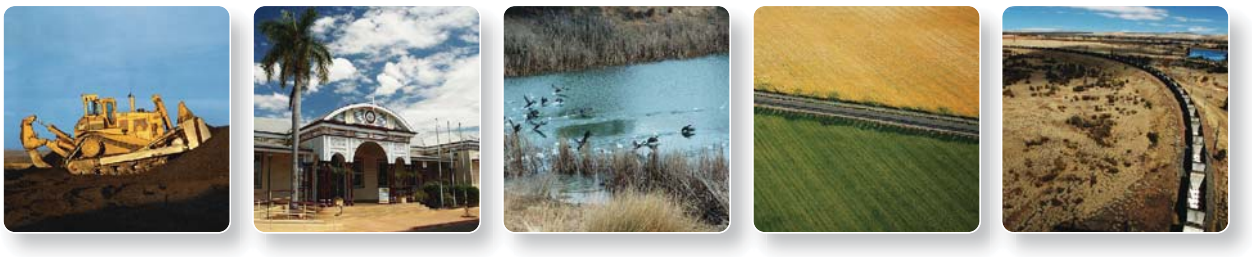


WALLARAH 2 COAL PROJECT

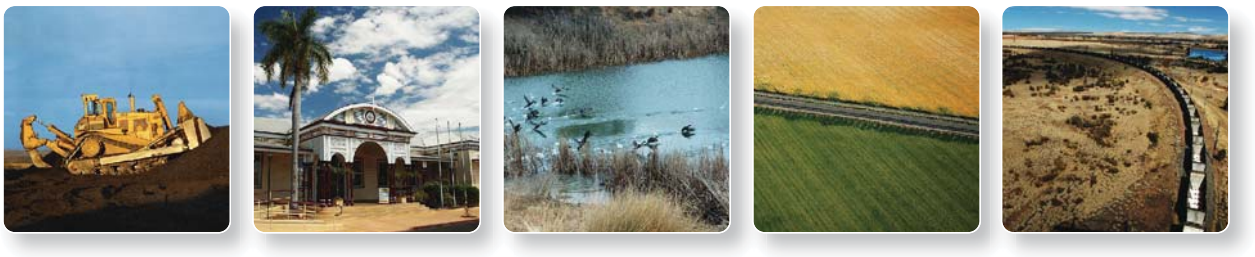
Amendment to Development Application SSD-4974 Volume 1

for

Wyong Areas Coal Joint Venture

July 2016

Hansen Bailey
ENVIRONMENTAL CONSULTANTS



WALLARAH 2 COAL PROJECT

Amendment to Development Application SSD-4974

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ENVIRONMENTAL CONSULTANTS

WALLARAH 2 COAL PROJECT

AMENDMENT TO DEVELOPMENT APPLICATION SSD-4974

Prepared by:

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July 2016

For:

WYONG AREAS COAL JOINT VENTURE
PO Box 3039
TUGGERAH NSW 2259

EXECUTIVE SUMMARY

Overview

The Wyong Areas Coal Joint Venture sought an amendment to the Development Application (SSD-4974) for the Wallarah 2 Coal Project (the Project) under clause 55 of the *Environmental Planning and Assessment Regulation 2000*. The Minister's delegate agreed to the amendment on 15 July 2016. This document contains the written particulars that indicate the nature of the changed development, as required under clause 55.

The amendment involves changes to the proposed coal transportation infrastructure and the re-alignment of a sewer connection. All other aspects of the Project will remain as previously proposed, including:

- Mining area, mining methods and maximum production rate;
- Coal handling or rail loading methods;
- Other surface infrastructure (i.e. other than coal transportation infrastructure);
- Construction schedule;
- Operational and construction workforce; and
- Capital investment value.

The Development Application (as originally made) was partly in respect of land owned by the Darkinjung Local Aboriginal Land Council. Specifically, the coal transportation infrastructure and sewer connection for the Project were originally proposed to be located on land owned by the Darkinjung Local Aboriginal Land Council. As a consequence of clause 49(3A) of the *Environmental Planning and Assessment Regulation 2000*, the Development Application (in its original form) cannot be granted development consent until the consent of the NSW Aboriginal Land Council has been obtained. The consent of the NSW Aboriginal Land Council has not been forthcoming. The Amendment avoids the need to develop infrastructure on land owned by the Darkinjung Local Aboriginal Land Council, thereby removing the requirement for the consent of the NSW Aboriginal Land Council.

This document demonstrates that the Project (as amended) will:

- Avoid direct land use conflicts with neighbouring land owners;
- Maintain legal access to adjacent private properties;
- Reduce the area of land disturbance required for the Project;
- Reduce the ecological impacts of the Project;
- Result in fewer interactions with streams and riparian vegetation;
- Comply with noise and air quality criteria for residences in Blue Haven;
- Implement appropriate noise mitigation measures at affected residences (in consultation with the relevant landowners);

- Require fewer train movements than previously proposed;
- Result in only limited visual impacts, with no impacts on residences in Blue Haven;
- Not result in any additional impacts on Aboriginal heritage values;
- Provide net production benefits to NSW of $274 million (present value) and employment benefits of $211 million (present value); and
- Provide significant contributions to the regional economy, including 300 direct jobs.

Background

The Wyong Areas Coal Joint Venture is seeking development consent for the Wallarah 2 Coal Project. The Project is located in the Wyong Local Government Area in the Central Coast region of New South Wales.

The key features of the Project include:

- A deep underground longwall mine extracting up to 5 Million tonnes per annum of export quality thermal coal;
- The Tooheys Road Site (located north-east of the intersection of the M1 Motorway and the Motorway Link Road) which includes a portal, coal handling facilities and stockpiles, water and gas management facilities, small office buildings, workshop, coal transportation infrastructure and connections to municipal water and sewerage systems;
- The Buttonderry Site (near the intersection of Hue Hue Road and Sparks Road) which includes administration offices, bathhouse, personnel access to the mine, ventilation shafts and water management structures;
- The Western Ventilation Shaft Site (located in the Wyong State Forest) includes a downcast ventilation shaft and water management structures;
- An inclined tunnel (or 'drift') from the surface at the Tooheys Road Site to the coal seam beneath the Buttonderry Site;
- Transportation of product coal to the Port of Newcastle by rail; and
- An operational workforce of 300 full time employees.

The Project constitutes State Significant Development. As such, the Project has been subject to the assessment process under Division 4.1 of Part 4 of the *Environmental Planning & Assessment Act 1979.*

The proponent made a request for Environmental Assessment Requirements on 13 October 2011. The Environmental Assessment Requirements for the Project were notified on 12 January 2012 and Supplementary Environmental Assessment Requirements were notified on 11 July 2012.

An Environmental Impact Statement was prepared in accordance with the relevant Environmental Assessment Requirements. In accordance with section 89F of the *Environmental Planning & Assessment Act 1979*, the Environmental Impact Statement was placed on public exhibition for 40 business days from 26 April 2013 to 21 June 2013.

A total of 748 submissions were received during the public exhibition period. A Response to Submissions document was prepared to address the issues raised in the submissions.

On 7 February 2014, the Director-General published the Environmental Assessment Report for the Project. The Environmental Assessment Report concluded that "*the project's benefits outweigh its potential impacts and it is therefore in the public interest*" (DP&I, 2014).

On 16 January 2014, the Minister for Planning directed the Planning Assessment Commission to review the merits of the Project as a whole. The Planning Assessment Commission published its Review Report in June 2014.

Following the review by the Planning Assessment Commission, the Project was the subject of legal proceedings in the NSW Land and Environment Court. The Court held that insofar as the Development Application (SSD-4974) is made in respect of Lot 195 DP 1032847 (which is owned by the Darkinjung Local Aboriginal Land Council), SSD-4974 cannot be determined until the NSW Aboriginal Land Council has consented to the making of the application. Despite the proponent's efforts to negotiate an agreeable outcome, the consent of the NSW Aboriginal Land Council has not been forthcoming.

Following the review by the Planning Assessment Commission, the coal transportation infrastructure and sewer connection for the Project were re-designed to avoid Aboriginal land. These proposed changes to the Project are referred to as the 'Amendment'.

Description of the Amendment

The Amendment can be summarised as follows:

- Removal of the previously proposed rail loop;
- Re-location of the rail spur and train load out facility to the eastern side of the Main Northern Rail Line;
- A conveyor system to deliver product coal from the stockpile to the new location of the train load out facility; and
- Realignment of sewer connection.

To avoid development on Aboriginal land, the rail spur has been re-located to a Crown Road (Nikko Road) on the eastern side of the Main Northern Rail Line. The spur is approximately 2.3 km long and will run alongside the southbound line between the Gosford Road and Motorway Link Road bridges. The train load out facility will be located on the rail spur, approximately 1.1 km north of the Motorway Link Road Bridge. The rail loop that was originally proposed is not required for the Amended Project.

A conveyor system (comprising the overland conveyor and bin feed conveyor) will be constructed to deliver coal from the product coal stockpile to the re-located train load out facility. The overland conveyor is approximately 2.3 km long and follows a west-east alignment. The overland conveyor delivers coal from the product stockpile to a transfer station adjacent to the Main Northern Rail Line. The transfer station will move coal from the overland conveyor to the bin feed conveyor. The bin feed conveyor is approximately 1.1 km long and follows a south-north alignment adjacent to the Main Northern Rail Line.

None of the infrastructure associated with the Amended Project will be developed on privately owned land. There are privately owned lots with frontage along Nikko Road. The proposed infrastructure on Nikko Road has been designed so that existing physical and legal access to these lots is maintained. There are also other legal access routes to some of these lots.

The Amendment will reduce the land disturbance associated with the Tooheys Road Site from 89 ha to 63 ha, which represents a reduction of 29%.

Regulatory Framework

To give effect to the Amendment, Wyong Areas Coal Joint Venture sought an amendment to the Development Application for the Project (SSD-4974) pursuant to clause 55 of the *Environmental Planning & Assessment Regulation 2000*. Clause 55 provides that a Development Application may be amended or varied by the application (with the agreement of the consent authority).

Clause 55(2) of the *Environmental Planning & Assessment Regulation 2000* states that "*the application to amend or vary the development application must have annexed to it written particulars sufficient to indicate the nature of the changed development*". This document was prepared to accompany the application to amend the Development Application, and provides a detailed description of the Amendment.

The Minister's delegate agreed to the amendment on 15 July 2016.

Environmental Impacts and Mitigation Measures

Flooding

G Herman & Associates has undertaken the *Spring Creek Flood Impact Assessment* to assess the potential flooding impacts that may result from the construction of the rail spur. The re-located rail spur will require crossings of Spring Creek and its tributaries.

The hydraulic model predicted that construction of the rail spur may result in very minor increases in flood levels at the two bridge crossings over Spring Creek. For a 1 in 100 year flood event, the flood levels at the two bridges are predicted to increase by 0.01 m and 0.03 m. The freeboard to the existing rail infrastructure is sufficient to accommodate these minor increases in flood levels. For this reason, the construction of the rail spur will not result in inundation of the Main Northern Rail Line.

The model predicts no significant change to the extent of flooding. The modelling also showed that the other culverts over Spring Creek have sufficient capacity to convey flows associated with a 1 in 100 year flood. Under the modelled conditions of a Probable Maximum Flood, inundation of the Main Northern Rail Line would occur regardless of whether or not the proposed rail spur is constructed.

The proponent will implement appropriate erosion and sediment controls during construction and operation of the proposed rail infrastructure. A detailed Erosion and Sediment Plan will be included in the Water Management Plan to be prepared for the Project.

Air Quality

Pacific Environment Limited has prepared an *Air Quality and Greenhouse Gas Assessment – Addendum*, which predicts the impacts of the Amended Project. The model that was previously developed for the Project was revised to reflect the proposed changes to the coal transportation infrastructure.

Air quality modelling has established that the impacts of the Amended Project alone (i.e. incremental impacts) will comply with the regulatory criteria for annual average TSP, PM_{10}, $PM_{2.5}$ and dust deposition levels. The incremental 24-hr average concentrations of PM_{10} and $PM_{2.5}$ will also comply with the regulatory criteria.

Based on recorded background levels and the modelled incremental impacts, cumulative levels for annual average PM_{10}, $PM_{2.5}$, TSP and dust deposition levels are also predicted to comply with the regulatory criteria.

Historical air quality monitoring has shown that there are days where the background concentration exceeds the criterion for 24-hr average PM_{10}, such as during bushfires. Due to the relatively minor contribution of the Project to PM_{10} levels, it is unlikely that the Amended Project will result in additional days where the 24-hr average criterion is exceeded.

Total emissions during the construction phase are estimated to be less than the total emissions during the operations phase. Consequently, emissions during the construction phase are also predicted to comply with the air quality criteria.

The proponent has previously committed to preparing an Air Quality and Greenhouse Gas Management Plan for the Project. This management plan will include dust controls to minimise the potential impacts of the Amendment.

Greenhouse Gas

The Amendment results in a shorter haulage distance to Newcastle, which will marginally reduce the indirect greenhouse gas emissions associated with rail transportation. Due to the additional conveyors associated with the Amendment, there will be a marginal increase in emissions resulting from electricity use.

The Amended Project is predicted to generate approximately 4,643,044 tonnes of CO_2-e in direct (Scope 1) greenhouse gas emissions over the life of the Project. The estimated Scope 1 emissions intensity of the Project is approximately 0.045 t CO_2-e per tonne of coal, which is comparable to the majority of underground coal mines in Australia (0.05 t CO_2-e per tonne of coal) (Deslandes, 1999).

Noise

Atkins Acoustics and Associates has prepared a *Noise and Vibration Impact Assessment Addendum*, which considers the acoustic impacts of the Amended Project.

Due to the re-location of the train load out facility and the removal of the rail loop, receptors to the north, south and west of the Tooheys Road Site are expected to experience lower noise levels than previously predicted. The modelled noise levels for these locations are up to 1.1 dBA less than the predictions for the previous layout of the Tooheys Road Site.

The Amended Project is predicted to comply with the relevant noise criteria for the Blue Haven area. Blue Haven is over 1 km from the location of the train load out facility and is separated from the proposed infrastructure by the elevated Motorway Link Road.

There are two residences (P14 and P15) located on Thompson Vale Road to the east of the proposed rail spur. Noise levels at these residences are predicted to exceed the noise criteria by up to 4 dBA under modelled conditions. The relevant noise criteria are predicted to be exceeded by up to 4 dBA at a single rural residential property (P16) on Bushells Ridge Road. These predicted exceedances represent a 'moderate' degree of affectation. To mitigate these impacts, the proponent will consult with these landowners and offer to apply appropriate acoustic treatments in accordance with the *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (NSW Government, 2014).

Residences to the north of Bushells Ridge Road in Wyee are predicted to experience exceedances of up to 2 dBA above the noise criteria during noise enhancing weather conditions. Exceedances of up to 2 dBA are categorised as 'negligible' impacts under the *Voluntary Land Acquisition and Mitigation Policy*.

The residences on Thompson Vale Road (P14 and P15) and Bushells Ridge Road (P16) are predicted to experience exceedances of the noise management levels during some construction activities. A Construction Noise and Vibration Management Plan will be developed in consultation with those landowners to manage impacts during the construction phase.

Vibration levels are predicted to comply with the structural damage criteria and human comfort criteria at the locations of the closest residences (on Thompson Vale Road).

The proponent has previously committed to preparing a Noise Management Plan for the operational phase of the Project. This management plan will include noise controls to minimise the potential impacts of the Project.

Ecology

Cumberland Ecology has prepared an *Ecological Impact Assessment – Addendum*, which assesses the ecological impacts of the Amendment.

The Amendment will reduce the disturbance associated with the Tooheys Road Site from 89 ha to 63 ha, which represents a reduction of 29%. As a consequence, the Amendment avoid impacts to approximately 11.1 ha of native vegetation.

The Amendment results in less or equal disturbance for all vegetation communities.

There are six Endangered Ecological Communities present at the Tooheys Road Site. The Amendment will significantly reduce disturbance to the Swamp Sclerophyll Forest Endangered Ecological Community from 2.85 ha to 0.63 ha, which represents a reduction of 78%. The Amendment will reduce disturbance to the River-flat Eucalyptus Forest Endangered Ecological Community from 5.86 ha to 5.42 ha, which represents a reduction of 8%. There is no change to the areas of disturbance for the other four Endangered Ecological Communities.

By reducing the extent of disturbance to native vegetation, the Amendment will result in less impact to potential habitat for flora and fauna species, including threatened and migratory species.

The previously proposed rail loop required crossings of Wallarah Creek and its tributaries. The Amendment removes the requirement for the rail loop, thus avoiding the removal of 0.45 ha of riparian vegetation along Wallarah Creek.

By re-locating the rail spur to the eastern side of the Main Northern Rail Line, the Amendment will also avoid impacts to 0.45 ha of riparian vegetation along the reaches of Spring Creek west of the Main Northern Rail Line. Although there will need to be crossings of Spring Creek on the eastern side of the Main Northern Rail Line, the creek channels at these locations have been modified due to the existing rail crossings. The impacts of re-locating the rail spur are substantially outweighed by the benefits of avoiding the previously proposed crossings of Wallarah Creek and Spring Creek.

The proponent has previously proposed a Biodiversity Offset Strategy to compensate for residual impacts to ecological values. The offset ratios for all vegetation communities have increased as a result of the lower areas of disturbance. Due to the reduced area of disturbance, the offset ratios for flora and fauna habitat will improve as a result of the Amendment.

Rail

A revised *Rail Study* has been undertaken by GHD to assess the rail network implications of the train movements associated with the Project. Rail network modelling was undertaken by Transport for NSW to determine the availability of train paths on the Main Northern Rail Line.

To accommodate the proposed changes to the rail spur, alternate train configurations have been adopted for the Amended Project. The train configurations for the Amended Project will have more wagons than the previously proposed train configuration. As a consequence, the Amended Project will require fewer train cycles per day.

The Amended Project will require 3 to 4 train cycles per day. The rail network modelling determined that there are six available train cycles. Using 25 tonne axle load wagons, there will be sufficient network capacity to accommodate the train movements associated with the Amended Project, without the need for additional rail infrastructure.

Given that the Amended Project requires fewer train cycles, the predicted impacts on level crossings will be reduced as a result of the Amendment.

To ensure that the Amended Project will not have any safety implications on the rail network, the proponent will prepare a Signalling Functional Specification to the satisfaction of Transport for NSW, RailCorp and Sydney Trains.

Aboriginal Heritage

OzArk Environmental & Heritage Management has prepared an *Aboriginal Cultural Heritage Assessment – Addendum*, which evaluates the impacts of the Amendment on cultural heritage values. Consultation with Aboriginal stakeholders for the purposes of this assessment has been undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010). Registered Aboriginal stakeholders were involved in the archaeological survey conducted on 2 March 2016.

The archaeological surveys did not identify any further Aboriginal sites or areas that are likely to contain subsurface archaeological deposits. Therefore, the Amendment is not expected to result in any impacts to additional Aboriginal items.

The removal of the rail loop from the design of the Tooheys Road Site is expected to have a beneficial impact. Removal of the rail loop will reduce the potential impacts to open site WC-OS2, which was identified during previous archaeological studies.

The proponent has previously committed to the preparation of an Aboriginal Cultural Heritage Management Plan.

Visual

The Design Partnership has prepared a *Visual Impact Assessment – Addendum*, which considered the visual impacts of the new infrastructure associated with the Amendment, including:

- Conveyors and gantries;
- Transfer Stations;
- Train Load Out Facility; and
- Noise Barrier.

These structures are only expected to be visible to motorists on the Motorway Link Road and Tooheys Road, as well as train passengers on the Main Northern Rail Line. The structures are not predicted to be visible from any locations that are accessible to pedestrians. Due to the speeds that motorists and train passengers will be travelling at when passing the proposed structures, the potential durations of view will be very short. The potential visual impacts are considered to be 'moderate'.

The following measures will be undertaken to minimise the visual contrast between the proposed structures and the surrounding landscape:

- The exteriors of the proposed structures will employ colours that achieve the greatest integration with the surrounding landscapes; and
- Vegetation that is removed for construction will be re-planted to provide visual screening (where practicable).

To minimise the effects of light spill at private residences, the use of external lighting will be limited and appropriately managed. The limited external lighting that is required will be designed in accordance with the relevant Australian Standard.

Economic Benefits

Gillespie Economics conducted an *Economic Impact Assessment* to estimate the potential economic benefits that will be provided by the Amended Project. This assessment included a cost benefit analysis and local effects analyses. The cost benefit analysis estimates that the Amended Project will generate net production benefits of $274 M (present value). In addition, the Amended Project may generate market and non-market employment benefits, which are estimated at $211 M (present value).

Provided that the value of unquantified residual environmental costs is less than these benefits, the Amended Project is considered to be desirable from an economic efficiency perspective.

The employment and expenditure associated with the Project will generate economic activity within the regional economy. When flow-on effects are considered, the contribution of the Amended Project to the regional economy may be as much as:

- $593 M in annual direct and indirect regional output or business turnover;
- $342 M in annual direct and indirect regional value-added;
- $69 M in annual direct and indirect household income; and
- 853 direct and indirect jobs.

The proponent also remains committed to a target of 70% local employment, which equates to 210 direct locally recruited employees. The proponent also commits to a target of at least 10% indigenous employment, which equates to a minimum of 30 indigenous employees during the operational phase.

The construction phase of the Amended Project will also generate significant contributions to the regional economy, as summarised in **Section 6.9.3**.

Justification

The Project (as originally proposed) required the construction and operation of a rail spur and sewer connection on land owned by the Darkinjung Local Aboriginal Land Council. The Project was the subject of legal proceedings in the Land and Environment Court regarding the issue of development on land owned by the Darkinjung Local Aboriginal Land Council. The Court held that insofar as the Development Application is made in respect of Lot 195 DP 1032847 (which is owned by the Darkinjung Local Aboriginal Land Council), the application cannot be determined without the consent of the NSW Aboriginal Land Council. The Amendment will avoid development on land owned by the Darkinjung Local Aboriginal Land Council, including Lot 195 DP 1032847, thereby removing the requirement for the consent of the NSW Aboriginal Land Council. The Amendment, if agreed to by the consent authority, will enable the Development Application to be determined.

The Amendment will result in a number of positive environmental outcomes. The reduction in the extent of disturbance due to the Amendment will reduce impacts to ecological, hydrological and cultural heritage values. Air quality and noise modelling has demonstrated that amenity impacts will be able to be managed in accordance with the relevant standards.

The Amendment also allows for the economic and employment benefits of the Project to be realised. The Project will generate significant numbers of direct and indirect jobs within the locality, which experiences higher than average unemployment rates. The Project will generate revenues in the form of royalties, company tax and voluntary contributions, which are used by governments to fund infrastructure projects and services. Without the Amendment, the Project will not be able to proceed in its current form and as such, these potential benefits may be foregone.

Due to the positive environmental outcomes and economic benefits that will be facilitated by the Amendment, there is considered to be sufficient justification for the consent authority to accept this amendment to the Development Application.

The Project (as originally proposed) was subject to a review by the Planning Assessment Commission. The Planning Assessment Commission concluded that "*If the recommendations concerning improved strategies to avoid, mitigate or manage the predicted impacts of the project are adopted, there is merit in allowing the project to proceed".* The Amended Project will provide significant economic benefits and requires less land disturbance than the original proposal. Accordingly there is considered to be merit in allowing the Amended Project to proceed.

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1 INTRODUCTION

1.1 BACKGROUND

The Wyong Areas Coal Joint Venture (WACJV) is seeking development consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Wallarah 2 Coal Project (the Project). The Project is located in the Wyong Local Government Area (LGA) in the Central Coast region of New South Wales. The location of the Project is shown in **Figure 1**.

The key features of the Project include:

- A deep underground longwall mine extracting up to 5 Million tonnes per annum (Mtpa) of export quality thermal coal;
    - The Tooheys Road Site (between the M1 Motorway and the Motorway Link Road) which includes a portal, coal handling facilities and stockpiles, water and gas management facilities, small office buildings, workshop, coal transportation infrastructure and connections to the municipal water and sewerage systems;
    - The Buttonderry Site (near the intersection of Hue Hue Road and Sparks Road) which includes administration offices, bathhouse, personnel access to the mine, ventilation shafts and water management structures;
    - The Western Ventilation Shaft Site in the Wyong State Forest, which includes a downcast ventilation shaft and water management structures;
- An inclined tunnel (or 'drift') from the surface at the Tooheys Road Site to the coal seam beneath the Buttonderry Site;
- Transportation of product coal to the Port of Newcastle by rail; and
- An operational workforce of up to 300 full time employees (including contractors).

The conceptual layout of the Project is shown in **Figure 2**.

The Project is the subject of a Development Application (DA) (SSD-4974) for State Significant Development. As such, the Project has been assessed under Division 4.1 of Part 4 of the EP&A Act.

The proponent made a request for Environmental Assessment Requirements (EARs) on 13 October 2011. The EARs for the Project were notified on 12 January 2012. Supplementary EARs were notified on 11 July 2012.

An Environmental Impact Statement (EIS) was prepared in accordance with the relevant EARs. In accordance with section 89F of the EP&A Act, the EIS was placed on public exhibition for 40 business days from 26 April 2013 to 21 June 2013.

A total of 748 submissions were received during the public exhibition period. A Response to Submissions (RTS) document was prepared to address the issues raised in these submissions.

On 7 February 2014, the Director-General published the Environmental Assessment Report for the Project. The Environmental Assessment Report concluded that "*the project's benefits outweigh its potential impacts and it is therefore in the public interest"* (DP&I, 2014).

On 16 January 2014, the Minister for Planning directed the Planning Assessment Commission (PAC) to review the merits of the Project as a whole. The PAC published its Review Report in June 2014 which concluded that: "*If the recommendations concerning improved strategies to avoid, mitigate or manage the predicted impacts of the project are adopted, there is merit in allowing the project to proceed".*

Following the review by the PAC, the Project was the subject of legal proceedings in the NSW Land and Environment Court (LEC)[1] instituted by the Darkinjung Local Aboriginal Land Council (DLALC). The LEC held that insofar as the DA (SSD-4974) is made in respect of Lot 195 DP 1032847 (which is owned by DLALC), the DA cannot be determined without the consent of the NSW Aboriginal Land Council. Despite WACJV's efforts to negotiate an agreeable outcome, the NSW Aboriginal Land Council has not consented to the making of the SSD-4974.

In light of the LEC's judgment, the coal transportation infrastructure and sewer connection for the Project was re-designed to avoid land owned by DLALC (including Lot 195 DP 1032847). The particulars of the changes to the Project can be summarised as follows:

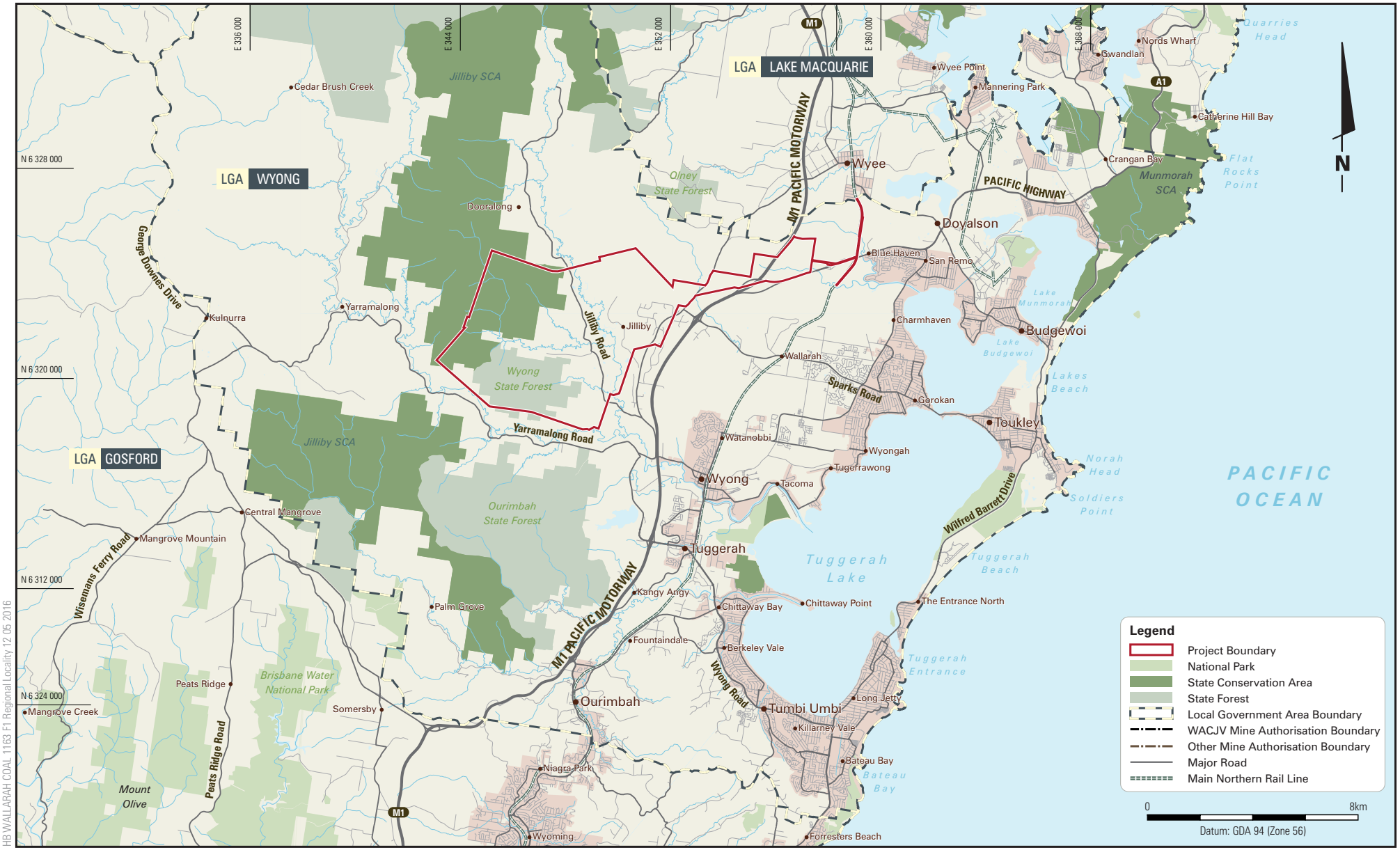
- Removal of the previously proposed rail loop;
- Re-location of the previously proposed rail spur to the eastern side of the Main Northern Rail Line, thereby avoiding Aboriginal Land;
- Re-location of the train load out facility to the eastern side of the Main Northern Rail Line;
- A conveyor system to deliver product coal from the stockpile to the new location of the train load out facility; and
- Realignment of the sewer connection.

These proposed changes are referred to as the 'Amendment'. The Amendment is described in detail in **Section 2**. By avoiding development on land owned by DLALC, including Lot 195 DP 1032847, the Amendment overcomes the impediment to determination of the DA identified by the LEC.

All other aspects of the Project remain identical to the original proposal (referred to as the 'Original Project'). The Project as a whole, incorporating the proposed changes, is referred to as the 'Amended Project'.

