Sydney Metro – Western Sydney Airport

Australian Government

NSW GOVERNMENT

sydney METRO

Buchanan Precast Facility

Determination Report for Review of Environmental Factors (REF)

September 2022

Cover: Existing Buchanan Precast Facility.

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1. Introduction

1.1. Sydney Metro – Western Sydney Airport

Sydney is expanding and the NSW Government is working hard to deliver an integrated transport system that meets the needs of customers now and in the future.

Sydney Metro is Australia's biggest public transport program. Services started on the Metro North West Line between Rouse Hill and Chatswood in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Greater Sydney travels. Sydney Metro's program of work includes:

- **Metro North West Line** – Opened in May 2019 with driverless trains running every four minutes in the peak in each direction between Tallawong Station in Rouse Hill and Chatswood
- **Sydney Metro City & Southwest** – A new 30-kilometre metro line extending the new metro network from the end of the North West Metro at Chatswood, under Sydney Harbour, through the Sydney central business district (CBD) and south west to Bankstown. The first section is due to open in 2024 with capacity to run a metro train every two minutes each way under the centre of Sydney
- **Sydney Metro West** – A new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Sydney CBD. This infrastructure investment would double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes
- **Sydney Metro – Western Sydney Airport** – A new metro railway that will service Greater Western Sydney and the new Western Sydney International (Nancy-Bird Walton) Airport forming the transport spine of the Western Parkland City.

Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

1.2. Background

Sydney Metro (as 'the Proponent' and determining authority) is seeking to approve the re-establishment and operation of a precast facility (the Proposal) at a pre-existing site located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site). The Proposal is required to support the construction of the Sydney Metro – Western Sydney Airport. The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and in 2017 to support construction of the New M5 project.

Minimal site construction works would be required to reinstate the precast facility as the site is already established. Site construction works for the Proposal would include:

- Re-instating fencing around the Proposal site
- Installing site office facilities
- Inspection of existing facilities including wastewater treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs

- Extension of the existing hardstand and shed awning by approximately 60 metres to the east of the existing hardstand and shed to accommodate the production of six viaduct precast moulds.

The Proposal site would be approximately four hectares in size and wholly contained within the area of the previously established precast facility. The Proposal site would accommodate the following facilities:

- Demountable site compound office
- A precast yard, including existing shed for construction of precast units and storage laydown area
- Wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin
- On-site parking for up to 60 vehicles.

The proposed use of the facility is temporary. Once the precast works required for the Proposal are completed, the use of the facility will cease.

The precast facility does not form part of the Sydney Metro – Western Sydney Airport project, which is located in Sydney and has been approved separately under the following:

- Critical State Significant Infrastructure approval SSI_10051
- EPBC Approval 2020-8687
- Western Sydney Airport - Airport Plan (September 2021)

1.3. Purpose of this document

Prior to proceeding with the Proposal, the determining authority must make a determination in accordance with Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Determination occurs after the assessment and documentation stages and after any consultation. A Determination Report must be prepared for all projects progressing through a Review of Environmental Factors (REF) planning pathway.

The purpose of this Determination Report is to:

- Present a summary of the submissions received during the public display of the REF, if any, and Sydney Metro's response to the issues and comments raised in these submissions
- Assess the environmental impacts with respect to the Proposal, which are detailed in the environmental impact assessment, and any proposed modifications as detailed and assessed in this Determination Report
- Identify the conditions of approval needed to minimise potential environmental impacts of the Proposal
- Identify whether potential environmental impacts are likely to be significant and whether an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) and/or Biodiversity Development Assessment Report (BDAR) is required
- Address whether the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) apply to the Proposal and whether a referral to the Commonwealth Government Environment Minister to determine if the activity is a controlled action is needed.

2. Proposal

The Proposal, as described in the REF, would comprise of the following key features and activities:

- Re-establishment of the Proposal site at Buchanan including removal of five trees and scattered grass with emerging saplings
- Removal of topsoil stockpile
- Extension of the existing precast yard shed and hardstand to the east by approximately 60 metres. The extension would be used to accommodate construction of precast concrete segments and is located wholly within the Proposal site
- Extension of the existing storage/laydown area within the Proposal site
- Installation of site office facilities including amenities
- Re-establishment of the existing carpark facilities to allow on-site parking for up to 60 light vehicles
- Re-establishment and repair of the internal roads (where required)
- Re-instating fencing around the Proposal site
- Reconnection of the ancillary supporting infrastructure, including utilities (power, water, sewerage, gas and communications), lighting and signage
- Production and dispatch of precast concrete segments
- Site decommissioning including the removal of the site office, plant and equipment.

The Proposal would be temporary, operating for an approximate timeframe of two years. The precast facility would generally operate during standard work hours.

3. Review of Environmental Factors

An assessment of relevant environmental issues of the Proposal is provided in Section 7 (Environmental impact assessment) of the REF. The REF is included as Appendix A to this Determination Report.

The following key potential environmental impacts were identified for the Proposal.

3.1. Traffic and transport

A Traffic and Transport Assessment (Jacobs, 2022) was prepared for the Proposal and is provided in Appendix B of the REF.

The Proposal would generate approximately 24 heavy vehicle movements and 100 light vehicle movements per day during construction and operation. The majority of heavy vehicles would be concrete trucks and delivery trucks while light vehicles would comprise of staff and labour vehicles. Vehicle movements to and from the Proposal site would be scheduled to minimise traffic disruption to the surrounding road network. Parking for up to 60 vehicles would be provided on-site, resulting in no impact to the provision of on-street car parking.

There is minimal public transport and no formal active transport facilities around the precast facility and as such, works are expected to have a negligible effect on public and active transport.

Traffic modelling shows that the intersection of George Booth Drive and the access road will continue to operate at a level of service (LoS) 'A' in both the morning and evening peak hours with very minor delays. Given the existing low traffic volumes of heavy vehicles in the peak periods, the relatively low traffic generation of the Proposal, the low historic rate of crashes in the area and the opportunity to manage contributing factors, the Proposal is not expected to impact on the operation of the surrounding road network or have a significant impact on road safety.

Traffic and transport impacts would be managed in accordance with the Conditions of Approval (CoA) as outlined in Section 9. This would include provision of a Construction Traffic Management Plan (CTMP), compliance with Sydney Metro's Construction Traffic Management Framework (CTMF), and an updated Transport Management Plan to meet the Over Size Over Mass (OSOM) Application requirements for deliveries during operation, if required.

The CTMF provides an overall strategy and approach for construction traffic management, and an outline of the traffic management requirements and processes that would be applied. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing impacts to the road network. The Transport Management Plan would manage the movement of OSOM vehicles that may be required for concrete segment delivery from the precast yard to the SM-WSA project site. The plan details the proposed OSOM routes, as well as the pinch points and relevant travel conditions around the OSOM movements.

3.2. Noise and vibration

A noise and vibration impact assessment was prepared for the Proposal and is provided in Appendix C of the REF.

Noise modelling completed as part of the noise and vibration impact assessment indicates that noise levels generated during typical construction activities are within the noise management level (NML) for the project. Construction noise levels during high impact activities

such as vegetation clearing with chainsaws will marginally exceed the NML (i.e. less than 2dB) at four receivers.

Noise levels for operational activities may exceed the intrusiveness level by up to 3 dB(A) during the daytime but are below the amenity noise levels. If OSOM deliveries are required, they will leave the site during the evening. For the evening period, predicted levels are within 3 dB(A) of the intrusive noise level and up to 4 dB(A) above the amenity noise level at three receivers. The significance of the residual noise level is considered marginal.

The residential receivers identified as noise affected by construction and operation of the Proposal are owned by the same owner of the land leased by the precast facility. Sydney Metro will continue to engage with community and stakeholders during construction and operation of the Proposal in accordance with the Sydney Metro – Western Sydney Airport Overarching Community Communication Strategy (OCCS).

Traffic movements in the form of light vehicles, delivery vehicles, trucks removing finished segments and concrete trucks arriving at the site would result in additional traffic noise. Traffic noise impacts have only been calculated along George Booth Drive, as there are residential receivers along the truck route. There are no residential receivers along the section of John Renshaw Drive that will be used and any additional heavy vehicle movement on motorways used to transport workers, materials and finished products would be negligible compared with existing traffic.

The predicted road traffic noise levels are below the NSW Road Noise Policy noise criteria. The assessment found the Proposal would have minimal impact on traffic noise generated to residences on George Booth Drive and are found to satisfy the traffic noise criteria identified in the REF.

Due to the distance between the precast yard works and receivers' vibration impacts are not anticipated.

Noise and vibration impacts from construction and operations would be managed in accordance with the Conditions of Approval (CoA) as outlined in Section 9. This would include compliance with Sydney Metro's Construction Noise and Vibration Standard (CNVS). The CNVS aims to manage noise and vibration levels where feasible and reasonable using a variety of mitigation measures. The CNVS provides guidance for managing construction noise and vibration impacts and also provides a list of standard mitigation measures that would be implemented where feasible and reasonable and trigger levels (based on exceedances of airborne NMLs) for the implementation of additional mitigation measures.

3.3. Biodiversity

A field assessment was conducted on 24 February 2022 to determine the biodiversity impact for the Proposal and is provided in Appendix D of the REF.

The Proposal would require the removal of two tree species. These are as follows:

- Three Grey gum (*Eucalyptus punctata*) trees
- Two Swamp paperbark (*Melaleuca linariifolia*)

The trees occur within a highly disturbed environment, covering approximately 0.02 hectares. The trees do not contain hollows and the removal of these trees does not meet the thresholds for offsetting under the Biodiversity Offsets Scheme. All other trees and dams within the site would be retained.

The Proposal would be unlikely to significantly impact threatened ecological communities or threatened species, populations or their habitats, under the *Biodiversity Conservation Act 2016* (BC Act) or EPBC Act and therefore an Assessment of Significance was not undertaken.

Construction and operational biodiversity impacts would be managed in accordance with the Condition of Approval (CoA) as outlined in Section 9. This would include compliance with Sydney Metro's Construction Environmental Management Framework (CEMF). The CEMF includes requirements for demarcation and protection of retained vegetation, pre-clearing surveys prior to native vegetation clearing, unexpected finds, and weed and disease management measures.

3.4. Other environmental impacts

Details of assessment of other potential environmental impacts associated with construction and operation of the Proposal is provided in Section 7 of the REF.

4. Clarifications on the Review of Environmental Factors

Since the exhibition of the REF, Sydney Metro has identified some parts of the REF that would benefit from further explanation or clarification. These are identified in Table 4-1.

Table 4-1 Clarifications on the REF

Relevant section of the REF	Explanation / Clarification
Section 1.2 – Overview of the Proposal	Site layout and the shed extension as displayed in the REF are indicative only and subject to construction planning and design development. Changes to site layout are being explored to minimise environmental impacts as described in the REF including minimising vegetation clearance and disturbance to the topsoil stockpile.
Section 5 (Description of the Proposal) and Section 8 (Environmental Management)	Whilst the activities onsite have been broken up into construction stages (site establishment and civil and building works) and operational stages (use and decommissioning of site) for assessment purposes in the REF, all activities at the precast facility are required to support the construction of the Sydney Metro - Western Sydney Airport project. As such, all activities on the site would be managed through a construction environmental management plan and in accordance with Sydney Metro's overarching construction management documents such as the CEMF. No operational environmental management plan is proposed.
7.1.4 – Transport (Potential impacts)	The REF does not detail the proposed OSOM arrangements in the main body of the REF document but covers this in the technical report in Appendix B of the REF. To clarify, it is proposed that OSOM vehicles would leave the site after 6:00 pm and travel approximately 100 kilometres south via the Hunter Expressway (M15) and Pacific Motorway (M1) to the Mooney Mooney Rest Area. The OSOM vehicles would remain at the Mooney Mooney Rest Area until night OSOM movements through the Sydney road network can commence. Travel between Mooney Mooney and the delivery sites at Badgerys Creek, Luddenham and Orchard Hills would commence in accordance with the required OSOM delivery arrangements.

5. Consultation

5.1. Public display of the Review of Environmental Factors

The REF was placed on public display from 22 – 30 June 2022 and the community and stakeholders were invited to provide their feedback.

Table 5-1 lists the consultation activities undertaken to engage with the community and stakeholders during or prior to the public display of the REF. The REF for the Proposal was made available online via the CPB Contractors website. As the project progresses, activities would be carried out in line with the requirements of the Sydney Metro OCCS.

Table 5-1: Consultation activities

Engagement tool	Activity
Proposal website	The REF was available for download on the CPB Contractors website cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport-surface-civil-and-alignment-works throughout the public display period.
Fact sheet	A fact sheet was distributed via letterbox drop to a total of 11 residential and commercial properties within a 1.5-kilometre radius of the Proposal on 21 June 2022. The fact sheet notified the community about the Proposal, provided information about the works and likely impacts, how to make a submission and details regarding the option for a community information session if requested. The fact sheet was emailed to Council on 27 June 2022 and was available on the project website.
Stakeholder briefings	Sydney Metro consulted with relevant parts of Transport for NSW, Cessnock City Council and National Parks and Wildlife Service (NPWS). Cessnock City Council – A phone call was made to Council on 8 June 2022 to discuss and provide an overview of the Proposal. A follow up email was sent on 8 June 2022 with contact details should Council have any further questions. The fact sheet and a link to the REF was emailed to Council on 27 June 2022. As of 12 July 2022, no response has been received from Council. NPWS –– A phone call was made to NPWS on 8 June 2022 to provide an overview of the Proposal and the use of the Right of Way. A follow up email was sent on 8 June 2022 with contact details should NPWS have any further questions. As of 12 July 2022, no response has been received from NPWS. Sydney Metro has also consulted with TfNSW as part of a separate internal process.
Contact mechanisms	The following were established prior to the public exhibition of the REF: • Email: sydneymetrowsa@transport.nsw.gov.au • Post: Writing to Sydney Metro, PO Box K659, Haymarket NSW 1240 and should be clearly marked 'Comments on Sydney Metro - Western Sydney Airport Buchanan Precast Facility Review of Environmental Factors' • Phone: 24-hour community line - 1800 717 703
Door knocking	Door knocking was conducted on 15 March 2022 at the three properties closest to the Proposal. No objections to the Proposal were received from the stakeholders contacted.
Phone calls	Five follow up phone calls were made to surrounding properties where contact details were known on 28 June 2022. No objections to the Proposal were received from the stakeholders contacted.

5.2. Submissions

During the public display of the REF no formal submissions were received.

5.3. Proposed future engagement

Should the Proposal be approved, community and stakeholder engagement activities would continue prior to and during construction and operation of the precast facility. All community and stakeholders would be provided with project updates by the following means:

- Works notifications distributed via targeted letterbox drops, emailed and uploaded to the project website at least seven days prior to commencement of the activity
- Updates to the project website cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport-surface-civil-and-alignment-works
- Signage at the construction site
- Doorknocking properties where required
- Stakeholder meetings and briefings where required or requested
- Access to a 24-hour project information phone line, email and post
- Project email list (subscription based)
- A dedicated Place Manager for direct community and stakeholder contact.

6. Determination

In order for the Proposal to proceed, Sydney Metro must examine and take into account to the fullest extent practicable all matters affecting or likely to affect the environment by reason of the construction, operation and decommissioning of the Proposal, and whether the Proposal is likely to significantly affect the environment in accordance with Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The objectives of this Determination Report are to:

- Review the assessment of the environmental impacts in respect of the Proposal, which is detailed in the REF
- Determine the significance of those impacts
- Address the relevant matters under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in respect to the Proposal.

This report has been prepared having regards to, among other things, the objective of Sydney Metro under the *Transport Administration Act 1988* to conduct its operations in compliance with the principles of ecologically sustainable development contained in Section 6(2) of the *Protection of the Environment Administration Act 1991*.

7. Statutory and planning framework

7.1. NSW legislation and regulations

7.1.1. Environmental Planning and Assessment Act (EP&A Act) 1979 and Biodiversity Conservation Act (BC Act) 2016

The EP&A Act regulates land use planning and development in NSW. The Proposal constitutes an 'activity' for the purposes of Part 5, Division 5.1 of the EP&A Act and is permissible without consent under Section 2.92 of the State Environmental Planning Policy (Transport and Infrastructure) 2021– refer to Section 7.1.2.

Sydney Metro is both the proponent and the determining authority in respect of the Proposal under Part 5, Division 5.1 of the EP&A Act.

Section 5.5 of the EP&A Act requires Sydney Metro to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. Section 5.7 of the EP&A Act requires consideration of whether a proposed activity is "likely to significantly affect the environment", which activity requires the determining authority to examine and consider an environmental impact statement (EIS). Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) provides that an activity that is likely to "significantly affect threatened species" requires a species impact statement (SIS).

Section 7 of the REF assesses the likely effect of the Proposal on the environment and on threatened species, populations and ecological communities. Having regard to the provisions of Sections 5.5 and 5.7 of the EP&A Act and Part 7 of the BC Act, the Proposal is not likely to significantly affect the environment or threatened species and therefore, neither an EIS or SIS is required.

7.1.2. State Environmental Planning Policy (Transport and Infrastructure) 2021

The Proposal is categorised as development for the purpose of a rail infrastructure facility and is being carried out by, or on behalf of, a public authority and, as such, the Proposal is permissible without consent under Section 2.92 of the Transport and Infrastructure SEPP. The Proposal supports the construction of a 23-kilometre new railway linking the Aerotropolis with greater Sydney. The Proposal would facilitate the construction of viaduct segments used to construct approximately 3.7 kilometres of viaducts and bridges for the purposes of a railway.

The Proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* (NP&W Act) and does not affect land or development regulated by the State Environmental Planning Policy (Resilience and Hazards) 2021 and the State Environmental Planning Policy (Planning Systems) 2021.

Part 2.2, Division 1 of the Transport and Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. No such consultation is required under the Transport and Infrastructure SEPP for the Proposal. Consultation is discussed in Section 6 of the REF.

7.2. Commonwealth legislation

7.2.1. Environment Protection and Biodiversity Conservation Act (EPBC Act) 1999

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as 'matters of national environmental significance'.

Under the EPBC Act, a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is required for proposed 'actions' that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land (including leased land).

The assessment of the Proposal's impact on matters of national environmental significance and the environment of Commonwealth land (Appendix A and Chapter 7 of the REF) found that it would be unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the Proposal has not been referred to the Australian Department of Climate Change, Energy, the Environment and Water under the EPBC Act.

Cumulative impacts have been considered during assessment of the REF and there will be no additional impacts to the controlling provisions of the Sydney Metro – Western Sydney Airport project as a result of the Proposal.

8. Environmental Management

Section 8 (Environmental management) of the REF outlines the approach to environmental management for the Proposal. Section 9 of this Determination Report also includes Conditions of Approval to minimise and manage the impacts of the Proposal.

8.1. Environmental management systems

The Sydney Metro environmental management system would be used to manage the Proposal noting that these relate to both construction and operation stages of the Proposal. The management system would provide the framework for implementing the environmental management measures documented in the REF, and any conditions of other approvals, licences or permits. The Sydney Metro environmental management system documents can be found on the Sydney Metro website www.sydneymetro.info/documents.

8.2. Environmental management plans

Whilst the activities onsite have been broken up into construction stages (site establishment and civil and building works) and operational stages (use and decommissioning of site) for assessment purposes in the REF, all activities at the precast facility are required to support the construction of the Sydney Metro – Western Sydney Airport project. As such, all activities on the site would be managed through a Construction Environmental Management Plan that would be prepared in accordance with Sydney Metro's overarching construction management documents referenced below. No operational environmental management plan is proposed.

8.2.1. Construction Environmental Management Framework

The Sydney Metro Construction Environmental Management Framework (CEMF) details the approach to environmental management and monitoring, which would be applied to the Proposal. The framework is a linking document between planning approval documentation (including commitments made within the REF) and construction environmental management documentation, which would be developed by the construction contractors.

The CEMF details the environmental management systems and processes for the construction and operation of the Proposal.

8.2.2. Construction Noise and Vibration Standard

Noise and vibration impacts of the Proposal would be managed in accordance with the Sydney Metro Construction Noise and Vibration Standard (CNVS), which aims to manage noise and vibration levels where feasible and reasonable using a variety of mitigation measures. The CNVS provides guidance for managing construction noise and vibration impacts to provide a consistent approach to management and mitigation across all Sydney Metro projects.

The Standard also provides:

- A list of standard mitigation measures that would be implemented where feasible and reasonable
- Trigger levels (based on exceedances of noise management levels) for the implementation of additional mitigation measures.

8.2.3. Construction Traffic Management Framework

Construction traffic impacts would be managed in accordance with the Sydney Metro Construction Traffic Management Framework (CTMF). This framework provides an overall strategy and approach for construction traffic management, and an outline of the traffic management requirements and processes that would be applied. It establishes the traffic

management processes and acceptable criteria to be considered and followed in managing impacts to the road network.

8.2.4. Transport Management Plan

The Transport Management Plan was included in Appendix B of the REF and provides the management strategies for OSOM transport of concrete segments from the pre-cast yard facility at Buchanan through to the Sydney Metro – Western Sydney Airport construction footprint. This plan includes escort requirements, haulage route, transport conditions, and transport permits.

8.3. Overarching Community Communication Strategy

The Overarching Community Communication Strategy (OCCS) has been prepared to guide Sydney Metro's approach to stakeholder and community liaison including engagement with communities, stakeholders and businesses. This plan is intended to be used as a framework for community engagement across all Sydney Metro projects and contracts. The OCCS considers all work activities and packages for Sydney Metro and its projects for the duration of work, and 12 months following the completion of construction.
Contract specific Community Communication Strategies (CCS) will be developed by appointed project delivery communication teams (PDCT) to address contract and site-specific needs of the community, stakeholders and businesses. These strategies will reflect the requirements of the OCCS and they will adhere to the requirements outlined in the relevant contract specification – Stakeholder and Community Engagement, along with requirements identified in any relevant planning approval. The OCCS and CCS are supported by a Construction Complaints Management System (CCMS) which outlines the framework for managing complaints, enquiries and escalation processes throughout the project lifecycle. The CCMS also outlines the process for reporting complaints.

8.4. Operational Management

All activities at the precast facility are required to support the construction of the Sydney Metro – Western Sydney Airport project. As such, environmental management of the site would be documented and implemented through a Construction Environmental Management Plan. No operational environmental management plan is proposed.

9. Conditions of approval

The Determination is subject to compliance with the Conditions of Approval (CoA) in Table 9-1.

The Conditions of Approval are consistent with the management and mitigation measures in Section 8.5 of the REF.

Table 9-1: Conditions of approval

Ref	Impact/Issue	Mitigation measure
General		
G1	Environmental management	An Environment Management Plan (EMP) will be prepared in accordance with the CEMF, CNVS, CTMF and submitted for review and endorsement by the Sydney Metro Environment Manager prior to commencement of the activity. As a minimum, the EMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed EMP will be implemented during the undertaking of the activity.
G2	General notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least seven days prior to commencement of the Proposal.
G3	General environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings.
Transport		
T1	Traffic management	A Construction Traffic Management Plan (CTMP) will be prepared in accordance with the Sydney Metro Construction Traffic Management Framework. The CTMP will include: • Confirmation of haulage routes • Measures to manage Oversize Overmass deliveries, if required • Measures to manage heavy vehicle movements • Measures to maintain access to local roads and properties • Site specific traffic control measures (including signage) to manage and • regulate traffic movement • Measures to maintain pedestrian and cyclist access

Ref	Impact/Issue	Mitigation measure
		• Requirements and methods to consult and inform the local community of impacts on the local road network • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms.
T2	Traffic management	Heavy vehicle movements to and from the Proposal site would be scheduled to minimise traffic disruption to the surrounding road network. This may include, but is not limited to: • Scheduling the movement of construction material, equipment and waste to occur outside of peak periods (during standard construction hours) where practical • Scheduling heavy vehicle deliveries to be evenly dispersed as far as practical to minimise convoying or platoons and queuing outside the Proposal site
T3	Traffic incidents	In the event of a traffic-related incident, coordination would be carried out with Transport Coordination and/or other parts of Transport for NSW.
T4	Emergency vehicles access	Access to properties for emergency vehicles would be provided at all times
T5	Road safety	All trucks would enter and exit the Proposal site in a forward direction, where feasible and reasonable to minimise collision and safety risks
T6	Road safety	The loading and unloading of trucks would be planned to ensure each individual truck haulage capacity is fully utilised to reduce the total number of truck movements
T7	Road safety	All loading /unloading activities would occur within the Proposal site
T8	Road safety	Public roads and access points would not be obstructed by any materials, vehicles, skip bins or the like, under any circumstances
T9	Road safety	All vehicles transporting loose materials would have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the Proposal site
T10	Road safety	All vehicles leaving the site would be checked that they are clean of materials that may fall on the roadway before they are allowed to leave the site
T11	Staff parking	All staff parking would be provided on-site and no staff will park on surrounding local streets
Noise and vibration		
NV1	Noise impacts during works	During construction, receivers that would potentially be affected by noise from the works would be appropriately notified before the relevant works start. Notification will be delivered to sensitive receivers at least 7 days prior to commencement of works.
NV2	Noise exceedances at receivers	Attended noise monitoring is to be undertaken to verify that noise levels resulting from works are in accordance with the levels predicted in this noise and vibration assessment report, subject to obtaining the property owner/occupier's consent to access the property (where required). Noise monitoring is recommended to be conducted at CT3/1416 George Booth Drive, Buchanan - within 30 metres of the building, on the side closest to the precast facility. If the standard mitigation measures are not found to be adequate, further mitigation measures would be considered and implemented where feasible and reasonable

Ref	Impact/Issue	Mitigation measure
NV3	At source noise impacts	The following at-source control measures are recommended to reduce potential noise impacts: • Sound Power or Sound Pressure Levels compliant plan and equipment • Equipment selection • Use and siting of plant • Non-tonal reversing alarms • Minimise disturbance arising from delivery of goods • Reduce noise from mobile plant through additional fittings • Limit use of engine compression breaks • Limit equipment in use.
NV4	Noise barriers	Any buildings or structures on site shall be used as a noise barrier, where practicable to provide shielding to the nearest affected receivers.
NV5	Noise impacts during works	The EMP would include a relevant section for construction noise and vibration management which must be prepared in accordance with the Sydney Metro Construction Noise and Vibration Standard. The EMP would be regularly updated to account for any changes in noise management issues and strategies.
NV6	Construction hours and scheduling	Construction and operation would be carried out during standard construction hours. Work generating high noise levels should be scheduled during less sensitive time periods, such as after 8 am.
NV7	Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • Noise and vibration mitigation measures • Permissible hours of work • Limitations to noise generating activities with special audible characteristics • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times • Environmental incident procedures • Behavioural practices (no dropping of materials from height, excessive revving of engines etc).
NV8	Verification monitoring	A noise monitoring program should be carried out for the duration of works in accordance with the EMP and any approval conditions.
Biodiversity		
B1	Potential fauna impact	Employment of a fauna spotter/catcher experienced in native fauna identification for pre-clearance works, to avoid direct impacts to species. Clearing works will be undertaken in accordance with the CEMF. Species identified as likely to occur within the Proposal area include snakes.
B2	Potential impact to adjacent vegetation	Avoid impacts to adjacent vegetation, including exclusion zones around trees to be retained (including a buffer for the tree root zone) and vegetation around dams.
B3	Unexpected threatened species	An unexpected threatened species finds procedure is to be contained in the EMP and followed if a threatened species is encountered that has not previously been identified and assessed in the environmental assessment
B4	Biosecurity risk	Biosecurity risks (i.e. weeds) must be managed in accordance with the Biosecurity Act 2015:

Ref	Impact/Issue	Mitigation measure
		• Machinery, vehicles, and footwear to be cleaned and washdown procedure adhered to, prior to moving to a new location from site • Disposal of sealed bagged weeds to a licenced waste disposal facility
Historical heritage		
NA1	Historical heritage	An unexpected heritage finds procedure is to be contained in the EMP and followed in the event that any unexpected heritage items, archaeological remains or potential relics of Historical origin are encountered
Aboriginal heritage		
AH1	Aboriginal heritage	An unexpected heritage finds procedure is to be contained in the EMP and followed in the event that any unknown or potential Aboriginal object/s, including skeletal remains are encountered
Property, land use and socio-economic		
P1	Property, land use and socio-economic management	Storage of plant and equipment is to be undertaken only within the previously disturbed footprint of the precast yard and within the footprint of the land leased by the Proposal for the precast facility
Soils and surface water quality		
SW1	Soil and water management	Environmental safeguards (e.g. sediment fences, sumps) are to be inspected and repaired to consistent with the Blue Book – "Managing Urban Stormwater: Soils and Construction" (4th Edition Landcom, 2004)
SW2	Contaminated land	An EMP will be prepared and implemented prior to construction. The EMP will include an Unexpected Contaminated Land Finds Protocol, or similar, which would document the process for the investigation, remediation and/or management of contamination if identified during the works. If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Sydney Metro Environment Manager and/or EPA
SW3	Accidental spills	A site-specific emergency spill plan will be developed and include spill management measures. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Sydney Metro and/or EPA)
SW4	Storage of substances	Storage of fuels, oils and other potentially harmful substances are to be stored in appropriately bunded areas
SW5	Elevated pH run off	Bunded areas will be available to collect concrete waste to ensure that runoff leaving the site would not pollute nearby land or waterways
Landscape and visual character		
L1	Visual impact	To reduce the potential visual impact of construction activities: • Work sites will be left tidy at the end of each work day • If night work is to occur, lighting for will comply with relevant Australian Standards, including AS4282-1997 (Control of the obtrusive effects of outdoor lighting)
Resource use and waste management		
R1	Resource use and waste management	An EMP will be prepared and implemented prior to construction. The PEMP would detail risks and standard management measures to reduce impacts on resource use and waste management
Air quality		

Ref	Impact/Issue	Mitigation measure
AQ1	Air quality management	An EMP will be prepared and implemented prior to construction. The EMP would detail risks and standard management measures to reduce impacts on air quality
Sustainability, climate change and greenhouse gases		
S1	Sustainability management	An EMP will be prepared and implemented prior to construction. The EMP would detail risks and standard management measures to reduce impacts on resource use and waste management
Cumulative impacts		
C1	Cumulative construction impacts	Consultation will be undertaken with surrounding projects or developments if they occur during construction to: • Increase awareness of construction timeframes and impacts • Coordinate impact mitigation and management (e.g. respite periods)

10. Conclusion

Having regard to the assessments in the REF, it is concluded that:

- the Proposal is not "likely to significantly affect the environment" for the purposes of Division 5.1 of the EP&A Act;
- the Proposal is not "likely to significantly affect threatened species" for the purposes of Part 7 of the BC Act.

Consequently, no environmental impact statement or species impact statement (or biodiversity development assessment report) is required to be prepared under Division 5.1 of the EP&A Act or Part 7 of the BC Act.

It is also considered that the Proposal does not trigger the need for referral or approval under the Commonwealth EPBC Act.

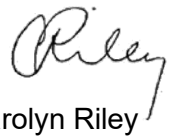
Based on Sydney Metro's careful consideration of the environmental impact assessment contained in the Review of Environmental Factors, and this Determination Report, including the environmental management and mitigation measures described in those documents, it is recommended that the Proposal proceed subject to the Conditions of Approval contained in Section 9 of this Determination Report.

Determination

Review of Environmental Factors: Buchanan Precast Facility

I, Carolyn Riley, Director Environment, Sustainability and Planning, Sydney Metro, state as follows:

- I have examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal assessed in the Buchanan Precast Facility Review of Environmental Factors and this Determination Report in accordance with Section 5.5 of the *Environmental Planning and Assessment Act 1979* (NSW).
- I have formed a view that the Proposal is not likely to have a significant impact on the environment, having regard to the environmental factors specified in the environmental factors guidelines that apply to the activity, as required by clause 171 (1) of the *Environmental Planning and Assessment Regulation 2021* (NSW). Therefore, an Environmental Impact Statement is not required.
- I have formed a view that the Proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats or impact biodiversity values. Therefore, a Biodiversity Development Assessment Report is not required.
- I have formed a view that the Proposal does not trigger the need for referral or approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
- I determine, on behalf of Sydney Metro, that the Proposal may proceed in accordance with the Conditions of Approval and environmental management measures, as described in this Determination Report, consistent with the Proposal described in the Buchanan Precast Facility Review of Environmental Factors and this Determination Report.

Signature: 

Name: Carolyn Riley

Title: Director Environment Sustainability and Planning

Project: Sydney Metro - Western Sydney Airport

Date: 14/09/2022

Appendix A

Review of Environmental Factors (REF)
Buchanan Precast Facility

Sydney Metro – Western Sydney Airport

Australian Government

NSW GOVERNMENT

sydney METRO

Buchanan Precast Facility

Review of Environmental Factors (REF)

June 2022

Cover: Existing Buchanan Precast Facility.

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Glossary

	Definitions
AHIMS	Aboriginal Heritage Information Management System
ASS	acid sulfate soils
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CBD	central business district
CO	carbon monoxide
CTMP	Construction Traffic Management Plan
dB(A)	decibel
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2021* (NSW)
EPA	NSW Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPL	Environment Protection Licence
ESD	ecologically sustainable development
ha	hectare
Heritage Act	*Heritage Act 1977* (NSW)
ICNG	Interim Construction Noise Guideline
$L_{Aeq(15minute)}$	The 'energy average noise level' considered over a 15-minute period. This parameter is used to assess potential construction noise impacts
LEP	Local Environmental Plan
LGA	local government area
LoS	level of service
mg	Milligrams
m^2	Metres squared
m^3	Metres cubed
NEPH	NEPH represents measurements reported by a nephelometer to determine visibility
NML	noise management level
NO_2	nitrogen dioxide
NPI	Noise Policy for Industry
NPWS	National Parks and Wildlife Service
NP&W Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OSOM	Oversize Overmass
O_3	Ozone
$PM_{2.5}$	particles with a diameter of 2.5 micrometres or less

	Definitions
PM_{10}	particles with a diameter of 10 micrometres or less
PTNL	project noise trigger level
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
Proponent (the)	Sydney Metro
Proposal (the)	The re-establishment and operation of a precast facility located on George Booth Drive, Buchanan, in the Cessnock LGA to support the construction of the Sydney Metro – Western Sydney Airport project
the Proposal site	The area that would be directly impacted by the Proposal
REF	Review of Environmental Factors
Resilience and Hazards SEPP	*State Environmental Planning Policy (Resilience and Hazards) 2021*
RNP	*NSW Road Noise Policy*
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SIS	species impact statement
SO_2	sulphur dioxide
Study area	The study area encompasses the Proposal site and the area that may be indirectly impacted by the Proposal. This area can vary in size depending on the environmental issue being discussed (e.g. biodiversity, heritage etc.) and the specific area for each issue is described in the relevant section.
TEC	threatened ecological communities
Transport and Infrastructure SEPP	*State Environmental Planning Policy (Transport and Infrastructure) 2021*

Executive summary

Description of the Proposal

Sydney Metro is proposing to re-establish and operate a precast facility (the Proposal) located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site) to support the construction of Sydney Metro – Western Sydney Airport. The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and in 2017 to support construction of the New M5 project.

Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

Sydney Metro – Western Sydney Airport involves the construction of approximately 3.5 kilometres of viaducts and bridges. These viaducts and bridges would be constructed from precast concrete elements that are transported to site prior to installation. The Proposal would support the efficient production of precast viaduct elements for the Sydney Metro – Western Sydney Airport project.

The Proposal would involve minimal site construction works to re-establish the precast facility, including the following key features and activities:

- Re-instating fencing around the Proposal site
- Installing site office facilities
- Inspection of existing facilities including waste water treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- Extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate production of two additional viaduct precast moulds (six moulds in total).

The Proposal site would be approximately four hectares in size and wholly contained within the previously established precast facility. The Proposal site would accommodate the following facilities:

- Demountable site compound office
- A precast yard, including existing shed for construction of precast units and storage laydown area
- Wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin
- On-site parking for up to 60 vehicles.

The proposed use of the facility is temporary. Once the precast works required for the Sydney Metro – Western Sydney Airport project are completed, the use will cease. The location of the tunnel segment precast facility for the Sydney Metro – Western Sydney Airport project is subject to separate consideration from the assessment and approvals to this Proposal. Refer to Figure 0-1 and Figure 0-2 for the site layout plan and an overview of the proposal site.

Figure 0-1: Site layout plan

Figure 0-2 Proposal site

Need for the Proposal

The proposed facility would manufacture approximately 3.5 kilometres of precast concrete viaduct segments for the construction and operation of a metro rail line between Orchard Hills and the Airport Business Park Station. It has been identified during detailed construction planning that additional precast facilities would be required to enable the efficient delivery of Sydney Metro -Western Sydney Airport. The 23 kilometre new railway will link residential areas with job hubs including the new Aerotropolis, and connect travellers from the new airport to the rest of Sydney's public transport system.

The Environmental Impact Statement (EIS) for Sydney Metro – Western Sydney Airport identified a potential precast facility on the airport site. The re-establishment of the proposed facility in Buchanan would remove the need to create a new precast facility and result in the efficient reuse of an existing site.

Options considered

The options considered to provide precast elements for Sydney Metro – Western Sydney Airport included:

- Establishing a new precast facility on the Western Sydney Airport site, as identified in the Sydney Metro – Western Sydney Airport Environmental Impact Statement
- Re-establishment of a previously used precast facility
- Sub-contracting work out to an existing approved facility.

Sub-contracting the work to an existing approved precast facility has been discounted due to the lack of suitable sub-contractors available, with appropriate viaduct precast experience.

The construction contractor delivering part of the Sydney Metro – Western Sydney Airport project has previously used the precast facility at Buchanan with minimal environmental impacts. The re-establishment of this precast facility will remove the need to establish a new precast facility at a new site and enable efficient reuse of the site. Less vegetation removal is required for the re-establishment of a precast facility, compared with construction of anew precast facility.

Undertaking the Proposal was identified as the preferred option, and is the subject of this REF.

Community and stakeholder consultation

The Proposal involves the re-establishment of a previous facility, and potential impacts to the community and stakeholders are considered minimal. Consultation has been carried out with the current landowner. A lease of the subject site will be entered into with the landowner and Sydney Metro prior to the Proposal commencing.

The transportation of precast segments would cross land that was previously owned by Yancoal (formerly Coal and Allied). This land has since been transferred to the National Parks and Wildlife Service (NPWS) and a Right of Way established. The Right of Way permits vehicular and non-vehicular access to and from the Proposal Lot by way of the access road at all times. The Proposal is not located on NPWS land. Given that a Right of Way has been established and vehicles would only use existing roads to travel through NPWS land, there would be no impact to NPWS land. However, consultation with NPWS has begun to ensure NPWS is aware of the Proposal and its potential impacts.

This REF will be placed on public display so all stakeholders can provide feedback on the Proposal. Sydney Metro will consider and respond to any submissions received in response to the REF.

An electricity easement which traverses through the property in a north westerly direction is owned by Ausgrid. Consultation with this stakeholder has commenced and would be completed prior to transferring precast components through the easements subject to high load permits being issued.

The Proposal does not trigger any further consultation requirements under the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP). However, consultation will be undertaken with Cessnock City Council to ensure it is aware of the Proposal and its potential impacts.

Consultation with directly impacted stakeholders has begun. A communications and consultation strategy will be implemented to support the REF. As noted in the next steps below, consultation with stakeholders (such as utility providers) and the community will be ongoing as this document is placed on public display. All issues raised will be considered by Sydney Metro.

Statutory considerations

The *Environmental Planning & Assessment Act 1979* (EP&A Act) provides for the environmental impact assessment of development including the use of land in NSW. Part 5, Division 5.1 of the EP&A Act generally specifies the environmental impact assessment requirements for activities carried out by public authorities, such as Sydney Metro, which do not require development consent, but are not exempt development. Such environmental impact assessment is required in order for the determining authority for the activity to discharge its duty, under section 5.5, to "examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity" in its consideration of an activity.

The Proposal is categorised as development for the purpose of a rail infrastructure facility and is being carried out on behalf of a public authority under section 2.91 of the Transport and Infrastructure SEPP and, as such, the Proposal is permissible without consent. The Proposal is not State significant infrastructure or State significant development and is not exempt development. Accordingly, the Proposal is to be assessed under Division 5.1 of the EP&A Act.

Sydney Metro is both the proponent and the determining authority of the Proposal, as it is a public authority and is the person proposing to carry out the activity (which terms are defined in s 5.1 of the EP&A Act).

The REF has been prepared to assist Sydney Metro to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 171 of the *Environmental Planning & Assessment Regulation 2021* (EP&A Regulation).

In accordance with section 5.5 of the EP&A Act, Sydney Metro must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

If the Proposal is likely to significantly affect the environment, then section 5.7 of the EP&A Act requires that an EIS be prepared and examined and considered by the determining authority. Based on the assessment contained in this REF, it is considered that the proposed

activity is not likely to have a significant impact upon the environment, and hence, no EIS is required for the Proposal.

Section 7 of this REF presents the environmental impact assessment for the Proposal in accordance with these requirements.

Environmental Impact Assessment

This REF contains an assessment of potential construction and operational environmental impacts of the Proposal. Should the Proposal proceed, mitigation measures, as set out in Section 8.5, would be implemented to minimise the potential impacts of the Proposal.

The following benefits of the Proposal have been identified:

- Re-using a site that has had the same land use in the past has a minimal impact and minor vegetation clearing
- Reuse of existing equipment and facilities to provide efficiencies and reduce project construction costs.

The following potential key impacts have been identified:

- Traffic and transport impacts associated with an increase in heavy and light vehicles around the Proposal site
- Minor increase in noise for sensitive receivers surrounding the Proposal site
- Minor biodiversity impacts associated with the removal of five trees that are not threatened or protected.

An assessment of each of the above, and other environmental issues is provided in Section 7 of this REF.

It is considered that the adverse environmental impacts are generally minimal in nature. With the adoption and implementation of the proposed mitigation measures and commitments specified in Section 8, the potential environmental impacts of the Proposal would be adequately mitigated and managed, and are not considered to be significant.

Justification and conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and clause 171 of the EP&A Regulation that provides for Sydney Metro, as a determining authority to take into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal and whether or not the activity is likely to significantly affect the environment

Should the Proposal proceed, any potential associated adverse impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF, and any conditions imposed in the Determination Report. This would ensure the Proposal is delivered to maximise benefits to the public.

The Proposal would not affect Commonwealth land or have a significant impact on any matters of national environmental significance. On balance, the Proposal's long-term benefits would outweigh its impacts, and the Proposal is considered to be justified.

Next steps

Sydney Metro will publicly display the REF for a period of seven days commencing June 2022 to enable the community to provide written comments on the Proposal.

A range of stakeholder and community consultation activities will be undertaken as part of the public display. Additional stakeholder and community consultation will continue to be implemented to inform the community and stakeholders about the Proposal throughout the detailed design and construction of the Proposal (should it be approved during the determination phase).

At the close of the public display period, Sydney Metro will consider and respond to the submissions received in response to the REF. Responses to submissions, along with the REF and any other relevant information, will be used by Sydney Metro to assess and determine the Proposal.

Should the Proposal be approved, Sydney Metro will make the responses to submissions and any conditions of approval publicly available. The local community would be notified and the REF displayed online.

Correspondence will also be sent to people who make a submission which would include contact details for further information and an indication of the anticipated timing of construction work.

1. Introduction

This section provides a background of the Proposal, an overview of the Proposal, an outline of the need for the Proposal, and an outline of the structure of this Review of Environmental Factors (REF).

1.1. Background

Sydney is expanding and the NSW Government is working hard to deliver an integrated transport system that meets the needs of customers now and in the future.

Sydney Metro is Australia's biggest public transport program. Services started on the Metro North West Line between Rouse Hill and Chatswood in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Greater Sydney travels. Sydney Metro's program of work includes:

- **Metro North West Line** – Opened in May 2019 with driverless trains running every four minutes in the peak in each direction between Tallawong Station in Rouse Hill and Chatswood
- **Sydney Metro City & Southwest** – A new 30-kilometre metro line extending the new metro network from the end of the North West Metro at Chatswood, under Sydney Harbour, through the Sydney central business district (CBD) and south west to Bankstown. It is due to open in 2024 with capacity to run a metro train every two minutes each way under the centre of Sydney
- **Sydney Metro West** – A new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Sydney CBD. This infrastructure investment would double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes
- **Sydney Metro – Western Sydney Airport** – A new metro railway that will service Greater Western Sydney and the new Western Sydney International (Nancy-Bird Walton) Airport forming the transport spine of the Western Parkland City.

Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

Sydney Metro (as 'the Proponent') is seeking approval to re-establish and operate a precast facility (the Proposal) located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site) to support the construction of Sydney Metro – Western Sydney Airport. The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and 2017 to support construction of the New M5 project.

- Minimal site construction works would be required to reinstate the precast facility as the site is already established. Site construction works for the Proposal would include:
- Re-instating fencing around the Proposal site
- Installing site office facilities

- Inspection of existing facilities including wastewater treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- Extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate the production of six viaduct precast moulds.

The Proposal site would be approximately four hectares in size and wholly contained within the previously established precast facility. The Proposal site would accommodate the following facilities:

- Demountable site compound office
- A precast yard, including existing shed for construction of precast units and storage laydown area
- Wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin
- On-site parking for up to 60 vehicles.

The proposed use of the facility is temporary. Once the precast works required for the Proposal are completed, the use will cease.

1.2. Overview of the Proposal

1.2.1. Location of the Proposal

The Proposal site lies wholly within the Cessnock LGA (Figure 1-1). The Proposal is located on private rural property which is predominately used for agriculture including cattle grazing and poultry farming. The address of the Proposal site is 1416 George Booth Drive, Buchanan, 2323, and the Lot number is 32 of DP1085798. The footprint of the Proposal would be wholly contained within the area previously used as a precast facility for the Hunter Expressway and New M5 projects.

The key features of the Proposal are shown in the site layout plan (Figure 1-2). Context to the environmental features around the Proposal area is shown in Figure 1-3

Figure 1-1: Proposal site

Figure 1-2: Site layout plan

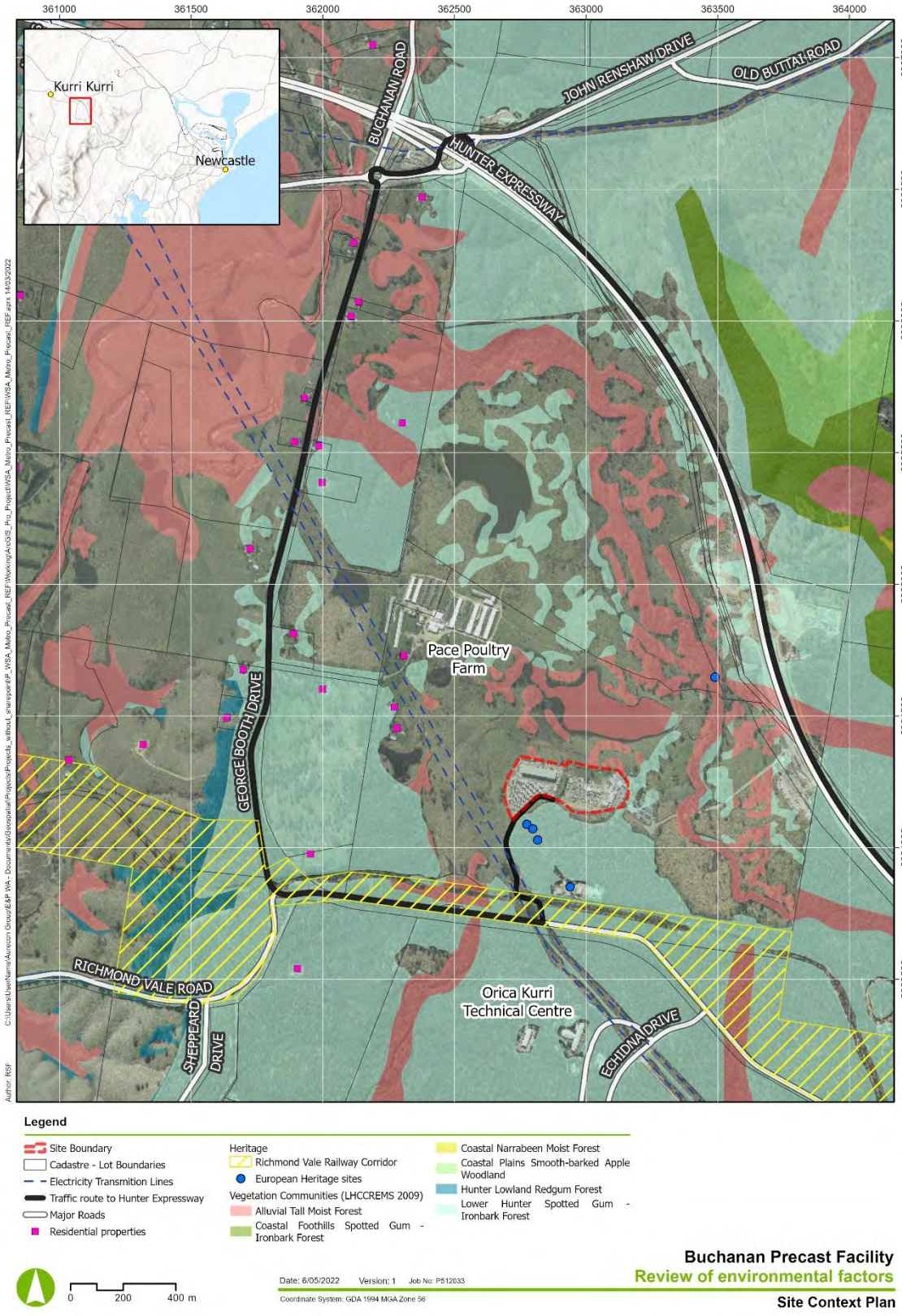

Figure 1-3: Site context plan

1.2.2. Key features of the Proposal

The Proposal would comprise the following key features:

- Re-establishment of the Proposal site at Buchanan including removal of five trees and ground cover disturbance of scattered grass with emerging saplings
- Extension of the existing precast yard shed and hardstand to the east by approximately 60 metres which currently includes a shed for construction of precast concrete segments and storage laydown areas
- Extension of the existing storage/laydown area
- Installation of site office facilities including amenities
- Re-establishment of the existing carpark facilities to allow on-site parking for up to 60 light vehicles
- Re-establishment and repair of the internal roads (where required)
- Reconnection of the ancillary supporting infrastructure, including utilities (power, water, sewerage, gas and communications), lighting and signage.

The Proposal would be temporary. operating for approximately two years. The precast facility would generally operate during standard work hours (see Section 5.3.4).

The Proposal is described further in Section 5 (Description of the Proposal).

1.2.3. Other relevant approvals

Other approvals that are relevant to this Proposal are discussed below. These Proposals do not form part of the activity which is assessed in this REF.

Sydney Metro – Western Sydney Airport

The Proposal would support the construction of the Sydney Metro – Western Sydney Airport project. The precast facility would manufacture precast concrete viaduct segments.

It has been identified through detailed construction planning that reduced environmental impacts and increased economic efficiencies could be gained through locating the precast facility offsite at the Buchanan site. Further details regarding the need for the Proposal are outlined in Chapter 2 (Need for the Proposal).

