



Transport  
for NSW

# **Automatic Train Protection (ATP) Project Eastern Suburbs and Illawarra Line – Area 4**

Determination Report

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# 1 Introduction

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## 1.1 Background

Transport for NSW (TfNSW) is the NSW Government's lead public transport agency that ensures planning and policy is fully integrated across all modes of transport in NSW. It manages a multi-billion dollar budget allocation for rail, bus, ferry and taxi services and related infrastructure in NSW.

Transport for NSW is responsible for improving the customer experience of transport services, transport policy and regulation, planning and program administration, procuring transport services, and infrastructure and freight.

The Eastern Suburbs & Illawarra Line – Area 4 is part of the Automatic Train Protection (ATP) Project (previously known as the Advanced train control Migration System (AMS) Project), which will play a key role in delivering faster and more reliable services as part of the NSW Government's Sydney's Rail Future (June 2012). The project will deliver significant safety benefits to customers and rail staff, and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

Transport for NSW is the proponent for the Eastern Suburbs & Illawarra Line – Area 4 ATP Project (referred to as 'the Proposed Activity' for the purposes of this document).

## 1.2 Review of environmental factors

A Review of Environmental Factors (REF) was prepared in July 2017 by Aurecon on behalf of TfNSW in accordance with sections 111 and 112 of the *Environmental Planning and Assessment 1979* (EP&A Act), and clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposed Activity. The REF is included as an Appendix.

## 1.3 Determination Report

Prior to proceeding with the Proposed Activity, the Secretary of TfNSW must make a determination in accordance with the provisions of Part 5 of the EP&A Act.

The objectives of this Determination Report are to:

- assess the environmental impacts with respect to the Proposed Activity which are detailed in the REF (and any proposed modifications, as detailed and assessed in this Determination Report)
- identify mitigation measures to minimise potential environmental impacts
- determine whether potential environmental impacts are likely to be significant
- address whether the provisions of the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* (the EPBC Act) applies to the Proposed Activity.

This report has been prepared having regard to, among other things, the objectives of TfNSW under the *Transport Administration Act 1988*:

- to plan for a transport system that meets the needs and expectations of the public,
- to promote economic development and investment,

- to provide integration at the decision-making level across all public transport modes,
- to promote greater efficiency in the delivery of transport infrastructure projects,
- to promote the safe and reliable delivery of public transport and freight services.

## 1.4 Description of the Proposed Activity in the REF

An overview of the Proposed Activity, which is the subject of the ATP Eastern Suburbs & Illawarra Line – Area 4 REF, is provided in the Executive Summary with full details set out in Section 3 of the REF. In summary, the Proposed Activity would involve the installation of trackside signalling equipment on the Eastern Suburbs & Illawarra Line and as outlined in the REF comprises:

- new track assets (i.e. controlled balises)
- new signalling cabling
- extension to existing signal cabinets and if required the installation of new cabinets to house ATP equipment.

The need for, and benefits of the Proposed Activity are outlined in Section 2 of the REF.

## 2 Consultation

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The communications approach for the proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the proposal are based on safety and rail system requirements. For this reason, there is limited opportunity for any community feedback into project deliverables. As such, the REF for the Eastern Suburbs & Illawarra Line - Area 4 has not been placed on public display.

## 3 Consideration of the environmental impacts

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### 3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The REF addresses the requirements of section 111 of the EP&A Act. In considering the Proposed Activity, all matters affecting or likely to affect the environment are addressed in the REF, the Determination Report, and associated documentation.

In accordance with the checklist of matters pursuant to clause 228(3) of the EP&A Regulation, an assessment is provided in Section 6 and Appendix 1 of the REF.

In respect of the Proposed Activity an assessment has been carried out regarding potential impacts on critical habitat, threatened species, populations or ecological communities or their habitats, under section 112 of the EP&A Act.

The likely significance of the environmental impacts of the Proposed Activity have been assessed in accordance with the then NSW Department of Planning's 1995 best practice guideline *Is an EIS Required?* It is concluded that the Proposed Activity is not likely to significantly affect the environment (including critical habitat) or threatened species, populations of ecological communities, or their habitats. Accordingly, an environmental impact statement under Part 5.1 of the EP&A Act is not required.

### **3.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)**

As part of the consideration of the Proposed Activity, all matters of national environmental significance (NES) and any impacts on Commonwealth land for the purposes of the EPBC Act have been assessed. In relation to NES matters, this evaluation has been undertaken in accordance with Commonwealth Administrative Guidelines on determining whether an action has, will have, or is likely to have a significant impact. A summary of the evaluation is provided in Section 4.5 and Appendix 2 of the REF.

It is considered that the Proposed Activity described in the REF is not likely to have a significant impact on any Commonwealth land and is not likely to have a significant impact on any matters of NES.

### **3.3 Heritage Act 1977**

The Proposed Activity would be undertaken within the curtilage of the Loftus Junction railway signal box which is listed on the State Heritage Register (SHR). The potential heritage impacts of the Proposed Activity are assessed in Section 6.6.2 of the REF. The works would not affect the heritage significance of these items. A Heritage exemption under Section 57(2) of the *Heritage Act 1977* would be obtained for all works within the curtilage of items listed on the SHR.

## **4 Conditions of Approval**

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If approved, the Proposed Activity would proceed subject to the Conditions of Approval included in Appendix 2

## **5 Conclusion**

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Having regard to the assessment in the REF it can be concluded that the Proposed Activity is not likely to significantly affect the environment (including critical habitat) or threatened species, populations of ecological communities, or their habitats. Consequently, an environmental impact statement is not required to be prepared under Part 5.1 of the EP&A Act.

It is also considered that the Proposed Activity does not trigger any approvals under Part 3 of the EPBC Act.

The environmental impact assessment (REF and Determination Report) is recommended to be approved subject to the proposed mitigation and environmental management measures included in the Conditions of Approval.

# Appendix 1: Review of Environmental Factors

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Transport  
for NSW

# **Automatic Train Protection (ATP) Project Eastern Suburbs & Illawarra Line – Area 4**

Review of Environmental Factors

## Document History

Version	Date of drafting	Author	Reviewer
1.0	13 June 2017	Jonathan Dowling	Jon Williamson
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## Abbreviations

Term	Meaning
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>AMS</b>	Advanced train control Migration System
<b>ATP</b>	Automatic Train Protection
<b>ASS</b>	Acid Sulfate Soils
<b>CEMP</b>	Construction Environmental Management Plan
<b>DP&amp;E</b>	NSW Department of Planning and Environment
<b>EEC</b>	Endangered Ecological Community
<b>EPA</b>	Environment Protection Authority
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
<b>EP&amp;A Regulation</b>	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
<b>ESD</b>	ecologically sustainable development (refer to Definitions)
<b>ETCS</b>	European Train Control System
<b>FM Act</b>	<i>Fisheries Management Act 1994 (NSW)</i>
<b>Georges River Council</b>	Georges River Council refers to the newly created Council consisting of the former Hurstville City and Kogarah City Councils following commencement of the NSW council amalgamations on 12 May 2016.
<b>Heritage Act</b>	<i>Heritage Act 1977 (NSW)</i>
<b>Infrastructure SEPP</b>	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
<b>IS</b>	Infrastructure and Services (Division of Transport for NSW)
<b>LEP</b>	local environmental plan
<b>LEU</b>	lineside electrical unit
<b>LGA</b>	local government area
<b>NES</b>	(Matters of) National Environmental Significance
<b>NPW Act</b>	<i>National Parks and Wildlife Act 1974 (NSW)</i>
<b>NSW</b>	New South Wales
<b>Native Vegetation Act</b>	<i>Native Vegetation Act 2003 (NSW)</i>
<b>NW Act</b>	<i>Noxious Weeds Act 1993 (NSW)</i>
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
<b>OEH</b>	Office of the Environment and Heritage
<b>OOHW</b>	Out of hours works
<b>Roads Act</b>	<i>Roads Act 1993 (NSW)</i>
<b>REF</b>	Review of Environmental Factors
<b>SEPP</b>	state environmental planning policy

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<b>Term</b>	<b>Meaning</b>
<b>SHR</b>	State Heritage Register
<b>TfNSW</b>	Transport for NSW
<b>TSC Act</b>	<i>Threatened Species Conservation Act 1995 (NSW)</i>
<b>ULX</b>	underline crossing

## Definitions

Term	Meaning
<b>Automatic Train Protection (ATP)</b>	ATP is a generic name, used globally to describe a range of train safety technologies, designed to ensure additional passenger and train crew safety through: <ol style="list-style-type: none"> <li>1. Ceiling speed supervision to prevent a train from travelling over a predetermined speed limit</li> <li>2. Brake-to-target supervision to supervise the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).</li> </ol>
<b>Balise</b>	An electronic beacon or transponder placed between the rails of a railway as part of an automatic train protection system.
<b>Concept design</b>	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
<b>Design and Construct Contract</b>	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Contractor is therefore responsible for all work on the project, both design and construction.
<b>Detailed design</b>	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
<b>Ecologically sustainable development</b>	Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased (refer to Section 4.1).
<b>Out of hours works</b>	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7:00am to 6:00pm Monday to Friday, 8:00am to 1:00pm Saturday and no work on Sundays/public holidays).
<b>Proponent</b>	A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.
<b>the Proposal</b>	The construction and operation of the Eastern Suburbs & Illawarra Line ATP Project.
<b>Rail Possession</b>	Possession is the term used by railway building/maintenance contractors to indicate they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
<b>Underline crossing</b>	An underline crossing (under track crossing) where the cable route crosses under the track from one side of the line to the other.

## Executive summary

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW, including the Automatic Train Protection (ATP) Project (previously known as the Advanced train control Migration System (AMS) Project) (the Proposal).

The ATP Project plays a key role in delivering faster and more reliable services under the NSW Government's *Sydney's Rail Future* (June 2012). The ATP Project will deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project has a phased integration and implementation process and will be progressively deployed in stages across nine discrete areas, with separate environmental impact assessments being prepared for each area. The works which are subject to this environmental impact assessment pertain to the deployment of the ATP Project within Area 4, located on the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

## Description of the Proposal

The Proposal involves the installation and operation of trackside signalling equipment at 34 locations between Arncliffe, Waterfall and Cronulla (Area 4) on the Eastern Suburbs & Illawarra Line. Figure 1-1 provides an overview map of the Proposal.

Area 4 traverses a 30 kilometre section of the railway corridor located in the Georges River and Sutherland Shire local government areas. Depending on the topography, ATP sites would generally be located up to 15 metres from existing rail tracks.

The proposed ATP trackside signalling equipment would communicate with a train mounted system which will improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system will be carried out at a train maintenance facility and does not form part of this environmental assessment.

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

## Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under the EP&A Act.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including 'signalling, train control, communication and security systems'.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under Infrastructure SEPP, the Proposal is permissible without consent. Consequently the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation).

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, 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.

## **Stakeholder communication**

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for any community feedback into project deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the Project and any likely resulting impacts.

The communication approach being implemented for the Project has also been developed having regard for the requirements of the planning process.

Refer to Chapter 5 for more information about the communications approach for the Proposal.

## **Environmental impact assessment**

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures to reduce the identified impacts. This REF identifies that, subject to the implementation of mitigation measures, potential environmental impacts can be controlled and reduced to acceptable levels which would not significantly affect the environment.

The main environmental issues relate to construction impacts such as erosion and sedimentation risks, work within the curtilage of heritage items, ground contamination and potential impacts to threatened species and/or communities as well as short-term traffic, air quality and noise issues for nearby receivers. Such impacts would be managed through the implementation of a Proposal wide Construction Environmental Management Plan (CEMP) and location specific Environmental Control Maps (ECM).

No operational impacts are anticipated as a result of the Proposal.

## **Conclusion**

This REF has been prepared having regard to sections 111 and 112 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

Should the Proposal proceed, the likely impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF. TfNSW has determined that an environmental impact statement (EIS) is not required for the Proposal, nor is the approval of the Minister for Planning.

## 1. Introduction

TfNSW was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Eastern Suburbs & Illawarra Line Automatic Train Protection (ATP) Project (the Proposal), to be delivered by Infrastructure and Services (I&S).

### 1.1 Overview of the Proposal

The Proposal involves the installation of trackside signalling equipment at 34 locations along the railway line between Arncliffe, Waterfall and Cronulla (Area 4) on the Eastern Suburbs & Illawarra Line (refer Figure 1-1). Detailed ATP site location plans for Area 4 are provided in Appendix 3.

The Proposal comprises new track assets installed on rail sleepers; new signalling cabling installed above and below ground; and the extension of a number of existing signalling cabinets and the installation of new signalling cabinets. This 30 kilometre stretch of railway corridor between Arncliffe and Waterfall is located in the Georges River and Sutherland Shire local government areas. A detailed description of the Proposal is provided in Chapter 3.

Depending on the topography, ATP sites would generally be located up to 15 metres from existing rail tracks. The proposed trackside signalling equipment would communicate with a train mounted system which will improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system will be carried out at a train maintenance facility and does not form part of this environmental assessment.

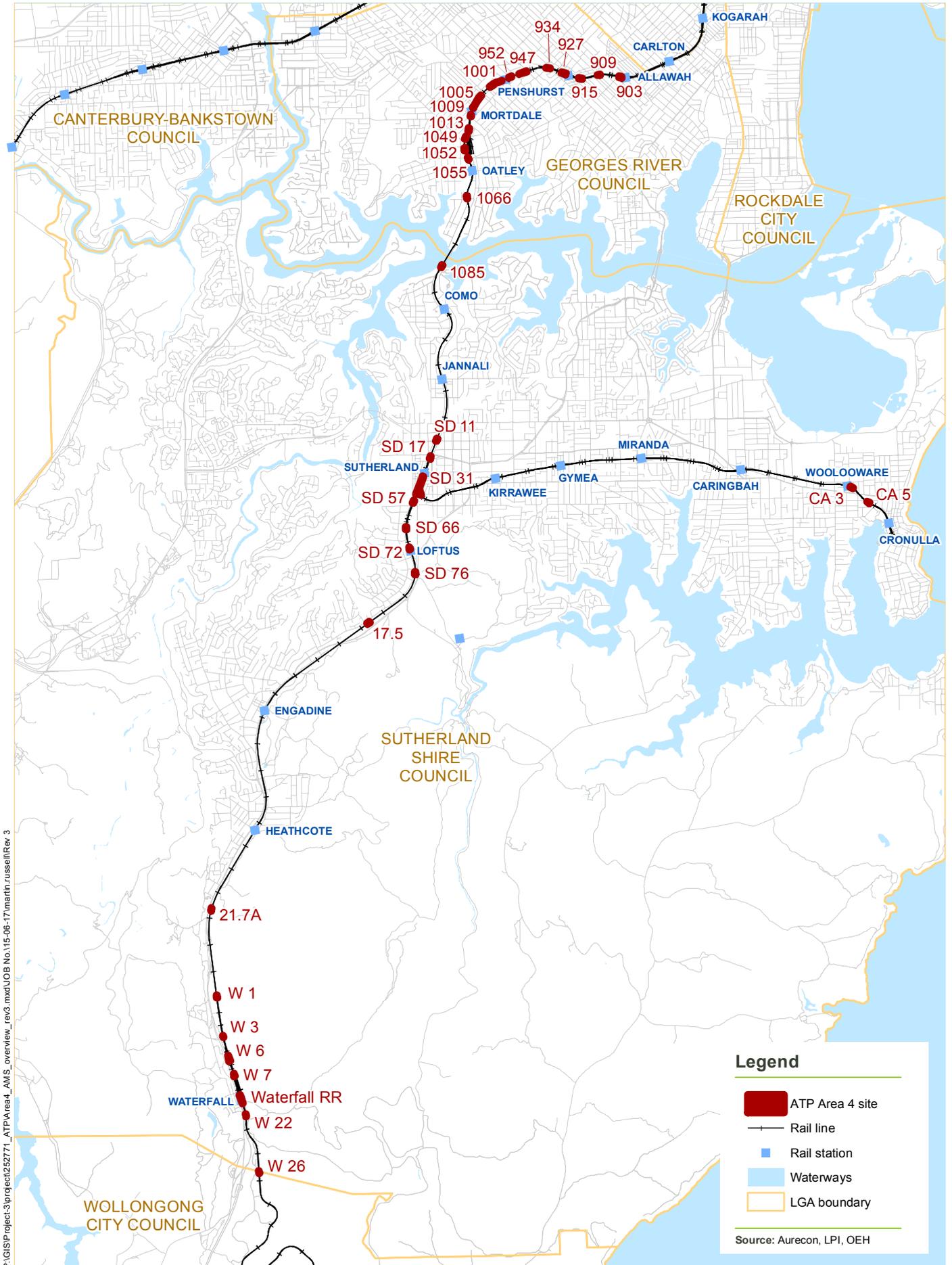
The Proposal would deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

### 1.2 Purpose of this Review of Environmental Factors

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 111 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal.

This REF has been prepared by TfNSW in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the EP&A Act. Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to significantly impact a matter of national environmental significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of the Environment and Energy for any necessary approvals under the EPBC Act.



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1:100,000  
0 1 2km

Projection: GDA 1994 MGA Zone 56

Automatic Train Protection (ATP) Area 4 REF

FIGURE 1-1 ATP Area 4 sites

## 2. Need for the Proposal

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Proposal. This chapter also provides a discussion of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

### 2.1 Strategic justification

The requirement to implement automatic protection technology was one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project would implement the European Train Control System (ETCS) (Limited Supervision) which is internationally recognised and reliable automatic train protection technology that has been tailored to meet the needs of the Sydney rail network. The ETCS enhances passenger and train crew safety through ceiling speed supervision to prevent a train from travelling over a predetermined speed limit and by brake-to-target supervision which supervises the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).

The ATP system monitors train speed against a set rail speed limit (ceiling speed) and alerts the driver if the train is over-speeding. The system applies the brakes automatically if the driver does not respond appropriately.

The ATP Project would upgrade the signalling system across the electrified rail network and would have a phased integration and implementation process. The ATP Project would be progressively deployed in stages across nine discrete areas until around 2019, with separate environmental impact assessments being prepared for each area. As noted in Section 1.1 this REF addresses ATP works in Area 4.

The Proposal will benefit the Eastern Suburbs & Illawarra Line by providing greater reliability and safety to the train services along the line and associated community and customer benefits.

### 2.2 Alternative options considered

A comprehensive review of automatic train protection technology options has been undertaken. The review assessed technology options against key criteria including technical capability, economic viability and level of risk mitigation.

The review recommended the ETCS (Limited Supervision) is adopted as the preferred automatic train protection technology. The ETCS was recommended as the preferred technology because it:

- is a high integrity safety system that controls risks associated with drivers over-speeding or exceeding the limit of their movement authority
- is available 'off the shelf' from multiple suppliers designing to common specifications
- is a mature technology with a large and rapidly growing user base
- is flexible in its application and can be overlaid, with minimal impact, to existing signalling systems and rolling stock
- will provide a major risk mitigation of the rail network's direct risks

- has a defined upgrade path to allow future functionality enhancements
- has the potential to enable future signalling changes which will deliver significant capacity benefits.

The NSW government response to the recommendations of the Waterfall Special Commission of Inquiry outlines its commitment to installing automatic train protection technology across the electrified rail network. As such, a 'do nothing' option was not considered a feasible alternative.

## 3. Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities.

### 3.1 The Proposal

The Proposal involves the installation of trackside signalling Infrastructure on the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4). The Proposal would take place at 34 locations along the railway line.

- The works at each ATP site comprise:
  - new track assets (i.e. controlled balises)
  - new signalling cabling
  - extension to existing signal cabinets and (if required) the installation of new cabinets to house ATP equipment.
- Figure 3-1 provides a schematic of the typical proposed works at each ATP site.
- The typical construction footprint at each ATP site would be around 40 metres long and 20 metres wide. Additional cabling extending beyond this footprint may be required for selected controlled balises. The site-specific footprint of each ATP site in Area 4 which has been assessed in this REF is shown in Appendix 3.

The new signalling cabling would connect to the existing 240 volt electricity network at each ATP site. All cabling would be located wholly within the rail corridor and underline crossings (ULXs) would be constructed to provide a crossing beneath the rail track where necessary.

- New track assets
- A balise would be mounted to the rail sleepers in the area between load bearing rails (referred to as the four foot) at locations where ceiling speed supervision and/or brake-to-target supervision is required. This is generally on the approach to a trackside signal. Depending on the type of sleeper (i.e. concrete or timber), the balise may be mounted using a combination of cable clips, vortex brackets or mechanical anchors. A series of balises are required at each ATP site and are spaced at intervals. Balises are categorised as infill, fixed or control balises depending on their proximity to the signal.
- It is noted the installation of fixed balises has been addressed in a separate environmental assessment and approval process and does not form part of this REF. Fixed balises which always send the same passive data (i.e. speed limit) are installed within the four foot and do not have any associated cabling activities.

#### New signalling cabling

Cables would connect the balises to a junction box which would be positioned adjacent to the track. These cables would be installed in elevated galvanised steel troughing or inside buried conduits. Other options for cable installation include pit and pipe, galvanised pipe or surface pipes.

Buried conduits can be installed by directional bores within or near the cess (the area immediately adjacent to the ballast shoulder). ULXs would be constructed to provide an underline crossing beneath the rail track where necessary. ULX depths can vary depending on site conditions. As a minimum, it is anticipated ULXs would be 1.8 metres from the top of the rail.

A combination of ULXs and above ground troughing may be used at each ATP site depending on the ground conditions and site access constraints. If existing troughing and pipes have sufficient spare capacity, the new signalling cabling would be installed in these facilities.

It is possible that supersucking, a form of non-destructive digging using pressurised water and a vacuum source, would be required at some ATP sites.

Cables from the ETCS junction box would terminate at a lineside electrical unit (LEU), which is housed in either in a signal cabinet (i.e. LOC), annex, bungalow or hut.

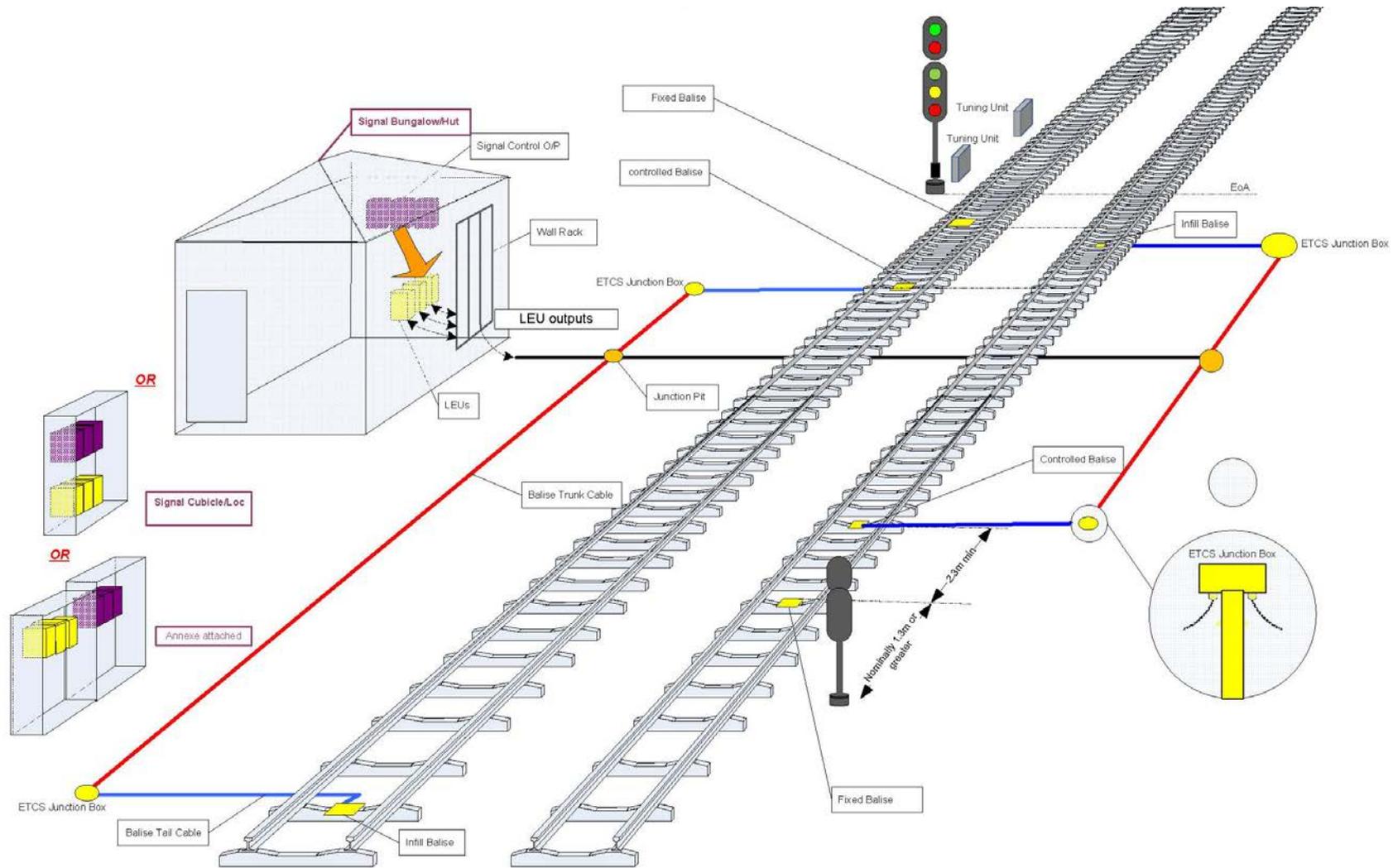
### **Signal cabinets**

Where space within the existing signal cabinet (i.e. LOC), bungalow or hut is constrained, a new signal cabinet would be installed or existing signalling cabinets would be extended by about six square metres to house the ATP equipment.

The new signal cabinet would generally be installed on a newly constructed concrete plinth adjacent to the slab of the existing signal cabinet. Alternatively, the new signal cabinet would be bolted to the existing cabinet.

ATP equipment housing would be fitted out with a LEU.

Where possible, the concrete plinths and cabinets would be pre-fabricated off site and delivered to the ATP sites in time for works to commence.



**Figure 3-1 Schematic of proposed works**

## 3.2 Construction methodology

### 3.2.1 Work methodology

The work methodology would involve the following stages:

- identify and mark up areas for stockpiling materials and segregating waste
- establish site access, including fenced off exclusion zones
- install erosion and sediment controls
- trenching and pit and pipe work (if required)
- install new signal equipment
- test all equipment prior to commissioning
- clear the work sites of any remaining construction plant or materials.

### 3.2.2 Plant and equipment

The following plant and equipment is likely to be used for the works:

- Supersucker
- Excavator (7 tonne) for excavation as well as rock breaking where required
- Hand and power tools
- Bobcat
- Compactor
- Generator
- Boring equipment
- Front end loader (5 tonne).

### 3.2.3 Timing

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

Main civil and structural construction works at each ATP site would be complete within around three weeks. Testing and commissioning of the newly installed system would commence following completion of civil and structural construction works.

The construction team would complete civil works at each ATP site prior to progressing to the next location.

Works would generally be scheduled to take place during standard working hours:

- 7.00am to 6.00pm Monday to Friday
- 8.00am to 1.00pm Saturday
- No work on Sunday or public holidays.

However, due to access constraints and the requirement for a safe working site, some works may be undertaken outside standard working hours and during scheduled track possessions. This includes installation of track assets (i.e. controlled balises).

If works, other than the installation of track assets, is required outside the standard working hours, further approval would be obtained and the affected community would be advised, in accordance with the TfNSW *Construction Noise Strategy* (7TP-ST-157).

### **3.2.4 Site access and storage of materials**

Access to the work sites would be via existing railway corridor access gates and access tracks. Access gates are locked at all times except for site deliveries and access / egress by site staff. Distance from the access gates to the work sites can range between 5 metres and 90 metres.

The construction process would require an average of 10 to 20 vehicle movements and a team of 5 to 15 people on site per day.

Temporary site storage areas would be established in cleared areas within the ATP site footprint.

Amenities such as portable toilets may be provided at some work sites where there is adequate space and suitable access.

## **3.3 Operations, management and maintenance**

The operation of the new signalling system would commence following the installation and commissioning of the train mounted system.

Sydney Trains or its appointed contractor would maintain the system. Maintenance would be undertaken in accordance with Sydney Trains standards.

## 4. Statutory considerations

Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government policies/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

### 4.1 Ecologically sustainable development

TfNSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD).

The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the *Environmental Planning and Assessment Regulation 2000* as:

- the precautionary principle: if there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation
- intergenerational equity: the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity: the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival
- improved valuation, pricing and incentive mechanisms: environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the ATP Project. The principles for ESD would be facilitated through the application of a range of environmental management tools such as the implementation of the construction environmental management plan and adherence to the TfNSW environmental management system. Table 4-1 identifies how the Proposal complies with the principles of ESD.

**Table 4-1 ESD principles and how they relate to the Proposal**

Principle	Compliance
Precautionary principle	There are no threats of serious or irreversible damage posed by the Proposal. The ATP sites are generally within a previously disturbed area in the rail corridor.  All of the environmental risks have been carefully considered through the preparation of this REF and would be managed through the implementation of the construction environmental management plan. The plan is unlikely to be stalled by a lack of scientific certainty.
Intergenerational equity	The Proposal will help ensure that future generations have a safer, more comfortable and more reliable rail transport options.

Principle	Compliance
Biodiversity conservation and ecological integrity	Due to the highly modified nature of ATP sites along the rail corridor, no areas of biodiversity or ecological significance are anticipated to be encountered. However, construction of the Proposal would be undertaken in accordance with a CEMP and location specific ECMs which would ensure the biodiversity conservation and ecological integrity of the receiving environment is retained.
Improved valuation and pricing of environmental resources	The REF has examined all of the environmental impacts associated with the Proposal and has recommended mitigation measures for the identified environmental risks that may result. The management of these risks has been factored into the overall budget allocation for the project, hence demonstrating that environmental resources have received appropriate valuation in the context of the Proposal.

## 4.2 NSW Government policies and strategies

In addition to statutory requirements, a number of NSW Government policies and strategies are relevant to the Proposal. Table 4-2 summarises the NSW Government policies and strategies applicable to the Proposal.

**Table 4-2 Relevant NSW Government policies/strategies**

Policy/Strategy	Commitment	Comment
<b>State Priorities – NSW: Making It Happen (NSW Government, 2015)</b>	<p>In September 2015, the NSW Government announced a series of State Priorities as part of <i>NSW: Making It Happen</i> (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. <i>NSW: Making it Happen</i> focuses on 12 key ‘priorities’ to achievement the NSW Government’s commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.</p> <p>One of the 12 priorities identified as part of <i>NSW: Making It Happen</i> relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.</p>	The Proposal would support the objective of improving the reliability of the public transport network.

<b>Policy/Strategy</b>	<b>Commitment</b>	<b>Comment</b>
<b>NSW Long Term Transport Master Plan</b>	<p>In December 2012, the NSW Government released the NSW Long Term Transport Master Plan. The Plan brings together land use planning with transport planning, and integrated planning for freight and passenger movements across all modes of transport.</p> <p>The Plan responds to the transport challenges of NSW through four types of actions:</p> <ul style="list-style-type: none"> <li>▪ integrate transport services</li> <li>▪ modernise our system</li> <li>▪ growing our networks to meet future demand</li> <li>▪ maintain important road and public transport assets.</li> </ul>	<p>The Proposal would be consistent with the NSW Long Term Transport Master Plan as it would modernise and support the growth of the network.</p>
<b>Sydney's Rail Future</b>	<p>Sydney's Rail Future, released in June 2012, is a plan developed to transform and modernise Sydney's rail network so that it can grow with our future population.</p> <p>The plan is an integral part of the NSW Long Term Transport Master Plan.</p>	<p>The Proposal would support the plan for Sydney's Rail Future. The plan specifically identifies the ATP Project as an important technological advancement to support faster, more reliable train services.</p>
<b>Draft Metropolitan Strategy for Sydney to 2031</b>	<p>In 2013, the NSW Government released the draft Metropolitan Strategy for Sydney to 2031 for consultation.</p> <p>The draft Strategy identifies nine key 'city shapers' that will play an important role in shaping the future growth of Sydney.</p> <p>The draft Strategy has been aligned with the NSW Long Term Transport Master Plan.</p>	<p>The Proposal would be consistent with the draft Metropolitan Strategy by ensuring the ongoing safe and efficient operation of the rail network, supporting the growth of Sydney.</p>

## 4.3 NSW legislation and regulations

### 4.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely, and as a consequence an environmental impact statement is not required, nor is the approval of the Minister for Planning.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment. Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

### 4.3.2 Other NSW legislation and regulations

Table 4-3 provides a list of other relevant legislation applicable to the Proposal.

**Table 4-3 Other relevant legislation applicable to the Proposal**

Applicable legislation	Considerations
<p><i>Heritage Act 1977</i></p>	<p>Section 57(1) of the <i>Heritage Act 1977</i> (Heritage Act) lists the types of activities/works that require approval from the Office of Environment and Heritage (OEH) Heritage Division when working on/in an item/place listed on the State Heritage Register (SHR). An application for an exemption can also be made under some circumstances. Approval from the Heritage Division is also required under Section 139 of the <i>Heritage Act 1977</i> prior to the disturbance or excavation of land if a project will, or is likely to result in, a relic being discovered, exposed, moved, damaged or destroyed.</p> <p>The Proposal involves works within or near items listed on the SHR, Sydney Train's section 170 Heritage and Conservation Register, the Kogarah Local Environmental Plan (LEP), the Hurstville LEP and the Sutherland Shire LEP. Given the disturbed nature of the rail corridor and limited excavation required, it is unlikely that the proposed works would affect any known or unknown archaeological items of heritage significance.</p> <p>Where works are located within the curtilage of items listed on the SHR and no adverse impact on the heritage significance of these items is expected as a result of the proposed works, an application would be submitted to Sydney Trains to obtain an exemption under s57(2) of the <i>Heritage Act</i>. Where works may adversely affect the heritage significance of item listed on the SHR, an application would be submitted to the OEH Heritage Division.</p> <p>More information on heritage is included in Section 6.6.</p>

Applicable legislation	Considerations
<p><i>National Parks and Wildlife Act 1974</i></p>	<p>The excavating, moving or exhibiting of Aboriginal objects requires a permit under Section 87 of the <i>National Parks and Wildlife Act 1974</i> (NPW Act). The harming or desecrating of Aboriginal objects or places is an offence under Section 86 of the NPW Act. Under Section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or people.</p> <p>There are no Aboriginal objects or places known to occur in the immediate vicinity of the ATP sites in Area 4 and no known items or places would be affected by the proposed work. A search of the Aboriginal Heritage Information Management System (AHIMS) confirmed that there are two Aboriginal sites located between 25 metres and 200 metres of ATP Area 4 site 1049 and 1085. These Aboriginal sites are located outside the rail corridor. Given the disturbed nature of the rail corridor, impacts on Aboriginal heritage are not expected. Safeguards have been proposed to address circumstances if an unexpected find occurs.</p> <p>All native birds, reptiles, amphibians and mammals, except the dingo, are protected in NSW under the NPW Act. The harming of protected fauna is prohibited under the NPW Act, but an exemption applies in relation to things that are essential to the carrying out of an activity to which Part 5 of the EP&amp;A Act applies and where the determining authority has complied with the provisions of that part.</p> <p>More information on Aboriginal heritage is included in Section 6.6.</p>
<p><i>Threatened Species Conservation Act 1995</i></p>	<p>The <i>Threatened Species Conservation Act 1995</i> (TSC Act) is directed at conserving threatened species, populations and ecological communities of animals and plants.</p> <p>A number of threatened species, populations and endangered ecological communities occur in the vicinity of the Proposal (i.e. Bynoe's wattle <i>Acacia Bynoeana</i>), Grey Headed Flying Fox (<i>Pteropus poliocephalus</i>) and Koala (<i>Phascolarctos cinereus</i>).</p> <p>Potential impacts to all threatened species, populations, endangered ecological communities which occur in the vicinity of the Proposal would be minimised through a hierarchy of controls outlined in Section 6.4.3 which includes consideration of the TSC Act and approval(s) from TfNSW.</p> <p>Section 6.4 provides further information about the biodiversity constraints associated with the proposal.</p>
<p><i>Native Vegetation Act 2003</i></p>	<p>The <i>Native Vegetation Act 2003</i> (NV Act) regulates the clearing of native vegetation on land in NSW except for excluded land which includes national parks, state forests and urban areas. Section 25(g) of the NV Act provides that any clearing that is part of an activity that is permissible without consent does not require approval under the Act.</p> <p>It is unlikely clearing of native vegetation would be required for the Proposal (refer to Section Table 6-4). Hence, no further consideration of the NV Act is required.</p>

Applicable legislation	Considerations
<i>Protection of the Environment Operations Act 1997</i>	The <i>Protection of the Environment Operations Act 1997</i> (POEO Act) provides a licensing framework for certain activities as defined in Schedule 1 of the POEO Act. The Proposal is not considered to fall within the definition of Section 33 ‘Railway systems activities’ of Schedule 1. As such, the Proposal does not require an environment protection licence (EPL) under the POEO Act.
<i>Roads Act 1993</i>	Under Section 138 of the <i>Roads Act 1993</i> , a person must not “erect a structure or carry out a work in, on or over a public road, or dig up or disturb the surface of a public road...” other than with the consent of the appropriate roads authority. However, clause 5(1) in Schedule 2 of the Act states that public authorities do not require consent for works on unclassified roads.  The Proposal does not require any work to be undertaken in, on or over a classified road. Therefore, approval from Roads and Maritime Services (RMS) would not be required.
<i>Crown Lands Act 1987</i>	The proposed work would not be undertaken on crown land and the provisions of this Act are not applicable to the Proposal.

## 4.4 Environmental planning instruments

### 4.4.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal.

Clause 79 of the Infrastructure SEPP allows for the development of rail infrastructure facilities by or on behalf of a public authority without consent on any land. Clause 78 defines ‘rail infrastructure facilities’ as including ‘signalling, train control, communication and security systems’.

Consequently, development consent is not required, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Chapter 5 of this REF discusses the consultation undertaken in relation to the Proposal.

### 4.4.2 Other environmental planning instruments

Table 4-4 provides a list of other relevant environmental planning instruments applicable to the Proposal.

**Table 4-4 Other relevant environmental planning instruments applicable to the Proposal**

Applicable instrument	Considerations
<i>State Environmental Planning Policy No. 14 – Coastal Wetlands</i> (SEPP 14)	The Proposal is not located within an area covered by the SEPP and therefore no further consideration of SEPP 14 is necessary.

<b>Applicable instrument</b>	<b>Considerations</b>
<i>State Environmental Planning Policy No. 19 – Bushland in Urban Areas (SEPP 19)</i>	<p>This SEPP protects and preserves bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes.</p> <p>Hurstville, Kogarah (Hurstville and Kogarah now form Georges River Council) and Sutherland are listed in Schedule 1 as areas where bushland needs to be preserved. The proposed work would not require removal or disturbance to bushland on or adjacent to land reserved or zoned for public open space. Therefore no further consideration of SEPP 19 is required.</p>
<i>State Environmental Planning Policy No. 26 – Littoral Rainforests (SEPP 26)</i>	<p>The Proposal is not located within an area covered by the SEPP and therefore no further consideration of SEPP 26 is required.</p>
<i>State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)</i>	<p>Hurstville, Kogarah (Hurstville and Kogarah now form Georges River Council) and Sutherland are not listed in Schedule 1 as an area possessing habitat or feed trees for koalas and therefore no further consideration of SEPP 26 is required.</p>
<i>State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)</i>	<p>SEPP 55 provides for a consistent state-wide planning approach to the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. If contaminated land is encountered during the construction works a suitable remediation plan would be developed, if required.</p>
<i>State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71)</i>	<p>The Proposal is within the coastal protection zone designated in the Coastal Protection SEPP. Approval under this SEPP is not required as the SEPP relates to the development of local environmental plans and assessment of Part 4 development applications. The Proposal complies with the aims and matters for consideration of the SEPP. No further consideration of the SEPP is required.</p>
<i>State Environmental Planning Policy (Major Development) 2005</i>	<p>This SEPP identifies certain developments which are deemed major projects. The Proposal is not listed in this SEPP.</p>
<i>State Environmental Planning Policy (State and Regional Development) 2011</i>	<p>The Proposal is not listed in the SEPP and has not been declared as State Significant Infrastructure or State Significant Development under the SEPP.</p>
<i>State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011</i>	<p>The Proposal is in the Georges and Wollongong catchments which are not part of a drinking water catchment. This SEPP does not apply to the Proposal.</p>
<i>Kogarah Local Environmental Plan 2012</i>	<p>The Proposal is in the Georges River LGA and is subject to the Kogarah Local Environmental Plan 2012 (Kogarah LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure.</p> <p>Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

Applicable instrument	Considerations
<i>Hurstville Local Environmental Plan 2012</i>	<p>The Proposal is in the Georges River LGA and is subject to the Hurstville Local Environmental Plan 2012 (Hurstville LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure. Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>
<i>Sutherland Local Environmental Plan 2015</i>	<p>The Proposal is in the Sutherland Shire LGA and is subject to the Sutherland Local Environmental Plan 2015 (Sutherland LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure. Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

## 4.5 Commonwealth legislation

### 4.5.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix 2.

The Proposal would not impact on any matters of NES or on Commonwealth land. Therefore a referral to the Commonwealth Department of the Environment and Energy is not required.