To give effect to the proposed changes to the Project, WACJV is seeking an amendment to the DA under clause 55 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

[1] *Darkinjung Local Aboriginal Land Council v Wyong Coal Pty Limited (No 2)* [2014] NSWLEC 71



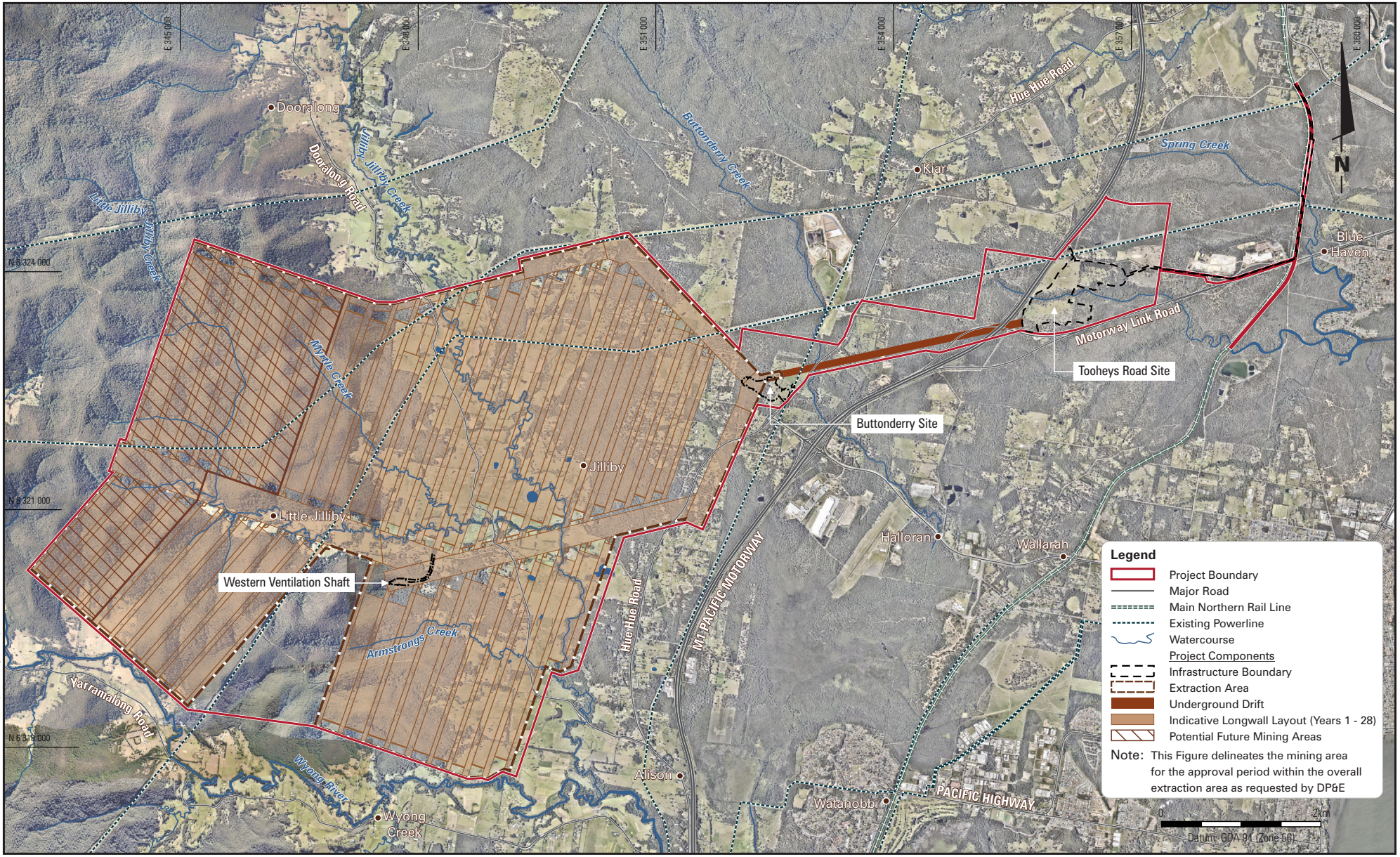
HB WALLARAH COAL 1163 F1 Regional Locality 12 05 2016

WALLARAH 2 COAL PROJECT

Wallarah 2 COAL PROJECT | HansenBailey ENVIRONMENTAL CONSULTANTS

Regional Locality

FIGURE 1



HB WALLARAH COAL 1163 F2 Conceptual Project Layout 08 06 2016

WALLARAH 2 COAL PROJECT

Wallarah 2 COAL PROJECT | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Conceptual Project Layout

FIGURE 2

1.2 LAND OWNERSHIP

The Amendment will involve the construction and operation of infrastructure on land that was not previously part of the Project. The proposed conveyor system will be situated on WACJV owned land, Crown land and Roads and Maritime Services (RMS) owned land. The re-located rail spur and train load out facility will be constructed within an unencumbered and largely unformed Crown Road (Nikko Road) before entering the corridor of the adjacent Main Northern Rail Line.

The proposed re-location of the rail spur will ensure that no part of the development is on land owned by the DLALC. The ownership of land in the vicinity of the Amended Project is shown in **Figure 3**. A revised Schedule of Lands is provided in **Appendix A**.

1.3 DOCUMENT PURPOSE

The DA for the Project was supported by the *Wallarah 2 Coal Project Environmental Impact Statement* (Hansen Bailey, 2013a). The EIS provided a detailed description of the Original Project and comprehensively assessed its potential environmental impacts.

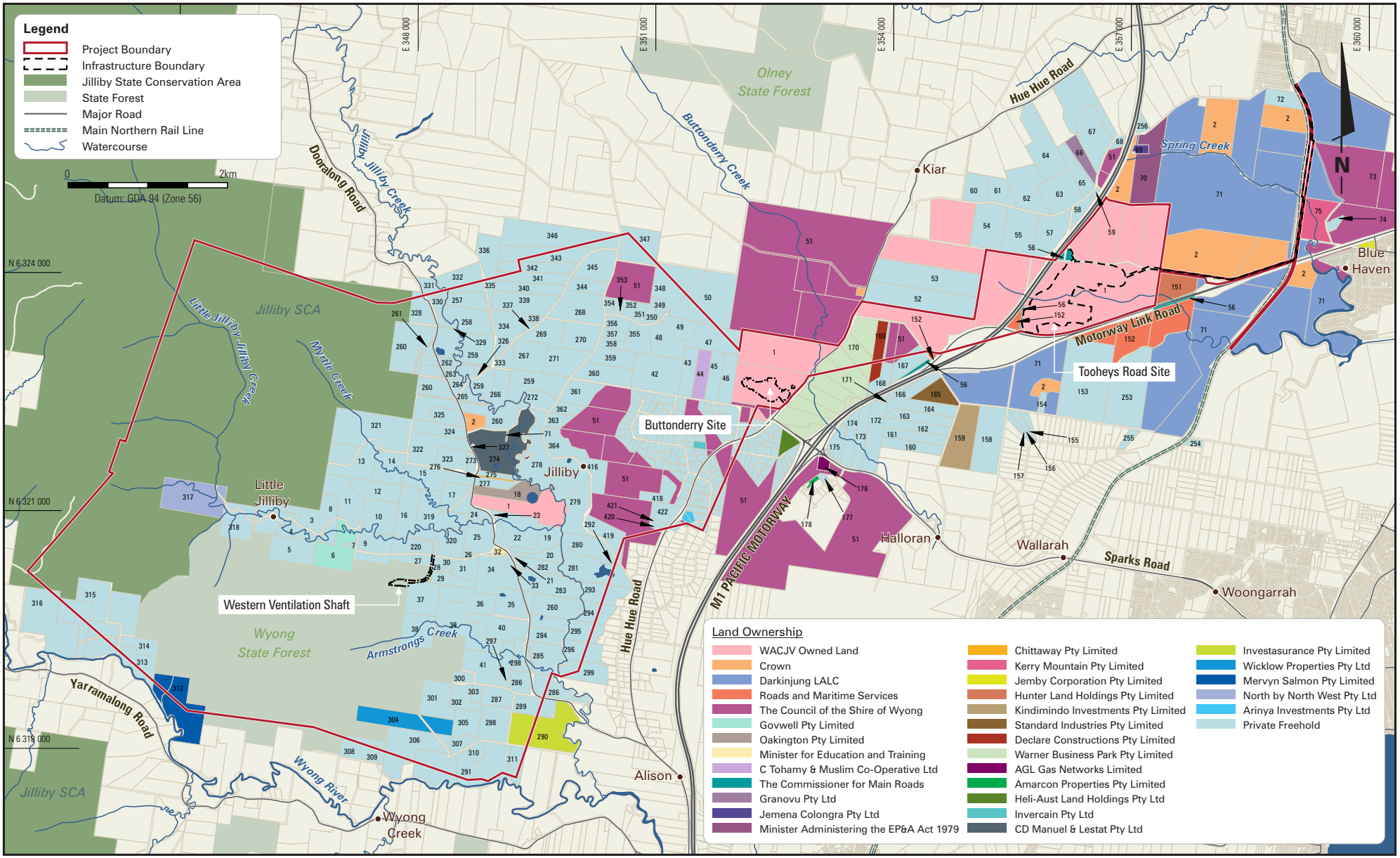
This document was prepared for two purposes. It initially served as the written particulars required under clause 55(2) of the EP&A Regulation to support an application to the consent authority for agreement to amend SSD-4974.

As the Minister's delegate has agreed to the requested amendment of the DA, this document now serves as a comprehensive assessment of the Amendment. The assessment contained in this document, together with the EIS and RTS, will enable the consent authority to complete its assessment and determination of SSD-4974 (as amended).

1.4 DOCUMENT STRUCTURE

This document is structured as follows:

- **Section 2** provides a detailed description of the Amendment;
- **Section 3** outlines the regulatory framework that is relevant to the Amendment;
- **Section 4** summarises the stakeholder engagement that has been undertaken for the Amendment;
- **Section 5** outlines the risk assessment that was undertaken to ascertain the environmental risks that required assessment;
- **Section 6** assesses the potential environmental impacts of the Amendment and describes the measures that will be implemented to mitigate or manage those impacts;
- **Section 7** consolidates the management and mitigation measures that have been adopted for the Amendment;
- **Section 8** provides a justification for the Amendment;
- **Section 9** lists the abbreviations and **Section 10** lists the sources that were relied upon during the preparation of this document.



HB WALLARAH COAL 1163 F3 Land Ownership 07 06 2016

WALLARAH 2 COAL PROJECT

Wallarah 2 COAL PROJECT | HansenBailey ENVIRONMENTAL CONSULTANTS

Land Ownership

FIGURE 3

2 DESCRIPTION OF THE AMENDMENT

This section describes each change proposed by the Amendment and compares each change to the Original Project. This section should be read in conjunction with Section 3 of the EIS.

2.1 OVERVIEW OF THE ORIGINAL PROJECT

WACJV is seeking development consent under Division 4.1 of Part 4 of the EP&A Act to facilitate the development and operation of an underground coal mine. Development consent is sought for a period of 28 years including a three year construction period.

The Project is generally comprised of the following features:

- A deep underground longwall mine extracting up to 5 Mtpa of export quality thermal coal;
- Surface infrastructure facilities, namely:
    - The Tooheys Road Site (located north-east of the intersection of the M1 Motorway and the Motorway Link Road) includes a portal, coal handling facilities and stockpiles, water and gas management facilities, small office buildings, workshop, coal transportation infrastructure and connections to municipal water and sewerage systems;
    - The Buttonderry Site (near the intersection of Hue Hue Road and Sparks Road) includes administration offices, bathhouse, personnel access to the mine, ventilation shafts and water management structures; and
    - Western Shaft Site (located in the Wyong State Forest) includes a downcast ventilation shaft and water management structures.
- An inclined tunnel (or 'drift') provides access to the mine and facilitates the conveyance of coal from the mine. The drift extends from the surface at the Tooheys Road Site to the coal seam, approximately 360 m beneath the Buttonderry Site;
- Transportation of product coal to the Port of Newcastle by rail; and
- An operational workforce of 300 full time employees.

Underground mining operations will be undertaken within the Extraction Area (as shown on **Figure 2**). The Infrastructure Boundary is shown on **Figure 2** and indicates the extent of surface disturbance required for construction of the surface infrastructure associated with the Amended Project.

Minor disturbance outside the Infrastructure Boundary may be required for ancillary works such as firebreaks, boreholes, water diversion structures, minor contour banks, pipelines (and associated tracks and other services), power supply, security fences, environmental monitoring, and erosion and sediment control.

2.2 DESCRIPTION OF THE AMENDED PROJECT

2.2.1 Underground Mining

The mine plan, mining method and coal production rate for the Amended Project are unchanged from the Original Project. The mine plan is shown in **Figure 2**.

2.2.2 Tooheys Road Site

The Tooheys Road Site will contain the main coal handling, transportation and water management infrastructure for the Project. The stockpiles, crusher, water management infrastructure (dams, water treatment plant) and other buildings are unchanged from the Project Description in the EIS. The only changes to the Tooheys Road Site relate to the coal transportation infrastructure.

The coal transportation infrastructure for the Original Project consisted of a rail loading facility near the product coal stockpile, and a rail loop around the site. The rail loop at the Tooheys Road Site was to be connected to the Main Northern Rail Line by a rail spur.

The Amended Project has omitted the rail loop proposed for the Original Project, and the rail spur and train load out facility have been relocated to the east of the Main Northern Rail Line. Product coal will be transported by conveyors to the train load out facility. The rail load out facility will be situated on the relocated rail spur, approximately 1.1 km north of the Motorway Link Road. The Project's trains will branch off the Main Northern Rail Line and onto the rail spur immediately south of Gosford Road, Wyee. The layout of the Tooheys Road Site for the Amended Project is illustrated in **Figure 4**.

The Tooheys Road Site will require a connection to the municipal sewer system. The indicative alignment of the sewer connection is shown in **Figure 4**.

The proposed conveyor system, rail spur, train load out bin and sewer connection will be located on a Crown Road (Nikko Road). This design ensures that the Amended Project will entirely avoid development on privately owned land, including Lot 195 DP 1032847 (owned by DLALC).

There are privately owned lots with frontage along Nikko Road, including lots owned by DLALC. The proposed infrastructure on Nikko Road has been designed so that physical access to these lots is maintained. Furthermore, the lots to the north of the Motorway Link Road are legally accessible via Thompson Vale Road, Spring Creek Road and Wyee Road (in the case of Lot 204 DP 1117900). Thompson Vale Road is a formed road and is considered to be the primary access road to these lots, as opposed to the largely unformed Nikko Road and Spring Creek Road. Nevertheless, WACJV will ensure that access via Nikko Road is maintained via easements. Development by WACJV on Nikko Road to the south of the Motorway Link Road will involve the installation of a sewerage pipeline. The pipeline will be installed so as not to impede access to the lots with frontage along Nikko Road.

The infrastructure layout for the Amended Project requires approximately 26 ha less disturbance than the previously proposed layout for the Original Project. A comparison of the surface disturbance required for the two layouts is provided in **Figure 5**. The proposed infrastructure for the Amended Project is described in greater detail in **Section 2.3**.

2.2.3 Buttonderry Site

The infrastructure at the Buttonderry Site is unchanged from the Project Description in the EIS.

2.2.4 Western Ventilation Shaft

The infrastructure at the Western Ventilation Shaft Site is unchanged from the Project Description in the EIS.

2.2.5 Coal Transportation

All product coal will be transported to Newcastle via rail. The Original Project adopted a train configuration of 38 x 120 tonne (t) wagons. A number of rail haulage options were considered for the Amended Project. In consultation with rail and port providers and based upon modelling work completed by Transport for NSW (TfNSW), it has been determined that the following configurations provide the required available paths and are suitable from a network efficiency perspective:

- 44 x 100 t wagons for the first three years of operation (Years 4 to 6); and
- 60 x 100 t wagons for the remainder of the Project (Years 7 to 28).

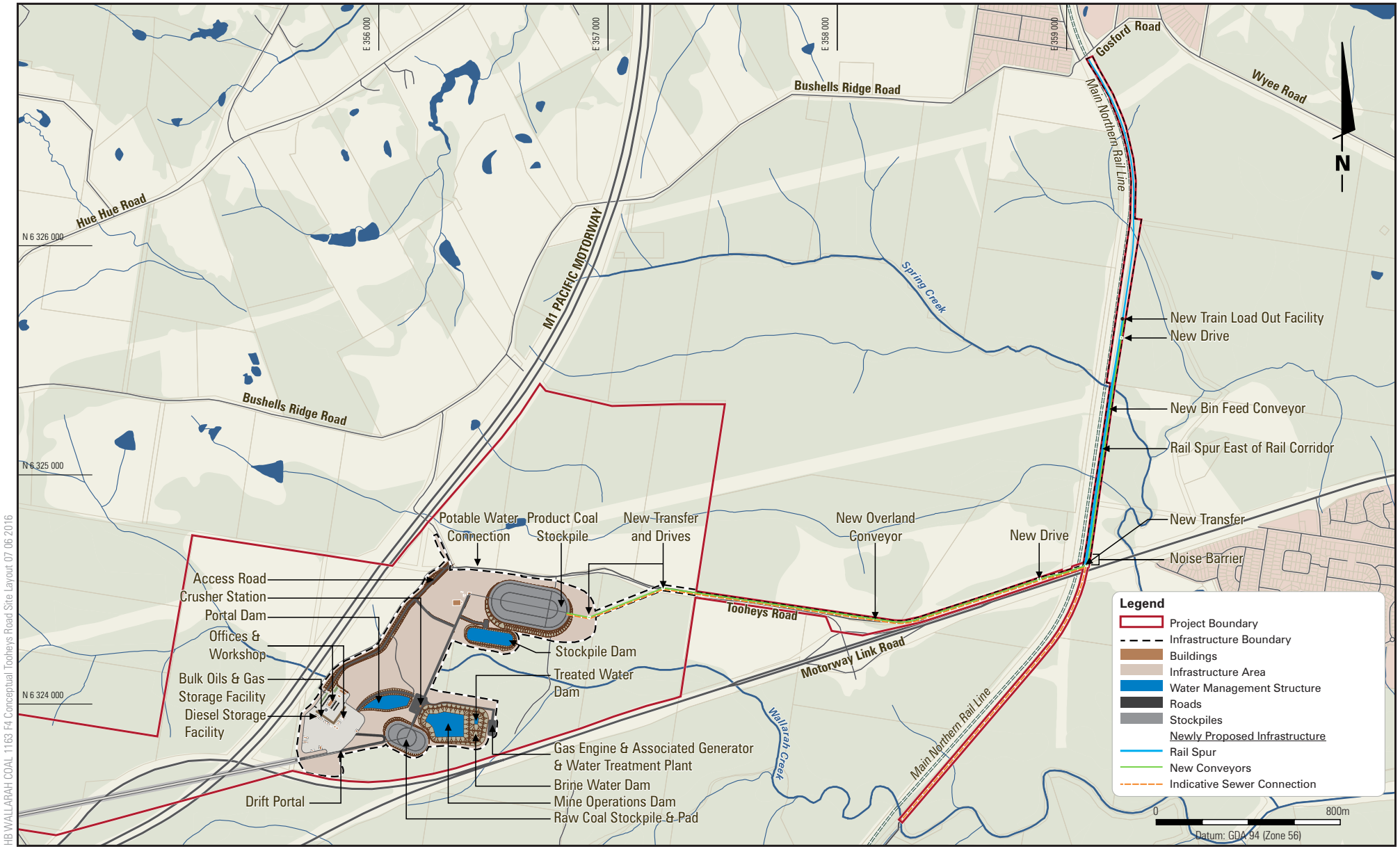
2.2.6 Summary

Table 1 provides a comparison of the Varied Project with the Original Project.

Table 1
Project Summary

Aspect	Original Project	Varied Project
Project Duration	28 years	No change
Mining Method	Underground longwall mining	No change
Coal Reserves	150 Mt within the Extraction Area (95 Mt to be recovered during the Project duration)	No change
Production Rate	Maximum of 5 Mtpa	No change
Tooheys Road Site	• Drift Portal • Raw coal stockpile • Secondary Crusher • Conveyor to product coal stockpile • Product coal stockpile • Rail loop and spur to the west of the Main Northern Rail Line • Train load out facility to the west of the product stockpile	• No change • No change • No change • No change • No change • Rail loop removed and rail spur relocated to the east of the Main Northern Rail Line • Train load out facility relocated to east of Main Northern Rail Line

Aspect	Original Project	Varied Project
	• Conveyor from product stockpile to train load out facility • Water Management Structures • Water Treatment Plant • Storage facilities • Workshop • Offices • Water and sewer connections	• Conveyors from product stockpile to relocated train load out facility • No change • No change • No change • No change • No change • Realignment of sewerage pipeline
Buttonderry Site	• Downcast shaft (personnel access to mine) • Mine ventilation fan house • Offices • Bathhouse • Storage facilities • Water management structures • Electrical substation • Helipad	• No change • No change • No change • No change • No change • No change • No change • No change
Western Ventilation Shaft Site	• Downcast shaft • Water management structures • Required from Year 13 of the Project onwards	• No change • No change • No change
Mine Plan	35 longwall panels to be mined during the Project (a further 11 panels may be the subject of a future application)	No change
Coal Transportation to Port	• Rail to Newcastle • 38 x 120t wagons	• No change • 44 x 100t wagons (Years 4 to 6) • 60 x 100t wagons (Years 7 to 28)
Employment	• Construction workforce of 450 full time personnel • Operation workforce of 300 full time personnel	• No change • No change
Water Management	• Mine Water Dams o Mine Operations Dam o Portal Dam o Stockpile Dam • Sediment Dams o Entrance Dam o Sedimentation Dam • Mine Water Treatment o Water Treatment Plant o Brine Treatment Plant o Treated Water Dam o Brine Dam	• No change • No change • No change
Waste Management	Brine to be disposed of in underground sump and longwall goafs	No change
Operational Hours	24 hours a day, 7 days a week	No change
Capital Investment	$805M	No change



HB WALLARAH COAL 1163 F4 Conceptual Tooheys Road Site Layout 07 06 2016

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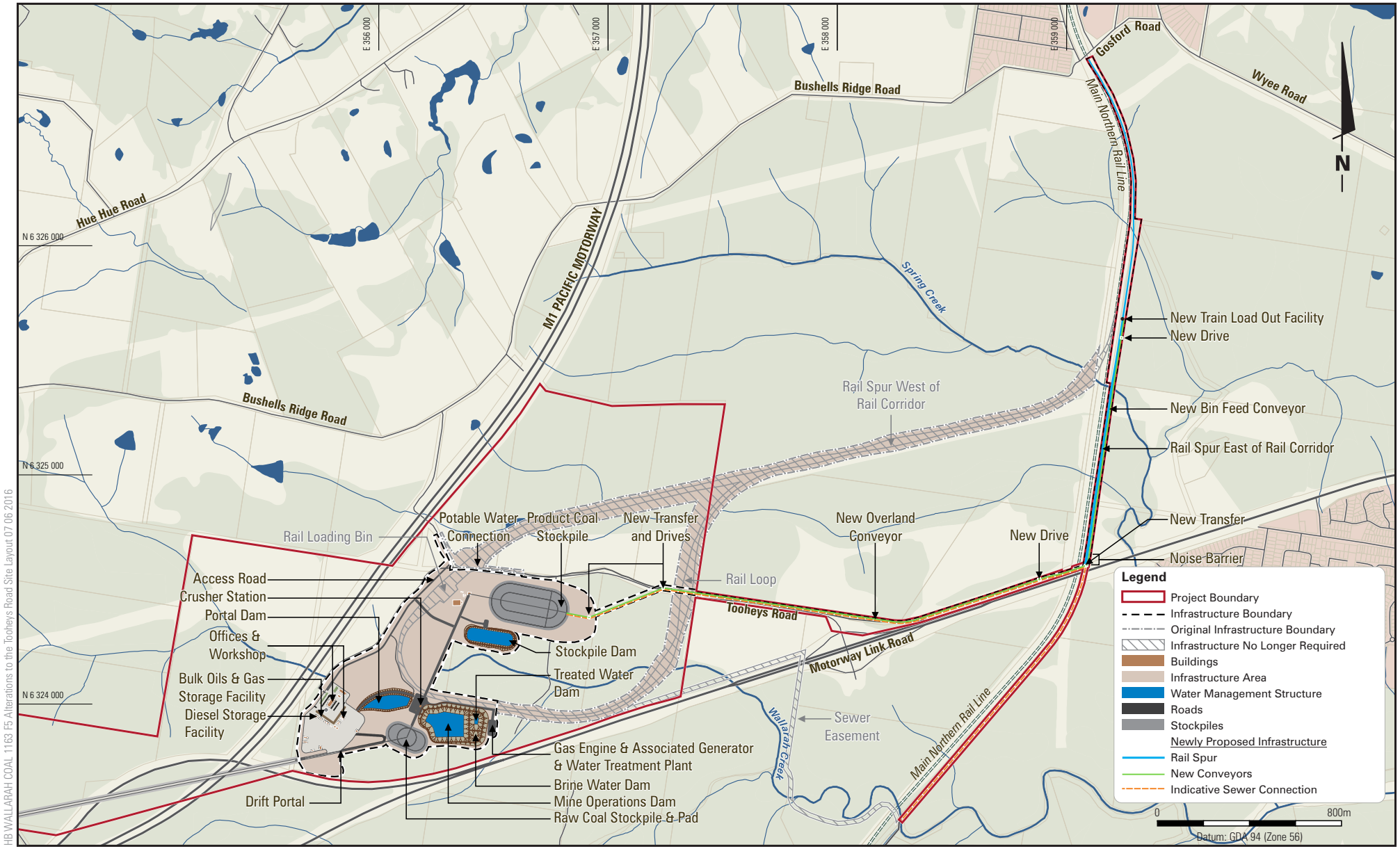
Conceptual Tooheys Road Site Layout

FIGURE 4



HB WALLARAH COAL 1163 F5 Alterations to the Tooheys Road Site Layout 07 06 2016

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Alterations to the Tooheys Road Site Layout

FIGURE 5

2.3 PROPOSED INFRASTRUCTURE

2.3.1 Conveyors and Transfer Stations

The conveyor system (comprised of the overland conveyor and bin feed conveyor) will be constructed to deliver coal from the product stockpile to the new rail load out facility. The overland conveyor is approximately 2.3 km long and follows a west-east alignment. The overland conveyor delivers coal from the product stockpile to a transfer station adjacent to the Main Northern Rail Line. The bin feed conveyor is approximately 1.1 km long and follows a south-north alignment adjacent to the Main Northern Rail Line. The indicative alignment of the conveyor system is shown in **Figure 4**.

The overland conveyor commences at the product stockpile and crosses to the northern side of Tooheys Road. The conveyor then follows the southern boundary of the Boral Montoro premises (comprised of a quarry and tile manufacturing plant) until it enters the corridor of the Motorway Link Road. Once within the road corridor, the conveyor runs parallel to the Motorway Link Road until it reaches the transfer station on the eastern side of the Main Northern Rail Line (see **Figure 4**). Elevated crossings will be constructed to enable the conveyor to pass over Tooheys Road, the Boral access road and the Main Northern Rail Line. The crossing of the Main Northern Rail Line will be via an enclosed gantry parallel to and north of the Motorway Link Road Bridge. WACJV has consulted and will continue to consult with Roads and Maritime Services (RMS), Transport for NSW (TfNSW), RailCorp and Sydney Trains to ensure that any road or rail safety risks associated with the Amendment are identified and appropriately managed.

The overland conveyor will be a belt conveyor with a maximum belt width of 2,400 mm. The overland conveyor system will be nominally driven by three 500 kW drives. The indicative locations of these drives are shown in **Figure 5**. The overland conveyor system has been designed to a nominal capacity of up to 4,500 tonnes per hour (tph).

The transfer station adjacent to the Main Northern Rail Line will transfer coal from the overland conveyor to the bin load conveyor. This transfer station will be a 'hood and spoon' type transfer designed to industry standards. The 'hood and spoon' design generates lower dust and noise emissions compared to other transfer designs. The transfer station will be fully enclosed to further reduce dust and noise emissions.

The bin feed conveyor will be predominantly ground-mounted adjacent to the proposed rail spur. The bin feed conveyor will be a trough belt conveyor with a nominal belt width of up to 2400 mm. The drives for the bin feed conveyor will be located approximately 90 m south of the train load out facility and approximately 1 km north of the Motorway Link Road (see **Figure 5)**. The bin feed conveyor will be nominally powered by two 500 kW drives. The bin feed conveyor has been designed to operate at a nominal capacity of up to 4,500 tph.

In order to minimise dust and noise impacts, both the overland conveyor and bin feed conveyor will be fitted with wind shielding (roof and one side wall). The shielding will be installed on the side of the conveyor that faces sensitive receptors.

2.3.2 Rail Spur

The rail spur for the Project has been relocated to the eastern side of the Main Northern Rail Line. The spur will run alongside the southbound line (Up line) between the Gosford Road and Motorway Link Road bridges (see **Figure 5**). The spur is approximately 2.2 km long and will be constructed to the NSW standard rail gauge. The rail spur will be constructed at similar grades to the existing grades along the Main Northern Rail Line. Detailed design and construction will be undertaken in consultation with RailCorp, Sydney Trains and TfNSW. Earthworks will be required for the construction of the rail spur, as described in **Section 2.4**. WACJV will continue to consult with these agencies to ensure that any rail safety risks associated with the Amendment are identified and appropriately managed.

The connection to the southbound line of the Main Northern Rail Line will be located a short distance south of the Gosford Road Bridge along a straight section of the Main Northern Rail Line. The existing Main Northern Rail Line crossovers are located approximately 500 m north of the Gosford Road Bridge. These crossovers will be utilised by the Project's train movements.

The existing crossovers are currently restricted to a speed of 25 km/h. Accordingly, the Project's trains will be restricted to this speed limit when re-joining the Main Northern Rail Line, unless suitable upgrades are implemented in consultation with RailCorp, Sydney Trains and TfNSW.

The rail spur will cross over Spring Creek and its tributaries. The creek crossings for the rail spur will be immediately adjacent and downstream of the corresponding bridges along the Main Northern Rail Line. The creek crossings for the rail spur will be designed so that there is minimal impact on the flood regime of Spring Creek.

The re-design of the rail infrastructure has resulted in fewer interactions with watercourses and riparian vegetation. The rail loop and spur for the Original Project required four crossings of Wallarah Creek (and its tributaries) and three crossings of Spring Creek (and its tributaries). The rail spur for the Amended Project only requires three crossings of Spring Creek (and its tributaries), which are located directly adjacent to the existing crossings for the Main Northern Rail Line.

2.3.3 Rail Loading System

The rail load out facility will be constructed on the eastern side of the Main Northern Rail Line, approximately 1.1 km north of the Motorway Link Road (see **Figure 4**). The bin is nominally 12 m in diameter, 29 m in height and has a maximum nominal capacity of approximately 1,000 t. The train loading system generally consists of:

- 1,500 mm loading gate;
- Telescopic chute (to suit the NSW rail network);
- Spillage pit to contain minor coal spills;
- Telemetry system to control the speed of trains as they are being loaded;

- Wagon closing trigger to confirm that wagon doors are closed;
- Track weigh scales before and after the bin; and
- Control room.

The loading system will be able to be controlled locally and remotely (from the main offices). The loading system will be capable of loading trains at a nominal rate of approximately 2,500 tph to 5,000 tph.

The conceptual design of the rail load out facility is illustrated in **Appendix B**.

2.3.4 Sewer Connection

A pipeline will be constructed to connect the Tooheys Road Site to the municipal sewerage system. The proposed sewer connection for the Original Project relied on an easement over land owned by DLALC. This easement was shown in Figure 19 of the EIS. The proposed sewer connection has been re-aligned to avoid land owned by the Darkinjung Local Aboriginal Land Council (see **Figure 4**).

The sewerage pipeline for the Amended Project will follow the alignment of the overland conveyor through the Boral Montoro premises and Motorway Link Road corridor. On the eastern side of the Main Northern Rail Line, the pipeline will run along Nikko Road towards the Charmhaven Sewage Treatment Plant to the south (see **Figure 4**). The pipeline will be installed so as to ensure that they will not present any impediment to the use of Nikko Road.

2.4 CONSTRUCTION

2.4.1 Schedule

The construction schedule for the Amended Project is unchanged from the Project Description in the EIS.

2.4.2 Earthworks

The construction of the rail spur will require earthworks. Conventional earthwork batters will be established on the western side of the rail spur. On the eastern side, retaining walls will be constructed where required to avoid encroachment onto private land.

