the turning circle being designed and maintained to facilitate a minimum 12m outer radius and unobstructed trafficable area.

[3] http://www.publish.csiro.au/pid/3461.htm

- any traffic management device being constructed to facilitate access by emergency services vehicles at all times,
- maintaining a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, above the carriageway area (4m),
- installing roadside sign-posts which clearly identify the roadway name, traffic directions, any dead end / no through sections, entry / exit points and any other emergency management arrangement for vehicle movements, &
- maintaining a carry capacity for fully-loaded firefighting vehicles (15 tonnes) at all times.

4. The entire building development shall be designed and constructed in accordance with Sections 3 (Construction General) & at least Section 5 (Construction for BAL-12.5) of AS3959.

5. The southern motel component shall ensure at least one entry / exit point on the structure that is located away from the elevation of the building exposed to, or within view of, the primary bushfire hazard.

6. All water, electricity and gas supplies incorporated or connected within the proposed development shall comply with the requirements of Section 4.2.7 of PBP. This includes;
   - providing access points for reticulated water supply by a ring main system for all internal roads,
   - installing a fire hydrant system with spacing, sizing and pressures to comply with AS 2419, or otherwise as determined using fire engineering principles based on a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed.
   - providing suitable firefighting hose and pump connections / access for NSW Fire Authorities (i.e. RFS & FRNSW) as applicable. This may include:
     - 65/70mm Storz outlet with a gate or ball valve provided within the APZ area, located away from the refuge,
     - gate or ball valves and pipes being adequate for water flow and are metal rather than plastic,
     - any underground water storage tanks having an access hole of 200mm to allow tankers to refill direct from the tank and a hardened ground surface for truck access supplied within 4 metres of the access hole,
     - any above ground tanks being manufactured of concrete or metal (plastic tanks should not be used) and any raised tanks having their stands protected. Water supply points should be provided with adequate shielding for the protection of fire fighters or occupants seeking to use the access the supply,
     - all above ground water pipes external to the identified refuge building should be metal including and up to any taps,
     - Any fixed pump-set providing water pressure should be shielded.

- Any new electrical transmission lines or onsite connections should be located underground.
- Any reticulated or bottled gas shall be installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping shall be used.
- Any fixed gas cylinders shall be kept clear of all flammable materials.
- If gas cylinders need to be kept close to the identified refuge building, the release valves must be directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal

7. As applicable, hydrant access and parking arrangements within the subject development site shall be designed, constructed and maintained in accordance with PBP Section 4.1.3 Access – Public Roads. Relevant to the subject development, this would otherwise include;
   - all new hydrant points shall be located outside of any parking reserves / bays to ensure accessibility to reticulated water for fire suppression at all times;
   - No Parking arrangements should be placed on the side of the road where the services (hydrants) are located to ensure accessibility to reticulated water for fire suppression at all times;
   - any additional parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement.

8. The subject development shall incorporate an Emergency Management / Evacuation Plan which complies with Section 4.2.7 of PBP and shall address the use/occupation of the facility on extreme and catastrophic fire rating days. The plan shall;
   - be prepared consistent with the RFS Guidelines for the Preparation of Emergency / Evacuation Plan and Approval / Certification Policy[4] for the same,
   - comply with AS3745 - Planning for emergencies in facilities (as applicable),
   - clearly detail and display all Emergency Assembly Areas including “onsite” (Place of Last Resort) and “offsite” arrangements, &
   - clearly detail the management requirements for safe vehicle access/egress during any emergency evacuation / relocation from the subject development site to off-site Emergency Assembly Areas.

9. Any identified refuge location(s) or ‘*Place of Last Resort* ’ within the proposed development should be located >100m from any identified forest vegetation / hazard within vicinity of the subject property.

10. An emergency / vehicle access route, or trafficable area, should be installed along and within the perimeter of the allotment and shall be maintained in accordance with PBP Section 4.1.3 (Access 3 – Fire Trails) as a minimum.

[4] *See Appendix 3 – NSW RFS Evacuation Plans Fast Fact*

NOTE AND DISCLAIMER:

1. *This Assessment has been based on bushfire protection guidelines as outlined in Planning for Bush Fire Protection 2006 (PBP) and alternate requirements established with the NSW Rural Fire Service at the time of this report. As noted by PBP, notwithstanding the precautions recommended, it should always be remembered that bushfires burn under a range of conditions and an element of risk, no matter how small, always remains.*

2. *The adoption of bushfire protection measures cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable behaviour and nature of fire and the difficulties associated with extreme weather and fire weather conditions.*

3. *This assessment does not imply or infer any approval for the removal and/or thinning of vegetation for Asset Protection or other purposes. It is the responsibility of the client/land owner to obtain any and all necessary approvals in this regard.*

Primary References

- *Planning for Bushfire Protection. A guide for councils, planners, fire authorities & developers (2006) – NSW Rural Fire Service*
- *Australian Standard 3959 – Construction of buildings in bushfire prone areas*

Appendix 1 – Evacuation Plans Fast Fact

NSW RURAL FIRE SERVICE | COMMUNITY RESILIENCE FAST FACTS | 8/07

Evacuation Plans

This Fast Fact clarifies the position of the NSW Rural Fire Service (RFS) on its process and role in reviewing and utilising Emergency and Evacuation Management Plans for developments in bush fire prone areas.

The general terms of approval (GTAs) issued by the RFS, particularly with a Special Fire Protection Purpose development application, often contain reference to the preparation of an Emergency and Evacuation Management Plan for the development in question. Such a plan is to be prepared in accordance with the **acceptable solutions** for emergency and evacuation planning outline in section 4.2.7 of *Planning for Bush Fire Protection 2006* (PBP).

In addition to the general requirements of PBP, there are three key documents that guide the preparation of such evacuation plans. The application of these documents is dependent upon the nature of the proposed development and includes the following:

- *Australian Standard 3745 (2010) – 'Planning for emergencies in facilities.*
- *Australian Standard 4083 (2010) – 'Planning for emergencies – Health care facilities'*,
- NSW RFS – *Guidelines for the Preparation of Bush Fire Evacuation Plans* and to an extent;
- NSW RFS – *Bush Fire Survival Plan.*

These documents provide guidance as to the required content and appropriate utilization of the evacuation plans. Furthermore, the **performance criteria** for emergency and evacuation planning, as outlined in section 4.2.7 of PBP, specifies that '*an Emergency and Evacuation Management Plan is **approved** by the relevant fire authority for the area*'. However, the RFS does not provide a comprehensive review and/or **approval** of emergency and evacuation planning documents.

The relevant certifying authority is responsible for the certification and approval of emergency and evacuation plans in accordance with the approved standards. This role may be further extended to incorporate certification of the performance-based criteria also, depending upon the expertise of the certifying authority. The RFS does **NOT** issue a deemed approval or certification that the evacuation plan is suitable and fit-for-purpose.

The only exception to the above may be where locally significant development (in terms of emergency management) is captured under the relevant Displan (Disaster Plan). The objective of a Displan is to ensure a coordinated response to emergencies by all agencies having responsibilities and functions in emergencies.

Under these circumstances a copy of the evacuation may be required to be supplied to either:

- Local Bush Fire Management Committee (BFMC);
- RFS District Office; or
- Local Emergency Management Officer (LEMO) – generally situated within the relevant local council.

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Version 1 – February 2012

APPENDIX E ECONOMIC STUDY

Worrowing Heights Hotel & Serviced Apartment Proposal

Economic Impact Assessment

Prepared for RMI Group Pty Ltd

March 2016

HillPDA CONSULTING

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Quality Control

This document is for discussion purposes only unless signed and dated by a Principal of HillPDA.

Reviewed by:

Dated 24 March 2016

Adrian Hack

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CONTENTS

TABLES

FIGURES

LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
DCP	Development Control Plan
EIA	Economic Impact Assessment
FTE	Full-Time Equivalent
GRP	Gross Regional Product
LEP	Local Environmental Plan
LGA	Local Government Area
Sqm	Square metre
TRA	Tourism Research Australia

E□ECUTIVE SUMMARY

Context

1. The subject land is located at 1310 Naval College Road, Worrowing Heights, approximately 25km south of the town of Nowra and in close proximity to the renowned white sand beaches of Jervis Bay.
2. With a total area of approximately 3.08ha, the site represents a significant developable area in close proximity to the Jervis Bay coastline and within close proximity to the busy Vincentia seaside village holiday precinct.
3. The landowner intends to lodge a development application concurrently with the planning proposal (or shortly afterward) for a 120-room hotel and 180-room serviced apartments with associated restaurant, bar and gaming areas.
4. Under the Shoalhaven Local Environmental Plan 2014 (LEP), the subject site is zoned RU2 Rural Landscape where 'hotel or motel accommodation' and 'serviced apartments' are prohibited. Development as proposed requires a rezoning of the site to SP3 Tourist zone or B4 Mixed Use zone.

Local Tourism and Hotel Outlook

1. Existing accommodation in the Jervis Bay area is dominated by caravan parks, holiday homes and holiday rental properties. It has an emerging bed & breakfast and hosted self-contained accommodation sector and an aging motel sector. Commercial accommodation is concentrated in Huskisson, with two large waterfront caravan parks, three motels and a range of B&Bs and hosted accommodation properties.
2. The Jervis Bay area is currently unable to accommodate large groups of visitors and discussions with tourism operators indicate that significant demand for such large-scale accommodation exists, predominantly driven by strong demand from Asian touring groups.
3. Long-term visitor forecasts for the broader South Coast NSW area indicate strong on-going growth in international, business and domestic visitor numbers over the coming decade. Approximately 1.2 million additional visitors are expected to visit

the South Coast NSW region in the coming decade, resulting in demand for 4.4 million visitor nights. This situation will ensure ongoing demand for accommodation in South Coast NSW, especially in the popular Jervis Bay area.

4. While capacity exists to absorb some of this demand within the existing accommodation network, the overall result of such increases in visitor nights is an identified need for 805 additional hotel/motel/serviced apartment rooms in the South Coast NSW region over the coming decade.

The Proposed Development

1. The proposed hotel development will supply the Jervis Bay area with an additional 120 hotel suites of 4-star standard and 180 serviced apartments.
2. Importantly, such a development will provide a unique point of difference in the generally small-scale local accommodation sector, which is typically dominated by small, independently operated properties, many of whom have owners who are typically lifestyle focused.
3. The development of the accommodation facility at the subject site provides the Jervis Bay area with the opportunity to retain its position as one of Australia's most sought after visitor destinations for a wide range of travellers.

Economic Impact Assessment

1. Total capital investment associated with the proposed accommodation complex is estimated to be in the order of $50 million.
2. Construction on site would provide 136 direct job years and 357 indirect (or flow-on) job years in the wider economy.
3. Total on-going or operational employment following the construction of the hotel, all of which would constitute new jobs, would amount to 140 full time, part time and casual.
4. Total indirect or flow-on jobs in the wider economy (in supplies, transport, retail, etc) following the development of the hotel would amount to a further 131 jobs.
5. Significant levels of visitor expenditure would be associated with the accommodation facility in terms of room rate revenues and

retail/associated spend on dining out, gifts, transport, etc. Some $16 million per year would be generated in room revenues, while retail and associated expenditures would total a further $10.7 million per year. These visitor spending components would total $26.7 million per year ($16m + $10.7m as measured in constant 2015 dollars).

6. Visitor spending associated with hotel guests would be generated in the local economy, with a share also directed to popular visitor destinations in the broader Shoalhaven LGA and beyond. The spending would support local businesses and local jobs.
7. Development will contribute $18 million per annum to Gross Regional Product once the new accommodation facility is operational.
8. Local Government rate revenue could increase in the order of $5,000 per year (in 2015 dollars), and would be higher where the rates are adjusted to take into account real increases in property values.

1 INTRODUCTION

Background

This report was commissioned by RMI Group Pty Ltd. It presents a preliminary market assessment of the potential for tourist accommodation to be developed on a largely vacant site in Worrowing Heights, having regard for the forecast market demand for accommodation in the region.

The subject land, 1310 Naval College Road, is located on the coast at Worrowing Heights, approximately 25km south of the town of Nowra. The site has significant frontage to Naval College Road and has access to the area's waterways, being located just 2.4km from the renowned white sand beaches of Jervis Bay and just 3km from the lake of St Georges Basin, making the site an appealing development proposition.

Vincentia Marketplace Shopping Centre, recently constructed at Stockland's Bayswood development, is located across Naval College Road from the northern boundary of the site. Other nearby uses include the Worrowing Jervis Bay Eco Resort which is a 250-acre property offering accommodation in eco huts, boatsheds, cottages and a heritage house.

Significant residential development has been occurring in the suburbs of Vincentia, north and east of the subject site, and in Sanctuary Point, to the south-west of the site.

It is intended that the landowner of the subject site will lodge a development application concurrently with the planning proposal (or shortly after) for a 120-room hotel and 180 serviced apartments with associated restaurant, bar and gaming areas. Under the Shoalhaven Local Environmental Plan 2014 (LEP), the subject site is zoned RU2 Rural Landscape where 'hotel or motel accommodation' and 'serviced apartments' are specifically listed as prohibited. The development could be achieved, however, through a rezoning of the site to the SP3 Tourist zone or B4 Mixed Use zone.

The landowner has received a Pre-Lodgement Advice Letter from Shoalhaven City Council stating the following:

- The creation of 3.08ha of additional tourist or business zoned land, or an additional permitted use for 'hotel or motel accommodation' and 'serviced apartments' is considered to have the potential to impact on existing tourist or business zoned land

within the vicinity, including but not limited to Bayswood, Vincentia and Huskisson Town Centres. An Economic Impact Study prepared by a suitably qualified person will need to be submitted to support the planning proposal to assess the potential impact of the proposal on existing similar development; and

- If a business zone is proposed a potential inconsistency with S117 1.1 Business and Industrial Zones exists with respect to achieving the objectives of the direction and providing new employment areas in accordance with a strategy approved by the Director-General of the Department of Planning. An Economic Impact Study must be submitted to justify any potential inconsistencies and give consideration to the objective of this direction.

Therefore, an Economic Impact Assessment is required in order to show the demand and supply situation for the accommodation uses in the region – now and into the future – and to identify the range of potential economic benefits which may be realised through development of the site for accommodation purposes.

This report addresses the above issues raised by Council in the Pre-Lodgement advice.

Report Objectives

The objectives of this report are as follows:

- To estimate the existing supply and demand situation for commercial accommodation in the Jervis Bay region, and to forecast demand in the period to 2025
- To assess opportunities for the subject land to accommodate a portion of the forecast demand
- To provide an outline of the economic benefits of development of the subject site, including consideration of investment, employment, and contribution to tourism.

This analysis is one component of a broader planning proposal which will include environmental assessment, architectural designs, etc.

2 SUBJECT SITE AND PROPOSAL

This Chapter provides a description of the subject site, including location and regional context, as well as the specific site characteristics relevant to development of tourist accommodation.

Location and Regional Context

1310 Naval College Road (the subject site) in the suburb of Worrowing Heights is located on the western side of Naval College Road, approximately 25km direct distance south of the Nowra.

The popular Vincentia tourist area is located approximately 2.4km to the east, while Vincentia Marketplace Shopping Centre is located directly opposite the site on Naval College Road.

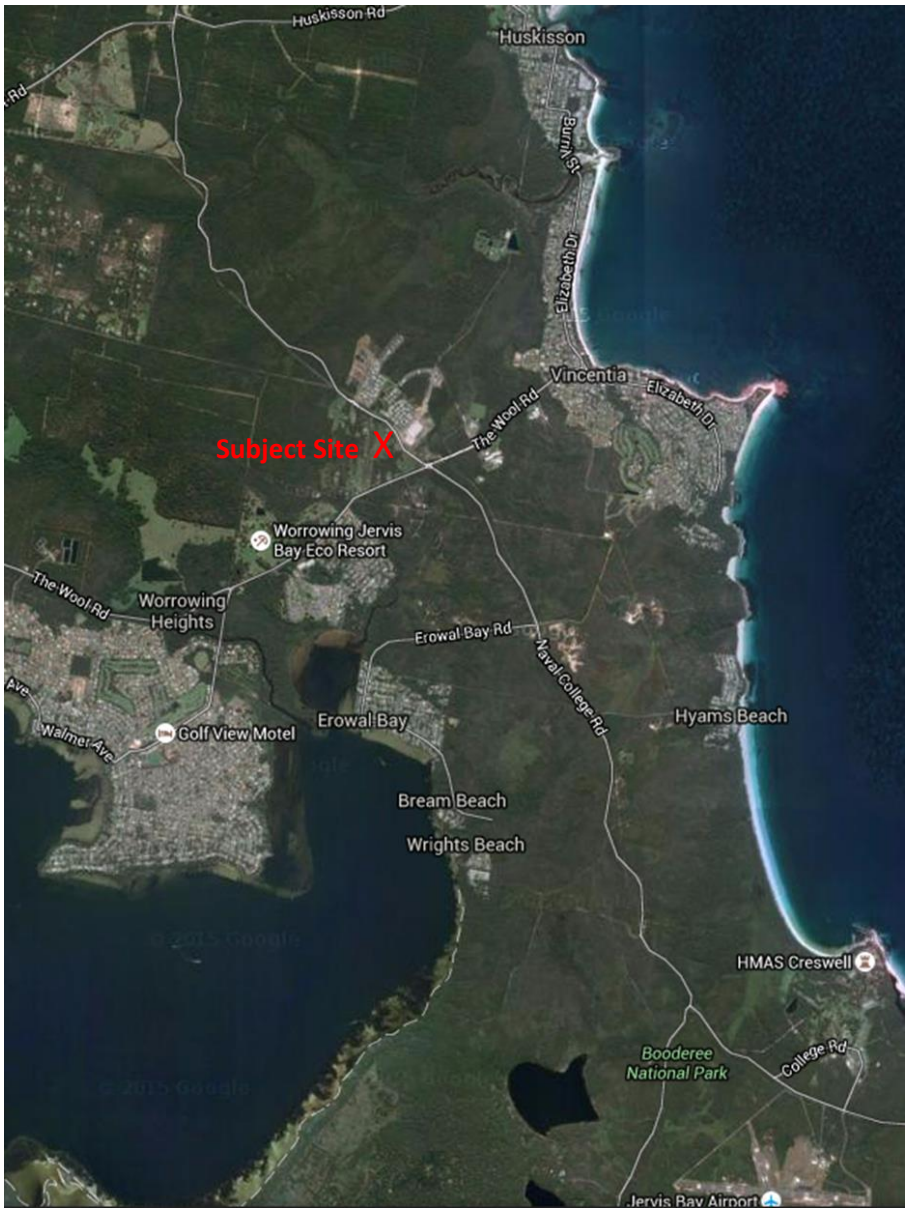
Surrounding land uses include:

- The lake of St Georges Basin to the south and Jervis Bay to the east
- Various State Forests and National Parks in close proximity
- Jervis Bay Airport located 10km to the south, which has mainly military usage but a small number of airlines operate private charter flights to the Airport
- HMAS Creswell, the Royal Australian Navy College, is located within the Booderee National Park
- The now established suburbs of Sanctuary Point to the south-west and Vincentia to the east
- Worrowing Jervis Bay Eco Resort which comprises primarily eco huts, cottages and boatsheds, set on a large 250-acre property.

In general, the subject site is relatively well served with access to nearby supermarket facilities, a medical centre and leisure centre via Naval College Road. Naval College Road runs essentially north-south and connects with Princes Highway approximately 13km to the north and Murrays Beach Boat Ramp approximately 15km to the south. The drive time to Jervis Bay Airport is approximately 9 minutes. Council has recently received $1.5 million of Federal Government funding through their Black Spot Programme to upgrade Naval College Road and make it safer for motorists.

The locational context of the site is shown in Figure 1.

Figure 1: Subject Site – Locational Context



Source: Google Earth 2016

Site Characteristics

Current Site Conditions

The total area of the subject site is approximately 3.08ha, representing a significant developable area in close proximity to the Jervis Bay coastline and within close proximity to the Vincentia seaside village holiday precinct.

The subject site is generally flat and predominantly cleared rural land with a dwelling and ancillary structures. Although the site is largely

unencumbered, it is understood that all existing structures will be removed to enable future development.

Attributes as a Location for Commercial Accommodation

On the basis of the locational and site attributes of the subject site, the following high-level considerations relevant to assessing the potential for commercial accommodation have been identified:

- Large site size: the site size of three hectares is a significant landholding that is able to accommodate a relatively large-scale tourist and commercial accommodation facility incorporating a range of ancillary infrastructure.
- Self-contained location potential: despite a location on the south-western edge of the Bayswood development, the surrounding area to the west of the subject site is characterised by a relatively undisturbed natural environment, providing the subject site with proximity to nearby forests and beaches. Given access to the site is only from Naval College Road, the subject site offers a sense of isolation that belies the proximity to the infrastructure and services provided by Vincentia and Sanctuary Point.
- Easily Developable: in general terms only, the subject site is relatively flat and readily developable for tourist accommodation. We are not aware of any significant encumbrance on the land that of itself would undermine development viability.
- Coastal Location: the attractiveness of the site to potential tourist accommodation providers is enhanced by the coastal location, with holiday promoters describing the Jervis Bay area as being a place "where the waters are crystal clear and the sand the whitest in the world."
- Proximity to Infrastructure: the subject site is highly accessible from the Princes Highway which follows the coastline for most of its length, Jervis Bay airport, a Woolworths and ALDI supermarket directly across Naval College Road, and a medical centre.
- Accessibility from Sydney and Canberra: getting to Jervis Bay is easy from both Sydney and Canberra. The region is a two hour drive from Sydney, while the drive from Canberra is a little over two and a half hours. Residents in these two cities are an important source of customers to Jervis Bay having regard for the fact that there are no public airports in Jervis Bay. Furthermore, 91% of visitors to the Jervis Bay region arrive by car, according to Tourism Research Australia. Those wishing to visit the area from

interstate or overseas are required to fly into either the Sydney or Canberra airports and connect to Jervis Bay by road, shuttle or rail.

The Worrowing Heights area is a proven location for accommodation uses.

Proposed Concept Plan

The subject site has been identified as a possible location for future tourist accommodation facilities in view of the site attributes described above.

Figure 2 shows a preliminary concept plan prepared for the site by BAKH Architecture in January 2016. Note that this preliminary concept plan has not yet been fully costed or finalised by the client and may be subject to some modifications. The concept plan provides a basis for market testing and is also intended to encourage future discussion of development options with Council.

The concept plan contains the following aspects relevant to the current economic impact assessment process:

- Accommodation is set back from the northern edge of subject site. This allows for the accommodation to remain on the 'edge' of the nearby forested areas and supports the outlook of the site towards areas of high natural value to tourists and other guests.
- A mix of 4 star hotel (120 rooms) and serviced apartments (180) is envisaged. This dual accommodation format is similar to many large hotels located in other coastal parts of New South Wales and Queensland, which provide significant competition for tourist spending. Effectively the entire site is identified for accommodation and associated purposes in the concept plan.
- A mix of other uses are also flagged for the site, including:
  - Lounge/ Waiting (100sqm);
  - Day Spa (200sqm);
  - Reception (40sqm);
  - Restaurant/ Bar (200sqm);
  - Travel Café (50sqm);
  - Powder/ Bathrooms/ Baby Change (50sqm);
  - Back of House Office, Staff Room, Luggage Store, Linen Store (80sqm);
  - Storage (50sqm);

- Laundromat (50sqm);
- Meeting/ Function Rooms (600sqm); and
- Other ancillary uses such as pool, plant room, fire stairs, circulation areas, etc.

These aspects are considered, as required, in the balance of the report.

Figure 2: Preliminary Concept Plan, 2016

Source: BAKH Architecture (Phase 2, January 2016)

3 STRATEGIC POLICY CONTE□T

This chapter provides a summary overview of relevant regional strategies that relate to the locality and in particular the tourism industry.

Shoalhaven Tourism Master Plan 2012-2017

The Master Plan was prepared by Jenny Rand & Associates and Dain Simpson Associates and provides the framework for taking the local tourism industry forward in the period 2012-2017.

Shoalhaven City Council has set a target of increasing expenditure from visitors from $678 million in 2011 to $1 billion by 2020. To achieve this target, visitation needs to increase by 47.5% from 2011 to 2020, equating to a compound growth rate of 4.42% per annum.

The policy notes that:

"The City lacks a large branded 4-4.5 star hotel and resort style properties." (p1) though Nowra is the nominated preferred area for this type of development.

The Master Plan acknowledges that the serviced apartment sector in the City is currently very small and notes:

"There is a need for additional serviced apartment accommodation in the City, with the recommended locations being Nowra, Huskisson-Vincentia and Mollymook-Ulladulla." (p128).

From a tourism perspective, the desired outcomes for the Bay & Basin Precinct are indicated as follows:

- Jervis Bay to retain its profile as an iconic NSW coastal destination – a marine sanctuary known for its dolphins, whales, seals and giant sting rays, crystal clear waters and pristine white sand beaches.
- Retention and enhancement of the character and atmosphere of Huskisson as the tourist hub of the area, coupled with the upgrading / redevelopment of the Vincentia shopping centre as a tourism precinct.
- For the emerging eco and soft adventure tour / activity sector to become a strong commercial sector offering a diverse range of quality marine and land-based activities, with these activities being ‘international’ ready.
- To have in place the marine infrastructure needed to support both commercial and recreational boating on the Bay.

- The Round the Bay Walk in place, linking each of the villages around the Bay.
- St Georges Basin to continue to be recognised as one of the fishing 'hot spots' along the NSW coast, with the area having the marine infrastructure to support the recreational fishing industry.

The report is a comprehensive assessment of issues and opportunities for tourism in the City, though directions for the specific suburb of Worrowing Heights are not provided. Directions for the Bay & Basin accommodation facilities are limited the need for additional facilities in the serviced apartment sector.

South Coast Regional Strategy 2007

The South Coast Regional Strategy applies to the period 2006–31 and covers the local government areas of Shoalhaven, Eurobodalla and Bega Valley. The document is one of a number of regional strategies prepared by the NSW Department of Planning and sets out a clear and certain land use plan for the South Coast, which balances the demands for future growth with the need to protect and enhance environmental values.

It is noted in the Strategy that the Region is the fourth most visited by Australian holidaymakers, after Sydney, Melbourne and Brisbane/Gold Coast. This is due in part to the proximity to Sydney, Melbourne and Canberra, but also due to the draw of the area's appealing natural environment.

Tourism is acknowledged as "a key growth and opportunity sector" (p25) and the Strategy further recognises that the tourist accommodation sector is likely to come under pressure in the future having regard for "significant demand for temporary or tourist accommodation in the Region and the gradual take-up of holiday homes for permanent housing by absentee owners as they retire and/or seek a 'sea change'" (p21).

Vincentia district is identified in the Strategy as a Major Town (p27) and therefore policy support is provided for new residential development within and adjoining this centre.

Illawarra Shoalhaven Regional Plan 2015

The Regional Plan includes the LGAs of Wollongong, Shellharbour, Kiama and Shoalhaven. Under the plan Vincentia is defined as a regional centre along with Kiama and Milton/Ulladulla. Regional centres are described as being “Major town centres servicing the

local area and surrounding suburbs, providing a range of business, retail and entertainment uses, including supermarkets, health and other services."

The Plan also acknowledges the importance of the tourism market and the opportunities to enhance and expand it including marine based tourism. This includes cruise ship visits to Jervis Bay. The Plan acknowledges that to "capitalise on these opportunities, it will be necessary to boost the amount of accommodation".

S117 Directions

Council notes that "if a business zone is proposed a potential inconsistency with S117 1.1 Business and Industrial Zones exists with respect to achieving the objectives of the direction and providing new employment areas in accordance with a strategy approved by the Director-General of the Department of Planning"[1].

The planning proposal aligns with the overall objectives of the above strategies, which aim to ensure that an appropriate level of tourist and other accommodation is provided in the region.

The purpose of the planning proposal is to highlight to the Director-General of the Department of Planning that the proposed development represents the only quality 4 star hotel which aims to meet a specific tourist sub-market in Jervis Bay currently not being serviced. In addition, the proposal provides an opportunity to make a significant contribution towards tourism accommodation and better utilise land that is currently under-utilised. This is discussed in greater detail in the following chapters.

[1] Pre-Lodgement Advice Letter – 1310 Naval College Road, Worrowing Heights

4 THE TOURISM MAR□ET IN □ERVIS BAY

Tourism is a major industry in the Jervis Bay region, as well as the broader Shire. This section provides an overview of existing visitor patterns including the current accommodation offer in Jervis Bay and overall market performance.

Tourism Industry Snapshot

Visitor Trends

Domestic

Over the past nine years the domestic tourism industry in Australia has experienced mixed fortunes, with a decline in total domestic visitor nights of -5% between 2006 and 2011. The relatively weak domestic tourism market during this period was generally associated with factors including a high Australian dollar, changing consumer tastes, increased international flight capacity and competitive international airfares. Since 2011 however, the market has rebounded with an upswing of almost 18% to 2015 as the Australian dollar falls. Growth in visitor nights nationally was almost 12% in the period from 2006 to 2015.

New South Wales overall has been fairly resilient during this downturn in domestic tourism, with total domestic visitor nights increasing modestly by 7% over the period 2006 to 2015.

The South Coast region – which includes Jervis Bay – has outperformed New South Wales in attracting domestic tourists, with the total number of domestic overnight trips increasing by 337,000 visitors (ie, 11% increase) and domestic visitor nights increasing by 937,000 visitor nights (ie, 8% increase) between 2006 and 2015.

International

In addition to its stable performance as a domestic tourism destination, the South Coast region has experienced significant growth in international visitor nights of approximately 52% since 2006. This growth rate is very similar to the 53% increase in international visitor nights experienced across New South Wales over the same period. The most significant countries of origin for international visitors to the South Coast region are United Kingdom, United States of America, and New Zealand.

Total international visitor nights in Australia increased by 63% over the same period to 2015. Most of this growth was concentrated in

ACT (152% increase, from a low base), Victoria (92% increase) and Western Australia (80% increase).

In 2015, the South Coast region represented approximately 3.2% of all international visitor nights in New South Wales and this share was identical in 2006.

Table 1 - South Coast NSW, Tourism Trends, 2006-2015 ('000s)

Key Tourism Metrics	International	Domestic Overnight	Domestic Day	Total
Year ending September 2015				
Visitors ('000)	128	3,463	6,341	9,932
Nights ('000)	2,516	12,507	-	15,023
Regional expenditure ($M)	218	1,586	661	2,465
Year ending September 2006				
Visitors ('000)	97	3,126	4,709	7,932
Nights ('000)	1,658	11,574	n/a	13,231
Regional expenditure ($M)	105	1,212	339	1,657
Change on September 2006 (%)				
Visitors	+32.7%	+10.8%	+34.6%	+25.2%
Nights	+51.8%	+8.1%	n/a	+13.5%
Regional expenditure	+107.0%	+30.9%	+94.6%	+48.8%

Source: Tourism Research Australia, Tourism Region Profiles

Visitor Profile

Domestic

The domestic visitor profile of the South Coast region is characterised by a high share of holiday travel relative to the rest of Australia. In the year to September 2015, approximately 60% of domestic visitors were holiday-oriented, well-above the average for the rest of Australia of 43%.

Although holiday travel is the largest category of domestic visitation in the South Coast region, Table 2 shows that the growth in holiday-makers to the South Coast region over the 2006 to 2015 period has not been as strong relative to the growth in those visiting friends and relatives, and business travellers.

For the subject site, an important consideration is where these domestic visitors choose to stay.

In the South Coast region, approximately 18% of domestic visitor nights are accommodated in hotels/motels/serviced apartments, according to the Tourism Research Australia 'Regional Tourism

Profiles' publication. For the Shoalhaven LGA, this share is only 9% (in 2013). This is a relatively low share indicates that while the South Coast region is currently attracting a high share of holidaymakers, these visitors are not being accommodated in hotels/motels/serviced apartments. This low share may be as a result of a lack of commercial accommodation options in the area.

Tourists can use various types of accommodation. These are hotel/motel, private hotel/guest house, rented flat/house, own holiday house/flat, friends or relatives home, farm, cabin in caravan park, on-site caravan, other in camping ground, other not in camping ground, boat/cabin cruiser, house boats, bed and breakfast establishments or other forms.

The low current share of holidaymakers accommodated in hotels/motels/serviced apartments may indicate that opportunity exists to increase this share over time as alternative accommodation options, such as holiday homes, become comparatively less affordable due to increasing demand and stable supply. Any growth in domestic tourist visitation to the South Coast region in the future, including to the Shoalhaven LGA, would be likely to result in growth in demand for commercial accommodation options, potentially including at the subject site.

International

Approximately 65% of international visitors to the South Coast region are visiting for a holiday, a relatively high share of total visitation compared with the average for Australia of approximately 32%.

As shown in Table 2, the share of holidaymaking international visitors has increased significantly since 2006. Despite this high rate growth, only a 30% share of all international visitors to the South Coast region stay in hotels/motels/serviced apartments. This is because a high share of international visitors stays in alternative forms of accommodation, namely:

- Commercial caravan parks and campgrounds,
- Backpackers/hostels, and
- Non-commercial caravan parks and campgrounds.

These forms of accommodation are most relevant to the relatively young age profile of international tourists visiting the South Coast region; 42% of international visitors to South Coast are aged 34 years and below, compared with 32% of domestic visitors to the region.

Table 2 - South Coast NSW, Purpose of Travel Trends, 2006-2015 ('000s)

Purpose of Travel (Visitors '000s)	International	Domestic Overnight	Domestic Day	Total
Year ending September 2015				
Holiday	79	2,002	3,367	5,448
Visiting friends and relatives	35	1,114	1,674	2,822
Business	7*	271	582	860
Year ending September 2006				
Holiday	56	1,869	2,780	4,706
Visiting friends and relatives	29	932	1,307	2,268
Business	5	251	358	615
Change on September 2006 (%)				
Holiday	+40.3%	+7.1%	+21.1%	+15.8%
Visiting friends and relatives	+19.5%	+19.5%	+28.1%	+24.5%
Business	+32.9%	+7.9%	+62.3%	+39.8%

Source: Tourism Research Australia, Tourism Region Profiles
*HillPDA estimate as the corresponding TRA data cannot be published due to insufficient survey sample

Jervis Bay Accommodation Market

Overview

The Jervis Bay area offers a diverse range of accommodation, dominated by caravan parks, holiday homes and holiday rental properties. It has an emerging bed & breakfast and hosted self-contained accommodation sector and an aging motel sector. Accommodation in the area is typically dominated by small, independently operated properties, many of whom have owners who are typically lifestyle focused. Commercial accommodation is concentrated in Huskisson, with two large waterfront caravan parks, three motels and a range of B&Bs and hosted accommodation properties.

The Jervis Bay region has a high incidence of holiday home ownership and, typically, absentee owners have their regular residence in Sydney, Wollongong and to a lesser extent inland rural areas. Discussions with staff at the Jervis Bay Visitor Information Centre indicate that many buyers see Jervis Bay as a location for holidaymaking in the short-term and retirement in the long-term.

Approximately 1,200 holiday homes are located in the Huskisson and Vincentia areas, while a further 1,050 and 170 holiday homes are located in the suburbs of Sanctuary Point and Erowal Bay respectively, according to the 2011 Census. These accommodation

options play a significant role in the local tourism market, with absentee owners able to rent out their holiday homes on such websites as Stayz.com, Jervisbayrentals.com.au and Jervis.com.au.

While the area is characterised by high levels of 'informal' holiday homes which are rented out to holidaymakers, the main 'formal' accommodation providers in the Jervis Bay area are:

- Worrowing Jervis Bay Eco Resort: 14 rooms
- The Huskisson: 8 rooms
- Huskisson Beach Bed and Breakfast: 6 rooms
- Dolphin Shores: 20 rooms
- Jervis Bay Motel: 15 rooms
- Golf View Motel: 10 rooms

While the Jervis Bay area has a range of accommodation options, feedback from local tourism information staff indicates that the area does not currently cater to large groups seeking high quality accommodation and recreational facilities, despite attracting such significant levels of annual visitation as indicated earlier.

Worrowing Jervis Bay Eco Resort (81 The Wool Road, Worrowing Heights)

Source: Worrowing Jervis Bay Eco Resort

Situated in Worrowing Heights, Worrowing Jervis Bay Eco Resort is in a national park and area attractions include Saint Georges Basin Country Club, Paradise Beach Reserve, and Booderee National Park. Additional area attractions include Jervis Bay National Park. The 250 acre property is situated in very close proximity to the subject site.

Property features

Predominantly secluded studio style luxury cabins, these one bedroom huts are furnished with locally sourced recycled materials and are located in a bush setting with wildlife at the doorstep. The property has 14 buildings altogether and was constructed in 1998.

Other hotel amenities

- Tour/ticket assistance
- Barbecue grills
- Laundry facilities
- Front desk (limited hours)
- Free self parking
- Smoke-free property
- Kitchen facilities

Room price range

From $250 to $280 per night

The Huskisson (73 Owen Street, Huskisson)

Source: The Huskisson

The Huskisson is located adjacent to the Huskisson RSL and within a 10-minute walk of Jervis Bay Maritime Museum. With eight rooms and a restaurant, this 3½-star hotel has a central location and is close to attractions such as the Lady Denman Heritage Complex and Jervis Bay National Park.

Property features

The Huskisson is a two-storey hotel which was built in 1932 but underwent renovation in 2012. Guests can take advantage of free parking, along with a free train station shuttle. Additional amenities include a terrace, a meeting room (120sqm), a garden, and a picnic area.

Other hotel amenities

- Luggage storage
- Terrace
- Babysitting or childcare (surcharge)
- ATM/banking
- Smoke-free property
- Free train station pickup
- Billiards or pool table

Room price range

From $125 to $350 per night

Huskisson Beach Bed and Breakfast (21 Beach Street, Huskisson)

Source: Huskisson Beach Bed and Breakfast

Huskisson Beach Bed and Breakfast is located close to Jervis Bay National Park and within 2km of the Huskisson RSL. With six rooms, this 3½-star bed & breakfast is close to local attractions such as Collingwood Beach and Jervis Bay Maritime Museum.

Property features

The Huskisson Beach Bed and Breakfast was constructed in 2014 and is the newest hotel offered in proximity of the subject site. The facility is set over two storeys and guests are provided with free parking onsite, laundry facilities and barbecue grills.

Highlights

Other hotel amenities

- 24-hour front desk
- Free breakfast
- Free WiFi
- Beach towels

Room price range

From $105 to $450 per night

Dolphin Shores (53 Beach Street, Vincentia)

Source: Dolphin Shores

Within a short walk of Collingwood Beach, Dolphin Shores is located within 3km of Jervis Bay National Park. This 20-room, 4-star motel is close to Nelsons Beach and Vincentia Golf Club with features such as an outdoor pool, onsite parking and a spa tub.

Property features

Jervis Bay Dolphin Shores has 16 rooms, two villas and one luxury 3-bedroom townhouse. The facility is the only 4-star rated motel in Vincentia and is centrally located to the main shopping precinct. The hotel offers guests parking, an outdoor pool, a spa tub, laundry facilities and barbecue grills.

Other hotel amenities

- Front desk (limited hours)
- Tours/ticket assistance
- WiFi (surcharge)
- Smoke-free property

Room price range

From $125 to $495 per night

Jervis Bay Motel (41 Owen Street, Huskisson)

Source: Jervis Bay Motel

Jervis Bay Motel is located in the centre of Huskisson, with beaches, cafes and shops less than 500m away. The Motel is also located in close proximity to Huskisson RSL and within a 10-minute walk of Jervis Bay Maritime Museum. Lady Denman Heritage Complex and Jervis Bay National Park are also nearby.

Property features

Jervis Bay Motel is a two-storey property which features 15 rooms. This 3½-4-star motel has conveniences such as an outdoor pool and onsite parking.

It is understood that a development application is currently under consideration to construct commercial additions and alterations to the value of $3.6 million. The proposal involves partial demolition of the existing motel, the construction of an additional 18 motel rooms and a new manager's residence. Construction will also include two future retail tenancies with frontage to Owen Street and additional car parking both on and off site. Approval would mean the Jervis Bay

Motel would have 33 guest suites upon completion. The maximum height of the proposed building is approximately 12.3m, with the majority of the bulk of the building sitting below 10m above natural ground level.

Other hotel amenities

- Barbecue grill(s)
- Front desk (limited hours)
- Free WiFi
- Smoke-free property

Room price range

From $85 to $95 per night

Golf View Motel (49 Paradise Beach Road, Sanctuary Point)

Source: Golf View Motel

Golf View Motel is located alongside a golf course and enjoys easy access by foot to Saint Georges Basin Country Club, while the Paradise Beach Reserve, Collingwood Beach and Booderee National Park are also just a short drive away.

Property features

This single level 3-star motel was constructed in 1990 and has a total of 10-rooms. Twin, double, triple and family rooms are available for guests and the motel promotes its golf course views in its marketing.

Other hotel amenities

- Barbecue grill(s)
- Front desk (limited hours)

- Tours/ticket assistance
- Free WiFi
- Free self parking
- Golf course on site
- Tennis on site

Room price range

From $122 to $188 per night

Commercial Performance

Seasonality has been a long-standing challenge for the Jervis Bay area, with the coastal location typically experiencing very strong January peaks. It is understood that that building off and shoulder season visitation has been a priority for the industry and that seasonality has been reduced to a degree as a result.

In the year to June 2015, the Shoalhaven LGA market was characterised by an annualised occupancy rate of 55.1% (ABS Cat. No. 8635.0). Although the market in the Jervis Bay area is generally considered highly cyclical, with peak periods coinciding with the summer season, levels of occupancy in the peak period were at the general levels of occupancy sought by commercial operators of approximately 65% and above, and suggests that demand exists for additional room construction based on those peak levels of demand, notwithstanding forecasts for additional room demand in the future (see Section 4).

As shown in Table 3, the annualised occupancy rate of 55% in Shoalhaven LGA is higher than that of the South Coast region (52%) and for the broader regional NSW area (53%).

Table 3 - Shoalhaven LGA Tourist Accommodation Profile, June 2015

Shoalhaven LGA		Establishments	Rooms	Room occupancy rate	Takings from accommodation ($ millions)	Average room rate
		No.	No.	%	$ million	$
September quarter	2013	27	617	46.8%	3.6	$137
	2014	26	600	43.6%	3.7	$155
	change	-3.7%	-2.8%	-6.8%	+2.8%	+13.2%
December quarter	2013	27	617	58.6%	5.1	$154
	2014	26	601	61.5%	5.7	$167
	change	-3.7%	-2.6%	+4.9%	+11.8%	+8.5%
March quarter	2014	27	616	63.9%	6.1	$172
	2015	26	598	67.4%	6.1	$168
	change	-3.7%	-2.9%	+5.5%	0.0%	-2.0%
June quarter	2014	27	614	51.7%	4.2	$144
	2015	27	678	48.8%	4.6	$159
	change	0.0%	+10.4%	-5.6%	+9.5%	+10.3%
Shoalhaven LGA YE June	2014	27	614	55.2%	19.0	$153
	2015	27	678	55.1%	20.1	$163
	change	0.0%	+10.4%	-0.2%	+5.8%	+6.6%
South Coast TR YE June	2014	120	3,729	50.9%	98	$141
	2015	122	3,905	52.4%	109	$148
	change	+1.7%	+4.7%	+2.9%	+11.6%	+5.4%
Regional NSW YE June	2014	1,094	38,541	51.3%	994	$139
	2015	1,119	38,472	53.2%	1,053	$144
	change	+2.3%	-0.2%	+3.7%	+5.9%	+3.9%
NSW YE June	2014	1,375	75,161	65.6%	3,125	$174
	2015	1,435	75,184	66.9%	3,244	$179
	change	+4.4%	0.0%	+2.0%	+3.8%	+2.6%

Source: Australian Bureau of Statistics (ABS), Survey of Tourist Accommodation
All Establishments (Hotels, motels and serviced apartments with 15 rooms or more)

5 ACCOMMODATION DEMAND FORECASTS

This section provides broad tourism forecasts for the period to 2025, including visitor nights and the implications for demand in the Jervis Bay region.

Forecast Visitor Nights

Although the number of visitors that travel is an important consideration for commercial tourism operators, the critical variable for measuring the demand for the accommodation industry is the number of room nights occupied.

At the high level, Tourism Research Australia (TRA) identifies average annual growth in visitor nights to Regional NSW of 3.1% in the period to 2025, as shown in Table 4. Growth is expected to be highest for business visitor nights at 6.8% per annum, with holiday visitor night growth of 2.4% per annum and growth in those visiting friends and relatives forecast to grow by 2.6% per annum for the same period.

TRA forecasts for regional NSW have been adjusted by the consultant to provide forecasts of total visitor night growth specifically for South Coast NSW. Typically, South Coast NSW has a higher share of holidaymakers than Regional NSW, while business visitation in South Coast NSW is notably lower by comparison.

According to this analysis total visitor nights in South Coast NSW are expected to increase by approximately 2.9% per annum over the forecast period, marginally lower than for the Regional NSW overall at 3.1%. Total visitor nights in South Coast NSW are therefore forecast to be approximately 17,930,000 in 2025 if the TRA projections are met, as shown in the Table. This would represent an increase of 4,430,000 visitor nights when compared with current levels.

Importantly, the Jervis Bay area does not currently have any hotels, motels or serviced apartments which are of a suitably significant scale to cater for large groups of both domestic and international tourists. The dolphin watching at Jervis Bay attracts significant numbers of international visitors into the area, though feedback received during consultation has indicated strongly that these visitors need to stay elsewhere due to a lack of local accommodation options which are suitable for group bookings. Potentially visitation by these groups could be expanded if suitable accommodation was available in the area. Tourism operators have identified the need for

consolidated accommodation options of at least 100 rooms in Jervis Bay to cater for this demand.

Table 4 - Visitor Night Forecasts by Trip Purpose to 2025, South Coast NSW ('000)

Year	Holiday	VFR	Business	Other	Total
	Regional New South Wales				
2014-15	36,880	24,900	7,910	7,510	77,200
2019-20	41,620	28,930	11,760	9,510	91,820
2024-25	46,610	32,090	15,260	10,620	104,580
Total change, 2015-2025	+9,730	+7,190	+7,350	+3,110	+27,380
	South Coast NSW				
Share of regional NSW	20.4%	15.0%	10.5%	18.9%	Total
2014-15	7,510	3,740	830	1,420	13,500
2019-20	8,480	4,350	1,240	1,790	15,860
2024-25	9,500	4,820	1,610	2,000	17,930
Total change, 2015-2025	+1,990	+1,080	+780	+580	+4,430

Source: Tourism Research Australia (TRA), State and Territory Tourism Forecasts 2015

Forecast Visitation

The TRA visitor night forecasts have been extrapolated by the consultant to provide an indication of how many additional visitors may be expected in the South Coast NSW region over the coming decade.

An additional 1.2 million visitors (both domestic and international) would be expected to stay overnight in the NSW South Coast region by 2025 compared to the current level of overnight visitors. This represents an increase on the 3.5 million visitors identified in latest information released by TRA, or an average increase in total visitation of 3% per annum.

Table 5 - Visitor Forecasts by Trip Purpose to 2025, South Coast NSW ('000)

Year	Holiday	VFR	Business	Other	Total
Av. nights per visit	3.86	3.29	2.60	11.80	
2014-15	1,950	1,140	320	120	3,530
2019-20	2,200	1,320	480	150	4,150
2024-25	2,460	1,470	620	170	4,720
Total change, 2015-2025	+510	+330	+300	+50	+1,190

Source: Tourism Research Australia (TRA), State and Territory Tourism Forecasts 2015; HillPDA

Accommodation Demand Forecasts

The forecast increase in total visitor nights in South Coast NSW (refer Table 5) is expected to drive demand for the development of additional commercial accommodation in the region.