1.3. Purpose of this Review of Environmental Factors

This REF describes the Proposal (refer to Section 5), documents its likely environmental impacts (refer to Section 7) and details the measures that would be implemented to mitigate and manage against any potential impacts (refer to Section 8.5). Sydney Metro, a NSW Government agency, is the proponent and a determining authority for this Proposal under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The REF has been prepared to meet the environmental assessment requirements of Division 5.1 of the EP&A Act (refer to Section 4.1.1).

The environmental impacts of the Proposal have been assessed in accordance with clause 171(2) of the EP&A Regulation, the *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This REF helps Sydney Metro to fulfil the requirements of section 5.5 of the EP&A Act; namely that Sydney Metro examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the Proposal.

The findings of the REF will be considered when assessing:

- Whether the Proposal is likely to have a significant impact on the environment and therefore require an environmental impact statement to be prepared and approval sought under Division 5.2 of the EP&A Act.
- Whether the Proposal is "likely to significantly affect threatened species" (as defined in section 7.2 of the BC Act), and therefore require a species impact statement (SIS) or, if Sydney Metro elects, a biodiversity development assessment report to be prepared under Part 7 of the BC Act.
- The potential for the Proposal to significantly impact a Matter of National Environmental Significance or Commonwealth land and the need to make a referral to the Commonwealth Minister for the Environment for a decision by the Minister for the Environment on whether assessment and approval is required under the EPBC Act (refer to Section 4.3.1).

1.4. Structure and content of the REF

Table 1-1: Structure and content of the REF

Section	Description
Section 1 – Introduction	Outlines the background of the Proposal
Section 2 – Need for the Proposal	Outlines the need for the Proposal
Section 3 – Options development and selection	Provides an overview of the options that were considered during the development of the Proposal
Section 4 – Statutory and planning considerations	Outlines the relevant environmental planning instruments and policies and provides an assessment of their relevance to the Proposal
Section 5 – Stakeholder and community consultation	Outlines the planned community and stakeholder engagement activities to be carried out to support the REF public display and construction phase
Section 6 – Description of the Proposal	Provides a detailed description of the Proposal, including the elements of the Proposal, construction and operation
Section 7 – Environmental impact assessment	Provides an assessment of the potential environmental impacts associated with the construction and operation of the Proposal
Section 8 – Environmental management	Outlines the proposed environmental management systems to be implemented and provides the mitigation measures to be implemented during the construction and operation of the Proposal, to manage the impacts identified in the REF
Section 9 – Justification and conclusion	Provides the justification for the Proposal and an outline of the key conclusions of this report

The REF is supported by key technical papers, which provide detailed assessment of specific environmental issues associated with the Proposal. These technical papers form appendices to this REF and have been used to inform the REF, as follows:

- Appendix B – Traffic and Transport Assessment (Jacobs, 2022)
- Appendix C – Noise and Vibration Assessment (Renzo Tonin, 2022)
- Appendix D – Biodiversity Assessment (Aurecon, 2022).

Appendix A details the environmental factors and matters: Consideration of clause 171(2) factors and matters of national environmental significance.

Appendix E is a community fact sheet that will be distributed to surrounding residential, community and commercial properties and made available on the Sydney Metro website.

Appendix F is a search of the Heritage NSW Aboriginal Heritage Information Management System to support the Aboriginal heritage assessment in Section 7.6.

2. Proposal context

This section discusses the need, objectives and key benefits of the Proposal. It also provides an outline of the consistency of the Proposal with relevant NSW Government policies and strategies.

2.1. Proposal need

Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

The Proposal would support the efficient construction of the Sydney Metro – Western Sydney Airport project by facilitating the manufacture of the viaduct precast segments. The construction and operation of the metro rail line between St Marys and Aerotropolis includes the construction of approximately 3.5 kilometres of viaducts and bridges. These viaducts and bridges would be constructed from precast concrete elements that are transported to site prior to installation. The need for Sydney Metro – Western Sydney Airport is detailed in the Sydney Metro – Western Sydney Airport Environmental Impact Statement (2020).

The re-establishment of this precast facility would remove the need to establish a new precast facility at a new site and enable efficient reuse of the site.

2.2. Consistency with strategic planning and policy

2.2.1. Future Transport Strategy 2056

The Future Transport 2056 strategy (Transport for NSW, 2018a) is the NSW Government's overarching strategy to prepare and position NSW for the rapid changes in technology and innovation in the transport system over the next 40 years.

The Proposal supports the plan by reducing the cost of providing infrastructure and presenting more job and training opportunities to regional NSW.

2.3. Proposal objectives

The objectives of the Proposal are to:

- Support the construction of the Sydney Metro – Western Sydney Airport project through the production of viaduct precast components
- Re-establish a previously used precast facility to:
    - Reduce environmental impacts as the impacts associated with re-establishing an existing site that had the same land use in the past are considered minimal.
    - Reuse existing equipment and facilities to provide efficiencies and reduce project construction costs.

3. Options development and selection

This section outlines options considered as part of the Proposal.

3.1. Identified options

3.1.1. Option 1 – Establish a new precast facility within the Western Sydney Airport footprint

Option 1 would involve establishing a new temporary precast facility within the footprint of the Western Sydney Airport construction boundary.

Advantages of this option include:

- Proximity to Sydney Metro – Western Sydney Airport construction sites

Disadvantages of this option include:

- Clearing of native vegetation, including a portion of EPBC Act listed threatened ecological communities and habitat areas for BC Act threatened species requiring biodiversity offsets (Cumberland Plain Land Snail, *Meridolum corneovirens).*
- Cumulative impacts from interfacing projects including Western Sydney Airport Stage One main works packages and the M12.
- Impacts associated with establishment of a new precast facility such as the use of resources, additional construction materials and associated costs.

3.1.2. Option 2 – Re-establishment of previously used precast facility

This option would involve establishing the precast facility at an existing facility. Advantages of this option include:

- Previous site establishment and can be operated by project staff
- Accessibility to the arterial road network from the Proposal site to enable efficient transportation of input materials and final precast products to the Sydney Metro – Western Sydney Airport construction site.
- Able to be re-established and operated with minimal environmental impacts.

Disadvantages of this option include:

- Distance from the Sydney Metro – Western Sydney Airport construction site requiring longer commute for heavy vehicles.

3.1.3. Option 3 – Sub-contracting work out to an existing approved precast facility

This option would involve sub-contracting to an existing approved precast facility. Advantages of this option include:

- No further planning approval requirements

Disadvantages of this option include:

- Lack of sub-contractors with appropriate viaduct precast component experience.

Option 2 and 3 are considered feasible. However, in this case, Option 2 has been chosen as it meets the objectives of the Proposal and was selected as the preferred option.

3.2. Proposal site selection

It was determined the re-establishment of the previously used precast facility was the preferred option. Principles influencing the selection of the Proposal site included:

- Availability of land to re-establish the precast facility
- Accessibility to the arterial road network from the site to enable efficient transportation of input materials and final precast products to minimise impacts to local roads
- Minimal impact or capability to mitigate impacts to the environment including impacts to noise and visual sensitive receivers, traffic, biodiversity, water, and air quality.

4. Statutory and planning considerations

This section outlines the statutory requirements and explains the environmental planning process and approvals process for the construction and operation of the Proposal. The environmental planning instruments relevant to the construction and operation of the Proposal are also outlined.

Sydney Metro is the determining authority for the Proposal. This REF fulfils Sydney Metro's obligation under Section 5.5 of the EP&A Act to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

4.1. Environmental Planning and Assessment Act 1979

The EP&A Act is the main legislation regulating land use planning and development assessment in NSW. The applicable planning approvals pathway for a development under the EP&A Act is generally dependent on the development's size, environmental impact and capital cost, as well as relevant planning provisions in environmental planning instruments, including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). Further discussion on SEPPs and LEPs likely to be applicable to the Proposal is provided below.

The main part of the EP&A Act that is relevant to the Proposal is Part 5, which is discussed in the following section.

4.1.1. Part 5 of the EP&A Act

Part 5 of the EP&A Act applies to activities that are permissible without development consent and are generally carried out by a public authority. Activities under Part 5 of the EP&A Act are assessed and determined by either a Minister or public authority – referred to as a "determining authority". Sydney Metro is a public authority and is the proponent and determining authority of the Proposal.

The Proposal comprises of an activity for the purposes of Division 5.1 of the EP&A Act (see Section 4.2.1).

Under Section 5.5 of the EP&A Act, Sydney Metro, as the proponent and determining authority for the purposes of Division 5.1 of the EP&A Act, must:

a. examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity, in accordance with section 5.5 of the EP&A Act; and

b. consider whether or not the activity is likely to significantly affect the environment.

Section 7 of this REF assesses the likely effect of the Proposal on the environment, including vegetation removal, noise impacts and traffic impacts.

Clause 171 of the EP&A Regulation defines the factors which must be considered when assessing the likely impact of an activity on the environment under Part 5 of the EP&A Act. Appendix A specifically responds to each of the factors for consideration under clause 171.

The Proposal is categorised as development for the purpose of a rail infrastructure facility and is being carried out on behalf of a public authority. Under section 2.91 of the Transport and Infrastructure SEPP the Proposal is permissible without consent. The Proposal is not State

Significant Infrastructure or State significant development. The Proposal can be assessed under Part 5 of the EP&A Act.

An EIS would be required for the Proposal if Sydney Metro considers that the Proposal is likely to significantly affect the environment. The Proposal is not likely to have significant impact on the environment including, a significant impact on threatened species therefore neither an EIS nor SIS is required. In this situation a REF is typically prepared; hence the decision to prepare this document. During the public display period, the community will be encouraged to make submissions to Sydney Metro on the Proposal.

Following the public display period, Sydney Metro will consider issues raised in submissions and respond to community and stakeholder feedback. If required, Sydney Metro may also propose changes to the Proposal and detail these in the Determination Report for the Proposal. These documents will be available to the public via the CPB Contractors website (**cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport**).

Following the preparation of the responses to submissions, Sydney Metro will determine whether to proceed with the Proposal. If the Proposal proceeds, it will be designed, constructed and operated in accordance with the description of the Proposal and mitigation measures outlined in this REF and Conditions of Approval.

The planning approvals process for the Proposal under Division 5.1 of the EP&A Act is outlined in Figure 4-1.

Figure 4-1: Planning approvals process for the Proposal

4.1.2. Part 7 of the BC Act

Section 7.8 of the BC Act provides that if a Part 5 activity is "likely to affect threatened species", then it is to be regarded as an activity that is "likely to significantly affect the environment" for the purposes of Part 5 of the EP&A Act. In that case, if an EIS is being prepared, it is to include or be accompanied by a SIS or if Sydney Metro elects, a biodiversity development assessment report (BDAR).

If the likely significant effect on threatened species is the only significant effect on the environment then an EIS need not be prepared; although an SIS or BDAR is still required. An activity that is "likely to significantly affect threatened species" is defined in section 7.2 of the BC Act, and the test for determining whether a proposed activity is "likely to significantly affect threatened species or ecological communities, or their habitats is in section 7.3 of the BC Act.

Three species listed under the BC Act have been identified within one kilometre of the Proposal site within the last 10 years. However, there are no records of these species on the Proposal site or the immediate surrounds. The nearest *L. discolor* record is from the forested area south of George Booth Drive. These threatened species will not use nor are reliant on the vegetation on site as key habitat and project related activities are not expected to significantly impact threatened species or communities. Other protected matters outlined in Section 7.3 do not trigger the need for referral or approval under the BC Act. Therefore, a BDAR, SIS or EIS is not required as the Proposal is not likely to significantly affect threatened species or ecological communities.

4.2. Environmental planning instruments

4.2.1. State Environmental Planning Policy (Transport and Infrastructure) 2022

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State. Section 2.91 of Transport and Infrastructure SEPP permits development on any land for the purpose of a railway or rail infrastructure facilities to be carried out by or on behalf of a public authority without consent. The Proposal supports the construction of a 23-kilometre new railway linking the Aerotropolis with greater Sydney. The Proposal would facilitate the construction of viaducts segments used to construct approximately 3.5 kilometres of viaducts and bridges.

As Sydney Metro is a public authority, development consent is not required for the Proposal.

The Proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* (NP&W Act) and does not affect land or development regulated by Resilience and Hazards State Environmental Planning Policy (2021) or State Environmental Planning Policy (Planning Systems) 2021.

Part 2.2, Division 1 of the Transport and Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. No consultation is required under the Transport and Infrastructure SEPP. Consultation is discussed in Section 6 of this REF.

4.2.2. State Environmental Planning Policy – Resilience and Hazards 2021

State Environmental Planning Policy – Resilience and Hazards 2021 (Resilience and Hazards SEPP) aims to ensure that in considering any application to carry out potentially hazardous or

offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact.

Potentially hazardous means a development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- To human health, life or property, or
- To the biophysical environment, and
- Includes a hazardous industry and a hazardous storage establishment.

The Proposal includes the importation of concrete for the construction of precast concrete viaducts. Based on the nature of the Proposal and the mitigation measures to be implemented it is not considered to be a 'potentially hazardous industry' or 'potentially offensive industry' under the Resilience and Hazards SEPP.

Some dangerous goods would be stored on site including chemicals used in the manufacture of concrete, oils for lubrication of moulds and maintenance chemicals, oils, and lubricants for the plant. The quantities of all dangerous goods stored onsite would however be well below the Resilience and Hazards SEPP thresholds.

The Resilience and Hazards SEPP also contains planning provisions for land use planning within the coastal zone consistent with the *Coastal Management Act 2016*. However, the activity will not be carried out on land within a vulnerable coastal area.

4.2.3. Cessnock Local Environmental Plan (LEP)

The Proposal is located within the Cessnock LGA. The principal relevant local environmental planning instrument under the EP&A Act is the Cessnock Local Environmental Plan 2011 (Cessnock LEP).

The operation of the Transport and Infrastructure SEPP however means that LEPs would not apply to the extent that they impose controls which are inconsistent with the Transport and Infrastructure SEPP. Notwithstanding, during the preparation of the REF, the provisions of the Cessnock LEP 2011 were considered.

The Proposal site is zoned RU2 Rural Landscape under the Cessnock LEP. The Proposal is classified as development for the purpose of 'industries' and therefore is prohibited in this zone under the Cessnock LEP. However, the Proposal would be permissible without the consent of Cessnock City Council, in accordance with Section 2.91 of the Transport and Infrastructure SEPP.

Table 4-1 lists the objectives of this zone and their consistency with the Proposal. Table 4-1 Local environmental plan zones affected by the Proposal

Table 4-1 Local environmental plan zones affected by the Proposal

Zone	Objectives	Consistency of the Proposal with the objectives
RU2 – Rural Landscape	To encourage sustainable primary industry production by maintaining and enhancing the natural resource base	The site has been previously established and the recommissioning and use provides an additional income stream to the rural landowner. The Proposal involves the removal of five trees. However, this is not considered to significantly reduce the natural resource base.
	To maintain the rural landscape character of the land	The site has been previously established and its recommissioning and use does not reduce rural landscape character in the medium or long term.
	To provide for a range of compatible land uses, including extensive agriculture	The use of the site is considered compatible with the surrounding uses. The site is not expected to reduce the landowner's ability to continue to use the site for productive agricultural purposes.
	To enable other forms of development that are associated with rural activity and require an isolated location or support tourism and recreation	The Proposal is similar in scale to other agricultural facilities in the area. While not associated with rural activities the temporary use of the facility does not prevent other forms of development.
	To ensure that the type and intensity of development is appropriate in relation to the rural capability and suitability of the land, the preservation of the agricultural, mineral and extractive production potential of the land, the rural environment (including scenic resources) and the costs of providing services and amenities.	The intensity of use of the site will be managed such that no significant impacts eventuate.
	To maintain and enhance the scenic character of the land.	The site has been previously established and its recommissioning and use does not reduce scenic character in the medium or long term.
	To ensure that development does not create unreasonable or uneconomic demands for the provision or extension of services.	The Proposal is consistent with this objective as it is not anticipated to create unreasonable or uneconomic demands for the provision or extension of services.
	To minimise the visual impact of vegetation clearing in order to be consistent with the rural character of the locality.	The Proposal is consistent with this objective as it will require minimal vegetation removal.
	To minimise disturbance to the landscape from development through clearing, earthworks, access roads and construction of buildings.	A small area would be required for clearing and would therefore involve earthworks. Apart from this, the Proposal is consistent with this objective as it will not require new clearing, earthworks, roads or construction of buildings.
	To ensure development does not intrude into the skyline when viewed from a road or other public place.	The Proposal is consistent with this objective as it will not intrude into the skyline.

Note: Consent as described in this table is not required from Cessnock City Council, in accordance with Section 2.91 of the Transport and Infrastructure SEPP (refer to Section 6.2.1).

4.2.4. Other relevant NSW legislation

Table 4-2 provides an overview of other relevant NSW legislation that is applicable to the Proposal.

Table 4-2: Other relevant NSW legislation

NSW legislation	Requirements for the Proposal
Aboriginal Land Rights Act 1983	The *Aboriginal Land Rights Act 1983* (NSW) applies to Crown lands that are not, among other things, lawfully needed for an essential public purpose; referred to as claimable Crown land. No claimable Crown lands would be affected by the Proposal.
Biodiversity Conservation Act 2016	The BC Act provides for the protection of threatened species, populations and ecological communities in NSW. If a threatened species, population or ecological community, or its habitat, is likely to occur in any area that may be affected by the Proposal then an assessment of significance must be prepared to determine whether the Proposal would have a significant impact. If it is concluded that there would be a significant impact, then Sydney Metro would be required to prepare a BDAR for approval by the Environment and Heritage Group of the Department of Planning and Environment (former NSW Office of Environment and Heritage), or for concurrence of the Environment Agency Head if the Minister is not the determining authority under Part 5 of the EP&A Act. Given the impact of the Proposal on biodiversity, the provisions of this Act would not influence how the Proposal would be approved. The Act has been considered for completeness in accordance with the requirements under Part 5 of the EP&A Act. The Proposal site is unlikely to have a significant impact on any threatened species or community. Biodiversity is discussed further in Section 7.3 (Biodiversity).
Heritage Act 1977	The Heritage Act provides protection for items of 'environmental heritage' in NSW. Items considered to be significant to the State are listed on the State Heritage Register (SHR) and cannot be demolished, altered, moved or damaged, or their significance altered without approval from the Heritage Council of NSW. The SHR was established under Section 31 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. Section 170 of the Heritage Act requires government agencies to maintain a heritage and conservation register (Section 170 register). These registers provide a list of government assets which may have State or local heritage significance. Sections 139 to 145 of the Heritage Act prevent the excavation or disturbance of land known or likely to contain relics, unless in accordance with an excavation permit. There are no listed or unlisted items of heritage significance identified within the Proposal site. Refer to Section 7.5 (Historic heritage) and Section 7.6 (Aboriginal heritage) for further information regarding impacts to heritage items.
National Parks and Wildlife Act 1974	Sections 86, 87 and 90 of the NP&W Act requires a permit to be obtained from the Environment and Heritage Group of the Department of Planning and Environment for the destruction or damage of Aboriginal objects. There are no gazetted Aboriginal Places in the Proposal site. Refer to Section 7.6 (Aboriginal heritage) for further information including mitigation measures to manage the impacts. Land adjacent to the southern boundary of the property is managed by(NPWS and a right of access exists over the land. However, the Proposal would not impact on NPWS Land.
Native Title (New South Wales) Act 1994	This Act provides for native title in relation to land or waters. No Native Title Claims within the Proposal site were identified therefore the Proposal would not affect land subject to native title or to which an Indigenous Land Use Agreement applies.
Protection of the Environment	The *Protection of the Environment Operations Act 1997* (POEO Act) aims to protect, restore and enhance the quality of the environment, to reduce risk to human health and provide information to the public about environmental protection and pollution. The POEO Act is administered by the Environment Protection Authority and provides for the

NSW legislation	Requirements for the Proposal
Operations Act 1997	regulation and authorisation of discharges to the environment through issuing of an environment protection licence (EPL) for scheduled developments and activities, as listed on Schedule 1 of the POEO Act. The scheduled activities set out in Schedule 1 that are most relevant to the Proposal include: • Concrete works (cl 13). The Proposal does not have capacity to produce more than 30,000 tonnes per year of concrete products and as such an EPL is not required.
Roads Act 1993	In accordance with Section 138 of the *Roads Act 1993*, consent from Transport for NSW would be required for the carrying out of work in, on or over a classified road. For works on unclassified roads, Clause 5 of Schedule 2 of the Act provides that a public authority is not required to obtain a road authority's consent. The Proposal would not include carrying out work in, on or over a classified road therefore consent from Transport for NSW would not be required.
Land Acquisition (Just Terms Compensation) Act 1991	The Proposal does not involve land acquisition. A lease agreement would be entered into with the landowner for the duration of use of the site and include appropriate end of use provisions that exclude the removal of existing infrastructure from the site.
Water Management Act 2000 and Water Act 1912	The *Water Act 1912* and the *Water Management Act 2000* (WM Act) are the two key pieces of legislation for the management of water in NSW and contain provisions for the licensing of water access and use. The (WM Act) was introduced to provide a comprehensive singular piece of legislation to effectively manage and regulate access, and use of, the State's water resources. Clause 38 of the *Water Management (General) Regulation 2011* provides that a public authority is exempt from Section 91E (1) of the WM Act in relation to all controlled activities that it carries out in, on or under waterfront land. As such a controlled activity approval is not required for the proposed activity. *Section 91A* of the WM Act provides that a person: *(a) who uses water from a water source to which this Part applies, and* *(b) who does not hold a water use approval for that use,* is guilty of an offence. The WM Act defines a water source as the whole or any part of one or more rivers, lakes or estuaries, or one or more places where water occurs naturally on or below the surface of the ground and includes the coastal waters of the State. It is not currently proposed to extract water for use from any natural water source. Should this intent change an application for a water use approval would be undertaken separately from the REF process. The project does not involve any ground penetration and as such consideration was not given to the aquifer interference aspects of the WM Act.

4.3. Commonwealth legislation

4.3.1. Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as 'matters of national environmental significance'.

Under the EPBC Act, a referral to the Commonwealth Department of Agriculture, Water and the Environment is required for proposed 'actions' that have the potential to significantly impact

on matters of national environmental significance or the environment of Commonwealth land (including leased land).

The assessment of the Proposal's impact on matters of national environmental significance and the environment of Commonwealth land (Appendix A and Chapter 0 of the REF) found that it would be unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the Proposal has not been referred to the Australian Government Department of Agriculture, Water and the Environment under the EPBC Act.

4.4. Summary of statutory requirements

A summary of the potential licences, permits, approvals and notifications that may be required for the construction, maintenance and operation of the Proposal are outlined in Table 4-3.

Table 4-3: Summary of potential licences, permits and approvals

Legislation	Authority	Requirement	Comment
EP&A Act	Sydney Metro	Consideration: section 2.91 of the Transport and Infrastructure SEPP outlines that development for the purpose of railways and railway infrastructure facilities are permissible without the need for development consent under Part 4 of the EP&A Act when undertaken by a public authority. If the Proposal is not exempt development, a duty to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal is imposed under s. 5.5. Further, an EIS is required if the Proposal is likely to significantly affect the environment.	This REF has been prepared to meet the assessment requirements under Division 5.1 of the EP&A Act.
EP&A Regulation	Sydney Metro	Consideration: under clause 171, the factors to be taken into account concerning the impact of an activity on the environment, and the 'Is an EIS required?' guideline (Department of Urban Affairs and Planning, 1999).	This REF has considered factors under Clause 171 in Appendix A.
Heavy Vehicle National Law	Sydney Metro	NSW Oversize Overmass (OSOM) Load Carrying Vehicle permits may be required for access from George Booth Drive to the Project Destination area for some precast component deliveries. The remainder of the road network between the site and Sydney is part of the NSW OSOM Load Carrying Vehicles Network Approved Routes which represents the legally enforceable network for eligible vehicles operating under the Multi-State Class 1 Load Carrying Vehicles Mass Exemption Notice. Where ineligible vehicles are used additional OSOM Load Carrying Vehicle permits may be required.	This would be conditioned as part of the Construction Transport Management Plan. See section 7.1 of this REF for the Transport impact assessment.

5. Description of the Proposal

5.1. Proposed works

The Proposal consists of the re-establishment and operation of a precast concrete facility (Figure 5-1) to support the production of viaduct segments required for construction of the Sydney Metro – Western Sydney Airport project. The facility would be established and operated on a site previously used as a precast facility for the Hunter Expressway project in 2010 and later in 2017 to support construction of the New M5 project, on George Booth Drive, Buchanan in the Cessnock LGA. The Proposal site is approximately four hectares in size.

Key features of the Proposal are shown in Figure 1-2.

Figure 5-1: The Proposal site showing inside the existing shed

The Proposal site has not been operating as a facility since 2019 and minimal site construction works would be required to reinstate the precast facility as the site is already established. The Proposal would comprise the following key features and activities:

- Re-instating fencing around the Proposal site
- Installing site office facilities and amenities
- Inspection of existing facilities including wastewater treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- Removal of topsoil stockpile and vegetation

- Extension of the storage laydown area
- Extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate six viaduct precast moulds.
- The Proposal site would be wholly contained within the previously established precast facility. The Proposal site would accommodate the following facilities: Demountable site compound office
- A precast yard, including existing shed for construction of precast units and storage laydown area
- Wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin
- On-site parking for up to 60 vehicles.

The Proposal would be temporary, operating for an approximate timeframe of two years.

Site decommissioning would involve removal of the site office, plant and equipment. Rehabilitation of the Proposal area to a pre-disturbance state is not part of the scope of works.

5.2. Construction

Construction of the Proposal would comprise the key stages and activities outlined in Table 5-1. These stages, and the operation stages in Table 5-1, would not necessarily be sequential and may be undertaken concurrently to the contractors' requirements.

Table 5-1: Proposal indicative construction stages

Construction stage	Description
Stage A: Site establishment	The following works would be required to establish the Proposal site: • Transporting equipment to site • Re-instating fencing around the Proposal site • Installing demountable site compound office and amenities • Inspection of existing facilities including waste water treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs.
Stage B: Civil and building work	The following works would be required to establish the Proposal site: • Clearing of five trees and grassed area for hardstand extension • Removal of grass covered topsoil stockpile and retaining within the Property boundary • Extending the existing precast yard and hardstand footprint • Extension of the existing shed installing an additional two moulds

5.2.1. Construction program

Construction is proposed to commence in October 2022 and be completed in May 2023. The total duration of construction and re-establishment of the facility is anticipated to be approximately eight months.

5.2.2. Construction workforce

The peak workforce during the construction, re-establishment and operation of the Proposal is approximately 40 people. Construction vehicles during the construction and re-establishment of the facility will generate approximately 24 heavy vehicles movements and 100 light vehicles movements per day and is consistent with the traffic management details and haul routes contained in Section 5.3.3 for the operation of the facility.

5.2.3. Construction plant and equipment

Indicative plant and equipment that would be required is provided below.

- Compressors
- Water blaster
- External form vibrators
- Poke vibrator- medium
- Weld sets
- Truck pump
- Hand tools
- Crane (35 tonne)
- Forklift (10 tonne)
- Light vehicles
- Workshop vehicle
- Flatbed trailer attached to a primer mover
- Scissor lift
- Generators
- Hydraulic pump
- Equipment for tables
- Straddle Carrier
- Gantry cranes
- Concrete delivery truck
- Rebar delivery truck
- Delivery trucks/vehicles
- Excavator

Additional equipment to that identified above may be needed. The requirement for additional equipment would be determined by the construction contractor to support the establishment of the precast facility.

5.2.4. Resources, materials and sourcing

The type and quantities of resources and materials needed to construct and re-establish the Proposal are relatively minor and readily available within the surrounding area. Materials required to construct the Proposal would be sourced from the surrounding metropolitan area and would include:

- Materials for concrete hardstand areas i.e. aggregate, sand and water
- Potable water which would be connected during site establishment works
- Water to be used for construction.

Materials would be transferred to the construction site by road, primarily along the connecting motorway network.

Sydney Metro's sustainable procurement policy requirements aim to procure material locally, contain a high recycled content and a low embodied energy. Materials that are cost and performance competitive and comparable in environmental performance would be obtained.

5.2.5. Waste

All generated waste would be appropriately stored and separated to maximise recycling volumes. Storage would be within the Proposal footprint prior to its transfer off-site. Waste volumes associated with the Proposal are anticipated to be minor. The likely waste materials that would be generated during construction comprise:

- Oil, grease and other liquid wastes
- General office waste
- Domestic waste from personnel
- Green waste from vegetation removal.

The waste would be transported from the construction site to an appropriately licenced facility. The location where the waste would be transferred for reuse, reprocessing or disposal would depend on its nature, type and classification. The approach to waste management is further detailed in Section 7.10 (Resource use and waste management).

5.2.6. Water management

The following construction water management infrastructure would be included as part of the Proposal:

- Two sediment basins are installed at the north-east and north-western end of the Proposal site.

5.2.7. Hours of work

Construction of the Proposal would occur during standard construction hours including:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- No work on Sundays or Public Holidays.

5.3. Operation

Operation and decommissioning of the Proposal would comprise the key stages and activities outlined in Table 5-2. These stages, and the construction stages in Table 5-1 would not necessarily be sequential and may be undertaken concurrently to the contractors' requirements.

Table 5-2 Proposal indicative operation stages

Construction stage	Description
Stage C: Use of site	This stage would involve the production of the precast concrete segments and would involve the following activities: • Receiving concrete deliveries from off-site Daracon concrete batching plant located at Cameron Park (18 deliveries per day) • Pouring about six precast concrete segments per day • Despatching precast concrete segments to Sydney (up to six deliveries per day).
Stage D: Decommissioning of site	This stage would involve decommissioning the site to its current state and would involve the following activities: • Removal of the temporary site office, plant and equipment. Note: Rehabilitation of the Proposal site to a pre-disturbance state is not part of the scope of works.

5.3.1. Operation plant and equipment

Indicative plant and equipment that would be required is provided below.

- Compressors
- Water blaster
- External form vibrators
- Poke vibrator- medium
- Weld sets
- Truck pump
- Hand tools
- Crane (35 tonne)
- Forklift (10 tonne)
- Light vehicles
- Workshop vehicle
- Flatbed trailer attached to a primer mover
- Scissor lift
- Generators
- Hydraulic pump
- Equipment for tables
- Straddle Carrier
- Gantry cranes
- Concrete delivery truck
- Rebar delivery truck
- Delivery trucks/vehicles
- Excavator

Additional equipment to that identified above may be needed. The requirement for additional equipment would be determined by the construction contractor to support the operation of the precast facility.

5.3.2. Waste

All generated waste would be appropriately stored and separated to maximise recycling volumes. Storage would be within the Proposal footprint prior to its transfer off-site. Waste volumes associated with the operation of the Proposal are anticipated to be minor. The likely waste materials that would be generated during construction comprise:

- Concrete from faulty precast segments
- Oil, grease and other liquid wastes
- General office waste
- Domestic waste from personnel.

The waste would be transported from the construction site to an appropriately licenced facility. The location where the waste would be transferred for reuse, reprocessing or disposal would depend on its nature, type and classification. The approach to waste management is further detailed in Section 7.10.

5.3.3. Traffic management, haul routes and access

This section outlines the likely changes to traffic during construction. Impacts on traffic would be minimised through the management measures outlined in Section 8.5.

Operation vehicles

The Proposal would generate approximately 24 heavy vehicles movements and 100 light vehicles movements per day. Majority of heavy vehicles would be concrete trucks and delivery trucks while light vehicles would comprise of staff and labour vehicles. Traffic impacts are discussed further in Section 7.1.

Operation vehicle access and haulage routes

Access to the Proposal site would be via an existing access road off George Booth Drive.

Concrete deliveries would be received from an off-site concrete batching plant in Cameron Park. The haulage route to Proposal site consists of Stenhouse Drive, Cameron Park Drive, Newcastle Link Road, Hunter Expressway, John Renshaw Drive, George Booth Drive.

The precast concrete segments would be delivered to the nominated compounds in Luddenham for the Sydney Metro – Western Sydney Airport project:

- 1793 Elizabeth Dr, Badgerys Creek NSW 2555
- 599 Luddenham Road, Luddenham NSW 2555
- Patons Land, Orchard Hills, NSW 2748.

The haulage route would be in accordance with the Construction Traffic Management Plan (CTMP) for the Proposal and is summarised below and shown in Figure 5-2:

- George Booth Drive, John Renshaw Drive, Hunter Expressway, Pacific Motorway, M1, Northconnex, M2, M7, M4, Northern Road, Elizabeth Drive.

A CTMP would be prepared for this Proposal. However, the Sydney Metro – Western Sydney Airport project will have a separately prepared CTMP that assesses heavy vehicle movements for the distribution of precast moulds within the Sydney Metro – Western Sydney Airport construction footprint and surrounds.

Traffic management, control and signage

The following measures would be implemented to minimise impact during deliveries:

- Deliveries of precast components to Sydney would be scheduled to be evenly dispersed to minimise convoying or platoons queuing at the delivery destinations.
- Traffic management measures would be used so that traffic flow is maintained in affected haulage routes. These measures would be documented in a CTMP that will be prepared for the Sydney Metro – Western Sydney Airport project in accordance with the Sydney Metro Construction Traffic Management Framework.

Road and lane closures

No lane closures have been anticipated as a result of the Proposal.

Parking

Up to 60 private light vehicles would access the site daily as part of the Proposal. The Proposal would provide a dedicated parking area for staff within the Proposal site.

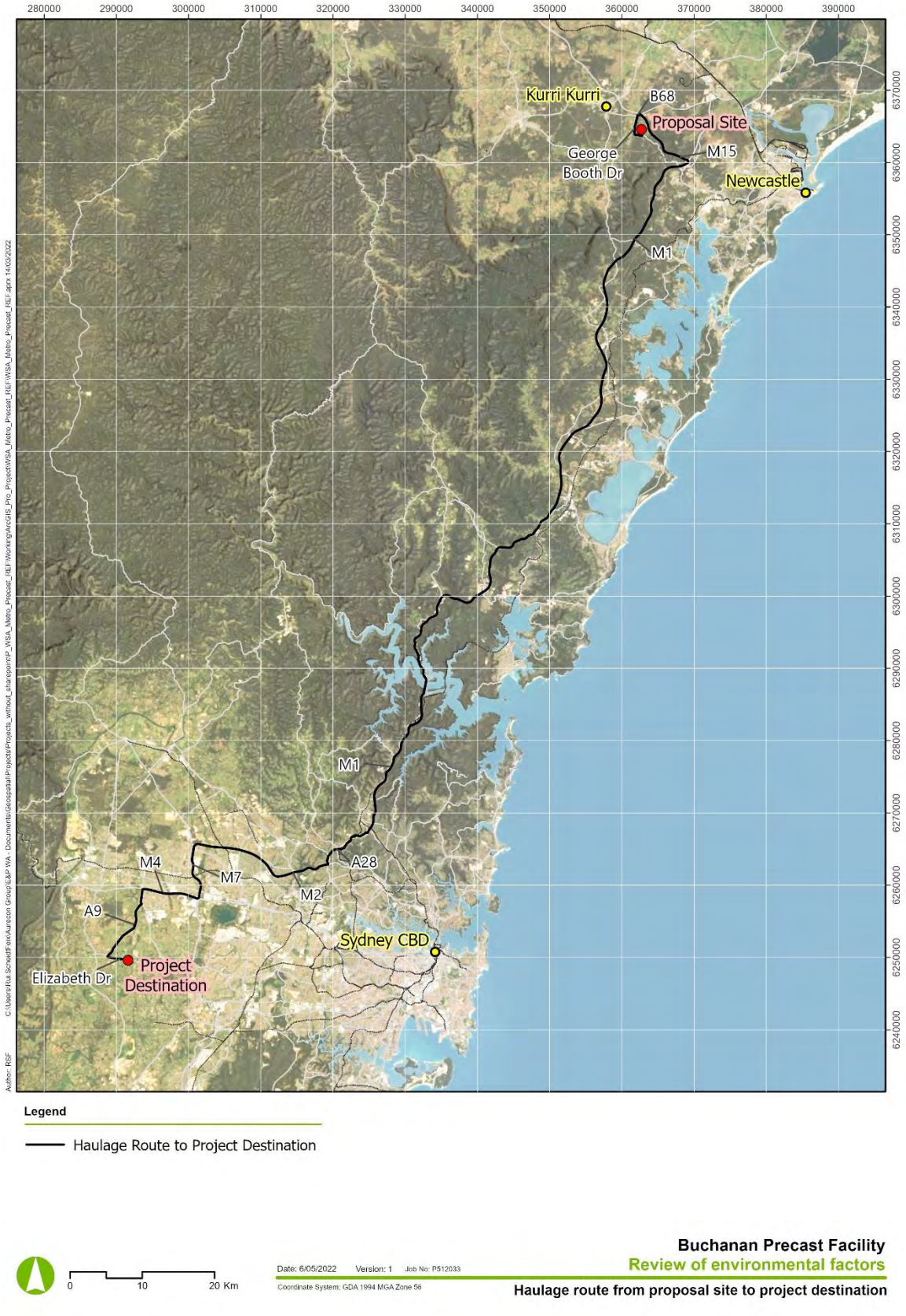

Figure 5-2: Haulage route from Proposal site to Elizabeth Drive

5.3.4. Hours of work

The Proposal would be required for approximately two years.

Operation of the Proposal would occur during standard construction hours including:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- No work on Sundays or Public Holidays.

The dispatch of precast components is proposed to be undertaken prior to 6pm on weekdays. Heavy vehicle deliveries would be scheduled to be evenly dispersed and are not expected to leave the precast yard outside of standard construction hours. Any other work undertaken outside standard construction hours (including if OSOM loads are required which cannot access the local road network) would be in accordance with the NSW Interim Construction Noise Guideline 2009 (ICNG) (NSW EPA, 2009) and the Sydney Metro Construction Noise and Vibration Standard.

5.3.5. Maintenance

The precast facilities would be placed on a routine cleaning, inspection and maintenance schedule that would be undertaken periodically throughout the operation of the Proposal. Maintenance and service vehicles would park in designated parking areas.

5.4. Property acquisition and leasing arrangements

The Proposal is located on a rural property owned by a private landowner. Land adjacent to the southern boundary of the property is managed by NPWS and a right of access exists over the land for transport of precast segments over existing roads. The electricity easement owned by Ausgrid traverses in a north-westerly direction over the lot boundary but does not cross the Proposal site.

The Proposal does not involve land acquisition. A lease agreement would be entered into with the landowner and Sydney Metro for the duration of use of the site and include appropriate end of use provisions that exclude the removal of existing infrastructure from the site.

6. Stakeholder and community consultation

This section summarises the planned community and stakeholder engagement activities to be undertaken in relation to the Proposal. Consultation has been undertaken with the affected landowner. A lease agreement would be entered into between the landowner and Sydney Metro for the duration of use of the site and include appropriate end of use provisions that exclude the removal of existing infrastructure from the Hunter Expressway Project from the Proposal site.

6.1. Consultation objectives

A communications and consultation strategy will guide and describe the key activities that will take place to inform and engage with the local community and key stakeholders across the Proposal's lifecycle. The approach to stakeholder and community consultation for the Proposal includes:

- Implementing a communication and engagement plan in accordance with the Sydney Metro – Western Sydney Airport Overarching Community Communication Strategy, that supports the REF program
- Informing the community and other stakeholders by providing clear, factual and timely information about planned construction and operational work and its associated environmental and social impacts
- Providing multiple mechanisms for prompt issues resolution
- Providing adequate opportunities for community members and other stakeholders to provide feedback
- Ensuring coordinated communications with other relevant and interfacing government agencies and stakeholders

This REF will be exhibited for a seven-day period commencing in June 2022. Through this process the community and stakeholders will be invited to make submissions, raise issues, seek clarification or ask questions about any aspect of the Proposal. All issues that are raised will be considered by Sydney Metro. Where required during construction, regular work updates would be provided online via community notifications and newsletters, and delivered to local residents.

6.2. Statutory notification requirements

6.2.1. Transport and Infrastructure SEPP Notification

Part 2 of the Transport and Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to commencing work that would affect various infrastructure and forms of transport. A summary of the Transport and Infrastructure SEPP consultation requirements is detailed in Table 6-1.

Table 6-1: Transport and Infrastructure SEPP consultation requirements

Consultation required under sections 2.10 to 2.15 of the Transport and Infrastructure SEPP	Relevant agency	Is consultation required?
Section 2.10		
Will the works have a substantial impact on the stormwater management services which are provided by council?	Cessnock City Council	No. The Proposal would not be connected to a council owned stormwater management system.
Are the works likely to generate traffic to an extent that will strain the existing road system in a local government area?	Cessnock City Council	No. The Proposal would represent a negligible increase in traffic generation and therefore would not strain the existing road system in the locality.
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	Cessnock City Council	No. The Proposal would not be connected to a council owned sewerage system.
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	Cessnock City Council	No. The Proposal would not be connected to a council owned water supply system.
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	Cessnock City Council	No. The Proposal would not involve installing temporary structures on, or enclosing of, public spaces.
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Cessnock City Council	No. The Proposal would not involve minor nor inconsequential excavation of council roads or adjacent footpaths.
Section 2.11		
Are the works likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential?	Cessnock City Council	No. There are no listed items of heritage significance identified within the Proposal site. In addition, the Proposal site is not within a heritage conservation area.
Section 2.12		
Are the works located on flood liable land?	Cessnock City Council, NSW State Emergency Service	No. The Proposal site is located outside flood liable land.

Consultation required under sections 2.10 to 2.15 of the Transport and Infrastructure SEPP	Relevant agency	Is consultation required?
Section 2.13		
Are the works for the purpose of air transport facilities; health services facility; correctional centre or group home; emergency services facilities and bushfire hazard reduction; public administration buildings and buildings of the Crown; railways; research and monitoring stations; roads and traffic; stormwater and management services or for residential purposes, in an area that on flood liable land?	NSW State Emergency Service	No. The Proposal is a temporary facility for the management of railway construction.
Section 2.14		
Are the works on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to the land?	Cessnock City Council	No. The activity will not be carried out on land within a coastal vulnerability area.
Section 2.15		
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*?	DPE–Environment and Heritage Group	Yes. The Proposal site is located adjacent to a national park or nature reserve. A right of Way has been established and vehicles would only use existing roads to travel through NPWS land,
Development on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone?	DPE – Environment and Heritage Group	No. The Proposal site is zoned RU2 Rural Landscape under the Cessnock LEP.
Are the works adjacent to a declared aquatic reserve or marine park under the *Marine Estate Management Act 2014*?	DPE	No. There are no aquatic reserves or marine parks within the Proposal site or surrounds.
Are the works in the foreshore area as defined by the *Place Management NSW Act 1998* (formerly known as *Sydney Harbour Foreshore Authority Act 1998*)	DPE – Housing and Property (former Property NSW)	No. The Proposal site is not within the foreshore area.
Do the works involve the development of a fixed or floating structure in or over navigable waters?	Transport for NSW	No. The Proposal does not involve any works in or over navigable waters.
Are the works on Defence communications buffer land?	Department of Defence	No The Proposal is outside the Defence communications buffer land.
Section 2.16		
Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?		No. The Proposal is a temporary facility for the management of railway construction.

Based on the considerations in Table 6-1, notification to public authorities under the Transport and Infrastructure SEPP would not be required. Consultation with Cessnock City Council via phone and email has been undertaken to ensure it is aware of the Proposal and its potential impacts. Council will be provided with a copy of the REF and an opportunity to provide comment.

6.3. Aboriginal community involvement

No consultation with the Aboriginal community has been undertaken in relation to the current Proposal nor for the most recent use of the precast yard for the construction of the New M5 in 2017. Prior to the site being established and used as a precast facility in 2010, consultation with the following Aboriginal stakeholder groups was undertaken:

- Barkuma Neighbourhood Centre
- Black Creek Aboriginal Corporation
- Lower Wonnarua Tribal Consultancy Pty Ltd
- Mindaribba Local Aboriginal Land Council
- Wonnarua Nation Aboriginal Corporation.

Aboriginal stakeholder groups were consulted via an Aboriginal Focus Group, as part of the ongoing consultation process for the Hunter Expressway Project. Given that the current Proposal involves the establishment and operation of a precast facility wholly within the site previously used for the Hunter Expressway Project and that it was considered that there would be no impacts to any Aboriginal cultural heritage areas or archaeological sites, further consultation with the Aboriginal community was not considered necessary.

6.4. Stakeholder involvement

Consultation will be undertaken with utility providers if detailed route planning identifies risks to utility networks from the transport of oversize / over mass loads. If required, this consultation will be undertaken as part of the development of the CTMP.

The transportation of segments would cross land that was previously owned by Yancoal (formerly Coal and Allied). This land has since transferred to the National Parks and Wildlife Service and a Right of Way has been established. The Right of Way permits vehicular and non-vehicular access to and from the Proposal Lot by way of the access road at all times. The Proposal is not on located on NPWS land. Consultation has been undertaken with NPWS to ensure they are aware of the Proposal and potential impacts. However, no impacts to NPWS are directly expected. Vehicles would only use existing roads to travel through NPWS land.

6.5. Consultation during REF public display

6.5.1. Consultation activities proposed during public display

The REF will be placed on public display for seven days between 20 and 27 June 2022. During this period, written submissions will be accepted for consideration. The REF will be displayed online at **cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport**.

Community members and stakeholders are invited to submit their feedback on the Proposal to the contractor by:

- Emailing: sydneymetrowsa@transport.nsw.gov.au

- Writing to Sydney Metro, PO Box K659, Haymarket NSW 1240 and should be clearly marked 'Comments on Sydney Metro - Western Sydney Airport Buchanan Precast Facility Review of Environmental Factors'.

During the public display period, community members and stakeholders can direct any enquiries to the contractor by:

- 24 hour Phone line: 1800 717 703
- Email: sydneymetrowsa@transport.nsw.gov.au

6.5.2. Engagement activities and tools

Table 6-2 lists the key engagement activities and tools and how they will be used to engage with the community and stakeholders during the public display of the REF.

Table 6-2: Key community and stakeholder engagement tools and activities

Engagement tool	Activity
Proposal website	Project information and the REF will be available via the CPB Contractors website **cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport**
Community fact sheet	A fact sheet will be distributed to surrounding residential, community and commercial properties. It will also be made available on the Sydney Metro website (provided in Appendix E).
Electronic direct mail	An email will be sent to a targeted Sydney Metro email distribution list.
Stakeholder and government consultation	Sydney Metro will consult with relevant parts of Transport for NSW, Cessnock City Council and other key stakeholders as required.
Sydney Metro Place Manager	A dedicated Sydney Metro Place Manager will reach out to the nearby community and businesses to share details of the REF and explain how they can comment and make a submission. The Place Manager will also be available to respond to community members seeking more information on the REF and the project.
Community information sessions	A community information session will be held during the public display of the REF if requested following the distribution of the community fact sheet.
Door knocking	Door knocking will be conducted for the three closest properties within the vicinity of the Proposal.
Phone number	The 24 hour Sydney Metro – Western Sydney Airport community information line, 1800 717 703, will be available to receive any submissions regarding the Proposal as well as any ongoing enquires

6.6. Response to submissions

Following the REF public display, Sydney Metro will consider submissions received and will:

- Summarise the issues raised in the submissions
- Provide responses to each issue raised in the received submissions
- Describe any proposed modifications and assess the environmental impact of these changes as required
- Identify any proposed new or revised environmental mitigation measures.

The responses to submissions will be published on the CPB Contractors website: **cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport**.

6.7. Post-determination consultation activities

Subject to determination of the Proposal, Sydney Metro will continue to engage with community and stakeholders in the lead up to, and during the construction of the Proposal as per the Sydney Metro – Western Sydney Airport Overarching Community Communication Strategy (see Section 8.4).

Methods used for engaging and providing information to the community and stakeholders during the Proposal delivery phase are outlined in Table 6-3. These activities will be undertaken by the construction contractor in consultation with Sydney Metro.

Table 6-3: Key community and stakeholder engagement activities during Proposal delivery phase

Tool	Purpose	Frequency
Community emails	To allow communication with the project team and inform the community of progress key milestones or activities including traffic changes.	As required
Community information line (1800 717 703)	Access to the project team during construction hours with message service after hours via a 1800 number.	24 hours a day, seven days a week
Letterbox notifications	Notification letters to inform identified sensitive receivers (local residents and businesses) affected by changes to road network and traffic conditions.	At least seven days prior to change
Project website (CPB Contractors)	Documents uploaded to the website (**cpbcon.com.au/en/our-projects/2022/sydney-metro-western-sydney-airport**) would include the REF, traffic alerts, notification letters and other public material related to the works.	To coincide with distribution
Signposting	Information or directional signage at the location of the traffic change to give advice to road users and pedestrians on duration of change and alternative paths.	At least seven days prior to change
Variable Message Signs (VMS)	Electronic variable message signs to provide advanced notice to road users of major traffic changes, emergencies, incidents and traffic delays.	At least seven days prior to change, or as required
Doorknocking	Used to discuss potential impacts of the Proposal on highly impacted stakeholders, especially residents and businesses directly impacted by construction activities.	As required
Meetings with individual/groups	Discuss project activities, including work in progress, upcoming activities and any issues associated. Meetings may also be used to discuss potential impacts and proposed mitigation measures.	As required
Place Manager	Maintaining close and ongoing contact with local communities and stakeholders during the delivery phase of the Buchanan Precast Facility.	Ongoing

7. Environmental impact assessment

This section provides a detailed description of the potential environmental impacts associated with the construction and operation of the Proposal. This includes consideration of the factors specified in the guidance 'Is an EIS required?' (Department of Urban Affairs and Planning, 1999) as required and the factors specified in clause 171(2) of the EP&A Regulation. A checklist of clause 171(2) factors and how they have been specifically addressed in this REF is included in Appendix A.

The Guidelines for Division 5.1 assessments (Department of Planning and Environment, 2022) commence on 1 July 2022 once amendments to the EP&A Regulation come into effect and as such, do not apply to this REF.

For each potential impact, the existing environment is characterised and then an assessment is carried out as to how the Proposal would impact on the existing environment for the proposed construction and operation of the Proposal.

7.1. Transport

7.1.1. Overview

A Traffic and Transport Assessment (Jacobs, 2022) was prepared for the Proposal and is provided in Appendix B. A summary of the assessment is provided in this section.

7.1.2. Methodology

Peak hour intersection counts on George Booth Drive, at its intersection with the access road, were previously conducted on 25 October 2016 as part of the REF prepared in December 2016 for the operation of the precast facility for the New M5 project. To account for traffic growth from 2016 to 2022, the intersection counts were scaled using a 3.1% annual growth rate. This growth rate has been assumed based on traffic growth observed between 2016 and 2021 at the nearby Transport for NSW permanent classifier station (ID HEXBUCHW-PR) situated on the Hunter Expressway (M15). This approach is anticipated to provide a conservative assessment for George Booth Drive given annual traffic growth on the Hunter Expressway is expected to exceed local roads and as there have been no major roadworks, upgrades or developments within the vicinity of the Proposal since 2016.

Intersection analysis using SIDRA Intersection software (version 9) was carried out using the intersection counts to determine potential traffic impacts at the intersection during morning (AM) and evening (PM) peak hour during operation of the facility.