## 5. Stakeholder communication

Chapter 5 discusses the information that will be provided to the community on the Proposal both during the planning approval process and during construction.

### 5.1 Communication approach

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for community feedback to influence project deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the ATP Project and any likely resulting impacts during construction.

The communication approach being implemented for the ATP Project has also been developed having regard for the requirements of the planning process.

The following principles for the Proposal would be adopted:

- generally raising awareness of the Proposal through notifications, site signage, door knocks, advertisements in local newspapers and directing interested stakeholders to the Transport for NSW website
- ensuring that up to date information about the Proposal is available on the Transport for NSW website
- making information available about the appropriate planning processes being followed compliant with legislative requirements
- responding to and recording any enquiries and interactions from the community regarding the Proposal
- ensuring a transparent approach.

## 5.2 Consultation requirements

Table 5-1 provides details of consultation requirements under the Infrastructure SEPP.

**Table 5-1 Infrastructure SEPP consultation requirements**

Clause	Clause particulars	Relevance to the Proposal
<b>Clause 13   Consultation with Councils – development with impacts on council related infrastructure and services</b>	<p>Where railway station works:</p> <ul style="list-style-type: none"> <li>▪ substantially impact on storm water management services</li> <li>▪ place a local road system under strain</li> <li>▪ involve connection to or impact on a council owned sewerage system</li> <li>▪ involve connection to and substantial use of council owned water supply</li> <li>▪ significantly disrupt pedestrian or vehicle movement</li> <li>▪ involve significant excavation to a road surface or footpath for which Council has responsibility.</li> </ul>	The proposed works are considered to be minor and should not have an impact on council related infrastructure or services.
<b>Clause 14   Consultation with Councils – development with impacts on local heritage</b>	<p>Where railway station works:</p> <ul style="list-style-type: none"> <li>▪ substantially impact on local heritage item (if not also a State heritage item)</li> <li>▪ substantially impact on a heritage conservation area.</li> </ul>	The proposed works are not expected to have a substantial impact on local heritage items or heritage conservation areas.
<b>Clause 15   Consultation with Councils – development with impacts on flood liable land</b>	<p>Where railway station works:</p> <ul style="list-style-type: none"> <li>▪ impact on land that is susceptible to flooding – reference would be made to <i>'Floodplain Development Manual: the management of flood liable land'</i>.</li> </ul>	The proposed works are not expected to impact on flood liable land or change flood patterns.
<b>Clause 16   Consultation with public authorities other than Councils</b>	Where development is identified as 'specified development' (i.e. adjacent to land reserved under the NPW Act or within the foreshore area identified in the Sydney Harbour Foreshore Authority Act), the relevant agency should be consulted.	The Proposal would be located adjacent to the Royal National Park and Heathcote National Park. Consultation with National Parks and Wildlife Service is required.

### 5.3 Communication activities

Table 5-2 identifies the communication activities intended to be undertaken during the planning, construction and commissioning phase of the Proposal.

**Table 5-2 Communication activities**

<b>Project phase</b>	<b>Communication tool or activity</b>	<b>Timeframe</b>
Planning	Establish a 1800 number for any enquiries and complaints related to the Proposal and log these interactions in a register.	Prior to REF determination
Construction	Install signage at each of the access gates identifying that works being undertaken as part of the Proposal and timeframe for delivery.	Prior to construction commencement
	Maintain the 1800 number for any enquiries and complaints related to the Proposal and log these interactions in a register (Consultation Manager).	Throughout construction phase
	Use a variety of communication tools such as letter box notifications, door knocks and website updates to keep stakeholders informed of construction activities.	Throughout construction phase
Commissioning	Update information on the website to reflect completion of the Proposal including overall benefits of work undertaken.	At completion

## 6. Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

To determine the likely impact of the Proposal, a preliminary environmental risk assessment has been undertaken for each proposed ATP site in Area 4. The preliminary environmental risk assessment has been undertaken for the following environmental issues:

- water quality / hydrology
- acid sulfate soils
- biodiversity
- noise
- heritage
- contamination
- land use
- traffic and access.

A number of other environmental issues, such as air quality and waste, would generally pose the same potential risk at each proposed ATP site in Area 4. As such, these issues have not been included in the risk assessment. The potential risk and likely impact of these issues are discussed in the relevant section and appropriate standard mitigation measures have been identified to be implemented at all ATP sites in Area 4.

The risk assessment has identified whether the works at the proposed ATP sites in Area 4 would present no impact or a low, medium or high risk of impact for the relevant environmental issue. The risk has been determined based on proximity to a sensitive waterbody, heritage item and /or residential property as well as the occurrence of actual or potential acid sulfate soils, threatened species and/or communities and contamination. A copy of the risk assessment criteria which was used to guide the risk classification at each ATP site in Area 4 is provided in Appendix 4.

The results of the preliminary environmental risk assessment are provided in Table 6-1.

Where a high risk has been identified at an ATP site in Area 4, a site-specific assessment has been provided in the relevant section. Where required, appropriate site-specific mitigation measures have been identified to be implemented at these ATP sites.

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at Appendix 1.

**Table 6-1 Preliminary environmental risk assessment**

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
903	SM903 I SM 905 IL	Low	Low	Low	Medium	Medium	Low	Low	Low
909	SM911 IL	Low	Low	Low	Low	Low	Low	Low	Low
915	SM917 UI SM919 DIL SM921 UIL	Low	Low	Low	Low	Medium	Low	Low	Low
927	SM929 UI SM931 DIL SM933 UIL	Low	Low	High	Low	Medium	Low	Low	Low
934	SM938 UI SM940 IL	Low	Low	High	Low	Medium	Low	Low	Low
947	SM946 DI SM948 UI SM949 UI	Low	Low	High	Low	Medium	Low	Low	Low
952	SM954 UI	Low	Low	High	Low	Medium	Low	Low	Low
1001	SM956 DI SM958 UI SM1001 DI SM1003 UI	Low	Low	High	Low	High	Low	Low	Low
1005	SM1005 DI SM1010 UI	Low	Low	High	Medium	Low	Low	Low	Low
1009	SM1009 DI	Low	Low	Low	Medium	High	Low	Low	Low
1013	SM1044 DI	Low	Low	Low	Medium	High	Low	Low	Low

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
1049	SM1049 DI SM1051 UI	Low	Low	Low	Low	High	Low	Low	Low
1052	SM1052 DI SM1054 UI	Low	Low	Low	Low	Medium	Low	Low	Low
1055	SM1055 DI	Low	Low	Low	Low	Low	Low	Low	Low
1066	SM1064 UI SM1066 UI	Low	Low	Low	Low	Low	Low	Low	Low
1085	SM1085 DI	Medium	Low	Low	Low	Medium	Low	Low	Low
SD 11	SD11 DI SD13 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 17	SD17 DI SD19 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 31	SD31 SC SD33 DI SD35 UI SD42 SCU SD52 DI SD54 UI	Low	Low	Low	Low	High	Low	Low	Low
SD 57	SD57 DI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 66	SD66 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 72	SD72 UI	Low	Low	Low	Low	Low	Low	Low	Low
SD 76	SD76 UI	Low	Low	High	Low	High	Low	Low	Low
17.5	17.4	Low	Low	Medium	Low	Medium	Low	Low	Low

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
CA 3	CA3	Low	Low	Low	Low	Medium	Low	Low	Low
CA 5	CA5	Low	Low	Low	Low	Low	Low	Low	Low
21.7A	W79	Low	Low	Medium	Low	Medium	High	High	Low
W1	W1	Low	Low	Medium	Low	Medium	Low	High	Low
W3	W3	Low	Low	Medium	Low	Medium	High	High	Low
W6	W4 W6	Low	Low	Medium	Low	Medium	High	High	Low
W7	W7	Low	Low	Medium	Low	Medium	Low	High	Low
Waterfall RR (WRR)	W17 W19 W23	Low	Low	Medium	Low	Medium	Low	Medium	Low
W22	W20	Low	Low	High	Low	Medium	High	High	Low
W26	W26 U W28 D	Low	Low	Medium	Low	Medium	Low	High	Low

## 6.1 Landforms, geology and soils

### 6.1.1 Existing environment

The Eastern Suburbs and Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4) has one major crossing at the Georges River. The elevation ranges from less than 10 metres at Arncliffe to around 220 metres at Waterfall. The topography is generally flat at each of the ATP sites in Area 4.

The geology throughout the Proposal area comprises Hawkesbury Sandstone and Ashfield Shale north of the Georges River and Hawkesbury Sandstone and rock from the Liverpool Subgroup to the south of the river.

There is a low risk of encountering Potential Acid Sulfate Soils (PASS) in the Proposal area. PASS are soils rich in iron sulphides (pyrite). If these soils are brought into contact with oxygen, oxidation occurs and they become Acid Sulfate Soils (ASS) which are highly acidic. A review of the Acid Sulfate Soil (ASS) Risk mapping indicates there is an extremely low to low probability of encountering ASS at all ATP sites in Area 4. The ASS Risk Maps include the following details:

- probability of occurrence of acid sulfate soil
- depth to acid sulfate soil
- environmental risk associated with disturbing the soil
- the landform element on which the soil occurs.

### 6.1.2 Potential impacts

Where space is available, existing conduits or GST would be used for the signal cabling works. Where space within existing cabling conduits or GST are not available, the signal and signal cabinet would be connected using underground cables installed in 0.3 metre wide trench at a depth of 0.6 metres. Land disturbance may also be required at ATP Area 4 sites to install new signalling cabinets where space is not available within existing cabinets. In general, up to 20 square metres of land would be disturbed at each ATP site in Area 4 during construction of the Proposal.

Excavated soil and rock for any cable trenching would be temporarily stockpiled on site and backfilled upon completion, provided it is not contaminated or weed infested.

Where trenching is difficult to undertake in rocky terrain, rock breaking may be required.

Trenching activities may result in erosion if appropriate mitigation measures are not in place. Soil erosion has the potential to destabilise landforms and deposit sediments in drainage systems and waterways. Sediment deposition and fine particles in suspension within waterways have direct impact on water quality and aquatic life.

As noted in Section 6.1, there is an extremely low to low probability of encountering ASS at all ATP sites in Area 4. In the unlikely event ASS are encountered and not appropriately controlled, the acid generated by ASS could lead to fish kills in nearby waterways and/or longer term degradation of buried rail assets such as cable conduits.

Given the site characteristics and the scope and size of the proposed site footprint, it is anticipated that erosion and sediment risks are minimal and can be effectively managed through the implementation of standard measures as outlined in the *Managing Urban Stormwater: Soils and Construction Guidelines* (the Blue Book) (Landcom 2004).

No operational impacts are expected.

### **6.1.3 Mitigation measures**

Site specific erosion and sediment control measures will be identified as part of CEMP/ECM. The proposed erosion and sediment control measures will be implemented in accordance with *Managing Urban Stormwater Soils and Construction* (Landcom 2004) (the Blue Book) and the *Acid Sulfate Soils Manual* (ASSMAC 1998) (if required) and would include, but not be limited to, those outlined below:

- Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains
- Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site
- Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion
- Disturbed areas would be reinstated as soon as possible
- If PASS is encountered during excavation works an ASS Management Plan must be prepared (as part of the CEMP) and alternative routes for trenching considered.

## **6.2 Water quality and hydrology**

### **6.2.1 Existing environment**

The Eastern Suburbs & Illawarra Line (Area 4) crosses the Georges River between ATP Area 4 site 1066 and 1085 (refer Figure 1-1). The rail corridor is part of the Georges and Wollongong catchments.

Track drainage and runoff generally discharges into bushland and nearby creeks, and into existing culverts in urban areas.

The existing drainage system within the railway corridor consists of an informal arrangement of pit and pipe and outfall points to stormwater. Overland flows from adjoining properties generally pass beneath the ballasted areas via culverts and buried pipes.

Existing shelters above signal cabinets and bungalows are located at a number of ATP sites in Area 4. Rainwater runoff from these shelters discharges to the ground and does not present a risk to local water quality.

Based on the available flood mapping covering the Proposal area, no ATP sites in Area 4 are located in flood planning areas. However, ATP Area 4 site 1085 is within 40 metres of the Georges River and may be flooded during an extreme flood event.

ATP sites in Area 4 within 50 metres of a waterway are listed in Table 6-2.

**Table 6-2 ATP sites in Area 4 within 50 metres of major waterways**

ATP Area 4 Site Name	Area/suburb	Waterway	Comments (Metres(m))
1085	Como	Georges River	Located about 40m south of Georges River

### 6.2.2 Potential impacts

Without appropriate safeguards, contaminants such as fuels and hydraulic oils from plant and equipment may reach nearby drains and discharge into local waterways. These contaminants may have the potential to harm aquatic life and affect the quality of water downstream. However, the risk of such an occurrence is generally low, given the distance between the proposed ATP sites in Area 4 and drains and creeks. ATP Area 4 site 1085 has been classified as medium risk from a water quality perspective due its proximity to the Georges River and potential to be impacted during an extreme flood event.

During excavation works there is the potential for sediment-laden water to be discharged into local water bodies and/or the nearby stormwater system during a rainfall event. Rain or groundwater may enter trench excavations. If inappropriately managed, sediment-laden water could be discharged into local water bodies and/or the nearby stormwater system.

No operational impacts are expected. The works would not affect the landform or the flow of water in the area.

### 6.2.3 Mitigation measures

During construction water quality impacts would be minimised through a range of control measures in addition to the erosion and sedimentation controls included in Section 6.1. The water quality measures would include, but not be limited to those outlined below:

- Erosion and sediment controls at each worksite would be detailed on the ECM and comply with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) (the Blue Book)
- Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall
- The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required
- Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks
- Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways
- Concrete slurries and wash-out would be collected for reuse or for off-site disposal
- Appropriately sized spill response kits must be kept on site and staff trained in their use
- Earthworks would be suspended during periods of heavy or prolonged rainfall. Plant and equipment would be removed where there is a high risk of inundation
- Dry street sweepers or hand-held brooms would be used to clean local roads in the event of tracked sediment

- Works are to be undertaken in accordance with the TfNSW *Chemical Storage and Spill Response Guidelines* (9TP-SD-066)
- Water discharge must be carried out as per TfNSW *Water Discharge Guidelines* (7TP-SD-024).

## **6.3 Air quality**

### **6.3.1 Existing environment**

The local air quality along the rail corridor between Arncliffe, Waterfall and Cronulla (Area 4) is typical of an urban/rural environment. The urban area is largely influenced by transport, industrial, commercial and domestic sources. The rural areas consist of large areas of bushland likely to have relatively good air quality.

### **6.3.2 Potential impacts**

There is a risk of impact on local air quality during the following activities, particularly during warm and dry weather:

- stockpiling of virgin and spoil materials
- excavation of trenches
- backfilling of trenches
- transporting of wastes
- plant movement on access
- emissions from plant and machinery.
- No dust or emissions are anticipated during the operation of the ATP Project.

### **6.3.3 Mitigation measures**

Air quality impacts throughout construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- Plant and equipment would be maintained in accordance with manufacturers' specifications
- Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently
- Plant or machinery would not be left idling
- All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours
- Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust
- Trucks transporting spoil and other waste materials would be covered appropriately
- Disturbed areas would be rehabilitated as soon as practicable.

## 6.4 Biodiversity

### 6.4.1 Existing environment

The Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4) experienced significant disturbance during construction of the railway line. The Royal National Park and Heathcote National Park are adjacent to the corridor between Loftus and Waterfall. To the north of Loftus the rail corridor generally traverses urban, commercial and industrial areas.

A desktop review of Endangered Ecological Communities (EECs) and a search of the Office of Environment and Heritage (OEH) Wildlife Atlas and the EPBC Protected Matters Search Tool identified there are potentially 64 species of fauna, 20 species of flora, 10 endangered ecological communities and 13 migratory bird species listed as threatened under the EPBC Act and recordings of 85 threatened fauna species, 31 threatened flora species and 25 endangered ecological communities listed under the TSC Act in the broader study area (within five kilometres of the rail corridor).

Table 6-3 lists threatened species which have previously been recorded in the vicinity of the Proposal. Any vegetation disturbance has the potential to impact these species.

**Table 6-3 Threatened species**

ATP Area 4 Site Name	Threatened species	Conservation status	Proximity to site
927			
934			
947	Gosford wattle ( <i>Acacia prominens</i> )	TSC Act (Endangered population)	This endangered population is known to occur along the rail corridor at Penshurst (potentially within the rail corridor).
952			
1001			
1005			
947	Grey Headed Flying Fox ( <i>Pteropus poliocephalus</i> )	EPBC Act (Vulnerable) TSC Act (Vulnerable)	One individual is located outside the rail corridor around 45 metres north of the ATP site in Area 4.
SD76	Bynoe's wattle ( <i>Acacia Bynoeana</i> )	EPBC Act (Endangered) TSC Act (Vulnerable)	One individual adjacent to the rail corridor and site footprint.
W22	Koala ( <i>Phascolarctos cinereus</i> )	TSC Act (Vulnerable) EPBC Act (Vulnerable (combined populations of Qld, NSW and ACT))	Two records around 65 metres and 100 metres south of the site footprint.

Table 6-4 provides a list of EECs which have occur in the vicinity of the Proposal. These EECs are listed under the TSC Act, none are listed under the EPBC Act.

**Table 6-4 Endangered ecological communities**

ATP Area 4 Site Name	Endangered Ecological Community (EEC)	Distance to EEC	Within the rail corridor
W6		15m	Yes
W7	Swamp sclerophyll forest on coastal floodplain	130m	No
Waterfall RR		45m	No
W22		50m	No

The rail corridor is disturbed and is unlikely to provide suitable habitat for fauna species although selected fauna species may traverse the rail corridor or forage along the edges. A Koala(s) has been sighted around 65 metres south of W22 on the fringe of the rail corridor. Site surveys complete for the concept design phase have confirmed there is no suitable habitat available for this species in the site footprint.

There is potential for noxious weeds to occur at ATP sites in Area 4. Site surveys completed for the concept design phase identified weedy vegetation ATP Area 4 site 909, 1001, 1005 and 1055.

The preliminary environmental risk assessment (refer Table 6-1) classified ATP sites in Area 4 as high risk from a biodiversity perspective based on their proximity to Endangered Ecological Communities (EECs) or to threatened species (refer to Table 6-3 and Table 6-4).

#### 6.4.2 Potential impacts

All construction works would be carried out within the rail corridor, and predominantly in areas subject to regular slashing/clearing for ongoing track maintenance and access. The majority of the new assets would either be installed within or close to the ballasted rail track area or around the existing signals or signal cabinet/huts. Where possible, the new infrastructure would utilise existing conduits for power and signal connections. In circumstances where there is no additional capacity in existing conduits; preference would be given to installing galvanised steel troughing and if this is not possible, underground conduits to connect new assets would be excavated.

In circumstances where new underground conduits or crossings are required, the construction impact would be minimised through a hierarchy of controls outlined in the Section 6.4.3, particularly in the vicinity of any threatened species or endangered ecological community.

It is anticipated that due to the nature of works and location of construction footprint, no vegetation removal except for the clearing of grasses and weeds would be required. Should vegetation other than grass and weeds need to be trimmed or removed to support the construction of the Proposal, further approval would be obtained from TfNSW.

The Gosford wattle is known to occur along the railway corridor around the Penshurst area (OEH 2017). Construction works at ATP Area 4 site 927, 934, 947, 952, 1001 and 1005 has the potential to impact this endangered population. Site surveys undertaken for the concept design phase noted vegetation at these ATP sites was over grown (refer Figure 6-1 and Figure 6-2) and may require minor clearing. Any disturbance to vegetation in these areas has the potential to impact this species if the mitigation measures listed in Section 6.4.3 are not implemented.

A Grey Headed Flying Fox has been recorded around 135 metres away from ATP Area 4 site 947 outside the rail corridor. Although this is not a Grey Headed Flying Fox roosting area, trees in the area may provide a suitable foraging habitat. No vegetation which could provide suitable foraging habitat would be disturbed, consequently impacts to this species are not expected.

Bynoe's wattle has been recorded around 40 metres away from ATP Area 4 site SD 76 outside the rail corridor. As this species is located outside the rail corridor and no vegetation removal except for the clearing of grasses and weeds is required impacts to this species are not expected.

A Koala(s) has been recorded around 65 metres away from ATP Area 4 site W22 on the fringe of the rail corridor (refer Appendix 3: Area 4 site location plans). Vegetation in the rail corridor is highly disturbed and site surveys complete for the concept design phase have confirmed suitable habitat for this species is not present in the site footprint.

Other native fauna is unlikely to be impacted by the proposed works, although there is a low risk that animals could potentially fall into an open trench and become trapped or injured.

As noted in Table 6-4, EEC's have been identified in the vicinity of some ATP sites in Area 4. Some of these EECs are located inside the rail corridor and adjacent to the site footprint. As no vegetation removal except for the clearing of grasses and weeds is required impacts to these EECs are not expected.

Trimming of EECs may be required along the access track to ATP Area 4 site W7 to ensure plant, vehicles and/or equipment can safely access the work area. Any trimming activities are expected to be minor and are not expected to significantly impact any fauna habitat. The desktop review (refer Section 6.4.1) identified the access track to W7 is adjacent to an EEC, hence there is potential for direct and/or indirect impacts on the EEC if trimming activities are required.

There is a low risk of damage to other stands of existing vegetation due to stockpiling of materials or vehicle movements. Appropriate control measures, such as fencing, would be installed to ensure the risk of damage to existing vegetation is minimised.

It is likely, that if not controlled correctly, the proposed works could cause the spread of weeds. Weed removal would be required at ATP Area 4 site 909, 1001, 1005 and 1055 (refer to Figure 6-1 and Figure 6-2). Any vegetation removal would be assessed by an ecologist to ensure any identified noxious weeds are removed appropriately.

No operational impacts are expected.



**Figure 6-1 ATP Area 4 site 1005 – overgrown vegetation**



**Figure 6-2 ATP Area 4 site 909 – overgrown vegetation**

### 6.4.3 Mitigation measures

Impacts on flora and fauna throughout construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- If threatened and/or protected flora or fauna species are identified, work in the vicinity of the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW's Environmental Officer, and advise on species management
- Construction staff would be made aware of the ecological constraints and the requirements for no impact to any vegetation at following ATP Area 4 sites. This information would be included on the location specific ECMs and would be marked as "no go zones":
  - **ATP Area 4 site SD 76:** Bynoe's wattle adjacent to the site footprint
  - **ATP Area 4 site W6 and W7:** Swamp sclerophyll forest on coastal floodplain EEC located adjacent to the access track
  - **ATP Area 4 site W22:** Koala Black recorded 65 metres and 100m south
- **ATP Area 4 sites 927, 934, 947, 952, 1001 and 1005:** Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Gosford wattle. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment and approvals would be undertaken by TfNSW.
- The site would be inspected for any trapped or injured fauna at the start of each day
- Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed
- Construction areas should be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation
- Stockpiles, plant, equipment and materials storage are to be located on existing cleared lands away from the drip zone of trees or other native vegetation
- Weeds shall be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse
- Piles of cleared vegetation should be mulched as soon as practicable after clearing and mulch reused where possible
- Vehicle turning circles and parking areas shall be clearly marked and should occur in areas free of native vegetation
- Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site
- Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets
- Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible
- Following confirmation of the detailed design where disturbance to vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey to establish the presence of any threatened

flora and fauna species and/or communities. Where a threatened species and/or communities is identified, further assessment would be undertaken to consider the likely impacts, for the approval of the TfNSW Principal Manager Environmental Impact Assessment

- Any trees requiring removal, trimming or pruning must be assessed and approved for removal using the TfNSW *Application for Removal or Trimming of Vegetation (9TP-FT-078)*
- All cleared vegetation (if any) shall be offset in accordance with TfNSW's *Vegetation Offset Guide (9TP-SD-087)*
- Management in accordance with TfNSW's guidelines, as applicable:
  - Fauna Management Guideline (3TP-SD-113)
  - Vegetation Management Guidelines (9TP-SD-111)
  - Weed Management and Disposal Guideline (3TP-SD-110).

## 6.5 Noise and vibration

### 6.5.1 Existing environment

The works at each ATP site in Area 4 would take place within the railway corridor which is surrounded by rural, residential, commercial and industrial land uses. Residential receivers are located from Allawah to Heathcote and at Waterfall. The noise environment in the surrounding areas is generally dominated by rail noise, road noise and industrial/commercial sources. The distance of the ATP sites in Area 4 to the nearest residential receiver varies from around 10 metres to more than 750 metres (refer Table 6-5).

**Table 6-5 Summary of nearest residential receiver to each ATP site in Area 4**

ATP Area 4 Site Name	Suburb	Nearest residential receiver (m)	Other comments
909	Hurstville	10 to 25m	<ul style="list-style-type: none"> <li>▪ ATP Area 4 sites 909, 947, 1005, 1009, 1013, CA 3 and CA 5 are in urban areas with existing rail and traffic noise</li> <li>▪ ATP Area 4 site 1066 is in a suburban area with existing rail noise</li> <li>▪ Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
947	Penshurst		
1005			
1009	Mortdale		
1013			
1066	Oatley		
CA 3 CA 5	Cronulla		
903	Hurstville	25 to 50m	<ul style="list-style-type: none"> <li>▪ ATP Area 4 sites 903, 915, 1001, 1052, 1055 and SD 31 are in urban areas with existing rail and traffic noise</li> <li>▪ ATP Area 4 sites SD 66, SD 72 and SD 76 are in a suburban area with existing rail noise. All ATP Area 4 sites have screening</li> <li>▪ Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
915			
1001	Penshurst		
1052	Oatley		
1055			
SD31	Sutherland		
SD 66 SD 72 SD 76	Loftus		

ATP Area 4 Site Name	Suburb	Nearest residential receiver (m)	Other comments
927 934	Hurstville		<ul style="list-style-type: none"> <li>ATP Area 4 sites 927, 934, 952, SD 11 and SD 17 are in urban areas with existing rail and traffic noise</li> <li>ATP Area 4 site 17.5 and Waterfall RR are in a suburban area with existing rail noise</li> <li>Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
952	Penshurst		
SD 11 SD 17	Sutherland	50 to 100m	
17.5	Loftus		
WRR	Waterfall		
1049 1085	Mortdale Como		
W6 W7 W22	Waterfall	100 to 200m	<ul style="list-style-type: none"> <li>ATP Area 4 site 1085 is located beside the Georges River, adjacent to bushland</li> <li>ATP Area 4 sites W6, W7 and W22 are surrounded by rural residential properties with existing road and rail noise</li> </ul>
SD 57 21.7A W1 W3 W26	Waterfall	200m or more	

## 6.5.2 Potential impacts

The *Interim Construction Noise Guideline* (ICNG) (DECC 2009) defines noise management levels (measured in decibels) for residential receivers and other types of receivers including commercial and industrial premises, places of worship and schools.

The ICNG states:

- Where the predicted or measured  $L_{Aeq, 15 \text{ min}}$  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 affected residents of the nature of works to be carried out, the expected noise levels and duration and contact details
- For works above the highly affected noise criteria, respite periods may be required, and for works outside standard hours there needs to be a strong justification and negotiation with the community (DECC 2009).

The ICNG introduces a qualitative method of construction noise assessment to simplify the identification of potential noise impacts, without complex predictions, for short-term works. Short-term works are defined as not likely to affect an individual or sensitive land use for more than three weeks.

The main civil and structural construction works at each ATP site in Area 4 is expected to be complete within three weeks. Construction noise would be generated during rock breaking (if required), supersucking and excavation associated with trenching and ULX construction. Following completion of civil construction works, testing and commissioning of the newly installed system would commence, this is expected to have a negligible noise impact.

The qualitative noise assessment methodology has been adopted for the Proposal due to the anticipated short-term nature of ATP construction works. The assessment uses the ATP construction noise estimation matrix which has been developed utilising inputs and guidance from the ICNG, *Australian Standard 2436 (AS2436) Guide to noise and vibration control on construction, demolition and maintenance sites* and *AS1055 Acoustics – Description and measurement of environmental noise General procedures*.

The qualitative construction noise assessment for the Proposal is provided in Table 6-5. This assessment evaluates key ATP construction activities based on distances to sensitive receivers, hours of works, construction methodology, plant and equipment and screening between the noise source and the receiver. These work activities have been assessed as they represent the worst case scenario (where rock breaking is not required) at each ATP site in Area 4. Rock breaking and ULX construction would not generally be required. However, if required, this would represent the worst case scenario.

The results presented Table 6-5 demonstrate construction works within 25 metres of suburban and urban areas with and without screening respectively and within 50 metres of a suburban area without screening present a moderate risk of noise impact. Accordingly their risk classification in the preliminary environmental risk assessment (refer Table 6-1) is noted as medium. All works at other ATP sites in Area 4 would present a low risk of noise impact (refer to Table 6-5). However, there is potential for noise impacts at locations where rock breaking and ULX construction is required. Where this is the case, surrounding receivers would be notified prior to the start of works.

Due to access constraints and the requirement for a safe working site, selected construction work may be undertaken outside standard working hours and during scheduled track possessions, although this would be minimised as far as practicable. These works would include the installation of track assets (i.e. controlled balises). It is unlikely high noise generating equipment would be required outside standard working hours and therefore it is unlikely work outside standard working hours would present a high risk of noise impact.

If works, other than the installation of track assets, is required outside the standard working hours, further approval would be obtained and the affected community would be advised, in accordance with the TfNSW *Construction Noise Strategy* (7TP-ST-157).

Vibration effects from the operation of heavy machinery, such as vibratory rollers or large earth moving equipment have the potential to cause structural disturbance or discomfort. The proposed work would not require the use of vibration-causing heavy machinery.

During operation, the ATP Project is not likely to increase noise or vibration within the rail corridor.

**Table 6-6 Qualitative Construction Noise Assessment**

Distance to nearest sensitive receiver		Approx. construction noise level at 7m, dB(A)		Noise screening or barriers		Ambient noise environment at receiver		Timing of construction work		Duration of construction work	
<i>Distance (m)</i>	<i>Rating</i>	<i>Category (refer AS2436)</i>	<i>Rating</i>	<i>Description</i>	<i>Rating</i>	<i>Description</i>	<i>Rating</i>	<i>Category</i>	<i>Rating</i>	<i>Duration</i>	<i>Rating</i>
<10	0	110dB(A) (e.g. rock breaking)	110	Receivers screened from effective noise source	-10	Quiet, rural, or isolated	-35	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	<1 hr	-20
10-25	-10	≥100dB(A) (e.g. bored piling, dump truck unloading)	100	Receivers not screened	0	Suburban	-45	Evenings / weekends (6pm – 10pm weekdays, 1pm – 10pm Sat, 8am – 10pm Sunday / public holidays)	10	<1 day	-10
25-50	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90			Urban or near busy roads or industrial activity	-55	Night (10pm – 7am weekdays, 10pm – 8am weekends / public holidays)	20	<1 week	-5
50-100	-22	≥80dB(A) (e.g. small generators, trucks, cherry pickers, pneumatic drill)	80							1 to 3 weeks	0
100-200	-28									> 3 and < 26 weeks	10
200-500	-34									>26 weeks	20
500-1000	-40										
>1000	-46										

Distance to nearest sensitive receiver		Approx. construction noise level at 7m, dB(A)		Noise screening or barriers		Ambient noise environment at receiver		Timing of construction work		Duration of construction work	
Distance (m)	Rating	Category (refer AS2436)	Rating	Description	Rating	Description	Rating	Category	Rating	Duration	Rating
ATP Area 4 Sites 10 to 25 metres from sensitive receivers	-10	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				
				Receivers screened from effective noise source	-10	Suburban	-45				
ATP Area 4 Sites 25 to 50 metres away from sensitive receivers	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				
				Receivers screened from effective noise source	-10	Suburban	-45				
				Receivers not screened	0	Suburban	-45				

**Impact / risk level ranges**

<b>Low: &lt;25</b>	Highly likely that noise mitigation will not be required, other than those identified above and if complaints “hot spots” have been considered
<b>Moderate: 25-35</b>	consider standard construction noise control measures as per the TfNSW Construction Noise Strategy (TTP-ST-157)
<b>High: 35+</b>	Inform community, implement all practical means to mitigate, >50 requires specialist noise study / advice

### 6.5.3 Mitigation measures

Construction works would adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as described in the ICNG and be carried out in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157). Control measures to minimise noise and vibration impacts would include, but not be limited to, those outlined below:

- Maximise the offset distance between noisy plant items and sensitive receivers
- Orient plant and equipment to minimise noise at sensitive receivers
- Avoid the simultaneous operation of two or more noise plant items in close vicinity and adjacent to sensitive receivers
- Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers
- Where necessary, use structures to shield sensitive receivers from noise sources
- Work, other than the installation of track assets, would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours: community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's *Out of Hours Works Application Form* (9TP-FT-079) in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157)
- Provide mitigation in accordance with the requirements of the TfNSW *Construction Noise Strategy* (7TP-ST-157) if high noise generating activities occur for extended periods
  - Noise complaints would be managed in accordance with TfNSW *Construction Noise Strategy* (7TP-ST-157). Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.
- In addition, residents within the main catchment area of ATP sites in Area 4 would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.

## 6.6 Heritage

### 6.6.1 Existing environment

A search for non-Aboriginal heritage items was undertaken by consulting the following databases: State Heritage Register (SHR), State Heritage Inventory, Kogarah LEP (which is now part of Georges River Council), Hurstville LEP (which is now part of Georges River Council), Sutherland LEP, Australian Heritage Database, (including Commonwealth Register of the National Estate), world heritage sites and Sydney Train's Section 170 Heritage and Conservation Register (Section 170 Register).

The heritage items and conservation areas with potential to be impacted by the Proposal are identified in Table 6-7. Where required, appropriate site-specific mitigation measures have been identified and are listed in Section 6.6.3.

A number of other heritage items and conservation areas are located adjacent to the Proposal. The Royal National Park and Heathcote National Park are within 10 and 15 metres respectively of the site footprints to the south of Loftus. The Peshurst Heritage Conservation Area is adjacent to ATP Area 4 sites 947, 934, 1001 and 952 and potential archaeological remains associated with former steam tramway office and street plantings of Port Jackson Fig and *Lophostemon confertus* (Brush Box) are adjacent to ATP Area 4 site SD 31 (refer to Appendix 3 ATP Area 4 site location maps). Given the proposed scope of works, there would be no impact on adjacent heritage items and as such these have not been identified below.

**Table 6-7 Heritage items located in the footprint of the proposed ATP sites in Area 4**

ATP Area 4 Site Name	Heritage item	Heritage listing	Heritage significance
1001	Peshurst Railway Station / Peshurst Railway Station Group	Hurstville LEP (Local) Section 170 Register	Peshurst Railway Station was constructed in 1905, the heritage listing includes the platform and weatherboard platform building, 1926 steel footbridge and stairs, and the brick overbridge. Peshurst Railway Station is of historical significance as its early 20th century structures demonstrate the development of the Illawarra Line in this period. Peshurst Railway Station is also of historical significance for its role as a transport hub for Peshurst since 1905.
1009, 1013, 1049	Mortdale Railway Station (including the car sheds)	Section 170 Register Kogarah LEP (Local) Hurstville LEP (Local)	Mortdale Railway Station is of historical significance as its early 20th century structures demonstrate the development of the Illawarra Line in this period and also for its role as a transport hub for Mortdale since 1922. The station is significant as a good example of Federation Queen Anne influenced railway station architecture. The Ellen Street underbridge constructed of brick has technical significance. In addition, one of the few power signal boxes which is still in use is near the station which adds to the significance.
SD 31	Sutherland Railway Station (including the bridge, retaining walls and Port Jackson Figs)	Section 170 Register Sutherland LEP (Local)	Sutherland Railway Station is of historical significance as an 1885 railway station rebuilt as part of the construction of the Cronulla line in 1939. Significant elements are platforms, platform buildings, out-of-room, tramway office and footbridge structure.
SD 76	Loftus Junction railway signal box	State Heritage Register	The junction box is the best surviving example of a signal box for a remote function from the Victorian period and is an important element of the South Coast Railway. The item includes the signal box and two drop-slab location huts.

ATP Area 4 Site Name	Heritage item	Heritage listing	Heritage significance
Waterfall RR	Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable)	Section 170 Register Sutherland LEP (Local)	The Waterfall railway residences and yard are significant as a group of structures dating from the period when Waterfall was a railway town servicing steam locomotives. The 1897 Waterfall railway residences are of historical significance as evidence of early 20th century railway operational requirements to accommodate railway staff on site. The 1908 turntable and 1905 water tank and water column are of historical significance as rare extant evidence of steam train technology at a major locomotive depot and are of technical significance as technology illustrative of the functioning of steam trains. The turntable is locally rare, being one of 3 turntables now extant on the Illawarra line.

A search for known Aboriginal heritage items was undertaken for the Proposal, (with a 100 metre buffer of the rail corridor between Arncliffe, Waterfall and Cronulla (Area 4)) using the Office of Environment and Heritage’s Aboriginal Heritage Information Management System (AHIMS).

Two Aboriginal heritage sites are between 25 metres and 200 metres of ATP Area 4 site 1049 and 1085. These Aboriginal heritage sites are located outside the rail corridor. The works would be confined to a defined footprint within the rail corridor and would not impact any of the identified Aboriginal heritage items located outside the railroad corridor

The Proposal is located within the Metropolitan, La Pouse, Gandangara, Tharawal and Illawarra Local Aboriginal Land Council’s (LALC).

### 6.6.2 Potential impacts

Proposed work at ATP Area 4 site SD 76 would be within the heritage curtilage of an item listed on the SHR (refer Table 6-7) and accordingly the environmental risk classification is noted as high (refer Table 6-1).The proposed works would involve trenching and the installation of trackside equipment. Where possible, works would be undertaken outside the curtilage of this SHR listed item.

Given the proposed scale of the works, the Proposal is not anticipated to have a significant impact on the Loftus Junction railway signal box which includes the signal box and two drop-slab location huts as identified in the heritage listings of the SHR items. No direct and/or indirect impact to the aesthetic significance or the historical significance of the heritage item is expected and proposed works would not result in any visual impacts. A heritage exemption under s.57(2) of the *Heritage Act 1977* would be obtained from Sydney Trains for all works within the curtilage of the SHR listed item.

The proposed works at ATP Area 4 sites 1001, 1009, 1013, 1049, SD 31 and Waterfall RR would be within the curtilage of locally significant heritage items listed under the Section 170 Register and Kogarah, Hurstville and Sutherland LEP (refer Table 6-7). The works are unlikely to result in any direct and /or indirect impacts to the heritage significance of these items. Consultation with Sydney Trains and the Georges River and/or Sutherland Shire Council would be undertaken prior to any works commencing at these locations.

The proposed works would not result in any visual impacts on heritage listed items adjacent to the Proposal.

There are no anticipated impacts on Aboriginal heritage as a result of the Proposal. Due to highly disturbed nature of the rail corridor, it is expected that the potential for items of Aboriginal heritage significance to be buried within the footprint of the ATP Area 4 sites across the Proposal is low.

### 6.6.3 Mitigation measures

Impact on heritage throughout construction would be minimised through a range of control measures, which would include, but not be limited to, those outlined below:

- **ATP Area 4 site SD 76:** Works would be within the heritage curtilage of the SHR listed Loftus Junction railway signal box. A Heritage exemption under s.57(2) of the *Heritage Act 1977* would be obtained from Sydney Trains prior to any construction commencing at this location
- **ATP Area 4 site 1001:** Works would be within the heritage curtilage of the locally significant Penshurst Railway Station / Penshurst Railway Station Group. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at this location
- **ATP Area 4 sites 1009, 1013 and 1049:** Works would be within the heritage curtilage of the locally significant Mortdale Railway Station and Car Sheds. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at these locations
- **ATP Area 4 site SD 31:** Works would be within the heritage curtilage of the locally significant Sutherland Railway Station. Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
- **ATP Area 4 site Waterfall RR:** Works would be within the heritage curtilage of the locally significant Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable). Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location
- If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted. TfNSW staff and the Office of Environment and Heritage (OEH) would be notified as required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes
- Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager and TfNSW staff would be notified immediately. The Office of Environment and Heritage would be notified in accordance with the *National Parks and Wildlife Act 1974*. The Local Aboriginal Land Council would be notified and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.

