

Modification Report

Ash Recycling Facilities, Eraring Power Station

20-Aug-2021
Commercial-in-Confidence

Modification Report

Ash Recycling Facilities, Eraring Power Station

Client: Origin Energy Eraring Pty Ltd

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Quality Information

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Executive Summary

Origin Energy Eraring Pty Ltd (Origin) owns and operates the Eraring Power Station (EPS) and associated Eraring Ash Dam (ERAD) on Rocky Point Road within the Lake Macquarie local government area (LGA). The combustion of coal during electricity generation at the EPS produces a mixture of fly ash and bottom ash. Ash generated at the EPS is either deposited onsite in the ERAD located to the north-east of the EPS or recycled offsite (e.g. as a construction material resource).

Ash recycling on the EPS site is currently achieved through various activities approved under Project Approval 07_0084 (Boral's bottom ash reclamation activities and Origin's unclassified fly ash storage facility which is hereafter referred to as EPS CCP Plant) and two separate local development consents for recycling activities carried out by Daracon and Flyash Australia. During the 2019-20 reporting period approximately 560,000 tonnes, or approximately 39% of ash produced at EPS, was recycled.

Condition 4A.1 of Project Approval 07_0084, as modified on 23 December 2019 for expansion of the ERAD, established a mandatory goal of 80% reuse or recycling of ash from the EPS. Origin currently monitors progress towards achieving the 80% reuse or recycling goal by 31 December 2021 via its Long-Term Ash Management Strategy.

Origin proposes to increase current ash recycling rates above existing levels and towards the 80% reuse or recycling goal set out by Condition 4A.1 of Project Approval 07_0084. The proposed modification would involve changes to the ash recycling activities currently carried out under Project Approval 07_0084, plus changes to and integration of the Daracon activities into Project Approval 07_0084.

The existing ash recycling facility operated by Daracon on the EPS site was approved by Lake Macquarie City Council (LMCC) (Development Consent DA/1937/2014/D). The proposed modification includes the integration of the existing Daracon facility into Origin's broader EPS Project Approval 07_0084 and an increase to the approved throughput of the Daracon operation in addition to other physical modifications to this facility. Following approval of the proposed modification, Development Consent DA/1937/2014/D would be surrendered.

The proposed modification would involve the following key elements:

- integration of works currently authorised under local development consent DA/1937/2014/D (the existing Daracon operations) into Origin's Project Approval 07_0084, and upgrades to those works to increase throughput capacity to 300,000 tpa, including construction of three additional 450t ash storage silos (modification area 1)
- modifications to existing ash recycling infrastructure currently authorised under Project Approval 07_0084 including construction of up to four additional 600t ash storage silos to provide additional ash storage capacity and enable export of up to 150,000 tpa of stored ash product (modification area 2)
- other supporting infrastructure including:
 - an internal road and weighbridge for delivery trucks at modification area 1 and 2
 - crib room and amenities building within modification area 2
 - water tanks within modification area 2
 - an option for a pneumatic fly ash pipeline (approximately 480m length) between the main power station and modification area 2.

Origin is seeking to modify Project Approval 07_0084 under section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the proposed modification is substantially the same development as that authorised by Project Approval 07_0084. This Modification Report has been prepared to accompany the modification application and provides an assessment of the key potential environmental impacts associated with the proposed modification.

The key environmental issue related to the proposed modification is potential traffic and transport impacts. A traffic impact assessment was prepared to assess the potential impact associated with an increase in truck movements accessing and egressing the EPS site (an additional 223 daily truck movements compared to 188 existing daily truck movements). The traffic impact assessment concluded that the forecast impact on the surrounding road network based on a worst-case assessment would be insignificant, and network performance would continue to operate under good conditions.

A qualitative assessment was undertaken of the potential impacts of the proposed modification on a range of other environmental factors, including:

- biodiversity
- heritage
- noise
- air quality
- soil and water
- visual amenity
- hazards
- waste
- socio-economic
- cumulative impact.

The assessment concluded there is likely to be minimal impacts and the proposed modification would be substantially the same development as originally approved.

The proposed modification is justified as it would provide the following economic and environmental benefits:

- it would promote the recovery of resources and recycling of materials
- it would increase the recycling of ash, which would result in a reduction in the volume of ash requiring disposal to the ERAD
- it would provide economic benefits through the increased sales of ash product
- it would be constructed and operated as part of an existing facility, complementing, and making efficient use of the site and resulting in minimal adverse environmental effects.

With the implementation of environmental mitigation measures outlined in **Section 8.0** of this Modification Report, it is unlikely that significant adverse impacts would occur as a result of the proposed modification and the proposed modification can proceed accordingly.

1.0 Introduction

1.1 Background

Origin Energy Eraring Pty Ltd (Origin) owns and operates the Eraring Power Station (EPS) and associated Eraring Ash Dam (ERAD) on Rocky Point Road within the Lake Macquarie local government area (LGA). EPS has been operating since 1982 and comprises four 720-megawatt (MW) coal fired generator units. EPS is Australia's largest power station with a generation capacity of 2,880 MW.

The combustion of coal during electricity generation at the EPS produces a mixture of fly ash and bottom ash, which is commonly termed Coal Combustion Product (CCP). Ash generated at the EPS is either deposited onsite in the ERAD located to the north-east of the EPS or recycled offsite (e.g. as a construction material resource).

Ash recycling on the EPS site (further described in **Section 1.3**) is currently achieved through various activities approved under Project Approval 07_0084 and two separate local development consents for facilities operated by Daracon and Fly Ash Australia. During the 2019-20 reporting period approximately 560,000 tonnes, or approximately 39% of ash produced at EPS, was recycled.

Condition 4A.1 of Project Approval 07_0084, as modified on 23 December 2019 for expansion of the ERAD, established a mandatory goal of 80% reuse or recycling of ash from the EPS. Origin currently monitors progress towards achieving the 80% reuse or recycling goal by 31 December 2021 via its Long-Term Ash Management Strategy (LTAMS) (Origin, 2020). To progress towards this goal, Origin is investigating a number of opportunities, including the application of a range of recycling technologies across both existing markets and new market opportunities.

Origin proposes to increase current ash recycling rates above existing levels and towards the 80% reuse or recycling goal set out by Condition 4A.1 of Project Approval 07_0084. The proposed modification would involve changes to the ash recycling activities currently carried out under Project Approval 07_0084, plus changes to and integration of the Daracon activities into Project Approval 07_0084.

The existing ash recycling facility operated by Daracon on the EPS site was approved by Lake Macquarie City Council (LMCC) (Development Consent DA/1937/2014/D) (**Appendix A**). The proposed modification includes the integration of the existing Daracon facility into Origin's broader EPS Project Approval 07_0084 and an increase to the approved throughput of the Daracon operation in addition to other physical modifications to this facility. Following approval of the proposed modification, Development Consent DA/1937/2014/D would be surrendered.

The proposed modification would involve the following key elements:

- integration of works currently authorised under local development consent DA/1937/2014/D (the existing Daracon operations) into Origin's Project Approval 07_0084, and upgrades to those works to increase throughput capacity to 300,000 tpa, including construction of three additional 450t ash storage silos (modification area 1)
- modifications to existing ash recycling infrastructure currently authorised under Project Approval 07_0084 including construction of up to four additional 600t ash storage silos to provide additional ash storage capacity and enable export of up to 150,000 tpa of stored ash product (modification area 2)
- other supporting infrastructure including:
 - an internal road and weighbridge for delivery trucks at modification area 1 and 2
 - crib room and amenities building within modification area 2
 - water tanks within modification area 2
 - an option for a pneumatic fly ash pipeline (approximately 480m length) between the main power station and modification area 2.

Origin is seeking to modify Project Approval 07_0084 under section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the proposed modification is substantially the same development as that authorised by Project Approval 07_0084. This Modification Report provides an assessment of the key potential environmental impacts associated with the proposed modification.

1.2 Proponent

Origin is the proponent and current owner of EPS and the ERAD. These facilities previously operated under the ownership of the NSW State Government via the State-Owned Entity Eraring Energy (under the *State-Owned Corporations Act 1989*, the *Energy Services Corporations Act 1995* and the *Energy Services Corporation (Eraring Energy) Regulations 2000*).

In July 2013, Origin took over ownership and operation of EPS and the adjoining ERAD. Origin has a large portfolio of power stations around Australia, with Eraring being the only coal-fired power station in its ownership. The other power stations it operates include gas-fired, wind, pumped water storage, solar and cogeneration plants.

1.3 Existing Approvals

The *Eraring Power Station Act 1981* was established in 1981 to authorise the development of the EPS. Various upgrades at the EPS site have subsequently been approved, including construction of an emergency turbine generator, expansion of the ERAD and capacity upgrades. Concept Approval 05_0138 for the upgrade of the ash disposal facility at EPS was granted on 14 December 2006, however this approval has since been relinquished following the repeal of Part 3A and the subsequent removal of certain savings and transitional provisions. The EPS currently operates under the following Project Approvals:

- Project Approval 05_0138 (14 December 2006) – Construction and operation of a 42MW emergency turbine generator
- Project Approval 07_0084 (29 April 2008) – Staged expansion of the ERAD in conjunction with changes in the ash disposal method from lean phase to dense phase and ancillary infrastructure (further discussed in **Section 1.3.1**)
 - Project Approval 07_0084 MOD 1 (23 December 2019) – Ash dam augmentation project including expansion of the ERAD to the west.
- Project Approval 06_238 (26 June 2008) – Capacity increase and performance improvements including construction and operation of the cooling water attemperation reservoir.

The proposed modification is seeking to increase the ash recycling capacity of EPS and Origin is therefore seeking to modify Project Approval 07_0084, as it relates to the ash management system at EPS. The ash management infrastructure approved under Project Approval 07_0084 is described further in the following section.

1.3.1 Project Approval 07_0084

Project Approval 07_0084 was issued under the former Part 3A (now repealed) provisions of the EP&A Act and has since transitioned to a state significant development (SSD) consent. The project as originally approved included two primary components:

- implementation of an ash management system incorporating ash collection, storage, conditioning and pumping facilities
- expansion of the existing ERAD to provide additional capacity.

The Environmental Assessment (EA) prepared for the upgrade and expansion of the ash management system (HLA-Envirosciences, 2007; hereafter referred to as the 2007 EA) described the new infrastructure to be constructed. This included:

- a new method of fly ash collection at each fabric filter hopper with the aim of collecting higher quantities of fine fly ash which will increase the sale of fly ash for use in the cement industry
- intermediate storage silos for the segregation of the finer fly ash from the remainder of the fly ash

- transfer pipelines from intermediate storage silos to the main storage silos
- main storage silos (two 1,000t silos)
- fly ash conditioning, mixing and pumping plants
- discharge slurry pipelines up to the discharge points at the ERAD.

1.3.2 Third Party Planning Approvals

A number of separate ash recycling facilities currently operate onsite at EPS and are operated by third party contractors in accordance with individual planning approvals. These separate approvals include:

- Development Consent DA/684/2009 approved on 8 July 2009 by LMCC for the ash recycling facility on the EPS site operated by Flyash Australia Pty Ltd (there would be no change to these operations as part of the proposed modification)
- Development Consent DA/1937/2014 approved on 28 April 2015 by LMCC for the facility operated by Daracon – a fly ash processing plant comprising two 100t silos¹ and one 33t silo with a capacity of 10,000 to 15,000 tpa.
 - DA/1937/2014/A: approved on 3 December 2015 to amend the overall height of development to 18.5m to accommodate a larger air filter
 - DA/1937/2014/B: approved on 21 December 2015 to include a fly ash classifying plant, a 220t collection silo² to store product after passing through the classifying plant and an additional 90t storage silo
 - DA/1937/2014/C: approved on 16 February 2018 to increase the size of the product silo (from 33t to 100t) which would disperse product into trucks. This would be achieved by increasing the diameter of the silo from 2.1m to 3.762m
 - DA/1937/2014/D: approved on 19 June 2019 to replace the existing classifier and associated infrastructure (due to operational issues) with a larger capacity silo. The new plant would have the capability of varying ratios of blended fly ash to result in a more sustainable product.

The proposed modification includes the integration of the existing Daracon facility into Origin's broader EPS Project Approval 07_0084 and upgrades to those works to increase the throughput capacity to 300,000 tpa, which would involve construction of three additional 450t ash storage silos. Development Consent DA/1937/2014 (as modified) would be surrendered following approval of the proposed modification. Further details of the existing Daracon operations are provided in **Section 2.3**.

1.4 Purpose of this Report

This Modification Report has been prepared for Origin to accompany an application under section 4.55(2) of the EP&A Act to modify Project Approval 07_0084. The proposed modification is seeking to increase ash recycling capacities at the EPS, including reconfiguration of existing operations and the construction of additional infrastructure.

Origin briefed the Department of Planning, Industry and Environment (DPIE) regarding the proposed modification on 5 November 2020 and submitted a Scoping Report on 23 April 2021. Advice received from DPIE (dated 30 April 2021) confirmed that a modification to Project Approval 07_0084 under section 4.55(2) of the EP&A Act would be the appropriate approval pathway for the proposed modification.

This Modification Report provides a description of the proposed modification, the statutory context and consultation undertaken and an assessment of potential environmental impacts in accordance with relevant statutory requirements. The Modification Report has included consideration of the matters set out in section 4.15 of the EP&A Act.

¹ The Daracon development consent documentation refers to the storage volume of silos in cubic metres. For consistency in this Modification Report, all storage volumes have been converted to tonnes using a dry bulk density of 1.1 tonne/m³.

² The approved 220t collection silo has not yet been constructed.

2.0 The Site

2.1 Site Description

The EPS is located on Rocky Point Road, Eraring, about 40 km southwest of Newcastle in the Lake Macquarie LGA. While the EPS site comprises several parcels of land, the relevant title identification for the proposed modification is Lot 11 DP 1050120.

The EPS site comprises approximately 1,200 hectares of land owned by Origin. This includes hardstand areas for EPS infrastructure, the ERAD and the remainder of the land largely undeveloped consisting of open grassland, canals and bushland (refer to **Figure 1**).

Operations at EPS are separated from surrounding land uses by extensive land holdings. Existing development in the vicinity of the EPS site includes the West Wallsend and Newstan Colliery, as well as the Vales Point Power Station. The Sydney to Newcastle Railway Line (Main Northern Railway) is located west of the EPS and further west the Pacific Motorway (F3 Highway) also runs parallel to the site.

Land to the west of EPS includes a mix of vegetated buffer lands and cleared agricultural land for grazing purposes and Lake Macquarie lies to the east. The closest residential area is situated in Border Street in the suburb of Eraring approximately 1 km south of the power station itself.

The proposed modification would be undertaken within the existing operational area of the EPS site, on two parts of the site that currently consist of existing hardstand with temporary demountable buildings (modification area 1) and a car park (modification area 2) (refer to **Section 3.0**).

2.2 Site History

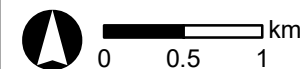
Construction of the EPS began in 1976, with four generating units being operational by April 1984 (Heritage NSW, 2008; Lake Mac Libraries, n.d). The original proponent of the EPS was the then Electricity Commission of New South Wales which was the statutory authority responsible for generating and supplying electricity in New South Wales under the now repealed *Electricity Commission Act 1950*.

The Electricity Commission of New South Wales began trading as Pacific Power on 1 January 1992 (NSW Government: State Records, 2016). Eraring Energy, an NSW State Government Owned Corporation, later took over the management of the EPS and Ash Dam in August 2000 from Pacific Power (HLA-Envirosciences, 2007). In July 2013, Origin acquired the EPS and Ash Dam from the NSW Government entity Eraring Energy and continued operation of the Site.

The ERAD was founded on ash deposits from the former Wangi Power Station in 1977 and was completed in 1982. In 2008, the Ash Dam was expanded to raise the total capacity from the original 29.2 million cubic metres to approximately 40 million cubic metres. This was achieved by increasing the Ash Dam's overall footprint in addition to implementing a new 'dense phase' storage and pumping system. The dense phase pumping system was designed to use a slurry mix of 70% ash and 30% water which allowed for approximately 40% more ash to be placed per cubic metre of Ash Dam volume than seen in the previous 'lean phase' system (AECOM, 2014).

Ash reclamation at the EPS began in 2005-2006, in which 595,000 tonnes of ash (44.5% of total ash produced) were recycled during that period, representing the largest amount of recycling to date. Recycling rates showed fluctuating trends with the lowest amount of recycling recorded in 2012-2013 at 427,968 tonnes and was attributed to a combination of unit outages and unforeseen industry shutdowns over the 2012 Christmas period (AECOM, 2017). During the 2019-20 reporting period approximately 560,000 tonnes, or approximately 39% of ash produced at EPS, was recycled (Origin, 2020).

Origin currently has agreements in place for ash to be recycled in the production of cement and concrete which is supplied to building and construction industries. Demand for ash derived products within this sector is primarily governed by the state of the building and construction industries in the Sydney and Hunter regions.



Legend

- Eraring Power Station
- Eraring Power Station Landholdings
- Modification area 1
- Modification area 2
- Railway
- Roads
- Pacific Motorway

FIGURE 1 SITE OVERVIEW

2.3 Current Operations

The EPS currently generates power from the four 720-megawatt (MW) coal-fired generators for the National Electricity Market (NEM). Ash produced by electricity generation is captured and categorised to determine suitability for beneficial reuse. Resource Recovery Orders and Exemptions exist for coal ash or blended coal ash under the *Protection of the Environment Operations Act 1997* (POEO Act) and *Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulation).

The categories of CCP at the EPS site are generally separated as follows:

- fly ash
- bottom ash.

The fly ash includes both run-of-station fly ash that is recycled directly from the power station and pond fly ash that is fly ash that is deposited in the ash dam.

To support the processing and supply of these different ash products to industries, a number of separate ash recycling facilities currently operate onsite at EPS. Some of these facilities are operated by third party contractors, including Daracon, Flyash Australia and Boral.

Together these and other initiatives have sustained an ash recycling rate averaging around 40% between 2005 and 2020. Ash that is not suitable for recycling by these contractors or which is surplus to market demand is currently collected in large silos and deposited as a dense phase slurry into the ERAD. The ERAD provides finite CPP storage capacity and Origin aims to increase the proportion of ash that is recycled towards a goal of 80% reuse or recycling by 31 December 2021.

The location of existing ash recycling operations at EPS is shown in **Figure 2** and a summary of these operations is provided in the following sections.

2.3.1 EPS CCP Plant

Origin currently sells unclassified fly ash to customers who load the ash directly from the EPS CCP Plant located immediately north east of the EPS generating units. The EPS CCP Plant consists of two 1,000t storage silos and associated structures and pipework.

These operations are approved under Origin's Project Approval (07_0084) as described in the 2007 EA. The 2007 EA showed the proposed ash recycling facility at the time being located on Construction Road. However, as detailed in the response to submissions (correspondence from Eraring Energy dated 15 February 2008) the proposed location of this infrastructure was amended, instead being located closer to the EPS generating units. The construction of up to four additional 600t silos currently proposed as part of the proposed modification would be located within the previously assessed area on Construction Road.

2.3.2 Daracon Facility

The Daracon facility operates under Development Consent DA/1937/2014 (as modified) issued by LMCC (refer to **Section 1.3**). The proposed modification includes the integration of the existing Daracon facility into Project Approval 07_0084 and upgrades to increase the throughput capacity of the facility, including construction of three additional 450t storage silos. Development Consent DA/1937/2014 (as modified) would be surrendered following approval of the proposed modification.

The Daracon facility is a relatively simple operation located adjacent to the EPS CCP Plant and is smaller in scale compared to the EPS CCP Plant. **Figure 3** shows the site layout for the existing Daracon facility. The facility comprises several components including:

- three 100t silos for fly ash, cement and product storage (north of the EPS CCP Plant) (**Figure 3**)
- ash classifying plant with 90t storage silo (east of the EPS CCP Plant) (**Figure 4**)
- 220t collection silo (to be located immediately south of the EPS CCP Plant but not yet constructed) (**Figure 5**)
- pressure pot system

- air slide and loading chute
- amenities and office shed.

The facility classifies fly ash within the classifying plant prior to storage and loading into trucks. A summary of the processing operation was provided in the Statement of Environmental Effects (SEE) (FEW, 2014) prepared for the original development application:

A pneumatic conveying system transfers powders, granules, and other dry bulk materials through an enclosed pipeline. The motive force for this transfer comes from a combination of pressure differential and the flow of air. The system's basic elements include a fan to create air flow, a conveying line, a receiving vessel and a dust collection system. The pressure pot system is a pneumatic conveying system which will be utilised to fill the silos and to blend the product.

As the pressure pot system is enclosed and has few moving parts, it allows the transportation of powdery material with minimal generation of dust and noise.

A summary of the classification process was provided in the SEE (MJM Environmental, 2015) prepared for the original classifying plant as part of DA/1937/2014/B. The Daracon classifier separates the finer fraction of fly ash in order to meet the requirements of AS 3582.1 1998 *Supplementary cementitious materials for use with Portland and blended cements part 1 Fly Ash 'fine grade'*. Fine grade fly ash is defined as having a minimum value of 75% of the fly ash passing through a 45-micron sieve. The Daracon classifier separates the fine fly ash particles as follows:

- the mixture of air and fly ash is delivered to Origin's two 1,000t storage silos (the EPS CCP Plant) by compressed air and falls into the silo in a 'cloud' of air and fly ash
- the coarser particles fall at a faster rate to the bottom of the 1,000t storage silos with the fins particles held in suspension
- conveying air exits the 1,000t storage silos through fabric filters (baghouses) through forced fan air extraction
- the fine fraction of fly ash is drawn to the fabric filters and is removed by jets of compressed air
- the fine fraction of fly ash is drawn into Daracon's collection silo, which is fitted with a dust collection system (baghouse) and a high capacity clean air fan.

The original classifying plant has since been replaced with a larger classifying plant as approved in DA/1937/2014/D. However, the Environmental Statement (Brolton Group, 2019) prepared for the development application for Modification D noted that the system will interface to all existing services, maintains the same environmental controls used by the previous classifier and does not introduce further design issues that would require additional environmental controls.

2.3.3 Flyash Australia Facility

The Flyash Australia facility operates continuously to supply fine grade fly ash and tailor-made ashes that can be utilised in a variety of concrete applications. The Flyash Australia plant operates under Development Consent DA/684/2009 issued by Lake Macquarie City Council. There would be no change to this operation as part of the proposed modification.

2.3.4 Boral Bottom Ash Reclamation Area

The Boral Bottom Ash Reclamation Area is used to reclaim bottom ash from the ERAD for recycling as an aggregate in applications such as bitumen in road construction projects. This operation is approved under Origin's Project Approval (07_0084) as described in the 2007 EA. There would be no change to Boral's operation as part of the proposed modification.



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

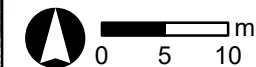
-  Eraring Power Station
-  Existing recycling facilities
-  Railway
-  Roads

FIGURE 2 EXISTING ASH RECYCLING FACILITIES



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Legend

 Modification area 1

FIGURE 3 SITE LAYOUT OF
DARACON FACILITY



Figure 4 Existing Daracon Facility Including Classifier (Left) and Storage Silos (Right)

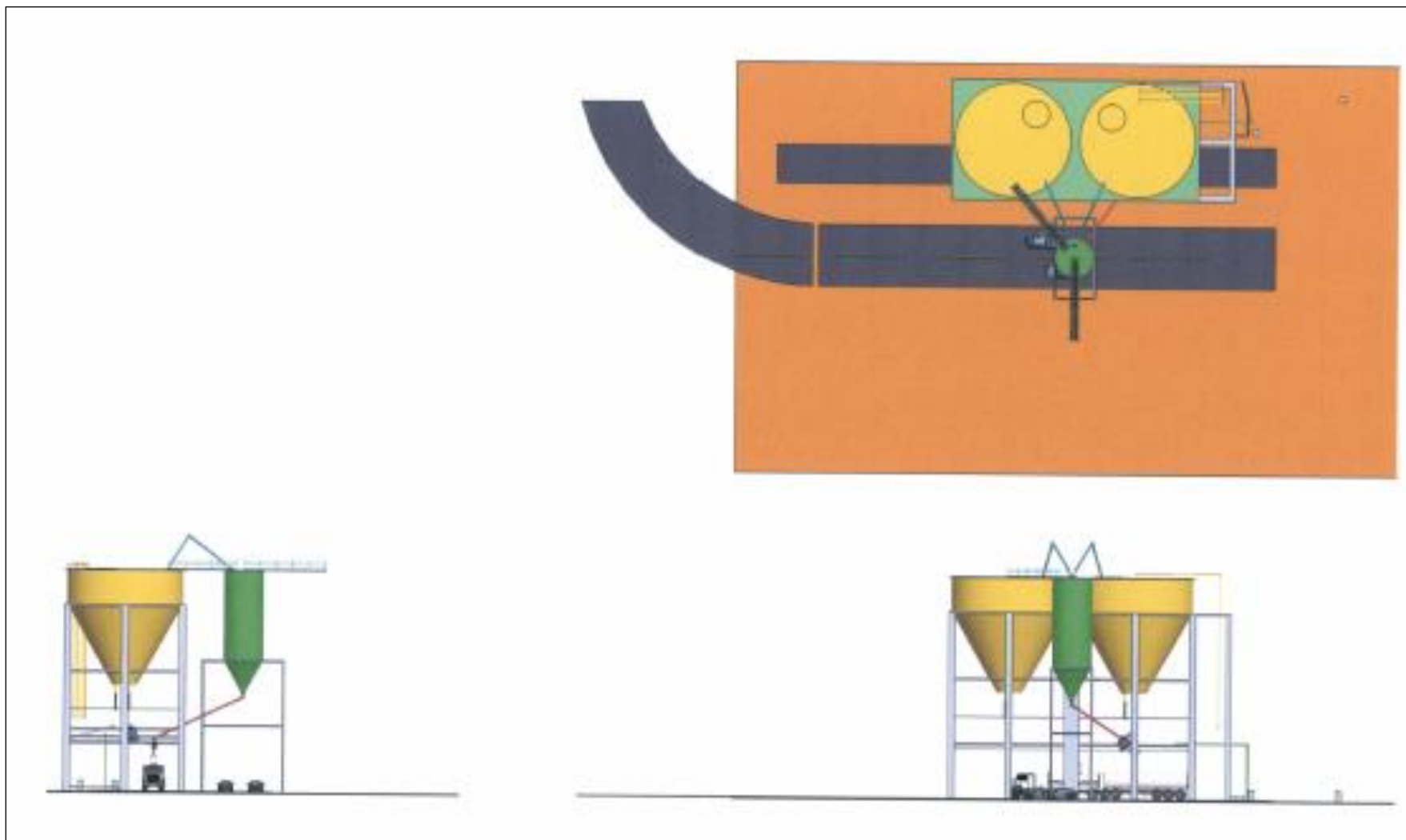


Figure 5 Approved 220t Collection Silo (Green) (Not Constructed) Adjacent to Existing EPS CCP Plant 1000t Silos (Yellow) (Source: MJM Environmental, 2015)

3.0 Modification Description

3.1 Proposed Modification Overview

Origin is seeking to modify existing operations under Project Approval 07_0084 to increase ash recycling capacities at the EPS. The proposed modification includes the reconfiguration of existing operations and the construction of additional infrastructure to increase ash storage capacity. The proposed modification will integrate with existing EPS operations and ash recycling, assisting to facilitate a sustainable increase in recycling towards the goal of 80% reuse or recycling of ash, as set out by Condition 4A.1 of PA 07_0084 MOD 1.

The proposed modification would involve changes to the existing Daracon facility discussed in **Section 2.3.2** (hereafter referred to as modification area 1) and construction of additional silos adjacent to Construction Road (hereafter referred to as modification area 2) (overview shown in **Figure 6**).

The key elements of the proposed modification include, but are not limited to:

- integration of the works currently authorised under local development consent DA/1937/2014/D (the existing Daracon operations) into Origin's Project Approval 07_0084, and upgrades to those works to increase throughput capacity to 300,000 tpa, including construction of three additional 450t ash storage silos (modification area 1) (**Figure 7** and **Figure 8**)
- Modifications to existing ash recycling infrastructure currently authorised under Project Approval 07_0084, including construction of up to four additional 600t ash storage silos to provide additional ash storage capacity and enable export of up to 150,000 tpa of stored ash product (modification area 2) (**Figure 9** and **Figure 10**)
- other supporting infrastructure shown on **Figure 7** and **Figure 9** include:
 - an internal road and weighbridge for delivery trucks at modification area 1 and 2
 - crib room and amenities building within modification area 2
 - water tanks within modification area 2
 - an option for a pneumatic fly ash pipeline (approximately 480m length) between the main power station and modification area 2.

These elements are described in detail in the following sections. A summary of approximate existing and proposed future ash recycling throughput capacities at EPS which are subject to changes as a result of the proposed modification are provided in **Table 1**.

Table 1 Summary of Existing and Proposed Ash Recycling Throughput Capacities

Operation	Existing / Proposed Facilities	Existing Capacity (tpa) (approx.)	Future Capacity (tpa) (approx.)
EPS CCP Plant	Existing - 2 x 1000t silos No change	300,000	300,000
Flyash Australia	No change	500,000	500,000
Daracon fly ash classifying plant and storage silos (modification area 1)	Existing - 1 x 90t silo, 3 x 100t silo, 1 x classifier Proposed – additional 3 x 450t storage silos	100,000	300,000
Bottom Ash Recovery Area	No change	150,000	150,000
New storage silos (modification area 2)	Existing - none existing Proposed – additional up to 4 x 600t silos	0	150,000
Total		1,050,000	1,400,000

3.2 Proposed Modification Elements

3.2.1 Increased Throughput and Additional Ash Storage Silos (Modification Area 1)

This element of the proposed modification would require integration of the existing Daracon facility (previously approved under LMCC DA/1937/2014/D) into the broader EPS Project Approval 07_0084 and relinquishment of LMCC DA/1937/2014/D. A description of the existing Daracon facility is provided in **Section 2.3**. The facility would continue to be operated and maintained by a third party.

The proposed modification includes a number of changes to the existing facility, including an increase to the approved throughput of the classifier installed by Daracon and construction of an additional three 450t storage silos.

The Daracon classifier is about 80m³ in size and is located at the EPS CCP Plant, immediately north east of the main station (unit 4) (refer to **Figure 6**). The classifier currently processes up to 100,000 tpa, however it has been identified that the classifier can operate up to 300,000 tpa without any physical modification to the existing facility.

Three additional 450t storage silos would be constructed adjacent to the existing Daracon storage silos (refer to **Figure 7** and **Figure 8**). The additional 450t ash storage silos would require a footprint of approximately 22m x 7m with a maximum height of approximately 25m. Civil works would be required to establish suitable foundations, which will require excavations up to 0.5m depth.

A number of optimisations and improvements would be undertaken to upgrade the services and construct the engineered controls required for the new infrastructure and EPS CCP Plant, including:

- compressed air supply from main plant to EPS CCP Plant
- power supply (new 2MVA transformer to replace existing transformer)
- upgrade of internal roads to provide road loop and weighbridge
- integration of new infrastructure and EPS CCP Plant systems to prevent overflow
- installation of ancillary infrastructure and removal of redundant infrastructure.

3.2.2 Additional 600t Ash Storage Silos (Modification Area 2)

This element of the proposed modification involves construction of up to four 600t silos to be operated and maintained by a third party up to approximately 150,000 tpa. The proposed location of the additional ash storage silos is an existing hardstand area of the EPS site located along Construction Road (refer to **Figure 6**).

Indicative plans for the layout of additional ash storage silos and supporting infrastructure are provided in **Figure 9** and **Figure 10**. The proposed modification includes an option for a pneumatic pipeline to transfer fly ash from EPS generating units to the new silos. An indicative location for the pneumatic fly ash pipeline is shown in **Figure 9** and this would be confirmed during detailed design. The alternative option is to transport the fly ash from the EPS CCP Plant to the new silos via truck.

The silos and related infrastructure would require a footprint of approximately 18m x 32m with maximum heights of approximately 25m. Civil works would be required to establish suitable foundations, which will require excavations up to 0.5m depth.

The new silos and related infrastructure would include:

- crib room and amenities
- up to four 600t silos
- an internal access road and truck weighbridge with suitable capacity for 28t trucks
- two water tanks for potable water
- plant to provide compressed air
- suitable foundations to support silos

- suitable bunding and drainage to mitigate risk of ash escaping the footprint
- area lighting, fencing and signage as required

Other services required for the silo operation would include.

- pneumatic pipe work from EPS generating units (up to 400t per day)
- power supply (approximately 75kVA)
- potable water to fill water tanks.

3.3 Construction Activities

3.3.1 Construction Staging

Construction works are expected to take around six months per stage of construction. Indicative construction staging for the proposed modification includes:

- Stage 1: Construction of three additional 450t storage silos (modification area 1)
- Stage 2: Construction of two additional 600t storage silos (modification area 2)
- Stage 3: Construction of a further two additional 600t storage silos (modification area 2) as required based on market demand and operational requirements.

Each stage of construction would include the following phases and construction activities where relevant:

- site establishment:
 - installation of temporary site fencing
 - installation of sediment control structures.
- civil works:
 - removal of existing buildings, structures and hardstand where necessary
 - earthworks and excavation for footings
 - construction of foundations and concrete slab.
- construction and installation of infrastructure:
 - construction of buildings where relevant
 - installation of storage silos
 - installation of mechanical equipment, pipe works and conveyors, electrical systems and instruments
 - construction of internal roads, pavements and hardstands.
- commissioning of the facilities
- demobilisation:
 - removal of temporary sediment control structures
 - demobilisation from site.

3.3.2 Construction Workforce and Hours

Approximately 20 construction staff are estimated to be required onsite during the peak construction period, although actual numbers would vary based on contractors and work methodology.

Construction activities would be carried out between 7am to 6pm, up to seven days per week. All deliveries to the construction site would occur during standard working hours:

- Monday to Friday – 7am to 6:00pm
- Saturdays – 8am to 1pm
- Sundays and Public Holidays – No work.