7.1.3. Existing environment

Road network

The Proposal site is situated to the east of the intersection of George Booth Drive and Richmond Vale Road and west of Hunter Expressway. These roads provide connections to the wider road network. Key roads in the study area include:

- George Booth Drive (MR527) - a single carriageway road with one lane in each direction that connects John Renshaw Drive (and then the Hunter Expressway) to the north with the Pacific Highway (M1) on southeast. George Booth Drive has a posted speed limit of 80 kilometres per hour except on a short section of road near John Renshaw Drive which has a posted speed limit of 60 kilometres per hour. The

priority intersection ('Give way') at George Booth Drive allows turning movements from all directions

- John Renshaw Drive (MR 588) – a rural regional road which connects Maitland Street at Kurri Kurri with the New England Highway to the east at Tarro. Between Hunter Expressway and George Booth Drive it is a dual carriageway road with two-lanes in each direction. John Renshaw Drive has a posted speed limit of 90 kilometres per hour in rural areas and 60 kilometres per hour in the town centres. John Renshaw Drive has major intersections with Hunter Expressway, New England Highway and the M1 Pacific Motorway
- Hunter Expressway - is a 40 kilometre long, four-lane freeway which was opened in 2014. This freeway links the M1 Motorway (Pacific Highway) near Seahampton and the New England Highway, west of Branxton. This provides an east-west connection between Newcastle and the Lower Hunter region. The access route to the Proposal site from Hunter Expressway is provided via a roundabout intersection at John Renshaw Drive. The opening of Hunter Expressway has resulted in a substantial reduction of traffic on George Booth Drive.

Traffic volumes and network performance

Table 7-1 summarises the predicted traffic volumes for George Booth Drive at its intersection with the access road.

Table 7-1: Existing traffic volumes and heavy vehicle flows on George Booth Drive (Jacobs, 2022)

Road	Location	Direction	Morning peak hour (veh/hr)	Evening peak hour (veh/hr)	Heavy vehicles as % of morning peak hour volume	Heavy vehicles as % of evening peak hour volume
George Booth Drive	Intersection of George Booth Drive and access road	Eastbound	133	103	2.3%	7.8%
		Westbound	85	131	1.2%	6.1%

Road safety

A review of the crash history associated with the roads forming part of the proposed access routes to the Proposal for the period January 2016 to December 2020 identified the following:

- A total of 39 crashes (an average of 7.8 per year)
- One crash was fatal (on the Hunter Expressway) and another 24 were injury crashes
- Majority of crashes (20 crashes) occurred on or near the Hunter Expressway
- Twenty per cent of crashes (eight crashes) occurred at a roundabout and eight per cent of crashes (three crashes) occurred at an intersection.

There were no intersection related crashes at the intersection of George Booth Drive and the access road.

Heavy vehicle routes

Roads in the vicinity of Proposal site, such as George Booth Drive, John Renshaw Drive and Hunter Expressway are the approved routes for 26 metre-long B-Doubles and 4.6 metre-high vehicles.

Public transport

There are few public transport services that operate near the Proposal site on George Booth Drive. Two bus services operate in the vicinity but do not provide direct connections to the Proposal site:

- Route 160 is a public bus service operated by Rover Coaches that travels between Cessnock and Newcastle via John Renshaw Drive. Route 160 operates at a frequency of five buses per day in each direction and the nearest bus stop to the site is located on John Renshaw Drive at Averys Lane.
- Route 2623 is a school bus service operated by Hunter Valley Buses that travels from Buchanan to Metford Public School via George Booth Drive. Route 2623 operates at a frequency of one service per day during the morning peak period

Pedestrian and cyclist facilities

There are no cycling and walking facilities in the vicinity of the Proposal site due to its rural nature. However, John Renshaw Drive is identified as a proposed on-road cycleway route on the Cessnock Council Cycle network map.

7.1.4. Potential impacts

Traffic volumes and network performance

As discussed in Section 5.3, the Proposal would generate about 24 heavy vehicle movements and 100 light vehicle movements per day during construction and operation. The majority of heavy vehicles would be concrete trucks and delivery trucks while light vehicles would comprise of staff and labour vehicles.

The traffic and transport assessment is based on 24 heavy vehicles and 100 light vehicles movements occurring during peak periods. Given the existing low traffic volumes of heavy vehicles in the peak periods, increases in vehicle movements as a result of the Proposal are not anticipated to impact on the operation of the surrounding road network.

Table 7-2 summarises the performance of the intersection at George Booth Drive and the access road in two scenarios in 2024 without operation of the Proposal and with the operation of the Proposal. Intersection performance can be measured using the level of service (LoS) scale, which grades performance from A (good) to F (poor). A LoS of A applies when traffic is delayed for an average of less than 15 seconds while a LoS of F applies when traffic is delayed for more than 70 seconds.

The intersection performance is based on the worst performing movement. The intersection at George Booth Drive and the access road currently operates at LoS A in both morning and evening peak periods.

Table 7-2: Intersection performance results and level of service (Jacobs, 2022)

Period	Intersection throughput (vehicle/hour)	Degree of saturation (v/c)	Average delay (seconds /vehicle)	LoS	95%percentile queue length (metres)
2024 without operation of the Proposal					
Morning Peak (7:30 am - 8:30 am)	230	0.074	7.3	A	<1
Evening Peak (3:45 pm - 4:45 pm)	240	0.075	7.2	A	<1
2024 with operation of the Proposal					

Period	Intersection throughput (vehicle/hour)	Degree of saturation (v/c)	Average delay (seconds /vehicle)	LoS	95%percentile queue length (metres)
2024 without operation of the Proposal					
Morning Peak (7:30 am - 8:30 am)	290	0.074	8.2	A	<1
Evening Peak (3:45 pm - 4:45 pm)	310	0.075	9.2	A	<1

As summarised in Table 7-2 above, traffic modelling indicates that the intersection of George Booth Drive and the access road will continue to operate at LoS A in both the morning and evening peak hours with very minor delays.

Road Safety

Given the relatively low traffic generation of the Proposal, the low historic rate of crashes in the area and the opportunity to manage contributing factors, the Proposal is not expected to have a significant impact on road safety.

Heavy Vehicles Routes

Due to the low number of daily OSOM vehicle movements, it is expected that the traffic impact of heavy vehicles on the road network would be minimal.

Public and active transport

There are no bus routes along east-west direction of George Booth Drive. There are no formal footpaths and cycle facilities are provided along George Booth Drive and within the study area. As such, the construction works would have minimal impact on public and active transport facilities.

Parking

Parking for up to 60 vehicles would be provided on-site, resulting in no impact to the provision of on-street car parking.

The proposed safeguards and management measures that will be implemented to address potential traffic and transport impacts of the Proposal are contained in Section 8.5.

7.2. Noise and vibration

7.2.1. Overview

A noise and vibration impact assessment was prepared for the Proposal by Renzo Tonin & Associates in March 2022. This assessment is attached as Appendix C of this REF. The results of this assessment are summarised below.

7.2.2. Methodology

Construction and operational noise associated with the Proposal was assessed in accordance with the:

- NSW Interim Construction Noise Guideline (DECC 2009) for construction noise
- NSW Noise Policy for Industry (EPA 2017) for operational noise

- NSW Road Noise Policy (DECCW 2011), for operational traffic noise.

Assessment criteria were established based on the background noise level of the surrounding area measured for a previous assessment of the Proposal site undertaken by Renzo Tonin & Associates in 2016 for the operation of the precast facility to support construction of the New M5 project. There have been minimal changes to the area surrounding the Proposal site since 2016, therefore monitoring data was considered representative of the existing noise environment surrounding the Proposal site.

Typical plant and equipment to be used on the Proposal site is provided in Appendix C of the noise and vibration impact assessment and formed the basis of noise and vibration prediction and assessment against the relevant criteria. The Cadna-A computer noise model was used to model and assess airborne noise impacts from the Proposal for construction and operation. It also considered the noise sources, receiver locations and height, topographical features, sound power levels of plant and equipment and possible noise mitigation measures.

The risk of vibration impact from the extension and operation of the proposed facility was assessed as negligible due to the significant distance to the nearest residential or other sensitive receiver.

7.2.3. Existing environment

The Proposal site is located on privately owned rural property. There are 10 residential noise sensitive receivers within one kilometre of the Proposal site. The nearest residential receiver is approximately 440 metres from the Proposal site. In addition, two industrial noise sensitive receivers including Henholme and the Orica Kurri Technical Centre are 950 metres from the Proposal site. Noise sensitive receivers are identified in Appendix B of the noise and vibration impact assessment. The background noise sources consist of the Henholme egg farm facility and traffic on the Hunter Expressway and George Booth Drive.

Heavy vehicles would access the Proposal from George Booth Drive via the Hunter Expressway to both the north and to the east. George Booth Drive is considered a sub-arterial road and the Hunter Expressway is a major arterial road.

7.2.4. Criteria

Construction noise criteria

Construction noise management levels for the nearest receivers have been established based on the Interim Construction Noise Guideline (ICNG). Receivers are construction noise affected where construction noise levels are above the Noise Management Level (NML), as defined below for standard construction hours:

- Nearest residential receivers day NML $L_{Aeq\ (15\ min)}$ 49 dB(A)
- Industrial premises $L_{Aeq\ (15min)}$ 75 dB(A)

Operational noise criteria

Operational noise from the Proposal was assessed against the Noise Policy for Industry (NPfI), which has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level (PNTL) which is the lower value of the project intrusiveness noise levels and project amenity noise levels. Accordingly, the following operational PTNL have been adopted for the Proposal:

- Nearest residential receivers Day PTNL $L_{Aeq\ (15\ min)}$ 44 dB(A) (intrusiveness)
- Industrial premises $L_{Aeq\ (15\ min)}$ 70 dB(A) (when in use)

Operation related road traffic noise criteria

The noise criteria used in the assessment of the traffic generated by the operation of the Proposal are set using the NSW Road Noise Policy (RNP), which sets criteria based on road category. George Booth Drive is considered a sub-arterial road and therefore the following road traffic noise criterion for existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments was adopted for the Proposal in accordance with the RNP:

- Nearest residential receivers day criterion: 60 dB(A) $L_{Aeq,\ (15\ hour)}$

According to the RNP, any increase in the total traffic noise level should be limited to 2 dB(A) above the corresponding 'no build option'.

7.2.5. Potential impacts

Construction

Construction noise levels are assessed at the most noise affected facade and floor level of a receiver building. Construction noise levels experienced at other points on the building may be lower. Noise emissions were determined by modelling the noise sources, receiver locations, and operating activities.

Table 7-3 summarises the predicted noise levels at surrounding receivers. Receivers where the noise criteria are exceeded are bolded in Table 7-3 and shown in Figure 7-1.

Table 7-3: Construction predicted noise level (Renzo Tonin & Associates, 2022)

Receiver ID	Address	Predicted noise level - dB(A), $L_{Aeq(15min)}$ Typical activities	Predicted noise level - dB(A), $L_{Aeq(15min)}$ High noise activities
R_01	1332 George Booth Drive, Buchanan	41	44
R_02	1395 George Booth Drive, Buchanan	-	35
R_03	1408 George Booth Drive, Buchanan	41	45
R_04	1413 George Booth Drive, Buchanan	-	34
R_05	1/1416 George Booth Drive, Buchanan	45	**50**
R_06	3/1416 George Booth Drive, Buchanan	46	**51**

Receiver ID	Address	Predicted noise level - dB(A), $L_{Aeq(15min)}$ Typical activities	Predicted noise level - dB(A), $L_{Aeq(15min)}$ High noise activities
R_07	4/1416 George Booth Drive, Buchanan	46	**51**
R_08	1424 George Booth Drive, Buchanan	45	**50**
R_09	1459 George Booth Drive, Buchanan	-	36
R_10	1490 George Booth Drive, Buchanan	-	34
C_01	1151 George Booth Drive, Buchanan	-	-
C_02	4/1416 George Booth Drive, Buchanan	-	-

Note: **Bold** text indicates an exceedance of the noise criteria, day NML $L_{Aeq\ (15\ min)}$ 49 dB(A)
'-' indicates predicted noise level is less than 40 dB(A)

Modelling indicates that noise levels generated during typical construction activities are within the NML for the project. There is a chance that construction noise levels during high impact activities such as vegetation clearing with chainsaws will marginally exceed the NML (i.e. less than 2dB).

Operational noise assessment

Table 7-4 summarises the predicted operation noise levels at surrounding receivers. Receivers where the noise criteria are exceeded are bolded in Table 7-4 and shown in Figure 7-1.

Table 7-4: Operation predicted noise level (Renzo Tonin & Associates, 2022)

Receiver ID	Address	Predicted noise level - dB(A), $L_{Aeq(15min)}$	NPI project noise trigger level - dB(A), $L_{Aeq(15min)}$ Day
R_01	1332 George Booth Drive, Buchanan	-	44
R_02	1395 George Booth Drive, Buchanan	-	44
R_03	1408 George Booth Drive, Buchanan	40	44
R_04	1413 George Booth Drive, Buchanan	-	44
R_05	**1/1416 George Booth Drive, Buchanan**	**45**	44
R_06	**3/1416 George Booth Drive, Buchanan**	**47**	44
R_07	**4/1416 George Booth Drive, Buchanan**	**46**	44
R_08	1424 George Booth Drive, Buchanan	-	44
R_09	1459 George Booth Drive, Buchanan	-	44
R_10	1490 George Booth Drive, Buchanan	-	44
C_01	1151 George Booth Drive, Buchanan	-	68
C_02	4/1416 George Booth Drive, Buchanan	-	68

Note: **Bold** text indicates an exceedance of the project noise trigger level (PTNL)

Modelling indicates that at some times there may be minor exceedances of the noise criteria, depending on what plant/ equipment are operating at the time. During the daytime, noise levels may exceed the intrusiveness level by up to 3 dB(A) but are below the amenity noise levels. For the evening period, predicted levels are within 3 dB(A) of the intrusive noise level and up to 4 dB(A) above the amenity noise level. The significance of the residual noise level is considered marginal.

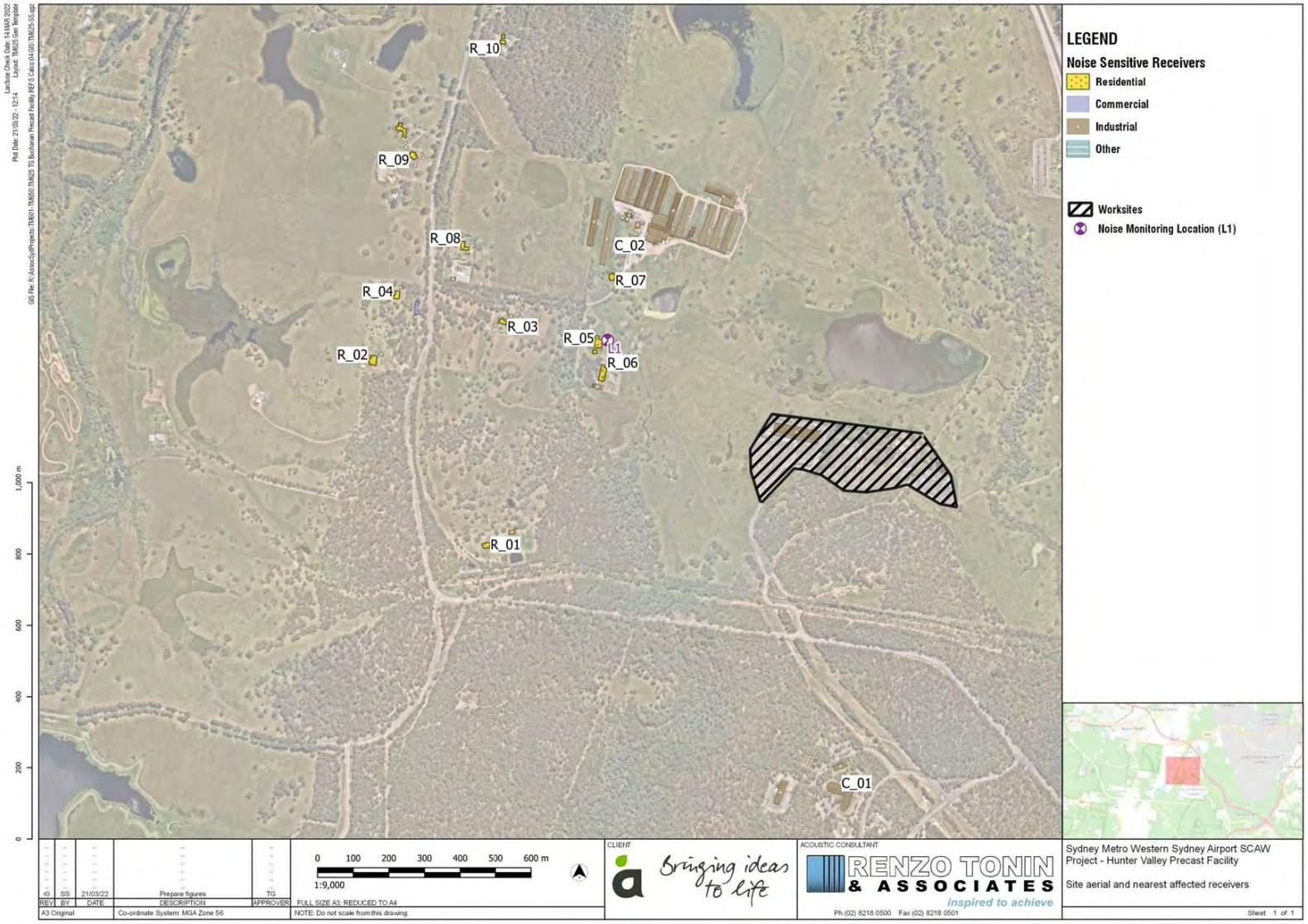

Figure 7-1: Noise sensitive receivers (Renzo Tonin & Associates 2022)

Table 7-3 and Table 7-4 show that minor exceedances of the relevant noise criteria would occur at four and three residences during construction and operation of the Proposal respectively (refer to Figure 7-1). The residential receivers identified as noise affected by construction and operation of the Proposal are owned by the owner of the land leased by the precast facility, it is unlikely that complaints would be received. Lessees have been consulted with via door knock and letter box drops. However, a recommendation to carry out attended noise monitoring has been made to verify noise levels during construction and operation of the Proposal as part of the proposed safeguards and management measures that will be implemented to address potential impacts of the Proposal (refer to Section 8.5).

Traffic noise assessment

Traffic noise impacts are not considered on the M15, M1, NorthConnex, M2, M7 and M4 as they are major motorways. Traffic noise impacts were not assessed on The Northern Road and Elizabeth Drive as this was assessed in the Sydney Metro Western Sydney Airport EIS. Traffic movements in the form of light vehicle movements, delivery vehicles, trucks removing finished segments and concrete trucks arriving at the site would result in additional traffic noise. The additional heavy vehicle movement on these motorways would be negligible compared with existing traffic.

Traffic noise impacts have therefore only been calculated along George Booth Drive, as there are residential receivers along the truck route. There are no residential receivers along the section of John Renshaw Drive.

The predicted road traffic noise levels are below the NSW Road Noise Policy noise criteria The assessment found the Proposal would have minimal impact on traffic noise generated to residences on George Booth Drive and are found to satisfy the traffic noise criteria identified in Section 8.5.

7.3. Biodiversity

7.3.1. Overview

A field assessment was conducted on 24 February 2022 by a suitably qualified ecologist to determine the biodiversity impact for the Proposal and is provided in Appendix D. A summary of the assessment is provided in this section.

7.3.2. Methodology

The biodiversity assessment involved:

- A desktop review of background reports, databases and mapping pertaining to the biodiversity of the bioregion and the study locality, including:
    - EPBC Protected Matters Search Tool
    - NSW Biodiversity Values Map and Threshold Tool
- Site inspection by a qualified ecologist on 24 February 2022

Targeted threatened flora or fauna surveys were not completed as part of the site assessment.

7.3.3. Existing environment

The Proposal site is located in the Sydney Basin Bioregion and within the Hunter River catchment. Two state conservation areas are located near the Proposal site and include the

Sugarloaf State Conservation Area and Werakata State Conservation Area located about two kilometres south and three kilometres west of the Proposal site respectively. Land adjacent to the southern boundary of the property is owned by NPWS and a Right of Way exists over the land.

Vegetation communities

The protected matters search tool indicated the presence of Threatened Ecological Communities (TECs) listed under the EPBC Act.

The following TEC is known to occur within a 10 kilometre radius of the Proposal site:

- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (Critically Endangered).

The following TECs are likely to occur within a 10 kilometre radius of the Proposal site:

- Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (Endangered)
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (Critically Endangered).

The following TECs may occur within a 10 kilometre radius of the Proposal site:

- Central Hunter Valley eucalypt forest and woodland (Critically Endangered)
- Hunter Valley Weeping Myall (Acacia pendula) Woodland (Critically Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

There are no mapped TECs in the Proposal site and the Proposal site is previously highly disturbed due to its previous use as a concrete batching facility. Therefore, the Proposal has little potential to impact TECs directly or indirectly where present in the broader locality. Given the Proposal is wholly located within the disturbed area, it is not expected to have a significant impact, provided standard environmental protection measures are implemented.

A review of the NSW Biodiversity Values Map and Threshold Tool indicates that the Proposal site is adjacent to but not within areas of mapped biodiversity values (see Figure **7-3**). Directly south and east of the Proposal site are mapped areas of biodiversity value for threatened species or communities. Further east of the proposal is an area of protected riparian land. Prior to disturbance and removal of vegetation, the Proposal area has been previously mapped as the following communities from the Jacobs, 2016 REF:

- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions (Endangered under the BC Act)
- Alluvial Tall Moist Forest.

Site inspection

A suitably qualified ecologist assessed the area for vegetation removal on 24 February 2022.

The Proposal site is highly disturbed, developed and operating previously as a concrete batching plant. 0.13 ha of native vegetation was cleared for the previous construction of the precast facility in 2010. The trees identified for removal as part of the Proposal are growing within an area marked as ‘Vegetation to be removed’ in Figure **7-3**. The area marked as vegetation to be removed is predominantly introduced grasses and weeds and will involve

removal of five trees and ground cover disturbance of scattered grass with emerging saplings including six *E.punctata* saplings. The five trees identified for removal are growing within two former fence lines in a highly disturbed environment of introduced grasses and adjacent to a topsoil storage mound. They are growing within a range of waste construction materials, including metal reinforcing rods, concrete and gravel.

The five trees expected to be removed are native yet do not constitute threatened species or communities. These trees are:

- Three Grey gum (*Eucalyptus punctata*) trees
- Two Swamp paperbark (*Melaleuca linariifolia*).

The remainder of the Proposal site consists of hardstand material which is populated with sparse exotic grassland.

Figure 7-2 Biodiversity features

Threatened fauna and flora

The Proposal site is located in proximity to records of listed threatened species under the EPBC Act and BC Act. Listed threatened species identified within one kilometre of the Proposal site, within the last 10 years, include:

- White-throated Needletail (*Hirundapus caudacutus*) – Vulnerable (EPBC Act)
- Swift parrot (*Lathamus discolor*) – Critically Endangered (EPBC Act), Endangered (BC Act)
- Little Lorikeet (*Glossopsitta pusilla*) – Vulnerable (BC Act)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – Vulnerable (BC Act).

There are no records of listed threatened species within the Proposal site or immediately adjacent.

The EPBC Protected Matter Search Tool identified a total of 53 threatened species that may, are likely, or known to occur, or to have habitat occurring, on or within a 10 kilometre radius of the Proposal site. These include 16 bird, two fish, four frog, nine mammal, 22 plant, and two reptile species.

No threatened species were identified during the site inspection; however, if there are changes to the Proposal site, further field assessment may be required to target specific threatened species. The Proposal is not expected to have a significant impact on threatened species.

Listed Migratory species

The EPBC Protected Matter Search Tool identified a total of 32 migratory species that may, are likely, or known to occur, or to have habitat occurring on or within a 10 kilometre radius of the Proposal site. These include one marine, seven terrestrial, and 24 wetland species. The Proposal is not expected to have a significant impact on migratory species, given there is little vegetation within the Proposal site.

Wetlands of International Importance

Hunter Estuary Wetlands Ramsar wetland is within 10 kilometres to the east of the Proposal site which is a Wetland of International Importance. However, with the implementation of standard erosion and sediment control measures and considering the distance to the site, the Proposal is not expected to have a significant impact on Wetlands of International Importance.

Regional Forest Agreements

The current scope of works includes the removal of five trees within a historically modified environment, which is not subject to Regional Forest Agreement conditions.

Listed Marine species

A total of 41 marine bird species were identified as may, likely, or known to occur, or to have habitat occurring on or within a 10 kilometre radius of the Proposal site. The Protected Matters Search Tool indicates the Proposal is not expected to have a significant impact on listed marine species.

Weeds

The high density of weeds present in the vicinity and broader site include Fireweed (*Senecio madagascariensis*), Asteraceae sp., Dandelion sp., Scotch Thistle (*Onopordum acanthium*), Purple top verbena (*Verbena Bonariensis*), Green Cestrum (*Cestrum parqui*), Lantana (*Lantana camara*), Creeping oxalis (*Oxalis corniculate*), Blackberry (*Rubus fruticosus*) and Noogoora burr (*Xanthium occidentale*).

Weeds may be present in the Proposal site and have the potential to spread due to the movement of construction plant and equipment across the Proposal site and when entering and exiting the site. These are not expected to be noxious weeds or weeds of national significance. This would be managed by the safeguards outlined in Section 8.5.

Fisheries

The Proposal would not obstruct fish passage and is not expected to have impacts on the dam within the Proposal site.

7.3.4. Potential impacts

The Proposal would involve the removal of five tree species. These are as follows:

- Three Grey gum (*Eucalyptus punctata*) trees – none of which was of sufficient size to contain hollows
- Two Swamp paperbark (*Melaleuca linariifolia*)

The trees identified for removal are growing within an area marked as 'Vegetation to be removed' in Figure **7-3**. The area marked as vegetation to be removed is predominantly introduced grasses and weeds. The five trees identified for removal are growing within two former fence lines in a highly disturbed environment of introduced grasses and adjacent to a topsoil storage mound. They are growing within a range of waste construction materials, including metal reinforcing rods, concrete and gravel. Six *E.punctata* juvenile saplings are also growing adjacent to the trees.

The five trees identified for removal occur within a highly disturbed environment, covering approximately 0.02 ha. Within the four-hectare Proposal site the removal of these trees do not meet the thresholds for offsetting under the Biodiversity Offsets Scheme. None of these trees contain hollows, with all other trees within the site and dams to be retained. The biodiversity offsets scheme will not apply to the Proposal.

Trees and associated vegetation growing in other parts of the Proposal site (nearest the access road, surrounding the dam and to the east of the dam) are to be retained. The dam is also to be retained.

The Proposal site is previously highly disturbed, with no listed threatened species or communities recorded within the Proposal site. The Proposal site, including the area identified for tree removal, is not within or adjoining an area mapped as Biodiversity Values.

Fauna species identified as likely to occur within the Proposal area include snakes.

Conclusion on significance of impacts

The Proposal would be unlikely to significantly impact threatened ecological communities or threatened species, populations or their habitats, under the BC Act or EPBC Act and therefore Species Impact Statements are not required.

The proposed safeguards and management measures that will be implemented to address potential biodiversity impacts of the Proposal are contained in Section 8.5.

Figure 7-3 Trees to be removed and retained

7.4. Landscape and visual character

7.4.1. Overview

A desktop landscape and visual character assessment was prepared for the Proposal, as it is considered to be low risk since it involves the re-establishment of an existing precast facility. A summary of the assessment is provided in this section.

7.4.2. Methodology

The visual impacts of the Proposal was assessed in accordance with the Transport for NSW *Guideline for landscape character and visual impact assessment - Environmental impact assessment practice note EIA-N04* (August 2020). Considering the scale of the Proposal the assessment was limited to a visual impact assessment, undertaken in accordance with Section 6 of the guideline.

The Proposals overall predicted level of visual impact was identified by considering the visual sensitivity of the Proposal site and the magnitude of the proposed work.

Visual sensitivity and magnitude are broadly defined as follows:

- Sensitivity refers to the qualities of the area and how sensitive the existing area is to the proposed change
- Magnitude refers to the nature and scale of the Proposal in relation to the existing area.

Using the visual impact rating matrix presented in Table 7-5, an overall visual impact rating was identified for the Proposal.

Table 7-5: Visual impact assessment rating matrix

		Magnitude			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

7.4.3. Existing environment

The Proposal site is located on a privately owned rural property which is predominately characterised by sweeping agricultural pasture land used for cattle grazing and poultry farming. The agricultural pasture land is punctuated by small isolated stands of trees, a large farm dam located towards the north eastern property boundary and large patches of remnant vegetation located along Surveyors Creek and towards the southern property boundary.

The rural landscape is interrupted by the existing infrastructure on site which is located in roughly the centre of the property, an electricity easement which traverses through the property in a north easterly direction and a poultry farm consisting of a number of large metal sheds located to the north western corner of the property. Three sensitive receivers (residential dwellings) are located within the property. The closest residential dwelling is located about 440 metres west of the Proposal.

Views of the Proposal site from the three sensitive receivers are generally unscreened due to the overall lack of tall vegetation located towards the west of the Proposal site. Views of the Proposal site beyond the property boundary are limited by the extent of existing tall vegetation and the flat to slightly undulating topography of the surrounding area. Visibility of the property from George Booth Drive is also limited.

The sensitivity of the Proposal site is considered to be low due to its previously disturbed nature and existing facilities. The existing visual environment of the Proposal site is shown in Figure 7-4, Figure 7-5 and Figure 7-6.

Figure 7-4: The Proposal site showing existing shed

Figure 7-5: View from the Proposal site looking west toward the residential receivers

Figure 7-6: View from the Proposal site looking north toward the residential receivers and poultry farm

7.4.4. Potential impacts

The construction and operation of the Proposal would result in temporary moderate-low visual impacts to the three identified sensitive receivers as a result of the following impacts:

- Associated operational activities
- Presence of construction plant and equipment
- Plant and equipment for vegetation removal
- Construction vehicles movements within Proposal site
- Light spill from any potential night work and construction vehicles (however night works are not expected for construction or operation of the Proposal).

As outlined above in Section 7.4.3, the sensitivity of the Proposal site is considered to be low due to it being previously disturbed by the Hunter Expressway precast facility in 2010 and to support construction of the New M5 project in 2017. However, the magnitude of the Proposal is considered to be moderate due to above mentioned impacts. Therefore, the overall impact on the three identified sensitive receivers within the property (includes landowner) would be moderate-low.

During operation, visual impacts to road users as a result of construction vehicle movements along haulage routes would be low. The majority of the roads specified in the haulage routes are classified as main roads and therefore are generally of low sensitivity due to existing traffic volumes. The Proposal would receive about 18 concrete deliveries from Daracon per day and generate four to six deliveries to Western Sydney Airport per day. Any additional vehicles generated as a result of the Proposal would be of low magnitude, compared with the existing volume on the main roads.

Construction of the Proposal is expected to require less vehicles than operation.

Visual impacts as a result of the Proposal would be temporary and limited to the duration of the Proposal. The proposed safeguards and management measures that will be implemented to address potential visual impacts of the Proposal are contained in Section 8.5.

7.5. Historical heritage

7.5.1. Overview

A desktop Historical heritage assessment was prepared for the Proposal as it is considered to be low risk as the Proposal is wholly located within the disturbed area of the previously established precast facility. A summary of the assessment is provided in this section.

7.5.2. Methodology

The Historical heritage assessment involved:

- A search of the following Historical heritage registers in February 2022 to identify heritage places within and near the Proposal:
    - NSW State Heritage Register
    - Cessnock Local Environmental Plan 2011
    - Section 170 heritage and conservation registers

- National Heritage List
- Commonwealth Heritage List

- A review of previously prepared environmental assessments for the previous use of the Proposal site.

7.5.3. Existing environment

Heritage items near the Proposal site

There is one listed heritage item near the Proposal site (approximately 460 metres south) and four potential heritage items identified within lot boundary (lot 32 DP 1085798) of which the Proposal site is within (Hunter Expressway Alliance, 2010). However, there are no heritage items located within the Proposal site itself. Heritage items include the Richmond Vale Railway, a derelict bridge on Surveyors Creek, a former quarry, former mine workings and pastoral infrastructure. These heritage items are described below and are presented in Table 7-6 and shown in Figure 1-3.

Richmond Vale Railway

The former Richmond Vale Railway corridor is located approximately 460 metres south of the Proposal site and adjacent to the southern Proposal boundary. This item is listed on the Cessnock LEP as having local heritage significance. The Richmond Vale Railway was operational in this location between 1905 and 1967. All track work was removed from the rail corridor between 1972 and 1973. No rail infrastructure was identified within the Proposal area during the site investigation in 2010 for the Hunter Expressway precast facility (Umwelt, 2010).

Derelict bridge on Surveyors Creek

The potential heritage item consists of the remains of a derelict bridge which is located approximately 690 metres north-east of the Proposal site. The bridge was constructed of rough conglomerate abutments that supported timber logs to form the deck which has since been removed. However, the remains of the former track comprising bitumen gravels on a gravel road base is evident leading to the derelict bridge. The year of construction of the bridge is unknown however is considered to be typical of a simple bridge constructed on a rural property in the Hunter Region.

Former quarry

The potential heritage item is located approximately 380 metres south of the Proposal site and has a history of excavation by the landowner. This potential heritage site was formerly used as the batching plant for the previous projects and has since been rehabilitated.

Former mine workings

The potential heritage item consists of an area of former mine workings located to the south of the Proposal site within a large area of remnant vegetation. Items within the area include a shaft, back filled pits and machine and building footings. The closest item is located approximately 160 metres south of the Proposal site.

Pastoral infrastructure

The potential heritage item consists of dams and cattle yards located towards the north and north west of the Proposal site respectively. The pastoral infrastructure forms part of a working

rural property. The closest item is located about approximately 180 metres north of the Proposal site.

Table 7-6: Listed and potential heritage items near the Proposal site

Item	Register listing(s)	Significance	Relationship to Proposal
Richmond Vale Railway	Cessnock LEP Item No. I214	Local	About Approximately 460 metres south
Derelict bridge on Surveyors Creek	Potential heritage item- Not a listed heritage item	Little or no heritage significance	About Approximately 690 metres north-east
Former quarry	Potential heritage item- Not a listed heritage item	Little or no heritage significance	About Approximately 380 metres south
Former mine workings	Potential heritage item- Not a listed heritage item	Little or no heritage significance	Closest item of the former mine workings is located about approximately 160 metres south
Pastoral infrastructure	Potential heritage item- Not a listed heritage item	Little or no heritage significance	Closest item of pastoral infrastructure is located about approximately 180 metres north

7.5.4. Potential impacts

The Proposal would be contained to land previously disturbed for the establishment and operation of a precast facility for the Hunter Expressway precast facility in 2010 and to support construction of the New M5 project in 2017. As such, there would be no potential for impacts on Historical heritage items listed in Table 7-6 as they are all more than 160 metres away from the Proposal site, or any unidentified Historical heritage items. The proposed safeguards and management measures that will be implemented to address potential Historical heritage impacts of the Proposal are contained in Section 8.5 including an unexpected heritage finds procedure.

7.6. Aboriginal heritage

7.6.1. Overview

A desktop Aboriginal heritage assessment was prepared for the Proposal as it is considered to be low risk as the Proposal is wholly located within the disturbed area of the previously established Hunter Expressway precast facility. A summary of the assessment is provided in this section.

7.6.2. Methodology

The Aboriginal heritage assessment involved:

- A search of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) Web Services on 21 February 2022 (provided in Appendix F)
- Review of the Aboriginal Cultural Heritage and Archaeological Survey and Assessment of the Hunter Expressway Alliance Project Office Compound and Batch Plant, near Buchanan, New South Wales (Umwelt (Australia) Pty Limited, 2010.

7.6.3. Existing environment

History of the People

The Proposal is located within the boundary of the Mindaribba Local Aboriginal Land Council. The Proposal site is near the boundary of the Killingworth and Wallis Creek soil landscapes. The two soil landscapes have distinct soils, geology, landforms and ecological communities. Each landscape has differing resources that were utilised by past Aboriginal people in terms of water availability, suitable shelter, raw material sources, soil types suitable for plant growth, presence of edible plants and fauna availability. The boundary of the two landscapes is transitional and the Proposal site has some traits of both landscapes described above.

The Proposal site is in close proximity to Surveyors Creek, a semi-permanent water source that may have provided Aboriginal people with drinking water and may have sustained both plant and animal species that were an integral part of past Aboriginal diet. It must be noted that there are other areas in the surrounding landscape that would have provided richer resource zones that would have been more favourable areas for occupation. Wallis Creek, which is a large, active watercourse, is located approximately 2.5 kilometres to the west of the Proposal site and the confluence of Wallis Creek and Surveyors Creek is approximately two kilometres to the north. As a result, Aboriginal sites within the Proposal site are expected to be of low density, reflecting the limited use of the area.

According to Aboriginal stakeholder knowledge and oral histories there are ceremonial grounds, burials, camping grounds, scarred trees, stone arrangements, rock art and a massacre site in the vicinity of the Hunter Expressway (Umwelt (Australia) Pty Limited, 2010).

Sites and places

An AHIMS search undertaken in February 2022 identified two registered sites within 50 metres of the Proposal site. None of the AHIMS sites identified are located within the Proposal site (refer to Figure 1-3). The Proposal would be contained within land previously disturbed for the establishment and operation of a precast facility for the Hunter Expressway project. As such, there is limited potential for unexpected Aboriginal sites or places to occur within the Proposal site.

Archaeological potential

No areas of archaeological potential were identified in the Proposal site. Due to the disturbance within the Proposal site as a result of historic land-use, erosion and current use of the area for agricultural purposes the likelihood for potential archaeological deposits in the area is low. There is also a low likelihood of locating Aboriginal scarred trees due to the extensive vegetation clearance (Umwelt (Australia) Pty Limited, 2010) which was confirmed during the site inspection on 24 February 2022.

7.6.4. Potential impacts

The Proposal would be contained within the previously disturbed and established precast facility and would result in minor ground disturbance to extend the existing precast yard shed and hardstand by approximately 60 metres. The ground disturbance would be consistent with the disturbance undertaken for previous use of the site as a precast facility. Disturbance would occur in an area subject to prior disturbance from stockpiling of site topsoil during the establishment of the precast facility. As such, there would be no potential for impacts to identified Aboriginal sites as none are identified within the Proposal site. It would be unlikely for any unidentified Aboriginal sites/places to be impacted due to small area of ground disturbance.

The proposed safeguards and management measures that will be implemented to address potential Aboriginal heritage impacts of the Proposal are contained in Section 8.5.

7.7. Property, land use and socio-economic

7.7.1. Overview

A desktop assessment for the potential property, land use and socio-economic impacts was prepared for the Proposal as it is considered to be low risk since it involves the re-establishment of an existing precast facility and expansion of the precast shed. A summary of the assessment is provided in this section.

7.7.2. Methodology

The property, land use and socio-economic impact assessment involved a desktop assessment of land use zoning, aerial photography, property boundaries and socio-economic characteristics.

7.7.3. Existing environment

Land use

The Proposal site is zoned RU2 Rural Landscape under the Cessnock LEP. The Proposal site is located on privately owned rural property on land previously established and operated as a precast facility. Surrounding land uses within the property comprise of agricultural pasture land used for cattle grazing and poultry farming.

Land use zones surrounding the property include:

- E1 – National Parks and Nature Reserves
- SP2 (railway) – Infrastructure
- SP2 (classified road) – Infrastructure
- RU2 Rural Landscape

Property ownership

As outlined in Section 5.4, the Proposal is located on private property owned by a private landowner. Land adjacent to the southern boundary of the property is owned by National Parks and Wildlife Services and a right of access exists over the land. The electricity easement which traverses through the property in a north westerly direction is owned by Ausgrid.

Socio-economic characteristics

The Proposal is located on property that is used for cattle grazing and poultry farming. The poultry farm is located approximately 500 metres north west of the Proposal site and is accessed from George Booth Drive via an access road located to the west of the property boundary.

Surrounding businesses are limited to small local businesses located on the surrounding rural properties. The Orica Kurri Technical Centre is located approximately 765 metres south of the property and the Kurri Kurri town centre is located approximately six kilometres north-west of the property.

7.7.4. Potential impacts

The Proposal would require a short term lease of approximately four hectares of the private property for the duration of the construction of the Sydney Metro – Western Sydney Airport project. The affected landholder would be consulted prior to and during construction and operation of the Proposal.

The Proposal has the potential to cause minor disruptions to local businesses. This would mostly be due to minor traffic delays (refer to Section 7.1).The Proposal may have a positive impact by stimulating the local economy by supporting local employment opportunities, through increased customers at local businesses.

During operation, the Proposal would have some minor negative impacts on the landowner and community for the following environmental factors:

- Transport, access and connectivity, this is addressed in Section 7.1
- Visual amenity, this is addressed in Section 7.3

No additional safeguards or management measures were identified. Measures to manage impacts associated with traffic, visual amenity and air quality are outlined in Section 8.5.

7.8. Soils and surface water quality

7.8.1. Overview

A desktop soil and surface water quality assessment was prepared for the Proposal as it is considered to be low risk since it involves the re-establishment of an existing precast facility. A summary of the assessment is provided in this section.

7.8.2. Methodology

The soils and surface water quality assessment involved a review of following databases and documents:

- Cessnock Local Environmental Plan 2011
- Contaminated land records of notices (NSW EPA)
- List of NSW contaminated sites notified to the EPA (NSW EPA) – Current as at 8 February 2022
- Acid Sulfate Soils Risk maps (NSW DPE)
- Australian Soil Resource Information System
- Phase 1 Environmental Site Assessment (Parsons Brinckerhoff, 2010).

7.8.3. Existing environment

Geology

The regional geological map of the area (1:100,000 Newcastle Coal Fields Regional Geology Series Sheet 9231, (Department of Mineral Resources 1995)) indicates that the Proposal site is underlain by the Tomago Coal Measures, Waratah Sandstone and the Lambton Subgroup of the Newcastle Coal Measures. These geological units generally consist of sandstone, siltstone, coal and tuff.

The regional soil map of the area (1:100,000 Soil landscape Map for Newcastle (Mattei 1995)) indicates the Proposal site is located within the Beresfield and Cockle Creek soil landscapes. The Beresfield landscape soils tend to be deep with sandy to silty topsoil on top of highly erodible subsoils. The subsoils have a high foundation hazard due to shrink-swell potential as well as areas of dispersive sodic soils.

The topography of the property is generally flat to slightly undulating however relatively flat in the Proposal site due to prior site establishment. Land to the north of the Proposal site slopes down slightly towards a farm dam.

Acid sulfate soils

Acid sulfate soils (ASS) are soils and sediments containing iron sulphides that, when exposed to oxygen, generate sulphuric acid and potentially toxic quantities of aluminium and other heavy metals. The sulfuric acid and heavy metals are produced in forms that can be readily released and absorbed into the environment, with potential adverse effects on the natural and built environment and human health.

The Proposal site is not mapped within the Cessnock LEP as being within an area where ASS may occur. This was confirmed by a search of the DPE Acid Sulfate Soils Risk maps on 3 March 2022 which shows no known occurrence of ASS within the vicinity of the Proposal which indicates an extremely low probability of ASS.

Contamination

The study area refers to the area of land previously disturbed by the Hunter Expressway precast facility. This includes the previously disturbed compound site, batch plant and access road footprint of the site.

A search of the NSW EPA contaminated land records of notices on 3 March 2022 identified three sites within the Cessnock LGA. The closest site recorded is over six kilometres north-west of the Proposal site. A search of the list of NSW contaminated sites notified to the EPA on 3 March 2022 did not identify any sites near the Proposal site.

The Phase 1 Environmental Site Assessment carried out in 2010 included the footprint of the Proposal. Potential on-site sources of contamination identified included pesticide and herbicide use. Contaminants of concern from pesticide and herbicide include Organochlorin and Organophosphorous pesticides however were identified as unlikely to pose a risk to human health and the environment. Potential off-site sources of contamination identified included the following:

- Activities associated with farming including potential use of pesticides and herbicides, including those used in the adjacent poultry farm
- Surface water run-off from the adjacent highway
- The former Richmond Vale Railway, located adjacent to the southern boundary of the study area.

The assessment did not identify any contamination in the Proposal site. Since the 2010 Phase 1 Environmental Site Assessment was undertaken, the Proposal site has been used as precast facility. Based on the site usage, contamination would not be expected to be present that would impact the ongoing land use as a precast facility, given the nature of the previous work and the minor volumes of chemicals that have been stored at the site and the low potential for significant spills to have occurred.

Catchment, surface water and flooding

The Proposal site is located within the Hunter catchment. Surface waterways in proximity to the Proposal site comprise Surveyors Creek and a large farm dam. Surveyors Creek generally traverses the property in a south easterly direction and is located approximately 40 metres east of the Proposal site. A farm dam is located towards the north eastern corner of the property and is approximately 100 metres north of the Proposal site. Two small basins about 600m² in surface area each are contained immediately adjacent to the precast shed hardstand to the north and north-west to capture runoff.

The 20 year average recurrence interval (ARI) flood levels for the property range between 19.1 metres Australian Height Datum (AHD) (north) and 20.4 metres AHD (south). The 100 year ARI flood levels for the property range between 20.15 metres AHD (north) and 20.6 metres AHD (south). The Proposal site is located adjacent to land mapped for the 100 year ARI flood levels and has been previously raised. Flood impacts to the Proposal were not considered further.

7.8.4. Potential impacts

The Proposal would be contained within the area previously disturbed and established for the Hunter Expressway precast facility. The Proposal would require removal of a grass covered topsoil stockpile and removal of five trees to extend the existing precast yard shed and hardstand by approximately 60 metres. The grass covered topsoil stockpile is 2,000m³ and would be relocated within the previously disturbed footprint of the precast facility and remained stockpiled. Minor earth works would be required within the 0.3 ha area required to extend the existing precast yard shed and hardstand by approximately 60 metres, however as these works would be completed within an estimated two weeks and therefore would not be expected to impact on soil and water quality during establishment. Temporary erosion and sediment controls would be installed during any exposure of soil.

During operation of the precast facility there would be the potential for site runoff to have elevated pH levels as a result of the concrete works being carried out on site. However, existing infrastructure including an on-site sediment basin within the Proposal footprint would capture and manage surface water on site to ensure that runoff leaving the site would not pollute nearby land or waterways. Details on surface water management would be detailed in the Environment Management Plan (EMP). Existing infrastructure would be inspected and any necessary repairs carried out before the facility is operational.

The Proposal may require the storage of fuels, oils and other potentially harmful substances onsite. The impact of accidental spills or leaks of these substances is anticipated to be low given the site is already established and the relatively flat topography of the Proposal site.

The proposed safeguards and management measures that will be implemented to address potential soil and surface water impacts of the Proposal are contained in Section 8.5

7.9. Air quality

7.9.1. Overview

A desktop air quality assessment was prepared for the Proposal as it is considered to be low risk since it involves the re-establishment of an existing precast facility. A summary of the assessment is provided in this section.

7.9.2. Methodology

The air quality assessment involved:

- Identifying air quality sensitive receivers with the potential to be adversely affected by the Proposal
- Establishing prevailing ambient air quality conditions around the Proposal using publicly available data over the last five complete calendar years (2017 to 2021) from air quality monitoring stations at Beresfield, operated by the Environment and Heritage Group of DPE.

7.9.3. Existing environment

Three sensitive receivers (residential dwellings) are located within the property (refer to Figure 1-3). The closest residential dwelling is located about 440 metres west of the Proposal site.

The Environment and Heritage Group of DPE operates a nearby ambient air quality monitoring station at Beresfield. Beresfield is located approximately 12 kilometres to the north east and is the closest station to the Proposal. The Beresfield air quality monitoring station records nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), sulphur dioxide (SO_2), PM_{10}, $PM_{2.5}$ and visibility (NEPH). Data collected for the period 2017 – 2021 showed that there were no days when the pollutants exceeded the criteria except for O_3, PM_{10} and NEPH.

- The O_3 one-hour average was exceeded twice on 31 December 2018 and 21 December 2019
- The O_3 four-hour rolling was exceeded five times on 31 December 2018 and 10, 19, 21 and 29 December 2019
- The NEPH one-hour average criterion was exceeded 43 times (including 39 times between October 2019 to February 2020 associated with regional bushfires)
- The PM_{10} (50 mg/m^3) 24-hour average criterion was exceeded 44 times (including 34 times between October 2019 to February 2020 associated with regional bushfires).

Many Environment and Heritage Group monitoring stations record that the PM_{10} criteria is exceeded a few times each year. This is typically driven by unavoidable events, such as dust storms, bushfires and hazard reduction burns, though other emission sources may include industry, motor vehicles, and domestic activities such as solid fuel heaters.

7.9.4. Potential impacts

During the construction works required to relocate the soil stockpile and extend the existing precast yard shed and hardstand, minor soil disturbance would occur that could generate dust. During operation of the Proposal, air quality may be temporarily affected as a result of particulate (dust) and gaseous (vehicle exhaust and volatile organic compounds) emissions. The soil stockpile would be relocated within the previously disturbed footprint of the precast facility and would remain stockpiled.

The total amount of dust generated would depend on the silt and moisture content of the soil, the types of activities being carried out, the size of exposed areas, the frequency of water spraying and the speed of machinery.

Primary sources of dust and exhaust emissions include:

- Vehicles entering and leaving the site, and on-site machinery
- Storage of fuel and refuelling activities
- Concrete dust
- Inadequate equipment maintenance.

The Proposal would require minor short-term soil disturbance (extension of the hardstand would take an estimated two weeks).The air quality impacts can be managed through the implementation of standard management measures (Section 8.5)., Impacts to ambient air quality from the Proposal would be temporary and minor.

7.10. Resource use and waste management

7.10.1. Overview

A desktop review of resource use and waste management impacts was prepared for the Proposal as it is considered to be low risk as the Proposal is wholly located within the disturbed area of the previously established Hunter Expressway precast facility. A summary of the assessment is provided in this section.

7.10.2. Methodology

The resource use and waste management assessment involved:

- Identifying resource use and management during construction and operation
- Identifying likely waste generating activities and likely waste types
- Identifying mitigation measures to manage potential impacts associated with resource use and waste management.

The waste management hierarchy principles established under the *Waste Avoidance and Resource Recovery Act 2001* of avoid/reduce/reuse/recycle/dispose would be applied to the construction and operation of the Proposal.

7.10.3. Potential impacts

The type and quantities of resources and materials needed to re-establish the Proposal are relatively minor and readily available within the Hunter region. The main resources needed to extend the existing precast yard shed and hardstand will be concrete, aggregate, sand and water.

The volume of waste anticipated to be generated during extension of the construction would be relatively minor. Existing local waste management facilities have capacity to receive the anticipated waste streams generated by the Proposal in skip bins. General construction wastes and wastes from site offices would be collected for offsite recycling wherever practicable. It is not expected special waste, restricted solid waste, and/or hazardous waste would be generated as part of the Proposal.

During operation, the key materials required for the operation of the Proposal include: concrete delivered from an off-site batch plant, steel and water.

The amount of input materials required would vary based on the precast production rates. For the purposes of this assessment, peak production rates have been assumed at 100 tonnes of concrete used per day. Refer to Chapter 5 (Description of the Proposal) for the volume of input materials required to support this production rate.

The volumes of waste generated during operations, maintenance and repairs are anticipated to be minimal and would be readily managed through the implementation of standard mitigation measures. Operation of the Proposal would generate waste streams, including:

- Concrete from faulty precast segments (anticipated to be approximately one to two per cent of total production)
- Oil, grease and other liquid wastes from the maintenance of plant and equipment
- General office waste (including sewerage and grey water)
- Domestic waste from personnel (including food scraps, glass and plastic bottles, paper and plastic containers).