Demand for additional rooms is forecast in Table 6 based on the following considerations:

- The estimated current number of hotel/motel/serviced apartment rooms in South Coast NSW of approximately 3,905 rooms (updated to July 2015); and
- Allowing for the additional room demand generated by the forecast growth in overnight visitation that is generated under the scenario presented in Table 4 (as per TRA forecasts).

According to this analysis, total growth in demand of approximately 1,295 rooms has been identified for South Coast NSW in the period to 2025, having regard for the existing supply. However, considering the low occupancy rate in South Coast NSW region (52.4%), it is likely that capacity exists in the current accommodation offer to cater for a share of this overall demand. At an average occupancy rate of 65% – which is considered realistic at such a predominantly coastal and seasonal location – capacity exists to absorb approximately 490 rooms within the existing accommodation network.

The overall result is an identified need for 805 additional rooms in the South Coast NSW region over the coming decade.

Note that this demand is for hotel/motel/serviced apartment accommodation only. There will also be continued demand for other relevant accommodation types, including hostels, bed and breakfasts, caravan and camping grounds etc.

Table 6 - Forecast Growth in Room Demand in South Coast NSW, 2015-25

	TRA Forecasts
Current number of rooms in South Coast NSW	3,905 rooms
Forecast annual growth in visitor nights to 2025	2.9%1
Total demand for rooms in 2025	5,200 rooms
Total additional rooms required to 2025	1,295 rooms
Less capacity in existing accommodation supply	-490 rooms2
Effective additional rooms required in South Coast NSW to 2025	805 rooms

Source: HillPDA
1 deduced from Table 4
2 South Coast NSW occupancy rate is currently 52.4%. When operating at a 65% average occupancy, existing accommodation supply could absorb demand for an additional 490 rooms.

Market Opportunities for the Jervis Bay Region

Tourism operators have identified the need for large-scale accommodation of 100 rooms at the very least in Jervis Bay to fill a current market gap for group bookings. While Jervis Bay currently offers a diverse range of accommodation, the offer is largely dominated by caravan parks, holiday homes and holiday rental properties. Furthermore, the area is increasingly emerging as a location for smaller B&B and hosted self-contained accommodation.

In terms of Jervis Bay's ability to accommodate large group bookings, a significant market gap currently exists. Local hotel/motel accommodation, as identified in Chapter 3, is dominated by small, independently operated properties and the motel sector is noticeably aging. Jervis Bay lacks a large branded, quality 4-4.5 star hotel and the subject site provides an obvious opportunity to fill this gap.

Further, business visitor nights in South Coast NSW are anticipated to grow by 780,000 nights to 2025 (refer Table 4) and these corporate travellers typically seek a superior level of accommodation, appointment and service to others hotels which are currently available in Jervis Bay. Potential may exist to expand the accommodation offer in Jervis Bay to cater for a share of this market.

Ongoing anticipated increases of nearly 2 million visitor nights in leisure travellers over the coming years may also provide opportunity for Jervis Bay. Leisure-focused accommodation establishments tend to provide sufficient entertainment to encourage an extended, self-contained on-site holiday. A range of appropriate recreational activities are usually included in the site design, and the size, quality

and facilities of a leisure-focused development will be determined by location and the market served. Generally, leisure travellers are seeking a holiday experience (associated with the accommodation) rather than only accommodation services.

6 ECONOMIC IMPACT ASSESSMENT

Development Investment

Investment in the project overall is estimated to be in the order of approximately $50 million. This includes infrastructure costs associated with readying the property for the development and construction of the hotel. Associated costs include consultants, contingency and other costs associated with the actual development.

Project cost figures used in this analysis are an indicative estimate only, and have been adopted by the consultant based on information provided by iarchitecture. Detailed cost estimations will be undertaken by the project quantity surveyors to confirm these preliminary estimates.

Construction Employment

Construction employment generation involves:

- Direct jobs, which are on-site; and
- Indirect (or flow-on) jobs, which are created elsewhere in the economy through the employment multiplier (eg, in design, finance, transport, etc) – this multiplier is derived from ABS National Accounts data.

The capital outlay on the new building and construction work associated with the development of the hotel complex (as outlined in this report), represents a major project for the Shoalhaven economy which would generate significant direct and indirect construction-related employment.

Direct Jobs

For the purposes of this economic impact assessment, 1 FTE (Full Time Equivalent) construction job year is supported for every $367,000 of building construction spending. This is based on Australian Bureau of Statistics (ABS) input-output tables and National Accounts data 2008-09 adjusted to account for inflation to June 2015.

Allowing for the estimated construction costs of $50 million approximately 136 job years (rounded) would be directly supported by construction (or 91 FTE jobs each year of the construction over 18 months).

In reality a greater number of people will work on the site during the construction period, although noting that many of these jobs will be for only part of the development.

Indirect Jobs

In addition to direct (or site-related) employment, the operation of the employment multiplier – which is derived from ABS Input/Output data – allows the calculation of indirect (or flow-on) jobs created elsewhere in the economy. From the ABS Input Output tables HillPDA has estimated the production induced and consumption induced multipliers in the construction industry to be 1.34 and 1.28 respectively.

Using these multipliers HillPDA has assessed total job years generated by construction to be 493.

Operational Employment

Direct jobs

Commonly used employment ratios for hotels vary according to their quality and widely accepted general figures are typically 0.4 FTE per room for 3 star hotels and 0.75 FTE per room for 4 star hotels. A higher ratio is considered appropriate for 5 star hotels because of their larger than average room sizes and the particular customer expectations regarding superior levels of service. The hotel facility identified in the concept plan (shown in Figure 2) indicates a 4 star quality rating. Serviced apartments employ staff at a rate of 1 per 3.7 rooms[2]. The rate is likely to be a little higher for 4 or 4.5 star quality – probably around 1 worker per 3 rooms.

Once fully operational, the proposed hotel in Jervis Bay would be expected to employ a total of approximately 140 persons. This represents a significant increase in the employment outcomes on the site compared to the current situation (ie, currently vacant and no employment), and these additional jobs would be associated with accommodation, catering, conferences and events, etc.

Indirect Jobs

The multiplier effect would lead to indirect (or flow-on) employment, and this is associated with the input to the day-to-day operation of the Jervis Bay hotel (eg, food and beverage supplies, laundry,

[2] ABS Tourism Accommodation Small Area Data 2015

contractors, maintenance, etc) and the expenditure of wages by permanent employees which support a range of businesses in the wider economy.

HillPDA estimates from the ABS Input/Output tables a multiplier of 1.94 applies to employment in "accommodation and food services" industry. That is, for every 10 direct jobs in the hotel, a further 0.94 indirect or flow-on jobs are created.

Following refurbishment of the hotel, the estimated 140 jobs at the hotel would generate a further 131 indirect jobs through the employment multiplier impacts.

The employment associated with both direct and indirect jobs generated through the operation of the Jervis Bay hotel will provide new opportunities for those seeking employment in the overall hotel industry and associated industries, including the wide range of supplier industries (from transport and financial services to entertainment, hospitality, and wider afield).

Employment Summary

A summary of construction jobs and new ongoing jobs associated with the Jervis Bay hotel development is shown in Table 7, including both direct and indirect (or flow-on) jobs. On-going jobs at the proposed hotel would comprise new employment generated at the site having regard for the existing vacant use.

Table 7 - Proposed Jervis Bay hotel development - Employment Summary

Type of Employment	Direct Employment	Indirect Employment	Total Employment
Construction-related employment	136 job years	357 jobs years	493 Job Years
On-going employment (operations, etc)	140 jobs	131 jobs	271 jobs

Source: ABS Input/output tables, iarchitecture, HillPDA
Note: 'Head Counts' include people in full-time, part-time and casual jobs

Tourism Benefits

Tourism, and in particular the accommodation sector, are key contributors to national economic activity and employment. A report by TRA (State of the Industry 2015, November 2015) shows that the tourism sector contributes 5.4% of the national GDP (direct 2.7% and indirect 2.7%). The sector directly employs approximately 534,000 persons or 4.6% of total employment, and indirectly employs a further 391,100 persons (as suppliers, etc).

Asian markets continue as the main contributor to Australian tourism, accounting for 50% of international visitor expenditure in 2014/15. For the year ahead, the report indicates continuing tourism growth with total expenditures up 4.5% over 2015/16, largely driven by strong inbound expenditure growth, especially from Asian markets; spending associated with visitors from China, for example, is forecast to increase by 9%.

In New South Wales in 2012/13, the tourism sector contributed directly $13.3 billion or 2.8% to the Gross State Product, and a further $15.1 billion indirectly, according to TRA. In total, tourism was worth $28.4 billion or 6.0% of the New South Wales economy. The sector generated 158,000 direct jobs or 4.4% of total employment, and a further 109,000 jobs indirectly.

A report by the Productivity Commission (Australia's International Tourism Industry – Research Paper, February 2015) indicates that "in 2014, total tourism spending contributed almost 3 per cent of Australia's GDP" and approximately one-third of this was by international visitors. Moreover, international tourism's share of total service exports was just over 60% (p3). By 2022/23, the number of international visitors is forecast to increase by almost 45%, reaching 9.6 million persons.

The Commission's report also confirms that "much of the growth in visitor numbers has come from emerging countries in Asia", particularly China and India. China was Australia's No.2 source of short-term visitors in 2014 (behind NZ), and up from No.20 in 1992 (p5).

These trends in tourism, particularly the international component, are indicators of the important role of the sector in the New South Wales and national economies, and reinforce the intent of the proposal at the subject site to enhance Jervis Bay's role in the visitor accommodation sector. In this regard, the provision of 300 rooms as part of the development would create a significant additional 4-star accommodation capacity, and this would be capable of attracting new visitors seeking modern and quality accommodation.

Having regard for the age and standard of nearby hotel/motel facilities, providing additional capacity in the 4-star market is particularly important in view of strong visitor growth trends anticipated for South Coast NSW in the coming decade, especially the key international and business traveller segments.

Visitor Expenditures

Increased patronage levels associated with an expanded accommodation offer in the Jervis Bay area would create new and increased levels of visitor expenditure for Jervis Bay and regional NSW. This expenditure would be generated in terms of (a) room rate revenues and (b) retail and associated spend in and around Jervis Bay and further afield on dining out, gifts, transport and so on.

In terms of room revenues, allowing for an occupancy rate of 65% for the total of 300 hotel suites and serviced apartments, and an average room rate in the order of $225 per night (noting the room rates of the competition in Chapter 3), the proposed hotel would generate a total of 71,175 room nights in Jervis Bay on an annual basis and room revenues of approximately $16 million per year.

In terms of retail and associated expenditures, and allowing for 1.5 visitors per room night and for each visitor to generate at least $100 in non-accommodation spending (eg, taxis, restaurants, entertainment, shopping, sight-seeing etc), then the 106,800 visitor nights would generate retail and associated expenditures of $10.7 million per year (ie, 300 rooms x 365 nights x 65% occupancy rate x 1.5 persons/room x $100/person).

Combined, the hotel accommodation plus retail and associated spending would total an estimated $26.7 million per year ($16m + $10.7m).

Noting that the proposed hotel is seeking to establish its profile among groups of international visitors, and allowing for say 60% of guest nights being attributable to non-New South Wales visitors (ie, interstate and international visitors), a total of at least $16 million per year in economic activity associated with guest spending could be attributed directly to the development. These interstate and international visitors would be attracted specifically to the proposed hotel as a standout ‘destination’ due to its uniqueness in the Jervis Bay area.

This direct spending would be generated in the local Jervis Bay economy, with a share also directed to popular visitor destinations within Shoalhaven. The spending would be directed to businesses in the Vincentia and Huskisson suburbs and in visitor-related activities, thus supporting these businesses and supporting local jobs.

Contribution to Gross Regional Product

TRA data (based on ABS Satellite Accounts) shows that each person employed in the tourism sector generates approximately $90,000 pa in terms of Gross Regional Product (GRP) and this includes direct and indirect impacts. GRP is a measure of the size of Shoalhaven's economy and the hotel would contribute to this, as indicated below. GRP is the value of all final goods and services produced by all firms in the economy (as opposed to goods still in processing or production).

Based on the expected 140 new jobs to be created at the proposed development, approximately $12.6 million in GRP would be generated for the New South Wales economy on an annual basis (as measured in constant 2015 dollars).

Rates Revenue

The property at 1310 Naval College Road contributed approximately $1,730 in rates to Shoalhaven City Council in 2014/15. This estimate is based off the NSW Valuer General's indicated land value of $324,000 at July 2015.

While a detailed rating assessment has not been undertaken for this study, annual rates payable would be expected to increase significantly due to the substantial increase in value associated with the fully developed hotel. Shoalhaven City Council uses Land Value to assess rateable amounts, and for commercial operations this is based on valuations undertaken by the Valuer General.

Assuming an uplift in the statutory unimproved land value to (say) $2 million, it would be expected that annual rates revenue would increase by approximately $5,000 pa (2015 dollars) to around $6,700 once the development is completed, which represents a significant uplift on the current situation. This estimate of land value is indicative only, and is broadly based on values identified in nearby commercial areas.

Potential Impact on Existing Development

The shortfall in large-scale development of new hotel room stock in the Jervis Bay area has a negative impact on the local tourism industry with many tourists who intended to stop overnight in Jervis Bay forced to continue their journey due to a lack of accommodation options.

Evidence received through stakeholder consultation supports the view that a lack of appropriate large-scale supply options has regularly precluded visitation types that require significant room allotments from prolonging their stay in the area, particularly conferences and large tour groups. Indeed, extremely limited or small-scale hotel/motel room supply – coupled with other coastal towns' ability to offer significant consolidated room clusters and integrate convention bookings with room offerings – has prevented Jervis Bay from competing in the conventions market.

Tourism package sellers, particularly those operating in the international market, have chosen not to target particular large tour groups due to this competitive disadvantage. Furthermore, though these immediate local losses are likely to have been absorbed by other areas along Australia's coastline, the potential damage to the perception of Jervis Bay may compound future visitation losses.

Looking ahead, Jervis Bay is at risk of not realising the significant growth in visitation that has been forecast, if the delivery of a sufficient volume and quality of new hotel stock does not occur. The reasons that capturing an increasing share of this growth in visitation are at risk are as follows:

- TRA predicts an increase of 4,430,000 visitor nights to South Coast NSW over the next decade when compared with current levels. Given the Jervis Bay commercial accommodation offer is currently very small-scale and ageing, and no new supply is proposed, Jervis Bay will continue to face a shortfall in suitable hotel accommodation and a corresponding loss of tourism visitation as large groups make daytrips to the area only or even bypass Jervis Bay altogether.
- The TRA forecasts for the South Coast NSW region are effectively made on the assumption that "all other things being equal", which includes the competitive offering of all tourist destinations. Having regard for the fact that other destinations competing directly with Jervis Bay in the global tourism market are currently, and will likely continue to, upgrade the volume and quality of their stock of tourism infrastructure, all other things may not be equal going forward. In order to maintain Jervis Bay's competitive position amongst global tourism offerings, a sufficient level of investment in new quality tourism infrastructure will be required. Without maintaining this market condition, Jervis Bay could not be expected to achieve a significant share of the forecast rate of growth in visitation.

- Any visitation loss as a result of an insufficient volume and quality of hotel room stock would be even more profound under a 'do nothing' scenario. The proposed hotel infrastructure is of a sufficiently high standard and suitably located facility to become an attraction in itself that is capable of generating visitation, independent of any factors.

Not only will the TRA forecast for South Coast NSW not be realised if the region overall fails to maintain adequate capacity and standard in its commercial accommodation offer, but visitation growth above and beyond these forecasts (which potentially could be realised if tourism investments in the region were superior to the offering of competitive areas) will certainly not be achieved.

In short, a review of the current supply in Jervis Bay, coupled with reports from leisure tour operators, provide support for the contention that a notable market gap exists for a large-scale hotel in Jervis Bay. The absence of such a facility has been detrimental to the local area's tourism sector. An opportunity exists to fill the market gap so that a share of anticipated visitation growth to the area can be captured in the coming decade.

Jervis Bay does not currently have the capacity in its hotel accommodation sector to achieve a significant share of the growth in tourist visitation forecast for South Coast NSW over the period to 2025. The proposed development aims to fill a current market gap for large-scale accommodation in the region, rather than compete directly with the existing small-scale accommodation facilities in the area. Furthermore, the hotel facility will be of 4 star quality, and this standard will provide an important and much needed point of difference with other commercial accommodation currently operating in the area.

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APPENDIX F VISUAL IMPACT ASSESSMENT

CLOUSTON associates

NAVAL COLLEGE ROAD, WORROWING HEIGHTS

Landscape Character & Visual Impact Assessment

S16-0031 ssue B
24/03/2016

NAVAL COLLEGE ROAD, WORROWING HEIGHTS LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

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Note: This document is Preliminary unless Validated.

Front cover image: View of development site from Naval College Road
Image opposite: Southern boundary of development site

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Image opposite: View along Naval College Road, looking southeast towards the roundabout junction with Moona Creek Road

EXECUTIVE SUMMARY

E1- INTRODUCTION

RMI Group Pty Ltd is proposing to develop a tourism site at 1310 Naval College Road in Worrowing Heights. In order to develop a project of this scale and type a rezoning application is required. This report has been prepared to support the re-zoning application. The key purpose of this Landscape Character and Visual Impact Assessment (LCVIA) is to assess the potential visual and landscape character impacts of the Proposal and possible mitigation measures.

E2 - THE PROPOSAL

The Proposal will consist of the following key elements:

- 120 room Hotel and 180 room Serviced Apartments with associated features and facilities such as conference venue, office and care takers buildings, restaurant/cafe and swimming pool.
- An area retained for open grazing farmland.
- Limited tree removal in the centre of the site with tree retention (where possible) on the periphery of the site.
- Sound barrier wall along the northern and eastern boundaries of the site. This will be embellished with green wall systems to screen the concrete wall.
- Demolition of the existing fibro cottage fronting onto Naval College Road.
- Retention and refurbishment of the large corrugated iron shed on the eastern boundary into a care takers residence.

E3 - THE PROJECT AREA

The project area is located on the South Coast of NSW, approximately 22 kilometres (km) southeast of Nowra and 4.5km southwest of Huskisson (refer Figure 1 and 2). The site is located on Naval College Road (number 1310) which connects the Princes Highway and the coastal town of Vincentia. The site area is approximately 3.07 hectares and is located in the Shoalhaven City Council area.

E4 - LANDSCAPE CHARACTER IMPACTS

The landscape character of the study area is typical of the South Coast of NSW with undulating topography, large swathes of native vegetation, creek lines, ridges and low density rural and suburban residential development.

The overall impact of the Proposal on the landscape character is rated as (refer to summary Table 2):

- Low across three character zones - Main Roads, Suburban Development and Commercial Precinct.
- Moderate/low across one zone - Bushland
- Moderate/high across one zone - Rural Development

Due to the topography and extent of existing bush land located within and also surrounding the study area the proposal is not likely to have a high impact on any of the character zones as described in this report. The Proposal may impact the amenity value of the Rural Development zone, rated as moderate/high, as well as altering some of its distinguishable landscape characteristics.

The Proposal will form a new feature within the project area. All the zones studied, however, have the capability to absorb change to some extent. The prominent height of the built form (up to 17.5 metres) will be the most noticeable element of the Proposal, standing out in a landscape that features one to two storey buildings and structures.

CLOUSTON associates

E5 - VISUAL IMPACT ASSESSMENT

The visual impacts of the Proposal on the private viewpoints studied range from moderate to moderate/high (refer Table 5 and Figure 8):

- four viewpoints rated as moderate (R5, R6, R7, R8)
- four viewpoints rated as moderate/high (R1, R2, R3, R4)

Generally, the closer the proximity of the dwelling to the Proposal, the higher the visual impact.

The visual impacts of the Proposal on the public viewpoints studied range from low to moderate (refer Table 5 and Figure 8):

- two viewpoints rated as moderate (R10, R14)
- one viewpoint rated as moderate-low (R9)
- three viewpoints rated as low (R11, R12, R13).

The low to moderate-low visual sensitivity of many of the public receptors has helped reduce the level of visual impact experienced. The main roads that traverse the study area such as Naval College Road are frequently trafficked at 60km per hour. Despite the Proposal being in relatively close proximity to the main road, the low sensitivity to change and the short duration of views experienced ensures a moderate impact on visual amenity.

Three public facilities were assessed as part of the visual impact assessment. Two (R11, R12) of the three facilities core activities were focused within the building with no or limited views of the Proposal from inside the building.

E5 - MITIGATION

The tree types of mitigation that would be appropriate as part of the Proposal include:

- Reduction: including refinements and modifications that address the siting and scale of built form such as locating built form in cleared or otherwise disturbed areas away from vegetation.
- Alleviation: including detailed design features such as materials and finishes such as planting along site boundaries to screen built form and reduce the scale of the built form.
- Off site mitigation including tree and shrub planting outside the Proposal boundary.

1.4 REPORT STRUCTURE

The report is structured into seven parts:

- Part 1 - Introduction - An introduction section that describes the planning and methodology context for the study.
- Part 2 - The Proposal - A description of the proposed development.
- Part 3 - Landscape Character Assessment - An overview of the existing landscape character of the study area including land use and vegetation. The study area is then described under distinct landscape character zones before the impact of the Proposal on each is assessed.
- Part 4 - Visual Impact Assessment - An overview of the existing visual environment of the study area and the subsequent visual impacts of the Proposal. Selected viewpoints are assessed on a range of qualitative and quantitative criteria.
- Part 5 - Mitigation Recommendations - A discussion as to the means by which the visual impacts identified can be reduced or offset.
- Part 6 - Conclusion - Conclusions are drawn on the overall impact of the Proposal within the study area.
- Part 7 - Photomontages - Photomontages of the Proposal taken from varied locations throughout the study area.

1 INTRODUCTION

Southern boundary of Development site, looking south towards Biggira and The Wool Roads

1. INTRODUCTION

1.1 PURPOSE OF THE REPORT

The key purpose of this Landscape Character and Visual Impact Assessment (LCVIA) is to assess the visual and landscape character impacts of the proposed development at 1310 Naval College Road with respect to a development proposal for the site.

The report identifies the potential visual impact of the development on surrounding character zones and receptors.

1.2 STUDY CONTEXT

This LCVIA aims to ensure that all possible effects of change and development in the landscape, views and visual amenity are taken into account. It is concerned with how the surroundings of individuals or groups of people may be specifically affected by such changes, both quantitatively and qualitatively.

Judgement as to the significance of the effects is arrived at by a process of reasoning, based upon analysis of the existing conditions, identification of receptors and assessment of their sensitivity, as well as the magnitude and nature of the changes that may result from any development.

This assessment is an independent report and is based on a professional analysis of the landscape and the Proposal at the time of writing. The current and potential future viewers (visual receptors) themselves have not been consulted about their perceptions. The analysis and conclusions are therefore based solely on a professional assessment of the anticipated impacts, based on a best practice methodology.

1.3 METHODOLOGY

A LCVIA is by its nature not an exact science and consequently is subject to varied methodologies both in Australia and overseas. Potentially subjective assessment material and differences of opinion about how to best assess visual characteristics, qualities, degrees of alteration and viewer sensitivity often arise. As a consequence, and as identified by the New South Wales (NSW) Land and Environment Court, the key to a robust process is to explain clearly the criteria upon which an assessment is made.

This study is broadly consistent with the following guidelines, methodology and best practice guidelines:

- United Kingdom Landscape Institute Guidelines for Landscape and Visual Impact Assessment, third edition (Landscape Institute (UK) April 2013)
- Environmental Impact Assessment Practice Note: Guidelines for Landscape Character and Visual Impact Assessment (Roads and Maritime Services March 2013)

The authors of this report have compiled a set of assessment criteria to form a robust and thorough assessment methodology for landscape and visual impacts. For more detail refer to the individual Methodology section within Part 3 and Part 4 of this report.

2

THE PROPOSAL

View of existing shed and other built form within and adjacent to the site

2. THE PROPOSAL

2.1 LOCATION

The project area is located on the South Coast of NSW, approximately 22 kilometres (km) southeast of Nowra and 4.5km southwest of Huskisson (refer Figure 1 and 2 below). The site is located on Naval College Road (number 1310) which connects the Princes Highway and the coastal town of Vincentia.

The site area is approximately 3.07 hectares and is located in the Shoalhaven City Council area.

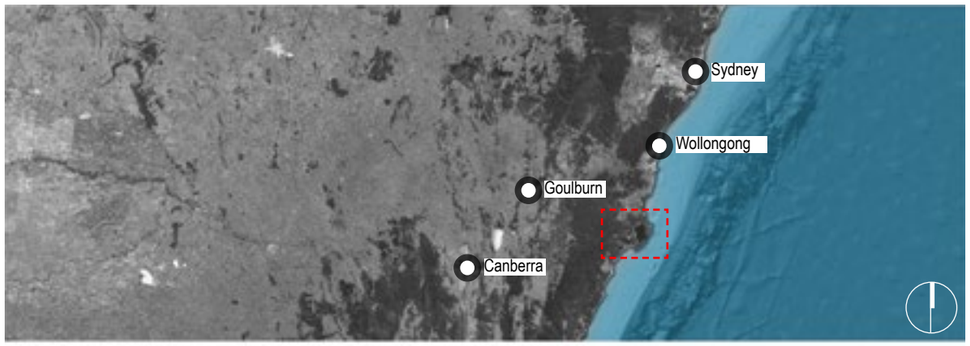

Figure 1 - Site context

Figure 2 - Site location

2.2 THE SITE

The existing site is a rural property with one dwelling, one large shed and pasture for grazing cattle. The site is tapered in shape, reducing in width as it tapers away from the road towards the south, with a narrow frontage of approximately 18 metres (m) width to the Naval College Road boundary. Adjacent to the site are other rural properties with similar characteristics, vegetation cover and built form.

Zoning

Under Shoalhaven Local Environmental Plan 1985 (amended on October 2011) the site is zoned 1 (b) (Rural “B” Arterial and Main Road Protection Zone).

Topography

The site slopes from the north-west corner towards the north-east corner following the gradient of Naval College Road. The fall is approximately 2m. The site also has a fall of approximately 5m from the southern boundary to the northern boundary.

Vegetation

The site is sparsely covered with Eucalypt species and other exotic species adjacent to the residence. There is a concentration of trees in the southern portion of the site. The ground is currently maintained as a slashed grassed area.

Figure 3: Existing site conditions

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Photograph 1: Existing residence adjacent to Naval College Road

Photograph 2: Existing sheds near eastern boundary

2.3 THE PROPOSAL

The proposed development will consist of:

- A 120 room Hotel and 180 room Serviced Apartments with associated features and facilities such as conference venue, office and care takers buildings, restaurants and swimming pool.
- An area retained for open grazing farmland.
- Some removal of trees in the centre of the site with tree retention (where possible) on the periphery of the site.
- Sound barrier wall along the northern and eastern boundaries of the site. This will be embellished with green wall systems to screen the concrete wall.
- Demolition of the existing fibro cottage fronting onto Naval College Road.
- Retention and refurbishment of the large corrugated iron shed on the eastern boundary into a care takers residence.

The height of the proposed buildings has not yet been finalised. However if the buildings were to be a maximum of five storeys high the structure would be approximately 17.5m high, allowing for 3.5m height for each floor. This is the basis of the assessment of the visual impact of the building.

CLOUSTON associates

Figure 4: Aerial view of Architect's indicative 3D model

Figure 5: street iew of Architect's indicative 3D model

3 LANDSCAPE CHARACTER ASSESSMENT

View from southern boundary towards property on The Wool Road

3.0 LANDSCAPE CHARACTER ASSESSMENT

3.1 CHAPTER OVERVIEW

This section of the LCVIA provides an overview of the existing landscape character of the study area including land use, vegetation, built form and topography. The study area is then described under distinct landscape character zones before the impact of the Proposal on each is assessed.

3.2 STUDY AREA

The study area specific to the landscape character assessment comprises the land within the project area and the surrounding landscape up to 2km from this boundary (see also section 4.2). Beyond 2km the site is not visible due to topography and dense bushland vegetation.

3.2.1 Topography

The landform and topography within and surrounding the project area is generally indicative of the South Coast of NSW. The land generally slopes towards the coastline with localised valleys and high points associated with creeks and drainage lines. The site is situated at the top of a ridgeline where the landform falls away either side of the ridge.

3.2.2 Vegetation

In general the landscape within the study area contains a mixture of vegetation ranging from native bushland areas, exotic domestic plantings and cleared land for pasture and agricultural purposes. Areas of bushland occur within the wider context of a modified landscape.

3.2.3 Land Use

The majority of land use within the study area comprises:

- Rural development
- Suburban development
- Commercial development

3.3 LANDSCAPE CHARACTER ASSESSMENT METHODOLOGY

To enable the assessment of impacts on landscape character, landscape character zones have been determined for the study area.

3.3.1 Landscape Character Zones

Landscape character zones are defined as areas having a distinct, recognisable and consistent pattern of elements, be they natural (soil, vegetation, landform) and/or human built form, making one landscape different from another. The study area and surrounds have been assessed and five landscape character zones have been established (refer to Figure 6 opposite):

- Zone 1 - Main Roads
- Zone 2 - Bushland
- Zone 3 - Rural Development
- Zone 4 - Suburban Development
- Zone 5 - Commercial Precinct

3.3.2 Assessment

The overall impact rating of the Proposal on any given landscape character zone is based on themes of sensitivity and magnitude.

Sensitivity

The degree to which a particular landscape type can accommodate change arising from a development, without detrimental effects on its character. This includes factors such as:

- Existing land use
- The pattern and scale of the landscape
- Visual enclosure, openness of views and distribution of visual receptors
- The value placed on the landscape.

Magnitude

The magnitude of the effects of the development within the landscape. Consideration is given to existing built form in the landscape and how closely the development matches this in bulk, scale and form. Magnitude is a study of the scale or degree of change to the landscape resource, the nature of the effect and its duration including whether it is permanent or temporary.

Overall Impact Rating

The severity of these impacts are calculated using Table 1 - based on a combination of magnitude and sensitivity.

		MAGNITUDE			
		HIGH	MODERATE	LOW	NEGLIGIBLE
SENSITIVITY	HIGH	HIGH	MODERATE-HIGH	MODERATE	NEGLIGIBLE
	MODERATE	MODERATE-HIGH	MODERATE	MODERATE/LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE/LOW	LOW	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Table 1: Landscape Character Impact Rating as a combination of Sensitivity and Magnitude.
Source: RMS Guidelines for Landscape Character and Visual Impact Assessment

CLOUSTON associates

Figure 6: Landscape Character Zones

LANDSCAPE CHARACTER ZONE 1 - MAIN ROADS

Photo A: The Wool Road

Element	Description
Topography	The road carriageway traverses through a modified landscape of undulating landform
Hydrology	Rainfall drainage varies, however in most situations drains from a central pitch in the road toward the road edge
Ecology/vegetation	Mixture of bushland at different intervals on both sides of the road, mixed with modified grassland associated with rural properties. Domestic plantings associated with residential areas also feature along the roads.
Land use	Transport Corridor
Built form	Rural/suburban road infrastructure
Spatial	Varies between enclosed views where dense bushland is adjacent to the road and open views within residential areas.

Development site ----- Site offset Zone 1 - Main Roads

CLOUSTON associates

DESCRIPTION

The quality of the road surface varies. It is mostly sealed, without kerb and gutter and lined with banks or swales. The road follows the general topography of the area with high points and valleys. Where the roadside is clear or free from trees, open views are available across the surrounding landscape.

ASSESSMENT

Sensitivity	Magnitude
The road is highly trafficked and used by local residents to access rural properties and local services. Although not a distinct tourist route the road does provide access for tourists to the Jervis Bay area. The speed limit is 60 kilometres per hour. Receptors move through this landscape zone relatively quickly. The sensitivity of this landscape zone to change is low given the recently developed service station and supermarket (at the corner of The Wool Road and Naval College Road) in close proximity to the development site.	Glimpses of the upper level(s) or roof of the development may be visible above the canopy line of the trees along sections of The Wool Road. The proposed built form is not thought to be visually dominant, but rather a contributor to the other built form in the area. The proposal is described as having a low magnitude within this landscape.

Sensitivity	LOW
Magnitude	LOW
Overall Landscape Character Impact Rating	**LOW**

From Table 1, using a combination of sensitivity and magnitude ratings.

Figure 6a: Landscape Character Zones

LANDSCAPE CHARACTER ZONE 2 - BUSHLAND

Photo B: Bushland area adjacent to The Wool Road

Element	Description
Topography	Varied topography including undulating landform with valleys and high points. There is a general fall of the land to the coastline and local creeks.
Hydrology	Rainfall drains to creeks and rural dams
Ecology/vegetation	The vegetation is dense consisting of a large variety of native trees, dense shrubs and some grasses
Land use	Privately owned
Built form	Limited to residential dwellings and farm buildings
Spatial	Mostly enclosed with views blocked by dense vegetation

CLOUSTON associates

DESCRIPTION

This landscape character zone occurs across a range of landform types from ridge lines to gullies. This zone commonly exists along roads corridors and is the dominant zone within the study area. Pockets of development occur within this zone including the service station and supermarket at the intersection of Naval College Road and The Wool Road.

ASSESSMENT

Sensitivity	Magnitude
There is some existing development within this zone such as rural dwellings, accommodation, schools etc. The vegetation provides a consistent backdrop to the coastline. The sensitivity rating is moderate.	Some vegetation on site will require removal as part of the development proposals. This would not include dense vegetation, but rather stand alone trees. The magnitude of the proposed development within this character zone is likely to be low.

Sensitivity	MODERATE
Magnitude	LOW
Overall Landscape Character Impact Rating	**MODERATE/LOW**

From Table 1, using a combination of sensitivity and magnitude ratings.

Figure 6b: Landscape Character Zones

LANDSCAPE CHARACTER ZONE 3 - RURAL DEVELOPMENT

Photo C: View towards The Wool Road rural properties

Element	Description
Topography	Sloping land falling away from ridge line (situated along the southern boundary of the site) towards The Wool Road and the coast line.
Hydrology	Rainfall drains to creeks and rural dams and also the main road drainage systems
Ecology/vegetation	Mixture of native and exotic planting within property boundaries, some planted in groups, others as stand alone trees and shrubs. Some properties are heavily vegetated with dense bushland.
Land use	Residential and farm development
Built form	Houses and farm buildings
Spatial	Varies between enclosed and open depending on topography and vegetation

CLOUSTON associates

DESCRIPTION

This character zone is concentrated as one pocket surrounding the development site. Due to the topography of the study area some rural dwellings will have views of the site. Other dwellings are further away and view the site through vegetation creating filtered/obstructed views of the site.

ASSESSMENT

Sensitivity	Magnitude
Residential development is low density (one to two storeys) and on large lot sizes. This is a distinct characteristic of this zone. Any new development will contribute to the built form already in place within the zone. The zone is described as having a moderate to high sensitivity to change.	The new development is likely to be visible from some parts of this zone. Existing vegetation will block views from some properties whereas others will most likely have direct views or filtered views. The proposal is described as having a moderate to high magnitude in this landscape.

Sensitivity	**MODERATE/HIGH**
Magnitude	**MODERATE/HIGH**
Overall Landscape Character Impact Rating	**MODERATE/HIGH**

From Table 1, using a combination of sensitivity and magnitude ratings.

Figure 6c: Landscape Character Zones

LANDSCAPE CHARACTER ZONE 4 - SUBURBAN DEVELOPMENT

Photo D: View looking east along Macgibbon Parade, Old Erowal Bay; and E: Typical style of housing and streetscape in new Stockland development off Naval College Road (Skiff Street)

Element	Description
Topography	Varied topography
Hydrology	Stormwater systems and local creeks
Ecology/vegetation	Mixture of stand alone trees and large shrubs, both native and exotic, planted within property boundary lines. Street tree planting in some streets
Land use	Residential
Built form	One to two storey houses with sheds, garages, car ports etc.
Spatial	Generally open due to the nature of the street layout and low density residential development

CLOUSTON associates

DESCRIPTION

This character zone is located in pockets near the development site. Many properties are set back from the road and have limited views outside the zone. A fence and dense screen planting is situated along the property boundaries of the Naval College Road suburban area blocking views of the site.

ASSESSMENT

Sensitivity	Magnitude
Screen planting, orientation and low density contribute to the low sensitivity of this zone.	The development is not likely to be visible from this zone. The proposal is described as contributory within this zone and as having a low magnitude.

Sensitivity	LOW
Magnitude	LOW
Overall Landscape Character Impact Rating	**LOW**

From Table 1, using a combination of sensitivity and magnitude ratings.

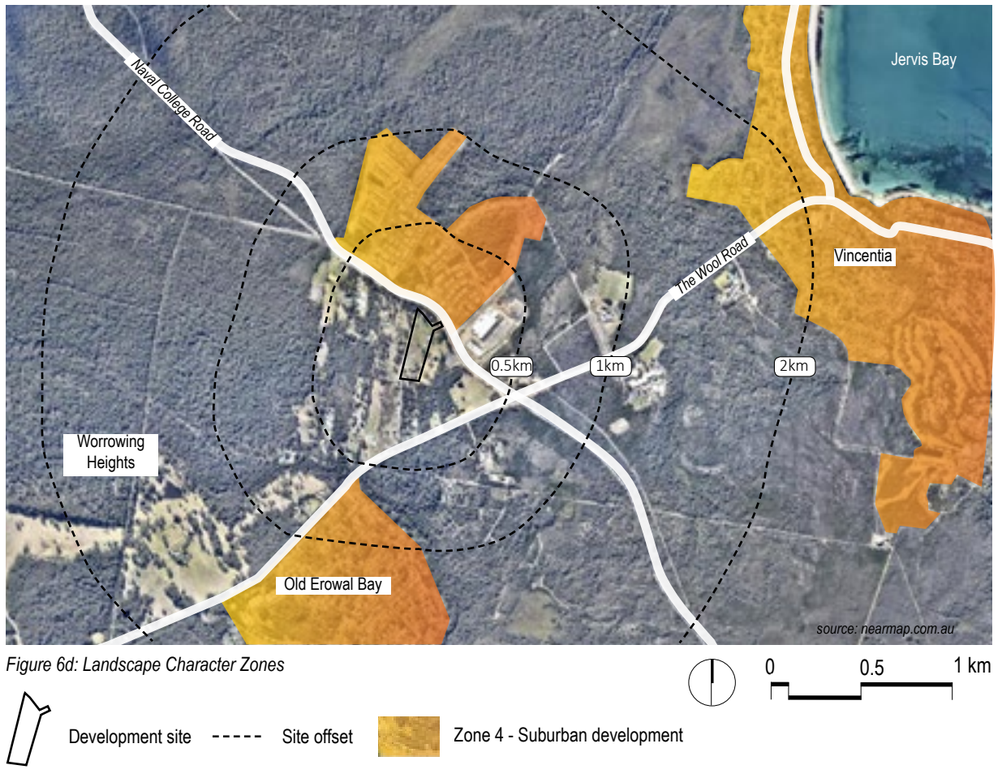


Figure 6d: Landscape Character Zones

LANDSCAPE CHARACTER ZONE 5 - COMMERCIAL PRECINCT

Photo F: Petrol station with shopping centre in background

Element	Description
Topography	Varied topography including steep slope and retaining walls in order to create a level area for the precinct
Hydrology	Engineered drainage including stormwater system
Ecology/vegetation	Limited vegetation due to large areas of hard standing to accommodate car parking and built form.
Land use	Commercial precinct - petrol station and shopping centre
Built form	2 storey large format buildings
Spatial	Open views

DESCRIPTION

This zone consists of a recently developed combined petrol station and shopping centre with associated car parking areas, rain gardens and landscape. The precinct is on the corner of Naval College Road and The Wool Road, opposite the development site. The commercial precinct is located approximately 2 to 3m lower than Naval College Road and the development site.

ASSESSMENT

Sensitivity	Magnitude
The proposed development will be in view from this zone. The overall change in character will be in line with the commercial precinct development and character. The zone is described as having a low sensitivity to change.	The development site will be in view from this zone. The proposed built form will be a contributory factor in a highly modified and developed commercial precinct and is therefore deemed likely to have a low magnitude.

Sensitivity	LOW
Magnitude	LOW
Overall Landscape Character Impact Rating	**LOW**

From Table 1, using a combination of sensitivity and magnitude ratings.

Figure 6e: Landscape Character Zones

3.4 LANDSCAPE CHARACTER SUMMARY

The landscape character of the study area is typical of the South Coast of NSW with undulating hillsides, large swathes of native vegetation, creek lines, ridges and a low density of rural and suburban residential development.

The overall impact of the Proposal on landscape character is rated as (refer to summary Table 2 below):

- Low across three character zone - Main Roads, Suburban Development and Commercial Precinct.
- Moderate/low across one zone - Bushland
- Moderate across no zones
- Moderate/high across one zone - Rural Development

Due to the topography and extent of existing bush land located within and also surrounding the study area the proposal is not likely to have a high impact on any of the character zones as described in this report. The Proposal may impact the amenity value of the Rural Development zone, rated as moderate/high, as well as altering some of its distinguishable landscape characteristics.

The Proposal will form a new feature within the project area. All the zones studied, however, have the capability to absorb change to some extent. The prominent height of the built form (up to 17.5 metres) turbines will be the most noticeable element of the Proposal, standing out in a landscape that features one to two storey buildings and structures.

Despite being dominated by bushland areas, large portions of the NSW Southern Coast has been heavily modified by agricultural for pasture and crop production and also pockets of suburban/commercial development. Irrespective of the extent and nature of modifications to the landscape, it is not correct to assume that the landscape surrounding the Proposal should be any less valued as a result of modification. Physical change in the appearance of the landscape is an ongoing and constant process from both human and environmental influences and can result in both positive and negative effects.

Summary of Landscape Character impacts

Zone	1. Main Roads	2. Bushland	3. Rural D'ment	4. Suburban D'ment	5. Commercial Precinct
Sensitivity	LOW	MODERATE	MODERATE/HIGH	LOW	LOW
Magnitude	LOW	LOW	MODERATE/HIGH	LOW	LOW
Overall Rating	**LOW**	**MODERATE/LOW**	**MODERATE/HIGH**	**LOW**	**LOW**

Table 2 Summary of Landscape Character Impacts

Existing Eucalypt trees within the Development site

4

VISUAL IMPACT ASSESSMENT

Looking south-east on Naval College Road

4.0 VISUAL IMPACT ASSESSMENT

4.1 CHAPTER OVERVIEW

This section of the report:

- Describes the extent of the study area.
- Explains the methodology used for the Visual Impact Assessment (VIA).
- Describes and assesses the visual impact on public and private domain receptors.
- Provides an indicative view of the proposed development for each receptor.
- Provides a summary of table and map of the receptor visual impacts.

4.2 VISUAL IMPACT ASSESSMENT STUDY AREA

For the purpose of this report the study area for the VIA is defined as the area of land within and beyond the project area which could be potentially visually affected by the Proposal. Based on a desktop analysis and site visit, a study area of approximately 1km offset from the site boundary was identified based on topography, receptor location and viewing distance.

Figure 7: Study area

4.3 KEY VISUAL RECEPTORS

During a detailed site visit (conducted on 2 March 2016), 14 key receptor sites with the potential to be visually impacted by some element of the Proposal were identified and selected for further analysis. These included both public and private domain views (refer Table 3 below and Figures 8 and 9 overpage). This is not an exhaustive list of all receptors that will be impacted by the Proposal but is considered representative of the spread of receptors within the study area.

4.3.1 Public Domain

The public domain within the study area with visibility of the Proposal includes main roads and public facilities.

4.3.2 Private Domain

Residential receptors which are likely to have views of the Proposal are located to the south, east and west of the site. Some of these properties are at the lower portion of the ridge line that runs along the southern boundary of the site. Others are adjacent to the site. There is a mixture of unobstructed and filtered views to the Proposal due to existing vegetation, other built form and topography.

4.3.3 Key Visual receptor summary

The following tables provide a summary list of each receptor.

Private Domain

Receptor No.	Type of receptor	Description
1	Dwelling	1312 Naval College Road
2	Dwelling	1308 Naval College Road
3	Dwelling	1282 Naval College Road
4	Dwelling	Property on Naval College Road (adjacent to R3)
5	Dwelling	10 Birriga Road
6	Dwelling	6 Birriga Road
7	Dwelling	4 Birriga Road
8	Dwellings	203, 205, 217 The Wool Road

Public Domain

Receptor No.	Type of receptor	Description
9	Commercial centre	Shopping centre and petrol station
10	Public building/ structure	Electricity Sub-station
11	Public building	Rural Fire Service building
12	Public building	Bay and Basin Leisure Centre
13	Public Park	Sports field
14	Main Road	Naval College Road

Table 3: Summary of key Receptors/viewpoints

4.4 VIA METHODOLOGY

4.4.2 Sensitivity and Magnitude

The overall impact rating of the Proposal on any given visual receptor is based on factors of magnitude and sensitivity.

Sensitivity

Each visual receptor type has an inherent and varied sensitivity to change in the visual scene based on their personal context in which the view is being experienced. This will have a direct bearing on the perception of visual impact experienced by the receptor and qualifies the quantitative impacts. Appendix A describes the levels of sensitivity for each receptor type.

Magnitude

The magnitude of the visual effects of the development within the landscape. A series of quantitative assessments are studied, including distance from development, quantum of view, duration of view and magnitude of change. Appendix A describes the ratings assigned to these quantitative assessments.

Overall impact rating

The severity of these impacts is calculated using matrix Table 3 - based on a combination of magnitude and sensitivity.

		MAGNITUDE			
		HIGH	MODERATE	LOW	NEGLIGIBLE
SENSITIVITY	HIGH	HIGH	MODERATE-HIGH	MODERATE	NEGLIGIBLE
	MODERATE	MODERATE-HIGH	MODERATE	MODERATE/LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE/LOW	LOW	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Table 4: Landscape Character Impact Rating as a combination of Sensitivity and Magnitude.
Source: RMS Guidelines for Landscape Character and Visual Impact Assessment

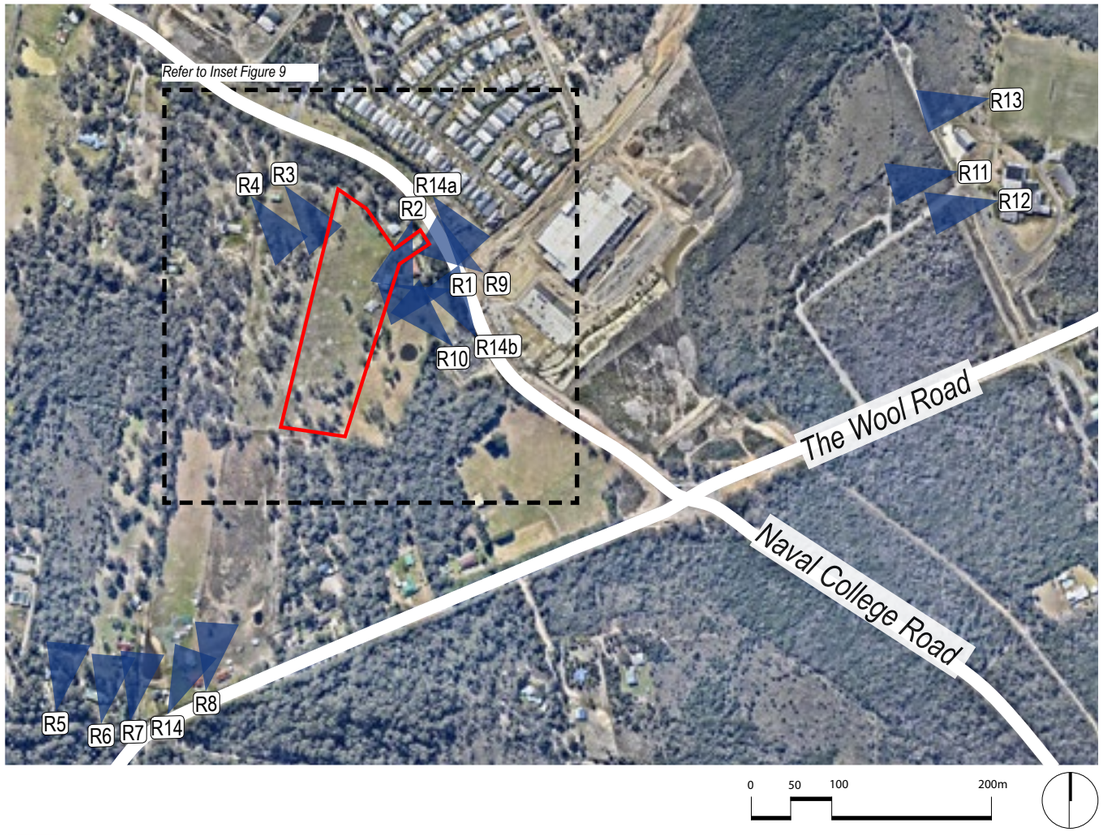


Figure 8: Receptor and viewpoint locations (part 1) (source nearmap)

Figure 9: Receptor and viewpoint locations (part 2) (source nearmap)

4.4.1 Viewpoint Analysis

Each Receptor analysis includes a description of the current view from a specific viewpoint followed by a discussion of the potential visual impacts of the Proposal on that view. Each viewpoint is accompanied by a location map and photograph of the current view, including an indicative location of the Proposal within the view. This is indicative only.