AECOM



Legend




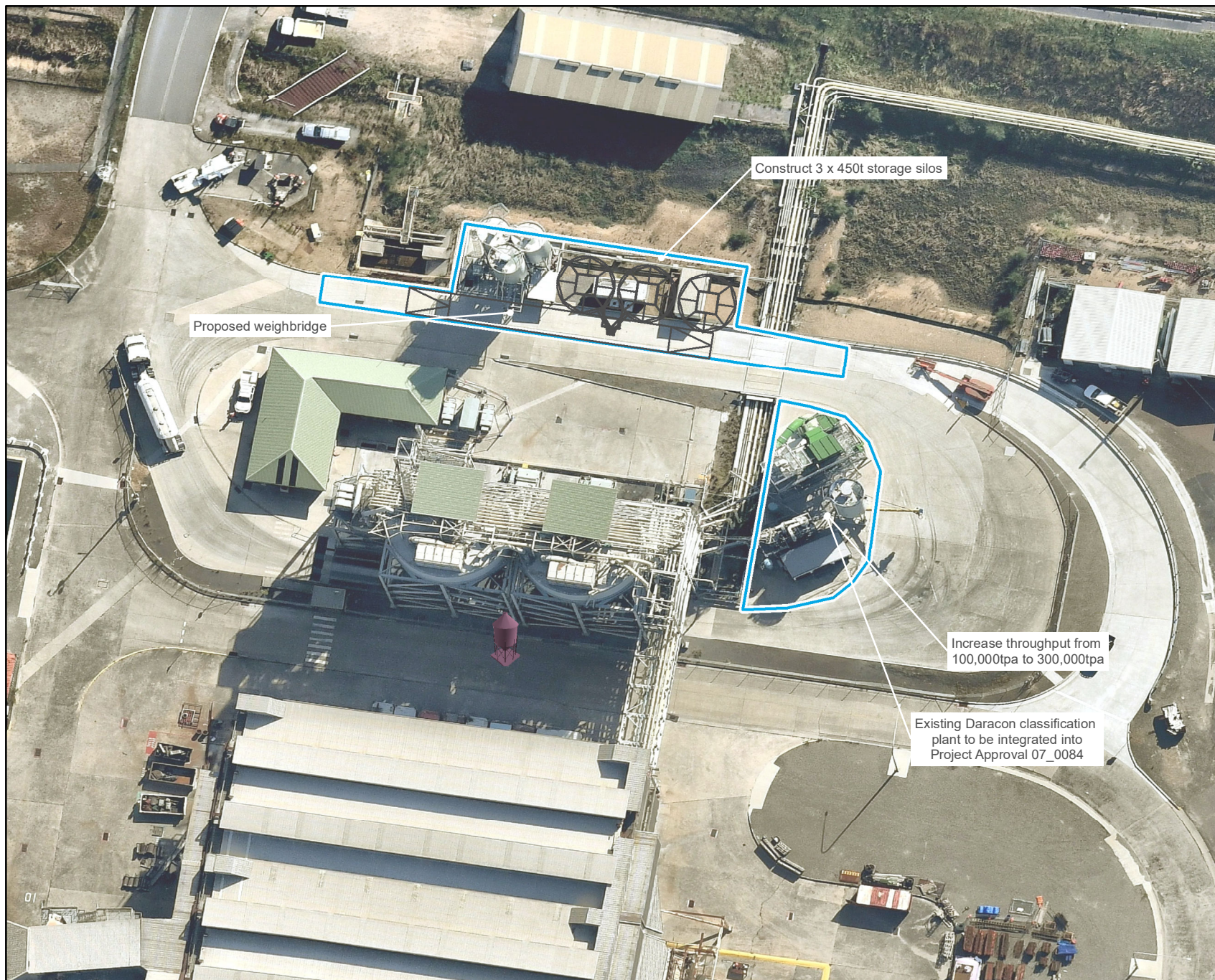
-  Modification area 1
-  Modification area 2
-  Roads

FIGURE 6 OVERVIEW
OF THE PROPOSED
MODIFICATION



AECOM



Legend




-  Modification area 1
-  Railway
-  Roads

FIGURE 7 OVERVIEW
OF THE PROPOSED
MODIFICATION AREA 1

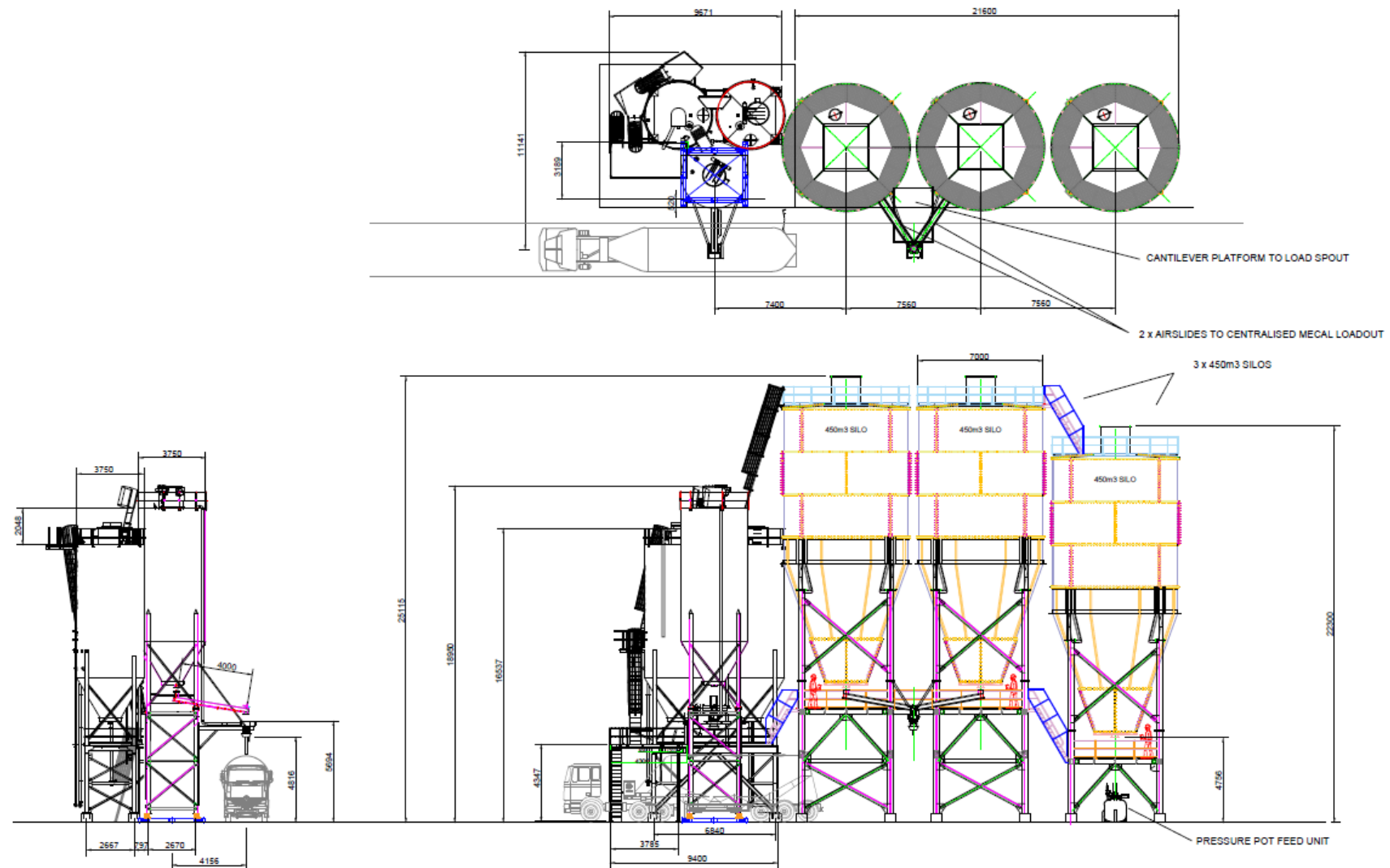


Figure 8 Modification Area 1 - General Arrangement for Additional Three 450t Ash Storage Silos



Legend

- Modification area 2
- Potential pneumatic pipeline route
- Roads



FIGURE 9 OVERVIEW
OF THE PROPOSED
MODIFICATION AREA 2

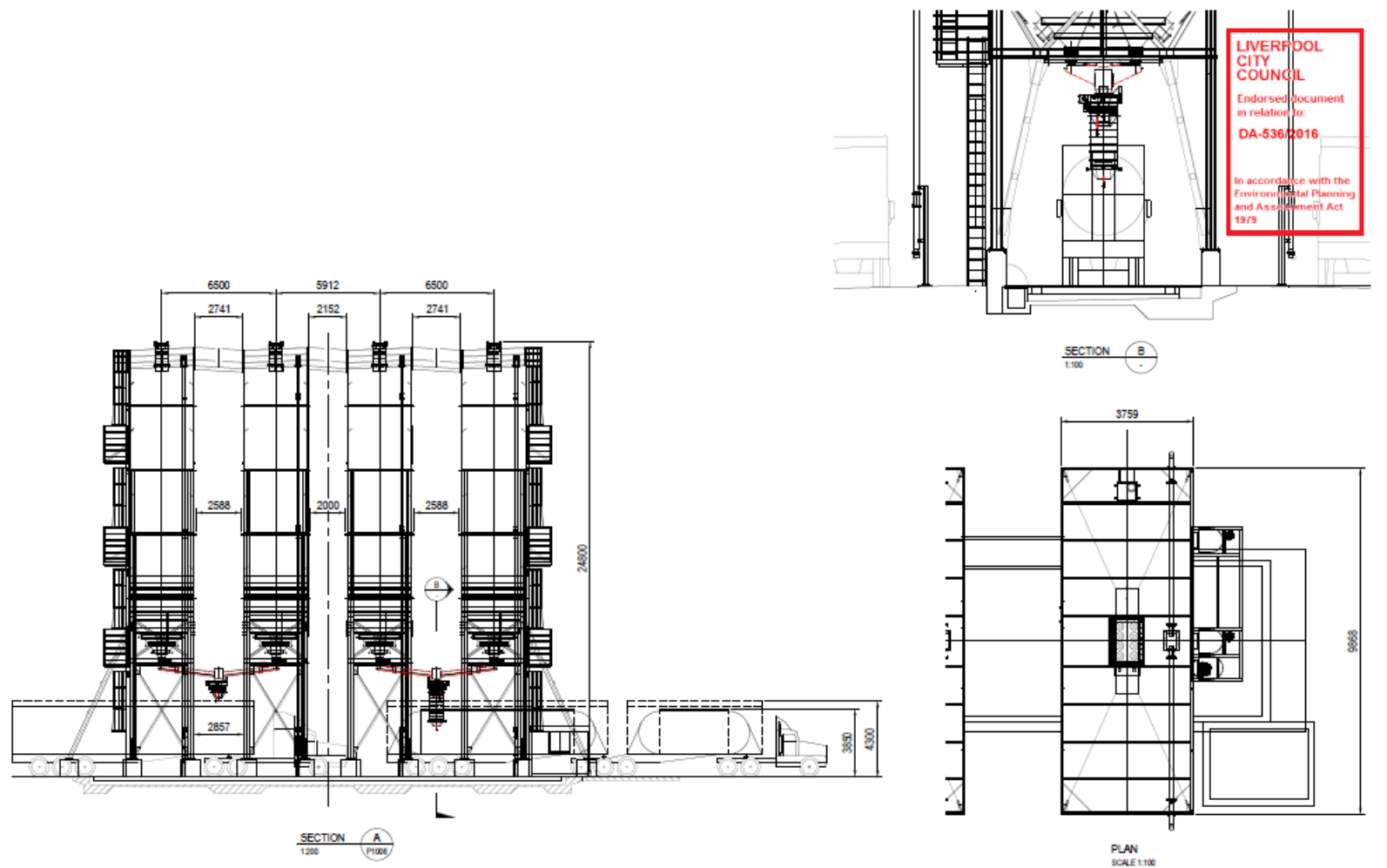


Figure 10 Modification Area 2 – Indicative General Arrangement for Additional 600t Ash Storage Silos (Source: APP Corporation, 2016 – SEE for Similar Reference Site)

3.3.3 Construction Plant and Equipment

The plant and equipment required for the proposed modification include:

- construction utility vehicles
- excavators
- cranes
- cement trucks
- grader.

3.3.4 Construction Traffic and Access

All construction traffic would enter the site from the existing access on Construction Road. Construction traffic would utilise existing transport routes via Construction Road, Wangi Road and the Pacific Highway (M1 Motorway).

Construction of the proposed modification would generate a temporary increase in light, medium and heavy vehicles accessing the Site to facilitate construction works and to deliver construction materials (approximately ten heavy vehicle movements and 20 light vehicle movements per day). Adequate parking for construction personnel is available within the existing EPS main car park. There are sufficient hard stand areas on the site to serve as laydown areas for construction vehicles and equipment.

3.4 Operational Activities

3.4.1 Proposed Operation

Operation of the proposed modification would be consistent with existing operational practices. Fly ash would be transferred from the EPS CCP Plant to the storage silos at modification area 1 via the existing pneumatic pipeline.

The transfer of fly ash from the EPS CCP Plant to the storage silos at modification area 2 would initially be via truck. Trucks would use internal site roads to transport the fly ash and a pump system would transfer the fly ash from the truck into the silos for storage. As a future option, Origin may construct a pneumatic pipeline to transfer fly ash directly from the EPS generating units to the storage silos at modification area 2. Both options would involve a closed loop process to keep the product dry and retain any airborne product within the system.

The storage silos would each be fitted with a dust collection system that adds the collected product back into the silo, preventing airborne product dispersion (i.e. dust).

The fly ash loading process (from storage silos to trucks) would be conducted on the weighbridge beneath the silos. A waste collection drain would be included around the weighbridge to capture fly ash in the event of an accidental spill. The waste collection drain would be integrated into the current wastewater management process (discussed further in **Section 7.6**).

The loading process would be a dry process (i.e. no 'wetting' of material). The lower sections of the silos would be enclosed in order to prevent potential dispersal of material.

3.4.2 Hours of Operation

The proposed modification would operate in accordance with existing operational hours. The EPS operates 24 hours per day, seven days per week. As such, the proposed modification would operate continuously as required to transport and process 'run-of-station' fly ash from EPS to saleable product.

3.4.3 Workforce

The proposed modification is expected to provide direct employment for two additional operational staff as well as the indirect employment of truck drivers associated with transport contractors.

3.4.4 Transport Requirements

Ash product would be transported via existing haulage routes (further discussed in **Section 7.1**). Site access for heavy vehicles would be via the existing entry point on Construction Road. Heavy vehicles travelling from the north would access the site from Pacific Highway via Wangi Road and Rocky Point Road travelling through the local centre of Awaba. Heavy vehicles travelling from the south would access the site from Pacific Highway via Dora Street and Wangi Road.

The proposed modification is expected to generate an additional 223 truck movements per day compared to 188 truck movements per day from existing ash recycling operations, bringing estimated maximum truck movements to 411 trucks per day. It is anticipated that the distribution of heavy vehicle traffic would continue in accordance with the existing distribution - 50% of trucks accessing / egressing the site from the north via Wangi Road, and 50% of trucks accessing / egressing the site from the south via Morisset. Further discussion of the potential traffic impacts of the proposed modification is provided in **Section 7.1**.

The Traffic Management Plan for the EPS would be updated to incorporate the proposed modification and would include parking controls on Construction Road to ensure that queuing does not occur in the loading area and its approaches.

4.0 Strategic Context

4.1 NSW Government Policy

4.1.1 Circular Economy Policy

The NSW Government developed a Circular Economy Policy which aims to maximise the use and value of resources by promoting long-lasting design, maintenance, repair, re-use, sharing, transforming, remanufacturing and recycling. The *NSW Circular Economy Policy Statement* (February 2019) provides a framework for implementing initiatives throughout the product life cycle and sets out the following key principles to underpin NSW Government decision making and planning:

- sustainable management of all resources
- valuing resource productivity
- design out waste and pollution
- maintain the value of products and materials
- innovate new solutions for resource efficiency
- create new circular economy jobs
- foster behaviour change through education and engagement.

The proposed modification would be consistent with these principles as it would promote resource recovery and recycling. The reuse of ash within the construction industry - for example as a replacement for cement in concrete – would assist in the sustainable management of resources, by replacing raw materials with recycled products and minimising the environmental impacts from the extraction and processing of those raw materials (as discussed in **Section 4.3**). The proposed modification would promote the recognition of ash as a valuable resource rather than as a waste product requiring disposal, and would create jobs in the resource recovery sector, including direct employment opportunities and the indirect employment of transport contractors.

4.1.2 NSW Waste and Sustainable Materials Strategy 2041

The *NSW Waste and Sustainable Materials Strategy 2041 - Stage 1: 2021-2027* (the Strategy) was published in June 2021 and updates the previous *Waste Avoidance and Resource Recovery Strategy 2014 – 2021*. The Strategy aims to assist NSW in transitioning to a circular economy over the next 20 years. As well as waste reduction and recycling, the Strategy focuses on the environmental benefits and economic opportunities of managing waste. The strategy sets out the actions to be taken in the first stage of the Strategy up to 2027 to deliver on the long-term objectives. The Strategy sets out a number of five- and ten-year targets including:

- reduce total waste generated by 10% per person by 2030
- have an 80% average recovery rate from all waste streams by 2030
- significantly increase the use of recycled content by governments and industry
- phase out problematic and unnecessary plastics by 2025
- halve the amount of organic waste sent to landfill by 2030.

To help achieve these long-term objectives, the Strategy notes that the NSW Government will establish a Carbon Recycling and Abatement Fund to support innovative circular economy approaches that manage waste and materials more efficiently and reduce emissions. Through this fund, the Government would support projects to trial the innovative use of low carbon recycled materials such as cement made with coal ash. The Strategy also aims to increase government procurement of local recycled material such as coal ash and glass in concrete and road base.

The proposed modification would support the objectives of the Strategy by increasing the storage and recycling of coal ash, reducing the volume of ash requiring disposal to the ERAD, and helping to progress towards the 80% reuse and recycling target.

4.2 NSW Coal Ash Inquiry

An inquiry was undertaken by the Public Works Committee to examine the costs for remediation of sites containing coal ash repositories across NSW. A report was published in March 2021 to describe the findings of the inquiry (Public Works Committee, 2021). The inquiry included investigation of the following issues:

- the prospective costs and government liability for remediation of coal ash repositories associated with a number of power stations (including the EPS) across the state
- the adequacy of the current regulatory regime for remediation of coal ash repositories
- the economic and employment opportunities associated with coal ash reuse, site remediation and repurposing of land.

The inquiry considered submissions from a range of stakeholders including power station operators, industry representatives, government representatives, community members, environmental groups and health professionals.

The Committee's report included discussion of potential impacts of coal ash dams, including the potential environmental impacts on Lake Macquarie and the closure of the Myuna Bay Sport and Recreation Centre due to risks associated with potential failure of the ash dam wall. These issues are not directly relevant to the proposed modification, which seeks to provide additional ash storage at the EPS site to facilitate an increase in ash recycling. Therefore, within this Modification Report the discussion of the inquiry findings has focused on those related to coal ash recycling.

One of the overall findings of the inquiry was that coal ash is a valuable resource and that there is widespread support across the spectrum of stakeholders for the greater reuse of coal ash. It was identified that greater reuse of coal ash would lead to industry development and job creation, a reduction in environmental harm and contribution towards developing a circular economy.

The committee made a number of recommendations, including the following which are of relevance to ash recycling and the proposed modification:

- Recommendation 10: That Transport for NSW review its procurement practices to, where feasible, mandate the use of recycled coal ash in government-funded transport infrastructure projects
- Recommendation 11: That Infrastructure NSW review its procurement practices to, where feasible, mandate the use of recycled coal ash in government-funded infrastructure projects
- Recommendation 12: That Transport for NSW review the construction standards for roads, with a view to ensuring that local government trials the use of coal ash in its road construction
- Recommendation 13: That the NSW Government partner with the Ash Development Association of Australia and other interested parties, and support feasibility studies and pilot projects to assess and demonstrate commercial viability of new industries, such as transformation of coal ash into lightweight aggregate or other higher value-add products
- Recommendation 14: That the NSW Environment Protection Authority ensure that the quantity of coal ash stored, produced, and the destination and purpose of coal ash reused, is publicly reported
- Recommendation 15: That the NSW Government promote circular economy principles when dealing with coal ash waste and promoting reuse, including facilitating consultation between regulatory bodies, electricity generators and key stakeholders in recycling, local government and construction sectors.

The proposed modification would be consistent with the recommendations of the coal ash inquiry, as it would provide additional ash storage at the EPS site which would enable larger volumes of ash to be stored and recycled, would assist in meeting the 80% ash reuse or recycling target and would promote the circular economy principles by increasing the reuse and recycling of coal ash.

4.3 Need for the Proposed Modification

Ash production at EPS varies on an annual basis depending on electricity demand in the NEM. In the past three financial years ash production has ranged between 1.42 and 1.73 Mtpa, and it is expected to be approximately of this order into the future. Thus, to achieve 80% reuse or recycling of this anticipated annual ash production, Origin would require the capacity to recycle up to 1.38 Mtpa of ash. Noting the dependence of ash recycling and sales on market demand, Origin is targeting ash recycling capacities across all facilities above an estimated 80% of total ash produced (up to 1.4 Mtpa).

Ash can be beneficially reused in the building and construction industry. Ash can be used as a replacement for cement in concrete, in sand-lime bricks, grout, embankments and backfills. Ash can also be used for other applications, for example as an industrial mineral filler in plastics, paints and varnishes, or as a growing medium or soil conditioner for plants.

The benefits of reusing ash include a reduction in the volume of ash requiring disposal to storage facilities such as the ERAD which also reduces the environmental impacts and costs associated with maintaining these storage facilities. Reuse of ash in construction materials can also reduce the energy demands in the construction industry by replacing a portion of cement production which is a highly energy-intensive process – this can result in carbon emission reductions in construction industry supply chains. The use of ash in concrete can also enhance the strength and durability of the resulting concrete product.

Ash that is surplus to recycling supply is deposited as a dense phase slurry into the ERAD. The ERAD has limited ash storage capacity, with storage capacity estimates indicating that the dam will reach its current capacity prior to the anticipated closure of the power station in 2032. The efficient and effective utilisation of this critical asset is vital to the continued operation of EPS and as national electricity demands continue to increase, so might the generation requirements at EPS. Consequently, achieving effective ash recycling and storage capacity is a key component of Origin's overall ash dam management strategy.

Origin has prepared a Long-Term Ash Management Strategy (LTAMS) which represents Origin's commitment to improve the environmental outcomes associated with operation of the EPS and the ERAD. The LTAMS is a dynamic document which undergoes regular review, with the aim of implementing strategies that maximise the recycling potential of both fly ash and bottom ash produced at EPS. The LTAMS documents the volumes of ash recycled each year by the current ash recycling facilities at the EPS (Daracon, Flyash Australia and Boral Bottom Ash facilities). The annual average recycling rate of ash at EPS is approximately 30-40% whereas Origin's target reuse or recycling goal is 80%.

The future capacity of the ERAD is integrally linked to ash recycling. The proposed modification would increase the capacity for ash recycling, thereby helping to manage the storage capacity available within the ERAD. The proposed modification would therefore assist in ensuring the future power system security within the broader National Electricity Market. A future increase in ash dam capacity as approved by Project Approval 07_0084 or a possible alternate design is also anticipated in addition to the increased ash recycling.

The project is consistent with the recommendations of the NSW Parliamentary Inquiry "Costs for remediation of sites containing coal ash repositories", March 2021.

4.4 Alternatives Considered

4.4.1 'Do Nothing'

Origin has estimated that the ERAD will reach its current storage capacity before the anticipated 2032 closure date, depending on electricity generation requirements and ash recycling rates. The 'Do Nothing' option would mean that Origin would be unable to manage and store ash produced from the EPS operations once the ERAD has reached its capacity, putting at risk EPS's ability to generate electricity in the future which is vital to NSW and Australia's energy needs.

Additionally, the proposed modification is required to progress ash recycling rates towards the 80% reuse or recycling target established by Condition 4A.1 of Project Approval 07_0084.

4.4.2 Investigation of Ash Reuse Options

Origin has implemented a program to investigate alternative applications for ash within new and existing markets. The LTAMS (Origin, 2020) includes a summary of Origin's program for investigation of alternative ash use. In particular, Origin is exploring the ability to provide distinct ash products as per the Australian Standards for fly ash. A summary of Origin's investigations into innovative new products and technology opportunities is provided below.

Ultra-high-volume fly ash pavement

Origin is conducting a durability assessment of an ultra-high-volume fly ash pavement constructed on the Coal Haul Road at EPS in 1995. Results to date indicate that the road has outperformed the standard heavy vehicle pavement design. Origin is also exploring the enhancement of all pavement components with the addition of fly ash. Full implementation of the opportunity would require engagement with the RMS and local council stakeholders to trial the product and enable the commercial roll out via a change of the relevant RMS Standards for pavements.

Ash amended road base pavements and quarry products

Origin is undertaking a range of product development trials with a regional quarry to incorporate ash products into sub grade, road base and other quarry materials suitable for utilisation in the Lake Macquarie City region. To date this opportunity has identified six potential products, featuring possible improvements on the Plasticity Index or workability of the products.

Light weight aggregate manufacturing

Origin is investigating an option for construction and operation of an aggregate manufacturing plant at EPS by a third party that would bind ash together to produce a range of coarse and fine aggregates for use in concrete and other traditional aggregate applications.

Pre-cast building materials

Origin is currently in various stages of research and negotiation with a number of organisations for the construction and operation of various building material manufacturing plants at EPS by a third party that would bind ash together to produce a range of pre-cast building materials including blocks, bricks, pavers and tiles.

Mine void rehabilitation

Origin currently recycles up to 50ktpa of fly ash for use in mine void rehabilitation projects throughout the Newcastle and Hunter regions. Origin is also developing additional grouting projects at EPS with local mines for the rehabilitation of the former mine workings.

Mine rehabilitation.

The mine rehabilitation ash recycling project involves the transport of ash excavated from the ash dam and transported to a mine site in the Lower Hunter area to be used for rehabilitation purposes within a disused tailings storage facility. The project involves up to 900,000t of fly ash being transported to the mine site for rehabilitation over a 2-year period via a private haul road network.

4.4.3 Preferred Option

In order to achieve 80% recycling of anticipated future ash generation, Origin would require the capacity to recycle more than 1.2 Mtpa of ash generated at EPS depending on power station output and ash generation rates.

Origin is active in the ash recycling market and continues to seek alternative ash recycling options. While Origin will continue to pursue the alternative ash use opportunities identified above, including progressing operations for mine site rehabilitation, market demand will be a key determinant in the actual ash recycling rates achieved through these options. The proposed modification is the preferred option as it would provide additional on-site ash storage which is needed to manage the irregular nature of ash demand that is market driven. With increased storage capacity, Origin can store more ash at times when demand is low, reducing the volume of ash sent to the ERAD. When demand increases, the ash can be recycled at a higher rate than is possible with the existing on-site storage.

5.0 Statutory Context

5.1 Local Matters

5.1.1 Lake Macquarie Local Environmental Plan 2014

All works would occur on Origin EPS operational land. EPS is located on land zoned as SP2 Infrastructure - Electricity Generating Works under the *Lake Macquarie Local Environmental Plan 2014* (LEP 2014).

The land use table in LEP 2014 lists the development that is permitted with consent on land zoned SP2 Infrastructure and includes development for '*the purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose*'. As the EPS is on land zoned for the purpose of electricity generating works, development that is ordinarily incidental or ancillary to electricity generating works would be permissible with consent.

The 2007 EA prepared for Project Approval 07_0084 described the ash recycling facilities required to manage the ash produced as a result of the electricity generating activities at EPS. Project Approval 07_0084 (as modified) established a mandatory goal of 80% reuse or recycling of ash generated at the EPS. Development for the purpose of ash recycling on the EPS site is therefore considered ancillary to the dominant use at the site. As such, the proposed modification would be permissible with consent under Part 4 of the EP&A Act.

The objectives of the SP2 Infrastructure zone are to:

- provide for infrastructure and related uses
- prevent development that is not compatible with or that may detract from the provision of infrastructure
- provide land required for the development or expansion of major health, education and community facilities.

The proposed modification would be consistent with the objectives of the LEP 2014 for the SP2 Infrastructure zone as it would provide for infrastructure related to the dominant use of the site, i.e. electricity generating works.

Clause 4.3 of LEP 2014 sets out the principal development standard related to the height of buildings. The objectives of the building height development standard (clause 4.3(1) of LEP 2014) are to ensure the height of buildings are appropriate for their location and to permit building heights that encourage high quality urban form. Clause 4.3(2) of LEP 2014 states that the height of a building is not to exceed the maximum height shown for that land on the Height of Buildings Map. For the EPS site the maximum height shown on the *Height of Buildings Map – Sheet HOB_006C* is 8.5m. It is noted that as a former Part 3A project, these provisions of the LEP 2014 have not previously applied to Project Approval 07_0084.

The proposed modification includes structures to a maximum height of approximately 25.115m and therefore exceeds the maximum building height. However, clause 4.6 of the LEP allows for variations to development standards, to provide an appropriate degree of flexibility in applying certain development standards to particular development.

Clause 4.6.3 of LEP 2014 states that development consent must not be granted for development that contravenes a development standard unless the consent authority has considered a written request from the applicant that seeks to justify the contravention of the development standard by demonstrating:

- a. that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case
- b. that there are sufficient environmental planning grounds to justify contravening the development standard.

While the proposed modification would exceed the maximum building, height set out in LEP 2014, it is important to consider the context of the site.

The proposed modification is located within the operational area of the EPS, which includes existing structures that exceed a height of 25m. Existing structures in the vicinity of the site include the EPS CCP Plant at approximately 27m, the main generating units at approximately 35m and the two stacks at approximately 200m. The height of proposed infrastructure would be appropriate for the proposed location given the context of the site within an existing power station and thus the objectives of the development standard (clause 4.3(1) of LEP 2014) would be achieved.

Proposed infrastructure would be consistent with the industrial nature of adjacent infrastructure and would not adversely impact the visual amenity of the EPS site. Sensitive receivers are located more than 1km from the site and views to the site are limited by extensive buffer lands.

Given the context of the site, the distance to receivers and the presence of extensive buffer lands which would minimise potential impacts to visual amenity, it is considered unreasonable to comply with the height restriction in this case. The proposed modification would be consistent with the objectives of the building height development standard and the objectives of the SP2 Infrastructure zone. Therefore, in accordance with clause 4.6 of LEP 2014, there are sufficient environmental planning grounds to justify the inconsistency with the building height requirements of LEP 2014.

Clause 5.10 of LEP 2014 includes specific provisions for the protection of heritage items, Aboriginal objects, and heritage conservation areas. The Eraring Power Station is listed as a heritage item under Schedule 5 of LEP 2014. Clause 10(4) of LEP 2014 requires the consent authority to consider the effect of the proposed development on the heritage significance of a heritage item prior to granting consent. An assessment of the potential impacts of the proposed modification to this listed heritage item is provided in **Section 7.3**. The proposed modification is expected to have minimal impact to the heritage significance of the EPS.

5.2 State Matters

5.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provide the framework for environmental planning in NSW. The EP&A Act aims to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.

The EPS currently operates under a number of Project Approvals (refer **Section 1.3**) including Project Approval 07_0084 (as modified) for the management of ash at the EPS site. Project Approval 07_0084 was issued under the former Part 3A (repealed) provisions of the EP&A Act and has since transitioned to an SSD approval. Modifications to Project Approval 07_0084 must now be assessed under the SSD provisions in accordance with Part 4 of the EP&A Act.

Origin is seeking to modify Project Approval 07_0084 under section 4.55(2) of the EP&A Act. To progress the proposed modification works in accordance with section 4.55 (2) of the EP& Act, the proposed modification must be considered to be '*substantially the same development*' as approved under Project Approval 07_0084 MOD 1. A comparative assessment of the approved development compared to the proposed modification is provided in **Appendix B**.

The proposed modification relates directly to approved activities already undertaken at the EPS site. Ultimately, the proposed modification forms part of the Long-Term Ash Management Strategy for the EPS, with the purpose of reaching the mandatory goal of 80% reuse or recycling of ash from the EPS by 31 December 2021, as per condition 4A.1 of Project Approval 07_0084 MOD 1.

Project Approval 07_0084 clearly describes secondary and ancillary uses required to facilitate the originally approved development. Project Approval 07_0084 authorises the export of CPP from the EPS and sets a goal for recycling 80% of ash produced at the EPS by virtue of condition 4A.1. The additional infrastructure required for the proposed modification would be similar in nature and scale to the ash recycling facilities described in the 2007 EA and would be located within existing operational areas of the EPS.

The proposed modification represents an expansion of the existing operation within the EPS site and would be consistent with the activities/land use described within the 2007 EA and Project Approval 07_0084. The proposed modification satisfies the requirements of '*substantially the same development*' when considering the activities approved at the EPS.

Therefore, modification of Project Approval 07_0084 is being sought under section 4.55 (2) of the EP&A Act. The Independent Planning Commission would be the approval authority and would determine this modification application (as per DPIE correspondence dated 30/04/2021).

Matters for Consideration

In determining a development application, the consent authority must take into consideration the matters listed under section 4.15(1) of the EP&A Act. **Table 2** identifies each matter of consideration along with a reference to where the matter is addressed in this Modification Report.

Table 2 Matters of Consideration Under Section 4.15(1) of the EP&A Act

Section 4.15(1) Matter for Consideration	Comment/Where Addressed
a. the provisions of any of the following documents that apply to the land to which the development application relates:	Section 5.1.1 and 5.2.2
i. any environmental planning instrument	
ii. any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved)	N/A - no draft environmental planning instruments relevant to the site or proposed modification.
iii. any development control plan	N/A – development control plans do not apply to SSD ³
iv. any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter under section 7.4	N/A – no known planning agreements applicable to the site or proposed modification
v. the regulations (to the extent that they prescribe matters for the purpose of this paragraph)	Table 3
b. the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality	Section 7.0
c. the suitability of the site for the development	Section 2.0 and 7.0
d. any submissions made in accordance with this Act or the regulations	Section 6.3
e. the public interest.	Section 7.7 and 9.0

Clause 115(1) of the EP&A Regulation sets out the information required to be included in an application for modification of development consent. **Table 3** identifies the information required to be included in the modification application along with a reference to where the matter is addressed in this Modification Report.

³ Clause 11 of the *State Environmental Planning Policy (State and Regional Development) 2011*

Table 3 Requirements for Modification Application under Clause 115(1) of the EP&A Regulation

Clause 115(1) Requirement	Comment/Where Addressed
an application for modification of a development consent under section 4.55(1), (1A) or (2) or 4.56(1) of the EP&A Act must contain the following information: a. The name and address of the applicant	Section 1.2 and 2.0
b. a description of the development to be carried out under the consent (as previously modified)	Section 2.3
c. the address and formal particulars of title, of the land on which the development is to be carried out	Section 2.0
d. a description of the proposed modification to the development consent	Section 3.0
e. a statement that indicates either: i. that the modification is merely intended to correct a minor error, misdescription or miscalculation, or ii. that the modification is intended to have some other effect, as specified in the statement.	Section 5.2.1
f. a description of the expected impacts of the modification	Section 7.0
g. an undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved	Section 5.2.1
g1. in the case of an application that is accompanied by a biodiversity development assessment report, the reasonable steps taken to obtain the like-for-like biodiversity credits required to be retired under the report to offset the residual impacts on biodiversity values if different biodiversity credits are proposed to be used as offsets in accordance with the variation rules under	N/A – biodiversity development assessment report not required
h. if the applicant is not the owner of the land, a statement that the owner consents to the making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner)	N/A – Origin owns the land to which the proposed modification relates
i. a statement as to whether the application is being made to the Court (under section 4.55) or to the consent authority (under section 4.56)	Section 5.2.1

5.2.2 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) are environmental planning instruments enacted under Part 3 of the EP&A Act that regulate land use and development.

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

SEPP 55 provides a state-wide planning control for the remediation of contaminated land to reduce the risk of harm to human health or other environmental systems. Clause 7 of SEPP 55 requires consideration of whether the land is contaminated and whether it is suitable (or can be made suitable) for proposed development.

A search of the Environment Protection Authority (EPA) contaminated land record of notices was undertaken on 28 May 2021 and did not identify any relevant notices related to existing contamination within the EPS site. Given the historic and existing use of the EPS site as a coal fired power station there is potential for contamination on the relevant land.

The proposed modification is for similar infrastructure currently used for existing operations on the site.

The proposed modification does not involve a sensitive use that would be incompatible with the potential level and type of contamination that may be present on the land. Remediation of the land is not likely to be required to make the land suitable for the proposed purpose.

Construction of the proposed modification would require minimal ground disturbance and in the event that contaminated soils are identified during construction, the management measures provided in **Section 7.6.3** would be implemented to minimise potential impacts.

Given the nature of the existing and proposed uses, the site would be suitable for the proposed development from a contamination perspective. An assessment of potential contamination impacts associated with the proposed modification is provided in **Section 7.6**.

5.2.3 Protection of the Environment Operations Act 1997

Origin currently holds Environment Protection Licence (EPL) 1429 under the *Protection of the Environment Operations Act 1997* (POEO Act). EPL 1429 applies to both the EPS and the ERAD and allows for the following scheduled activities to occur:

- coal works
- crushing, grinding or separating
- general chemical storage
- electricity generation
- petroleum products storage
- sewage treatment processing.

The proposed modification would continue to operate in accordance with the conditions of EPL 1429. The results of monitoring required under EPL 1429 (e.g. air quality, surface water and groundwater monitoring) are reported on an ongoing basis in accordance with the requirements of the EPL 1429 and the POEO Act. Origin would consult with EPA to confirm whether a variation to the EPL would be required to incorporate the proposed modification.

5.2.4 Heritage Act 1977

The *Heritage Act 1977* aims to protect and conserve the State's cultural heritage and provide for the identification and registration of items of State heritage significance. A place, building, work, relic, moveable object, or precinct that is of heritage significance to the State or to a local area can be listed on the State Heritage Register. If an item is listed on the State Heritage Register or is the subject of an interim listing, approval must be obtained under Section 58 of the *Heritage Act 1977* for works or activities that may impact on these items.

The EPS is listed as an item of local heritage significance under the LEP 2014. Potential impacts to cultural heritage as a result of the proposed modification are discussed in **Section 7.3**. The proposed modification would be constructed on existing hardstand within the operational area of the EPS and would not directly impact key electricity generation infrastructure or technology at the EPS. New infrastructure to be constructed would be similar in nature and scale to that already operational at the EPS. Potential impacts to cultural heritage as a result of the proposed modification would be minimal.

5.2.5 Coal Mine Subsidence Compensation Act 2017

Part 3 of the *Coal Mine Subsidence Compensation Act 2017* requires approval from the Chief Executive for development within a mine subsidence district. EPS is located within the West Lake Mine Subsidence District. Consultation with Subsidence Advisory NSW was undertaken for the proposed modification (refer to **Section 6.2**).

5.3 Commonwealth Matters

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions that would have, or are likely to have, a significant impact on matters of National Environmental Significance (NES), Commonwealth activities or actions on Commonwealth land likely to have a significant impact on the environment. The EPBC Act lists nine matters of NES which must be addressed.

An EPBC Act Protected Matters Search of matters of NES was undertaken on 28 May 2021 for the site to determine what matters of NES may be present within 10km of the proposed modification.

The results of this database search are summarised in **Table 4** and provided in full at **Appendix C**.

Table 4 Consideration of NES Matters Under the EPBC Act

NES Matters	Comment
World Heritage properties	There are no World Heritage Properties within 10km of the site.
National Heritage places	There are no National Heritage Places within 10km of the site.
Ramsar wetlands of international importance	There are no Ramsar wetlands within 10km of the site.
Listed threatened species and ecological communities	The Protected Matters Search identified four Commonwealth-listed threatened ecological communities and 73 Commonwealth-listed threatened species that may occur within 10km of the site. Given the minor extent of works proposed within existing operational areas of the EPS, impacts to Commonwealth-listed threatened species or ecological communities would be unlikely to occur.
Listed Migratory Species	The Protected Matters Search identified 47 Commonwealth-listed migratory species that may occur within 10km of the site. Given the minor extent of works proposed within existing operational areas of the EPS, impacts to Commonwealth-listed migratory species would be unlikely to occur.
Commonwealth Marine Area	The proposed modification is not located within or adjacent to a Commonwealth marine area.
Great Barrier Reef Marine Park	The proposed modification is not located within or adjacent to the Great Barrier Reef Marine Park.
Nuclear actions (including uranium mining)	The proposed modification would not involve nuclear action.
Water resources impacted on by a coal seam gas or large coal mining development	The proposed modification would not involve coal seam gas or coal mining

The proposed modification would be located within the operational area of the EPS on existing hardstand areas. The proposed modification is not expected to have a significant impact on relevant matters of NES. Accordingly, the proposed modification would not need to be referred to the Commonwealth Department of Agriculture, Water and the Environment.