Although excavated material (from the site of the rail spur) will be reused as fill material wherever possible, approximately 60,000 m^3 of additional fill material will be required for construction of the rail spur. Where suitable, the excavated material produced by drift development at the Tooheys Road Site will be used for this purpose. Excavated rock will be sized at the crusher before being transported to the location of the rail spur via the overland conveyor. The overland conveyor will be constructed prior to commencement of the earthworks for the rail spur.

2.5 ALTERNATIVES CONSIDERED

2.5.1 Alternative 1 – Original Project

The Original Project required the construction of a rail spur partly on land owned by DLALC. The Original Project is currently not feasible because the consent of the NSW Aboriginal Land Council has not been obtained. Development consent for the Original Project cannot be granted without the consent of the NSW Aboriginal Land Council.

2.5.2 Alternative 2 – Alternative Location of Train Load Out Facility

WACJV considered an infrastructure layout similar to the Amended Project, except with the train load out facility located near the Motorway Link Road Bridge. Under this alternative layout, the train load out facility will be near the transfer station.

This alternative layout was considered unsuitable due to the relative proximity of the train load out facility to the Blue Haven residential area. The proposed location of the train load out facility provides a much greater setback from Blue Haven, thus reducing the potential for dust and noise impacts. The proposed location also provides greater visual screening by topography and vegetation.

2.5.3 Alternative 3 – Alternative Location of Rail Spur

WACJV considered siting the bin feed conveyor and rail spur on the western side of the Main Northern Rail Line corridor as opposed to the eastern side (as is proposed for the Amended Project). A comprehensive risk evaluation for this alternative was undertaken in consultation with TfNSW. This alternative was considered unsuitable due to potential rail safety concerns and potential interactions with an existing access track used by the DLALC for accessing its lands to the north.

There is also less space on the western side of the Main Northern Rail Line than on the eastern side, resulting in greater risks associated with construction of the rail spur and conveyor. There were also other concerns pertaining to this alternative including:

- The rail spur may have extended to the south of the Motorway Link Road Bridge, which may have impacted upon DLALC's assets;
- Potential noise and dust concerns; and
- Increased visibility of the train load out facility from publicly accessible areas.

2.5.4 Alternative 4 –Vales Point Power Station

WACJV considered the transportation of product coal via the Vales Point Power Station. This alternative involved the construction of an overland conveyor to deliver coal to the power station, and the construction of a new train loading facility at the power station. Following consultation with Delta Electricity (now owned by the Sunshine Electricity Joint Venture) as owner of the Vales Point Power Station, this alternative was not considered to be feasible due to land access constraints and significantly greater capital costs.

2.5.5 Alternative 5 – Amended Project

The preferred alternative is the Amended Project which is comprised of changes to the proposed coal transportation infrastructure and the re-alignment of a sewer connection.

The Amended Project removes direct land use conflict with neighbouring land owners in that it avoids development on both DLALC land and privately owned land, whilst ensuring legal access to adjacent private properties.

Impacts from the Amended Project will comply with relevant noise and air quality criteria, as well as result in no visual impacts on the residences of Blue Haven.

The Amendment will provide significant environmental benefits including a 29% reduction in land disturbance associated with the Tooheys Road Site. Specifically, it will result in fewer interactions with streams and riparian vegetation, reduce impacts to ecological habitat and cause no additional impacts to Aboriginal heritage values. See **Section 6** for further discussion.

By avoiding development on Lot 195 DP 1032847 and other Aboriginal land, the requirement to obtain the consent of the NSW Aboriginal Land Council no longer applies. Therefore, the Amendment allows SSD-4974 to be determined in accordance with the EP&A Act.

The Amendment will allow for the economic and employment benefits of the Amended Project to be realised.

3 REGULATORY FRAMEWORK

This section describes the legislative and regulatory requirements applicable to the Amendment. This section considers the relevant provisions of NSW and Commonwealth Acts, Regulations and Environmental Planning Instruments.

3.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

This section should be read in conjunction with Section 4.1 of the EIS.

3.1.1 Development Application Process

The development application (SSD-4974) for State Significant Development under Division 4.1 of Part 4 of the EP&A Act was made on 18 September 2012.

Schedule 1 of the *Environmental Planning & Assessment Regulation 2000* (EP&A Regulation) states that application for SSD must be accompanied by an EIS. Schedule 2 of the EP&A Regulation states that prior to preparing an EIS, the proponent must make a request for Environmental Assessment Requirements (EARs).

The proponent made a request for EARs on 13 October 2011. The EARs for the Project were notified on 12 January 2012. Supplementary EARs were notified on 11 July 2012.

The '*Wallarah 2 Coal Project Environmental Impact Statement'* (Hansen Bailey, 2013a) was prepared in accordance with the EARs. In accordance with section 89F of the EP&A Act, the EIS was placed on public exhibition for 40 business days from 26 April 2013 to 21 June 2013.

A total of 748 submissions were received during the public exhibition period. The issues raised in these submissions were addressed in the '*Wallarah 2 Coal Project Response to Submissions'* (Hansen Bailey, 2013b).

On 7 February 2014, the Director-General published the Environmental Assessment Report for the Project. The Environmental Assessment Report concluded that "*the project's benefits outweigh its potential impacts and it is therefore in the public interest"* (DP&I, 2014).

On 16 January 2014, the Minister for Planning directed the PAC to review the merits of the Project as a whole. In accordance with its terms of reference, the PAC held a public hearing in Wyong on 2 April 2014. In June 2014, the PAC published its Review Report, which concluded that "*if the recommendations concerning improved strategies to avoid, mitigate or manage the predicted impacts of the project are adopted, then there is merit in allowing the project to proceed"*.

3.1.2 Amending a Development Application

The EP&A Regulation was made pursuant to section 157 of the EP&A Act. Clause 55 of the EP&A Regulation provides that a DA may be amended or varied by the applicant. An amendment requires with the agreement of the consent authority.

Clause 55(2) of the EP&A Regulation provides that "*the application to amend or vary the development application must have annexed to it written particulars sufficient to indicate the nature of the changed development*". This document describes the proposed changes to the Project and assesses the environmental impacts of these changes.

Section 89F of the EP&A Act outlines the requirement for public exhibition of applications for SSD. Section 89F(4) provides that if the original application was placed on public exhibition, an additional period of exhibition is not required for the amended application "*unless the Secretary determines that the amended, substituted or later application substantially differs from the original application and the environmental impact of the development concerned has not been reduced by the changes proposed in the amended, substituted or later application*." Section 89F(4) demonstrates that the power to amend a DA is wide (as it makes provision for amended applications that are substantially different from the original application) and is beneficial and facultative. The Amendment falls within the power to amend under clause 55 of the EPA Regulation.

3.1.3 Other Provisions of the EP&A Act

All other provisions of the EP&A Act will apply to the determination of the development application (as amended). These provisions were discussed in Section 4 of the EIS.

3.1.4 Gateway Process

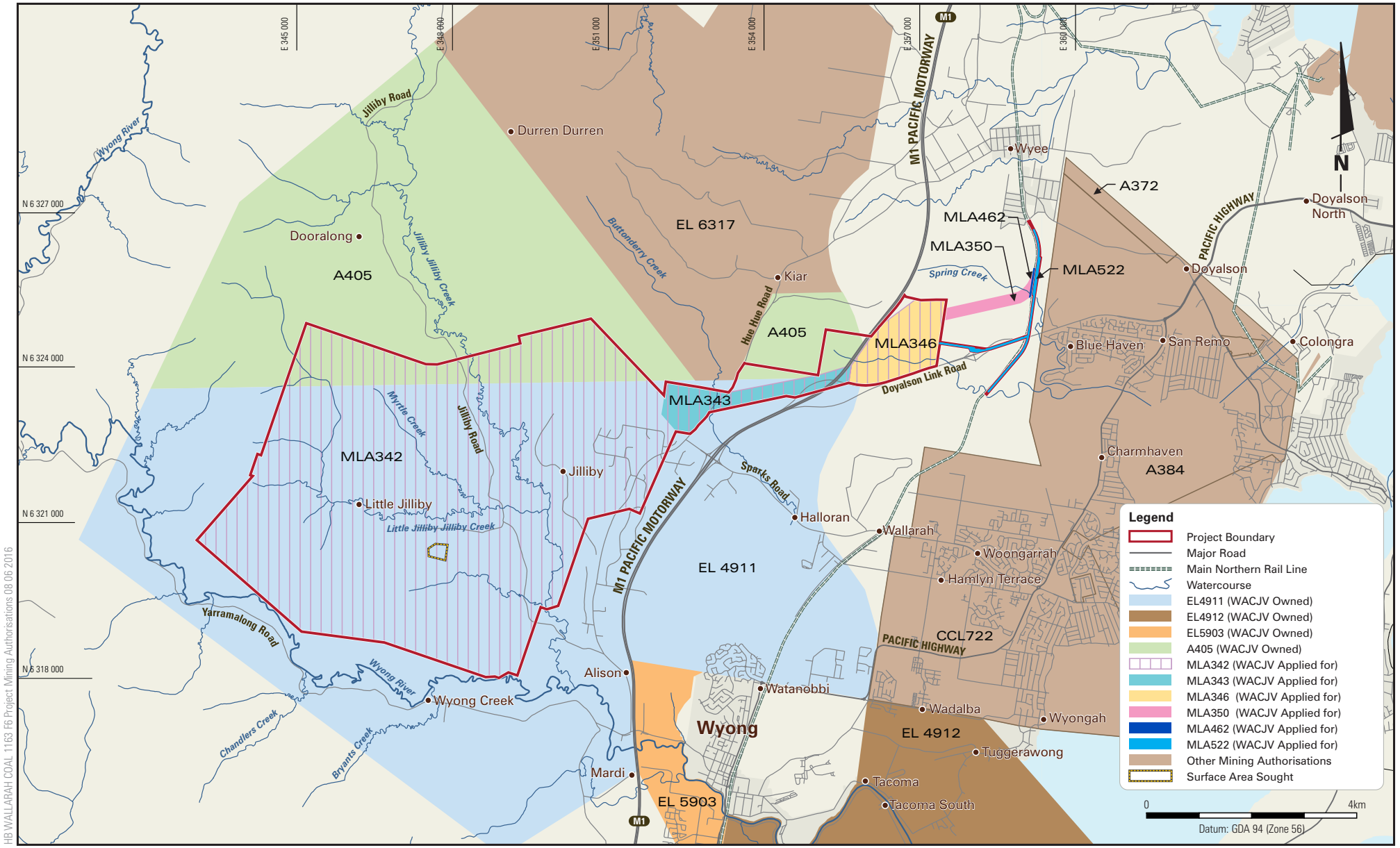
Clause 50A of the EP&A Regulation was enacted to give effect to the 'Gateway process' described in the Strategic Regional Land Use Plan (DP&I, 2012). Clause 50A(1) provides that the 'Gateway process' applies to any proposed mining development on Strategic Agricultural Land (as indicated on the Strategic Agricultural Land Map or a site verification certificate). However, clause 50A(3) states that the 'Gateway process' does not apply to any application where the EARs were notified prior to 10 September 2012. Given that the EARs for the Project were notified on 12 January 2012 and 11 July 2012, the 'Gateway process' does not apply to the Project.

3.2 OTHER NSW LEGISLATION

This section should be read in conjunction with Sections 4.3 and 4.4 of the EIS.

3.2.1 Mining Act 1992

On 24 February 2016, WACJV submitted Mining Lease Application (MLA) 522 in respect of the land required for the conveyor system, rail spur and associated works. WACJV has previously submitted MLAs 342, 343, 346, 350 and 462 in respect of the Project. The mining authorisations and MLAs held by WACJV are shown in **Figure 6**.



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Mining Authorisations

FIGURE 6

3.2.2 Roads Act 1993

The rail spur and train load out facility are proposed to be constructed within Nikko Road (an unformed and unencumbered Crown road). WACJV submitted an application (W562973) to close Nikko Road on 18 January 2016. The Department of Primary Industries – Lands (DPI – Lands) confirmed that Nikko Road was not encumbered by any existing permits or applications.

Section 138 of the *Roads Act 1983* (Roads Act) provides that the consent of the roads authority is required for the erection of a structure or the carrying out of works in, on or over a public road. Construction works will need to be undertaken on the section of Nikko Road that is the subject of road closure application W562973. Section 7 states that the Minister for Roads is the roads authority for Crown roads. Therefore, the Minister's consent will be required for works on Nikko Road (should it remain a Crown road at the time of construction).

The construction of the conveyor system will take place partially within a section of the RMS corridor for the Motorway Link Road. Under section 7 of the Roads Act, the local council is the roads authority for all roads other than Crown Roads and freeways. The consent of Wyong Shire Council (WSC) will be required for construction works within this corridor.

Pursuant to section 89K of the EP&A Act, consent under section 138 of the Roads Act cannot be refused if it is required for the carrying out of an approved SSD.

3.3 ENVIRONMENTAL PLANNING INSTRUMENTS

This section should be read in conjunction with Sections 4.1.7 and 4.1.10 of the EIS.

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

The *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) declares certain categories of development to be SSD. Schedule 1 of the SRD SEPP declares coal mining (and related works) to be SSD. Schedule 1 relevantly states:

> *(1) "Development for the purpose of mining that:*
> *(a) is coal or mineral sands mining; or*
> …
> *(3) Development for the purpose of mining related works (including primary processing plants or facilities for storage, loading or transporting any mineral, ore or waste material) that:*
> *(a) is ancillary to or an extension of another State significant development project."*

Therefore, the Amendment constitutes SSD.

3.3.2 Mining SEPP

State Environmental Planning Policy (Mining, Petroleum Production and Extraction Industries) 2007 (Mining SEPP) dictates the permissibility of mining activities and the matters that must be considered by consent authorities when determining an application for a mining development. Clause 7(1)(a) of the Mining SEPP provides that underground mining is permissible (with consent) on any land. 'Underground mining' is defined under clause as:

> *(a) mining carried out beneath the earth's surface, including bord and pillar mining, longwall mining, top-level caving, sub-level caving and auger mining, and*
> *(b) shafts, drill holes, gas and water drainage works, surface rehabilitation works and access pits associated with that mining (whether carried out on or beneath the earth's surface),*
>
> *but does not include open cut mining."*

Clause 7(1)(b) of the Mining SEPP provides that the following development is permissible:

> (a) mining carried out:
> (i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or
> (ii) on land that is, immediately before the commencement of this clause, the subject of a mining lease under the *Mining Act 1992* or a mining licence under the *Offshore Minerals Act 1999*

Clause 7(1) also provides that the following development is permissible (with consent):

> *(d) facilities for the processing or transportation of minerals or mineral bearing ores on land on which mining may be carried out (with or without development consent), but only if they were mined from that land or adjoining land*

3.3.3 State Environmental Planning Policy No 71 – Coastal Protection

The *State Environmental Planning Policy No 71 – Coastal Protection* (Coastal Protection SEPP) prescribes matters that must be considered by the consent authority when determining an application for development within the coastal zone. A portion of the Amendment is located within the coastal zone.

Clause 14 of the Coastal Protection SEPP provides that consent must not be granted to a development that would impede physical access to the coastal foreshore. 'Coastal foreshore' is defined under the SEPP as *'land with frontage to a beach, estuary, coastal lake, headland, cliff or rock platform'.* The nearest land that constitutes 'coastal foreshore' is the land fronting Budgewoi Lake, which is approximately 2.5 km south-east of the Project Boundary. The proposed infrastructure for the Amendment will not restrict public access to the coastal foreshore.

Clause 15 of the Coastal Protection SEPP provides that consent must not be granted to a development that proposes to dispose of effluent via a non-reticulated system, and where negative impacts on water quality would occur as a result. As explained in **Section 2.3.4**, all effluent generated by the Amended Project will be conveyed to the Charmhaven Sewage Treatment Plant. This will ensure that there are no discharges of untreated wastewater to watercourses.

Clause 16 of the Coastal Protection SEPP provides that consent must not be granted to a development that would result in discharges of untreated stormwater to coastal waterbodies. The water management system has been designed so that all runoff from industrial and hardstand areas is captured and treated prior to being discharged from the site. In addition, temporary sediment basins will be established during construction to ensure that all runoff is treated prior to being discharged off site. Therefore, the Project will not result in discharges of untreated stormwater.

3.3.4 Wyong Local Environmental Plan 2013

The *Wyong Local Environmental Plan 2013* (Wyong LEP 2013) has superseded the *Wyong Local Environmental Plan 1991*, which was in force at the time of lodging the DA. The Wyong LEP 2013 is accompanied by updated land zoning maps. The land zoning under the Wyong LEP 2013 is shown in **Figure 7**.

The Amendment is located on land that is zoned as IN1 General Industrial, RU6 Transition, E2 Environmental Conservation, and SP2 Infrastructure. Under the Wyong LEP 2013, Development for the purposes of underground mining is permissible (with consent) in zone IN1. However, development for the purposes of underground mining is prohibited in zones RU6, E2 and SP2. Section 89E(3) of the EP&A Act provides that "*Development consent may be granted despite the development being partly prohibited by an environmental planning instrument*."

Clause 7 of the Mining SEPP provides that development for the purpose of underground mining is permissible with development consent on any land. There is therefore an inconsistency between clause 7 of the Mining SEPP and the provisions of the Wyong LEP 2013.

Clause 5 of the Mining SEPP states that if there is an inconsistency between the Mining SEPP and another environmental planning instrument, the Mining SEPP prevails to the extent of the inconsistency. Therefore, the Mining SEPP prevails over the Wyong LEP 2013, thus permitting underground mining to be carried out with development consent.

The definition of 'mining': under clause 3 of the Mining SEPP includes the:

a) Construction, operation and decommissioning of associated works, and
b) Stockpiling, processing, treatment and transportation of materials extracted, and
c) Rehabilitation of land affected by mining.

Accordingly, the coal handling and transportation infrastructure proposed as part of the Amendment will be permissible with development consent. Even if that was not the case

Section 89E(3) of the EP&A Act provides that "*Development consent may be granted despite the development being partly prohibited by an environmental planning instrument*."

3.4 ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT 1999

This section should be read in conjunction with Section 4.6 of the EIS.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the role of the Commonwealth in the assessment of proposed developments. A proponent must make a Referral under section 68 of the EPBC Act if the proposed action has the potential to result in significant impacts to Matters of National Environmental Significant (MNES).

The Referral for the Project (EPBC 2012/6388) was lodged on 17 May 2012. On 15 June 2012, the Project was deemed to be a 'controlled action', with sections 18 and 18A (which relate to listed threatened species and communities) being the controlling provisions. The Assistant Secretary of DoE decided that the Project will be assessed by 'accredited assessment' under the EP&A Act.

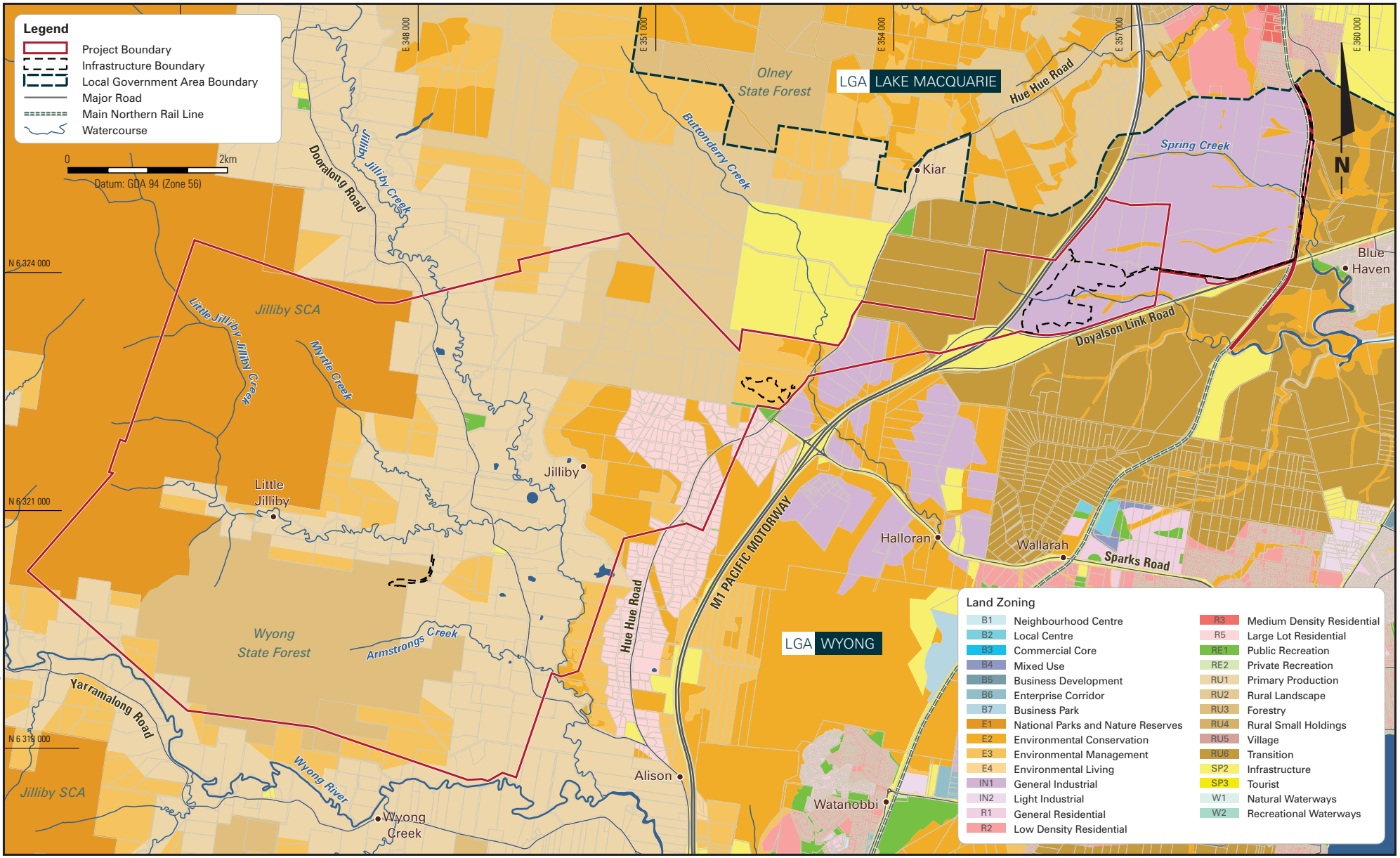
On 22 October 2013, sections 24D and 24E of the EPBC Act were also deemed to be controlling provisions. Sections 24D and 24E are concerned with the protection of water resources.

Section 156A of the EPBC Act states that a proponent may make a request to vary an action that has been the subject of a Referral. Under section 156B, the Minister must decide whether or not to accept the variation. The Minister may only accept the variation if the varied proposal is substantially the same in character as the original proposal. The Amendment represents only a minor change to the coal transportation method for the Project. The following aspects of the Project will remain unchanged from the original proposal:

- Underground mining activities;
- Coal processing at the Tooheys Road Site;
- All surface activities at the Buttonderry Site and Western Ventilation Shaft;
- Project duration; and
- Operational and construction workforce.

The Amended Project is considered to be of the same character as the original proposal.

WACJV has made a request under section 156A of the EPBC Act to vary the action (EPBC 2012/6388).



HB WALLARAH COAL 1163 F7 Land Zoning 08 06 2016

WALLARAH 2 COAL PROJECT

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Land Zoning

FIGURE 7

4 STAKEHOLDER ENGAGEMENT

This section outlines the stakeholder engagement that has been undertaken for the Amendment, including consultation with regulatory authorities, registered Aboriginal parties and the wider community. This section should be read in conjunction with Section 5 of the EIS, which described the stakeholder consultation undertaken for the Original Project.

4.1 STAKEHOLDER ENGAGEMENT FOR THE PROJECT

WACJV implemented an extensive stakeholder engagement program for the Project, which included consultation with regulatory authorities, third party infrastructure owners, Aboriginal stakeholders, near neighbours and the wider community. Stakeholder engagement was undertaken via a number of methods including:

- Community newsletters;
- Information days;
- Community reference group;
- Personal briefings with landowners;
- Community contact line and website;
- Participation at local fairs and trade shows;
- Briefings and meetings with state and local government authorities;
- Briefings and meetings with third party infrastructure owners;
- Consultation with Aboriginal stakeholders in accordance with the '*Aboriginal cultural heritage consultation requirements for proponents 2010'* (DECCW, 2010); and
- Sponsorship and support of community groups and clubs.

4.2 STAKEHOLDER ENGAGEMENT FOR THE AMENDMENT

4.2.1 Regulatory Consultation

Further consultation has been undertaken specifically for the Amendment. Briefings and meetings have been held with a number of local and state government authorities since September 2015. The objectives of the regulatory consultation were to:

- Notify the relevant regulatory authorities of the proposed Amendment;
- Ascertain the process for amending the DA;
- Identify issues of concern so that these can be addressed in this document; and
- Confirm that potential interactions with public infrastructure are acceptable to the owners of these assets (e.g. RMS, RailCorp, TfNSW, Sydney Trains).

Table 2 summarises the consultation with regulatory authorities regarding the Amendment. **Table 3** lists the issues raised by regulatory authorities and identifies where these issues are addressed in this document.

Table 2
Regulatory Consultation Undertaken for the Amendment

Stakeholder	Methods of Engagement	Purpose of Consultation
Department of Planning & Environment	• Meetings on 23/09/15, 14/10/15, 25/11/15, 08/03/16 and 08/04/16	• Provide briefing on the Amendment • Determine the process for amending the DA for the Project
Department of Trade and Investment, Regional Infrastructure and Services	• Meetings on 23/09/15, 21/10/15, 18/11/15, 25/11/15, 27/11/15, 27/01/16, 02/02/16, 24/02/16 and 03/03/16	• Provide briefing on the Amendment • Discuss mining lease application for the Amendment
Transport for NSW, RailCorp and Sydney Trains	• Meetings on 23/09/15, 27/11/15, 02/02/16, 25/02/16 and 02/05/16 • Teleconference on 24/03/16	• Provide briefing on the Amendment • Ensure that there are no safety risks associated with interactions with the Main Northern Rail Line corridor • Discuss access deeds/agreements and related requirements
Roads and Maritime Services	• Meetings on 05/11/15, 02/12/15 and 09/03/16	• Provide briefing on the Amendment • Ensure that there are no safety risks associated with interactions with the Motorway Link Road corridor • Discuss access deeds/agreements and related requirements
Department of Primary Industries – Lands	• Meetings on 09/12/15	• Provide briefing on the Amendment • Discuss status and process for closure of Crown Road (Nikko Road)
Wyong Shire Council	• Meetings on 06/01/16, 29/02/16 and 06/04/16	• Provide briefing on the Amendment
Office of Environment and Heritage	• Meeting on 22/03/16	• Provide briefing on the Amendment • Discuss ecological impacts and confirm the Biodiversity Offset Strategy

Table 3
Issues Raised by Stakeholders

Issue	Where Addressed
Process under the EP&A Act for amending the DA for the Project (SSD-4974)	**Section 3.1.2**
Mining authorities required for the Amended Project	**Section 3.2.1**
Impacts of the Project on the rail capacity of the Main Northern Rail Line	**Section 6.6**
Rail safety considerations	**Section 6.6.4**
Adequacy of offsets to compensate for impacts to ecological values	**Section 6.5.4**

4.2.2 Infrastructure Owners

WACJV has commenced consultation with Boral Montoro Pty Limited (Boral) regarding access to Lot 194 DP 1032847 and Lot 168 DP 705480. Boral holds Mining Lease 554 and Special Lease 165762 in respect of these lots.

The infrastructure associated with the Motorway Link Road is owned by RMS. WACJV has consulted with and will continue to consult with RMS to ensure that any road safety risks associated with the Amendment are identified and appropriately managed.

The rail infrastructure along the Main Northern Rail Line is owned by RailCorp, Sydney Trains and TfNSW. WACJV has consulted with and will continue to consult with these agencies to ensure that any rail safety risks associated with the Amendment are identified and appropriately managed.

4.2.3 Community Consultation

A community newsletter was distributed in May 2016 to notify the community and local businesses of WACJV's recent mining lease application and to provide an update on the Project.

WACJV has undertaken direct consultation with adjoining landowners and businesses.

4.2.4 Aboriginal Community Consultation

An assessment has been undertaken to assess the potential impacts of the Amendment on Aboriginal heritage (see **Section 6.7**). Consultation with the Aboriginal community has been undertaken specifically for the purposes of the Amendment. The consultation program was conducted in accordance with the process prescribed by *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010).

Stage 1 of the consultation process involved identifying Aboriginal parties that may have an interest in the proposed development. On 19 January 2016, letters were sent to the prescribed authorities seek contact details for known Aboriginal parties. All Aboriginal parties identified by these authorities were sent a letter inviting them to register an interest in the Aboriginal cultural heritage assessment.

On 20 January 2016, an advertisement was placed in the Central Coast Express Advocate (a local newspaper) to seek further expressions of interest. In response to the advertisement and letters, three Aboriginal parties expressed an interest in the *Aboriginal Cultural Heritage Assessment – Addendum* (OzArk, 2016) for the Amendment, namely:

- DLALC;
- Guringai Tribal Link Aboriginal Corporation (GTLAC); and
- Kevin Duncan.

Stage 2 of the consultation process involved providing information to the registered Aboriginal parties about the Amendment.

Stage 3 of the consultation process involved seeking cultural knowledge from the registered Aboriginal parties. To meet these objectives, the 'Methodology' for the *Aboriginal Cultural Heritage Assessment – Addendum* was provided to the Aboriginal parties on 16 February 2016. In accordance with the DECCW (2010) guidelines, the Aboriginal parties were given 28 days to review and provide feedback on the Methodology. All three of the registered Aboriginal parties provided feedback on the Methodology. The feedback on the methodology is appended to the *Aboriginal Cultural Heritage Assessment – Addendum* (see **Section 4.2.4**).

Stage 4 of the consultation process is the review of the draft Aboriginal cultural heritage assessment report by the registered Aboriginal parties. The draft report was provided to the Aboriginal parties on 31 March 2016.

In accordance with the DECCW (2010) guidelines, the Aboriginal parties were given 28 days to review and provide feedback on the draft report. All three of the Aboriginal parties provided feedback, which is appended to the *Aboriginal Cultural Heritage Assessment – Addendum* (**Appendix H**).

DLALC was consulted regarding the proposed concept for the Amendment in February 2016.

5 RISK ASSESSMENT

This section outlines the risk assessment that was undertaken to determine the potential environmental risks that may arise as a result of the Amendment. This section should be read in conjunction with Section 6 of the EIS.

A risk assessment was undertaken during the preparation of the EIS to identify the key risks associated with the Original Project. Using the WACJV risk assessment matrix, the identified risks were ranked as 'extreme', 'high', 'medium' or 'low'. Risks that were given a higher rating were afforded greater emphasis in the environmental assessment of the Original Project. The risk assessment for the Original Project identified no 'extreme' risks, six 'high' risks, seven 'medium' risks and nine 'low' risks.

A risk assessment was undertaken to identify the risks that may arise as a result of the Amendment. The scope of the risk assessment was limited to the aspects of the Project that are altered by the Amendment (see **Section 2**). The identified risks were ranked using the WACJV risk assessment matrix.

For each identified hazard, a preliminary risk evaluation was undertaken to determine the risk rating in the absence of controls. For hazards where the preliminary risk rating was 'extreme', 'high' or 'medium', controls were developed to reduce the level of risk. The residual risk was then re-evaluated with the effect of the proposed controls. The ratings for the residual risks considered in the risk assessment are presented in **Table 4**.

Table 4
Risk Assessment Ratings

Extreme Risk	High Risk	Medium Risk	Low Risk
None	None	Water management	Aboriginal heritage
		Ecology	Greenhouse gas
		Noise	Rail
		Visual	Contamination
		Air Quality	

6 IMPACTS, MANAGEMENT AND MITIGATION

This section summarises the predicted environmental impacts of the Amendment, and compares these to the predicted impacts of the Original Project. This section also outlines the additional management and mitigation measures to be implemented to ameliorate these impacts.