## 6.7 Waste

### 6.7.1 Overview

TfNSW is required to manage waste in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The waste hierarchy (Avoid, Reuse, Recycle, Energy Recovery and Disposal) should be followed for all projects.

### 6.7.2 Potential impacts

The main waste streams that may be generated during construction include:

- excavated material
- slurry from underbore arisings
- slurry from underbore arisings
- concrete
- steel
- wood
- vegetation
- packaging
- general litter including glass, plastic, metal and paper waste.

The volume of concrete waste is expected to be minimal as concrete plinths used for extending existing signal cabinets and bungalows would be pre-manufactured off-site, where possible, and transported to the ATP Area 4 sites when required.

No operational impacts are expected.

### 6.7.3 Mitigation measures

A Waste Management Plan would be prepared to detail waste types and quantities as well as methods for segregation, handling, storing and disposal. Furthermore, waste impacts would be minimised through a range of control measures, (consistent with the WARR Act) which would include, but not be limited to, those outlined below:

- All waste would be classified in accordance with the *Waste Classification Guidelines* (EPA 2014) and transported to a place that can lawfully accept the waste
- Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures
- Packaging would be minimised, where possible and where the safety and delivery of services is not compromised
- Wherever possible, suitable excavated material would be reused for backfilling, landscaping and other purposes
- Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste
- Any spoil or waste material tracked onto roads would be swept up immediately
- Adequate numbers of bins and waste containers would be placed available on site. The site manager would ensure bins are not overflowing and are appropriately covered
- Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal
- All waste would be removed when work is completed.

## 6.8 Contaminated land and hazardous materials

### 6.8.1 Existing environment

The proposed ATP sites in Area 4 have been initially investigated for potential land contamination. The investigation included:

- Site assessment
- Search of OEH register of contaminated sites
- Search of Sydney Trains records
- Review of all materials that would be used to establish their potential for land contamination.

Due to the historical and ongoing use of the rail corridor, the following potential sources of contamination may be present in the vicinity of the ATP sites in Area 4:

- Fuel and oil spills and engine emissions
- Rail corridor maintenance activities, such as application of pesticides and herbicides
- Brake linings
- Historical cables / pipework ducting and former site structures, with potential asbestos containing materials
- Fabric of old rolling stock
- Imported fill.

O'Donnell Griffin has undertaken a site survey for each proposed ATP sites in Area 4 and carried out a ballast contamination risk assessment. The following information was recorded during the assessments:

- Visual evidence of contamination
- Presence of hazardous building materials
- Waste materials
- Surrounding land use.

The following information sources were searched as part of the assessment:

- Hazardous sites register
- Contaminated land register
- Local knowledge
- Track maintenance history.

ATP sites in Area 4 with known or potential contamination are classed as high risk (refer to Table 6-1). Details of potential contamination at high risk sites are provided in Table 6-8.

**Table 6-8 ATP sites in Area 4 with potential contamination**

ATP Area 4 Site Name	Contamination	Location (Metres (m))
21.7A	Asbestos	-
W3	Suspected asbestos	Buildings and structures likely to be constructed with asbestos
W6	Suspected asbestos	-
W22	Asbestos	-

### 6.8.2 Potential impacts

The Proposal requires minimal excavations. The proposed trenching would vary in length and would generally be about 0.3 metres wide and 0.9 metres deep. Supersucking may be undertaken to find empty conduits and once found this practice replaces trenching.

There is a risk of encountering contaminated material and asbestos during excavation (refer Table 6-8). If encountered, contaminants may pose a risk to health of workers and the environment in general.

If uncontrolled, stockpiling of contaminated spoil could lead to pollution of nearby watercourses due to rainfall runoff or stockpile slippage.

Asbestos removal is likely to be required at ATP Area 4 site 21.7A and W22. There is also potential for asbestos to be found ATP Area 4 site W3 and W6. The removal of asbestos would require an experienced, appropriately licensed removal contractor in accordance with the *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia, 2016). An Occupational Hygienist would be on site during removal works.

Construction of the Proposal would not require the use of any chemicals and/or hazardous materials.

The operation of the ATP Project is not expected to cause contamination or generate hazardous materials.

### 6.8.3 Mitigation measures

The risk of encountering unknown contaminants during excavation shall be managed in accordance with TfNSW's procedures, the CEMP, ECM and land contamination legislation. Control measures to manage contamination risks would include, but not be limited to, those outlined below:

- All waste spoil would be managed in accordance with the Waste Classification Guidelines (NSW EPA 2014) and *National Environment Protection (Assessment of Site Contamination) Measure 1999*
- All hazardous materials removal and clean-up operations must be carried out in accordance with the NSW *Work Health and Safety Act* and Regulations 2011 and the Safe Work NSW requirements

- As part of the ATP Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works
- During excavation, site workers will look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.
- If any previously unidentified contamination is encountered, or suspected, works in the vicinity of the find would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained
- Personnel dealing with the hazardous substances should be appropriately trained
- Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal
- The quantity of spoil generated would be minimised
- If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials
- Hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available at the on site
- No fuels would be stored at on site
- Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia 2016). An Occupational Hygienist should be on site during removal works.

## 6.9 Visual amenity

### 6.9.1 Existing environment

The Proposal is located in the rail corridor of the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4). The rail corridor is generally surrounded by bushland, rural, residential, commercial and industrial land use types with a major waterway crossing at Georges River.

Residents adjoin the rail corridor at ATP Area 4 sites 903, 909, 915, 927, 934, 947, 952, 1001, 1005, 1009, 1013, 1052, 1055, 1066, SD 11, SD 17, SD 31, SD 66, SD 72, SD 76 and Waterfall RR.

ATP sites in Area 4 are generally visible to train passengers and often not visible from outside the rail corridor.

## **6.9.2 Potential impacts**

During construction the visual environment would be temporarily altered through the presence of temporary work buildings, plant and equipment.

Due to the relative minor scale of the works, the Proposal is not anticipated to have a long-term impact on the consistency of the character of the railway corridor. It is not expected to cause additional light reflection or shadowing.

Any trimming of native vegetation (refer Section 6.4.2) is expected to be minor and is not anticipated to not reduce privacy for adjacent property owners.

## **6.9.3 Mitigation measures**

Visual impact during construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- Clearance of vegetation shall be minimised
- The work area shall be maintained in an orderly manner
- All temporary signage associated with the works must be appropriately displayed
- All work equipment and materials would be contained within the designated boundaries of the work site.

## **6.10 Land use**

### **6.10.1 Existing environment**

The proposed ATP sites in Area 4 are on land owned by TfNSW which is zoned SP2 Infrastructure under the Kogarah LEP, Hurstville LEP (Kogarah and Hurstville now form Georges River Council) and Sutherland LEP. The Proposal is located in the rail corridor and is currently used for rail purposes. The neighbouring land uses between Arncliffe and Loftus include residential, industrial and commercial land uses. Between Loftus and Waterfall the neighbouring land uses include national park and residential.

### **6.10.2 Potential impacts**

The Proposal would not affect or alter the current use of the sites or the immediate surrounding area as a rail corridor. It would not have any effects on the use of the neighbouring properties.

As noted in Section 6.4.1, the Royal National Park and Heathcote National Park are adjacent to the rail corridor at a number of ATP sites in Area 4 between Loftus and Waterfall. As a result these ATP Area 4 sites have been classed as high risk (refer to Table 6-1) from a land use perspective. Provided the mitigation measures noted in Section 6.1.3, 6.2.3, 6.4.3 and 6.12.3 are implemented, potential impacts to the adjacent national parks are not anticipated.

### **6.10.3 Mitigation measures**

No specific control measures are required.

## **6.11 Socio-economic impacts**

### **6.11.1 Existing environment**

The Proposal is in the Kogarah, Hurstville (Kogarah and Hurstville now form Georges River Council) and Sutherland LGAs which in the 2011 census had a population of around 97,340, 78,855 and 210,863 respectively, with a median age of 36, 37, 37 and 39 respectively. The main employment areas in the Proposal area are north of the Georges River in the Georges River LGAs.

The Eastern Suburbs & Illawarra Line is regularly used by passenger and freight traffic. The rail line plays an important role in the economic activity of the local areas and enables commuters to travel to and from other major economic areas.

### **6.11.2 Potential impacts**

Social and economic considerations typically focus on the effect on the local community as a whole, and on any local businesses. Amenity issues such as noise and traffic are some of the key issues that can affect the community and are discussed in detail in Sections 6.5 and Section 6.12.

The Proposal is not expected to impact commuter parking, station access or any businesses around any ATP site in Area 4. The construction of the Proposal would require scheduled track possessions. Noise impacts would be temporary (around three weeks).

There would be positive long term effects resulting from the Proposal, as the ATP Project would provide a more reliable and safe rail network.

### **6.11.3 Mitigation measures**

In addition to the control measures proposed in the noise and traffic sections, other control measures are outlined below:

- Nearby residents and businesses would be informed about the nature and timing of works
- Signage would notify the public about the works
- Appropriate fencing would help maintain public safety during construction.

## **6.12 Traffic and access**

### **6.12.1 Existing environment**

Access to the railway corridor is obtained using existing access gates. Distance from the access gates to ATP sites in Area 4 can range between 5 metres and 90 metres. These access gates are used regularly by Sydney Train for periodic maintenance activities along the corridor. It is estimated that staff and contractors currently use the gates and access tracks around 14 to 20 times a year.

Access gates are generally positioned in areas to enable safe access to the surrounding road network. Volumes of traffic on the surrounding road network vary according to time of day and are expected to be busiest during morning and evening peak periods.

### **6.12.2 Potential impacts**

During construction, there would be an increased number of vehicles using the local streets; however, the anticipated increase in the volume of traffic is relatively small (about one vehicle per hour would access / egress the corridor).

Pedestrians are not expected to be affected by vehicles accessing or egressing the work sites.

As works are to take place in the rail corridor, access changes to local roads or access to driveways are not expected.

### **6.12.3 Mitigation measures**

Impacts associated with traffic and access would be minimised through a range of control measures, which would include, but not be limited to those outlined below:

- A traffic speed limit shall be enforced at all sites
- Scheduled road movements must be minimised where possible
- Deliveries of plant and materials must be undertaken outside peak periods where possible
- Vehicles shall be parked within the rail corridor and not in public commuter parking spaces
- Where access to the sites requires access through land not owned by TfNSW, consultation would be undertaken with would land owners and consent to access the land would be obtained where required.

## **6.13 Light spill**

### **6.13.1 Existing environment**

Ambient artificial lighting varies at each ATP site in Area 4 depending on the surrounding land use. In many cases, light spillage from suburban street lighting provides artificial light at ATP site in Area 4. More remote ATP sites in Area 4 would have minimal artificial light.

The existing sites are not fitted with external lighting.

### **6.13.2 Potential impacts**

Some work may be undertaken during night-time periods. Lighting towers would be required to illuminate the work areas, which may result in temporary light spill impacts on nearby residents.

No operational light spill is expected.

### **6.13.3 Mitigation measures**

Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.

## 6.14 Demand on resources

The Proposal would not significantly increase the demand on any current or likely scarce resource. Water, electricity or materials supplies required for the Proposal would not be significant in comparison to other large scale construction projects. All materials used in the construction of the Proposal are common construction materials.

## 6.15 Cumulative impacts

Cumulative impacts often result when several different construction projects are scheduled for similar times and locations.

A search of the Department of Planning and Environment's Major Projects register, Kogarah Council, Hurstville Council (Kogarah and Hurstville Councils now form Georges River Council) and Sutherland Shire Council development application register and the TfNSW projects website was undertaken in May 2017. The following projects are located close to the Proposal:

- **ATP Area 4 site 915:** A mixed use development at is currently underway at 1-35 Tracey Street, Hurstville. This development is adjacent to the rail line about 150 metres east.
- **ATP Area 4 sites 1013, 1049, 1052 and 1055:** The Mortdale Maintenance Facility Project: which includes track and overhead wiring extension work, the installation of maintenance equipment inside the existing facility, lighting and electrical upgrades was scheduled to commence in April 2017 and will take around 12 months to complete. ATP Area 4 sites are located around the maintenance facility.
- **South Coast Power Supply Reliability Improvement:** The South Coast Power Supply Reliability Improvement project is an initiative by Transport for NSW to develop solutions to better manage power demand without building new substations and transmission lines. This project is in planning stages.
- **Sutherland to Cronulla Active Transport Link:** Shared bicycle and pedestrian path from Sutherland to Cronulla. The 11 kilometre path is mainly on existing paths. An REF was prepared in 2016. Cumulative impacts with this project are not expected.
- **Transport Access Program:** The program carries out station improvements to deliver accessible, modern, secure and integrated transport infrastructure. Improvements are being made to the following stations Arncliffe, Engadine, Heathcote, Jannali and Oatley. No ATP Area 4 sites are in the vicinity of these stations.

Where other works are planned during the same scheduled track possessions, coordination meetings would identify the appropriate responsibilities for undertaking notifications to affected stakeholders.

There is also a risk of cumulative impacts if unscheduled work, e.g. emergency work by other utilities or developers is required. Such situations would be monitored and addressed by the Project Manager.

The Proposal involves works at a number of ATP Area 4 sites along the rail corridor. The construction team would complete works at each location prior to progressing to the next location so cumulative impacts are minimised.

Overall this work, as part of the AMS, would result in significant benefits by providing a more reliable and safe rail network.

### 6.15.1 Mitigation measures

- Any other major development or works planned in the vicinity of the site would be further investigated before work begins and cumulative impacts minimised where possible
- Consultation with Georges River Council and Sutherland Shire Council and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## 7. Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures.

### 7.1 Environmental management plans

A construction environmental management plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of the TfNSW (Infrastructure and Services) Environmental Management System (EMS). The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would incorporate as a minimum all environmental mitigation measures identified below in Section 7.2, any conditions from licences or approvals required by legislation, and a process for demonstrating compliance with such mitigation measures and conditions.

### 7.2 Mitigation measures

#### 7.2.1 Standard mitigation measures (for all ATP Area 4 sites)

Standard mitigation measures for the Proposal are listed in Table 7-1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6, should the Proposal proceed.

**Table 7-1 Proposed standard mitigation measures**

No.	Standard mitigation measures
<b>General</b>	
1	This REF has been developed based on the ATP Concept Design, further environmental approvals may be required if design developments during the detailed design phase extend proposed works outside the assessed site footprint provided on the ATP Area 4 site location plans.
2	Location specific Environmental Controls Map (ECM) would be developed prior to commencement of construction in accordance with TfNSW's <i>Guide to Environmental Control Map</i> (3TP-SD-015). The ECM would be implemented for the duration of construction.
3	An ATP Project risk assessment including environmental aspects and impacts would be undertaken prior to the commencement of construction.
4	Weekly inspections to monitor environmental compliance and performance would be undertaken during construction.
5	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, mitigation measures and conditions of approval.

No.	Standard mitigation measures
<b>Landforms, geology and soil</b>	
6	Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains.
7	Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site.
8	Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion.
9	Disturbed areas would be reinstated as soon as possible.
10	If PASS encountered during excavation works an ASS Management Plan must be prepared (as part of the CEMP) and alternative routes for trenching works considered.
<b>Water quality and hydrology</b>	
11	Erosion and sediment controls at each worksite would be detailed on the ECM and comply with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004) (the Blue Book).
12	Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall.
13	The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required.
14	Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks.
15	Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways.
16	Concrete slurries and wash-out would be collected for reuse or for off-site disposal.
17	Appropriately sized spill response kits must be kept on site and staff trained in their use.
18	Earthworks would be suspended during periods of heavy or prolonged rainfall. Plant and equipment would be removed from site where there is a high risk of inundation.
19	Dry street sweepers or hand-held brooms would be used to clean local roads in the event of tracked sediment.
• 20	• Works are to be undertaken in accordance with the TfNSW Chemical Storage and Spill Response Guidelines (9TP-SD-066).
21	Water discharge from site must be carried out as per TfNSW <i>Water Discharge Guidelines</i> (7TP-SD-024).
<b>Air quality</b>	
22	Plant and equipment would be maintained in accordance with manufacturers' specifications.
23	Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently.
24	Plant or machinery would not be left idling.
25	All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours.
26	Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust.

No.	Standard mitigation measures
27	Trucks transporting spoil and other waste materials from site would be covered appropriately.
28	Disturbed areas would be rehabilitated as soon as practicable.
<b>Biodiversity</b>	
29	If threatened and/or protected flora or fauna species are identified, work in the vicinity of the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW's Environmental Officer, and advise on species management.
30	Construction staff would be made aware of the ecological constraints and the requirements for no impact to any vegetation at following locations. This information would be included on the location specific ECMs and would be marked as "no go zones": <ul style="list-style-type: none"> <li>▪ <b>ATP Area 4 site SD 76:</b> Bynoe's wattle adjacent to the site footprint</li> <li>▪ <b>ATP Area 4 site W6 and W7:</b> Swamp sclerophyll forest on coastal floodplain EEC located adjacent to the access track</li> <li>▪ <b>ATP Area 4 site W22:</b> Koala Black recorded 65 metres and 100m south.</li> </ul>
31	<b>ATP Area 4 site 927, 934, 947, 952, 1001 and 1005:</b> Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Gosford wattle. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment and approvals would be undertaken by TfNSW.
32	The site would be inspected for any trapped or injured fauna at the start of each day.
33	Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed.
34	Construction areas should be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation.
35	Stockpiles, plant, equipment and materials storage are to be located on existing cleared lands away from the drip zone of trees or other native vegetation.
36	Weeds shall be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse.
37	Piles of cleared vegetation should be mulched as soon as practicable after clearing and mulch reused where possible.
38	Vehicle turning circles and parking areas shall be clearly marked and should occur in areas free of native vegetation.
39	Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site.
40	Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets.
41	Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.

No.	Standard mitigation measures
42	Following confirmation of the detailed design where disturbance to vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey of to establish the presence of any threatened flora and fauna species and/or communities. Where a threatened species and/or communities is identified, further assessment would be undertaken to consider the likely impacts, for the approval of the TfNSW Principal Manager Environmental Impact Assessment.
43	Any trees requiring removal, trimming or pruning that have not been previously assessed in accordance with this REF must be assessed and approved for removal using the TfNSW <i>Application for Removal or Trimming of Vegetation( 9TP-FT-078)</i> .
44	All cleared vegetation (if any) shall be offset in accordance with TfNSW's <i>Vegetation Offset Guide (9TP-SD-087)</i> .
45	Management in accordance with TfNSW's guidelines, as applicable: <ul style="list-style-type: none"> <li>▪ Fauna Management Guideline (3TP-SD-113)</li> <li>▪ Vegetation Management Guidelines (9TP-SD-111)</li> <li>▪ Weed Management and Disposal Guideline (3TP-SD-110).</li> </ul>
<b>Noise and vibration</b>	
46	Maximise the offset distance between noisy plant items and sensitive receivers.
47	Orient plant and equipment to minimise noise at sensitive receivers.
48	Avoid the simultaneous operation of two or more noisy plant items in close vicinity and adjacent to sensitive receivers.
49	Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers.
50	Where necessary, use structures to shield sensitive receivers from noise sources.
51	Work, other than the installation of track assets, would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours: affected community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's <i>Out of Hours Works Application Form (9TP-FT-079)</i> in accordance with TfNSW's <i>Construction Noise Strategy (7TP-ST-157)</i> .
52	Provide mitigation in accordance with the requirements of the TfNSW <i>Construction Noise Strategy (7TP-ST-157)</i> if high noise generating activities occur for extended periods.
53	Noise complaints would be managed in accordance with TfNSW <i>Construction Noise Strategy (7TP-ST-157)</i> . Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.
54	Residents within the main catchment area of ATP Area 4 sites identified in the Proposal would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.

No.	Standard mitigation measures
<b>Heritage</b>	
55	<b>ATP Area 4 site SD 76:</b> Works would be within the heritage curtilage of the SHR listed Loftus Junction railway signal box. A Heritage exemption under s.57(2) of the <i>Heritage Act 1977</i> would be obtained from Sydney Trains prior to any construction commencing at this location.
56	<b>ATP Area 4 site 1001:</b> Works would be within the heritage curtilage of the locally significant Penshurst Railway Station and Penshurst Railway Station Group. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at this location.
57	<b>ATP Area 4 sites 1009, 1013 and 1049:</b> Works would be within the heritage curtilage of the locally significant Mortdale Railway Station and Car Sheds. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at these locations.
58	<b>ATP Area 4 site SD 31:</b> Works would be within the heritage curtilage of the locally significant Sutherland Railway Station. Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
59	<b>ATP Area 4 site Waterfall RR:</b> Works would be within the heritage curtilage of the locally significant Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable). Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
60	If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted. TfNSW staff and the Office of Environment and Heritage (OEH) would be notified as required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes.
61	Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager and TfNSW staff would be notified immediately. OEH would be notified in accordance with the <i>National Parks and Wildlife Act 1974</i> . The Local Aboriginal Land Council would be notified and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.
<b>Waste</b>	
62	All waste would be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA 2014) and transported to a place that can lawfully accept the waste.
63	Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures.
64	Packaging would be minimised, where possible and where the safety and delivery of services is not compromised.
65	Wherever possible, suitable excavated material would be reused for backfilling, landscaping and other purposes.
66	Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste.
67	Any spoil or waste material tracked onto roads would be swept up immediately.
68	Adequate numbers of bins and waste containers would be available on site. The site manager would ensure bins are not overflowing and are appropriately covered.

No.	Standard mitigation measures
69	Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal.
70	All waste would be removed when work is completed.
<b>Contaminated land and hazardous materials</b>	
71	All waste spoil would be managed in accordance with the Waste Classification Guidelines (NSW EPA 2014) and National Environment Protection (Assessment of Site Contamination) Measure 1999.
72	All hazardous materials removal and clean-up operations must be carried out in accordance with the NSW <i>Work Health and Safety Act</i> and Regulations 2011 and the Safe Work NSW requirements.
73	As part of the ATP Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works.
74	During excavation, site workers would look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.
75	If any previously unidentified contamination is encountered, or suspected, works in the vicinity of the find would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained.
76	Personnel dealing with the hazardous substances should be appropriately trained.
77	Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal.
78	The quantity of spoil generated would be minimised.
79	If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials.
80	Hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available at the on site.
81	No fuels would be stored at on site.
82	Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the <i>How to Safely Remove Asbestos Code of Practice</i> (Safe Work Australia, 2016). An Occupational Hygienist should be on site during removal works.
<b>Visual amenity</b>	
83	Clearance of vegetation shall be minimised.
84	The work area shall be maintained in an orderly manner.
85	All temporary signage associated with the works must be appropriately displayed.
86	All work equipment and materials would be contained within the designated boundaries of the work site.

No.	Standard mitigation measures
<b>Land use</b>	
87	No specific control measures are required.
<b>Socio-economic impacts</b>	
88	Nearby residents and businesses would be informed about the nature and timing of works.
89	Signage would notify the public about the works.
90	Appropriate fencing would help maintain public safety during construction.
<b>Traffic and access</b>	
91	A traffic speed limit shall be enforced at all sites.
92	Scheduled road movements must be minimised where possible.
93	Deliveries of plant and materials must be undertaken outside peak periods where possible.
94	Vehicles shall be parked within the rail corridor and not in public commuter car parking spaces.
95	Where access to the sites requires access through land not owned by TfNSW, consultation would be undertaken with land owners and consent to access the land would be obtained where required.
<b>Light spill</b>	
96	Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.
<b>Cumulative impacts</b>	
97	Any other major development or works planned in the vicinity of the site would be further investigated before work begins and cumulative impacts minimised where possible.
98	Consultation with Georges River Council and Sutherland Shire Council and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## **8. Conclusion**

This REF has been prepared in accordance with the provisions of section 111 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal will play a key role in delivering faster and more reliable rail services and will provide significant safety benefits to rail customers and staff.

The main environmental issues relate to construction impacts such as erosion and sedimentation, potential water quality, biodiversity and heritage impacts as well as short-term traffic and noise issues for nearby receivers.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 6, and Appendices 1 and 2). Should the ATP Project proceed, these impacts would be effectively managed through the implementation of the mitigation measures and the conditions of approval. As a result, these environmental impacts are not considered to be significant. 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 ESD (refer to Section 4.1). These would be considered further during the detailed design, construction and operational phases of the Proposal. This will ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

## References

- Department of Environment and Climate Change 2009 *Interim Construction Noise Guideline*
- EPA 2014 *Waste Classification Guidelines*, Sydney
- Landcom 2004 *Managing Urban Stormwater, Soils and Construction Guidelines*, March, 2004
- NSW Acid Sulfate Soil Management Advisory Committee 1998 *Acid Sulfate Soil Manual*
- NSW Government 2014 *Rebuilding NSW - State Infrastructure Strategy 2014*, Sydney
- NSW Government 2015 *State Priorities – NSW: Making It Happen*, Sydney
- Office of Environment and Heritage (OEH) 2017 Gosford wattle, Hurstville and Kogarah Local Government Areas – profile.  
<http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10022>
- Office of Environment and Heritage (OEH) 2014a Threatened Species, Population and Communities Database. Search by region.  
<http://www.environment.nsw.gov.au/threatenedSpeciesApp/AreaHabitatSearch.aspx>
- Office of Environment and Heritage (OEH) 2014b NSW Bionet Atlas of NSW Wildlife Database, Office of Environment and Heritage NSW.  
<http://www.bionet.nsw.gov.au/>
- TfNSW 2014 *Automatic Train Protection Eastern Suburbs and Illawarra Line and South Coast Line: Arncliffe to Kiama Review of Environmental Factors*

## Appendix 1 – Consideration of clause 228 factors

The table below demonstrates TfNSW’s consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
<p><b>Any environmental impact on a community?</b></p> <p>During construction there may be minor noise and traffic disturbances to the nearby community from deliveries and construction works. During track possession, some works would take place outside standard working hours.</p> <p>In the long term, the ATP Project will improve reliability and safety of the Sydney Train services on the Eastern Suburbs &amp; Illawarra Line.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any transformation of a locality?</b></p> <p>The Proposal would not transform the locality. The works would support the ongoing operation of the rail network.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any environmental impact on the ecosystem of the locality?</b></p> <p>With the implementation of the proposed control measures, the proposed works are not anticipated to impact on the ecosystem of the locality.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b></p> <p>There will be a minor reduction in the aesthetic values of the neighbourhood due to the anticipated noise, air quality and traffic impacts resulting during construction. However, these will be temporary and minor in nature. No long-term reduction in the quality or value of the locality is anticipated.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</b></p> <p>No such significant places will be affected during construction or operation.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?</b></p> <p>No habitat on which protected or endangered species would be reliant on is anticipated to be impacted by the proposed works.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b></p> <p>No protected or endangered species are anticipated to be impacted by the proposed works.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any long-term effects on the environment?</b></p> <p>The proposed activities are not anticipated to pose any environmental risks in the long term.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any degradation of the quality of the environment?</b></p> <p>The proposed work is not expected to have any significant adverse impacts on the quality of the environment.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

Factor	Impacts
<p><b>Any risk to the safety of the environment?</b>            During construction there is a risk to the environment due to accidental spills and sedimentation. These risks would be minimised through the implementation of the proposed control measures.</p>	<p><input type="checkbox"/> nil  <input checked="" type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any reduction in the range of beneficial uses of the environment?</b>            Works are to take place within the existing rail corridor and would not reduce the beneficial uses of the environment.</p>	<p><input checked="" type="checkbox"/> nil  <input type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any pollution of the environment?</b>            During construction there is a risk of noise, water and air pollution. These risks would be minimised through the implementation of the proposed control measures.</p>	<p><input type="checkbox"/> nil  <input checked="" type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any environmental problems associated with the disposal of waste?</b>            During construction it is possible spoil may be contaminated and an appropriate remediation plan and/or waste disposal method would be required.</p>	<p><input type="checkbox"/> nil  <input checked="" type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</b>            Construction materials are readily available and would be sourced from local contractors where possible.</p>	<p><input checked="" type="checkbox"/> nil  <input type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any cumulative environmental effect with other existing or likely future activities?</b>            The distance between the proposed ATP sites in Area 4 is such that cumulative noise, air quality and traffic impacts are not expected.            Overall this Proposal will have significant benefits in providing a safer and more efficient rail network.</p>	<p><input checked="" type="checkbox"/> nil  <input type="checkbox"/> minor  <input type="checkbox"/> significant</p>
<p><b>Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</b>            The Proposal would not contribute to or be affected by coastal processes or hazards.</p>	<p><input checked="" type="checkbox"/> nil  <input type="checkbox"/> minor  <input type="checkbox"/> significant</p>

## Appendix 2 – Consideration of matters of national environmental significance

The table below demonstrates TfNSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to the Commonwealth Department of the Environment and Energy.

Factor	Impacts
<p><b>Any impact on a World Heritage property?</b> There are no World Heritage properties in the vicinity the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a National Heritage place?</b> There are no National Heritage places in the vicinity of the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a wetland of international importance?</b> There are no wetlands of international importance in the vicinity of the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a listed threatened species or communities?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed threatened species or ecological communities or their habitats are not expected. Indirect impacts are also not expected.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impacts on listed migratory species?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed migratory species or their habitats are not expected. Indirect impacts are also not expected.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a Commonwealth marine area?</b> The site is not in the vicinity of any Commonwealth marine areas.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Does the Proposal involve a nuclear action (including uranium mining)?</b> The Proposal does not involve any nuclear actions.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Additionally, any impact (direct or indirect) on Commonwealth land?</b> The site is not on or close to any Commonwealth land.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>In relation to coal seam gas and large coal mining developments, any impact on a water resource?</b> The Proposal does not relate to a coal seam gas or large coal mining development.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

## Appendix 3 – ATP Area 4 site location plans

## Appendix 4 – ATP Preliminary environmental risk assessment criteria

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Water Quality and Hydrology</b>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;25m and ≤150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway ≤25m from works</li> </ul>
	<ul style="list-style-type: none"> <li>Waterway is relatively degraded</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is relatively sensitive</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is highly sensitive and/or specifically protected</li> </ul>
<b>Non-Indigenous Heritage</b>	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of a heritage item/place (including works within the curtilage of items on Section 170, LEP Heritage Schedules)</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of item(s) on the State heritage register</li> </ul>
<b>Indigenous Heritage</b>	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of heritage item/place</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of heritage item/place, or works may affect such a site</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>No vegetation removal required</li> </ul>	<ul style="list-style-type: none"> <li>Tree pruning or lopping required</li> <li>Trees/vegetation within 5m of works</li> <li>Works within a bush regeneration area</li> </ul>	<ul style="list-style-type: none"> <li>Removal of trees/vegetation required</li> <li>Excavations likely to affect tree roots</li> </ul>
	<ul style="list-style-type: none"> <li>No threatened species or ecologically sensitive area(s) affected</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) within 150m of works</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) potentially impacted</li> </ul>
	<ul style="list-style-type: none"> <li>Negligible potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>Potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>High potential to encounter native fauna species</li> </ul>
<b>Potential Contamination</b>	<ul style="list-style-type: none"> <li>No contamination sites identified within vicinity of works (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination in ballast environmental site survey, however no evidence of hazardous building materials, waste materials or contamination of land uses (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination, hazardous building materials and waste within ballast environmental site survey</li> <li>Surrounding land uses indicate potential contamination (EPA search)</li> </ul>
	<ul style="list-style-type: none"> <li>No contamination identified in ballast environmental site survey</li> </ul>		

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Noise</b>	<ul style="list-style-type: none"> <li>Sensitive receptors are identified greater than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located greater than 50m and less than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located equal to or less than 50m of works</li> </ul>
<b>Land Use</b>	<ul style="list-style-type: none"> <li>National park and/or reserve greater than 100m from works</li> </ul>	<ul style="list-style-type: none"> <li>National park and/or reserve within 100m of works</li> </ul>	<ul style="list-style-type: none"> <li>Works bounded by a national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>Works unlikely to extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Works may extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Site access through national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>No disruption to local land uses anticipated</li> </ul>	<ul style="list-style-type: none"> <li>Works could affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>	<ul style="list-style-type: none"> <li>Works outside the rail corridor</li> <li>Works affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>
<b>Potential ASS</b>	<ul style="list-style-type: none"> <li>No risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>Low risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>High risk of ASS occurring within 4m of natural soil surface</li> </ul>
<b>Traffic and access</b>	<ul style="list-style-type: none"> <li>Works are not considered to have an impact on access or parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>Works have the potential to impact on access/parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>The rail corridor access gate is located within close proximity to community places or sensitive receptors, the proposed works are considered likely to have an impact on access/parking for community places or sensitive receptors</li> </ul>



Transport  
for NSW

# **Automatic Train Protection (ATP) Project Eastern Suburbs & Illawarra Line – Area 4**

Review of Environmental Factors

## Document History

Version	Date of drafting	Author	Reviewer
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## Abbreviations

Term	Meaning
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>AMS</b>	Advanced train control Migration System
<b>ATP</b>	Automatic Train Protection
<b>ASS</b>	Acid Sulfate Soils
<b>CEMP</b>	Construction Environmental Management Plan
<b>DP&amp;E</b>	NSW Department of Planning and Environment
<b>EEC</b>	Endangered Ecological Community
<b>EPA</b>	Environment Protection Authority
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
<b>EP&amp;A Regulation</b>	<i>Environmental Planning and Assessment Regulation 2000</i> (NSW)
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
<b>ESD</b>	ecologically sustainable development (refer to Definitions)
<b>ETCS</b>	European Train Control System
<b>FM Act</b>	<i>Fisheries Management Act 1994</i> (NSW)
<b>Georges River Council</b>	Georges River Council refers to the newly created Council consisting of the former Hurstville City and Kogarah City Councils following commencement of the NSW council amalgamations on 12 May 2016.
<b>Heritage Act</b>	<i>Heritage Act 1977</i> (NSW)
<b>Infrastructure SEPP</b>	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
<b>IS</b>	Infrastructure and Services (Division of Transport for NSW)
<b>LEP</b>	local environmental plan
<b>LEU</b>	lineside electrical unit
<b>LGA</b>	local government area
<b>NES</b>	(Matters of) National Environmental Significance
<b>NPW Act</b>	<i>National Parks and Wildlife Act 1974</i> (NSW)
<b>NSW</b>	New South Wales
<b>Native Vegetation Act</b>	<i>Native Vegetation Act 2003</i> (NSW)
<b>NW Act</b>	<i>Noxious Weeds Act 1993</i> (NSW)
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i> (NSW)
<b>OEH</b>	Office of the Environment and Heritage
<b>OOHW</b>	Out of hours works
<b>Roads Act</b>	<i>Roads Act 1993</i> (NSW)
<b>REF</b>	Review of Environmental Factors
<b>SEPP</b>	state environmental planning policy

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<b>Term</b>	<b>Meaning</b>
<b>SHR</b>	State Heritage Register
<b>TfNSW</b>	Transport for NSW
<b>TSC Act</b>	<i>Threatened Species Conservation Act 1995 (NSW)</i>
<b>ULX</b>	underline crossing

## Definitions

Term	Meaning
<b>Automatic Train Protection (ATP)</b>	ATP is a generic name, used globally to describe a range of train safety technologies, designed to ensure additional passenger and train crew safety through: <ol style="list-style-type: none"> <li>1. Ceiling speed supervision to prevent a train from travelling over a predetermined speed limit</li> <li>2. Brake-to-target supervision to supervise the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).</li> </ol>
<b>Balise</b>	An electronic beacon or transponder placed between the rails of a railway as part of an automatic train protection system.
<b>Concept design</b>	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
<b>Design and Construct Contract</b>	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Contractor is therefore responsible for all work on the project, both design and construction.
<b>Detailed design</b>	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
<b>Ecologically sustainable development</b>	Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased (refer to Section 4.1).
<b>Out of hours works</b>	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7:00am to 6:00pm Monday to Friday, 8:00am to 1:00pm Saturday and no work on Sundays/public holidays).
<b>Proponent</b>	A person or body proposing to carry out an activity under Part 5 of the EP&A Act - in this instance, TfNSW.
<b>the Proposal</b>	The construction and operation of the Eastern Suburbs & Illawarra Line ATP Project.
<b>Rail Possession</b>	Possession is the term used by railway building/maintenance contractors to indicate they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
<b>Underline crossing</b>	An underline crossing (under track crossing) where the cable route crosses under the track from one side of the line to the other.

## Executive summary

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW, including the Automatic Train Protection (ATP) Project (previously known as the Advanced train control Migration System (AMS) Project) (the Proposal).

The ATP Project plays a key role in delivering faster and more reliable services under the NSW Government's *Sydney's Rail Future* (June 2012). The ATP Project will deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project has a phased integration and implementation process and will be progressively deployed in stages across nine discrete areas, with separate environmental impact assessments being prepared for each area. The works which are subject to this environmental impact assessment pertain to the deployment of the ATP Project within Area 4, located on the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

## Description of the Proposal

The Proposal involves the installation and operation of trackside signalling equipment at 34 locations between Arncliffe, Waterfall and Cronulla (Area 4) on the Eastern Suburbs & Illawarra Line. Figure 1-1 provides an overview map of the Proposal.

Area 4 traverses a 30 kilometre section of the railway corridor located in the Georges River and Sutherland Shire local government areas. Depending on the topography, ATP sites would generally be located up to 15 metres from existing rail tracks.

The proposed ATP trackside signalling equipment would communicate with a train mounted system which will improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system will be carried out at a train maintenance facility and does not form part of this environmental assessment.

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

## Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under the EP&A Act.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. Clause 79 of the Infrastructure SEPP allows for the development of 'rail infrastructure facilities' by or on behalf of a public authority without consent on any land. Clause 78 defines 'rail infrastructure facilities' as including 'signalling, train control, communication and security systems'.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under Infrastructure SEPP, the Proposal is permissible without consent. Consequently the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation).

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, 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.

## **Stakeholder communication**

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for any community feedback into project deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the Project and any likely resulting impacts.

The communication approach being implemented for the Project has also been developed having regard for the requirements of the planning process.

Refer to Chapter 5 for more information about the communications approach for the Proposal.

## **Environmental impact assessment**

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures to reduce the identified impacts. This REF identifies that, subject to the implementation of mitigation measures, potential environmental impacts can be controlled and reduced to acceptable levels which would not significantly affect the environment.

The main environmental issues relate to construction impacts such as erosion and sedimentation risks, work within the curtilage of heritage items, ground contamination and potential impacts to threatened species and/or communities as well as short-term traffic, air quality and noise issues for nearby receivers. Such impacts would be managed through the implementation of a Proposal wide Construction Environmental Management Plan (CEMP) and location specific Environmental Control Maps (ECM).

No operational impacts are anticipated as a result of the Proposal.

## Conclusion

This REF has been prepared having regard to sections 111 and 112 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

Should the Proposal proceed, the likely impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF. TfNSW has determined that an environmental impact statement (EIS) is not required for the Proposal, nor is the approval of the Minister for Planning.

## 1. Introduction

TfNSW was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Eastern Suburbs & Illawarra Line Automatic Train Protection (ATP) Project (the Proposal), to be delivered by Infrastructure and Services (I&S).

### 1.1 Overview of the Proposal

The Proposal involves the installation of trackside signalling equipment at 34 locations along the railway line between Arncliffe, Waterfall and Cronulla (Area 4) on the Eastern Suburbs & Illawarra Line (refer Figure 1-1). Detailed ATP site location plans for Area 4 are provided in Appendix 3.

The Proposal comprises new track assets installed on rail sleepers; new signalling cabling installed above and below ground; and the extension of a number of existing signalling cabinets and the installation of new signalling cabinets. This 30 kilometre stretch of railway corridor between Arncliffe and Waterfall is located in the Georges River and Sutherland Shire local government areas. A detailed description of the Proposal is provided in Chapter 3.

Depending on the topography, ATP sites would generally be located up to 15 metres from existing rail tracks. The proposed trackside signalling equipment would communicate with a train mounted system which will improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system will be carried out at a train maintenance facility and does not form part of this environmental assessment.