6.0 Consultation

6.1 Department of Planning, Industry and Environment

Consultation with DPIE has been undertaken prior to lodgement of this Modification Report, to provide details of the proposed modification and to seek initial feedback regarding the approval pathway and matters to be addressed within the Modification Report.

A project briefing was held with DPIE on 5 November 2020 and a Scoping Report (AECOM, 2021) was subsequently submitted to DPIE. The Scoping Report provided a description of the proposed modification and outlined the proposed planning approval pathway and environmental assessment approach for relevant environmental issues.

Correspondence from DPIE (dated 30 April 2021) confirmed that the proposed modification can be assessed as a modification under section 4.55 the EP&A Act. DPIE also provided a list of environmental assessment requirements to be addressed in the Modification Report in addition to the assessment and consultation outlined in the Scoping Report.

The environmental assessment requirements specified by DPIE (correspondence dated 30 April 2021) and outlined within the Scoping Report (AECOM, 2021) are reproduced in **Table 5** along with a reference to the relevant section of the Modification Report which addresses that matter.

Table 5 Environmental Assessment Requirements for the Modification Report

Matter to be Addressed	Where Addressed
DPIE - Additional Environmental Requirements	
Clear and detailed justification for, and benefits of, the proposed modification application	Section 9.0
Description of other existing consents for recycling activities on-site (if applicable)	Section 1.3
A table summarising previous modifications to the original project approval and the proposed modification, outlining clearly the changes made to the project.	Section 1.3 and Appendix B
Detailed consideration of the matters in section 4.15 of the EP&A Act, including the objects of the Act, permissibility and relevant statutory planning instruments.	Section 5.0
Scoping Report – Environmental Assessment Approach	
General Requirements The Modification Report would include the following: <ul style="list-style-type: none"> a detailed description of the proposed modification, including <ul style="list-style-type: none"> existing operations carried out on the EPS (as relevant to the modification) and applicable development consents details of construction and operation of the proposed modification need for the proposed modification justification for the proposed modification likely interactions between the development and existing, approved and proposed operations in the vicinity of the EPS plans of proposed building. statutory context for the proposed modification, including consideration of relevant environmental planning instruments an assessment of the likely impacts of the proposed modification on the environment, focusing on the specific issues identified below, including: <ul style="list-style-type: none"> a description of the existing environment 	Section 3.0 Section 2.3 and 1.3 Section 3.3 and 3.4 Section 4.3 Section 9.0 Section 7.7 Figure 8 and Figure 10 Section 5.0 Section 7.0

Matter to be Addressed	Where Addressed
<ul style="list-style-type: none"> - an assessment of the likely impacts at all stages of the development (which is commensurate with the level of impact), including any cumulative impacts, taking into consideration any relevant guidelines, policies, plans and statutes - a description of the measures that would be implemented to avoid, minimise and, if necessary, offset the potential impacts of the development. • a consolidated summary of all the proposed environment management and monitoring measures. 	Section 8.0
<p>Traffic</p> <p>A Traffic Impact Statement would be prepared which would include:</p> <ul style="list-style-type: none"> • assessment of the traffic volumes likely to be generated during construction and operations, including a description of haul routes • an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network • a description of the measures that would be implemented to mitigate transport impacts during construction and operation. 	Section 7.1
<p>Biodiversity</p> <p>Noting that the risk of impacts is considered to be low (i.e. development in small areas of existing power station infrastructure), the Modification Report would include an assessment of the likelihood of impacts to listed threatened species, populations, or ecological communities.</p>	Section 7.2
<p>Aboriginal Heritage</p> <p>Noting that the risk of impacts is considered to be low (i.e. development in small areas of existing power station infrastructure), the Modification Report would include an assessment of the likelihood of impacts to Aboriginal cultural and archaeological.</p>	Section 7.3
<p>Noise</p> <p>The Modification Report would include an assessment of potential noise impacts, including</p> <ul style="list-style-type: none"> • an assessment of the potential construction, operational and transport noise impacts in accordance with the EPA's NSW Road Noise Policy and the EPA's Noise Policy for Industry • description of measures that would be implemented to mitigate noise impacts during construction and operation of the proposed modification. 	Section 7.4
<p>Air Quality</p> <p>The Modification Report would include an assessment of potential air quality impacts, including:</p> <ul style="list-style-type: none"> • a qualitative assessment of the potential air quality, dust and odour impacts of the development • the details of reasonable and feasible mitigation measures to minimise dust emissions • details of proposed air quality management and monitoring measures. 	Section 7.5
<p>Soil and Water</p> <p>The Modification Report would include an assessment of potential impacts to soil and water, including</p>	Section 7.6

Matter to be Addressed	Where Addressed
<ul style="list-style-type: none"> an assessment of potential impacts to soil and water resources, topography, drainage lines, watercourses and coastal wetlands in the vicinity of the EPS details of water requirements during operation of the proposed modification a description of the proposed water management system, water monitoring program, erosion and sediment control measures and other proposed measures to mitigate impacts to soil and water resources. 	
<p>Other Issues</p> <p>The Modification Report would include discussion of other environmental issues, such as</p> <ul style="list-style-type: none"> hazards – including a description of the type and quantities of input materials required for the proposed modification and the storage, handling and processing procedures that would be implemented visual – including an assessment of the potential visual impacts of the proposed modification on the amenity of the surrounding area wastes – including a description of the wastes that may be generated as a result of the proposed modification and how these wastes would be disposed of. 	<p>Section 7.7</p>

6.2 Other Agencies

Consultation letters were issued to the following agencies to provide a description of the proposed modification and to obtain their input on key requirements to be addressed in this Modification Report:

- LMCC;
- EPA;
- Subsidence Advisory NSW; and
- Transport for New South Wales (TfNSW).

A summary of the outcomes of this agency consultation is provided in **Table 6** along with reference to the relevant section of the Modification Report which addresses that matter.

Table 6 Agency Consultation

Agency	Issues Raised	Response / Where Addressed
LMCC	<p>The following types of designated development, from schedule 3 of the EP&A Regulation, should be reviewed to ensure they do not trigger any additional matters for consideration:</p> <ul style="list-style-type: none"> • Section 7 Cement Works • Section 9 Chemical storage facilities • Section 14 Concrete works • Section 32 Waste management facilities or works. <p>If fly ash from the storage silos will be utilised by existing blend and recycling plants on site, does this cause existing approved fly ash recycling on site to be classified as designated development?</p>	<p>Project Approval 07_0084 has transitioned to an SSD consent. Section 4.10(2) of the EP&A Act states that designated development does not include SSD. Therefore, the proposed modification is not designated development.</p>
	<p>Development for the purposes of industry is prohibited within the SP2 (Infrastructure) Zone. It should be clearly demonstrated as part of the application that the proposed development is ancillary to the existing power station.</p>	Section 5.2.1
	<p>The development site has a maximum building height of 8.5m identified which will be exceeded by the proposed silos. This will require consideration as part of the proposal.</p>	Section 5.1.1
	<p>Particulate matter may be emitted from the processes during material transport and blending. The application should clearly outline the process for transport of material to silos and what systems will be in place. It would be expected that air quality controls for the facility would be documented in an Air Quality Management Plan (or equivalent document).</p>	Section 3.4.1 and 7.5
	<p>The development will likely result in increased vehicle movements to remove the product from site. As part of the application, the impact on the existing road network, required upgrades and methods for transport should be clearly demonstrated.</p>	Section 7.1
	<p>During further discussions between AECOM and Council on 16 July 2021, Council raised no issues with the proposed integration of Daracon operations into Origin's Project Approval 07_0084 and the surrender of DA/1937/2014 and were generally supportive of this approach. It was noted that this process must be clearly described in the modification report.</p>	<p>The integration of existing Daracon operations and surrender of DA/1937/2014 is discussed in Section 1.3.2, Section 2.3.2, and Section 3.0.</p>
EPA	No response received	N/A
Subsidence Advisory NSW	No response received	N/A

Agency	Issues Raised	Response / Where Addressed
TfNSW	<p>The traffic assessment to be prepared should include the following:</p> <ul style="list-style-type: none"> current traffic counts for all of the proposed truck traffic routes and intersection with and including Wangi Road in the vicinity of the site the anticipated additional truck movements and distribution of the trips generated by truck movements above the quoted 105 trucks per day (210 one-way ash truck movements) to achieve the 80% reuse or recycling goal traffic analysis of the relevant intersections using SIDRA (including electronic files). 	<p>The traffic assessment prepared for the proposed modification is presented in Section 7.1 and has been prepared in accordance with these recommendations.</p>

6.3 Community and Stakeholders

A community consultative committee (CCC) has been established as part of the ERAD expansion project (Project Approval 07_0084 MOD 1). The CCC comprises:

- an independent chairperson appointed by DPIE
- up to seven community and stakeholder representatives
- a LMCC representative
- up to three representatives from Origin.

While the CCC has been established specifically to consult with community and stakeholder representatives about the MOD 1 expansion of the ERAD, the CCC also discusses other aspects of the EPS operations. Origin has presented information to the CCC about the proposed ash recycling facilities (CCC meeting minutes 23 July 2020) and will continue to provide updates to the CCC on the progress of the proposed modification.

Clause 118 of the EP&A Regulation sets out the public exhibition requirements for applications to modify SSD consents under section 4.55(2) of the EP&A Act. Notice of the application must be published by the consent authority for the minimum period specified in Clause 10, Schedule 1 of the EP&A Act, which is 14 days. As such, this Modification Report would be placed on public exhibition for a minimum period of 14 days, which would provide community members and other stakeholders an opportunity to submit comments on the proposed modification. A response to submissions report would be prepared to provide a response to each of the public submissions.

7.0 Environmental Assessment

7.1 Traffic and Transport

7.1.1 Existing Environment

The site is accessed via an entry point on Construction Road (refer to **Figure 11**), an internal EPS road with a single lane in each direction which experiences light volumes of traffic. There is already an existing left turning lane to facilitate movements from the northbound side of the road into the site, while southbound traffic can also turn right into the site via the entry point. The speed limit is variable along Construction Road, with a posted 20km/hour speed limit near the entry point to the site while approximately 150 metres southbound, the speed limit is increased to 50km/hour.

Construction Road is accessed via Rocky Point Road which is a local road that generally provides one traffic lane in each direction. The posted speed limit of Rocky Point Road is 60km/hour with heavy vehicles access via northbound and southbound offramps from Wangi Road. It is estimated that heavy vehicles access Rocky Point Road in equal proportions from the north and south. Heavy vehicle access routes from the north and south are shown in **Figure 11 - Figure 13** and described in the sections below.

Access Route from The North

The majority of heavy vehicles that access the site from the north, travel from the M1 Pacific Motorway at Ryhope through Awaba via a 17 kilometre route via Cessnock Road, Wilton Road, Wangi Road and finally Rocky Point Road (refer to **Figure 11**). Cessnock Road is a State road running north of Wilton Road in an east-west direction. Cessnock Road provides one traffic lane in each direction, with some turning lanes at intersections, and the posted speed limit is 80km/h. Wilton road is a two-way road with one lane in each direction and a posted speed limit of 80km/h, with the exception of the short section through the township of Awaba which is 60km/h. Wangi Road is speed limited to 80 km/h and 90 km/h and generally comprises one lane in each direction however does feature one northbound and one southbound duel lane overtaking zone between Wilton Rd and the Rocky Point Road intersection.

A small portion of north bound heavy vehicles that are accessing ash markets in the Lake Macquarie and Newcastle regions would travel along Wangi Road through Toronto to a range of end-user destinations instead of accessing the M1 at Ryhope via Awaba or Toronto. For the purpose of the quantitative assessment to follow it is assumed all northbound heavy vehicles travel to the M1.

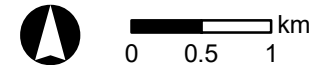
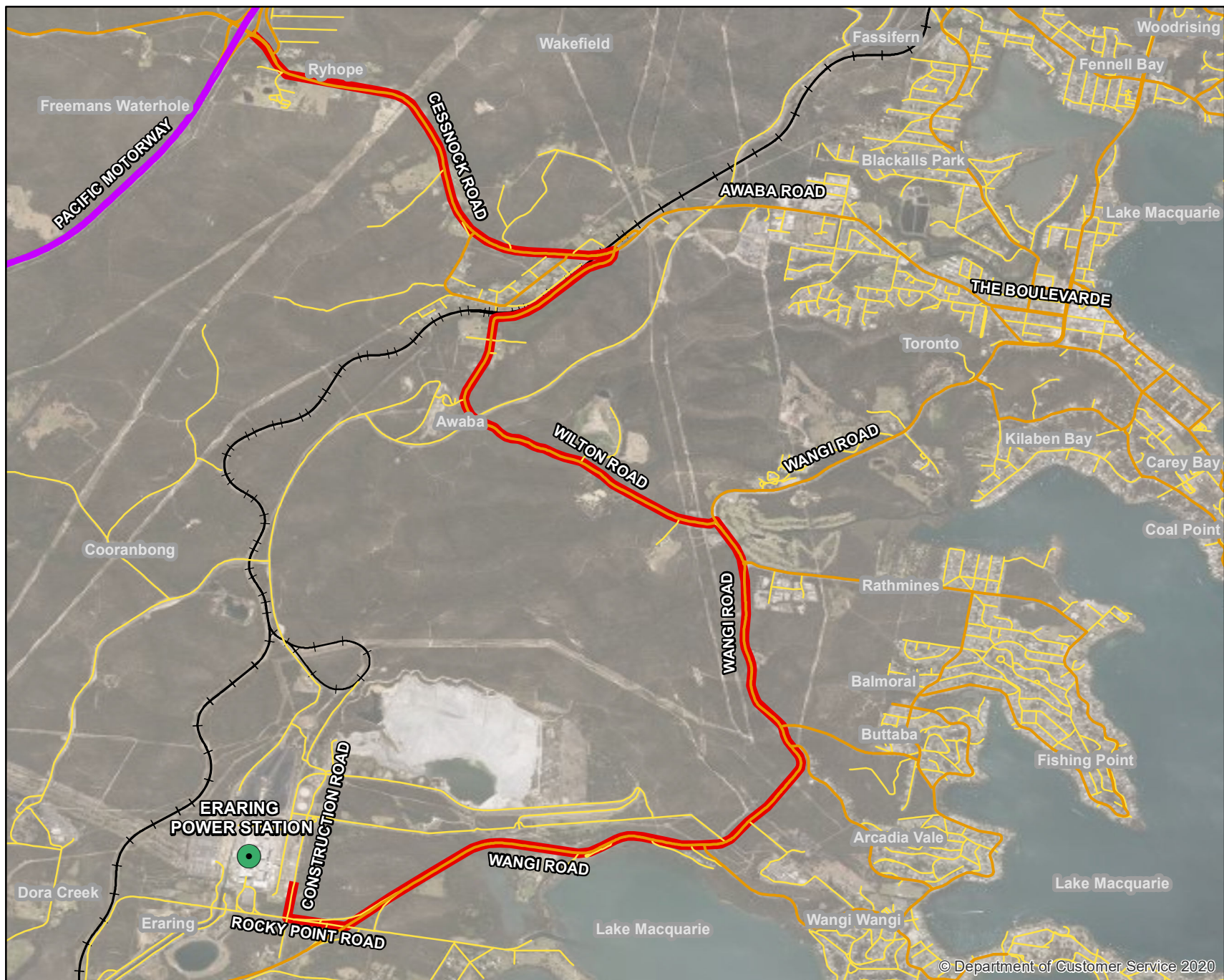
Alternative access route from the north (during bridge construction on Wilton Road)

Vehicles that access the site from the north however may be required to take an alternative route due to a planned project to replace the existing timber bridge along Wilton Road, Awaba. The project is currently in the design and tendering process, however LMCC has installed load limit (gross load limit 40 tonnes), traffic control and detour signage prior to the construction of the new bridge to protect the existing structure. Heavy vehicles generated by the site are expected to be semi-trailer silo trucks and B-doubles which would have a gross mass exceeding 40 tonnes when full. Therefore, prior and during the bridge construction, it is assumed that heavy vehicles with a full load that access the site from the north would alternatively travel from the M1 Pacific Motorway at Ryhope through Awaba and Toronto via a 21km kilometre route that accesses Awaba Road instead of Wilton Road (refer to **Figure 12**). The travel time of the vehicles would generally be increased by around three minutes as a result. Awaba Road runs in an east-west direction and provides one traffic lane in each direction, with some turning lanes at intersections. The exception is a short section (The Boulevard) through the township of Toronto which provides two traffic lanes in each direction. The posted speed limit is 60km/h, with the exception of a 40km/h school zone for Toronto High School and an 80km/h westbound, short section of the road connecting to Cessnock Road. It is further assumed that heavy vehicles would be able to resume using Wilton Road after the new bridge has been constructed.

Access route from the south

The route from the south commencing at the M1 interchange at Morisset is approximately 10 kilometres in length and travels through Morisset and Dora Creek to the site (refer to **Figure 13**). Heavy vehicles access the site from the M1 via Mandalong Road, which becomes Dora Street and in turn Macquarie Street before becoming Wangi Road. This route is a single lane in both directions with the exception of one northbound and one southbound dual lane overtaking zone on Wangi Road between the site and township of Dora Creek. The speed limit varies between 50km/h through Morisset to 90km/h along the Wangi Rd section of this route.

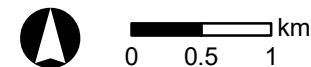
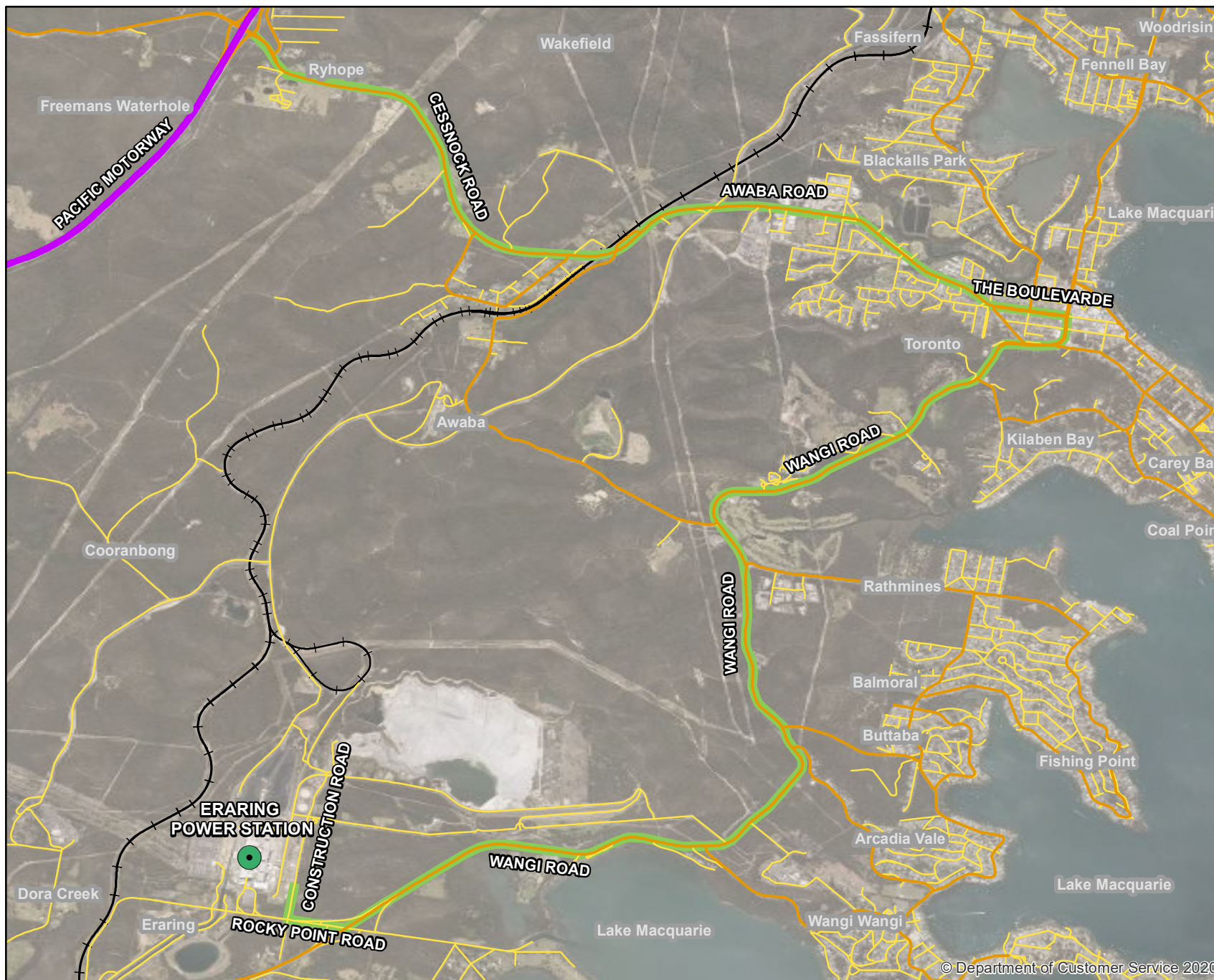
Vehicles travelling from the south travel through the township of Morisset. At the centre of Morisset is Morisset train station, and a four-way signalised intersection with Dora Street, Short Street and the train station access road. Dora Street and Short Street generally provide a single traffic lane in each direction at this location, with a speed limit of 50km/h.



Legend

- Eraring Power Station
- Access route
- Major Roads
- Main Roads
- Local Roads
- Railway

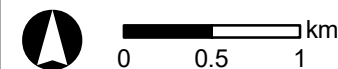
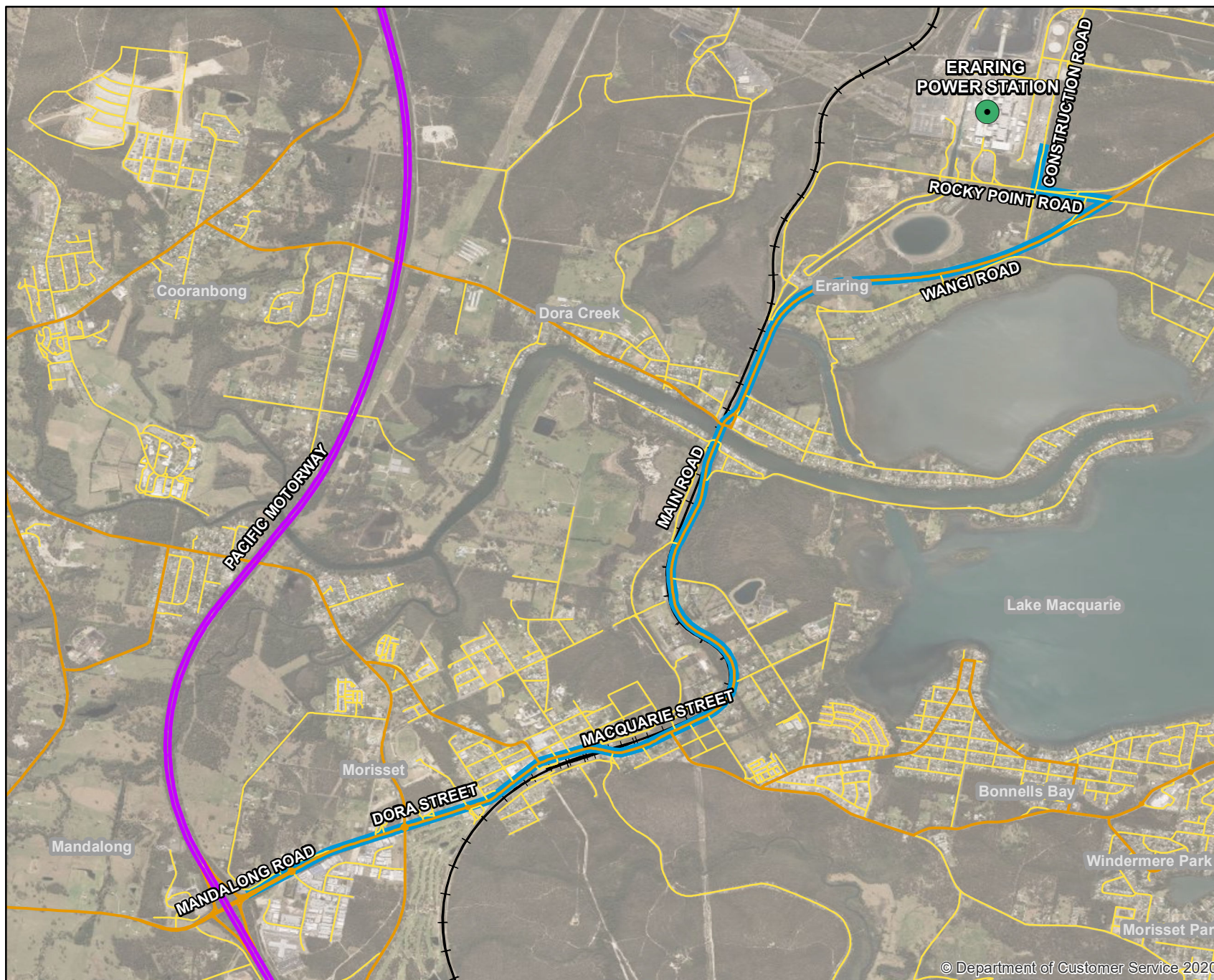
FIGURE 11 HEAVY VEHICLE ACCESS ROUTE FROM THE NORTH (POST BRIDGE CONSTRUCTION)



Legend

- Eraring Power Station
- Access route
- Major Roads
- Main Roads
- Local Roads
- Railway

FIGURE 12 ALTERNATE
HEAVY VEHICLE ACCESS
ROUTE FROM THE
NORTH (PRE BRIDGE
CONSTRUCTION)



Legend

- Eraring Power Station
- Acces route
- Major Roads
- Main Roads
- Local Roads
- Railway

FIGURE 13 HEAVY VEHICLE ACCESS ROUTE FROM THE SOUTH

7.1.2 Existing Fly Ash Traffic Generation

The site has historically recycled up to approximately 540,000 tonnes per annum of saleable fly ash product. This equates to approximately 188 daily truck movements (94 in, 94 out) accessing / egressing the site during peak market conditions. Recent observation indicates a traffic distribution of 50% of trucks accessing / egressing the site from the north via Wangi and Wilton Rd through Awaba or via Wangi and Awaba Road through Toronto, and 50% of trucks accessing / egressing the site from the south via Morisset.

7.1.3 Existing Network Performance

Traffic count information at the critical intersections surrounding the site was collected on Thursday 5 April 2018 between 0700 – 1000 and 1600 – 1900. The AM peak hour was identified as being between 07:30 – 08:30, and the PM peak hour being between 16:30 – 17:30. The traffic surveys are provided in **Appendix D**. To reflect existing traffic volumes due to the traffic count data being collected in 2018, the traffic volumes have been modified by applying an annual growth rate of 1.5 per cent. The basis of this calculation is that the inner Newcastle traffic study prepared by Newcastle City Council used this growth factor for future demand forecasting. This is likely to be an overestimate for traffic growth around the EPS site, therefore adoption of this annual growth rate provides a conservative assessment of existing network performance.

To create a baseline to assess any future traffic impacts because of the proposed modification, the existing network performance at the critical intersections has been assessed using the SIDRA Intersection 9 software package for the following intersections:

Network Model

- Rocky Point Road / Construction Road
- Rocky Point Road / Wangi Road (on-ramp northbound)
- Rocky Point Road / Wangi Road Slip Road
- Rocky Point Road / Wangi Road (off ramp northbound)
- Rocky Point Road / Wangi Road (on ramp southbound)
- Rocky Point Road / Wangi Road (off ramp southbound)

Standalone Intersection Model

- Dora Street / Short Street

The performance indicators for SIDRA applicable to the proposed modification are:

- Degree of Saturation (DoS) – measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS of less than 0.9
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection, which corresponds to the Level of Service (LoS) – a measure of the overall performance of the intersection (this is explained further in **Table 7**)
- Mean and 95th percentile back of queue length – length, in metres, of the 95th percentile queue length experienced along each lane of each leg of the modelled intersection.

In assessing the northern route through Awaba or Toronto it was deemed modelling was not required at any point along this route. Intersections at Cessnock Road / Wilton Road and Wilton Road / Wangi Road or Cessnock Road / Awaba Road and Awaba Road / Wangi Road are not considered to be high traffic intersections and it is anticipated that the minor increase in traffic as a result of this proposed modification will have negligible impact on the performance of these intersections.

Table 7 Performance Criteria for Intersections

Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	>70	Roundabouts require other control mode	At capacity, requires other control mode

Source: Guide to Traffic Generating Developments, RTA 2002

The existing network performance at the aforementioned intersections is presented in **Table 8**.

Table 8 Existing Intersection Performance In 2021 AM and PM Peak

Intersection	AM Peak Hour			PM Peak Hour		
	DoS	Delay (s)	LoS	DoS	Delay (s)	LoS
Rocky Point Road / Construction Road	0.037	7.8	A	0.163	9.8	A
Rocky Point Road / Wangi Road (on-ramp northbound)	0.019	1.8	A	0.200	3.4	A
Rocky Point Road / Wangi Road Slip Road	0.023	0.7	A	0.080	1.0	A
Rocky Point Road / Wangi Road (off ramp northbound)	0.031	5.7	A	0.080	6.0	A
Rocky Point Road / Wangi Road (on ramp southbound)	0.036	3.0	A	0.093	5.4	A
Rocky Point Road / Wangi Road (off ramp southbound)	0.038	5.9	A	0.23	5.8	A
Dora Street / Short Street	0.693	8.0	A	0.722	11.1	A

As can be seen from **Table 8**, all of the key intersections surrounding the site are currently performing at LoS A in both the AM and PM peak hours. Based on the performance criteria for intersections presented in **Table 7**, the network is performing well with good operation at all intersections modelled.

7.1.4 Impact Assessment

Construction

Construction of the proposed modification would result in a moderate and temporary increase of approximately 20 light vehicles and 10 heavy vehicles per day accessing the site to facilitate construction works and to deliver construction materials. It is however anticipated that the future design year assessment where the site is operating at full capacity will generate a greater number of vehicle trips than the likely combination of existing and construction traffic volumes. Therefore, the future design year assessment has been undertaken to assess the worst-case scenario, and the construction traffic impacts on network performance have not been modelled. Nevertheless, daily traffic volume increases of this level would result in very low peak hour traffic volumes generated and would have a negligible impact on network performance across whichever route the construction vehicles take to and from the site.

An upgrade of internal roads may also be required to facilitate the increased truck movements associated with the construction and operation of the proposed modification. Impacts due to internal road upgrades are expected to be minor and temporary with possibilities to schedule workaround once the construction sequence has been established.

Operation

The operation of the proposed modification is anticipated to result in an increase in heavy vehicle trips entering and exiting the site to pick up fly ash for distribution to building and construction industries. Heavy vehicles will access the site from the intersection of Construction Road / Rocky Point Road coming via north and south off ramps of Wangi Road, and exit the site via intersection of Construction Road / Rocky Point Road using the north and south on ramps to Wangi Road to eventually access Pacific Highway.

Ash recycling rates are market dependant and as such heavy vehicles accessing EPS for ash transport fluctuate. The proposed new ash recycling facilities may come online at different times but for the purpose of this assessment a single stage uplift to the recycling capacity of the facilities is proposed, with the current operations of approximately 540,000 tonnes per annum of saleable fly ash product, scaling up to an estimated capacity of 1,400,000 tonnes after the construction completion in 2022. To prepare a peak hour traffic impact assessment, the following assumptions have been made which are consistent with the current operations:

- 60% of all truck movements will occur during a five-hour period in the morning. The peak hour truck movements will be calculated by dividing 60% of total truck movements by five
- peak hour truck movements will be distributed using a ratio of 50% in, 50% out
- 50% of peak hour truck movements will access / egress the site from the north, and 50% of peak hour truck movements will access / egress the site from the south
- it is anticipated that in the order of 10% of trucks leaving the site will stay in the local Lake Macquarie / Newcastle area. While these trucks may not travel the entire distance to the M1 Pacific Motorway, it is likely they will travel a significant portion of either the presented north or south routes from the site. A conservative approach has been taken for this assessment in assuming this 10% of trucks will travel the entire distance to / from the Pacific Motorway (5% via north route and 5% via south route resulting in a 50/50 split north/south)

Table 9 presents the forecast peak hour trip generation and distribution for the proposed modification.

Table 9 Trip Generation Forecast

Assumption	Existing operation (peak)		Proposed with modified operation (peak)		Net change	
Daily truck movements	188		411		+223	
60% of daily truck movements occur in a five-hour period in the morning	113		247		+134	
Peak hour truck movements	23		49		+26	
Distribution	In	Out	In	Out	In	Out
Peak hour truck movements accessing / egressing the site	12	12	25	25	+ 13	+ 13
Peak hour truck movements accessing / egressing the site via the north	6	6	13*	13	+ 7	+ 7
Peak hour truck movements accessing / egressing the site via the south	6	6	13*	13	+ 7	+ 7

* values rounded up for assessment purposes

Following the completion of the base year modelling, the performance of the opening year scenario for each intersection for the 2022 year with the proposed modification was modelled by applying the growth factor of 1.5 per cent and the trips presented in **Table 9**.

Modelling was undertaken for the AM peak hour only, considering that the majority of the trips will be generated during the AM peak, and because the existing conditions showed excellent network performance in the PM peak. Therefore, the AM peak hour assessment represents the worst-case scenario. The forecast network performance in 2022 with the proposed modification is presented in **Table 10**.

Table 10 Forecast opening year 2022 intersection performance

Intersection	AM Peak Hour (without proposed modification)			AM Peak Hour (with proposed modification)		
	DoS	Delay (s)	LoS	DoS	Delay (s)	LoS
Rocky Point Road / Construction Road	0.037	7.8	A	0.055	10.1	A
Rocky Point Road / Wangi Road (on-ramp northbound)	0.019	1.8	A	0.026	3.2	A
Rocky Point Road / Wangi Road Slip Road	0.023	0.7	A	0.029	0.6	A
Rocky Point Road / Wangi Road (off ramp northbound)	0.031	5.7	A	0.037	5.9	A
Rocky Point Road / Wangi Road (on ramp southbound)	0.036	3	A	0.043	4.7	A
Rocky Point Road / Wangi Road (off ramp southbound)	0.038	5.9	A	0.048	6.0	A
Dora Street / Short Street	0.693	8	A	0.701	7.8	A

As the final case, the performance of the desired design option for each intersection for the 2032 design year was modelled. This was undertaken for both the AM and PM peak hours. Future background traffic growth calculations were undertaken and have been set at 1.5 per cent per year and calculated using the compound growth method. The forecast network performance in 2032 is presented in **Table 11**.

Table 11 Forecast design year 2032 intersection performance

Intersection	AM Peak Hour (without proposed modification)			AM Peak Hour (with proposed modification)		
	DoS	Delay (s)	LoS	DoS	Delay (s)	LoS
Rocky Point Road / Construction Road	0.037	7.8	A	0.060	9.9	A
Rocky Point Road / Wangi Road (on-ramp northbound)	0.019	1.8	A	0.029	3.2	A
Rocky Point Road / Wangi Road Slip Road	0.023	0.7	A	0.032	0.6	A
Rocky Point Road / Wangi Road (off ramp northbound)	0.031	5.7	A	0.042	5.9	A
Rocky Point Road / Wangi Road (on ramp southbound)	0.036	3	A	0.049	4.6	A
Rocky Point Road / Wangi Road (off ramp southbound)	0.038	5.9	A	0.054	6.0	A
Dora Street / Short Street	0.693	8	A	0.742	8.6	A

The proposed opening and design year network performance is still operating at LoS A across all intersections, signifying that network operations are expected to perform with minimal delay with good conditions. It is therefore concluded that the forecast impact on the surrounding road network based on a worst-case assessment would be insignificant, and network performance would continue to operate under good conditions.

Cumulative Impact

A separate DA modification has been submitted for Northern Coal Logistics Project (refer to **Section 7.7** 'Cumulative Impact'). If this project, which is in the vicinity of EPS, is approved, approximately 104 additional truck trips per day or 208 truck movements per day would be added to the surrounding road network, specifically to Wangi Road and Wilton Road. However, given that all intersections of the study area are performing in LoS A in the design year as shown in **Table 13**, this additional truck volume is anticipated to have a minimal impact to the intersection performance. Therefore, it is concluded that cumulative impacts of Northern Coal Logistics Project would be minimal and network performance would continue to operate under good conditions if both projects operate concurrently.

Origin is also seeking regulatory and environmental planning approval for the construction and operation of a grid-scale Battery Energy Storage System (BESS) (refer to **Section 7.7** 'Cumulative Impact'). Traffic generated by the construction of the BESS was confirmed in consultation with Origin in June 2021. Construction of the BESS project would include an additional 110 workers travelling to the site, which would generate 110 additional inbound movements and 110 additional outbound movements per day. These light vehicle movements are expected to occur during the hours prior to shift commencement (6:00 am to 7:00 am) and after shift end (6:00 pm to 7:00 pm). Also, the construction of the BESS project is expected to generate an additional 60 two-way heavy vehicle movements per day. The majority of heavy vehicle movements are expected to occur between 6:00 am to 7:00 pm and would be distributed evenly within this time period.