The impacts are expected to be minor. The proposed safeguards and management measures that will be implemented to address potential resource use and waste management impacts of the Proposal are contained in Section 8.5.

7.11. Sustainability, climate change and greenhouse gases

7.11.1. Overview

The National Strategy for Ecologically Sustainable Development (Department of Environment and Heritage, 1992) defines Ecologically Sustainable Development (ESD) as “using, conserving and enhancing the community’s resources so that the ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased”. The concept of ESD gives formal recognition to environmental and social considerations in decision-making to ensure that current and future generations enjoy an environment that functions as well as, or better than, the environment they inherit. Consideration of the Proposal against the principles of ESD are detailed in Section 9 (Justification and conclusion).

An overview of the key documents which set the approach to sustainability for the Proposal is provided below.

Project specific sustainability plan

A Sydney Metro – Western Sydney Airport Sustainability Plan has been developed to set out the sustainability principles, objectives and initiatives including performance targets and outcomes which would be adopted from planning, procurement, design, construction and operations to end-of-life. This encompasses all three aspects of sustainability – environmental, social and economic.

Six principles have been developed to govern environmental and socio-economic outcomes and performance for Sydney Metro – Western Sydney Airport. The principles are designed to deliver on the Sydney Metro Environment and Sustainability Policy commitments and are set out in Figure 7-7.

Figure 7-7: Sustainability principles and objectives

Targets and initiatives have been developed to support the sustainability principles for Sydney Metro – Western Sydney Airport. The following initiatives would be of particular relevance to the Proposal:

- Low carbon requirements for concrete
- Reuse of water during operation of the precast facility
- Used of recycled aggregate during production of precast elements

7.11.2. Climate change and greenhouse gases

The Proposal's contribution to NSW's greenhouse gas emissions and the known effects of climate change has been considered in the following sections.

Greenhouse gas emissions and mitigation measures

The volume of greenhouse gas emissions generated during construction of the Proposal would be relatively minor. While it would not be possible to completely avoid the generation of greenhouse gas emissions during construction (due to the need to consume energy and resources), emissions would be mitigated through the implementation of the Sydney Metro – Western Sydney Airport Sustainability Plan.

Potential greenhouse gas emissions would result from the following activities:

- Construction traffic and equipment emissions
- Emissions generated in producing construction materials (embodied energy)
- Electricity-generated emissions in response to the power requirements to service the Proposal
- Upstream and downstream lifecycle emissions (e.g. fuel extraction, processing, production, transport, disposal) including emissions at the construction compounds/ laydown areas

Operational greenhouse gas emissions associated with the Proposal would predominantly be attributed to vehicular movements, electrical consumption to power equipment and machinery, and embodied energy in materials.

Climate change risks and mitigation measures

Climate change could have potential direct and indirect impacts in the Lower Hunter and more specifically to the Proposal. The types of potential climate change risks during construction and operation of the Proposal would be associated with severe weather events, such as the increased frequency and severity of rainfall events placing increased pressure on erosion and sediment control measures and/or resulting in the flooding of the Proposal site and surrounds. Potential climate change risks can be appropriately managed through the implementation of risk management processes such as mitigation measures including erosion and sediment controls (refer to Section 7.8 (Soils and surface water quality)).

7.12. Cumulative impacts

7.12.1. Overview

Cumulative impacts can occur when impacts from a project interact or overlap with impacts from other projects, and can potentially result in a larger overall effect on the environment, businesses or local communities. Cumulative impacts may occur when projects are constructed or operated concurrently or consecutively. Projects constructed consecutively (or sequentially) can have construction activities occurring over extended periods of time with little or no break in construction activities. This has the potential for increased impacts and construction fatigue for local communities.

7.12.2. Methodology

The assessment methodology for the cumulative impact assessment for the project involved:

- Identifying committed projects that are likely to be under construction and/or operation in the area within one kilometre of the Proposal site, concurrently or consecutively with the Proposal, by referring to:
    - The NSW Department of Planning and Environment major projects assessments register
    - The Australian Government Department of Environment public notices and the invitation to comment register
    - Public agency websites that are progressing development under Part 5 of the EP&A Act
- Identifying potential impacts of the above projects where known
- Assessing whether the impacts of the Proposal would combine with the impacts of these projects to create a cumulative effect
- Assessing whether mitigation measures considered in this REF would be sufficient to manage impacts, or need modifying or supplementing.

7.12.3. Potential impacts

Cumulative traffic impacts at the delivery point have not been assessed as part of the Sydney Metro – Western Sydney Airport project as the delivery of precast segments via the local road network in Luddenham has been considered in the Sydney Metro -Western Sydney Airport EIS. Projects considered as part of the cumulative impact assessment are provided in

Table 7-7.

Table 7-7: Projects assessed as part of the cumulative impact assessment

Project name, proponent, status and expected construction period	Description
Projects	
Orica Kurri Technical Centre, 1151 George Booth Drive, Richmond Vale, NSW 2323	Ongoing operation of the Orica ammonium nitrate emulsion plant which commenced in 2012

No cumulative traffic impacts are expected. Noise, vibration and air quality impacts associated with the above project is expected to be identified and managed at a project level through appropriate noise, vibration and air quality mitigation measures and due to the distance between the projects, cumulative impacts are not expected. No other proposed developments were identified.

The proposed safeguards and management measures that will be implemented to address cumulative impacts of the Proposal are contained in Section 8.5.

8. Environmental management

This section identifies how the environmental impacts of the Proposal would be managed through Environmental Management Plans and mitigation measures. Section 8.5 lists the proposed mitigation measures for the Proposal to minimise the impacts of the Proposal identified in Section 7 (Environmental impact assessment).

8.1. Environmental management systems

The Sydney Metro environmental management system would be used to manage the construction and operation of the Proposal. The management system would provide the framework for implementing the environmental management measures documented in this REF, and any conditions of other approvals, licences or permits.

8.2. Environmental management plans

Sydney Metro has developed and successfully implemented a range of documents to set out the management approach during construction of its projects. These documents are outlined below and would be applied, as relevant, to the construction of the Proposal.

8.2.1. Construction Environmental Management Framework

The Sydney Metro Construction Environmental Management Framework (CEMF) details the approach to environmental management and monitoring during construction, which will be applied to this Proposal. The framework is a linking document between planning approval documentation (including commitments made within this REF) and construction environmental management documentation, which would be developed by the construction contractors.

The CEMF details the environmental, stakeholder and community management systems and processes for the construction of the Proposal.

8.2.2. Construction Noise and Vibration Standard

Noise and vibration impacts of the Proposal would be managed in accordance with the Sydney Metro Construction Noise and Vibration Standard (CNVS), which aims to manage noise and vibration levels where feasible and reasonable using a variety of mitigation measures. The CNVS provides guidance for managing construction noise and vibration impacts to provide a consistent approach to management and mitigation across all Sydney Metro projects.

The Standard also provides:

- A list of standard mitigation measures that would be implemented where feasible and reasonable
- Trigger levels (based on exceedances of airborne NMLs) for the implementation of additional mitigation measures.

8.2.3. Construction Traffic Management Framework

Traffic impacts associated with the Proposal would be managed in accordance with the Sydney Metro Construction Traffic Management Framework (CTMF). This framework provides an overall strategy and approach for construction traffic management, and an outline of the traffic management requirements and processes that would be applied. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing impacts to the road network.

8.3. Operational Management

Environmental impacts during the operation of the Proposal such as for operational noise and operational traffic would be managed in accordance with the mitigation measures outlined in Table 8-1.

8.4. Overarching Community Communication Strategy

The Overarching Community Communication Strategy (OCCS) has been prepared to guide Sydney Metro's approach to stakeholder and community liaison including engagement with communities, stakeholders and businesses. This plan is intended to be used as a framework for community engagement across all Sydney Metro projects and contracts. The OCCS considers all work activities and packages for Sydney Metro and its projects for the duration of work, and 12 months following the completion of construction.

Contract specific Community Communication Strategies (CCS) will be developed by appointed project delivery communication teams (PDCT) to address contract and site specific needs of the community, stakeholders and businesses. These strategies will reflect the requirements of the OCCS and they will adhere to the requirements outlined in the relevant contract specification – Stakeholder and Community Engagement, along with requirements identified in any relevant planning approval. The OCCS and CCS are supported by a Construction Complaints Management System (CCMS) which outlines the framework for managing complaints, enquiries and escalation processes throughout the project lifecycle. The CCMS also outlines the process for reporting complaints.

8.5. Mitigation measures

Mitigation measures to be implemented during the construction and operation of the Proposal are listed in Table 8-1.

Table 8-1: Construction environmental management measures

Ref	Issue	Mitigation measure
General		
G1	Environmental management	An Environment Management Plan (EMP) will be prepared in accordance with the CEMF, CNVS, CTMF and submitted for review and endorsement of the Sydney Metro Environment Manager prior to commencement of the activity. As a minimum, the EMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed EMP will be implemented during the undertaking of the activity.

Ref	Issue	Mitigation measure
G2	General notification	All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity will be notified at least seven days prior to commencement of the activity.
G3	General environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings
Transport		
T1	Traffic management	A Construction Traffic Management Plan (CTMP) will be prepared in accordance with the Sydney Metro Construction Traffic Management Framework. The CTMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to consult and inform the local community of impacts on the local road network • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms.
T2	Traffic management	Heavy vehicle movements to and from the Proposal site would be scheduled to minimise traffic disruption to the surrounding road network. This may include, but is not limited to: • Scheduling the movement of construction material, equipment and waste to occur outside of peak periods (during standard construction hours) where practical • Scheduling heavy vehicle deliveries to be evenly dispersed as far as practical to minimise convoying or platoons and queuing outside the Proposal site
T3	Traffic incidents	In the event of a traffic-related incident, coordination would be carried out with Transport Coordination and/or other parts of Transport for NSW.
T4	Emergency vehicles access	Access to properties for emergency vehicles would be provided at all times
T5	Road safety	All trucks would enter and exit the Proposal site in a forward direction, where feasible and reasonable to minimise collision and safety risks
T6	Road safety	The loading and unloading of trucks would be planned to ensure each individual truck haulage capacity is fully utilised to reduce the total number of truck movements
T7	Road safety	All loading /unloading activities would occur within the Proposal site
T8	Road safety	Public roads and access points would not be obstructed by any materials, vehicles, skip bins or the like, under any circumstances
T9	Road safety	All vehicles transporting loose materials would have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the Proposal site
T10	Road safety	All vehicles leaving the site would be checked that they are clean of materials that may fall on the roadway before they are allowed to leave the site

Ref	Issue	Mitigation measure
T11	Staff parking	All staff parking would be provided on-site and no staff will park on surrounding local streets
Noise and vibration		
NV1	Noise impacts during works	During construction, receivers that would potentially be affected by noise from the works would be appropriately notified before the relevant works start. Notification will be delivered to sensitive receivers at least 7 days prior to commencement of works.
NV2	Noise exceedances at receivers	Attended noise monitoring is to be undertaken to verify that noise levels resulting from works are in accordance with the levels predicted in this noise and vibration assessment report, subject to obtaining the property owner/occupier's consent to access the property (where required). Noise monitoring is recommended to be conducted at CT3/1416 George Booth Drive, Buchanan - within 30 metres of the building, on the side closest to the precast facility. If the standard mitigation measures are not found to be adequate, further mitigation measures would be considered and implemented where feasible and reasonable
NV3	At source noise impacts	The following at-source control measures are recommended to reduce potential noise impacts: • Sound Power or Sound Pressure Levels compliant plan and equipment • Equipment selection • Use and siting of plant • Non-tonal reversing alarms • Minimise disturbance arising from delivery of goods • Reduce noise from mobile plant through additional fittings • Limit use of engine compression breaks • Limit equipment in use.
NV4	Noise barriers	Any buildings or structures on site shall be used as a noise barrier, where practicable to provide shielding to the nearest affected receivers.
NV5	Noise impacts during works	The EMP would include a relevant section for construction noise and vibration management which must be prepared in accordance with the Sydney Metro Construction Noise and Vibration Standard. The EMP would be regularly updated to account for any changes in noise management issues and strategies.
NV6	Construction hours and scheduling	Construction and operation would be carried out during standard construction hours. Work generating high noise levels should be scheduled during less sensitive time periods, such as after 8 am.
NV7	Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • Noise and vibration mitigation measures • Permissible hours of work • Limitations to noise generating activities with special audible characteristics • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times • Environmental incident procedures • Behavioural practices (no dropping of materials from height, excessive revving of engines etc).

Ref	Issue	Mitigation measure
NV8	Verification monitoring	A noise monitoring program should be carried out for the duration of works in accordance with the EMP and any approval conditions.
Biodiversity		
B1	Potential fauna impact	Employment of a fauna spotter/catcher experienced in native fauna identification for pre-clearance works, to avoid direct impacts to species. Clearing works will be undertaken in accordance with the CEMF. Species identified as likely to occur within the Proposal area include snakes.
B2	Potential impact to adjacent vegetation	Avoid impacts to adjacent vegetation, including exclusion zones around trees to be retained (including a buffer for the tree root zone) and vegetation around dams.
B3	Unexpected threatened species	An unexpected threatened species finds procedure is to be contained in the EMP and followed if a threatened species is encountered that has not previously been identified and assessed in the environmental assessment.
B4	Biosecurity risk	Biosecurity risks (i.e. weeds) must be managed in accordance with the Biosecurity Act 2015: • Machinery, vehicles, and footwear to be cleaned and washdown procedure adhered to, prior to moving to a new location from site • Disposal of sealed bagged weeds to a licenced waste disposal facility
Landscape and visual character		
L1	Visual impact	To reduce the potential visual impact of construction activities: • Work sites will be left tidy at the end of each work day • If night work is to occur, lighting for will comply with relevant Australian Standards, including AS4282-1997 (Control of the obtrusive effects of outdoor lighting).
Historical **heritage**		
NA1	Historical heritage	An unexpected heritage finds procedure is to be contained in the EMP and followed in the event that any unexpected heritage items, archaeological remains or potential relics of Historical origin are encountered.
Aboriginal heritage		
AH1	Aboriginal heritage	An unexpected heritage finds procedure is to be contained in the EMP and followed in the event that any unknown or potential Aboriginal object/s, including skeletal remains are encountered.
Property, land use and socio-economic		
P1	Property, land use and socio-economic management	Storage of plant and equipment is to be undertaken only within the previously disturbed footprint of the precast yard and within the footprint of the land leased by the Proposal for the precast facility
Soils and surface water quality		
SW1	Soil and water management	Environmental safeguards (e.g. sediment fences, sumps) are to be inspected and repaired to consistent with the Blue Book – “Managing Urban Stormwater: Soils and Construction” (4th Edition Landcom, 2004)
SW2	Contaminated land	An EMP will be prepared and implemented prior to construction. The EMP will include an Unexpected Contaminated Land Finds Protocol, or similar, which would document the process for the investigation, remediation and/or management of contamination if identified during the works. If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Sydney Metro Environment Manager and/or EPA.

Ref	Issue	Mitigation measure
SW3	Accidental spills	A site specific emergency spill plan will be developed, and include spill management measures. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Sydney Metro and/or EPA).
SW4	Storage of substances	Storage of fuels, oils and other potentially harmful substances are to be stored in appropriately bunded areas
SW5	Elevated pH run off	Bunded areas will be available to collect concrete waste to ensure that runoff leaving the site would not pollute nearby land or waterways.
Air quality		
AQ1	Air quality management	An EMP will be prepared and implemented prior to construction. The EMP would detail risks and standard management measures to reduce impacts on air quality
Resource use and waste management		
R1	Resource use and waste management	An EMP will be prepared and implemented prior to construction. The PEMP would detail risks and standard management measures to reduce impacts on resource use and waste management
Sustainability, climate change and greenhouse gases		
S1	Sustainability management	An EMP will be prepared and implemented prior to construction. The PEMP would detail risks and standard management measures to reduce impacts on resource use and waste management
Cumulative impacts		
C1	Cumulative construction impacts	Consultation will be undertaken with surrounding projects or developments if they occur during construction to: • Increase awareness of construction timeframes and impacts • Coordinate impact mitigation and management (e.g. respite periods).

9. Justification and conclusion

This section provides the justification for the Proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the Proposal is in the public interest. The Proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Clause 7(4) of Schedule 2 to the EP&A Regulation.

This REF seeks to assess the environmental impacts of the re-establishment, expansion and operation of a proposed precast facility located on George Booth Drive, Buchanan, NSW.

9.1. Justification

9.1.1. Need for the Proposal

Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

The Proposal would support the efficient construction of the Sydney Metro – Western Sydney Airport project by facilitating the construction of the viaduct segments. The construction and operation of the metro rail line between St Marys and Aerotropolis includes the construction of approximately 3.5 kilometres of viaducts. These viaducts would be constructed from precast concrete elements that are transported to site prior to installation. The need for Sydney Metro – Western Sydney Airport is detailed in the Sydney Metro – Western Sydney Airport Environmental Impact Statement (2020.

The re-establishment of this precast facility would remove the need to establish a new precast facility at a new site and enable efficient reuse of the site.

9.1.2. Benefits and impacts of the Proposal

The key benefits of the Proposal to re-establish a previously used precast facility are to:

- reduce the clearing footprint required within the Western Sydney Airport construction boundary
- reuse existing equipment and facilities to provide efficiencies and reduce project construction costs.

The potential impacts associated with the Proposal that will have safeguards and management measures to mitigate include:

- Traffic and transport impacts associated with an increase in heavy and light vehicles around the Proposal site
- Increase in noise for sensitive receivers surrounding the Proposal site
- Minor biodiversity impacts associated with the removal of five trees.

Environmental impacts have been avoided or would be minimised wherever possible through design and the site-specific mitigation measures summarised in Section 8. The benefits of the Proposal are considered to outweigh the potential impacts and the Proposal is considered to be justified.

9.2. Objects of the EP&A Act

An assessment of the Proposal against the objects of the EP&A Act is provided in Table 9-1.

Table 9-1: Assessment of the Proposal against the objects of the EP&A Act

Object	Comment
1.3(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources	The Proposal would provide social and economic benefits by providing employment opportunities in the region and by reusing the existing equipment and facilities, will provide efficiencies and reduce project construction costs. The Proposal would have no impact on the state's key natural and other resources; agricultural land, natural areas, forests or minerals. A range of safeguards and management measures are proposed to minimise potential environmental impacts associated with the Proposal.
1.3(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment	Ecologically sustainable development is considered in Section 9.3.
1.3(c) to promote the orderly and economic use and development of land	This objective is not directly relevant to the Proposal
1.3(d) to promote the delivery and maintenance of affordable housing	This objective is not directly relevant to the Proposal
1.3(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats	The Proposal is not predicted to have a significant impact on conservation of threatened and other species of native animals and plants, ecological communities and their habitats.
1.3(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)	The Proposal is not predicted to have any impacts on any Aboriginal or Historical heritage.
1.3(g) to promote good design and amenity of the built environment	The Proposal relates to reusing the existing equipment and facilities so this objective is not directly relevant to the Proposal
1.3(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants	The construction of all buildings would be completed in a manner which is consistent with the applicable Australian and international safety standards.
1.3(i) To promote the sharing of the responsibility for environmental planning between different levels of government in the State	Sharing the responsibility of environmental planning is interpreted under two principal planning approval pathways in the EP&A Act. The EP&A Act also describes who is responsible for managing and coordinating these pathways. Division 5.1 of the EP&A Act describes the responsibilities for public agencies undertaking development without consent. These provisions are supported by the provisions of the Transport and Infrastructure SEPP. Collectively they describe the sharing responsibilities across all levels of Government in delivering public infrastructure. In delivering the Proposal under the above pathway Sydney Metro has fulfilled its obligations in this regard under the EP&A Act.
1.3(j) To provide increased opportunity for public involvement and participation	Consultation would be undertaken with the community and stakeholders prior to the re-establishment of the Proposal.

Object	Comment
in environmental planning and assessment	The public display of the REF and the submissions response process will provide an opportunity for the public to raise concerns and comments about the Proposal. Sydney Metro will respond to these submissions and undertake additional environmental assessment if and where required.

9.3. Ecologically sustainable development

Sydney Metro is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ESD. The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the EP&A Regulation as:

- Precautionary principle — Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for not implementing mitigation measures or strategies to avoid potential impacts
- Inter-generational equity — The present generation should ensure that the health, diversity and productivity of the environment are equal to or better for the future generations
- Conservation of biological diversity and ecological integrity — Preserving biological diversity and ecological integrity requires that ecosystems, species and genetic diversity within species are maintained
- Improved valuation and pricing of environmental resources — This principle establishes the need to determine economic values for services provided by the natural environment, such as the atmosphere's ability to receive gaseous emissions, cultural values and visual amenity.

The principles of ESD have been adopted by Sydney Metro throughout the development and assessment of the Proposal and the Proposal would be delivered within the environmental and sustainability framework established for the proposed Sydney Metro – Western Sydney Airport . Table 9-2 provides an assessment of the Proposal in relation to the principles of ESD.

Table 9-2: Adherence with the principles of ESD

ESD principle	Comment
Precautionary principle	A precautionary approach has been applied throughout the development of the Proposal. The REF process has sought to minimise the environmental impact of the Proposal. There are no threats of serious or irreversible damage posed by this development. All of the environmental risks have been carefully and thoughtfully considered through the preparation of the REF and would be mitigated through the implementation of Sydney Metro's Construction Environmental Management Framework for the Proposal and the mitigation measures included in Section 8 (Environmental management).
Inter-generational equity	The Proposal would support the delivery of the Sydney Metro – Western Sydney Airport project which will provide long-term transport and city-shaping benefits across Greater Western Sydney. Implementation of the safeguards outlined in this REF would ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
Conservation of biological diversity	The Proposal site layout has been designed to minimise impacts to biodiversity, including through the extension of the hardstand area to avoid vegetation clearing where practical.

ESD principle	Comment
and ecological integrity	The Proposal would require the removal of five trees. As discussed in Section 7.3 the Proposal site does not contain any threatened ecological communities, suitable fauna habitat or threatened species. Therefore no significant ecological impacts as a result of the Proposal are anticipated. Any potential impacts would be minimised through the proposed safeguards outlined in Section 8.
Improved valuation and pricing of environmental resources	Environmental and social issues were considered in the strategic planning and establishment of the need for the Proposal, and in consideration of various Proposal options. The value placed on environmental resources is evident in the extent of the planning, environmental investigations, design of Proposal and proposed mitigation measures. Implementation of these mitigation measures would result in an economic cost to Sydney Metro. Mitigation measures relating to resource management include the avoidance, reuse, recycling and management of waste during construction and operation of the Proposal.

9.4. Conclusion

The Proposal has been subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of other environmental planning instruments as well as other NSW and Commonwealth legislation.

The Proposal as described in the REF best meets the Proposal objectives. Some potential impacts may occur relating to traffic, access, noise and biodiversity issues. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts.

The REF has considered and assessed these impacts in accordance with Clause 171 of the EP&A Regulation and the requirements of the EPBC Act (refer to Section 7, Appendix A (Consideration of Environmental Factors and Matters of National Environmental Significance)). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an EIS is not required, nor is the approval of the Minister for Planning.

The Proposal has also taken into account the principles of ecologically sustainable development and the objects of the EP&A Act. The Proposal would be delivered to maximise the benefit for the community, be cost effective and minimise any adverse impacts on the environment. On balance, the Proposal is considered justified and in the public interest.

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Appendix A: Consideration of Environmental Factors and Matters

Consideration of clause 171(2) factors and matters of national environmental significance

In addition to the requirements of the *Is an EIS required?* guideline as detailed in the REF, the following factors, listed in Cause 171(2) of the EP&A Regulation have also been considered to assess the likely impacts of the Proposal on the natural and built environment.

Table A1-1: Review of clause 171(2) environmental factors

Clause 171 considerations	Impact
a) The environmental impact on the community.	
Construction and operation of the Proposal would result in some short-term negative impacts on traffic, noise and vibration and biodiversity. These issues could impact negatively on the identified sensitive receivers and community as described in Section 7.1 (Transport), Section 7.2 (Noise and Vibration) and Section 7.3 (Biodiversity). These impacts would be managed according to the safeguards outlined in Section 8.5.	Short-term, minor, negative
b) The transformation of the locality.	
During construction and operation, the Proposal would result in temporary impacts on the existing locality, which would be predominantly through negative visual amenity impacts associated with visibility of site facilities and associated operational activities, presence of construction plant and equipment, construction vehicles movements within the Proposal site. These impacts would be managed according to the safeguards outlined in Section 8.5.	Short-term, minor, negative
c) The environmental impact on the ecosystems of the locality.	
The Proposal would not impact on the ecosystems of the locality.	Nil
d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality.	
The construction and operation of the Proposal would result in temporary moderate-low visual impacts to the three identified sensitive receivers (residential dwellings) identified within the property. Visual impacts would be associated with the visibility of the associated use including presence of construction plant and equipment and construction vehicles movements within the Proposal site. Visual impacts as a result of the Proposal would be temporary and limited to the duration of construction of the Sydney Metro – Western Sydney Airport project. At the completion of the Sydney Metro – Western Sydney Airport project construction works, all plant and equipment brought to the site in relation to the Buchanan Precast Facility would be removed and the site returned to its existing state.	Short-term, minor, negative

Clause 171 considerations	Impact
e) The effects on any locality, place or building that has aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	
The construction and operation of the Proposal would result in temporary moderate-low visual impacts to the three identified sensitive receivers (residential dwellings) identified within the property. Visual impacts would be associated with operational activities and the presence of construction plant and equipment, construction vehicles movements within the Proposal site. Visual impacts as a result of the Proposal would be temporary and limited to the duration of construction of the Sydney Metro – Western Sydney Airport project. At the completion of Sydney Metro – Western Sydney Airport project construction works the site would be returned to its existing state.	Short-term, minor, negative
f) The impact on the habitat of protected animals (within the meaning of the *Biodiversity Conservation Act 2016*).	
The Proposal would not impact on the habitat of protected animals.	Nil
g) The endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	
The Proposal would not endanger of any species of animal, plant or other form of life, whether living on land, in water or in the air.	Nil
h) long-term effects on the environment.	
The Proposal would facilitate construction of the Sydney Metro – Western Sydney Airport project. Sydney Metro is Australia's biggest public transport program and will deliver an integrated transport system that meets the needs of customers now and in the future.	Short-term, moderate, positive
i) degradation of the quality of the environment.	
The Proposal has the potential to degrade the quality of the environment as a result of traffic, noise and air quality impacts. These impacts would be managed according to the safeguards outlined in Section 8.5.	Short-term, minor, negative
j) risk to the safety of the environment.	
Occupational health and safety hazards include transporting construction plant and materials beneath the Ausgrid electricity lines. Consultation with Ausgrid has been undertaken to avoid any impacts..	Nil
k) reduction in the range of beneficial uses of the environment.	
The Proposal is located on the land that previously operated as a precast facility for the Hunter Expressway and New M5 road projects. The use of the site does not limit the existing surrounding agricultural uses.	Nil
l) pollution of the environment.	
The Proposal has the potential to generate pollution as a result of traffic, noise, water, and air quality	Short-term, minor, negative

Clause 171 considerations	Impact
impacts. These impacts would be managed according to the safeguards outlined in Section 8.5.	
m) environmental problems associated with the disposal of waste.	
Construction and operation of the Proposal would generate waste streams, including: • Concrete • Green waste from vegetation removal • Oil, grease and other liquid wastes from the maintenance of construction plant and equipment • General construction waste • Domestic waste from construction personnel Volumes of waste generated by the Proposal would be readily managed through the application of standard mitigation measures outlined in Section 8.5.	Short-term, minor, negative
n) Increased demands on natural or other resources that are, or are likely to become, in short supply.	
The Proposal would require resources such as concrete and water, which are common construction materials. The Proposal would not create a substantial demand on these resources.	Nil
o) The cumulative environmental effect with other existing or likely future activities.	
Operation of the Proposal may overlap with other local developments within the area. Given the nature of the Proposal, cumulative impacts as a result of concurrent development is anticipated to be minor and would be managed according to safeguards outlined in Section 8.5.	Short-term, minor, negative
p) The impact on coastal processes and coastal hazards, including those under projected climate change conditions.	
The Proposal would not result in any impact on coastal processes and coastal hazards including those under projected climate change conditions.	Nil
q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,	
The Proposal would not affect any local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1.	Nil
r) other relevant environmental factors	
No further relevant environmental factors were identified for the construction and operation of the Proposal	Nil

Consideration of Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the Proposal should be referred to the Australian Government's Department of Agriculture, Water and the Environment. These issues are considered in Table A1.2.

Table A1-2: Checklist of EPBC Act matters

Matters of national environmental significance	Impact
(a) World heritage properties.	
There are no items within the Proposal site listed on the World Heritage List.	Nil
(b) National heritage places.	
There are no items within the Proposal site listed on the National Heritage List.	Nil
(c) Wetlands of international importance.	
There are no wetlands of international importance in the Proposal site or likely to be affected by the Proposal. The Hunter estuary wetlands are located more than 10 kilometre to the east of the Proposal site.	Nil
(d) Nationally threatened species and ecological communities.	
The Proposal would have no impact on a listed threatened species or community. There are 4 listed threatened ecological communities and 40 listed threatened species migratory species, or species habitat that is known to occur within the area, however the Proposal would not require the clearance of any threatened ecological communities and the existing vegetation in the Proposal site is limited to sparsely distributed exotic grassland and therefore is not considered to provide suitable fauna habitat.	Nil
(e) Migratory species	
The Proposal would have no impact on a listed migratory species. There are 17 listed migratory species that are known to occur within the area, however the Proposal would not provide suitable habitat for migratory species due to the areas low habitat potential.	Nil
(f) Commonwealth marine areas.	
The Proposal would have no impact on a Commonwealth marine area.	Nil
(g) The Great Barrier Reef Marine Park	
The Proposal would have no impact on The Great Barrier Reef Marine Park.	Nil
(h) Protection of water resources from coal seam gas development and large coal mining development	
The Proposal would have no impact on water resources from coal seam gas development and large coal mining development	Nil
(i) Nuclear actions (including uranium mining).	
The Proposal does not involve a nuclear action	Nil
(j) Any impact (direct or indirect) on Commonwealth land?	
The Proposal would have no impact (direct or indirect) on Commonwealth land.	Nil

Appendix B

Traffic and Transport Assessment

Traffic and Transport Assessment

Document no: IA055301.244
Revision no: 03

CPB Contractors and United Infrastructure Joint Venture

Hunter Pre-cast Facility
23 May 2022

Traffic and Transport Assessment

Client name:	CPB Contractors and United Infrastructure Joint Venture		
Project name:	Hunter Pre-cast Facility		
Document no:	IA055301.244	**Project no:**	IA055301
Revision no:	03	**Prepared by:**	April Alcock
Date:	23 May 2022	**File name:**	Hunter Pre-cast Facility - Traffic and Transport Assessment
Doc status:	Final		

Document history and status

Revision	Date	Description	Author	Reviewed
01	25/03/2022	Draft	A. Alcock	S. Quinn
02	13/05/2022	Final	A. Alcock	S. Quinn
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1. Introduction

1.1 Proposal background

Sydney is expanding and the NSW Government is working hard to deliver an integrated transport system that meets the needs of customers now and in the future.

Sydney Metro is Australia's biggest public transport program. Services started on the Metro North West Line between Rouse Hill and Chatswood in May 2019 on this new stand-alone metro railway system, which is revolutionising the way Greater Sydney travels. Sydney Metro's program of work includes:

- **The North West Metro Line** – Opened in May 2019 with driverless trains running every four minutes in the peak in each direction between Tallawong Station in Rouse Hill and Chatswood
- **Sydney Metro City & Southwest** – A new 30-kilometre metro line extending the new metro network from the end of the North West Metro at Chatswood, under Sydney Harbour, through the Sydney central business district (CBD) and south west to Bankstown. It is due to open in 2024 with capacity to run a metro train every two minutes each way under the centre of Sydney
- **Sydney Metro West** – A new 24-kilometre metro line that would connect Greater Parramatta with the Sydney CBD. Confirmed stations include Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Sydney CBD. This infrastructure investment would double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes
- **Sydney Metro – Western Sydney Airport** – A new metro railway that will service Greater Western Sydney and the new Western Sydney International (Nancy-Bird Walton) Airport forming the transport spine of the Western Parkland City.

The Sydney Metro – Western Sydney Airport is a city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis. The 23-kilometre new railway will link residential areas with job hubs including the new Aerotropolis and connect travellers from the new airport to the rest of Sydney's public transport system.

Sydney Metro (as 'the Proponent') is seeking approval to re-establish and operate a precast facility (the Proposal) located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site) to support the construction of the Sydney Metro – Western Sydney Airport. The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and 2017 to support construction of the New M5 project.

- Minimal site construction works would be required to reinstate the precast facility as the site is already established. Site construction works for the Proposal would include:
- Re-instating fencing around the Proposal site
- Installing site office facilities
- Inspection of existing facilities including waste water treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- Extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate six viaduct precast moulds.

The Proposal site would be approximately four hectares in size and wholly contained within the previously disturbed and established precast facility. The Proposal site would accommodate the following facilities:

- Demountable site compound office
- A precast yard, including existing shed for construction of precast units and storage laydown area
- Wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin

- On-site parking for up to 60 vehicles.

The proposed use of the facility is temporary. Once the precast works required for the Sydney Metro – Western Sydney Airport are completed, the use of the facility will cease. The location of the Proposal is shown in Figure 1-1 and the layout of the Proposal is shown in Figure 1-2.

1.2 Proposal location

The address of the Proposal is Lot 32, 1416 George Booth Drive, Buchanan. The Proposal is located within the Cessnock City Council Local Government area, approximately 160 kilometres north-west of Sydney and 30 kilometres west of Newcastle. The footprint of the Proposal would be wholly contained within the area previously used as the pre-cast facility for the Hunter Expressway and the New M5 projects.

The Proposal is situated on land zoned RU2 rural which is predominately used for agriculture including cattle grazing and poultry farming. The main land use features within the property where the Proposal is located include:

- A relatively flat area of disturbed land with existing shed
- Three residential dwellings located towards the western property boundary (closest residential dwelling located about 530 metres west of the Proposal)
- A poultry farm located towards the north-western corner
- An Ausgrid electricity easement (comprising two 33 kilovolt power lines and one 11 kilovolt power line with a clearance of eight metres) which traverses through the property in a north westerly direction
- A large dam located towards the north-eastern corner of the property.

Land uses adjacent to the Proposal comprise a mix of agricultural grazing land located to the north and west, the Hunter Expressway corridor located to the east, the former Richmond Vale Railway corridor which runs parallel to the southern boundary of the property and undeveloped bushland owned by National Parks and Wildlife Services located adjacent to the southern property boundary.

Figure 1-1. Site locality

Figure 1-2. Site layout

1.3 Purpose of this report

The purpose of this report is to identify and assess the potential impacts of the Proposal on the local traffic and transportation network, and to describe management and / or mitigation measures to minimise these impacts.

1.4 Report structure

The remainder of this report is structured as follows:

- **Section 1** provides the background and purpose of the report
- **Section 2** provides a description of the assessment approach
- **Section 3** describes the existing environment in relation to traffic and transport
- **Section 4** describes the operation of the Proposal and expected traffic generation
- **Section 5** provides an assessment of potential traffic impacts
- **Section 6** outlines the proposed mitigation and management measures
- **Section 7** provides a conclusion.

2. Assessment approach and methodology

2.1 Study area

The study area for this traffic and transport impact assessment consists of the transport network surrounding the Proposal, including the roads which form part of the proposed access routes to and from the site.

2.2 Methodology

To assess the impact of the Proposal on the transport and traffic network, the following methodology has been used to identify and, where possible, quantify the following:

- Impacts on road network performance – assessed using traffic modelling to determine the performance of the road network with and without vehicles associated with the operation of the Proposal
- Impacts on public transport – assessed through an analysis of proposed changes to public transport operations including routes and stop infrastructure to determine impacts on public transport customers
- Impacts on pedestrians and cyclists – assessed through an analysis of proposed changes to cycleways and footpaths
- Impacts on road safety – assessed through an analysis of safety issues and trends associated with the roads forming part of the proposed access routes to the Proposal
- Impacts of oversized overmass (OSOM) vehicles – assessed through an analysis of OSOM requirements and potential routes.

3. Existing conditions

3.1 Road network

The Proposal is connected to the surrounding road network by George Booth Drive, John Renshaw Drive (B86) and the Hunter Expressway (M15), as shown in Figure 1-1. These roads are described in further detail below.

3.1.1 George Booth Drive

George Booth Drive is a 16-kilometre collector road that extends between Buchanan to the northwest and Edgeworth to the southeast. At its north-western end, the road connects to John Renshaw Drive (B68) and Buchanan Road via an at-grade roundabout. George Booth Drive is a single carriageway road with one lane in each direction. The road has a posted speed limit of 80 kilometres per hour that reduces to 60 kilometres approximately 400 metres south of the roundabout.

George Booth Drive provides access to the Proposal via a priority controlled ('Give way') T-intersection, as shown in Figure 3-1. The intersection was upgraded as part of Hunter Expressway compound site facilitation works and features a channelised right-turn treatment on George Booth Drive, and auxiliary left-turn treatments on George Booth Drive and the Site Access Road.

Figure 3-1. Intersection of George Booth Drive and the Site Access Road, facing in the eastern direction
Image source: Google Street View (2021)

3.1.2 John Renshaw Drive

John Renshaw Drive (B86) is a State road that provides connectivity between the New England Highway, M1 Pacific Motorway and the Hunter Expressway. The road is accessible from the New England Highway via a grade separated roundabout. Access to George Booth Drive and Buchanan Road is provided via a second, at-grade roundabout situated approximately 230 metres west of the grade separated roundabout, as shown in Figure 3-2.

Between the Hunter Expressway and George Booth Drive, John Renshaw Drive has two lanes of traffic in each direction and a posted speed limit of 60 kilometres per hour. West of the at-grade roundabout, John Renshaw Drive has one lane of traffic in each direction and the speed limit increases to 90 kilometres per hour.

Figure 3-2. John Renshaw Drive facing in the westbound direction towards the roundabout
Image source: Google Street View (2021)

3.1.3 Hunter Expressway

The Hunter Expressway is a motorway class road providing connectivity between the M1 Pacific Motorway at the Newcastle Link Road interchange at Cameron Park and the New England Highway at Lower Belford. Near the site, the Hunter Expressway is a four-lane, two-way dual carriageway road with a posted speed limit of 110 kilometres per hour.

Figure 3-3. Hunter Expressway facing in the westbound direction near the grade separated roundabout with John Renshaw Drive

Image source: Google Street View (2021)

3.2 Heavy vehicle access routes

Near the site, the Hunter Expressway, John Renshaw Drive and George Booth Drive all permit 25/26 metre B-double and 4.6-metre-high vehicles, as shown in Figure 3-4Figure 1-1. These roads are also part of the oversize overmass load carrying vehicles network (which permits eligible vehicles operating under the Multi-State Class 1 Load Carrying Vehicles Mass Exemption Notice and the Multi-State Class 1 Load Carrying Vehicles Dimension Exemption Notice), with the travel condition that vehicles or combinations exceeding 3.2 m in width are not permitted to travel from Monday to Friday from 5:00 am to 9:00 am and from Monday to Friday from 4:00 pm to 6:00 pm (except on State-wide public holidays).

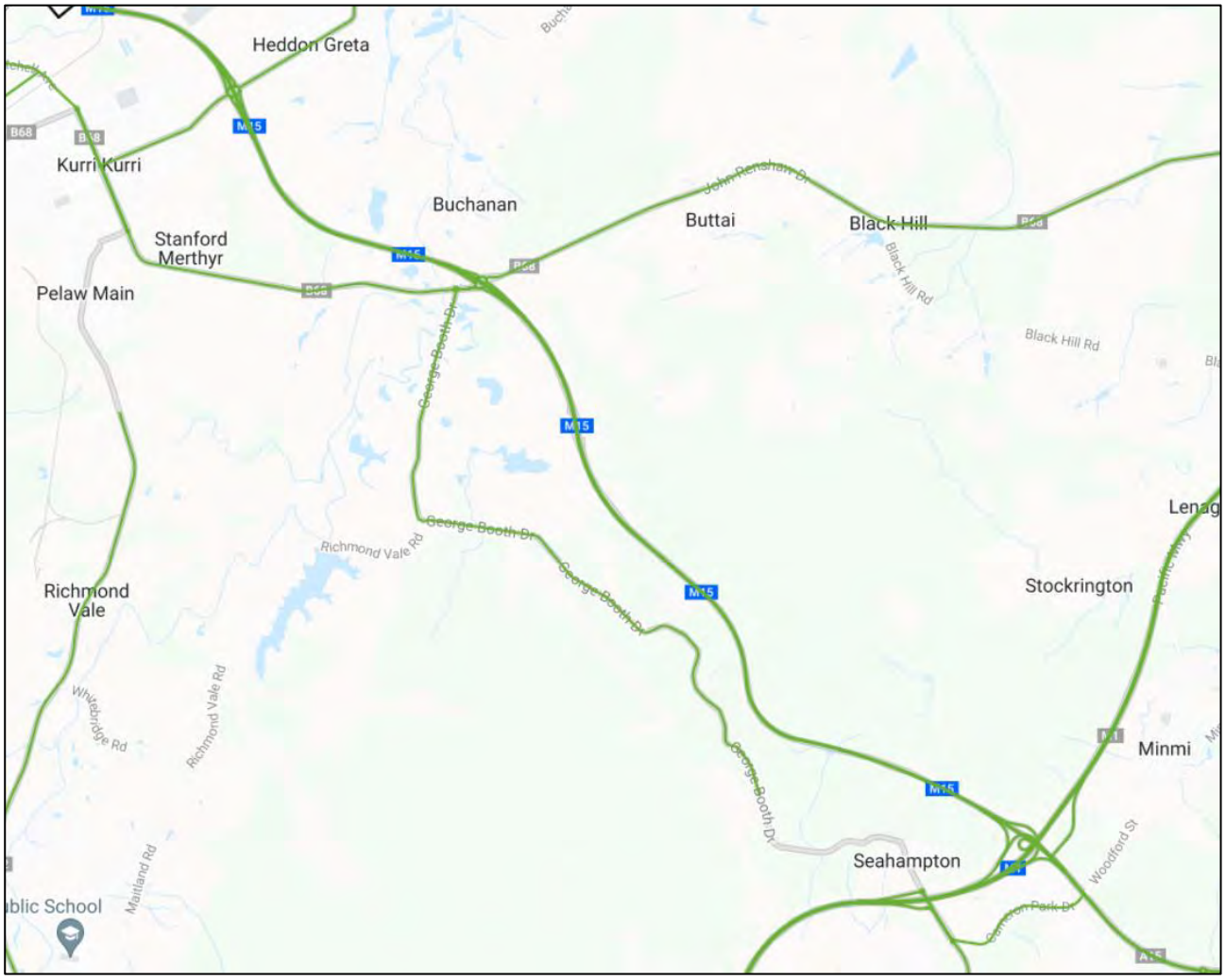


Figure 3-4. Approved 25/26 metre B-double routes in the vicinity of the Proposal

Source: NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) Map, TfNSW (2020b)

3.3 Traffic volumes and patterns

3.3.1 Hunter Expressway

Traffic volumes on the Hunter Expressway were obtained from the nearest Transport for NSW (TfNSW) permanent classifier station (ID HEXBUCHW-PR) located to the north-east of the Proposal Site, 960 metres south of John Renshaw Drive, Buchanan. The average annual weekday traffic volumes on the Hunter Expressway are shown in Table 3-1. Heavy vehicles account for approximately 12 per cent of the total traffic volume travelling along the Hunter Expressway.

Table 3-1: Average annual weekday total traffic volumes on the Hunter Expressway

Direction of travel	2016	2017	2018	2019	2020	2021
Eastbound (vehicles per weekday)	14,768	16,543	16,607	17,275	16,442	16,690
Westbound (vehicles per weekday)	13,950	15,873	16,824	17,043	16,389	16,458
Total	**28,718**	**32,416**	**33,431**	**34,318**	**32,831**	**33,148**

Data source: Transport for NSW Traffic Volume Viewer (March 2022)

3.3.2 George Booth Drive

Intersection counts were performed on George Booth Drive near the Site Access Road on Tuesday 25 October 2016. To account for traffic growth from 2016 to the current year (2022), the intersection counts were scaled using a 3.1% annual growth rate. This growth rate has been assumed based on traffic growth observed between 2016 and 2021 at the nearby Transport for NSW permanent classifier station (ID HEXBUCHW-PR) situated on the Hunter Expressway (M15). This approach is anticipated to provide a conservative assessment for George Booth Drive given annual traffic growth on the Hunter Expressway is expected to exceed local roads and as there have been no major roadworks, upgrades or developments within the vicinity of the Proposal since 2016.

The scaled traffic counts are shown in Figure 3-5 and Figure 3-6. George Booth Drive currently carries the following traffic volumes:

- 133 (2.3% heavy vehicles) vehicles in the eastbound direction and 85 (1.2% heavy vehicles) vehicles in westbound direction during the morning peak hour (7:30 am to 8:30 am)
- 103 (7.8% heavy vehicles) vehicles in the eastbound direction and 131 (6.1% heavy vehicles) vehicles in westbound direction during the evening peak hour (3:45 pm to 4:45 pm).

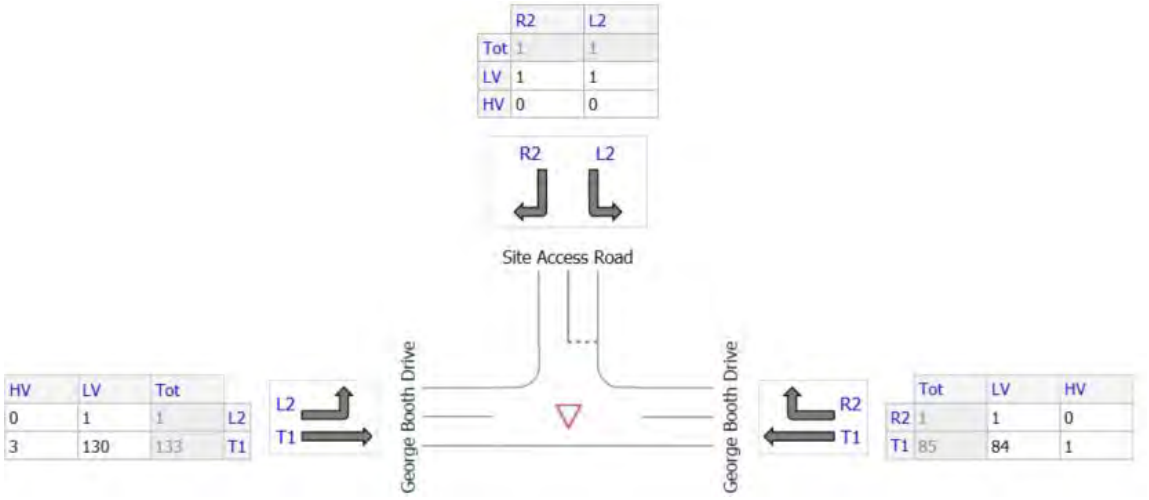


Figure 3-5. Existing hourly traffic volumes during the morning peak period (7:30 am to 8:30 am)

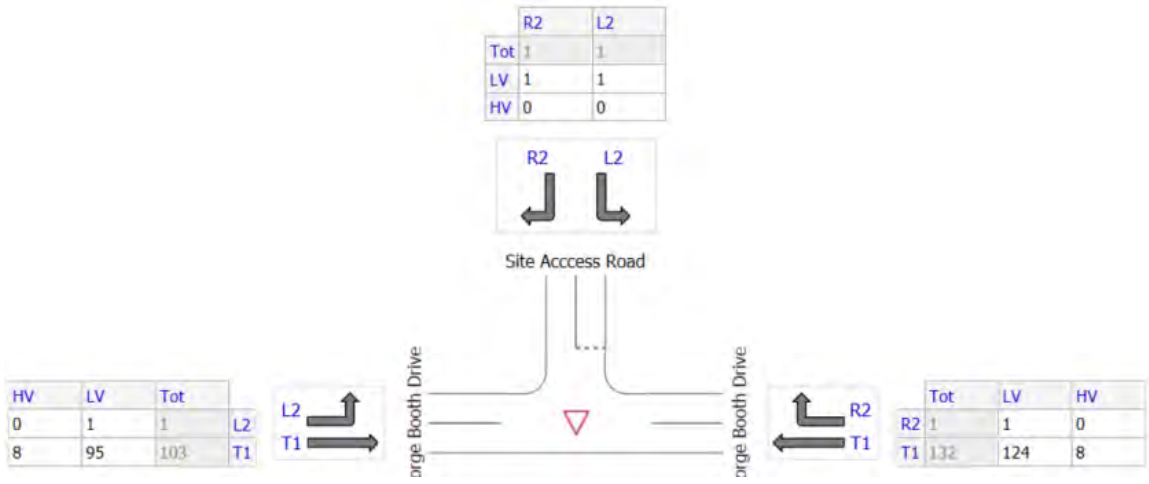


Figure 3-6. Existing hourly traffic volumes during the evening peak period (3:45 pm to 4:45 pm)

3.4 Road safety

A review of crash data was undertaken to provide an assessment of safety issues and trends associated with the roads forming part of the proposed access routes to the Proposal. Crash data for was sourced from TfNSW's Centre for Road Safety database (TfNSW, 2022a). The crash data comprised self-reported crashes in the five-year period from January 2016 to December 2020.

In the five-year period from 2016 to 2020, a total of 39 crashes were reported in the study area. As shown in Table 3-2, the highest number of crashes were reported in 2020 with nine crashes occurring during the period. Other key findings include:

- The majority of crashes (20 crashes) occurred on or near the Hunter Expressway
- 20 per cent of crashes (8 crashes) occurred at a roundabout and 8 per cent of crashes (3 crashes) occurred at an intersection
- No crashes occurred the intersection of George Booth Drive and the Site Access Road.

Table 3-2. Crashes by reporting year

Location	2016	2017	2018	2019	2020	Total
Hunter Expressway	3	4	3	3	2	**15**
John Renshaw Drive	1	0	1	1	3	**6**
George Booth Drive	2	1	1	1	2	**7**
Hunter Expressway / John Renshaw Drive roundabout	1	1	1	1	1	**5**
John Renshaw Drive / George Booth Drive / Buchanan Road roundabout	0	1	0	1	1	**3**
John Renshaw Drive / Averys Lane intersection	0	0	1	0	0	**1**
George Booth Drive / Richmond Vale Road intersection	1	1	0	0	0	**2**
Total	**8**	**8**	**7**	**7**	**9**	**39**

Data source: TfNSW, Centre for Road Safety (2016-2020)

Crashes by vehicle type are shown in Table 3-3. The majority of crashes (69 per cent of all crashes) involved a car. 43 per cent of crashes involved a heavy or light truck.