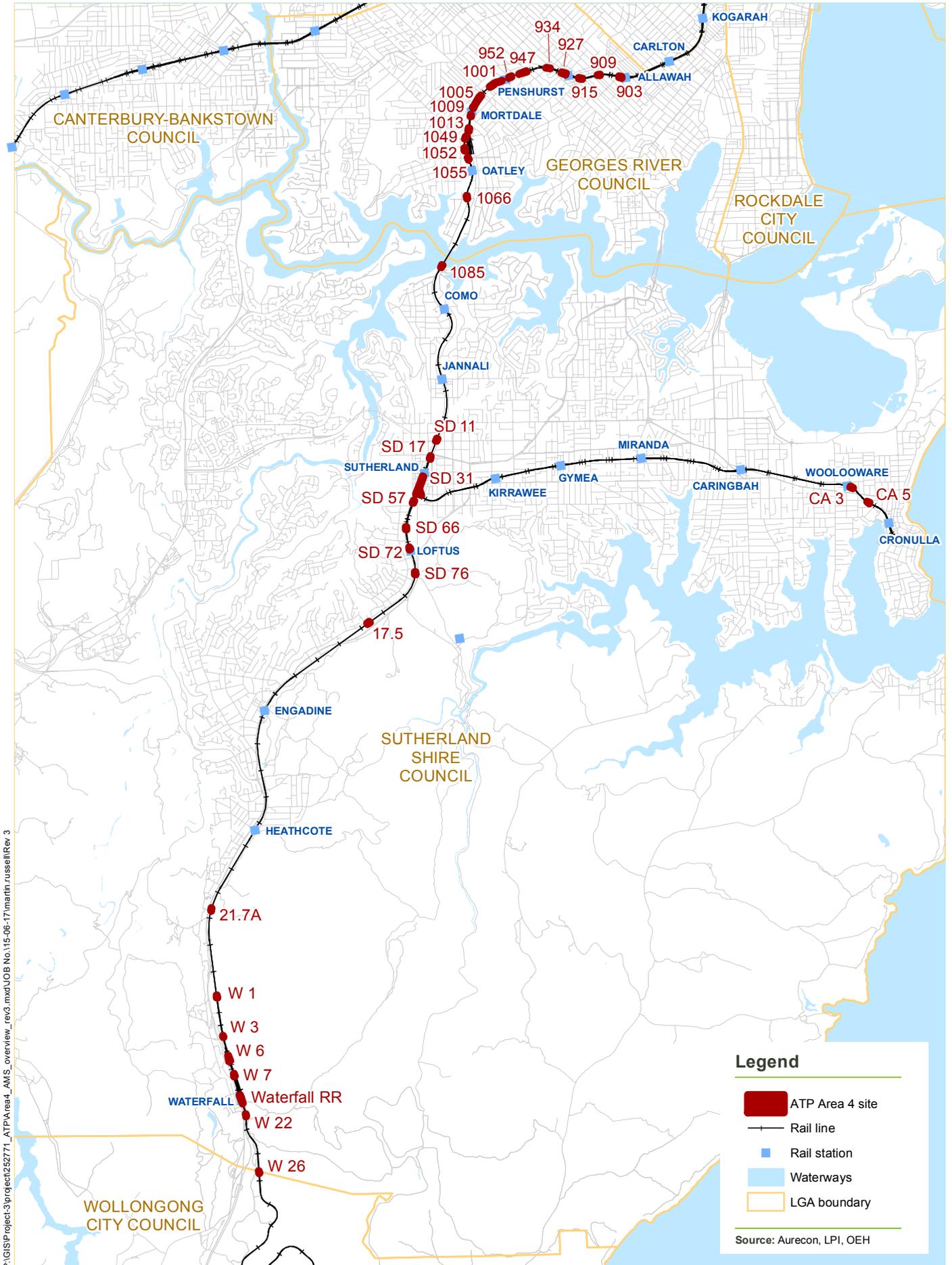
The Proposal would deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

### 1.2 Purpose of this Review of Environmental Factors

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 111 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal.

This REF has been prepared by TfNSW in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 of the EP&A Act. Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to significantly impact a matter of national environmental significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of the Environment and Energy for any necessary approvals under the EPBC Act.



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Projection: GDA 1994 MGA Zone 56

Automatic Train Protection (ATP) Area 4 REF

FIGURE 1-1 ATP Area 4 sites

## 2. Need for the Proposal

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Proposal. This chapter also provides a discussion of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

### 2.1 Strategic justification

The requirement to implement automatic protection technology was one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project would implement the European Train Control System (ETCS) (Limited Supervision) which is internationally recognised and reliable automatic train protection technology that has been tailored to meet the needs of the Sydney rail network. The ETCS enhances passenger and train crew safety through ceiling speed supervision to prevent a train from travelling over a predetermined speed limit and by brake-to-target supervision which supervises the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).

The ATP system monitors train speed against a set rail speed limit (ceiling speed) and alerts the driver if the train is over-speeding. The system applies the brakes automatically if the driver does not respond appropriately.

The ATP Project would upgrade the signalling system across the electrified rail network and would have a phased integration and implementation process. The ATP Project would be progressively deployed in stages across nine discrete areas until around 2019, with separate environmental impact assessments being prepared for each area. As noted in Section 1.1 this REF addresses ATP works in Area 4.

The Proposal will benefit the Eastern Suburbs & Illawarra Line by providing greater reliability and safety to the train services along the line and associated community and customer benefits.

### 2.2 Alternative options considered

A comprehensive review of automatic train protection technology options has been undertaken. The review assessed technology options against key criteria including technical capability, economic viability and level of risk mitigation.

The review recommended the ETCS (Limited Supervision) is adopted as the preferred automatic train protection technology. The ETCS was recommended as the preferred technology because it:

- is a high integrity safety system that controls risks associated with drivers over-speeding or exceeding the limit of their movement authority
- is available 'off the shelf' from multiple suppliers designing to common specifications
- is a mature technology with a large and rapidly growing user base
- is flexible in its application and can be overlaid, with minimal impact, to existing signalling systems and rolling stock
- will provide a major risk mitigation of the rail network's direct risks

- has a defined upgrade path to allow future functionality enhancements
- has the potential to enable future signalling changes which will deliver significant capacity benefits.

The NSW government response to the recommendations of the Waterfall Special Commission of Inquiry outlines its commitment to installing automatic train protection technology across the electrified rail network. As such, a 'do nothing' option was not considered a feasible alternative.

## 3. Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities.

### 3.1 The Proposal

The Proposal involves the installation of trackside signalling Infrastructure on the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4). The Proposal would take place at 34 locations along the railway line.

- The works at each ATP site comprise:
  - new track assets (i.e. controlled balises)
  - new signalling cabling
  - extension to existing signal cabinets and (if required) the installation of new cabinets to house ATP equipment.
- Figure 3-1 provides a schematic of the typical proposed works at each ATP site.
- The typical construction footprint at each ATP site would be around 40 metres long and 20 metres wide. Additional cabling extending beyond this footprint may be required for selected controlled balises. The site-specific footprint of each ATP site in Area 4 which has been assessed in this REF is shown in Appendix 3.

The new signalling cabling would connect to the existing 240 volt electricity network at each ATP site. All cabling would be located wholly within the rail corridor and underline crossings (ULXs) would be constructed to provide a crossing beneath the rail track where necessary.

- New track assets
- A balise would be mounted to the rail sleepers in the area between load bearing rails (referred to as the four foot) at locations where ceiling speed supervision and/or brake-to-target supervision is required. This is generally on the approach to a trackside signal. Depending on the type of sleeper (i.e. concrete or timber), the balise may be mounted using a combination of cable clips, vortex brackets or mechanical anchors. A series of balises are required at each ATP site and are spaced at intervals. Balises are categorised as infill, fixed or control balises depending on their proximity to the signal.
- It is noted the installation of fixed balises has been addressed in a separate environmental assessment and approval process and does not form part of this REF. Fixed balises which always send the same passive data (i.e. speed limit) are installed within the four foot and do not have any associated cabling activities.

#### **New signalling cabling**

Cables would connect the balises to a junction box which would be positioned adjacent to the track. These cables would be installed in elevated galvanised steel troughing or inside buried conduits. Other options for cable installation include pit and pipe, galvanised pipe or surface pipes.

Buried conduits can be installed by directional bores within or near the cess (the area immediately adjacent to the ballast shoulder). ULXs would be constructed to provide an underline crossing beneath the rail track where necessary. ULX depths can vary depending on site conditions. As a minimum, it is anticipated ULXs would be 1.8 metres from the top of the rail.

A combination of ULXs and above ground troughing may be used at each ATP site depending on the ground conditions and site access constraints. If existing troughing and pipes have sufficient spare capacity, the new signalling cabling would be installed in these facilities.

It is possible that supersucking, a form of non-destructive digging using pressurised water and a vacuum source, would be required at some ATP sites.

Cables from the ETCS junction box would terminate at a lineside electrical unit (LEU), which is housed in either in a signal cabinet (i.e. LOC), annex, bungalow or hut.

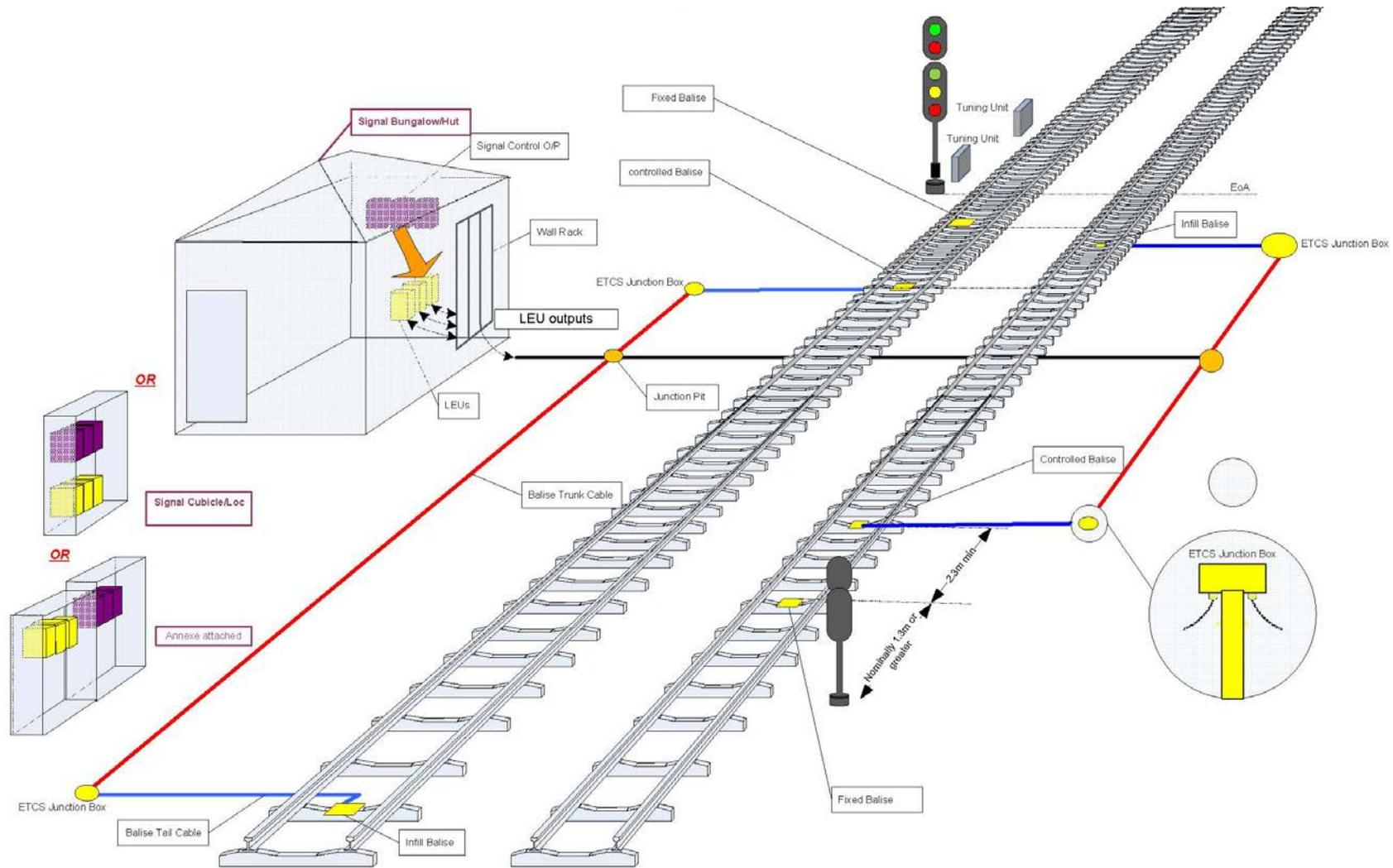
### **Signal cabinets**

Where space within the existing signal cabinet (i.e. LOC), bungalow or hut is constrained, a new signal cabinet would be installed or existing signalling cabinets would be extended by about six square metres to house the ATP equipment.

The new signal cabinet would generally be installed on a newly constructed concrete plinth adjacent to the slab of the existing signal cabinet. Alternatively, the new signal cabinet would be bolted to the existing cabinet.

ATP equipment housing would be fitted out with a LEU.

Where possible, the concrete plinths and cabinets would be pre-fabricated off site and delivered to the ATP sites in time for works to commence.



**Figure 3-1 Schematic of proposed works**

## 3.2 Construction methodology

### 3.2.1 Work methodology

The work methodology would involve the following stages:

- identify and mark up areas for stockpiling materials and segregating waste
- establish site access, including fenced off exclusion zones
- install erosion and sediment controls
- trenching and pit and pipe work (if required)
- install new signal equipment
- test all equipment prior to commissioning
- clear the work sites of any remaining construction plant or materials.

### 3.2.2 Plant and equipment

The following plant and equipment is likely to be used for the works:

- Supersucker
- Excavator (7 tonne) for excavation as well as rock breaking where required
- Hand and power tools
- Bobcat
- Compactor
- Generator
- Boring equipment
- Front end loader (5 tonne).

### 3.2.3 Timing

Construction of the Proposal is expected to commence in late 2017 and continue for about 18 months.

Main civil and structural construction works at each ATP site would be complete within around three weeks. Testing and commissioning of the newly installed system would commence following completion of civil and structural construction works.

The construction team would complete civil works at each ATP site prior to progressing to the next location.

Works would generally be scheduled to take place during standard working hours:

- 7.00am to 6.00pm Monday to Friday
- 8.00am to 1.00pm Saturday
- No work on Sunday or public holidays.

However, due to access constraints and the requirement for a safe working site, some works may be undertaken outside standard working hours and during scheduled track possessions. This includes installation of track assets (i.e. controlled balises).

If works, other than the installation of track assets, is required outside the standard working hours, further approval would be obtained and the affected community would be advised, in accordance with the TfNSW *Construction Noise Strategy* (7TP-ST-157).

### **3.2.4 Site access and storage of materials**

Access to the work sites would be via existing railway corridor access gates and access tracks. Access gates are locked at all times except for site deliveries and access / egress by site staff. Distance from the access gates to the work sites can range between 5 metres and 90 metres.

The construction process would require an average of 10 to 20 vehicle movements and a team of 5 to 15 people on site per day.

Temporary site storage areas would be established in cleared areas within the ATP site footprint.

Amenities such as portable toilets may be provided at some work sites where there is adequate space and suitable access.

## **3.3 Operations, management and maintenance**

The operation of the new signalling system would commence following the installation and commissioning of the train mounted system.

Sydney Trains or its appointed contractor would maintain the system. Maintenance would be undertaken in accordance with Sydney Trains standards.

## 4. Statutory considerations

Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government policies/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

### 4.1 Ecologically sustainable development

TfNSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD).

The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the *Environmental Planning and Assessment Regulation 2000* as:

- the precautionary principle: if there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation
- intergenerational equity: the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity: the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival
- improved valuation, pricing and incentive mechanisms: environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the ATP Project. The principles for ESD would be facilitated through the application of a range of environmental management tools such as the implementation of the construction environmental management plan and adherence to the TfNSW environmental management system. Table 4-1 identifies how the Proposal complies with the principles of ESD.

**Table 4-1 ESD principles and how they relate to the Proposal**

Principle	Compliance
Precautionary principle	There are no threats of serious or irreversible damage posed by the Proposal. The ATP sites are generally within a previously disturbed area in the rail corridor.  All of the environmental risks have been carefully considered through the preparation of this REF and would be managed through the implementation of the construction environmental management plan. The plan is unlikely to be stalled by a lack of scientific certainty.
Intergenerational equity	The Proposal will help ensure that future generations have a safer, more comfortable and more reliable rail transport options.

Principle	Compliance
Biodiversity conservation and ecological integrity	Due to the highly modified nature of ATP sites along the rail corridor, no areas of biodiversity or ecological significance are anticipated to be encountered. However, construction of the Proposal would be undertaken in accordance with a CEMP and location specific ECMs which would ensure the biodiversity conservation and ecological integrity of the receiving environment is retained.
Improved valuation and pricing of environmental resources	The REF has examined all of the environmental impacts associated with the Proposal and has recommended mitigation measures for the identified environmental risks that may result. The management of these risks has been factored into the overall budget allocation for the project, hence demonstrating that environmental resources have received appropriate valuation in the context of the Proposal.

## 4.2 NSW Government policies and strategies

In addition to statutory requirements, a number of NSW Government policies and strategies are relevant to the Proposal. Table 4-2 summarises the NSW Government policies and strategies applicable to the Proposal.

**Table 4-2 Relevant NSW Government policies/strategies**

Policy/Strategy	Commitment	Comment
<b>State Priorities – NSW: Making It Happen (NSW Government, 2015)</b>	<p>In September 2015, the NSW Government announced a series of State Priorities as part of <i>NSW: Making It Happen</i> (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. <i>NSW: Making it Happen</i> focuses on 12 key ‘priorities’ to achievement the NSW Government’s commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.</p> <p>One of the 12 priorities identified as part of <i>NSW: Making It Happen</i> relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.</p>	The Proposal would support the objective of improving the reliability of the public transport network.

<b>Policy/Strategy</b>	<b>Commitment</b>	<b>Comment</b>
<b>NSW Long Term Transport Master Plan</b>	<p>In December 2012, the NSW Government released the NSW Long Term Transport Master Plan. The Plan brings together land use planning with transport planning, and integrated planning for freight and passenger movements across all modes of transport.</p> <p>The Plan responds to the transport challenges of NSW through four types of actions:</p> <ul style="list-style-type: none"> <li>▪ integrate transport services</li> <li>▪ modernise our system</li> <li>▪ growing our networks to meet future demand</li> <li>▪ maintain important road and public transport assets.</li> </ul>	<p>The Proposal would be consistent with the NSW Long Term Transport Master Plan as it would modernise and support the growth of the network.</p>
<b>Sydney's Rail Future</b>	<p>Sydney's Rail Future, released in June 2012, is a plan developed to transform and modernise Sydney's rail network so that it can grow with our future population.</p> <p>The plan is an integral part of the NSW Long Term Transport Master Plan.</p>	<p>The Proposal would support the plan for Sydney's Rail Future. The plan specifically identifies the ATP Project as an important technological advancement to support faster, more reliable train services.</p>
<b>Draft Metropolitan Strategy for Sydney to 2031</b>	<p>In 2013, the NSW Government released the draft Metropolitan Strategy for Sydney to 2031 for consultation.</p> <p>The draft Strategy identifies nine key 'city shapers' that will play an important role in shaping the future growth of Sydney.</p> <p>The draft Strategy has been aligned with the NSW Long Term Transport Master Plan.</p>	<p>The Proposal would be consistent with the draft Metropolitan Strategy by ensuring the ongoing safe and efficient operation of the rail network, supporting the growth of Sydney.</p>

## 4.3 NSW legislation and regulations

### 4.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Part 5 of the EP&A Act. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

In accordance with section 111 of the EP&A Act, TfNSW, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely, and as a consequence an environmental impact statement is not required, nor is the approval of the Minister for Planning.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Part 5 of the EP&A Act has a significant impact on the environment. Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

### 4.3.2 Other NSW legislation and regulations

Table 4-3 provides a list of other relevant legislation applicable to the Proposal.

**Table 4-3 Other relevant legislation applicable to the Proposal**

Applicable legislation	Considerations
<i>Heritage Act 1977</i>	<p>Section 57(1) of the <i>Heritage Act 1977</i> (Heritage Act) lists the types of activities/works that require approval from the Office of Environment and Heritage (OEH) Heritage Division when working on/in an item/place listed on the State Heritage Register (SHR). An application for an exemption can also be made under some circumstances. Approval from the Heritage Division is also required under Section 139 of the <i>Heritage Act 1977</i> prior to the disturbance or excavation of land if a project will, or is likely to result in, a relic being discovered, exposed, moved, damaged or destroyed.</p> <p>The Proposal involves works within or near items listed on the SHR, Sydney Train's section 170 Heritage and Conservation Register, the Kogarah Local Environmental Plan (LEP), the Hurstville LEP and the Sutherland Shire LEP. Given the disturbed nature of the rail corridor and limited excavation required, it is unlikely that the proposed works would affect any known or unknown archaeological items of heritage significance.</p> <p>Where works are located within the curtilage of items listed on the SHR and no adverse impact on the heritage significance of these items is expected as a result of the proposed works, an application would be submitted to Sydney Trains to obtain an exemption under s57(2) of the <i>Heritage Act</i>. Where works may adversely affect the heritage significance of item listed on the SHR, an application would be submitted to the OEH Heritage Division.</p> <p>More information on heritage is included in Section 6.6.</p>

Applicable legislation	Considerations
<p><i>National Parks and Wildlife Act 1974</i></p>	<p>The excavating, moving or exhibiting of Aboriginal objects requires a permit under Section 87 of the <i>National Parks and Wildlife Act 1974</i> (NPW Act). The harming or desecrating of Aboriginal objects or places is an offence under Section 86 of the NPW Act. Under Section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or people.</p> <p>There are no Aboriginal objects or places known to occur in the immediate vicinity of the ATP sites in Area 4 and no known items or places would be affected by the proposed work. A search of the Aboriginal Heritage Information Management System (AHIMS) confirmed that there are two Aboriginal sites located between 25 metres and 200 metres of ATP Area 4 site 1049 and 1085. These Aboriginal sites are located outside the rail corridor. Given the disturbed nature of the rail corridor, impacts on Aboriginal heritage are not expected. Safeguards have been proposed to address circumstances if an unexpected find occurs.</p> <p>All native birds, reptiles, amphibians and mammals, except the dingo, are protected in NSW under the NPW Act. The harming of protected fauna is prohibited under the NPW Act, but an exemption applies in relation to things that are essential to the carrying out of an activity to which Part 5 of the EP&amp;A Act applies and where the determining authority has complied with the provisions of that part.</p> <p>More information on Aboriginal heritage is included in Section 6.6.</p>
<p><i>Threatened Species Conservation Act 1995</i></p>	<p>The <i>Threatened Species Conservation Act 1995</i> (TSC Act) is directed at conserving threatened species, populations and ecological communities of animals and plants.</p> <p>A number of threatened species, populations and endangered ecological communities occur in the vicinity of the Proposal (i.e. Bynoe's wattle <i>Acacia Bynoeana</i>), Grey Headed Flying Fox (<i>Pteropus poliocephalus</i>) and Koala (<i>Phascolarctos cinereus</i>).</p> <p>Potential impacts to all threatened species, populations, endangered ecological communities which occur in the vicinity of the Proposal would be minimised through a hierarchy of controls outlined in Section 6.4.3 which includes consideration of the TSC Act and approval(s) from TfNSW.</p> <p>Section 6.4 provides further information about the biodiversity constraints associated with the proposal.</p>
<p><i>Native Vegetation Act 2003</i></p>	<p>The <i>Native Vegetation Act 2003</i> (NV Act) regulates the clearing of native vegetation on land in NSW except for excluded land which includes national parks, state forests and urban areas. Section 25(g) of the NV Act provides that any clearing that is part of an activity that is permissible without consent does not require approval under the Act.</p> <p>It is unlikely clearing of native vegetation would be required for the Proposal (refer to Section Table 6-4). Hence, no further consideration of the NV Act is required.</p>

Applicable legislation	Considerations
<i>Protection of the Environment Operations Act 1997</i>	The <i>Protection of the Environment Operations Act 1997</i> (POEO Act) provides a licensing framework for certain activities as defined in Schedule 1 of the POEO Act. The Proposal is not considered to fall within the definition of Section 33 ‘Railway systems activities’ of Schedule 1. As such, the Proposal does not require an environment protection licence (EPL) under the POEO Act.
<i>Roads Act 1993</i>	Under Section 138 of the <i>Roads Act 1993</i> , a person must not “erect a structure or carry out a work in, on or over a public road, or dig up or disturb the surface of a public road...” other than with the consent of the appropriate roads authority. However, clause 5(1) in Schedule 2 of the Act states that public authorities do not require consent for works on unclassified roads.  The Proposal does not require any work to be undertaken in, on or over a classified road. Therefore, approval from Roads and Maritime Services (RMS) would not be required.
<i>Crown Lands Act 1987</i>	The proposed work would not be undertaken on crown land and the provisions of this Act are not applicable to the Proposal.

## 4.4 Environmental planning instruments

### 4.4.1 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal.

Clause 79 of the Infrastructure SEPP allows for the development of rail infrastructure facilities by or on behalf of a public authority without consent on any land. Clause 78 defines ‘rail infrastructure facilities’ as including ‘signalling, train control, communication and security systems’.

Consequently, development consent is not required, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Chapter 5 of this REF discusses the consultation undertaken in relation to the Proposal.

### 4.4.2 Other environmental planning instruments

Table 4-4 provides a list of other relevant environmental planning instruments applicable to the Proposal.

**Table 4-4 Other relevant environmental planning instruments applicable to the Proposal**

Applicable instrument	Considerations
<i>State Environmental Planning Policy No. 14 – Coastal Wetlands</i> (SEPP 14)	The Proposal is not located within an area covered by the SEPP and therefore no further consideration of SEPP 14 is necessary.

Applicable instrument	Considerations
<i>State Environmental Planning Policy No. 19 – Bushland in Urban Areas (SEPP 19)</i>	<p>This SEPP protects and preserves bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes.</p> <p>Hurstville, Kogarah (Hurstville and Kogarah now form Georges River Council) and Sutherland are listed in Schedule 1 as areas where bushland needs to be preserved. The proposed work would not require removal or disturbance to bushland on or adjacent to land reserved or zoned for public open space. Therefore no further consideration of SEPP 19 is required.</p>
<i>State Environmental Planning Policy No. 26 – Littoral Rainforests (SEPP 26)</i>	<p>The Proposal is not located within an area covered by the SEPP and therefore no further consideration of SEPP 26 is required.</p>
<i>State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)</i>	<p>Hurstville, Kogarah (Hurstville and Kogarah now form Georges River Council) and Sutherland are not listed in Schedule 1 as an area possessing habitat or feed trees for koalas and therefore no further consideration of SEPP 26 is required.</p>
<i>State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)</i>	<p>SEPP 55 provides for a consistent state-wide planning approach to the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. If contaminated land is encountered during the construction works a suitable remediation plan would be developed, if required.</p>
<i>State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71)</i>	<p>The Proposal is within the coastal protection zone designated in the Coastal Protection SEPP. Approval under this SEPP is not required as the SEPP relates to the development of local environmental plans and assessment of Part 4 development applications. The Proposal complies with the aims and matters for consideration of the SEPP. No further consideration of the SEPP is required.</p>
<i>State Environmental Planning Policy (Major Development) 2005</i>	<p>This SEPP identifies certain developments which are deemed major projects. The Proposal is not listed in this SEPP.</p>
<i>State Environmental Planning Policy (State and Regional Development) 2011</i>	<p>The Proposal is not listed in the SEPP and has not been declared as State Significant Infrastructure or State Significant Development under the SEPP.</p>
<i>State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011</i>	<p>The Proposal is in the Georges and Wollongong catchments which are not part of a drinking water catchment. This SEPP does not apply to the Proposal.</p>
<i>Kogarah Local Environmental Plan 2012</i>	<p>The Proposal is in the Georges River LGA and is subject to the Kogarah Local Environmental Plan 2012 (Kogarah LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure.</p> <p>Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

Applicable instrument	Considerations
<i>Hurstville Local Environmental Plan 2012</i>	<p>The Proposal is in the Georges River LGA and is subject to the Hurstville Local Environmental Plan 2012 (Hurstville LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure. Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>
<i>Sutherland Local Environmental Plan 2015</i>	<p>The Proposal is in the Sutherland Shire LGA and is subject to the Sutherland Local Environmental Plan 2015 (Sutherland LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure. Rail infrastructure is permissible with consent.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

## 4.5 Commonwealth legislation

### 4.5.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix 2.

The Proposal would not impact on any matters of NES or on Commonwealth land. Therefore a referral to the Commonwealth Department of the Environment and Energy is not required.

## 5. Stakeholder communication

Chapter 5 discusses the information that will be provided to the community on the Proposal both during the planning approval process and during construction.

### 5.1 Communication approach

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for community feedback to influence project deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the ATP Project and any likely resulting impacts during construction.

The communication approach being implemented for the ATP Project has also been developed having regard for the requirements of the planning process.

The following principles for the Proposal would be adopted:

- generally raising awareness of the Proposal through notifications, site signage, door knocks, advertisements in local newspapers and directing interested stakeholders to the Transport for NSW website
- ensuring that up to date information about the Proposal is available on the Transport for NSW website
- making information available about the appropriate planning processes being followed compliant with legislative requirements
- responding to and recording any enquiries and interactions from the community regarding the Proposal
- ensuring a transparent approach.

## 5.2 Consultation requirements

Table 5-1 provides details of consultation requirements under the Infrastructure SEPP.

**Table 5-1 Infrastructure SEPP consultation requirements**

Clause	Clause particulars	Relevance to the Proposal
<b>Clause 13   Consultation with Councils – development with impacts on council related infrastructure and services</b>	Where railway station works: <ul style="list-style-type: none"> <li>▪ substantially impact on storm water management services</li> <li>▪ place a local road system under strain</li> <li>▪ involve connection to or impact on a council owned sewerage system</li> <li>▪ involve connection to and substantial use of council owned water supply</li> <li>▪ significantly disrupt pedestrian or vehicle movement</li> <li>▪ involve significant excavation to a road surface or footpath for which Council has responsibility.</li> </ul>	The proposed works are considered to be minor and should not have an impact on council related infrastructure or services.
<b>Clause 14   Consultation with Councils – development with impacts on local heritage</b>	Where railway station works: <ul style="list-style-type: none"> <li>▪ substantially impact on local heritage item (if not also a State heritage item)</li> <li>▪ substantially impact on a heritage conservation area.</li> </ul>	The proposed works are not expected to have a substantial impact on local heritage items or heritage conservation areas.
<b>Clause 15   Consultation with Councils – development with impacts on flood liable land</b>	Where railway station works: <ul style="list-style-type: none"> <li>▪ impact on land that is susceptible to flooding – reference would be made to <i>'Floodplain Development Manual: the management of flood liable land'</i>.</li> </ul>	The proposed works are not expected to impact on flood liable land or change flood patterns.
<b>Clause 16   Consultation with public authorities other than Councils</b>	Where development is identified as 'specified development' (i.e. adjacent to land reserved under the NPW Act or within the foreshore area identified in the Sydney Harbour Foreshore Authority Act), the relevant agency should be consulted.	The Proposal would be located adjacent to the Royal National Park and Heathcote National Park. Consultation with National Parks and Wildlife Service is required.

### 5.3 Communication activities

Table 5-2 identifies the communication activities intended to be undertaken during the planning, construction and commissioning phase of the Proposal.

**Table 5-2 Communication activities**

<b>Project phase</b>	<b>Communication tool or activity</b>	<b>Timeframe</b>
Planning	Establish a 1800 number for any enquiries and complaints related to the Proposal and log these interactions in a register.	Prior to REF determination
Construction	Install signage at each of the access gates identifying that works being undertaken as part of the Proposal and timeframe for delivery.	Prior to construction commencement
	Maintain the 1800 number for any enquiries and complaints related to the Proposal and log these interactions in a register (Consultation Manager).	Throughout construction phase
	Use a variety of communication tools such as letter box notifications, door knocks and website updates to keep stakeholders informed of construction activities.	Throughout construction phase
Commissioning	Update information on the website to reflect completion of the Proposal including overall benefits of work undertaken.	At completion

## 6. Environmental impact assessment

Chapter 6 of the REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

To determine the likely impact of the Proposal, a preliminary environmental risk assessment has been undertaken for each proposed ATP site in Area 4. The preliminary environmental risk assessment has been undertaken for the following environmental issues:

- water quality / hydrology
- acid sulfate soils
- biodiversity
- noise
- heritage
- contamination
- land use
- traffic and access.

A number of other environmental issues, such as air quality and waste, would generally pose the same potential risk at each proposed ATP site in Area 4. As such, these issues have not been included in the risk assessment. The potential risk and likely impact of these issues are discussed in the relevant section and appropriate standard mitigation measures have been identified to be implemented at all ATP sites in Area 4.

The risk assessment has identified whether the works at the proposed ATP sites in Area 4 would present no impact or a low, medium or high risk of impact for the relevant environmental issue. The risk has been determined based on proximity to a sensitive waterbody, heritage item and /or residential property as well as the occurrence of actual or potential acid sulfate soils, threatened species and/or communities and contamination. A copy of the risk assessment criteria which was used to guide the risk classification at each ATP site in Area 4 is provided in Appendix 4.

The results of the preliminary environmental risk assessment are provided in Table 6-1.

Where a high risk has been identified at an ATP site in Area 4, a site-specific assessment has been provided in the relevant section. Where required, appropriate site-specific mitigation measures have been identified to be implemented at these ATP sites.

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at Appendix 1.

**Table 6-1 Preliminary environmental risk assessment**

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
903	SM903 I SM 905 IL	Low	Low	Low	Medium	Medium	Low	Low	Low
909	SM911 IL	Low	Low	Low	Low	Low	Low	Low	Low
915	SM917 UI SM919 DIL SM921 UIL	Low	Low	Low	Low	Medium	Low	Low	Low
927	SM929 UI SM931 DIL SM933 UIL	Low	Low	High	Low	Medium	Low	Low	Low
934	SM938 UI SM940 IL	Low	Low	High	Low	Medium	Low	Low	Low
947	SM946 DI SM948 UI SM949 UI	Low	Low	High	Low	Medium	Low	Low	Low
952	SM954 UI	Low	Low	High	Low	Medium	Low	Low	Low
1001	SM956 DI SM958 UI SM1001 DI SM1003 UI	Low	Low	High	Low	High	Low	Low	Low
1005	SM1005 DI SM1010 UI	Low	Low	High	Medium	Low	Low	Low	Low
1009	SM1009 DI	Low	Low	Low	Medium	High	Low	Low	Low
1013	SM1044 DI	Low	Low	Low	Medium	High	Low	Low	Low

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
1049	SM1049 DI SM1051 UI	Low	Low	Low	Low	High	Low	Low	Low
1052	SM1052 DI SM1054 UI	Low	Low	Low	Low	Medium	Low	Low	Low
1055	SM1055 DI	Low	Low	Low	Low	Low	Low	Low	Low
1066	SM1064 UI SM1066 UI	Low	Low	Low	Low	Low	Low	Low	Low
1085	SM1085 DI	Medium	Low	Low	Low	Medium	Low	Low	Low
SD 11	SD11 DI SD13 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 17	SD17 DI SD19 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 31	SD31 SC SD33 DI SD35 UI SD42 SCU SD52 DI SD54 UI	Low	Low	Low	Low	High	Low	Low	Low
SD 57	SD57 DI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 66	SD66 UI	Low	Low	Low	Low	Medium	Low	Low	Low
SD 72	SD72 UI	Low	Low	Low	Low	Low	Low	Low	Low
SD 76	SD76 UI	Low	Low	High	Low	High	Low	Low	Low
17.5	17.4	Low	Low	Medium	Low	Medium	Low	Low	Low

Signal cabinet / LOC / hut (referred to as the ATP Area 4 Site Name hereafter in this REF)	Signals	Water quality / hydrology	Acid Sulfate Soils	Biodiversity	Noise	Heritage	Contamination	Land use	Traffic and access
CA 3	CA3	Low	Low	Low	Low	Medium	Low	Low	Low
CA 5	CA5	Low	Low	Low	Low	Low	Low	Low	Low
21.7A	W79	Low	Low	Medium	Low	Medium	High	High	Low
W1	W1	Low	Low	Medium	Low	Medium	Low	High	Low
W3	W3	Low	Low	Medium	Low	Medium	High	High	Low
W6	W4 W6	Low	Low	Medium	Low	Medium	High	High	Low
W7	W7	Low	Low	Medium	Low	Medium	Low	High	Low
Waterfall RR (WRR)	W17 W19 W23	Low	Low	Medium	Low	Medium	Low	Medium	Low
W22	W20	Low	Low	High	Low	Medium	High	High	Low
W26	W26 U W28 D	Low	Low	Medium	Low	Medium	Low	High	Low

## 6.1 Landforms, geology and soils

### 6.1.1 Existing environment

The Eastern Suburbs and Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4) has one major crossing at the Georges River. The elevation ranges from less than 10 metres at Arncliffe to around 220 metres at Waterfall. The topography is generally flat at each of the ATP sites in Area 4.

The geology throughout the Proposal area comprises Hawkesbury Sandstone and Ashfield Shale north of the Georges River and Hawkesbury Sandstone and rock from the Liverpool Subgroup to the south of the river.

There is a low risk of encountering Potential Acid Sulfate Soils (PASS) in the Proposal area. PASS are soils rich in iron sulphides (pyrite). If these soils are brought into contact with oxygen, oxidation occurs and they become Acid Sulfate Soils (ASS) which are highly acidic. A review of the Acid Sulfate Soil (ASS) Risk mapping indicates there is an extremely low to low probability of encountering ASS at all ATP sites in Area 4. The ASS Risk Maps include the following details:

- probability of occurrence of acid sulfate soil
- depth to acid sulfate soil
- environmental risk associated with disturbing the soil
- the landform element on which the soil occurs.

### 6.1.2 Potential impacts

Where space is available, existing conduits or GST would be used for the signal cabling works. Where space within existing cabling conduits or GST are not available, the signal and signal cabinet would be connected using underground cables installed in 0.3 metre wide trench at a depth of 0.6 metres. Land disturbance may also be required at ATP Area 4 sites to install new signalling cabinets where space is not available within existing cabinets. In general, up to 20 square metres of land would be disturbed at each ATP site in Area 4 during construction of the Proposal.

Excavated soil and rock for any cable trenching would be temporarily stockpiled on site and backfilled upon completion, provided it is not contaminated or weed infested.

Where trenching is difficult to undertake in rocky terrain, rock breaking may be required.

Trenching activities may result in erosion if appropriate mitigation measures are not in place. Soil erosion has the potential to destabilise landforms and deposit sediments in drainage systems and waterways. Sediment deposition and fine particles in suspension within waterways have direct impact on water quality and aquatic life.

As noted in Section 6.1, there is an extremely low to low probability of encountering ASS at all ATP sites in Area 4. In the unlikely event ASS are encountered and not appropriately controlled, the acid generated by ASS could lead to fish kills in nearby waterways and/or longer term degradation of buried rail assets such as cable conduits.

Given the site characteristics and the scope and size of the proposed site footprint, it is anticipated that erosion and sediment risks are minimal and can be effectively managed through the implementation of standard measures as outlined in the *Managing Urban Stormwater: Soils and Construction Guidelines* (the Blue Book) (Landcom 2004).

No operational impacts are expected.

### **6.1.3 Mitigation measures**

Site specific erosion and sediment control measures will be identified as part of CEMP/ECM. The proposed erosion and sediment control measures will be implemented in accordance with *Managing Urban Stormwater Soils and Construction* (Landcom 2004) (the Blue Book) and the *Acid Sulfate Soils Manual* (ASSMAC 1998) (if required) and would include, but not be limited to, those outlined below:

- Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains
- Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site
- Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion
- Disturbed areas would be reinstated as soon as possible
- If PASS is encountered during excavation works an ASS Management Plan must be prepared (as part of the CEMP) and alternative routes for trenching considered.

## **6.2 Water quality and hydrology**

### **6.2.1 Existing environment**

The Eastern Suburbs & Illawarra Line (Area 4) crosses the Georges River between ATP Area 4 site 1066 and 1085 (refer Figure 1-1). The rail corridor is part of the Georges and Wollongong catchments.

Track drainage and runoff generally discharges into bushland and nearby creeks, and into existing culverts in urban areas.

The existing drainage system within the railway corridor consists of an informal arrangement of pit and pipe and outfall points to stormwater. Overland flows from adjoining properties generally pass beneath the ballasted areas via culverts and buried pipes.

Existing shelters above signal cabinets and bungalows are located at a number of ATP sites in Area 4. Rainwater runoff from these shelters discharges to the ground and does not present a risk to local water quality.

Based on the available flood mapping covering the Proposal area, no ATP sites in Area 4 are located in flood planning areas. However, ATP Area 4 site 1085 is within 40 metres of the Georges River and may be flooded during an extreme flood event.

ATP sites in Area 4 within 50 metres of a waterway are listed in Table 6-2.

**Table 6-2 ATP sites in Area 4 within 50 metres of major waterways**

ATP Area 4 Site Name	Area/suburb	Waterway	Comments (Metres(m))
1085	Como	Georges River	Located about 40m south of Georges River

### 6.2.2 Potential impacts

Without appropriate safeguards, contaminants such as fuels and hydraulic oils from plant and equipment may reach nearby drains and discharge into local waterways. These contaminants may have the potential to harm aquatic life and affect the quality of water downstream. However, the risk of such an occurrence is generally low, given the distance between the proposed ATP sites in Area 4 and drains and creeks. ATP Area 4 site 1085 has been classified as medium risk from a water quality perspective due its proximity to the Georges River and potential to be impacted during an extreme flood event.