During construction of the BESS project, all light vehicles would access the EPS site via Rocky Point Road and Wangi Road. It is anticipated that the distribution of this traffic would be similar to the existing traffic patterns in the area, with approximately 50% of these vehicles accessing the site from the north and 50% from the south. Principal materials and components required to construct the BESS project are expected to originate from Port Botany in Sydney. As such, heavy vehicles would access the EPS site from the south. Oversized components are expected to be transported to the EPS site from the Port of Newcastle. Oversized vehicle movements would be conducted outside standard hours.

Operation of the BESS Project would occur 24 hours per day, 365 days per year. Traffic generation during operation of the BESS project is expected to be minimal and would be limited to a small number of traffic movements associated with specialist maintenance staff, functional tests and facility upkeep activities.

Jacobs (2021) has undertaken a quantitative assessment of traffic impacts for the BESS project, including cumulative impacts of the proposed increase in trucks associated with the ash recycling uplift (i.e. the proposed modification). Under the cumulative scenario (including construction of the BESS project and the proposed modification), all modelled intersections within the study area would continue to perform at LoS A. Jacobs conclude *"the potential impacts on road network performance, parking, access, public transport, pedestrians and cyclists, safety and road condition during construction, cumulative construction and operation of the Project are expected to be minimal."*

7.1.5 Management Measures

The following measures would be implemented during construction and operation of the proposed modification to minimise potential traffic impacts:

- all truck drivers would be provided with route maps to ensure that they access the site from the proposed route (being via the Pacific Highway (M1), Mandalong Road and through Morisset onto Wangi Road and via Pacific Highway (M1), Cessnock Road, Awaba Road or Wilton Road onto Wangi Road)
- yearly saleable fly ash product generated by the site would not exceed what is stated in this Modification Report. Where possible, maximum truck sizes would be used to minimise trips generated by the site
- all additional car and truck parking would be managed wholly within the site
- if the construction stages of Origin projects overlap, potential cumulative traffic impacts would be managed through implementation of a CEMP and careful planning of works.

7.2 Biodiversity

7.2.1 Existing Environment

A background review of existing information was completed to identify the existing ecological environment surrounding the proposed modification. The background review included analysis of existing biodiversity reports previously prepared for EPS and conducting a range of database searches. The following database searches were carried out in May 2021:

- BioNet Atlas of NSW Wildlife (BioNet)
- EPBC Act Protected Matters Search Tool (discussed in **Section 5.3**)
- *State Environmental Planning Policy (Coastal Management) 2018* (Coastal Management SEPP).

Local Ecological Context

The locality is occupied by rural landscapes and residential areas associated with Dora Creek, Eraring, Myuna Bay and Rathmines, with substantial areas of intact vegetation within the buffer land associated with EPS. Key land uses around the proposed modification include rural and residential areas, infrastructure, transport routes and open space. The M1 Pacific Motorway and Main Northern Railway are located to the west of EPS and contribute to fragmentation and barriers to fauna movement.

Lake Macquarie's freshwater or brackish wetlands include areas of coastal lagoons, creek lines and alluvial flats. These habitats can provide important spawning and nursery areas for many species of freshwater fish, provide habitat for a high number of bird and amphibian species and absorb and recycle nutrients through the ecosystem.

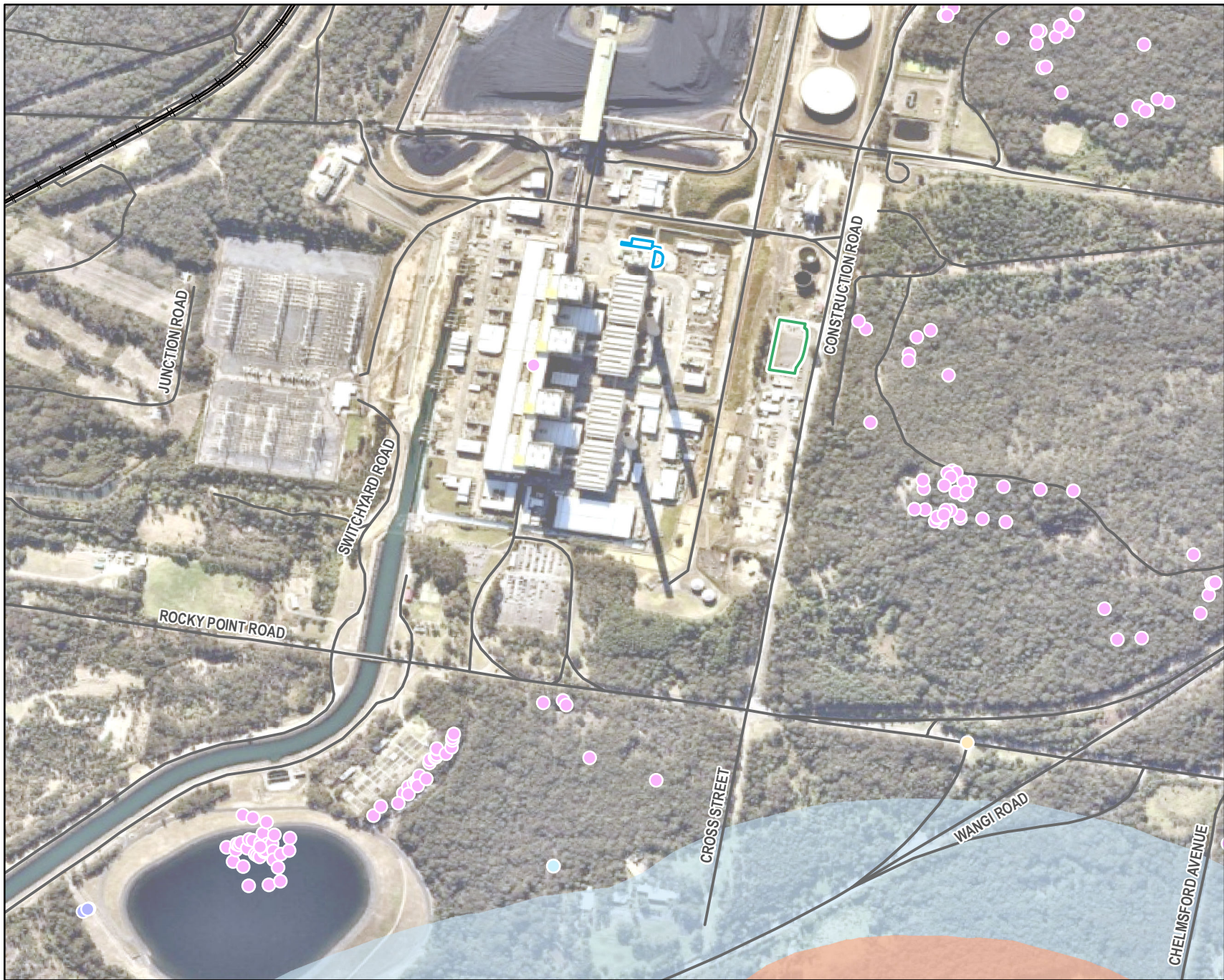
Both modification areas are located on previously disturbed, hardstand areas of the EPS. Modification area 1 is surrounded by existing infrastructure associated with the EPS. Modification area 2 is located within an existing car park with small strips of maintained grass and planted trees.

Desktop Survey

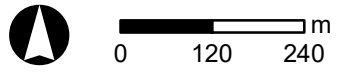
The BioNet search identified 12 threatened flora species and 35 threatened fauna species that have previously been recorded within a 10 km radius of the proposed modification. No threatened species records were identified within the modification areas. The closest recording was for Black-eyed Susan (*Tetradlea juncea*) located about 70 m east of modification area 2 on the opposite side of Construction Road. Black-eyed Susan is listed as vulnerable under both the *Biodiversity Conservation Act 2016* (BC Act) and EPBC Act.

The proposed modification, at its closest point, is located about 800 m north of an area mapped as coastal environment under the Coastal Management SEPP.

The results of the desktop assessment are shown on **Figure 14**.



AECOM



Legend

- Modification area 1
- Modification area 2
- Coastal Use Area
- Coastal Environmental Area
- Black-eyed Susan
- Bynoe's Wattle
- Grey-headed Flying-fox
- Swift Parrot
- Railway
- Roads

FIGURE 14 BIODIVERSITY ASSESSMENT DESKTOP OVERVIEW

7.2.2 Potential Impacts

Construction

While some isolated strips of planted grass would be removed at modification area 2, no native vegetation clearing is required for the construction of the proposed modification, and therefore there would be no direct impacts to vegetation and fauna habitat.

Given the existing environment immediately surrounding the proposed modification is used for industrial purposes, it is considered unlikely for fauna to regularly use or occupy the modification areas and therefore unlikely to be directly impacted by construction activities or indirectly impacted from construction noise and dust. Construction work would be carried out between 7am to 6pm, and therefore construction lighting is not expected to impact on fauna.

There is potential for weed species to be inadvertently brought onto the site during construction via construction vehicles and machinery accessing the site. As the proposed modification areas are existing hardstand, potential impacts associated with weed invasion or spread would be minor.

The coastal environmental area is located more than 800m from the modification areas, and therefore the proposed modification is not expected to impact this area of the coastal zone.

The proposed modification is expected to have negligible impact to biodiversity during construction.

Operation

The proposed modification is not expected to result in additional impacts on the biodiversity values of surrounding lands. No substantial impacts are expected to occur in relation to connectivity, corridors, or habitat fragmentation.

Increased noise and light have the potential to adversely impact native species, by disturbing the roosting and foraging behaviour of fauna species or reducing the occupancy of areas of suitable habitat. There may be a minor increase in the noise emissions associated with proposed new infrastructure. While the transport of product materials would be undertaken during daytime hours only, some additional lighting may be required within modification area 2 for work health and safety purposes. Lighting would be downward facing and designed to minimise light spill from the area.

Given the offset distances to sensitive receivers, the proposed modification is not expected to result in substantial change to noise or light impacts compared to existing operations and is not likely to significantly impact threatened species, populations and communities.

7.2.3 Management Measures

The following management measures would be implemented as part of the Construction Environmental Management Plan (CEMP) during construction of the proposed modification:

- The CEMP would identify mitigation measures and procedures including:
 - Ground disturbance and soil handling activities would be undertaken in accordance with existing procedures outlined in the Biodiversity and Land Management Plan (AECOM, 2020). The procedures would incorporate:
 - soil handling protocols and stockpiling procedures
 - rehabilitation of disturbance areas
 - weed management activities.
- Exterior lighting would be designed and constructed in accordance with *Australian Standard 4282 – Control of Obtrusive Effects and Outdoor Lighting*.

7.3 Heritage

7.3.1 Existing Environment

A background review of existing information was completed to identify Aboriginal and non-Aboriginal heritage items in the vicinity of the proposed modification. The desktop assessment included review of previous heritage investigations undertaken at EPS and searches of relevant heritage databases. The following database searches were carried out in May 2021:

- Aboriginal Heritage Information Management System (AHIMS)
- National Native Title Register
- Register of Native Title Claims
- State Heritage Register.

Aboriginal Heritage

The database searches identified the following information:

AHIMS database

The AHIMS search carried out for the proposed modification included a search area centred on the site including a 200 m buffer (refer **Appendix E**). The search did not identify any previously recorded Aboriginal sites or places within the search area.

Native title

The National Native Title Register search identified five determinations for the Lake Macquarie City Council LGA. The listings identify that Native title does not exist in all five determinations.

The Register of Native Title Claims did not identify any applications claims for the Lake Macquarie City Council LGA.

Previous Aboriginal heritage investigations

Existing AHIMS data and previous Aboriginal archaeological investigations indicate that the Lake Macquarie region is relatively understudied in terms of Aboriginal archaeology. Of those that have been undertaken, collectively most of the sites identified distributed around Lake Macquarie are located on the eastern side to allow the exploitation of the lake and ocean. Consequently, Aboriginal sites in the western areas of Lake Macquarie are relatively scarce.

Previous archaeological survey at the EPS site (HLA-Envirosciences, 2006) did not identify evidence of surface Aboriginal sites and assessed the potential for subsurface archaeological sites to be low on the basis of a lack of a developed or *in situ* soil profile within the surveyed area. The previous investigations indicated that Aboriginal occupation typically focused within two areas - along the Lake Macquarie foreshore (comprising artefact scatters and shell middens) and in the foot slopes and mountains of the Dividing Range to the west of Lake Macquarie.

Historic Heritage

The entire EPS site is listed as an item of local heritage significance under the LEP 2014 (mapping shown in **Appendix E**).

As described in the statement of significance for the heritage item, the EPS “*represents the "State of the Art" in its technology and is one of the biggest power stations in the State. It is undoubtedly highly significant, although considering its youth, it is arguable whether Eraring yet qualifies as a heritage item*” (Heritage NSW, 2008). The significance of EPS is considered to relate primarily to electricity generation infrastructure and technology associated with the power station building.

No other cultural heritage items were found within the vicinity of the Project site or the EPS.

7.3.2 Potential Impacts

Construction

Aboriginal Heritage

Potential impacts of the proposed modification on Aboriginal heritage include damage to Aboriginal sites as a result of construction works, in particular earthworks required for establishment of infrastructure. However, minimal ground disturbance would be required, and the proposed modification is unlikely to impact on Aboriginal heritage based on the following:

- no previously recorded Aboriginal sites or places have been identified within or near the proposed modification
- both modification areas have been subject to previous disturbance and consist mostly of paved hardstand
- only minimal ground disturbance would be required for construction of additional ash recycling infrastructure and these would be located on previously disturbed areas of the EPS site.

Historic Heritage

The proposed modification would not significantly impact key electricity generation infrastructure or technology at EPS. Additional ash recycling facilities would be constructed adjacent to existing structures at the EPS and some connections may be required to integrate the operations. However, these alterations would be minor and would not significantly impact the heritage significance of the heritage item.

Operation

Operation of the proposed modification is not expected to result in impacts to Aboriginal heritage or non-Aboriginal heritage. Infrastructure to be installed would be consistent with the visual appearance and current use of existing infrastructure at the EPS. The proposed modification is therefore not expected to impact the heritage item or the heritage significance of the EPS and would be consistent the approved project.

7.3.3 Management Measures

The following management measures would be implemented as part of the CEMP during construction of the proposed modification:

- workers and contractors involved in construction of the proposed modification would be made aware of the heritage significance of the EPS
- in the unlikely event that Aboriginal objects, including possible human skeletal remains, are identified at any point during construction of the proposed modification, the following procedure would be followed:

Aboriginal Sites

- immediately cease all works in the area to prevent further impacts to the site
- engage a suitably qualified heritage consultant to determine the nature, extent and significance of the find and provide appropriate management advice. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts
- prepare and submit an AHIMS site card for the site.

Human Skeletal

- all work in the vicinity of the remains should cease immediately
- the location should be cordoned off and the NSW Police notified
- if the Police suspect the remains are Aboriginal, they will contact the DPIE and arrange for a forensic anthropologist or archaeological expert to inspect the site.

Subsequent management actions will be dependent on the findings of the inspection undertaken, including:

- if the remains are identified as modern and human, the area will become a crime scene under the jurisdiction of the NSW Police
- if the remains are identified as pre-contact or historic Aboriginal, DPIE and all Registered Aboriginal Parties (RAPs) are to be formally notified in writing. Where impacts to exposed Aboriginal skeletal remains cannot be avoided an appropriate management mitigation strategy will be developed in consultation with DPIE and RAPs
- if the remains are identified as historic non-Aboriginal, the site is to be secured and the Department of Premier and Cabinet contacted
- if the remains are identified as non-human, work can recommence immediately.

7.4 Noise

7.4.1 Existing Environment

A desktop noise assessment was carried out to identify potential construction, operational and transport noise impact. The assessment has considered relevant guidelines such as the EPA's NSW Road Noise Policy (EPA, 2017) and the Noise Policy for Industry (DECCW, 2011). Given the context of the site and the distance to sensitive receivers, a qualitative assessment was undertaken for the proposed modification which involved:

- identifying nearby sensitive receivers and background noise environment
- assessing potential impacts to sensitive receivers
- recommending suitable noise mitigation measures to be implemented.

The EPS site is largely isolated from other receivers through the buffer of woodland on most of the perimeters. The nearest residential receivers are located over one kilometre south and south east of the EPS site on Biddulph Street, Wharf Street, Payten Street, Point Piper Road, Macleay Street, Chelmsford Avenue, Border Street and South Street, Eraring (refer to **Figure 15**). The Myuna Bay Sport and Recreation Centre is located about 2 km to the east and is currently closed.

Residential receivers are separated from the EPS site by Wangi Road and Rocky Point Road. These roads carry high traffic volumes including heavy vehicle traffic and therefore generate a substantial level of road traffic noise. The existing noise environment at the southern periphery of the EPS site is dominated by road traffic noise from Wangi Road (AECOM, 2018a).

Condition 2.3 of Project Approval 07_0084 sets out the conditions related to construction noise and requires Origin to undertake construction activities that would generate an audible noise at residential premises only during the following hours:

- 7.00 am to 6.00 pm, Mondays to Fridays, inclusive
- 8.00 am to 1.00 pm on Saturdays
- at no time on Sundays and public holidays.

Condition 2.4 of Project Approval 07_0084 notes that the construction hours may be varied with prior written approval of the Planning Secretary. There are no operational noise limits specified in Project Approval 07_0084 or EPL 1429. Ash recycling activities are masked by the greater noise contribution of the power station and are at a significant distance from the closest sensitive noise receiver (over one kilometre).



AECOM



0 210 420 m

Legend

- Modification area 1
- Modification area 2
- Nearby residential streets
- Streets separating EPS
- Railway
- Roads

FIGURE 15 NEARBY RESIDENTIAL STREETS

7.4.2 Potential Impacts

Construction

Additional noise would be generated during construction of the proposed modification from the movement of construction vehicles and plant and machinery. These potential noise impacts would be temporary and not anticipated to impact upon residential receivers due to the noise screening from existing buffer lands and the distance to the nearest residential receivers (approximately 1km).

Construction works potentially audible at residential premises would be undertaken during the standard construction hours specified in Condition 2.3 of Project Approval 07-0084 (refer to **Section 7.4.1**). All deliveries to the construction site would be undertaken during these standard working hours. Standard construction noise management measures would be implemented (refer to **Section 7.4.3**).

Operation

Operations would be undertaken 24 hours a day, seven days a week as required. Additional noise sources as a result of the proposed modification would include additional pumps for the conveying of ash material and loading/unloading of trucks. Noise generated at the EPS site is dominated by the operation of the power station and the additional noise sources for the proposed modification would be masked by the existing operations. Operation of the additional infrastructure to be installed as part of the proposed modification is not expected to significantly alter noise emissions compared to those already occurring as a result of existing EPS operations. Given the distance to nearest sensitive receivers (over one kilometre from the EPS site) and the minor nature of additional noise sources, potential noise impacts from additional infrastructure are expected to be negligible.

Operation of the proposed modification would result in additional truck movements for the transport of ash product and may therefore increase potential road traffic noise impacts. **Section 7.1.4** presents the forecast traffic vehicle movements, including an increase of 223 daily truck movements. The forecast peak hour truck movements include an additional 13 vehicles accessing and egressing the site respectively, and these additional vehicles are assumed to be distributed evenly between the north and south haulage routes (i.e. seven from the north and seven from the south). Given the context of existing traffic along the haulage routes (approximately 7,000 vehicles per day along Wangi Road), the additional truck movements are not expected to have a significant noise impact at the nearest sensitive receivers.

Potential noise impacts are therefore expected to remain substantially the same as the approved project during operation of the proposed modification. Existing noise management measures would continue to be implemented during operation of the proposed modification.

7.4.3 Management Measures

The following measures would be implemented during construction and operation of the proposed modification to minimise potential noise impacts:

- the CEMP would consider potential sources of noise and would include mitigation measures to be implemented during construction to minimise potential noise impacts including:
 - plant and machinery would be regularly maintained to ensure it is in good working condition
 - noise generating machinery would be directed away from sensitive noise receivers
 - use of movement alarms on vehicles and mobile plant would be minimised where possible.
- construction works potentially audible at residential premises would only be undertaken during hours specified in Condition 2.3 to Project Approval 07_0084:
 - 7am to 6pm Monday to Friday
 - 8am to 1pm Saturdays
 - At no time on Sundays and Public Holidays.

All deliveries to the construction site would be undertaken during these standard working hours.

- noise complaints would be managed in accordance with the Environmental Management Plan for EPS and recorded in the Incident Management System
- in the event of a noise complaint, an investigation would be undertaken. Where validated noise complaints are identified, mitigation measures would be implemented and follow up monitoring conducted.

7.5 Air Quality

7.5.1 Existing Environment

EPS is surrounded predominantly by undeveloped bushland, which serves as a buffer zone between the EPS and surrounding residential areas. There are a number of coal mines located in the vicinity of EPS, including the Myuna Colliery to the east, Mandalong Mine to the west and Newstan Colliery to the north.

The nearest residential suburbs to EPS include Eraring (approximately 1 km south), Dora Creek (approximately 4 km southwest), Wangi Wangi, Arcadia Vale and Buttaba (approximately 3 km east), Awaba (approximately 3 km north), and Toronto (approximately 4.5 km northeast).

The EPS currently operates in accordance with the site's EPL 1429. Continuous ambient air quality monitoring is currently undertaken at two locations, including south of the EPS site at Dora Creek and east of the EPS site in Marks Point. Continuous monitoring is undertaken for sulfur dioxide (SO₂), nitrogen oxides (NO, NO_x and NO₂) as well as various meteorological parameters. Depositional dust is also monitored at four locations in the vicinity of EPS. Stack emission monitoring is conducted at discharge points on the four boiler units at EPS and on the Emergency Turbine Generator. The results of the air quality monitoring are reported to the EPA as part of the Annual Return submitted in accordance with the conditions of the EPL 1429.

Origin implements air quality management measures at EPS in accordance with the following documents:

- Eraring Power Station Environmental Management Plan (Origin, 2019)
- Eraring Power Station Coal Combustion Management Facility: Air Quality Management Plan DRAFT (Jacobs, 2020)
- Ash Dam Operations Safety and Dust Management Plan (Origin, 2020a).

7.5.2 Potential Impacts

Construction

Potential air quality impacts during construction of the proposed modification would relate primarily to generation of dust as a result of demolition of existing pavement, civil works for construction of foundations and stockpiling of construction and/or waste materials. Emissions may also be generated as a result of diesel-powered plant and equipment and the transport of construction and/or waste materials to and from site.

Air quality impacts to residential receivers would be minimal given the distance from the proposed modification to the closest residential receiver (approximately 1 km). Potential emissions generated during construction would be minor and temporary and would be managed in accordance with standard mitigation measures.

Operation

The proposed modification would operate as an enclosed system to keep the product dry and to retain any airborne product within the system (i.e. no direct air emissions during transfers or truck loading operations). Fly ash would either be delivered in sealed vehicles equipped for pneumatic transfer from the vehicle to the storage silo or transferred directly to the silo from the EPS generating units via pneumatic pipeline. Storage silos would be equipped with a high-level sensor alarm and automatic delivery shut down switch to prevent overfilling.

There would be no new emission point sources introduced as part of the proposed modification. Air filtration systems are already fitted to the existing Daracon silos.

The proposed new storage silos would also be fitted with air filtration (i.e. custom designed dust collectors) which captures dust and returns it back into the silo, preventing airborne dispersion of particulates. These air filtration systems typically achieve emission control efficiencies in the range of 99.5 – 99.9%.

The proposed modification would operate in accordance with the *Protection of the Environment Operations (Clean Air) Regulation 2010* (Clean Air Regulation). Exhaust air from the air filtration systems would be consistent with the standard of concentration for electricity generation - materials handling activities (Schedule 3 of the Clean Air Regulation), with particulate emission concentrations less than 20 mg/m³.

Therefore, operation of the proposed modification is not expected to substantially change the air emissions at EPS compared to the approved project, given the sealed nature of the fly ash handling and storage system and the proposed air filtration systems that would be implemented on new and existing infrastructure.

Indirect air quality impacts from the proposed modification may include vehicle exhaust emissions from the increase in truck movements and staff vehicles however these impacts to air quality are expected to be minor.

In the event of an accidental spill, ash material would be recovered via a dry collection process and returned to the operational process for storage or disposal to the ERAD. Potential air quality impacts would be managed in accordance with existing air quality management practices.

7.5.3 Management Measures

The following management measures would be implemented during construction and operation of the proposed modification:

- Dust minimisation measures would be implemented where required for exposed stockpiles and unsealed construction areas, such as water spraying during windy weather and/or covering when stockpiling is required for long periods
- Emission controls used on vehicles and construction equipment would comply with standards listed in Schedule 4 of the *Protection of the Environment Operations (Clean Air) Regulation 2010*
- Vehicle loads involving loose materials (e.g. during construction) would be covered when travelling offsite
- air filtration systems would be installed, operated and maintained as recommended in the relevant user manual and routine inspections of equipment would be carried out.

7.6 Soil and Water

7.6.1 Existing Environment

A qualitative assessment was carried out to identify potential impacts to soil and water resources as a result of the proposed modification. The following sections describe the soil and water environments in the vicinity of the EPS.

Soil

Modification area 1 is located at about 17 m AHD and modification area 2 is located at about 32 m AHD.

The Gosford-Lake Macquarie 1:100,000 Geological Sheet (9131 and part sheet 9231), Geological Survey of New South Wales, identifies the subsurface geology at the Site to be predominately Munmorah Conglomerates, part of the Narrabeen Group, comprising conglomerates, pebbly sandstones and grey to green shales, derived from the Mesozoic, early Triassic period. The Gosford-Lake Macquarie Geological Sheet recognises a potential unidentified fault running through the centre of the EPS Site.

The geology identified during previous investigation works (ERM, 2015 and AECOM, 2018b) at the EPS Site was predominately sandy clays with conglomerate and weathered sandstone bedrock.

Portions of the EPS land are categorised as class 5 acid sulphate soil land, however both modification areas do not have an acid sulphate soil categorisation (refer to **Figure 16**).

A search of the NSW EPA Contaminated Lands Register was undertaken on the 11/06/2021. No records of contaminated lands were identified within the boundaries of the EPS.

However, given the historic use of the EPS site as a coal fired power station there is potential for the presence of contaminated soil.

Surface Water

Localised topography is varied across the EPS Site with the eastern portion of the EPS Site sloping down towards Lake Macquarie and the western portion of the Site sloping down towards Muddy Lake. Crooked Creek is located within the boundaries of the EPS and other nearby waterbodies include Dora Creek, Myuna Bay and Bonnells Bay. Surface water across the EPS Site is generally controlled by drains, creeks and dams. Surface water monitoring activities are currently undertaken in accordance with the requirements of EPL 1429.

The ERAD exists within the EPS boundaries to the north east of the EPS. Ash is pumped into the Ash dam in a dense phase mixture of 70% ash and 30% water. The ash dam is at times partially submerged, particularly towards the southern extent of the Ash dam. The Eraring attenuating cooling water pond is located to the immediate south of the EPS. Both the Ash dam and the attenuating cooling water pond are prescribed dams under the *Dams Safety Act 1978*.

An open inlet canal pumps water from Bonnells Bay at the southern extent of the EPS border up to EPS to be used as cooling water, prior to being discharged to the outlet canal. The water leaving the outlet canal is released through discharge point EPA 21 into Myuna Bay. There are small water basins to the north and north east of the EPS. Stormwater at the EPS is managed through the onsite drainage system, as outlined below and in the EPS Water Management Plan (WMP) (Stantec, 2018):

- stormwater captured within Canal Road, Stores Road and Stacks Road is released through the outlet canal
- stormwater captured from the north and north east of the Ash dam is channelled in clean water drains to Crooked creek and off-Site
- stormwater captured north-west and west of EPS is channelled through the clean water system and flows off-Site through Muddy Lake.

The footprint of both modification areas consists mostly of hardstand area. A new first flush pit has been installed east of the existing EPS CCP Plant / Daracon facility to provide spill containment control for the existing Daracon facility. The first flush pit is designed to capture any contaminated water and discharge it to Boomerang Pond (refer to **Figure 17**). First flush systems ensure contaminated water is flushed into the pit and once the holding pit is full, clean stormwater runoff cannot enter the holding pit.

Modification area 2 would consist of gravity stormwater drainage which would be received by the EPS stormwater drainage system via the Megalitre Pond and then the Outlet Canal (shown on **Figure 17**). The EPS stormwater drainage system is described in the EPS Water Management Plan (Stantec, 2018). A basic sedimentation pit with a high-level discharge point is proposed at the downstream corner of modification area 2, to collect any fly ash spills prior to them reaching the Megalitre Pond.

Neither of the modification areas are located within a flood planning area under the Lake Macquarie LEP. Historically, flooding is known to occur in major and minor streams that feed into Lake Macquarie as well as on low lying lands adjacent to parts of Lake Macquarie (Lake Mac Libraries, n.d-b).

Groundwater

Groundwater flow at the EPS Site is complex due to the large amount of cut and fill works present across the EPS Site, potential fractures within bedrock and external factors such as underground mine workings water.

Groundwater monitoring activities are currently undertaken in accordance with the requirements of EPL 1429. There are multiple groundwater monitoring points onsite at the EPS, with the closest being 500 m west of the proposed modification. During the December 2020 monitoring event, groundwater was at a stabilised depth of 24.45, at this monitoring point.

Previous investigations indicated groundwater is present at the EPS Site and broadly defined to aquifer systems to be shallow groundwater (within 7 metres below top of casing (m btoc)) primarily in low lying areas and deeper groundwater (within 10 to 15 m btoc) (ERM, 2015).



AECOM



0 150 300 m

Legend

- Modification area 1
- Modification area 2
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Railway
- Roads

FIGURE 16 ACID SULFATE
SOIL LEP MAPPING NEAR
THE PROPOSED
MODIFICATION

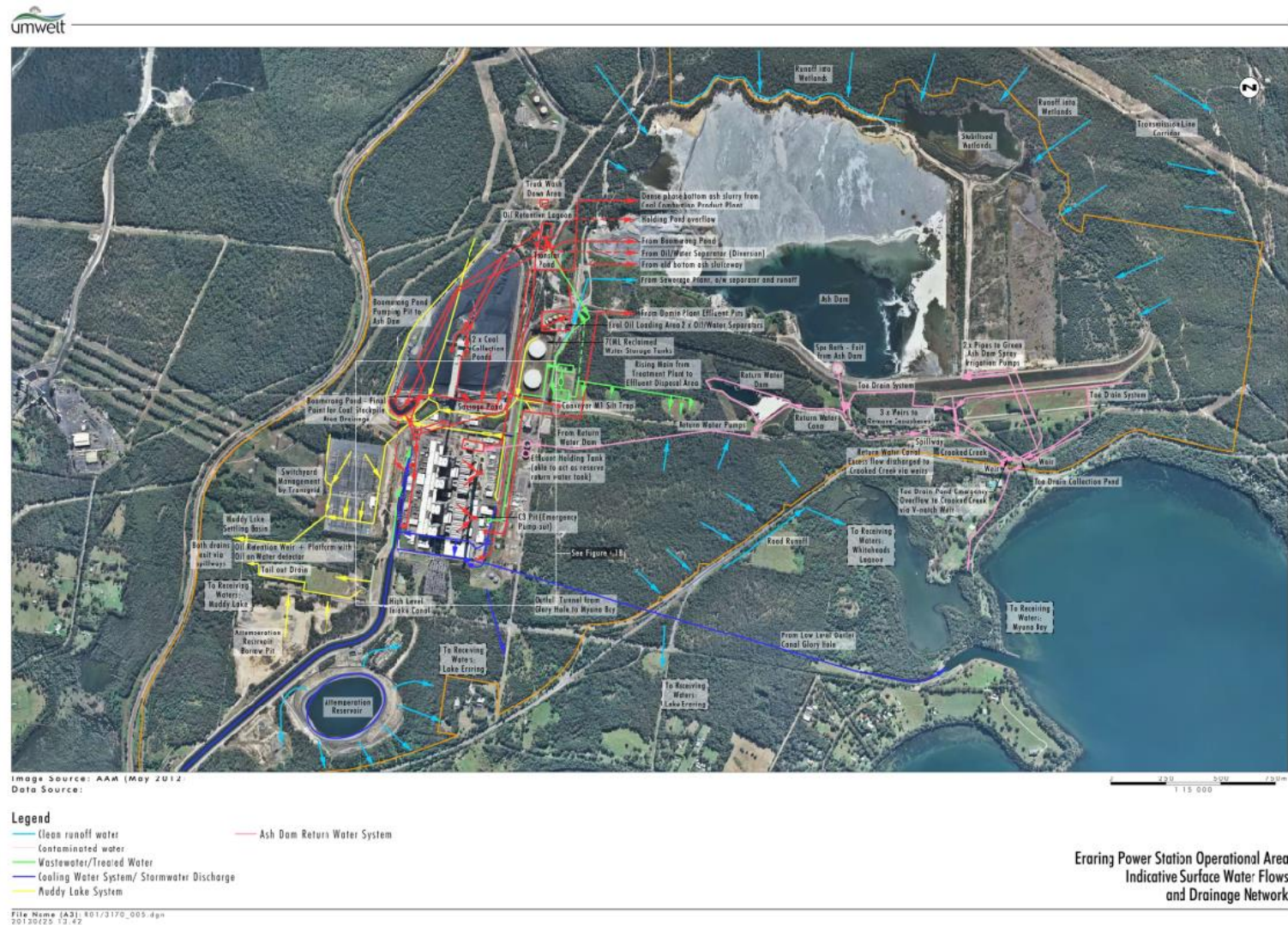


Figure 17 Location of WMP Site Components Applicable to the Proposed Modification (Source: Umwelt, 2013)

7.6.2 Potential Impacts

Construction

During construction, excavation work has the potential to cause erosion and sedimentation impacts from ground disturbance and the stockpiling of materials. Without appropriate controls, the transport of material by air or water has the potential to pollute the surrounding environment both on and off site. It is expected that potential erosion or sedimentation impacts can be appropriately managed through adequate sediment control devices and mitigation measures provided in the CEMP and will be in accordance with the EPS Biodiversity and Land Management Plan (AECOM, 2020).

The risk of encountering acid sulphate soils is considered to be low, given the limited nature of excavation work required for the proposed modification and the distance of the modification areas to Class 5 land identified on acid sulfate soils mapping (refer **Section 7.6.1**).

Given the historic use of the EPS site as a coal fired power station, there may be potential for encountering contaminated soils. Any potentially contaminated soil would be analysed and handled in accordance with the CEMP. Contaminated waste would be disposed of by a licenced contractor at an appropriately licenced facility.

Topsoil would be stockpiled appropriately, analysed and assessed for suitable re-use onsite in accordance with the NSW EPA Excavated Natural Material (ENM) Order (2014). Any surplus waste materials would be assessed for suitable re-use or for waste classification purposes and would be removed offsite by a licenced contractor and disposed of at an appropriately licenced facility.

Erosion and sedimentation impacts from excavation work also has the potential to impact on surface water, if not managed correctly. Increased pollutant concentrations or sediment in surface water runoff can impact on water quality in surrounding waterways. It is expected that potential erosion or sedimentation impacts can be appropriately managed through adequate sediment control devices and mitigation measures provided in the CEMP.

The proposed modification is not expected to encounter groundwater during construction as excavation depths within both modification areas are not expected to be more than 0.5 m. The proposed modification is therefore considered unlikely to impact on groundwater quality during construction.

Operation

Potential impacts to soils as a result of the proposed modification would relate to the potential for contaminants in the fly ash to leach into the soils in the event that fly ash is deposited on the ground during operation or filling of trucks. There is a low risk of this occurring due to the sealed nature of the fly ash handling and storage system which would retain any airborne product within the system. As the modification areas would consist of hardstand, it is unlikely that this interaction would occur.

The proposed modification would not increase impervious surfaces within either of the modification areas, therefore there is not expected to be a substantial increase in surface water flows from site.

The fly ash loading process (from storage silos to trucks) would be conducted on the weighbridge beneath the silos. A waste collection drain would be included around the weighbridge to capture accidental spills of fly ash and water ingress into the loading area. The waste collection drain would enable solids to be captured and fall out of suspension, with overflow of water going into the current wastewater management process. During the loading process, the lower sections of the silos would be enclosed in order to prevent potential dispersal of material. Therefore, the potential for fly ash to be deposited on the ground and entering surface water runoff would be low. In addition, the potential for surface water containing material has been mitigated by the installation of the first flush pit (refer to **Section 7.6.1**), which captures surface water run-off from the EPS CCP Plant and roads immediately adjacent.

It is considered unlikely that flooding would affect the proposed modification and the existing stormwater drainage system is considered adequate to cope with sustained rain events. The proposed modification is not expected to directly impact on groundwater quality once operational.