For a detailed description of the assessment factors and impact ratings used see Appendix A.

4.4.2 Receptor/Viewpoint Access

For residential receptors, access was not possible to the property itself. For the visual impact assessment, a photo was taken at the closest publicly accessible point - often the end of the properties driveway. The description of visual impact is therefore estimated from the property's main dwelling area.

Example of Receptor and viewpoint analysis

RECEPTOR X

Receptor number

Location map

Viewpoint location

Photo location and direction marker

Viewpoint photo

Indicative location of the Proposal

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
1	M	M	L	M	M	M

Assessment matrix table
Refer Appendix A for more details

Visual Impact Rating	MODERATE

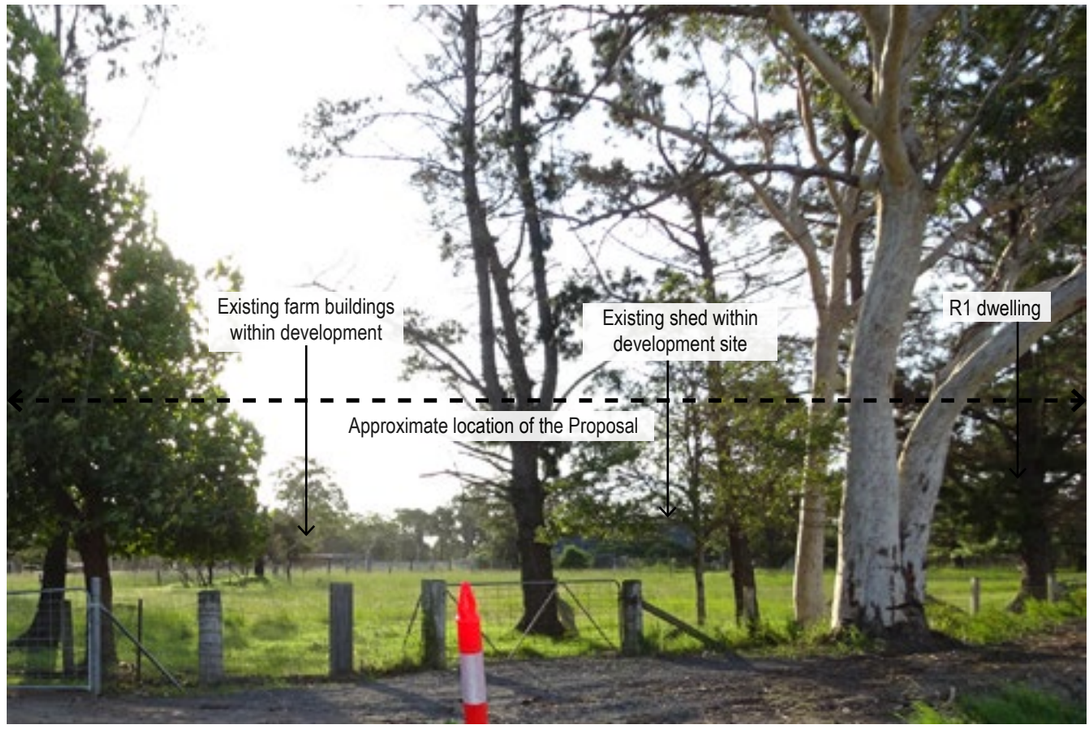
Overall visual impact

Dense vegetation along Biggira Road

RECEPTOR VIEWPOINT 1

Photograph of receptor

Viewpoint Location



Photograph of receptor's view (taken closer to R10 due to vegetation along R1 boundary blocking views)

Location	Type	Distance to site (m)	No. of properties	Receptors
1312 Naval College Road	Dwelling	170	1	Residents

Current view	Expected Visual Impact
Views from the property were difficult to obtain due to established trees. The viewpoint (looking west) shows a position further south-east on Naval College Road road where it is assumed views of the proposal would be experienced from within the yard/paddock area. The views are mostly open from within the property. Some planting along the north western boundary near the dwelling provides some screening.	The Proposal will be visible from this receptor. Being a neighbouring property the visual impact is likely to be significant. Views to the sky will be obstructed and the new built form is likely to be a dominant feature in the landscape. A sound barrier/wall may be installed along the boundary between the two properties. This feature will also have a significant impact on this receptor.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R1	M-H	H	M-H	H	M-H	H

Overall Visual Impact Rating	MODERATE-HIGH

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 2

Photograph of receptor

Viewpoint Location

Photograph of receptor's view

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Location	Type	Distance to site (m)	No. of properties	Receptors
1308 Naval College Road	Dwelling	212	1	Residents

Current view	Expected Visual Impact
The viewpoint taken from Naval Collage Road looking south west indicates mostly open views of the site from within the property and rear rooms of the dwelling (assumed, as access was not possible). Some planting along the north western boundary near the dwelling provides some screening.	The Proposal will be visible from this receptor. Due to the fact that the proposed development is located on the neighbouring property the visual impact is likely to be significant. Views to the sky will be obstructed and the new built form is likely to be a dominant feature in the landscape. A sound barrier/wall may be installed along the boundary between the two properties. This feature will also have a significant impact on this receptor.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R2	M-H	H	M-H	H	M-H	H

Overall Visual Impact Rating	MODERATE-HIGH

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 3

Photograph of receptor

Viewpoint Location

Photograph of receptor's view, from western boundary fence line, approximately 50m south of dwelling

Location	Type	Distance to site (m)	No. of properties	Receptors
1282 Naval College Road	Dwelling	183	1	Residents

Current view	Expected Visual Impact
The viewpoint taken approximately 50m from the dwelling looking east shows filtered views from the property and the dwelling to the development site. There are some existing trees that provide some screening.	Due to the fact that the proposed development is located on the neighbouring property the visual impact is likely to be significant. Views to the sky will be obstructed and the new built form is likely to be a dominant feature in the landscape.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R3	M-H	H	M-H	H	M-H	M-H

Overall Visual Impact Rating	MODERATE-HIGH

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 4

Development site

Viewpoint location

Photograph of receptor

Viewpoint Location

Photograph of receptor's view (taken at a point in line with the dwelling house from within R3 property)

Location	Type	Distance to site (m)	No. of properties	Receptors
Naval College Road	Dwelling	222	1	Residents

Current view	Expected Visual Impact
The viewpoint looking south east shows filtered views to the site across one property with scattered trees. Screen planting has been planted along the receptor boundary but is not yet established to block views.	The proposal will be visible from this viewpoint. The change in topography, that is the Proposal will be situated at a lower level to the receptor , will reduce the overall built form that will be visible.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R3	M-H	H	M-H	H	M-H	M-H

Overall Visual Impact Rating	MODERATE-HIGH

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 5

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
10 Biggira Road	Dwelling	694	1	Residents

Current view	Expected Visual Impact
The viewpoint looking north west shows dense existing vegetation with limited views of the Proposal. However it is assumed that filtered views of the site are possible. Houses along Biggara Road are visible from the southern boundary of the development site. The receptor is situated at a lower level than that of the development site.	The upper level and/or roof of the Proposal may be visible from this viewpoint. However there are existing trees that will provide screening and/or filtered views. The Proposal would be viewed at a distance of nearly 700m with other built form (other existing houses) within the view to the development site.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R5	M-H	M	M-L	M-H	M	M

Overall Visual Impact Rating	MODERATE

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 6

Photograph of receptor

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
6 Biggira Road	Dwelling	673	1	Residents

Current view	Expected Visual Impact
The viewpoint looking north east from the property driveway shows vegetation along the receptor's boundary. This creates a visual filter between the receptor and the development site. The house is situated at the road level, which is lower than the development site. Tree coverage at the rear and along the eastern boundary of the site was not fully assessed but assumed from review of aerial photographs to be scattered and thought to provide screening.	The upper level and/or roof of the Proposal may be visible from this viewpoint. However there are existing trees that will provide screening and/or filtered views. The Proposal would be viewed at a distance of nearly 700m with other built form (other existing houses) within the view to the development site.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R6	M-H	M	M-L	M-H	M	M

Overall Visual Impact Rating	MODERATE

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 7

Aerial photograph of receptor

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
4 Biggira Road	Dwelling	662	1	Residents

Current view	Expected Visual Impact
The viewpoint was taken from the driveway entrance of a battle-axe property. The viewpoint looking north east indicates filtered views to the development site. Existing trees along the eastern boundary of the receptor property provide some level of screening. However limited vegetation on neighbouring properties on The Wool Road allows views to the development site boundary.	It is possible that the upper level(s) and/or roof of the Proposal could be seen from this receptor. However there are existing trees that will provide screening and/or filtered views. The Proposal would be viewed at a distance of approximately 650m with other built form (other existing houses) within the view to the development site.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R7	M-H	M	M-L	M-H	M	M

Overall Visual Impact Rating	MODERATE

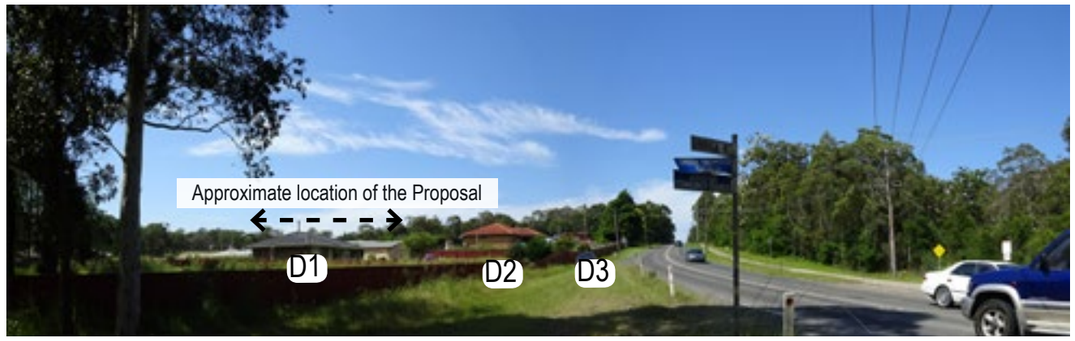
From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 8

Aerial photograph of receptor (three dwellings D1, D2, D3)

Viewpoint Location

View from southern boundary of development site showing The Wool Road properties



General receptor view from The Wool Road

Location	Type	Distance to site (m)	No. of properties	Receptors
The Wool Road (no.s 203, 205, 217)	Dwellings	600	3	Residents

Current view	Expected Visual Impact
Viewpoints from receptor driveways were obstructed and did not provide an indication of the likely view to the development site. Other views were taken to determine the overall view analysis of this group of receptors including views from the southern boundary of the development site and from The Wool Road. It can be assumed that the development site can be seen from this receptor. The lack of vegetation within the property boundaries of dwellings 2 and 3 allows views up the to the top of the ridge line/development site boundary.	It is possible that the upper level(s) and/or roof of the Proposal could be seen from this receptor. However there are existing trees that will provide screening and/or filtered views. The Proposal would be viewed at a distance of approximately 600m with other built form (existing houses/sheds etc.) within the view to the development site.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R8	M-H	M	M-L	M-H	M	M

Overall Visual Impact Rating	MODERATE

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 9

Photograph of receptor

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
Naval College Road	Commercial (shopping centre/petrol station)	222	2	Users and employees

Current view	Expected Visual Impact
The viewpoint looking north west from the public footpath adjacent to the shopping centre and petrol station indicates obstructed views to the development site. The footpath is at the road level, whereas the commercial development is at a lower level where views would be further obstructed.	Obstructed views of the Proposal are expected from this viewpoint. The upper level(s) may be visible as the structure rises in height towards the rear of the development site. Existing trees along Naval College Road will continue to screen the site.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R9	M-L	H	M-L	M	M-L	L

Overall Visual Impact Rating	MODERATE-LOW

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 10

Photograph of receptor

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
Naval College Road	Public infrastructure	163	1	Employees

Current view	Expected Visual Impact
The viewpoint looking north west indicates filtered views of the site through existing trees. The existing dwelling and shed on the development site are visible.	Filtered views of the Proposal are expected from this viewpoint. Existing trees along Naval College Road will continue to screen the site. The commercial precinct (R9) is also taken into consideration in terms of the scale and size of built form recently constructed in close proximity to the site. The Proposal would contribute to the existing built form and would not necessarily be at odds with the visual qualities of the immediate Naval College Road area. Although some ratings are listed as High to Moderate below, the Substation is not highly frequented. It is assumed employees would not spend extended periods of time at the sub-station, nor would they be focused on the views to the development site whilst they were attending to work matters.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R10	M-L	H	M	M	M-L	L

Overall Visual Impact Rating	MODERATE

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 11

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
Off The Wool Road	Public facilities (Crossroads Rural Fire Brigade)	913	1	Users/ Employees

Current view	Expected Visual Impact
Access to the building was not possible. The viewpoint, looking south west was obtained at the site gate. The viewpoint shows vegetation that exists between the receptor and the development site. The topography is such that the commercial precinct (R9) is not visible. It is assumed that the view from the building is similar to that of R13 where the development site is visible.	There is likely to be minimal impact on the visual quality of the viewpoint from this location. The upper level(s)/roof of the Proposal may be visible from within the fenced area. The Proposal would contribute to the existing built form within the landscape.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R11	L	M	L	M	L	L

Overall Visual Impact Rating	LOW

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 12

Viewpoint Location

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
Off The Wool Road	Public facilities (Bay and Basin Leisure Centre)	928	1	Users/employees

Current view	Expected Visual Impact
The viewpoint looking east shows the rooftops and trees within the Stockland housing and commercial developments off Naval College Road.	There is likely to be minimal impact on the visual quality of the viewpoint from this location. The upper level(s)/roof of the Proposal may be visible above the existing houses and trees. The Proposal would contribute to the existing built form within the landscape.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R12	M-L	M	L	M	L	L

Overall Visual Impact Rating	LOW

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 13

Viewpoint Location

Photograph of receptor's view

Location	Type	Distance to site (m)	No. of properties	Receptors
Off The Wool Road	Public Park	979	1	Users

Current view	Expected Visual Impact
The viewpoint shows long distance views of the development site. However the view is across the creek line, existing vegetation, the rooftops and trees within the Stockland housing estate and commercial developments off Naval College Road. Trees and power lines along Naval College Road are also visible.	There is likely to be minimal impact on the visual quality of the viewpoint from this location. The upper level(s)/roof of the Proposal may be visible above the existing houses and trees. The Proposal would contribute to the existing built form within the landscape.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R13	H	M	L	M	L	L

Overall Visual Impact Rating	LOW

From Table 3, using a combination of sensitivity and magnitude ratings.

RECEPTOR VIEWPOINT 14

Photograph of receptor

Viewpoint Location

Photograph of receptor's view (14a)

Photograph of receptor's view (14b)

Location	Type	Distance to site (m)	No. of properties	Receptors
Naval College Road - travelling north west and south east	Main Road	varies	n/a	Users of Naval College Road

Current view	Expected Visual Impact
As shown in the viewpoint photographs opposite there are several existing, mature trees planted along Naval College Road. Theses trees provide filtered views and in some instances screen the development site. Views directly into the site are limited due to the narrow driveway entrance and tapered shape of the site.	The Proposal will be visible whilst travelling in both directions along Naval College Road. When travelling south east the view may be obstructed by vegetation with R2's (no. 1308) property. More direct glimpses of the Proposal would be experienced whilst driving past the entrance to the Proposal. Whilst travelling north west the upper levels of the Proposal may be seen. The receptors will move past the Proposal quickly when travelling in both directions. However motorists will be required to reduce speed at the roundabout to the Commercial Precinct. Views of the Proposal may be more prominent in this location.

RECEPTOR IDENTIFICATION	RECEPTOR SENSITIVITY	MAGNITUDE				
		DISTANCE	QUANTUM OF VIEW	PERIOD OF VIEW	MAGNITUDE OF CHANGE	SUMMARY OF RATINGS
R14	M	H	M-L	M-L	M-L	M

Overall Visual Impact Rating	MODERATE

From Table 3, using a combination of sensitivity and magnitude ratings.

4.6 VISUAL IMPACT SUMMARY

4.6.1 Overall Summary

From the analysis of visual receptors in the foregoing section, the summary of qualitative and quantitative visual impacts of the proposal are:

Receptor Identification	Receptor Type	Location	Receptor Sensitivity	MAGNITUDE					Overall Impact Rating
				Distance	Quantum of View	Period of View	Magnitude of Change	Summary of Magnitude Ratings	
Private Domain									
1	Dwelling	1312 Naval College Road	M-H	H	M-H	H	M-H	H	MODERATE-HIGH
2	Dwelling	1308 Naval College Road	M-H	H	M-H	H	M-H	H	MODERATE-HIGH
3	Dwelling	1282 Naval College Road	M-H	H	M-H	H	M-H	H	MODERATE-HIGH
4	Dwelling	Property on Naval College Rd	M-H	H	M-H	H	M-H	M-H	MODERATE-HIGH
5	Dwelling	10 Birriga Road	M-H	M	M-L	M-H	M	M	MODERATE
6	Dwelling	6 Birriga Road	M-H	M	M-L	M-H	M	M	MODERATE
7	Dwelling	4 Birriga Road	M-H	M	M-L	M-H	M	M	MODERATE
8	Dwellings	203, 205, 217 The Wool Road	M-H	M	M-L	M-H	M	M	MODERATE
Public Domain									
9	Commercial centre	Shopping centre and petrol station	M-L	H	M-L	M	M-L	L	MODERATE-LOW
10	Public building/ structure	Electricity Sub-station	M-L	H	M	M	M-L	L	MODERATE
11	Public building	Rural Fire Service building	L	M	L	M	L	L	LOW
12	Public building	Bay and Basin Leisure Centre	M-L	M	L	M	L	L	LOW
13	Public Park	Sports field	H	M	L	M	L	L	LOW
14	Main Road	Naval College Road	M	H	M-L	M-L	M-L	M	MODERATE

Table 5 - Summary of visual impacts of the Proposal across the study area

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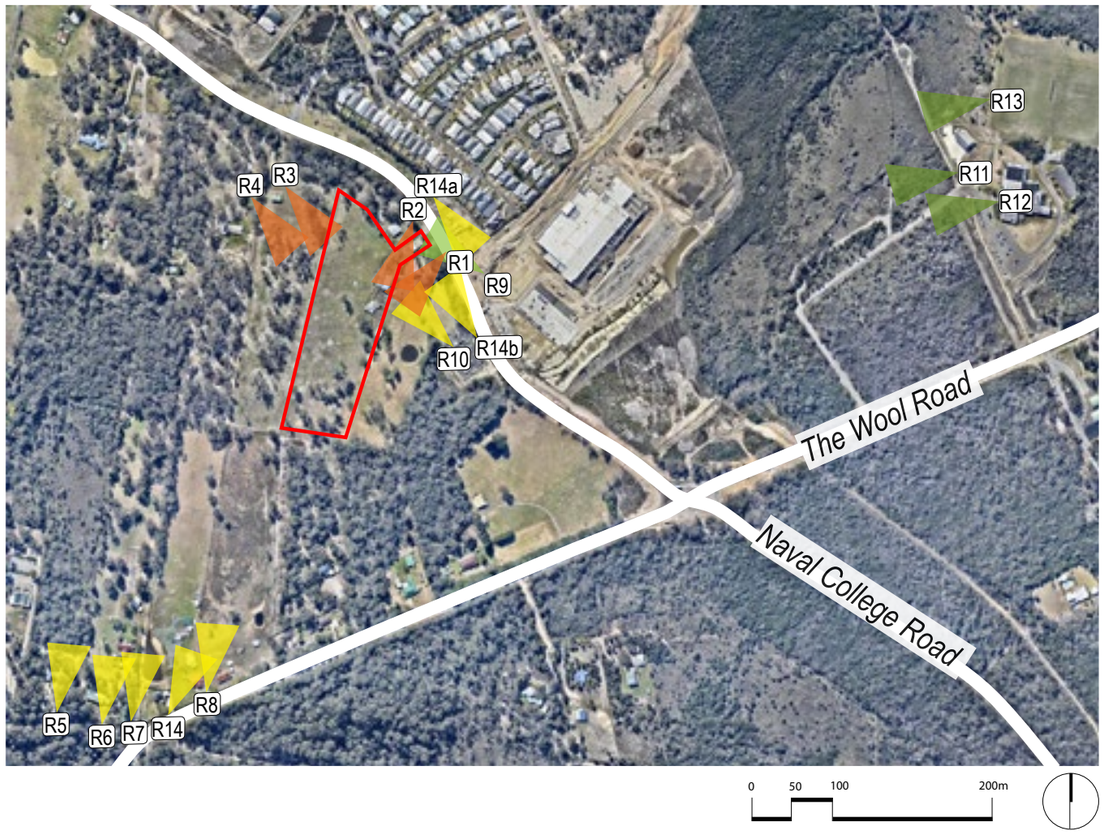

Figure 8: Summary of visual impacts of the Proposal across the study area

4.6.2 Private Receptors

The visual impacts of the Proposal on the private viewpoints studied range from moderate to moderate/high (refer Table 5 and Figure 8):

- four viewpoints rated as moderate (R5, R6, R7, R8)
- four viewpoints rated as moderate-high (R1, R2, R3, R4)

Generally, the closer the proximity of the dwelling to the Proposal, the higher the visual impact.

Local vegetation and topography can significantly alter the visual impact experienced by individual properties. Many of the dwellings are surrounded by vegetation in the form of garden planting and/or nearby bushland. These may filter or block views of the Proposal from the main part of a dwelling. However, the Proposal is most likely to be visible from other parts of the property (such as the driveway, yards etc.) and so a visual impact is still recorded.

4.7.1 Public Receptors

The visual impacts of the Proposal on the public viewpoints studied range from low to moderate (refer Table 5 and Figure 8):

- two viewpoints rated as moderate (R10, R14)
- one viewpoints rated as moderate-low (R9)
- three viewpoints rated as low (R11, R12, R13).

The low to moderate-low visual sensitivity of many of the public receptors has helped reduce the level of visual impact experienced. The main roads that traverse the study area such as Naval College Road are frequently trafficked at 60km/hour. Despite the Proposal being in relatively close proximity to the main road, the low sensitivity to change and the short duration of views experienced ensures a moderate impact on visual amenity.

Three public facilities were assessed as part of the visual impact assessment. Two (R11, R12) of the three facilities core activities were focused within the building with no or limited views of the Proposal from inside the building. The third (R13) facility is a park/sports field where again, the focus of the activity is within the park/field space but due to the nature of an open area views to the Proposal are experienced more frequently.

4.7 CONSTRUCTION IMPACTS

Potential visual impacts may occur during the construction phases of the Proposal. The key construction activities that would be visible from areas surrounding the development site include:

- ongoing detailed site assessment including sub-surface geotechnical investigations.
- various civil works to upgrade access point(s).
- construction facilities, including portable structures and laydown areas.
- construction and directional signage.
- excavation, earthworks and vegetation clearing.
- various construction activities including erection of structures, cranes, construction vehicle etc.
- night lighting for out of hours work (if this is permitted under Council regulations).

The majority of the construction activities are generally temporary in nature. The cranes are likely to be the most visible construction elements although the majority of activities would be unlikely to result in an unacceptable level of visual impact given the relatively short duration of construction.

4.9 NIGHTTIME LIGHTING

It is envisaged that the Proposal will include night lighting. This could include:

- Street lighting for general safety and way finding throughout the development.
- Feature lighting to highlight planting, architectural features and potentially public art could also be incorporated in the Proposal.
- Lighting of corridors, motel rooms, foyer adn public areas.

The impact of night lighting and existing light sources were not assessed as part of the VIA. However it was noted that street lighting along Naval College Road and The Wool Road provide strong sources of light to the study area.

Night time lighting associated with the Proposal could be visible from a number of the residential locations within the study area, however, topography and screening vegetation would block or partially obscure views toward night time obstacle lighting.

Overall, night lighting (if installed) is expected to have a moderate/low impact on the viewpoints studied.

5

MITIGATION MEASURES

View from Biggira Road looking north

6.0 MITIGATION MEASURES

6.1 TYPES OF MITIGATION
Effective mitigation measures for any form of potential visual impact are those that entail:

- Avoidance
- Reduction
- Alleviation

6.2 AVOIDANCE
A thorough site analysis has been undertaken to identify the most suitable parts of the site to be developed on. Avoidance measures have not been considered suitable for this Proposal.

6.3 REDUCTION
The principal forms of reduction are associated with refinements and modifications that address the siting and scale of built form. Measures include:

- Locating built form in cleared or otherwise disturbed areas away from vegetation.
- Avoiding stockpiling materials in areas supporting vegetation where possible.
- Restricting vegetation clearing to those areas where it is necessary. Opportunities to minimise clearing should be part of the detailed design.
- Working with the site's existing topography to position taller buildings in locations where their built form imposes less of a visual impact.
- Trimming rather than removal of trees to be undertaken where possible and to be conducted by a qualified arborist.
- Rehabilitating vegetated areas where ground is disturbed.

6.3 ALLEVIATION
Options to alleviate impacts are usually associated with detailed design features such as materials, finishes, reflectivity, planting character and the like. Measures include:

6.3.1 Vegetation
- Planting along site boundaries to screen built form and reduce the scale of the built form.
- Reinforce the local semi-rural landscape character through the use of appropriate vegetation including stand alone trees within grassland, dense bushland areas and a mixture of native and exotic gardens to reflect the domestic landscape of the study area.
- Areas disturbed by construction to be restored to match existing condition.

6.3.2 Materials and finishes
- A sound wall is proposed along the south eastern and northern boundaries. This should be a feature in the landscape through the use of public art and/or green walls.
- Materials should reflect the local surroundings and character of the study area.
- Finishes and colours should be subtle with some feature colours.
- Architectural screening of any services/equipment/vents/lift shafts on the roof of hte building(s)

6.4 OFF SITE MITIGATION
Tree and shrub planting outside the Proposal boundary may assist in visually screening the bypass and should be considered further during the detailed design. This would be appropriate for the Private receptors.

6

CONCLUSION

View looking north west at Naval College Road and Moona Creek Road roundabout

7.0 CONCLUSION

A comprehensive LCVIA of the Proposal and the surrounding area has been conducted. The assessment has identified and evaluated landscape character zones, key viewpoints, distance zones, viewer sensitivity and overall impacts using best practice methodology.

In summary, this LCVIA concludes that the Proposal has a relatively limited visual catchment and overall moderate visual impact on due to:

- The limited number of sensitive residential dwellings in proximity to the project area.
- The limited number of public viewers on roads and limited quantity of public open space.
- Topography that limits views of the project area, blocking views of the majority of the Proposal from distances of over 2km
- Dense areas of bushland and planting within private residences that block or filter views towards the Proposal.

The low density of residential viewer locations within the study area ensures that moderate/high visual impacts are limited to dwellings within 1km of the Proposal. The viewpoints that have received the highest visual impact ratings are neighbouring properties with panoramic views over the site and its surrounds. The lack of existing tall built form within the study area is likely to add to the visual prominence of the Proposal.

Public viewpoints are mostly limited to the local road network. These view locations are dynamic with motorists travelling along the roads relatively quickly, reducing the duration of the view and hence the severity of the visual impact. The other public receptors are a mixture of facilities, all of whose activities are focused within a building or on activities within the immediate area of the receptor.

The recent development of the petrol station, shopping centre and housing estate off Moona Creek Road demonstrate a recently modified landscape. The Proposal contributes to the built form and scale of these developments. The Proposal is not a stand alone development within a pristine landscape, but rather a contributing factor of the overall landscape and visual quality of the area.

Some mitigation measures are considered appropriate to minimise the visual effects of the Proposal. The extent and nature of appropriate mitigation measures for private receptors would be subject to consultation and agreement with individual property owners.

7 PHOTOMONTAGES

View from public park looking east towards the development site

7.0 PHOTOMONTAGES

7.1 METHODOLOGY

Photos for the Proposal were taken on 2 March 2016. The weather was sunny for the entire site visit. Photos were taken at 3 viewpoints in total (refer to Figure 9).

The following tasks were undertaken to create the photomontages:

- A basic Sketch up model of the Proposal was prepared.
- The model was inserted into a Google Earth terrain model in its approximate location on the development site.
- The viewpoints were located within Google Earth.
- Screen shots of the Proposal were taken from the viewpoint locations.
- Photoshop software was used to delete trees and buildings that will be removed as part of the Proposal.

The photomontages provide an indicative view of the Proposal. The images are not spatially correct or geo-referenced. They are an approximation of what the Proposal may look like within a particular view.

Photomontage 1
This view is taken from the northern side of Naval College Road (travelling south east), opposite no. 1308 (Receptor no. 2). Key observations from this montage are:

- Existing and proposed trees screen the south eastern part of the development.
- New tree planting along the development driveway and property boundaries will provide further screening.
- Whilst travelling at approximately 60km per hour on this road the actual views experienced will be fleeting and not directly into the property as indicated by the photomontage.

Photomontage 2
This view is taken from the roundabout intersection of Naval College Road and Moona Creek Road, on the footpath adjacent to Receptor no. 9. Key observations from this montage are:

- Tall, existing trees provide a screen to the proposed buildings. Additional planting will further screen the buildings.
- The general view at the roundabout will also include the commercial precinct to wards the east.

Photomontage 3
This view is taken from the southern side of Naval College Road (travelling north west), near the sub station (Receptor no. 10). Key observations from this montage are:

- Tall, existing trees provide a screen to the proposed buildings. Additional planting will further screen the buildings.
- The general view along this road will also include the commercial precinct to wards the east.

Development site

Photomontage location

Figure 9: Photomontage Viewpoint Locations

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PUBLIC PHOTOMONTAGE 1

Location: Naval College Road, opposite site

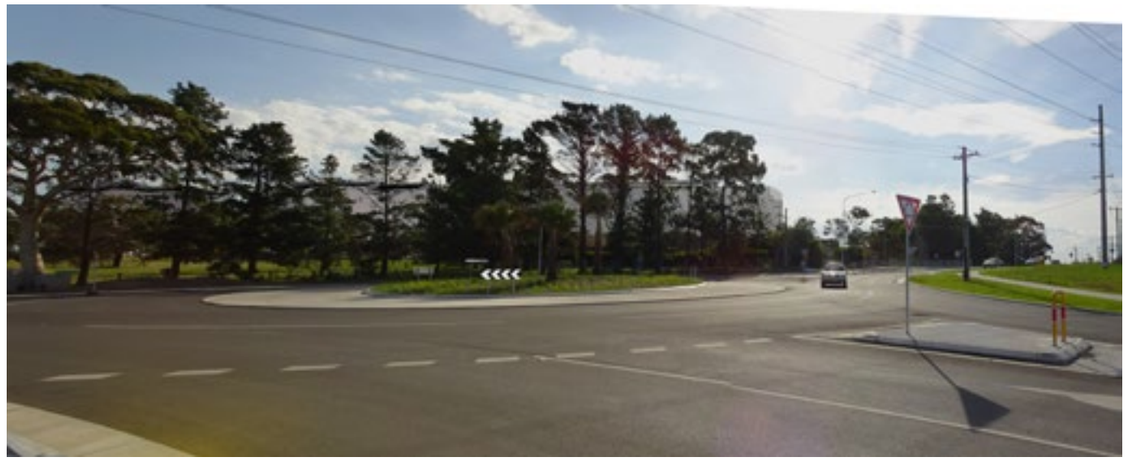
Existing

Proposed

PUBLIC
PHOTOMONTAGE 2

Location: Corner of Naval College Road and Moona Creek Road

Existing



Proposed

PUBLIC
PHOTOMONTAGE 3

Location: Sub station on Naval College Road

Existing

Proposed

APPENDIX A

An explanation of the rating categories used within this report to determine the level of visual impact on each viewpoint/receptor studied. These rating categories have been developed by CLOUSTON Associates and follow national and international best practice.

SENSITIVITY Qualitative Assessment Definitions		
Receptor sensitivity	**H** **M-H** **M** **M-L** **L**	Each visual receptor type has an inherent and varied sensitivity to change in the visual scene based on their personal context in which the view is being experienced. This will have a direct bearing on the perception of visual impact experienced by the receptor and qualifies the quantitative impacts: • **Public Reserve, Parks, Reserves, Public walkways:** the purpose of visiting and using reserves largely relates to an enhanced sense of wellbeing. Receptor is more sensitive to both positive and negative visual experiences, especially where the reserve is the destination for leisure and relaxation. • **Residential:** view from Dwelling or garden may be experienced regularly over extended periods of time; residents may have chosen the location specifically for the view and/or develop a strong familiarity and association with the view and have high sensitivity to change • **Public Roads/Transport:** the view experienced can be important to the driver/passenger but is sometimes a brief experience and the driver is usually focused on the road. • **Commercial Property - Work:** view can enhance the work or education experience but focus of activity is not principally on the view. • **Semi-Private property - Work/Education/Service provider:** view can enhance the work or education experience but focus of activity is not principally on the view.

MAGNITUDE Quantitative assessment definitions		
Distance		The effect the Proposal has on the view relating to the distance between the Proposal and the visual receptor. The distances are from the approximate centre of the site and categorised as:
	H	Within 0 - 500 metres- high impact.
	M	501 - 1,000 metres - moderate impact.
	L	Further than 1,001 metres - low impact.
Quantum of view		The Quantum of view relates to the openness of the view and the angle of the view to the visual receptor. A development located in the direct line of sight has a higher impact than if it were located obliquely at the edge of the view. Whether the view of the Proposal is filtered by vegetation etc. also affects the impact, as does the nature of the view (panoramic, restricted etc.). A small element within a panoramic view has less impact than the same element within a restricted or narrow view. The effects can be categorised as:
	H	• A direct view of the Proposal or its presence (sometimes in a very narrow or highly framed view), where the Proposal occupies the greater proportion of the view cone.
	M-H	• A direct view of the Proposal within a panoramic view where the Proposal occupies a large proportion of the view cone.
	M	• A direct view of the Proposal or its presence in a broader view where the Proposal occupies a moderate proportion of the view cone.
	M-L	• A direct or slightly oblique view of the Proposal within a broad or panoramic view cone
	L	• An oblique, highly filtered or largely obscured view of the Proposal.

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MAGNITUDE Quantitative assessment definitions		
Distance		The effect the Proposal has on the view relating to the distance between the Proposal and the visual receptor. The distances are from the approximate centre of the site and categorised as:
	H	Within 0 - 500 metres- high impact.
	M	501 - 1,000 metres - moderate impact.
	L	Further than 1,001 metres - low impact.

SUMMARY		
Combined Rating		The nature of the visual impact may be **beneficial** or **adverse**, based on a transparent professional assessment of the combined totals of qualitative and quantitative ratings and comments as outlined above.
	H	• Highly adverse
	M-H	• Moderately to Highly adverse
	M	• Moderately adverse
	M-L	• Slightly adverse
	L	• Neutral or Beneficial.

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APPENDIX G HYDRAULIC ASSESSMENT

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Building Environmental Services
ABN: 103 106 282 875

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Com□an□	**: S□oa□□a□en C□t□ Counc□□**	**Date**	**: 17 □arc□ 2016**
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DBA Hydraulics have been commissioned to assist in establishing hydraulic load calculations for lodgement with Shellharbour Council to establish whether or not existing Council water and sewer infrastructure is capable of supporting the anticipated load. In particular the available pressure within the existing water mains being adequate to provide an effective firefighting facility.

□oa□ assessment

We have referred to Sydney Water's *Sewer and Water System Design Manual* data to assist in assessing the anticipated loads.

In assessing the building load we have divided the development into discreet areas, described by function and applied various design coefficients to relate floor area to population. From estimated population figures we have then applied Sydney Water data to convert estimated population figures to EP (equivalent population). The totalled EP are then converted to a daily discharge estimate and a peak simultaneous load.

Se□er Dra□na□e Ca□cu□at□ons

Item	Description	Area/No	Sq.m/person or number	No	EP / unit	EP Totals
	Community Facilities					
1	Pool	75	1.5	50	0.25	12.5
2	Day Spa	200	5	40	0.25	10.0
	Ground Floor					
3	Restaurant / Bar	200	1	200	0.25	50.0
4	Travel Cafe	50	3	17	0.25	4.25
5	Meeting Function Room	200	3	33	0.05	3.3
	Mezzanine					
6	Meeting Rooms	400	3	66	0.05	6.6
	Upper Levels					
7	Rooms Building One	170	1.5	255	0.4	102
8	Rooms Building Two	200	1.5	300	0.4	120
					Total	**308.65**

□ota□□a□□ se□er □sc□ar□e: □□P □250 /□a□□ **77,162 □tres □er □a□□**

□e□ort

Domest□c □ ater Ser□□ce Ca□cu□at□ons

In calculating the potable water demands for the project reference is made to the above sewer demands for daily consumption.

□ota□□a□□□ □omest□c □ater consum□t□on: □□P □250 /□a□□ **77,162 □tres □er □a□□**

AS/N□S 3500.1 is used for assessing the probable simultaneous demand based upon the diversified loads predicted in Tables 3.2 and 3.3 of that Standard. The loading units applied in these calculations are derived from Table 3.1.

Probab□e S□mu□taneous f□o□ ca□cu□at□ons

Item	Description	AREA/No	Sq.m/person or number	Sanitary fixtures allowance	Loading units
	Community Facilities				
1	Pool	75	1.5	1.5 / 15 = 5	20
2	Day Spa	200	5	1.5/ 15 = 3	12.0
	Ground Floor				
3	Restaurant / Bar	200	1	3sfM 5sf F	34.0
4	Travel Cafe	50	3	4 total	10.0
5	Meeting Function Room	200	3	5wc, 10ur 10bsn 10wc 10 bsn	40 50 = 90
	Mezzanine				
6	Meeting Rooms	400	3	10wc, 20u 20 bsn 20wc 20bsn	80 100 = 180
	Upper Levels				
8	Rooms Building One	170	1.5	1x bathroom Group @ 4 LU	680
10	Rooms Building Two	200	1.25	Ditto	800
				TOTAL	1,826
				Estimated PSD	**18.26 L/s**

C□ec□ Ca□cu□at□on from □S/N□S 3500□1

□□0.03n □0.4554 $n^{0.5}$
n □370
□ □19.84 L/s **Estimated PSD** **19.84 L/s**

Da□□□ □uc□□e □ □ssoc□ates □NS□ □Pt□ □t□
Suite 8, 38 Rowe St, Eastwood NSW 2122
02 9804 8086 david@davidbuckle.com.au
http://www.davidbuckle.com.au

F□re Ser□□ces □ ater Deman□

For the purpose of water demand calculations it is assumed that the building will be protected with fire sprinklers to a max ordinary hazard rating and that fire compartments will be less than 10,000m2.

F□re Ser□□ces Instantaneous Deman□

The above configuration of building envelope would result in instantaneous demands of:

- Fire Hydrant flow rate 20 L/s
- Fire Sprinkler flow rate 22 L/s (including accumulation)

F□re Ser□□ces □ttenuate□ Deman□s

Whilst the above flow rates reflect what would be a max simultaneous demand in a peak fire event this is not necessarily the demand that would be placed on the water mains infrastructure as these fire demands can be met by the provision of onsite static storage and pressure pump sets.

As fire sprinkler supplies only require a 90 minute storage duration it is common practice to provide on-site storage for fire sprinklers and an 8 hour make-up supply.

The above configuration of water storage and make-up would result in instantaneous demand of:

- Fire Hydrant flow rate 20 L/s
- Fire Sprinkler flow rate 1 L/s (make-up supply)

F□re Ser□□ces Pressure □equ□rements□

Required fire services pressure requirements can be met by the installation of pressure boosting pumps either in line or from static storage. Pressure not being an issue if flow is available, the final make-up of fire services supply cannot be determined until the capacity of Shellharbour infrastructure is determined.

Yours Faithfully

For David Buckle □ Associates

Len Hutton

APPENDIX H ELECTRICAL CAPACITY ASSESSMENT

NORTHROP
Level 11, 345 George Street, Sydney NSW 2000
T (02) 9241 4188 F (02) 9241 4324
E sydney@northrop.com.au ABN 81 094 433 100

ELECTRICAL SERVICES
ELECTRICAL CAPACITY REPORT

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1310 Na□a□□oa□, □ orro□ □n□ □e□□□ts

P□□P□□□D □□
Northrop Consulting Engineers
ACN 064 775 088
Level 11, 345 George Street,
SYDNEY NSW 2000

Tel: 02 9241 4188
Fax: 02 9241 4324

Ref: S16119

P□□P□□□D F□□
iArchtiecture
50 □unction St
NOWRA NSW, 2541

Tel: (02) 4421 2588
Fax: (02) 4422 4911

Activity schedule

Date	Revision	Issue	Initial
22.03.16	1	Draft For Review	SB

IND□□

1. SERVICES OVERVIEW

1.1 Power

1.1.1 Main Infrastructure

The Electrical Maximum Demand for the proposed site, developed through the use of the intended usage areas (Appendix A) is 1819.9 Amps per phase, inclusive of a 15% contingency for future design requirements.

Based on Endeavour Energy standard substation sizes, we will require two off Padmount Kiosk Substations (subject to Level 3 design and Endeavour Energy approval). These substations are to be positioned at the front of the site to allow direct access by Endeavour Energy. The associated easement for these substations is approximately 11m x 3.3m. A chamber substation arrangement can be considered for this development, in order to reduce the visual impact at the property frontage. In this instance, two transformers would be required within the chamber. The exact spatial dimensions of this chamber are subject to Endeavour Energy requirements and further ASP3 design. It shall be noted that chamber substations incur a significantly higher cost.

The exact requirements of the substations are subject to further detailed design to be undertaken by an ASP3 and coordinated with Endeavour Energy.

The Huskisson Zone Substation is located on Lot 1754 Naval College Road, adjacent the proposed site. This allow for minimal extension to the HV network, in the event of existing HV feeders having insufficient capacity a new feeder cad be installed within the services allocation along Naval College Road to provide Electrical supply to the proposed development.

1.1.2 Customer Site Equipment

The Electrical Main Switchboard shall be located within 50m of the associated substations. The requirements of this switch room are subject to detailed concept design and further development of the architectural floor layouts.

1.1.3 Electrical Maximum Demand

Dist Group	Load Description	Area (m^2)	Load per m^2 (VA)	Load for whole area (kVA)	Load (A/Phase)
Building One/Stage One					
Community Facilities	Pool	75			32.0
	Day Spa	200			32.0
Basement					
	Car Parks For Motel	5400	20	108	155.9
	Car Parks for Hotel	1500	20	30	43.3
	Entry Lobby	10	60	0.6	0.9
	Laundromat	50	500	25	36.1

	Garbage Storage	150	15	2.25	3.2
	Delivery/Storage	200	15	3	4.3
	Lifts/Lift lobby	20	60	1.2	1.7
	Fire Stairs	20	40	0.8	1.2
	Services	20	100	2	2.9
	Circulation	40	50	2	2.9
	Plant Room	200	300	60	86.6
Ground Floor					
	Covered Entry/Drop off	250	50	12.5	18.0
	Entry Lobby	100	80	8	11.5
	Lounge/Waiting	100	50	5	7.2
	Reception	40	50	2	2.9
	Restaurant/Bar	200	200	40	57.7
	Travel Caf	50	500	25	36.1
	Powder/Bathrooms/Baby Change	50	60	3	4.3
	Back of House office/Staff Room/Luggage Store/Linen store	80	40	3.2	4.6
	Storage	50	20	1	1.4
	Meeting/Function Room	200	150	30	43.3
	Lifts/Lift lobby	20	50	1	1.4
	Fire Stairs	20	20	0.4	0.6
	Services	20	100	2	2.9
	Circulation	40	50	2	2.9
Mezzanine					
	Meeting Rooms	400	110	44	63.5
	Back of House	100	50	5	7.2
Upper Levels (1-5)					
	15 sqm unit	945	80	75.6	109.1
	22 sqm unit	950	80	76	109.7
	45 sqm unit	952	80	76.16	109.9
Sta e 1 ota	**997 4**				
u n o/Sta e o					
Basement	Car Parks For Motel	5400	20	108	155.9
	Entry Lobby	10	60	0.6	0.9
	Garbage Storage	150	20	3	4.3
	Lifts/Lift lobby	20	60	1.2	1.7
	Fire Stairs	20	20	0.4	0.6
	Services	20	100	2	2.9
	Circulation	40	60	2.4	3.5
	Plant Room	200	300	60	86.6
Upper Levels (1-5)					
	15 sqm unit	945	80	75.6	109.1
	22 sqm unit	950	80	76	109.7
	45 sqm unit	952	80	76.16	109.9
Sta e o ota	**585 1**				
	otas	**21159 0**	**3880 0**	**1052 1**	**1582 5**
			Contingency		15
	S3000 a mum Deman Non-Domest c, Des n S are Ca ac t				**1819 9 m s/ P ase**

Structural Mechanical Civil Hydraulic Environmental Electrical Structural Mechanical Civil Hydraulic Environmental Electrical Structural Mechanical Civil Hydraulic Environmental Electrical

1.2 Communications

1.2.1 Main Infrastructure

The proposed site is not within NBN Co rollout zones at this point in time, default the infrastructure provider of last resort responsibilities to Telstra.

This will require coordination with Telstra Smart Community to arrange the incoming infrastructure to the development. We expect a lead-in cable of approximately 200-pair would be sufficient for this development.

Upon review of Telstra DBYD information, existing copper reticulation is run via Naval College Road and Moona Creek Road. Minor extensions to this distribution would be required as part of Telstra works.

The rollout of the nbn™ network has not started in this area.

Don't worry, we are planning to come to you. We're working collaboratively with local governments on the design and deployment of the network for each area. You can register to be notified when the **nbn**™ network will be available at your address.

Register with us and we'll let you know when you can switch to the nbn™ network.

1310 Naval College Road, Worrowing Heights NSW 2540

1310 Naval College Road, Worrowing Heights NSW 2540
Not your address?

Where you stand within the nbn™ rollout

- **Not currently available**
- Build preparation
- Build commenced
- Service available

1.2.2 Customer Side Equipment

The customer side MDF must be located within 15m radial distance from the property boundary, preferentially co-located with the Main Switch room to allow for ease of earthing the telecommunication installation.

APPENDIX A

Area Usage Breakdown



RMI GROUP PTY LTD
ABN 77 162 177 997

FOUNDER CONTACT DETAILS:

Mr George Anastasopoulos
(Founder/ CEO/ Director)
Mobile Number: +61 455 337 875
Email Address: george.anasta@rmigroup.sydney

POSTAL ADDRESS:

PO Box 186. VINCENTIA. 2540.

HEAD OFFICE:

Suite 301,
Fayworth House
379 Pitt Street, Sydney. NSW. 2000.