During excavation works there is the potential for sediment-laden water to be discharged into local water bodies and/or the nearby stormwater system during a rainfall event. Rain or groundwater may enter trench excavations. If inappropriately managed, sediment-laden water could be discharged into local water bodies and/or the nearby stormwater system.

No operational impacts are expected. The works would not affect the landform or the flow of water in the area.

### 6.2.3 Mitigation measures

During construction water quality impacts would be minimised through a range of control measures in addition to the erosion and sedimentation controls included in Section 6.1. The water quality measures would include, but not be limited to those outlined below:

- Erosion and sediment controls at each worksite would be detailed on the ECM and comply with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) (the Blue Book)
- Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall
- The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required
- Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks
- Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways
- Concrete slurries and wash-out would be collected for reuse or for off-site disposal
- Appropriately sized spill response kits must be kept on site and staff trained in their use
- Earthworks would be suspended during periods of heavy or prolonged rainfall. Plant and equipment would be removed where there is a high risk of inundation
- Dry street sweepers or hand-held brooms would be used to clean local roads in the event of tracked sediment

- Works are to be undertaken in accordance with the TfNSW *Chemical Storage and Spill Response Guidelines* (9TP-SD-066)
- Water discharge must be carried out as per TfNSW *Water Discharge Guidelines* (7TP-SD-024).

## **6.3 Air quality**

### **6.3.1 Existing environment**

The local air quality along the rail corridor between Arncliffe, Waterfall and Cronulla (Area 4) is typical of an urban/rural environment. The urban area is largely influenced by transport, industrial, commercial and domestic sources. The rural areas consist of large areas of bushland likely to have relatively good air quality.

### **6.3.2 Potential impacts**

There is a risk of impact on local air quality during the following activities, particularly during warm and dry weather:

- stockpiling of virgin and spoil materials
- excavation of trenches
- backfilling of trenches
- transporting of wastes
- plant movement on access
- emissions from plant and machinery.
- No dust or emissions are anticipated during the operation of the ATP Project.

### **6.3.3 Mitigation measures**

Air quality impacts throughout construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- Plant and equipment would be maintained in accordance with manufacturers' specifications
- Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently
- Plant or machinery would not be left idling
- All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours
- Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust
- Trucks transporting spoil and other waste materials would be covered appropriately
- Disturbed areas would be rehabilitated as soon as practicable.

## 6.4 Biodiversity

### 6.4.1 Existing environment

The Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4) experienced significant disturbance during construction of the railway line. The Royal National Park and Heathcote National Park are adjacent to the corridor between Loftus and Waterfall. To the north of Loftus the rail corridor generally traverses urban, commercial and industrial areas.

A desktop review of Endangered Ecological Communities (EECs) and a search of the Office of Environment and Heritage (OEH) Wildlife Atlas and the EPBC Protected Matters Search Tool identified there are potentially 64 species of fauna, 20 species of flora, 10 endangered ecological communities and 13 migratory bird species listed as threatened under the EPBC Act and recordings of 85 threatened fauna species, 31 threatened flora species and 25 endangered ecological communities listed under the TSC Act in the broader study area (within five kilometres of the rail corridor).

Table 6-3 lists threatened species which have previously been recorded in the vicinity of the Proposal. Any vegetation disturbance has the potential to impact these species.

**Table 6-3 Threatened species**

ATP Area 4 Site Name	Threatened species	Conservation status	Proximity to site
927			
934			
947	Gosford wattle ( <i>Acacia prominens</i> )	TSC Act (Endangered population)	This endangered population is known to occur along the rail corridor at Penshurst (potentially within the rail corridor).
952			
1001			
1005			
947	Grey Headed Flying Fox ( <i>Pteropus poliocephalus</i> )	EPBC Act (Vulnerable) TSC Act (Vulnerable)	One individual is located outside the rail corridor around 45 metres north of the ATP site in Area 4.
SD76	Bynoe's wattle ( <i>Acacia Bynoeana</i> )	EPBC Act (Endangered) TSC Act (Vulnerable)	One individual adjacent to the rail corridor and site footprint.
W22	Koala ( <i>Phascolarctos cinereus</i> )	TSC Act (Vulnerable) EPBC Act (Vulnerable (combined populations of Qld, NSW and ACT))	Two records around 65 metres and 100 metres south of the site footprint.

Table 6-4 provides a list of EECs which have occur in the vicinity of the Proposal. These EECs are listed under the TSC Act, none are listed under the EPBC Act.

**Table 6-4 Endangered ecological communities**

ATP Area 4 Site Name	Endangered Ecological Community (EEC)	Distance to EEC	Within the rail corridor
W6		15m	Yes
W7	Swamp sclerophyll forest on coastal floodplain	130m	No
Waterfall RR		45m	No
W22		50m	No

The rail corridor is disturbed and is unlikely to provide suitable habitat for fauna species although selected fauna species may traverse the rail corridor or forage along the edges. A Koala(s) has been sighted around 65 metres south of W22 on the fringe of the rail corridor. Site surveys complete for the concept design phase have confirmed there is no suitable habitat available for this species in the site footprint.

There is potential for noxious weeds to occur at ATP sites in Area 4. Site surveys completed for the concept design phase identified weedy vegetation ATP Area 4 site 909, 1001, 1005 and 1055.

The preliminary environmental risk assessment (refer Table 6-1) classified ATP sites in Area 4 as high risk from a biodiversity perspective based on their proximity to Endangered Ecological Communities (EECs) or to threatened species (refer to Table 6-3 and Table 6-4).

#### 6.4.2 Potential impacts

All construction works would be carried out within the rail corridor, and predominantly in areas subject to regular slashing/clearing for ongoing track maintenance and access. The majority of the new assets would either be installed within or close to the ballasted rail track area or around the existing signals or signal cabinet/huts. Where possible, the new infrastructure would utilise existing conduits for power and signal connections. In circumstances where there is no additional capacity in existing conduits; preference would be given to installing galvanised steel troughing and if this is not possible, underground conduits to connect new assets would be excavated.

In circumstances where new underground conduits or crossings are required, the construction impact would be minimised through a hierarchy of controls outlined in the Section 6.4.3, particularly in the vicinity of any threatened species or endangered ecological community.

It is anticipated that due to the nature of works and location of construction footprint, no vegetation removal except for the clearing of grasses and weeds would be required. Should vegetation other than grass and weeds need to be trimmed or removed to support the construction of the Proposal, further approval would be obtained from TfNSW.

The Gosford wattle is known to occur along the railway corridor around the Penshurst area (OEH 2017). Construction works at ATP Area 4 site 927, 934, 947, 952, 1001 and 1005 has the potential to impact this endangered population. Site surveys undertaken for the concept design phase noted vegetation at these ATP sites was over grown (refer Figure 6-1 and Figure 6-2) and may require minor clearing. Any disturbance to vegetation in these areas has the potential to impact this species if the mitigation measures listed in Section 6.4.3 are not implemented.

A Grey Headed Flying Fox has been recorded around 135 metres away from ATP Area 4 site 947 outside the rail corridor. Although this is not a Grey Headed Flying Fox roosting area, trees in the area may provide a suitable foraging habitat. No vegetation which could provide suitable foraging habitat would be disturbed, consequently impacts to this species are not expected.

Bynoe's wattle has been recorded around 40 metres away from ATP Area 4 site SD 76 outside the rail corridor. As this species is located outside the rail corridor and no vegetation removal except for the clearing of grasses and weeds is required impacts to this species are not expected.

A Koala(s) has been recorded around 65 metres away from ATP Area 4 site W22 on the fringe of the rail corridor (refer Appendix 3: Area 4 site location plans). Vegetation in the rail corridor is highly disturbed and site surveys complete for the concept design phase have confirmed suitable habitat for this species is not present in the site footprint.

Other native fauna is unlikely to be impacted by the proposed works, although there is a low risk that animals could potentially fall into an open trench and become trapped or injured.

As noted in Table 6-4, EEC's have been identified in the vicinity of some ATP sites in Area 4. Some of these EECs are located inside the rail corridor and adjacent to the site footprint. As no vegetation removal except for the clearing of grasses and weeds is required impacts to these EECs are not expected.

Trimming of EECs may be required along the access track to ATP Area 4 site W7 to ensure plant, vehicles and/or equipment can safely access the work area. Any trimming activities are expected to be minor and are not expected to significantly impact any fauna habitat. The desktop review (refer Section 6.4.1) identified the access track to W7 is adjacent to an EEC, hence there is potential for direct and/or indirect impacts on the EEC if trimming activities are required.

There is a low risk of damage to other stands of existing vegetation due to stockpiling of materials or vehicle movements. Appropriate control measures, such as fencing, would be installed to ensure the risk of damage to existing vegetation is minimised.

It is likely, that if not controlled correctly, the proposed works could cause the spread of weeds. Weed removal would be required at ATP Area 4 site 909, 1001, 1005 and 1055 (refer to Figure 6-1 and Figure 6-2). Any vegetation removal would be assessed by an ecologist to ensure any identified noxious weeds are removed appropriately.

No operational impacts are expected.



**Figure 6-1 ATP Area 4 site 1005 – overgrown vegetation**



**Figure 6-2 ATP Area 4 site 909 – overgrown vegetation**

### 6.4.3 Mitigation measures

Impacts on flora and fauna throughout construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- If threatened and/or protected flora or fauna species are identified, work in the vicinity of the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW's Environmental Officer, and advise on species management
- Construction staff would be made aware of the ecological constraints and the requirements for no impact to any vegetation at following ATP Area 4 sites. This information would be included on the location specific ECMs and would be marked as "no go zones":
  - **ATP Area 4 site SD 76:** Bynoe's wattle adjacent to the site footprint
  - **ATP Area 4 site W6 and W7:** Swamp sclerophyll forest on coastal floodplain EEC located adjacent to the access track
  - **ATP Area 4 site W22:** Koala Black recorded 65 metres and 100m south
- **ATP Area 4 sites 927, 934, 947, 952, 1001 and 1005:** Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Gosford wattle. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment and approvals would be undertaken by TfNSW.
- The site would be inspected for any trapped or injured fauna at the start of each day
- Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed
- Construction areas should be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation
- Stockpiles, plant, equipment and materials storage are to be located on existing cleared lands away from the drip zone of trees or other native vegetation
- Weeds shall be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse
- Piles of cleared vegetation should be mulched as soon as practicable after clearing and mulch reused where possible
- Vehicle turning circles and parking areas shall be clearly marked and should occur in areas free of native vegetation
- Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site
- Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets
- Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible
- Following confirmation of the detailed design where disturbance to vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey to establish the presence of any threatened

flora and fauna species and/or communities. Where a threatened species and/or communities is identified, further assessment would be undertaken to consider the likely impacts, for the approval of the TfNSW Principal Manager Environmental Impact Assessment

- Any trees requiring removal, trimming or pruning must be assessed and approved for removal using the TfNSW *Application for Removal or Trimming of Vegetation (9TP-FT-078)*
- All cleared vegetation (if any) shall be offset in accordance with TfNSW's *Vegetation Offset Guide (9TP-SD-087)*
- Management in accordance with TfNSW's guidelines, as applicable:
  - Fauna Management Guideline (3TP-SD-113)
  - Vegetation Management Guidelines (9TP-SD-111)
  - Weed Management and Disposal Guideline (3TP-SD-110).

## 6.5 Noise and vibration

### 6.5.1 Existing environment

The works at each ATP site in Area 4 would take place within the railway corridor which is surrounded by rural, residential, commercial and industrial land uses. Residential receivers are located from Allawah to Heathcote and at Waterfall. The noise environment in the surrounding areas is generally dominated by rail noise, road noise and industrial/commercial sources. The distance of the ATP sites in Area 4 to the nearest residential receiver varies from around 10 metres to more than 750 metres (refer Table 6-5).

**Table 6-5 Summary of nearest residential receiver to each ATP site in Area 4**

ATP Area 4 Site Name	Suburb	Nearest residential receiver (m)	Other comments
909	Hurstville	10 to 25m	<ul style="list-style-type: none"> <li>▪ ATP Area 4 sites 909, 947, 1005, 1009, 1013, CA 3 and CA 5 are in urban areas with existing rail and traffic noise</li> <li>▪ ATP Area 4 site 1066 is in a suburban area with existing rail noise</li> <li>▪ Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
947	Penshurst		
1005			
1009	Mortdale		
1013	Oatley		
1066			
CA 3 CA 5	Cronulla		
903	Hurstville	25 to 50m	<ul style="list-style-type: none"> <li>▪ ATP Area 4 sites 903, 915, 1001, 1052, 1055 and SD 31 are in urban areas with existing rail and traffic noise</li> <li>▪ ATP Area 4 sites SD 66, SD 72 and SD 76 are in a suburban area with existing rail noise. All ATP Area 4 sites have screening</li> <li>▪ Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
915	Penshurst		
1001	Oatley		
1052			
1055	Sutherland		
SD31			
SD 66	Loftus		
SD 72			
SD 76			

ATP Area 4 Site Name	Suburb	Nearest residential receiver (m)	Other comments
927 934	Hurstville		<ul style="list-style-type: none"> <li>ATP Area 4 sites 927, 934, 952, SD 11 and SD 17 are in urban areas with existing rail and traffic noise</li> <li>ATP Area 4 site 17.5 and Waterfall RR are in a suburban area with existing rail noise</li> <li>Vegetation, fences and buildings screen some sections along the rail corridor, urban environment is surrounded by residential and some commercial properties</li> </ul>
952	Penshurst		
SD 11 SD 17	Sutherland	50 to 100m	
17.5	Loftus		
WRR	Waterfall		
1049 1085	Mortdale Como		
W6 W7 W22	Waterfall	100 to 200m	<ul style="list-style-type: none"> <li>ATP Area 4 site 1085 is located beside the Georges River, adjacent to bushland</li> <li>ATP Area 4 sites W6, W7 and W22 are surrounded by rural residential properties with existing road and rail noise</li> </ul>
SD 57 21.7A W1 W3 W26	Waterfall	200m or more	

## 6.5.2 Potential impacts

The *Interim Construction Noise Guideline* (ICNG) (DECC 2009) defines noise management levels (measured in decibels) for residential receivers and other types of receivers including commercial and industrial premises, places of worship and schools.

The ICNG states:

- Where the predicted or measured  $L_{Aeq, 15 \text{ min}}$  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 affected residents of the nature of works to be carried out, the expected noise levels and duration and contact details
- For works above the highly affected noise criteria, respite periods may be required, and for works outside standard hours there needs to be a strong justification and negotiation with the community (DECC 2009).

The ICNG introduces a qualitative method of construction noise assessment to simplify the identification of potential noise impacts, without complex predictions, for short-term works. Short-term works are defined as not likely to affect an individual or sensitive land use for more than three weeks.

The main civil and structural construction works at each ATP site in Area 4 is expected to be complete within three weeks. Construction noise would be generated during rock breaking (if required), supersucking and excavation associated with trenching and ULX construction. Following completion of civil construction works, testing and commissioning of the newly installed system would commence, this is expected to have a negligible noise impact.

The qualitative noise assessment methodology has been adopted for the Proposal due to the anticipated short-term nature of ATP construction works. The assessment uses the ATP construction noise estimation matrix which has been developed utilising inputs and guidance from the ICNG, *Australian Standard 2436 (AS2436) Guide to noise and vibration control on construction, demolition and maintenance sites* and *AS1055 Acoustics – Description and measurement of environmental noise General procedures*.

The qualitative construction noise assessment for the Proposal is provided in Table 6-5. This assessment evaluates key ATP construction activities based on distances to sensitive receivers, hours of works, construction methodology, plant and equipment and screening between the noise source and the receiver. These work activities have been assessed as they represent the worst case scenario (where rock breaking is not required) at each ATP site in Area 4. Rock breaking and ULX construction would not generally be required. However, if required, this would represent the worst case scenario.

The results presented Table 6-5 demonstrate construction works within 25 metres of suburban and urban areas with and without screening respectively and within 50 metres of a suburban area without screening present a moderate risk of noise impact. Accordingly their risk classification in the preliminary environmental risk assessment (refer Table 6-1) is noted as medium. All works at other ATP sites in Area 4 would present a low risk of noise impact (refer to Table 6-5). However, there is potential for noise impacts at locations where rock breaking and ULX construction is required. Where this is the case, surrounding receivers would be notified prior to the start of works.

Due to access constraints and the requirement for a safe working site, selected construction work may be undertaken outside standard working hours and during scheduled track possessions, although this would be minimised as far as practicable. These works would include the installation of track assets (i.e. controlled balises). It is unlikely high noise generating equipment would be required outside standard working hours and therefore it is unlikely work outside standard working hours would present a high risk of noise impact.

If works, other than the installation of track assets, is required outside the standard working hours, further approval would be obtained and the affected community would be advised, in accordance with the TfNSW *Construction Noise Strategy* (7TP-ST-157).

Vibration effects from the operation of heavy machinery, such as vibratory rollers or large earth moving equipment have the potential to cause structural disturbance or discomfort. The proposed work would not require the use of vibration-causing heavy machinery.

During operation, the ATP Project is not likely to increase noise or vibration within the rail corridor.

**Table 6-6 Qualitative Construction Noise Assessment**

Distance to nearest sensitive receiver		Approx. construction noise level at 7m, dB(A)		Noise screening or barriers		Ambient noise environment at receiver		Timing of construction work		Duration of construction work	
<i>Distance (m)</i>	<i>Rating</i>	<i>Category (refer AS2436)</i>	<i>Rating</i>	<i>Description</i>	<i>Rating</i>	<i>Description</i>	<i>Rating</i>	<i>Category</i>	<i>Rating</i>	<i>Duration</i>	<i>Rating</i>
<10	0	110dB(A) (e.g. rock breaking)	110	Receivers screened from effective noise source	-10	Quiet, rural, or isolated	-35	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	<1 hr	-20
10-25	-10	≥100dB(A) (e.g. bored piling, dump truck unloading)	100	Receivers not screened	0	Suburban	-45	Evenings / weekends (6pm – 10pm weekdays, 1pm – 10pm Sat, 8am – 10pm Sunday / public holidays)	10	<1 day	-10
25-50	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90			Urban or near busy roads or industrial activity	-55	Night (10pm – 7am weekdays, 10pm – 8am weekends / public holidays)	20	<1 week	-5
50-100	-22	≥80dB(A) (e.g. small generators, trucks, cherry pickers, pneumatic drill)	80							1 to 3 weeks	0
100-200	-28									> 3 and < 26 weeks	10
200-500	-34									>26 weeks	20
500-1000	-40										
>1000	-46										

Distance to nearest sensitive receiver		Approx. construction noise level at 7m, dB(A)		Noise screening or barriers		Ambient noise environment at receiver		Timing of construction work		Duration of construction work	
Distance (m)	Rating	Category (refer AS2436)	Rating	Description	Rating	Description	Rating	Category	Rating	Duration	Rating
ATP Area 4 Sites 10 to 25 metres from sensitive receivers	-10	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				
				Receivers screened from effective noise source	-10	Suburban	-45				
ATP Area 4 Sites 25 to 50 metres away from sensitive receivers	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				
				Receivers screened from effective noise source	-10	Suburban	-45				
				Receivers not screened	0	Suburban	-45				

**Impact / risk level ranges**

<b>Low: &lt;25</b>	Highly likely that noise mitigation will not be required, other than those identified above and if complaints “hot spots” have been considered
<b>Moderate: 25-35</b>	consider standard construction noise control measures as per the TfNSW Construction Noise Strategy (TTP-ST-157)
<b>High: 35+</b>	Inform community, implement all practical means to mitigate, >50 requires specialist noise study / advice

### 6.5.3 Mitigation measures

Construction works would adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as described in the ICNG and be carried out in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157). Control measures to minimise noise and vibration impacts would include, but not be limited to, those outlined below:

- Maximise the offset distance between noisy plant items and sensitive receivers
- Orient plant and equipment to minimise noise at sensitive receivers
- Avoid the simultaneous operation of two or more noise plant items in close vicinity and adjacent to sensitive receivers
- Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers
- Where necessary, use structures to shield sensitive receivers from noise sources
- Work, other than the installation of track assets, would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours: community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's *Out of Hours Works Application Form* (9TP-FT-079) in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157)
- Provide mitigation in accordance with the requirements of the TfNSW *Construction Noise Strategy* (7TP-ST-157) if high noise generating activities occur for extended periods
  - Noise complaints would be managed in accordance with TfNSW *Construction Noise Strategy* (7TP-ST-157). Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.
- In addition, residents within the main catchment area of ATP sites in Area 4 would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.

## 6.6 Heritage

### 6.6.1 Existing environment

A search for non-Aboriginal heritage items was undertaken by consulting the following databases: State Heritage Register (SHR), State Heritage Inventory, Kogarah LEP (which is now part of Georges River Council), Hurstville LEP (which is now part of Georges River Council), Sutherland LEP, Australian Heritage Database, (including Commonwealth Register of the National Estate), world heritage sites and Sydney Train's Section 170 Heritage and Conservation Register (Section 170 Register).

The heritage items and conservation areas with potential to be impacted by the Proposal are identified in Table 6-7. Where required, appropriate site-specific mitigation measures have been identified and are listed in Section 6.6.3.

A number of other heritage items and conservation areas are located adjacent to the Proposal. The Royal National Park and Heathcote National Park are within 10 and 15 metres respectively of the site footprints to the south of Loftus. The Penshurst Heritage Conservation Area is adjacent to ATP Area 4 sites 947, 934, 1001 and 952 and potential archaeological remains associated with former steam tramway office and street plantings of Port Jackson Fig and *Lophostemon confertus* (Brush Box) are adjacent to ATP Area 4 site SD 31 (refer to Appendix 3 ATP Area 4 site location maps). Given the proposed scope of works, there would be no impact on adjacent heritage items and as such these have not been identified below.

**Table 6-7 Heritage items located in the footprint of the proposed ATP sites in Area 4**

ATP Area 4 Site Name	Heritage item	Heritage listing	Heritage significance
1001	Penshurst Railway Station / Penshurst Railway Station Group	Hurstville LEP (Local) Section 170 Register	Penshurst Railway Station was constructed in 1905, the heritage listing includes the platform and weatherboard platform building, 1926 steel footbridge and stairs, and the brick overbridge. Penshurst Railway Station is of historical significance as its early 20th century structures demonstrate the development of the Illawarra Line in this period. Penshurst Railway Station is also of historical significance for its role as a transport hub for Penshurst since 1905.
1009, 1013, 1049	Mortdale Railway Station (including the car sheds)	Section 170 Register Kogarah LEP (Local) Hurstville LEP (Local)	Mortdale Railway Station is of historical significance as its early 20th century structures demonstrate the development of the Illawarra Line in this period and also for its role as a transport hub for Mortdale since 1922. The station is significant as a good example of Federation Queen Anne influenced railway station architecture. The Ellen Street underbridge constructed of brick has technical significance. In addition, one of the few power signal boxes which is still in use is near the station which adds to the significance.
SD 31	Sutherland Railway Station (including the bridge, retaining walls and Port Jackson Figs)	Section 170 Register Sutherland LEP (Local)	Sutherland Railway Station is of historical significance as an 1885 railway station rebuilt as part of the construction of the Cronulla line in 1939. Significant elements are platforms, platform buildings, out-of-room, tramway office and footbridge structure.
SD 76	Loftus Junction railway signal box	State Heritage Register	The junction box is the best surviving example of a signal box for a remote function from the Victorian period and is an important element of the South Coast Railway. The item includes the signal box and two drop-slab location huts.

ATP Area 4 Site Name	Heritage item	Heritage listing	Heritage significance
Waterfall RR	Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable)	Section 170 Register Sutherland LEP (Local)	The Waterfall railway residences and yard are significant as a group of structures dating from the period when Waterfall was a railway town servicing steam locomotives. The 1897 Waterfall railway residences are of historical significance as evidence of early 20th century railway operational requirements to accommodate railway staff on site. The 1908 turntable and 1905 water tank and water column are of historical significance as rare extant evidence of steam train technology at a major locomotive depot and are of technical significance as technology illustrative of the functioning of steam trains. The turntable is locally rare, being one of 3 turntables now extant on the Illawarra line.

A search for known Aboriginal heritage items was undertaken for the Proposal, (with a 100 metre buffer of the rail corridor between Arncliffe, Waterfall and Cronulla (Area 4)) using the Office of Environment and Heritage's Aboriginal Heritage Information Management System (AHIMS).

Two Aboriginal heritage sites are between 25 metres and 200 metres of ATP Area 4 site 1049 and 1085. These Aboriginal heritage sites are located outside the rail corridor. The works would be confined to a defined footprint within the rail corridor and would not impact any of the identified Aboriginal heritage items located outside the railroad corridor

The Proposal is located within the Metropolitan, La Perouse, Gandangara, Tharawal and Illawarra Local Aboriginal Land Council's (LALC).

### 6.6.2 Potential impacts

Proposed work at ATP Area 4 site SD 76 would be within the heritage curtilage of an item listed on the SHR (refer Table 6-7) and accordingly the environmental risk classification is noted as high (refer Table 6-1). The proposed works would involve trenching and the installation of trackside equipment. Where possible, works would be undertaken outside the curtilage of this SHR listed item.

Given the proposed scale of the works, the Proposal is not anticipated to have a significant impact on the Loftus Junction railway signal box which includes the signal box and two drop-slab location huts as identified in the heritage listings of the SHR items. No direct and/or indirect impact to the aesthetic significance or the historical significance of the heritage item is expected and proposed works would not result in any visual impacts. A heritage exemption under s.57(2) of the *Heritage Act 1977* would be obtained from Sydney Trains for all works within the curtilage of the SHR listed item.

The proposed works at ATP Area 4 sites 1001, 1009, 1013, 1049, SD 31 and Waterfall RR would be within the curtilage of locally significant heritage items listed under the Section 170 Register and Kogarah, Hurstville and Sutherland LEP (refer Table 6-7). The works are unlikely to result in any direct and /or indirect impacts to the heritage significance of these items. Consultation with Sydney Trains and the Georges River and/or Sutherland Shire Council would be undertaken prior to any works commencing at these locations.

The proposed works would not result in any visual impacts on heritage listed items adjacent to the Proposal.

There are no anticipated impacts on Aboriginal heritage as a result of the Proposal. Due to highly disturbed nature of the rail corridor, it is expected that the potential for items of Aboriginal heritage significance to be buried within the footprint of the ATP Area 4 sites across the Proposal is low.

### 6.6.3 Mitigation measures

Impact on heritage throughout construction would be minimised through a range of control measures, which would include, but not be limited to, those outlined below:

- **ATP Area 4 site SD 76:** Works would be within the heritage curtilage of the SHR listed Loftus Junction railway signal box. A Heritage exemption under s.57(2) of the *Heritage Act 1977* would be obtained from Sydney Trains prior to any construction commencing at this location
- **ATP Area 4 site 1001:** Works would be within the heritage curtilage of the locally significant Penshurst Railway Station / Penshurst Railway Station Group. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at this location
- **ATP Area 4 sites 1009, 1013 and 1049:** Works would be within the heritage curtilage of the locally significant Mortdale Railway Station and Car Sheds. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at these locations
- **ATP Area 4 site SD 31:** Works would be within the heritage curtilage of the locally significant Sutherland Railway Station. Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
- **ATP Area 4 site Waterfall RR:** Works would be within the heritage curtilage of the locally significant Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable). Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location
- If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted. TfNSW staff and the Office of Environment and Heritage (OEH) would be notified as required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes
- Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager and TfNSW staff would be notified immediately. The Office of Environment and Heritage would be notified in accordance with the *National Parks and Wildlife Act 1974*. The Local Aboriginal Land Council would be notified and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.

## 6.7 Waste

### 6.7.1 Overview

TfNSW is required to manage waste in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The waste hierarchy (Avoid, Reuse, Recycle, Energy Recovery and Disposal) should be followed for all projects.

### 6.7.2 Potential impacts

The main waste streams that may be generated during construction include:

- excavated material
- slurry from underbore arisings
- slurry from underbore arisings
- concrete
- steel
- wood
- vegetation
- packaging
- general litter including glass, plastic, metal and paper waste.

The volume of concrete waste is expected to be minimal as concrete plinths used for extending existing signal cabinets and bungalows would be pre-manufactured off-site, where possible, and transported to the ATP Area 4 sites when required.

No operational impacts are expected.

### 6.7.3 Mitigation measures

A Waste Management Plan would be prepared to detail waste types and quantities as well as methods for segregation, handling, storing and disposal. Furthermore, waste impacts would be minimised through a range of control measures, (consistent with the WARR Act) which would include, but not be limited to, those outlined below:

- All waste would be classified in accordance with the *Waste Classification Guidelines* (EPA 2014) and transported to a place that can lawfully accept the waste
- Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures
- Packaging would be minimised, where possible and where the safety and delivery of services is not compromised
- Wherever possible, suitable excavated material would be reused for backfilling, landscaping and other purposes
- Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste
- Any spoil or waste material tracked onto roads would be swept up immediately
- Adequate numbers of bins and waste containers would be placed available on site. The site manager would ensure bins are not overflowing and are appropriately covered
- Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal
- All waste would be removed when work is completed.

## 6.8 Contaminated land and hazardous materials

### 6.8.1 Existing environment

The proposed ATP sites in Area 4 have been initially investigated for potential land contamination. The investigation included:

- Site assessment
- Search of OEH register of contaminated sites
- Search of Sydney Trains records
- Review of all materials that would be used to establish their potential for land contamination.

Due to the historical and ongoing use of the rail corridor, the following potential sources of contamination may be present in the vicinity of the ATP sites in Area 4:

- Fuel and oil spills and engine emissions
- Rail corridor maintenance activities, such as application of pesticides and herbicides
- Brake linings
- Historical cables / pipework ducting and former site structures, with potential asbestos containing materials
- Fabric of old rolling stock
- Imported fill.

O'Donnell Griffin has undertaken a site survey for each proposed ATP sites in Area 4 and carried out a ballast contamination risk assessment. The following information was recorded during the assessments:

- Visual evidence of contamination
- Presence of hazardous building materials
- Waste materials
- Surrounding land use.

The following information sources were searched as part of the assessment:

- Hazardous sites register
- Contaminated land register
- Local knowledge
- Track maintenance history.

ATP sites in Area 4 with known or potential contamination are classed as high risk (refer to Table 6-1). Details of potential contamination at high risk sites are provided in Table 6-8.

**Table 6-8 ATP sites in Area 4 with potential contamination**

ATP Area 4 Site Name	Contamination	Location (Metres (m))
21.7A	Asbestos	-
W3	Suspected asbestos	Buildings and structures likely to be constructed with asbestos
W6	Suspected asbestos	-
W22	Asbestos	-

### 6.8.2 Potential impacts

The Proposal requires minimal excavations. The proposed trenching would vary in length and would generally be about 0.3 metres wide and 0.9 metres deep. Supersucking may be undertaken to find empty conduits and once found this practice replaces trenching.

There is a risk of encountering contaminated material and asbestos during excavation (refer Table 6-8). If encountered, contaminants may pose a risk to health of workers and the environment in general.

If uncontrolled, stockpiling of contaminated spoil could lead to pollution of nearby watercourses due to rainfall runoff or stockpile slippage.

Asbestos removal is likely to be required at ATP Area 4 site 21.7A and W22. There is also potential for asbestos to be found ATP Area 4 site W3 and W6. The removal of asbestos would require an experienced, appropriately licensed removal contractor in accordance with the *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia, 2016). An Occupational Hygienist would be on site during removal works.

Construction of the Proposal would not require the use of any chemicals and/or hazardous materials.

The operation of the ATP Project is not expected to cause contamination or generate hazardous materials.

### 6.8.3 Mitigation measures

The risk of encountering unknown contaminants during excavation shall be managed in accordance with TfNSW's procedures, the CEMP, ECM and land contamination legislation. Control measures to manage contamination risks would include, but not be limited to, those outlined below:

- All waste spoil would be managed in accordance with the Waste Classification Guidelines (NSW EPA 2014) and *National Environment Protection (Assessment of Site Contamination) Measure 1999*
- All hazardous materials removal and clean-up operations must be carried out in accordance with the NSW *Work Health and Safety Act* and Regulations 2011 and the Safe Work NSW requirements

- As part of the ATP Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works
- During excavation, site workers will look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.
- If any previously unidentified contamination is encountered, or suspected, works in the vicinity of the find would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained
- Personnel dealing with the hazardous substances should be appropriately trained
- Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal
- The quantity of spoil generated would be minimised
- If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials
- Hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available at the on site
- No fuels would be stored at on site
- Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia 2016). An Occupational Hygienist should be on site during removal works.

## 6.9 Visual amenity

### 6.9.1 Existing environment

The Proposal is located in the rail corridor of the Eastern Suburbs & Illawarra Line between Arncliffe, Waterfall and Cronulla (Area 4). The rail corridor is generally surrounded by bushland, rural, residential, commercial and industrial land use types with a major waterway crossing at Georges River.

Residents adjoin the rail corridor at ATP Area 4 sites 903, 909, 915, 927, 934, 947, 952, 1001, 1005, 1009, 1013, 1052, 1055, 1066, SD 11, SD 17, SD 31, SD 66, SD 72, SD 76 and Waterfall RR.

ATP sites in Area 4 are generally visible to train passengers and often not visible from outside the rail corridor.

## **6.9.2 Potential impacts**

During construction the visual environment would be temporarily altered through the presence of temporary work buildings, plant and equipment.

Due to the relative minor scale of the works, the Proposal is not anticipated to have a long-term impact on the consistency of the character of the railway corridor. It is not expected to cause additional light reflection or shadowing.

Any trimming of native vegetation (refer Section 6.4.2) is expected to be minor and is not anticipated to not reduce privacy for adjacent property owners.

## **6.9.3 Mitigation measures**

Visual impact during construction would be minimised through a range of control measures which would include, but not be limited to, those outlined below:

- Clearance of vegetation shall be minimised
- The work area shall be maintained in an orderly manner
- All temporary signage associated with the works must be appropriately displayed
- All work equipment and materials would be contained within the designated boundaries of the work site.

## **6.10 Land use**

### **6.10.1 Existing environment**

The proposed ATP sites in Area 4 are on land owned by TfNSW which is zoned SP2 Infrastructure under the Kogarah LEP, Hurstville LEP (Kogarah and Hurstville now form Georges River Council) and Sutherland LEP. The Proposal is located in the rail corridor and is currently used for rail purposes. The neighbouring land uses between Arncliffe and Loftus include residential, industrial and commercial land uses. Between Loftus and Waterfall the neighbouring land uses include national park and residential.

### **6.10.2 Potential impacts**

The Proposal would not affect or alter the current use of the sites or the immediate surrounding area as a rail corridor. It would not have any effects on the use of the neighbouring properties.

As noted in Section 6.4.1, the Royal National Park and Heathcote National Park are adjacent to the rail corridor at a number of ATP sites in Area 4 between Loftus and Waterfall. As a result these ATP Area 4 sites have been classed as high risk (refer to Table 6-1) from a land use perspective. Provided the mitigation measures noted in Section 6.1.3, 6.2.3, 6.4.3 and 6.12.3 are implemented, potential impacts to the adjacent national parks are not anticipated.

### **6.10.3 Mitigation measures**

No specific control measures are required.

## **6.11 Socio-economic impacts**

### **6.11.1 Existing environment**

The Proposal is in the Kogarah, Hurstville (Kogarah and Hurstville now form Georges River Council) and Sutherland LGAs which in the 2011 census had a population of around 97,340, 78,855 and 210,863 respectively, with a median age of 36, 37, 37 and 39 respectively. The main employment areas in the Proposal area are north of the Georges River in the Georges River LGAs.

The Eastern Suburbs & Illawarra Line is regularly used by passenger and freight traffic. The rail line plays an important role in the economic activity of the local areas and enables commuters to travel to and from other major economic areas.

### **6.11.2 Potential impacts**

Social and economic considerations typically focus on the effect on the local community as a whole, and on any local businesses. Amenity issues such as noise and traffic are some of the key issues that can affect the community and are discussed in detail in Sections 6.5 and Section 6.12.

The Proposal is not expected to impact commuter parking, station access or any businesses around any ATP site in Area 4. The construction of the Proposal would require scheduled track possessions. Noise impacts would be temporary (around three weeks).

There would be positive long term effects resulting from the Proposal, as the ATP Project would provide a more reliable and safe rail network.

### **6.11.3 Mitigation measures**

In addition to the control measures proposed in the noise and traffic sections, other control measures are outlined below:

- Nearby residents and businesses would be informed about the nature and timing of works
- Signage would notify the public about the works
- Appropriate fencing would help maintain public safety during construction.

## **6.12 Traffic and access**

### **6.12.1 Existing environment**

Access to the railway corridor is obtained using existing access gates. Distance from the access gates to ATP sites in Area 4 can range between 5 metres and 90 metres. These access gates are used regularly by Sydney Train for periodic maintenance activities along the corridor. It is estimated that staff and contractors currently use the gates and access tracks around 14 to 20 times a year.

Access gates are generally positioned in areas to enable safe access to the surrounding road network. Volumes of traffic on the surrounding road network vary according to time of day and are expected to be busiest during morning and evening peak periods.

### **6.12.2 Potential impacts**

During construction, there would be an increased number of vehicles using the local streets; however, the anticipated increase in the volume of traffic is relatively small (about one vehicle per hour would access / egress the corridor).

Pedestrians are not expected to be affected by vehicles accessing or egressing the work sites.

As works are to take place in the rail corridor, access changes to local roads or access to driveways are not expected.

### **6.12.3 Mitigation measures**

Impacts associated with traffic and access would be minimised through a range of control measures, which would include, but not be limited to those outlined below:

- A traffic speed limit shall be enforced at all sites
- Scheduled road movements must be minimised where possible
- Deliveries of plant and materials must be undertaken outside peak periods where possible
- Vehicles shall be parked within the rail corridor and not in public commuter parking spaces
- Where access to the sites requires access through land not owned by TfNSW, consultation would be undertaken with would land owners and consent to access the land would be obtained where required.

## **6.13 Light spill**

### **6.13.1 Existing environment**

Ambient artificial lighting varies at each ATP site in Area 4 depending on the surrounding land use. In many cases, light spillage from suburban street lighting provides artificial light at ATP site in Area 4. More remote ATP sites in Area 4 would have minimal artificial light.

The existing sites are not fitted with external lighting.

### **6.13.2 Potential impacts**

Some work may be undertaken during night-time periods. Lighting towers would be required to illuminate the work areas, which may result in temporary light spill impacts on nearby residents.

No operational light spill is expected.

### **6.13.3 Mitigation measures**

Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.

## 6.14 Demand on resources

The Proposal would not significantly increase the demand on any current or likely scarce resource. Water, electricity or materials supplies required for the Proposal would not be significant in comparison to other large scale construction projects. All materials used in the construction of the Proposal are common construction materials.

## 6.15 Cumulative impacts

Cumulative impacts often result when several different construction projects are scheduled for similar times and locations.

A search of the Department of Planning and Environment's Major Projects register, Kogarah Council, Hurstville Council (Kogarah and Hurstville Councils now form Georges River Council) and Sutherland Shire Council development application register and the TfNSW projects website was undertaken in May 2017. The following projects are located close to the Proposal:

- **ATP Area 4 site 915:** A mixed use development at is currently underway at 1-35 Tracey Street, Hurstville. This development is adjacent to the rail line about 150 metres east.
- **ATP Area 4 sites 1013, 1049, 1052 and 1055:** The Mortdale Maintenance Facility Project: which includes track and overhead wiring extension work, the installation of maintenance equipment inside the existing facility, lighting and electrical upgrades was scheduled to commence in April 2017 and will take around 12 months to complete. ATP Area 4 sites are located around the maintenance facility.
- **South Coast Power Supply Reliability Improvement:** The South Coast Power Supply Reliability Improvement project is an initiative by Transport for NSW to develop solutions to better manage power demand without building new substations and transmission lines. This project is in planning stages.
- **Sutherland to Cronulla Active Transport Link:** Shared bicycle and pedestrian path from Sutherland to Cronulla. The 11 kilometre path is mainly on existing paths. An REF was prepared in 2016. Cumulative impacts with this project are not expected.
- **Transport Access Program:** The program carries out station improvements to deliver accessible, modern, secure and integrated transport infrastructure. Improvements are being made to the following stations Arncliffe, Engadine, Heathcote, Jannali and Oatley. No ATP Area 4 sites are in the vicinity of these stations.

Where other works are planned during the same scheduled track possessions, coordination meetings would identify the appropriate responsibilities for undertaking notifications to affected stakeholders.

There is also a risk of cumulative impacts if unscheduled work, e.g. emergency work by other utilities or developers is required. Such situations would be monitored and addressed by the Project Manager.