6.1 FLOODING

This section should be read in addition to section 7.4.1 of the EIS.

6.1.1 Background

Subsidence has the potential to impact upon flooding regimes by altering the surface topography within floodplains. The potential impacts of subsidence on flooding regimes were considered in the *Flood Impact Assessment* (GHA, 2013), which was presented as Appendix K of the EIS. The *Flood Impact Assessment* included hydraulic modelling for all catchments present within the Subsidence Impact Limit, namely the catchments of Hue Hue Creek, Jilliby Jilliby Creek, Little Jilliby Jilliby Creek and the Wyong River. The underground mining aspects of the Project will not be affected by the Amendment. Therefore, the potential flooding impacts associated with underground mining will remain as assessed in the *Flood Impact Assessment*.

GHA has undertaken the *Spring Creek Flood Impact Assessment* (see **Appendix C**) to assess the potential flooding impacts of the Amendment, specifically the re-location of the re-located rail spur. The re-located rail spur will require crossings of Spring Creek and its tributaries.

6.1.2 Methodology

Hydrological Modelling

Hydrological modelling using the DRAINS software model was undertaken to determine flood flows in Spring Creek. Flows were calculated for both the 1% Annual Exceedance Probability (AEP) storm event (i.e. 1 in 100 year flood) and the Probable Maximum Flood (PMF).

Rainfall data was obtained from 12 rain gauges in the locality. The 1% AEP storm was estimated using the procedures outlined in *Australian Rainfall and Runoff – A Guide to Flood Estimation* (Pilgrim, 2007). The probable maximum precipitation was calculated using the Generalised Short Duration Method described in *Bulletin 53* (Bureau of Meteorology, 2003). The probable maximum precipitation was input into the DRAINS model to determine the PMF.

Hydraulic Modelling

Hydraulic modelling was undertaken using the HEC-RAS model to determine flood levels based on the modelled flows for the critical 1% AEP and PMF events. The hydraulic modelling was undertaken for Spring Creek under existing conditions (i.e. without the rail spur) and after construction of the rail spur.

Topographic information for the modelling was predominantly sourced from a 2006 Aerial Laser Survey (ALS). The ALS generated topographic information with an accuracy of ± 0.1 m laterally and ± 0.2 m vertically. The ALS data was supplemented by orthophoto maps and ground surveys. Detailed surveys were undertaken within the Addendum Study Area (as illustrated on **Figure 8**). These surveys confirmed the accuracy of the ALS data. The dimensions of the existing bridge crossings over Spring Creek were measured manually.

Surface roughness was estimated by comparing the vegetation cover and topography of Spring Creek and its catchment with published data (Chow, 1986). Vegetation cover was determined from site inspections and aerial photographs.

6.1.3 Impact Assessment

Wallarah Creek

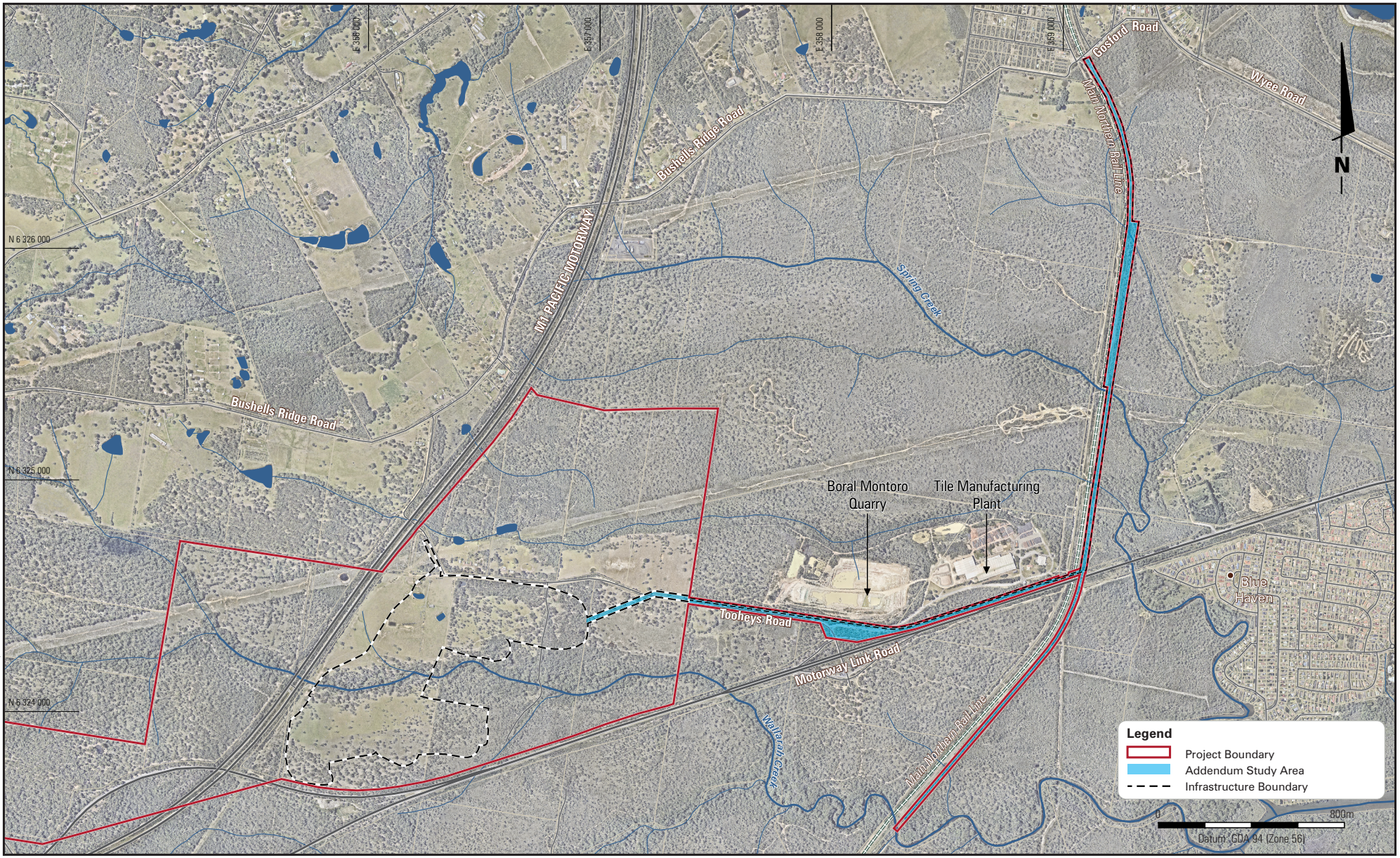
A small section of the proposed conveyor system is located within the Wallarah Creek catchment. The proposed conveyor system will not affect the volume of runoff in the Wallarah Creek catchment.

The previously proposed rail loop required crossings of Wallarah Creek and its tributaries. The Amendment removes the requirement for these crossings, thus avoiding these potential impacts to Wallarah Creek (see **Figure 5**).

Spring Creek

The proposed infrastructure for the Amendment is predominantly located within the catchment of Spring Creek as shown on **Figure 5**. Spring Creek has a total catchment area of 11.5 km^2 upstream of the Motorway Link Road. The Motorway Link Road acts as a hydraulic control for Spring Creek. Accordingly, the Amendment will not have any impacts on Spring Creek downstream of the Motorway Link Road.

The key locations within the Spring Creek catchment are the interactions with the existing and proposed infrastructure (see **Figure 5**). The DRAINS modelling determined that the critical storm duration is 2 hours for all key locations. The modelled flows for the 1% AEP flood and PMF are presented in **Table 5**.



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WALLARAH 2 COAL PROJECT

Addendum Study Area

FIGURE 8

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Table 5
Predicted Flood Flows

Location	1% AEP Flow (m^3/s)	PMF Flow (m^3/s)
Bridge 1	59.10	310.0
Bridge 2	61.10	278.0
Culvert 1	25.80	93.1*
Culvert 2	8.71	30.4*
Motorway Link Road	204.00	1,228.0

** Includes flow over rail embankment*

The Amendment will not result in any measurable changes to flood flows in the Spring Creek catchment. The potential impacts of the Amendment would occur through the impediment of flow, rather than changes to flow volumes.

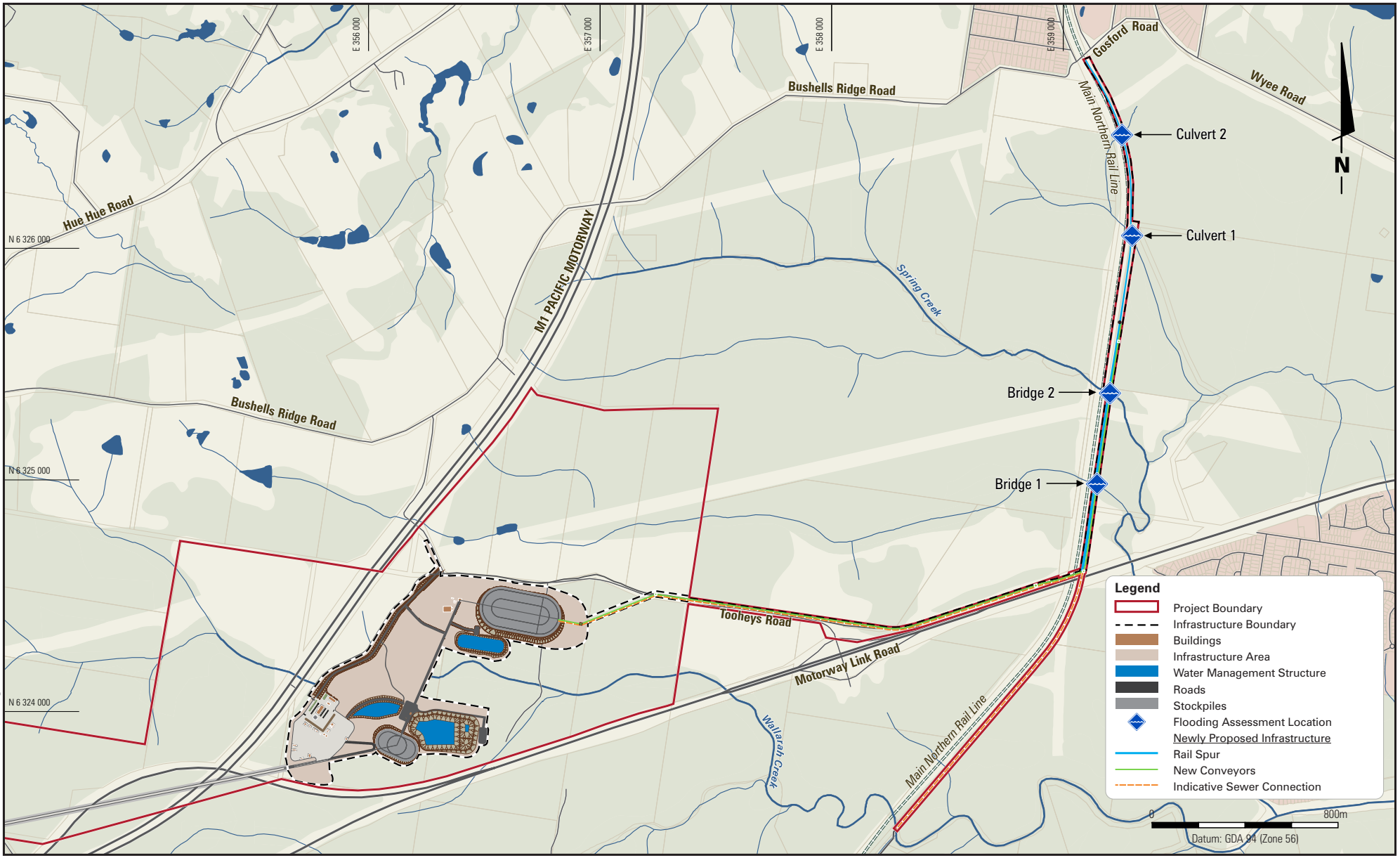
The HEC-RAS model predicted that construction of the rail spur may result in very minor increases in flood levels at Bridges 1 and 2. For a 1% AEP flood event, the flood levels at Bridges 1 and 2 are predicted to increase by 0.01 m and 0.03 m respectively. The model predicts no significant change to the 1% AEP flood extent. The modelling also showed that the culverts have sufficient capacity to convey the 1% AEP flows.

The modelling results indicate that the culverts do not have sufficient capacity to convey the PMF flows. That is, the Main Northern Rail Line would experience significant inundation during a PMF (under existing conditions). Inundation would occur regardless of whether or not the rail spur is constructed adjacent to the Main Northern Rail Line.

6.1.4 Management and Mitigation Measures

The predicted increases in flood levels during a 1% AEP flood are very minor, and will not result in inundation of the railway line. The freeboard to the existing rail infrastructure is sufficient to accommodate these minor increases in flood levels. As such, measures to manage flood levels are not considered necessary. Re-grading or lining of the stream can be implemented (if necessary) to counterbalance the potential minor increases in flood levels.

WACJV will implement appropriate erosion and sediment controls during construction and operation of the proposed rail infrastructure. Diversion bunds and swales will be installed so that all runoff is directed to sediment basins and pollution control devices. This will ensure that there are no opportunities for untreated discharges to Spring Creek. A detailed Erosion and Sediment Plan will be included in the Water Management Plan to be prepared for the Project.



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Flooding Assessment Locations

FIGURE 9

6.2 AIR QUALITY

This section should be read in conjunction with section 7.5 of the EIS.

6.2.1 Background

The potential impacts of the Project on air quality were considered in the *Air Quality and Greenhouse Gas Assessment* (PAEHolmes, 2012), which was presented as Appendix L of the EIS This assessment considered the potential impacts of the Project by modelling emissions from the Tooheys Road Site and Buttonderry Site.

Pacific Environment Limited (PEL) has prepared an *Air Quality and Greenhouse Gas Assessment – Addendum*, which predicts the impacts of the Amended Project. The model that was developed for the Original Project was revised to reflect the proposed changes to the coal transportation infrastructure.

The *Air Quality and Greenhouse Gas Assessment – Addendum* is presented in full in **Appendix D**.

6.2.2 Methodology

Air Quality Monitoring

The air quality monitoring program for the Project commenced in 1996. Air quality monitoring is undertaken to establish background concentrations of Total Suspended Particulates (TSP) and Particulate Matter (PM), as well as background dust deposition levels. The current assessment undertaken by PEL has considered monitoring data collected subsequent to the previous assessment in 2012.

Background levels have been revised using the additional data collected since the previous assessment. Based on the available air quality monitoring data, the following air quality levels have been adopted as the background levels:

- Annual average PM_{10} concentration of 17 µg/m^3;
- Annual average $PM_{2.5}$ concentration of 7 µg/m^3;
- Annual average TSP concentration of 33 µg/m^3; and
- Annual average dust deposition of 1.6 g/m^2/month.

Dispersion Modelling

The previous assessment by PAEHolmes (2012) was undertaken generally in accordance with the *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (DEC, 2005). The model that was developed for the assessment of the Original Project was adopted for the current assessment, and revised (where necessary) to account for the Amendment.

The CALPUFF dispersion model was used to predict the potential dust concentrations that may result from the Project. The meteorological conditions used in the CALPUFF model were generated using the CALMET model. The meteorological inputs into the CALMET model were obtained from the Tooheys Road weather station and the Bureau of Meteorology weather stations at Cooranbong, Norah Head and Williamtown.

The inventories of dust emissions were revised to reflect the re-location of infrastructure and the introduction of new dust sources (e.g. conveyors and transfer stations). Separate inventories were prepared for the construction and operations phases. Dust controls were considered in the calculations of dust emissions. Therefore, the effects of dust controls are accounted for in the results of the CALPUFF model.

Identification of Sensitive Receptors

All of the representative receptors considered in the PAEHolmes (2012) assessment were retained for the current assessment. Due to the re-location of the rail spur and train load out facility further to the north and east, additional representative receptors were considered in the current assessment. Ten additional receptors, located in the suburbs of Blue Haven and Wyee, were assessed in the revised modelling. **Figure 10** shows the locations of all representative receptors considered in the revised modelling.

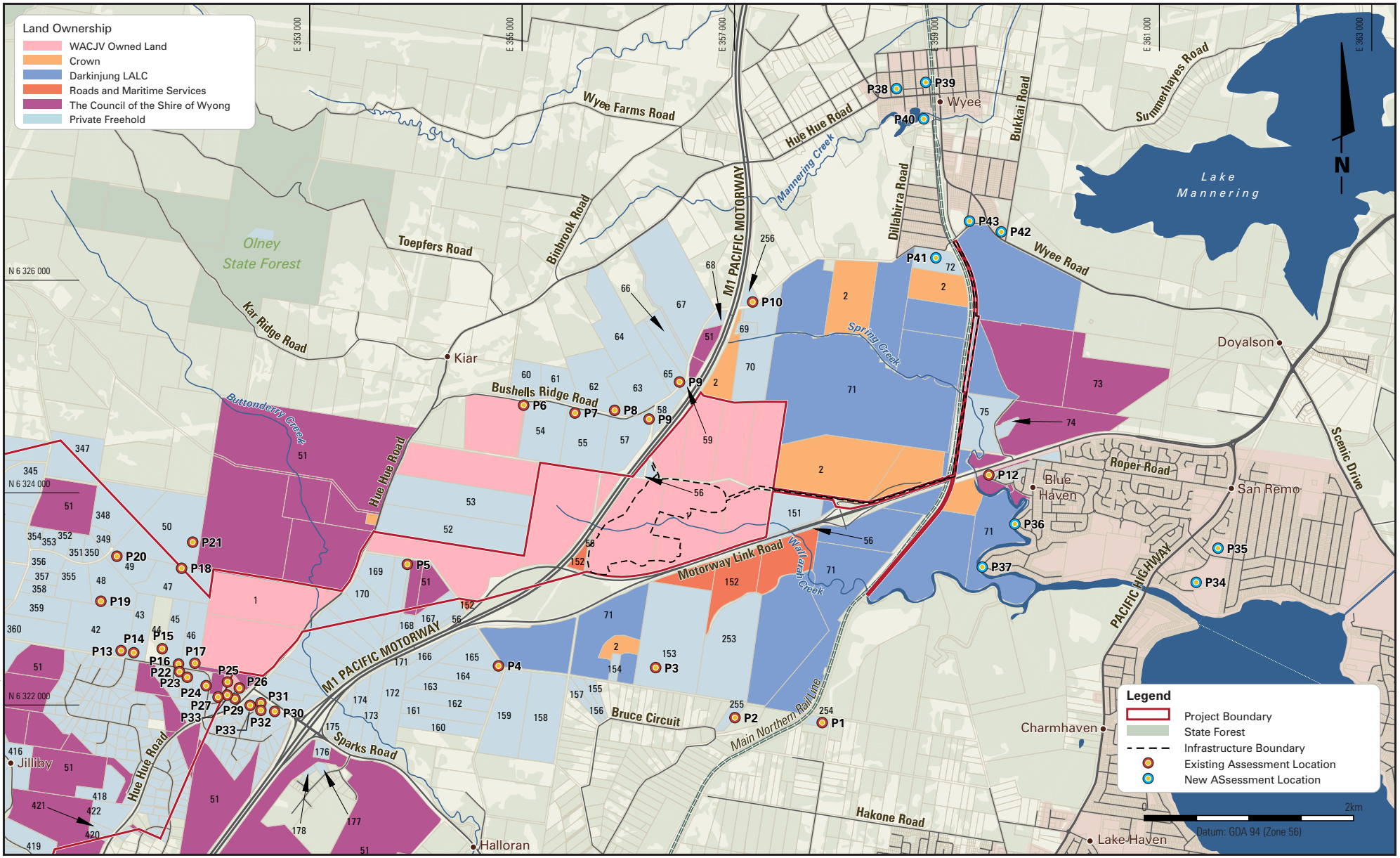
Assessment Criteria

The relevant criteria for assessing emissions were sourced from DEC (2005) and the *Ambient Air – National Environment Protection Measures* (NEPC, 2016). The relevant assessment criteria are outlined in **Table 6**.

Table 6
Air Quality Assessment Criteria

Pollutant	Standard	Averaging Period	Application	Source
Deposited Dust	2 g/m^2/month	Annual	Incremental*	DEC (2005)
	4 g/m^2/month	Annual	Cumulative	DEC (2005)
TSP	90 $\mu g/m^3$	Annual	Cumulative	DEC (2005)
PM_{10}	50 $\mu g/m^3$	24-Hour	Incremental*	DEC (2005)
	30 $\mu g/m^3$	Annual	Cumulative	DEC (2005)
$PM_{2.5}$	25 $\mu g/m^3$	24-Hour	Cumulative	NEPC (2016)
	8 $\mu g/m^3$	Annual	Cumulative	NEPC (2016)

** Refers to emissions from the Project alone.*



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WALLARAH 2 COAL PROJECT

Air Quality Assessment Locations

FIGURE 10

6.2.3 Impact Assessment

Operations Phase

The primary sources of emissions during the operations phase include coal handling activities at the Tooheys Road Site (e.g. conveyors and stockpiles) and the upcast ventilation shaft at the Buttonderry Site.

The incremental impacts of the Amended Project are predicted to comply with the regulatory criteria for annual average TSP, PM_{10}, $PM_{2.5}$ and dust deposition. The incremental 24-hr average concentrations of PM_{10} and $PM_{2.5}$ are also predicted to be less than the regulatory criteria. The dust levels resulting from the Project alone (i.e. incremental impacts) are presented in **Table 7**. The predicted impacts of the Amended Project are comparable to the predicted impacts of the Original Project (see **Table 7**). Therefore, the Amendment does not significantly alter the predicted air quality impacts of the Project.

The air quality contours generated by the dispersion model are shown in **Figure 11**. These contours represent the boundaries of the regions where dust concentrations may exceed the regulatory criteria. As evident in **Figure 11**, there are no private residences within the regions where dust concentrations may exceed the criteria. **Figure 11** shows the 30 µg/m^3 contour for annual average TSP. Since there are no private residences within the 30 µg/m^3 contour, annual average TSP levels resulting from the Amended Project are expected to be well below the criteria (90 µg/m^3). Similarly, **Figure 11** shows the 4 µg/m^3 contour for annual average $PM_{2.5}$. Since there are no private residence within this region, annual average $PM_{2.5}$ levels resulting from the Amended Project are predicted to be well below the criteria (8 µg/m^3).

The background levels of PM_{10}, $PM_{2.5}$, TSP and dust deposition (as stated in **Section 6.2.2**) were added to the predicted incremental impacts to determine the cumulative impact of the Project and other dust generating activities. Based on recorded background levels and the modelled incremental impacts, there are no predicted exceedances of the criteria for cumulative annual average PM_{10}, $PM_{2.5}$, TSP and dust deposition.

Historical air quality monitoring has shown that there are days where the background concentration exceeds the criterion for 24-hr average PM_{10}. That is, there would be exceedances of this criterion regardless of whether the Project is operational. Due to the relatively minor contribution of the Project to PM_{10} levels, there is a low probability that the Project will result in additional days where the 24-hr average criterion will be exceeded.

Construction Phase

A comparison of the inventories of emissions indicated that the total emissions during the construction phase are estimated to be less than 85% of the total emissions during the operations phase. Given that air quality emissions during operations are predicted to comply with the regulatory air quality criteria, emissions during the construction phase are also expected to comply with the criteria.

Table 7
Predicted Incremental Air Quality Impacts

Measure	Unit of Measurement	Criteria	Maximum Predicted Level	
			Original Project	Amended Project
Annual average PM_{10}	$\mu g/m^3$	30	1.6	1.7
Maximum 24-hr average PM_{10}	$\mu g/m^3$	50	27.2	29.5
Annual average $PM_{2.5}$	$\mu g/m^3$	8	0.46	0.47
Maximum 24-hr average $PM_{2.5}$	$\mu g/m^3$	25	4.9	5.3
Annual average TSP	$\mu g/m^3$	90	2.4	2.6
Annual average dust deposition	g/m^2/month	2	0.14	0.13

Coal Transportation

Fugitive emissions resulting from coal transportation via rail were re-assessed due to the proposed changes to the train configurations for the Project. Consistent with the Original Project, WACJV commits to water spraying of the coal surface during train loading and best practice load profiling.

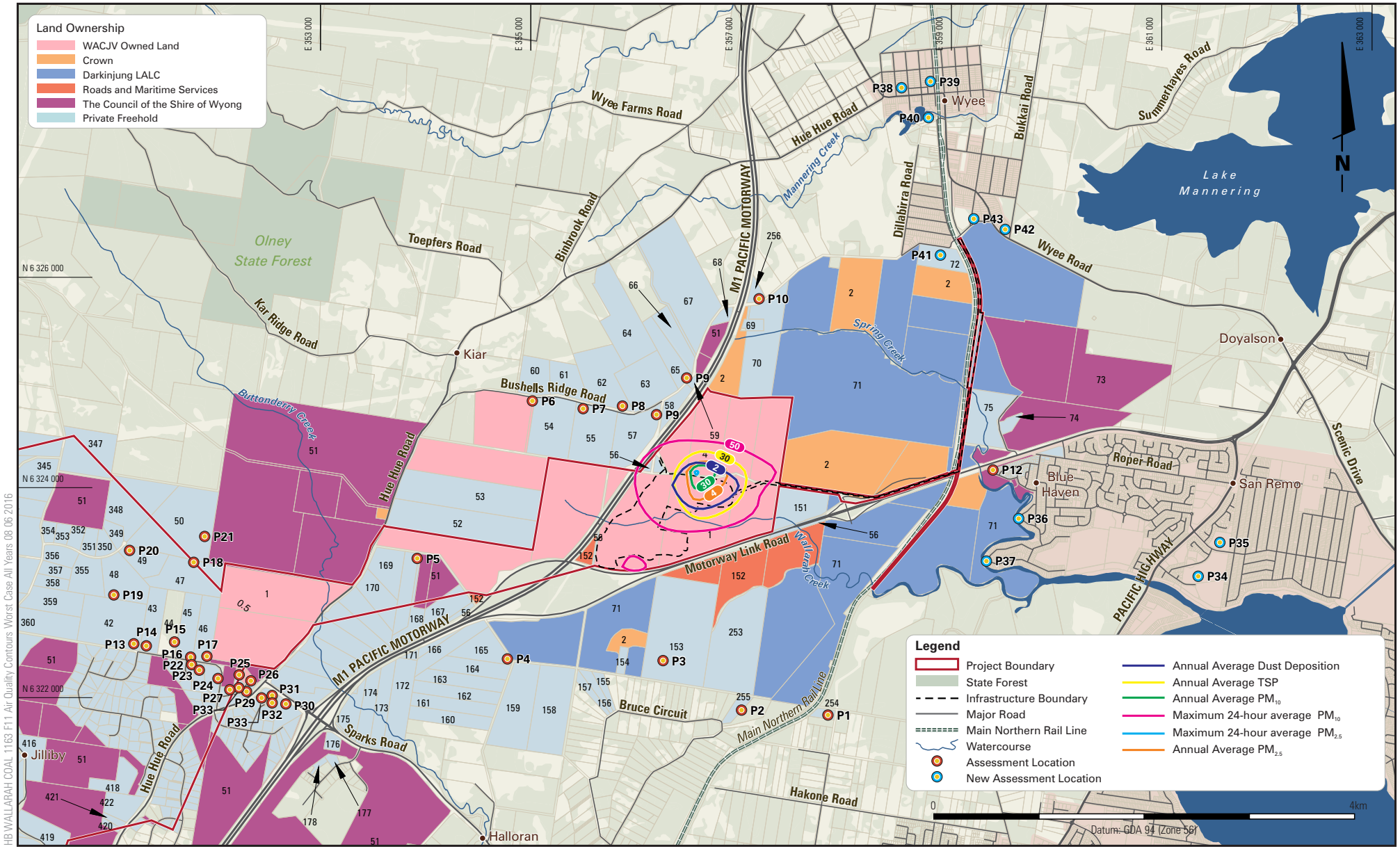
For a loaded train with 60 wagons, the total surface area of exposed coal would be approximately 1,930 m^2. Katestone (2012) found that watering of product coal during loading can reduce emissions by up to 99%. PEL conservatively assumed that water spraying could result in a 50% reduction in emissions. Based on these assumptions, the total windblown emissions (in terms of TSP) are estimated at 85 kg/year. This represents a negligible portion of the emissions for the Project. Accordingly, the impact on ground level concentrations of TSP will be negligible.

6.2.4 Management and Mitigation Measures

WACJV has previously committed to the preparation of an Air Quality and Greenhouse Gas Management Plan (AQGHGMP) for the Project. The following dust controls have been adopted specifically to minimise the potential impacts of the Amendment:

- Shielding of conveyors (roof and one side wall); and
- Enclosure of transfer stations.

These additional controls will be included in the AQGHGMP. The monitoring program in the AQGHGMP will consider the locations of the additional receptors that were considered in the current assessment.



HB WALLARAH COAL 1163 F11 Air Quality Contours Worst Case All Years 08 06 2016

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Air Quality Contours (Worst Case)

FIGURE 11

6.3 GREENHOUSE GAS

This section should be read in conjunction with Section 7.6 of the EIS.

6.3.1 Background

The potential greenhouse gas impacts of the Project were considered in the *Air Quality and Greenhouse Gas Assessment* (PAEHolmes, 2012), which was presented as Appendix L of the EIS. That assessment estimated the potential direct and indirect greenhouse gas emissions of the Original Project as a whole.

The following aspects of the Amendment have the potential to affect the emissions estimates:

- Rail haulage distances will decrease due to the removal of the rail loop, resulting in lower emissions associated with diesel use; and
- Additional conveyors will increase the emissions associated with electricity use.

A revised Greenhouse Gas Assessment was undertaken by PEL to quantify the potential changes in greenhouse gas emissions due to the Amendment. The *Air Quality and Greenhouse Gas Assessment – Addendum* is presented in full in **Appendix D**.

6.3.2 Methodology

Greenhouse gas emissions were estimated based on the methods outlined in the following guidelines:

- *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard* (World Resources Institute/World Business Council for Sustainable Development, 2004);
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008*; and
- National Greenhouse Accounts Factors (DCCEE, 2015).

In calculating the Scope 1, Scope 2 and Scope 3 emissions associated with the Project, PEL considered the potential emissions of the following gases:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous Oxide (N_2O); and
- Synthetic gases (hydrofluorocarbons, SF_6, CF_4, C_2F_6).

The combined effect of these gases was determined and expressed in terms of carbon dioxide equivalent (CO_2-e).

6.3.3 Impact Assessment

Carbon dioxide (CO_2) and methane (CH_4) are the primary greenhouse gases that will be generated by the Project. These gases are formed and released via the combustion of fuels and fugitive emissions (i.e. liberation of CH_4 from coal seams during mining). The predicted emissions due to the Project are presented in **Table 8**.

The Amendment results in a shorter haulage distance to Newcastle, which will marginally reduce the Scope 3 emissions associated with rail transportation. Due to the additional conveyors associated with the Amendment, there will be a marginal increase in emissions resulting from electricity use.

Table 8
Estimated Greenhouse Gas Emissions

Scope	Source	Estimated Emissions (t CO_2-e)
Scope 1	Diesel combustion	62,497
	Fugitive emissions	3,505,585
	Flaring	1,074,963
	Total Scope 1 emissions	4,643,044
Scope 2*	Electricity use	1,061,990
Scope 3*	Diesel combustion	3,219
	Electricity use	151,713
	Rail transportation	144,924
	Use of product coal	255,727,076
	Total Scope 3 emissions	256,026,932

** Indirect emissions*

The estimated Scope 1 emissions intensity of the Project is approximately 0.045 t CO_2-e per tonne of coal, which is similar to the majority of underground coal mines in Australia (0.05 t CO_2-e per tonne of coal) (Deslandes, 1999).