HEAD OFFICE:
Reception: +61 (02) 8001 6301

PRELIMINARY BRIEF INFORMATION, TOURIST ACCOMMODATION,

1310 NAVAL COLLEGE ROAD, WORROWING HEIGHTS, NEW SOUTH WALES

YIELD AREA SCENARIOS MATRIX

DATE: Friday, 11 March, 2016
VERSION: 1 (Draft – For Preliminary Discussion Purposes)
PAGES: 4
DOCUMENT REFERENCE NUMBER: WorrowingHeightsPreliminaryBrief11March2016V1

SITE AREA: 30, 700 Square Metres
RPD: Lot 1752 on RP 28, 785

BRIEF INFORMATION OUTLINE – WORROWING HEIGHTS (NSW):

DATE: Friday, 11 March, 2016 VERSION: 1

BUILDING ONE / STAGE ONE:

COMMUNITY FACILITIES:

Stand Alone Structure

	Description:	Area:	Notes:
1.	Pool	75.0	15.0m long
2.	Day Spa	200.0	

PARTLY SUBTERRANEAN BASEMENT:

	Description:	Area:	Notes:
1.	Car Parks 30 sqm / bay For Motel Option	5,400	Assume: 180.0 Cars
	Car Parks 30 sqm/ bay For Hotel Option	1,500	Assume: 50.0 cars
2.	Entry Lobby	10.0	
3.	Laundromat	50.0	
4.	Garbage Storage	150.0	
5.	Delivery/ Storage	200.0	
6.	Lifts/ Lift Lobby (2 No. Lifts)	20.0	
7.	Fire Stairs	20.0	
8.	Services	20.0	
9.	Circulation	40.0	
10.	Plant Room	200.0	
	TOTAL	6,110 sqm	

GROUND FLOOR:

	Description:	Area:	Notes:
1.	Covered Entry/ Drop Off	250.0	Outside Tower
2.	Entry Lobby	100.0	
3.	Lounge/ Waiting	100.0	
4.	Reception	40.0	
5.	Restaurant/ Bar	200.0	
6.	Travel Cafe	50.0	
7.	Powder/ Bathrooms/ Baby Change	50.0	
8.	Back of House Office, Staff Room, Luggage Store, Linen Store	80.0	
9.	Storage	50.0	
10.	Meeting/ Function Room	200.0	
11.	Lifts/ Lift Lobby (2 No. Lifts)	20.0	
12.	Fire Stairs	20.0	
13.	Services	20.0	
14.	Circulation	40.0	
	TOTAL	1, 270.0 SQM	

MEZZANINE:

Assumed Floor Plate Area: About half of typical Floor Level (ie 500.0 sqm)

	Description:	Area:	
1.	Meeting Rooms	400.0	
2.	Back of House	100.0	

UPPER LEVELS (1 – 5):

Assumed Floor Plate Area: 950 Square Metres

2.0 STAR OPTION (SAY):

	Description:	No:	Area:
1.	15.0 sqm unit (+6.0 sqm circulation)	45.0 (Total: 225 rooms)	945.0
2.	Fire Stairs	2 No.	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store	1 No.	
5.	Services		

3.0 STAR OPTION (Say):

	Description:	No.:	Total:
1.	22.0 sqm unit (+ 6.0 sqm Circulation)	34.0 (Total: 170 rooms)	950.0
2.	Fire Stairs	2 No	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store	1 No.	
5.	Services		

4.0 STAR OPTION (Say):

	Description:	No:	Total:
1.	45.0 sqm dual key unit/ 5 Balcony (+ 6.0 sqm Circulation)	17.0 (Total: 85 units/ 170 Rooms)	952 sqm
2.	Fire Stairs	2 No.	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store		
5.	Services		

BRIEF INFORMATION OUTLINE – WORROWING HEIGHTS (NSW):

DATE: Friday, 11 March, 2016 VERSION: 1

BUILDING TWO/ STAGE TWO:

PARTLY SUBTERRANEAN BASEMENT:

	Description:	Area:	Notes:
1.	Car Parks 30 sqm / bay For Motel Option	5,400	Assume 180.0 Cars (Includes Circulation)
	Car Parks 30 sqm/ bay For Hotel Option	Nil (Provided in Building A)	50.0 cars
2.	Entry Lobby	10.0	
3.	Garbage Storage	150.0	
4.	Lifts/ Lift Lobby (2 No. Lifts)	20.0	
5.	Fire Stairs	20.0	
6.	Services	20.0	
7.	Circulation	40.0	
8.	Plant Room	200.0	
	TOTAL		

UPPER LEVELS (Ground, 1 – 5):

Assumed Floor Plate Area: 950 Square Metres

2.0 STAR OPTION (SAY):

	Description:	No:	Area:
1.	15.0 sqm unit (+6.0 sqm circulation)	45.0 (Total: 270 rooms)	945.0
2.	Fire Stairs	2 No.	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store	1 No.	
5.	Services		

3.0 STAR OPTION (Say):

	Description:	No.:	Total:
1.	22.0 sqm unit (+ 6.0 sqm Circulation)	34.0 (Total: 204 rooms)	950.0
2.	Fire Stairs	2 No	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store	1 No.	
5.	Services		

4.0 STAR OPTION (Say):

	Description:	No:	Total:
1.	45.0 sqm dual key unit/ 5 Balcony (+ 6.0 sqm Circulation)	17.0 (Total: 100 units/ 200 Rooms)	952 sqm
2.	Fire Stairs	2 No.	
3.	Lifts/ Lift Lobby	2 No.	
4.	Linen Store		
5.	Services		

NOTES:

APPENDIX B

Dial Before You Dig Documentation

□o:	Mr Shaun Burgess
P□one:	02 9241 4188
Fa□:	Not Supplied
□ma□:	shaun.burgess@sydney.northrop.com.au

D□a□before □ou □□□ Job □:	10455757	DIAL BEFORE YOU DIG www.1100.com.au
Sequence □	51688298	
Issue Date:	03/21/2016	
□ocat□on:	1310 Naval College Road,Worrowing Heights,NSW-2540	**Some impact. No onsite action required.**

Location of Underground Telecommunications Facilities and Power Facilities

We thank you for your enquiry. In relation to your enquiry at the above address:

- **nbn□s** records indicate that there □□□ underground fibre optic, telecommunications and/or power facility/facilities (owned or controlled by **nbn**) in the vicinity of the location identified above ("Location").
- **nbn** indicative plan/s are attached with this notice ("Indicative Plans").
- The Indicative Plan/s show general depth and alignment information only and are not an exact, scale or accurate depiction of the location, depth and alignment of the fibre optic, telecommunications and/or power facilities shown on the plan/s.
- In particular, the fact that the Indicative Plan/s show that a facility is installed in a straight line, or at uniform depth along its length cannot be relied upon as evidence that the facility is, in fact, installed in a straight line or at uniform depth.
- You should read the Indicative Plans in conjunction with this notice and in particular, the notes below.
- You should note that, at the present time, the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables. As such, consistent with the notes below, particular care must be taken by you to make your own enquiries and investigations to precisely locate any power cables and manage the risk arising from such cables accordingly.
- The information contained in the Indicative Plans is valid for 28 days from the date of issue set out above. You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators at your

expense to locate **nbn** telecommunications and/or power facilities during any activities you carry out on site).

We thank you for your enquiry and appreciate your continued use of the Dial Before You Dig Service. If you are planning to excavate or require further information, please contact **nbn** on 1800 626 762. For any enquiries related to moving assets or Planning and Design activities, please email the **nbn** at relocationWorks@nbnco.com.au.

Notes:

1. You are now aware that there are items of telecommunications and/or power facilities in the vicinity of the above property that could be damaged as a result activities carried out (or proposed to be carried out) by you in the vicinity of the Location.
2. You should have regard to section 474.6 and 474.7 of the *Criminal Code Act 1995* (CoA) which deals with the consequences of interfering or tampering with a telecommunications facility. Only persons authorised by **nbn** can interact with **nbn**'s network facilities.
3. Any information provided is valid only for **28** days from the date of issue set out above.

Indicative Plans

1	7	13	19	25
2	8	14	20	26
3	9	15	21	27
4	10	16	22	28
5	11	17	23	29
6	12	18	24	30

LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

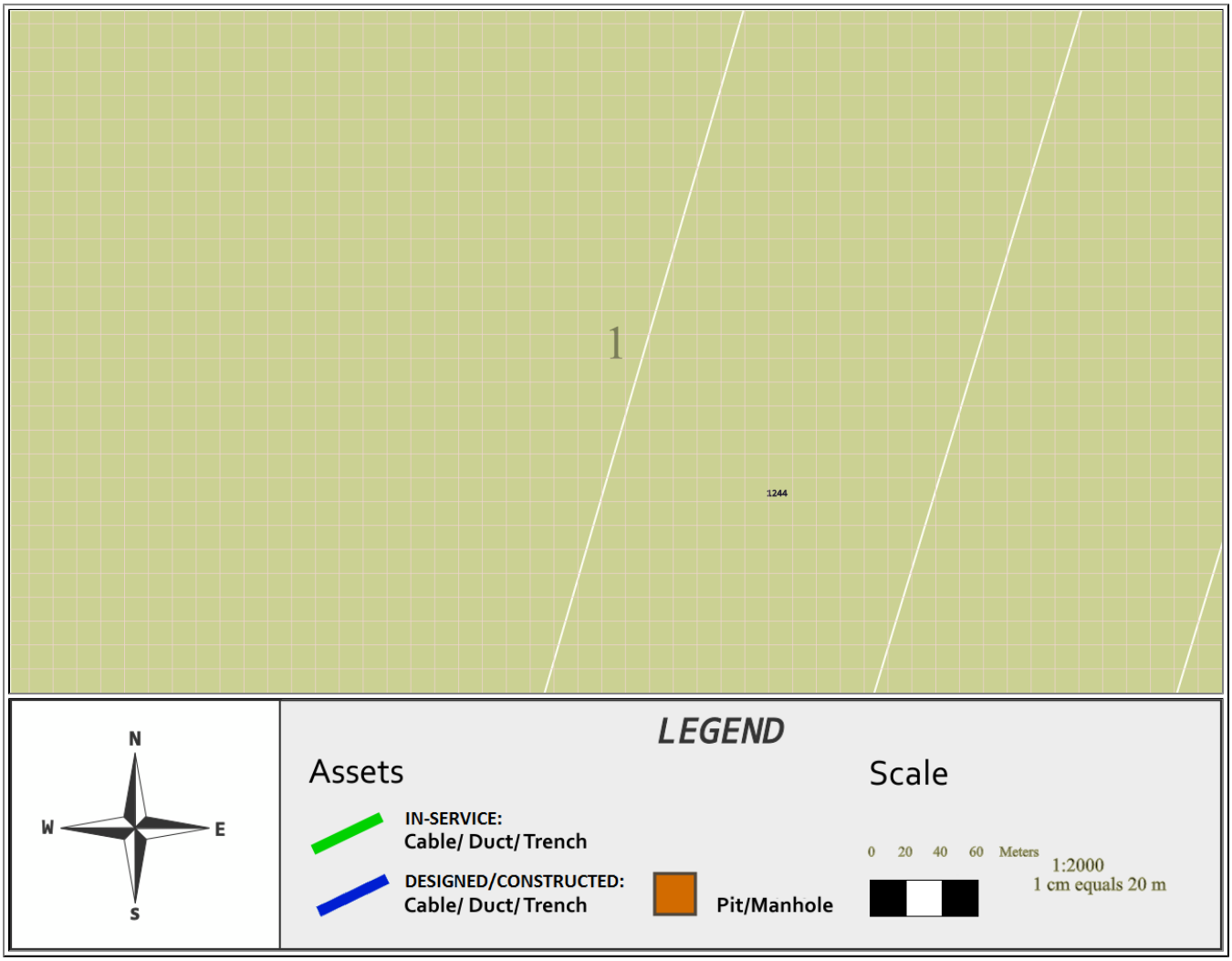
DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

Scale

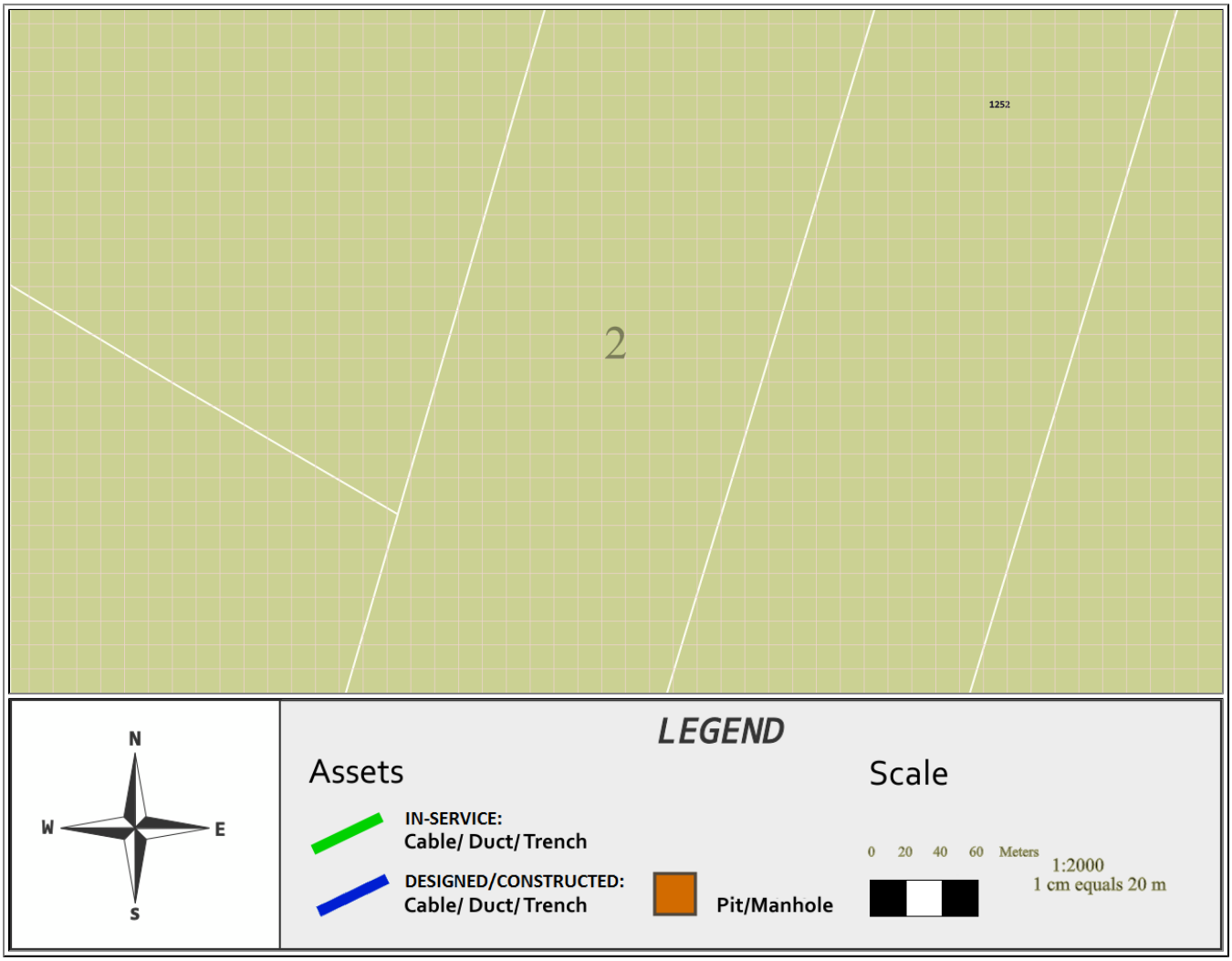
0 20 40 60 Meters

1:2000
1 cm equals 20 m



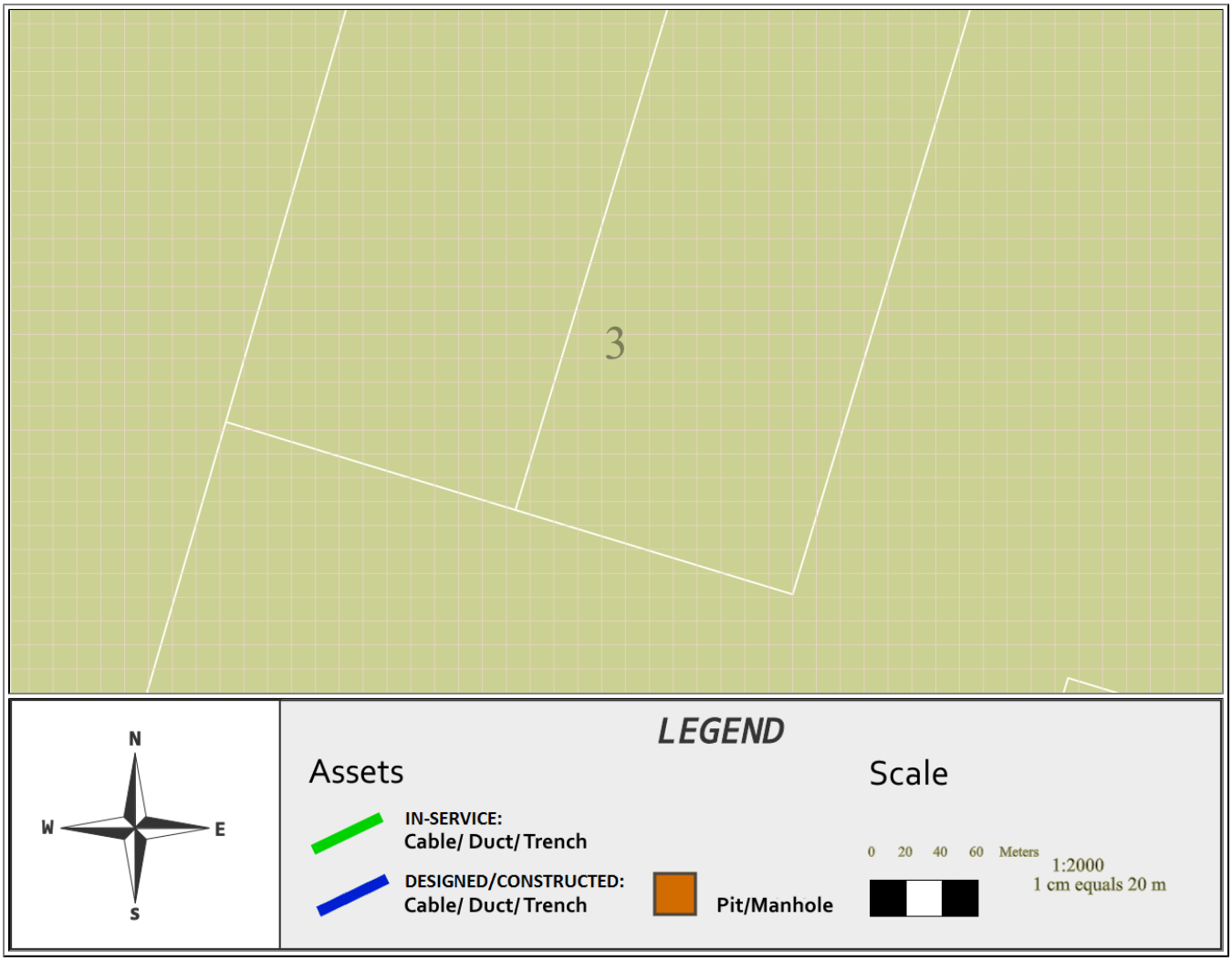
Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



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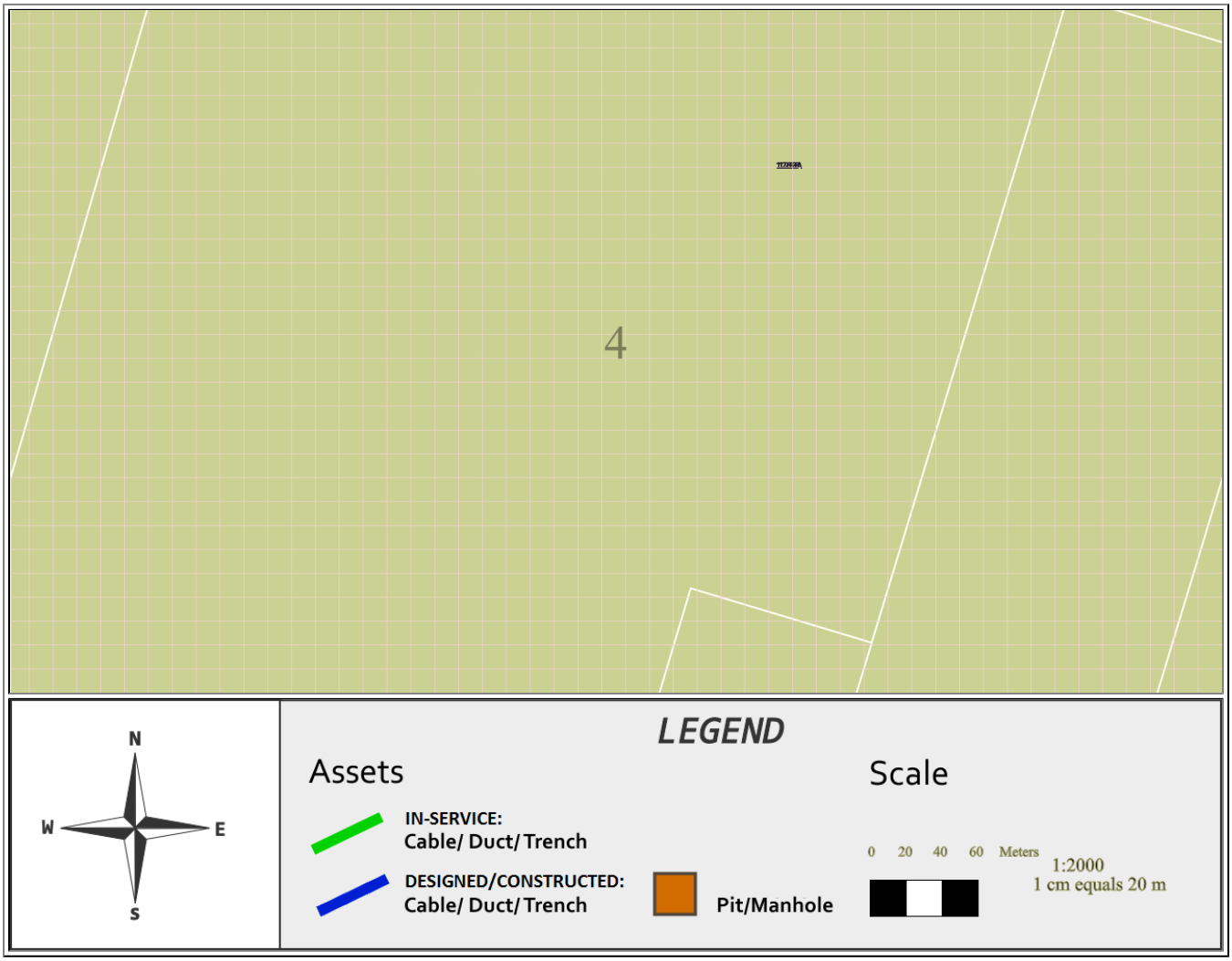
Email info@nbn.com.au Web nbn.com.au



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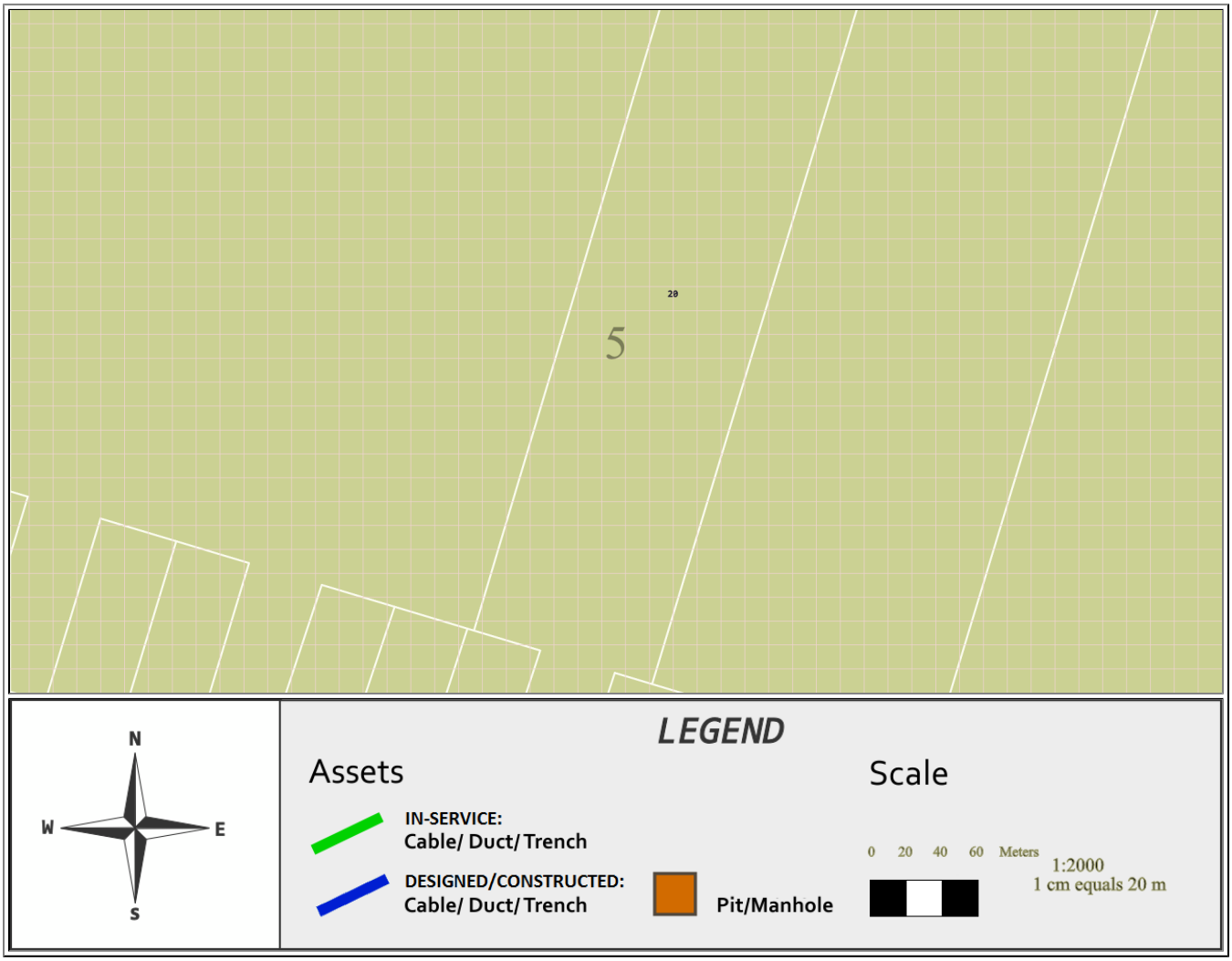
Email info@nbn.com.au Web nbn.com.au



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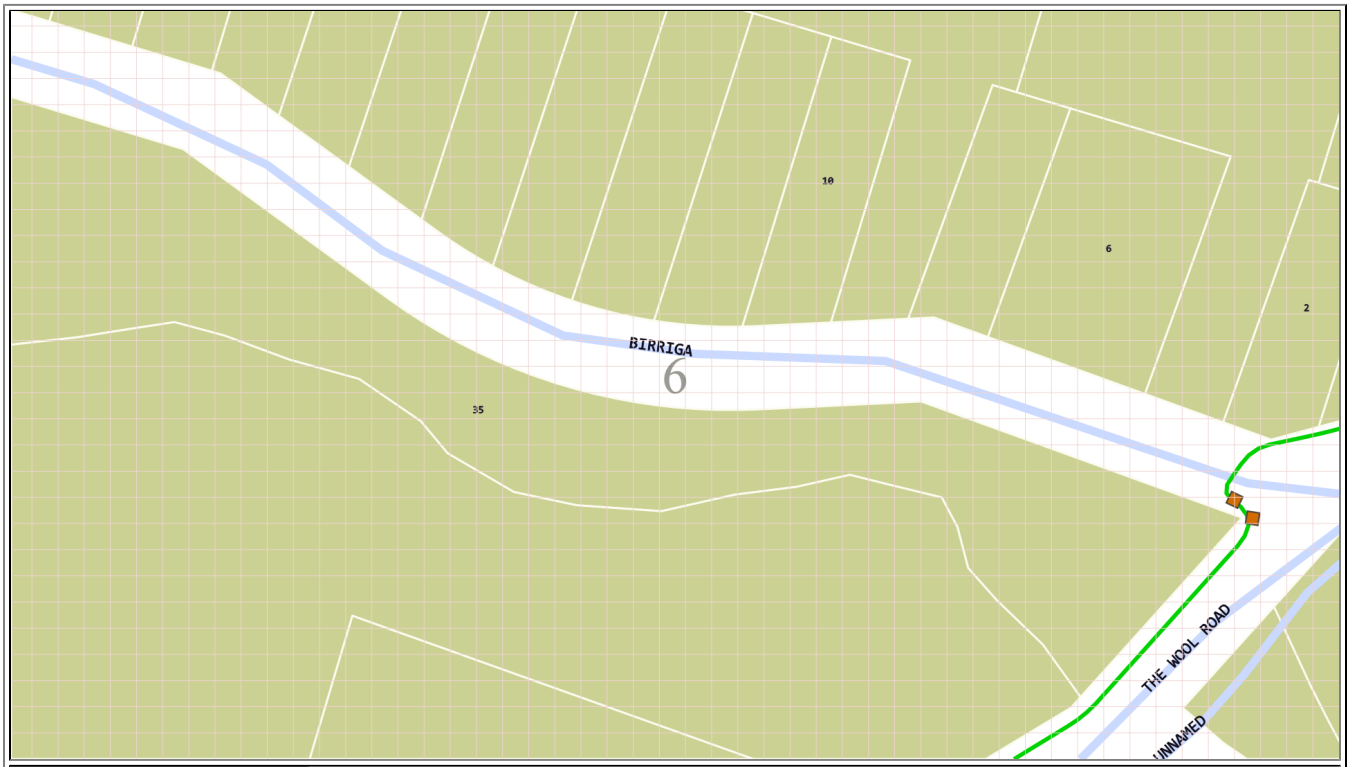

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LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

Scale

0 20 40 60 Meters

1:2000
1 cm equals 20 m

Email info@nbn.com.au Web nbn.com.au

N
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S

LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

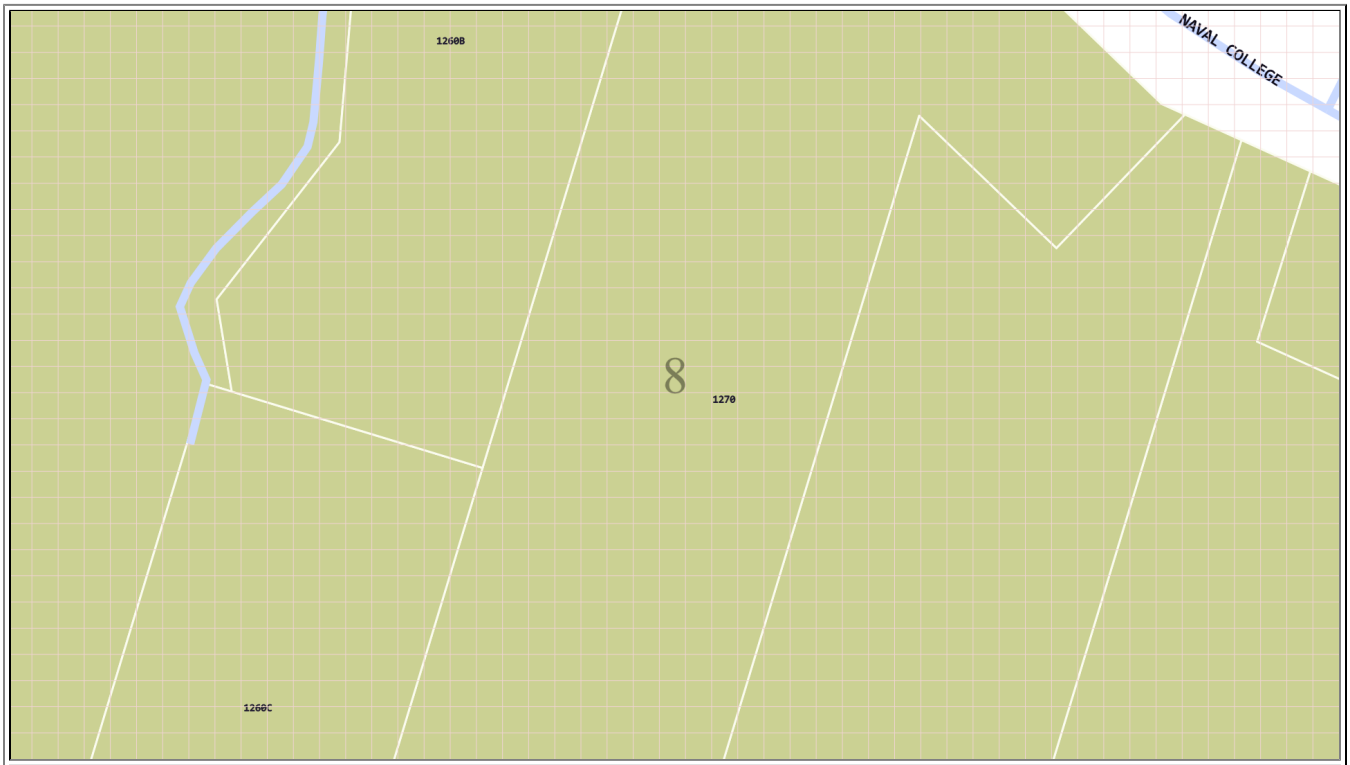
Scale

0 20 40 60 Meters

1:2000
1 cm equals 20 m

Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



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LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

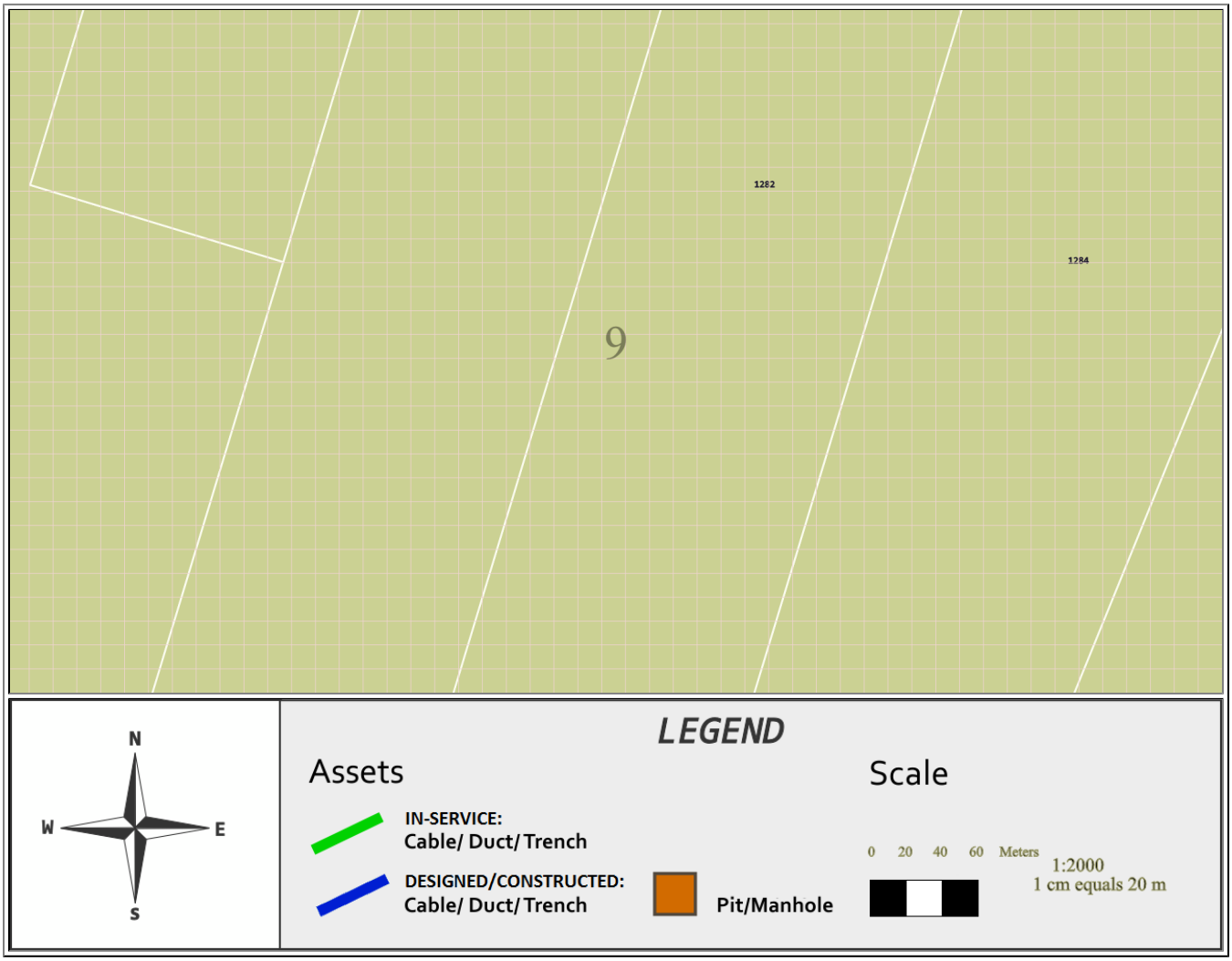
Scale

0 20 40 60 Meters

1:2000
1 cm equals 20 m

Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



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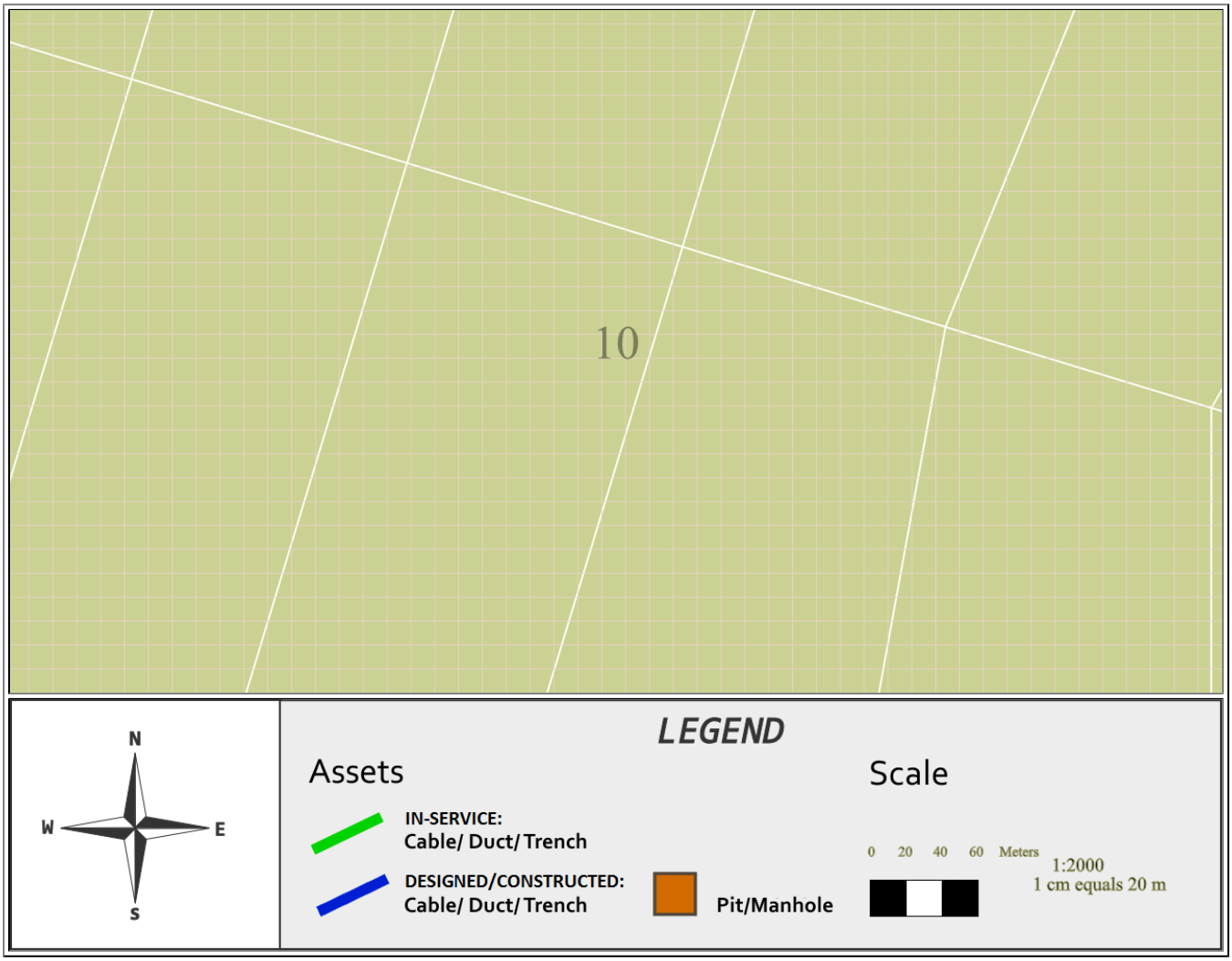
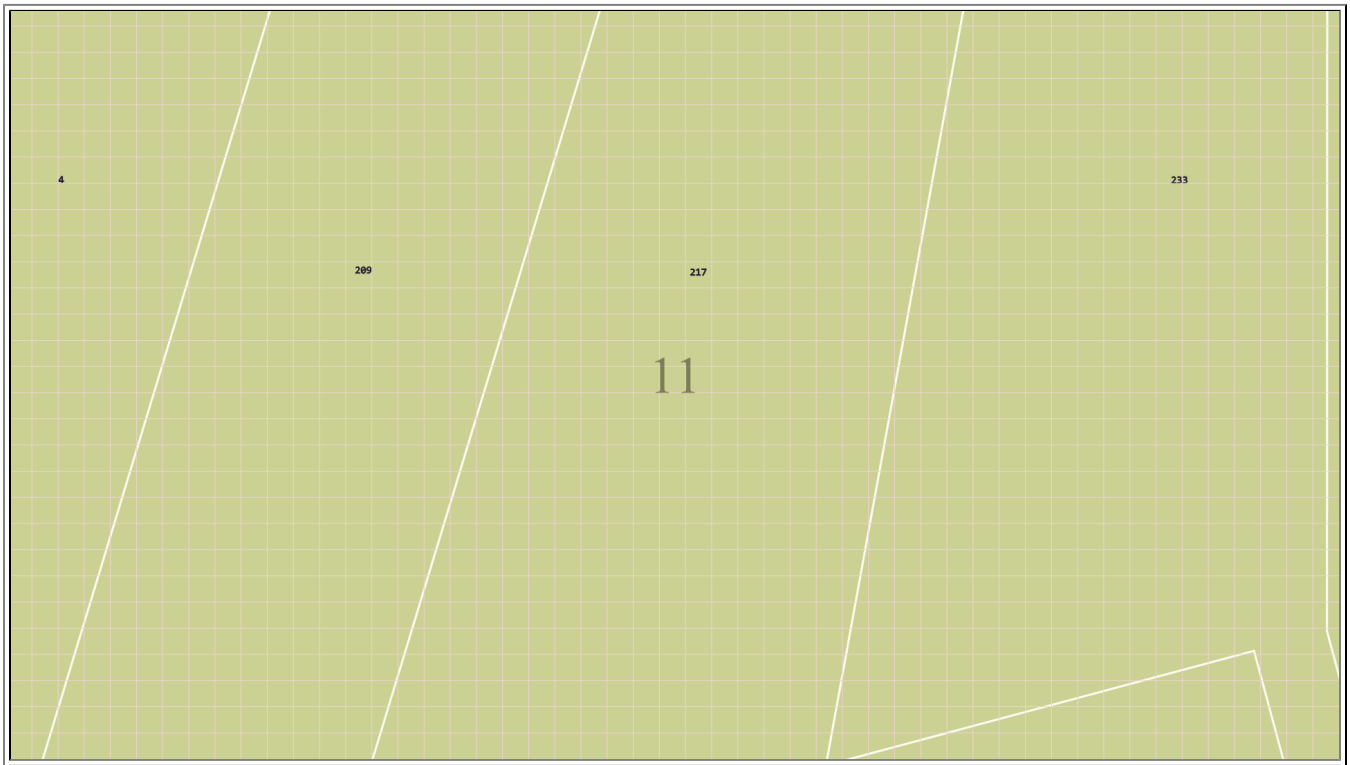
Email info@nbn.com.au Web nbn.com.au



Email info@nbn.com.au Web nbn.com.au



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LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