The Proposal involves works at a number of ATP Area 4 sites along the rail corridor. The construction team would complete works at each location prior to progressing to the next location so cumulative impacts are minimised.

Overall this work, as part of the AMS, would result in significant benefits by providing a more reliable and safe rail network.

### 6.15.1 Mitigation measures

- Any other major development or works planned in the vicinity of the site would be further investigated before work begins and cumulative impacts minimised where possible
- Consultation with Georges River Council and Sutherland Shire Council and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## 7. Environmental management

This chapter of the REF identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures.

### 7.1 Environmental management plans

A construction environmental management plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of the TfNSW (Infrastructure and Services) Environmental Management System (EMS). The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed, and outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would incorporate as a minimum all environmental mitigation measures identified below in Section 7.2, any conditions from licences or approvals required by legislation, and a process for demonstrating compliance with such mitigation measures and conditions.

### 7.2 Mitigation measures

#### 7.2.1 Standard mitigation measures (for all ATP Area 4 sites)

Standard mitigation measures for the Proposal are listed in Table 7-1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6, should the Proposal proceed.

**Table 7-1 Proposed standard mitigation measures**

No.	Standard mitigation measures
<b>General</b>	
1	This REF has been developed based on the ATP Concept Design, further environmental approvals may be required if design developments during the detailed design phase extend proposed works outside the assessed site footprint provided on the ATP Area 4 site location plans.
2	Location specific Environmental Controls Map (ECM) would be developed prior to commencement of construction in accordance with TfNSW's <i>Guide to Environmental Control Map</i> (3TP-SD-015). The ECM would be implemented for the duration of construction.
3	An ATP Project risk assessment including environmental aspects and impacts would be undertaken prior to the commencement of construction.
4	Weekly inspections to monitor environmental compliance and performance would be undertaken during construction.
5	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, mitigation measures and conditions of approval.

No.	Standard mitigation measures
<b>Landforms, geology and soil</b>	
6	Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains.
7	Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site.
8	Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion.
9	Disturbed areas would be reinstated as soon as possible.
10	If PASS encountered during excavation works an ASS Management Plan must be prepared (as part of the CEMP) and alternative routes for trenching works considered.
<b>Water quality and hydrology</b>	
11	Erosion and sediment controls at each worksite would be detailed on the ECM and comply with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004) (the Blue Book).
12	Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall.
13	The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required.
14	Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks.
15	Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways.
16	Concrete slurries and wash-out would be collected for reuse or for off-site disposal.
17	Appropriately sized spill response kits must be kept on site and staff trained in their use.
18	Earthworks would be suspended during periods of heavy or prolonged rainfall. Plant and equipment would be removed from site where there is a high risk of inundation.
19	Dry street sweepers or hand-held brooms would be used to clean local roads in the event of tracked sediment.
• 20	• Works are to be undertaken in accordance with the TfNSW Chemical Storage and Spill Response Guidelines (9TP-SD-066).
21	Water discharge from site must be carried out as per TfNSW <i>Water Discharge Guidelines</i> (7TP-SD-024).
<b>Air quality</b>	
22	Plant and equipment would be maintained in accordance with manufacturers' specifications.
23	Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently.
24	Plant or machinery would not be left idling.
25	All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours.
26	Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust.

No.	Standard mitigation measures
27	Trucks transporting spoil and other waste materials from site would be covered appropriately.
28	Disturbed areas would be rehabilitated as soon as practicable.
<b>Biodiversity</b>	
29	If threatened and/or protected flora or fauna species are identified, work in the vicinity of the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW's Environmental Officer, and advise on species management.
30	Construction staff would be made aware of the ecological constraints and the requirements for no impact to any vegetation at following locations. This information would be included on the location specific ECMs and would be marked as "no go zones": <ul style="list-style-type: none"> <li>▪ <b>ATP Area 4 site SD 76:</b> Bynoe's wattle adjacent to the site footprint</li> <li>▪ <b>ATP Area 4 site W6 and W7:</b> Swamp sclerophyll forest on coastal floodplain EEC located adjacent to the access track</li> <li>▪ <b>ATP Area 4 site W22:</b> Koala Black recorded 65 metres and 100m south.</li> </ul>
31	<b>ATP Area 4 site 927, 934, 947, 952, 1001 and 1005:</b> Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Gosford wattle. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment and approvals would be undertaken by TfNSW.
32	The site would be inspected for any trapped or injured fauna at the start of each day.
33	Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed.
34	Construction areas should be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation.
35	Stockpiles, plant, equipment and materials storage are to be located on existing cleared lands away from the drip zone of trees or other native vegetation.
36	Weeds shall be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse.
37	Piles of cleared vegetation should be mulched as soon as practicable after clearing and mulch reused where possible.
38	Vehicle turning circles and parking areas shall be clearly marked and should occur in areas free of native vegetation.
39	Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site.
40	Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets.
41	Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.

No.	Standard mitigation measures
42	Following confirmation of the detailed design where disturbance to vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey of to establish the presence of any threatened flora and fauna species and/or communities. Where a threatened species and/or communities is identified, further assessment would be undertaken to consider the likely impacts, for the approval of the TfNSW Principal Manager Environmental Impact Assessment.
43	Any trees requiring removal, trimming or pruning that have not been previously assessed in accordance with this REF must be assessed and approved for removal using the TfNSW <i>Application for Removal or Trimming of Vegetation( 9TP-FT-078)</i> .
44	All cleared vegetation (if any) shall be offset in accordance with TfNSW's <i>Vegetation Offset Guide (9TP-SD-087)</i> .
45	Management in accordance with TfNSW's guidelines, as applicable: <ul style="list-style-type: none"> <li>▪ Fauna Management Guideline (3TP-SD-113)</li> <li>▪ Vegetation Management Guidelines (9TP-SD-111)</li> <li>▪ Weed Management and Disposal Guideline (3TP-SD-110).</li> </ul>
<b>Noise and vibration</b>	
46	Maximise the offset distance between noisy plant items and sensitive receivers.
47	Orient plant and equipment to minimise noise at sensitive receivers.
48	Avoid the simultaneous operation of two or more noisy plant items in close vicinity and adjacent to sensitive receivers.
49	Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers.
50	Where necessary, use structures to shield sensitive receivers from noise sources.
51	Work, other than the installation of track assets, would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours: affected community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's <i>Out of Hours Works Application Form (9TP-FT-079)</i> in accordance with TfNSW's <i>Construction Noise Strategy (7TP-ST-157)</i> .
52	Provide mitigation in accordance with the requirements of the TfNSW <i>Construction Noise Strategy (7TP-ST-157)</i> if high noise generating activities occur for extended periods.
53	Noise complaints would be managed in accordance with TfNSW <i>Construction Noise Strategy (7TP-ST-157)</i> . Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.
54	Residents within the main catchment area of ATP Area 4 sites identified in the Proposal would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.

No.	Standard mitigation measures
<b>Heritage</b>	
55	<b>ATP Area 4 site SD 76:</b> Works would be within the heritage curtilage of the SHR listed Loftus Junction railway signal box. A Heritage exemption under s.57(2) of the <i>Heritage Act 1977</i> would be obtained from Sydney Trains prior to any construction commencing at this location.
56	<b>ATP Area 4 site 1001:</b> Works would be within the heritage curtilage of the locally significant Penshurst Railway Station and Penshurst Railway Station Group. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at this location.
57	<b>ATP Area 4 sites 1009, 1013 and 1049:</b> Works would be within the heritage curtilage of the locally significant Mortdale Railway Station and Car Sheds. Consultation with Sydney Trains and Georges River Council would be undertaken prior to any works commencing at these locations.
58	<b>ATP Area 4 site SD 31:</b> Works would be within the heritage curtilage of the locally significant Sutherland Railway Station. Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
59	<b>ATP Area 4 site Waterfall RR:</b> Works would be within the heritage curtilage of the locally significant Waterfall Railway Residences and Yard (Including the Waterfall Railway Turntable). Consultation with Sydney Trains and Sutherland Shire Council would be undertaken prior to any works commencing at this location.
60	If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted. TfNSW staff and the Office of Environment and Heritage (OEH) would be notified as required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes.
61	Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager and TfNSW staff would be notified immediately. OEH would be notified in accordance with the <i>National Parks and Wildlife Act 1974</i> . The Local Aboriginal Land Council would be notified and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.
<b>Waste</b>	
62	All waste would be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA 2014) and transported to a place that can lawfully accept the waste.
63	Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures.
64	Packaging would be minimised, where possible and where the safety and delivery of services is not compromised.
65	Wherever possible, suitable excavated material would be reused for backfilling, landscaping and other purposes.
66	Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste.
67	Any spoil or waste material tracked onto roads would be swept up immediately.
68	Adequate numbers of bins and waste containers would be available on site. The site manager would ensure bins are not overflowing and are appropriately covered.

No.	Standard mitigation measures
69	Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal.
70	All waste would be removed when work is completed.
<b>Contaminated land and hazardous materials</b>	
71	All waste spoil would be managed in accordance with the Waste Classification Guidelines (NSW EPA 2014) and National Environment Protection (Assessment of Site Contamination) Measure 1999.
72	All hazardous materials removal and clean-up operations must be carried out in accordance with the NSW <i>Work Health and Safety Act</i> and Regulations 2011 and the Safe Work NSW requirements.
73	As part of the ATP Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works.
74	During excavation, site workers would look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.
75	If any previously unidentified contamination is encountered, or suspected, works in the vicinity of the find would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained.
76	Personnel dealing with the hazardous substances should be appropriately trained.
77	Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal.
78	The quantity of spoil generated would be minimised.
79	If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials.
80	Hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available at the on site.
81	No fuels would be stored at on site.
82	Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the <i>How to Safely Remove Asbestos Code of Practice</i> (Safe Work Australia, 2016). An Occupational Hygienist should be on site during removal works.
<b>Visual amenity</b>	
83	Clearance of vegetation shall be minimised.
84	The work area shall be maintained in an orderly manner.
85	All temporary signage associated with the works must be appropriately displayed.
86	All work equipment and materials would be contained within the designated boundaries of the work site.

No.	Standard mitigation measures
<b>Land use</b>	
87	No specific control measures are required.
<b>Socio-economic impacts</b>	
88	Nearby residents and businesses would be informed about the nature and timing of works.
89	Signage would notify the public about the works.
90	Appropriate fencing would help maintain public safety during construction.
<b>Traffic and access</b>	
91	A traffic speed limit shall be enforced at all sites.
92	Scheduled road movements must be minimised where possible.
93	Deliveries of plant and materials must be undertaken outside peak periods where possible.
94	Vehicles shall be parked within the rail corridor and not in public commuter car parking spaces.
95	Where access to the sites requires access through land not owned by TfNSW, consultation would be undertaken with land owners and consent to access the land would be obtained where required.
<b>Light spill</b>	
96	Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.
<b>Cumulative impacts</b>	
97	Any other major development or works planned in the vicinity of the site would be further investigated before work begins and cumulative impacts minimised where possible.
98	Consultation with Georges River Council and Sutherland Shire Council and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## **8. Conclusion**

This REF has been prepared in accordance with the provisions of section 111 of the EP&A Act, taking into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal will play a key role in delivering faster and more reliable rail services and will provide significant safety benefits to rail customers and staff.

The main environmental issues relate to construction impacts such as erosion and sedimentation, potential water quality, biodiversity and heritage impacts as well as short-term traffic and noise issues for nearby receivers.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 6, and Appendices 1 and 2). Should the ATP Project proceed, these impacts would be effectively managed through the implementation of the mitigation measures and the conditions of approval. As a result, these environmental impacts are not considered to be significant. 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 ESD (refer to Section 4.1). These would be considered further during the detailed design, construction and operational phases of the Proposal. This will ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

## References

- Department of Environment and Climate Change 2009 *Interim Construction Noise Guideline*
- EPA 2014 *Waste Classification Guidelines*, Sydney
- Landcom 2004 *Managing Urban Stormwater, Soils and Construction Guidelines*, March, 2004
- NSW Acid Sulfate Soil Management Advisory Committee 1998 *Acid Sulfate Soil Manual*
- NSW Government 2014 *Rebuilding NSW - State Infrastructure Strategy 2014*, Sydney
- NSW Government 2015 *State Priorities – NSW: Making It Happen*, Sydney
- Office of Environment and Heritage (OEH) 2017 Gosford wattle, Hurstville and Kogarah Local Government Areas – profile.  
<http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10022>
- Office of Environment and Heritage (OEH) 2014a Threatened Species, Population and Communities Database. Search by region.  
<http://www.environment.nsw.gov.au/threatenedSpeciesApp/AreaHabitatSearch.aspx>
- Office of Environment and Heritage (OEH) 2014b NSW Bionet Atlas of NSW Wildlife Database, Office of Environment and Heritage NSW.  
<http://www.bionet.nsw.gov.au/>
- TfNSW 2014 *Automatic Train Protection Eastern Suburbs and Illawarra Line and South Coast Line: Arncliffe to Kiama Review of Environmental Factors*

## Appendix 1 – Consideration of clause 228 factors

The table below demonstrates TfNSW’s consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
<p><b>Any environmental impact on a community?</b></p> <p>During construction there may be minor noise and traffic disturbances to the nearby community from deliveries and construction works. During track possession, some works would take place outside standard working hours.</p> <p>In the long term, the ATP Project will improve reliability and safety of the Sydney Train services on the Eastern Suburbs &amp; Illawarra Line.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any transformation of a locality?</b></p> <p>The Proposal would not transform the locality. The works would support the ongoing operation of the rail network.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any environmental impact on the ecosystem of the locality?</b></p> <p>With the implementation of the proposed control measures, the proposed works are not anticipated to impact on the ecosystem of the locality.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b></p> <p>There will be a minor reduction in the aesthetic values of the neighbourhood due to the anticipated noise, air quality and traffic impacts resulting during construction. However, these will be temporary and minor in nature. No long-term reduction in the quality or value of the locality is anticipated.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</b></p> <p>No such significant places will be affected during construction or operation.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?</b></p> <p>No habitat on which protected or endangered species would be reliant on is anticipated to be impacted by the proposed works.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b></p> <p>No protected or endangered species are anticipated to be impacted by the proposed works.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any long-term effects on the environment?</b></p> <p>The proposed activities are not anticipated to pose any environmental risks in the long term.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any degradation of the quality of the environment?</b></p> <p>The proposed work is not expected to have any significant adverse impacts on the quality of the environment.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

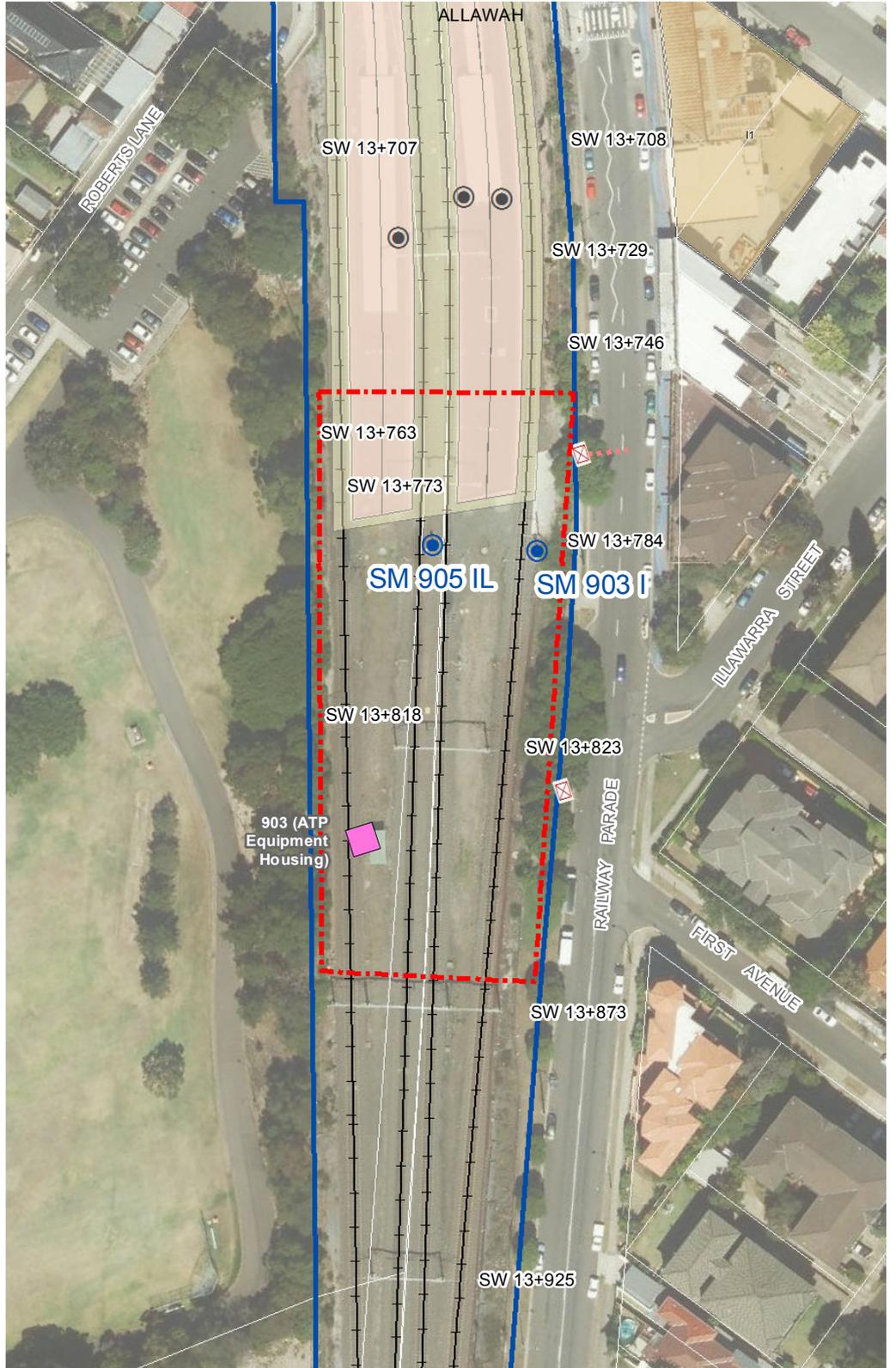
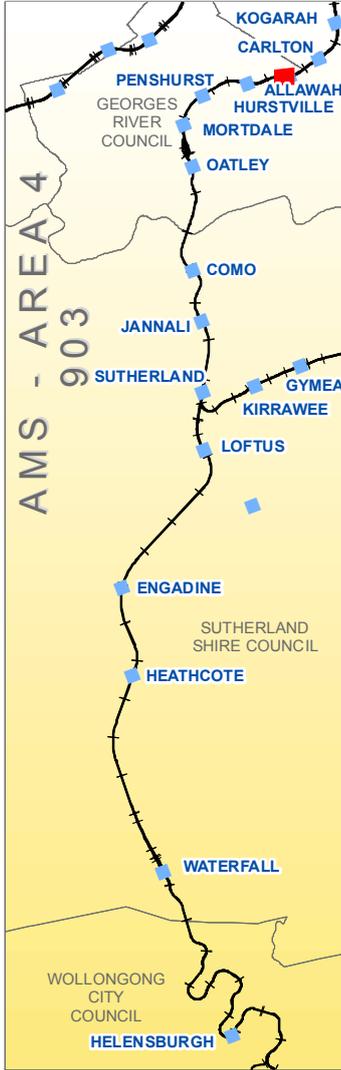
Factor	Impacts
<p><b>Any risk to the safety of the environment?</b>            During construction there is a risk to the environment due to accidental spills and sedimentation. These risks would be minimised through the implementation of the proposed control measures.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any reduction in the range of beneficial uses of the environment?</b>            Works are to take place within the existing rail corridor and would not reduce the beneficial uses of the environment.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any pollution of the environment?</b>            During construction there is a risk of noise, water and air pollution. These risks would be minimised through the implementation of the proposed control measures.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any environmental problems associated with the disposal of waste?</b>            During construction it is possible spoil may be contaminated and an appropriate remediation plan and/or waste disposal method would be required.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</b>            Construction materials are readily available and would be sourced from local contractors where possible.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any cumulative environmental effect with other existing or likely future activities?</b>            The distance between the proposed ATP sites in Area 4 is such that cumulative noise, air quality and traffic impacts are not expected.            Overall this Proposal will have significant benefits in providing a safer and more efficient rail network.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</b>            The Proposal would not contribute to or be affected by coastal processes or hazards.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

## Appendix 2 – Consideration of matters of national environmental significance

The table below demonstrates TfNSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to the Commonwealth Department of the Environment and Energy.

Factor	Impacts
<b>Any impact on a World Heritage property?</b> There are no World Heritage properties in the vicinity the site.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Any impact on a National Heritage place?</b> There are no National Heritage places in the vicinity of the site.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Any impact on a wetland of international importance?</b> There are no wetlands of international importance in the vicinity of the site.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Any impact on a listed threatened species or communities?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed threatened species or ecological communities or their habitats are not expected. Indirect impacts are also not expected.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Any impacts on listed migratory species?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed migratory species or their habitats are not expected. Indirect impacts are also not expected.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Any impact on a Commonwealth marine area?</b> The site is not in the vicinity of any Commonwealth marine areas.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Does the Proposal involve a nuclear action (including uranium mining)?</b> The Proposal does not involve any nuclear actions.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>Additionally, any impact (direct or indirect) on Commonwealth land?</b> The site is not on or close to any Commonwealth land.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<b>In relation to coal seam gas and large coal mining developments, any impact on a water resource?</b> The Proposal does not relate to a coal seam gas or large coal mining development.	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

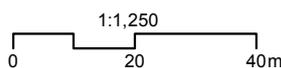
## Appendix 3 – ATP Area 4 site location plans



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

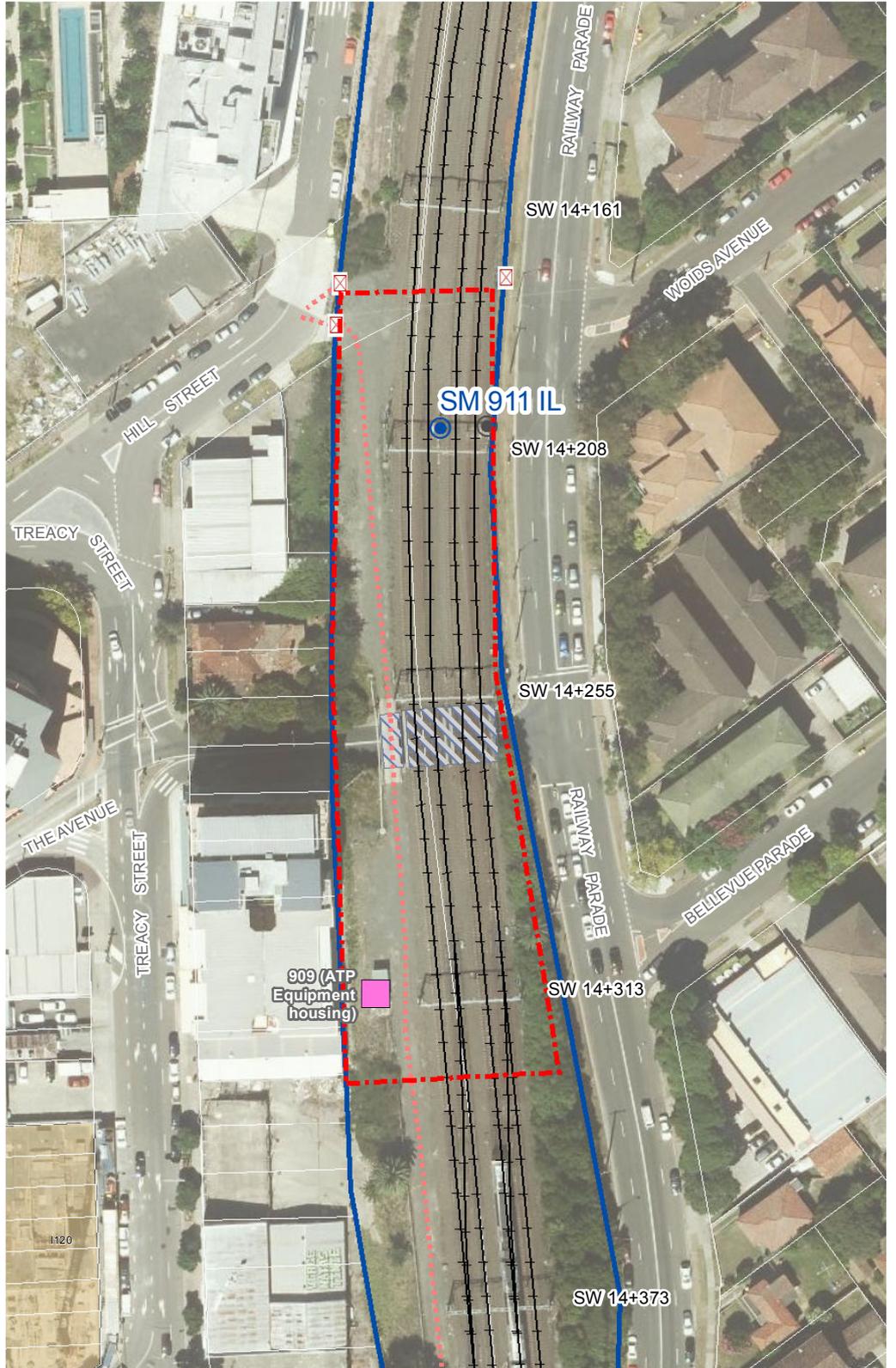
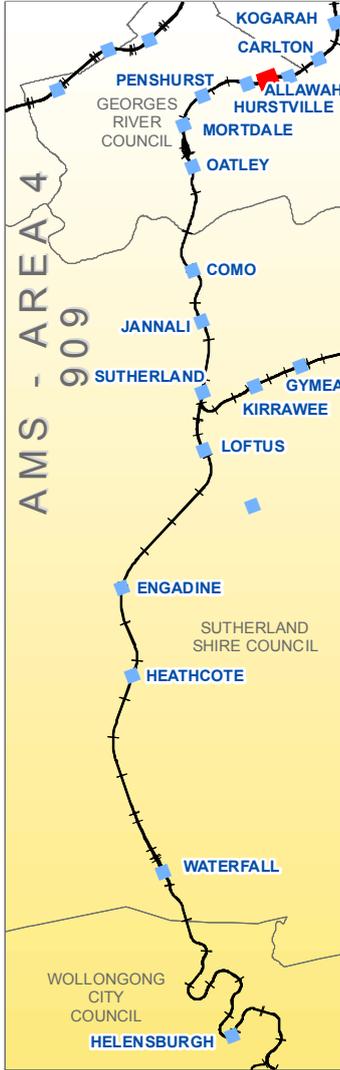


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

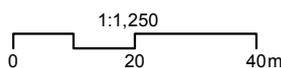
ATP Area 4 Site 903



Cabling note: N/A

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|--------------------------|---------------------|--|-------------------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b> |  |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |                               | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                |                               | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         |                               | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |                               |  |
| Rail line                | Tunnel section      | EEC vegetation                           |                               |  |
|                          | Substation location | Heritage item/heritage conservation area |                               |  |

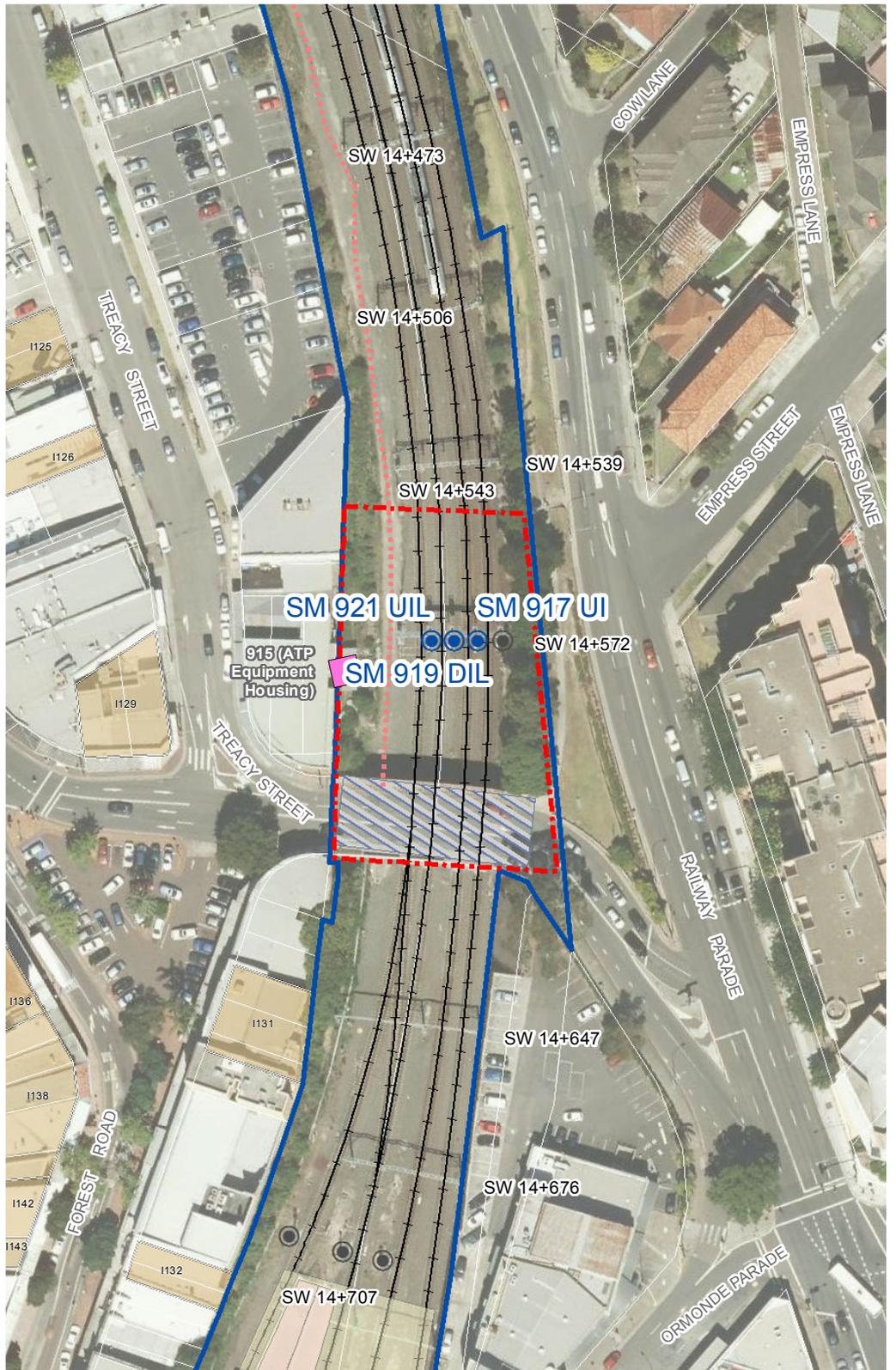
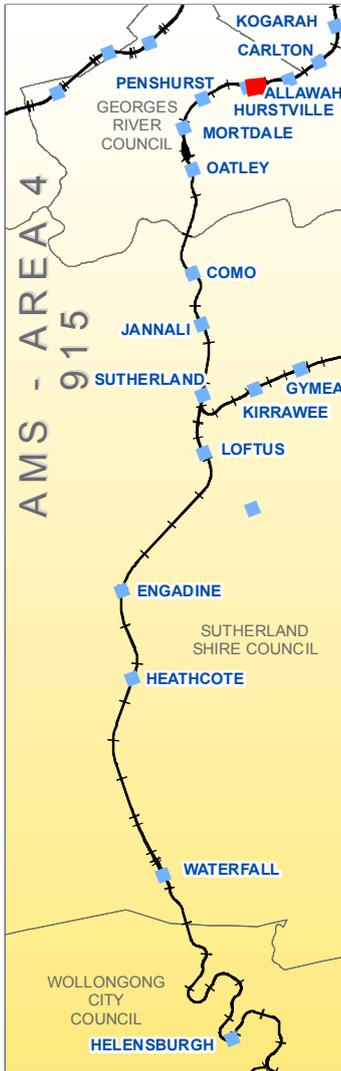


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

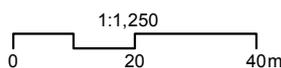
ATP Area 4 Site 909



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		

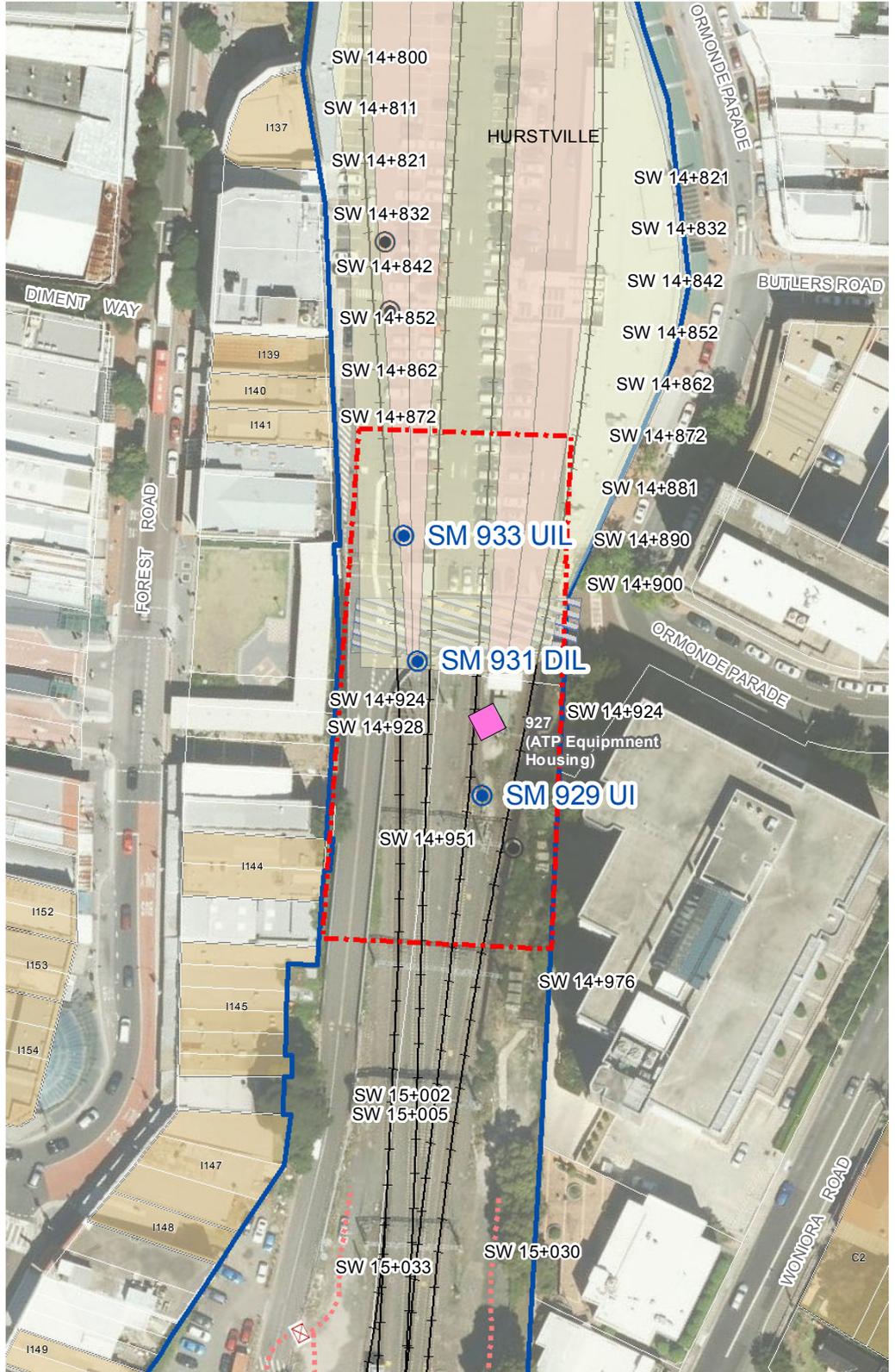
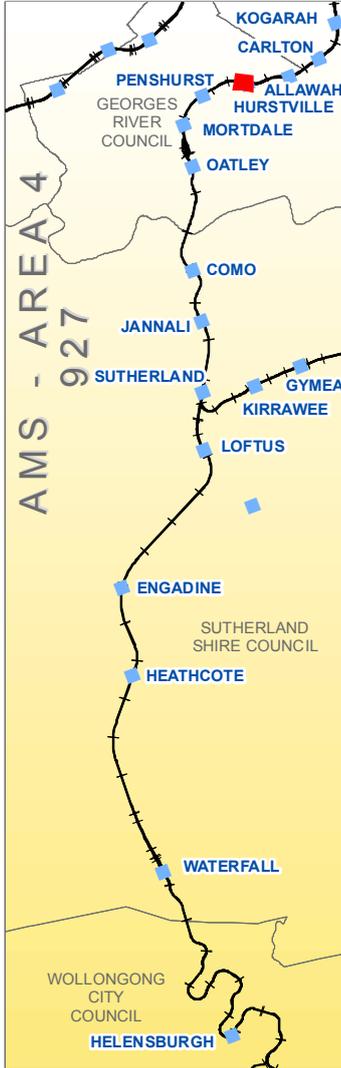


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

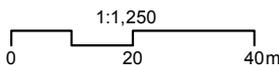
ATP Area 4 Site 915



Cabling note: New cabling routes between SM929 UI and SM1005. Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

- |                          |                     |  |                               |  |
|--------------------------|---------------------|--|-------------------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b> |  |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |                               | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                |                               | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         |                               | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |                               |  |
| Rail line                | Tunnel section      | EEC vegetation                           |                               |  |
|                          | Substation location | Heritage item/heritage conservation area |                               |  |

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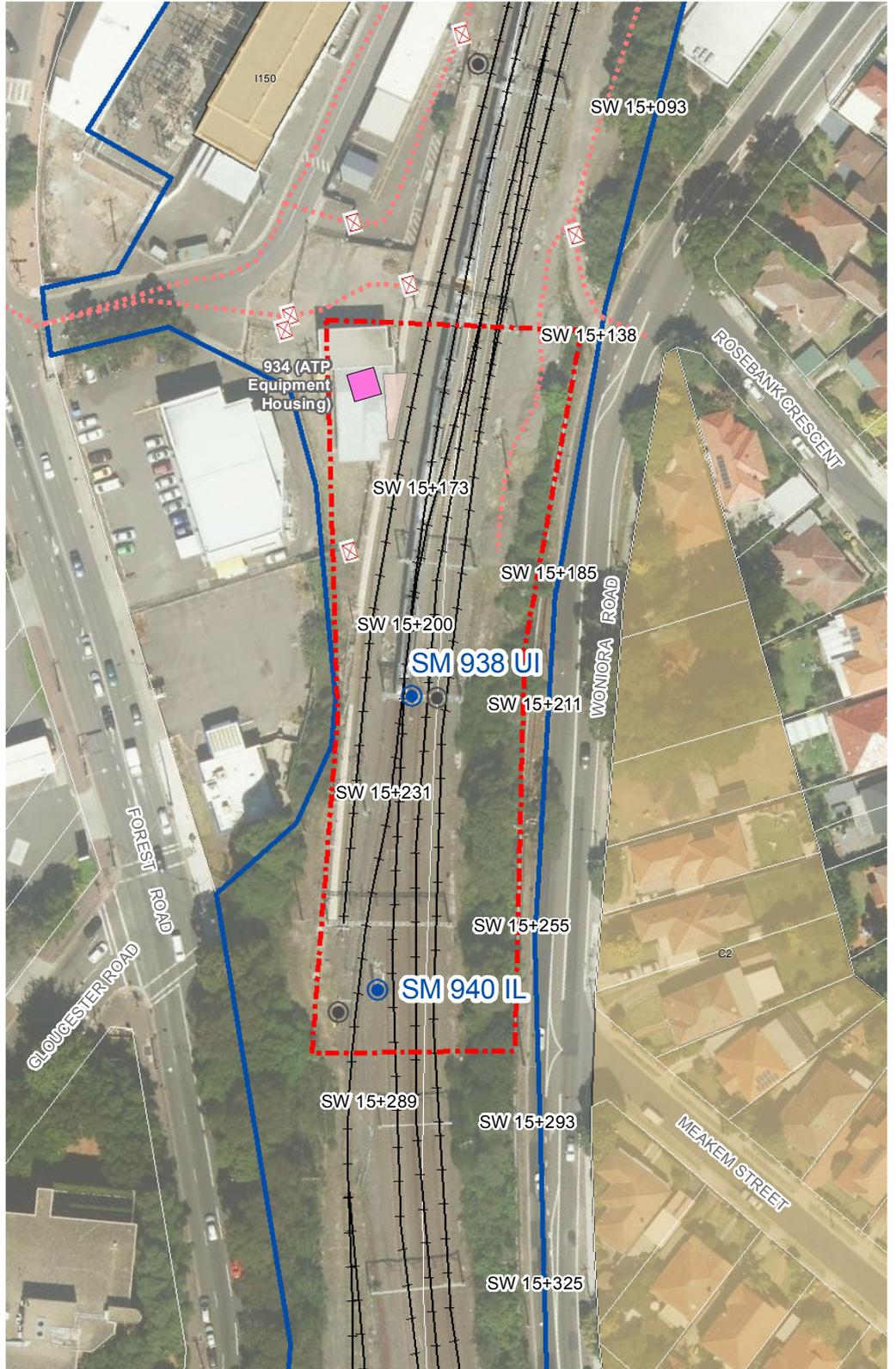
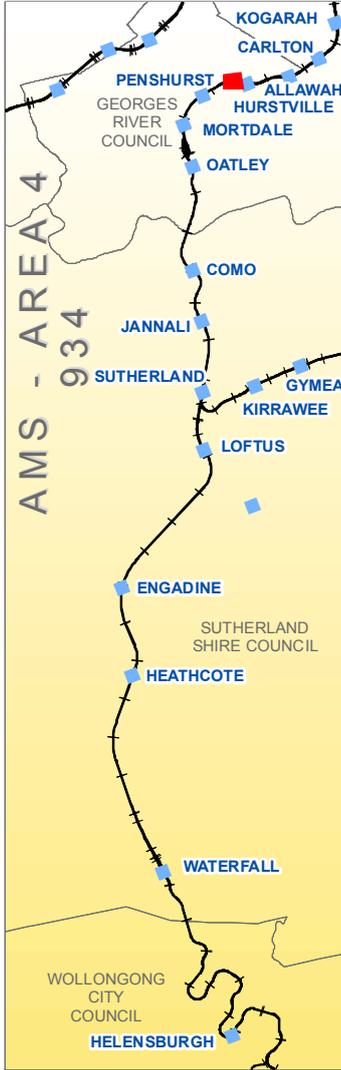