The predicted annual direct emissions (Scope 1) represent approximately 0.1% of Australia's commitment under the Kyoto Protocol (591.5 Mt CO_2-e). Given that Australia contributed 1.12% of global emissions in 2012 (PBL Netherlands Environmental Assessment Agency, 2015), the Project's contribution to greenhouse gas emissions will be very minor.

6.3.4 Management and Mitigation Measures

WACJV has previously committed to developing an Energy and Greenhouse Strategy which will focus on improving energy efficiency and reducing greenhouse gas emissions. Given that the nature and quantity of emissions associated with the Project will not materially change as a result of the Amendment, the previously proposed management measures will remain sufficient.

6.4 NOISE

6.4.1 Background

The potential acoustic impacts of the Project were considered in the *Noise and Vibration Impact Assessment* (Atkins Acoustics, 2013), which was presented as Appendix N of the EIS This assessment considered the potential impacts of the Project by modelling noise emissions from the Tooheys Road Site and Buttonderry Site.

Atkins Acoustics and Associates (Atkins Acoustics) has prepared a *Noise and Vibration Impact Assessment Addendum*, which predicts the impacts of the Amended Project. The model that was developed for the Original Project was revised to reflect the proposed changes to the Tooheys Road Site.

The *Noise and Vibration Impact Assessment Addendum* is presented in full in **Appendix E**.

6.4.2 Methodology

Noise Monitoring

Noise monitoring is required to ascertain the background noise levels in the areas surrounding the Project. Attended and unattended noise surveys were conducted in 2006, 2007 and 2012 to establish the background noise levels in the vicinity of the Tooheys Road Site and Buttonderry Site.

Due to the re-location of the rail spur and train load out facility further to the north and east, additional receptors in the suburbs of Blue Haven and Wyee were considered in the revised modelling. Additional noise surveys were conducted in 2016 to measure the background noise levels at these locations. The monitoring and assessment locations considered in the revised noise modelling are shown in **Figure 12**. Additional noise surveys were undertaken at three locations (M13, M14 and M15) to determine the background noise levels for five new assessment locations (P13, P14, P15, P16 and P17).

Noise Modelling

The previous assessment by Atkins Acoustics (2013) was undertaken in accordance with the following guidelines:

- *NSW Industrial Noise Policy* (EPA, 2000) (INP);
- *Interim Construction Noise Guideline* (DECC, 2009); and
- *Road Noise Policy* (OEH, 2011).

The potential noise impacts of the Original Project were assessed using the Environmental Noise Model (ENM). The ENM simulates the propagation of sound from the Project and the attenuation provided by factors such as distance, vegetation, topography, artificial structures and atmospheric conditions. The model that was developed for the Original Project was revised to account for the Amendment. The revisions to the ENM included the re-location of noise sources (e.g. train load out facility) and the addition of new noise sources (e.g. conveyors, transfer stations, etc.).

The meteorological data for the ENM were obtained from the Tooheys Road weather station and the Bureau of Meteorology. The revised noise modelling utilised the same meteorological inputs as the revised CALPUFF dispersion model (see **Section 6.2.2**).

Noise Criteria

The assessment criteria for the operations phase were developed in accordance with the INP. The INP prescribes two criteria for the assessment of operational noise, namely the intrusive criterion and the amenity criterion. The intrusive criterion is generally set at 5 dBA above the background noise level. The intrusive criteria for private receptors were determined based on the results of noise surveys.

The amenity criterion is dependent on the nature of the land use (e.g. rural, suburban, industrial) at the receptor locations. The intrusive criteria were selected with reference to the zoning of the land under the Wyong LEP 2013 (see **Section 3.3.3**). The Project Specific Noise Criteria (PSNC) for the five new assessment locations are presented in **Table 9**. The PSNC for the locations considered in the previous assessment are unchanged.

Research indicates that sleep disturbance can occur as a result of short, sharp noises that are clearly audible over the background noise level. The INP recommends a sleep disturbance criterion equivalent to 15 dBA above the background noise level. Based on this recommendation, the sleep disturbance criteria for the new assessment locations are in the range of 48-54 dBA (see **Table 9**). The research associated with the *Road Noise Policy* (RNP) indicated that noise levels of less than 50-55 dBA are unlikely to induce awakening reactions.

The *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extraction Industry Development* (NSW Government, 2014) (VLAMP) outlines the actions that are required if noise levels are predicted to exceed the PSNC. The action that is required is dependent on the magnitude of the exceedance.

Noise levels that are up to 2 dBA above the PSNC are deemed to be 'negligible' impacts and do not require any management actions.

If the PSNC are exceeded by 3-5 dBA, the proponent is required to offer to apply acoustic treatments to the affected residences. Exceedances of the PSNC by more than 5 dBA will give rise to landowners' rights to acquisition.

The VLAMP also states that voluntary land acquisition rights will be invoked if the amenity criteria are exceeded at more than 25% of the area of privately owned land. For the purpose of this rule, the 'land' is defined as the total area of contiguous lots owned by the same landowner.

The recommendations of the VLAMP are outlined in **Table 10**.

Table 9
Project Specific Noise Criteria

Location	Period	Background Noise Level (dBA)	PSNC		Amenity Criteria
			Operational Noise $L_{Aeq, 15\ min}$	Sleep Disturbance $L_{A1, 1\ min}$	$L_{Aeq, Period}$
P13	Day	49	54	-	60-65
	Evening	45	50	-	50-55
	Night	39	44	54	45-50
P14	Day	37	42	-	60-65
	Evening	39	42*	-	50-55
	Night	37	42	52	45-50
P15	Day	37	42	-	60-65
	Evening	39	42*	-	50-55
	Night	37	42	52	45-50
P16	Day	33	38	-	70
	Evening	39	38*	-	70
	Night	34	38*	48	70
P17	Day	33	38	-	55-60
	Evening	39	38*	-	45-50
	Night	34	38*	48	40-45

** Adjusted in accordance with the OEH application notes. The evening and night criteria cannot be higher than the day time criterion.*

Table 10
Recommended Actions under the VLAMP

Noise Category	Predicted Noise Levels	Recommended Action
Negligible	0-2 dBA above PSNC	Not a discernible noise impact – no action required
Marginal	3-5 dBA above PSNC and Project contributes less than 1 dBA at residence	Mechanical ventilation and air conditioning
Moderate	3-5 dBA above PSNC and Project contributes more than 1 dBA at residence	Mechanical ventilation, air conditioning and faced upgrade
Significant	More than 5 dBA above PSNC at residence	Mechanical ventilation, air conditioning and faced upgrade, property acquisition
Significant	Exceedance of the amenity criteria over greater than 25% of land area	Properly acquisition

Construction Noise and Vibration

Potential noise impacts during the construction phase were assessed in accordance with the *Interim Construction Noise Guideline* (ICNG). The ICNG recommends Noise Management Levels (NMLs) to limit noise generated by construction activities. For construction activities during standard work hours, the NML is the background noise level plus 10 dBA. For work outside standard hours, the NML is the background noise level plus 5 dBA.

Rather than being mandatory limits, the NMLs act as triggers for further noise mitigation. If the predicted construction noise levels are greater than 75 dBA, respite periods may need to be introduced, provided that the community is prepared to accept a longer construction program.

Potential vibration impacts during the construction phase were assessed in accordance with *Assessing Vibration: a Technical Guideline* (DEC, 2006). This guideline recommends limits to prevent impacts to human comfort. In addition, German Standard *DIN4150 Part 3 (1986)* recommends limits to prevent structural damage.

6.4.3 Impact Assessment

Operational Noise

Predicted noise levels at assessment locations P1 to P10 were included in the assessment for the Original Project (Atkins Acoustics, 2013). Assessment locations P1 to P10 are situated to the north, south and west of the Tooheys Road Site (see **Figure 12**). The modelled noise levels for these locations are predicted to be up to 1.1 dBA less than the previously modelled noise levels these locations. This is due to the following aspects of the Amendment:

- The re-location of the train load out facility to the east of the Main Northern Rail Line, thereby increasing its distance from locations P1 to P10; and
- Removal of the rail loop, which eliminates a potential source of wheel squeal.

Wheel squeal, caused by the interaction of train wagons with the track, is associated with curved sections of rail track. The rail spur for the Amended Project is predominantly straight, and the turnout from the Main Northern Rail Line has a large radius of curvature. Compared to the previously proposed rail loop, the rail spur has significantly less potential for wheel squeal. Therefore, predicted noise levels at assessment locations P1 to P10 are expected to be lower due to the Amendment.

The predicted noise levels during the operations phase for the day and night periods are shown in **Figure 13** and **Figure 14**, respectively. Noise levels at assessment location P13 are predicted to be within the PSNC. That is, the Amended Project is predicted to comply with the PSNC for the Blue Haven area.

Noise levels at locations P14 and P15 are predicted to exceed the PSNC by up to 4 dBA under modelled conditions. These locations are representative of two residences on Thompson Vale Road. The predicted exceedances represent a ‘moderate’ degree of affection, based on the noise categories in the VLAMP. WACJV will consult with these landowners and offer to apply acoustic treatments In accordance with the recommendations of the VLAMP (as described in **Table 10**).

Noise levels at location P16 are also predicted to exceed the PSNC by up to 4 dBA. Location P16 is representative of a single rural residential property on Bushells Ridge Road. The predicted exceedance at this residence represents a ‘moderate’ degree of affectation.

Acoustic treatment of this residence will be undertaken in accordance with the VLAMP (as described in **Table 10**).

Noise levels at location P17 are predicted to exceed the PSNC by up to 2 dBA. This location is representative of residences in the southern extremity of Wyee. The VLAMP categorises exceedances of up to 2 dBA as 'negligible' impacts. No management actions are recommended for negligible impacts.

Impacts to privately owned land were assessed in accordance with the VLAMP. There are no privately owned properties (including DLALC's land) where the amenity criteria are predicted to be exceeded at more than 25% of the land area.

Construction Noise

The residences on Thompson Vale Road (P14 and P15) and Bushells Ridge Road (P16) are predicted to experience exceedances of the NMLs for standard work hours and work outside standard hours. The Amended Project is predicted to comply with the NMLs for standard work hours in the Blue Haven area. However, residences in Blue Haven may experience exceedances of the NMLs for work outside standard hours. Exceedances of NMLs are generally short term in nature and will be managed to acceptable levels.

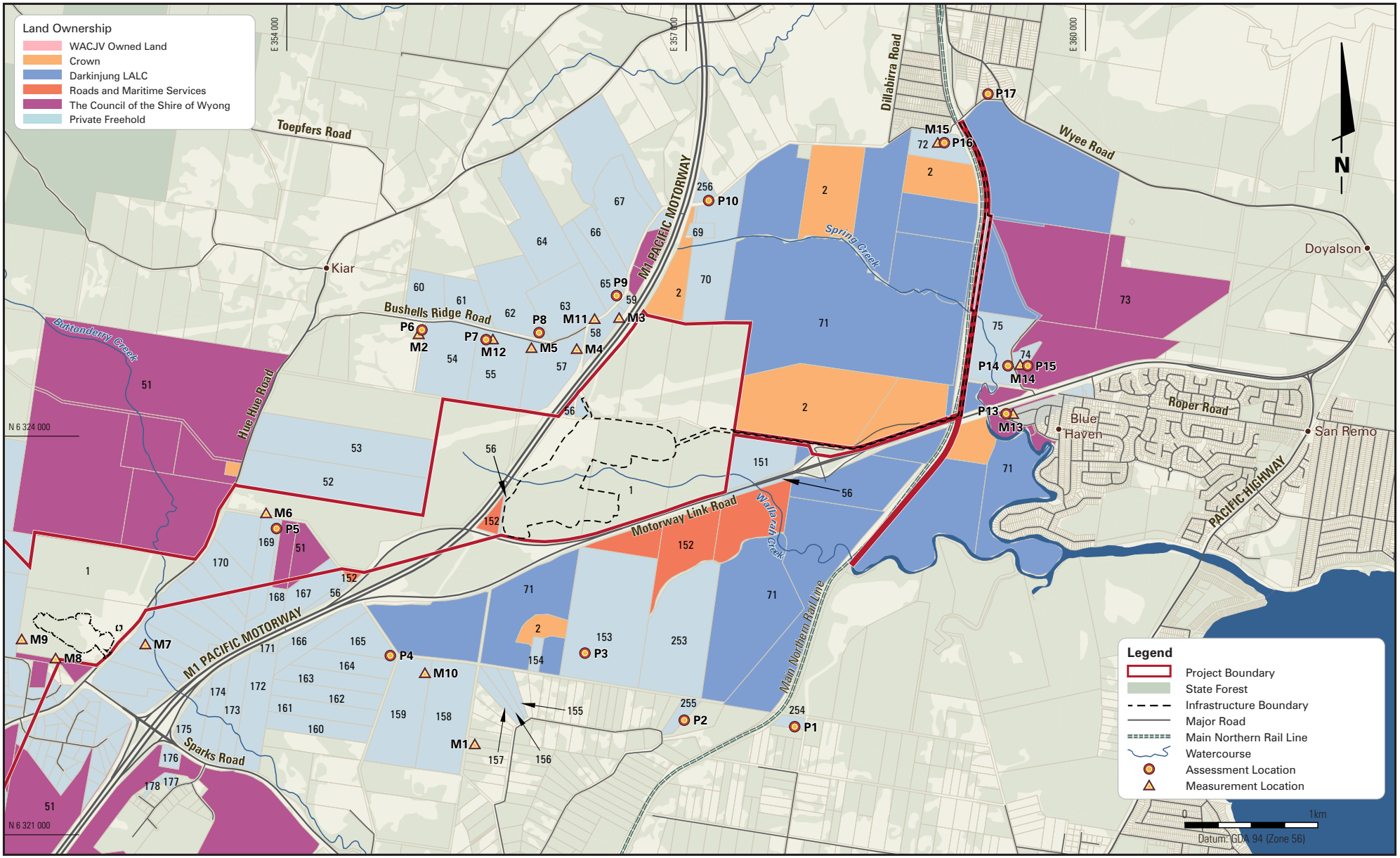
To reduce potential road traffic noise during the construction phase, personnel will be transported to the site of the rail spur via bus, rather than commuting to the site individually. This will substantially reduce vehicular movements in the vicinity of Blue Haven and the two residences on Thompson Vale Road. Road traffic noise associated with the Amended Project is predicted to be within the 60 dBA target for collector roads.

Rail Noise

The rail noise generated by the Original Project was predicted to be within the rail noise criteria. The Amended Project will require fewer train cycles than the Original Project (as discussed in **Section 6.6**). As a result, the Amended Project is also predicted to comply with the rail noise criteria.

Vibration

Dynamic impact rollers are expected to be main source of ground vibration during construction. Ground vibration generated by impact rollers will typically range between 2-4 mm/s at a distance of 20 m, and below 1.5 mm/s at a distance of 40 m. Vibration levels are predicted to comply with the structural damage criteria at distances greater than 20 m. Vibration levels are also predicted to comply with the human comfort criteria at the locations of the closest residences (i.e. P14 and P15 on Thompson Vale Road).



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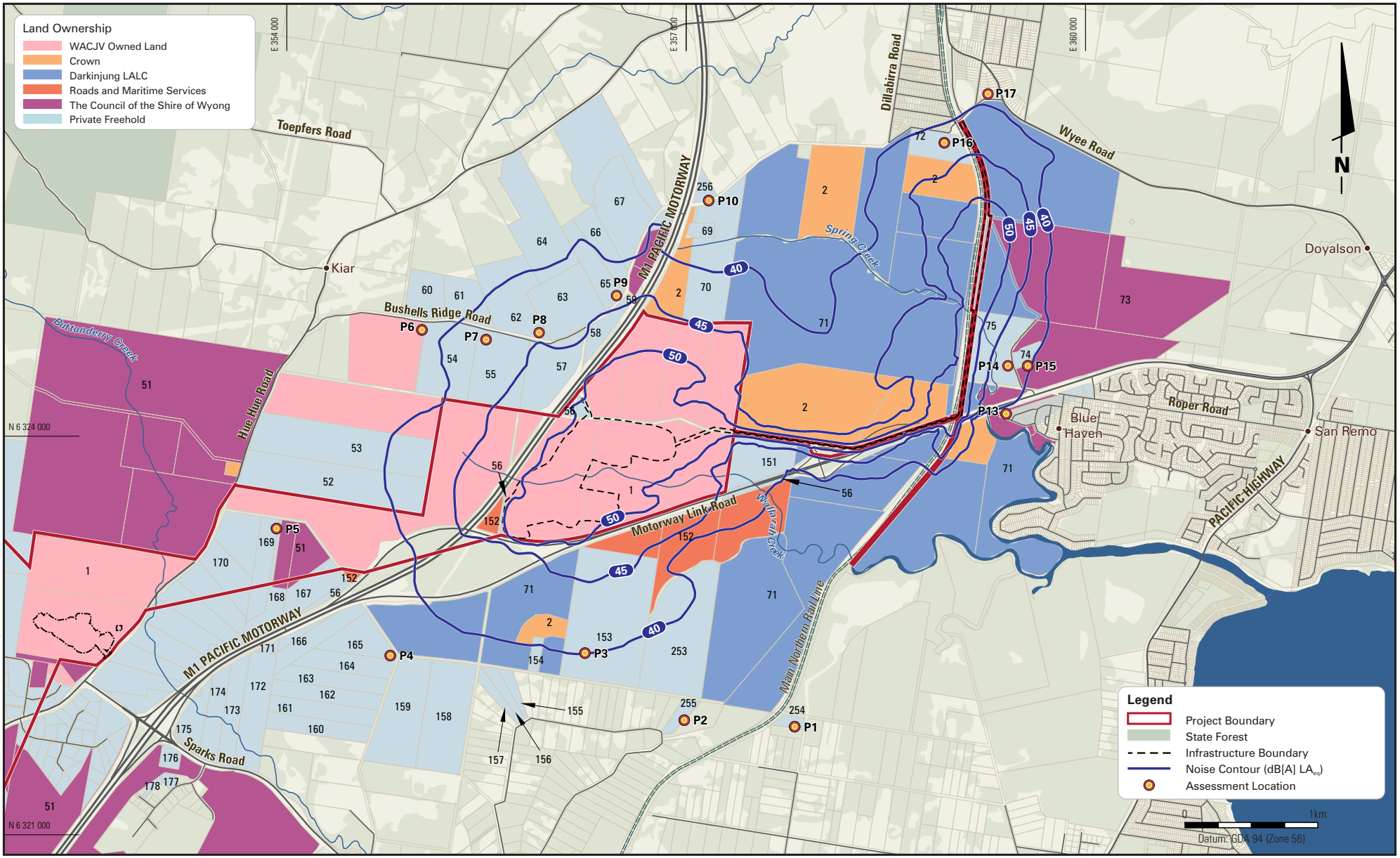
Reference Noise Monitoring and Assessment Locations

FIGURE 12



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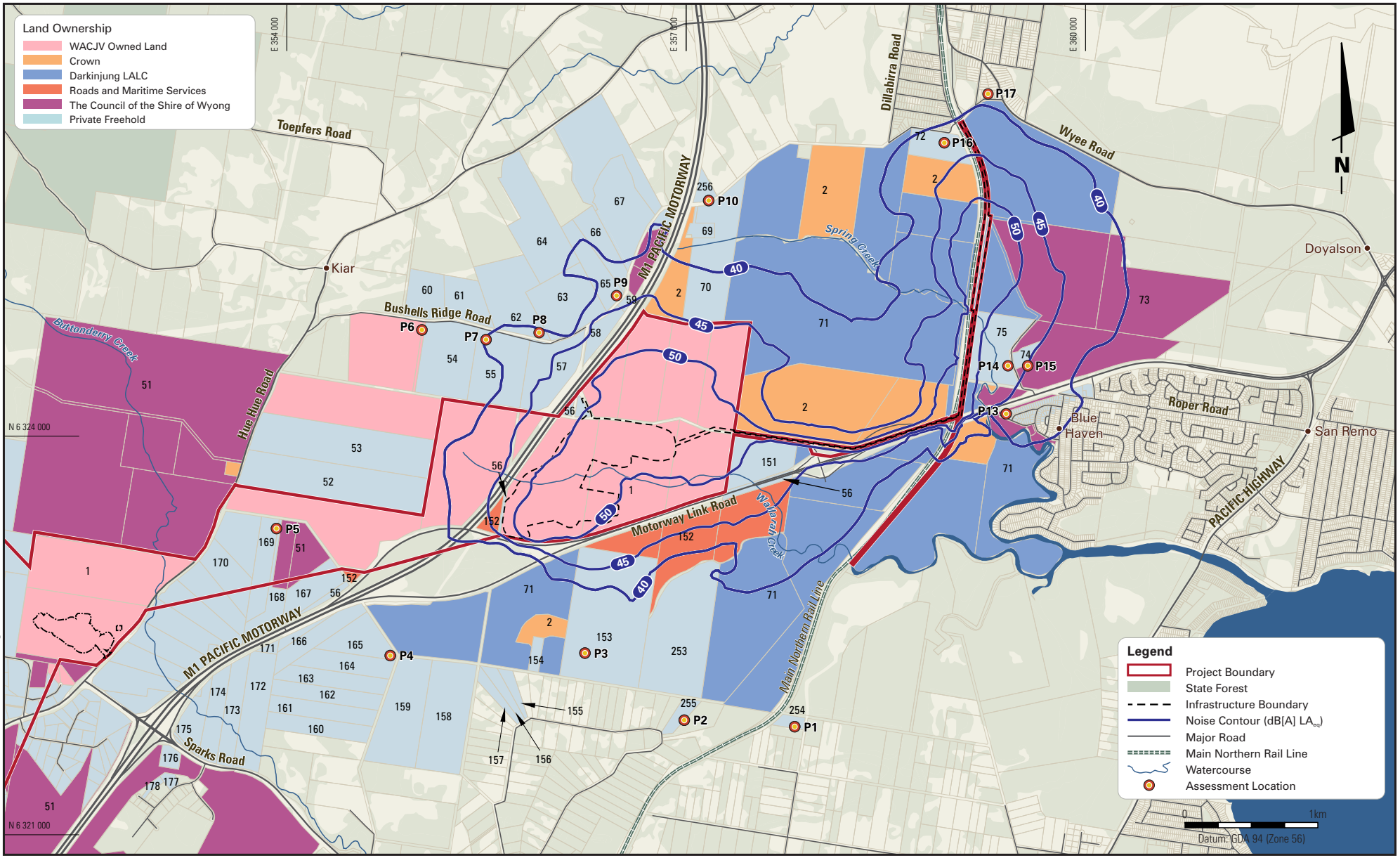
Day Time Noise Contours (Worst Case)

FIGURE 13



HB WALLARAH COAL 1163 F14 Noise Contours - Night Time - Worst Case 08 06 2016

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Night Time Noise Contours (Worst Case)

FIGURE 14

6.4.4 Management and Mitigation Measures

The following noise controls are proposed to minimise the noise emissions associated with the Amendment:

- Shielding of conveyors (roof and side wall);
- Enclosure of conveyor drives and transfers;
- Construction of a noise barrier adjacent to the southern extent of the rail spur (or an alternative measure to achieve similar noise mitigation) as indicatively shown in **Figure 4**; and
- Where necessary, operating only two of the four locomotives units whilst the train is on the rail spur.

The effects of these proposed controls have been accounted for in the noise modelling. The results of the modelling indicate that these controls are effective at avoiding exceedances of the PSNC at Blue Haven and at limiting the exceedances at other receptor locations.

WACJV has committed to the preparation of a Noise Management Plan (NMP) for the operational phase of the Project. The proposed noise controls for the Amendment will be included in the NMP.

The NMP will include a Construction Noise and Vibration Management Plan to manage predicted short term exceedances of the construction NMLs. This plan will include a protocol for Work Outside Standard Hours. During the construction phase, preference will be given to contractors that are able to use low noise emission equipment. All site personnel will be inducted and educated about best practice work methods to minimise noise.

6.5 ECOLOGY

This section should be read in conjunction with sections 7.9 and 7.10 of the EIS.

6.5.1 Background

The potential impacts of the Project on ecological values were considered in the *Ecological Impact Assessment* (Cumberland Ecology, 2013), which was presented as Appendix O of the EIS. The assessment considered the potential impacts of the entire Project, including both surface disturbance and mining induced subsidence.

Cumberland Ecology has prepared an *Ecological Impact Assessment – Addendum*, which assesses the ecological impacts of the Amendment. The potential impacts associated with subsidence, the Buttonderry Site and the Western Ventilation Shaft will not be altered by the Amendment. As such, the potential impacts associated with these aspects of the Project will remain as assessed in Cumberland Ecology (2013).

The *Ecological Impact Assessment – Addendum* is presented in full in **Appendix F**.

6.5.2 Methodology

Desktop Assessment

Database searches were conducted to identify the threatened species and ecological communities that have the potential to occur in the locality of the Project. A search of BioNet, the Atlas of NSW Wildlife (OEH, 2015) identified the threatened species and communities, as listed under the *Threatened Species Conservation Act 1995* (TSC Act), which have been recorded within the locality (i.e. within a 10 km radius).

Similarly, a search of the Protected Matters Search Tool (DoE, 2015) identified the species and communities listed under the EPBC Act that have the potential to occur within 10 km of the Addendum Study Area.

Database searches were also conducted to identify key fish habitat and threatened aquatic species that may occur in the vicinity of the Project.

Field Surveys

Field surveys within the Addendum Study Area (see **Figure 8**) were conducted between 24 November 2015 and 14 January 2016. All survey tasks were conducted in accordance with the relevant standards and guidelines, including minimum survey requirements provided in the OEH's *Biodiversity Survey Guidelines Working Draft* (DEC, 2004) and *Field Survey Methods* (DECCW, 2009).

Vegetation mapping for the Wyong LGA was previously undertaken by Bell (2002a, 2002b). Walking meander surveys were undertaken to ground-truth the vegetation mapping within the Addendum Study Area. The walking meander surveys included assessments of the condition of the vegetation communities. The condition of each community was categorised as either 'moderate to good' or 'low', which are the descriptors under the Biobanking guidelines.

The flora survey effort consisted of five 20 m x 20 m quadrats within the Addendum Study Area. The abundance of flora species within the quadrats was approximated using the Braun-Blanquet cover abundance scale. In addition to the quadrat sampling, random meander surveys were conducted to identify flora species outside of the quadrats.

Further targeted searches were conducted for threatened flora species. Eleven quadrats (20 m x 20 m) were sampled specifically for *Angophora inopina* to determine the density of this species within the Addendum Study Area. The following flora species were targeted during the meander surveys:

- *Angophora inopina*;
- *Corunastylis* sp. Charmhaven;
- *Acacia bynoeana;*
- *Callistemon linearifolius;*
- *Cryptostylis hunteriana;*
- *Grevillea parviflora ssp parviflora;*
- *Melaleuca biconvexa;* and

- *Tetratheca juncea*.

Extensive fauna surveys were undertaken for the *Ecological Impact Assessment* (Cumberland Ecology, 2013). Additional fauna habitat assessments were undertaken within the Addendum Study Area from 24 November 2015 to 14 January 2016. The fauna habitat assessments included identification of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas. Tree hollows are significant because they provide habitat for arboreal fauna, birds and bats. Five quadrats (20 m x 50 m) were sampled specifically for tree hollows to determine the density per hectare.

Aquatic habitat assessments were undertaken at the locations where Spring Creek and its tributaries pass through the Addendum Study Area. The aquatic habitat assessment included observations of riparian vegetation, water clarity, bank stability and erosion, and the presence of built structures.

6.5.3 Impact Assessment

Database Searches

The database searches revealed changes in species listings since the previous assessment in 2013. The listing for *Corunastylis insignis* (formerly *Genoplesium insignis*) under the TSC Act has changed from 'Endangered' to 'Critically Endangered'. The species has also been listed as a Critically Endangered species under the EPBC Act.

Thelymitra sp. Adorata (Wyong Sun Orchid) has been listed as a Critically Endangered Species under EPBC Act.

The Regent Honeyeater (*Anthochaera Phrygia*) and Swift Parrot (*Lathamus discolor*) have had their EPBC Act listings changed to 'Critically Endangered'. The listings for these species under the TSC Act have not changed.

Two threatened species, *Corunastylis* sp. Charmhaven and the Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*), have been recorded within the locality since the previous assessment.

No threatened or protected aquatic species have been recorded in the locality of the Project. The lower reaches of Spring Creek, including at the location of the proposed rail spur, are mapped as key fish habitat.

Vegetation Communities

The following vegetation communities were identified within the Addendum Study Area:

- Narrabeen Doyalson Coastal Woodland;
- Narrabeen Alluvial Drainage Line Complex; and
- Narrabeen Impeded Wet Heath.

The Narrabeen Doyalson Coastal Woodland is equivalent to the biometric community known as Scribbly Gum Woodland. The Narrabeen Alluvial Drainage Line Complex conforms to the Paperbark Swamp Forest and Swamp Mahogany Forest biometric communities. The Narrabeen Impeded Wet Heath is the only community that was not present within the Project Boundary for the Original Project. The Narrabeen Impeded Wet Heath is equivalent to the biometric community known as Hairpin Banksia Heath. This biometric community is not listed under the TSC Act or EPBC Act. The vegetation communities identified within the Addendum Study Area are shown in **Figure 15**.

The Amendment will reduce the disturbance required for construction of the Tooheys Road Site from 89 ha to 63 ha, which represents a 29% reduction. The disturbance required for construction of the Buttonderry Site and Western Ventilation Shaft will remain unchanged. The total disturbance required for the Project will decrease from 103 ha to 76 ha as a result of the Amendment. This represents a 26% reduction in the total extent of disturbance.

As shown in **Table 11**, the Amendment results in less or equal disturbance for all vegetation communities compared to the predicted impacts of the Original Project. Six Endangered Ecological Communities (EECs) under the TSC Act are present within the Project Boundary.

The Amendment will reduce disturbance to the Swamp Sclerophyll Forest EEC from 2.85 ha to 0.63 ha, which represents a reduction of 78%. Similarly, the Amendment will reduce disturbance to the River-flat Eucalyptus Forest EEC from 5.86 ha to 5.42 ha, which represents a reduction of 8%. There is no change to the areas of disturbance for the other four EECs.