7.6.3 Management Measures

The following management measures would be implemented during construction and operation of the proposed modification:

Construction

- an Erosion and Sediment Control Plan (ESCP) would be prepared as part of the CEMP for the proposed modification in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and 'Blue Book' standards. The ESCP would include, at a minimum, the location of controls to be implemented, water flow paths, location of spill kits, concrete wash out facilities and chemical storage
- appropriate erosion and sedimentation control measures would be installed such as sediment fences and straw bales to divert/limit sediment laden stormwater runoff from entering drainage lines and depressions
- stormwater management measures would be developed such as surface flow diversions and management and disposal of contaminated or turbid stormwater that would collect in open cut trenches in a rainfall event
- procedures would be prepared for the isolation and clean-up of any spills that may occur. Emergency spill kits would be accessible during construction
- emergency procedures would be prepared for high rainfall events that could exacerbate soil erosion during construction. Works would not be undertaken during heavy rain or when heavy rain is forecast
- a dedicated, fully contained, concrete wash-out area would be established that would be appropriately sign posted. All liquid and solid wastes would be disposed of or reused in accordance with relevant waste legislation and guidelines
- the area to be disturbed by construction activities would be minimised as far as possible and areas subject to earthworks and construction disturbance would be stabilised as soon as practically possible
- excavated soil that is suspected of being contaminated would be separated from clean excavated soil and treated by stockpiling on plastic sheeting, bunding and treating or disposing of appropriately as soon as practicable to reduce the risk of contaminating surrounding areas
- topsoil would be stockpiled separately and clearly signposted for reuse in restoration activities
- construction workers would be informed of the following general indicators of potential contamination:
 - illegal or uncontrolled dumping of wastes adjacent to the construction site
 - discolouration or staining of soil
 - abnormal colouration of surface water or groundwater
 - chemicals floating on the water table
 - odours emanating from the water or soil
 - dead vegetation within or adjacent to areas of otherwise normal growth
 - liquid or solid chemicals or chemical wastes found on or in the soil (including abandoned drums or containers)
 - inadvertent chemical spills during construction (hydraulic fluid, fuel etc)
 - materials suspected of containing asbestos
- refuelling of construction vehicles and machinery on site would not be allowed
- the release of dirty water from site would be prohibited. Surface water captured on site during construction would be filtered through sediment control devices such as sediment fences prior to release off site.

Operation

- accidental leakage or spills of ash material would be managed in accordance with Origin's existing operating procedures
- site operating procedures would be updated to incorporate relevant elements of the proposed modification, including management measures and maintenance requirements of new plant and equipment where required.

7.7 Other Considerations

Other environmental aspects that were identified as having very low or no anticipated impact include:

- visual amenity
- hazards
- waste
- socio-economic
- cumulative impact.

Consideration of these aspects is provided in

Table 12.

Table 12 Other Environmental Aspects

Environmental Aspect	Consideration
Visual Amenity	<p>There are sufficient areas of land between the modification areas and nearby sensitive receivers to minimise potential visual impacts. The nearest residential areas are located over 1km from the EPS site.</p> <p>The addition of construction plant and equipment would be consistent with the industrial nature of the EPS site and potential visual impacts during construction would be minor and temporary.</p> <p>The proposed modification would install new infrastructure to a maximum height of approximately 25m. The storage silos to be constructed at modification area 1 would be located adjacent to existing structures of similar or greater heights, including the EPS CCP Plant at approximately 27m, the main generating units at approximately 35m and the two stacks at approximately 200m.</p> <p>New infrastructure at modification area 2 would result in a more noticeable change, as the area currently consists of a carpark. Other structures in the immediate vicinity of modification area 2 include buildings to the south, two large water reservoirs approximately 100m to the north and the main power station approximately 200m to the east.</p> <p>Construction Road, which is adjacent to modification area 2, is a private EPS road and does not carry significant traffic volumes. Visual access to modification area 2 would be limited to contractors and EPS staff accessing the site.</p> <p>The additional infrastructure required for the proposed modification would be located within the existing operational area of the EPS and would remain consistent with the existing structures at the site. Given the industrial setting of the surrounding area and limited views into the site, visual amenity impacts are expected to be negligible.</p>

Environmental Aspect	Consideration
Hazards	<p>Potential hazards during construction would relate to the storage and handling of substances such as fuels and chemicals and the risk of potential accidental spills. Accidental spills of these substances can result in contamination impacts to the surrounding environment.</p> <p>Construction activities where there is a potential for accidental spills to occur include the use of plant and equipment, refuelling and maintenance of plant and equipment and the use of paints.</p> <p>Appropriate storage and handling procedures would be implemented to reduce the chance of accidental spills occurring and emergency response procedures would be developed as part of the CEMP (refer to Section 7.6.3).</p> <p>The proposed modification includes the installation of silos for the storage of fly ash, which is an operational activity already being undertaken at the EPS. The proposed modification would not require the use of any additional input materials, fuels or chemicals.</p> <p>Hazard management measures currently in place at EPS site would continue to be implemented during operation of the proposed modification.</p>
Waste Management	<p>Construction of the proposed modification would generate minor quantities of wastes typical of construction sites, such as materials used in the packaging of plant and equipment delivered to the site, scrap metal, asphalt, redundant infrastructure, timber formwork and soils, as well as putrescibles and recyclable materials from construction personnel. Materials would be reused or recycled where possible. Waste materials would be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (EPA, 2014) prior to disposal offsite to an authorised receiver.</p> <p>As discussed in Section 7.6.2, excess topsoil or waste materials identified as not being suitable for re-use would be removed off-site by a licensed contractor and disposed of at an appropriately licenced facility, in accordance with the NSW EPA Waste Classification Guidelines (EPA, 2014).</p> <p>The proposed modification would require minimal vegetation removal in modification area 2 (isolated strips of planted grass). Where possible, green waste would be re-used as mulch for any landscaping requirements within modification area 2.</p> <p>During operation of the proposed modification, no additional wastes would be generated aside from a minor increase in general putrescible wastes associated with the amenities and office building within modification area 2.</p> <p>Overall, the proposed modification is expected to result in beneficial impacts by reducing the volume of fly ash requiring disposal to the ERAD. This would be consistent with the objectives of the waste management hierarchy by promoting the recovery of resources and recycling of materials.</p>
Socio-Economic	<p>The construction of the proposed modification would produce a marginal, temporary increase in demand for construction and installation workers/contractors in Lake Macquarie.</p> <p>The operation of the proposed modification would provide economic benefits by reusing the ash generated from the combustion of coal at EPS and ensuring the ongoing operation of EPS to cater for the increasing needs of the national electricity market.</p> <p>The proposed modification seeks to increase the ash storage capacity at EPS so as to increase the proportion of ash being recycled within the building and</p>

Environmental Aspect	Consideration
	<p>construction industry. Recycling of ash in construction materials can reduce the energy demands in the construction industry by replacing a portion of cement production which is a highly energy-intensive process. The use of ash in concrete can also enhance the strength and durability of the resulting concrete product.</p> <p>The benefits of reusing ash include a reduction in the volume of ash requiring disposal to storage facilities such as the ERAD which also reduces the environmental impacts and costs associated with maintaining these storage facilities.</p> <p>Overall, the proposed modification is expected to result in beneficial socio-economic impacts by increasing the recycling of ash and reducing the disposal of ash to the ERAD.</p>
Cumulative Impacts	<p>A search of the Lake Macquarie Council website for recent development applications (DAs), and a search of the NSW Planning Portal – Major Projects website for recently approved projects were carried out on 11 June 2021.</p> <p>Criteria for the Lake Macquarie Council website search included DA's lodged within the last 30 days within Eraring or Myuna Bay. The Major Projects website search utilised the map function to identify projects within the proximity of the proposal modification.</p> <p>Three DAs have been lodged to Lake Macquarie Council in Eraring within the last 30 days. No DAs were lodged in Myuna Bay.</p> <p>One major project, namely Northern Coal Logistics project, is located about 1.5 km west of the proposed modification and was determined in 2018.</p> <p>Modification applications (SSD-5145 and MP10_0080) have been submitted by Centennial Northern Coal Services Pty Limited and Centennial Myuna Pty Limited respectively and are currently in the 'response to submissions' phase. The modifications are seeking approval for dispatch of up to 1.0 Mtpa of coal by truck from Cooranbong Entry site to Myuna Colliery. The proposed transport route includes Wangi Road, Wilton Road and private haul roads.</p> <p>Origin also has two other projects currently being considered, including the Eraring BESS Project - for which an Environmental Impact Statement is currently being prepared – and a modification for expansion of the ERAD – for which a Scoping Report has been prepared.</p> <p>Another project which has been identified throughout the environmental assessment process is the upgrade to Wilton Road Bridge in Awaba. Wilton Bridge is located about 5.4 km north of the proposed modification, however is located on the northern access route (refer to Section 7.1).</p> <p>Table 13 below outlines potential cumulative construction and operational impacts between the proposed modification and the projects identified above.</p>

Environmental Aspect	Consideration		
	Table 13 Potential Cumulative Impacts from the Proposed Modification		
	Identified projects	Construction Impacts	Operational Impacts
	3 x DAs	Construction impacts are expected to be negligible given the minor nature of the DAs	No cumulative operational impacts are anticipated
	Northern Coal Logistics	If approved, the Northern Coal Logistics modification would not require construction work	If approved, the Northern Coal Logistics modification would generate additional trucks along Wangi Road and Wilton Road, with approximately 104 truck trips (208 movements) per day. The cumulative impact of this additional traffic and the proposed modification is discussed in Section 7.1.4 and is expected to be minimal.
	Eraring Power Station (Battery and ERAD expansion projects)	<p>There may be minor and temporary impacts during construction of the proposed projects. A quantitative assessment of traffic impacts for the BESS project, including the cumulative impacts associated with traffic generated by the proposed modification, has been undertaken by Jacobs (2021) (discussed in Section 7.1.4). Potential cumulative traffic impacts are expected to be minimal.</p> <p>Assessment of cumulative impacts associated with the ERAD expansion project would be undertaken as part of the environmental assessment for that project.</p> <p>If construction stages overlap Origin would manage potential cumulative impacts to traffic, noise and air through implementation of a CEMP and careful planning of works.</p>	It is anticipated that the proposed projects would generate low operational traffic volumes and potential cumulative traffic impacts would therefore be minimal. Other potential operational impacts of the proposed modification such as noise and air quality are expected to be negligible and would not contribute meaningfully to cumulative impacts.

Environmental Aspect	Consideration		
	Wilton Bridge Upgrade	<p>Upgrades to Wilton Bridge will require a detour to be put in place. If construction vehicles are using this access route, they will be required to use this detour. Given the limited number of construction vehicles expected, this impact is expected to be negligible.</p> <p>If construction stages overlap, impacts to noise and air are not expected to accumulate given the minor nature of both works and large buffer distance between sites.</p>	<p>When the proposed modification is operational, trucks would be required to use an alternate route to the site (refer to Section 7.1). This is likely to be similar to the proposed detour route imposed by the project for heavy vehicles. This would result in a minor cumulative impact of heavy vehicles using this route.</p> <p>Once the bridge is operational, there is not expected to be any cumulative impacts.</p>

8.0 Summary of Management Measures

A summary of the management measures that would be implemented during construction and operation of the proposed modification is presented in **Table 14**.

Table 14 Summary of management measures for the proposed modification

Environmental Aspect	Management Measure
General	<p>Construction works potentially audible at residential premises would only be undertaken during hours specified in Condition 2.3 to Project Approval 07_0084:</p> <ul style="list-style-type: none"> • 7am to 6pm Monday to Friday • 8am to 1pm Saturdays • At no time on Sundays and Public Holidays. <p>A CEMP would be prepared and implemented during construction of the Project.</p>
Traffic and Transport	<p>The following measures would be implemented during construction and operation of the proposed modification to minimise potential traffic impacts:</p> <ul style="list-style-type: none"> • all truck drivers would be provided with route maps to ensure that they access the site from the proposed route (being via the Pacific Highway (M1), Mandalong Road and through Morisset onto Wangi Road and via Pacific Highway (M1), Cessnock Road, Awaba Road or Wilton Road onto Wangi Road) • yearly saleable fly ash product generated by the site would not exceed what is stated in this Modification Report. Where possible, maximum truck sizes would be used to minimise trips generated by the site • all additional car and truck parking would be managed wholly within the site • if the construction stages of Origin projects overlap, potential cumulative traffic impacts would be managed through implementation of a CEMP and careful planning of works.
Biodiversity	<p>The following mitigation measures would be implemented as part of the CEMP for the proposed modification to minimise potential impacts to biodiversity:</p> <ul style="list-style-type: none"> • the CEMP would identify mitigation measures and procedures including: <ul style="list-style-type: none"> - ground disturbance and soil handling activities would be undertaken in accordance with existing procedures outlined in the Biodiversity and Land Management Plan (AECOM, 2020). The procedures would incorporate: <ul style="list-style-type: none"> ▪ soil handling protocols and stockpiling procedures ▪ rehabilitation of disturbance areas ▪ weed management activities • exterior lighting would be designed and constructed in accordance with <i>Australian Standard 4282 – Control of Obtrusive Effects and Outdoor Lighting</i>.
Heritage	<p>The following mitigation measures would be implemented as part of the CEMP during construction of the proposed modification</p> <ul style="list-style-type: none"> • workers and contractors involved in construction of the proposed modification would be made aware of the heritage significance of the EPS • in the unlikely event that Aboriginal objects, including possible human skeletal remains, are identified at any point during construction of the proposed modification, the following procedure would be followed: <p><u>Aboriginal Sites</u></p> <ul style="list-style-type: none"> - immediately cease all works in the area to prevent further impacts to the site

Environmental Aspect	Management Measure
	<ul style="list-style-type: none"> - engage a suitably qualified heritage consultant to determine the nature, extent and significance of the find and provide appropriate management advice. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts - prepare and submit an AHIMS site card for the site. <p><u>Human Skeletal</u></p> <ul style="list-style-type: none"> - all work in the vicinity of the remains should cease immediately - the location should be cordoned off and the NSW Police notified - if the Police suspect the remains are Aboriginal, they will contact the DPIE and arrange for a forensic anthropologist or archaeological expert to inspect the site. <p>Subsequent management actions will be dependent on the findings of the inspection undertaken, including:</p> <ul style="list-style-type: none"> - if the remains are identified as modern and human, the area will become a crime scene under the jurisdiction of the NSW Police - if the remains are identified as pre-contact or historic Aboriginal, DPIE and all Registered Aboriginal Parties (RAPs) are to be formally notified in writing. Where impacts to exposed Aboriginal skeletal remains cannot be avoided an appropriate management mitigation strategy will be developed in consultation with DPIE and RAPs - if the remains are identified as historic non-Aboriginal, the site is to be secured and the Department of Premier and Cabinet contacted - if the remains are identified as non-human, work can recommence immediately.
Noise	<p>The following measures would be implemented during construction and operation of the proposed modification to minimise potential noise impacts:</p> <ul style="list-style-type: none"> • the CEMP would consider potential sources of noise and would include mitigation measures to be implemented during construction to minimise potential noise impacts including <ul style="list-style-type: none"> - plant and machinery would be regularly maintained to ensure it is in good working condition - noise generating machinery would be directed away from sensitive noise receivers - use of movement alarms on vehicles and mobile plant would be minimised where possible. • construction works potentially audible at residential premises would only be undertaken during hours specified in Condition 2.3 to Project Approval 07_0084: <ul style="list-style-type: none"> - 7am to 6pm Monday to Friday - 8am to 1pm Saturdays - At no time on Sundays and Public Holidays. <p>all deliveries to the construction site would be undertaken during these standard working hours.</p> • noise complaints would be managed in accordance with the Environmental Management Plan for EPS and recorded in the Incident Management System. • in the event of a noise complaint, an investigation would be undertaken. Where validated noise complaints are identified, mitigation measures would be implemented and follow up monitoring conducted.

Environmental Aspect	Management Measure
Air Quality	<p>The following mitigation measures would be implemented during construction of the proposed modification:</p> <ul style="list-style-type: none"> dust minimisation measures would be implemented where required for exposed stockpiles and unsealed construction areas, such as water spraying during windy weather and/or covering when stockpiling is required for long periods emission controls used on vehicles and construction equipment would comply with standards listed in Schedule 4 of the <i>Protection of the Environment Operations (Clean Air) Regulation 2010</i> vehicle loads involving loose materials (e.g. during construction) would be covered when travelling offsite air filtration systems would be installed, operated, and maintained as recommended in the relevant user manual and routine inspections of equipment would be carried out.
Soil and Water	<p>The following mitigation measures would be implemented during construction and operation of the proposed modification:</p> <p>Construction</p> <ul style="list-style-type: none"> an Erosion and Sediment Control Plan (ESCP) would be prepared as part of the CEMP for the proposed modification in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and 'Blue Book' standards. The ESCP would include, at a minimum, the location of controls to be implemented, water flow paths, location of spill kits, concrete wash out facilities and chemical storage appropriate erosion and sedimentation control measures would be installed such as sediment fences and straw bales to divert/limit sediment laden stormwater runoff from entering drainage lines and depressions stormwater management measures would be developed such as surface flow diversions and management and disposal of contaminated or turbid stormwater that would collect in open cut trenches in a rainfall event procedures would be prepared for the isolation and clean-up of any spills that may occur. Emergency spill kits would be accessible during construction emergency procedures would be prepared for high rainfall events that could exacerbate soil erosion during construction. Works would not be undertaken during heavy rain or when heavy rain is forecast a dedicated, fully contained, concrete wash-out area would be established that would be appropriately sign posted. All liquid and solid wastes would be disposed of or reused in accordance with relevant waste legislation and guidelines the area to be disturbed by construction activities would be minimised as far as possible and areas subject to earthworks and construction disturbance would be stabilised as soon as practically possible excavated soil that is suspected of being contaminated would be separated from clean excavated soil and treated by stockpiling on plastic sheeting, bunding and treating or disposing of appropriately as soon as practicable to reduce the risk of contaminating surrounding areas topsoil would be stockpiled separately and clearly signposted for reuse in restoration activities construction workers would be informed of the following general indicators of potential contamination: <ul style="list-style-type: none"> illegal or uncontrolled dumping of wastes adjacent to the construction site discolouration or staining of soil abnormal colouration of surface water or groundwater

Environmental Aspect	Management Measure
	<ul style="list-style-type: none"> - chemicals floating on the water table - odours emanating from the water or soil - dead vegetation within or adjacent to areas of otherwise normal growth - liquid or solid chemicals or chemical wastes found on or in the soil (including abandoned drums or containers) - inadvertent chemical spills during construction (hydraulic fluid, fuel etc) - materials suspected of containing asbestos • refuelling of construction vehicles and machinery on site would not be allowed • the release of dirty water from site would be prohibited. Surface water captured on site during construction would be filtered through sediment control devices such as sediment fences prior to release off site. <p>Operation</p> <ul style="list-style-type: none"> • accidental leakage or spills of ash material would be managed in accordance with Origin's existing operating procedures • site operating procedures would be updated to incorporate relevant elements of the proposed modification, including management measures and maintenance requirements of new plant and equipment where required.
Hazards	<ul style="list-style-type: none"> • appropriate storage and handling procedures would be implemented to reduce the chance of accidental spills occurring and emergency response procedures would be developed as part of the CEMP. • hazard management measures currently in place at EPS site would continue to be implemented during operation of the proposed modification.
Waste Management	<ul style="list-style-type: none"> • waste materials generated during construction would be reused or recycled where possible • waste materials would be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (EPA, 2014) prior to disposal offsite to an authorised receiver.

9.0 Justification and Conclusion

This Modification Report presents details of the proposed modification, describes the existing environment, assesses the potential impacts on the environment and identifies management measures designed to minimise or avoid the identified impacts.

The proposed modification seeks to increase current ash recycling rates above existing levels and towards the 80% recycling goal set out by Condition 4A.1 of Project Approval 07_0084. This would be achieved by optimising existing ash recycling facilities and constructing additional recycling facilities.

The benefits of reusing ash include a reduction in the volume of ash requiring disposal to storage facilities such as the ERAD. The ERAD has limited ash storage capacity, with storage capacity estimates indicating that the dam will reach its current capacity prior to the anticipated closure of the power station in 2032. The efficient and effective utilisation of this critical asset is vital to the continued operation of EPS and as national electricity demands continue to increase, so might the generation requirements at EPS. Consequently, achieving effective ash recycling and storage capacity is a key component of Origin's overall ash dam management strategy.

An assessment has been undertaken in relation to the potential environmental impacts of the proposed modification. The key environmental issue was determined to be traffic and transport. A traffic impact assessment was prepared to assess the potential impact associated with an increase in truck movements to and from the EPS site. The traffic impact assessment concluded that the forecast impact on the surrounding road network based on a worst-case assessment would be insignificant, and network performance would continue to operate under good conditions.

Assessment of other environmental issues was also undertaken and concluded there is likely to be minimal impacts and the proposed modification would be substantially the same development as originally approved.

This Modification Report has considered the beneficial and adverse effects of the proposed modification. The proposed modification is justified as it would provide the following economic and environmental benefits:

- promotes the recovery of resources and recycling of materials
- increases the recycling of ash, which would result in a reduction in the volume of ash requiring disposal to the ERAD
- provides economic benefits through the increased sales of ash product
- would be constructed and operated as part of an existing facility, complementing, and making efficient use of the site and resulting in minimal adverse environmental effects.

With the implementation of environmental mitigation measures outlined in **Section 8.0**, it is unlikely that significant adverse impacts would occur as a result of the proposed modification and the proposed modification can proceed accordingly.

10.0 References

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Appendix A

Daracon Development
Consent DA/1937/2014

Appendix A Daracon Development Consent DA/1937/2014

19 July 2019

BFG GROUP PTY LTD
33 Jura St
HEATHERBRAE NSW 2324

Application to Modify Development Consent Notice of Determination

Pursuant to Section 4.55 of the Environmental Planning and Assessment Act 1979 and
Clause 122 of the Environmental Planning and Assessment Regulation 2000.

Development Application No: DA/1937/2014/D
Property Address: Lot 11 DP 1050120, 268 Rocky Point Road, ERARING
NSW 2264
Original Proposal: Industry - Amendment To Consent
Modification sought: Amended Plans
Determination Status: Amended Approval
Determination Date: 19 July 2019
Consent to operate from: 28 April 2015
Consent to lapse on: 28 April 2020

Conditions of Consent

(Approved subject to the conditions specified in this notice and in accordance with
the stamped approved plans.)

Reason for the Imposition of Conditions

The reason for the imposition of the following conditions is to ensure, to Council's
satisfaction, the objects of the *Environmental Planning and Assessment Act 1979* (as
amended) are achieved:

- (a) To encourage:
 - (i) The proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forest, minerals, water, cities, towns, and villages for the purpose of promoting the social and economic welfare of the community and a better environment;
 - (ii) The promotion and co-ordination of the orderly and economic use of development of land;
 - (iii) The protection, provision, and co-ordination of communication and utility services;

- (iv) The provision of land for public purposes;
 - (v) The provision and co-ordination of community services and facilities;
 - (vi) The protection of the environment, including the protection and conservation of native animals and plants including threatened species, populations, and ecological communities and their habitats;
 - (vii) Ecologically Sustainable Development; and
 - (viii) The provision and maintenance of affordable housing.
- (b) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State.
 - (c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.

1. Prescribed Conditions

- (a) The work must be carried out in accordance with the requirements of the *Building Code of Australia*.
- (b) In the case of residential building work for which the *Home Building Act 1989* requires there to be a contract of insurance in force in accordance with Part 6 of that Act, that such a contract of insurance is in force before any building work authorised to be carried out by the consent commences.
- (c) A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:
 - (i) showing the name, address and telephone number of the Principal Certifying Authority for the work, and
 - (ii) showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and
 - (iii) stating that unauthorised entry to the work site is prohibited.

Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.
- (d) Residential building work within the meaning of the *Home Building Act 1989* must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the following information:
 - (i) in the case of work for which a principal contractor is required to be appointed:
 - a. the name and licence number of the principal contractor, and
 - b. the name of the insurer by which the work is insured under Part 6 of that Act,
 - (ii) in the case of work to be done by an owner-builder:
 - a. the name of the owner-builder, and
 - b. if the owner-builder is required to hold an owner-builder permit under that Act, the number of the owner-builder permit.

If arrangements for doing the residential building work are changed while the work is in progress so that the information notified under (d) becomes out of date, further work must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the updated information.

2. Approved Documentation (Modification D)

The development consent incorporates this schedule of conditions and the plans and documents referenced and stamped as follows:

(a) Plans Reference:

Plans prepared by:			
Name of Plan	Drawing Number	Issue	Date
General Arrangement	Figure 1A	-	9 July 2014
General Arrangement	Figure 1A	2	08 October 2015
Site Layout	Figure 1B	-	23 April 2014
Site Layout	Figure 1B	2	03 December 2015
Site Layout	Figure 1B	3	06 December 2017
Traffic	Figure 2	-	9 July 2014

Plans prepared by: PFA			
Name of Plan	Sheet	Issue	Date
Eraring Fine Ash Facility Proposal	1 of 4	-	13.10.15
Eraring Fine Ash Facility Proposal	2 of 4	-	13.10.15
Eraring Fine Ash Facility Proposal	3 of 4	-	13.10.15
Eraring Fine Ash Facility Proposal	4 of 4	-	13.10.15
200m3 Silo	1 of 1	-	23.11.15

Plans prepared by: Bulky Flyash Grout – Deleted by Modification D

Plans prepared by: Brolton Group

Name of Plan	Drawing Number	Issue	Date
Frame and Equipment Assembly Fly Ash Classifier	1 of 3	A	08.04.19
Frame and Equipment Assembly Fly Ash Classifier	2 of 3	A	0.04.19
Frame and Equipment Assembly Fly Ash Classifier	3 of 3	A	08.04.19

Plans prepared by: Monteath and Powys

Name of Plan	Drawing Number	Issue	Date
Proposed Fly Ash Classifier	1 of 2	1	13.06.19
Proposed Fly Ash Classifier	2 of 2	1	13.06.19

Plans prepared by: Bulk Engineering Pty Ltd

Name of Plan	Drawing Number	Issue	Date
Bulk Flyash & Grout 80m3 Silo	BE00-	-	23.11.15
Blend Plant 90m3 Silo Structure	BFG01 – 2368	-	27.11.16

(b) Document Reference:

Document	Reference	Author	Date
Amended Statement of Environmental Effects; as amended by letter	1409038	FEW	17 December 2014
	-	BFG	1 April 2015
	-	FEW	1 April 2015
Application form to vary a development standard	-	FEW	-

Details of the development shown in the approved plans and documents referenced are altered in the manner indicated by:

- (i) Any amendments made by Council on the approved plans or documents;
- (ii) Any notes, markings, or stamps on approved plans or documents, and
- (iii) Any conditions contained in this consent.

3. Construction Certificate

Prior to the commencement of building work or subdivision work, a Construction Certificate shall be obtained.

Note: If the Construction Certificate is issued by a Principal Certifying Authority that is not Council it will be necessary to lodge the Construction Certificate and other approved documents with Council within two days of such approval. (Clause 142(2) EPA Regulation 2000).

4. Occupation Certificate

The development shall not be occupied or used prior to the issuing of a Final Occupation Certificate or Interim Occupation Certificate by the Principal Certifying Authority. Where an Interim Occupation Certificate has been issued, only that part of the building to which the Certificate applies may be occupied or used.

5. Commencement of the Use of the Land

The approved use of the land shall not commence until all relevant conditions of this consent have been complied with and a Final or Interim Occupation Certificate has been issued. Where an Interim Occupation Certificate has been issued, only that part of the building to which the Certificate applies may be occupied or used.

6. Floor Levels – Flooding

Council records indicate that the development site is likely to be or has been affected by flooding.

The proposed development has been assessed against Councils flood planning levels and shall meet the following Flood Planning Level criteria.

The batching plant and all unsealed electrical installations associated with the proposed development, eg. switches, power points, etc. shall be placed above 2.36m AHD. This shall not impact upon the overall height of the development.

7. Height (Modification B)

The maximum height of the proposed development shall be 27.10 metres measured from existing ground level.

8. Fix Damage Caused by Construction Works

Any damage or injury caused to a public road or associated structures including footpaths, drains, kerb and gutter and utility services caused as a consequence of the construction works shall be made good at the cost of the person with the benefit of the consent.

Any disused kerb and gutter and footpath crossing shall be removed and replaced with full kerb and gutter in accordance with Council's standards to match finished adjoining kerb and gutter. All replacement works are to be completed to the satisfaction of Council prior to the issue of an Occupation Certificate at the cost of the person with the benefit of the consent.

9. Hoarding and Construction Site Safety Fencing

Construction site safety fencing and/or hoarding shall be provided in accordance with WorkCover requirements. Such fencing and/or hoarding shall be erected wholly within the property boundary unless prior approval from Council is obtained.

Council approval is required to install hoarding, site fencing or overhead protective structures over or adjoining a public place i.e. a footpath or a Public Reserve. No work shall commence until written approval is obtained.

10. External Material Colours and Reflection

The exterior colour scheme shall be limited to "Colourbond Rivergum" only.

External materials shall have low-reflective properties.

11. Building Waste

Prior to any construction work commencing, containment of building waste materials shall be provided within the boundaries of the building site, above natural or excavated ground level, by a screened area of silt stop fabric or shade cloth, having minimum dimensions of 2.4 x 2.4 x 1.2 metres high OR equivalent size waste disposal bin.

The enclosure or bin shall be maintained for the term of the construction to the completion of the development.

The enclosure or bin shall be regularly cleaned to ensure proper containment of the building wastes generated on the site.

Appropriate provision is to be made to prevent wind blown rubbish escaping from the containment.

12. Site Amenities

Throughout the course of building or demolition works on the site, toilet facilities shall be provided at the rate of one toilet for every 20 persons or part of 20 persons employed at the site.

Each toilet shall be installed as follows:

- (a) in a sewered area, connect the temporary builder's toilet facility to the Hunter Water Corporation's sewerage system in accordance with such authority's requirements prior to commencing any building work.
- (b) where the connection of the toilet facility to the Hunter Water Corporation's sewer is impractical, an application to approve the use of a chemical closet is to be made to Council accompanied with the appropriate fee for approval. Such approval shall be obtained prior to the issue of a Construction Certificate.

13. Dial Before You Dig

Prior to commencement of work, the free national community service "Dial Before You Dig" shall be contacted on 1100 regarding the location of underground services in order to prevent injury, personal liability and even death. Enquiries should provide the property details and the nearest cross street/road.



14. Noise - Construction Sites

The operating noise level of construction site operations, including machinery, plant and equipment when measured at any affected premises, shall be evaluated and comply with the requirements of the NSW Office of Environment and Heritage publication "Interim Construction Noise Guideline" July 2009.

Approved Construction Times

The approved hours for construction of this development are –

Monday to Friday - 7.00am to 6.00pm.

Saturday – 8am to 1pm.

No construction work shall take place on Sundays or Public Holidays.

Construction Periods in Excess of 26 Weeks

If the construction period is in excess of 26 weeks, a Noise Management Plan (NMP) shall be provided to Council prior to the issue of the first construction certificate. Such plan shall be prepared with the assistance of a suitably qualified acoustic engineer, indicating whether the use of machinery, plant and equipment during those operations can be completed without causing offensive noise (as defined in the *Protection of the Environment Operations Act 1997*) in the neighbouring area. The NMP shall be complied with at all times during the construction period and shall identify any mitigation measures to control noise, noise monitoring techniques and reporting methods, likely potential impacts from noise and a complaints handling system.

Operational times may be amended with the written advice of Council's General Manager or delegate.

15. Noise – Ongoing Operation of Machinery, Plant and Equipment

The Laeq (15 minute) operating noise level of machinery, plant and equipment when measured at the boundary of the nearest residential premises shall comply with either the amenity or intrusiveness criteria calculated in accordance with the NSW Office of Environment and Heritage Industrial Noise Policy. For assessing amenity criteria, the area shall be categorised in accordance with the guidelines outlined in Chapter 2 of that Policy.

Prior to the issue of an Interim or Final Occupation Certificate, whichever occurs first, certification from a suitably qualified acoustic consultant shall be submitted to the Principal Certifying Authority, demonstrating compliance with the above.

16. Bunded Spillage Areas

Chemicals and grease stored in bulk form, or work areas where spillages are likely to occur, shall be bunded in accordance with the *NSW Office of Environment and Heritage Protection Manual – “Bunding and Spill Management.”*

17. Emissions

There shall be no interference with the amenity of the neighbourhood by reason of the emission of any "offensive noise" as defined in the *Protection of the Environment Operations Act 1997*, vibration, smell, fumes, smoke, vapour, steam, soot, ash or dust, or otherwise as a result of the development.

18. Mine Subsidence Board

Evidence of an approval from the Mine Subsidence Board must be provided to the certifying Authority prior to the issue of the first Construction Certificate.

19. Air Quality Management Plan (Modification B)

Council request the proponent prepare an Air Quality Management Plan (AQMP), prior to the commissioning of the facility, for the operation of the facility. The AQMP must be developed to ensure compliance with statutory provisions in the *Protection of the Environment Operations Act 1997*, the *Protection of the Environment Operations (Clean Air) Regulation 2010*, and relevant standards. The AQMP shall address the management of air pollutants from the facility during routine operation, scheduled maintenance, and for emergency works. The AQMP shall, where feasible and appropriate, be developed in accordance with current air quality management procedures for fly-ash handling at the power-station site.

Right of Appeal

If you are dissatisfied with this decision (including a determination on a review under Section 8.2), Section 8.9 of the Environmental Planning and Assessment Act 1979 gives you the right to appeal to the Land and Environment Court within six months after:

- (a) the date on which you receive this notice, or
- (b) the date on which that application is taken to have been determined in accordance with the regulations made under Section 8.11, 4.55(6) or 4.56(3).

Section 4.55 of the Environmental Planning and Assessment Act 1979, does not give a right of appeal to an objector who is dissatisfied with the determination of the Council to grant consent to a development application, unless the application is for designated development (including designated development that is integrated development). The objector may, within 28 days after the date on which the notice of the determination was given in accordance with the regulations, and in accordance with rules of the court, appeal to the Court.

Right of Review

Section 8.2 of the Environmental Planning and Assessment Act 1979 provides that the applicant may request the Council to review the modified determination. The request must be made in writing (or on the review application form) within 28 days after the date as specified in this notice of determination. **(See exclusions note below).**

Exclusions: A request to review the determination of a modified development application pursuant to Section 8.2 of the Environmental Planning and Assessment Act 1979 can only be undertaken where the consent authority is Council, other than:

- (a) A determination to modify a complying development certificate, or
- (b) A determination in respect of designated development, or
- (c) A determination made by the Council under Section 4.34 in respect of an application by the Crown.
- (d) A determination that is taken to have been made because the Council has failed to determine an application.

Planning Assessment Commission

The Planning Assessment Commission has not conducted a public hearing in respect of this application.

Advisory Notes:

Hunter Water Requirements

The owner is required to comply with the requirements of the Hunter Water Act 1991, relevant to the development. If you require further information, please contact Hunter Water on 1300 657 657.

Should you require further information, please contact the undersigned on 4921 0399 or by e-mail on gmathews@lakemac.nsw.gov.au.

Yours faithfully



Glen Mathews
Development Planner
Development Assessment and Certification

Appendix B

Project Approval Comparative Assessment

Appendix B Comparative Assessment

Table B1 provides an overview of the key elements of the approved project as a basis for comparison against the proposed modification.

Table B2 provides a comparative assessment of the originally approved development compared to the proposed modification.

It is noted that Project Approval 07_0084 is a Part 3A Project Approval which has transitioned to a State Significant Development (SSD) consent, and as such the development as modified must be substantially the same development as the development authorised by the consent as last modified under the former section 75W (as per clause 3BA (6) of schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*).

A modification to Project Approval 07_0084 (MOD 1) was approved under section 75W of the EP&A Act on 23 December 2019. The MOD 1 project involved the augmentation of the Eraring Ash Dam using an alternate placement strategy and landform design to maintain operational flexibility and extend the storage life of the Eraring Ash Dam.

The MOD 1 project did not modify the ash recycling infrastructure originally approved under the Project Approval 07_0084. Thus, while the prior status of Project Approval 07_0084 as a transitional Part 3A project is noted, the comparative assessment focuses primarily on the description of the original Environmental Assessment (EA) for ash management at the EPS (HLA-Envirosciences, 2007), which describes the existing ash recycling activities authorised by Project Approval 07_0084.

Table B1 Overview of Key Elements of Approved Project and Proposed Modifications

Approval / Modification	Activity / Use	Ash Recycling Infrastructure	Scale of Production	Project Life	Operational Hours	Vegetation clearing	Operational Traffic	Key changes to approved environment impacts
Project Approval 07_0084 Upgrade and expansion of Eraring Ash Dam	Storage of ash within the Eraring Ash Dam Recycling of ash	-Main storage silos (2 x 1,000t); -Intermediate storage silos -transfer pipelines -Flyash condition, mixing and pumping plants -Discharge slurry pipelines	Not specified, though noted that approximately 45% of ash produced at EPS is recycled, with 595,000 tonnes recycled during 2005-2006.	Beyond 2030	Continuous (24 hrs, 7 days per week)	21 hectares	Not specified, assumed to be no net increase to existing traffic movements.	Not applicable
Modification 1 Ash Dam Augmentation	Alternate ash placement strategy Diversion of stormwater flows	No change to ash recycling infrastructure	No change. Mandatory goal of 80% reuse or recycling of ash from EPS established within Project Approval.	2032	No change	8.95 hectares	Operational traffic not quantified, as likely to use excavated material obtained from within the EPS site.	Direct impacts of vegetation clearing requiring offsetting. Negligible hydrological impacts as a result of diverted stormwater flows. Subsidence and surface water connectivity hazards requiring mine void remediation.
Proposed Modification Ash Recycling Facilities	No change	Integration of existing Daracon facility into Project Approval 070084, including 3 x 100t silos, classifier and 1 x 90t silo, 1 x 220t silo, ancillary infrastructure. Additional 3 x 450t silos and up to 4 x 600t silos.	Increase ash recycling capacities at EPS up to approximately 1,400,000 tonnes per annum	No change	No change	Negligible (planted grass strips to be removed)	Additional 223 daily truck movements	Negligible traffic and transport impacts. Negligible impacts to biodiversity and heritage. Negligible noise and air quality emissions.