Table 3-3. Crashes by vehicle classification

Location	Motorcycle	Bicycle	Heavy truck	Light truck	Car
Hunter Expressway	1	1	3	3	10
John Renshaw Drive	0	0	1	3	4
George Booth Drive	1	0	1	1	5
Hunter Expressway / John Renshaw Drive roundabout	0	0	1	1	3
John Renshaw Drive / George Booth Drive / Buchanan Road roundabout	0	0	1	0	3
John Renshaw Drive / Averys Lane intersection	0	0	0	1	1
George Booth Drive / Richmond Vale Road intersection	1	0	0	1	1
Total	**3**	**1**	**7**	**10**	**27**

Data source: TfNSW, Centre for Road Safety (2016-2020)

Crashes by injury severity are shown in Table 3-4. During the five-year period, the majority of crashes resulted in an injury (54 per cent of all crashes). 21 per cent of all crashes resulted in a serious injury, while one crash resulted in a fatality.

Table 3-4. Crashes by injury severity

Location	Fatal	Serious	Moderate	Minor / other	Non-casualty (towaway)
Hunter Expressway	1	2	5	2	5
John Renshaw Drive	0	0	2	0	4
George Booth Drive	0	3	1	1	2
Hunter Expressway / John Renshaw Drive roundabout	0	1	1	1	2
John Renshaw Drive / George Booth Drive / Buchanan Road roundabout	0	0	2	0	1
John Renshaw Drive / Averys Lane intersection	0	1	0	0	0
George Booth Drive / Richmond Vale Road intersection	0	1	1	0	0
Total	**1**	**8**	**12**	**4**	**14**

Data source: TfNSW, Centre for Road Safety (2016-2020)

Table 3-5 provides a breakdown of crashes by lighting conditions and contributing factors. 15 per cent of crashes in the area reported between 2016 and 2020 involved speeding and 8 per cent involved fatigue as a contributing factor. Moreover, 38 per cent of crashes occurred at dawn, dusk or in darkness.

Table 3-5. Crashes by lighting condition and contributing factor (not mutually exclusive)

	Lighting condition				Contributing factor	
Location	**Daylight**	**Dawn**	**Dusk**	**Darkness**	**Speeding**	**Fatigue**
Hunter Expressway	8	3	1	3	3	1
John Renshaw Drive	4	1	0	1	0	0
George Booth Drive	4	1	0	2	3	1
Hunter Expressway / John Renshaw Drive roundabout	5	0	0	0	0	0
John Renshaw Drive / George Booth Drive / Buchanan Road roundabout	1	0	0	2	0	1
John Renshaw Drive / Averys Lane intersection	0	0	0	1	0	0
George Booth Drive / Richmond Vale Road intersection	2	0	0	0	0	0
Total	**24**	**5**	**1**	**9**	**6**	**3**

Data source: TfNSW, Centre for Road Safety (2016-2020)

The number of crashes by road user movement (RUM) group are shown in Table 3-6. The most common crash types involved vehicles travelling off the road on a curve (28 per cent of all crashes), followed by the collision of vehicles travelling in the same direction (23 per cent of all crashes) and vehicles travelling off the road on a straight section (23 per cent of all crashes).

Table 3-6. Crashes by road user movement (RUM) group[1]

Location	Pedestrians (00-09)	Adjacent direction (10-19)	Opposing direction (20-29)	Same direction (30-39)	Manoeuvring (40-49)	Overtaking (50-59)	On path (60-69)	Off path on straight (70-79)	Off path on curve (80-89)	Miscellaneous (90-99)
Hunter Expressway	0	0	0	4	0	0	2	5	4	0
John Renshaw Drive	0	0	1	1	0	1	0	2	1	0
George Booth Drive	0	0	1	0	1	0	1	1	3	0
Hunter Expressway / John Renshaw Drive roundabout	0	1	0	2	0	0	0	0	2	0
John Renshaw Drive / George Booth Drive / Buchanan Road roundabout	0	1	0	1	0	0	0	1	0	0
John Renshaw Drive / Averys Lane intersection	0	0	0	1	0	0	0	0	0	0
George Booth Drive / Richmond Vale Road intersection	0	0	1	0	0	0	0	0	1	0
Total	**0**	**2**	**3**	**9**	**1**	**1**	**3**	**9**	**11**	**0**

Data source: TfNSW, Centre for Road Safety (2016-2020)

3.5 Public transport network

Two bus services operate in the vicinity of the Proposal including route 160 and route 2623. Route 160 is a public bus service operated by Rover Coaches that travels between Cessnock and Newcastle via John Renshaw Drive. Route 160 operates at a frequency of five buses per day in each direction and the nearest bus stop to the site is located on John Renshaw Drive at Averys Lane.

Route 2623 is a school bus service operated by Hunter Valley Buses that travels from Buchanan to Metford Public School via George Booth Drive. Route 2623 operates at a frequency of one service per day during the morning peak period. The location of the bus stop servicing route 2623 is shown in Figure 3-7.

[1] RUM group refers to road user movement group, which includes a group of movements or actions (classified by RUM number) undertaken by the vehicles involved directly before the crash.

Figure 3-7. Bus routes and stops in the vicinity of the Proposal

3.6 Pedestrian and cycling network

Active transport infrastructure is limited in the area due to the rural nature of the site. No formal pedestrian facilities are provided in the area. Provisions for cyclists include on-road bicycle lanes along the following sections of road:

- The Hunter Expressway – on both sides of the road, including the on and off-ramps to John Renshaw Drive
- John Renshaw Drive – on both sides of the road between the Hunter Expressway and Wallis Creek Bridge
- George Booth Drive – on both sides of the road between the John Renshaw Drive / George Booth Drive roundabout and approximately 200 metres south of the roundabout.

4. Description of proposal

4.1 Site operating hours

The pre-cast facility is anticipated to re-commissioned in October 2022 and would be in operation for a duration of two years, subject to the delivery strategy and construction program for the Sydney Metro - Western Sydney Airport project. Typical operation of the site would occur during the following standard construction hours:

- Monday to Friday: 7:00 am to 6:00 pm
- Saturday: 8:00 am to 1:00 pm
- Sunday or public holiday: no work.

Activities undertaken outside of the standard operation hours may include:

- The delivery of materials as required by the authorities for safety reasons
- Emergency situations to prevent the loss of lives and properties and/or to prevent environmental harm
- Situations where agreement is reached with affected receivers.

4.2 Traffic generating activities

The Proponent proposes to re-commence operations of the pre-cast facility to manufacture precast concrete segments necessary for viaduct segments required for the Sydney Metro - Western Sydney Airport project. The main traffic generating activities associated with the Proposal are summarised in Table 4-1 and Table 4-2.

Table 4-1. Summary of traffic generating activities during site mobilisation

Stage	Description of activities	Vehicle type(s)
Stage A: Site establishment	The following works would be required to establish the Proposal site: ▪ Transporting equipment to site ▪ Re-instating fencing around the Proposal site ▪ Installing demountable site compound office and amenities ▪ Inspection of existing facilities including waste water treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs.	▪ Light vehicles including cars, utility vehicles and vans ▪ Heavy vehicles including semi-trailers, cranes, and truck and dog combinations
Stage B: Civil and building work	The following works would be required to establish the Proposal site: ▪ Clearing of five trees and grassed area for hardstand extension ▪ Removal of grass covered topsoil stockpile and retaining within the Property boundary ▪ Extending the existing precast yard and hardstand footprint ▪ Extension of the existing shed installing an additional two moulds	▪ Light vehicles including cars, utility vehicles and vans ▪ Heavy vehicles including semi-trailers, cranes, and truck and dog combinations

Table 4-2: Summary of traffic generating activities during operation

Stage	Description of activities	Vehicle type(s)
Stage C: Use of site	This stage would involve the production of the precast concrete segments and would involve the following activities: ▪ Receiving concrete deliveries from an off-site concrete batching plant located at Cameron Park (18 deliveries per day) ▪ Pouring about six precast concrete segments per day ▪ Despatching precast concrete segments to Sydney (up to six deliveries per day). The constructed pre-cast components will be delivered to either: - 1793 Elizabeth Dr, Badgerys Creek NSW 2555 - 599 Luddenham Road, Luddenham NSW 2555 - Patons Lane, Orchard Hills, NSW 2748.	▪ Light vehicles including cars, utility vehicles and vans ▪ Heavy vehicles including concrete trucks, cranes and oversize overmass vehicles
Stage D: Decommissioning of site	This stage would involve decommissioning the site to its current state and would involve the following activities: ▪ Removal of the site office, plant and equipment. Note: Rehabilitation of the Proposal site to a pre-disturbance state (prior to being used for the Hunter Expressway project) is not part of the scope of works.	▪ Light vehicles including cars, utility vehicles and vans ▪ Heavy vehicles including semi-trailers and cranes

4.3 Traffic generation and directional distribution

The forecast traffic generation of the Proposal is summarised in Table 4-3. Stage C is expected to generate the highest number of vehicles, with up to 50 additional light vehicles movements and 12 additional heavy vehicle movements occurring on the network during the morning and evening peak hours.

Table 4-3. Indicative vehicle movements

Stage	Morning Peak Hour (7:30 am to 8:30 am)				Evening Peak Hour (3:45 pm to 4:45 pm)			
	Light Vehicles		Heavy Vehicles		Light Vehicles		Heavy Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
A-B	20	5	6	4	5	25	2	4
C	45	5	6	6	5	45	6	6
D	20	5	6	4	5	25	2	4

During the operation of the site, all vehicles would travel to the Proposal via George Booth Drive. It is anticipated that approximately 70% of light vehicles would access the Proposal from the west and 30% from the south. Deliveries of concrete would originate from an off-site concrete batching plant located 10 kilometres to the south-east of the site at Cameron Park. It is expected that heavy vehicles transporting concrete would travel to the Proposal via the shortest route and therefore arrive via George Booth Drive from the east.

4.4 Parking

All staff parking would be accommodated on-site and not on surrounding local roads. Approximately 50 to 60 on-site parking spaces would be available.

5. Assessment of traffic impacts

5.1 Impacts on intersection performance

Traffic modelling has been undertaken to assess the traffic impacts of the Proposal on the performance of the George Booth Drive / Site Access Road intersection. The approach to traffic modelling undertaken for this assessment aligns with the *Traffic Modelling Guidelines* (Roads and Maritime, 2013) and includes the following broad steps:

- Development of calibrated and validated single intersection base models (validated against Google typical traffic data) to align with existing operational conditions along the proposed vehicle access routes
- Application of anticipated operational traffic demands to the base models to enable the identification of potential impacts on road network performance. It is noted that operational activity associated with the Proposal may occur up until the year 2024. The year 2024 has therefore been selected as the assessment year as it is the last year of anticipated operations and presents a worst-case scenario with the greatest background traffic growth. To account for background traffic growth, traffic volumes have been scaled using a 3.1% annual growth rate, as discussed in Section 3.3.2.

Models were developed using the SIDRA Intersection 9 traffic modelling software package. SIDRA Intersection 9 is a micro-analytical tool for evaluation of intersection performance mainly in terms of capacity, level of service and a wide range of other performance measures such as delay, queue length and stops for vehicles and pedestrians, as well as fuel consumption, pollutant emissions and operating cost.

The traffic modelling was undertaken for the morning peak (7:30 am to 8:30 am) and evening peak periods only (3:45 pm to 4:45 pm). The peak traffic periods represent a worst-case scenario as during these periods the road network experiences the maximum background traffic demand, and the available spare capacity of the road network is at its most limited.

5.1.1 Intersection performance indicators

5.1.1.1 Level of Service

The criteria for evaluating the operational performance of intersections is defined in Table 5-1 and is adopted from the Guide to Traffic Generating Developments (Roads and Maritime, 2002). For priority (sign-controlled) intersections, the criteria for evaluating the performance of intersections is based on the worst delay across all legs of the intersection during the peak hour. This average vehicle delay is equated to a corresponding Level of Service (LoS) from A (best) to F (worst). For rural roads, the desired LoS is C.

Table 5-1: Level of service definitions

LoS	Average delay (seconds/vehicle)	Give way and stop signs
A	Less than 15	Good operation
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory, but accident study required
D	43 to 56	Near capacity and accident study required
E	57 to 70	At capacity, requires other control mode
F	Over 70	Extreme delay, traffic signal or other major treatment required

Source: Guide to Traffic Generating Developments (RMS, version 2.2, 2002)

5.1.1.2 95th percentile queue

95th percentile queue is the length (in metres) below which 95% of all observed cycle queues lengths fall. In other words, this queue length is expected to be exceeded only for 5% of observed queues. The 95th percentile queue is often interpreted as a design queue and is used to determine the desirable turn lane and storage lengths. Ideally, the 95th percentile queue should fit within the provided turning lane without spilling into the adjacent through lanes.

5.1.1.3 Average delay

Average delay refers to the average additional amount of time it takes a vehicle to pass through the intersection than free flow conditions and takes into account congestion (i.e. queueing), signal delays, pedestrian crossing and the physical size of the intersection. This parameter is usually described in seconds and provides drivers with a tangible measurement.

5.1.1.4 Intersection performance results

SIDRA Intersection 9 was used to model the performance of the George Booth Drive / Site Access Road intersection. The intersection was modelled under the following two scenarios:

- Without operation of the Proposal (without vehicles associated with operation of the pre-cast facility)
- With operation of the Proposal (with vehicles associated with operation of the pre-cast facility).

The intersection performance results for each scenario are presented in Table 5-2.

The results indicate that the intersection would operate satisfactorily at a LoS A without the operation of the Proposal in 2024. Minimal queue lengths are observed for all approaches and the results show the maximum average delay any approach would experience is approximately eight seconds or less. These results indicate that the intersection will be operating well within its capacity in 2024 without the Proposal, which is primarily due to the low volumes present.

The intersection is expected to continue to perform at a LoS A with operation of the Proposal. The maximum increase in average delay as a result of the Proposal is anticipated to be two seconds or less, which is considered negligible. Minimal queuing is expected on all approaches of the intersection during the morning and evening peak periods. As such, the operation of the Proposal is expected to have a negligible impact on the performance of the George Booth Drive / Site Access Road intersection.

Table 5-2. Intersection performance results

Analysis period	2024 without operation of the Proposal					2024 with operation of the Proposal				
	Intersection throughput (veh/hr)	Degree of saturation (v/c)	Average delay (sec/veh)	Level of Service	95th percentile queue length (m)	Intersection throughput (veh/hr)	Degree of saturation (v/c)	Average delay (sec/veh)	Level of Service	95th percentile queue length (m)
Morning Peak (7:30 am - 8:30 am)	230	0.074	7.3	A	<1	290	0.074	8.2	A	<1
Evening Peak (3:45 pm - 4:45 pm)	240	0.075	7.2	A	<1	310	0.075	9.2	A	<1

5.2 Impacts on road safety

As outlined in Section 3.4, no crashes were reported at the George Booth Drive and the Site Access Road intersection during the five-year period between 2016 and 2020. Additional vehicles using this intersection are unlikely to have an impact on the future crash frequency as modelled performance suggests that the intersection would continue to operate at a LoS A and well within capacity. Moreover, as discussed in Section 5.1.1.4, queue lengths at the intersection with additional traffic volumes are expected to remain very short and therefore would not extend into the main flow of traffic nor cause safety issues on George Booth Drive.

All vehicles travelling to the site via the Hunter Expressway would use the existing on and off-ramps. These ramps are designed to facilitate safe vehicle movements by allowing vehicles to accelerate / decelerate without affecting the main flow of traffic. In addition, the channelised right-turn treatment on George Booth Drive and auxiliary left-turn treatments on George Booth Drive and the Site Access Road would facilitate safe turning movements by allowing vehicles to accelerate / decelerate without affecting the main flow of traffic.

As outlined in Section 3.4, 15 per cent of crashes in the area reported between 2016 and 2020 involved speeding and eight per cent involved fatigue as a contributing factor. To minimise the risks of speeding, and fatigue, as well as other impacts associated with additional traffic movements on road safety, all workers and delivery drivers should be advised of appropriate access routes, speed limits, travel times and the designated site entry point prior to mobilisation / visiting the site.

Given the relatively low traffic generation of the Proposal, the low historic rate of crashes in the area and the opportunity to manage contributing factors, the Proposal is not expected to have a significant impact on road safety.

5.3 Impacts on the public transport network

The operation of the Proposal would not have an impact on bus services or the operation of bus stops.

5.4 Impacts on pedestrians and cyclists

The operation of the Proposal would not have an impact on pedestrians or cyclists.

5.5 Parking

Parking for approximately 50 to 60 vehicles would be provided on site. As such, the operation of the Proposal would not impact existing parking opportunities or facilities in the local area.

5.6 Cumulative operational impacts

There are no nearby developments near the Proposal site that are underway or likely to commence during the operation of the Proposal. As such, no cumulative impacts are anticipated.

5.7 Impacts of oversized/overmass vehicles

Oversized or overmass (OSOM) vehicles would be required to transport the pre-cast concrete segments to the construction sites located in Sydney. The Proposal is expected to generate four to six one-way OSOM vehicle movements per day. The transportation requirements for the pre-cast concrete segments are summarised below in Table 5-3.

Table 5-3. Segment transportation combination requirements.

Item number	Item description / dimensions	Transport combinations and escort requirements
660	Concrete segments (11.2l x 3.2w x 2.74h x 48T)	▪ Transport configuration: 5x8 low loader or 2x8-3x8 dolly low loader ▪ Overall transport dimensions: (26l x 3.5w x 4.6h x 92T) ▪ Escort requirements daytime: nil ▪ Escort requirements night: 1 x Pilot
174	Concrete segments (10.9l x 2.5w x 2.73h x 65T)	▪ Transport configuration: 2x8-5x8 Dolly & low loader ▪ Overall transport dimensions: (26l x 3.5w x 4.6h x 99T) ▪ Escort requirements daytime: nil ▪ Escort requirements night: 1 x Pilot
267	Concrete segments (10.9l x 3.2w x 2.73h x 51T)	▪ Transport configuration: 5x8 low loader or 2x8-3x8 dolly low loader ▪ Overall transport dimensions: (26l x 3.5w x 4.6h x 95T) ▪ Escort requirements daytime: nil ▪ Escort requirements night: 1 x Pilot

OSOM vehicles would leave the site after 6:00 pm and travel approximately 100 kilometres south via the Hunter Expressway (M15) and Pacific Motorway (M1) to the Mooney Mooney Rest Area. The OSOM vehicles would remain at the Mooney Mooney Rest Area until night OSOM movements through the Sydney Road network can commence. Travel between Mooney Mooney and the delivery sites at Badgerys Creek, Luddenham and Orchard Hills would commence after 9:30 pm.

A Transport Management Plan for the movement of OSOM vehicles has been prepared by REX J Andrews Engineered Transportation Pty Ltd and is provided in Appendix A. The plan details the proposed OSOM routes, as well as the pinch points and conditions around the OSOM movements.

Due to the low number of daily OSOM vehicle movements and the occurrence of OSOM vehicle movements outside peak periods, it is expected that the traffic impact of OSOM vehicles on the road network would be minimal.

6. Mitigation and management measures

The main impact of the Proposal is expected to be a minor increase in light and heavy vehicle movements on the local roads surrounding the Proposal site. As discussed in Section 5.1, this is not likely to affect the performance of the road network given the available spare capacity of the network to accommodate additional traffic volumes. Recommended mitigation measures to minimise the traffic and transport impacts of the Proposal are summarised in Table 6-1.

Table 6-1. Summary of traffic and transport mitigation measures

ID	Issue	Mitigation measure
T1	Traffic management	Heavy vehicle movements to and from the Proposal site would be scheduled to minimise traffic disruption to the surrounding road network. This may include, but is not limited to: ▪ Scheduling the movement of construction material, equipment and waste to occur outside of peak periods where practical ▪ Scheduling heavy vehicle deliveries to be evenly dispersed as far as practical to minimise convoying or platoons and queuing outside the Proposal or on the road network
T2	Traffic management	Where feasible, vehicles would be routed to avoid or minimise movements on local and regional roads (e.g., Luddenham Road)
T3	Traffic incidents	In the event of a traffic-related incident, coordination would be carried out with Transport Coordination and/or other parts of Transport for NSW.
T4	Emergency vehicles access	Access to properties for emergency vehicles would be provided at all times
T5	Road safety	All trucks would enter and exit the proposal site in a forward direction, where feasible and reasonable to minimise collision and safety risks
T6	Road safety	The loading and unloading of trucks would be planned to ensure each individual truck haulage capacity is fully utilised to reduce the total number of truck movements
T7	Road safety	All loading / unloading activities would occur within the Proposal site
T8	Road safety	Public roads and access points to the Proposal would not be obstructed by any materials, vehicles, skip bins or the like, under any circumstances
T9	Staff parking	All staff parking would be provided on-site and not on surrounding local roads

7. Conclusion

This traffic and transport impact assessment was prepared on behalf of Sydney Metro ('the Proponent') to identify and assess the potential impacts of the Proposal on the local traffic and transportation network. Recommended mitigation and management measures were identified in response to the impact assessment findings.

Potential impacts of the Proposal during operation have been identified as follows:

- Operational vehicle movements are expected to have a minimal impact on the operation of the surrounding road network as roads have spare capacity to accommodate the relatively very low increase in operational traffic
- No impacts to parking are expected as all parking for operational vehicles would be provided on-site
- No impacts to public transport, pedestrians and cyclists and road access are expected
- Given the relatively low traffic generation of the Proposal, the low historic rate of crashes in the area and the opportunity to manage crash contributing factors, the Proposal is not expected to have a significant impact on road safety.

Oversized overmass (OSOM) vehicle movements will be subject to a separate Traffic Management Plan (refer to Appendix A). Due to the low number of daily OSOM vehicle movements and the occurrence of OSOM vehicle movements outside peak hours, it is expected that the traffic impact of OSOM vehicles on the road network would be minimal.

8. References

RTA 2002, *Guide to Traffic Generating Developments*

TfNSW (Transport for NSW) (2022a), viewed March 2022, https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/nsw.html?tabnsw=3

TfNSW (Transport for NSW) (2022b), viewed March 2022, https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html

TfNSW (Transport for NSW) (2022c), viewed March 2022, https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/nsw-load-carrying-network/map/index.html

Appendix A. Transport Management Plan for OSOM vehicles

REX J ANDREWS
ENGINEERED TRANSPORTATION

TRANSPORT MANAGEMENT PLAN

CLIENT: JACOBS

FROM: BUCHANAN

TO: SYDNEY METRO, WEST SYDNEY AIRPORT (SMWSA)

ITEMS TO BE TRANSPORTED: CONCRETE SEGMENTS

12/05/2022 REV 00

Rev.	Date	Change	Responsible	Checked
00	26/04/22	Route Assessed	C Andrews	✓
00	06/05/22	Report compiled	C Andrews	✓
00	12/05/22	Report completed	W Andrews	✓

Index:

1.0 Introduction

This document describes observations and previous experience on sections of this route and explains the Transport of concrete segments from the cast yard facility at Buchanan (NSW) through to the West Sydney airport project near Luddenham (NSW)

This Desktop Route survey took place on 26-04-22.

2.0 Evaluation

1	No work required
2	Some Work required
3	Moderate amount of works required
4	Large amount of works required

(Mark below boxes with an X)

		1	**2**	**3**	**4**
A	Harbour	**X**			
B	Road Modification	**X**			
C	Road Furnishings	**X**			
D	Trees	**X**			
E	Site Entrance			**X**	
F	Bridge Calculations		**X**		
G	Traffic Control		**X**		

3.0 Project data.

Date of latest Route Assessment. 26/04/2022
Survey undertaken by. (Rex J Andrews P/L)
Project name. Sydney Metro Western Sydney Airport
Location. Buchanan (NSW) to Orchard Hills, Luddenham and Badgerys Creek(NSW)

Items to be transported:
660 Concrete segments (11.2l x 3.2w x 2.74h x 48T)
174 Concrete segments (10.9l x 2.5w x 2.73h x 65T)
267 Concrete segments (10.9l x 3.2w x 2.73h x 51T)

4.0 Transport combinations and escort requirement

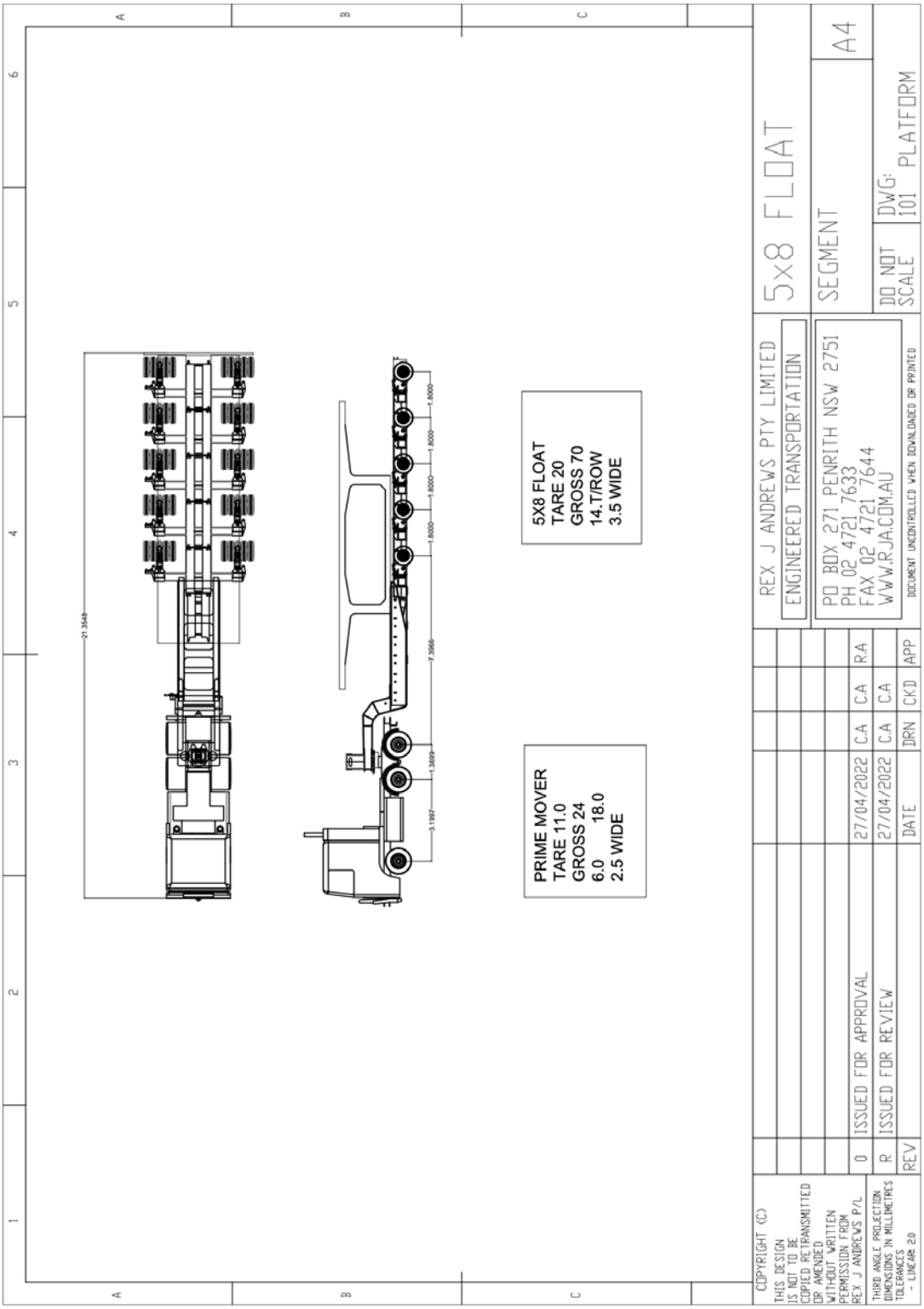
Item: 660 Concrete segments (11.2l x 3.2w x 2.74h x 48T)
Transport configuration: 5x8 low loader or 2x8-3x8 dolly low loader
Overall transport dimensions: (26l x 3.5w x 4.6h x 92T)
Escort requirements daytime: Nil (Travel only between 9:00am & 4:00pm)
Escort requirements night time: 1 x Pilot (Travel only between 9:30pm & 5:00am)

Item: 174 Concrete segments (10.9l x 2.5w x 2.73h x 65T)
Transport configuration: 2x8-5x8 Dolly & low loader
Overall transport dimensions: (26l x 3.5w x 4.6h x 99T)
Escort requirements daytime: Nil (Travel only between 9:00am & 4:00pm)
Escort requirements night time: 1 x Pilot (Travel only between 9:30pm & 5:00am)

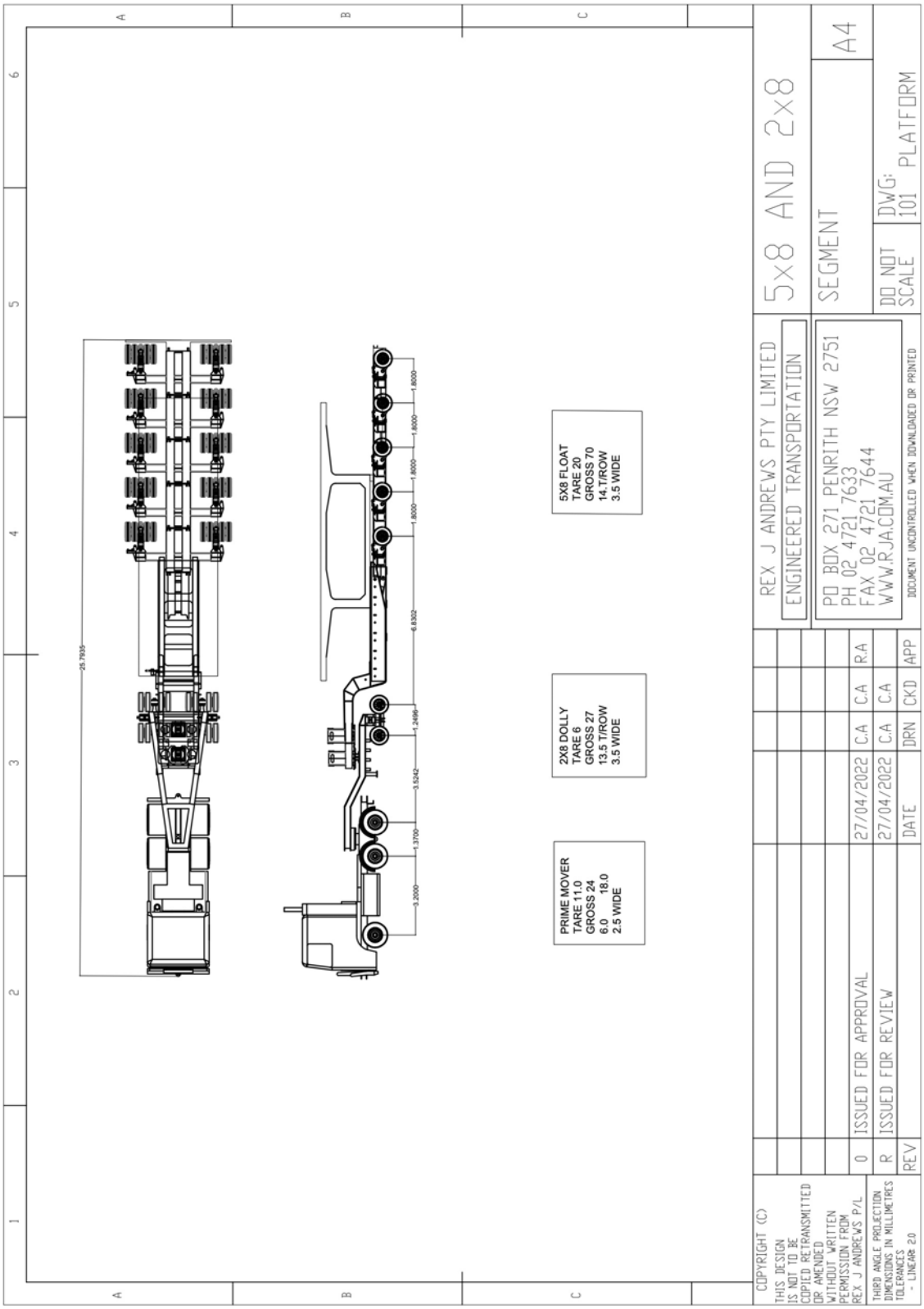
Item: 267 Concrete segments (10.9l x 3.2w x 2.73h x 51T)
Transport configuration: 5x8 low loader or 2x8-3x8 dolly low loader
Overall transport dimensions: (26l x 3.5w x 4.6h x 95T)
Escort requirements daytime: Nil (Travel only between 9:00am & 4:00pm)
Escort requirements night time: 1 x Pilot (Travel only between 9:30pm & 5:00am)

5.0 Transport drawings.

5x8 low loader:



2x8 5x8 low loader:



6.0 Route selection: Buchanan to SMWSA Project.

This project will require 3 different routes to each site entrance. The routes will all be the same through to Mamre Road. From that point on the routes will differ through to each site entrance. The following are the routes to be used for this project.

Route 1 will be used for delivery through to Patons Lane at Orchard Hills.

Route 2 will be used for delivery through to 599 Luddenham Road, Luddenham.

Route 3 will be used for delivery through to 1793 Elizabeth Drive at Badgerys Creek.

ROUTE 1: Buchanan to SMWSA Orchard Hills site

GPS link to route: https://goo.gl/maps/XgMyCPhiytGVcDFL7

Distance: 182.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Mamre Road, Luddenham Road, Patons lane.

ROUTE 2: Buchanan to SMWSA Luddenham site

GPS link to route: https://goo.gl/maps/TQDnXjPcBDjaUU5U9

Distance: 184.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Mamre Road, Luddenham Road.

ROUTE 3: Buchanan to SMWSA Badgerys Creek site

GPS link to route: https://goo.gl/maps/g7GJ5CJoVsQa7qqR7

Distance: 197.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Northern Road, Elizabeth Drive.

7.0 Transport conditions

The following are the conditions for these routes:

- Day time travel between Buchanan and Mooney Mooney cannot take place during the following times. 7:00am till 9:00am and 4:00pm till 6:00pm.
- Day time travel between Mooney Mooney and SMWSA sites cannot take place during the following times 7:00am till 10:00am and 3:00pm till 6:00pm if travelling on clearways and between 7:00am and 9:00am and 4:00pm till 6:00pm if not a clearway.
- Night time travel can only take place between 9:30pm and 5:00am if on clearways and between 9:30pm and 7:00am if not travelling on clearways.
- No unnecessary noise to be made before 7.00am.
- A prestart meeting to be held between the truck driver & pilot before load departs.
- If for any reason communications fail between the pilot and driver, the load is to cease travelling once a suitable place to park has been found, until such time as communications can be re-established.
- Permits/Approval letter from rail authorities to travel across any rail crossing/structure on this route are to be carried with load.
- Permits/Approval letters from state government authorities to access their networks on this route are to be carried with load.
- Permits/Approval letter from Local councils to access their networks on this route are to be carried with load.
- Site must have suitable areas available to safely park all loads once inside the site boundary.
- All drivers and pilots are to follow procedures listed in the Transport plan including pinch point procedures and travel restrictions.

8.0 Schedule of movement

MOVEMENT DATE: TBC likely starting in 2023.

9.0 Fatigue scheduling example:

REX J ANDREWS PTY LTD
ENGINEERED TRANSPORTATION

Sydney
PO Box 271, Penrith NSW 2751
Ph: 02 4721 7633 Fx: 02 47217644
Em: sydney@rja.com.au

Adelaide
PO Box 6072, Burton SA 5110
Ph: 08 8280 5541 Fx: 08 8280 8365
Em: adelaide@rja.com.au

Newcastle
16 Yilen Close, Beresfield NSW 2322
Ph: 02 4966 1788 Fx: 02 4966 1744
Em: newcastle@rja.com.au

Trip Schedule

Schedule Details SMWSA Segments
Transport of concrete segments from Buchanan to the SMWSA project

Sch No SCH05288
Date 12/05/2022 2:08:15 pm
Written By Warrick Andrews
Consulted Mark Sciberras

Schedule Notes:
-This Schedule has been written based on values known at the time for good driving conditions and no known fatigue related issues prior to starting the trip.
- Do not drive to the schedule if you fell tired. Stop revive survive
- No attempt should be made to make up for lost time on a schedule.
- Please modify all times according to your real start time.
- You must still fill in your Logbook, exactly as the hours you have worked.

Please work with the Scheduler who wrote this to make the schedule better for all.

Start	End	Hr	Day	Km	avg	Type	Location	Notes
5:30am	8:00am	2.50	1	190	76	Driving	Sydney depot to Buchanan	Empty Travel
8:00am	9:00am	1.00	1	0	0	Working	Buchanan	Loading
9:00am	10:30am	1.50	1	108	72	Driving	Buchanan to Mooney Mooney	Loaded travel
10:30am	11:00am	0.50	1	0	0	Paid Rest	Mooney Mooney	30 minute rest break
11:00am	1:00pm	2.00	1	88	44	Driving	Mooney Mooney to SMWSA	Loaded travel
1:00pm	2:00pm	1.00	1	0	0	Working	SMWSA	Unloading
2:00pm	3:00pm	1.00	1	30	30	Driving	SMWSA Sydney Depot	Empty Travel

10.0 Emergency Procedures

- In the event of an emergency situation, such as breakdown, the load will be moved to the left-hand lane/shoulder to ensure minimal traffic impacts; In such instances the TMC should be promptly advised so that all necessary warnings are made. All parties involved in the movement will have contacts for all emergency numbers required on the project.
- Where a tow is required, the trailer will be unhooked from the prime mover and a Heavy towing operator be called from the list of emergency contacts. In such instances the TMC should be promptly advised so that all necessary warnings can be made.
- If a vehicle collides with the load, the driver and or pilot is to notify emergency services via 000, before providing traffic control with the assistance of the pilots and enact their emergency procedures for this type of incident.
- If the driver and or pilots decide that the movement should be suspended as a result of time or potential traffic impacts the trailer with the load will be moved to a safe parking location.
- In the event of bad weather, the driver is to notify the first point of contact before departing.
- If the road is blocked between the pickup location and drop off location, and the load is still at the port than the load is not to depart.
- If the load is in transit, and the road is blocked ahead, then the load is to find a suitable parking area until road is cleared.
- Refer to Rex J Andrews P/L “SOP_025_Emergency plan”

11.0 Emergency contacts

- Main emergency number (000)
- NSW Traffic operations (02 88821219)
- TMC operations room (1800 679782)

HEAVY TOWING OPERATORS ON ROUTE:

- Sydney: GRS Towing, (1300550600)
- Sydney: Westruck Towing, (1300136129)

12.0 Transport approvals required

Approvals will need to be sought from the following departments.

- NHVR
- TfNSW
- TMC
- UGL
- Sydney Trains
- Penrith City Council

13.0 Pinch Points

The following are the pinch points on these routes:

- REGULAR ROUTE ASSESMENTS: Throughout the project the transport operator is to keep in constant contact with TfNSW and local councils regarding roadwork's and any upcoming road modifications that would take place on the route during the project. Drivers are to have full contact details and communicate regularly with these roadwork's managers while on route.

- SYDNEY: Loads are not to enter the Northconnex Tunnel. All oversize loads are to travel via Pennant Hills Road unless advised otherwise.

PINCHPOINT PROCEDURES

Whilst some pinch points are known along the route demonstrating a method of negotiating each individual hazard would be flawed as traffic conditions are constantly changing.

It is crucial that appropriate measures are applied to avoid impact to road users and road infrastructure, the chosen route has been assessed and the load is capable of navigating the route, however local traffic conditions can create pinch points.

A pinch point is an area identified by the lead pilot and relayed to the convoy as having the potential to interfere with the swept path of the load, pinch points can be created by road furnishings, roundabouts, narrow sections of road, roadkill, corners, road works, parked vehicles, damaged pavement, this list is not exhaustive.

For the purposes of this traffic management plan identified pinch points will follow the following protocol.

The pilot must travel a sufficient distance in front of the load on single lane roads so as to give sufficient warning to the driver and oncoming motorists, this will allow sufficient time to relay back road conditions or choke points if there is a problem to allow the driver to halt the load before causing congestion to other road users.

In the event of parked vehicles or local traffic conditions preventing the load from safely navigating the permitted route, the load cannot proceed until it is safe to do so.

The lead pilot will warn all oncoming traffic of the impending load, when the way forward for the transporter is established as being clear the load may proceed.

If built up queued traffic is behind the load, ensure that an opportunity to allow this traffic to pass is taken at the first safe opportunity.

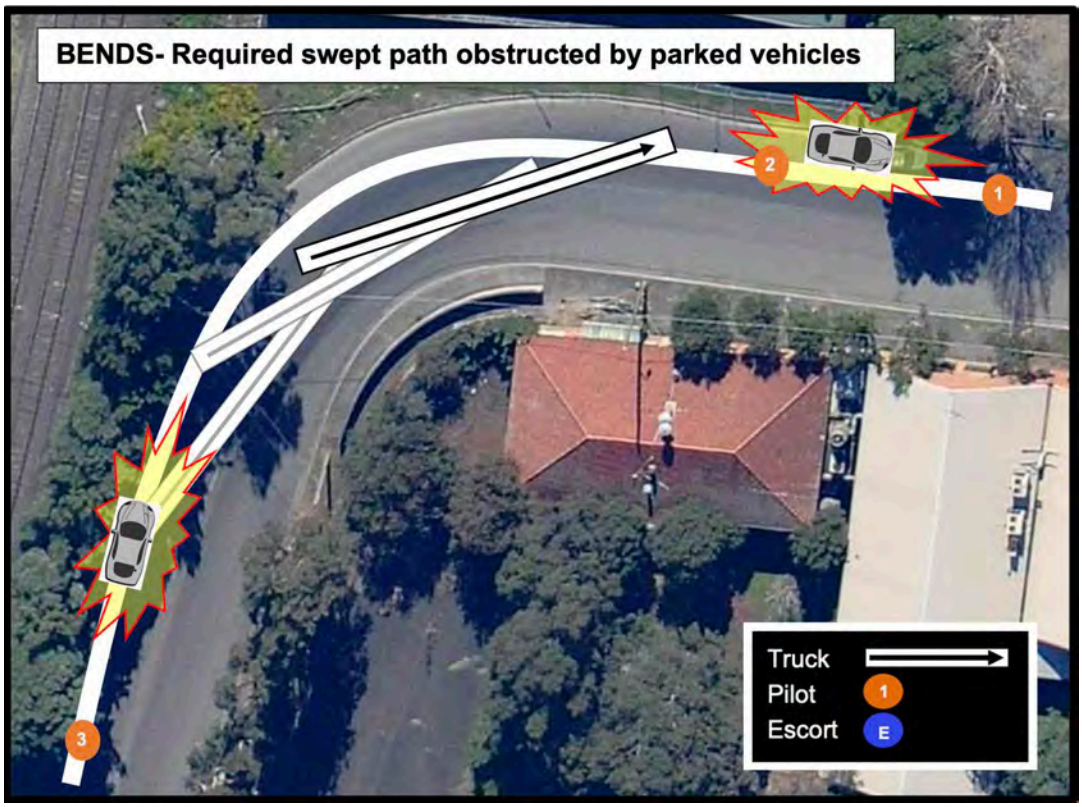
The procedure for crossing bridges may have certain restrictions depending on the type and weight of the load. The NHVR permit will list any bridge structure that have conditions to cross. If there are conditions to cross this structure, then the driver MUST follow these conditions. A Pilot may be required to warm oncoming traffic if the vehicle needs to travel over a bridge on single lane road in the centre line.

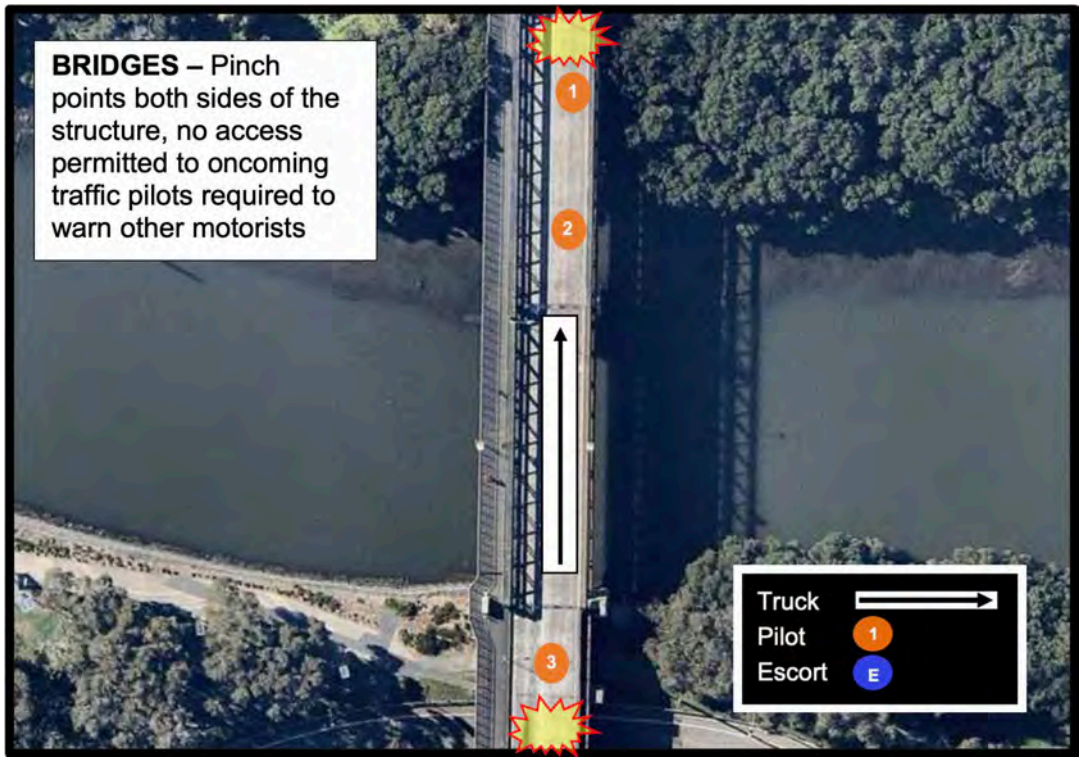
It is crucial that pinch points are discussed at the toolbox briefing and that all parties are aware of the protocols in place.

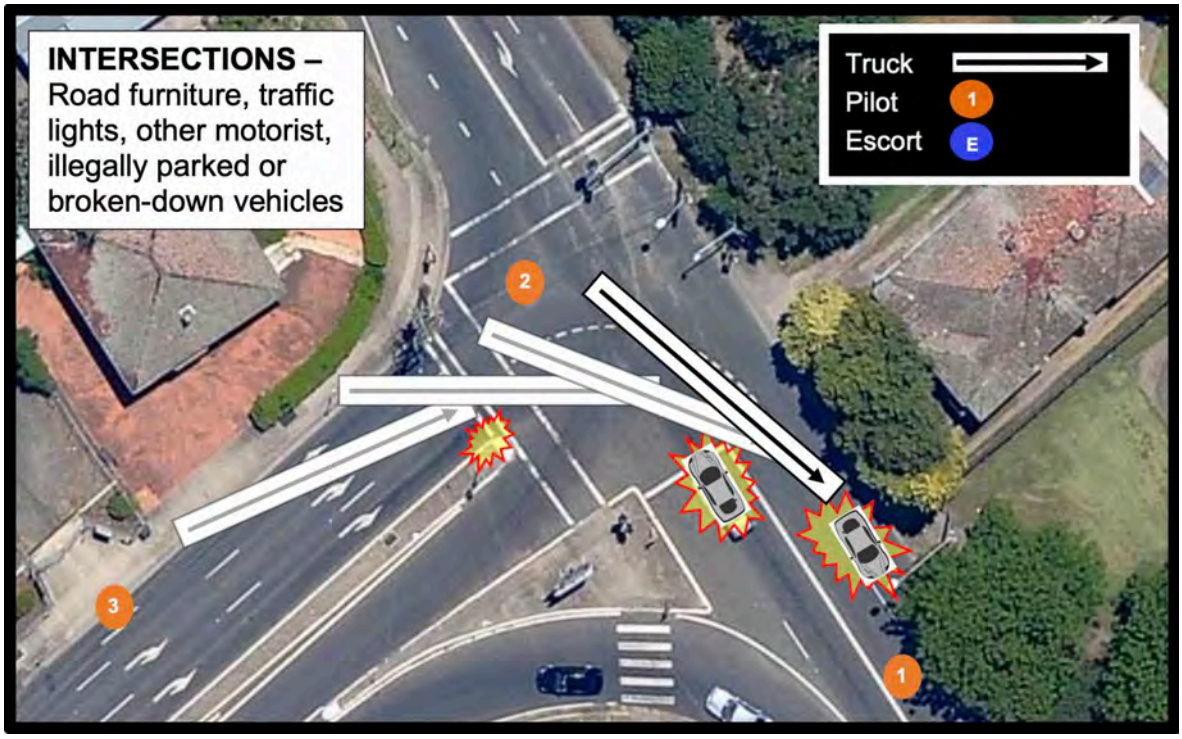
Drivers should familiarise themselves with the route including nominated bypasses for heavy vehicles along the route.

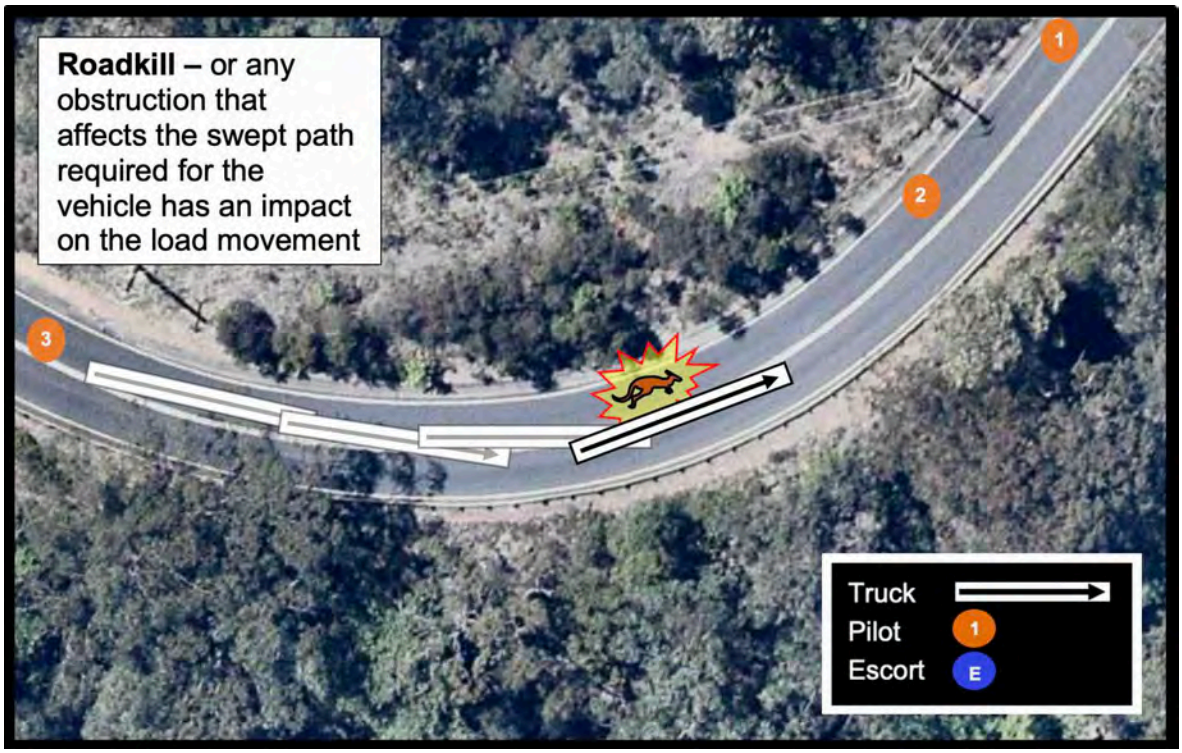
If there is any doubt as to the viability of accessing the permitted route the load must not continue until the way forward has been deemed appropriate.