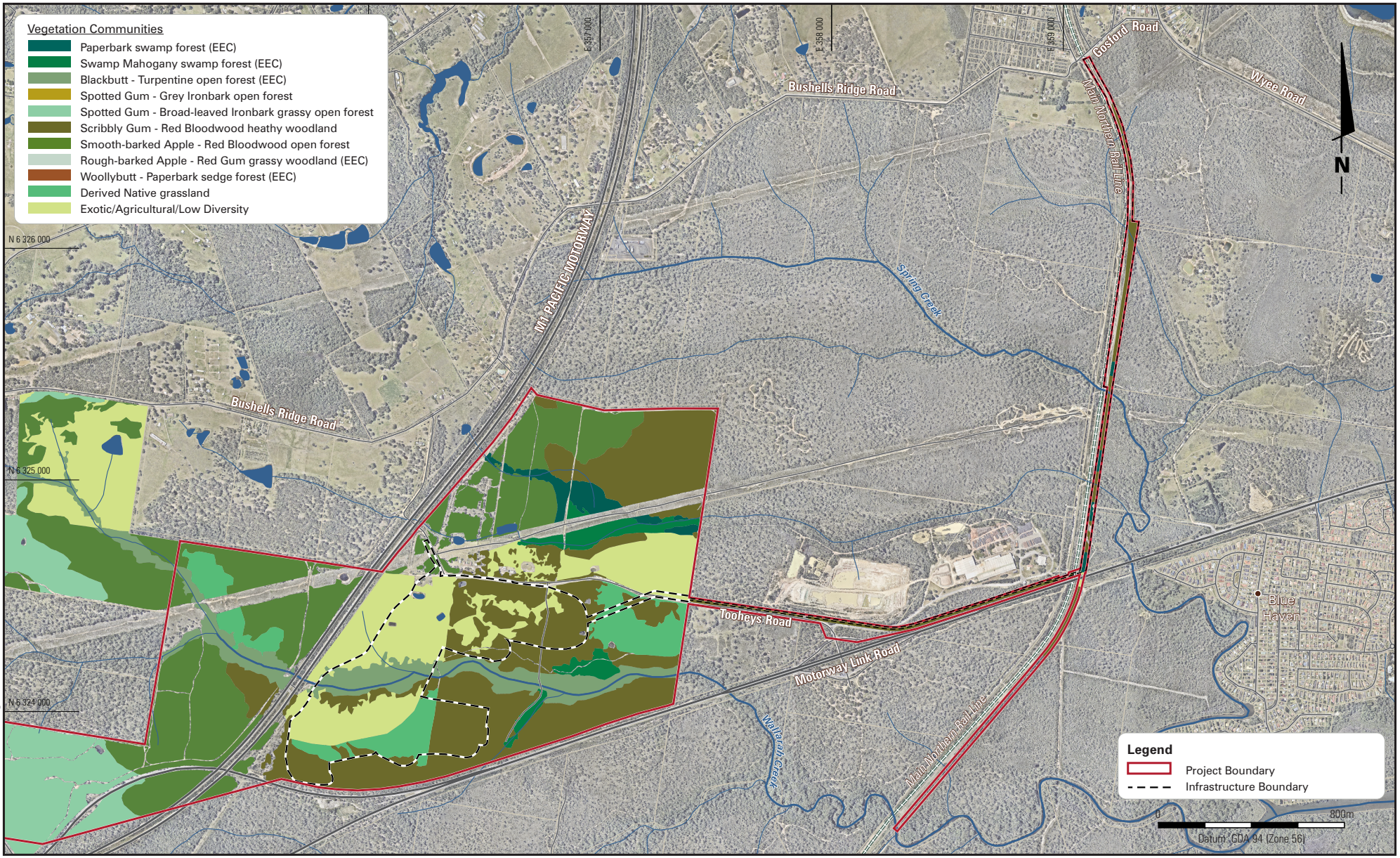
The disturbance required for the Amended Project will result in loss of habitat for flora and fauna species, fragmentation of vegetated areas and edge effects. However, the extent of these impacts will be less than the predicted impacts of the Original Project.

Table 11
Reduction in Vegetation Disturbance due to the Amendment

Vegetation Community	Area of Disturbance (ha)		
	Original Project	Amended Project	Difference
Blackbutt - Turpentine open forest of the foothills of the North Coast	5.86	5.41	-0.45 (7.7%)
Coachwood - Crabapple warm temperate rainforest of the North Coast and northern Sydney Basin	0.00	0.00	0.00 (0%)

Vegetation Community	Area of Disturbance (ha)		
	Original Project	Amended Project	Difference
Mountain Blue Gum - Turpentine moist shrubby open forest of the coastal ranges of the Central Coast, Sydney Basin	1.69	1.69	0.00 (0%)
Paperbark swamp forest of the coastal lowlands of the North Coast and Sydney Basin **(EEC*)**	1.08	0.63	-0.45 (41.7%)
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin **(EEC*)**	0.00	0.00	0.00 (0%)
Rough-barked Apple - red gum grassy woodland of the MacDonald River Valley on the Central Coast, Sydney Basin **(EEC*)**	0.00	0.00	0.00 (0%)
Scribbly Gum - Red Bloodwood heathy woodland on the coastal plains of the Central Coast, Sydney Basin	33.81	28.13	-5.68 (16.8%)
Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin	3.77	2.26	-1.50 (39.8%)
Spotted Gum - Broad-leaved Ironbark grassy open forest of dry hills of the lower Hunter Valley, Sydney Basin **(EEC*)**	4.47	4.47	0.00 (0%)
Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin	0.81	0.81	0.00 (0%)
Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin **(EEC*)**	1.77	0.00	-1.77 (100%)
Woollybutt - Paperbark sedge forest on alluvial plains of the Central Coast, Sydney Basin **(EEC*)**	0.00	0.00	0.00 (0%)
Derived Native Grassland	7.25	6.01	-1.24 (17.1%)
Exotic/Agricultural/Low Diversity Grassland	27.99	25.64	-2.22 (7.9%)
Water/Farm Dam	0.58	0.51	-0.07 (12.1%)
Cleared	13.89	0.69	-13.21 (95.1%)
Total EEC vegetation	*13.18*	*10.51*	*-2.67* (20.2%)
Total Native Vegetation	*60.51*	*49.42*	*-11.10* (18.3%)
Total Vegetation	*88.51*	*75.19*	*-13.32* (15.0%)
Total Area	*102.98*	*76.38*	*-26.60* (25.8%)

** Listed under the TSC Act*



HB WALLARAH COAL 1163 F15 Vegetation Communities 08 06 2016

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Vegetation Communities

FIGURE 15

Threatened Flora

One threatened flora species (*Angophora inopina*) was identified within the Addendum Study Area. Based on the quadrat sampling undertaken for this species, the density of this species within the Tooheys Road Site was determined to be 56 individuals per hectare. Large numbers of *Angophora inopina* were recorded within the footprint of the previously proposed rail loop. The Amendment will therefore avoid impacts to large numbers of *Angophora inopina*.

The recorded locations of threatened flora species are shown in **Figure 16**.

Tetratheca juncea, Acacia bynoeana and *Cryptostylis hunteriana* were not recorded but are considered likely to occur within the Addendum Study Area. These species have previously been recorded within Scribbly Gum Woodland, which is the dominant vegetation community within the Addendum Study Area.

The following flora species are considered as having the potential to occur due to the presence of suitable habitat within the Addendum Study Area:

- *Caladenia tessellata* (Thick Lip Spider Orchid);
- *Callistemon linearifolius* (Netted Bottle Brush);
- *Corunastylis insignis* (formerly *Genoplesium insignis*) (Variable Midge Orchid);
- *Eucalyptus camfieldii* (Camfield's Stringybark);
- *Eucalyptus parramattensis subsp. parramattensis* (*Eucalyptus parramattensis* C. Hall. *subsp. parramattensis* in Wyong and Lake Macquarie local government areas);
- *Grevillea parviflora ssp parviflora;*
- *Melaleuca biconvexa*; and
- *Rhizanthella slateri* (Eastern Underground Orchid).

The removal of vegetation reduces the available habitat for flora species. As shown in **Table 11**, the Amendment significantly reduces the areas of vegetation communities that will be disturbed.

The Amendment will avoid the disturbance of 11.1 ha of native vegetation, which provides habitat for threatened flora species.

Threatened and Migratory Fauna

The vegetation within the Addendum Study Area has either regenerated from past clearing or has been modified as a result of current land uses. The following fauna habitats have been identified within the Addendum Study Area:

- Remnant forest and woodland;
- Swamp forests;
- Regenerating vegetation;

- Pasture/exotic grassland areas; and
- Tree hollows.

Twenty seven threatened fauna species have previously been recorded within the Project Boundary. Based on the availability of suitable habitat, 25 of these are considered likely to occur within the Addendum Study Area. A further seven threatened species have the potential to occur within the Addendum Study Area, but have not been recorded previously. Detailed descriptions of these species are provided in **Appendix F**.

The Paperbark Swamp Forest community provides potential habitat for threatened amphibians, particularly the Wallum Froglet (*Crinia tinnula*). The Swamp Mahogany Forest community provides foraging habitat for threatened avifauna (birds) and arboreal mammals. However, there are limited numbers of large and medium hollows in the Swamp Mahogany Forest within the Addendum Study Area. As such, the Addendum Study Area is limited in breeding and roosting habitat for avifauna and arboreal mammals. Detailed descriptions of the fauna species that have the potential to occur within the Addendum Study Area are provided in **Appendix F**.

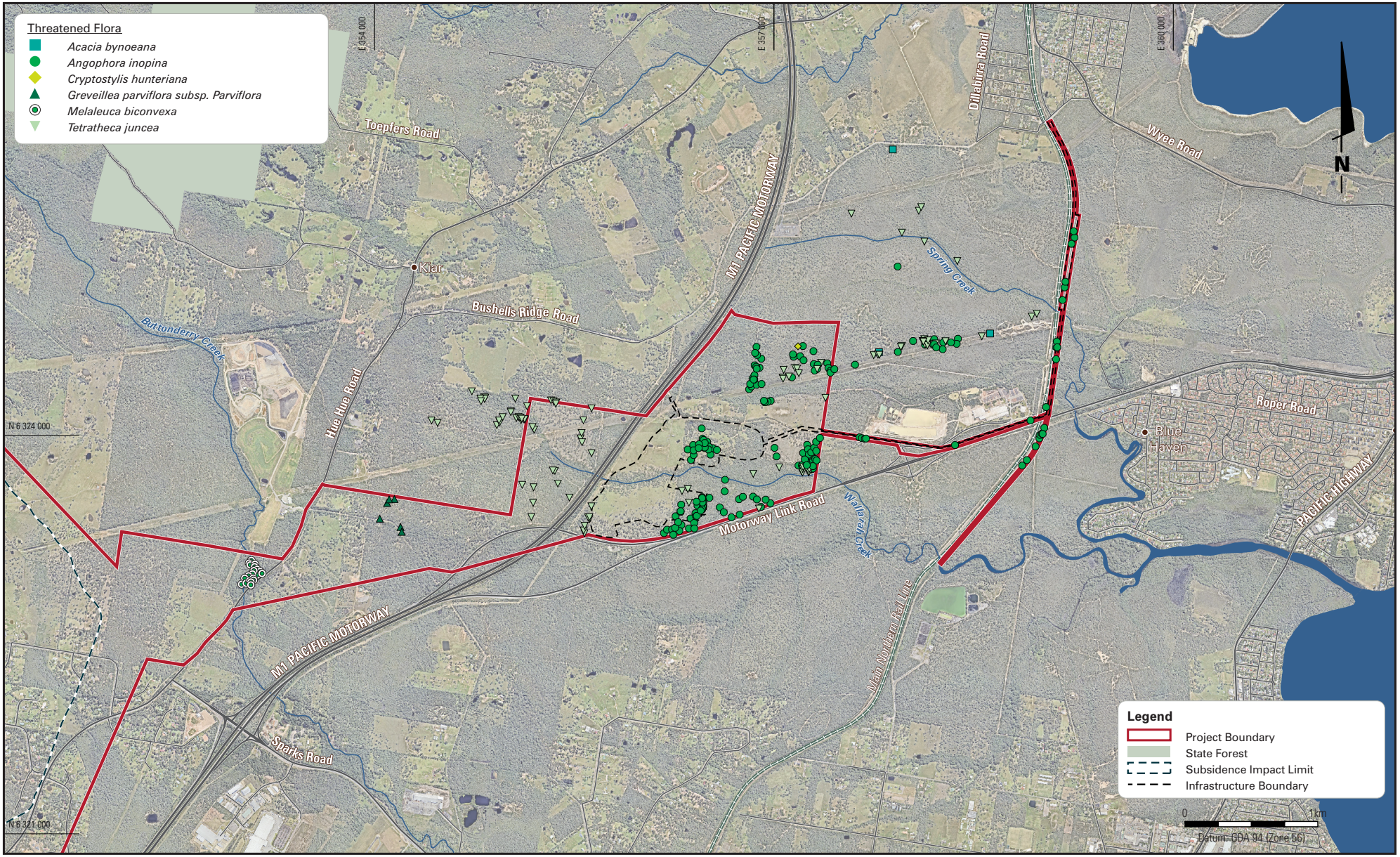
Six migratory species listed under the EPBC Act have previously been recorded within the Project Boundary. Of these species, the White-bellied Sea-eagle (*Haliaeetus leucogaster*) and White-throated Needletail (*Hirundapus caudacutus*) are considered likely to occur within the Addendum Study Area due to the availability of suitable habitat. Although habitat for the other four migratory species is limited within the Addendum Study Area, these species may pass through the area in the course of migration. Detailed descriptions of these migratory species are provided in **Appendix F**.

The recorded locations of threatened and migratory fauna species are shown in **Figure 17**.

The removal of vegetation will reduce the available habitat for threatened and migratory fauna species. As shown in **Table 11**, the Amendment significantly reduces the areas of vegetation communities that will be disturbed. The Amendment will result in the avoidance of impacts to 11.1 ha of native vegetation, which provides habitat for threatened fauna species.

Impacts to Aquatic Habitat

The previously proposed rail loop required crossings of Wallarah Creek and its tributaries. The reaches of Wallarah Creek that would have been crossed by the rail loop are considered to be Class 3 fish habitat. Those reaches provide permanent to semi-permanent wetland habitat, but are unlikely to provide fish passage. The Amendment removes the requirement for the rail spur, thus avoiding the removal of 0.45 ha of riparian vegetation along Wallarah Creek.



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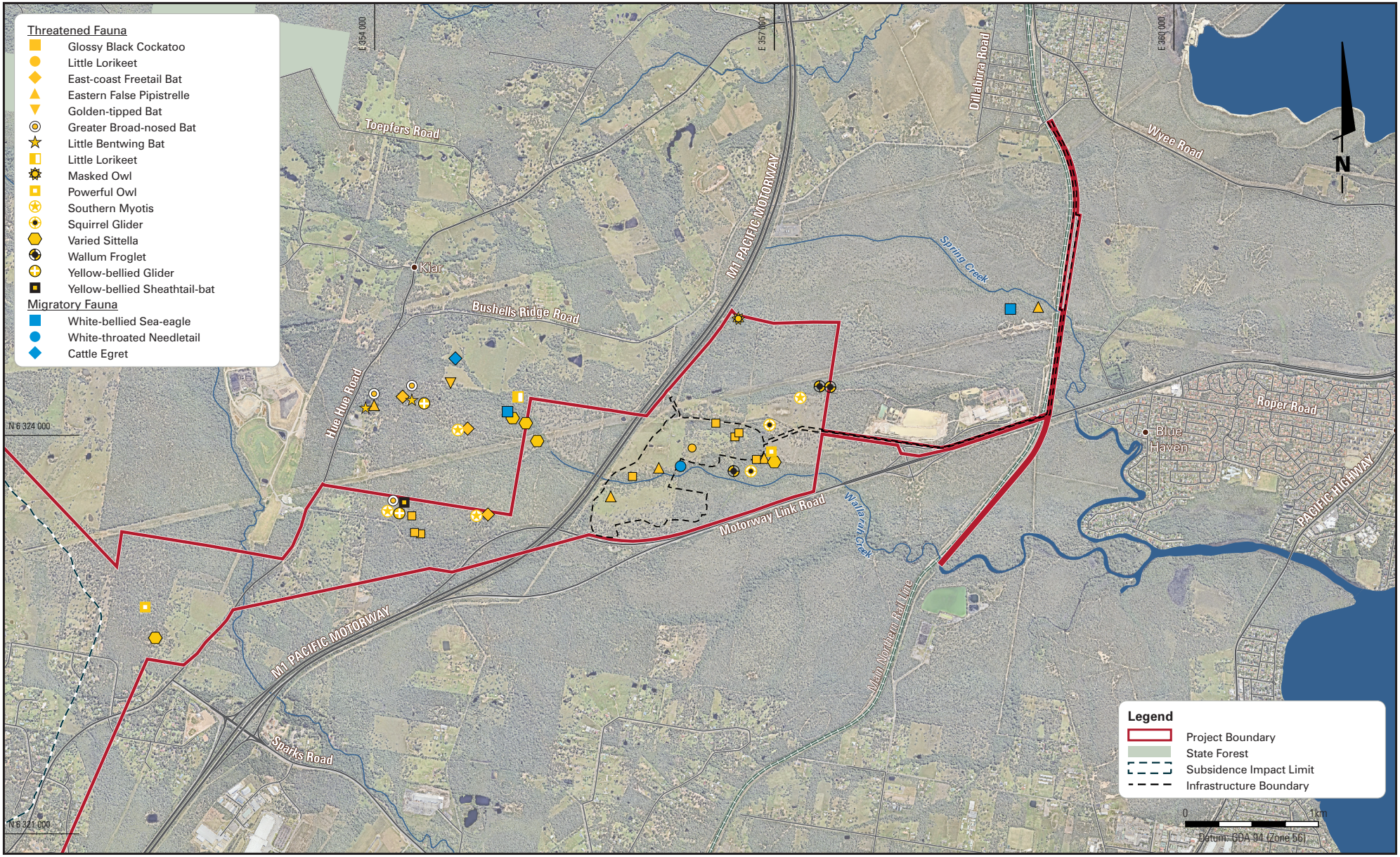
Threatened Flora

FIGURE 16



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Threatened and Migratory Fauna

FIGURE 17

The previous alignment of the rail spur would have required crossings of Spring Creek and its tributaries. The reaches of Spring Creek within the Project Boundary are considered to be Key Fish Habitat, as they support permanent pools that provide reasonable fish passage. The Amendment involves re-locating the rail spur to the eastern side of the Main Northern Rail Line. The re-design of the rail infrastructure has resulted in fewer interactions with watercourses and riparian vegetation. This avoids impacts to 0.5 ha of riparian vegetation along the reaches of Spring Creek west of the railway line. Crossings of Spring Creek would need to be established on the eastern side of the railway line. However, these crossings would be adjacent and immediately downstream of the existing crossings for the Main Northern Rail Line. The stream channels have been modified due to the existing rail crossings. The proposed crossings for the re-located rail spur will only result in minor additional impacts. The impacts of the re-located rail spur are substantially outweighed by the benefits of avoiding the previously proposed crossings of Wallarah Creek and Spring Creek.

6.5.4 Management and Mitigation Measures

The mitigation measures for the Project were developed according to the following hierarchy of principles:

- Avoid – to the extent possible, the Project has been designed to avoid or minimise ecological impacts;
- Mitigate – where certain impacts are unavoidable through design changes, mitigation measures have been introduced to ameliorate the ecological impacts of the Project; and
- Compensate – the residual impacts of the Project, following the implementation of mitigation measures, have been compensated to offset what would otherwise be a net loss of habitat.

Avoidance

The Amendment reduces the area of disturbance required for the Tooheys Road Site from 89 ha to 63 ha. Due to the reduced area of disturbance, the Amendment will avoid impacts to 11.1 ha of native vegetation that provides habitat for fauna and flora species. In particular, the Amendment removes the requirement for a rail loop. This avoids impacts to areas that contain a high density of *Angophora inopina*, which is a listed species under both the TSC Act and EPBC Act.

Mitigation

As described in the EIS, WACJV will prepare a Biodiversity Management Plan (BMP) for the Project. The BMP will include mitigation measures such as:

- Pre-clearance surveys (including translocation of fauna where practicable);
- Vegetation clearance protocols;
- Ecological monitoring;
- Weed and pest control; and

- Rehabilitation.

Compensation

WACJV has developed a Biodiversity Offset Strategy (BOS) to compensate for residual impacts to species and ecological communities. The BOS consists of three offset areas:

- Hue Hue Road Offset Area;
- Tooheys Road Northern Offset Area; and
- Tooheys Road Southern Offset Area.

The offsets that were proposed for the Original Project have been largely retained for the Amended Project, with the exception of a small area (parts of Lot 102 DP 755245 and Lot 103 DP 755245) within the Tooheys Road Southern Offset Area, which will be required for development of the Amended Project. The vegetation in this area consists predominantly of derived native grassland.

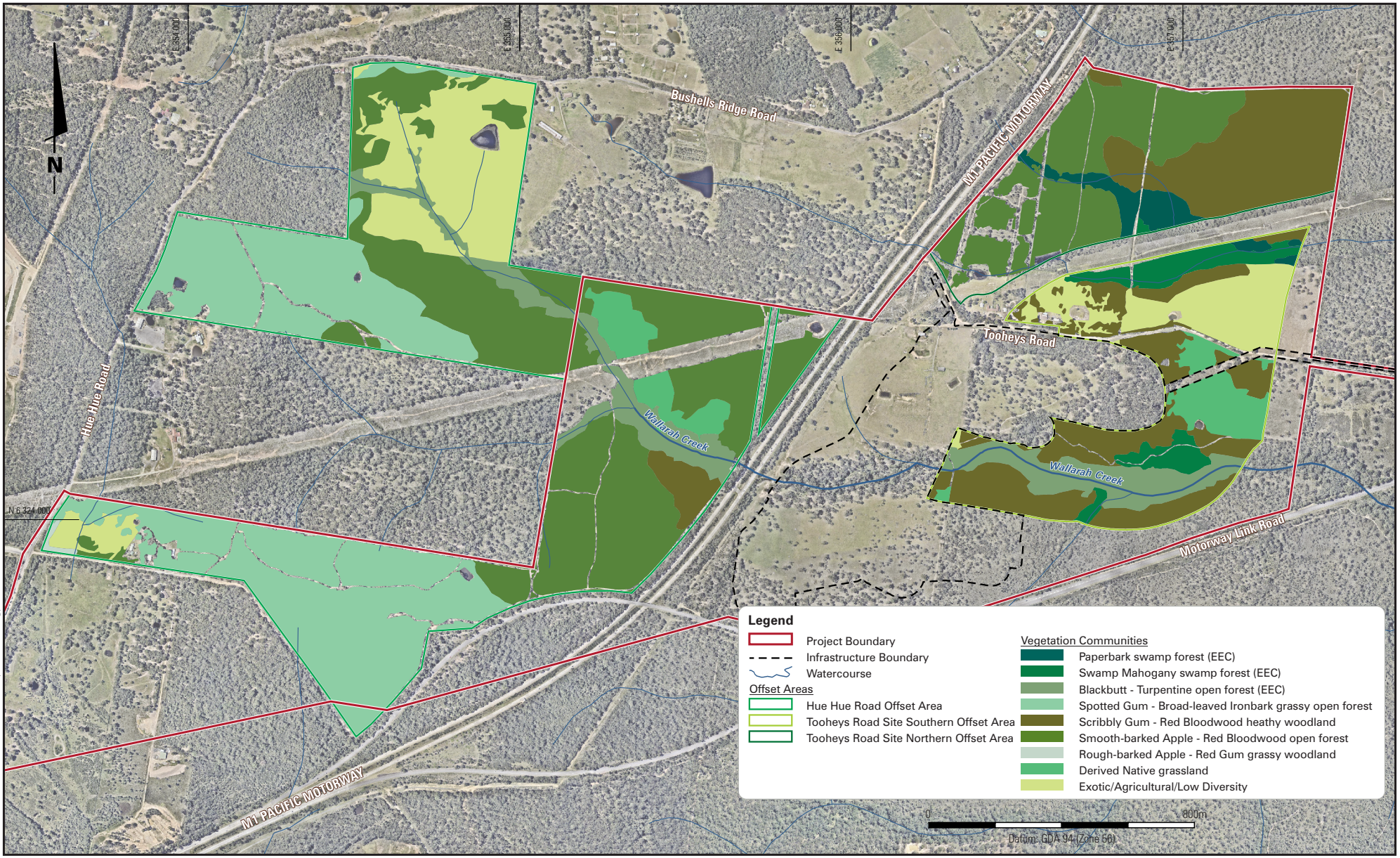
The vegetation communities present within the offset areas are shown in **Figure 18**. Due to the reduced area of disturbance (as shown in **Table 11**), the offset ratios for all vegetation communities will be better than or equal to the offset ratios for the Original Project.

Table 12 shows the changes in offset ratios due to the Amendment. Based on advice from OEH, the vegetation communities have been grouped according to vegetation formation for the purposes of offset calculations.

The native vegetation within the offset areas provides habitat for threatened flora and fauna. Due to the reduced area of disturbance, the offset ratios for flora and fauna habitat will improve as a result of the Amendment. The offset ratios for flora habitat and fauna habitat are shown in **Table 13** and **Table 14** respectively.

The adequacy of the BOS was assessed in accordance with the '*Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*' (DSEWPaC, 2012). The policy requires that direct offsets (i.e. conservation of land) must satisfy at least 90% of the offset requirement for listed species under the EPBC Act.

As shown in **Table 15**, the proposed BOS satisfies the offset requirements for all listed species that have the potential to be impacted by the Project.



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Biodiversity Offset Strategy

FIGURE 18

Table 12
Improvements in Offset Ratios for Vegetation Communities

Formation	Vegetation Community	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Offset Ratio	Impact Area (ha)	Offset Area (ha)	Offset Ratio
Wet Sclerophyll Forests (Grassy subformation)	Blackbutt - Turpentine open forest of the foothills of the North Coast	5.9	16.9	*2.9*	5.4	16.9	*3.1*
Wet Sclerophyll Forests (Shrubby subformation)	Mountain Blue Gum - Turpentine moist shrubby open forest of the coastal ranges of the Central Coast, Sydney Basin	1.7	0.0	*0.0*	1.7	0.0	*0.0*
	Subtotal for Wet Sclerophyll Forests	**7.6**	**16.9**	***2.2***	**7.1**	**16.9**	***2.4***
Dry Sclerophyll Forests (Shrubby subformation)	Scribbly Gum - Red Bloodwood heathy woodland on the coastal plains of the Central Coast, Sydney Basin	33.8	39.8	*1.2*	28.1	39.5	*1.4*
Dry Sclerophyll Forests (Shrubby subformation)	Smooth-barked Apple - Red Bloodwood open forest on coastal plains on the Central Coast, Sydney Basin	3.8	74.0	*19.6*	2.3	74.0	*32.7*
Dry Sclerophyll Forests (Shrubby subformation)	Derived Native Grassland	7.3	11.0	*1.5*	6.0	10.6	*1.8*
Dry Sclerophyll Forests (Shrub/grass subformation)	Spotted Gum - Broad-leaved Ironbark grassy open forest of dry hills of the lower Hunter Valley, Sydney Basin (EEC)	4.5	55.4	*12.4*	4.5	55.4	*12.4*
Dry Sclerophyll Forests (Shrub/grass subformation)	Spotted Gum - Grey Ironbark open forest on the foothills of the Central Coast, Sydney Basin	0.8	0.0	*0.0*	0.8	0.0	*0.0*
	Subtotal for Dry Sclerophyll Forests	**50.1**	**180.2**	***3.6***	**41.7**	**179.5**	***4.3***

Formation	Vegetation Community	Original Project			Amended Project		
		Impact Area (ha)	**Offset Area (ha)**	**Offset Ratio**	**Impact Area (ha)**	**Offset Area (ha)**	**Offset Ratio**
Forested Wetlands	Paperbark swamp forest of the coastal lowlands of the North Coast and Sydney Basin (EEC)	1.1	3.9	*3.6*	0.6	3.9	*6.2*
Forested Wetlands	Rough-barked Apple - red gum grassy woodland of the MacDonald River Valley on the Central Coast, Sydney Basin (EEC)	0.0	0.4	*N/A*	0.0	0.4	*N/A*
Forested Wetlands	Swamp Mahogany swamp forest on coastal lowlands of the North Coast and northern Sydney Basin (EEC)	1.8	6.3	*3.6*	0.0	6.3	*N/A*
	Subtotal for Forested Wetlands	**2.9**	**10.6**	***3.7***	**0.6**	**10.6**	***16.8***

Table 13
Improvements in Offset Ratios for Flora Habitat

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
Acacia bynoeana	Scribbly Gum - Red Bloodwood woodland, Smooth-barked Apple – Red Bloodwood forest, Spotted Gum - Broad-leaved Ironbark forest, Spotted Gum - Grey Ironbark forest	42.9	169.2	*3.9*	35.7	168.9	*4.7*
Angophora inopina	Paperbark Swamp forest Scribbly Gum - Red Bloodwood woodland, Smooth-barked Apple - Red Bloodwood forest, Swamp Mahogany forest,	40.4	124.1	*3.1*	31.0	123.8	*4.0*
Cryptostylis hunteriana	Blackbutt - Turpentine open forest Scribbly Gum - Red Bloodwood woodland, Smooth-barked Apple - Red Bloodwood open forest, Spotted Gum - Broad-leaved Ironbark grassy open forest, Spotted Gum - Grey Ironbark open forest,	48.7	186.1	*3.8*	41.1	185.8	*4.5*
Grevillea parviflora subsp parviflora	Scribbly Gum - Red Bloodwood woodland Smooth-barked Apple - Red Bloodwood open forest Spotted Gum - Broad-leaved Ironbark grassy open forest, Spotted Gum - Grey Ironbark open forest Swamp Mahogany forest,	44.6	175.5	*3.9*	35.7	175.2	*4.9*
Melaleuca biconvexa	Blackbutt – Turpentine forest, Paperbark Swamp forest Phragmites australis and Typha orientalis coastal	8.7	27.1	*3.1*	6.0	27.1	*4.5*

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
	freshwater wetlands Swamp Mahogany swamp forest, Woollybutt - Paperbark sedge forest,						
Tetratheca juncea	Blackbutt – Turpentine forest Scribbly Gum - Red Bloodwood woodland, Smooth-barked Apple – Red Bloodwood , Spotted Gum - Broad-leaved Ironbark grassy open forest, Spotted Gum - Grey Ironbark open forest, Swamp Mahogany Forest,	50.5	192.4	*3.8*	41.1	192.1	*4.7*
Potentially occurring flora species (*Asterolasia elegans, Caladenia tessellata, Callistemon linearifolius, Eucalyptus camfieldii, Genoplesium insignis, Maundia triglochinoides, Rhizanthella slateri, Rutidosis heterogama, Syzygium paniculatum, Thelymitra sp. adorata, Eucalyptus parramattensis subsp. parramattensis*)	Collectively all vegetation communities occurring in Project Boundary (except Exotic/Agricultural/Low Diversity grasslands)	60.5	207.6	*3.4*	49.4	207.0	*4.2*

Table 14
Improvements in Offset Ratios for Fauna Habitat

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
Amphibians (Wallum Froglet, Giant Barred Frog, Green and Golden Bell Frog, Green-thighed Frog, Giant Burrowing Frog, Littlejohn's Tree Frog, Stuttering Frog)	Blackbutt – Turpentine forest; Coachwood - Crabapple rainforest; Mountain Blue Gum - Turpentine forest; Paperbark Swamp Forest, Phragmites australis and Typha orientalis coastal freshwater wetlands, Swamp Mahogany Forest,	10.4	27.1	*2.6*	7.7	27.1	*3.5*
Forest Owls (Powerful Owl, Masked Owl, Barking Owl, Sooty Owl)	Mountain Blue Gum - Turpentine Scribbly Gum – Red Bloodwood woodland, Smooth-barked Apple – Red Bloodwood forest, Spotted Gum – Broadleaved Ironbark, Spotted Gum – Grey Ironbark,	44.5	169.2	*3.8*	37.4	168.9	*4.5*
Arboreal mammals (Eastern Pygmy Possum, Squirrel Glider, Yellow-bellied Glider)	Blackbutt – Turpentine forest Mountain Blue Gum - Turpentine forest, Scribbly Gum – Red Bloodwood woodland, Smooth-barked Apple – Red Bloodwood forest, Spotted Gum – Grey Ironbark forest, Spotted Gum – Broadleaved Ironbark forest,	50.4	186.1	*3.7*	42.8	185.8	*4.3*
Microchiropteran Bats (Yellow-bellied Sheathtail-bat, East-coast Freetail Bat, Eastern False pipistrelle, Little Bentwing Bat,	Blackbutt – Turpentine Forest Mountain Blue Gum Turpentine forest, Scribbly Gum – Red Bloodwood woodland Smooth-barked Apple – Red Bloodwood forest,	50.4	186.1	*3.7*	42.8	185.8	*4.3*

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
Eastern Bentwing Bat, Golden-tipped Bat, Southern Myotis, Greater Broad-nosed Bat, Large-eared Pied Bat)	Spotted Gum – Broadleaved Ironbark forest, Spotted Gum – Grey Ironbark forest,,						
Wetland birds (Black Bittern, Black-necked Stork, Black-tailed Godwit, White-fronted Chat, Australasian Bittern)	Paperbark Swamp Forest, Phragmites australis and Typha orientalis coastal freshwater wetlands Swamp Mahogany Forest,	2.9	10.2	*3.6*	0.6	10.2	*16.3*
Migratory Parrots (Little Lorikeet, Swift Parrot)	Blackbutt – Turpentine forest; Paperbark swamp forest; Scribbly Gum - Red Bloodwood; Smooth-barked Apple - Red Bloodwood open forest; Spotted Gum - Broad-leaved Ironbark forest; Spotted Gum - Grey Ironbark forest, Swamp Mahogany swamp forest	51.6	196.3	*3.8*	41.7	196.0	*4.7*
Cockatoos (Glossy Black Cockatoo, Gang-gang Cockatoo)	Scribbly Gum - Red Bloodwood woodland Smooth-barked Apple - Red Bloodwood open forest Spotted Gum – Broad Leaved Ironbark Forest, Spotted Gum - Grey Ironbark forest,	42.9	169.2	*3.9*	35.7	168.9	*4.7*
Regent Honeyeater	Blackbutt – Turpentine forest; Scribbly Gum - Red Bloodwood; Smooth-barked Apple - Red Bloodwood open forest; Spotted Gum - Broad-leaved Ironbark forest; Spotted Gum - Grey Ironbark forest,	48.7	186.1	*3.8*	41.1	185.8	*4.5*

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
Grey-headed Flying Fox	Blackbutt - Turpentine forest; Coachwood - Crabapple rainforest; Mountain Blue Gum - Turpentine forest; Scribbly Gum - Red Bloodwood woodland; Smooth-barked Apple - Red Bloodwood open forest Spotted Gum - Broad-leaved Ironbark forest; Spotted Gum - Grey Ironbark forest; Swamp Mahogany forest	52.2	192.4	*3.7*	42.8	192.1	*4.5*
Little Eagle	Blackbutt – Turpentine forest, Scribbly Gum - Red Bloodwood woodland, Smooth-barked Apple - Red Bloodwood forest,	43.4	130.7	*3.0*	35.8	130.4	*3.6*
Varied Sittella	Scribbly Gum - Red Bloodwood woodland Smooth-barked Apple - Red Bloodwood forest,	37.6	113.8	*3.0*	30.4	113.5	*3.7*
Bush Stone-curlew	Scribbly Gum - Red Bloodwood woodland Smooth-barked Apple - Red Bloodwood forest,	37.6	113.8	*3.0*	30.4	113.5	*3.7*
Koala	Blackbutt - Turpentine forest; Mountain Blue Gum - Turpentine forest; Paperbark swamp forest; Scribbly Gum - Red Bloodwood woodland; Smooth-barked Apple - Red Bloodwood forest; Spotted Gum - Broad-leaved Ironbark forest; Spotted Gum - Grey Ironbark forest Swamp Mahogany swamp forest	53.3	196.3	*3.7*	43.4	196.0	*4.5*

Threatened Species	Habitat Required	Original Project			Amended Project		
		Impact Area (ha)	Offset Area (ha)	Habitat ratio	Impact Area (ha)	Offset Area (ha)	Habitat ratio
Spotted tailed Quoll	Blackbutt - Turpentine forest; Mountain Blue Gum - Turpentine forest; Paperbark swamp forest; Scribbly Gum - Red Bloodwood woodland; Smooth-barked Apple - Red Bloodwood forest; Spotted Gum - Broad-leaved Ironbark forest; Spotted Gum - Grey Ironbark forest; Swamp Mahogany swamp forest	53.3	196.3	*3.7*	43.4	196.0	*4.5*

Table 15
Adequacy of Offsets for Impacts to EPBC Act Listed Species

Listed Species	Percentage of Required Offsets provided by the Biodiversity Offset Strategy	
	Original Project	**Amended Project**
Angophora inopina	137.0%	192.8%
Tetratheca juncea	202.8%	248.3%
Giant Barred Frog	91.5%	122.2%
Spotted-tailed Quoll	101.6%	186.9%

6.6 RAIL

This section supersedes section 7.13 of the EIS.