Table B2 Comparative Assessment of Originally Approved Development Consent Compared to the Proposed Modification

Element	Originally Approved	Proposed Modification	Evaluation of Change
Approved activities / existing use	<p>The Environmental Assessment for ash management at the EPS (the 2007 EA)⁴ states: <i>CCP is produced through the burning of coal for the generation of electricity. In 2005/06, 595,000 tonnes of CCP from EPS was reused, which represents a total of 44.5% of the CCP produced. While a large proportion of CCP is reused, the remainder is stored at the existing CCP storage facility to the north of the power station pending the development of reuse markets.</i></p> <p>The 2007 EA also notes that a Long-Term Management Strategy has been prepared to address future management of ash at EPS. This document is updated annually and describes the status of Origin's ongoing investigation of alternative ash recycling. These initiatives include ultra-high-volume fly ash pavement; ash amended road base pavements and quarry products; light weight aggregate manufacturing; pre-cast building materials; mine void rehabilitation; and mine rehabilitation.</p> <p>The MOD1 Project Approval has a mandatory goal of 80% reuse or recycling of ash from EPS by 31 December 2021. The 2018 Environmental Assessment for MOD 1 noted that Origin aims to increase the proportion of ash that is beneficially reused</p>	<p>The proposed modification represents a continuation of ash recycling activities that were described in the 2007 EA. The proposed modification includes construction of additional infrastructure in addition to an uplift from existing infrastructure in order to increase the capacity for ash recycling at the EPS.</p>	<p>The 2007 EA described the ash recycling activities already being undertaken at that time and noted that the aim was to increase ash recycling as markets arise.</p> <p>The proposed modification represents an extension of the existing operation at the EPS site and would be consistent with the activities/land use described within the 2007 EA and Project Approval 07_0084. It is considered that the proposed modification would satisfy the requirements of 'substantially the same' development when considering approved activities and existing use of the EPS.</p>

⁴ Environmental Assessment – Upgrade and Expansion of the Coal Combustion Management System, Eraring Power Station, dated November 2007, prepared by HLA - Envirosciences

Element	Originally Approved	Proposed Modification	Evaluation of Change
	to meet this mandatory goal and to continue to identify new market opportunities, driving the development of new recycling streams through innovation and product development.		
Consistency with Long-Term Ash Management Strategy (LTAMS)	<p>The LTAMS was initially prepared in accordance with the Concept Approval for the proposed modification (since relinquished). DPIE approved the LTAMS on the condition that it be updated within one month of issue of Project Approval and reviewed periodically until 2015. The revised LTAMS was submitted to DPIE in June 2008 and has typically been reviewed and submitted to DPIE annually.</p> <p>The LTAMS establishes a target of 80% reuse or recycling of ash from EPS by 31 December 2021, as a mandated goal in the proposed modification Approval 07_0084 MOD1. The key goal of the LTAMS is to develop and implement strategies that maximise the recycling potential of fly ash (both classified and unclassified) and bottom ash produced at EPS. The objectives include:</p> <ul style="list-style-type: none"> • working towards a change in perception of ash from a waste product to a commodity • establishing and developing new markets for ash across a variety of industry sectors 	<p>The proposed modification would include additional infrastructure and support the continued increase in throughput of existing operations in order to provide sufficient capacity at EPS to meet the 80% reuse or recycling goal subject to market demand. This is in line with the mandated goal within the LTAMS and Project Approval 07_0084 MOD1.</p> <p>The proposed modification would assist in meeting the objectives of the LTAMS by promoting resource recovery and encouraging the recycling of ash rather than disposal of ash within the Eraring Ash Dam. Origin facilitates ash recycling at EPS through a number of third-party operators, and the proposed modification would continue to foster these partnerships. The proposed modification would also improve the efficiency of ash management at EPS by reducing the need to dispose of a large proportion of ash to the Eraring Ash Dam.</p>	The proposed modification, including the additional ash storage silos, would be consistent with the aims and objectives of the LTAMS and requirements of Project Approval 07_0084 by enabling Origin to achieve sufficient capacity in order to meet the stipulated goal of 80% ash reuse or recycling subject to market demand.

Element	Originally Approved	Proposed Modification	Evaluation of Change
	<ul style="list-style-type: none"> fostering partnerships between Origin, industry, governments and the community improving the efficiency of ash management at EPS. 		
Ash recycling infrastructure	<p>The 2007 EA stated that the construction of new fly ash collection and storage/pumping plants would likely incorporate:</p> <ul style="list-style-type: none"> A new method of fly ash collection at each fabric filter hopper with the aim of collecting higher quantities of fine fly ash which would increase the sale of fly ash for use in the cement industry Intermediate storage silos to allow segregation of the finer fly ash from the remainder of the fly ash Transfer pipelines from intermediate storage silos to the main storage silos. Main storage silos (2 x 1,000t) Fly ash conditioning, mixing and pumping plants Discharge slurry pipelines up to the discharge points at the ash storage facility. <p>The main fly ash storage silos would be located along the internal access road known as Construction Road on the eastern side of the EPS. There would be two silos, each approximately 1,000t in capacity.</p>	<p>Required infrastructure would include:</p> <ul style="list-style-type: none"> Proposed classifier silo approximately 3 x 450t capacity (operated by a third party) Proposed additional intermediate storage silos consisting of staged installation of up to four 600 tonne capacity silos (operated by a third party) <p>Existing infrastructure, which would be retained includes:</p> <ul style="list-style-type: none"> EPS CCP Plant Existing Daracon classifier silos consisting of 3 x 100t, 1 x 220t collection silo, classifier, 1 x 90t silo, (operated in accordance with DA 1937/2014/4D) Existing Boral Bottom Ash Recycling Area (approved under PA07_0084) Existing Flyash Australia Plant (operated in accordance with DA/684/2009) 	<p>The additional infrastructure required for the proposed modification would be similar in nature and scale to the ash recycling facilities described in the 2007 EA. These would be located within the existing operational area of the EPS and would remain consistent with the surrounding environment and existing uses. The two sets of 2 x 600t capacity silos (approximate) are proposed to be located in the general area where the two 1000t silos were proposed in the 2007 EA, along Construction Road.</p>

Element	Originally Approved	Proposed Modification	Evaluation of Change
Footprint	The 2007 EA showed the proposed ash recycling facilities at the time being located on Construction Road. It is noted that the facility was not constructed at this location. Nonetheless, the area along Construction Road has been previously assessed and approved for the construction of ash recycling facilities, in particular 2 x 1000t silos.	The likely footprint for new ash recycling infrastructure is shown on Figure 6 and includes the existing footprint and an area along Construction Road for additional ash silos (previously assessed for the ash recycling facilities in the 2007 EA).	The additional ash storage silos would be constructed on previously disturbed, hardstand areas of the EPS site. The footprint for the proposed modification is considered to be substantially the same as that originally approved.
Scale of Production	<p>2007 EA states that approximately 45% of all ash produced at EPS is recycled through commercial agreements (for use in other production processes such as concrete manufacturing, or as a gravel substitute in landscaping and roads). In 2005/06 approximately 595,000 tonnes of ash from EPS was recycled.</p> <p>The Project Approval 007_0084 MOD1 has a mandatory goal of 80% reuse or recycling of ash from EPS by 31 December 2021. That is, EPS is already conditioned to achieve 80% ash recycling subject to market conditions.</p>	<p>The proposed modification aims to achieve sufficient capacity to meet an 80% reuse or recycling goal subject to market conditions. The proposed changes are aimed at enabling this to be more readily achieved noting not all developments would likely operate at full capacity individually year in year out. This would be achieved through a combination of existing recycling operations, increased scale of production for some existing operations and construction of additional infrastructure:</p> <ul style="list-style-type: none"> Increased throughput of existing third-party classifier uplifted to 300,000 tpa., with an additional 3x 450t storage silos. New third-party 600t silos with capacity up to 150,000 tpa. 	<p>The existing infrastructure can deliver up to approximately 1.1 Mt and in some years, this would be 80% recycling. The change enables the existing 80% reuse or recycling goal to be more consistently achieved, subject to market conditions, improving supply security.</p> <p>The proposed modification represents an extension of existing operations at the EPS site and would be consistent with the intended scale of ash recycling authorised by Project Approval 07_0084 MOD 1 and mandated by the 80% ash reuse or recycling goal included within the conditions of consent.</p>
Project Life	2007 EA noted that EPS has an expected life at least up to 2030. Ash management system required to achieve sufficient capacity to accommodate the life of EPS beyond 2030.	Origin propose to operate EPS for the purpose of power generation until 2032.	The proposed modification life would be comparatively similar to that originally assessed and the same as described in the 2018 modification (MOD 1).

Element	Originally Approved	Proposed Modification	Evaluation of Change
	The 2018 EA ⁵ stated that Eraring Power Station is expected to reach the end of its operational life by 2032.		
Operational hours	<p>Fly ash generation, processing, storage, collection and transport operate on a continuous basis.</p> <p>There are no consent limits regarding hours of operation, however construction activities that would generate an audible noise at residential premises are limited to standard construction hours.</p>	<p>It is expected that ash recycling operations would continue to be undertaken in accordance with existing practices – that is, on a continuous basis.</p> <p>Construction activities would be undertaken during standard construction hours in accordance with the conditions of PA 07_0084, unless otherwise agreed in writing by the Planning Secretary.</p>	Operational hours are expected to be consistent with existing approved operational hours.
Hazard and Risk	<p>The 2006 EA prepared for Concept Plan application stated that the proposed upgrade of the existing facility did not involve the introduction of new dangerous goods to the EPS, nor an increase in the volume of dangerous goods to be stored on the EPS. Given the industrial nature of the EPS and surrounds it was considered that the EPS remains suitable for current use, including the proposed upgrade works to the facility and is not hazardous or offensive development.</p> <p>The 2007 EA prepared for Project Approval stated that the proposed works are not hazardous or offensive development.</p>	The proposed modification does not require the introduction of new dangerous goods to be stored on site, and does not involve a substantial increase in the volume of dangerous goods stored on site,	<p>The additional ash recycling infrastructure would be similar in nature and scale to those described in the 2007 EA and would represent a continuation of existing operations.</p> <p>A preliminary risk review has indicated the risk profile of the EPS would not change. Based on preliminary review it is considered that the hazard and risk profile of the proposed modification would remain substantially the same as the originally approved project.</p>
Traffic Impacts	The 2006 EA prepared for Concept Plan application identified that there would be no	Internal site access from existing and proposed ash recycling facilities to the	Origin is not restricted by any conditions relating to ash transport onto

⁵ Ash Dam Augmentation Project Environmental Assessment, dated 15 August 2018, prepared by AECOM

Element	Originally Approved	Proposed Modification	Evaluation of Change
	<p>net increase in traffic movements during the operational phase of the proposed modification.</p> <p>The 2007 EA prepared for Project Approval did not describe traffic numbers or related impacts.</p> <p>There are no consent limits specific to operational traffic.</p>	<p>external road network (Wangi Road) would be via existing internal roads and there would be no significant onsite changes to support the proposed modification.</p>	<p>the surrounding road network for up to 80% ash recycling.</p> <p>As current ash recycling rates average around 40%, the proposed modification in enabling reliable ash recycling up to on average 80% is expected to double the existing truck movements from approximately 188 truck movements per day to 411 movements per day. This is compared to approximately 7000 vehicle movements per day on Wangi Road.</p> <p>An increase in traffic movements would occur irrespective of the proposed modification as Origin progress towards the existing 80% reuse or recycling goal using existing infrastructure until the proposed facilities are operational. Traffic impact assessment has identified that network operations would perform with minimal delay, and all intersections modelled would continue to operate at LoS A during operation of the proposed modification.</p>
Ecological Impacts	<p>The 2006 EA prepared for Concept Plan application identified 52 hectares of vegetation to be cleared.</p> <p>The 2007 EA prepared for Project Approval identified a reduced area of 21 hectares of vegetation to be cleared.</p>	<p>The additional ash storage silos would be located on previously disturbed, hardstand areas of the EPS site.</p>	<p>Aside from the removal of strips of planted grass, no vegetation clearing would be required for construction of the additional ash storage silos.</p> <p>Clearing of vegetation to support implementation of the proposed</p>

Element	Originally Approved	Proposed Modification	Evaluation of Change
	The 2018 EA prepared for Project Approval MOD 1 identified 8.95 hectares of native vegetation to be cleared.		modification is an activity which has been previously considered and assessed.
Cultural Heritage	<p>The 2007 EA described the database searches, archaeological surveys and Aboriginal consultation undertaken for the proposed modification. No previously recorded Aboriginal sites were identified in the study area and there was no evidence of surface Aboriginal sites identified during the surveys.</p> <p>Based on geomorphological interpretations, the entire study area was found to have a very low potential for archaeological sites and/or deposits.</p> <p>Visual observations suggested the potential for subsurface archaeological sites was also low given the lack of a developed or <i>in situ</i> profile being evident within the study area.</p> <p>The 2007 EA identified that there were no known items of non-Aboriginal heritage significance under the <i>Heritage Act 1977</i> on the EPS.</p>	The construction of additional ash storage silos would be undertaken on previously disturbed land within the EPS site.	Only minimal ground disturbance would be required for construction of additional ash recycling infrastructure and these would be located on previously disturbed areas of the EPS site.
Noise	The 2006 EA prepared for Concept Plan application concluded that the proposed modification would not generate significant	The proposed modification may include some noise generating equipment such as pumps and ancillary equipment required for	Given the context of the EPS, additional noise generated from the

Element	Originally Approved	Proposed Modification	Evaluation of Change
	<p>noise over and above that already occurring as a result of the ash disposal process and that there would be no significant impact on terms of noise on local receivers.</p> <p>The 2007 EA prepared for Project Approval noted that the EPS is separated from surrounding land uses by extensive tracts of land which provide a buffer that minimises adverse visual and acoustic impacts. There was no further discussion of noise generated by the proposed modification or potential impacts.</p> <p>There are no consent limits regarding operational noise, however construction activities that would generate an audible noise at residential premises are limited to standard construction hours.</p>	<p>the transfer of ash around the EPS and loading of trucks. Additional noise generated from project infrastructure is not likely to be significant.</p> <p>There would be additional truck movements associated with operation of the proposed modification (refer to the 'Traffic Impacts' section of this table) which has the potential to increase traffic related noise.</p>	<p>proposed modification is not likely to result in impacts to sensitive receivers.</p>
Air Quality	<p>The 2007 EA prepared for Project Approval focused the assessment of air quality impacts on impacts from the expansion of the ash dam.</p>	<p>The proposed modification does not relate to any change in ash dam operations and there would be no material change in air quality impacts at the ash dam.</p> <p>The proposed handling, storage and transport of run-of-station fly ash associated with the proposed modification is a completely sealed process where ash is conveyed pneumatically and stored in silos with advanced air filtration to capture fugitive emissions.</p>	<p>There is not expected to be any material change in air emissions from the proposed modification, given the sealed nature of the fly ash handling and storage system.</p> <p>Origin is currently undertaking upgrades to the air filtration associated with existing ash recycling operations. New facilities (e.g. silos) would be fitted with air filtration where appropriate to minimise fugitive emissions.</p>
Visual Amenity	<p>The 2006 EA prepared for Concept Approval and the 2007 EA prepared for</p>	<p>The proposed modification would be consistent with the existing industrial nature</p>	<p>The additional infrastructure required for the proposed modification would be</p>

Element	Originally Approved	Proposed Modification	Evaluation of Change
	Project Approval noted that the EPS is separated from surrounding land uses by extensive tracts of land which provide a buffer that minimises adverse visual and acoustic impacts.	<p>of the EPS site. Additional infrastructure may include the following:</p> <ul style="list-style-type: none">• additional silos• amenities and office building• pneumatic pipeline.	<p>similar in nature and scale to the ash recycling facilities described in the 2007 EA, would be located within the existing operational area of the EPS and would remain consistent with the surrounding environment.</p> <p>As per the original assessment, surrounding buffer lands would minimise views to the EPS and visual impacts would be limited. The proposed changes would not be visible off-site.</p>

Appendix C

EPBC Act Protected
Matters Search

Appendix C EPBC Act Protected Matters Search



EPBC Act Protected Matters Report

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

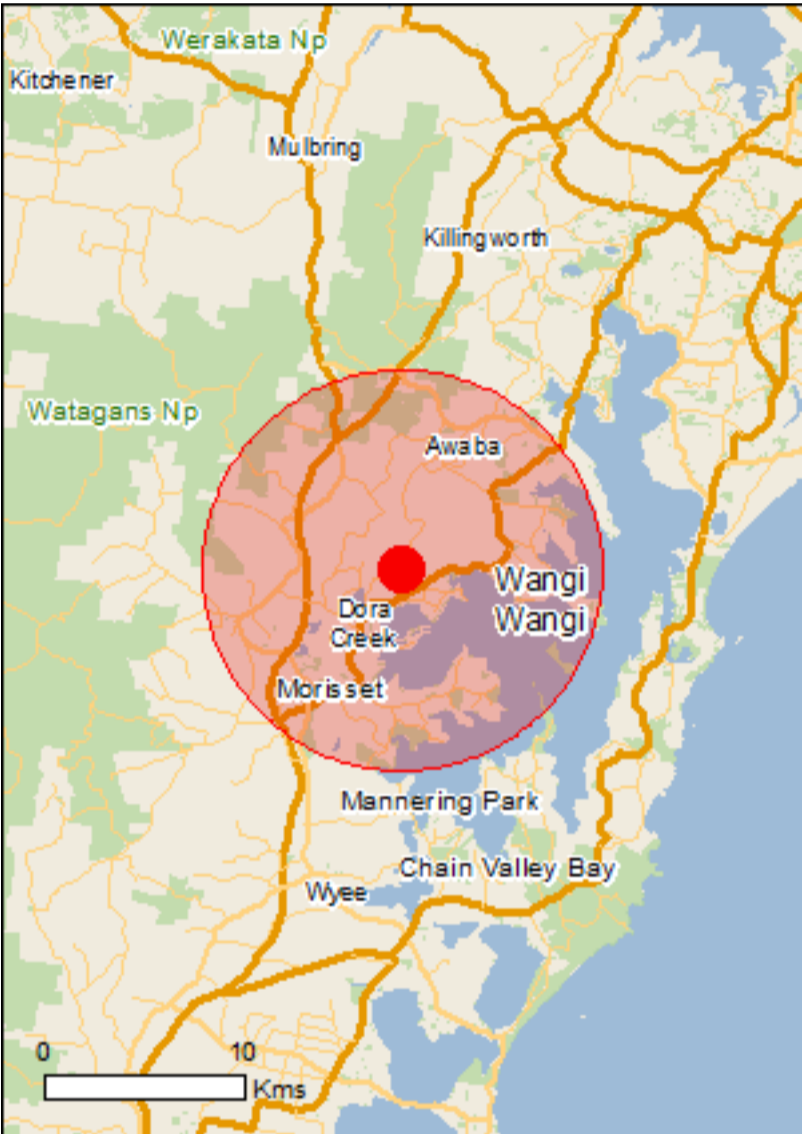
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 28/05/21 09:39:20

- [Summary](#)
- [Details](#)

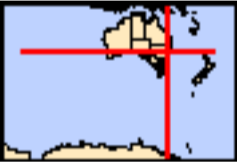
[Matters of NES](#)[Other Matters Protected by the EPBC Act](#)[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	73
Listed Migratory Species:	47

Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

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

Commonwealth Land:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	51
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	1
Invasive Species:	49
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

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

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Uperoleia mahonyi Mahony's Toadlet [89189]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur

Name	Status	Type of Presence within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Corunastylis insignis Wyong Midge Orchid 1, Variable Midge Orchid 1 [84692]	Critically Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Diuris praecox Newcastle Doubletail [55086]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus parramattensis subsp. decadens Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat may occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Limosa lapponica Bar-tailed Godwit [844]		within area Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Service Homes Corporation

Listed Marine Species	[Resource Information]
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* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Mammals		
Dugong dugon		
Dugong [28]		Species or species habitat may occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

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

Extra Information

State and Territory Reserves		[Resource Information]
Name		State
LNE Special Management Zone No1		NSW
Lake Macquarie		NSW
Pulbah Island		NSW
Sugarloaf		NSW
The Hunter Lakes		NSW
Watagans		NSW

Regional Forest Agreements		[Resource Information]
Note that all areas with completed RFAs have been included.		
Name		State
North East NSW RFA		New South Wales

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species

Name	Status	Type of Presence
Oryctolagus cuniculus Rabbit, European Rabbit [128]		habitat likely to occur within area Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom,		Species or species

Name	Status	Type of Presence
Common Broom, French Broom, Soft Broom [20126]		habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.06145 151.52085

Acknowledgements

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

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

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

Please feel free to provide feedback via the [Contact Us](#) page.

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Appendix D

Traffic Surveys

Appendix D Traffic Surveys

Survey Details

TTM Reference: **18SYD0065**

Location: **Rocky Point Rd & Construction Rd**

Suburb: **Eraring**

Date: **Thursday, 5 April 2018**

Duration: **0700-1000 & 1600-1900**

Weather: **Fine**

Notes: **0**

Peak Hours

AM Peak Hour: 0730-0830

PM Peak Hour: 1645-1745

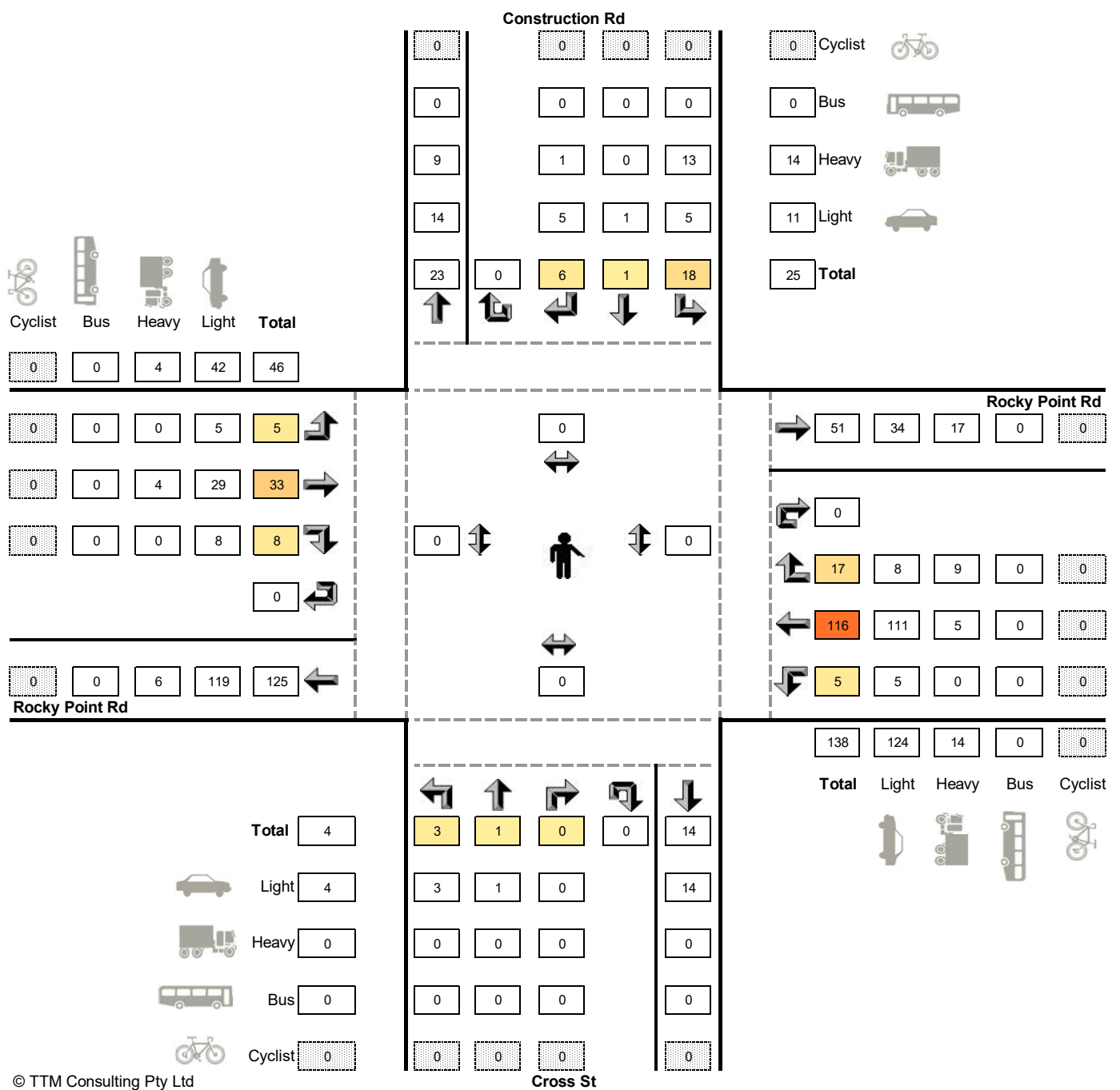
ttm

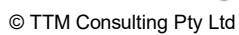
Peak Hour Summary

<i>1</i>	3	↗	<i>1</i>	<i>0</i>	<i>131</i>
<i>207</i>	8	→	↙	↓	↘
<i>0</i>	0	↘			
↙	↑	↗	↙	6	<i>8</i>
1	0	0	←	57	<i>11</i>
<i>1</i>	<i>0</i>	<i>0</i>	↙	4	<i>0</i>

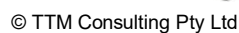
Image







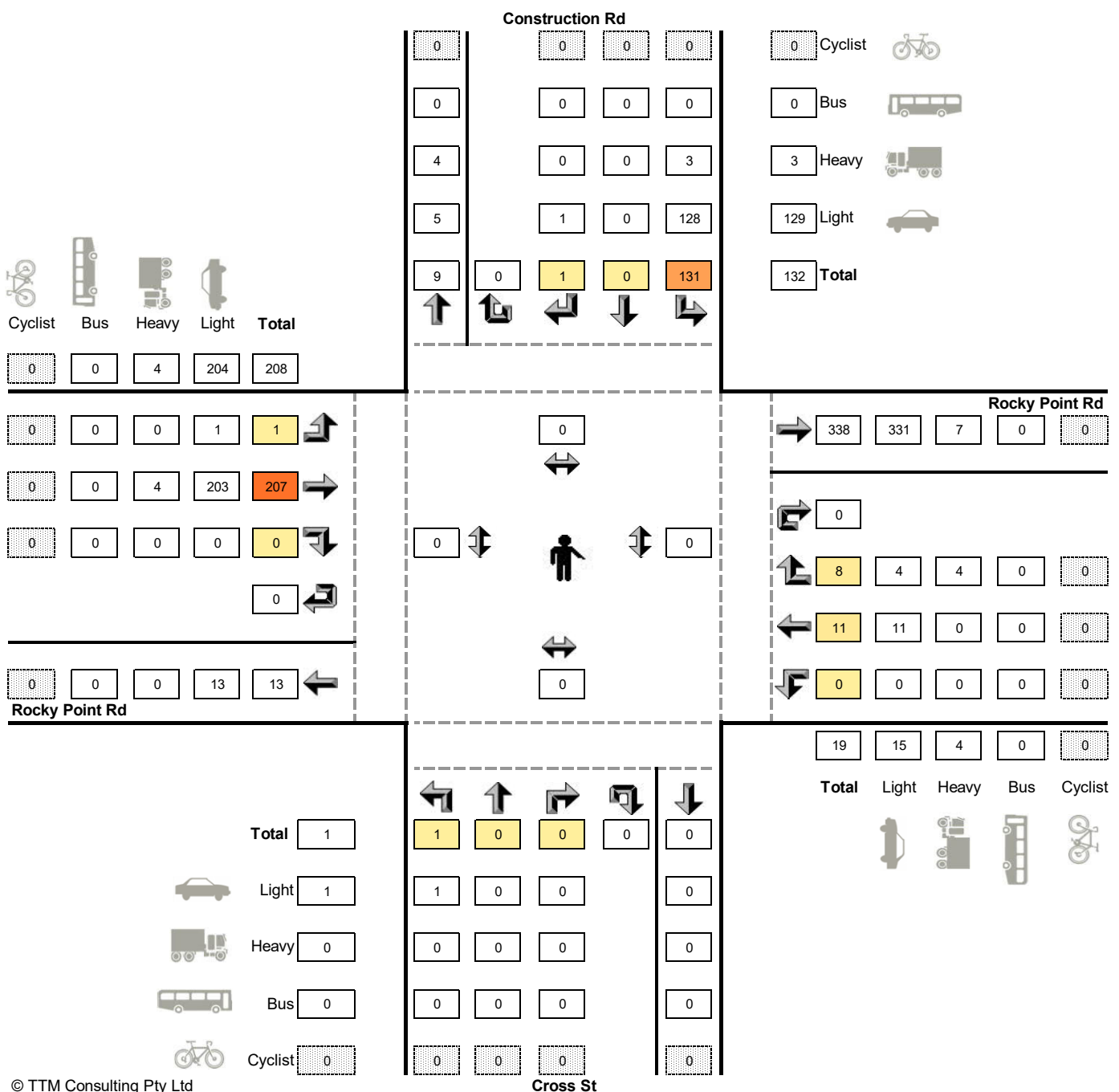
ttm



TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Construction Rd
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 PM Peak: 1645-1745
 Weather: Fine



www.ttmgroup.com.au



TTM Data

TTM Reference: 18SYD0065

Location: Rocky Point Rd & Construction Rd

Suburb: Eraring

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1645-1745



Time	Northern Approach: Construction Rd																Southern Approach: Cross St																								
15 min	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds			
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist				Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist				Light	Heavy	Bus	Total	Cyclist					
7:00	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:30	1	2	0	3	0	1	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	1	0	1	0	0	0	0	0	0	2	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:15	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
9:45	1	3	0	4	0	0	0	0	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	13	0	18	0	1	0	0	1	0	5	1	0	6	0	0	25	0	0	3	0	3	0	1	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0
AM Peak	1	4	0	5	0	1	0	0	1	0	2	0	0	2	0	0	8	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

16:00	4	2	0	6	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	4	1	0	5	0	0	0	0	0	0	1	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	7	0	0	7	0	1	0	0	1	0	1	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	12	0	0	12	0	0	0	0	0	0	1	0	0	1	0	13	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
17:00	93	2	0	95	0	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:15	12	1	0	13	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:30	11	0	0	11	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:45	4	1	0	5	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18:00	4	2	0	6	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
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18:30	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
18:45	5	2	0	7	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	
TOTAL	161	12	0	173	0	1	0	0	1	0	3	0	0	3	0	177	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	
PM Peak	128	3	0	131	0	0	0	0	0	0	1	0	0	1	0	132	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	

TTM Data

TTM Reference: 18SYD0065

Location: Rocky Point Rd & Construction Rd

Suburb: Eraring

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

AM Peak: 0730-0830

PM Peak: 1645-1745

Notes:



Time	Eastern Approach: Rocky Point Rd																	Western Approach: Rocky Point Rd																				
15 min	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist				Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist										
7:00	0	0	0	0	0	9	2	0	11	0	1	0	0	1	0	0	12	0	0	0	0	0	1	0	0	1	0	0	0	2	0	0	2	0	0			
7:15	0	0	0	0	0	13	0	0	13	0	0	1	0	1	0	0	14	0	0	0	0	0	1	0	0	1	0	0	0	2	0	0	2	0	0			
7:30	1	0	0	1	0	13	0	0	13	0	1	0	0	1	0	0	15	0	0	0	0	0	2	1	0	3	0	0	0	3	0	0	3	0	0			
7:45	1	0	0	1	0	15	0	0	15	0	1	2	0	3	0	0	19	0	0	1	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0			
8:00	1	0	0	1	0	12	1	0	13	0	1	0	0	1	0	0	15	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0			
8:15	1	0	0	1	0	16	0	0	16	0	0	1	0	1	0	0	18	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	0	0			
8:30	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0	0	11	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0			
8:45	0	0	0	0	0	11	1	0	12	0	1	1	0	2	0	0	14	0	0	0	0	0	2	0	0	0	1	0	0	3	0	0	3	0	0			
9:00	0	0	0	0	0	7	0	0	7	0	2	2	0	4	0	0	11	0	0	0	0	0	4	2	0	6	0	0	0	6	0	0	6	0	0			
9:15	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	3	0	0	3	0	2	0	6	0	0	6	0	0			
9:30	1	0	0	1	0	1	1	0	2	0	0	0	0	0	0	0	3	0	0	1	0	0	3	0	0	3	0	1	0	5	0	0	5	0	0			
9:45	0	0	0	0	0	1	0	0	1	0	1	2	0	3	0	0	4	0	0	0	0	0	7	1	0	8	0	2	0	10	0	0	10	0	0			
TOTAL	5	0	0	5	0	111	5	0	116	0	8	9	0	17	0	0	138	0	0	5	0	0	5	0	0	33	0	8	0	8	0	0	46	0	0			
AM Peak	4	0	0	4	0	56	1	0	57	0	3	3	0	6	0	0	67	0	0	3	0	0	3	0	0	8	0	0	0	11	0	0	11	0	0			
16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	16	0	0	16	0	0	0	0	0	16	0	0				
16:15	0	0	0	0	0	5	1	0	6	0	2	0	0	2	0	0	8	0	0	0	0	0	17	0	0	17	0	0	0	0	0	17	0	0				
16:30	0	0	0	0	0	6	0	0	6	0	3	1	0	4	0	0	10	0	0	1	0	0	24	0	0	24	0	0	0	0	0	25	0	0				
16:45	0	0	0	0	0	4	0	0	4	0	1	0	0	1	0	0	5	0	0	0	0	0	35	2	0	37	0	0	0	0	0	37	0	0				
17:00	0	0	0	0	0	1	0	0	1	0	1	1	0	2	0	0	3	0	0	0	0	0	77	0	0	77	0	0	0	0	0	77	0	0				
17:15	0	0	0	0	0	4	0	0	4	0	1	1	0	2	0	0	6	0	0	0	0	0	42	1	0	43	0	0	0	0	0	43	0	0				
17:30	0	0	0	0	0	2	0	0	2	0	1	2	0	3	0	0	5	0	0	1	0	0	49	1	0	50	0	0	0	0	0	51	0	0				
17:45	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	6	0	0	0	0	0	6	0	0	6	0	0	0	0	0	6	0	0				
18:00	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	2	0	0	2	0	0	0	0	3	0	0					
18:15	0	0	0	0	0	12	0	0	12	0	0	2	0	2	0	0	14	0	0	0	0	0	3	0	0	3	0	0	0	0	3	0	0					
18:30	15	0	0	15	0	8	0	0	8	0	0	1	0	1	0	0	24	0	0	0	0	0	10	0	0	10	0	0	0	0	10	0	0					
18:45	8	0	0	8	0	3	0	0	3	0	0	0	0	0	0	0	11	0	0	0	0	0	19	0	0	19	0	0	0	0	19	0	0					
TOTAL	23	0	0	23	0	53	1	0	54	0	9	9	0	18	0	0	95	0	0	3	0	0	300	4	0	304	0	0	0	0	0	307	0	0				
PM Peak	0	0	0	0	0	11	0	0	11	0	4	4	0	8	0	0	19	0	0	1	0	0	203	4	0	207	0	0	0	0	0	208	0	0				