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

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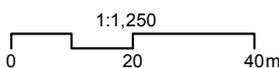
ATP Area 4 Site 927



Cabling note: New cabling routes between SM929 UI and SM1005  
Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

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|--------------------------|---------------------|--|-------------------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b> |  |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |                               | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                |                               | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         |                               | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |                               |  |
| Rail line                | Tunnel section      | EEC vegetation                           |                               |  |
|                          | Substation location | Heritage item/heritage conservation area |                               |  |

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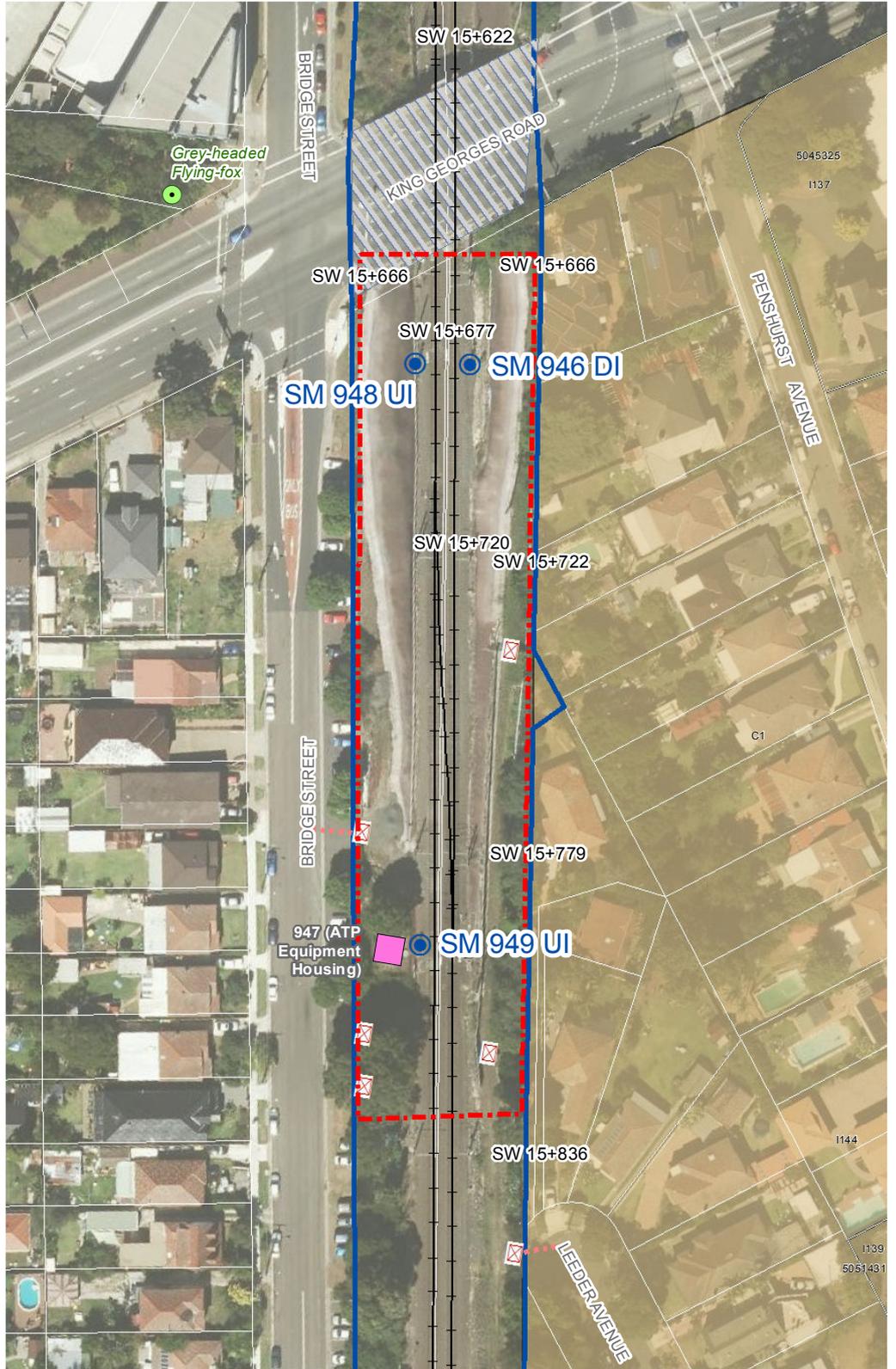
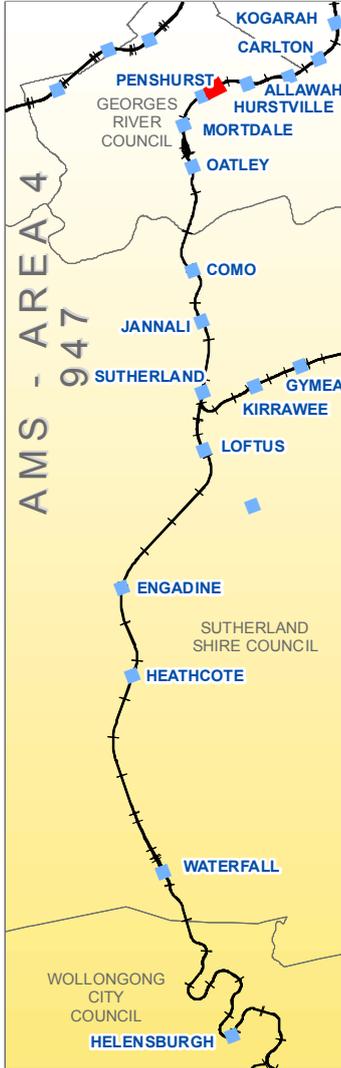


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

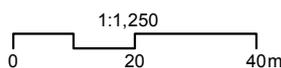
ATP Area 4 Site 934



Cabling note: New cabling routes between SM929 UI and SM1005  
 Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

- |                          |                     |  |                               |  |
|--------------------------|---------------------|--|-------------------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b> |  |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |                               | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                |                               | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         |                               | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |                               |  |
| Rail line                | Tunnel section      | EEC vegetation                           |                               |  |
|                          | Substation location | Heritage item/heritage conservation area |                               |  |

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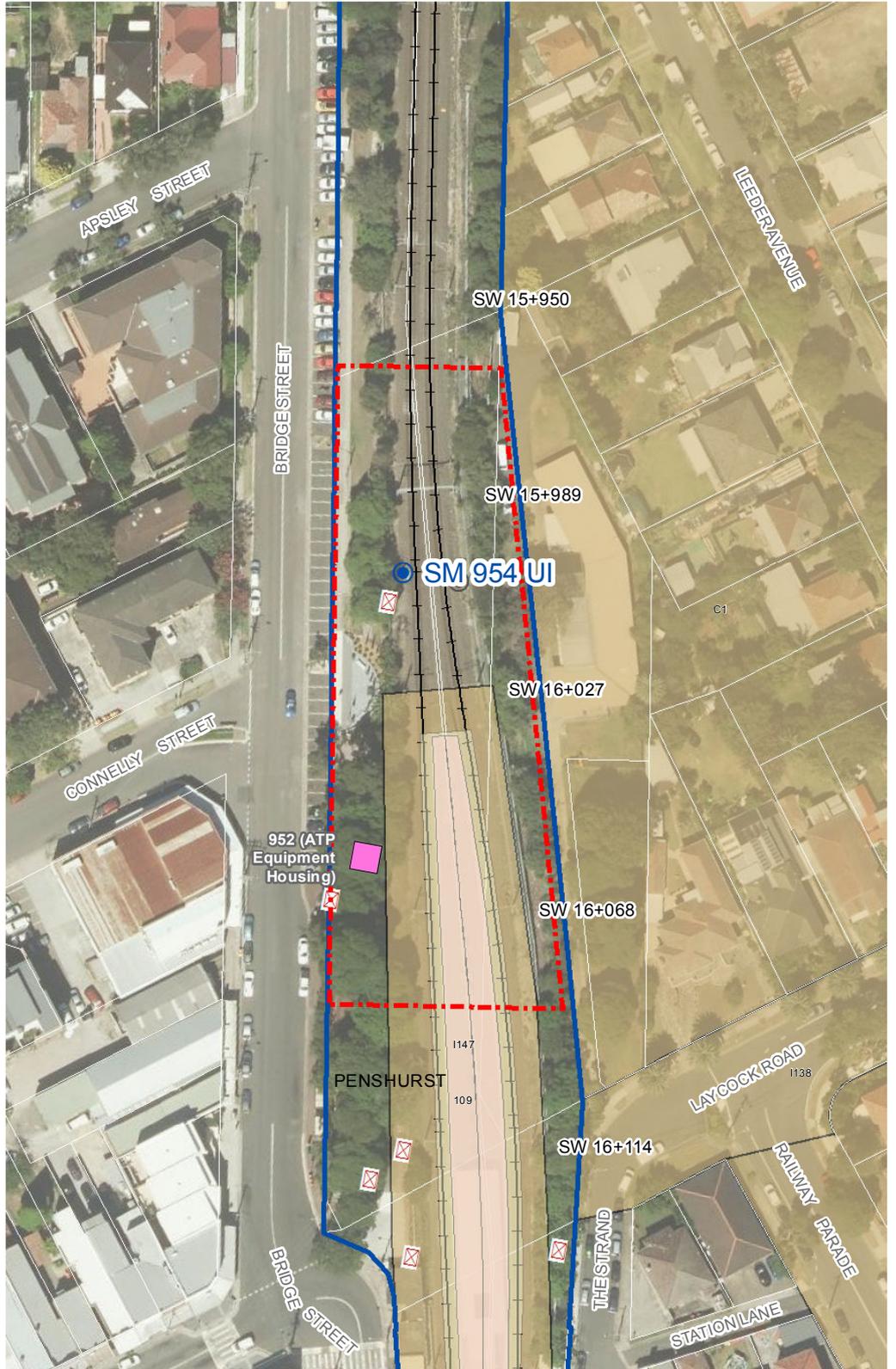
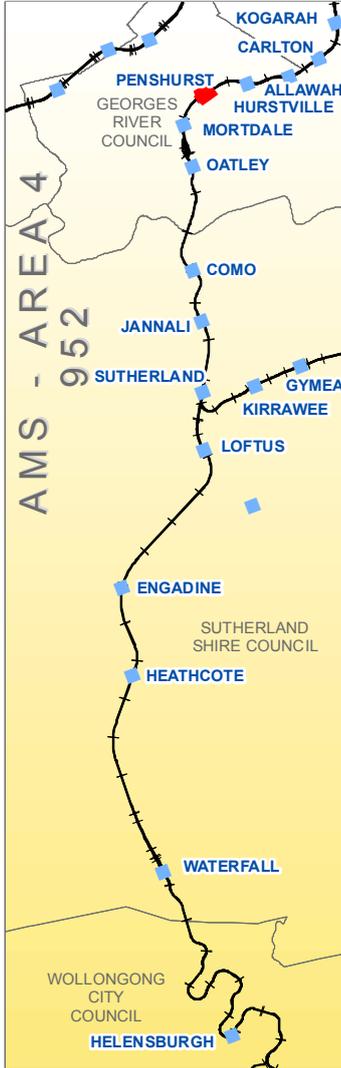


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

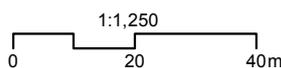
ATP Area 4 Site 947



Cabling note: New cabling routes between SM929 UI and SM1005  
 Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

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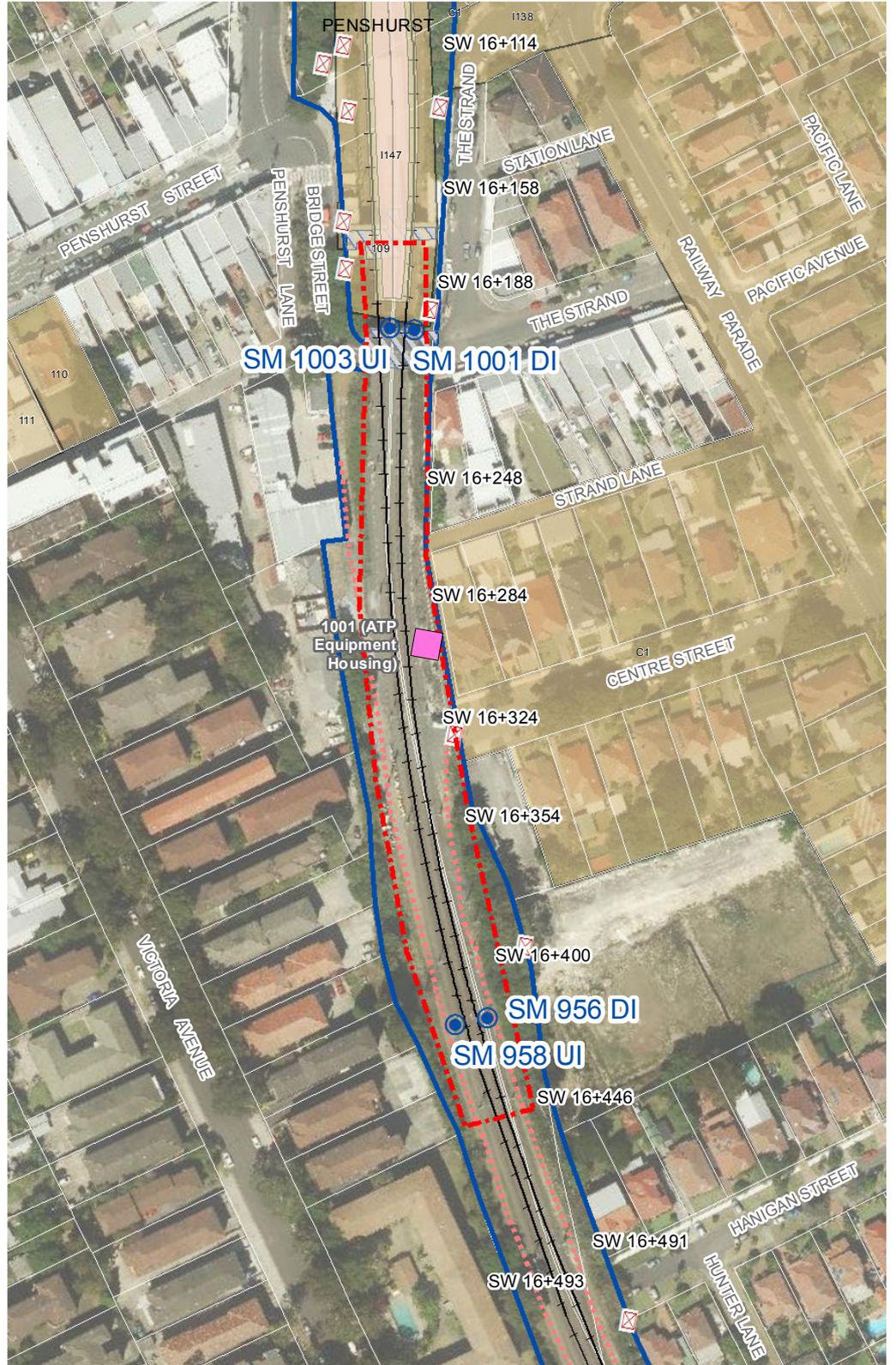
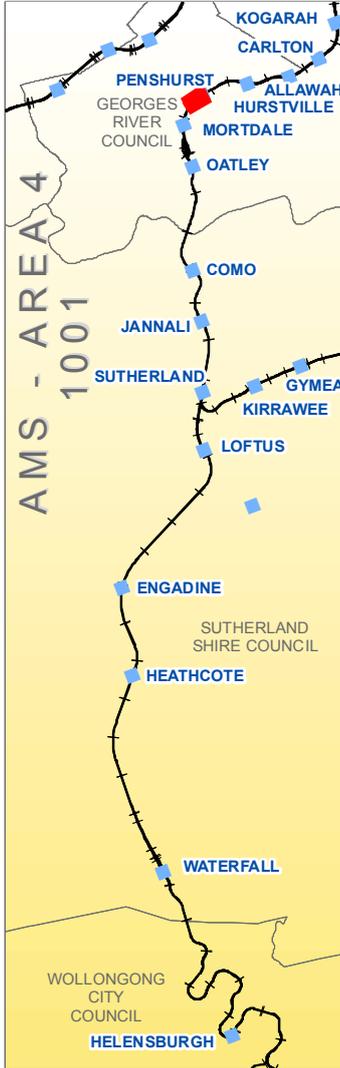


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

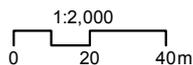
ATP Area 4 Site 952



Cabling note: New cabling routes between SM929 UI and SM1005  
 Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

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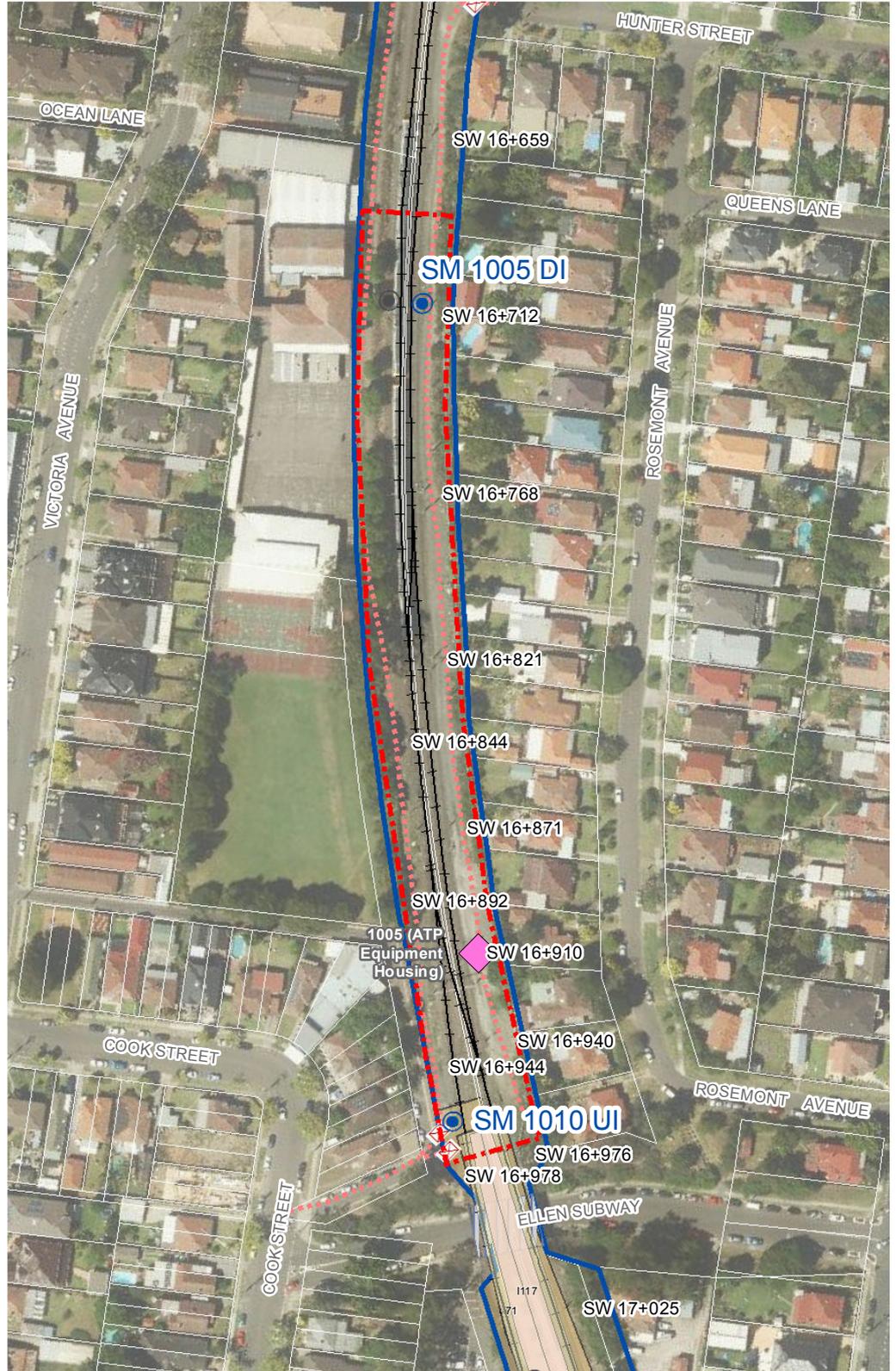
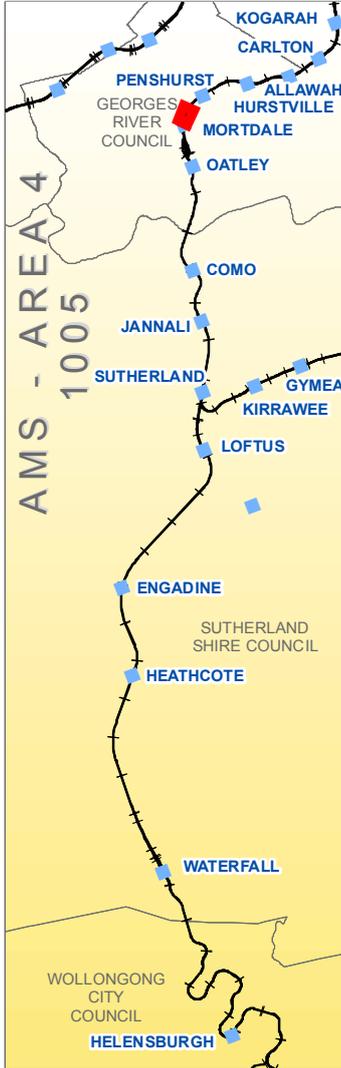


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

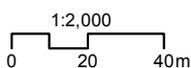
ATP Area 4 Site 1001



Cabling note: New cabling routes between SM929 UI and SM1005  
 Known population of Gosford wattle in this area. No vegetation removal without TfNSW approval

- |                          |                     |  |                               |  |
|--------------------------|---------------------|--|-------------------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b> |  |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |                               | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                |                               | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         |                               | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |                               |  |
| Rail line                | Tunnel section      | EEC vegetation                           |                               |  |
|                          | Substation location | Heritage item/heritage conservation area |                               |  |

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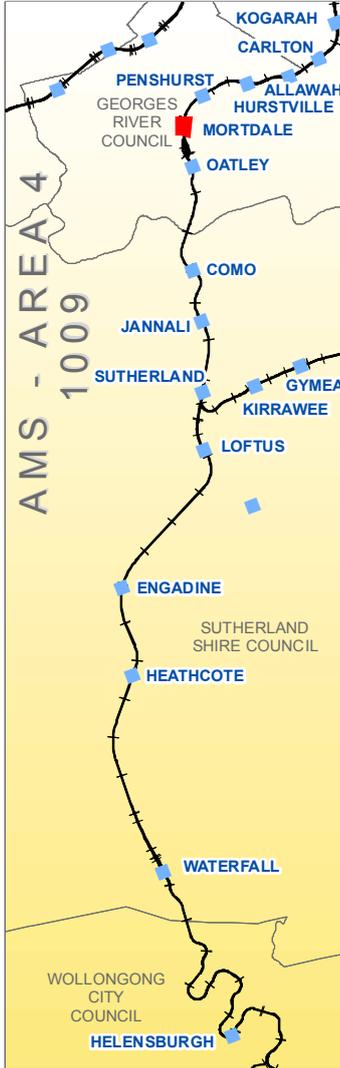


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

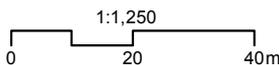
ATP Area 4 Site 1005



Cabling note: N/A

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|--------------------------|---------------------|--|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b>                                |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |  |
| Rail line                | Tunnel section      | EEC vegetation                           |  |
|                          | Substation location | Heritage item/heritage conservation area |  |

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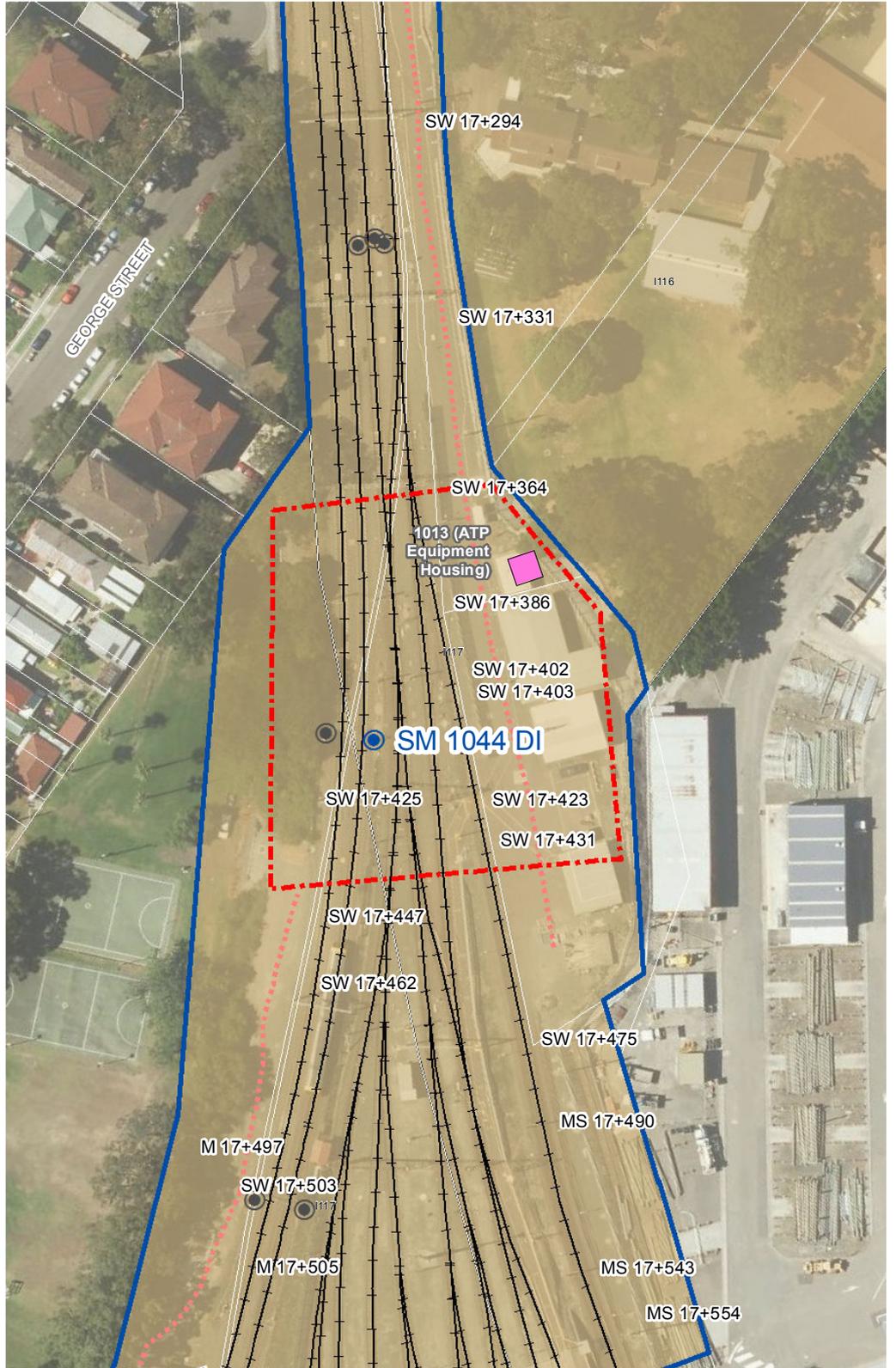
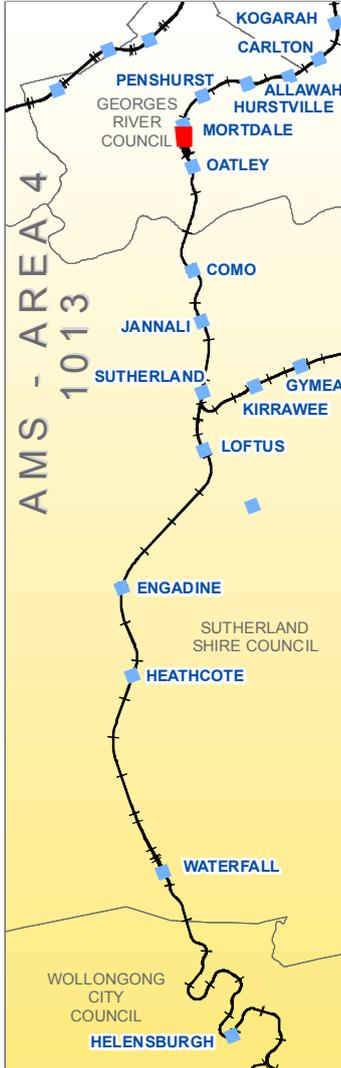


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

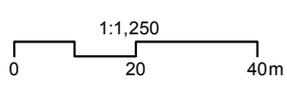
ATP Area 4 Site 1009



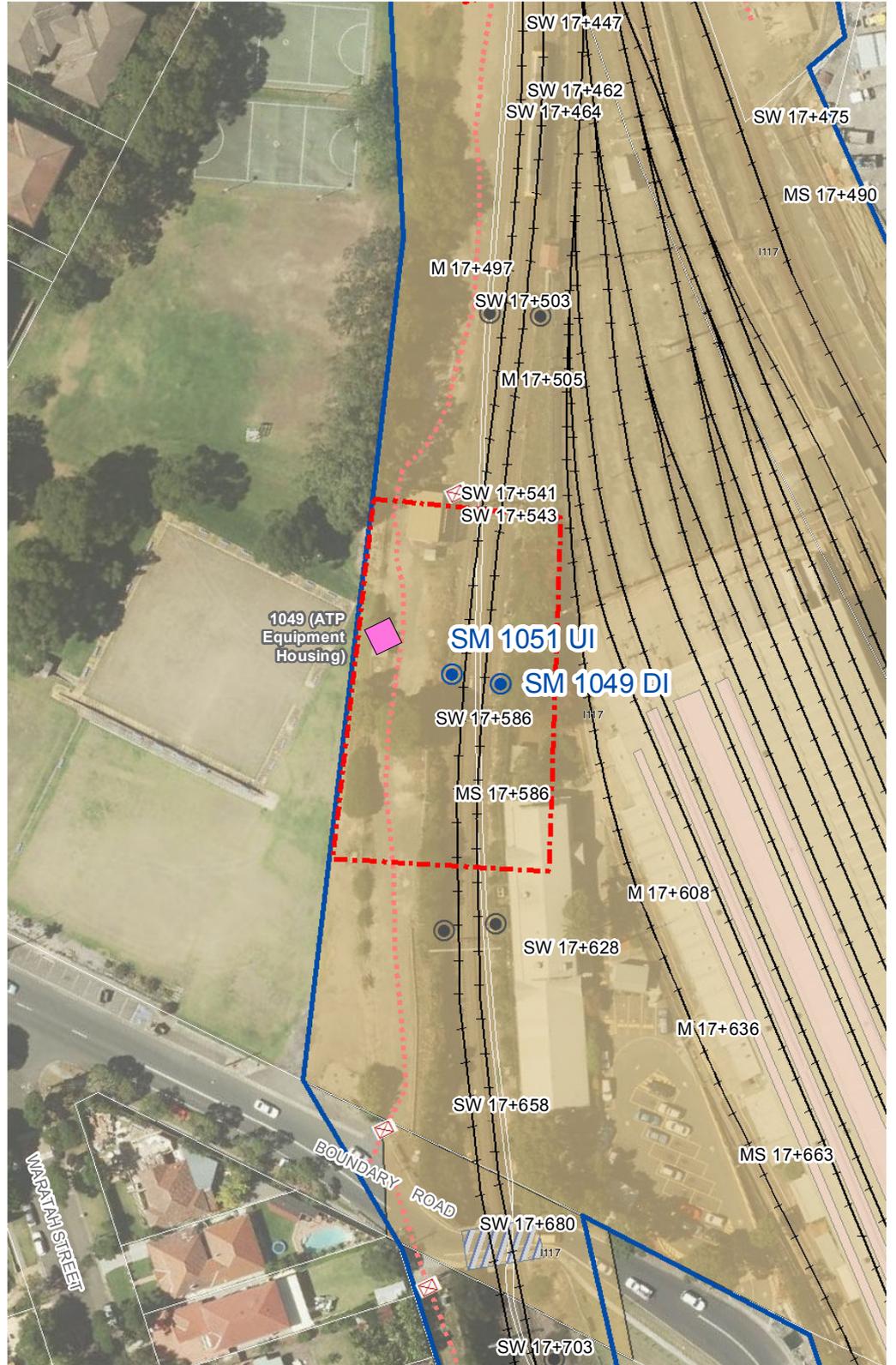
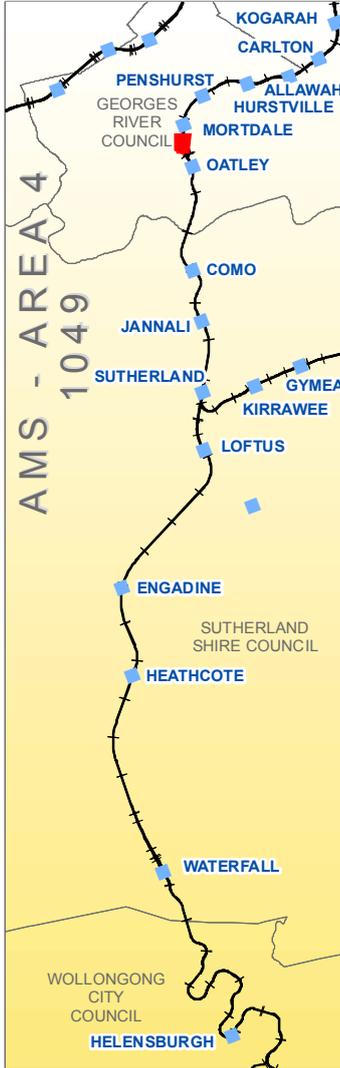
Cablings note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		



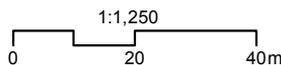
Projection: GDA 1994 MGA Zone 56  
Source: Aurecon, OEH, Sydney Trains, LPI



Cablings note: N/A

P:\GIS\Project-3\project\252771\_ATP\Area4\_AMS\_rev4.mxd\JOB No.130-06-17\martin.russell\Rev 4

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

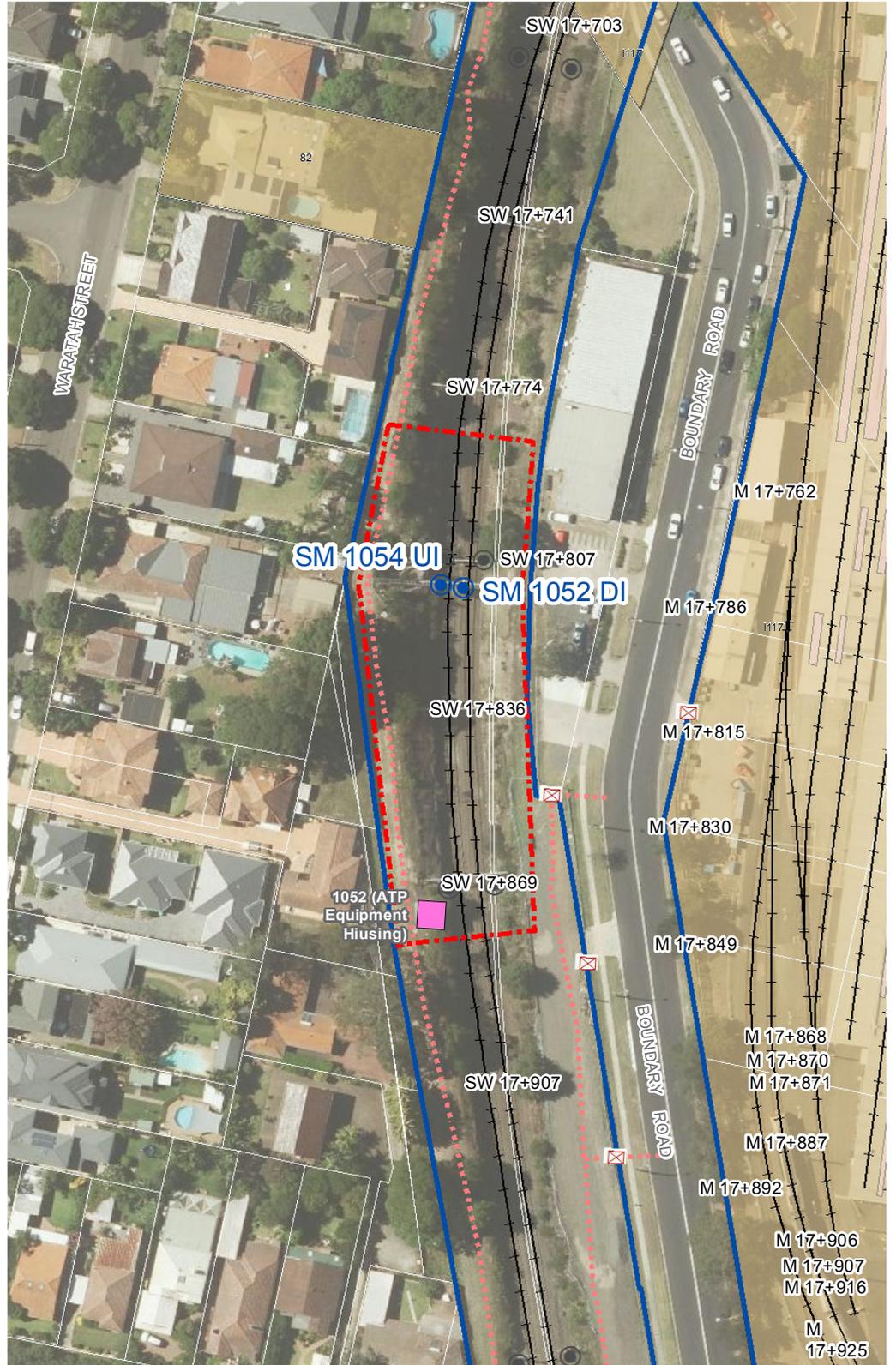
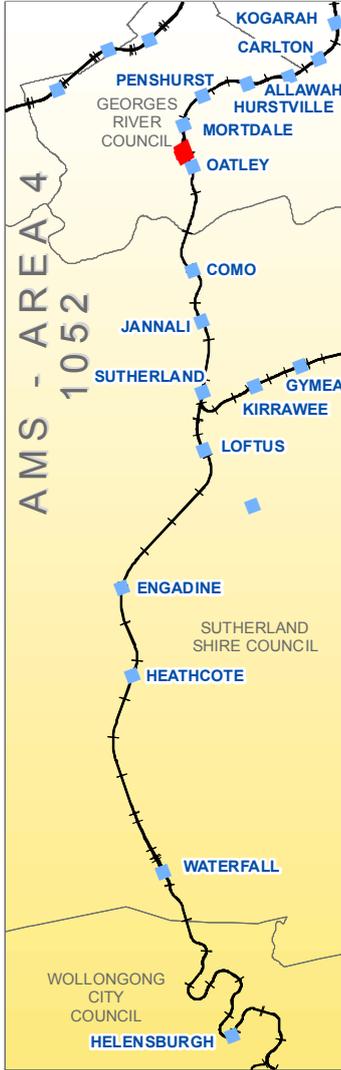