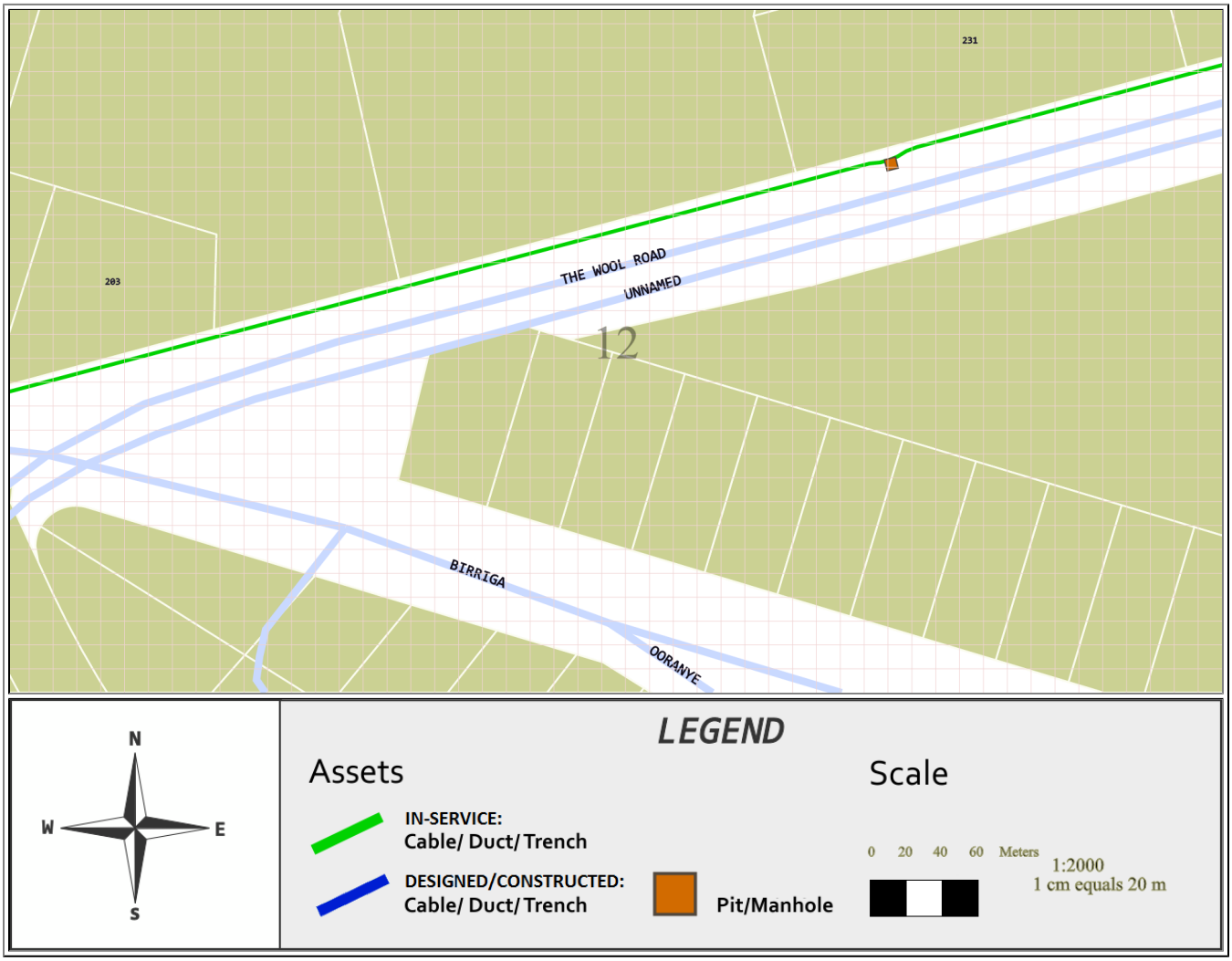
Scale

0 20 40 60 Meters

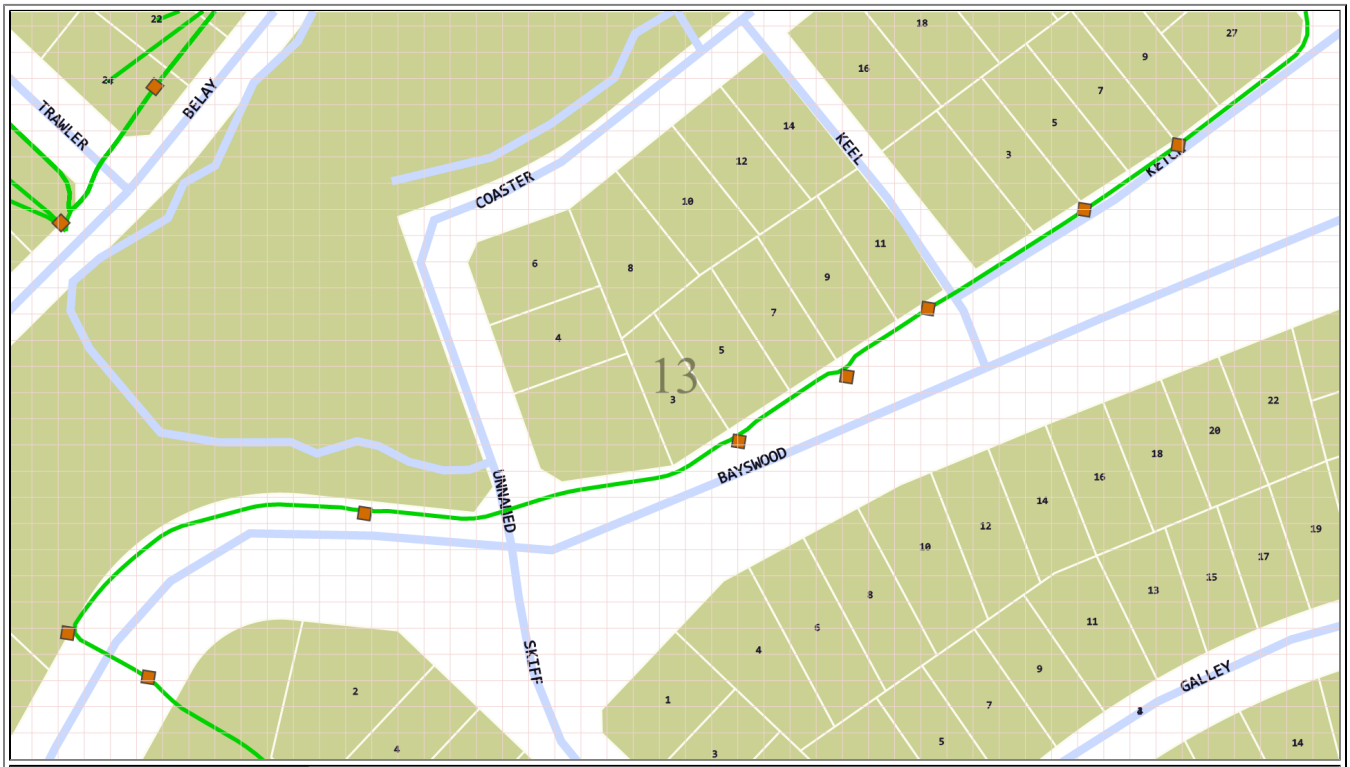
1:2000
1 cm equals 20 m

Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



Email info@nbn.com.au Web nbn.com.au



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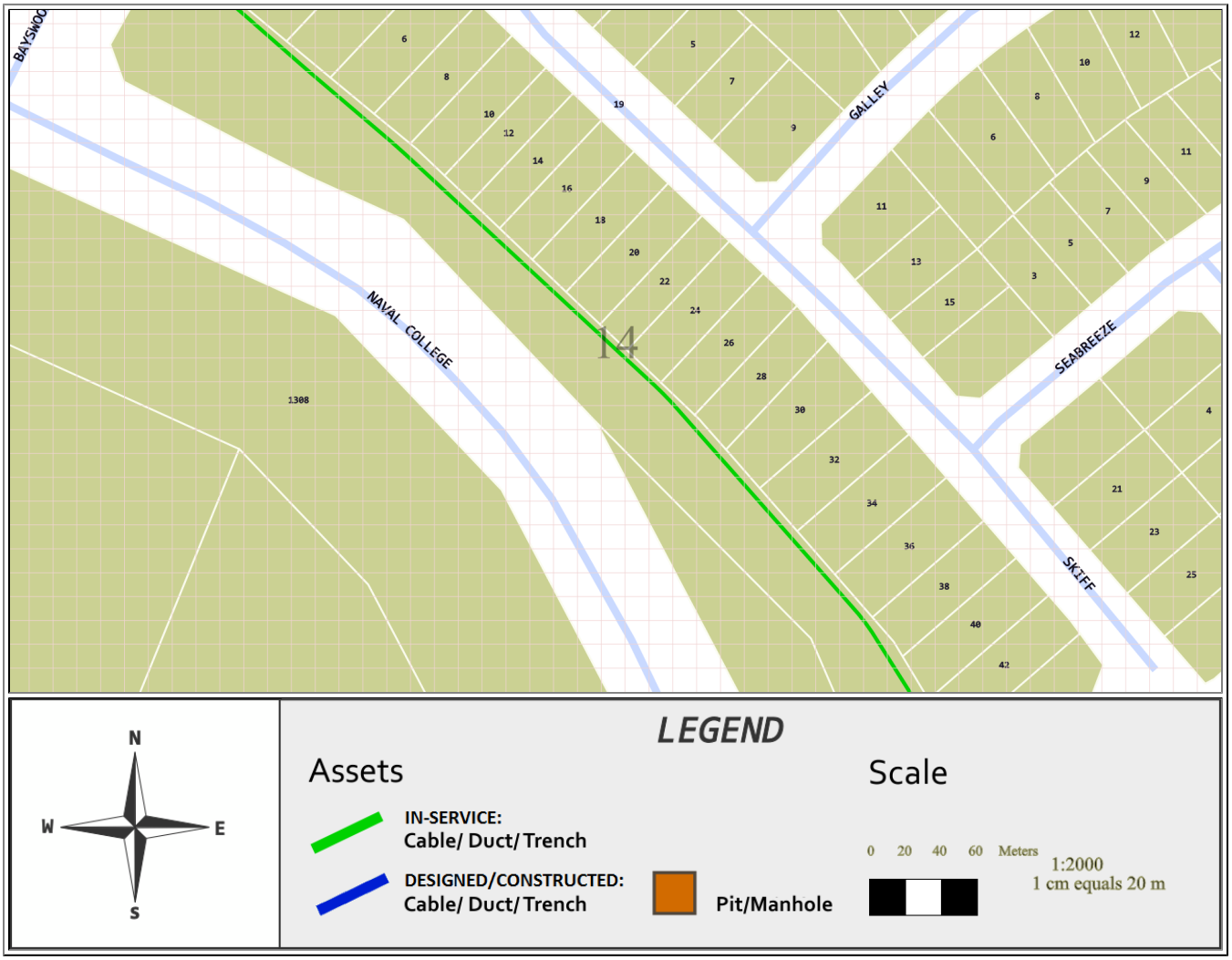

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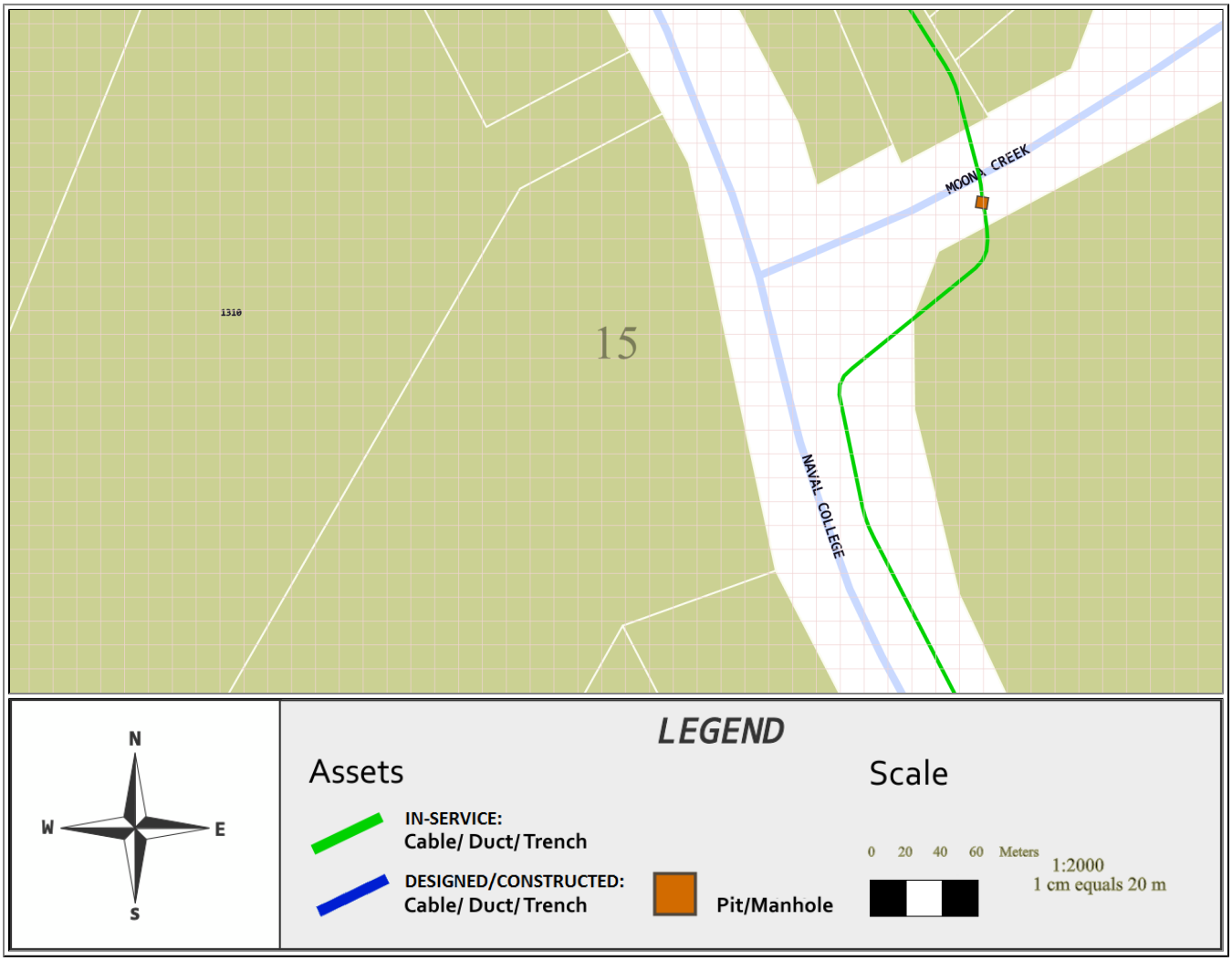

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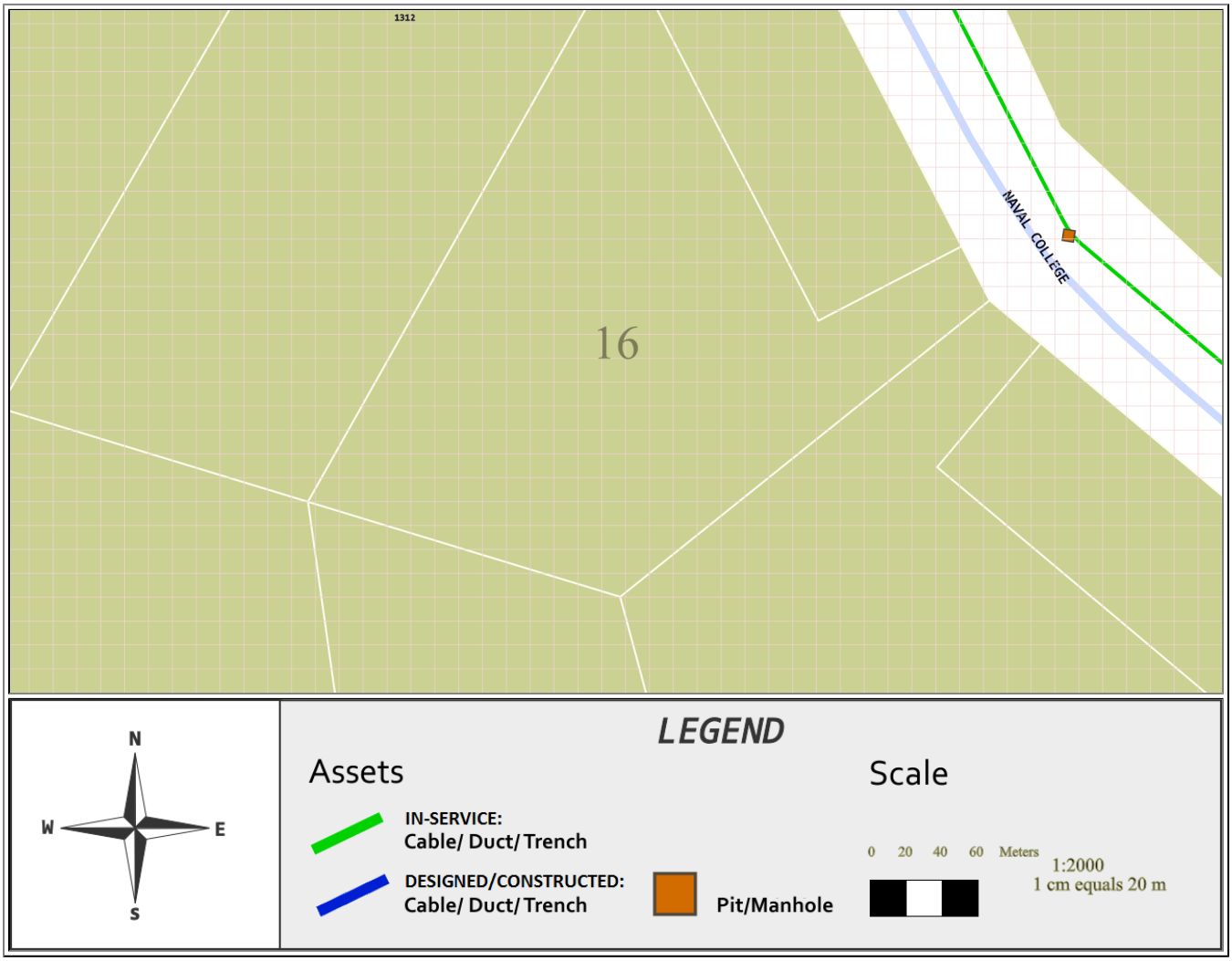

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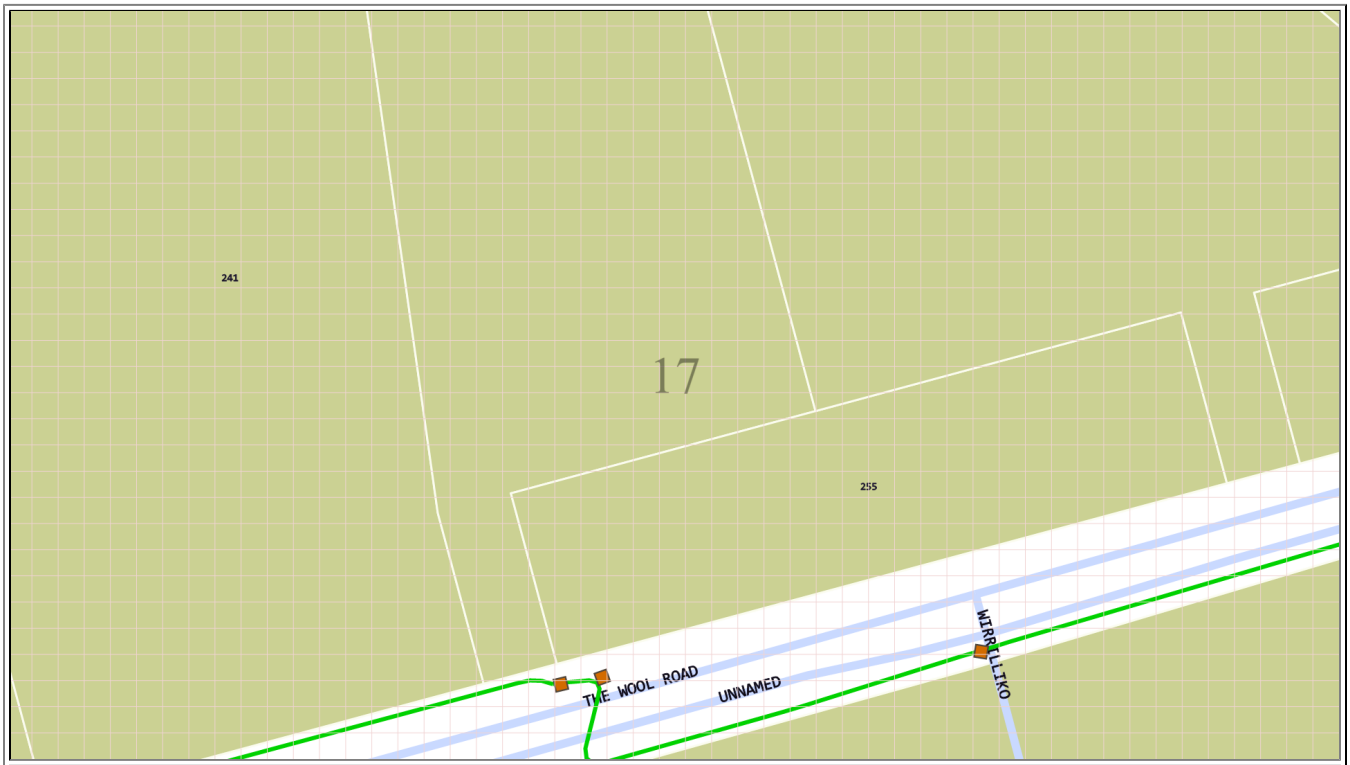

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LEGEND

Assets

IN-SERVICE:
Cable/ Duct/ Trench

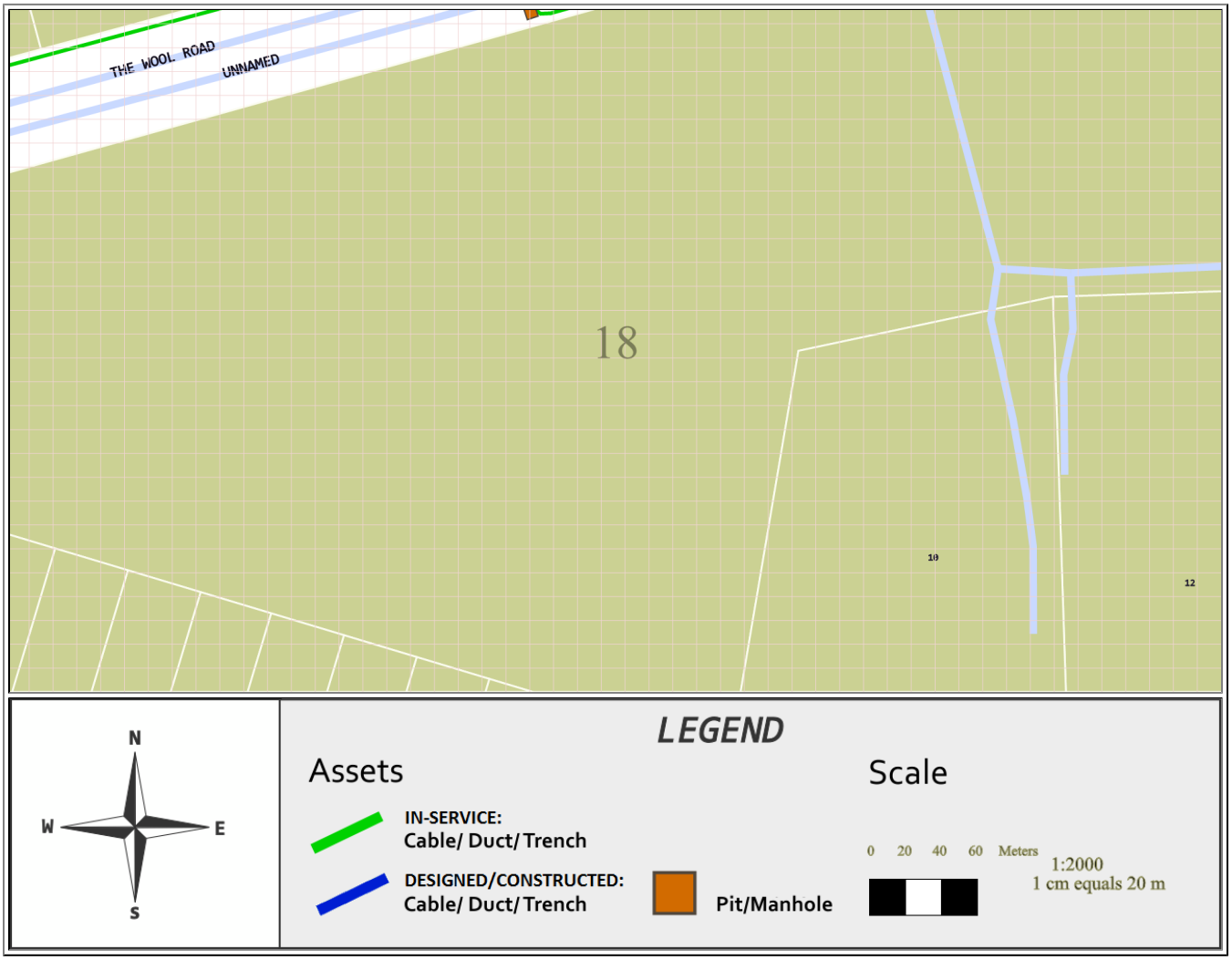
DESIGNED/CONSTRUCTED:
Cable/ Duct/ Trench

Pit/Manhole

Scale

0 20 40 60 Meters

1:2000
1 cm equals 20 m



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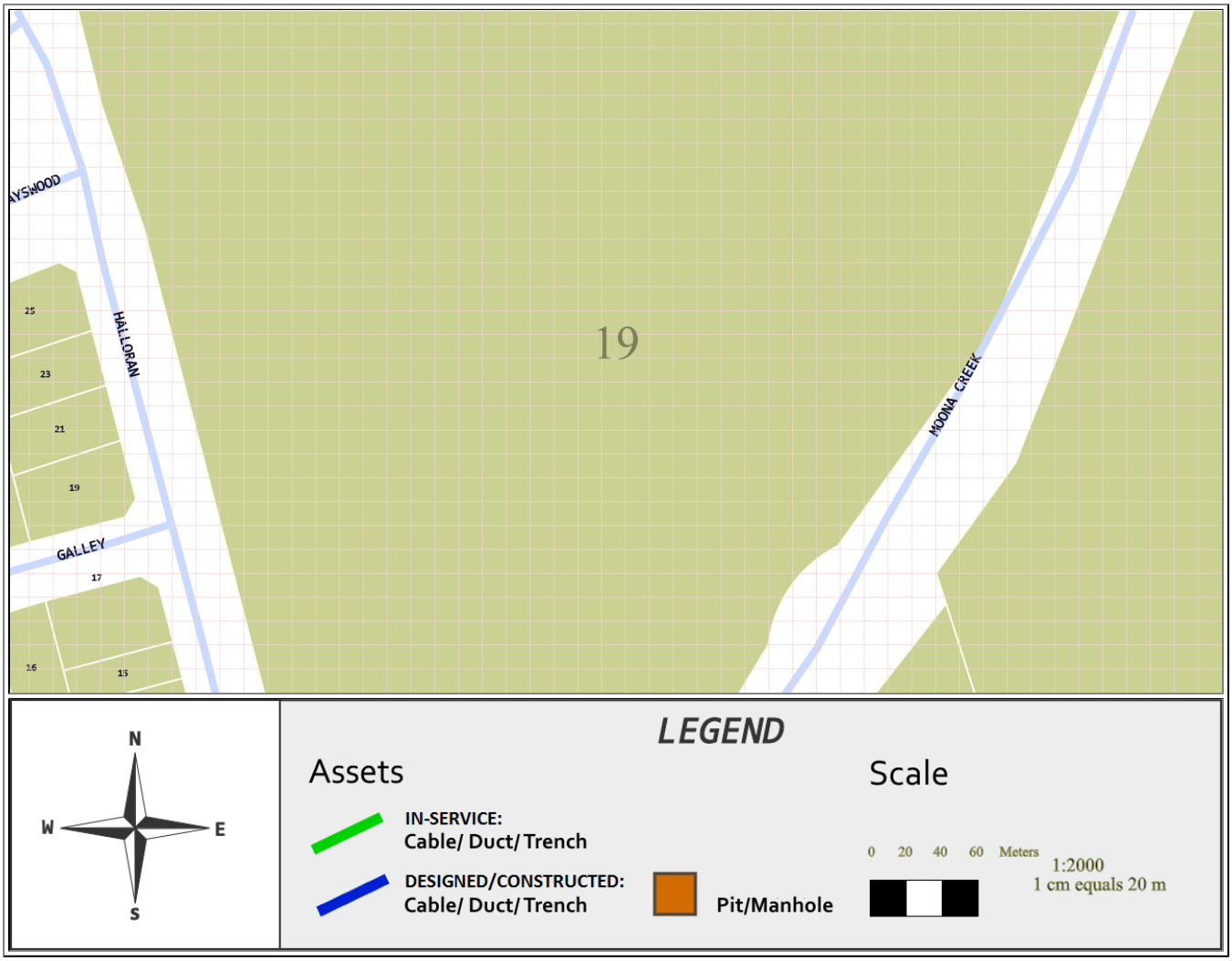

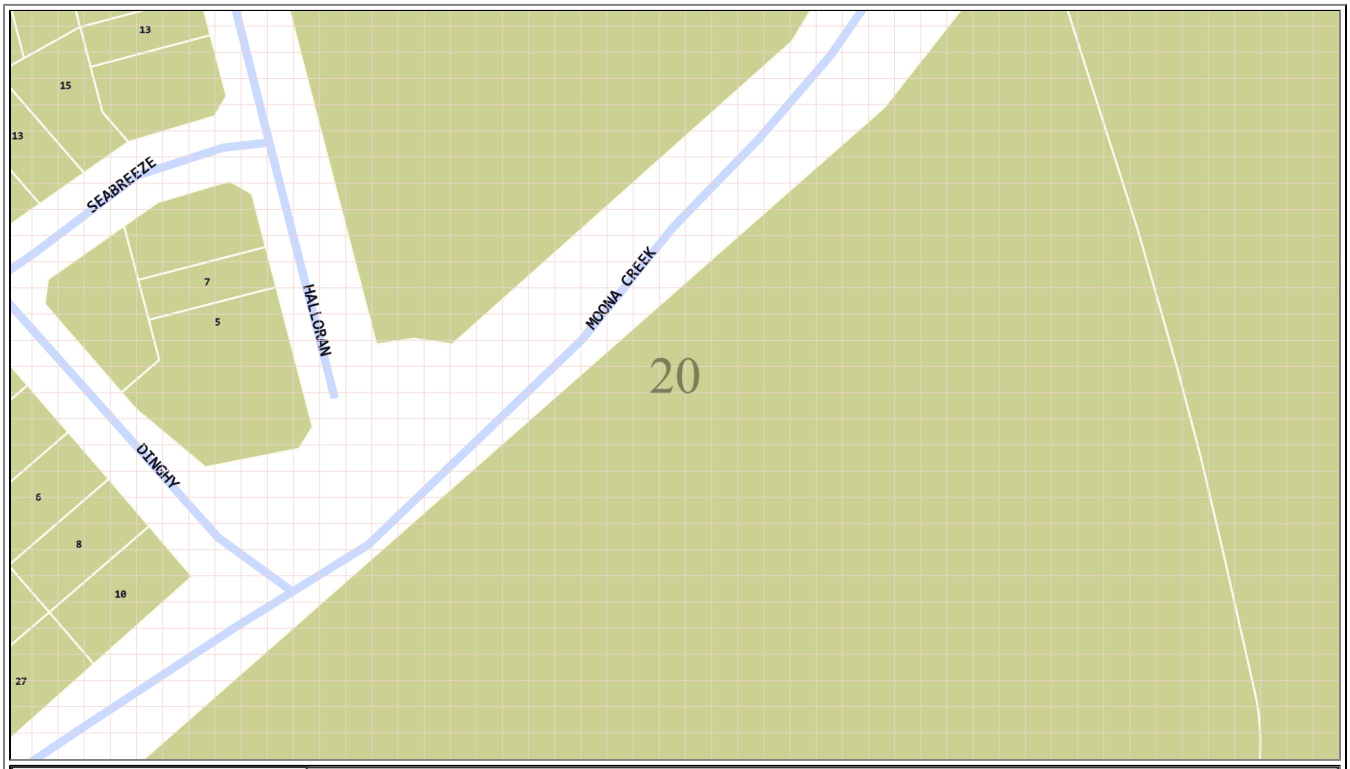

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LEGEND

Assets

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Cable/ Duct/ Trench

DESIGNED/CONSTRUCTED:
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Level 11, 100 Arthur Street, North Sydney NSW 2060

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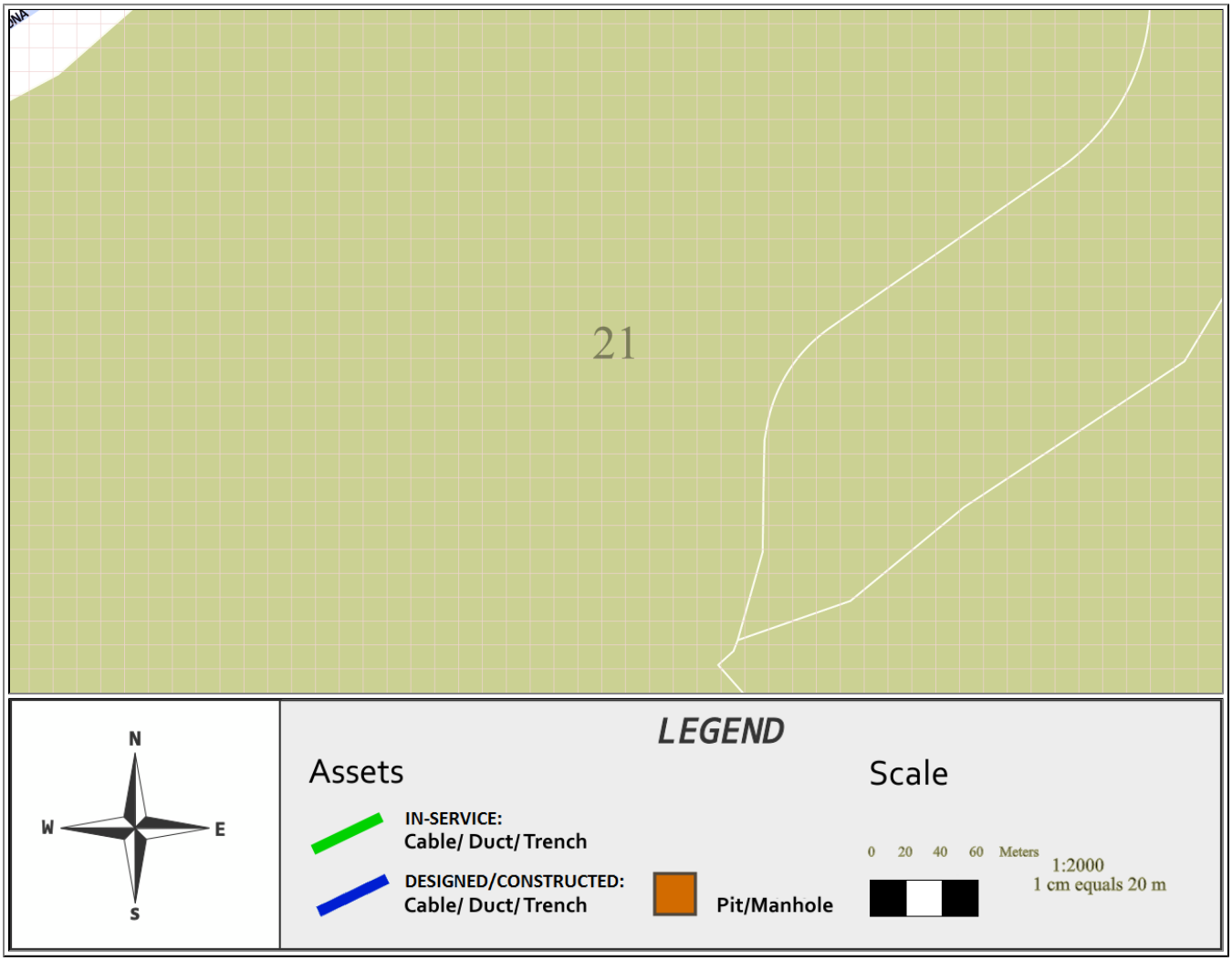

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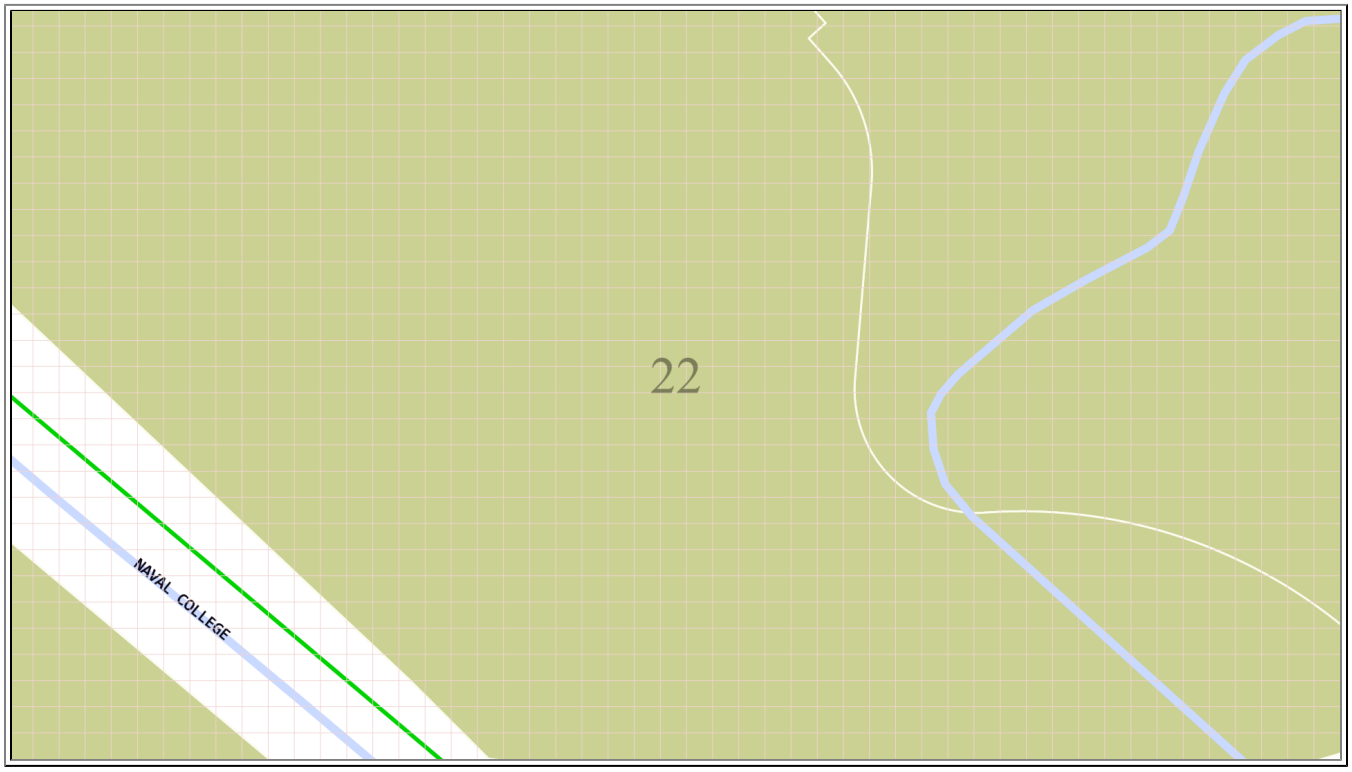


□eferra□ Con□□t□ons

The following are conditions on which **nbn** provides you with the Indicative Plans. By accepting the plans,you are agreeing to these conditions. These conditions are in addition, and not in replacement of, any duties and obligations you have under applicable law.

1. **nbn** does not accept any responsibility for any inaccuracies of its plans. You are expected to make your own enquiries and perform your own investigations (including engaging appropriately qualified plant locators at your expense to locate **nbn** telecommunications and/or power facilities during any activities you carry out on site).
2. You acknowledge that **nbn** has specifically notified you above that the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables.
3. You should not assume that **nbn** cables and assets follow straight lines or are installed at uniformed depths along their lengths, even if they are indicated on plans provided to you. Careful onsite investigations are essential to locate the exact position of cables.
4. In carrying out any works in the vicinity of **nbn** facilities, you must maintain the following minimum clearances:
    - 300mm when laying assets inline, horizontally or vertically
    - 500mm when operating vibrating equipment, for example: jackhammers or vibrating plates;and
    - 1000mm when operating mechanical excavators.

- Adherence to clearances as directed by other asset owner's instructions and take into account any uncertainty for power cables.

5. You are aware that there are inherent risks and dangers associated with carrying out work in the vicinity of underground facilities (such as **nbn** fibre optic,copper and coaxial cables,and power cable feed to **nbn** assets).Damage to underground electric cables may result in:
    - Injury from electric shock or severe burns, with the possibility of death.
    - Interruption of the electricity supply to wide areas of the city.
    - Damage to your excavating plant.
    - Responsibility for the cost of repairs.
6. You must take all reasonable precautions to avoid damaging **nbn** facilities. These precautions may include ,but not limited to, the following:
    - All excavation sites should be examined for underground cables by careful hand excavation. Cable cover slabs if present must not be disturbed. Hand excavation needs to be undertaken with extreme care to minimise the likelihood of damage to the cable, for example, the blades of hand equipment should be aligned parallel to the line of the cable rather than digging across the cable.
    - If any undisclosed underground cables are located, notify **nbn** immediately.
    - All personnel must be properly briefed, particularly those associated with the use of earth-moving equipment, trenching, boring and pneumatic equipment.
    - The safety of the public and other workers must be ensured.
    - All excavations must be undertaken in accordance with all relevant legislation and regulations.
7. You will be responsible for all damage to **nbn** facilities that are connected whether directly, or indirectly with work you carry out (or work that is carried out for you or on your behalf) at the Location. This will include,without limitation, all losses expenses incurred by **nbn** as a result of any such damage.
8. You must immediately report any damage to **nbn** network that you are/become aware of. Notification may be by telephone - 1800 626 762.
9. Except to the extent that liability may not be capable of lawful exclusion, **nbn** and its servants and agents and the related bodies corporate of **nbn** and their servants and agents shall be under no liability whatsoever to any person for any loss or damage (including indirect or consequential loss or damage) however caused (including, without limitation, breach of contract negligence and/or breach of statute) which may be suffered or incurred from or in connection with this information sheet or any Plans attached hereto. Except as expressly provided to the contrary in this information sheet or the attached Indicative Plans, all terms, conditions, warranties, undertakings or representations (whether expressed or implied) are excluded to the fullest extent permitted by law.

All works undertaken shall be in accordance with all relevant legislations, acts and regulations applicable to the particular state or territory of the Location. The following table lists all relevant documents that shall be considered and adhered to.

State/Territory	Documents

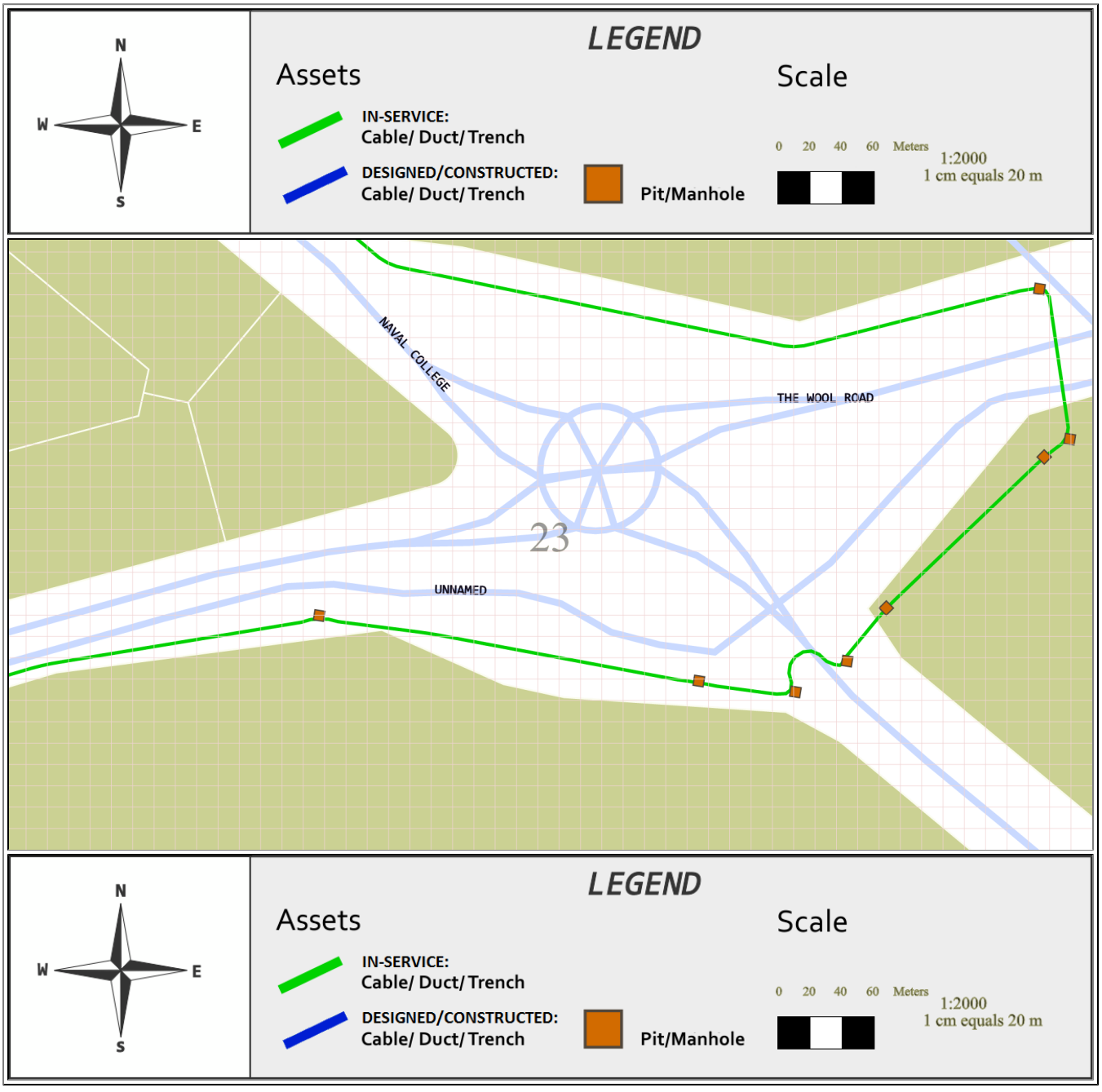
Nat□ona□	Work Health and Safety Act 2011
	Work Health and Safety Regulations 2011
	Safe Work Australia - Working in the Vicinity of Overhead and Underground Electric Lines (Draft)
	Occupational Health and Safety Act 1991
NS□	Electricity Supply Act 1995
	Work Cover NSW - Work Near Underground Assets Guide
	Work Cover NSW - Excavation Work: Code of Practice
□IC	Electricity Safety Act 1998
	Electricity Safety (Network Asset) Regulations 1999
□ □D	Electrical Safety Act 2002
	Code of Practice for Working Near Exposed Live Parts
S□	Electricity Act 1996
□□S	Tasmanian Electricity Supply Industry Act 1995
□ □	Electricity Act 1945
	Electricity Regulations 1947
N□	Electricity Reform Act 2005
	Electricity Reform (Safety and Technical) Regulations 2005
□C□	Electricity Act 1971

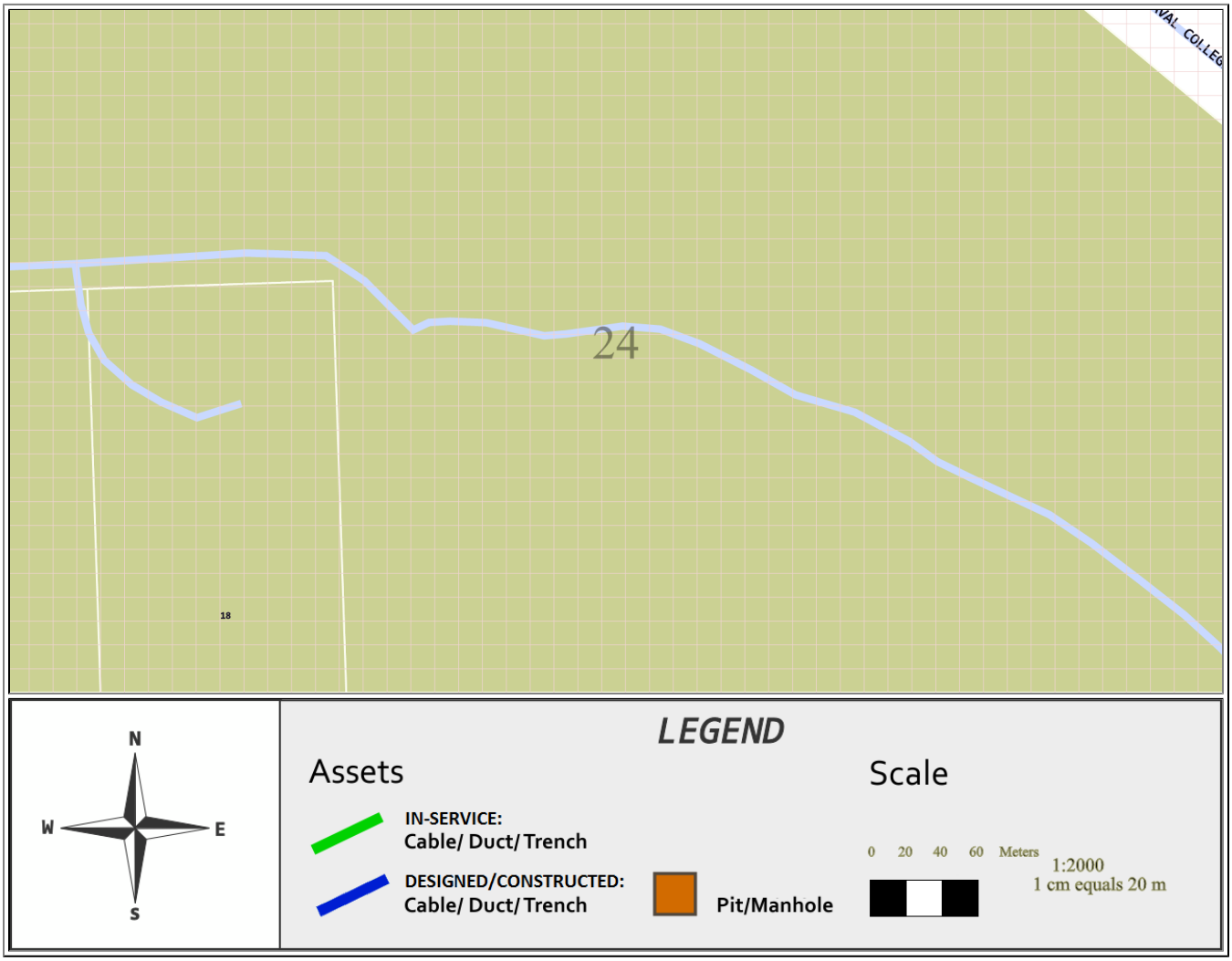
Thank You,

Net□or□ □ □erat□ons Centre - □ssurance

Date: 03/21/2016

Cont- PDF for Job Number: 10455757 , Sequence Number: 51688298 , Issue Date: 03/21/ 2016