6.6.1 Background

The potential impacts of the Project on the capacity, efficiency and safety of the rail network were assessed in the *Rail Study for the Wallarah 2 Coal Project* (Rail Management Consultants Australia, 2012), which was presented as Appendix R of the EIS. This assessment considered the potential impacts of the train movements associated with the Project.

The Amendment involves changes to the rail infrastructure for the Project. The train configurations for the Project have also been altered to accommodate these changes. A revised *Rail Study* has been undertaken by GHD to assess the rail network implications of the train configurations for the Amended Project.

The *Rail Study* is presented in full in **Appendix G**.

6.6.2 Methodology

Determining Path Demands

The geometry of the rail spur was the key consideration in the selection of appropriate train configurations for the Amended Project. Due to physical constraints, the length of the rail spur is limited to 2,175 m. The train configurations for the Amended Project were chosen in consultation with rail providers, TfNSW, RailCorp and Sydney Trains as described in **Section 4.2.1**.

The Amended Project will employ the following configurations:

- 44 x 100 t wagons for the first three years of operations (Years 4 to 6); and
- 60 x 100 t wagons for the remainder of the Project.

The trains for the Amended Project will have more wagons than the trains for the Original Project.

Assuming a loading efficiency of 94%, trains with 44 x 100 t wagons will have a capacity of 3,212 tonnes and trains with 60 x 100 t wagons will have a capacity of 4,380 t. Based on the anticipated coal production schedule and the capacity per train, the number of train cycles required was calculated for a number of scenarios. It was determined that the Project will generally require between 3 and 4 train cycles per day.

Prior to Year 10 of the Amended Project, the average coal production rate will be less than 4.3 Mtpa. Three train cycles per day will be sufficient to support this production rate. In Years 4 to 6, the average production rate will be less than 2 Mtpa. In these years, three cycles per day using the smaller trains (44 x 100 t wagons) will be sufficient.

From Year 10 onwards, the average coal production rate is expected to increase to 4.8 Mtpa. To support this average production rate, three to four train cycles per day will be required.

Train Path Modelling

TfNSW conducted rail network modelling to determine the availability of train paths on the Main Northern Rail Line. The RailSys model was used to simulate future network infrastructure scenarios interposed with current train schedules.

The model considered scheduled passenger and freight train movements on the section of the Main Northern Rail Line from the Project to Islington Junction. Islington Junction represents the limit of TfNSW's ownership of the Main Northern Rail Line. There is an additional travel time of approximately 15 minutes from Islington Junction to the port. This section of the Main Northern Rail Line is owned by the Australian Rail Track Corporation (ARTC).

Three scenarios were considered in the train path modelling:

- 25 Tonne Axle Load (TAL) wagon train with 44 wagons;
- 25 TAL wagon train with 60 wagons; and
- 30 TAL wagon train with 54 wagons.

The modelling assumed that 25 TAL wagon trains are limited to a speed of 80 km/h, and that 30 TAL wagon trains are limited to a speed of 60 km/h. The modelling assumed dwell times of at least 1.5 hours on the rail spur and at the Port of Newcastle.

6.6.3 Impact Assessment

Network Capacity

Based on the adopted train configurations, the Amended Project will require 3 to 4 train cycles per day. The Amended Project will require fewer train cycles than the Original Project due to the use of trains with more wagons.

The RailSys modelling (undertaken by TfNSW) determined that there are six available train cycles. For the two scenarios involving 25 TAL wagon trains, four of the available cycles do not require the use of proposed passing loops at Awaba. Therefore, there will be sufficient available cycles to accommodate the train movements associated with the Amended Project, without the need for additional rail infrastructure.

Due to the lower speed of the 30 TAL wagon trains, only two of the available cycles do not require use of the Awaba passing loops. In order for there to be sufficient available cycles, passing loops would need to be constructed at Awaba in order for this scenario to be viable. Accordingly, this wagon configuration has not been adopted for the Amended Project.

Level Crossings

Trains associated with the Project will pass through level crossings at St James Road, Adamstown and Clyde Street, Islington. Existing closure times for these level crossings were calculated in the *Cobbora Coal Project Environmental Assessment* (EMGA Mitchell McLennan, 2012) (Cobbora EA). The St James Road crossing is estimated to be closed for 432 minutes per day and the Clyde Road crossing is estimated to be closed for 463 minutes per day.

Given that the Amended Project requires fewer train cycles than the Original Project, the predicted impacts on closure times for each crossing are predicted to be 11 minutes per day less. The predicted closures associated with the Amended Project represent less than 3% of existing closure times.

It should also be noted that the proposal to develop the Cobbora Coal Project has been abandoned. The closure times stated in the EA included the train movements associated with the Cobbora Coal Project. Since the Project requires fewer train cycles than the Cobbora Coal Project, the cumulative closure times at level crossing are expected to be lower than the total durations stated in the Cobbora EA.

6.6.4 Management and Mitigation Measures

To ensure that the Amended Project will not have any safety implications on the rail network, the rail spur has been conceptually designed in the accordance with Sydney Trains and ARTC train loading guidelines. The rail infrastructure owners will continue to be consulted during detailed design of the rail spur for the Amended Project.

The approval of RailCorp and Sydney Trains is required for all third party connections to the Main Northern Rail Line. WACJV will prepare a Signalling Functional Specification to the satisfaction of TfNSW, RailCorp and Sydney Trains.

6.7 ABORIGINAL HERITAGE

This section should be read in conjunction with section 7.14 of the EIS.

6.7.1 Background

The potential impacts of the Project on Aboriginal cultural heritage values were considered in the *Aboriginal Cultural Heritage Assessment* (OzArk, 2012), which was presented as Appendix S of the EIS. This assessment considered the potential impacts of the Project in its entirety, including both surface disturbance and subsidence induced by longwall mining.

OzArk Environmental & Heritage Management (OzArk) has prepared an *Aboriginal Cultural Heritage Assessment – Addendum*, which evaluates the impacts of the Amendment. The potential impacts associated with subsidence, the Buttonderry Site and the Western Ventilation Shaft will not be changed by the Amendment. As such, the potential impacts associated with these aspects of the Project will remain as assessed in OzArk (2012).

The *Aboriginal Cultural Heritage Assessment – Addendum* is presented in full in **Appendix H**.

6.7.2 Methodology

Consultation

Consultation with Aboriginal stakeholders for the purposes of the *Aboriginal Cultural Heritage Assessment – Addendum* has been undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010), as described in **Section 4.2.4**.

Desktop Assessment

A predictive model was developed to determine the likelihood of Aboriginal materials being present within the Addendum Study Area (see **Figure 8**). Archaeological studies have generally shown that there is strong correlation between the presence of a water source (permanent or ephemeral) and prior Aboriginal occupation. OzArk (2012) previously identified Aboriginal sites within landforms associated with Wallarah Creek. Such landforms are not present within the Addendum Study Area. Although the Addendum Study Area does contain landforms associated with Spring Creek, the hydrological resources within this area are limited. OzArk has concluded that Aboriginal populations are more likely to have occupied the area surrounding Budgewoi Lake (approximately 3 km downstream) due to its abundant water resources.

The extent of rock outcropping within the Addendum Study Area is very limited. This is significant because rock outcrops provide materials for tool manufacture. Due to the limited hydrological resources and lack of rock outcrops within the Addendum Study Area, the likelihood of Aboriginal sites being present within this area was deemed to be low.

A search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 10 February 2016 to determine whether any Aboriginal sites have previously been recorded within the Addendum Study Area. The results of the database search are discussed in **Section 6.7.3**.

Field Surveys

In addition to the desktop assessment, an archaeological survey of the Addendum Study Area was conducted in consultation with registered Aboriginal stakeholders on 2 March 2016.

The portion of the Addendum Study Area within the rail corridor was not surveyed due to safety considerations. Due to the highly modified nature of land within the rail corridor, it is highly unlikely that heritage items would have been identified in this area. The surveys were undertaken by a qualified archaeologist from OzArk and representatives of DLALC and GTLAC. The other registered stakeholder, Kevin Duncan, was unable to participate in the archaeological survey on 2 March 2016 but was provided a guided overview tour of the Addendum Study Area on 5 April 2016.

6.7.3 Impact Assessment

Aboriginal Artefacts

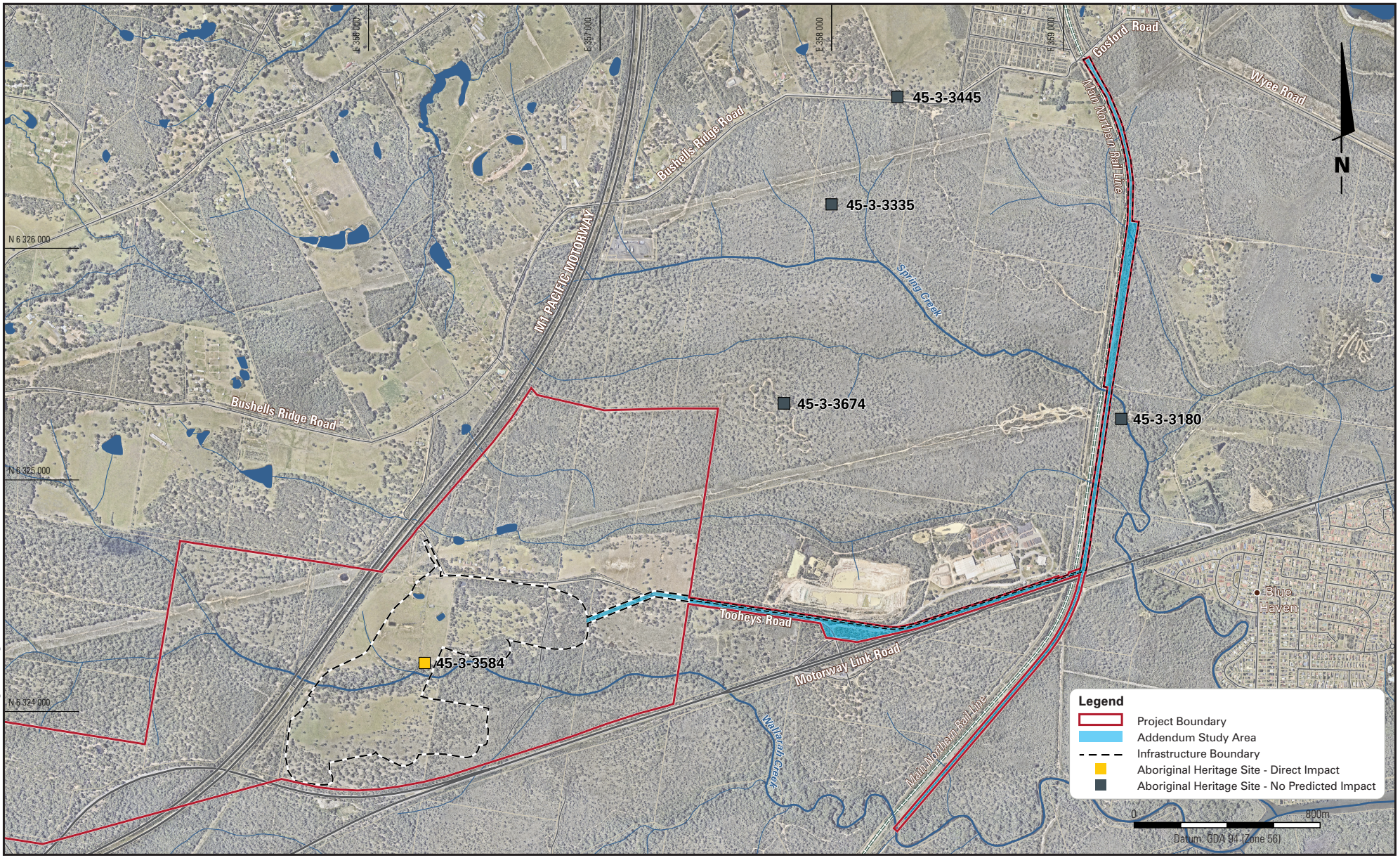
There have been no sites previously registered on the AHIMS database within the Addendum Study Area. However, there are four recorded sites in its vicinity (see **Figure 19**).

The field surveys did not identify any further Aboriginal sites within the Addendum Study Area. In addition, the surveys did not identify any areas that are likely to contain subsurface archaeological deposits. As such, the Amendment is not expected to result in any further impacts to Aboriginal artefacts (i.e. beyond the predicted impacts in the EIS).

The removal of the rail loop from the design of the Tooheys Road Site is expected to have a beneficial impact. Removal of the rail loop will reduce the potential impacts to open site WC-OS2, which was identified during previous archaeological studies.

Archaeologically Sensitive Landforms

The removal of the rail loop will also reduce impacts to Wallarah Creek, which is the most archaeologically sensitive landform in the vicinity of the Tooheys Road Site. The banks of Spring Creek to the west of the Main Northern Rail Line are also considered to be an archaeologically sensitive landform. The re-location of the rail spur will reduce potential impacts to these reaches of Spring Creek. The re-located rail spur will cross Spring Creek on the eastern side of the Main Northern Rail Line. The reaches of Spring Creek to the east of the railway line are not considered to be archaeologically sensitive due to the effects of previous development. Therefore, the Amendment results in a lesser impact to both Aboriginal artefacts and archaeologically sensitive landforms.



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Aboriginal Heritage Sites

FIGURE 19

6.7.4 Management and Mitigation Measures

Given that no Aboriginal sites were identified within the Addendum Study Area, there are no additional management and mitigation measures proposed.

The portion of the Addendum Study Area within the rail corridor was not surveyed due to safety considerations. For completeness, it is proposed to survey this area once the necessary safety precautions are in place. Surveys of the rail corridor will be undertaken prior to construction of the rail spur.

WACJV has previously committed to the preparation of an Aboriginal Cultural Heritage Management Plan (ACHMP). The implications of the Amendment will be considered in the preparation of the ACHMP. Although the likelihood of Aboriginal sites being present within the Addendum Study Area is very low, the ACHMP will include an unanticipated finds protocol to deal with the unlikely event that Aboriginal items are encountered during construction.

6.8 VISUAL

This section should be read in conjunction with section 7.16 of the EIS.

6.8.1 Background

The potential impacts of the Project on visual amenity were considered in the *Visual Impact Assessment* (The Design Partnership, 2013), which was presented as Appendix U of the EIS. This assessment considered the potential visual impacts of the Tooheys Road Site, Buttonderry Site and Western Ventilation Shaft.

The Design Partnership has prepared a *Visual Impact Assessment – Addendum*, which evaluates the visual impacts of the Amendment. The potential impacts associated with the Buttonderry Site and the Western Ventilation Shaft will not be altered by the Amendment. As such, the potential impacts associated with these aspects of the Project will remain as assessed in The Design Partnership (2013).

The *Visual Impact Assessment – Addendum* is presented in full in **Appendix I**.

6.8.2 Methodology

Desktop Assessment

The *Visual Impact Assessment – Addendum* considered the visibility of the new infrastructure associated with the Amendment, including:

- Conveyors and gantries;
- Transfer Stations;
- Train Load Out Facility; and
- Noise Barrier.

A desktop assessment was undertaken to identify the viewshed (or visual limits) of the proposed infrastructure. The viewshed is the range of locations from which the proposed infrastructure may be visible.

Site Visit

A site visit was conducted to take photograph from key viewpoints. The key viewpoints are locations where members of the public are most likely to view the proposed infrastructure. The coordinates and elevation of potential viewpoints were recorded.

Assessment Framework

The Visual Impact Rating (VIR) is a product of the 'Visibility' of the structure and the Visual Absorption Capacity (VAC) of the surrounding landscape. The matrix used to determine VIR is reproduced in **Table 16**. 'Visibility' is dictated by the number of viewers, duration of views, viewing distance and context of views. The VAC is the capacity of the landscape to protect viewers from visual impacts. The VAC is influenced by vegetation cover, topography and presence of other development. A 'High' VAC indicates that the development would result in a low level of visual contrast with the surrounding landscape. Conversely, a 'Low' VAC indicates that there would be significant visual contrast between the development and the surrounding landscape.

Table 16
Visual Impact Rating Matrix

	1. VISIBILITY		
	LOW	MODERATE	HIGH

2. VISUAL ABSORPTION CAPACITY	**3. VISUAL IMPACT RATING**		
HIGH	LOW	LOW	MODERATE
MODERATE	LOW	MODERATE	HIGH
LOW	LOW	MODERATE	HIGH

6.8.3 Impact Assessment

Viewsheds

The new proposed infrastructure is not expected to be visible from any private residences. There is significant vegetation to the east of the railway line which will prevent views for private residences to the east.

The conveyor system is generally not expected to be visible due to screening provided by vegetation. However, the conveyor system crosses over the Main Northern Rail Line via an elevated gantry. This gantry may be visible from locations along the Motorway Link Road, Tooheys Road and Main Northern Rail Line. Views for train passengers will be limited as trains will pass beneath the structure. The gantry will only be visible to motorists and train passengers. The conveyor gantry will not be visible from any locations that are accessible by pedestrians.

The transfer station adjacent to the Motorway Link Road will be approximately 8 m tall. This transfer station may be visible from locations along Motorway Link Road, in close proximity to the overpass. From more distant locations along Motorway Link Road, the transfer station will be concealed by vegetation and the overpass structure itself. The transfer station may also be viewed by train passengers on the Main Northern Rail Line. There are no pedestrian views of the transfer station.

The train load out facility will be approximately 28 m high and 13.5 m wide. The train load out facility will be visible from the Motorway Link Road overpass. However, the motorist would need to be looking directly north along the Main Northern Rail Line to view the facility. The facility will also be visible to train passengers on the Main Northern Rail Line. There are no pedestrian views of the train load out facility.

The noise barrier will be approximately 50 m long and 4.5 m high. The noise barrier will be visible from the Motorway Link Road bridge, but it will be partially obscured by the Transfer Station (which is 3.5 m taller).

Visibility

A visibility rating was determined for each of the potential viewpoints. There are high numbers of potential viewers from the Motorway Link Road and Main Northern Rail Line. The new proposed infrastructure will be less than 1.5 km from these viewpoints, which is considered to be a short viewing distance. Due to the moving nature of vehicles and trains, the period of view is very short for these viewpoints.

Tooheys Road generally carries light traffic volumes. As a result, the number of potential viewers from this viewpoint is low. Motorists on Tooheys Road will be able to view the conveyor system from a short viewing distance and for a longer period of view.

Based the number of potential viewers, viewing distances and durations of views, the visibility of the new proposed infrastructure is considered to be ‘Moderate’.

Visual Absorption Capacity

The ground mounted conveyor will be visible from Tooheys Road. There is limited screening provided by vegetation. The ground mounted conveyor will not be visible from the Motorway Link Road. The elevated gantry crossing over the Main Northern Rail Line will be visible from locations on the Motorway Link Road. Views of the conveyor gantry will be partially screened by mature vegetation. The gantry crossing over Tooheys Road will be visible from Tooheys Road. However, this gantry is situated within the Boral Montoro premises, which is not frequented by members of the public. The VAC for the landscape surrounding the conveyor system is rated as 'Moderate'.

The transfer station is expected to be visible from the Motorway Link Road. The structure will be substantially concealed by the guard rail along the road. However, the top of the transfer station will be 2 m higher than the guard rail, so the top of the structure will be visible. There is no screening vegetation between the Motorway Link Road and the transfer station. The VAC for the landscape surrounding the transfer station is rated as 'Low'.

The train load out facility will potentially be visible from the Motorway Link Road overpass. However, the facility will be located approximately 1.1 km north of the Motorway Link Road. Due to the distance from the road and the short period of view, the train load out facility will be difficult to discern for motorists. The facility will also be visible to train passengers for very short periods of view. The facility will have a backdrop of tall trees and mid to lower storey vegetation. However, there is no vegetation screening present between the facility and potential viewpoints. There are four transmission line pylons, which are approximately 35 m high in the vicinity of the facility. Therefore, the facility will be similar in character to other infrastructure that train passengers will encounter. The VAC for the landscape surrounding the train load out facility is rated as 'Low'.

Visual Impact Rating

Using the matrix shown in **Table 16**, the visibility and VAC ratings were used to generate a VIR. Based on a visibility rating of 'Moderate' and VAC ratings of 'Moderate' to 'Low', the VIR of the new infrastructure for the Amendment is 'Moderate'.

Lighting Impacts

All new infrastructure associated with the Amendment has been designed to minimise the need for external lighting.

All required external lighting will be designed in accordance with Australian Standard *AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting*.

The transfer stations and train load out bin will be completely automated so that personnel movements to these structures are limited to maintenance works. As a result, the need for external lighting in the vicinity of the new infrastructure will be minimal.

Furthermore, WACJV will minimise the potential for light spill by directing external lights downwards and by employing low lux lamps. No lighting will be directed towards public roads. Any residual nuisance lighting that may potentially occur will be shielded.

6.8.4 Management and Mitigation Measures

Although potential views of the proposed infrastructure will be limited in duration, the following measures will be undertaken to minimise the visual contrast between the proposed structures and the surrounding landscape:

- The exteriors of the proposed structures will employ colours that achieve the greatest integration with the surrounding landscapes; and
- Vegetation that is removed for construction will be re-planted in areas to provide visual screening (where practicable).

To minimise the effects of light spill at private residences, the extent of external lighting will be restricted. The limited external lighting that is required will be designed in accordance with the relevant Australian Standard.

6.9 ECONOMICS

This section supersedes section 7.18 of the EIS.

6.9.1 Background

The potential economic impacts of the Original Project were assessed in the *Economic Impact Assessment* (Gillespie Economics, 2013), which was presented as Appendix W of the EIS. This assessment was undertaken in accordance with the *Draft Guideline for Economic Effects and Evaluation in Environmental Impact Assessment* (James and Gillespie, 2002).

In December 2015, DP&E published the *Guidelines for the economic assessment of mining and coal seam gas proposals* (Economic Guidelines). Gillespie Economics has undertaken a revised *Economic Impact Assessment* for the entirety of the Amended Project in accordance with these guidelines.

The revised assessment utilised the latest available economic forecasts (including coal prices and foreign exchange rates).

The *Economic Impact Assessment* is presented in full in **Appendix J**.

6.9.2 Methodology

The Economic Guidelines recommend two analyses for assessing the economic impacts of a development:

- A Cost Benefit Analysis (CBA) to determine whether the Amended Project is justifiable from an economic perspective; and
- A Local Effects Analysis (LEA) to assess the impacts of the Amended Project within the locality, specifically:

- Net employment to existing residents;
- Non-labour project expenditure; and
- Environmental and social change in the local community.

The LEA recommended by the Economic Guidelines is considered to be highly conservative in terms of potential economic benefits.

In addition to the LEA recommended by the Economic Guidelines, a supplementary LEA was undertaken using Input-Output (IO) analysis to determine the direct and indirect economic activity generated by the Amended Project.

Cost Benefit Analysis

The CBA is a comparison of the present value of the aggregate benefits of a project with the present value of the aggregate costs. The CBA for the Amended Project is a trade-off between:

- The net production benefits to society including royalties, company tax and net producer surplus, and any economic benefits to existing landholders, workers, and suppliers; and
- The environmental, social and cultural impacts including net public infrastructure costs.

If the value of the aggregate benefits is greater than the value of the aggregate costs (i.e. a positive net present value), the development is considered to be desirable from an economic efficiency perspective.

The Economic Guidelines require the CBA be assessed in terms of the net benefit to NSW. The CBA was initially undertaken from a global perspective and then refined to include only the benefits that accrue to NSW.

Local Effects Analysis

The LEA was undertaken to assess the impacts of the Amended Project on its 'locality', which is defined under the Economic Guidelines as the relevant Statistical Area 3 (SA3). In this case, the Wyong, Gosford and Lake Macquarie LGAs constitute the 'locality' for the Amended Project.

The Economic Guidelines prescribe that only people who ordinarily reside in the region at the time of the proposal should be included in the initial estimation of increases in direct local employment increases. The Economic Guidelines assume that these people would otherwise be employed in the region and so the increase in disposable wages for the region is the difference between the average net income of these people in the mining industry and the average net income in other industries.

From a regional economy perspective, the approach recommended by the Economic Guidelines is likely to understate effects since it does not account for income spending of persons who migrate into the region as a result of being employed by the Project.

The Economic Guidelines allow for supplementary analyses to be undertaken using alternate methodologies or assumptions. To quantify the potential flow-on effects for local communities, a supplementary LEA was undertaken using IO analysis. The Economic Guidelines recognise IO analysis as a method of estimating flow-on effects. IO analysis identifies the economic activity generated by a project in terms of four main indicators:

- Gross regional output – the gross value of business turnover;
- Value-added – the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output (excluding income costs);
- Income – the wages paid to employees including imputed wages for self-employed persons and business owners; and
- Employment – the number of persons employed (including self-employed, full-time and part-time).

The proponent remains committed to a target of 70% local employment, which equates to 210 direct locally recruited employees. The proponent also commits to a target of at least 10% indigenous employment, which equates to a minimum of 30 indigenous employees during the operational phase.

Peer Review

BDA Group was commissioned to undertake a peer review of the *Economic Impact Assessment*. The peer review considered the following:

- The appropriateness of the assumptions, methods and results presented;
- Compliance with the Economic Guidelines; and
- The overall efficacy of the analysis and conclusions.

The economics peer review by BDA Group is presented in **Appendix K**.

6.9.3 Impact Assessment

Cost Benefit Analysis

A CBA estimated that the Amended Project would have total net production benefits of $585 M (present value). Given that the proponent is foreign owned, the production benefits that will accrue to NSW are largely limited to royalties, company tax and voluntary contributions. In accordance with the Economic Guidelines, it was assumed that 32% of company tax payments would accrue to NSW. The net production benefits that will accrue to NSW are estimated at $275 M (present value), comprised of $200 M in royalties, $70 M in company tax and $5 M in voluntary contributions.

In addition, the Amended Project is expected to generate market and non-market employment benefits. Market employment benefits represent the increase in employee income as a result of a project. Assuming that 50% of the workforce would otherwise be employed at a

reservation wage of $52,000, the Amended Project will result in market employment benefits of approximately $25 M (present value). Non-market employment benefits are the values that the community attributes to employment, such as the existence values that people hold for the employment of others. The non-market employment benefits of the Amended Project are estimated at $186 M (present value). Therefore, the Amended Project is predicted to generate employment benefits valued at approximately $211 M (present value).

The environmental impacts (i.e. costs) of the Amended Project are estimated to have a present value of $1 M. These costs are substantially outweighed by the predicted production benefits and employment benefits. The net social benefit of the Amended Project is predicted to range from $274 M to $485 M (present values), depending on whether employment benefits are considered.

Local Effects Analysis

Based on the methodology prescribed by the Economics Guidelines, the LEA estimates that the Amended Project will provide the following benefits to the region:

- $7.6 M to $12.8 M in annual direct household income; and
- 79 to 134 direct jobs.

When multiplier effects are included, the Amended Project is predicted to provide the following benefits:

- $13 M to $22 M in annual direct and indirect household income; and
- 224 to 381 direct and indirect jobs.

Supplementary Local Effects Analysis

The supplementary LEA was undertaken using the IO method to estimate the potential flow-on effects for the region and state. IO analyses were undertaken for both the construction phase and the operations phase.

The peak year of construction, in terms of number of construction employees, is expected to be Year 2 of the Project. In Year 2, the construction workforce is predicted to provide the following contributions to the regional economy:

- $363 M in annual direct and indirect output;
- $140 M in annual direct and indirect value added;
- $68 M in annual direct and indirect household income; and
- 1,111 direct and indirect jobs.

Due to the larger inter-sectoral linkages, the economic effects are expected to be greater at a state level. In Year 2, the construction workforce is predicted to provide the following contributions to the NSW economy:

- $527 M in annual direct and indirect output;

- $223 M in annual direct and indirect regional value added;
- $129 M in annual direct and indirect household income; and
- 1,605 direct and indirect jobs.