Examples of pinch points:






INTERSECTIONS – Road furniture, traffic lights, other motorist, illegally parked or broken-down vehicles
Truck
Pilot 1
Escort E
2
3
1


Roadkill – or any obstruction that affects the swept path required for the vehicle has an impact on the load movement
1
2
3
Truck
Pilot 1
Escort E

14.0 Managing queued traffic behind the load.

During the journey the interaction with other road users will require management of queued traffic.

The protocol to provide queued traffic an opportunity to pass the load will be reliant on the rear pilot constantly monitoring the queue of traffic and relaying this information back to the driver, the pilot in conjunction with the driver will identify suitable areas that allow a safe passing point for the passing vehicles.

The load MUST pull over or slow to allow the backed-up vehicles to pass at regular 10-minute intervals. The pilot will inform the driver when there has been a lag from last pull over and if other cars have been following for a short distance, in this instance apply the passing protocol again, this will continue throughout the journey as required to ensure queued traffic do not experience excessive delays. The driver and pilot will also allow vehicles to pass at any opportunity that allows a safe area for this vehicle and its load to pull over safely and will.

15.0 Interacting with roadwork:

Roadworks to be checked weekly. TfNSW/TMC should provide the project with a list of conflicts. The transport operator should contact any conflicts and seek approval to pass through their workzone.

The pilot will make contact with the road crews at these conflicts to advise of the nature of the load, size, dimensions, to establish if the load is ok to enter the work zone.

In this instance the convoy will work with all reasonable instructions from the road crew to coordinate the safe passage of the load through the affected areas.

Pilots and local traffic controllers will work together to facilitate the necessary actions required to travel through the work zone.

16.0 Emergency stopping / pulling up for rest areas:

In the event of an emergency or scheduled rest break, establish positive communications with the pilot and driver and identify the next suitable area to halt the movement, during which the pilot should remain 200 metres behind the load to warn approaching traffic.

Ensure the load is as far left as possible so as to not impede any traffic from passing.

If the stop is for a breakdown and is major and requires a mechanic to attend contact the TMC and advise them of the disruption to traffic. Minor repairs that can be rectified in a short time do not require the TMC to be advised.

In the event that road works are encountered on route pilot is to call in on the nominated UHF channel and advise the local traffic control of the inbound load and await approval to enter the work zone.

Follow normal traffic management procedures as out lined in: SOP_030 Traffic Management Procedures.

The suggested rest areas are an indication only and dependant on the local traffic movements and occupancy of these rest areas it may not be possible to get off the road.

In this instance the lead pilot should travel ahead to identify the next suitable area.

This methodology can also be adopted to allow built up traffic to pass by slowing the load down and easing into break down areas to allow traffic to pass before continuing on.

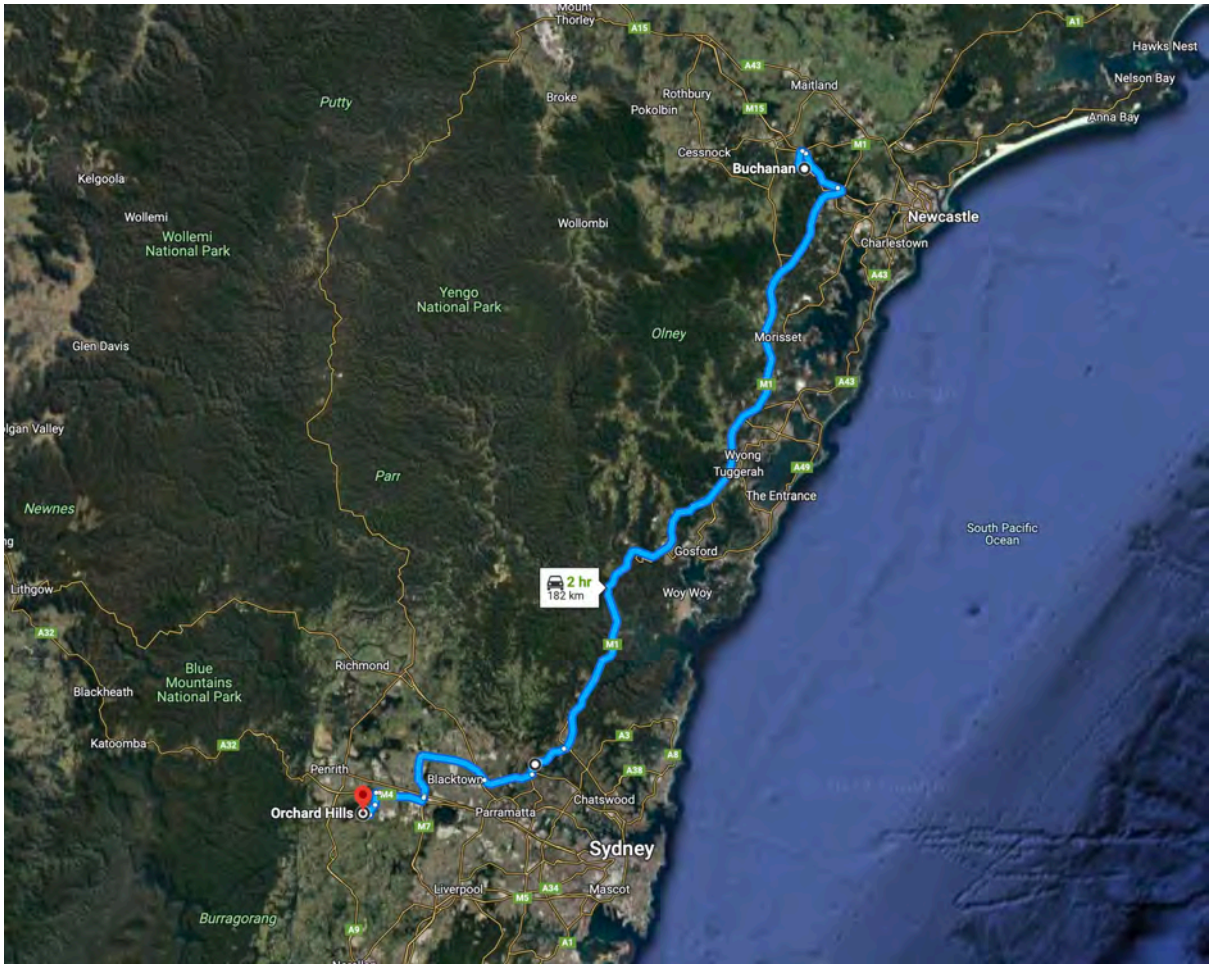
Listed in the index are Emergency parking areas on route.

17.0 Route 1 Transport plan & pinch points: Buchanan to SMWSA Orchard Hills site

GPS link to route: https://goo.gl/maps/XgMyCPhiytGVcDFL7

Distance: 182.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Mamre Road, Luddenham Road, Patons lane.



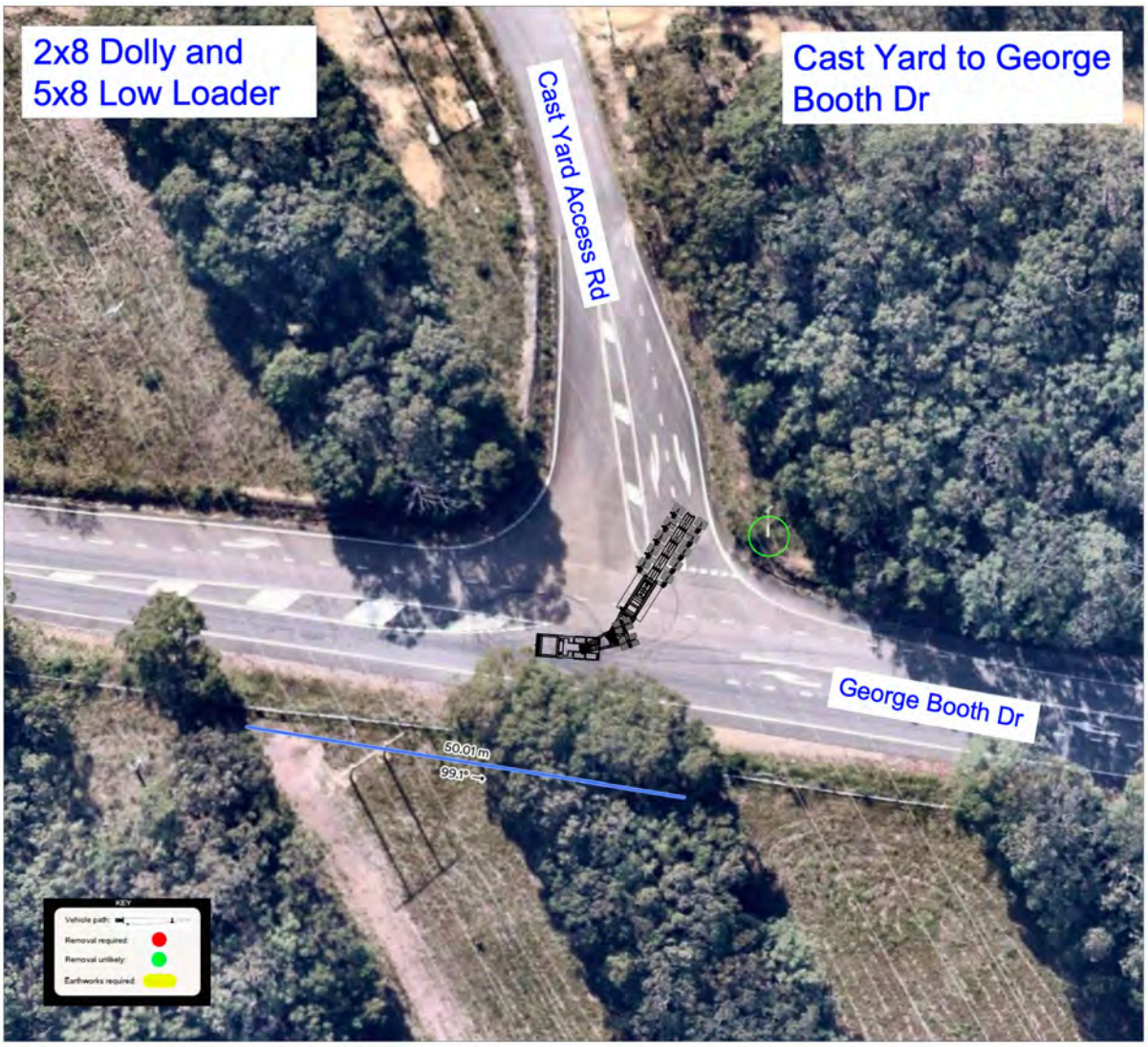
KEY	
PINCH POINT	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Buchanan	Cast yard onto George Booth Drive GPS Link: https://goo.gl/maps/eBSdLRrJqMTtSrdi6	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
3.8	Buchanan	George Booth Drive onto John Renshaw drive GPS Link: https://goo.gl/maps/e67Gi8VKRxmSHT6k8	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
4.0	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS Link: https://goo.gl/maps/3r85iDwMVJd5sDXGA	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn at the roundabout	No problems with this section of road
13.5	Cameron Park	Hunter Expressway onto the M1 GPS link: https://goo.gl/maps/nEVETPtPyUpH6k4o8	Length: 100.0 Metres Width: 6.5 Metres	Left hand exit, before right hand bend, than right hand merge onto the M1 Motorway	No problems with this section of road
100.0	Mt White	M1 Motorway under Mt White overpass GPS link: https://goo.gl/maps/K3fPPe4fNx63xB3j7	Left Lane: 5.2 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.4 mtrs	Travel directly ahead	This is the lowest structure on the M1 Motorway. All loads have sufficient clearance.
108.0	Mooney Mooney	M1 Motorway into Hawkesbury River Parking area GPS link: https://goo.gl/maps/yDzjirEKLAbREE8B6	100.0 long x 6.0 wide	Merge to left	Can be used for overnight parking as well as for fatigue breaks.
132.0	Wahroonga	M1 onto Pennant Hills Rd GPS link: https://goo.gl/maps/bskC8kD4CdW9xmwYA	Length: 70.0 Metres Width: 7.0 Metres	Left hand turn	No problems with this section of road
133.0	Normanhurst	Pennant Hills Road under Pedestrian overpass GPS link: https://goo.gl/maps/nYbjkf5AJ9D2xvUt7	Left Lane: 5.15 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	This is the lowest structure on this route. All loads have sufficient clearance.
140.0	West Pennant Hills	Pennant Hills Rd onto M2 Motorway GPS link: https://goo.gl/maps/cCsJwSt1NsRi5cSs6	Length: 70.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
149.0	Winston Hills	M2 Motorway onto M7 Motorway GPS link: https://goo.gl/maps/PC96cBq2xqtW85vG7	Width: 12.0 Metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
153.0	Kings Park	M7 Motorway GPS link: https://goo.gl/maps/T8WcbR9T84Zs7WpF7	100.0 long x 6.0 wide	Merge to left	Can be used for fatigue breaks.
168.0	Eastern Creek	M7 Motorway onto M4 Motorway GPS link: https://goo.gl/maps/NcJRcCHx7jKdoKwz6	Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
177.0	St Marys	M4 Motorway onto Mamre Road GPS link: https://goo.gl/maps/DmvkY7hJDCHzGSGq9	Length: 45.0 Metres Width: 6.0 Metres	Left hand turn	No problems with this section of road.
179.0	Erskine Park	Mamre Road onto Luddenham Road GPS link: https://goo.gl/maps/enkvZs3YCxtCYD6M6	Length: 50.0 Metres Width: 7.5 Metres	Right hand turn	No problems with this section of road.
181.0	Orchard Hills	Luddenham Road onto Patons Lane GPS link: https://goo.gl/maps/MFJqqEkQL8eczdYz6	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road.
182.0	Orchard Hills	Patons Lane into Orchard Hills site GPS link: https://goo.gl/maps/QAp5CicXmE5LHY4G7		Right hand turn	Site to make suitable access for the swept path and dimensions of the largest loads.

0.0 Km's: Cast yard onto George Booth Drive at Buchanan.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/eBSdLRrJqMTtSrdi6

PROCEDURE: Right hand turn from the cast yard onto George Booth Drive.

3.8 to 4.0 Km's: George Booth Drive through to the Hunter Expressway at Buchanan.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/efbRZr6KJRKnwZr36

PROCEDURE: Right hand turn through two roundabouts and onto the Hunter Expressway.

132.0 Km's: M1 Motorway onto Pennant Hills Road at Wahroonga.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/bskC8kD4CdW9xmwYA

PROCEDURE: Left hand turn from the M1 Motorway onto Pennant Hills Road.

140.0 Km's: Pennant Hills Road onto the M2 Motorway at West Pennant Hills.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cCsJwSt1NsRi5cSs6

PROCEDURE: Right hand turn from Pennant Hills Road onto the M2 Motorway.

177.0 Km's: M4 Motorway onto Mamre Road at St Marys.

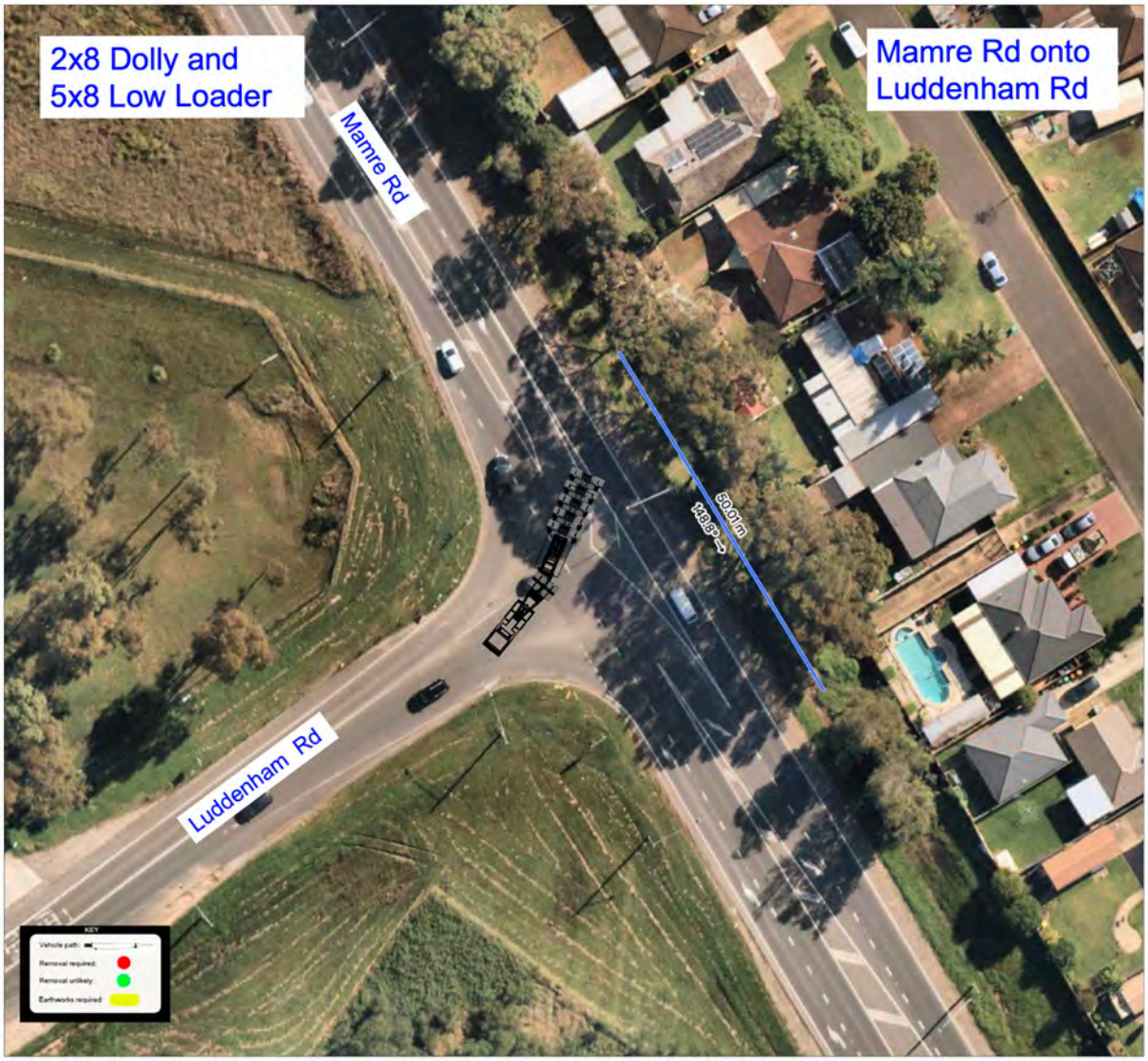
Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/DmvkY7hJDCHzGSGq9

PROCEDURE: Left hand turn from the M4 onto Mamre Road.

179.0 Km's: Mamre Road onto Luddenham Road at Erskine Park.

Image 1:

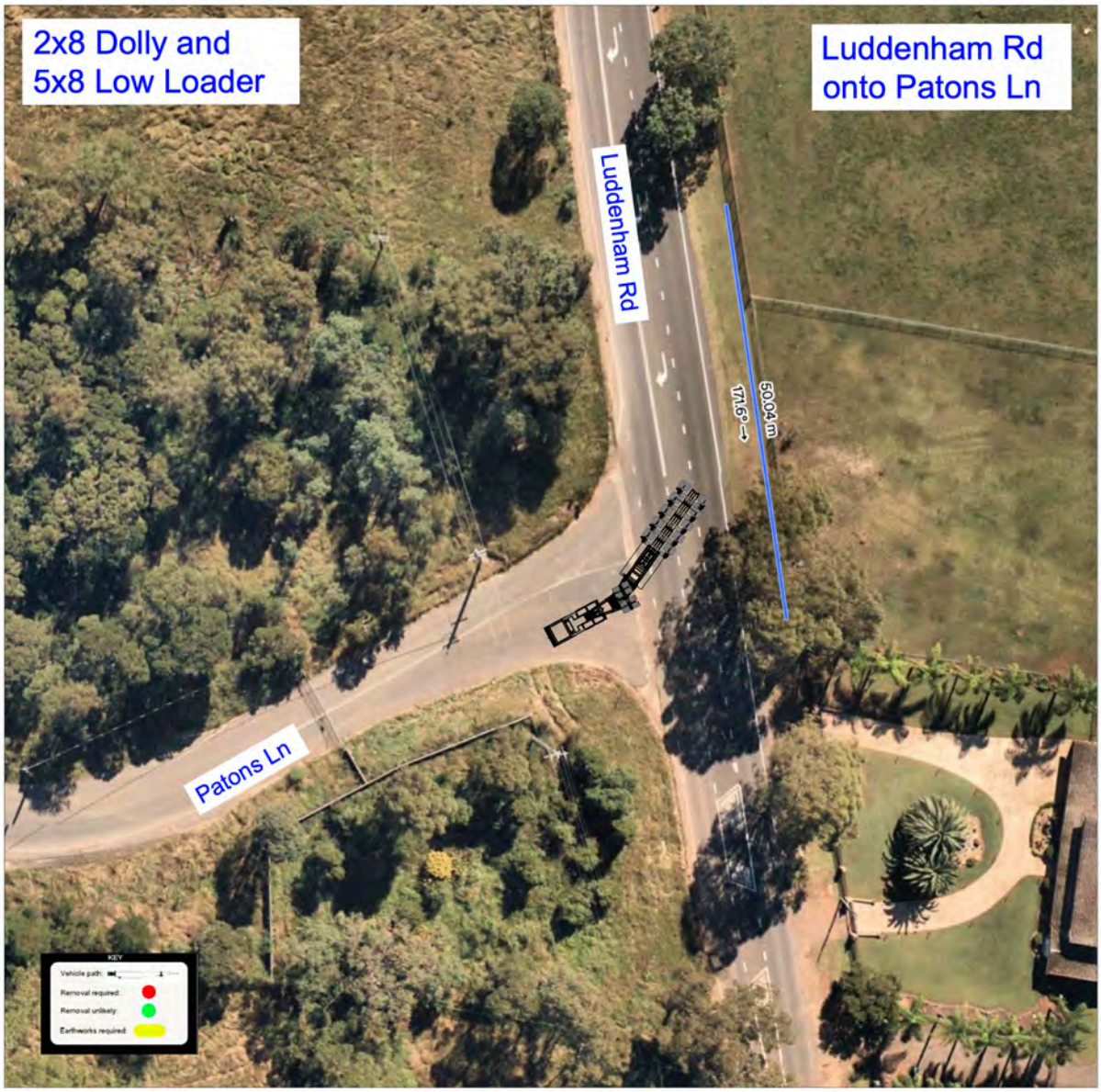


GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/enkvZs3YCxtCYD6M6

PROCEDURE: Right hand turn from Mamre Road onto Luddenham Road.

181.0 Km's: Luddenham Road onto Patons Lane at Orchard Hills.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/MFJqqEkQL8eczdYz6

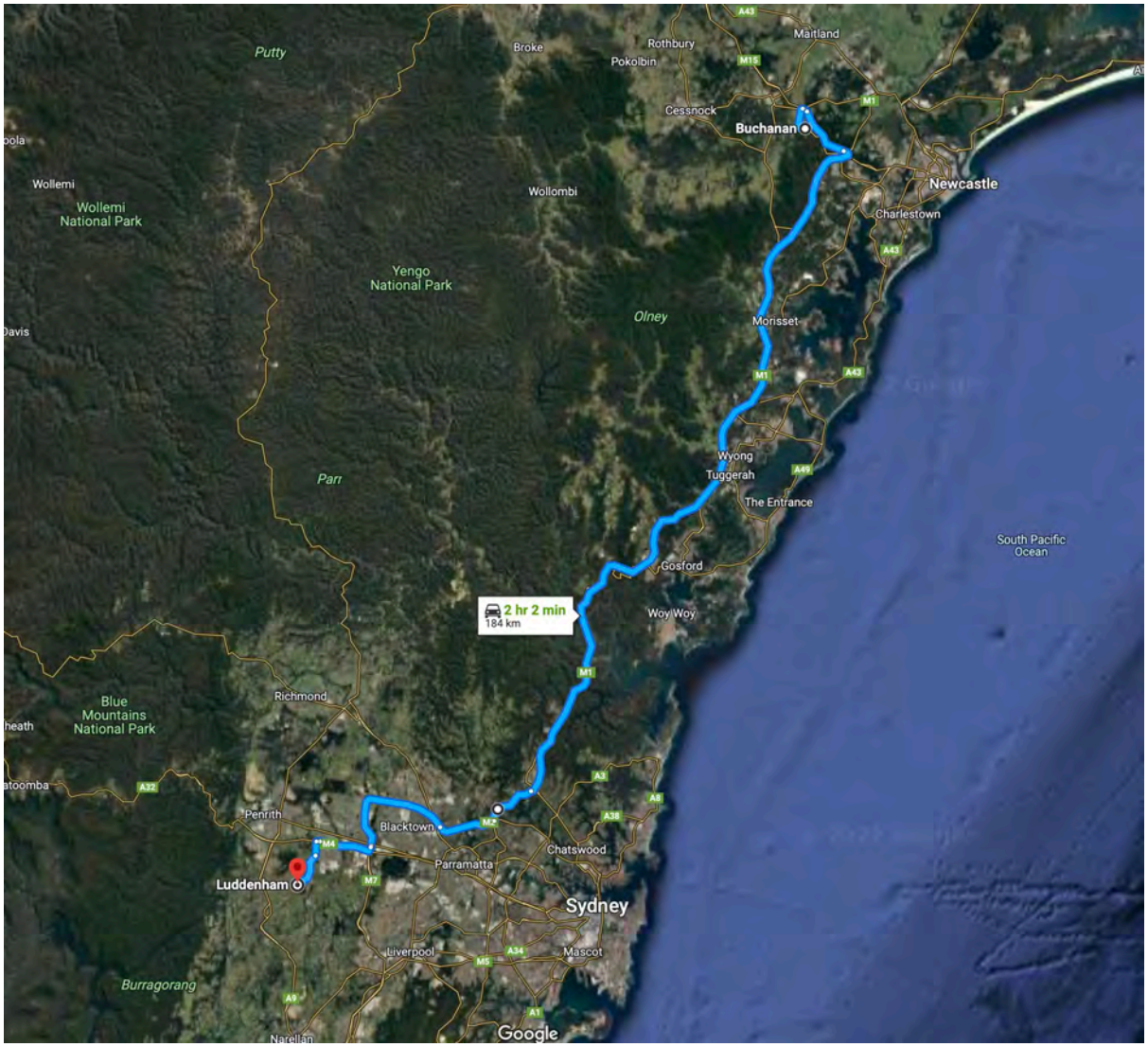
PROCEDURE: Right hand turn from Luddenham Road onto Patons Lane.

18.0 Route 2 Transport plan & pinch points: Buchanan to SMWSA Luddenham site

GPS link to route: https://goo.gl/maps/TQDnXjPcBDjaUU5U9

Distance: 184.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Mamre Road, Luddenham Road.



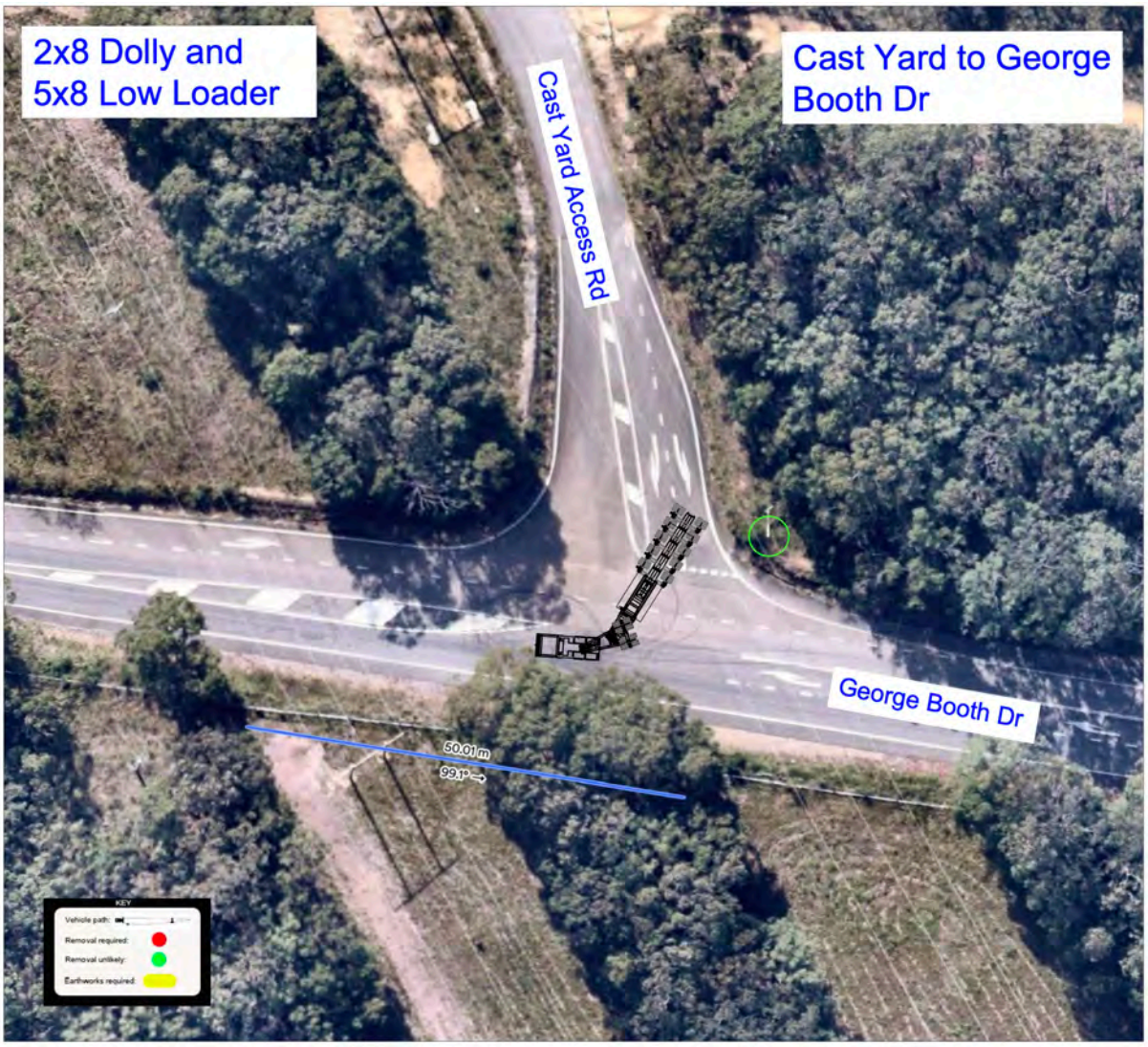
KEY	
PINCH POINT	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Buchanan	Cast yard onto George Booth Drive GPS Link: https://goo.gl/maps/eBSdLRrJqMTtSrdi6	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
3.8	Buchanan	George Booth Drive onto John Renshaw drive GPS Link: https://goo.gl/maps/e67Gi8VKRxmSHT6k8	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
4.0	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS Link: https://goo.gl/maps/3r85iDwMVJd5sDXGA	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn at the roundabout	No problems with this section of road
13.5	Cameron Park	Hunter Expressway onto the M1 GPS link: https://goo.gl/maps/nEVETPtPyUpH6k4o8	Length: 100.0 Metres Width: 6.5 Metres	Left hand exit, before right hand bend, than right hand merge onto the M1 Motorway	No problems with this section of road
100.0	Mt White	M1 Motorway under Mt White overpass GPS link: https://goo.gl/maps/K3fPPe4fNx63xB3j7	Left Lane: 5.2 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.4 mtrs	Travel directly ahead	This is the lowest structure on the M1 Motorway. All loads have sufficient clearance.
108.0	Mooney Mooney	M1 Motorway into Hawkesbury River Parking area GPS link: https://goo.gl/maps/yDzjirEKLAbREE8B6	100.0 long x 6.0 wide	Merge to left	Can be used for overnight parking as well as for fatigue breaks.
132.0	Wahroonga	M1 onto Pennant Hills Rd GPS link: https://goo.gl/maps/bskC8kD4CdW9xmwYA	Length: 70.0 Metres Width: 7.0 Metres	Left hand turn	No problems with this section of road
133.0	Normanhurst	Pennant Hills Road under Pedestrian overpass GPS link: https://goo.gl/maps/nYbjkf5AJ9D2xvUt7	Left Lane: 5.15 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	This is the lowest structure on this route. All loads have sufficient clearance.
140.0	West Pennant Hills	Pennant Hills Rd onto M2 Motorway GPS link: https://goo.gl/maps/cCsJwSt1NsRi5cSs6	Length: 70.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
149.0	Winston Hills	M2 Motorway onto M7 Motorway GPS link: https://goo.gl/maps/PC96cBq2xqtW85vG7	Width: 12.0 Metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
153.0	Kings Park	M7 Motorway GPS link: https://goo.gl/maps/T8WcbR9T84Zs7WpF7	100.0 long x 6.0 wide	Merge to left	Can be used for fatigue breaks.
168.0	Eastern Creek	M7 Motorway onto M4 Motorway GPS link: https://goo.gl/maps/NcJRcCHx7jKdoKwz6	Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
177.0	St Marys	M4 Motorway onto Mamre Road GPS link: https://goo.gl/maps/DmvkY7hJDCHzGSGq9	Length: 45.0 Metres Width: 6.0 Metres	Left hand turn	No problems with this section of road.
179.0	Erskine Park	Mamre Road onto Luddenham Road GPS link: https://goo.gl/maps/enkvZs3YCxtCYD6M6	Length: 50.0 Metres Width: 7.5 Metres	Right hand turn	No problems with this section of road.
184.0	Luddenham	Luddenham Road into Luddenham site GPS link: https://goo.gl/maps/BmZdu9QiUQ765m1LA		Right hand turn	Site to make suitable access for the swept path and dimensions of the largest loads.

0.0 Km's: Cast yard onto George Booth Drive at Buchanan.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/eBSdLRrJqMTtSrdi6

PROCEDURE: Right hand turn from the cast yard onto George Booth Drive.

3.8 to 4.0 Km's: George Booth Drive through to the Hunter Expressway at Buchanan.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/efbRZr6KJRKnwZr36

PROCEDURE: Right hand turn through two roundabouts and onto the Hunter Expressway.

132.0 Km's: M1 Motorway onto Pennant Hills Road at Wahroonga.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/bskC8kD4CdW9xmwYA

PROCEDURE: Left hand turn from the M1 Motorway onto Pennant Hills Road.

140.0 Km's: Pennant Hills Road onto the M2 Motorway at West Pennant Hills.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cCsJwSt1NsRi5cSs6

PROCEDURE: Right hand turn from Pennant Hills Road onto the M2 Motorway.

177.0 Km's: M4 Motorway onto Mamre Road at St Marys.

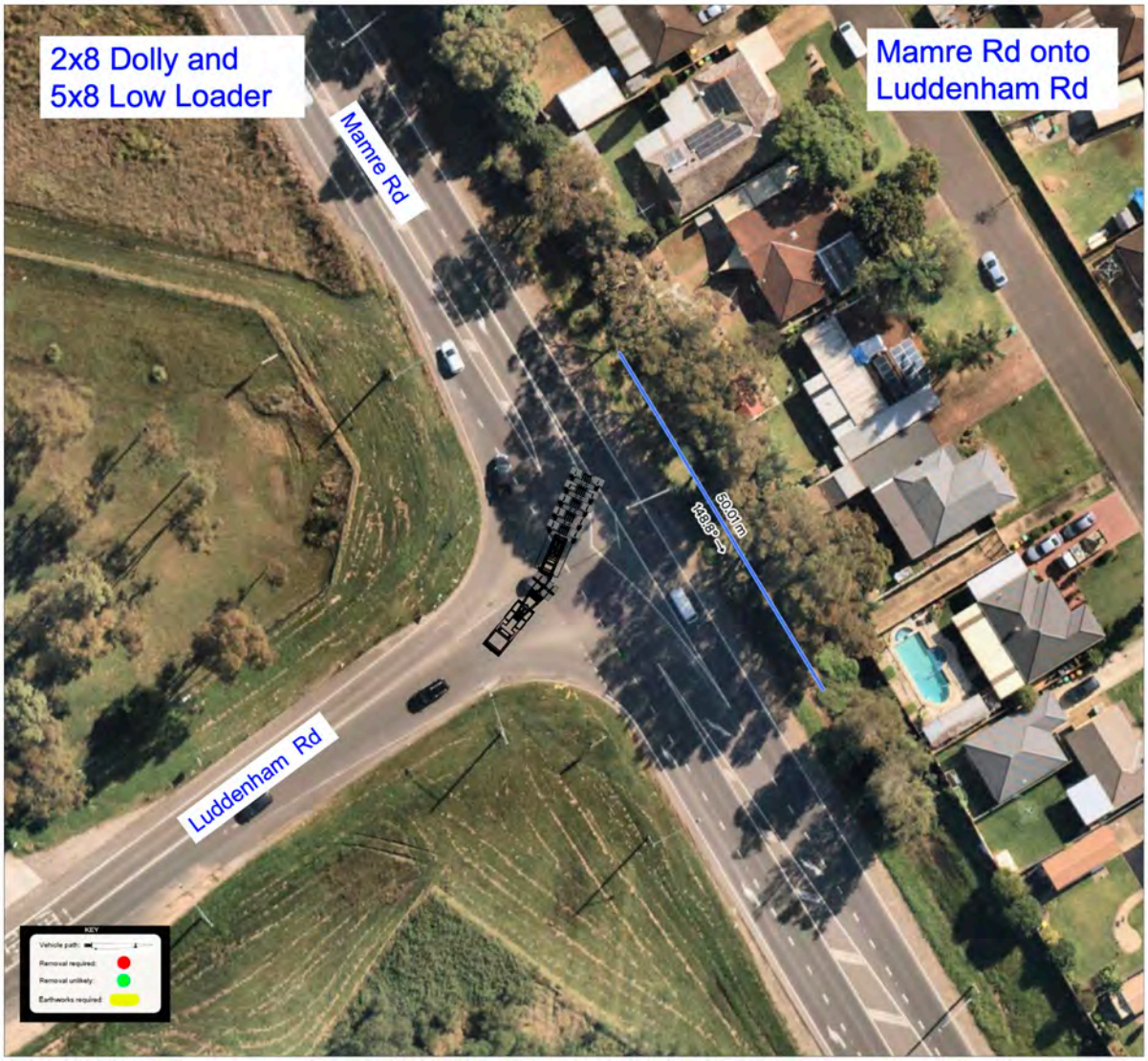
Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/DmvkY7hJDCHzGSGq9

PROCEDURE: Left hand turn from the M4 onto Mamre Road.

179.0 Km's: Mamre Road onto Luddenham Road at Erskine Park.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/enkvZs3YCxtCYD6M6

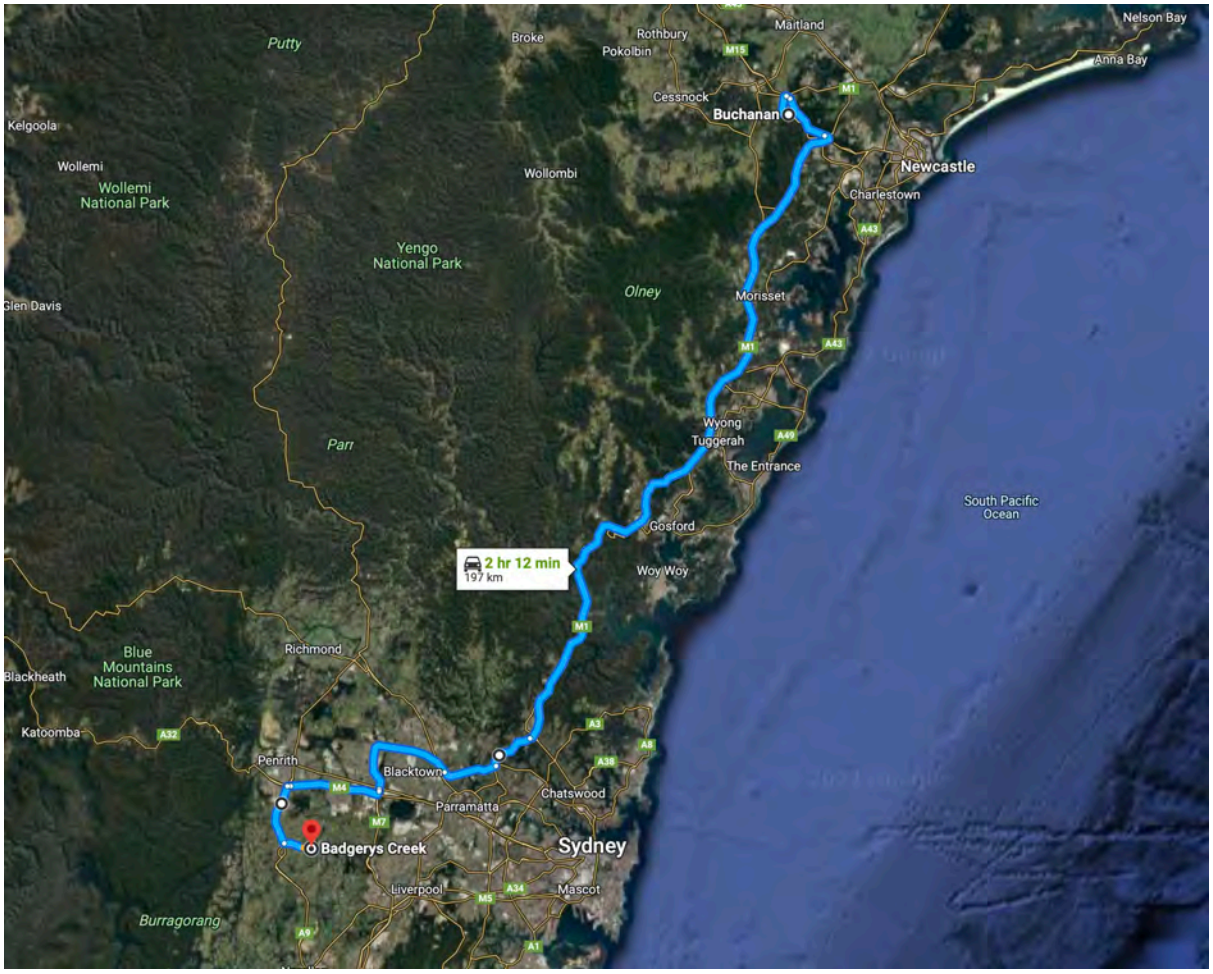
PROCEDURE: Right hand turn from Mamre Road onto Luddenham Road.

19.0 Route 3 Transport plan & pinch points: Buchanan to SMWSA Badgerys Creek site

GPS link to route: https://goo.gl/maps/g7GJ5CJoVsQa7qqR7

Distance: 197.0 kilometres

Route: George Booth Drive, John Renshaw Drive, Hunter Expressway, M1 Motorway, Pennant Hills Road, M2 Motorway, M7 Motorway, M4 Motorway, Northern Road, Elizabeth Drive.



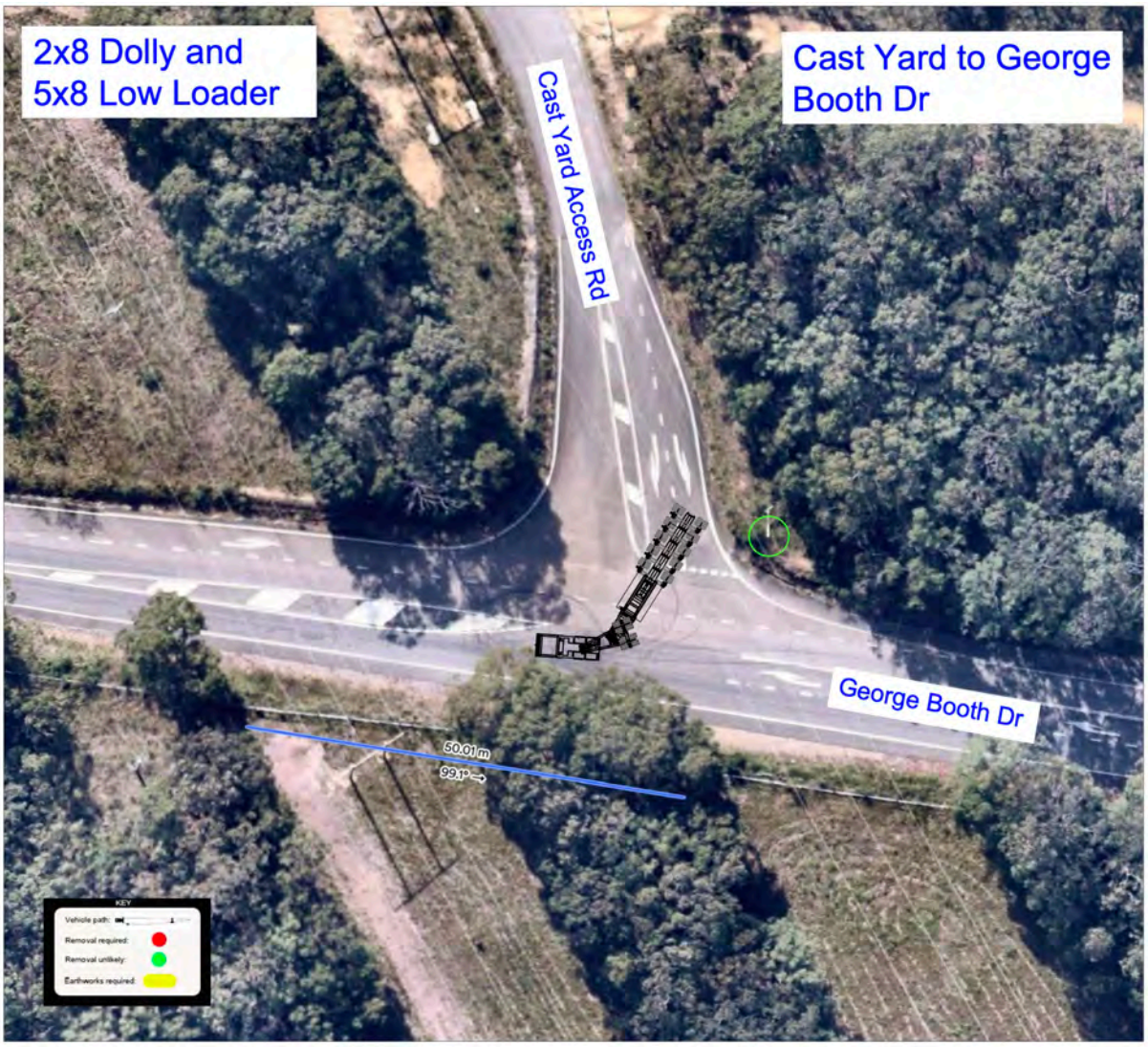
KEY	
PINCH POINT	
CAUTION	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Buchanan	Cast yard onto George Booth Drive GPS Link: https://goo.gl/maps/eBSdLRrJqMTtSrdi6	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
3.8	Buchanan	George Booth Drive onto John Renshaw drive GPS Link: https://goo.gl/maps/e67Gi8VKRxmSHT6k8	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
4.0	Buchanan	John Renshaw Drive onto the Hunter Expressway GPS Link: https://goo.gl/maps/3r85iDwMVJd5sDXGA	Length: 40.0 Metres Width: 6.5 Metres	Right hand turn at the roundabout	No problems with this section of road
13.5	Cameron Park	Hunter Expressway onto the M1 GPS link: https://goo.gl/maps/nEVETPtPyUpH6k4o8	Length: 100.0 Metres Width: 6.5 Metres	Left hand exit, before right hand bend, than right hand merge onto the M1 Motorway	No problems with this section of road
100.0	Mt White	M1 Motorway under Mt White overpass GPS link: https://goo.gl/maps/K3fPPe4fNx63xB3j7	Left Lane: 5.2 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.4 mtrs	Travel directly ahead	This is the lowest structure on the M1 Motorway. All loads have sufficient clearance.
108.0	Mooney Mooney	M1 Motorway into Hawkesbury River Parking area GPS link: https://goo.gl/maps/yDzjirEKLAbREE8B6	100.0 long x 6.0 wide	Merge to left	Can be used for overnight parking as well as for fatigue breaks.
132.0	Wahroonga	M1 onto Pennant Hills Rd GPS link: https://goo.gl/maps/bskC8kD4CdW9xmwYA	Length: 70.0 Metres Width: 7.0 Metres	Left hand turn	No problems with this section of road
133.0	Normanhurst	Pennant Hills Road under Pedestrian overpass GPS link: https://goo.gl/maps/nYbjkf5AJ9D2xvUt7	Left Lane: 5.15 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	This is the lowest structure on this route. All loads have sufficient clearance.
140.0	West Pennant Hills	Pennant Hills Rd onto M2 Motorway GPS link: https://goo.gl/maps/cCsJwSt1NsRi5cSs6	Length: 70.0 Metres Width: 6.5 Metres	Right hand turn	No problems with this section of road
149.0	Winston Hills	M2 Motorway onto M7 Motorway GPS link: https://goo.gl/maps/PC96cBq2xqtW85vG7	Width: 12.0 Metres	Travel directly ahead	No problems with this section of road.

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
153.0	Kings Park	M7 Motorway GPS link: https://goo.gl/maps/T8WcbR9T84Zs7WpF7	100.0 long x 6.0 wide	Merge to left	Can be used for fatigue breaks.
168.0	Eastern Creek	M7 Motorway onto M4 Motorway GPS link: https://goo.gl/maps/NcJRcCHx7jKdoKwz6	Width: 6.5 Metres	Travel directly ahead	No problems with this section of road.
182.0	Orchard Hills	M4 Motorway onto Northern Road GPS link: https://goo.gl/maps/zW86yMN7Kw9VRJzH8	Length: 60.0 Metres Width: 8.0 Metres	Left hand turn	No problems with this section of road.
193.0	Luddenham	Northern Road onto Elizabeth Drive GPS link: https://goo.gl/maps/ftt5yXjyYfi99mRc7	Length: 40.0 Metres Width: 6.5 Metres	Left hand turn	No problems with this section of road.
197.0	Badgerys Creek	Patons Lane into Orchard Hills site GPS link: https://goo.gl/maps/6v4skVMzTssjnydo8		Left hand turn	Site to make suitable access for the swept path and dimensions of the largest loads.

0.0 Km's: Cast yard onto George Booth Drive at Buchanan.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/eBSdLRrJqMTtSrdi6

PROCEDURE: Right hand turn from the cast yard onto George Booth Drive.

3.8 to 4.0 Km's: George Booth Drive through to the Hunter Expressway at Buchanan.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/efbRZr6KJRKnwZr36

PROCEDURE: Right hand turn through two roundabouts and onto the Hunter Expressway.

132.0 Km's: M1 Motorway onto Pennant Hills Road at Wahroonga.

Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/bskC8kD4CdW9xmwYA

PROCEDURE: Left hand turn from the M1 Motorway onto Pennant Hills Road.