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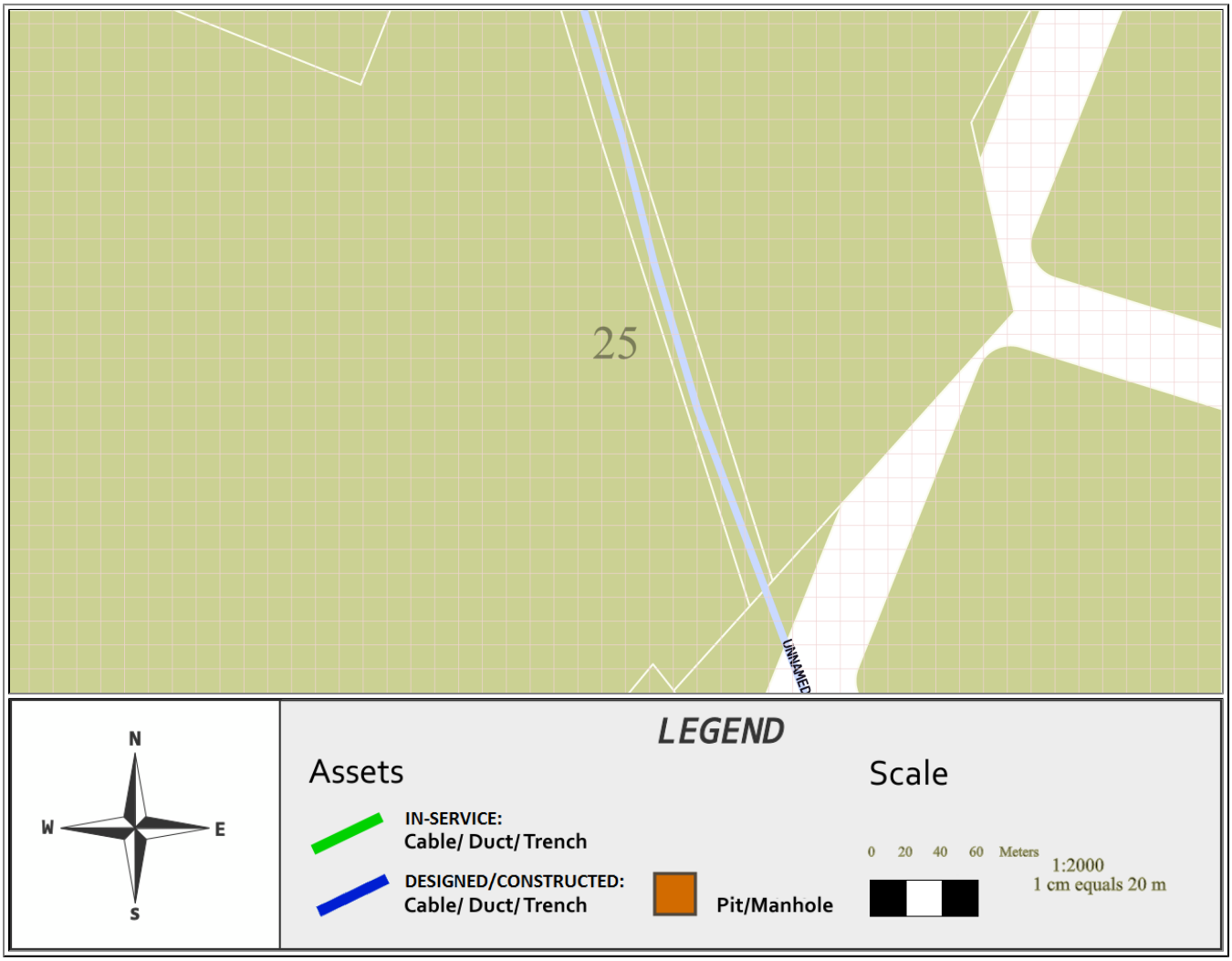

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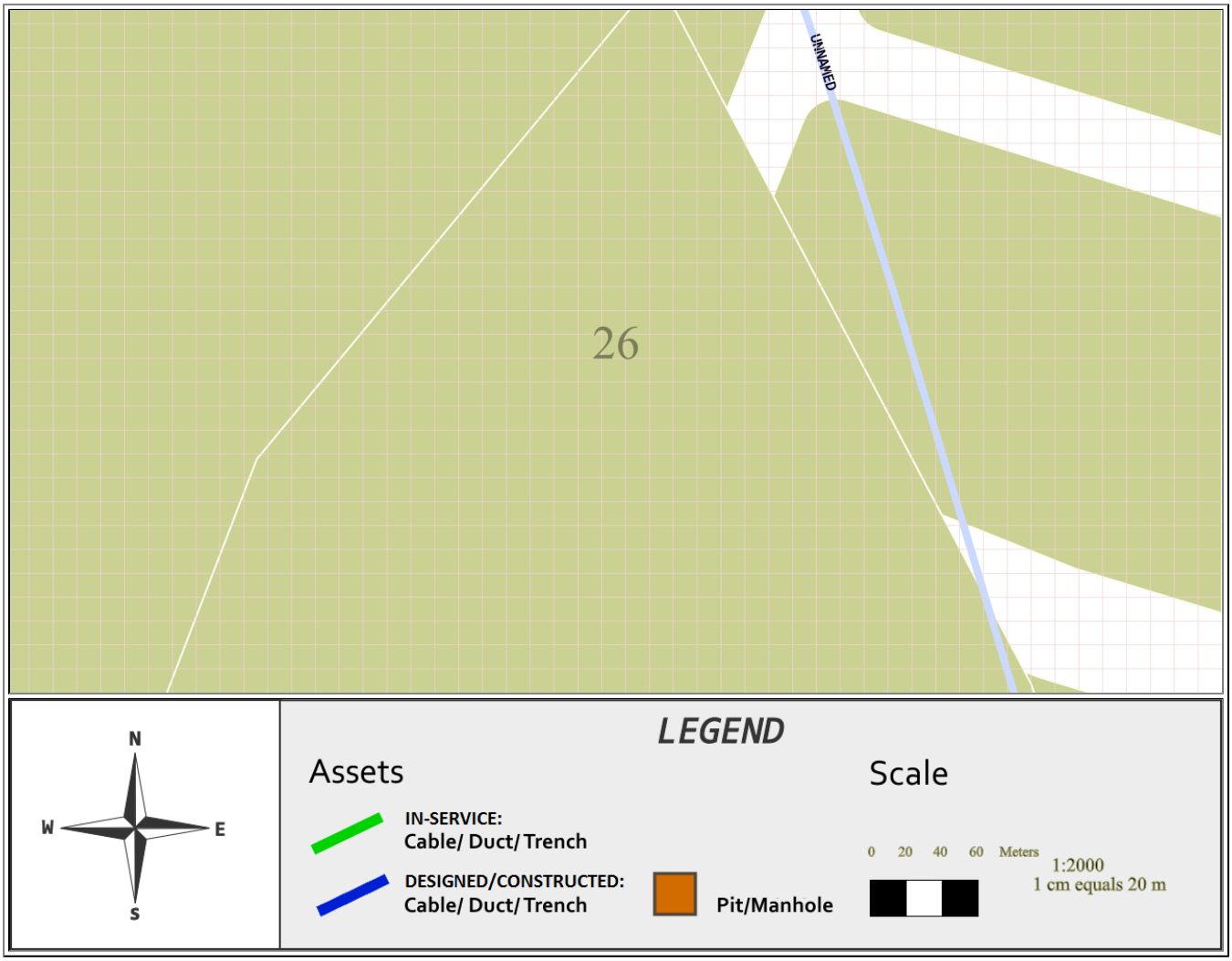

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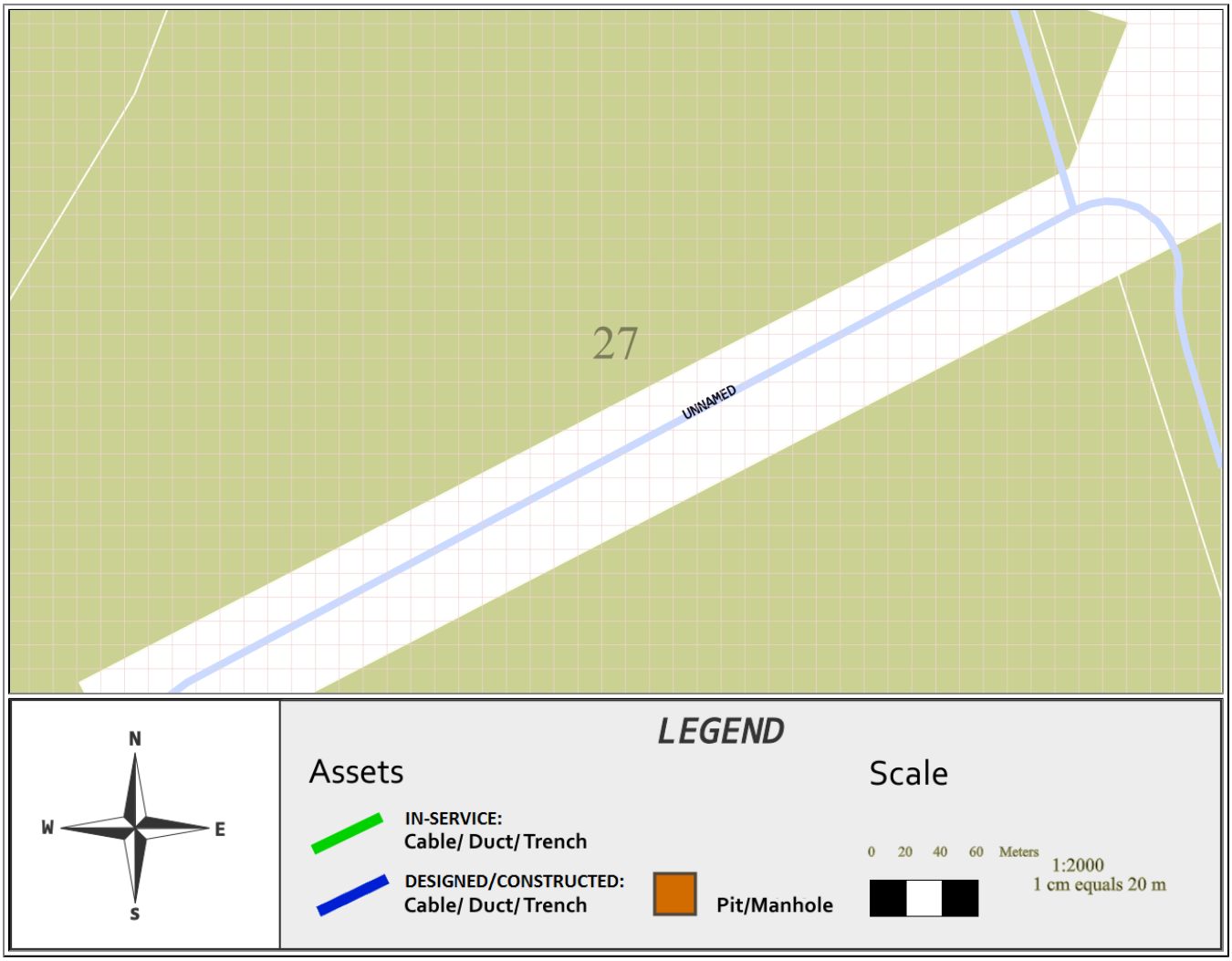

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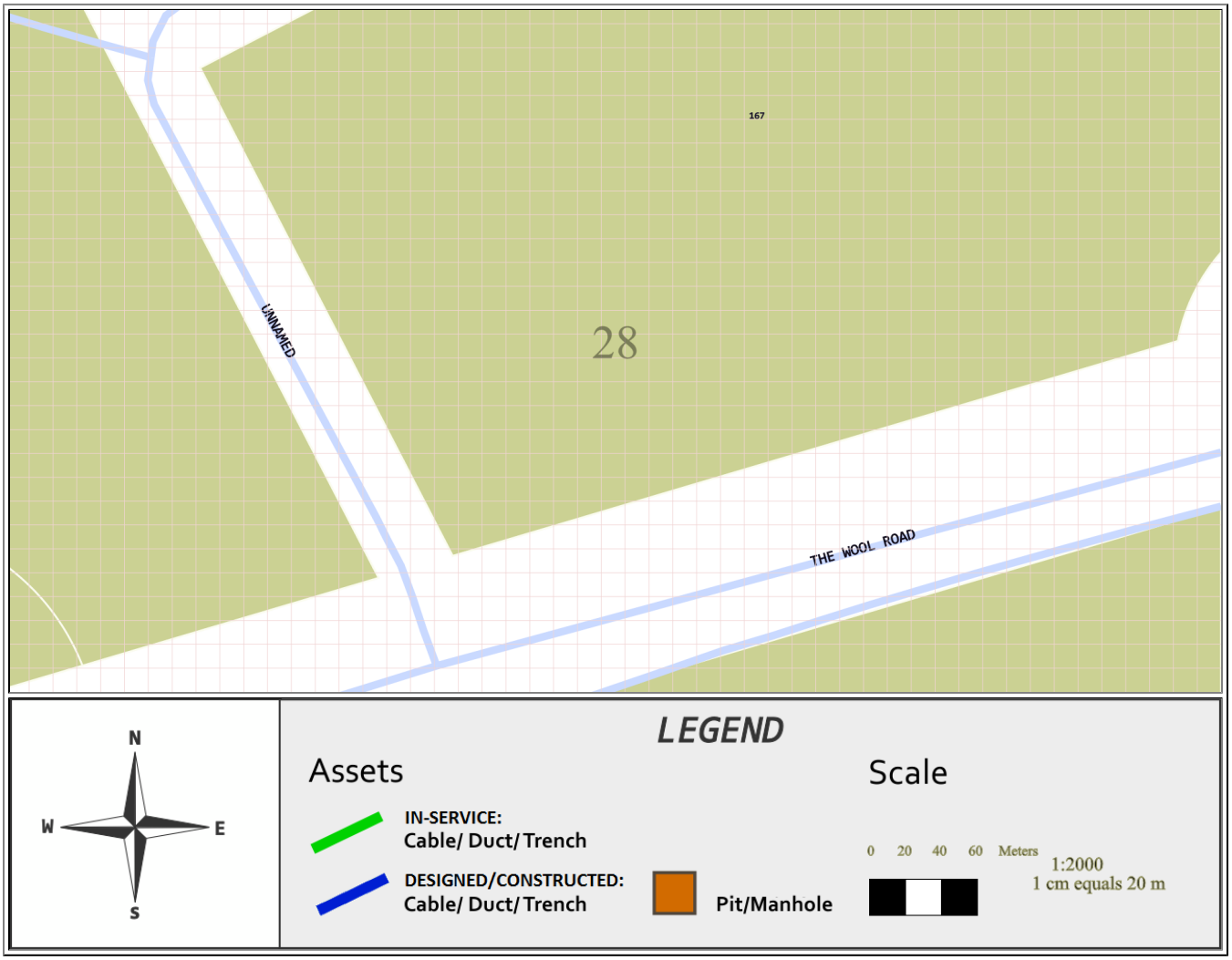

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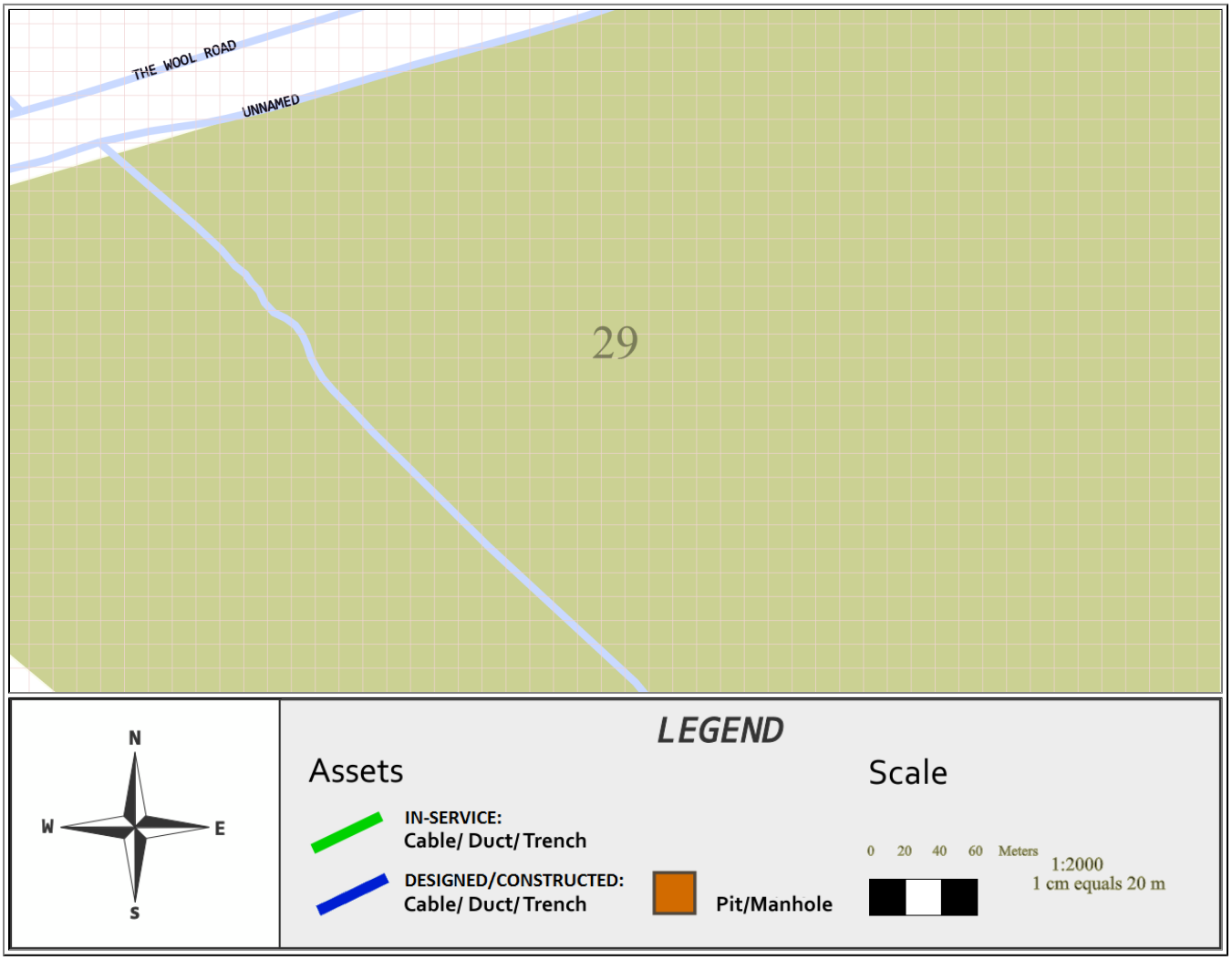

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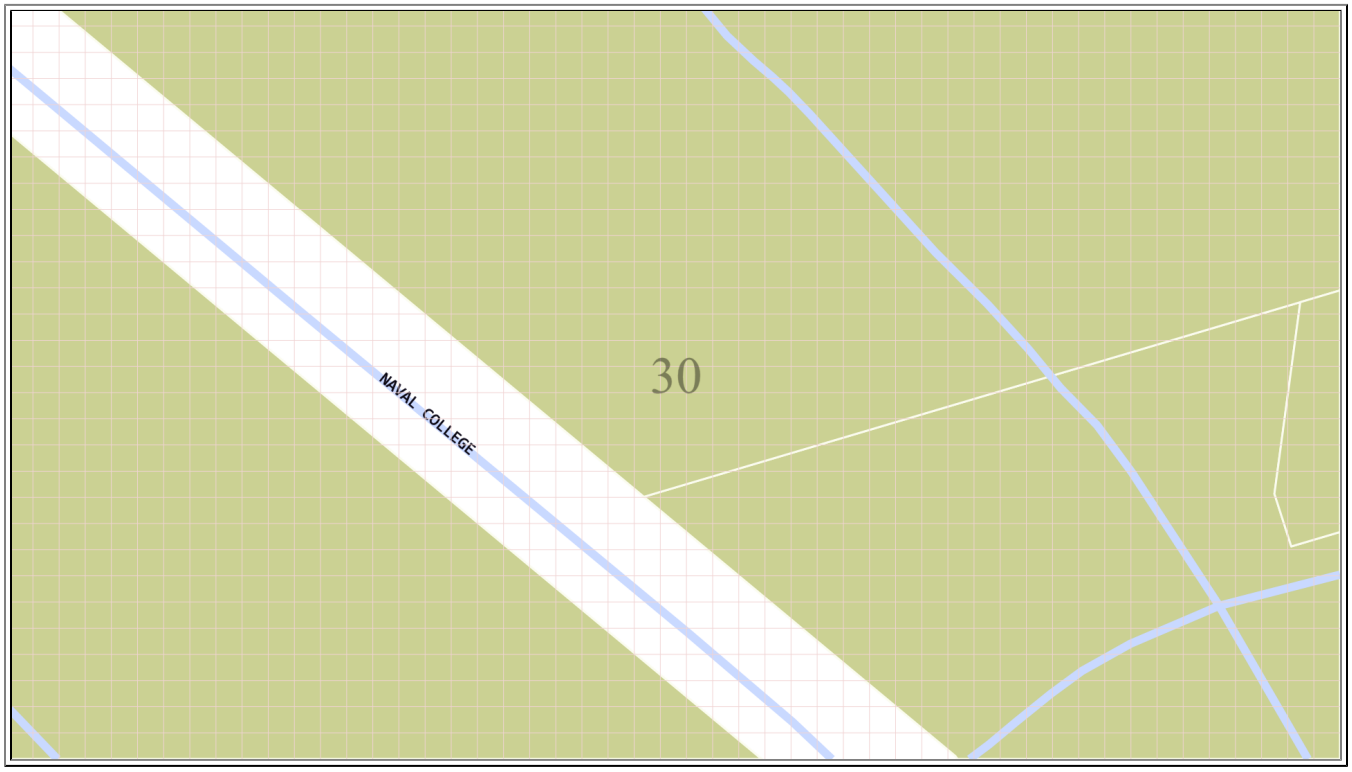

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Email info@nbn.com.au Web nbn.com.au

If further clarification is required, please contact:
Endeavour Energy
Phone: (02) 9853 4161 (8:00am-4:30pm Mon-Fri)
Emergency Phone Number: 131 003

Endeavour Energy

DBYD Underground Search Report

Date: 22/03/2016

DBYD Sequence No: 51688296 **DBYD Job No:** 10455757

ENDEAVOUR ENERGY ASSETS AFFECTED

To:	Mr Shaun Burgess		Company:	Not Supplied	
Address:	Level 11 345 George Street, Sydney, NSW 2000				
Cust. ID:	1426704	Email:	shaun.burgess@sydney.northrop.com.au		
Phone:	02 9241 4188	Mobile:	Not Supplied	Fax:	Not Supplied
Enquiry Location:	1310 Naval College Road, Worrowing Heights, NSW 2540				

Our Search has shown that **UNDERGROUND ASSETS ARE PRESENT** on our plans within the nominated enquiry location. This search is based on the graphical position of the excavation site as denoted in the DBYD customer confirmation sheet.

WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be printed and made available at the worksite where excavation is to be undertaken. Plans must be reviewed and understood by the crew on site prior to commencing excavation.

SUPPLEMENTARY MATERIAL

Material	Purpose	Location
DBYD Cover Letter	Endeavour Energy DBYD response Cover Letter	Attached
DBYD Important Information & Disclaimer	Endeavour Energy disclaimer, responsibilities and information on understanding plans	Attached
DBYD Response Plans	Endeavour Energy DBYD plans	Attached
Work Cover NSW *"Work near underground assets: Guide"*	Guideline for anyone involved in construction work near underground assets	Contact Work Cover NSW for a copy
Work Cover NSW *"Excavation work: Code of practice"*	Practical guidance on managing health and safety risks associated with excavation	URL [Click Here]
Safe Work Australia *"Working in the vicinity of overhead and underground electric lines guidance material"*	Provides information on how to manage risks when working in the vicinity of overhead and underground electric lines at a workplace	URL [Click Here]
Endeavour Energy Safety Brochures & Guides	To raise awareness of dangers of working on or near Endeavour Energy's assets	URL [Click Here]

If further clarification is required, please contact:
Endeavour Energy
Phone: (02) 9853 4161 (8:00am-4:30pm Mon-Fri)
Emergency Phone Number: 131 003

WARNING

This excavation is in the vicinity of Endeavour Energy's Transmission, Pilot, Communication or Fibre Optic Cables

Please Notify

ENDEAVOUR ENERGY

Between 8.30am - 4.00pm

on

0418 489 957

Transmission Mains South

SPRINGHILL

4 WORKING days **before commencing Excavation**

DESIGN COMPLIANCE & INDEMNITY

This design complies with Integral Energy's relevant standards as current at this time and as listed on Integral Energy Accredited Service Provider's Internet Site. These standards include, but are not limited to:

GT&C:	General Terms & Conditions
EMS:	Environmental Management Standard
MCI:	Mains Construction Instruction
MDI:	Mains Design Instruction
PDI:	Protection Design Instruction
SDI:	Substation Design Instruction
SAD0001:	Design Drawing Standard
MMI:	Mains Maintenance Instruction
SMI:	Substation Maintenance Instruction

Additionally, where relevant, the design complies with C(b) - "Guideline for Design and Maintenance of Overhead Distribution and Transmission Lines" published by ESAA, and other relevant standards.

Tony Pollard Electrics indemnifies Integral Energy for any loss or damage resulting from non-compliance with the above standards.

Signed: Pat Anthony Name: Pat Anthony

Service Provider Number: 2448 Date: 17/9/07

WORKS COMPLETED

CONSTRUCTED BY: _____

WORKS COMPLETED : _____ NAME

_____ SIGNED _____ DATE

INSPECTED BY : _____ NAME

_____ SIGNED _____ DATE

AUTHORISATION OF ESTIMATED VALUE OF INTEGRAL ENERGY FUNDED ASSETS

SIGNED: Funding Approved Han Phan SERVICE No: _____

PRINT NAME: _____

DATE: 20/07/07 FUNDING AMOUNT: $70,317.00

ATTENTION

ALL SERVICES MUST BE CHECKED BEFORE CONSTRUCTION CONTACT 'DIAL BEFORE YOU DIG' ON 1100

IE CAP NO.	IE FILE NO.	LOT NO.S	NO. OF LOTS	CLIENT & DEVELOPER'S REP	CONTACT	LOCAL COUNCIL
URS8765	2006/04921/001	101 TO 174 INCLUSIVE	74	CARDNO FORBES RIGBY	MARK KLEIN PH: 02 4228 4133 FAX: 02 4228 6811	SHOALHAVEN CITY COUNCIL

TRANSELECT DESIGN CONTACT
PAUL ANTHONY PH: 02 4272 2811 FAX: 02 4272 1773

TYPICAL EARTHING DIAGRAM

COMMON EARTHING DETAIL

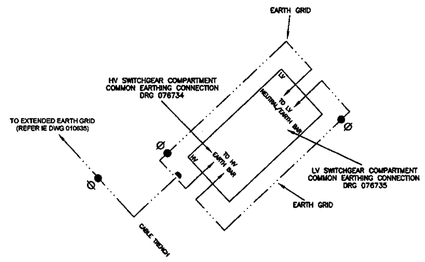
(REFER TO SDI 100 FOR COMMON EARTHING REQUIREMENTS)

THIS EARTHING DIAGRAM IS A GUIDE ONLY AND SHOWS A MINIMUM REQUIREMENT. ADDITIONAL EARTHING MAY BE REQUIRED TO MEET THE REQUIRED MAXIMUM EARTH RESISTANCE MEASUREMENTS AS STATED IN INTEGRAL ENERGY SDI 100. TO ALLOW REASONABLE PERFORMANCE OF THE NETWORK PROTECTION SYSTEMS, HV EARTHS MUST ACHIEVE A STAND ALONE VALUE BEFORE BEING CONNECTED TO ANY MEN SYSTEM OF 10 OHMS OR LESS.

EARTH TEST RESULTS

DATE OF TEST – 21/02/07
WEATHER – WARM / HOT
SOIL CONDITION – DRY
METHOD OF SOIL RESISTIVITY TEST – DRIVEN ROD
APPARENT SOIL RESISTIVITY = 266 OHM METRES
CALCULATED ELECTRODE SYSTEM / ARRANGEMENT – 6 x 20m ELECTRODES (COMBINED EARTHING)
COMBINED / TOTAL EARTH RESISTANCE OF SYSTEM TO BE LESS THAN 1 OHM
CALCULATIONS AS PER ESAA SUBSTATION EARTHING GUIDE SECT 5.2.3 & 7.1.1.1

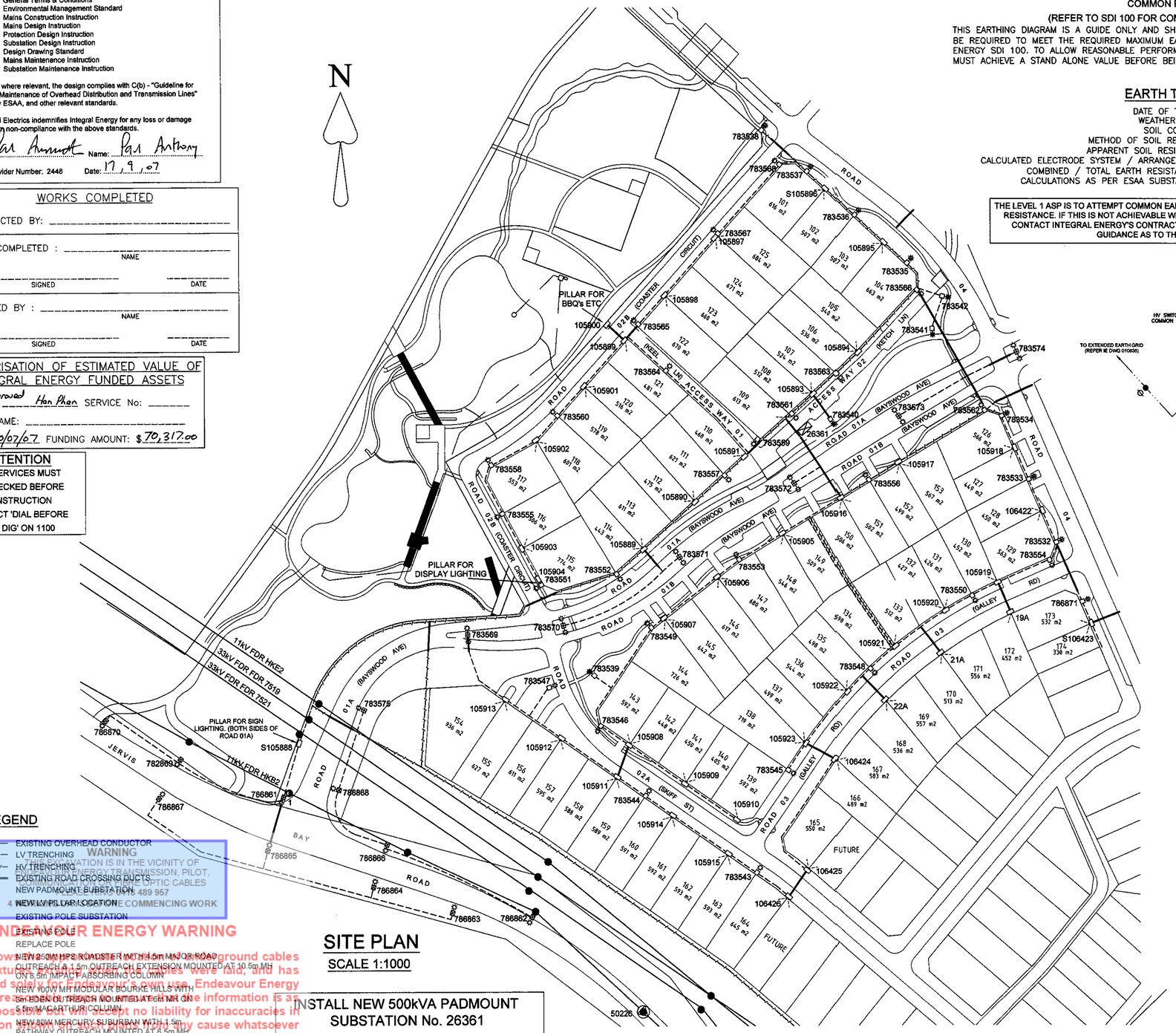
THE LEVEL 1 ASP IS TO ATTEMPT COMMON EARTHING WITH A 1 OHM STANDALONE COMBINED EARTHING RESISTANCE. IF THIS IS NOT ACHIEVABLE WITH 6 x DEEP ELECTRODES THEN THE LEVEL 1 ASP IS TO CONTACT INTEGRAL ENERGY'S CONTRACTS INSPECTOR AND LEVEL 3 ASP TO OBTAIN FURTHER GUIDANCE AS TO THE USE OF SEPARATE EARTHING.



LOCATION FOR ELECTRODES INDICATIVELY SHOWN. REFER TO SDI100 (IE DWG 010635 FOR DETAILS)

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MCI005, MCI006, MDI0020 AND THE GENERAL TERMS AND CONDITIONS SPJ4004.
2. IN SOME INSTANCES THE DESIGNATED LOCATION OF THE PADMOUNT SUBSTATION COULD BE A SLOPING SITE. SHOULD IT BE NECESSARY FOR THE INSTALLATION OF RETAINING WALLS OR THE BATTERING AND RESTORATION OF THE EARTH AROUND THE PADMOUNT SUBSTATION, THE ASSOCIATED WORK WILL BE THE RESPONSIBILITY OF THE DEVELOPER.
3. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE IDENTIFICATION OF ANY SERVICES OR OTHER IMPEDIMENTS THAT MAY AFFECT THE INSTALLATION OF THE PADMOUNT SUBSTATION IN THE DESIGNATED LOCATION.
4. ALL TRENCHES TO BE IN ACCORDANCE WITH INTEGRAL ENERGY'S MDI0022 FOR SHARED TRENCHES. THE LEVEL 1 SERVICE PROVIDER IS TO ARRANGE FOR THE INSTALLATION OF TELSTRA AND AGL ASSETS AS WELL AS MANAGE THE TRENCH BACKFILLING AND RE–INSTATEMENT.
5. COMMON EARTHING REQUIRED AS PER SDI100. EARTHING INSET IS FOR INDICATIVE EARTHING ARRANGEMENTS. SEE DRAWING 010635 FOR FURTHER DETAILS.
6. PADMOUNT SUBSTATION IS TO BE INSTALLED SUCH THAT THE PLINTH IS ABOVE THE 1 IN 100 YEAR FLOOD LEVEL.
7. THIS SHEET 1 OF 4 IS TO SHOW RETICULATION OF THE SUBDIVISION ONLY. FOR DETAILS OF 11kV FEEDER RETICULATION FROM HUSKISSON ZONE SUBSTATION REFER TO SHEET 2 OF 4.



LEGEND

- EXISTING OVERHEAD CONDUCTOR
- LV TRENCHING
- HV TRENCHING
- EXISTING ROAD CROSSING DUCTS
- NEW PADMOUNT SUBSTATION
- NEW LV PILLAR LOCATION
- EXISTING POLE SUBSTATION
- EXISTING POLE
- REPLACE POLE
- NEW 250W HPS ROADSTER WITH 1.5m OUTREACH & 1.5m OUTREACH EXTENSION MOUNTED AT 10.5m MH ON 8.5m IMPACT ABSORBING COLUMN
- NEW 100W MH MODULAR BOURKE HILLS WITH 3m HDEN OUTREACH MOUNTED AT 6m MH ON 5.5m MACARTHUR COLUMN
- NEW 80W MERCURY SUBURBAN WITH 1.5m PATHWAY OUTREACH MOUNTED AT 6.5m MH ON 4.5m SLIMLINE COLUMN
- NEW 80W MERCURY SUBURBAN WITH 3m STANDARD OUTREACH MOUNTED AT 7.5m MH ON SLIMLINE COLUMN
- NEW 150W MH ROADSTER WITH 3m STANDARD DOUBLE OUTREACH MOUNTED AT 7.5m MH ON 5.5m SLIMLINE COLUMN
- SAME AS ABOVE EXCEPT SINGLE OUTREACH

SITE PLAN

SCALE 1:1000

INSTALL NEW 500kVA PADMOUNT SUBSTATION No. 26361
TRANSFORMER SIZE: 500 kVA
HV SWITCHGEAR: TYPE CFC
LV SWITCHGEAR: 4 FEEDER CAT 1
SUBSTATION CUBICLE: SIZE 14
EARTHING TO: SDI100
PREDICTED EARTHING: COMMON (REFER EARTHING DAIGRAM NOTE)

SUPPLEMENTARY NOTE

WITH REFERENCE TO MCI0006 SECT 7.1.6, THE PADMOUNT SUBSTATION WILL REQUIRE PROTECTION IN THE FORM OF "ARMCO" STYLE RAILIING ALONG THE "ACCESS WAY 02" SIDE OF THE SUBSTATION. REFER TO AS/NZS 3845:1999 FOR DESIGN AND CONSTRUCTION REQUIREMENTS OF THE "ARMCO" RAILING.

FUNDING ARRANGEMENTS FOR SCOPE OF WORKS

ASP LEVEL 1 ELECTRICAL WORKS

INTEGRAL ENERGY SUPPLIED MATERIALS

1 x 500kVA TRANSFORMER (ASSET ONLY) = $18,662

INTEGRAL ENERGY FUNDED & CONSTRUCTED

ESTABLISHMENT OF A NEW 11kV OUTDOOR CIRCUIT BREAKER AT HUSKISSON ZONE SUB

INTEGRAL ENERGY FUNDED & ASP L1 CONSTRUCTED - REIMBURSEMENT

SPARE 125mm DUCTS FROM "Z" TO "A" TO "B".
2365m @ $19/m = $44,935.00

SPARE 50mm DUCTS FROM "Z" TO "A" TO "B".
1120m @ $6/m = $6,720.00

CUSTOMER FUNDED / INTEGRAL ENERGY CONSTRUCTED - NON CONTESTABLE

* LABOUR, MATERIALS & PLANT ASSOCIATED WITH CONNECTION OF FEEDER CABLE WITHIN HUSKISSON ZONE AND TESTING AND FIRST CONNECTION OUT OF ZONE = $10,425.64 AS PER DESIGN INFORMATION DATED 21/02/07

CUSTOMER FUNDED NON CONTESTABLE

INCLUDES BUT NOT LIMITED TO:

* ADMIN, INSPECTION, COMMISSIONING AND SWITCHING FEES.

CLIENT / DEVELOPER FUNDED CONTESTABLE WORKS

ALL OTHER WORKS AND MATERIALS INCLUDING BUT NOT LIMITED TO:

* INSTALLATION AND ESTABLISHMENT OF THE PM SUBSTATION
* TRENCHING AND CIVIL WORKS (INCLUDING UNDERBORES)
* DUCT INSTALLATION
* CABLE LAYING AND/OR INSTRUCTIONS
* JOINTING
* SUPPLY AND INSTALLATION OF LV PILLARS
* OVERHEAD INSTALLATIONS
* SUPPLY AND INSTALLATION OF STREET LIGHTING

CUSTOMER FUNDED

INCLUDES BUT NOT LIMITED TO:

* PEGGING OF EASEMENTS, PROPERTY BOUNDARIES AND INFRASTRUCTURE LOCATIONS
* REGISTRATION OF EASEMENTS
* PROVIDING SITE ACCESS
* PROVIDING LEVEL SITE PADMOUNT SUBSTATION

MATERIAL RETURNS TO NEAREST INTEGRAL ENERGY WORK DEPOT BY LEVEL 1 ASP

NIL

ATTENTION

SERVICE PROVIDER TO NOTIFY NETWORK DATA DAILY WHEN WORK IS IN PROGRESS. PHONE: (02) 9853 4161

FIELD POLE NUMBER	NEW	REMOVE	EXISTING	BRACKET	SPAN LENGTH (m)	LINE DEV. (degrees)	CONSTR. NUMBER HV	CONSTR. NUMBER LV	AUGER DIA (mm)	SET DEPTH (mm)	TYPE	FOOTING	STAY	RELOCATE	REPLACE	NEW	EXISTING	REMOVE	LOCATION
761611					–	–	EXISTING + UG/OH	–	–	–	EXISTING WOOD	–						X	2
3GY059					–	–	21	1 + 6	2050	600	12.5m/8kN WOOD	C			X				1
	LANTERNS				CONSTRUCTIONS				HOLE		POLE								

CAP NO	URS8765	REFERENCE DRAWINGS	
GIS MAP NO	W64102		
HV SWITCHING	X		
O/H MAINS			
U/G MAINS	X		
SUBSTATIONS	X		

TRANSELECT DRAWING NO.	60474–003	RADIX REF: 00078430	
SHEET	1 OF 4	A1	
DRAWN	D.M.J.	UBD REF	MAP 4 D13
CHECKED	P.M.A.	LG AREA	SHOALHAVEN C.C.
DESIGN	P.M.A.	IE REGION	SOUTHERN
		HV OP.DIAG	HUSKISSON 1 H2

ORIGINAL SCALE 1:1000 — I.E. DRAWING NO. 312289 — REV A

JERVIS BAY RD
VINCENTIA
URS8765
ELECTRICAL RETICULATION

Design certification shall lapse where:

1. Notice of intent has not been received within six (6) months of this certification.
2. Construction has been interrupted for more than six (6) months.

Where design certification has lapsed, the design must be resubmitted for certification by the accredited Level 3 Service Provider.

CERTIFIED BY INTEGRAL ENERGY

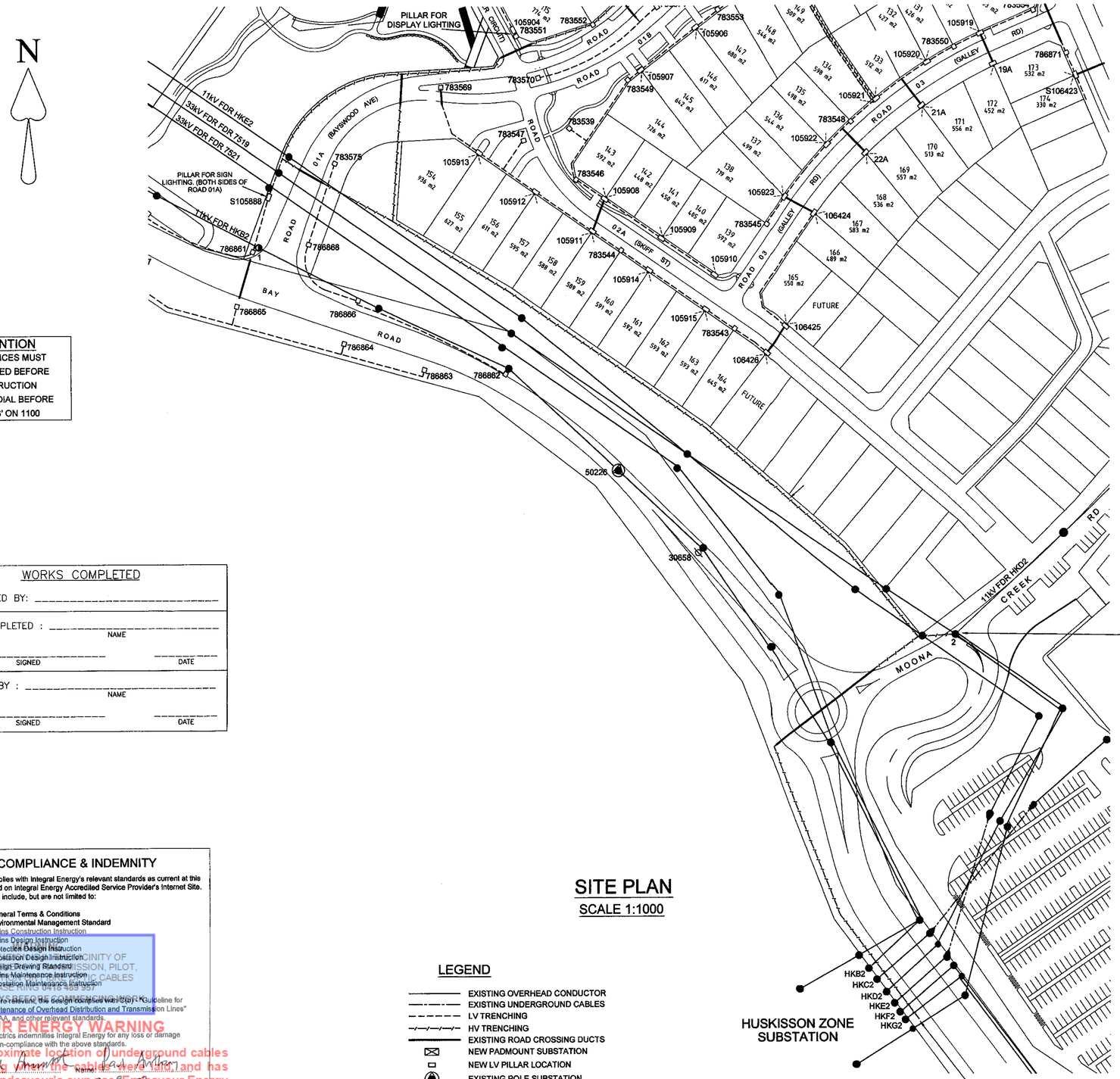
Examiner's Name:
Signature: C. Price
Date: 19/09/07 Amendment No: A

This certification is issued subject to Integral Energy's Standard Certification Terms.

transelect INNOVATIVE POWER SOLUTIONS
A Division of Tony Pollard Electrics Pty Ltd (TPE)
Ph: (02) 4272 2260
Fax: (02) 4272 1773
18 Investigator Drive, Unanderra NSW 2526

2	22/03/16	DBYD			
1	20/09/07	ISSUED FOR CERTIFICATION	P.M.A.	D.M.J.	P.M.A.
A	19/09/07	ISSUED FOR CERTIFICATION	P.M.A.	D.M.J.	P.M.A.
AMENDMENT	DATE	ISSUE PURPOSE	DRAWN	CHECKED	DESIGN

	NOTES
1	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MCI005, MCI006, MDI0020 AND THE GENERAL TERMS AND CONDITIONS SPJ4004.
2	THIS SHEET 2 OF 4 IS TO SHOW ELECTRICAL RETICULATION OF 11kV FEEDER FROM HUSKISSON ZONE SUBSTATION. FOR DETAILS ON REMAINDER OF SUBDIVISION REFER TO SHEET 1 OF 4.



SITE PLAN
SCALE 1:1000

INITIALLY THE 11kV SUPPLY TO THE SUBDIVISION IS TO BE CONNECTED BY L1 ASP TO EXISTING FEEDER HKD2 AT POLE LOCATION 2. L1 ASP IS TO CONTINUE 11kV CABLE FROM NEAR POLE LOCATION 2 TO THE ZONE SUBSTATION AND LEAVE SHORT CIRCUITED AND CAPPED AT BOTH ENDS. AT A LATER DATE INTEGRAL ENERGY WILL REMOVE THE UG/OH FROM POLE LOCATION 2 AND STJ THE CABLE TO BE FED FROM HUSKISSON ZONE SUBSTATION.