The Amended Project will also generate economic activity through purchases of construction equipment. Purchases of construction equipment are predicted to peak in Year 3 of the Project. In Year 3, equipment purchases associated with the Amended Project are predicted to result in the following effects on the regional economy:

- $25 M in annual direct and indirect output;
- $10 M in annual direct and indirect value added;
- $4 M in annual direct and indirect household income; and
- 77 direct and indirect jobs.

In Year 3, the impact of equipment purchases on the NSW economy are predicted to be:

- $121 M in annual direct and indirect output;
- $51 M in annual direct and indirect value added;
- $28 M in annual direct and indirect household income; and
- 374 direct and indirect jobs.

During the operations phase, the Amended Project is predicted to make the following contributions to the regional economy:

- $593 M in annual direct and indirect regional output or business turnover;
- $342 M in annual direct and indirect regional value-added;
- $69 M in annual direct and indirect household income; and
- 853 direct and indirect jobs.

Similarly, the impacts of the Amended Project on the NSW economy during the operations phase are predicted to be:

- $707 M in annual direct and indirect output;
- $398 M in annual direct and indirect regional value added;
- $104 M in annual direct and indirect household income; and
- 1,179 direct and indirect jobs.

The predictions of the LEA are likely to represent the lower bound of potential economic impacts. Conversely, the predictions of the supplementary LEA are likely to represent the upper bound of potential impacts. The actual impacts on the regional economy are likely to fall between the predictions of the LEA and supplementary LEA.

Peer Review

In its peer review of the *Economic Impact Assessment*, BDA Group found that "*the analysis and its documentation to be consistent with the NSW Government (2015) Guidelines*". With regard to the findings of the *Economic Impact Assessment*, BDA Group concludes that:

> *"based on the assumptions, data and analyses presented, Gillespie Economics appropriately concludes that the project offers net economic benefits to the local community, State and more broadly to Australia, and therefore relative to the no project scenario, is desirable from an economic efficiency perspective".*

6.10 CONTAMINATION

This section should be read in conjunction with section 7.22 of the EIS.

6.10.1 Background

The potential contamination risks associated with the Amended Project were considered in the *Contamination Impact Assessment* (DLA, 2013), which was presented as Appendix AA of the EIS. This assessment considered the potential risks associated with the Tooheys Road Site, Buttonderry Site and Western Ventilation Shaft.

DLA Environmental (DLA) has prepared a *Contamination Impact Assessment – Addendum* which specifically assesses the potential contamination risks associated with the land within the Addendum Study Area.

The *Contamination Impact Assessment – Addendum* is presented in full in **Appendix L**.

6.10.2 Methodology

Desktop Assessments

A number of desktop assessments were undertaken to determine potential locations of contaminants. The results of these desktop assessments informed the development of a targeted sampling program.

A search of the Stored Chemical Information Database (maintained by Workcover NSW) was undertaken to determine whether any Dangerous Goods Licences have previously been issued for the properties within the Addendum Study Area. This search was undertaken for all parcels of land within the Addendum Study Area, except for the rail corridor (Lot 4 DP 1191556). This lot was not included in the search because it does not contain any buildings that could have potentially been used for the storage of dangerous goods.

DLA conducted a search of the registers pertaining to section 58 of the *Contaminated Land Management Act 1997* (CLM Act). The purpose of these searches was to determine whether the land within the Addendum Study Area has been subject to notices relating to contaminated land.

DLA reviewed historical aerial photographs of the Addendum Study Area from 1954 to 2006 to determine the nature of previous land uses. Historical title searches were also conducted for the lots within the Addendum Study Area.

Field Investigations

Based on the findings of the desktop assessments, a target sampling program was conducted on 24 November 2015, 8 December 2015 and 14 January 2016. The targeted sampling program included the collection of the following samples:

- 22 soil samples for chemical analysis;
- Seven soil samples for asbestos analysis;
- One fragment sample for asbestos analysis;
- Three sediment samples; and
- Three water samples.

The soil samples were collected for chemical analyses in accordance with the *Sampling Design Guidelines* (NSW EPA, 1995), the *National Environment Protection (Assessment of Site Contamination) Measure (No.1)* (NEPM) and Australian Standard *AS4482.1-2005*.

All sample analyses were conducted by NATA accredited laboratories. Samples were analysed for the following parameters:

- Heavy metals - Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn);
- Asbestos;
- Total Recoverable Hydrocarbons (TRH);
- Monocyclic Aromatic Hydrocarbons (BTEX);
- Volatile Total Recoverable Hydrocarbons (vTRH);
- Polycyclic Aromatic Hydrocarbons (PAHs).
- Organochlorine Pesticides (OCP); and
- Polychlorinated Biphenyls (PCB).

6.10.3 Impact Assessment

Database Searches

This search of the Stored Chemical Information Database showed that a Dangerous Goods Licence had previously been issued for Lot 168 DP 705480. This licence permitted the storage of a 210 kg Liquefied Petroleum Gas decanting cylinder on that property.

The search of the registers pertaining to the CLM Act determined that none of the properties within the Addendum Study Area have been encumbered by notices relating to contaminated land.

Land Use History

There are three freehold lots within the Addendum Study Area. These were privately owned prior to being acquired by WACJV. There are also two lots of Crown land within the Addendum Study Area, both of which are occupied by the Boral Montoro premises.

The review of historical aerial photographs determined that the quarry was established around 1985. Prior to development of the quarry and tile manufacturing plant (see **Figure 8**), those parcels of Crown land were heavily vegetated. The portion of the Crown land within the Addendum Study Area remains heavily vegetation. The Crown road (Nikko Road) was cleared for agricultural purposes prior to 1975, but has gradually regenerated since. No buildings have ever been constructed on the Crown road. The WACJV land within the Addendum Study Area was previously used for agriculture (chicken farming).

Soil Samples

Criteria for the assessment of soil contamination are prescribed by the NEPM. The NEPM provides the following criteria:

- Health-based investigation levels (HILs);
- Health-based screening levels (HSLs);
- Ecological-based investigation levels (EILs); and
- Ecological-based screening levels (SELs).

The assessment criteria are outlined in detail in **Appendix L**.

Where a sample result is greater than 250% of the criteria or where the standard deviation of the data set is greater than 50% of the criteria, the non-compliant locations are not considered a part of the general population of the site, but rather as a ‘hotspot’ or a different population. ‘Hotspots’ are defined as localised areas where contaminant concentrations are noticeably higher than in surrounding areas. ‘Hotspots’ may be disregarded in the final determination of soil suitability.

All 22 of the soil samples complied with the criteria for volatile TRH, BTEX and PAH. One sample (C5-Automotive) registered an exceedance of the NEPM criteria for semi-volatile TRH. This sample recorded a concentration of 310 mg/kg for the F3 (C_{16}-C_{34}) fraction of TRH, which marginally exceeds the criteria of 300 mg/kg. All other samples complied with the criteria for semi-volatile TRH.

All 22 of the soil samples were analysed for heavy metals. One sample (S5-Automotive) recorded a concentration of 31,000 mg/kg for copper, which exceeds the NEPM criteria of 17,000 mg/kg. The concentrations of metals in sample C4, which was collected only 2.0 m from C5-Automotive, are within the criteria. This suggests that sample S5-Automotive is a hotspot. The elevated copper concentrations in sample C5-Automotive are most likely due to the presence of a burnt out vehicle at that location, rather than previous land uses.

For all of the soil samples, concentrations of pesticides and asbestos were below the limits of detection. During the field inspections, a fragment of asbestos was observed near the Motorway Link Road overpass above the Main Northern Rail Line. This fragment was found to contain Chrysotile asbestos. Due to the location of the fragment, it is likely that the material was illegally dumped.

Water Samples

Water samples were assessed in accordance with the NEPM, *Guidelines for the Assessment and Management of Groundwater Contamination* (DEC, 2007) and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

ANZECC (2000) prescribes 'low risk trigger values' which represent the concentrations below which there is a low risk of adverse biological effects. If the trigger values are exceeded, further site-specific investigations to assess potential contamination or management and remedial actions may be required.

ANZECC provides low risk trigger values for the protection of 80-99% of aquatic species. The trigger values that should be adopted are dependent on the health of the receiving aquatic ecosystem. Due to the proximity of agricultural activities, main roads and railway lines to Spring Creek, the trigger values for protection of 95% of freshwater species were deemed to be suitable for this assessment. The assessment criteria for water samples are outlined in detail in **Appendix L**.

For all three water samples, concentrations of TRH (volatile and semi-volatile), BTEX and PAH were below the limits of detection.

All three water samples contained zinc concentrations exceeding the criteria prescribed by the NEPM. One of these samples (CR2-Water) also exceeded the criteria for chromium, copper and lead. The exceedances of the criteria for water samples are outlined in **Table 17**.

The results of the water samples indicate that background contaminant levels in Spring Creek are greater than the criteria for certain analytes. These results provide a baseline for assessing the impacts of the Project.

Table 17
Exceedances of Criteria for Water Samples

Analyte	Criteria (µg/L)	Sample Concentration (µg/L)		
		CR1-Water	CR2-Water	CR3-Water
Zinc	8	26	27	18
Lead	3.4	No exceedance	5	No exceedance
Chromium	1.0	No exceedance	2	No exceedance
Copper	1.4	No exceedance	3	No exceedance

Sediment Samples

Criteria for the assessment of sediment samples were sourced from ANZECC (2000). These criteria are outlined in detail in **Appendix L**.

For all three sediment samples, concentrations of TRH (volatile and semi-volatile), BTEX and PAH were below the limits of detection.

Two of the three sediment samples registered exceedances of the low risk trigger values prescribed by ANZECC (2000). However, these concentrations were within the high risk trigger values. The recorded exceedances of the low risk trigger values are outlined in **Table 18**. The concentrations for all other heavy metals were below the low risk trigger values in all three samples.

No pesticides were detected in any of the three sediment samples.

Table 18
Exceedances of Trigger Values for Sediment Samples

Analyte	ANZECC Trigger Values		Sample	
	Low Risk Trigger (mg/kg)	High Risk Trigger (mg/kg)	CR-Sed-1 (mg/kg)	CR-Sed-2 (mg/kg)
Lead	50	110	110	62
Zinc	200	410	390	310

6.10.4 Management and Mitigation Measures

DLA has determined that there is no evidence of soil contamination being prevalent within the Addendum Study Area. The elevated concentrations of heavy metals and semi-volatile PAH in sample C5-Automotive are localised and most likely due to dumping of automotive waste. As there is no evidence of contamination caused by historical land uses, no remediation measures are necessary.

The portion of the Addendum Study Area within the Boral Montoro premises (see **Figure 8**) contains a bund, which appears to be constructed from extracted materials. If excavation of the bund is required during construction of the overland conveyor, a contamination specialist will be engaged to undertake an assessment of the material within the bund.

The water and sediment samples collected for this assessment provide useful baseline data. Water and sediment sampling in Spring Creek will continue to be undertaken on a six-monthly basis and compared to the baseline data. Sampling will be conducted upstream and downstream of the proposed rail spur to determine the impacts of the Project (if any). This monitoring commitment will be detailed in the Water Management Plan.

6.11 BLUE HAVEN

*This section consolidates the findings in **Sections 6.2**, **6.4** and **6.8** that relate to the suburb of Blue Haven.*

6.11.1 Background

The suburb of Blue Haven, within the Wyong LGA, is located to the south-east of the Amended Project. As at the 2011 census, Blue Haven had a population of 6,167 persons (ABS, 2011).

The suburb of Blue Haven consists predominantly of land zoned as 'R1 General Residential' or 'R2 Low Density Residential', with a smaller area of land zoned as 'E2 Environmental Conservation'. The land that is zoned as R1 or R2 has largely been utilised for residential development.

Blue Haven is surrounded predominantly by land zoned as 'RU6 Transition' or 'E2 Environmental Conservation'. Under the Wyong LEP 2013, 'Dwelling houses' and 'Dual occupancies' are permissible with consent on land zoned as 'RU6 Transition'. However, other forms of 'residential accommodation', such as higher density residential development, are prohibited within zone RU6. All forms of 'residential accommodation' are prohibited within zone E2.

The nearest component of the Amended Project to Blue Haven is the transfer station near the Motorway Link Road. This transfer station is approximately 320 m west of Blue Haven (see **Figure 20**). The Train Load Out Facility is located approximately 1.1 km to the north-west of Blue Haven (see **Figure 20**). The nearest residences in Blue Haven are separated from the transfer station and Train Load Out Facility by dense vegetation and the elevated Motorway Link Road.

WACJV recognises the need to maintain the existing amenity for residents in Blue Haven. The coal transportation infrastructure for the Amended Project has been designed specifically to minimise the potential for air quality, noise and visual impacts on Blue Haven.

6.11.2 Noise

The noise sources nearest to Blue Haven will be the transfer station and locomotives to the north of the Motorway Link Road. The suburb of Blue Haven is located entirely south of the Motorway Link Road. Consequently, these noise sources will be separated from Blue Haven by the elevated Motorway Link Road and intervening vegetation. No noise sources will be located south of the Motorway Link Road.

The Noise and Vibration Impact Assessment considered the potential noise levels at assessment location P13, which is near the western boundary of Blue Haven (see **Figure 12**). Assessment location P13 is representative of the nearest residences in Blue Haven and as such, the predicted noise levels at P13 represent the worst case impact on the suburb. Preliminary noise modelling indicated that noise controls were needed to avoid exceedances of the PSNC for Blue Haven. A combination of noise controls are proposed to manage noise levels at Blue Haven, such as:

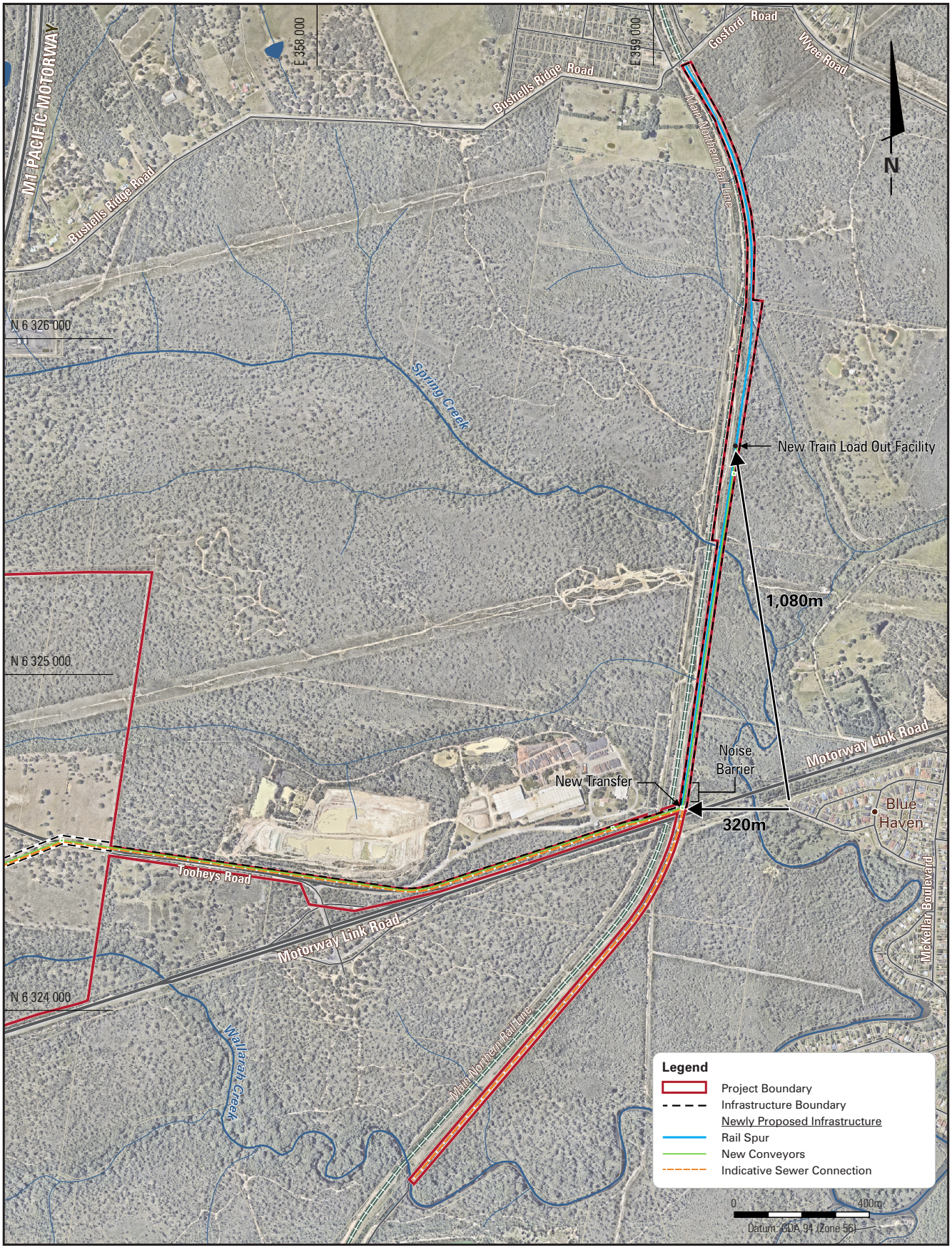
- Enclosure of the transfer station;
- Construction of a noise barrier (or a suitable alternative) along the southern extent of the rail spur to shield Blue Haven from noise generated by the train locomotives; and
- During certain weather conditions or sensitive periods of time, the southern train locomotives will be switched off whilst the train is being loaded.

The noise modelling demonstrates that when such controls are implemented, operational noise levels will be within the PSNC for the nearest location in Blue Haven.

Noise modelling was also undertaken to predict noise levels at Blue Haven during the construction phase. The Amended Project is predicted to comply with the construction NMLs for standard work hours. The ICNG defines standard work hours as being 7 am to 6 pm on weekdays and 8 am to 1 pm on Saturdays. Construction activities will occasionally be required outside of standard work hours. The ICNG prescribes lower NMLs for work outside standard hours. The noise modelling predicts that the NMLs for work outside standard hours may be exceeded during certain construction activities. Noise impacts during the construction phase are generally short term and irregular in nature. Nevertheless, WACJV will implement a Construction Noise Management Plan to minimise noise impacts during the construction phase of the Amended Project.

6.11.3 Vibration

Ground vibration may be generated by construction equipment, particularly compaction rollers. Vibration levels generated by the Amended Project are predicted to be within the structural damage and human comfort criteria at the closest location in Blue Haven.



HB WALLARAH COAL 1163 F20 Setback from Blue Haven 09 06 2016

WALLARAH 2 COAL PROJECT

Wallarah 2 COAL PROJECT | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Setback from Blue Haven

FIGURE 20

6.11.4 Air Quality

The Air Quality and Greenhouse Gas Impact Assessment considered the potential dust concentrations at assessment location P12, which is near the western boundary of Blue Haven (see **Figure 10**). Assessment location P12 is representative of the nearest residences in Blue Haven and as such, the predicted dust concentrations at P12 represent the worst case impact on the suburb.

To minimise dust emissions in the vicinity of Blue Haven, WACJV has committed to the following dust controls:

- Enclosure of all transfer stations;
- Dust suppression measures (such as water sprays) at transfers and the train load out facility; and
- Shielding of conveyors (roof and one side wall) and full enclosure of the elevated conveyor gantry crossing over the Main Northern Rail Line.

The air quality modelling has demonstrated that when these dust controls are implemented, the Amended Project will comply with all the relevant air quality criteria ($PM_{2.5}$, PM_{10}, TSP and dust deposition) at Blue Haven.

6.11.5 Visual

The Amended Project will not be visible from any locations in Blue Haven. The coal transportation infrastructure associated with the Amended Project will be shielded from receptors in Blue Haven by the Motorway Link Road and dense vegetation.

7 MANAGEMENT AND MITIGATION SUMMARY

Table 19 summarises the additional measures that will be implemented to manage and mitigate the predicted environmental impacts of the Amendment. This section should be read in conjunction with Section 8 of the EIS.

Table 19
Management and Monitoring Measures

Ref	Commitment	Section
Water		
1	Prepare an Erosion and Sediment Control Plan to minimise the risk of impacts Spring Creek during construction of the rail spur and conveyors.	**Section 6.1.4**
Air Quality		
2	The Air Quality and Greenhouse Gas Management Plan for the Project will include dust controls developed specifically for the Amendment.	**Section 6.2.4**
3	Transfer stations for the conveyor system will be fully enclosed to reduce dust and noise emissions.	**Section 6.2.4**
4	All conveyors will be fitted with a roof and one side wall to provide shielding. The elevated gantry crossing the Main Northern Rail Line will be enclosed.	**Section 6.2.4**
Noise		
5	The Noise Management Plan (including a Construction Noise and Vibration Management Plan) for the Project will include noise controls developed specifically for the Amendment.	**Section 6.4.4**
6	To reduce noise levels in Blue Haven, a noise barrier (or suitable alternative) will be established at the southern end of the rail spur.	**Section 6.4.4**
7	When conditions dictate the need for further noise mitigation, only two of the four locomotive units will be operated whilst a train is idling on the rail spur.	**Section 6.4.4**
Ecology		
8	The Biodiversity Management Plan to be developed for the Project will include management measures developed specifically for the Amendment.	**Section 6.5.4**
Rail		
9	Prior to construction, WACJV will prepare a Signalling Functional Specification to the satisfaction of TfNSW, RailCorp and Sydney Trains.	**Section 6.6.4**
Aboriginal Heritage		
10	Prior to construction, additional archaeological survey will be undertaken along the portion of the Addendum Study Area within the rail corridor.	**Section 6.7.4**
Visual		
11	Colours for the exteriors of proposed structures will be chosen so that visual integration with the surrounding landscape is optimised.	**Section 6.8.4**
12	Vegetation will be re-planted wherever possible to provide additional visual screening.	**Section 6.8.4**
13	Wherever practicable, external lights will be directed downwards and will employ low lux lamps to minimise light spill.	**Section 6.8.4**
Contamination		
14	If excavation of the bund within the Boral Montoro premises is required, the risk of contamination will be investigated by a qualified specialist prior to the activity.	**Section 6.10.4**

8 JUSTIFICATION OF THE AMENDMENT

This section explains the need for the Amendment and summarises the positive outcomes (economic and environmental) that are predicted to result from the Amendment.

8.1 NEED FOR THE AMENDMENT

The judgment of the LEC in *Darkinjung Local Aboriginal Land Council v Wyong Coal Pty Limited (No 2)* gave rise to an impediment to the determination of the SSD-4974 (in its original form). The LEC held that insofar as the DA is made in respect of Lot 195 DP 1032847 (owned by DLALC), SSD-4974 could not be determined until the NSW Aboriginal Land Council has provided its consent. Despite WACJV's efforts to negotiate an agreeable outcome, the NSW Aboriginal Land Council has not provided its consent. The Amendment avoids development on land owned by DLALC, particularly Lot 195 DP 1032847. By avoiding development on Lot 195 DP 1032847 and other Aboriginal land, the requirement to obtain the consent of the NSW Aboriginal Land Council no longer applies. Therefore, the Amendment allows SSD-4974 to be determined in accordance with the EP&A Act.

The determination of the Amendment will allow for the economic and employment benefits of the Project to be realised. The Project will generate significant numbers of direct and indirect jobs within the locality, which experiences higher than average unemployment rates. The Project will generate revenues in the form of royalties, company tax and voluntary contributions, which are used by governments to fund infrastructure projects and services. Without the Amendment, the Project would not be able to proceed in its original form and as such, these potential benefits may be foregone.

8.2 ENVIRONMENTAL IMPACTS

The environmental impacts that are predicted to result from the Amendment have been comprehensively assessed in this document to sufficiently indicate the nature of the changed development.

The Amendment will reduce the extent of disturbance that is required for the development of the Tooheys Road Site by 26 ha. As a result, the predicted impacts of the Amended Project on biodiversity values will be less than the predicted impacts of the Original Project. The Amendment will reduce the extent of disturbance to six native vegetation communities. These communities provide habitat to native flora and fauna species, so the Amendment will also reduce the magnitude of impacts to these species.

The Amendment is not expected to cause any additional impacts to Aboriginal heritage values. No Aboriginal items were identified within the Addendum Study Area, and the potential for Aboriginal items to be present in this area is low. One previously identified site (WC-OS2) was predicted to be impacted by the construction of the rail loop in the EIS. By omitting the rail loop, the Amendment will reduce the magnitude of impacts to this site.

The removal of the rail loop will also reduce impacts to Wallarah Creek, which was identified as an archaeologically sensitive landform. Therefore, the Amendment is predicted to reduce impacts to Aboriginal artefacts and archaeologically sensitive landforms.

The Amendment removes the requirement for rail crossings over Wallarah Creek (and its tributaries). Instead, the re-located rail spur will cross over Spring Creek (and its tributaries) at locations immediately downstream of the crossings for the Main Northern Rail Line.

These creek sections have already been modified to accommodate the existing structures. As a result, impacts on the hydrology and ecology of Spring Creek are expected to be less significant than the potential impacts to Wallarah Creek (which will be avoided as a result of the Amendment). The Amendment will result in fewer interactions with watercourses and riparian vegetation.

The Amendment will not materially alter the air quality and greenhouse gas impacts of the Project. Air quality modelling has demonstrated that the Amendment will comply with the relevant air quality criteria.

WACJV has adopted additional controls to manage noise associated with the relocated and proposed new infrastructure. As a result of these controls, the Amended Project is expected to comply with the noise criteria at Blue Haven. Three residences in the vicinity of the rail spur are predicted to experience a 'moderate' degree of affectation. In accordance with the VLAMP, acoustic treatments to these residences will be implemented in consultation with the property owners.

The infrastructure associated with the Amendment has the potential to be visible to motorists and train passengers. The visual impact rating is considered to be 'moderate' due to the very short period of potential views.

The Amendment is predicted to reduce the number of train movements required for the Project. Rail network modelling has established that there is sufficient rail capacity to accommodate these train movements. Due to fewer train movements, the Amendment will reduce the impacts to closure times at level crossings.

8.3 BENEFITS OF THE AMENDMENT

As discussed in **Section 6.9.3**, the CBA estimates that the Amended Project will generate net production benefits of $274 M (present value). In addition, the Amended Project will generate market and non-market employment benefits, which are estimated as having a value of $211 M (present value). Unless the value of unquantified residual environmental costs is greater than these benefits, the Amended Project is considered to be desirable from an economic efficiency perspective.

The employment and expenditure generated by the Amended Project will stimulate economic activity in the region (Wyong, Gosford and Lake Macquarie LGAs), including the direct employment of 300 persons during the operations phase.

When flow-on effects are considered, the contribution of the Amended Project to the regional economy during the operations phase may be as much as:

- $593 M in annual direct and indirect regional output or business turnover;
- $342 M in annual direct and indirect regional value-added;
- $69 M in annual direct and indirect household income; and
- 853 direct and indirect jobs.

The construction phase of the Amended Project will also generate significant contributions to the regional economy, as summarised in **Section 6.9.3**.

8.4 CONCLUSION

The Amendment removes the requirement to obtain the consent of the NSW Aboriginal Land Council, which is an impediment to determination of the DA (in its original form). The Amendment will also result in a number of positive environmental outcomes. By reducing the extent of disturbance required for coal transportation infrastructure, the potential impacts to ecological, hydrological and cultural heritage values will also be reduced. With the implementation of the proposed management and mitigation measures, the air quality, acoustic and visual amenity of Blue Haven will be maintained.

By providing the opportunity for the Project to proceed, the Amendment allows for the economic and employment benefits of the Project to be realised. The Project will also generate direct and indirect jobs within the locality, which is currently experiencing higher than average unemployment rates. The Project will generate revenues in the form of royalties, company tax and voluntary contributions, which are used by governments to fund infrastructure projects and services. Without the Amendment, the Project (in its original form) would not be able to proceed and as such, these potential benefits may be foregone.

This document provides;

- Written particulars sufficient to indicate the nature of the changed development, as required under clause 55(2) of the EP&A Regulation;
- Justification of the Amendment, thereby enabling the consent authority to agree to amendment of the DA; and
- Comprehensive assessment of the potential impacts of the Amendment to allow the amended DA to be determined.

In its review of the Original Project, the Planning Assessment Commission concluded that "*If the recommendations concerning improved strategies to avoid, mitigate or manage the predicted impacts of the project are adopted, there is merit in allowing the project to proceed".* The Amended Project will provide significant economic benefits and requires less land disturbance than the original proposal. Accordingly there is considered to be merit in allowing the Amended Project to proceed.

* * *

For
HANSEN BAILEY

Andrew Wu
Environmental Engineer

James Bailey
Director

9 ABBREVIATIONS

Term	Definition
ACHMP	Aboriginal Cultural Heritage Management Plan
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
ALS	Aerial Laser Survey
ANZECC (2000)	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
AQGHGMP	Air Quality and Greenhouse Gas Management Plan
AS	Australian Standard
BMP	Biodiversity Management Plan
BOS	Biodiversity Offset Strategy
BTEX	Monocyclic Aromatic Hydrocarbons
CALMET / CALPUFF	CALMET is a meteorological pre-processor that includes a wind field generator containing objective analysis and parameterised treatments of slope flows, terrain effects and terrain blocking effects. The pre-processor produces fields of wind components, air temperature, relative humidity, mixing height and other micro-meteorological variables to produce the 3-D meteorological fields that are utilised in the CALPUFF air quality dispersion model.
CBA	Cost Benefit Analysis
CH4	Methane
CLM Act	*Contaminated Land Management Act 1997*
CO^2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
DA	Development Application
dBA	Decibels
DLALC	Darkinjung Local Aboriginal Land Council
DP&I	Department of Planning and Industry
DRAINS	Flood model software utilised to determine hydrology of the water catchment.
EARs	Environmental Assessment Requirements
EECs	Endangered Ecological Communities
EILs	Ecological-based investigation levels
EIS	Environmental Impact Statement
ENM	Environmental Noise Model
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GTLAC	Guringai Tribal Link Aboriginal Corporation
ha	Hectare
HEC – RAS	Flood model software utilised to determine the hydraulic behaviour of the water catchment.
HILs	Health-based investigation levels
HSLs	Health-based screening levels

Term	Definition
ICNG	*Interim Construction Noise Guideline*
INP	*Industrial Noise Policy*
IO	Input-Output
km	Kilometre
Km/h	Kilometres per hour
kW	Kilowatt
LEA	Local Effects Analysis
LEC	NSW Land and Environment Court
LEP	Local Environmental Plan
LGA	Local Government Area
M	Million
MLA	Mining Lease Application
mm	Millimetres
MNES	Matters of National Environmental Significance
Motorway Link Road	Also referred to as Doyalson Link Road
mt	Million tonnes
Mtpa	Million tonnes per annum
N_2O	Nitrous Oxide
NEPC, 2016	National Environment Protection Measures
NEPM	*National Environment Protection Measure*
NMLs	Noise Management Levels
OCP	Organochlorine Pesticides
PAC	Planning Assessment Commission
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PEL	Pacific Environment Limited
PM	Particulate Matter
PMF	Probable Maximum Flood
Project	Wallarah 2 Coal Project
PSNC	Project Specific Noise Criteria
RMS	Roads and Maritime Services
RTS	Response to Submissions
SELs	Ecological-based screening levels
SEPP	State Environmental Planning Policy
SF_6, CF_4, C_2F_6	Synthetic gases (hydrofluorocarbons)
SRD	State and Regional Development
SSD	State Significant Development
t	tonne
TAL	Tonne Axle Load
TfNSW	Transport for NSW
tph	tonnes per hour

Term	Definition
TRH	Total Recoverable Hydrocarbons
TSC Act	*Threatened Species Conservation Act 1997*
TSP	Total Suspended Particulates
VAC	Visual Absorption Capacity
VIR	Visual Impact Rating
VLAMP	*Voluntary Land Acquisition and Mitigation Policy*
VTRH	Volatile Total Recoverable Hydrocarbons
WACJV	Wyong Areas Coal Joint Venture

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