Survey Details

TTM Reference: **18SYD0065**

Location: **Rocky Point Rd & Wangi Rd NB On-Ramp**

Suburb: **Eraring**

Date: **Thursday, 5 April 2018**

Duration: **0700-1000 & 1600-1900**

Weather: **Fine**

Notes: **0**

Peak Hours

AM Peak Hour: 0730-0830

PM Peak Hour: 1645-1745

ttm

Peak Hour Summary

			0	0	
			0	0	
202	4	↗	↙	↘	
136	9	→			
			↖	10	4
			←	66	20

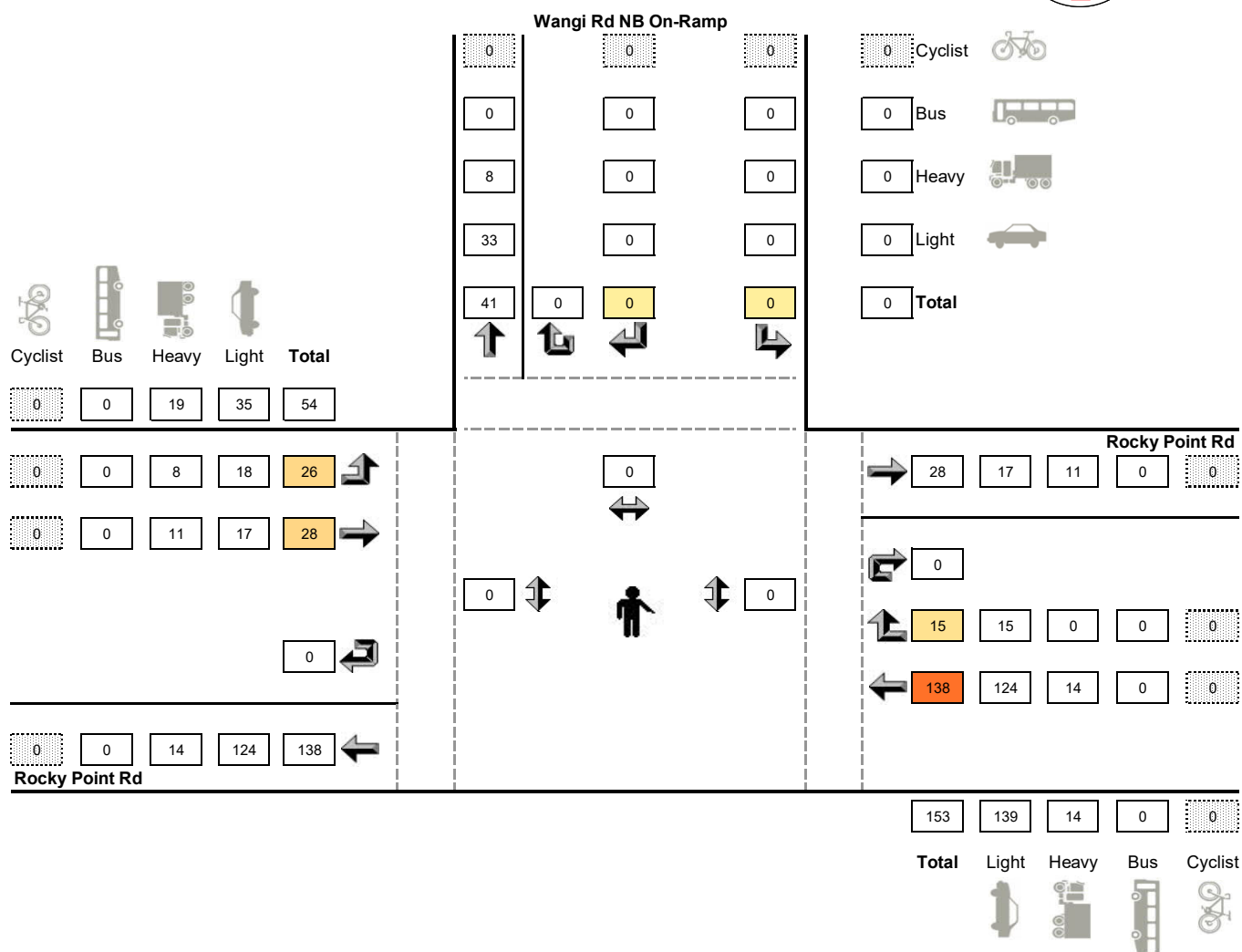
Image

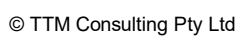


TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd NB On-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 0700-1000
 Weather: Fine



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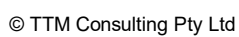




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6

Survey Details

TTM Reference: **18SYD0065**

Location: **Rocky Point Rd & Wangi Rd NB Off-Ramp**

Suburb: **Eraring**

Date: **Thursday, 5 April 2018**

Duration: **0700-1000 & 1600-1900**

Weather: **Fine**

Notes: **0**

Peak Hours

AM Peak Hour: 0730-0830

PM Peak Hour: 1645-1745

ttm

Peak Hour Summary

138	9	→
0	0	↘

↙	↘
23	3
11	8

←	54	13
↙	0	0

Image



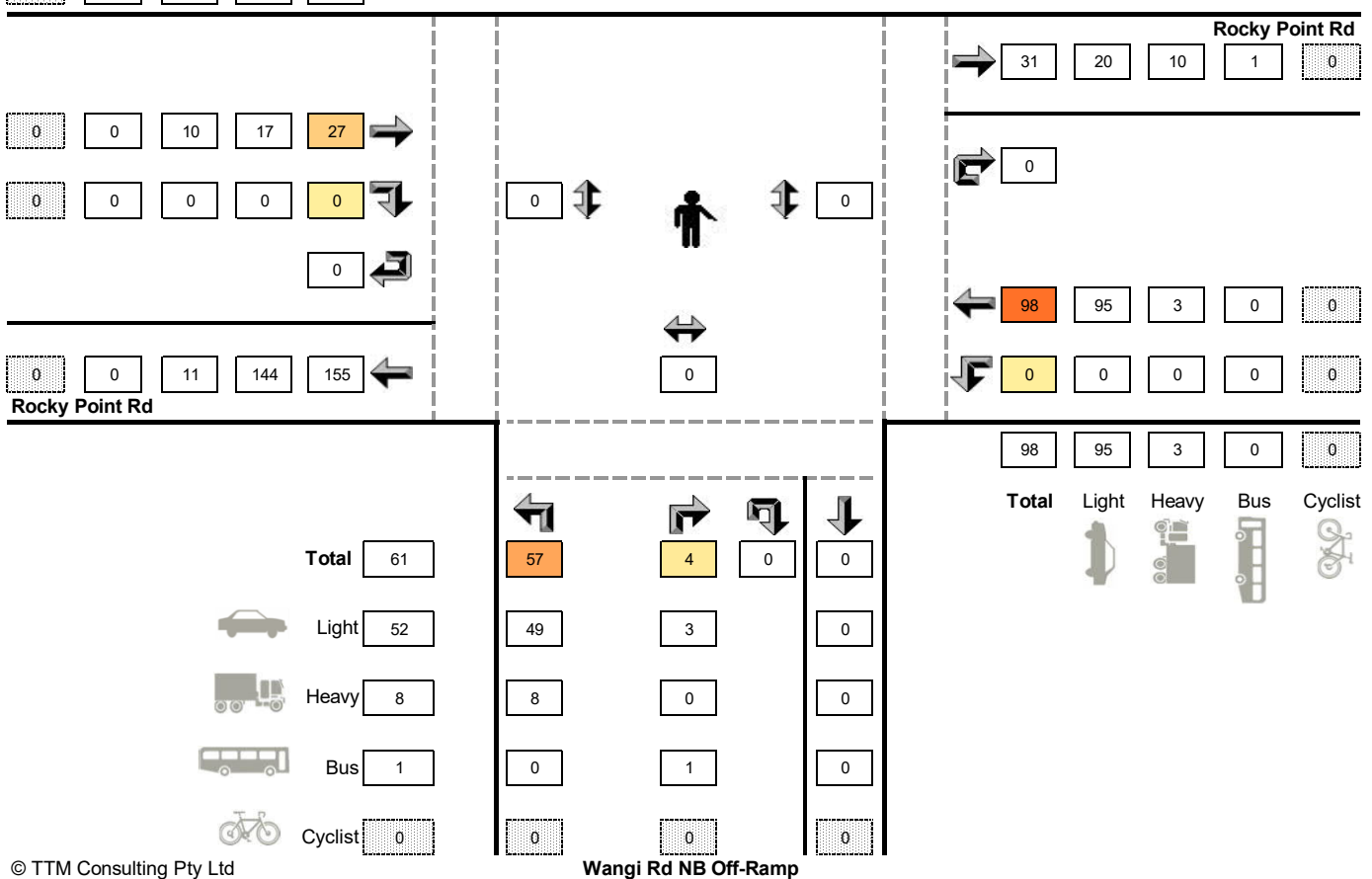
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd NB Off-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 0700-1000
 Weather: Fine



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				Total
0	0	10	17	27



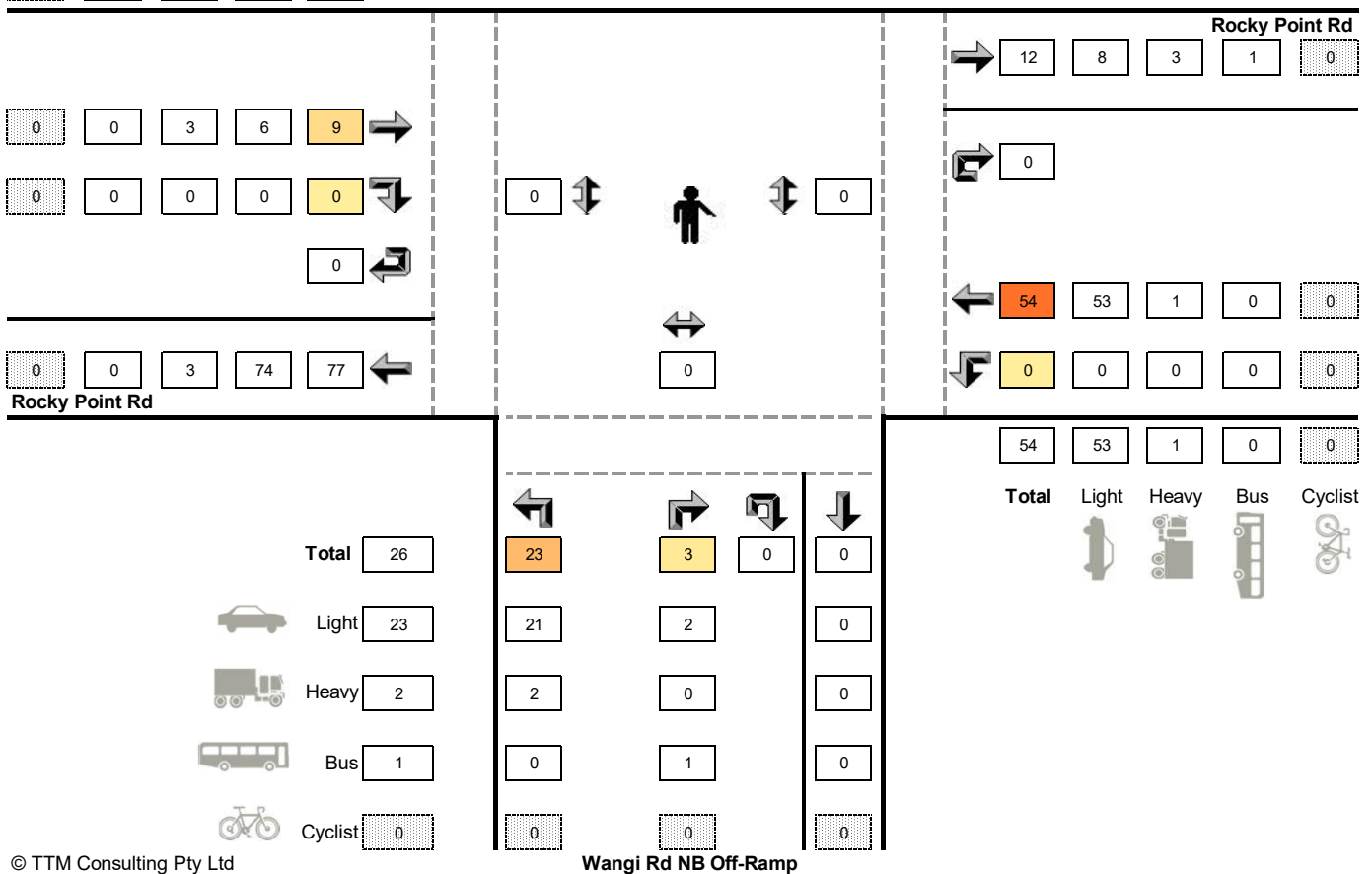
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd NB Off-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 AM Peak: 0730-0830
 Weather: Fine



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				Total
0	0	3	6	9



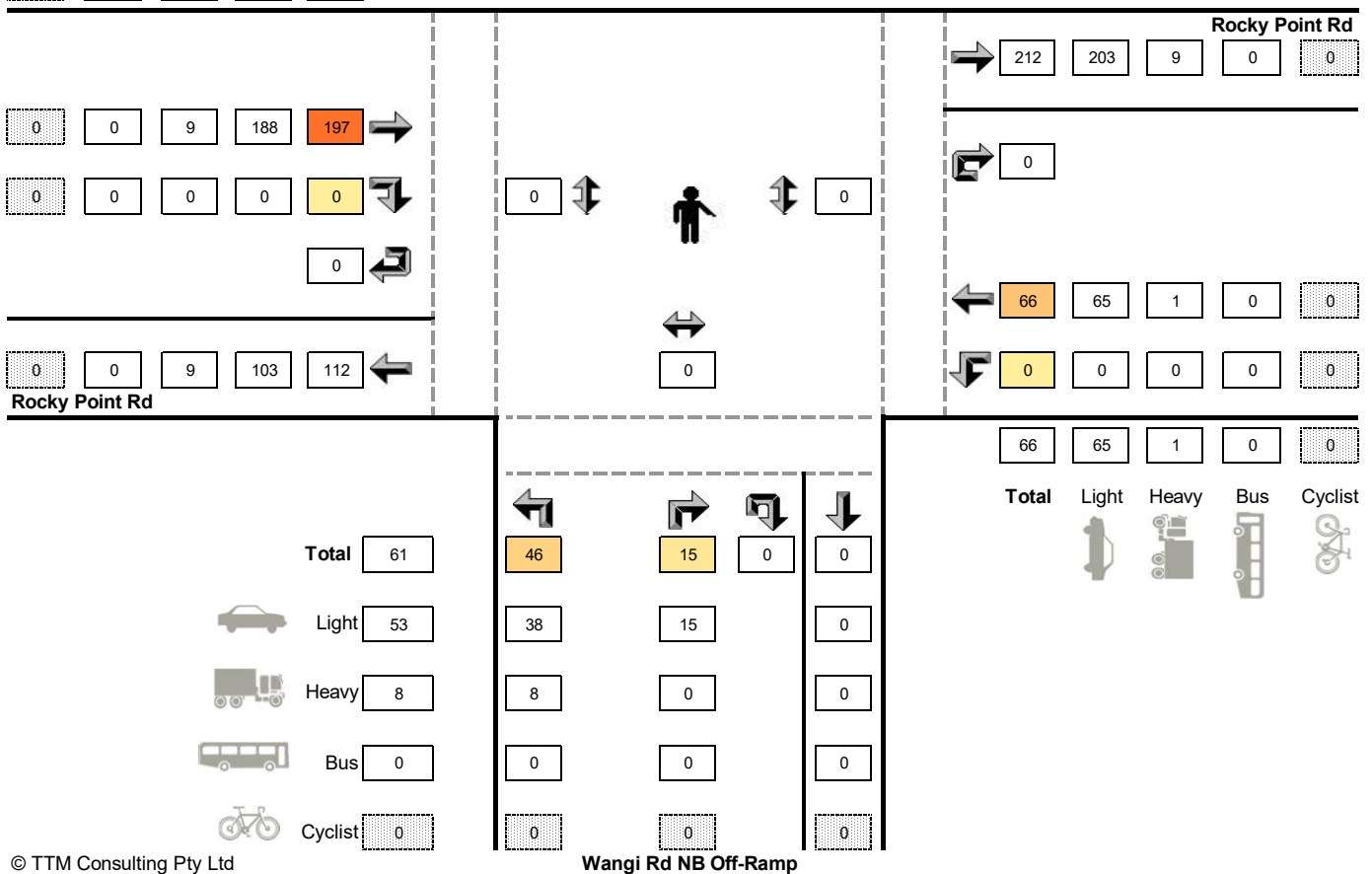
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd NB Off-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 1600-1900
 Weather: Fine



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				Total
0	0	9	188	197



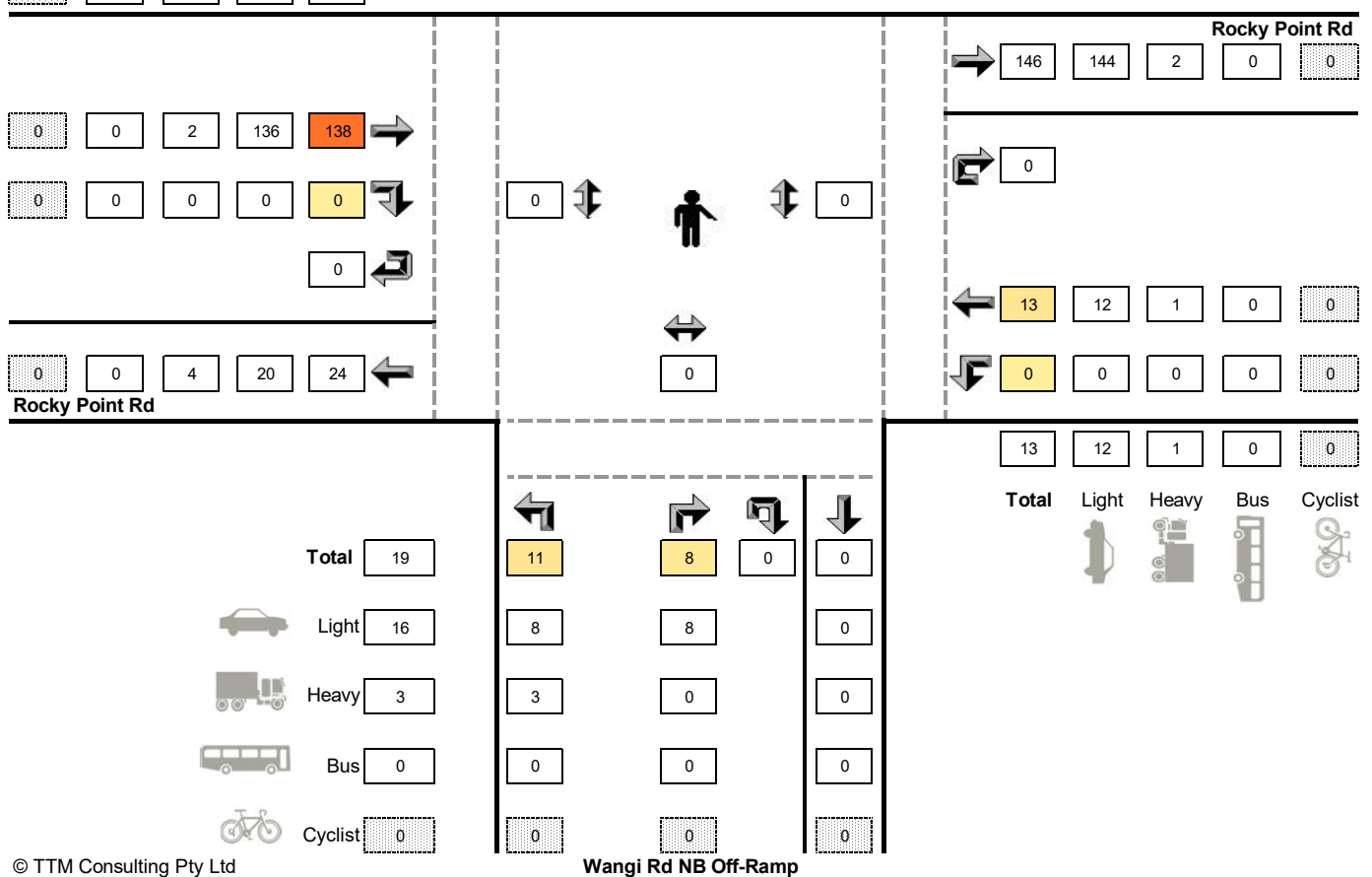
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd NB Off-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 PM Peak: 1645-1745
 Weather: Fine



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				Total
0	0	2	136	138



TTM Data

TTM Reference: 18SYD0065

Location: Rocky Point Rd & Wangi Rd NB Off-Ramp

Suburb: Eraring

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1645-1745



Time	Western Approach: Rocky Point Rd													Southern Approach: Wangi Rd NB Off-Ramp													Eastern Approach: Rocky Point Rd															
15 min	Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					U Turn	TOTAL	Cyclists	Peds
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist					Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist					Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist				
7:00	0	2	0	2	0	0	0	0	0	0	0	2	0	0	4	1	0	5	0	0	0	0	0	0	5	0	0	0	0	10	0	0	10	0	0	10	0	0				
7:15	1	2	0	3	0	0	0	0	0	0	0	3	0	0	7	1	0	8	0	0	0	0	0	0	8	0	0	0	0	5	0	0	5	0	0	5	0	0				
7:30	2	2	0	4	0	0	0	0	0	0	0	4	0	0	5	0	0	5	0	2	0	1	3	0	8	0	0	0	0	12	0	0	12	0	0	12	0	0				
7:45	2	1	0	3	0	0	0	0	0	0	0	3	0	0	6	1	0	7	0	0	0	0	0	0	7	0	0	0	0	12	1	0	13	0	0	13	0	0				
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	4	0	0	0	0	16	0	0	16	0	0	16	0	0				
8:15	2	0	0	2	0	0	0	0	0	0	0	2	0	0	6	1	0	7	0	0	0	0	0	0	7	0	0	0	0	13	0	0	13	0	0	13	0	0				
8:30	1	0	0	1	0	0	0	0	0	0	0	1	0	0	5	0	0	5	0	1	0	0	1	0	6	0	0	0	0	5	0	0	5	0	0	5	0	0				
8:45	1	0	0	1	0	0	0	0	0	0	0	1	0	0	7	1	0	8	0	0	0	0	0	0	8	0	0	0	0	7	0	0	7	0	0	7	0	0				
9:00	4	1	0	5	0	0	0	0	0	0	0	5	0	0	1	2	0	3	0	0	0	0	0	0	3	0	0	0	0	9	0	0	9	0	0	9	0	0				
9:15	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	0	0	2	0	0	2	0	0				
9:30	1	1	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	3	1	0	4	0	0	4	0	0				
9:45	2	1	0	3	0	0	0	0	0	0	0	3	0	0	2	1	0	3	0	0	0	0	0	0	3	0	0	0	0	1	1	0	2	0	0	2	0	0				
TOTAL	17	10	0	27	0	0	0	0	0	0	0	27	0	0	49	8	0	57	0	3	0	1	4	0	61	0	0	0	0	95	3	0	98	0	0	98	0	0				
AM Peak	6	3	0	9	0	0	0	0	0	0	0	9	0	0	21	2	0	23	0	2	0	1	3	0	26	0	0	0	0	53	1	0	54	0	0	54	0	0				
16:00	9	0	0	9	0	0	0	0	0	0	0	9	0	0	0	1	0	1	0	1	0	0	1	0	2	0	0	0	0	3	0	0	3	0	0	3	0	0				
16:15	10	1	0	11	0	0	0	0	0	0	0	11	0	0	4	0	0	4	0	1	0	0	1	0	5	0	0	0	0	5	0	0	5	0	0	5	0	0				
16:30	12	0	0	12	0	0	0	0	0	0	0	12	0	0	4	1	0	5	0	0	0	0	0	5	0	0	0	0	7	0	0	7	0	0	7	0	0					
16:45	18	0	0	18	0	0	0	0	0	0	0	18	0	0	5	0	0	5	0	3	0	0	3	0	8	0	0	0	0	2	0	0	2	0	0	2	0	0				
17:00	75	1	0	76	0	0	0	0	0	0	0	76	0	0	1	0	0	1	0	3	0	0	3	0	4	0	0	0	0	4	1	0	5	0	0	5	0	0				
17:15	17	1	0	18	0	0	0	0	0	0	0	18	0	0	1	1	0	2	0	0	0	0	0	2	0	0	0	0	0	4	0	0	4	0	0	4	0	0				
17:30	26	0	0	26	0	0	0	0	0	0	0	26	0	0	1	2	0	3	0	2	0	0	2	0	5	0	0	0	0	2	0	0	2	0	0	2	0	0				
17:45	5	1	0	6	0	0	0	0	0	0	0	6	0	0	2	0	0	2	0	0	0	0	0	2	0	0	0	0	5	0	0	5	0	0	5	0	0					
18:00	2	2	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	2	0	2	0	0	0	0	4	0	0	4	0	0	4	0	0				
18:15	3	1	0	4	0	0	0	0	0	0	0	4	0	0	3	2	0	5	0	1	0	0	1	0	6	0	0	0	0	10	0	0	10	0	0	10	0	0				
18:30	5	0	0	5	0	0	0	0	0	0	0	5	0	0	11	1	0	12	0	1	0	0	1	0	13	0	0	0	0	11	0	0	11	0	0	11	0	0				
18:45	6	2	0	8	0	0	0	0	0	0	0	8	0	0	6	0	0	6	0	1	0	0	1	0	7	0	0	0	0	8	0	0	8	0	0	8	0	0				
TOTAL	188	9	0	197	0	0	0	0	0	0	0	197	0	0	38	8	0	46	0	15	0	0	15	0	61	0	0	0	0	65	1	0	66	0	0	66	0	0				
PM Peak	136	2	0	138	0	0	0	0	0	0	0	138	0	0	8	3	0	11	0	8	0	0	8	0	19	0	0	0	0	12	1	0	13	0	0	13	0	0				

Survey Details

TTM Reference: **18SYD0065**

Location: **Rocky Point Rd & Wangi Rd SB On-Ramp**

Suburb: **Eraring**

Date: **Thursday, 5 April 2018**

Duration: **0700-1000 & 1600-1900**

Weather: **Fine**

Notes: **0**

Peak Hours

AM Peak Hour: 0730-0830

PM Peak Hour: 1645-1745

ttm

Peak Hour Summary

10 6 →

136 6 ↘

↙	↘
0	0
<i>0</i>	<i>0</i>

←	54	<i>13</i>
↙	8	<i>4</i>

Image



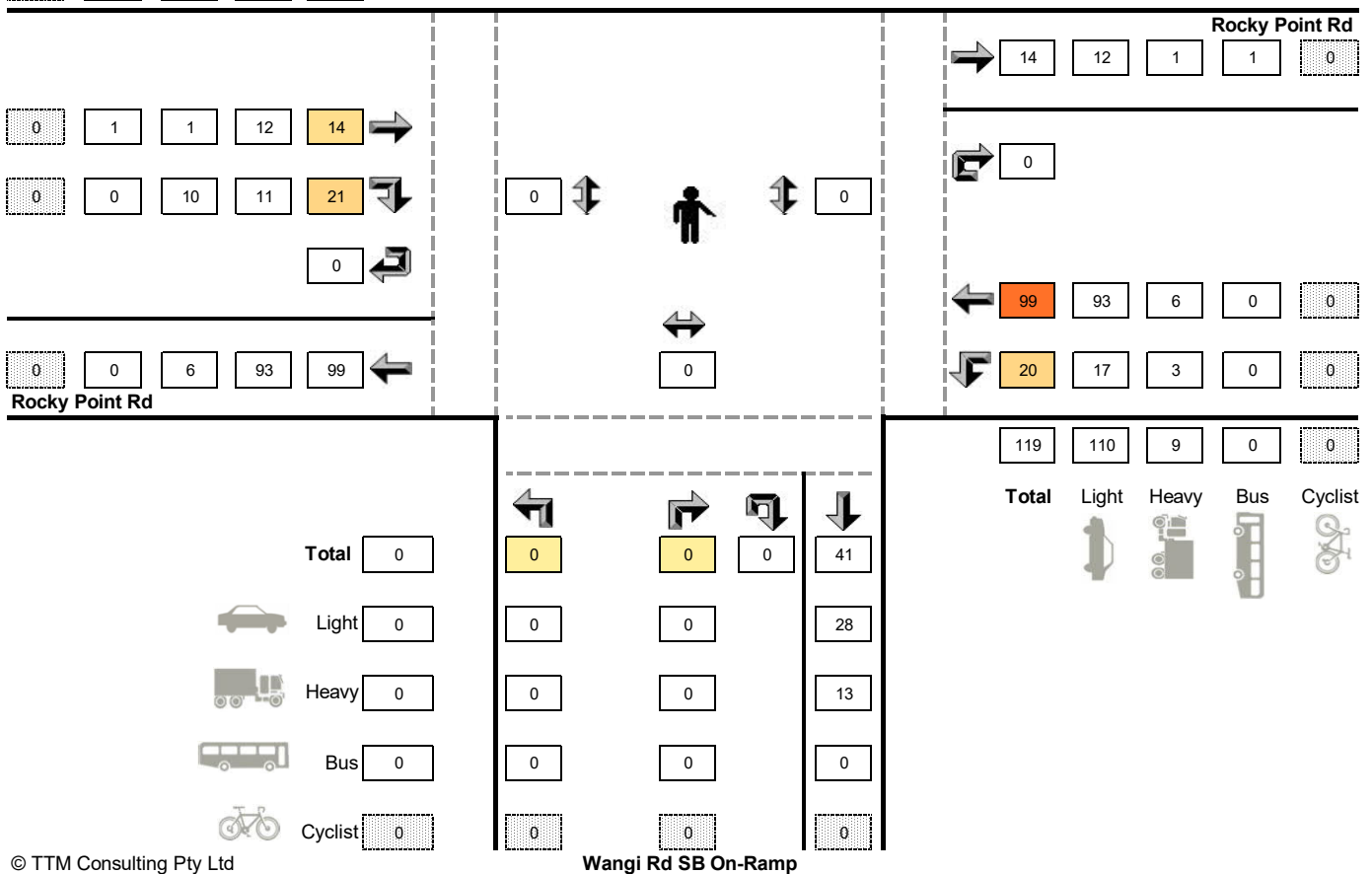
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd SB On-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 0700-1000
 Weather: Fine



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				Total
0	1	11	23	35



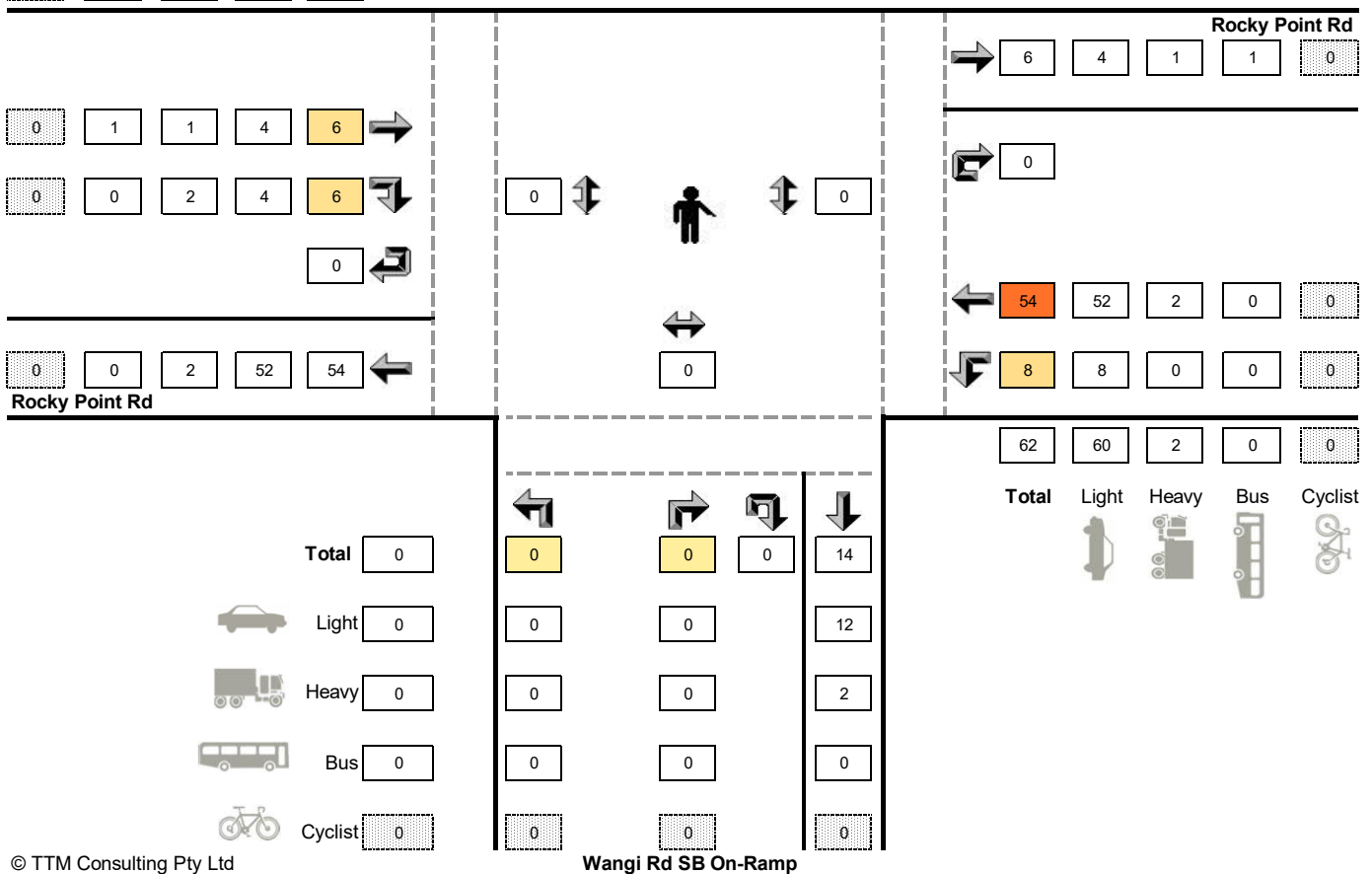
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd SB On-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 AM Peak: 0730-0830
 Weather: Fine



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				Total
0	1	3	8	12



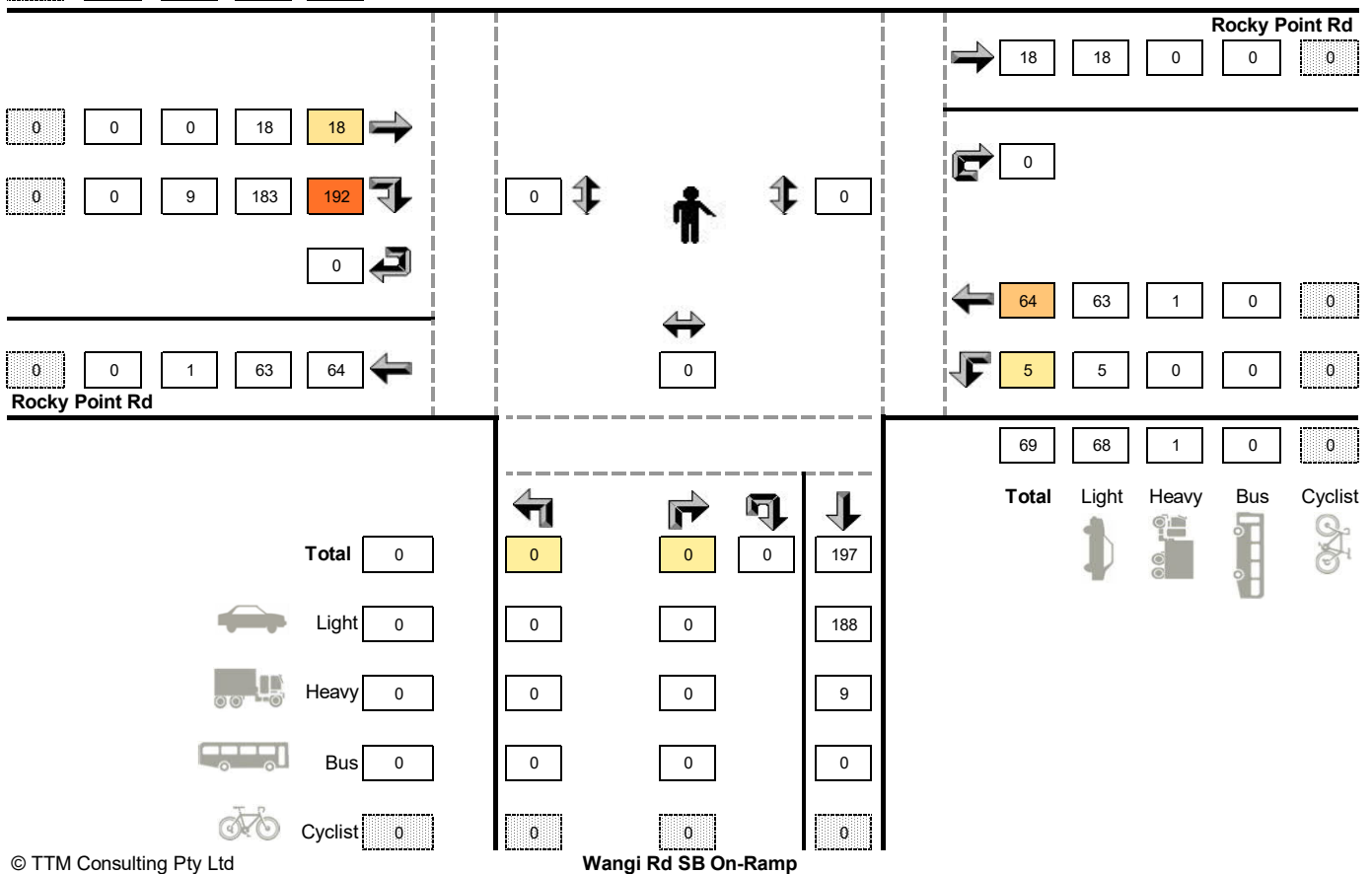
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd SB On-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 1600-1900
 Weather: Fine