ATTENTION
ALL SERVICES MUST BE CHECKED BEFORE CONSTRUCTION CONTACT 'DIAL BEFORE YOU DIG' ON 1100

ATTENTION
SERVICE PROVIDER TO NOTIFY NETWORK DATA DAILY WHEN WORK IS IN PROGRESS. PHONE: (02) 9853 4161

LEGEND
- EXISTING OVERHEAD CONDUCTOR
- EXISTING UNDERGROUND CABLES
- LV TRENCHING
- HV TRENCHING
- EXISTING ROAD CROSSING DUCTS
- NEW PADMOUNT SUBSTATION
- NEW LV PILLAR LOCATION
- EXISTING POLE SUBSTATION
- ROAD CROSSING DUCT CONFIGURATION (26) REFER TO MDI0020 SECTION 9
- EXISTING POLE
- REPLACE POLE
- EXISTING ABS (N/C)
- NEW STREET LIGHT COLUMN
- NEW STREET LIGHT LUMINAIRE

LEVEL 1 ASP IS TO RUN 11kV CABLE INTO HUSKISSON ZONE SUBSTATION VIA INTEGRAL ENERGY SUPPLIED DUCTS. LEVEL 1 ASP IS TO LIAISE WITH INTEGRAL ENERGY'S CONTRACTS INSPECTOR TO LEAVE CABLE COILED IN A SUITABLE LOCATION TO ENABLE INTEGRAL ENERGY TO CARRY OUT FUTURE CONNECTION TO 11kV CIRCUIT BREAKER

WORKS COMPLETED

CONSTRUCTED BY: _____

WORKS COMPLETED : _____ NAME

_____ SIGNED _____ DATE

INSPECTED BY : _____ NAME

_____ SIGNED _____ DATE

DESIGN COMPLIANCE & INDEMNITY

This design complies with Integral Energy's relevant standards as current at this time and as listed on Integral Energy Accredited Service Provider's Internet Site. These standards include, but are not limited to:

GT&C: General Terms & Conditions
EMS: Environmental Management Standard
MCI: Mains Construction Instruction
MDI: Mains Design Instruction
PDI: Protection Design Instruction
SDI: Substation Design Instruction
SAD0001: Design Drawing Standard
MMI: Mains Maintenance Instruction
SMI: Substation Maintenance Instruction

Additionally, where relevant, the design complies with "Guideline for Design and Maintenance of Overhead Distribution and Transmission Lines" published by ESAA, and other relevant standards.

Tony Pollard Electrics indemnifies Integral Energy for any loss or damage resulting from non-compliance with the above standards.

Signed: _____ Name: _____

Service Provider Number: 2448 Date: _____

THIS EXCAVATION IN THE VICINITY OF ENDEAVOUR ENERGY TRANSMISSION, PILOT, COMMUNICATIONS OR FIBRE OPTIC CABLES PLEASE RING 9818 4683 307

4 Working Days Notice Required

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid and has been prepared solely for Endeavour's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is as accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.

Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's Property

All Electrical apparatus shall be considered as live until proved de-energised. Contact with live electrical apparatus will cause severe injury or death

Those excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCP) may be present in some sub-transmission trenches

OPERATIONAL LIMITATIONS

Unless otherwise approved, interuptions to supply must be avoided.
The following alternatives must be considered -
* Mobile Generators or Substations
* Live line work
* Design alterations
* Low voltage paralleling
* Work practices / standards

NOTE: All costs associated are to be funded by customer/developer

IE CAP NO.	IE FILE NO.	LOT NO.S	NO. OF LOTS	CLIENT & DEVELOPER'S REP	CONTACT	LOCAL COUNCIL	TRANSELECT DESIGN CONTACT
URS8765	2006/04921/001	101 TO 174 INCLUSIVE	74	CARDNO FORBES RIGBY	MARK KLEIN PH: 02 4228 4133 FAX: 02 4228 6611	SHOALHAVEN CITY COUNCIL	PAUL ANTHONY PH: 02 4272 2811 FAX: 02 4272 1773

AMENDMENTS
A ISSUED FOR CONSTRUCTION D.M.J. 29/07/07

Design certification shall lapse where:
1. Notice of intent has not been received within six (6) months of this certification.
2. Construction has been interrupted for more than six (6) months.
Where design certification has lapsed, the design must be resubmitted for certification by the accredited Level 3 Service Provider.

CERTIFIED BY INTEGRAL ENERGY
Examiner's Name: _____
Signature: C. Lue
Date: 19/09/07 Amendment No: A
This certification is issued subject to Integral Energy's Standard Certification Terms.

transelect INNOVATIVE POWER SOLUTIONS A Division of Tony Pollard Electrics Pty Ltd (TPE)
Ph: (02) 4272 2260 Fax: (02) 4272 1773 18 Investigator Drive, Unanderra NSW 2526

		REFERENCE DRAWINGS		
CAP NO	URS8765			
GIS MAP NO	W64102			
HV SWITCHING	X	.	.	.
O/H MAINS	.	.	.	.
U/G MAINS	X	.	.	.
SUBSTATIONS	X	.	.	.

TRANSELECT DRAWING NO.	60474-004	
DRAWN	D.M.J.	
CHECKED	P.M.A.	
DESIGN	P.M.A.	
RADIX REF: 00078430	SHEET 2 OF 4	A1
UBD REF	MAP 4 D13	
LG AREA	SHOALHAVEN C.C.	
IE REGION	SOUTHERN	
HV OP.DIAG	HUSKISSON 1 H2	
ORIGINAL SCALE	1:1000	
I.E. DRAWING NO.	312289	REV A

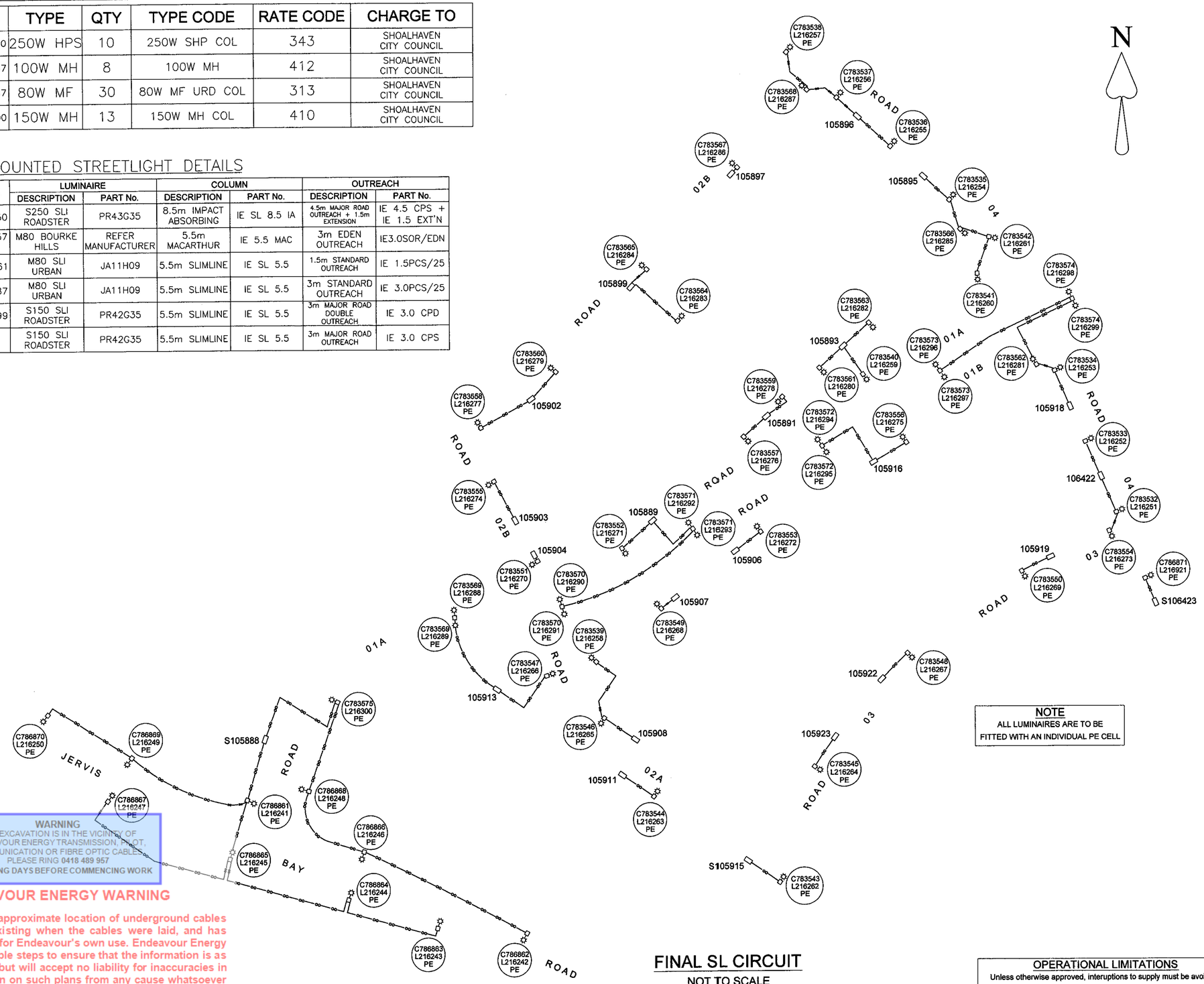
JERVIS BAY RD
VINCENTIA
URS8765
ELECTRICAL RETICULATION

NEW LANTERN CHARGE DETAILS

LANTERNS	TYPE	QTY	TYPE CODE	RATE CODE	CHARGE TO
216241 TO 216250	250W HPS	10	250W SHP COL	343	SHOALHAVEN CITY COUNCIL
216251 TO 216257	100W MH	8	100W MH	412	SHOALHAVEN CITY COUNCIL
216258 TO 216287	80W MF	30	80W MF URD COL	313	SHOALHAVEN CITY COUNCIL
216288 TO 216300	150W MH	13	150W MH COL	410	SHOALHAVEN CITY COUNCIL

COLUMN MOUNTED STREETLIGHT DETAILS

LANTERNS	LUMINAIRE		COLUMN		OUTREACH	
	DESCRIPTION	PART No.	DESCRIPTION	PART No.	DESCRIPTION	PART No.
216241 TO 216250	S250 SLI ROADSTER	PR43G35	8.5m IMPACT ABSORBING	IE SL 8.5 IA	4.5m MAJOR ROAD OUTREACH + 1.5m EXTENSION	IE 4.5 CPS + IE 1.5 EXT'N
216251 TO 216257 & 217921	M80 BOURKE HILLS	REFER MANUFACTURER	5.5m MACARTHUR	IE 5.5 MAC	3m EDEN OUTREACH	IE3.0SOR/EDN
216258 TO 216261	M80 SLI URBAN	JA11H09	5.5m SLIMLINE	IE SL 5.5	1.5m STANDARD OUTREACH	IE 1.5PCS/25
216262 TO 216287	M80 SLI URBAN	JA11H09	5.5m SLIMLINE	IE SL 5.5	3m STANDARD OUTREACH	IE 3.0PCS/25
216288 TO 216299	S150 SLI ROADSTER	PR42G35	5.5m SLIMLINE	IE SL 5.5	3m MAJOR ROAD DOUBLE OUTREACH	IE 3.0 CPD
216300	S150 SLI ROADSTER	PR42G35	5.5m SLIMLINE	IE SL 5.5	3m MAJOR ROAD OUTREACH	IE 3.0 CPS



	NOTES
1	THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MCI005, MCI006, MDI0020 AND THE GENERAL TERMS AND CONDITIONS SPJ4004.
2	ALL LUMINAIRES ARE TO BE FITTED WITH AN INDIVIDUAL PE CELL.

ATTENTION
ALL SERVICES MUST BE CHECKED BEFORE CONSTRUCTION
CONTACT 'DIAL BEFORE YOU DIG' ON 1100

ATTENTION
SERVICE PROVIDER TO NOTIFY NETWORK DATA DAILY WHEN WORK IS IN PROGRESS. PHONE: (02) 9853 4161

APPROVAL TO CONNECT TO PUBLIC LIGHTING
DATE APPROVED: 19-09-07
REVIEWERS SIGNATURE: _____
THIS APPROVAL IS ISSUED SUBJECT TO INTEGRAL ENERGY'S GENERAL TERMS AND CONDITIONS FOR CONNECTION OF PUBLIC LIGHTING.

NOTE
ALL LUMINAIRES ARE TO BE FITTED WITH AN INDIVIDUAL PE CELL

WARNING
THIS EXCAVATION IS IN THE VICINITY OF ENDEAVOUR ENERGY TRANSMISSION, PILOT, COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING 0418 489 957
4 WORKING DAYS BEFORE COMMENCING WORK

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared solely for Endeavour's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is as accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.

Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy Property.

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Those excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCP) may be present in some sub-transmission trenches

FINAL SL CIRCUIT

NOT TO SCALE

LEGEND

LAY NEW UNDERGROUND SL CABLES
2 x 16mm2 1C PVC/PVC (RED/BLACK) IN 50mmØ DUCT
(R.L. 1200m C.L. 1350m (PER CONDUCTOR)

OPERATIONAL LIMITATIONS
Unless otherwise approved, interuptions to supply must be avoided.
The following alternatives must be considered -
* Mobile Generators or Substations
* Live line work
* Design alterations
* Low voltage parallelling
* Work practices / standards
NOTE: All costs associated are to be funded by customer/developer

DESIGN COMPLIANCE & INDEMNITY
This design complies with Integral Energy's relevant standards as current at this time and as listed on Integral Energy Accredited Service Provider's Internet Site. These standards include, but are not limited to:

GT&C: General Terms & Conditions
EMS: Environmental Management Standard
MCI: Mains Construction Instruction
MDI: Mains Design Instruction
PDI: Protection Design Instruction
SDI: Substation Design Instruction
SAD0001: Design Drawing Standard
MMI: Mains Maintenance Instruction
SMI: Substation Maintenance Instruction

Additionally, where relevant, the design complies with C(b) - "Guideline for Design and Maintenance of Overhead Distribution and Transmission Lines" published by ESAA, and other relevant standards.

Tony Pollard Electrics indemnifies Integral Energy for any loss or damage resulting from non-compliance with the above standards.

Signed: _____ Name: Paul Anthony
Service Provider Number: 2448 Date: 17/9/07

IE CAP NO.	IE FILE NO.	LOT NO.S	NO. OF LOTS	CLIENT & DEVELOPER'S REP	CONTACT	LOCAL COUNCIL
URS8765	2006/04821/001	101 TO 174 INCLUSIVE	74	CARDNO FORBES RIGBY	MARK KLEIN PH: 02 4228 4133 FAX: 02 4228 6811	SHOALHAVEN COUNCIL

TRANSELECT DESIGN CONTACT
PAUL ANTHONY PH: 02 4272 2811 FAX: 02 4272 1773

AMENDMENTS	ISSUED FOR CONSTRUCTION	AS CONSTRUCTED FORM	CHKD	DRAWN	DATE
1	ISSUED FOR CONSTRUCTION		P.M.A.	D.M.J.	17/9/07

Design certification shall lapse where:
1. Notice of intent has not been received within six (6) months of this certification.
2. Construction has been interrupted for more than six (6) months.
Where design certification has lapsed, the design must be resubmitted for certification by the accredited Level 3 Service Provider.

CERTIFIED BY INTEGRAL ENERGY
Examiner's Name: C. Pace
Signature:
Date: 19/09/07 Amendment No: A
This certification is issued subject to Integral Energy's Standard Certification Terms.

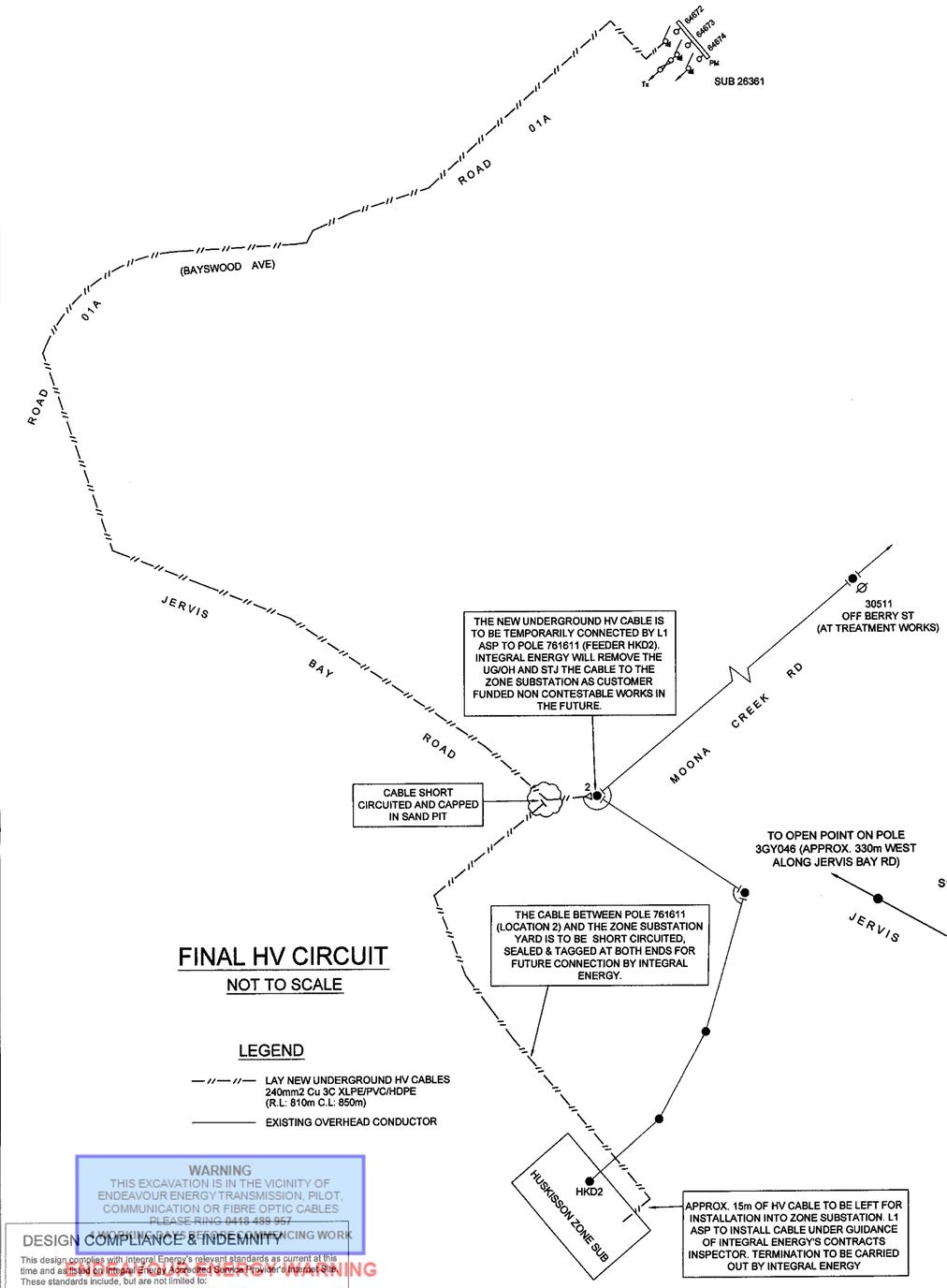
transelect INNOVATIVE POWER SOLUTIONS
A Division of Tony Pollard Electrics Pty/Ltd (TPE)
Ph: (02) 4272 2260
Fax: (02) 4272 1773
18 Investigator Drive, Unanderra NSW 2526

		REFERENCE DRAWINGS		
CAP NO	URS8765			
GIS MAP NO	W64102			
HV SWITCHING	X			
O/H MAINS				
U/G MAINS	X			
SUBSTATIONS	X			

TRANSELECT DRAWING NO.		RADIX REF: 00078430	A1	ORIGINAL SCALE	I.E. DRAWING NO.	REV
60474-006		SHEET 4 OF 4		NTS	312289	A
DRAWN	D.M.J.	UBD REF	MAP 4 D13	JERVIS BAY RD VINCENTIA URS8765 ELECTRICAL RETICULATION		
CHECKED	P.M.A.	LG AREA	SHOALHAVEN C.C.			
DESIGN	D.M.J.	IE REGION	SOUTHERN			
		HV OP.DIAG	HUSKISSON 1 H2			

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MCI005, MCI006, MDI0020 AND THE GENERAL TERMS AND CONDITIONS SPJ4004.



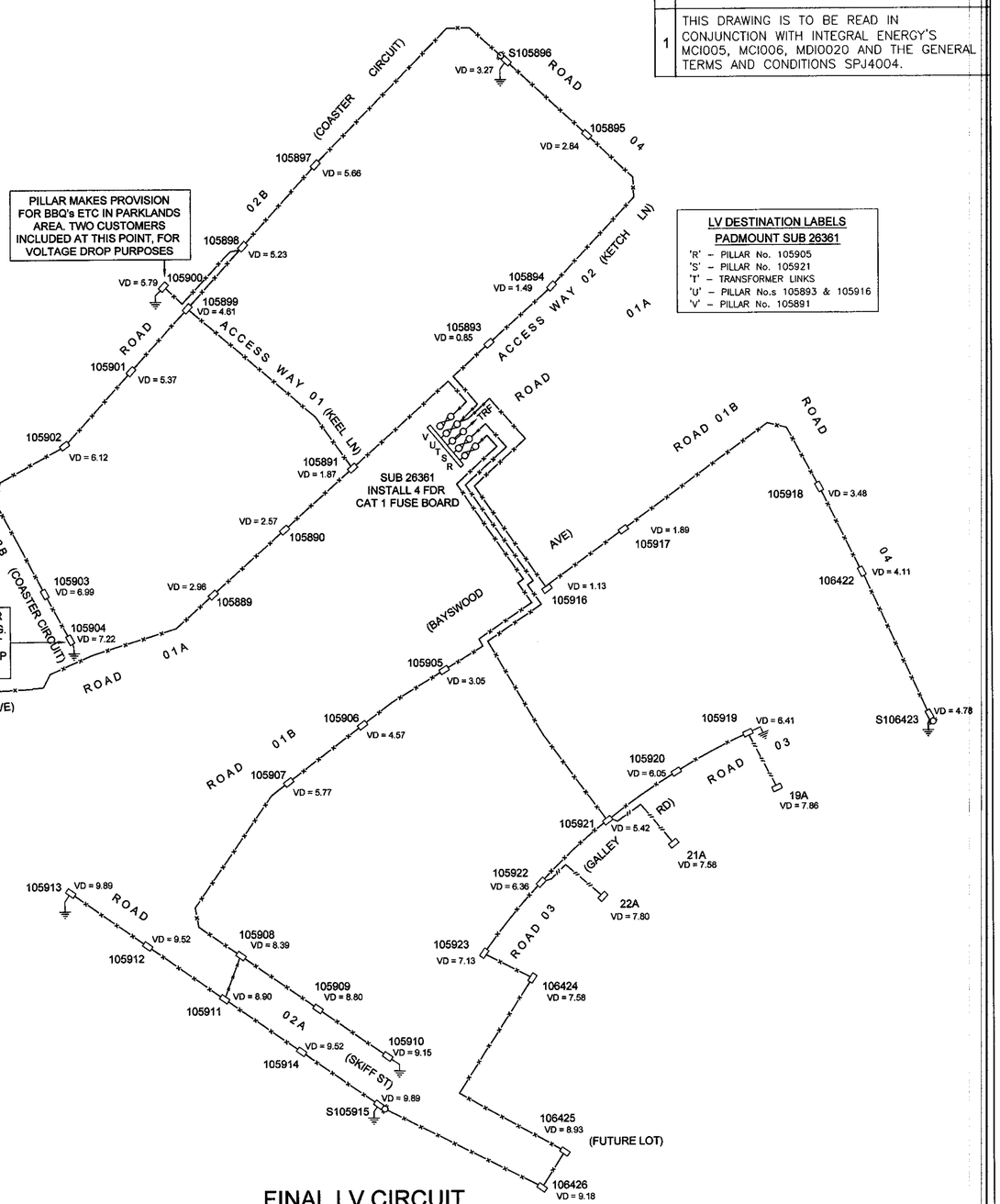
FINAL HV CIRCUIT

NOT TO SCALE

LEGEND

— //— //— LAY NEW UNDERGROUND HV CABLES 240mm2 Cu 3C XLPE/PVC/HDPE (R.L: 810m C.L: 850m)

——— EXISTING OVERHEAD CONDUCTOR



LV DESTINATION LABELS
PADMOUNT SUB 26361

'R' – PILLAR No. 105905
'S' – PILLAR No. 105921
'T' – TRANSFORMER LINKS
'U' – PILLAR No.s 105893 & 105916
'V' – PILLAR No. 105891

FINAL LV CIRCUIT

NOT TO SCALE

LEGEND

——— EXISTING OVERHEAD CONDUCTOR

—x—x—x— LAY NEW UNDERGROUND LV CABLES 240mm2 Al 4C XLPE/PVC (R.L. 1690m C.L. 1880m)

— //— //— LAY NEW UNDERGROUND LV CABLES 50mm2 Cu 4C XLPE/PVC (R.L. 75m C.L. 80m)

DESIGN COMPLIANCE & INDEMNITY

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GTSC:	General Terms & Conditions
EMS:	Environmental Management Standard
MCI:	Mains Construction Instruction
MDI:	Mains Design Instruction
PDI:	Protection Design Instruction
SDI:	Substation Design Instruction
SAD0001:	Design Drawing Standard
MMI:	Mains Maintenance Instruction
SMI:	Substation Maintenance Instruction

Additionally, where relevant, the design complies with C(b) - "Guideline for Design and Maintenance of Overhead Distribution and Transmission Lines" published by ESAA, and other relevant standards.

Tony Pollard Electrics Indemnifies Integral Energy for any loss or damage resulting from non-compliance with the above standards.

Signed: Per Summit Name: Paul Anthony
Service Provider Number: 2445 Date: 19 / 3 / 07

OPERATIONAL LIMITATIONS

Unless otherwise approved, interuptions to supply must be avoided.
The following alternatives must be considered -

* Mobile Generators or Substations
* Live line work
* Design alterations
* Low voltage parallelling
* Work practices / standards

NOTE: All costs associated are to be funded by customer/developer

ATTENTION

ALL SERVICES MUST BE CHECKED BEFORE CONSTRUCTION CONTACT 'DIAL BEFORE YOU DIG' ON 1100

ATTENTION

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IE CAP NO.	IE FILE NO.	LOT NO.S	NO. OF LOTS	CLIENT & DEVELOPER'S REP	CONTACT	LOCAL COUNCIL
URS8765	2006/04921/001	101 TO 174 INCLUSIVE	74	CARDNO FORBES RIGBY	MARK KLEIN PH: 02 4228 4133 FAX: 02 4228 6811	SHOALHAVEN CITY COUNCIL

TRANSELECT DESIGN CONTACT
PAUL ANTHONY PH: 02 4272 2811 FAX: 02 4272 1773

AMENDMENT	ISSUED FOR CONSTRUCTION	ISSUED FOR CONSTRUCTION	ISSUED FOR CONSTRUCTION
DRAWN	D.M.J.	D.M.J.	D.M.J.
CHKD	P.M.A.	P.M.A.	P.M.A.
DATE	19/03/07	19/03/07	19/03/07

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CERTIFIED BY INTEGRAL ENERGY

Examiner's Name:
Signature: C. Price
Date: 19/03/07 Amendment No: A

This certification is issued subject to Integral Energy's Standard Certification Terms.

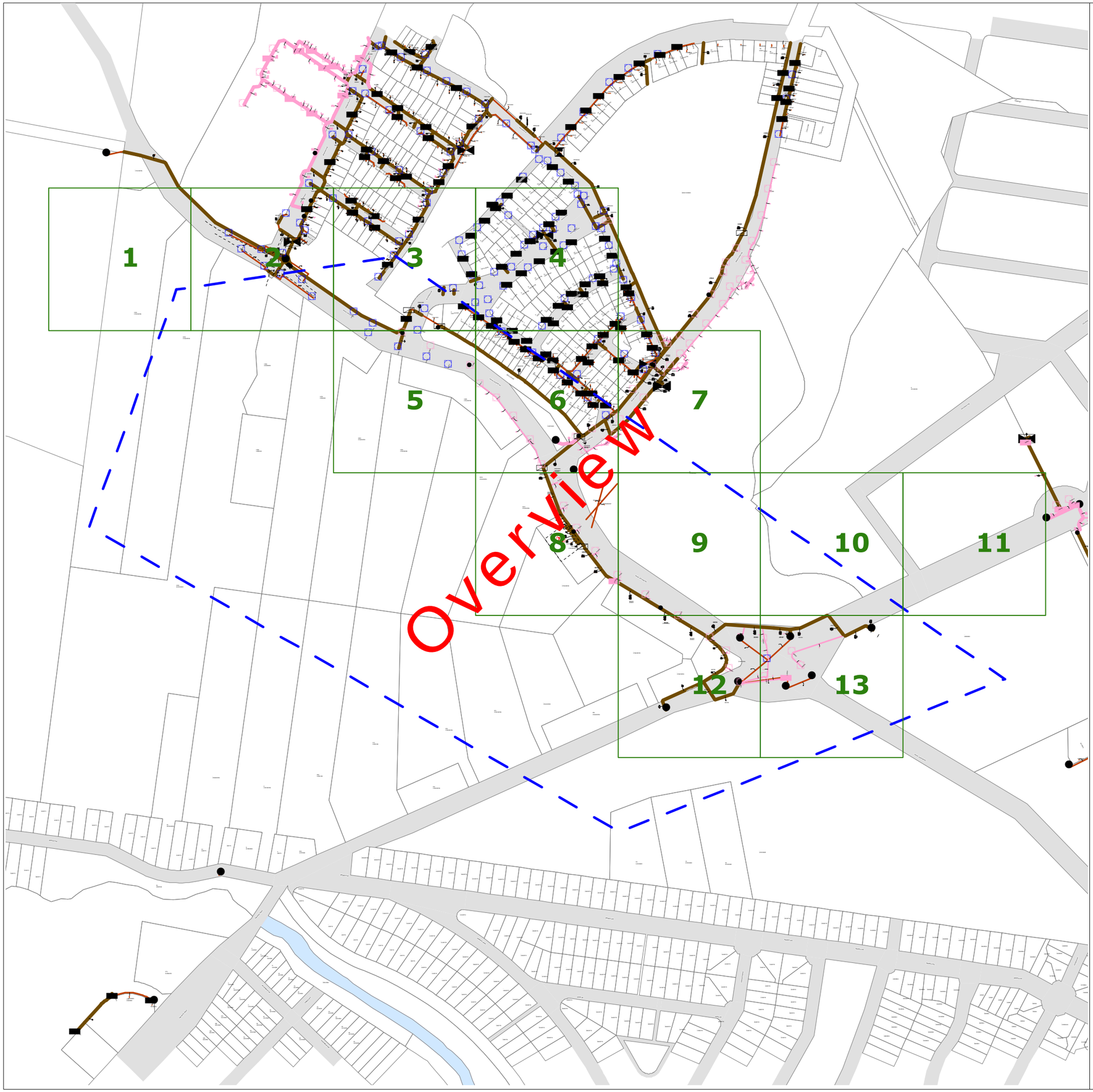
transelect
INNOVATIVE POWER SOLUTIONS
A Division of Tony Pollard Electrics Pty Ltd (TPE)
Ph: (02) 4272 2260
Fax: (02) 4272 1773
18 Investigator Drive, Unanderra NSW 2526

CAP NO	URS8765	REFERENCE DRAWINGS			
GIS MAP NO	W64102				
HV SWITCHING	X	.	.	.	
O/H MAINS	.	.	.	.	
U/G MAINS	X	.	.	.	
SUBSTATIONS	X	.	.	.	

TRANSELECT DRAWING NO.	60474–005	RADIX REF: 00078430	A1
		SHEET 3 OF 4	
DRAWN	D.M.J.	UBD REF	MAP 4 D13
CHECKED	P.M.A.	LG AREA	SHOALHAVEN C.C.
DESIGN	P.M.A.	IE REGION	SOUTHERN
		HV OP.DIAG	HUSKISSON 1 H2

ORIGINAL SCALE	I.E. DRAWING NO.	REV
NTS	312289	A

JERVIS BAY RD
VINCENTIA
URS8765
ELECTRICAL RETICULATION



Endeavour Energy

WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be printed and made available at the worksite where excavation is to be undertaken. Plans must be reviewed and understood by the crew on site prior to commencing excavation.

INFORMATION PROVIDED BY ENDEAVOUR ENERGY

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
- Depth of underground assets may vary significantly from information provided on plans as a result of changes to road, footpath or surface levels subsequent to installation.
- Such plans have been prepared solely for use by Endeavour Energy staff for design, construction and maintenance purposes.
- All enquiry details and results are kept in a register.

DISCLAIMER

Whilst Endeavour Energy has taken all reasonable steps to ensure that the information contained in the plans is as accurate as possible it will accept no liability for inaccuracies in the information shown on such plans.

WARNING
THIS EXCAVATION IS IN THE VICINITY OF
ENDEAVOUR ENERGY TRANSMISSION, PILOT,
COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING **0418 489 957**
4 WORKING DAYS BEFORE COMMENCING WORK

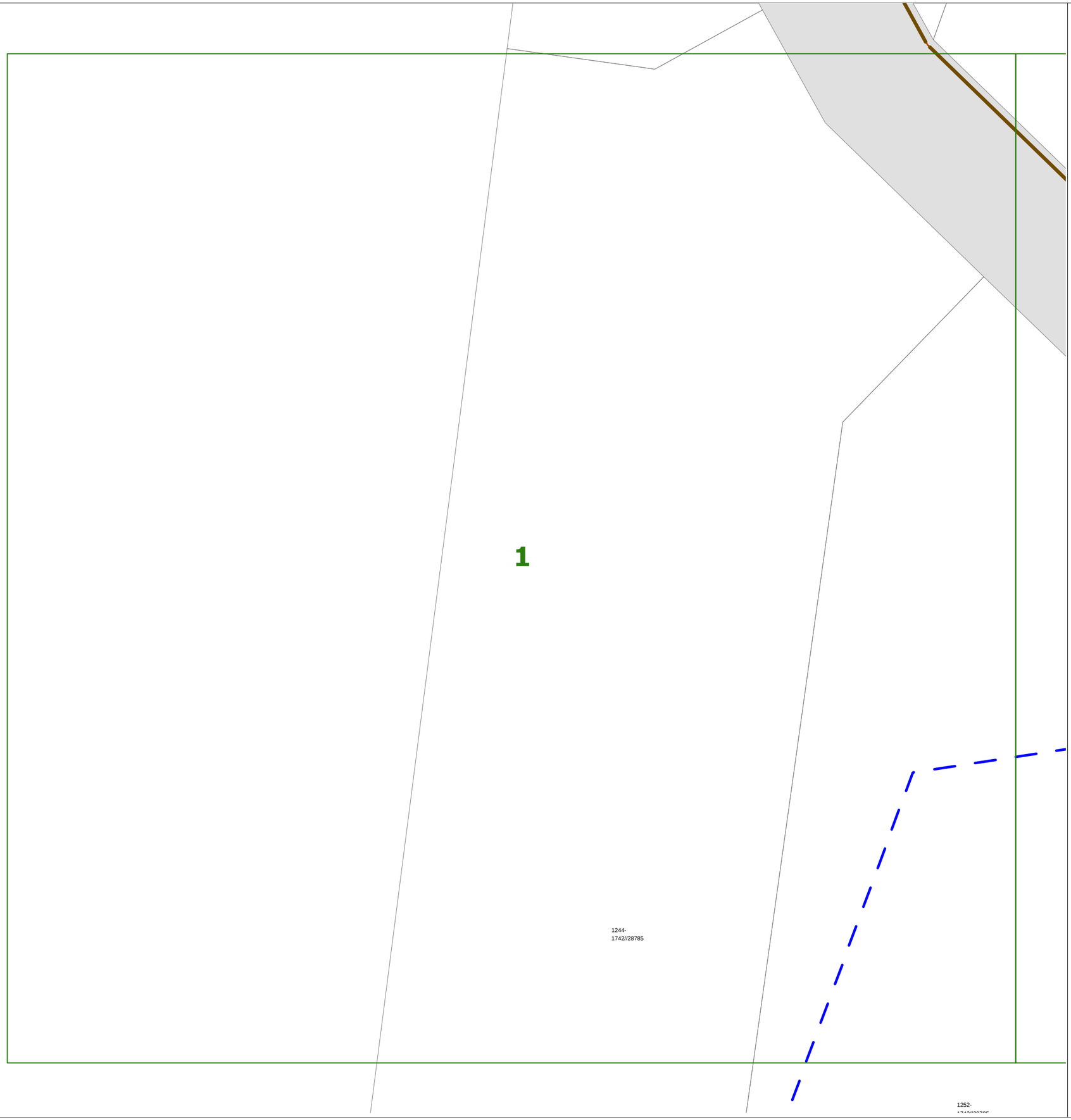
LEGEND

- Street light column (or)
- Padmount substation
- Overground pillar (O.G.Box) (or)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	51688296
Issued Date:	22/03/2016



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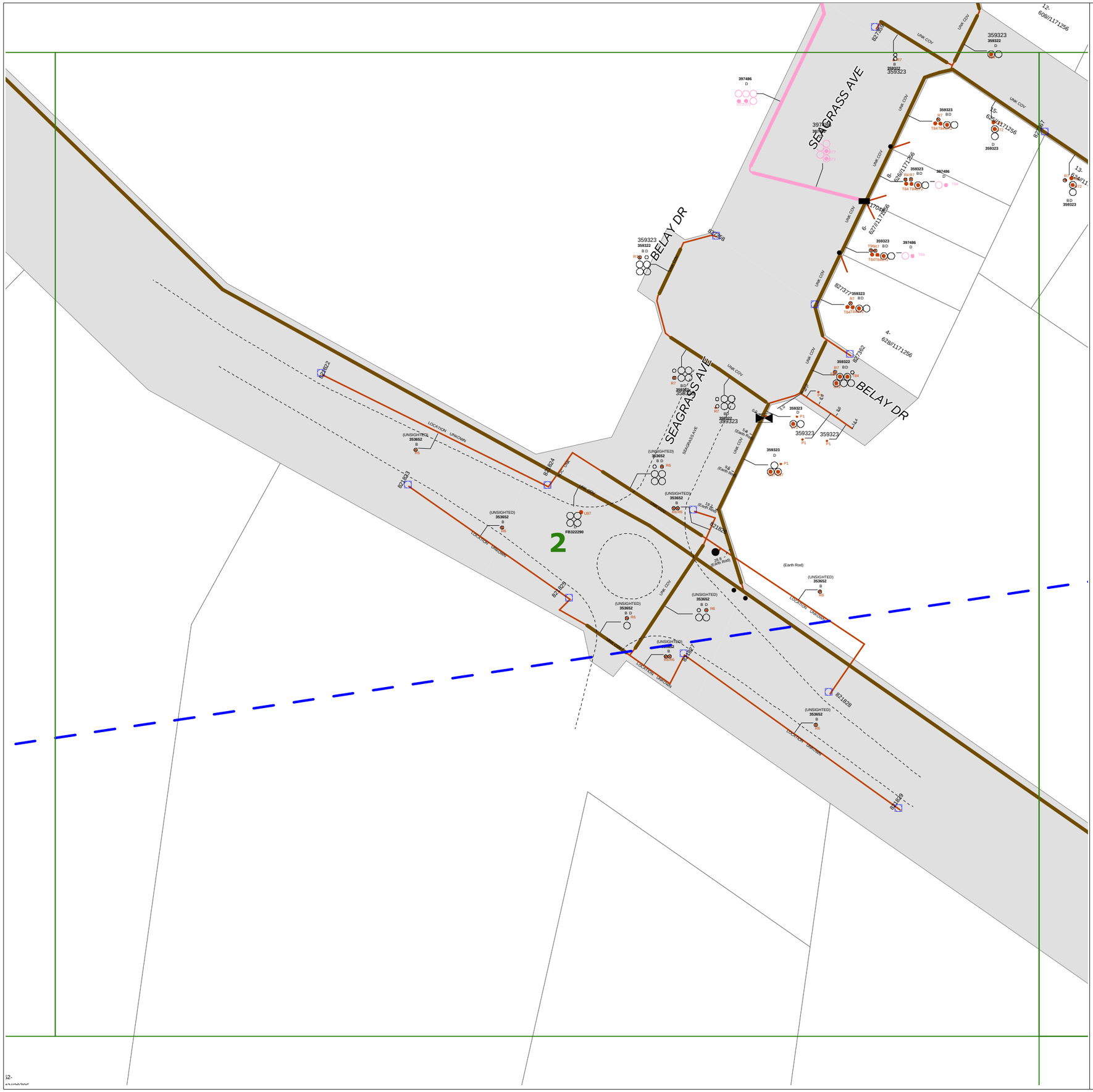

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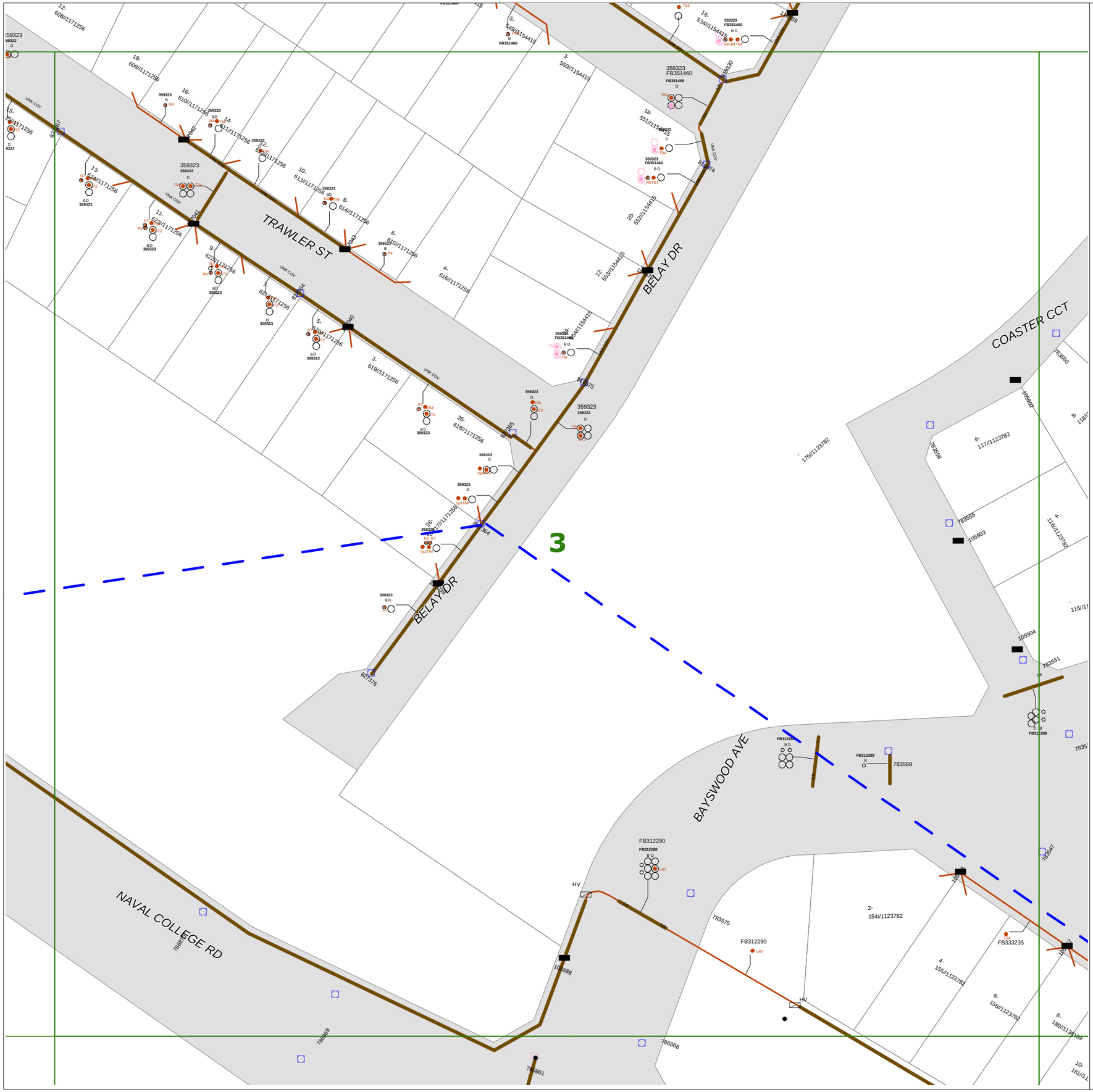

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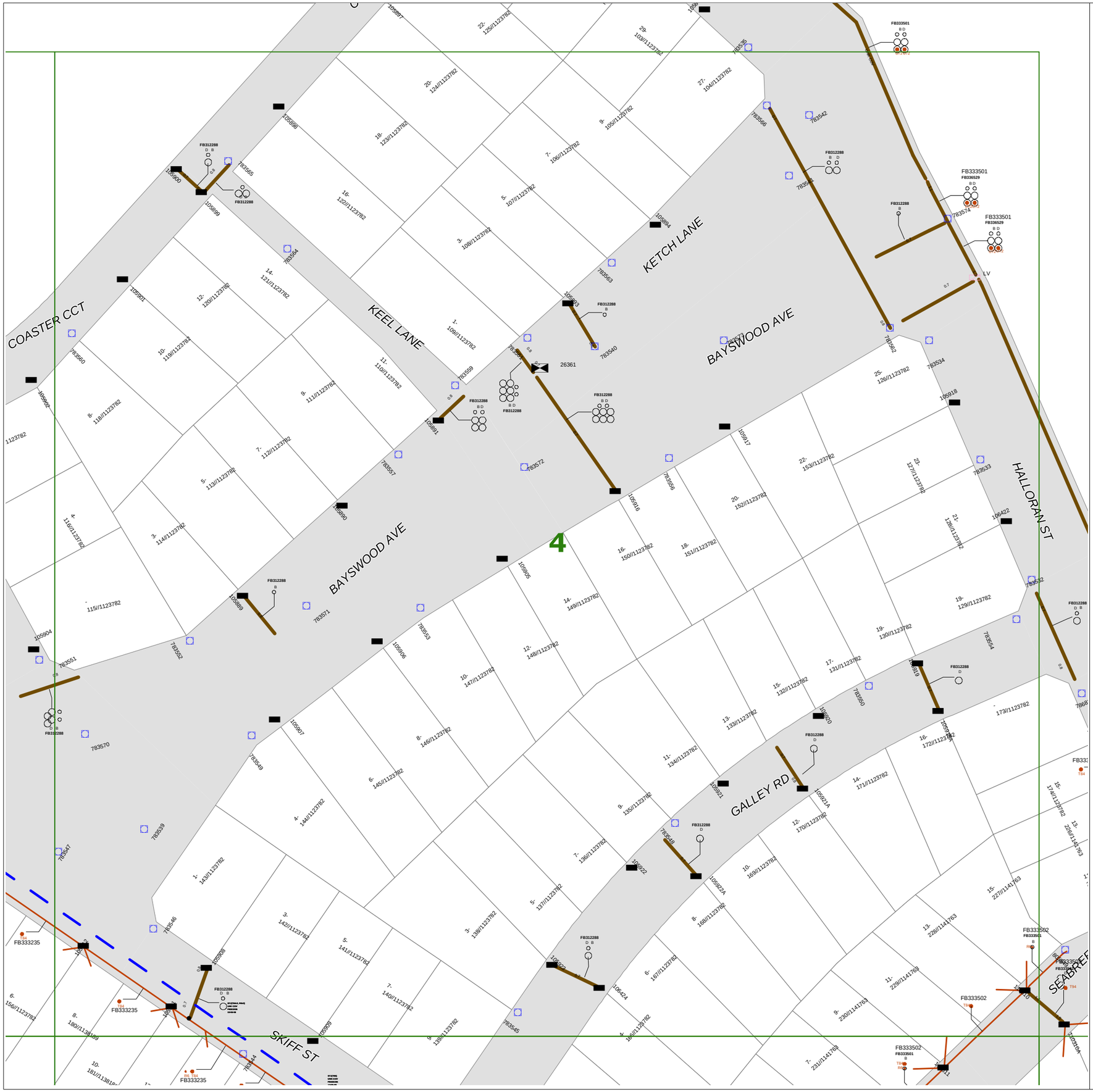