140.0 Km's: Pennant Hills Road onto the M2 Motorway at West Pennant Hills.

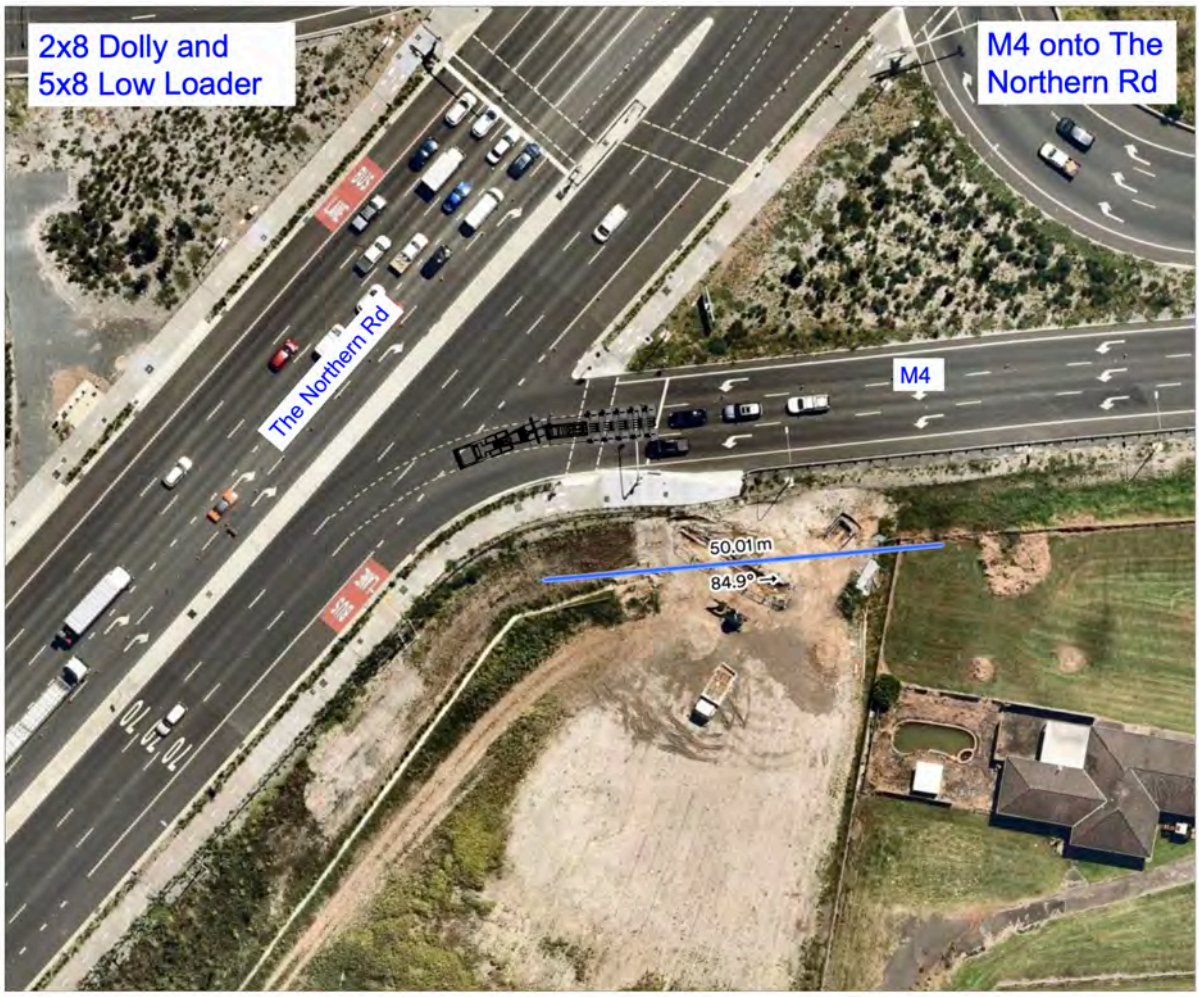
Image 1:

GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/cCsJwSt1NsRi5cSs6

PROCEDURE: Right hand turn from Pennant Hills Road onto the M2 Motorway.

182.0 Km's: M4 Motorway onto the Northern Road at Orchard Hills.

Image 1:

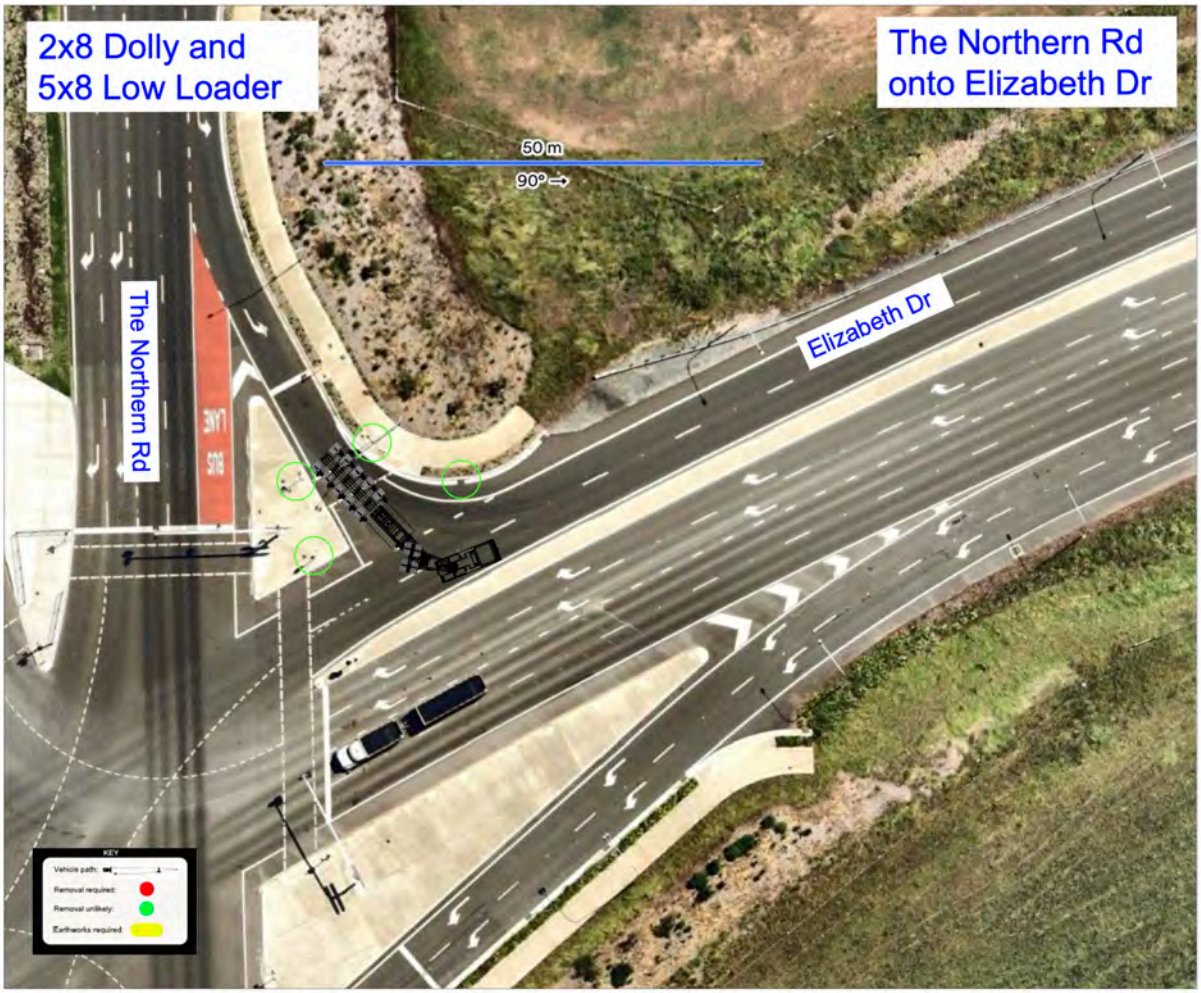


GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/zW86yMN7Kw9VRJzH8

PROCEDURE: Left hand turn from the M4 onto the Northern Road.

193.0 Km's: The Northern Road onto Elizabeth Drive at Luddenham.

Image 1:



GPS LINK FOR SECTION OF ROAD: https://goo.gl/maps/ftt5yXjyYfi99mRc7

PROCEDURE: Right hand turn from Mamre Road onto Luddenham Road.

20.0 Conclusion:

After studying all options and undertaking a route survey, these routes in their current condition are suitable for the segment deliveries.

The following are the key points that need to be taken into consideration, when planning the transport of the components from the port to site.

BRIDGES:

- All transport combinations will require approvals through NHVR to travel over structures on these routes.

LENGTH:

- The length clearance on these routes are clear for the components in this TMP.

WIDTH:

- The width clearance on these routes are clear for the components in this TMP.

OVERHEAD STRUCTURES:

- The height clearance under structures on these routes are clear for the components in this TMP.

OVERHEAD UTILITIES:

- The height clearance under overhead utilities on these routes are clear for the components in this TMP.

VEGETATION:

- The clearance on these routes are clear for the components in this TMP.

PAVEMENT:

- The pavement is of Highway grade for the entirety on all routes.

PENNANT HILLS ROAD:

- All oversize loads cannot travel loaded through the Northconnex Tunnel and must use Pennant Hills Road.
- Returning empty if the trailers are under 26 metres in length and 2.8 in width, they can use the North Connex Tunnel.

SITE ENTRANCE:

- Design drawings are required to confirm exact location and suitable access into site.

21.0 References:

Rex J Andrews route survey # 347 REV00
SMWSA
Jacobs
Google Earth/Maps
Nearmaps
Australian Load Restraint Guide
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)

Disclaimer: This route study is a guide only; government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

This study was undertaken using data supplied by Rex J Andrews P/L. Equipment and swept paths might vary if using transport methodology other than the data supplied by Rex J Andrews.

22.0 TMP Review:

Final Review	Name	Signature	Date
TMP Checked by:			

Sign On: **I confirm that I have received a hard copy of this TMP, I have read and understood the contents; by signing this document I acknowledge that I am now familiar with the identified pinch points, the route and the conditions relating to time of travel. I understand that prior to travel a supervisor may ask me questions specific to this TMP, in the event that I cannot demonstrate awareness of the conditions of the TMP I must delay my departure until I have reviewed its content.**

Name	Role	Signature	Date	Company

Appendix C

Noise and Vibration Assessment

RENZO TONIN & ASSOCIATES
Inspired to achieve

Acoustics
Vibration
Structural Dynamics

SYDNEY METRO WESTERN SYDNEY AIRPORT PROJECT

Buchanan Precast Facility - Noise and Vibration Assessment

9 May 2022

Aurecon Australasia Pty Ltd

TM625-01_1F01 SMWSA HV Precast NVA (r2)

35 1983-2017 ACOUSTIC ENGINEERING EXCELLENCE

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21.03.2022	Initial issue	0	1	T. Gowen	-	M. Tabacchi
09.05.2022	Address client comments	-	2	T. Gowen	-	M. Tabacchi

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Contents

List of tables

1 Introduction

This noise and vibration assessment has been prepared on behalf of Aurecon Australasia Pty Ltd (Aurecon) for the re-establishment and operation of a precast facility (the Proposal) located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site) to support the construction of the Sydney Metro – Western Sydney Airport project. . The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and 2017 to support construction of the WestConnex New M5 project. A noise assessment was prepared by Renzo Tonin and Associates in 2018 [5] as part of the Review of Environmental Factors (REF) prepared for the use of precast facility on that project.

This noise and vibration assessment applies to construction of the extension to the precast facility and operation of the facility to produce precast elements for the Sydney Metro Western Sydney Airport project during the daytime assessment period, as defined by the NSW Interim Construction Noise Guideline (ICNG) [1] and the NSW Noise Policy for Industry (NPfI) [2].

This noise and vibration assessment will be submitted to Sydney Metro, forming part of the Review of Environmental Factors (REF) for the precast facility.

1.1 Structure of this noise and vibration assessment report

This report is structured as follows:

- **Section 2** - Description of proposed works and operating hours
- **Section 3** - Existing acoustic environment
- **Section 4** - Nearest sensitive receivers
- **Section 5** - Noise objectives
- **Section 6** - Construction and operational noise assessment
- **Section 7** - Traffic noise assessment
- **Section 8** - Conclusion.

1.2 Quality assurance

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Description of proposed works and operating hours

2.1 Summary of works addressed in this report

This report assesses noise and vibration impacts from activities associated with the extension and operation of the precast facility for the Sydney Metro – Western Sydney Airport project. The construction activities associated with the extension of the facility include:

- Vegetation clearing
- Site leveling
- Shed extension construction and additional laydown areas.

The operational activities include:

- Delivery of materials to site
- Fabrication of precast segments
- Transportation of finished segments from site.

2.2 Hours of operation

The extension of the precast facility will occur during the ICNGs recommended standard construction hours:

Stage	Proposed hours	Notes
Construction	• 7 am to 6 pm Monday to Friday • 8 am to 1 pm Saturdays • No work on Sundays or Public Holidays	ICNG recommended standard construction hours
Operation	• 7 am to 6 pm Monday to Friday • 8 am to 1 pm Saturdays • No work on Sundays or Public Holidays	NPfI day period

The facility will not operate outside of these hours.

2.3 Operational traffic

The precast site will generate additional traffic movements in the form of:

- Light vehicle movements generated by personnel travelling to and from work
- Heavy vehicle movements generated by:
  - Delivery vehicles bringing raw materials, plant, and equipment to the site
  - Trucks removing finished segments from the site

- Concrete trucks bringing concrete to the site

Traffic generated within the Proposal site is included as part of the noise assessment of the work activities identified in Section 6. When operational traffic moves on the public road network, a different noise assessment methodology is appropriate as vehicle movements would be regarded as additional road traffic on public roads rather than as part of the site's operational activities. Traffic noise is addressed in Section 7.

The operational traffic assessment has been used to assess both construction and operational traffic. Traffic generated during the construction stage will be less than the traffic generated during operation.

2.4 Vibration assessment

The nearest residential or other sensitive receiver is located more than 400 metres from the Proposal. At this distance the risk of vibration impact from the extension and operation of the proposed facility is assessed as negligible. No further assessment of vibration impacts is required.

3 Existing acoustic environment

Criteria for the assessment of construction and operational noise are usually derived from the existing noise environment of an area, excluding noise from the subject development.

Fact Sheet A of the NPfI outlines two methods for determining the background noise level of an area. The 'Long term' method is recommended during the planning and approval stage where there is significant potential for noise impact. The 'Short term' is suggested for low-risk developments and compliance checks. This assessment has used long-term noise monitoring measured for the previous use of the precast facility for the WestConnex New M5 project.

As the noise environment of an area almost always varies over time, background and ambient noise levels need to be determined for the operational times of the proposed development. For example, in a suburban or urban area the noise environment is typically at its minimum at 3am in the morning and at its maximum during the morning and afternoon traffic peak hours. The NPfI outlines the following standard time periods over which the background and ambient noise levels are to be determined:

- Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
- Evening: 18:00-22:00 Monday to Sunday & Public Holidays
- Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

3.1 Noise measurement locations

Noise measurements are ideally carried out at the nearest or most potentially affected locations surrounding a development. An alternative, representative location should be established in the case of access restrictions, or a safe and secure location cannot be identified. Furthermore, representative locations may be established in the case of multiple receivers as it is usually impractical to carry out measurements at all locations surrounding a site.

Long-term unattended noise monitoring was conducted at the closest residence to the Precast Facility (1416 George Booth Drive, Buchanan) over approximately one week to establish existing ambient and background levels. The monitor was installed in the free field, approximately 30m from building, on the side closest to the facility.

The long-term measurement location is shown in Figure B1, A.1.

3.2 Long-term noise measurement results

Long-term noise monitoring was carried out from Wednesday, 12 October 2016 to Monday, 24 October 2016. Review of aerial photography from 2016 compared to 2022 shows there has been minimal changes to the area surrounding the Proposal site. The monitoring data from 2016 is therefore considered representative of the existing noise environment surrounding the Proposal site.

The long-term noise monitoring methodology is detailed in APPENDIX D, and noise level-vs-time graphs of the data are included in APPENDIX E. Table 3.1 presents the overall single Rating Background Levels (RBL) and representative ambient L_{eq} noise levels for each assessment period, determined in accordance with the NPfI.

Table 3.1: Long-term noise monitoring results, dB(A)

Monitoring location	L_{A90} Rating Background Level (RBL)			L_{Aeq} Ambient noise levels		
	Day	Evening	Night	Day	Evening	Night
L1 - 1416 George Booth Drive	39	39 (41)	36	50	48	46

Notes: Shoulder: 06:00-07:00 Monday to Saturday.

Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays

Evening: 18:00-22:00 Monday to Sunday & Public Holidays

Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

Number in brackets refers measured RBL. NPfI requires that where measured evening RBL is higher than the Day RBL, the Day RBL applies to the evening period

As required by the NPfI, the external ambient noise levels presented are free-field noise levels. [i.e. no façade reflection]

4 Nearest sensitive receivers

4.1 Residential receivers

An indicative list of the nearest, potentially affected residential receivers are summarised in Table 4.1 below.

Table 4.1: Nearest residential noise sensitive receivers

Receiver ID	Nearest residential receiver address	Approx. distance receiver boundary to works
R_01	1332 George Booth Drive, Buchanan	690m
R_02	1395 George Booth Drive, Buchanan	1100m
R_03	1408 George Booth Drive, Buchanan	765m
R_04	1413 George Booth Drive, Buchanan	1030m
R_05	CT1/1416 George Booth Drive, Buchanan	500m
R_06	CT3/1416 George Booth Drive, Buchanan	440m
R_07	CT4/1416 George Booth Drive, Buchanan	585m
R_08	1424 George Booth Drive, Buchanan	960m
R_09	1459 George Booth Drive, Buchanan	1220m
R_10	1490 George Booth Drive, Buchanan	1280m

All relevant residential sensitive receivers in the vicinity of the worksite are identified on aerial photographs located in A.1.

4.2 Non-residential receivers

The closest non-residential receivers are two industrial premises (Table 4.2) approximately 540m and 765m away from the Precast Facility.

Table 4.2: Nearest non-residential receivers

Receiver ID	Land use	Other sensitive receiver address	Approx. distance to worksite
C_01	Industrial	Orica Kurri Technical Centre, 1151 George Booth Drive, Richmond Vale	765m
C_02	Industrial	Henholme, CT4/1416 George Booth Drive, Buchanan	540m

There are no 'other' noise sensitive receivers (e.g. educational institutions, places of worship, recreational areas, etc.) surrounding the site.

All relevant land uses near the worksite are identified on aerial photographs located in A.1.

5 Noise objectives

5.1 Construction noise objectives

The ICNG provides guidelines for assessing noise generated during the construction phase of developments. Table 5.1 reproduced from the ICNG, sets out the airborne noise management levels and how they are to be applied for residential receivers.

Table 5.1 Noise management levels at residential receivers

Time of day	Management level $L_{Aeq\ (15\ min)}$ [1]	How to apply
Recommended standard hours: Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before/ after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Notes: 1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metre above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Table 5.2 sets out the ICNG noise management levels for other noise sensitive receiver locations. Where premises are noise-sensitive and cannot be suitably classified by the categories in this table, it is recommended that the recommended 'maximum' internal noise levels presented in AS/NZS 2107:2016 are adopted.

Table 5.2: Noise management levels at other noise sensitive land uses, dB(A)

Land use	Time of day	Where objective applies	Management level $L_{Aeq\ (15\ min)}$
Industrial premises	When in use	Outdoor noise level	75

Notes: 1. Outdoor noise level based on internal noise level in ICNG and assumes 10 dB loss through an open window

5.1.1 Summary of construction noise management levels

The ICNG construction noise management levels are presented in Table 5.3.

Table 5.3: ICNG construction noise management levels

Receiver location	Time of Day[1, 2]	Management level $L_{Aeq\ (15\ min)}$
Nearest residential receivers	Standard hours (Day)	49
Industrial premises	When in use	75

5.2 Operational noise criteria

The noise criteria used in the assessment of the operation of the Proposal are set using the NPfI. The NPfI assessment has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level (PNTL) which is the lower value of the project intrusiveness noise levels and project amenity noise levels.

5.2.1 Project intrusive noise levels

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15minute}$ Intrusiveness noise level = Rating Background Level ('RBL') plus 5dB(A)

Based upon the noise levels presented in Section 3.2, the intrusiveness noise levels for residential receivers are reproduced in Table 5-4 below.

Table 5-4: Residential intrusiveness noise levels

Intrusiveness noise level, $L_{Aeq,15min}$		
Day	**Evening**	**Night**
39 + 5 = 44	39 + 5 = 44	36 + 5 = 41

Notes: 1. Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
2. On Sundays and Public Holidays, Daytime 8.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night 10.00 pm to 8.00 am
Grey text indicates assessment period not applicable to this assessment.

5.2.2 Amenity noise levels

The project amenity noise levels for different time periods of day are determined in accordance with Section 2.4 of the NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,period}$) for various receivers including residential, industrial receivers and sensitive receivers such as schools (or tertiary educational facilities). These "recommended amenity noise levels" represent the objective for total industrial noise experienced at a receiver location. However, when assessing a single industrial development and its

impact on an area, "project amenity noise levels" apply. The recommended amenity noise levels applicable for the subject area are reproduced in Table 5.5 below.

Table 5.5: Project amenity noise levels

Type of Receiver	Noise Amenity Area	Time of Day[1, 2]	Recommended amenity noise level, L_{Aeq}, dB(A)[4]
Residential	Rural	Day/ Evening/ Night	50/ 45/ 40
Industrial premises	All	When in use	70

Notes:
1. Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
2. On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
4. The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated

Grey text indicates assessment period not applicable to this assessment.

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

$L_{Aeq,period}$ Project amenity noise level = $L_{Aeq,period}$ Recommended amenity noise level – 5dB(A)

Furthermore, given that the intrusiveness noise level is based on a 15 minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,period}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$L_{Aeq,15minute}$ = $L_{Aeq,period}$ + 3dB(A)

The project amenity noise levels ($L_{Aeq,\ 15min}$) applied for this project are reproduced in Table 5.6 below, based on an 'Urban' noise amenity area, considering the existing noise environment (refer to noise measurements presented in Section 3.2.

Table 5.6: Project amenity noise levels

Type of Receiver	Noise Amenity Area	Time of Day[1, 2]	Recommended Noise Level, dB(A)	
			$L_{Aeq,\ Period}$	$L_{Aeq,\ 15min}$
Residence	Rural	Day	50 – 5 = 45	45 + 3 = **48**
		Evening	45 – 5 = 40	40 + 3 = **43**
		Night	40 – 5 = 35	35 + 3 = **38**
Industrial premises		When in use	70 – 5 = 65	65 + 3 = **68**

Notes:
1. Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
2. On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Grey text indicates assessment period not applicable to this assessment.

5.2.3 Project noise trigger levels

The NPfI project trigger levels are presented in Table 5.7.

Table 5.7: NPfI site requirement and project noise trigger level (PNTL)

Receiver location	Time of Day[1, 2]	$L_{Aeq, 15min}$ NPfI site requirement, dB(A)	
		Intrusive	Amenity
Nearest residential receivers	Day	**44**	48
Industrial premises	When in use	-	68

Notes: The controlling noise trigger level is **bolded**.

5.3 Operation related road traffic noise criteria

The noise criteria used in the assessment of the traffic generated by the operation of the Proposal are set using the NSW Road Noise Policy (RNP) [[3]].

Table 5.8 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use. These criteria are for assessment against facade corrected noise levels when measured in front of a building facade. In Table 5.8, freeways, arterial roads and sub-arterial roads are grouped together and attract the same criteria.

Table 5.8: Road traffic noise assessment criteria for residential land uses

Road category	Type of project/land use		Assessment criteria – dB(A)	
			Day 7:00am-10:00pm	Night 10:00pm-7:00am
Freeway/ arterial/ sub-arterial roads	1.	Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq,(15\ hour)}$ 55 (external)	$L_{Aeq,(9\ hour)}$ 50 (external)
	2.	Existing residences affected by noise from redevelopment of existing freeway / arterial / sub-arterial roads	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)
	3.	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)
Local roads	4.	Existing residences affected by noise from new local road corridors	$L_{Aeq,(1\ hour)}$ 55 (external)	$L_{Aeq,(1\ hour)}$ 50 (external)
	5.	Existing residences affected by noise from redevelopment of existing local roads		
	6.	Existing residences affected by additional traffic on existing local roads generated by land use developments		

Note: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for sensitive developments near busy roads (see Appendix C10).

Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary

objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.

In assessing feasible and reasonable mitigation measures, an increase of up to 2dB represents a minor impact that is considered barely perceptible to the average person.

For existing residences and other sensitive land uses affected by *additional traffic on existing roads generated by land use developments*, any increase in the total traffic noise level (where the assessment criteria cannot be achieved) should be limited to 2dB above that of the corresponding 'no build option'.

This assessment is of the noise impact on existing residences caused by additional traffic generated by a new land use development. George Booth Drive is considered a sub-arterial road. Therefore this assessment uses the category 3:

- Day criterion: 60dB(A) $L_{Aeq,(15hour)}$.

6 Construction and operational noise assessment

6.1 Noise prediction methodology

A noise model was developed for the Proposal using the CadnaA computer modelling program and noise levels were predicted using the noise propagation algorithm ISO 9613-2 (1996), which incorporates moderately adverse meteorological conditions, implemented in accordance with ISO/TR 17534-3 (2015).

The noise prediction models consider:

- Location of noise sources and sensitive receiver locations.
- Height of sources and receivers referenced to one metre digital ground contours for the site area and surrounding area.
- Sound Power Levels (L_w) of plant and equipment likely to be used during operation (see Table C1 in APPENDIX C).
- Each noise-sensitive building in the project has been assessed separately, considering all facades
- Separation distances between sources and receivers
- Acoustic shielding, potential reflections and attenuation from intervening structures, barriers and topography (natural and purpose built)
- Ground absorption between the source and receiver, typically assuming 0.5.

6.2 Predicted construction noise levels

Construction noise levels are assessed at the most noise affected facade and floor level of a receiver building. Construction noise levels experienced at other points on the building may be lower.

Noise emissions were determined by modelling the noise sources, receiver locations, and operating activities, based on the information presented in APPENDIX C. The construction works have been grouped into the following two categories:

- Typical activities (T), which will exclude high impact sources (e.g. rock hammer, concrete saw, chainsaw, vibratory rollers);
- High noise activities (H), which will include high impact sources (e.g. rock hammer, concrete saw, chainsaw, vibratory rollers).

The predicted levels are conservative and represent the equipment/plant operating simultaneously in any 15 minute period. Where plant items are not operating simultaneously, or for reduced times in a 15 minute period, noise impacts could be lower than predicted.

A 5 dB(A) penalty in accordance with the ICNG has been factored into the noise modelling levels where applicable to allow for particularly annoying activities, such as rock hammering, saw cutting and jack hammering.

Predicted L_{Aeq} noise levels from typical and high noise construction activities are presented in Table 6.2 below for all receivers. The predictions are representative of noise levels during the works.

Table 6.1: Predicted noise levels

Receiver ID	Address	Predicted noise level - dB(A), $L_{Aeq,(15min)}$		ICNG NML - dB(A) $L_{Aeq,(15min)}$
		Typical	High noise	
R_01	1332 George Booth Drive, Buchanan	41	44	49
R_02	1395 George Booth Drive, Buchanan	-	35	49
R_03	1408 George Booth Drive, Buchanan	41	45	49
R_04	1413 George Booth Drive, Buchanan	-	34	49
R_05	1/1416 George Booth Drive, Buchanan	45	**50**	49
R_06	3/1416 George Booth Drive, Buchanan	46	**51**	49
R_07	4/1416 George Booth Drive, Buchanan	46	**51**	49
R_08	1424 George Booth Drive, Buchanan	45	**50**	49
R_09	1459 George Booth Drive, Buchanan	-	36	49
R_10	1490 George Booth Drive, Buchanan	-	34	49
C_01	1151 George Booth Drive, Richmond Vale	-	-	75
C_02	4/1416 George Booth Drive, Buchanan	-	-	75

Note: **Bold** text indicates an exceedance of the Noise Management Level (NML)
'-' indicates predicted noise level is less than 40 dB(A)

Modelling indicates that noise levels generated during typical construction activities are within the NMLs for the project. There is a chance that construction noise levels during high impact activities such as vegetation clearing with chainsaws will marginally exceed the NML (i.e. less than 2dB). Therefore, the risk of noise complaints due to the construction works associated with the extension of the facility is considered low.

Some general noise management measures are presented in Section 6.4.1.

6.3 Predicted operational noise levels

Key details regarding the site layout, the likely plant and equipment (including truck movements), and hours of operation were informed by the Design Team. This information is presented in APPENDIX C and formed the basis for all modelling assumptions used in this assessment.

The modelling of the operation of the precast facility includes combinations of items of plant considered to be representative of typical worst-case operation.

Predicted L_{Aeq} noise levels from the sites are presented in Table 6.2 below for all receivers. The predictions are representative of noise levels during the works.

Table 6.2: Predicted operational noise levels (day period)

Receiver ID	Address	Predicted noise level - dB(A), $L_{Aeq,(15min)}$	NPfI project noise trigger level - dB(A), $L_{Aeq,(15min)}$
R_01	1332 George Booth Drive, Buchanan	-	44
R_02	1395 George Booth Drive, Buchanan	-	44
R_03	1408 George Booth Drive, Buchanan	40	44
R_04	1413 George Booth Drive, Buchanan	-	44
R_05	1/1416 George Booth Drive, Buchanan	**45**	44
R_06	3/1416 George Booth Drive, Buchanan	**47**	44
R_07	4/1416 George Booth Drive, Buchanan	**46**	44
R_08	1424 George Booth Drive, Buchanan	-	44
R_09	1459 George Booth Drive, Buchanan	-	44
R_10	1490 George Booth Drive, Buchanan	-	44
C_01	1151 George Booth Drive, Richmond Vale	-	68
C_02	4/1416 George Booth Drive, Buchanan	-	68

Note: **Bold** text indicates an exceedance of the project noise trigger level
'-' indicates predicted noise level is less than 40 dB(A)

Modelling indicates that at some times there may be minor exceedances of the noise criteria, depending on what plant/ equipment are operating at the time. During the daytime, noise levels may exceed the intrusiveness level by up to 3 dB(A) but are below the amenity noise levels. The significance of the residual noise level is considered marginal. Aurecon advises that the residences where the exceedances are occurring are owned by the owner of the land leased by the precast facility.

In the event of complaints, mitigation measures such as staggered operation of equipment or the erection of noise barriers can be considered after verification noise monitoring has been conducted.

Some general noise management measures are presented in Section 6.4.1.

6.4 Noise mitigation and management

6.4.1 Other noise control measures

The following at-source control measures are recommended to reduce potential noise impacts:

Table 6.3: Noise mitigation and management measures

Action required	Applies to	Details	Estimated noise benefit
At-source mitigation measures			
Maximum noise levels	Airborne noise	The noise levels of plant and equipment (including rental plant) must have operating Sound Power or Sound Pressure Levels compliant with the allowable noise levels in Appendix C of the TfNSW CNVS.	Variable. Minimise noise impact and reduce risk of annoyance.
Rental plant and equipment	Airborne noise	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the allowable noise levels in Appendix C of the TfNSW CNVS.	Variable. Minimise noise impact and reduce risk of annoyance.
Use and siting of plant	Airborne noise Vibration	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. - The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. - Plant used intermittently to be throttled down or shut down. - Noise-emitting plant to be directed away from sensitive receivers.	Up to 20 dB reduction + reduce vibration
Non-tonal and ambient sensitive reversing alarms	Airborne noise	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. This should include delivery vehicles for OOHW where feasible and reasonable. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.	5-10 dB reduction
Minimise disturbance arising from delivery of goods	Airborne noise	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Site access points and roads located as far as possible away from sensitive receivers.	Variable. Reduce noise/ vibration impact + risk of annoyance.
Silencers on Mobile Plant	Airborne noise	Where possible reduce noise from mobile plant through additional fittings including: - Residential grade mufflers - Air Parking brake engagement is silenced. Ensure plant including the silencer is well maintained.	0-20 dB reduction Reduce annoyance + sleep disturbance.
Engine compression brakes	Airborne noise	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained original equipment manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'In-service test procedure' and standard.	5-20 dB reduction
Path mitigation measures			
Use buildings and structures on site to act as noise barrier	Airborne noise	Any buildings or structures on site shall be used as a noise barrier, where practicable to provide shielding to the nearest affected receivers.	Receiver **with** line of site of the works area: 5-10 dB reduction Receiver **without** line of site of the works area: 0-5 dB reduction

Action required	Applies to	Details	Estimated noise benefit
Management measures			
Construction Environmental Management Plan update	Airborne noise Vibration	The CEMP including at minimum relevant section for construction noise and vibration management must be prepared prior to the commencement of construction and regularly updated to account for changes in noise management issues and strategies.	-
Implement stakeholder consultation measures	Airborne noise	During construction, receivers that would potentially be affected by noise from the works would be appropriately notified before the relevant works start. Notification will be delivered to sensitive receivers at least 7 days prior to commencement of works.Notification (letterbox drop and website notification) detailing upcoming construction operation of site, delivered to sensitive receivers at least 7 days prior to commencement of relevant works. In addition, the following strategies may be adopted to notify the community of upcoming works: Project Specific Website Project Infoline Email Distribution List Web-based Surveys Social Media Community and Stakeholder Meetings.	Keeps stakeholders informed of the likely impact. Community may identify solution to assist in managing impacts.
Construction hours and scheduling	Airborne noise Vibration	Construction would be carried out during the standard daytime working hours. Work generating high noise levels should be scheduled during less sensitive time periods, such as after 8 am.	Minimise noise and reduce risk of annoyance.
Site inductions	Airborne noise Vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Permissible hours of work • Any limitations on noise generating activities with special audible characteristics • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/unloading areas and procedures • Site opening/closing times (including deliveries) • Environmental incident procedures.	Keeps construction workforce informed of actions required to minimise noise and vibration impact.
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors. No excessive revving of plant and vehicle engines. Controlled release of compressed air.	0-20 dB reduction Reduce annoyance + sleep disturbance.
Verification monitoring	Airborne noise	A noise monitoring program should be carried out for the duration of works in accordance with the Construction Noise and Vibration Management Plan and any approval conditions.	Minimises noise impact.

6.4.2 Attended noise monitoring

Attended noise monitoring is to be undertaken to verify that noise levels resulting from works are in accordance with the levels predicted in this noise and vibration assessment report, subject to obtaining the property owner/occupier's consent to access the property (where required).

It is recommended that noise monitoring is conducted at the following location:

- CT3/1416 George Booth Drive, Buchanan - within 30m of the building, on the side closest to the precast facility.

Noise monitoring should follow the procedures outlined in Sydney Metro – Western Sydney Airport project Construction Noise and Vibration Management Plan. Note that monitoring at all properties may be undertaken from the property boundary to limit any inconvenience to property owners.

6.4.3 Complaints handling

Noise complaints received and responded to will be managed in accordance with the CNVMP and Construction Complaints Management System.

Sydney Metro operate a 24-hour construction complaints line. Enquiries/ complaints may also be received through the project email mailbox (sydneymetrowsa@transport.nsw.gov.au) or through the complaints hotline (1800 717 703).

7 Traffic noise assessment

7.1 Traffic sources

All heavy vehicles will travel between the Proposal site and the Sydney Metro – Western Sydney Airport project along the following heavy vehicle route:

- George Booth Drive (From New M5 REF)
- John Renshaw Drive
- M15 Hunter Expressway Pacific Motorway
- M1 Pacific Motorway
- NorthConnex
- M2 Hills Motorway
- M7 Westlink Motorway
- M4 Western Motorway
- A9 The Northern Road (A9)
- Elizabeth Drive, Patons Lane or Luddenham Road (dependent on where each viaduct precast elements are needed).

Traffic noise impacts are not considered on the M15, M1, NorthConnex, M2, M7 and M4 as they are major motorways. The additional heavy vehicle movement on these motorways would be negligible compared with existing traffic. Furthermore, traffic noise impacts were not assessed on The Northern Road and Elizabeth Drive as this was assessed in the Sydney Metro Western Sydney Airport EIS [4]. Traffic noise impacts have therefore only been calculated along George Booth Drive, as there are residential receivers along the truck route. There are no residential receivers along the section of John Renshaw Drive.

Details of projected vehicle movements associated with the works were provided by Aurecon. Light vehicle movements were not considered to be significant. Traffic noise is assessed for the day period.

Existing traffic volumes were informed by the previous noise assessment prepared by Renzo Tonin and Associates in 2018 [5] and the Sydney Metro – Western Sydney Airport – Technical Paper 2: Noise and Vibration [4]. The traffic data assumptions are summarised in Table 7.1.

Table 7.1: Traffic noise modelling data – existing road network

Road	Road category (RNP)	15-hour day period (7am-10pm)			
		Existing		With project	
		TOTAL	HV	TOTAL	HV
George Booth Drive (north of access road)	Sub-arterial	706	7.2%	846	15.5%

7.2 Predicted traffic noise

The potential impact of road traffic noise to nearby residential receivers has been estimated using the United Kingdom Department of Environment's 'Calculation of Road Traffic Noise' (1988) method. The method uses the average 1-hour traffic volume for the 'assessment period' (i.e. day or night) to predict the $L_{10, 1hour}$ noise levels. A correction of -3dB(A) is applied to obtain the $L_{eq, 1 hour}$ noise levels which equate to the L_{Aeq} noise levels for the 'assessment period'.

For the purpose of this assessment the model has taken into account:

- traffic volume and heavy vehicle forecasts;
- vehicle speed;
- road gradient;
- ground reference levels of the road and receivers;
- separation distances of the road to receivers (assumed 15m setback);
- ground type between the road and receivers; and
- angles of view of the road from the receiver's position.

For assessment purposes, residential receivers are assumed to be a typical worst-case distance of 15m from the road. The posted speed limit on George Booth Drive and The Northern Road is 80 km/h. The posted speed limit on Elizabeth Drive is 60 km/h.

Table 7.2 below summarises the predicted traffic noise levels during the day period.

Table 7.2: Predicted traffic noise levels (with/ without construction)

Road	Predicted noise level Day period (7am to 10pm), dB(A)			
	Noise descriptor	No precast facility	With precast facility	RNP Noise Criteria
George Booth Drive	$L_{Aeq(15h)}$	54.6	56.8	60 (2.2dB increase)

Note: **Bold text indicates more than 2dB(A) increase in traffic noise levels resulting from traffic.**

The predicted road traffic noise levels are below the RNP noise criteria and indicate traffic noise levels are below the RNP noise criteria. Therefore, the precast facility will have minimal impact on traffic noise generated to residences on George Booth Drive and are found to satisfy the traffic noise criteria identified in Section 5.2.3.

7.3 Traffic noise mitigation and management

None required when on public roads, provided hourly traffic movements associated with operation of the precast facility are consistent with the assumptions outlined above. The Sydney Metro – Western Sydney Airport project has incorporated a Heavy Vehicle Code of Conduct to assist in managing impacts associated with heavy vehicles on public roads. It includes several measures, including limiting of compression braking, which will ensure that noise impacts of heavy vehicle traffic on surrounding streets are minimised. The Heavy Vehicle Code of Conduct will be applied to the operation of the Proposal.

8 Conclusion

In conclusion, works associated with the construction and operation of the Proposal have been identified and described in this report. The potentially affected noise sensitive receivers and relevant noise objectives have been identified and discussed to allow the assessment of potential noise impacts.

Construction noise

Predicted noise levels from the construction of the facility are within the NMLs recommended by the ICNG. The likelihood of complaint due to construction noise associated with the extension of the facility is considered to be low.

Construction vibration

The nearest residential or other sensitive receiver is located more than 400 metres from the Proposal site. At this distance the risk of vibration impact from the extension and operation of the proposed facility is assessed as negligible.

Operational noise

The expected noise levels from the operation of the facility have been predicted and presented in Section 6.3. Noise levels will comply with the noise objectives, except for the noted exceedances at the three residences close to the precast facility, where there is potential for exceedance of the noise criteria of up to 3 dB(A).

Noise mitigation and management measures have been presented in Section 6.4 to aid in providing additional noise reduction benefits where exceedance of the objective occurs.

Construction and operational traffic

Traffic noise generated by the precast facility on the local road network has been assessed in Section 7. Traffic noise levels are predicted to comply with the noise objectives.

References

[1] NSW Interim Construction Noise Guideline, Department of Environment and Climate Change, 2009.

[2] NSW Noise Policy or Industry, Environmental Protection Authority, 2017.

[3] NSW Road Noise Policy, Department of Environment, Climate Change and Water NSW, 2011.

[4] M2A Joint Venture 2020 Sydney Metro - Western Sydney Airport - Technical Paper 2: Noise and Vibration October 2020

[5] Renzo Tonin and Associates 2016 WestConnex New M5 - Noise Impact Statement: Hunter Valley Precast Facility January 2018

APPENDIX A Glossary of terminology

A.1 Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of common sounds in our daytime environment:

threshold of hearing	0 dB	The faintest sound we can hear
	10 dB	Human breathing
almost silent	20 dB	
	30 dB	Quiet bedroom or in a quiet national park location
generally quiet	40 dB	Library
	50 dB	Typical office space or ambience in the city at night
moderately loud	60 dB	CBD mall at lunch time
	70 dB	The sound of a car passing on the street
loud	80 dB	Loud music played at home
	90 dB	The sound of a truck passing on the street
very loud	100 dB	Indoor rock band concert
	110 dB	Operating a chainsaw or jackhammer
extremely loud	120 dB	Jet plane take-off at 100m away
threshold of pain	130 dB	
	140 dB	Military jet take-off at 25m away

dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.

Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

A.2 Acoustic concepts

A.2.1 Sound and noise

The terms 'sound' and 'noise' are almost interchangeable, except that in common usage 'noise' is often used to refer to unwanted sound. Sound is a vibration that travels as an audible wave of pressure through the air from a source to a receiver location such as the human ear. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) is a unit of measurement used to express the ratio of a quantity to another on a logarithmic scale to make the wide range of sound pressure more manageable.

Sound power is the rate at which a source emits acoustic energy and is unaffected by the environment. It is a property of the source that is emitting acoustic energy.

In contrast, **sound pressure** is the effect, and it is affected by factors associated with the built and natural environment such as distance, direction, obstacles etc. The sound pressure is the acoustic energy or 'noise level' at a distance away from the noise source. The relationship between sound power and sound pressure can be explained by considering the analogy of an electric heater, which radiates heat into a room and temperature is the effect. Like sound pressure, temperature also reduces with distance from the source following the inverse square law.

In this technical working paper, **sound power level** is identified by the symbols **SWL** or $\mathbf{L_w}$, while **sound pressure level** is represented by **SPL** or $\mathbf{L_p}$, and both have the same scientific unit in dB.

A.2.2 Individual's perception of sound

The loudness of sound depends on its sound pressure level. The A-weighted decibel [dB(A)] is generally used for the purposes of environmental noise impact assessment as it has been adjusted to account for the varying sensitivity of the human ear to different frequencies of sound. People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dB(A) is a good measure of the loudness of environmental noise to the human ear as it considers this frequency dependant sensitivity.

Different noise sources having the same dB(A) level generally sound equally loud. However, the frequency of a sound is what gives it a distinctive pitch or tone – for example, the rumble of distant thunder is an example of a low frequency sound and a whistle is an example of a high frequency sound. Most sounds we hear in our daily lives have sound pressure levels in the range of 30 to 90 dB(A). The following table provide some points of reference, measured in dB(A), of familiar sounds and those from construction activities.

Table A-1 Perception of sound - familiar sounds and construction noise

Common sounds	Construction noise	Sound pressure level
Leaf blower at operator's ear	Concrete saw or jack hammer 7 metres away	90 dB(A)
Airplane cabin during cruise (Airbus 321)	Excavator (with bucket) 7 metres away	80 dB(A)
General traffic noise kerbside next to Military Road	Towable compressor 7 metres away	75 dB(A)
Normal conversation at 1 metre		60 dB(A)
Outdoor air conditioning unit 1 metre away	Towable compressor 50 metres away	55 dB(A)
General office		50 dB(A)
Inside private office	Ground-borne noise from road header tunnel excavation between depths of 20 metres to 50 metres	40 dB(A)
Inside bedroom		30 dB(A)

In terms of sound perception, a change of 1 dB(A) or 2 dB(A) in the sound pressure level is difficult for most people to detect, while a 3 dB(A) to 5 dB(A) change corresponds to a small but noticeable change in loudness. An increase in sound level of 10 dB(A) is perceived as a doubling of loudness. However,

individuals may perceive the same sound differently since many factors can influence an individual's response, including:

- The specific characteristics of the noise (eg. frequency, intensity, duration of the noise event)
- Time of day noise events occur
- Individual sensitivities and lifestyle
- Reaction to an unfamiliar sound
- Understanding of whether the noise is avoidable and the notions of fairness.

A.2.3 Environmental noise assessment indicators

Environmental noise is an accumulation of noise pollution that occurs outside and is most commonly attributed to various modes of transport as well as industrial and construction activities. Environmental noise has been shown to have an adverse effect on the quality of life, especially following long-term exposure. The focus of the present technical assessment is on annoyance and sleep disturbance as they constitute most of the burden related to the impact of environmental noise on health outcomes. Noise annoyance is defined by the World Health Organization as a feeling of displeasure, nuisance, disturbance or irritation caused by a specific sound. Sleep disturbance relates to difficulty with sleep initiation, consolidation as well as awakening and reduced quality of sleep.

In New South Wales, contemporary environmental noise assessment criteria for addressing noise annoyance and sleep disturbance are specified by the Environment Protection Authority (EPA). Potential road traffic noise impact is assessed in accordance with the NSW Road Noise Policy. For motorway and ventilation facilities that are permanently fixed, and associated noise emissions are long-term in nature, noise criteria have been adopted in accordance with the Noise Policy for Industry. For enabling construction activities which are temporary in nature and highly variable, EPA's Interim Construction Noise Guideline provides the underlying assessment principles for the determination of potential construction noise impact.

L_{Aeq} - To protect against long-term repeated noise exposure, the indicator for assessing the cumulative noise exposure level over a specific time interval is the equivalent sound pressure level, denoted as LAeq. The LAeq indicator accounts for the total energy content from all sources of sound under consideration. The fact that the L_{Aeq} is a cumulative measure means that louder activities have greater influence of the LAeq level than do quieter ones, and activities that last longer in time have greater LAeq than do shorter ones. An increase in the number of events also increases the LAeq. Further, people react to the duration of noise events, judging longer events to be more annoying than shorter ones, assuming equal maximum noise levels.

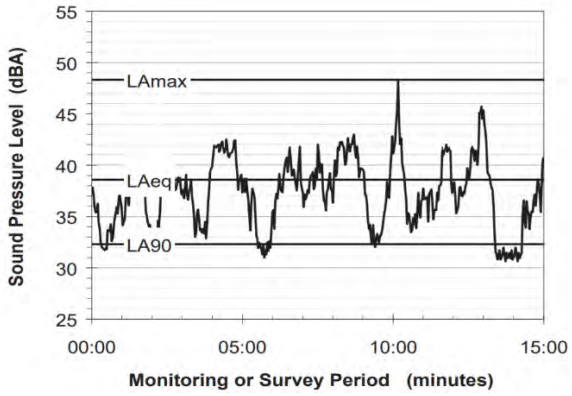
L_{Amax} - It is important to note that even though L_{Aeq} levels are numerically lower than maximum noise levels (denoted as LAmax). None of the noise is ignored, just as all the rain that falls in the rain gauge in one hour counts toward the total. In the case of noisy but short-lived maximum noise events, which can

sometime result in immediate short-term awakening reaction, potential impact is assessed using the LAmax indicator in which its emergence above the background noise environment is evaluated.

L_{A90} - The L_{A90} is the level of noise that is present almost constantly, or for 90 percent of the time and is commonly referred to as the background noise. Typical examples of what types of noise may contribute to the background noise levels are continuously flowing traffic or air conditioner noise.

These three noise indicators of L_{Amax}, L_{Aeq} and L_{A90} are presented in Figures A-1 for example noise monitoring survey period showing the sound pressure level of a varying noise environment such as environmental noise.

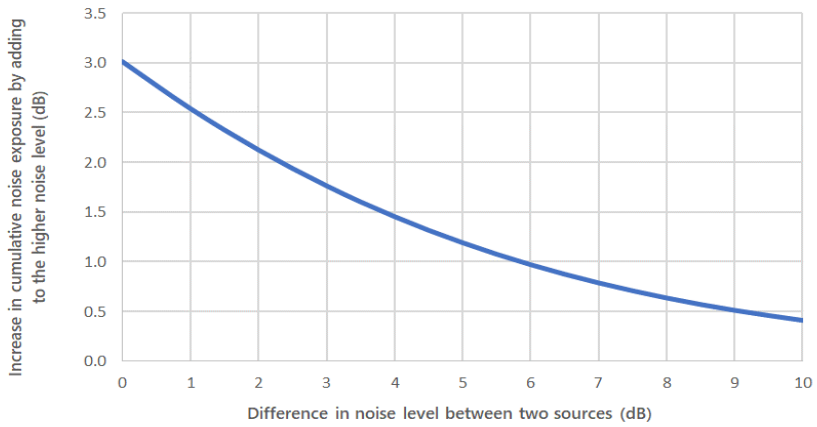
Figure A-1: Environmental noise assessment indicators



A.2.4 Cumulative sound exposure

As illustrated in Figure A-2, for two activities that result in the same amount of acoustical energy or noise level at a receiver location, the cumulative sound exposure level would be 3 dB higher than the level of just one single activity. This is because the decibel (dB) scale is logarithmic. Conversely, if the activity closer to your home results in noise exposure level that is 10 dB higher than the activity occurring further away, the quieter works would contribute very little to the cumulative noise exposure level.

Figure A-2: Difference in noise level between two sources



APPENDIX B Nearest sensitive receivers

Landuse Check Date: 14 MAR 2022
Plot Date: 21/03/22 - 12:14 Layout: TM625 Gen Template
GIS File: R:\Assoc\Syd\Projects\TM601-TM650\TM625 TG Buchanan Precast Facility REF\5 Calcs\04 GIS\TM625-SS.qgz

LEGEND

Noise Sensitive Receivers

- Residential
- Commercial
- Industrial
- Other

- Worksites
- Noise Monitoring Location (L1)

0 200 400 600 800 1,000 m

REV	BY	DATE	DESCRIPTION	APPROVER
r0	SS	21/03/22	Prepare figures	TG

A3 Original | Co-ordinate System: MGA Zone 56

0 100 200 300 400 500 600 m
1:9,000

FULL SIZE A3; REDUCED TO A4
NOTE: Do not scale from this drawing.