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				Total
0	0	9	201	210



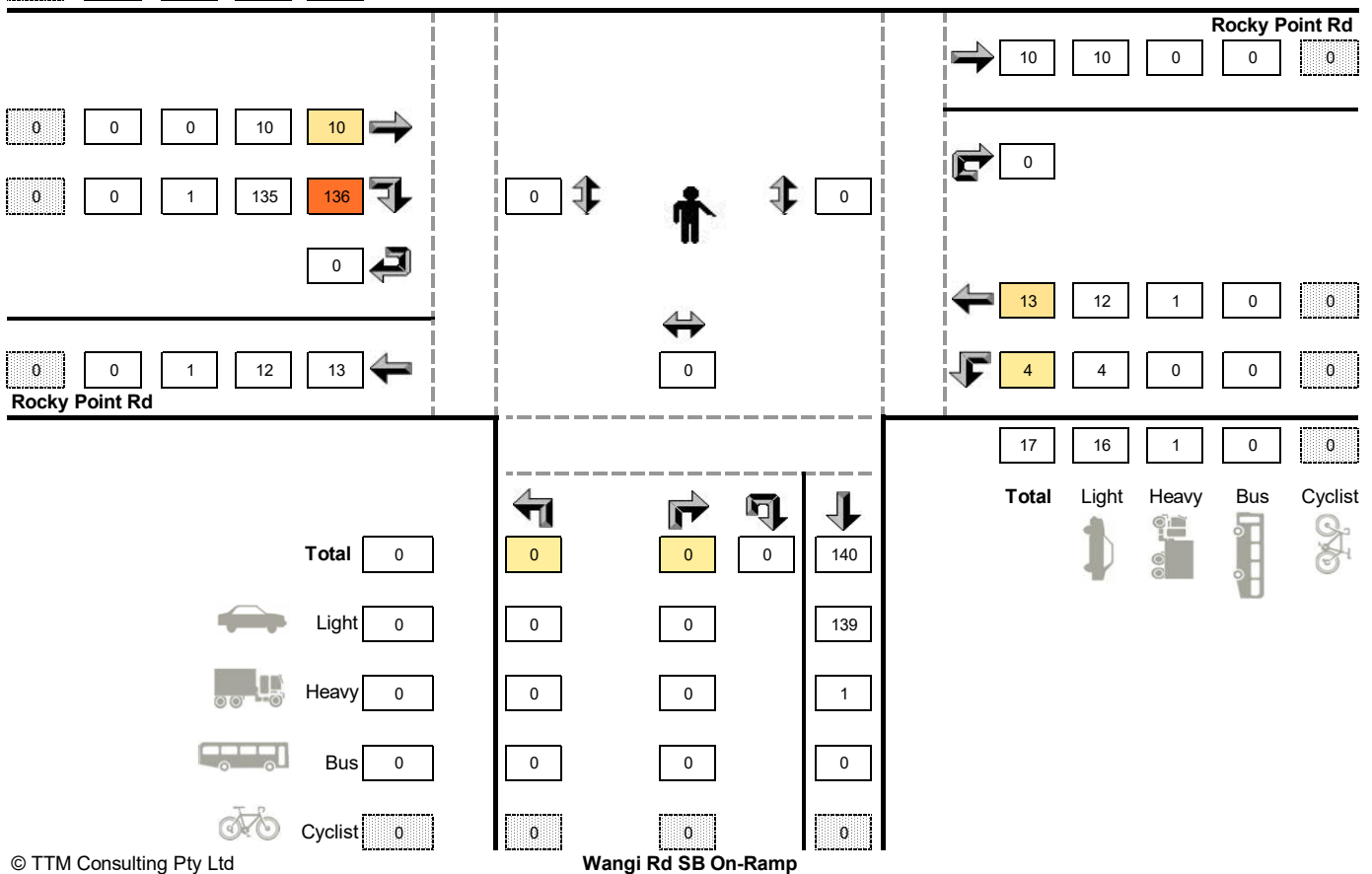
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd SB On-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 PM Peak: 1645-1745
 Weather: Fine



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				Total
0	0	1	145	146



TTM Data

TTM Reference: 18SYD0065

Location: Rocky Point Rd & Wangi Rd SB On-Ramp

Suburb: Eraring

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1645-1745



Time	Western Approach: Rocky Point Rd													Southern Approach: Wangi Rd SB On-Ramp													Eastern Approach: Rocky Point Rd																
15 min	Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					U Turn	TOTAL	Cyclists	Peds	
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds	
7:00	0	0	0	0	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	9	1	0	10	0	0	12	0	0
7:15	0	0	0	0	0	1	2	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	5	0	0	5	0	0	6	0	0	
7:30	3	1	1	5	0	1	1	0	2	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	12	0	0	12	0	0	13	0	0	
7:45	1	0	0	1	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	12	1	0	13	0	0	15	0	0	
8:00	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	15	1	0	16	0	0	19	0	0	
8:15	0	0	0	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	13	0	0	13	0	0	15	0	0	
8:30	1	0	0	1	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	5	0	0	5	0	0	6	0	0	
8:45	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	6	1	0	7	0	0	9	0	0	
9:00	2	0	0	2	0	2	1	0	3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	10	0	0	10	0	0	11	0	0	
9:15	1	0	0	1	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0		
9:30	2	0	0	2	0	1	1	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	0	3	1	0	4	0	0	7	0	0	
9:45	2	0	0	2	0	0	2	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	1	0	2	0	0	4	0	0	
TOTAL	12	1	1	14	0	11	10	0	21	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	3	0	20	0	93	6	0	99	0	0	119	0	0	
AM Peak	4	1	1	6	0	4	2	0	6	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	52	2	0	54	0	0	62	0	0	

16:00	1	0	0	1	0	9	0	0	9	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0
16:15	1	0	0	1	0	8	1	0	9	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	0	6	0	0
16:30	0	0	0	0	0	12	1	0	13	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	5	0	0
16:45	3	0	0	3	0	16	0	0	16	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	0	0	4	0	0
17:00	5	0	0	5	0	76	0	0	76	0	0	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	4	1	0	5	0	0	6	0	0
17:15	0	0	0	0	0	17	1	0	18	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	4	0	0
17:30	2	0	0	2	0	26	0	0	26	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	0	0	3	0	0
17:45	0	0	0	0	0	5	1	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	5	0	0	
18:00	3	0	0	3	0	1	2	0	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	4	0	0
18:15	1	0	0	1	0	3	1	0	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	10	0	0	10	0	0	11	0	0
18:30	1	0	0	1	0	5	0	0	5	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	0	11	0	0
18:45	1	0	0	1	0	5	2	0	7	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	0	8	0	0
TOTAL	18	0	0	18	0	183	9	0	192	0	0	210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	63	1	0	64	0	0	69	0	0
PM Peak	10	0	0	10	0	135	1	0	136	0	0	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	12	1	0	13	0	0	17	0	0

Survey Details

TTM Reference: **18SYD0065**

Location: **Rocky Point Rd & Wangi Rd SB Off-Ramp**

Suburb: **Eraring**

Date: **Thursday, 5 April 2018**

Duration: **0700-1000 & 1600-1900**

Weather: **Fine**

Notes: **0**

Peak Hours

AM Peak Hour: 0730-0830

PM Peak Hour: 1800-1900

ttm

Peak Hour Summary

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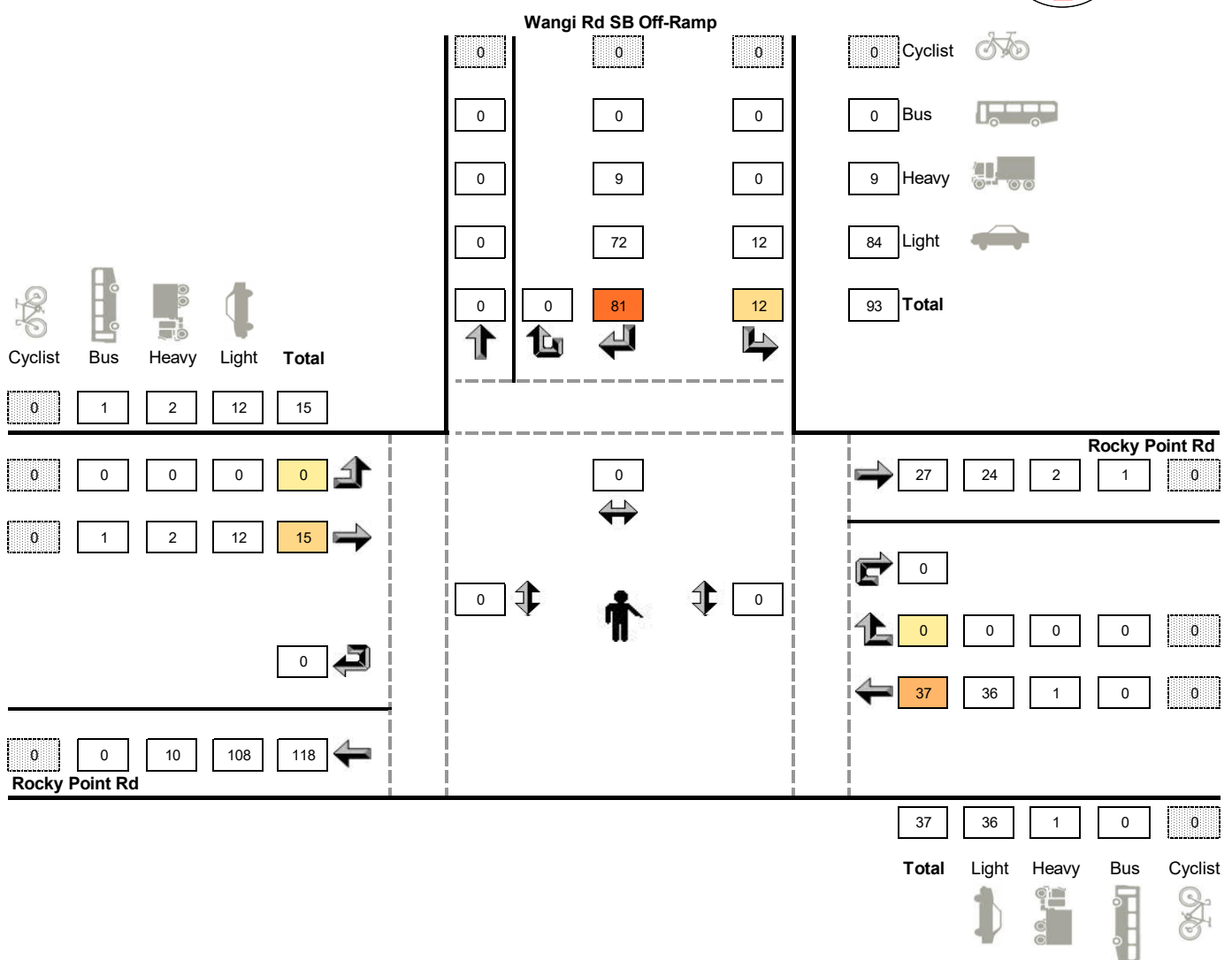
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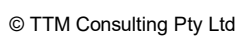
TTM Reference: 18SYD0065
 Location: Rocky Point Rd & Wangi Rd SB Off-Ramp
 Suburb: Eraring
 Date: Thursday, 5 April 2018
 Survey Period: 0700-1000
 Weather: Fine



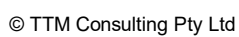
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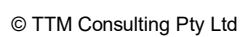


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TTM Data

TTM Reference: 18SYD0065

Location: Rocky Point Rd & Wangi Rd SB Off-Ramp

Suburb: Eraring

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1800-1900



Time	Eastern Approach Rocky Point Rd														Northern Approach Wangi Rd SB Off-Ramp														Western Approach Rocky Point Rd																									
15 min	Straight							Right							U Turn	TOTAL	Cyclists	Peds	Left							Right							U Turn	TOTAL	Cyclists	Peds	Left							Straight							U Turn	TOTAL	Cyclists	Peds
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	U Turn	TOTAL	Cyclists	Peds												
7:00	1	1	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	10	1	0	11	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
7:15	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	4	0	0	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
7:30	3	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	10	0	0	10	0	0	10	0	0	0	0	0	0	0	4	1	1	6	0	0	0	6	0	0	0	0	0									
7:45	3	0	0	3	0	0	0	0	0	0	0	3	0	0	2	0	0	2	11	1	0	12	0	0	14	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0								
8:00	11	0	0	11	0	0	0	0	0	0	0	11	0	0	1	0	0	1	8	1	0	9	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
8:15	3	0	0	3	0	0	0	0	0	0	0	3	0	0	1	0	0	1	11	0	0	11	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
8:30	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	5	0	0	5	0	0	6	0	0	6	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0									
8:45	3	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	4	2	0	6	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
9:00	2	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	7	1	0	8	0	0	10	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0									
9:15	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3	0	0	3	0	1	0	0	1	0	0	4	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0								
9:30	5	0	0	5	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	2	0	0	2	0	0	2	0	0	0	0	0	0	1	1	0	2	0	0	2	0	0	2	0	0	0									
9:45	2	0	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	1	1	1	3	0	0	3	0	0	3	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0									
TOTAL	36	1	0	37	0	0	0	0	0	0	0	37	0	0	12	0	0	12	0	72	9	0	81	0	0	93	0	0	0	0	0	12	2	1	15	0	0	15	0	0	15	0	0	0	0									
AM Peak	20	0	0	20	0	0	0	0	0	0	0	20	0	0	4	0	0	4	0	40	2	0	42	0	0	46	0	0	0	0	0	5	1	1	7	0	0	7	0	0	7	0	0	0	0									
16:00	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3	0	0	3	0	1	0	0	1	0	0	4	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0								
16:15	3	0	0	3	0	0	0	0	0	0	0	3	0	0	2	0	0	2	0	3	0	0	3	0	0	5	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0								
16:30	2	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	4	0	0	4	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
16:45	2	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	1	0	0	1	0	0	3	0	0	3	0	0	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3	0	0								
17:00	2	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	3	1	0	4	0	0	4	0	0	0	0	0	0	0	5	0	0	5	0	0	5	0	0	5	0	0	0	0									
17:15	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3	0	0	3	0	0	3	0	0	3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
17:30	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0									
17:45	1	0	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	2	0	4	0	0	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
18:00	3	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	3	0	0	3	0	0	3	0	0	3	0	0	0	0									
18:15	3	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	9	0	0	9	0	0	9	0	0	9	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0									
18:30	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0	0	10	0	0	10	0	0	10	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0									
18:45	2	0	0	2	0	0	0	0	0	0	0	2	0	0	1	0	0	6	0	0	6	0	0	7	0	0	7	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0									
TOTAL	22	0	0	22	0	0	0	0	0	0	0	22	0	0	15	0	0	15	0	47	1	0	48	0	0	63	0	0	0	0	0	18	0	0	18	0	0	18	0	0	18	0	0	0	0									
PM Peak	9	0	0	9	0	0	0	0	0	0	0	9	0	0	1	0	0	1	0	26	0	0	26	0	0	27	0	0	0	0	6	0	0	6	0	0	6	0	0	6	0	0	6	0	0	0								

Survey Details

TTM Reference: **18SYD0065**
Location: **Dora St & Short St**
Suburb: **Morisset**
Date: **Thursday, 5 April 2018**
Duration: **0700-1000 & 1600-1900**
Weather: **Fine**
Notes: **0**

Peak Hours

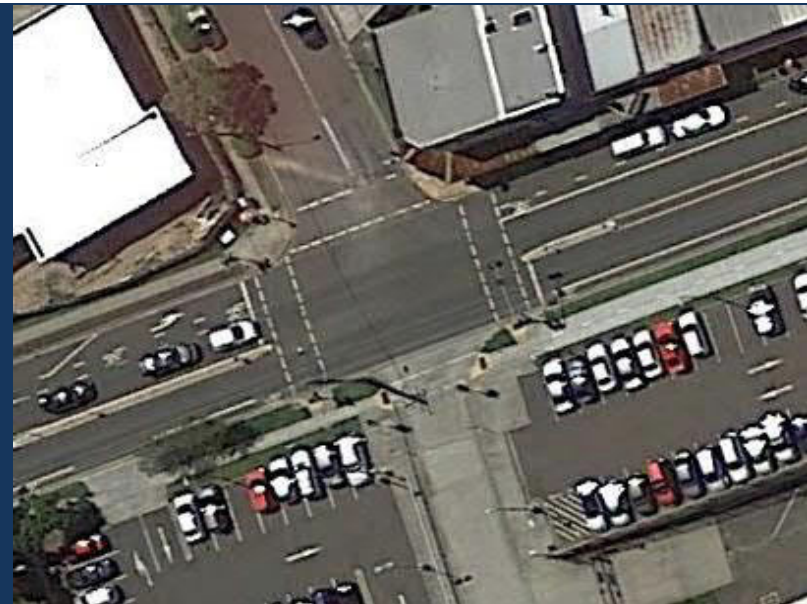
AM Peak Hour: 0730-0830
PM Peak Hour: 1630-1730

ttm

Peak Hour Summary

22	16	↗	65	7	93
885	523	→	58	5	25
0	0	↘	↙	↓	↘
↙	↑	↗	↙	1	0
0	0	0	←	912	674
0	0	0	↙	3	1

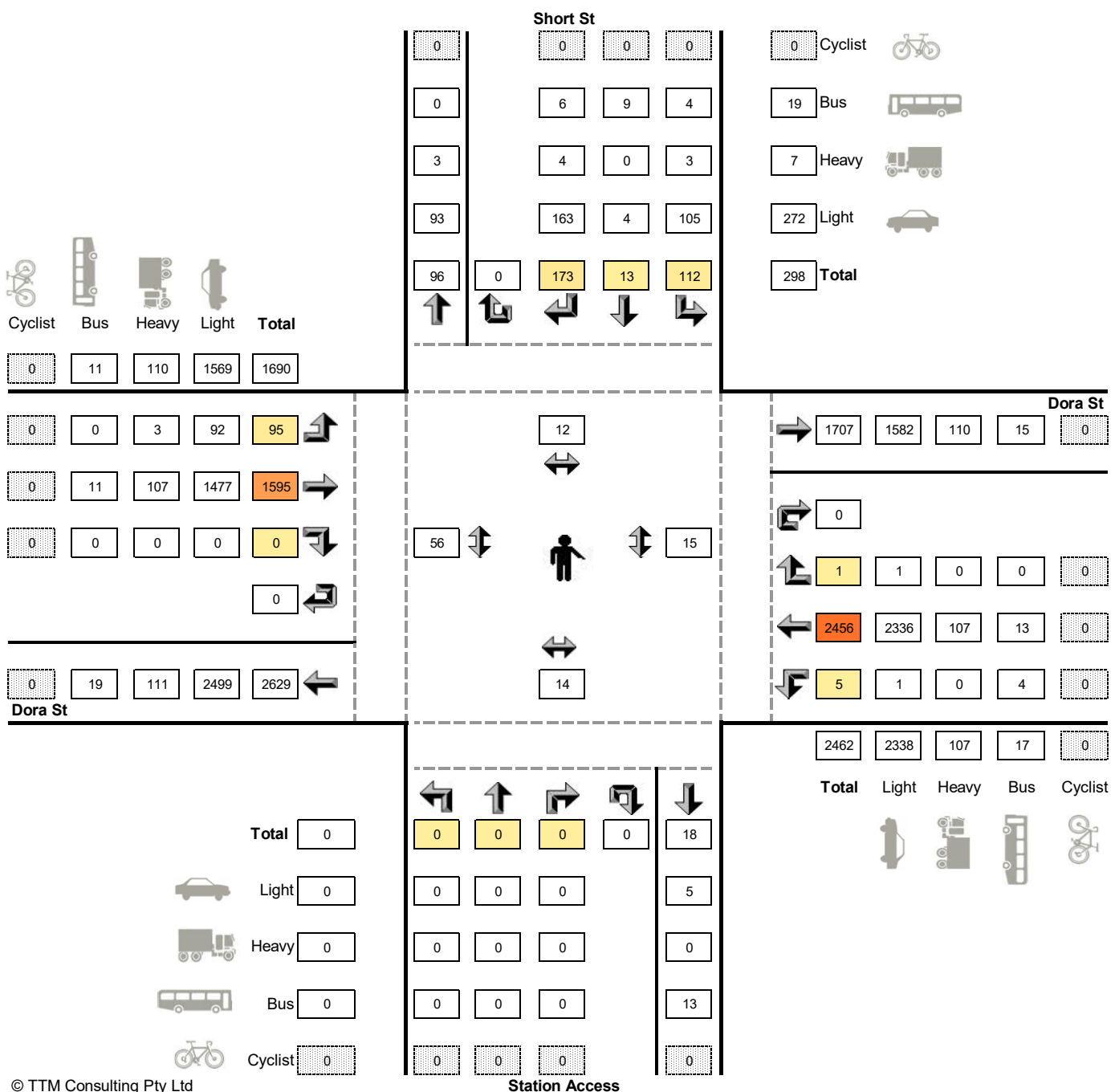
Image



TTM Reference: 18SYD0065
 Location: Dora St & Short St
 Suburb: Morisset
 Date: Thursday, 5 April 2018
 Survey Period: 0700-1000
 Weather: Fine



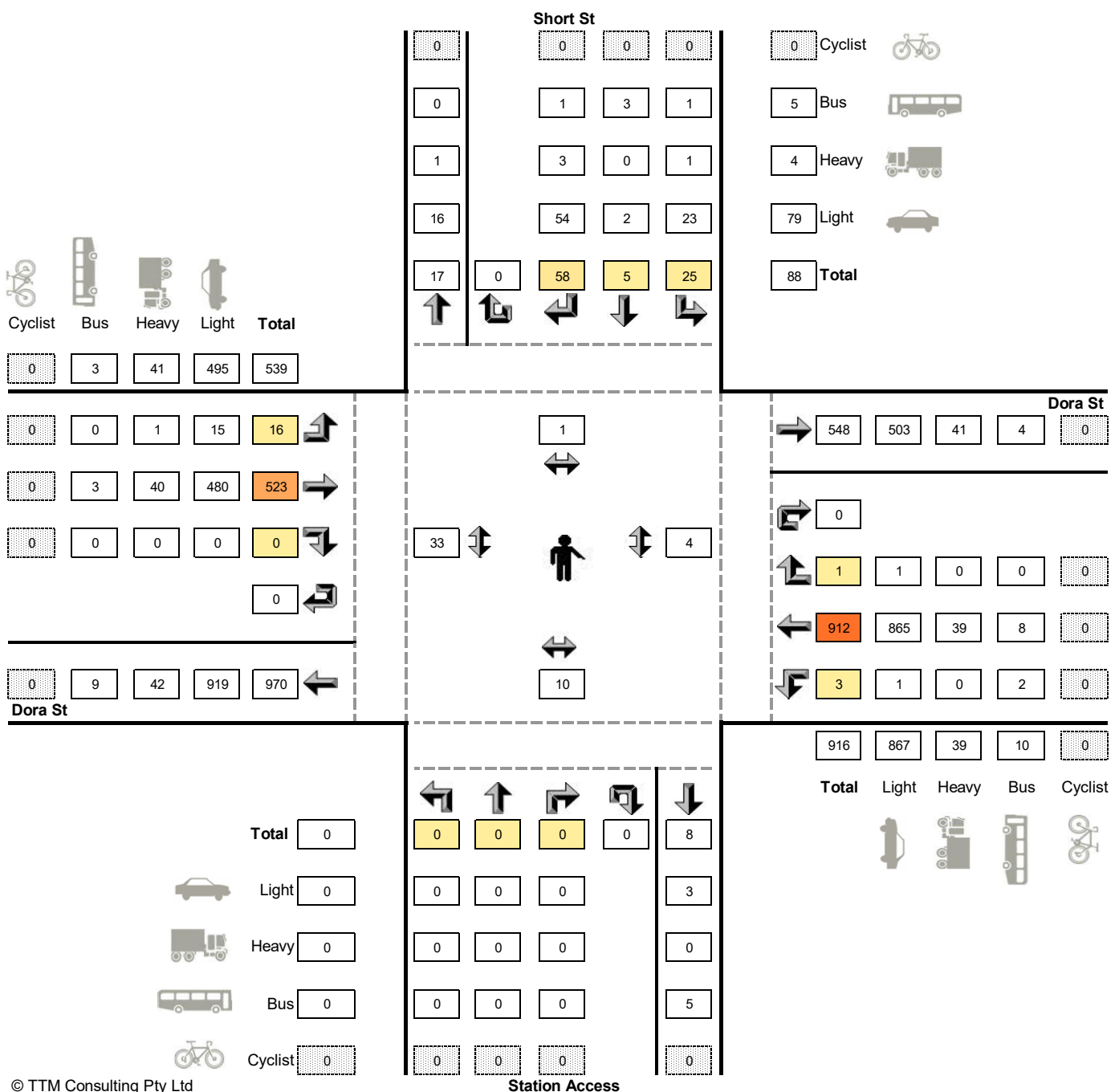
www.ttmgroup.com.au



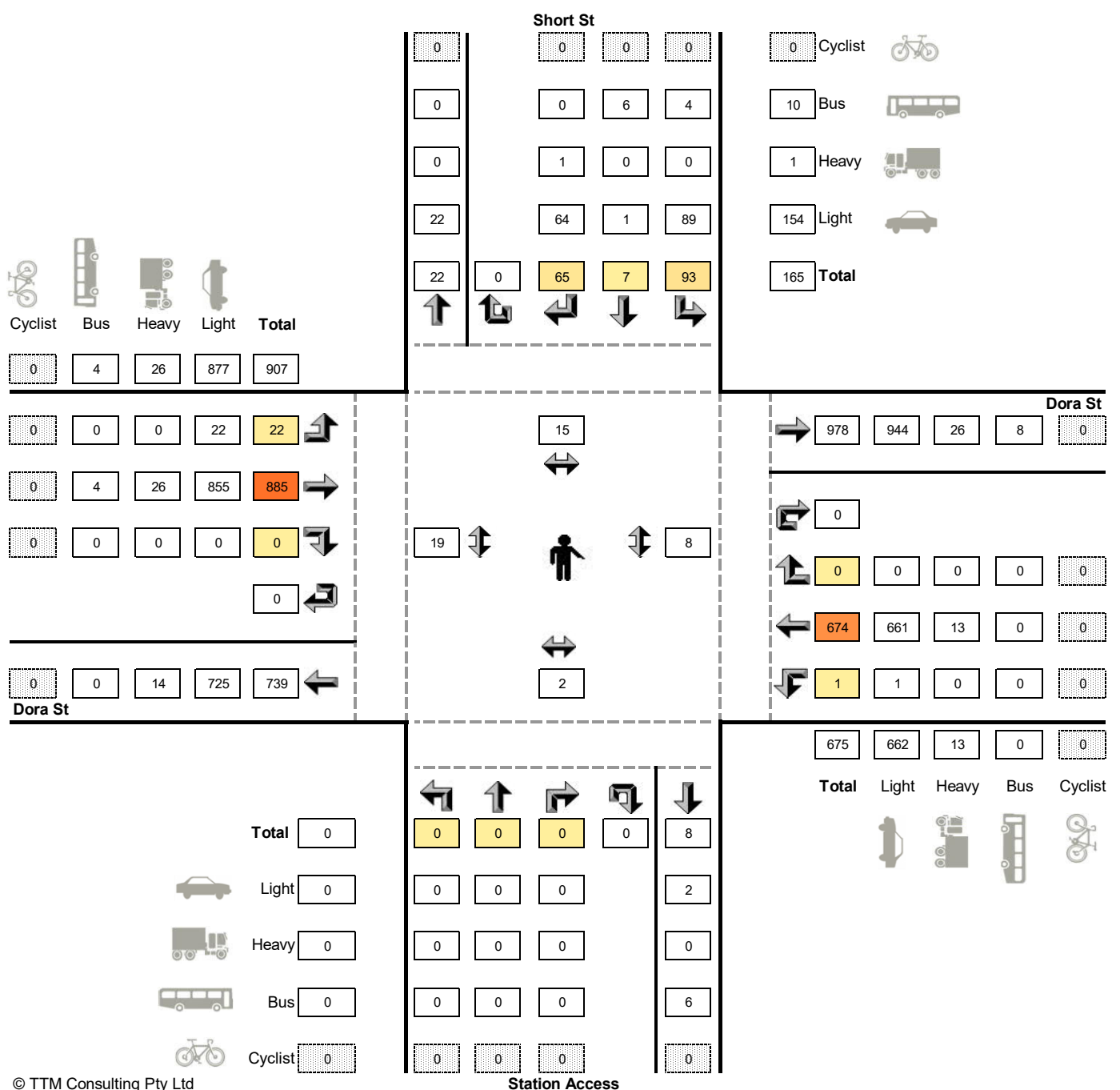
TTM Reference: 18SYD0065
 Location: Dora St & Short St
 Suburb: Morisset
 Date: Thursday, 5 April 2018
 AM Peak: 0730-0830
 Weather: Fine



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TTM Data

TTM Reference: 18SYD0065

Location: Dora St & Short St

Suburb: Morisset

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1630-1730



Time	Northern Approach: Short St																		Southern Approach: Station Access																									
15 min	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds						
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist					Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist					Light	Heavy	Bus	Total	Cyclist						
7:00	5	0	0	5	0	0	0	1	1	0	14	0	3	17	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	3	0	0	3	0	0	0	1	1	0	7	0	1	8	0	0	12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	6	0	1	7	0	0	0	1	1	0	13	1	0	14	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	5	0	0	5	0	1	0	1	2	0	18	1	1	20	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
8:00	8	0	0	8	0	1	0	0	1	0	13	1	0	14	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15	4	1	0	5	0	0	0	1	1	0	10	0	0	10	0	0	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:30	8	0	0	8	0	0	0	1	1	0	18	0	1	19	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:45	7	0	2	9	0	1	0	1	2	0	13	1	0	14	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
9:00	16	1	0	17	0	0	0	0	0	0	17	0	0	17	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15	14	0	0	14	0	1	0	0	1	0	13	0	0	13	0	0	28	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	11	0	0	11	0	0	0	0	0	0	15	0	0	15	0	0	26	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	18	1	1	20	0	0	0	2	2	0	12	0	0	12	0	0	34	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
TOTAL	105	3	4	112	0	4	0	9	13	0	163	4	6	173	0	0	298	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	
AM Peak	23	1	1	25	0	2	0	3	5	0	54	3	1	58	0	0	88	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	

16:00	18	0	0	18	0	1	0	1	2	0	13	0	0	13	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16:15	20	0	0	20	0	2	0	2	4	0	16	0	0	16	0	0	40	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	23	0	2	25	0	0	0	0	0	0	12	0	0	12	0	0	37	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
16:45	22	0	0	22	0	0	0	2	2	0	16	0	0	16	0	0	40	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	20	0	0	20	0	0	0	2	2	0	17	0	0	17	0	0	39	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	24	0	2	26	0	1	0	2	3	0	19	1	0	20	0	0	49	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	12	0	0	12	0	0	0	0	0	0	13	0	0	13	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	16	0	1	17	0	1	0	2	3	0	11	0	0	11	0	0	31	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
18:00	13	0	0	13	0	0	0	3	3	0	18	0	2	20	0	0	36	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
18:15	17	0	1	18	0	0	0	0	0	0	9	0	0	9	0	0	27	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
18:30	8	1	1	10	0	0	1	0	1	0	7	0	0	7	0	0	18	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18:45	18	0	1	19	0	0	0	2	2	0	4	0	0	4	0	0	25	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	211	1	8	220	0	5	1	16	22	0	155	1	2	158	0	0	400	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	
PM Peak	89	0	4	93	0	1	0	6	7	0	64	1	0	65	0	0	165	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2

TTM Data

TTM Reference: 18SYD0065

Location: Dora St & Short St

Suburb: Morisset

Date: Thursday, 5 April 2018

Survey Duration: 0700-1000 & 1600-1900

Weather: Fine

Notes:

AM Peak: 0730-0830

PM Peak: 1630-1730



Time	Eastern Approach: Dora St																	Western Approach: Dora St																				
15 min	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds	Left					Straight					Right					U Turn	TOTAL	Cyclists	Peds
time start	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist				Light	Heavy	Bus	Total	Cyclist	Light	Heavy	Bus	Total	Cyclist										
7:00	0	0	0	0	0	196	10	0	206	0	0	0	0	0	0	0	206	0	1	4	0	0	4	0	83	16	3	102	0	0	0	0	0	0	106	0	0	
7:15	0	0	2	2	0	197	11	0	208	0	0	0	0	0	0	0	210	0	2	5	0	0	5	0	103	5	0	108	0	0	0	0	0	0	113	0	8	
7:30	0	0	1	1	0	204	13	0	217	0	0	0	0	0	0	0	218	0	1	1	0	0	1	0	117	10	3	130	0	0	0	0	0	0	131	0	4	
7:45	0	0	1	1	0	258	10	1	269	0	0	0	0	0	0	0	270	0	0	6	0	0	6	0	123	10	0	133	0	0	0	0	0	0	139	0	7	
8:00	1	0	0	1	0	191	6	0	197	0	0	0	0	0	0	0	198	0	2	5	0	0	5	0	131	13	0	144	0	0	0	0	0	0	149	0	9	
8:15	0	0	0	0	0	212	10	7	229	0	1	0	0	1	0	0	230	0	1	3	1	0	4	0	109	7	0	116	0	0	0	0	0	0	120	0	13	
8:30	0	0	0	0	0	161	5	2	168	0	0	0	0	0	0	0	168	0	1	12	1	0	13	0	136	4	1	141	0	0	0	0	0	0	154	0	3	
8:45	0	0	0	0	0	214	8	0	222	0	0	0	0	0	0	0	222	0	4	10	0	0	10	0	141	6	1	148	0	0	0	0	0	0	158	0	2	
9:00	0	0	0	0	0	163	7	0	170	0	0	0	0	0	0	0	170	0	1	9	0	0	9	0	136	14	1	151	0	0	0	0	0	0	160	0	2	
9:15	0	0	0	0	0	174	13	1	188	0	0	0	0	0	0	0	188	0	1	13	0	0	13	0	115	7	1	123	0	0	0	0	0	0	136	0	5	
9:30	0	0	0	0	0	183	10	1	194	0	0	0	0	0	0	0	194	0	0	12	1	0	13	0	128	8	1	137	0	0	0	0	0	0	150	0	0	
9:45	0	0	0	0	0	183	4	1	188	0	0	0	0	0	0	0	188	0	1	12	0	0	12	0	155	7	0	162	0	0	0	0	0	0	174	0	3	
TOTAL	1	0	4	5	0	2336	107	13	2456	0	1	0	0	1	0	0	2462	0	15	92	3	0	95	0	1477	107	11	1595	0	0	0	0	0	0	1690	0	56	
AM Peak	1	0	2	3	0	865	39	8	912	0	1	0	0	1	0	0	916	0	4	15	1	0	16	0	480	40	3	523	0	0	0	0	0	0	539	0	33	

16:00	0	0	0	0	0	158	6	0	164	0	0	0	0	0	0	0	164	0	8	7	0	0	7	0	209	4	1	214	0	0	0	0	0	0	221	0	19
16:15	0	0	0	0	0	151	5	0	156	0	0	0	0	0	0	0	156	0	6	7	0	0	7	0	209	6	0	215	0	0	0	0	0	0	222	0	4
16:30	0	0	0	0	0	163	5	0	168	0	0	0	0	0	0	0	168	0	5	7	0	0	7	0	221	6	1	228	0	0	0	0	0	0	235	0	6
16:45	0	0	0	0	0	153	4	0	157	0	0	0	0	0	0	0	157	0	0	3	0	0	3	0	219	9	3	231	0	0	0	0	0	0	234	0	6
17:00	0	0	0	0	0	183	1	0	184	0	0	0	0	0	0	0	184	0	1	8	0	0	8	0	208	6	0	214	0	0	0	0	0	0	222	0	1
17:15	1	0	0	1	0	162	3	0	165	0	0	0	0	0	0	0	166	0	2	4	0	0	4	0	207	5	0	212	0	0	0	0	0	0	216	0	6
17:30	2	0	0	2	0	146	5	0	151	0	0	0	0	0	0	0	153	0	0	10	0	0	10	0	218	10	1	229	0	0	0	0	0	0	239	0	3
17:45	0	0	0	0	0	115	3	0	118	0	0	0	0	0	0	0	118	0	0	6	0	0	6	0	223	0	0	223	0	0	0	0	0	0	229	0	2
18:00	0	0	0	0	0	110	3	0	113	0	0	0	0	0	0	0	113	0	5	10	0	0	10	0	186	4	0	190	0	0	0	0	0	0	200	0	10
18:15	0	0	0	0	0	119	2	0	121	0	0	0	0	0	0	0	121	0	2	11	0	0	11	0	188	2	0	190	0	0	0	0	0	0	201	0	4
18:30	1	0	0	1	0	86	1	0	87	0	0	0	0	0	0	0	88	0	7	12	0	1	13	0	143	3	1	147	0	0	0	0	0	0	160	0	3
18:45	0	0	0	0	0	79	4	0	83	0	0	0	0	0	0	0	83	0	0	9	0	0	9	0	145	3	1	149	0	0	0	0	0	0	158	0	0
TOTAL	4	0	0	4	0	1625	42	0	1667	0	0	0	0	0	0	0	1671	0	36	94	0	1	95	0	2376	58	8	2442	0	0	0	0	0	0	2537	0	64
PM Peak	1	0	0	1	0	661	13	0	674	0	0	0	0	0	0	0	675	0	8	22	0	0	22	0	855	26	4	885	0	0	0	0	0	0	907	0	19

Appendix E

Heritage Database
Search

Appendix E Heritage Database Search

Alana Mitchell
17 Warabrook Boulevard
Warabrook New South Wales 2304
Attention: Alana Mitchell
Email: alana.mitchell@aecom.com

Date: 07 May 2021

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.0649, 151.5151 - Lat, Long To : -33.0565, 151.5284 with a Buffer of 200 meters, conducted by Alana Mitchell on 07 May 2021.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(http://www.nsw.gov.au/gazette\)](http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.



Lake Macquarie
Local Environmental
Plan 2014

Heritage Map - Sheet HER_006C

- Heritage**
- Conservation Area - General
 - Item - General
 - Item - Archaeological
 - Item - Landscape
- Cadastre**
- Cadastre 9/2/2016 © Land and Property Information (LPI)