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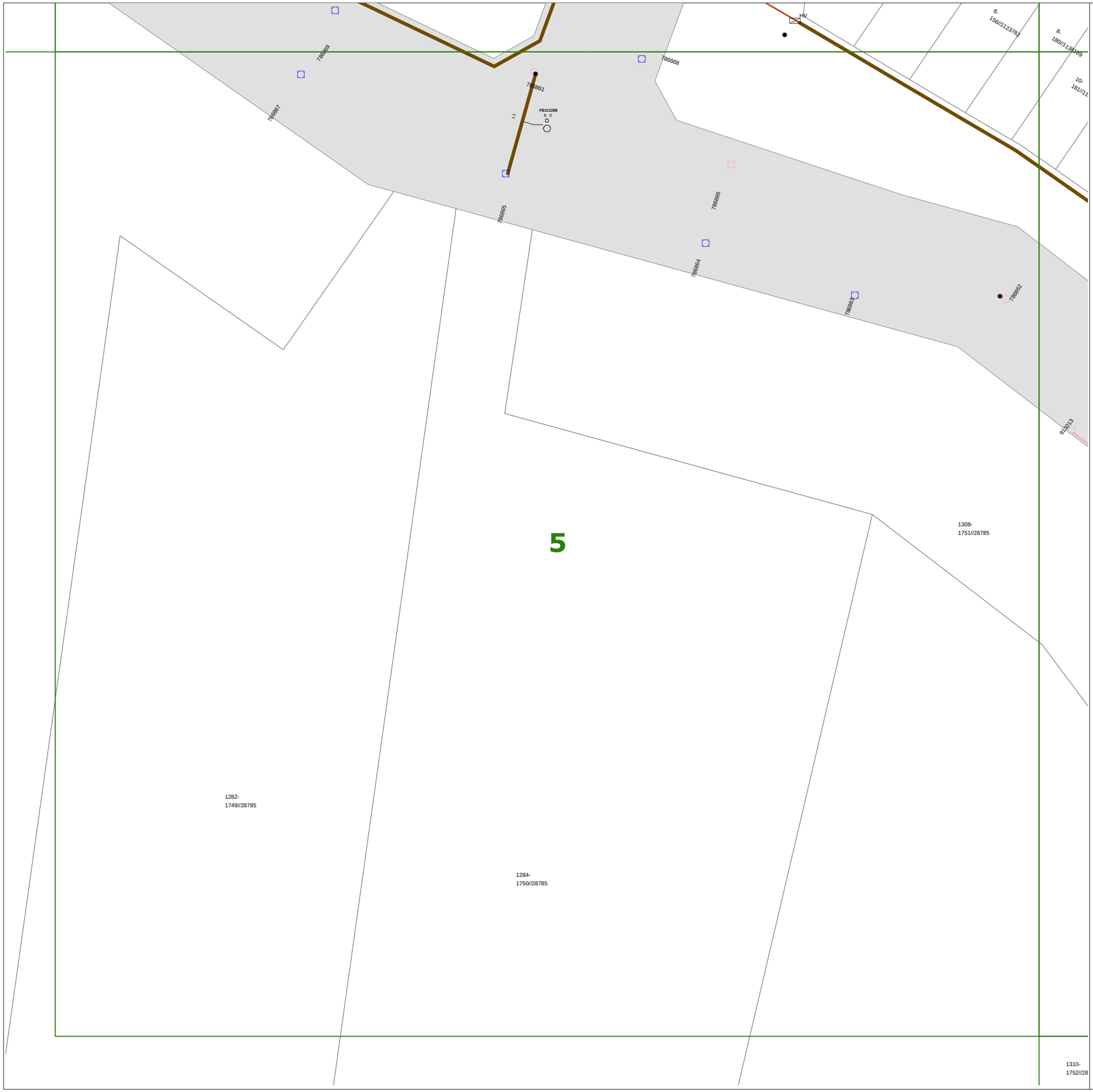

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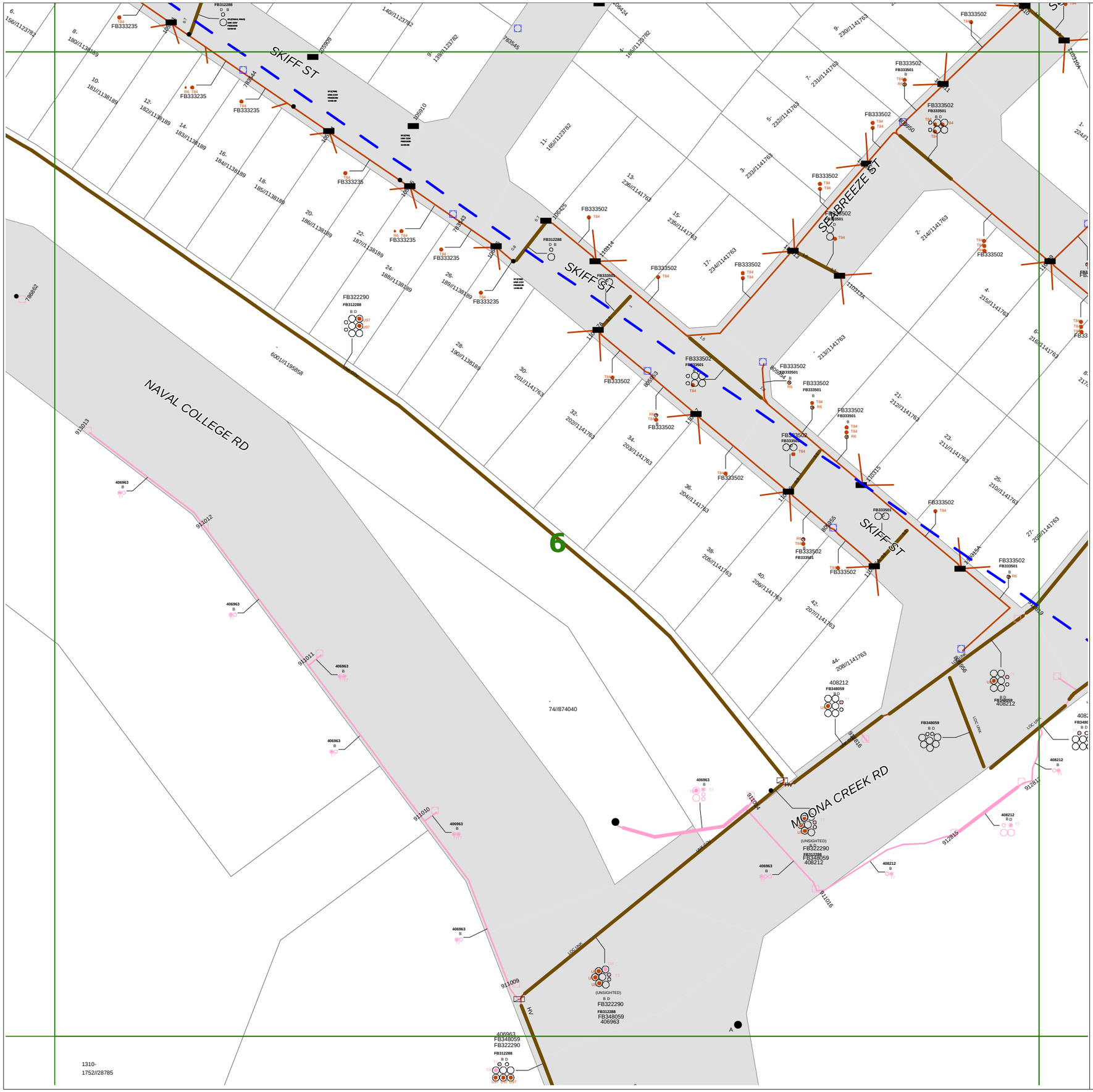

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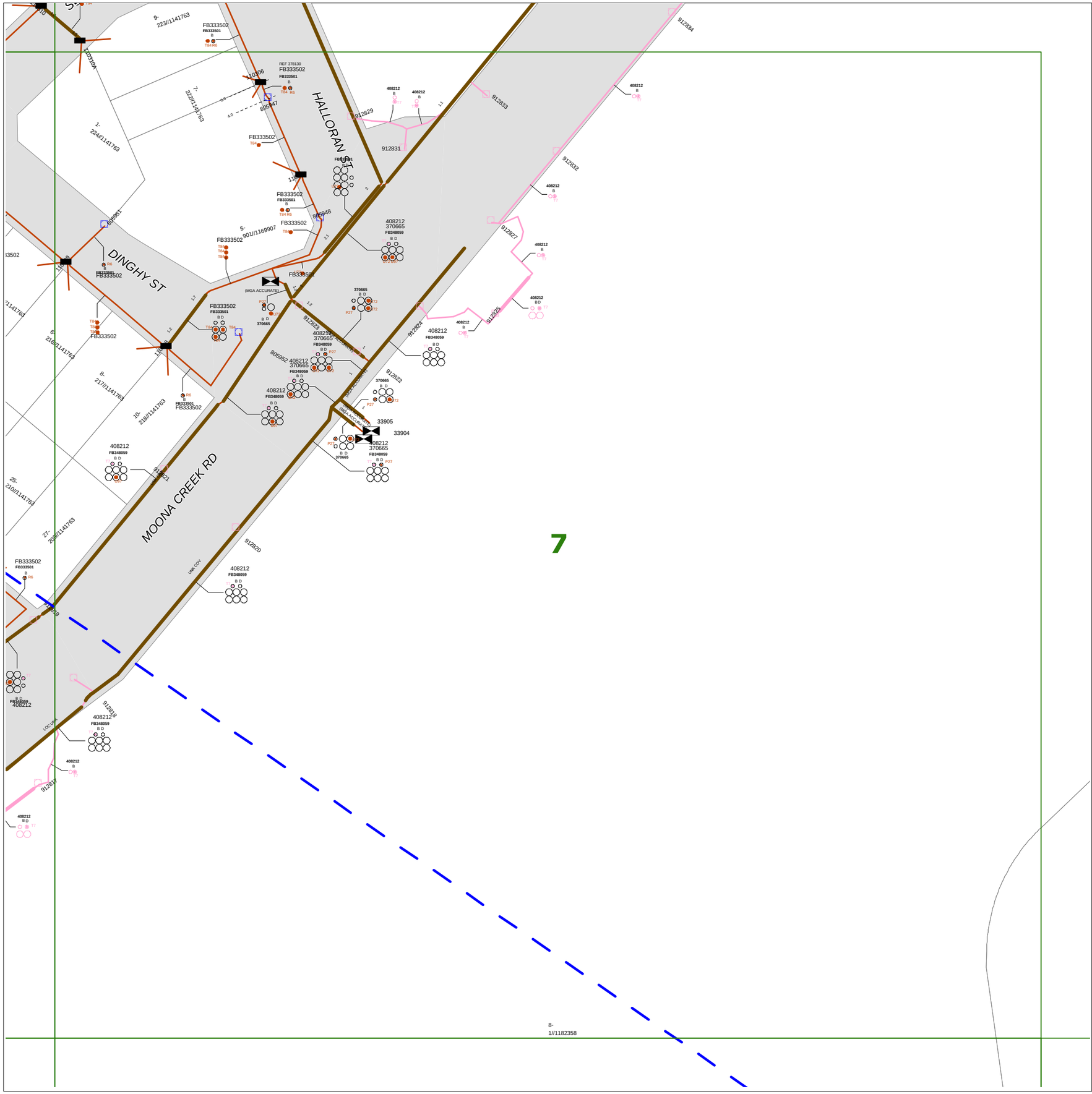

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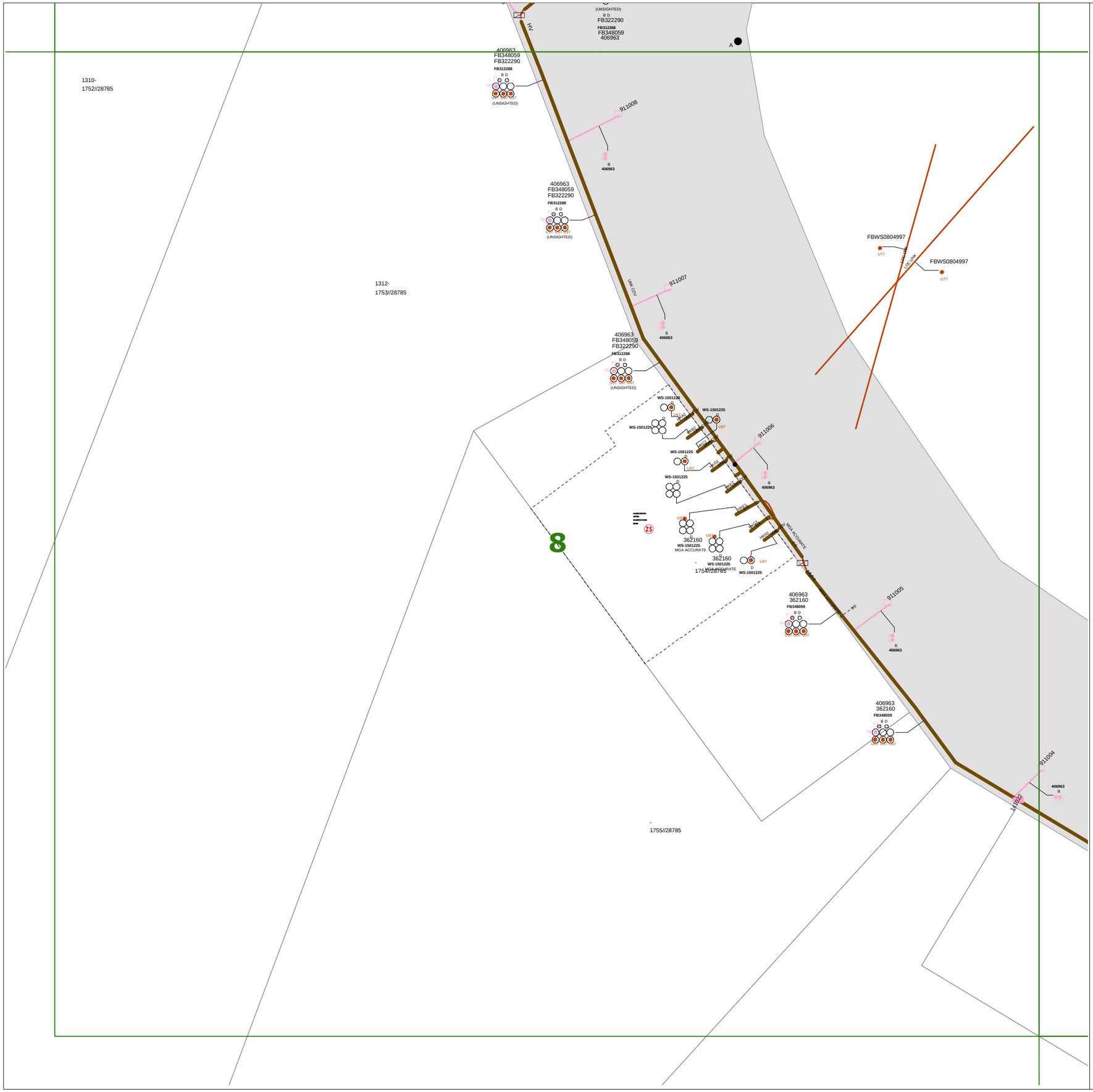

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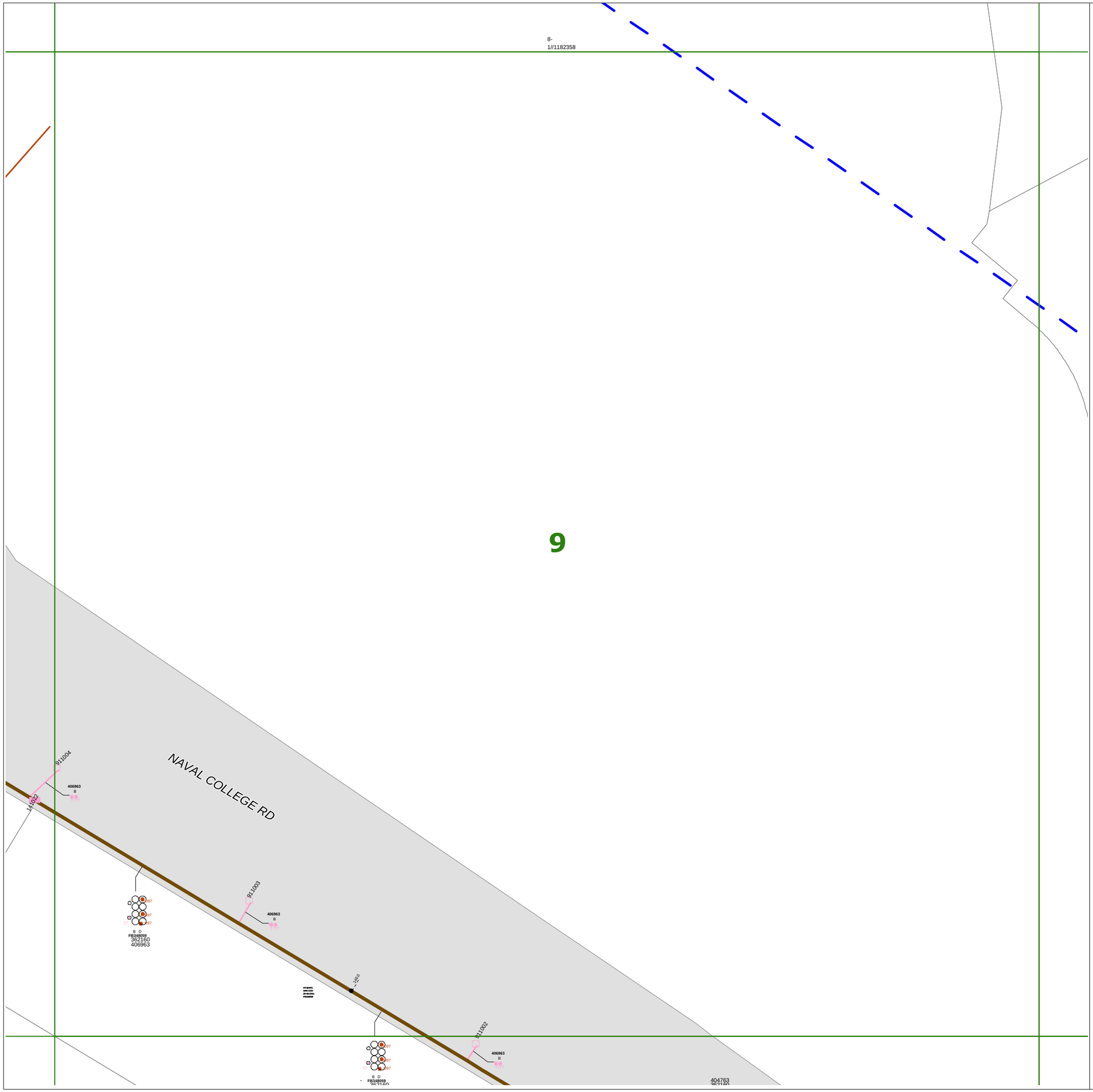

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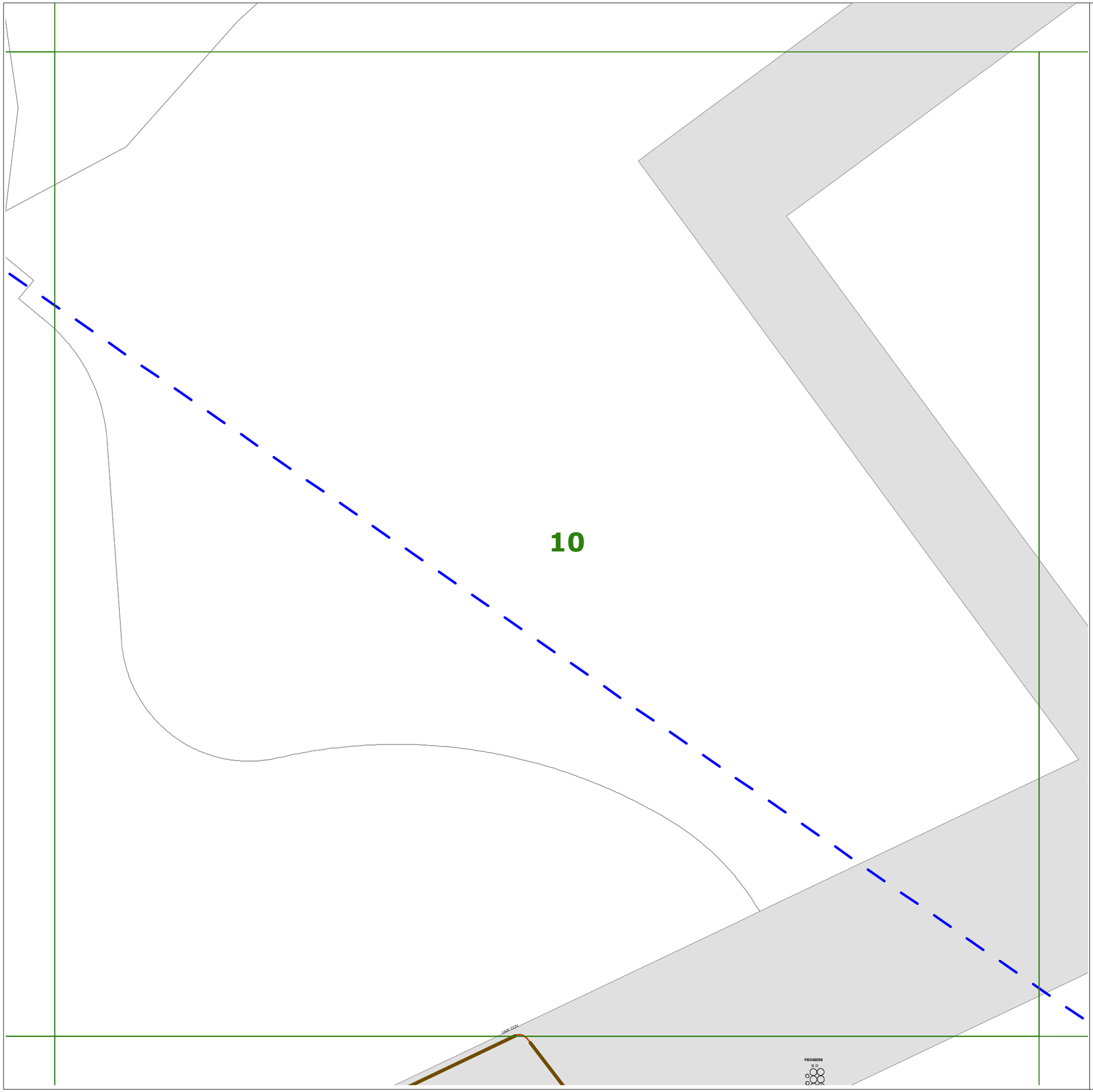

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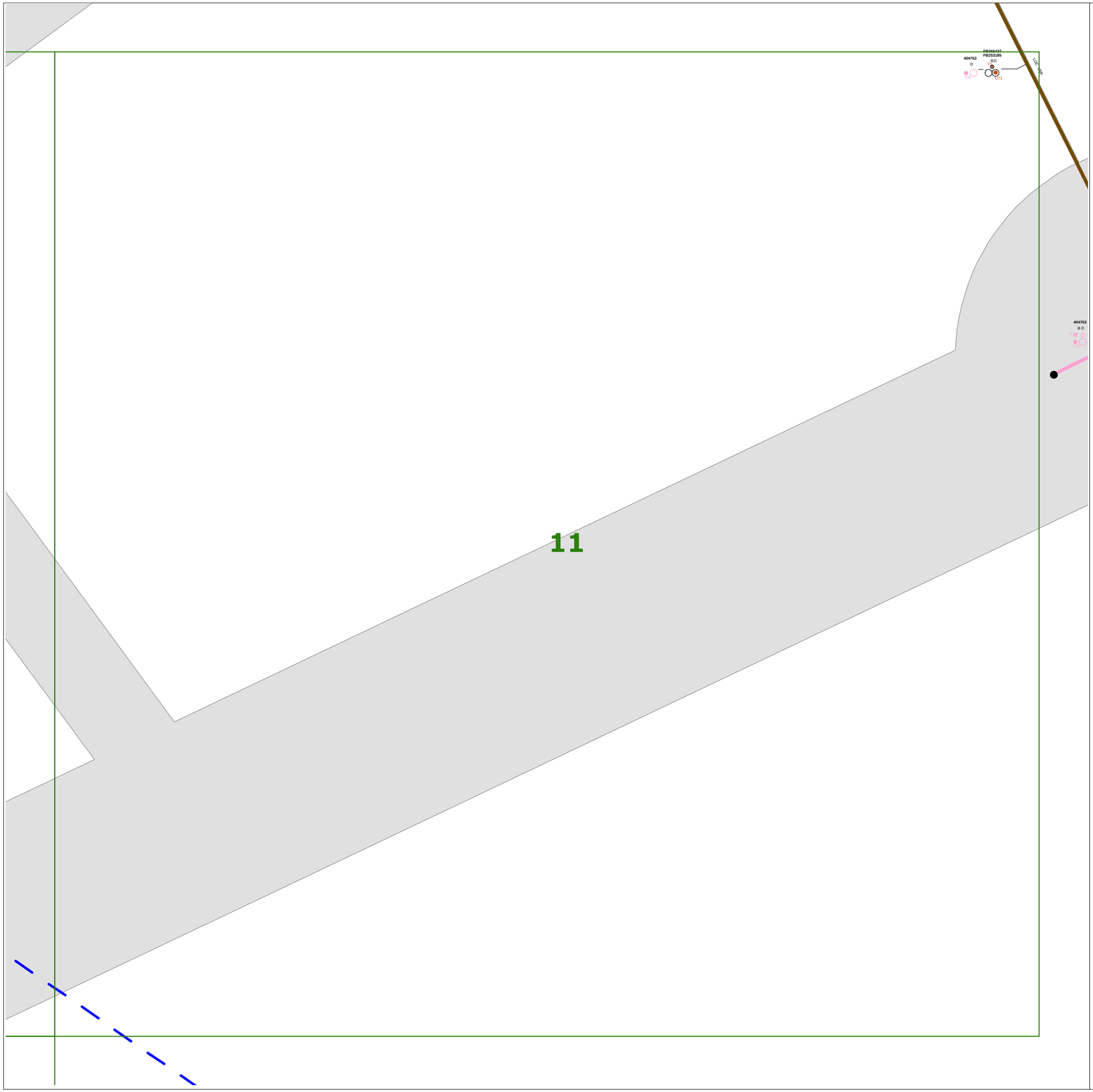

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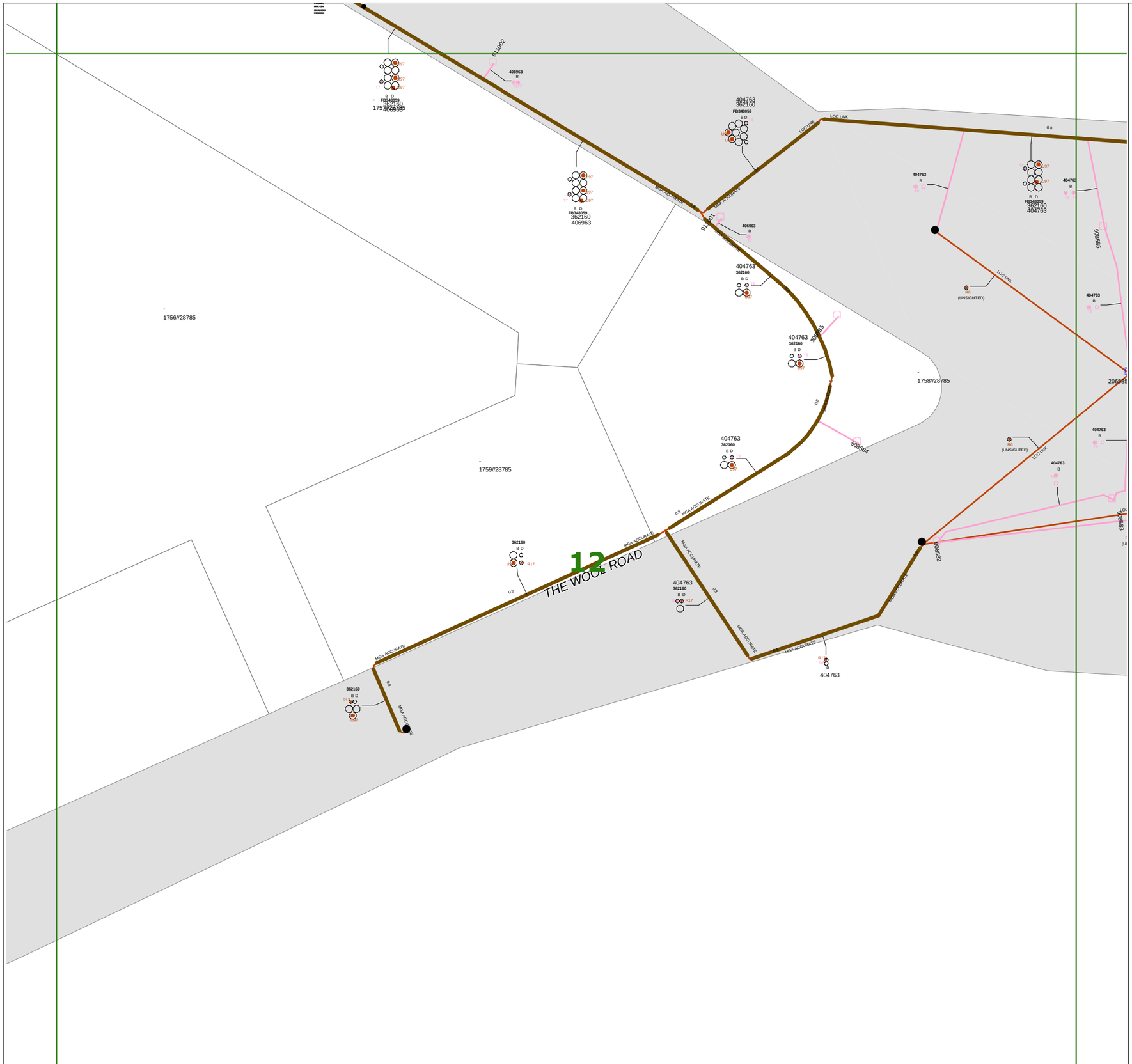

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- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be printed and made available at the worksite where excavation is to be undertaken. Plans must be reviewed and understood by the crew on site prior to commencing excavation.

INFORMATION PROVIDED BY ENDEAVOUR ENERGY

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
- Depth of underground assets may vary significantly from information provided on plans as a result of changes to road, footpath or surface levels subsequent to installation.
- Such plans have been prepared solely for use by Endeavour Energy staff for design, construction and maintenance purposes.
- All enquiry details and results are kept in a register.

DISCLAIMER

Whilst Endeavour Energy has taken all reasonable steps to ensure that the information contained in the plans is as accurate as possible it will accept no liability for inaccuracies in the information shown on such plans.

WARNING
THIS EXCAVATION IS IN THE VICINITY OF
ENDEAVOUR ENERGY TRANSMISSION, PILOT,
COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING **0418 489 957**
4 WORKING DAYS BEFORE COMMENCING WORK

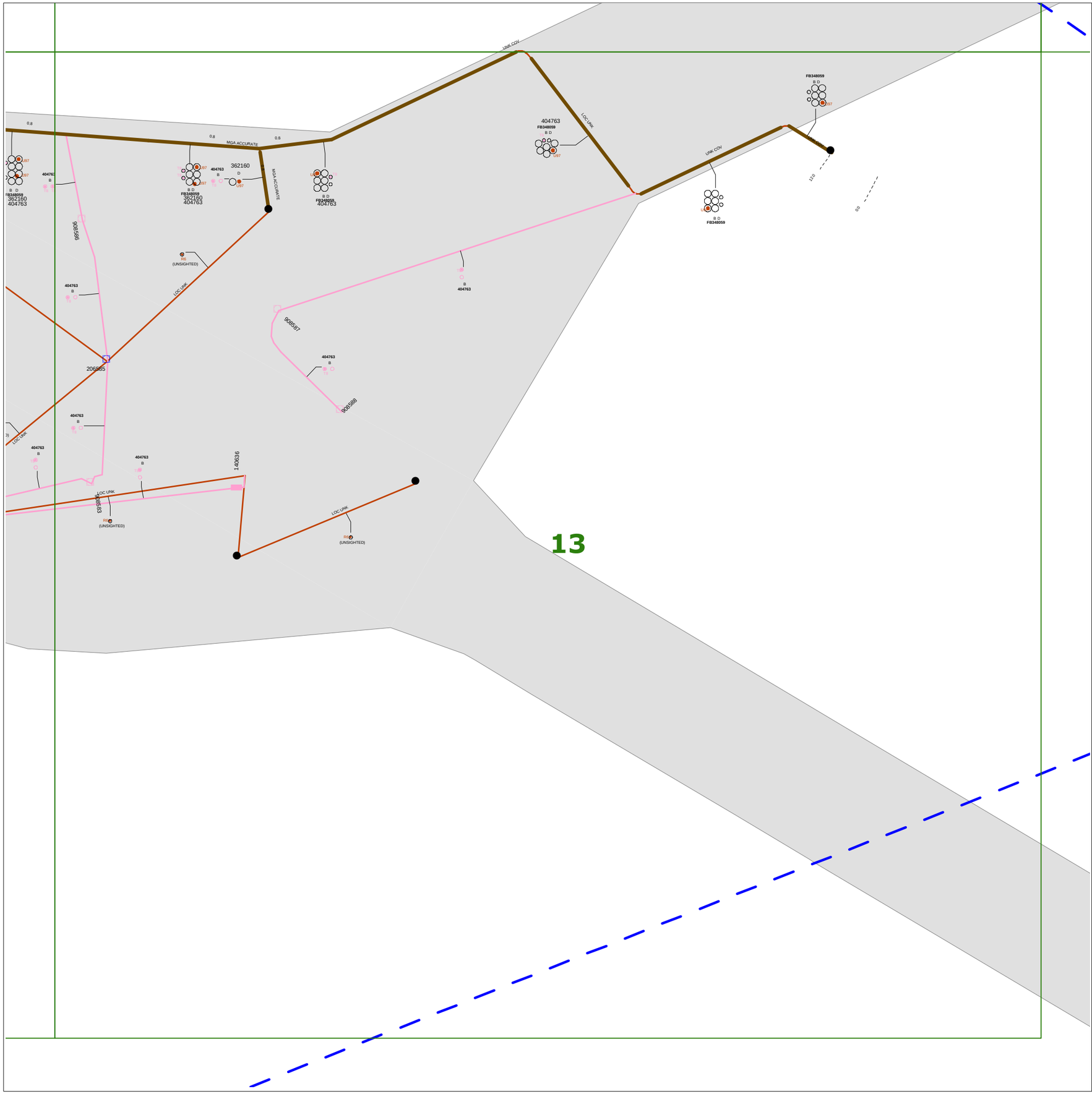
LEGEND

- Street light column
- Padmount substation
- Overground pillar (O.G.Box)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	51688296
Issued Date:	22/03/2016



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- Street light column (or)
- Padmount substation
- Overground pillar (O.G.Box) (or)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	51688296
Issued Date:	22/03/2016

If further clarification is required, please contact:
Endeavour Energy
Phone: (02) 9853 4161 (8:00am-4:30pm Mon-Fri)
Emergency Phone Number: 131 003

BEFORE COMMENCING EXCAVATION YOU MUST READ AND UNDERSTAND ALL INFORMATION PROVIDED IN THE DBYD RESPONSE AND LISTED BELOW

BACKGROUND

Endeavour Energy is able to make available plans of its underground assets to persons who intend to undertake excavation works in Endeavour Energy's distribution area. Any plans provided to you are made available subject to the provisions set out below, in the provided plans, and in the Endeavour Energy DBYD response Cover Letter.

We have set out below important information regarding the recommended procedures that should be followed when using this service and also the extent of our responsibility in respect of any plans provided. It is very important that you read and understand all the information and disclaimers provided below before excavating.

Information Provided by Endeavour Energy:

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
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CUSTOMER REQUESTS AND RESPONSIBILITIES

- Endeavour Energy expects to be able to provide relevant plans within 48 hours after a request is made.
- If the enquiry falls within the Transmission Mains area, additional notification requirements shall be complied with as per the instructions in the response Cover Letter.
- Endeavour Energy retains copyright over all plans and details provided in response to a customer's request.
- Persons excavating are expected to exercise all due care in the vicinity where underground assets are indicated and will be held responsible for any damage to any underground assets (including any Endeavour Energy property) or any other loss caused (including consequential losses) as a result of such excavations.
- All underground assets should be visually located by soft digging (pot holing) or hand digging.
- A person who undertakes excavation work is subject to duties and responsibilities under the *Work Health and Safety Act 2011* and *Work Health and Safety Regulation 2011*. Please refer to the Work Cover NSW "*Work near underground assets: Guide*" and "*Excavation work: Code of practice*" which contain practical advice for working near underground utility services.
- Any damage to Endeavour Energy's assets must be immediately reported on **131 003**.
- In all cases of electric shock or suspected electric shock the victim shall immediately be transported to hospital or medical centre for treatment.
- If conduit material cannot be identified, it should be assumed to contain asbestos material.
- Endeavour Energy plans are frequently updated to record changes to underground assets. All plans are valid for **20** working days from the date of issue.

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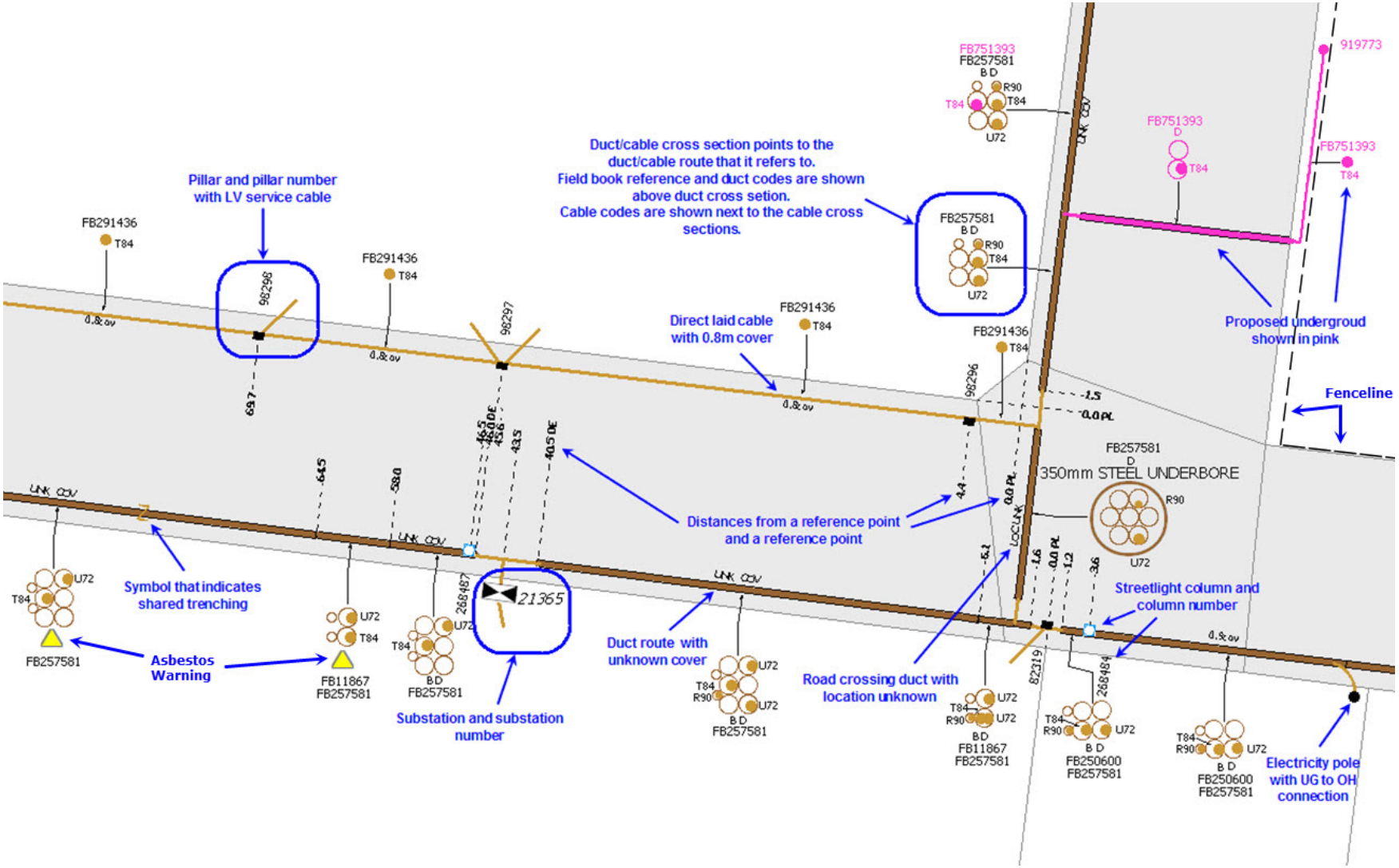
EXAMPLE OF HOW TO READ ENDEAVOUR ENERGY PLANS



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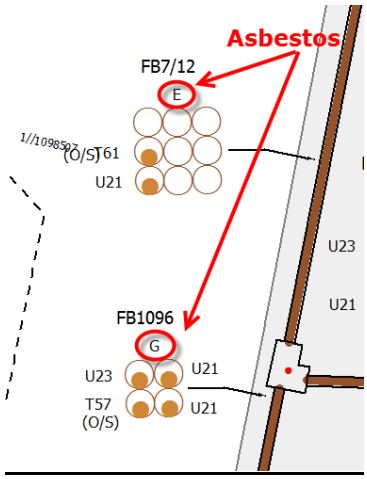
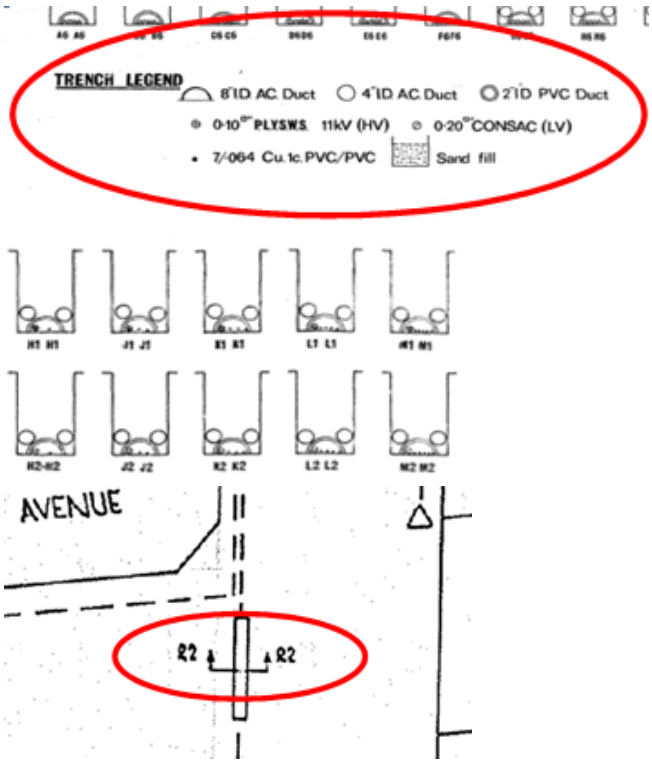
IDENTIFYING ASBESTOS DUCTS

1. Duct codes **E, F** and **G** identify Fibro Conduits

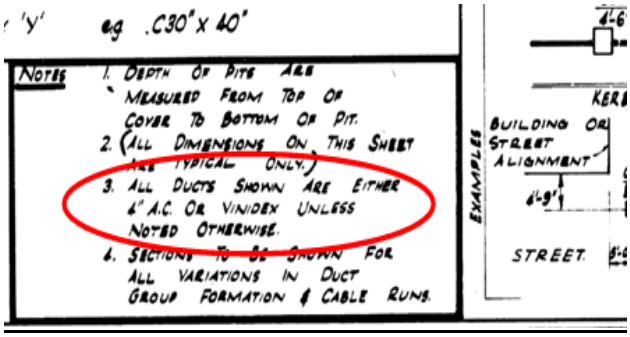


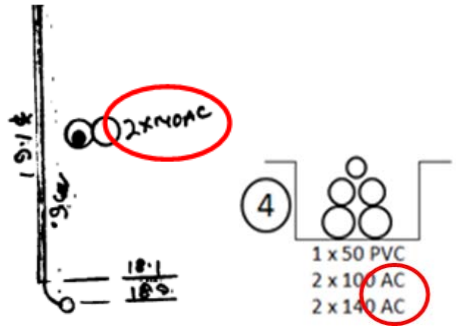
If underground details have not been captured and drawings are used, the method for identifying asbestos ducts and standards are different for the different utilities that amalgamated with Endeavour Energy. Using Reticulation Drawings, there are numerous ways to determine if a duct route has asbestos ducts, refer to following examples:

2. The duct codes **G,H,J,K,L,M Q,R,S,T,U,V,W & X** under each configuration are used on old Blue Mountains drawings to identify Asbestos

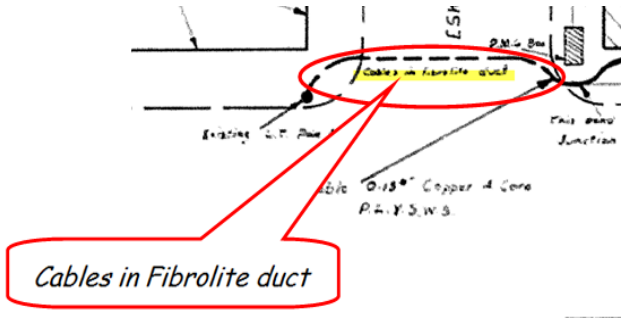


3. **AC** (Asbestos Cement) acronym

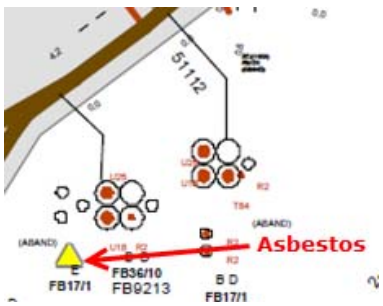




4. **Fibrolite** (asbestos) ducts



5. Yellow **triangle** identifies Fibro Conduits



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STANDARD UNDERGROUND SYMBOLS / LABELS

NOTE: *If symbology has not been provided on the plan use symbols as shown below.*

SYMBOLS & ACRONYMS

or — Street light column

Padmount substation

or — Overground pillar (O.G.Box)

Underground pit

Duct run

Cable run


Typical duct section


Typical underbore section

Blocked duct

Cable section

Asbestos warning

STJ, PBJ, TTJ

STJ Straight through joint

PBJ Parallel branch joint

TTJ Transition through joint

Underground to overhead pole

SL Streetlight conductor

SC Service cable

SE Cable sealed end

SF Service Feeder

OS Out of Service

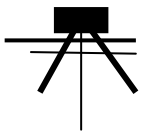
O.A.M. Over awning main

U.A.M. Under awning main

N.I.S. Not in service

Fence/dimensioning

Shared trenching


Service point of attachment

DUCT CODE LABLES

B = 50 mm PVC

D = 125mm PVC

E = 100mm Fibro Conduit (Asbestos)

F = 140mm Fibro Conduit (Asbestos)

G = 150mm Fibro Conduit (Asbestos)

DEPTH & LOCATION LABELS

0.5- 0.7 COV = 0.5m – 0.7m

0.9 COV = 0.9m Depth

UNK COV = Depth Unknown

LOC UNK = Location Unknown

0.9 PL = Located 0.9m from Property Line

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