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Sydney Metro Western Sydney Airport SCAW Project - Hunter Valley Precast Facility

Site aerial and nearest affected receivers

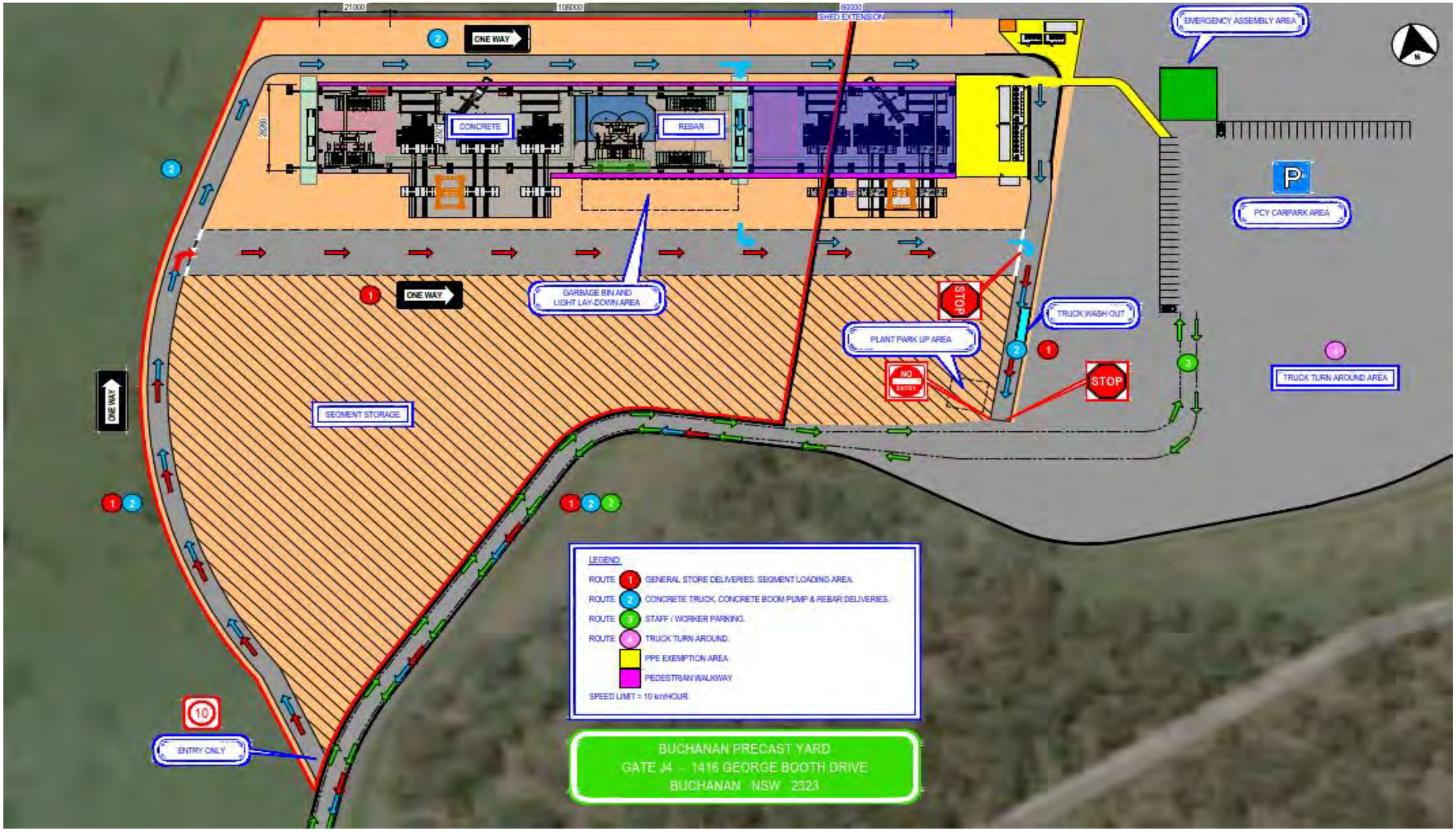
APPENDIX C Precast facility activities and noise sources

Table C1: Construction timetable/ activities/ equipment **PRECAST FACILITY - HUNTER VALLEY**

Activity/ Work Area	Aspect	Plant/ Equipment (as provided by client)	Day	Evening	Night	Timing of Activity			Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant	Vibration intensive plant	Notes
			7am - 6pm	6pm - 10pm	10pm - 7am	Start Date	End Date	Duration (Weeks)	L_{Aeq}	Penalty	L_{Amax}			
Construction Stage														
Precast Yard Construction Phase	Vegetation Clearing	Excavator 25T w bucket	2	-	-	Sep-22	Sep-22		103	-	108	-	-	
		Chainsaw (Petrol)	1	-	-				116	5	120	HN	-	
		Tub grinder/ mulcher	1	-	-				120	5	124	HN	-	
		Dump truck	4 p.h.	-	-				106	-	111	-	-	
	Site levelling including flood mitigation and drainage	Excavator 40T w bucket	2	-	-	Sep-22	Sep-22		106	-	111	-	-	
		Excavator 30T w bucket	1	-	-				103	-	108	-	-	
		Moxie Truck	4 per hour	-	-				109	-	119	-	-	
		Semi-trailer truck	1	-	-				106	-	111	-	-	
		Grader	1	-	-				113	-	121	-	-	
		Vibratory Roller	1	-	-				109	5	113	HN	X	
	Shed extension construction & laydown areas	Delivery truck	1	-	-	Oct-22	Nov-22		106	-	111	-	-	
		Concrete pump	2	-	-				103	-	107	-	-	
		Concrete Agi	8 p.h.	-	-				108	-	111	-	-	
		Compressor	2	-	-				102	-	103	-	-	
		Pneumatic vibrator	2	-	-				97	-	100	-	-	
		Generator	2	-	-				94	-	95	-	-	
		Mobile crane (20t-250t)	2	-	-				104	-	108	-	-	
		EWP	2	-	-				95	-	98	-	-	
		Concrete / road / rail saw	2	-	-				121	5	129	HN	X	
		Excavator 35T w hammer	2	-	-				118	5	126	HN	X	
		Telehander / Franna crane (10t)	2	-	-				98	-	102	-	-	
		Forklift	2	-	-				99	-	103	-	-	
		Hand tools (non-powered)	4	-	-				105	-	118	-	-	
Operation Stage														
Precast Yard	General/ minor equipment	Compressor (125 CFU)	3	-	-	Dec-22			109	-	111	-	-	Not used with water blasters
		Water Blaster (3000 PSI)	3	-	-				104	-	115	-	-	Not used with compressors
		External Form Vibrators	54	-	-				97	-	100	-	-	Half an hour only, by themselves
		Poker Vibrator (Medium)	6	-	-				99	-	102	-	-	
		Weld set	6	-	-				96	-	107	-	-	
		Truck pump (concrete)	2	-	-				106	-	110	-	-	Hire, for afternoon pours
	Small hand tools	Grinder (7")	6	-	-				108	-	118	-	-	
		Hilti Drill	6	-	-				106	-	118	-	0	
		Skill Saw	6	-	-				115	5	120	HN	-	
	Cranage	Crane 35t (or Telehandler)	2	-	-				104	-	108	-	-	Start up and demobilisation only
		Forklift 10t	1	-	-				99	-	103	-	-	Always in use
	Transport	Light Vehicle	50 per day	-	-				89	-	100	-	-	Staff/Labour - arrive at start and leave at end of day
		Site Pickup	6 per day	-	-				89	-	100	-	-	
		Truck wash unit	1	-	-				99	-	101	-	-	
		Workshop Vehicle	2	-	-				89	-	100	-	-	
	Access equipment	Scissor Lift	5	-	-				95	-	98	-	-	Always in use
	Gensets	Generator (25kva)	4	-	-				92	-	94	-	-	Always in use
		Generator (100kva) - Offices	2	-	-				94	-	96	-	-	Always in use
		Generator (450kva) - Factory	1	-	-				95	-	97	-	-	Always in use
	Precast moulds	Hydraulic Pump	6	-	-				-	-	-	-	-	No mechanical noise
	Reinforcement equipment	Equip For Tables	5	-	-				-	-	-	-	-	No mechanical noise
	Straddle carrier	Straddle Carrier 110t	2	-	-				108	-	112	-	-	Always in use
	Gantry cranes	Gantry 15t	3	-	-				106	-	110	-	-	Always in use
		Gantry 10t	3	-	-				106	-	110	-	-	Always in use
	Deliveries - regular	Concrete Delivery Truck	16 per day	-	-				108	-	111	-	-	
		Rebar Delivery Truck	2 per day	-	-				106	-	111	-	-	Sit on site (engine off) 2-3 hours
	Deliveries - miscellaneous	Delivery Trucks	6 per day	-	-				106	-	111	-	-	Misc. and variable
	Deliveries - Precast segments for storage	Oversize Delivery Truck	16 per day	-	-				106	-	111	-	-	
	Precase concrete segment delivery	Oversize Delivery Truck	-	-	4 per hour				106	-	111	-	-	
		Crane 100t	-	-	1				104	-	108	-	-	

Figure C1: Site Layout and Hoardings

PRECAST FACILITY - HUNTER VALLEY



APPENDIX D Noise monitoring methodology

D.1 Noise monitoring equipment

A long-term unattended noise monitor consists of a sound level meter housed inside a weather resistant enclosure. Noise levels are monitored continuously with statistical data stored in memory for every 15-minute period.

Long term noise monitoring was conducted using the following instrumentation:

Description	Type	Octave band data	Logger location(s)
RTA07 (NTi Audio XL2, with low noise microphone)	Type 1	1/3	1

Notes: All meters comply with AS IEC 61672.1 2004 "Electroacoustics - Sound Level Meters" and designated either Type 1 or Type 2 as per table, and are suitable for field use.

The equipment was calibrated prior and subsequent to the measurement period using a Bruel & Kjaer Type4231 calibrator. No significant drift in calibration was observed.

D.2 Meteorology during monitoring

Measurements affected by extraneous noise, wind (greater than 5m/s) or rain were excluded from the recorded data in accordance with the NSW Noise Policy for Industry [2]. Determination of extraneous meteorological conditions was based on data provided by the Bureau of Meteorology (BOM), for a location considered representative of the noise monitoring location(s). However, the data was adjusted to account for the height difference between the BOM weather station, where wind speed and direction is recorded at a height of 10m above ground level, and the microphone location, which is typically 1.5m above ground level (and less than 3m). The correction factor applied to the data is based on Table C.1 of ISO 4354:2009 '*Wind actions on structures*'.

D.3 Noise vs time graphs

Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the L_{10}, L_{90}, and L_{eq} levels. The statistical descriptors L_{10} and L_{90} measure the noise level exceeded for 10% and 90% of the sample measurement time. The L_{eq} level is the equivalent continuous noise level or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels, as presented in this report, illustrate these concepts for the broadband dB(A) results.

APPENDIX E Noise monitoring graphs

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inspired to achieve

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Vibration
Structural Dynamics

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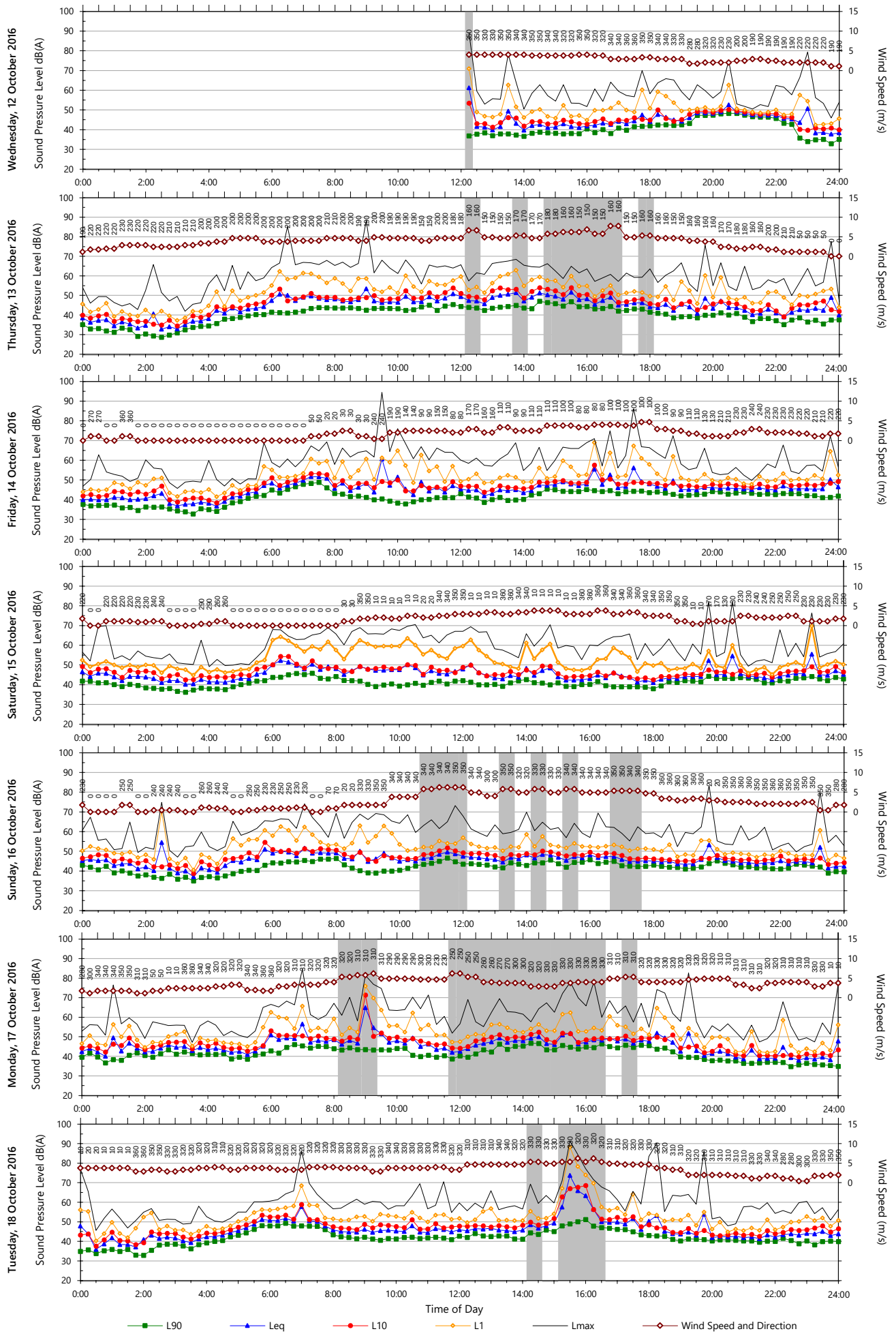
Background & Ambient Noise Monitoring Results - NSW 'Noise Policy for Industry', 2017

Periods with insufficient results excluded	L_{A90} Background Noise Levels[4]			L_{Aeq} Ambient Noise Levels		
Date	**Day[1]**	**Evening[2]**	**Night[3]**	**Day[1]**	**Evening[2]**	**Night[3]**
Wednesday-12-October-2016	-	42	30	-	48	44
Thursday-13-October-2016	-	38	34	-	44	44
Friday-14-October-2016	39	42	38	50	46	46
Saturday-15-October-2016	39	41	37	47	47	47
Sunday-16-October-2016	-	41	39	-	46	47
Monday-17-October-2016	-	37	35	-	46	47
Tuesday-18-October-2016	41	40	37	47	47	48
Wednesday-19-October-2016	36	40	35	47	45	46
Thursday-20-October-2016	45	42	38	49	47	47
Friday-21-October-2016	41	44	39	49	49	48
Saturday-22-October-2016	-	44	37	-	52	48
Sunday-23-October-2016	39	37	36	55	48	45
Monday-24-October-2016	-	-	-	-	-	-
Representative Weekday[5]	**41**	**41**	**36**	**49**	**47**	**46**
Representative Weekend[5]	**39**	**41**	**37**	**52**	**49**	**47**
Representative Week[5]	**39**	**41**	**37**	**50**	**48**	**46**

Notes:

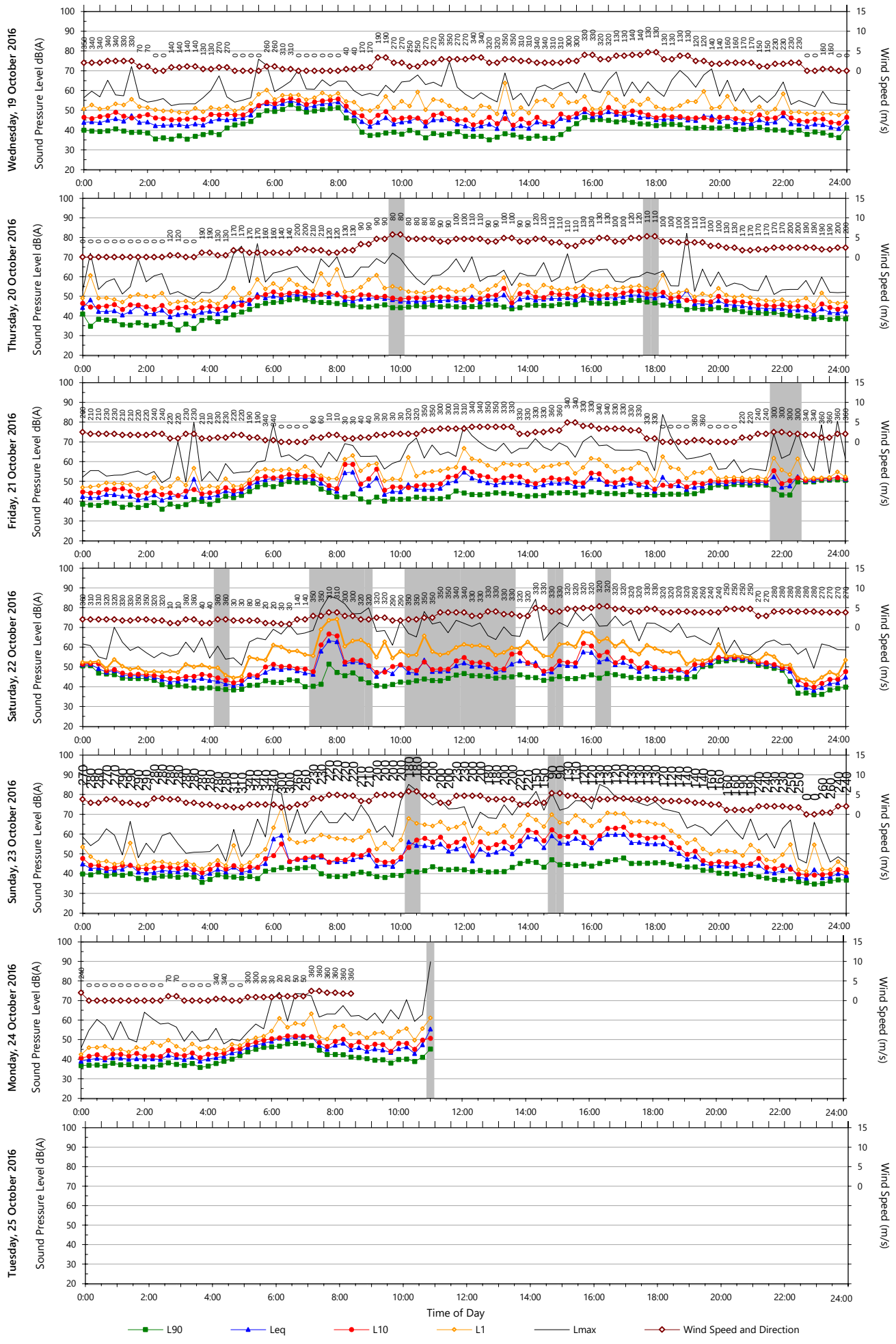
1. Day is 7:00am to 6:00pm on all days except Sundays and Public Holidays when it is 8:00am to 6:00pm 2. Evening is 6:00pm to 10:00pm

3. Night is the remaining periods 4. Assessment Background Level (ABL) for individual days 5. Rating Background Level (RBL) for L_{A90} and logarithmic average for L_{Aeq} 6. Leq is calculated in the free field. 2.5dB is subtracted from results if logger is placed at façade 7. Number in brackets represents the measured (actual) RBL value, which is below the minimum policy value of 30 dB(A) during the evening or night period or 35 dB(A) during the day period.



Data File: Manual Import

Template: QTE-26 Logger Graphs Program (r38)



Data File: Manual Import

Template: QTE-26 Logger Graphs Program (r38)

Appendix D

Biodiversity Assessment

aurecon

Bringing ideas to life

Sydney Metro Western Sydney Airport Buchanan Precast Facility

Biodiversity Assessment

CPB Contractors

Reference: P512033

Revision: 1

2022-05-12

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Author signature		Approver signature	
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Contents

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1 Site Context

1.1 Proposal description

Sydney Metro (as 'the Proponent') is seeking approval to re-establish and operate a precast facility (the Proposal) located on George Booth Drive, Buchanan, in the Cessnock local government area (LGA) (the Proposal site) to support the construction of the Sydney Metro – Western Sydney Airport. The Proposal site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and 2017 to support construction of the New M5 project.

1.1.1 Key features of the Proposal

The Proposal would comprise the following key features:

- Re-establishment of the Proposal site at Buchanan including the removal of five trees and ground cover disturbance of scattered grass with emerging saplings
- Extension of the existing precast yard shed and hardstand to the east by approximately 60 metres which currently includes a shed for construction of precast concrete segments and storage laydown areas
- Extension of the storage/laydown area
- Installation of site office facilities including amenities
- Re-establishment of the existing carpark facilities to allow on-site parking for up to 60 light vehicles
- Re-establishment and repair of the internal roads (where required)
- Reconnection of the ancillary supporting infrastructure, including utilities (power, water, sewerage, gas and communications), lighting and signage.

Minimal site construction works would be required to reinstate the precast facility as the site is already established. Site construction works for the Proposal would include:

- Re-instating fencing around the Proposal site
- Installing site office facilities
- Inspection of existing facilities including waste water treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- Extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate six viaduct precast moulds.

The Proposal would be temporary, operating for an approximate timeframe of two years. The precast facility would generally operate during standard work hours. The Proposal layout is shown in **Figure 1**.

This biodiversity assessment is to consider the potential impacts of the removal of five trees growing in the centre of the site to enable the extension of the existing shed to the east.

Figure 1 Proposal site layout

1.2 Existing environment

The Proposal site was previously cleared for operation as a precast facility in 2010. As a result, the environment is highly disturbed, with limited native vegetation. The Proposal site contains a large number of weeds and introduced grasses, as well as construction waste materials (gravel, concrete reinforcement, concrete waste). The Proposal site is adjacent to areas of important biodiversity values, including waterways such as Surveyors Creek, as well as several dams and large forested areas.

1.3 Site assessment

A field assessment was conducted by two suitably qualified Aurecon ecologists on 24 February 2022 to determine the species of trees identified for removal. Five trees were identified for removal, which are confirmed as the following:

- Three Grey gum (*Eucalyptus punctata*) trees– none of which contained hollows (see **Figure 2**)
- Two Swamp paperbark (*Melaleuca linariifolia*) trees

The trees identified for removal are growing within an area marked as 'Vegetation to be removed' in **Figure 1**. The area marked as vegetation to be removed is predominantly introduced grasses and weeds and will involve removal of five trees and ground cover disturbance of scattered grass with emerging saplings including six *E.punctata* saplings. The five trees identified for removal are growing within two former fence lines in a highly disturbed environment of introduced grasses and adjacent to a topsoil storage mound. They are growing within a range of waste construction materials, including metal reinforcing rods, concrete and gravel.

The high density of weeds present in the vicinity and broader site include Fireweed (*Senecio madagascariensis*), *Asteraceae* sp., *Dandelion* sp., Scotch thistle (*Onopordum acanthium*), Purple top verbena (*Verbena Bonariensis*), Green cestrum (*Cestrum parqui*), Lantana (*Lantana camara*), Creeping oxalis (*Oxalis corniculate*), Blackberry (*Rubus fruticosus*) and Noogoora burr (*Xanthium occidentale*).

Trees and associated vegetation growing in other parts of the site (nearest the access road, surrounding the dam and to the east of the dam) are to be retained. The dams are also to be retained. Targeted threatened flora or fauna surveys were not completed as part of the site assessment due to the previously disturbed nature of the site as confirmed during the site visit, lack of suitable habitat and because no threatened species have been previously identified within the Proposal site.

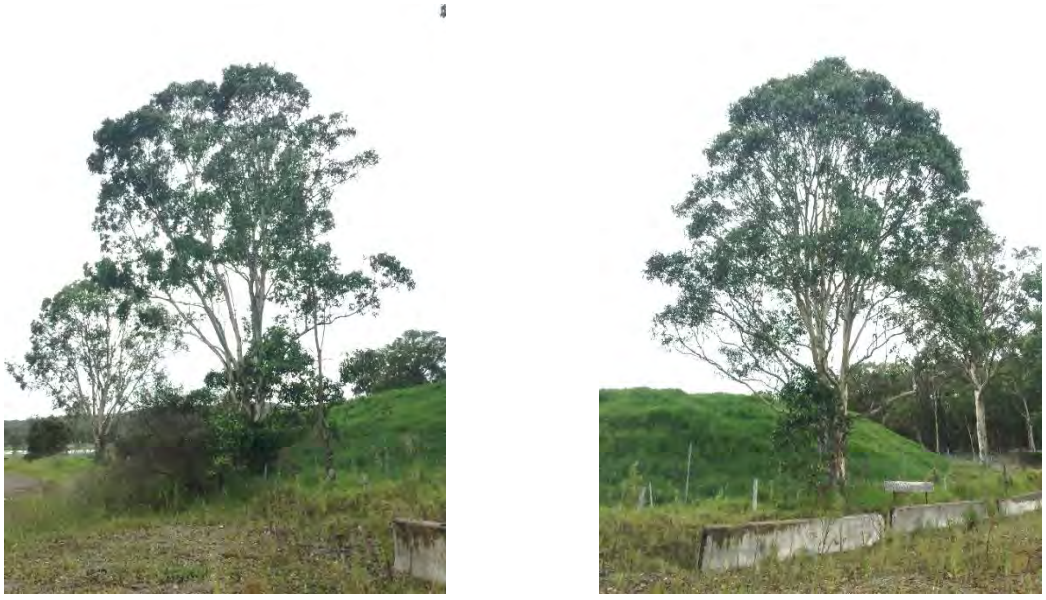

Figure 2 Grey gums (*E. punctata*) to be removed.

2 Biodiversity assessment

2.1 EPBC Act Protected Matters

The Protected Matters Search Tool (PMST) is used to identify potential Matters of National Environmental Significance (MNES) and other protected matters under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), which may occur in proximity to the Proposal site. A search of the PMST was conducted on 21 March 2022, encompassing a 10km radius around the Proposal site. PMST search results are detailed in Table 1.

Table 1. PMST search results with 10 km buffer around Proposal site.

Category	Matter	Relevance
MNES		
Wetlands of International Importance	Hunter Estuary Wetlands Ramsar wetland is within 10km to the east of the Proposal site.	**Context:** The Hunter Estuary Wetlands Ramsar wetland is within the region; however the Proposal site is not adjacent to strong hydrological links to it as it is located more than 50km downstream. **Impact**: The Proposal has the potential to impact stormwater runoff and flow velocity in the area, particularly to the adjacent Surveyors Creek and tributaries, potentially contributing to erosion and sedimentation, if standard sediment and erosion controls are not applied. **Mitigation**: Mitigation measures are required to control for sedimentation and drainage effects, in accordance with the NSW 'Blue Book' Managing Urban Stormwater - Volumes 1 and 2A (NSW Government 2004). **Conclusion**: The implementation of standard erosion and sediment control measures, and considering the distance to the sites, the Proposal is not expected to have a significant impact on Wetlands of International Importance.
Listed Threatened Ecological Communities (TECs)	The following TECs are **known** to occur within a 10 km radius of the Proposal site: ■ Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (E) The following TECs are **likely** to occur within a 10 km radius of the Proposal site: ■ Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (E) ■ River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria (CE) The following TECs **may** to occur within a 10 km radius of the Proposal site:	**Context**: There are no mapped TECs in the Proposal site; the Proposal site is previously highly disturbed, used as a concrete batching facility. **Impact**: The Proposal has little potential to impact TECs directly or indirectly where present in the broader locality. **Mitigation**: Mitigation measures including exclusion zones should be maintained around any adjacent TECs present to mitigate potential direct impacts, along with appropriate biosecurity controls, and sediment and erosion control measures in accordance with the NSW Blue Book (2004). **Conclusion**: The Proposal is not expected to have a significant impact on TECs, provided standard environmental protection measures are implemented.

	■ Central Hunter Valley eucalypt forest and woodland (CE) ■ Hunter Valley Weeping Myall (Acacia pendula) Woodland (CE) ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CE) **Note: E = Endangered, CE= Critically Endangered, V=Vulnerable**	
Listed Threatened Species	A total of 53 threatened species were identified as may, likely, or known to occur, or to have habitat occurring, on or within a 10 km radius of the Proposal site. These include 16 bird, 2 fish, 4 frog, 9 mammal, 22 plant, and 2 reptile species. **Note: E = Endangered, CE= Critically Endangered, V=Vulnerable**	**Context**: Several listed threatened species and species habitats are recorded within a 10km radius of the Proposal site; however there are no NSW BioNet records of threatened species within the Proposal site- see 2.2.2 Threatened Species. **Impact**: The current scope of works is limited to the removal of five trees growing within a highly modified environment. **Mitigation**: Mitigation measures for potential direct impacts include exclusion zones around dams within Proposal site and vegetation to be removed, biosecurity controls and washdown procedures and weed control to mitigate spread of weeds to and from site, as well as continuous sediment and erosion control measures in accordance with the NSW Blue Book (2004). A fauna spotter-catcher should be present for the clearing and removal of vegetation. **Conclusion**: Field assessment was conducted on 4 February 2022 to determine the type of trees to be removed. No threatened species were identified during the general site reconnaissance; however, if there are changes to the Proposal area, further field assessment may be required to target specific threatened species. The Proposal is not expected to have a significant impact on threatened species.
Listed Migratory Species	A total of 32 migratory species were identified as may, likely, or known to occur, or to have habitat occurring on or within a 10 km radius of the Proposal site. These include 1 marine, 7 terrestrial, and 24 wetland species.	**Context**: Migratory species are identified as potentially within the Proposal site. **Impact**: The current scope of works includes the removal of five trees, which may impact on migratory species, if standard controls are not applied. **Mitigation**: Mitigation measures for potential direct impacts include exclusion zones around dams within Proposal site and retained vegetation, biosecurity controls and washdown procedures and weed control to mitigate spread of weeds to and from site, as well as continuous sediment and erosion control measures in accordance with the NSW Blue Book (2004). A fauna spotter-catcher should be present for all vegetation removal. **Conclusion**: The Proposal is not expected to have a significant impact on migratory species, given the abundance of adjacent undisturbed habitat.
Other Matters Protected by the EPBC Act		
Commonwealth Land	There are 11 Commonwealth Land areas identified on or within a 10km radius of the Proposal site, including land under the control of:	**Context**: There are several areas of Commonwealth land within 10km of the Proposal site, however not within the Proposal site itself. **Impact**: Offsite environmental impacts could include sediment and erosion impacts, noise and vibration impacts, as well as risk of

	■ Telstra Corporation Limited ■ Defence Housing Authority ■ Airservices Australia ■ Unknown	spreading weeds and other invasive species, if standard controls are not applied. **Mitigation**: Mitigation measures for potential impacts to areas surrounding the Proposal site include appropriate biosecurity controls, noise and vibration controls for construction and operation, and appropriate sediment and erosion controls in accordance with the NSW Blue Book (2004). **Conclusion**: The Proposal is not expected alter current land use or to have a significant impact on Commonwealth or Defence Land areas.
Listed Marine Species	A total of 41 marine bird species were identified as may, likely, or known to occur, or to have habitat occurring on or within a 10 km radius of the Proposal site.	**Context**: Without mitigation measures, the Proposal has the potential to impact stormwater runoff and flow velocity in the area, however it is more than 50km upstream from marine environments **Impact**: The Proposal is too far upstream from marine environments and standard erosion and sediment control measures are applied to manage water quality and the potential for pollution. **Mitigation**: The Proposal site is a significant distance from marine receptors, and mitigation measures are to be employed to control for sedimentation and drainage effects, in accordance with the NSW Blue Book (2004). **Conclusion**: The Proposal is not expected to have a significant impact on listed marine species.
Extra Information		
State and Territory Reserves	State and territory reserves on or within a 10km radius of the Proposal site: ■ Blue Gum Hills Regional Park ■ Hexham Swamp NRS Addition – Gazettal in Progress ■ Pambalong Nature Reserve ■ Sugarloaf State Conservation Area ■ Werakata National Park ■ Werakata State Conservation Area	**Context**: There are several reserves in proximity to the Proposal site. **Impact**: Offsite environmental impacts could include sediment and erosion impacts, as well as risk of spreading weeds and other invasive species, if standard controls are not applied. **Mitigation**: Mitigation measures for potential impacts to areas surrounding the Proposal site include appropriate biosecurity controls, and sediment and erosion controls in accordance with the NSW Blue Book (2004). **Conclusion**: The Proposal is not expected to have a significant impact on nearby state and territory reserves, provided that appropriate mitigation measures are adhered to.
Regional Forest Agreements	North East NSW RFA	**Context**: RFAs are long-term plans aimed at the sustainable management and conservation of Australia's native forests. There are 10 RFAs across Victoria, NSW, WA and Tasmania. **Impact**: The current scope of works includes the removal of five trees within a historically modified environment, which is not subject to RFA conditions. **Mitigation**: Mitigation measures for potential impacts to areas surrounding the Proposal site include appropriate biosecurity controls, and sediment and erosion controls in accordance with the NSW Blue Book (2004). **Conclusion**: The Proposal is not expected to have a significant impact on nearby RFAs, given works occur in an already disturbed area, and provided that appropriate mitigation measures are adhered to.

2.2 Biodiversity values

2.2.1 NSW Biodiversity Values Map and Threshold Tool

A review of the NSW Biodiversity Values Map and Threshold Tool indicates that the Proposal site is adjacent to but not within areas of mapped biodiversity values (Figure 3). Directly south and east of the Proposal site are mapped areas of biodiversity value to threatened species or communities. Further east of the Proposal is an area is protected riparian land.

The five trees identified for removal occur within a highly disturbed environment, covering approximately 0.02 ha. Within the four hectare Proposal site the trees identified for removal are not within or adjoining an area mapped as Biodiversity Values, and do not meet the patch size thresholds for offsetting. Therefore, the removal of these trees will not exceed the biodiversity offsets scheme threshold, and the biodiversity offsets scheme is not triggered.

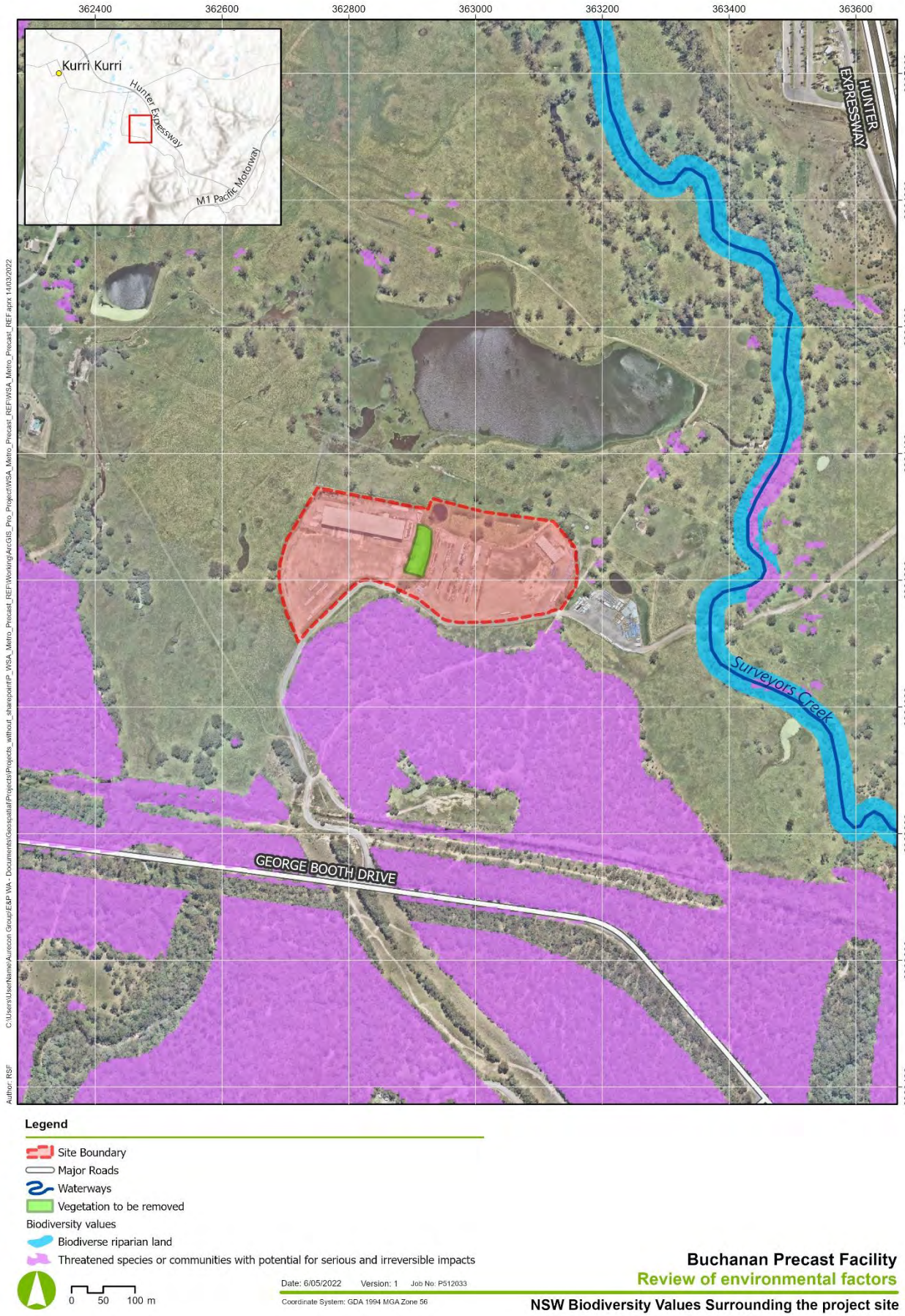

Figure 3 NSW Biodiversity Values surrounding the Proposal site.

2.2.2 Threatened Species

The BioNet Atlas of NSW Wildlife database contains records of wildlife sightings within NSW. A search of the BioNet database was conducted on 21 March 2021, encompassing a 10km radius around the Proposal site. The Proposal site contains many records of EPBC and BC Act listed threatened species. Listed species identified within **1km** of the Proposal site, within the last 10 years, include:

- White-throated Needletail (*Hirundapus caudacutus*) – Vulnerable (EPBC)
- Swift parrot (*Lathamus discolor*) – Critically Endangered (EPBC), Endangered (BC)
- Little Lorikeet (*Glossopsitta pusilla*) – Vulnerable (BC)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – Vulnerable (BC)

There are no records of these species on the Proposal site or immediately adjacent. The nearest *L. discolor* record is from the forested area south of George Booth Drive. These threatened species will not use, or are not reliant on the vegetation on site as key habitat, and Proposal related activities are not expected to significantly impact threatened species or communities. No threatened flora or fauna, and no TECs were identified during the site inspection.

2.2.3 Vegetation Mapping

Vegetation for the Proposal area has been previously mapped[1] as:

- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions (E under the BC Act)
- Alluvial Tall Moist Forest.

The Proposal site is highly disturbed, developed and operating previously as a concrete batching plant. The trees identified for removal are growing on construction waste materials (gravel, concrete reinforcement, concrete waste), in a constructed part of the site, in an area dominated by exotic pasture grasses and weeds. The five trees being removed, and vegetation present, does not constitute threatened species or communities.

2.3 Summary and Recommendations

The Proposal site is previously highly disturbed, with no listed threatened species or TECs recorded from the site. The Proposal site is not within or adjoining an area mapped as Biodiversity Values, and proposed tree removal does not exceed the biodiversity scheme offsets threshold. Therefore, the biodiversity offsets scheme will not apply to this proposal.

Five trees in the highly disturbed central part of the site are identified for removal (see **Figure 4**). All other trees within the site, and dams, are to be retained. None of these trees contain hollows, and therefore present limited habitat opportunities for fauna.

[1] Jacobs (2016) Road Construction Pre-cast Facility REF, prepared for Roads and Maritime Services.

Figure 4 Trees to be removed and trees to be retained

Additional measures to mitigate potential biodiversity impacts include the following:

- Employment of a fauna spotter/catcher experienced in native fauna identification for pre-clearance works, to avoid direct impacts to species. Species identified as likely to occur within the Proposal area include snakes.
- Avoid impacts to adjacent vegetation, including exclusion zones around trees to be retained (including a buffer for the tree root zone) and vegetation around dams.
- An unexpected threatened species finds procedure is developed for the contractor's Construction Environmental Management Plan (CEMP) and followed if a threatened species is encountered that has not previously been identified and assessed in the environmental assessment.
- To control for sedimentation and erosion impacts, apply continuously the standard sediment erosion controls for construction, excavation and the management of spoil heaps in the NSW Blue Book (2004) and relevant supporting volumes.
- Biosecurity risks (i.e. weeds) must be managed in accordance with the *Biosecurity Act 2015*:
  - Machinery, vehicles, and footwear to be cleaned and washdown procedure adhered to, prior to moving to a new location from site
  - Disposal of sealed bagged weeds to a licenced waste disposal facility.

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Appendix E

Community Fact Sheet

Australian Government

BUILDING OUR FUTURE

NSW GOVERNMENT

sydney METRO

Concrete segments in holding yard on the Metro North West project. Similar segments will be manufactured for the Sydney Metro – Western Sydney Airport project at the Precast Facility in Buchanan.

Have your say

Proposed Buchanan Precast Facility - viaduct segment production for the new Sydney Metro - Western Sydney Airport project.

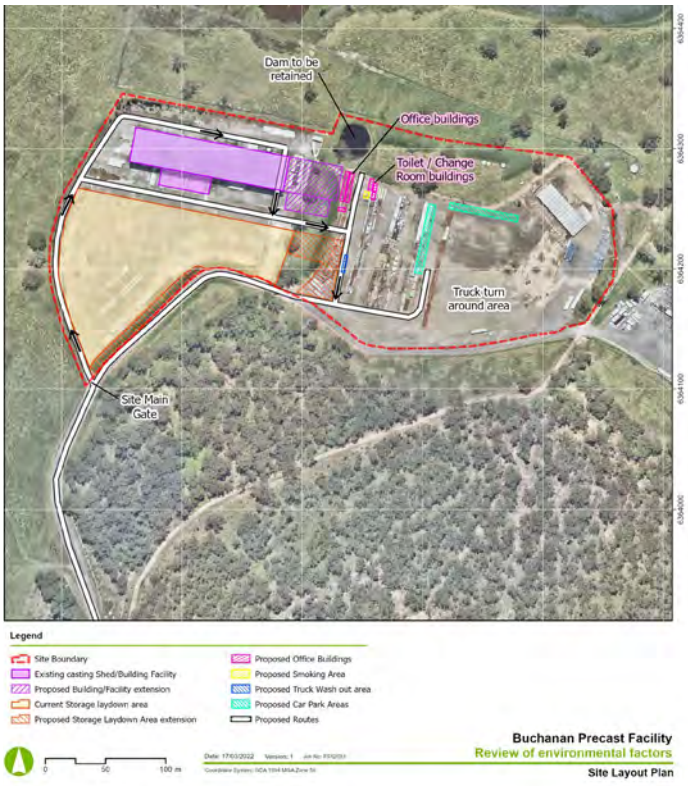
Sydney Metro is proposing to re-establish and operate a Precast Facility located at George Booth Drive, Buchanan, in the Cessnock local government area to support the construction of the Sydney Metro – Western Sydney Airport project. The site is an area of land that previously operated as a precast facility in 2010 to support construction of the Hunter Expressway project and in 2017 to support construction of the New M5 project.

CPB Contractors and United Infrastructure (CPBUI) Joint Venture has been awarded the Surface and Civil Alignment Works contract for the Sydney Metro – Western Sydney Airport project. This contract includes construction of approximately 3.5 kilometres of viaducts. The viaducts will be constructed from concrete segments produced at the Precast Facility in Buchanan and then transported to construction sites for the Sydney Metro – Western Sydney Airport project prior to installation.

The facility will be approximately four hectares in size and contained within the boundary of the previously established precast facility site. It would accommodate the following facilities:

- a demountable site office
- a precast yard, including the existing construction shed for concrete segments
- a storage laydown area
- wastewater treatment facilities consisting of septic tanks, sand filtration system and sediment basin
- on-site parking for up to 60 vehicles.

The site map below shows the site boundary, building locations, proposed new facilities, as well as the vehicle movement routes.



Sydney Metro – Western Sydney Airport, Buchanan Precast Facility Review of Environmental Factors will be open to public comment from 23 June 2022 until 30 June 2022. A copy of the Review of Environmental Factors will be located on the CPBUI website: **https://tinyurl.com/BuchananPrecast**

The Review of Environmental Factors considers potential environmental impacts of the proposal and the mitigation measures.

These works are being assessed and will be determined by Sydney Metro in accordance with the Environmental Planning & Assessment Act 1979 (NSW).

Community members are invited to provide feedback on the proposal. Submissions can be made via:

- Email: sydneymetrowsa@transport.nsw.gov.au
- Post: Sydney Metro, PO Box K659, Haymarket NSW 1240 and should be clearly marked 'Comments on Sydney Metro - Western Sydney Airport Buchanan Precast Facility Review of Environmental Factors'
- Phone: 24 hour community line - 1800 717 703

A report outlining the submissions received and responses to these submissions will be made available on the Sydney Metro website following the exhibition period.

Site establishment

Work is required at the site to prepare the facility for operations. This will involve:

- re-instating fencing around the site
- installing site office facilities
- inspection of existing facilities including wastewater treatment facilities (septic tanks, sand filtration system and sediment basin) and completing any necessary repairs
- extension of the existing hardstand and shed awning by approximately 60 metres to the east to accommodate six concrete segment moulds.

Construction vehicles

The facility would generate approximately 24 heavy vehicle movements and 100 light vehicle movements per day. The majority of heavy vehicles will be concrete trucks and delivery trucks while light vehicles will comprise of staff and labour vehicles.

Construction vehicle access and haulage routes

Access to the site will be via an existing access road off George Booth Drive.

Concrete deliveries will be received from a concrete batching plant in Cameron Park. The haulage route from Cameron Park to the site consists of Stenhouse Drive, Cameron Park Drive, Newcastle Link Road, Hunter Expressway, John Renshaw Drive, George Booth Drive.

The precast concrete segments will then be delivered to compounds for the Sydney Metro – Western Sydney Airport project via the route George Booth Drive, John Renshaw Drive, Hunter Expressway, Pacific Motorway, M1, NorthConnex, M2, M7, M4, Northern Road, Elizabeth Drive.

Operation

The facility will be required for approximately two years from September 2022 until December 2024.

Operation of the facility will be during standard construction hours which are:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- No work on Sundays or Public Holidays.

The dispatch of precast concrete segments to construction sites for the Sydney Metro – Western Sydney Airport project is proposed to be undertaken prior to 6pm on weekdays in accordance with noise and traffic impact requirements. Work undertaken outside standard construction hours would be in accordance with the NSW Interim Construction Noise Guideline 2009 (ICNG) (NSW EPA, 2009) and the Sydney Metro Construction Noise and Vibration Standard.

Future use

The proposed use of the facility is temporary. Once the precast works required for the Sydney Metro – Western Sydney Airport project are completed, the use will cease.

If you would like to receive updates about the Sydney Metro – Western Sydney Airport project by email, please contact Sydney Metro via sydneymetrowsa@transport.nsw.gov.au to be added to the distribution list. Thank you for your cooperation while we complete these essential works.

Have your say
If you have any questions or would like more information please contact our project team:

1800 717 703 Community information line open 24 hours

sydneymetrowsa@transport.nsw.gov.au

Sydney Metro – Western Sydney Airport
PO Box K659, Haymarket NSW 1240

Translating and interpreting service
If you need help understanding this information, please contact the Translating and Interpreting Service on **131 450** and ask them to call us on **1800 717 703**.

Appendix F

AHIMS Searches

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : George Booth Drv Precast

Client Service ID : 661298

Date: 21 February 2022

[redacted]

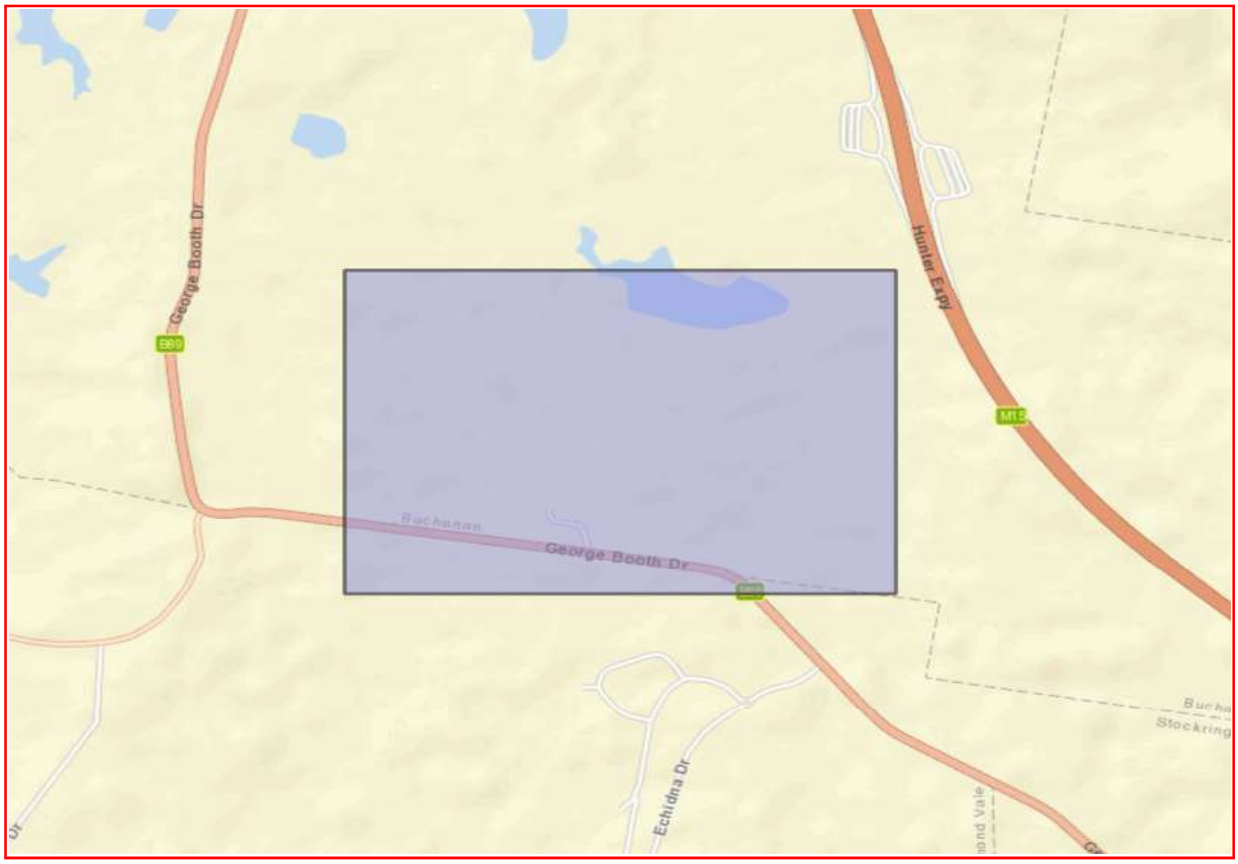
Attention: [redacted]

Email: [redacted]

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -32.8572, 151.5273 - Lat, Long To : -32.8482, 151.5428, conducted by [redacted] on 21 February 2022.

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



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

Have your say
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1800 717 703 Community infoline open 24 hours

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