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

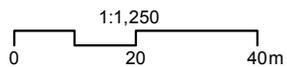
ATP Area 4 Site 1049



Cabling note: N/A

P:\GIS\Project3\project\252771\_ATP\Area4\_AMS\_rev4.mxd\JOB No.130-06-17\martin.russe@rev4

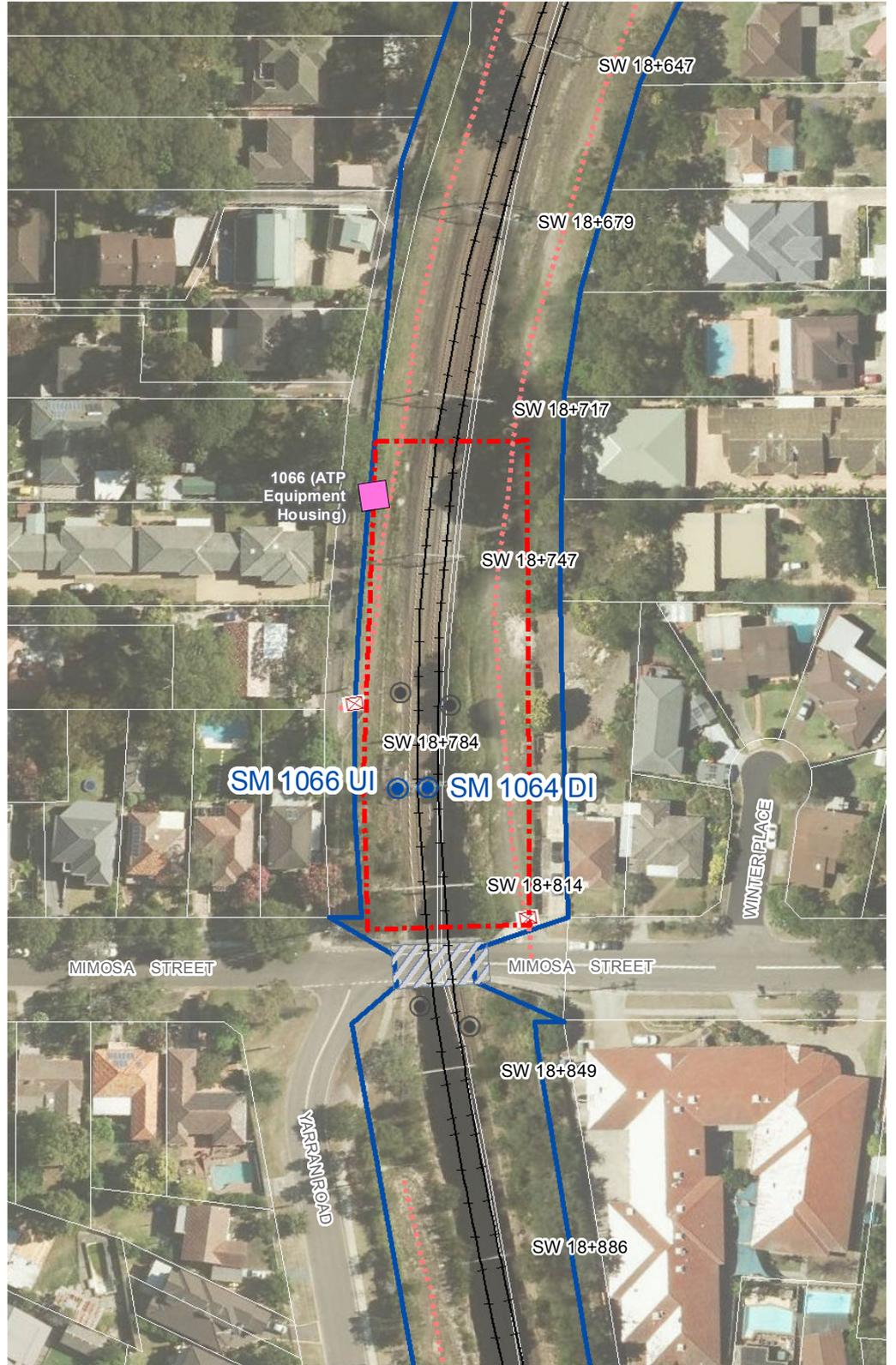
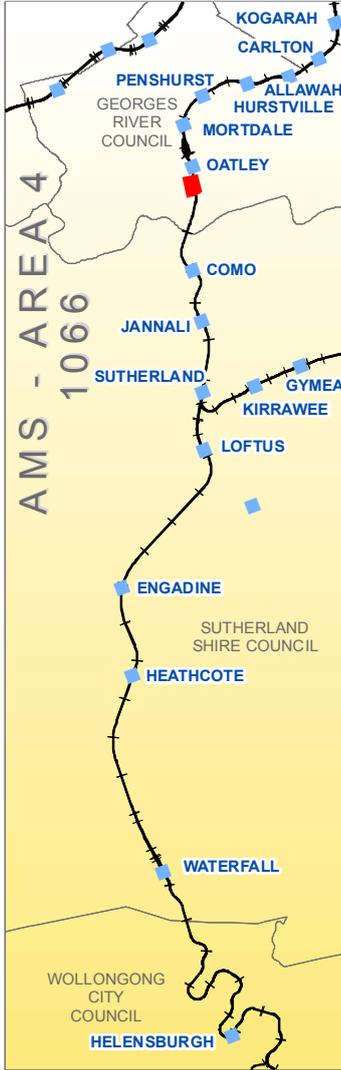
Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	



Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

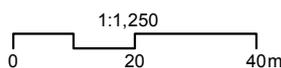




Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

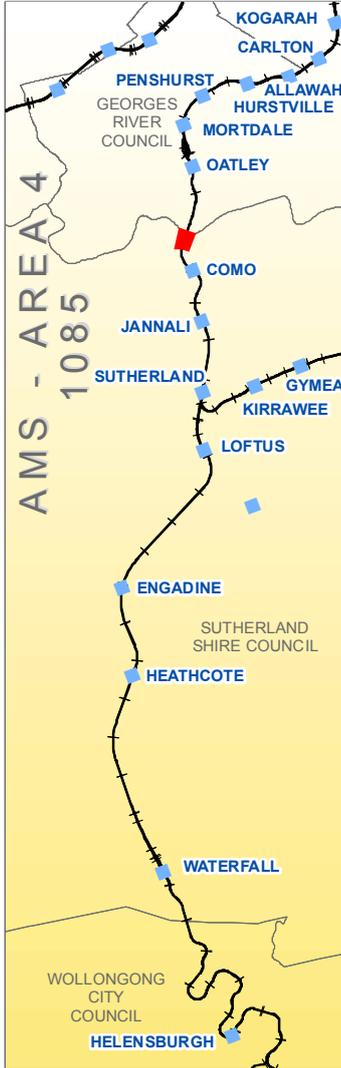


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

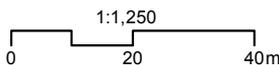
ATP Area 4 Site 1066



Cablings note: N/A

P:\GIS\Project-3\project\252771\_ATP\Area4\_AMS\_rev4.mxd\JOB No.130-06-17\martin.russe\Rev 4

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		

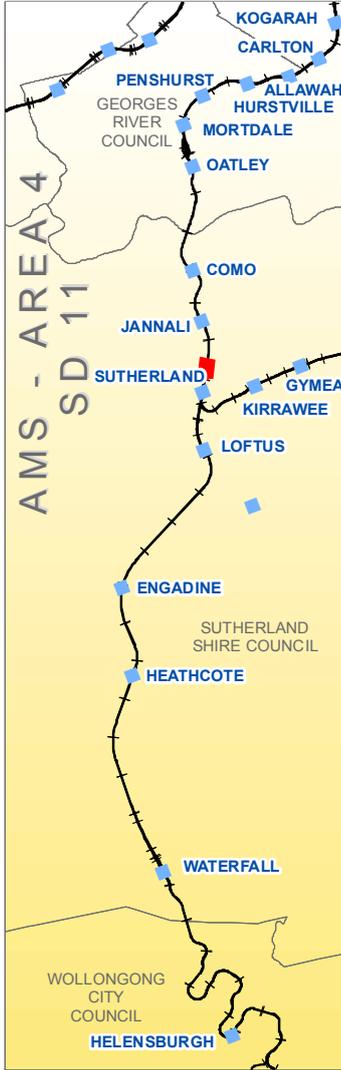


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

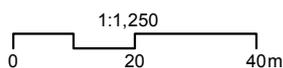
ATP Area 4 Site 1085



Cabling note: N/A

P:\GIS\Project-3\project\252771\_ATP\Area4\_AMS\_rev4.mxd\JOB No.130-06-17\martin.russeil\Rev 4

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

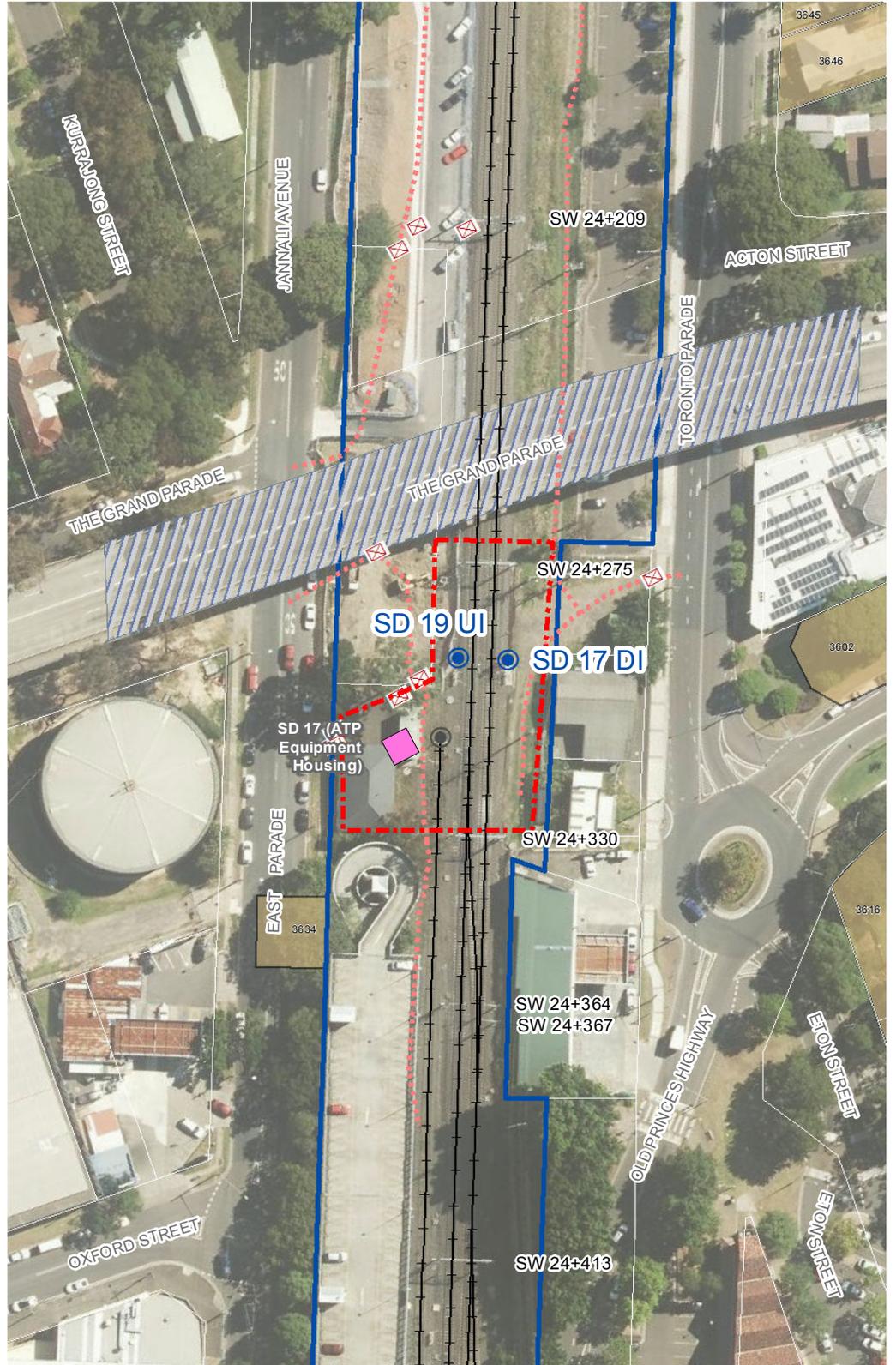
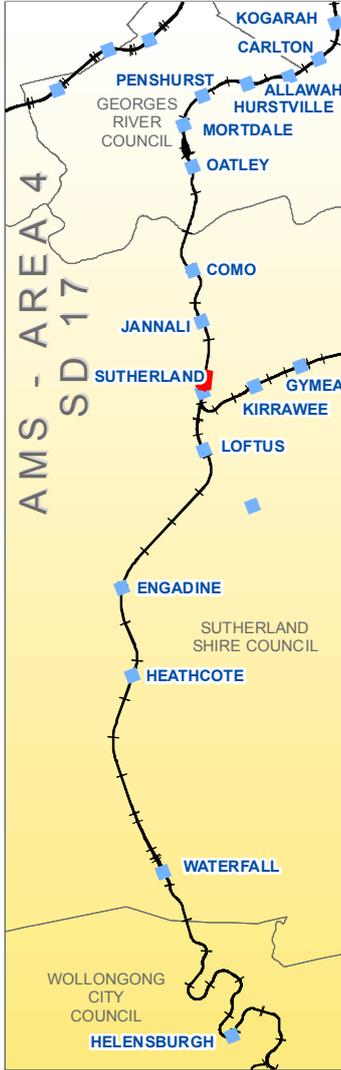


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

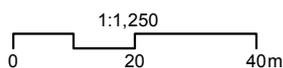
ATP Area 4 Site SD 11



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

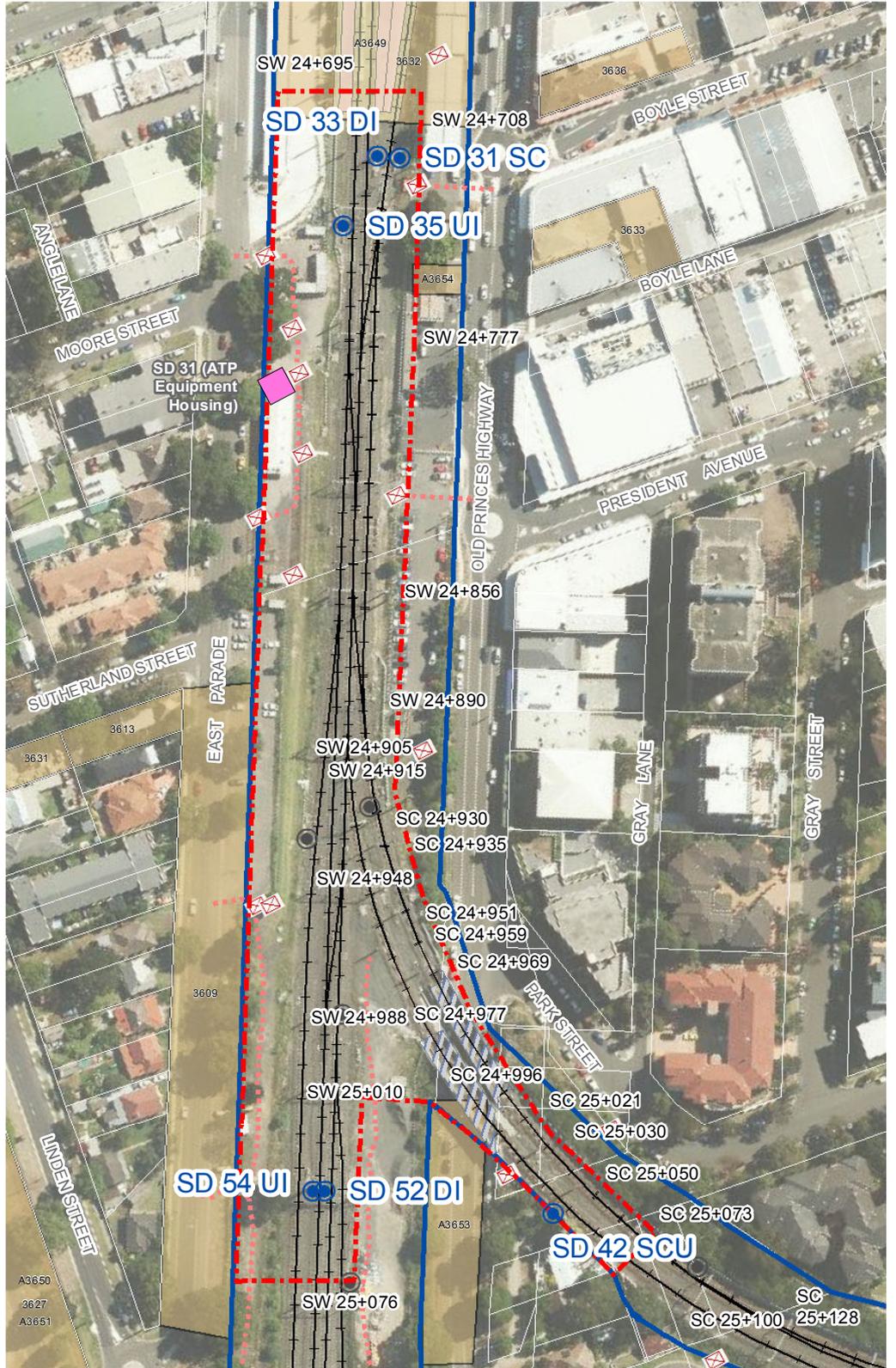
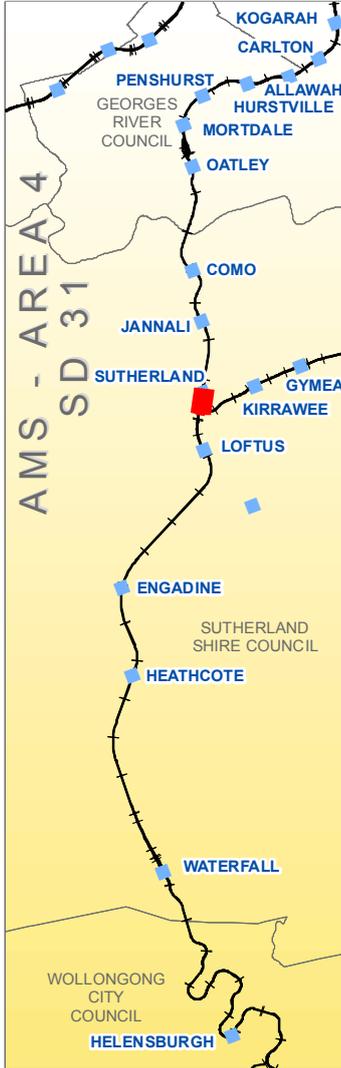


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

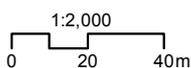
ATP Area 4 Site SD 17



Cabling note: N/A

Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

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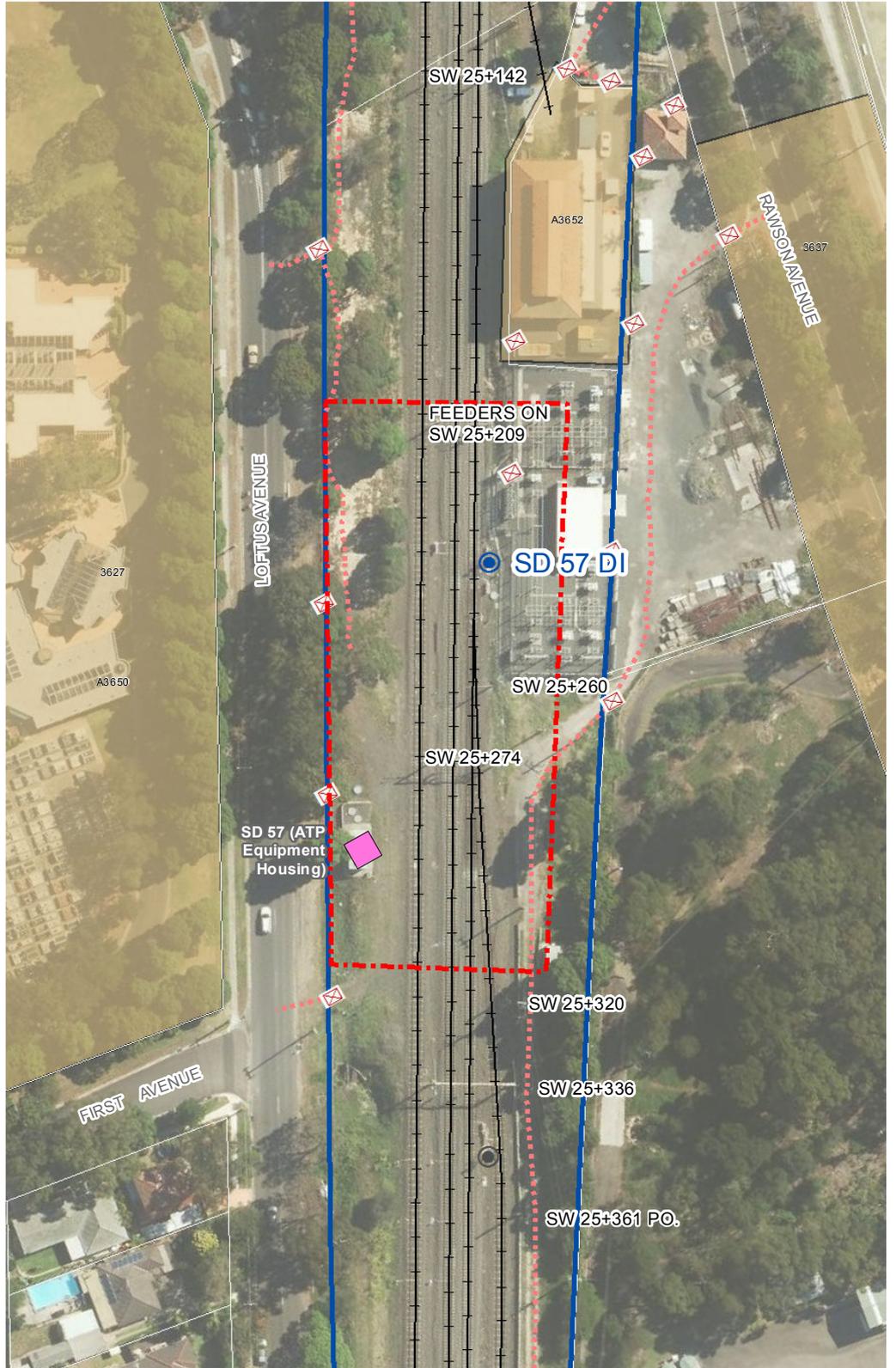
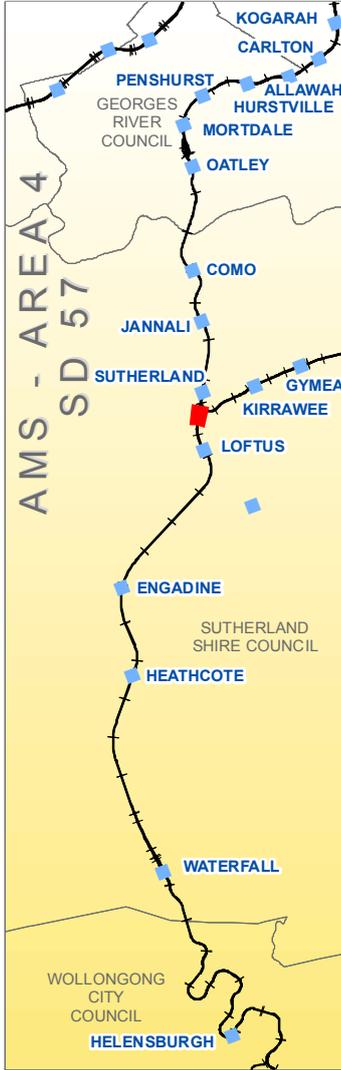


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

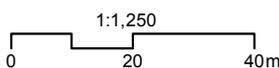
ATP Area 4 Site SD 31



Cabling note: N/A

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- |                          |                     |  |  |
|--------------------------|---------------------|--|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b>                                |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |  |
| Rail line                | Tunnel section      | EEC vegetation                           |  |
|                          | Substation location | Heritage item/heritage conservation area |  |

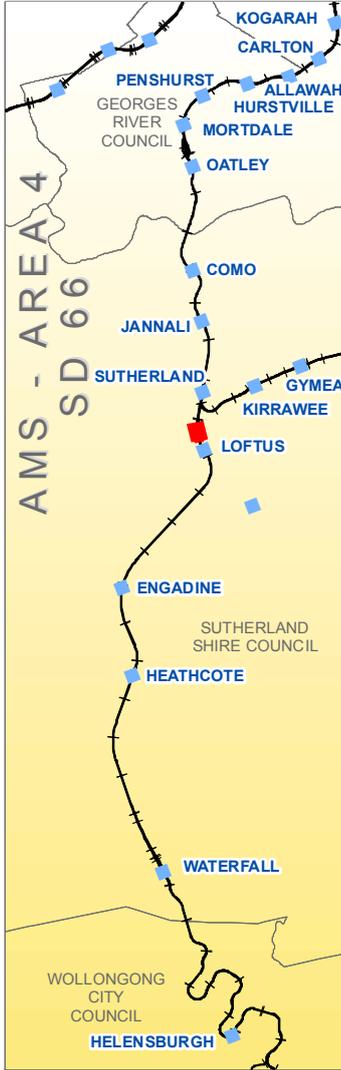


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

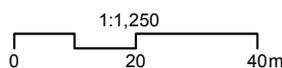
ATP Area 4 Site SD 57



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

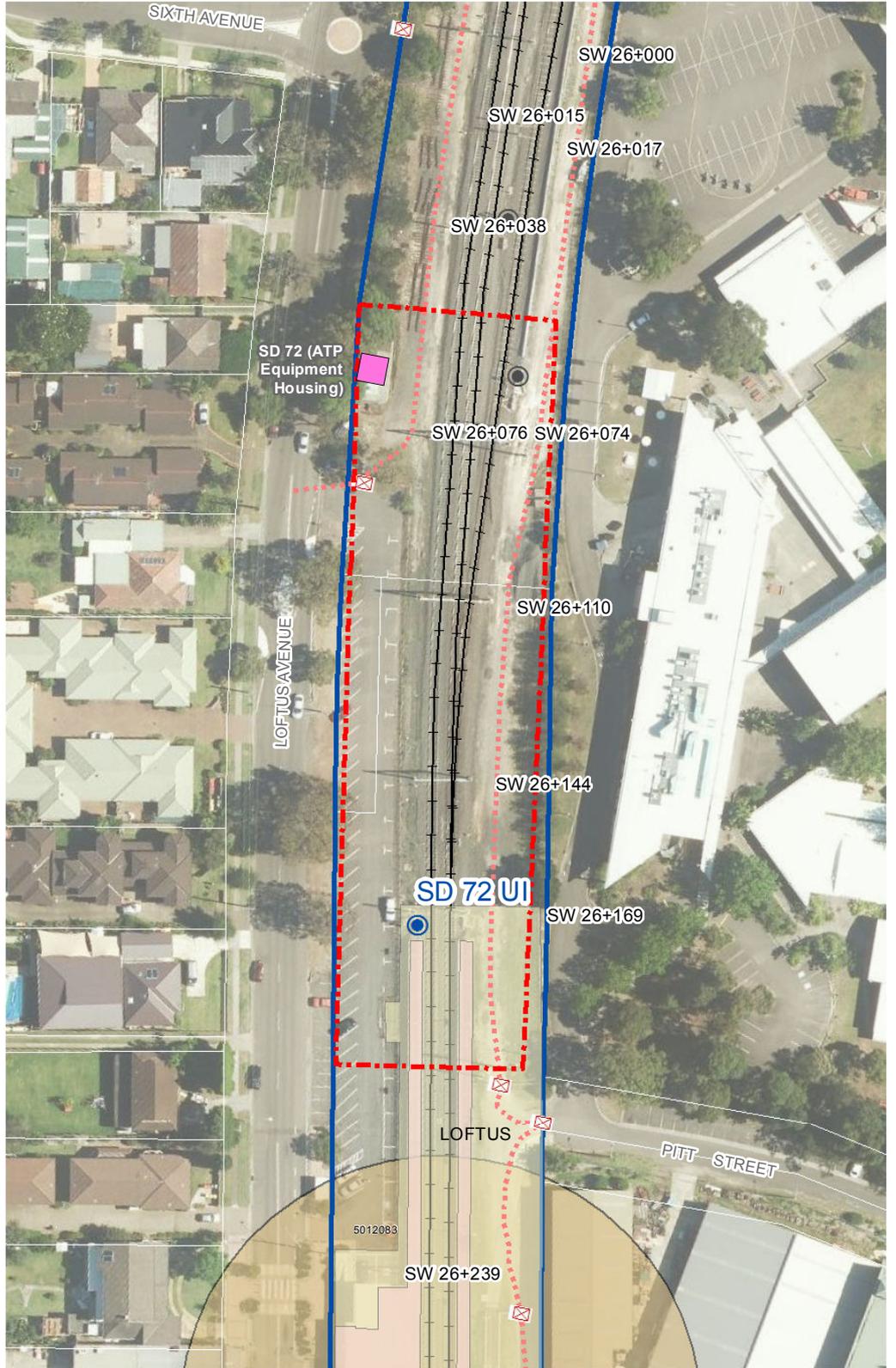
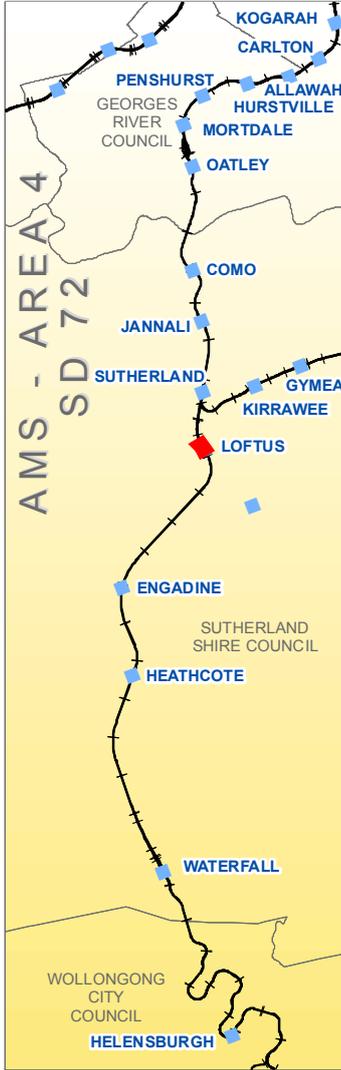


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

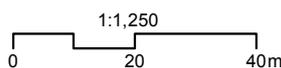
ATP Area 4 Site SD 66



Cabling note: N/A

- |                          |                     |  |  |
|--------------------------|---------------------|--|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b>                                |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |  |
| Rail line                | Tunnel section      | EEC vegetation                           |  |
|                          | Substation location | Heritage item/heritage conservation area |  |

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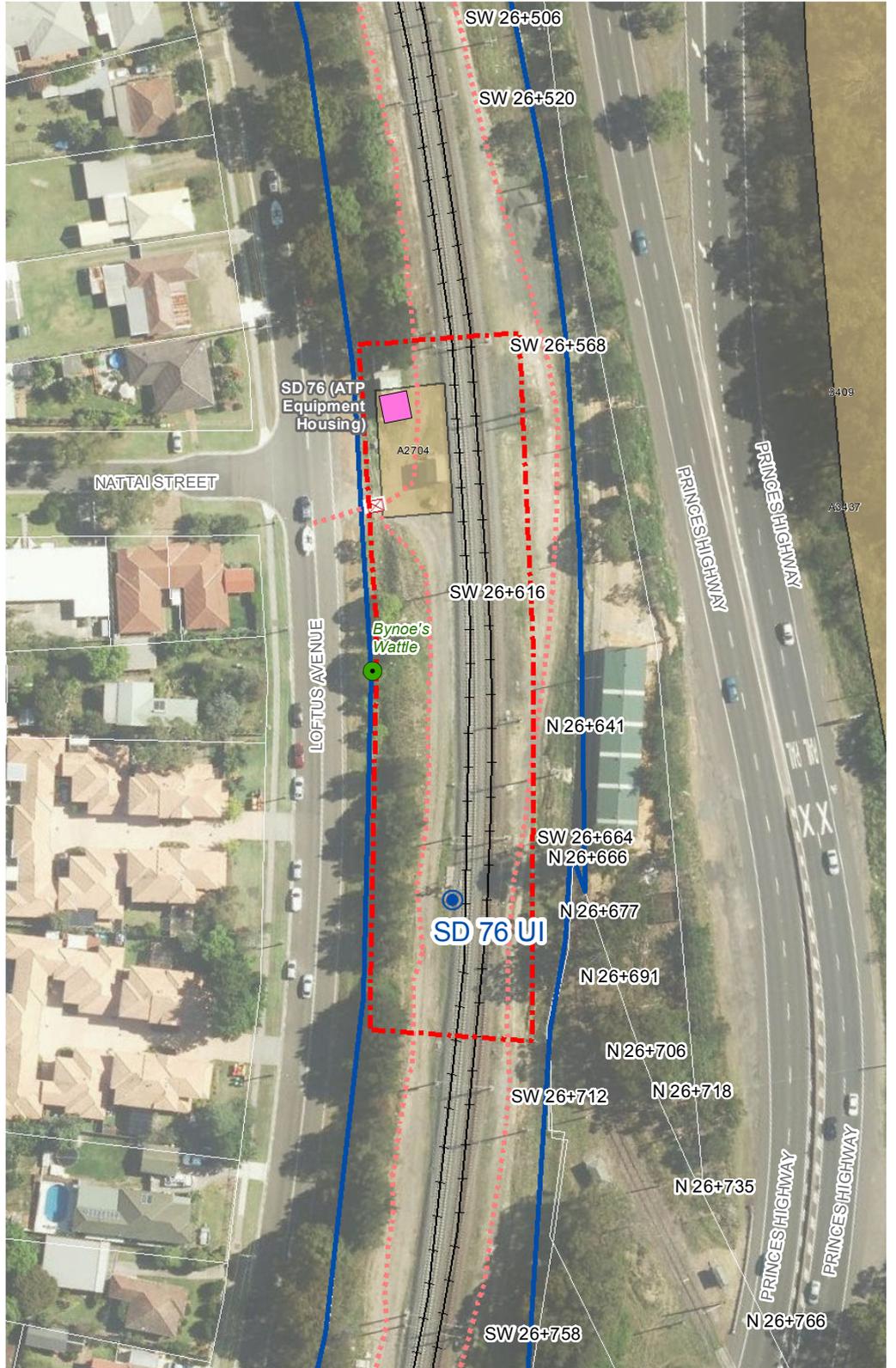
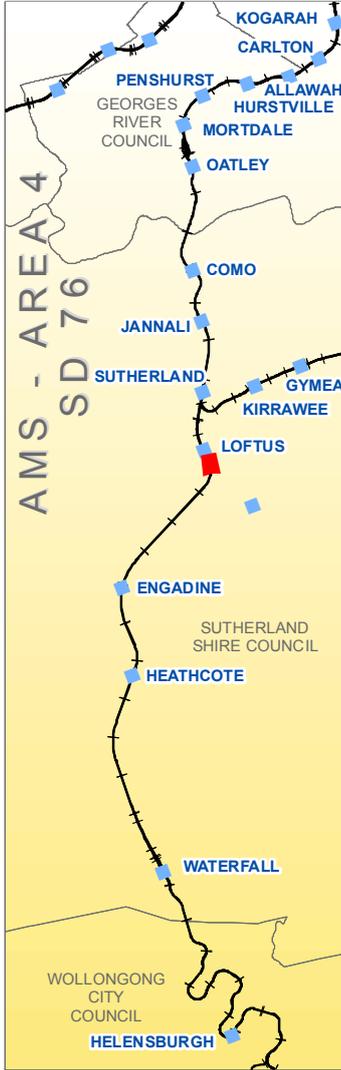


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

ATP Area 4 Site SD 72



Cabling note: N/A

Site footprint

ATP equipment housing

Signal location

Other signal location

Indicative rail corridor

Rail line

Access gate

Access road

Platform

Station

Bridge

Tunnel section

Substation location

Area of potential contamination

SEPP14 wetlands

SEPP71 coastal protection

Threatened fauna

Threatened flora

EEC vegetation

Heritage item/heritage conservation area

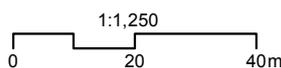
**Acid Sulfate Soil Risk**

High risk of ASS occurring within 4m of natural soil surface

Low risk of ASS occurring within 4m of natural soil surface

No risk of ASS occurring within 4m of natural soil surface

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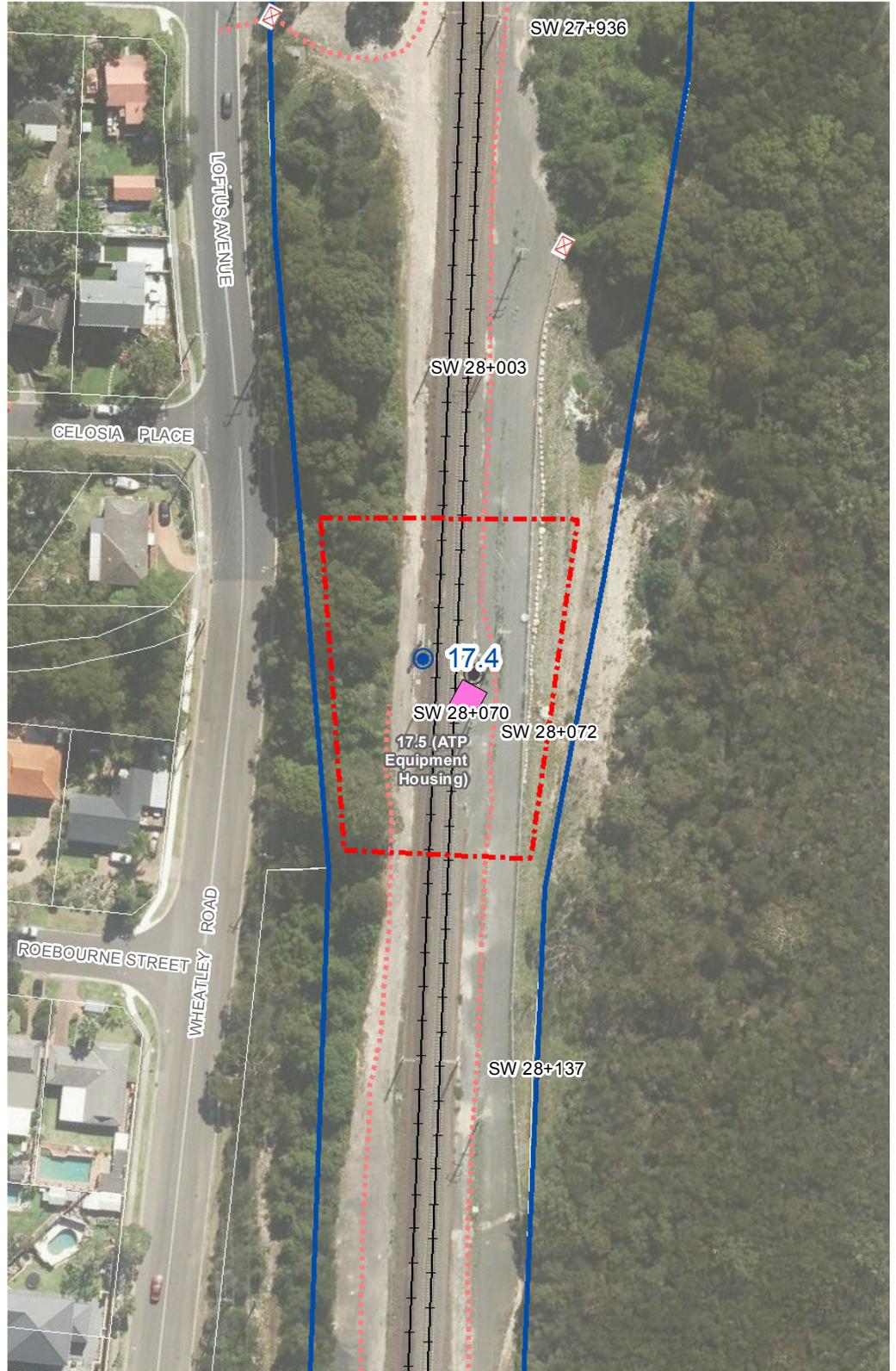
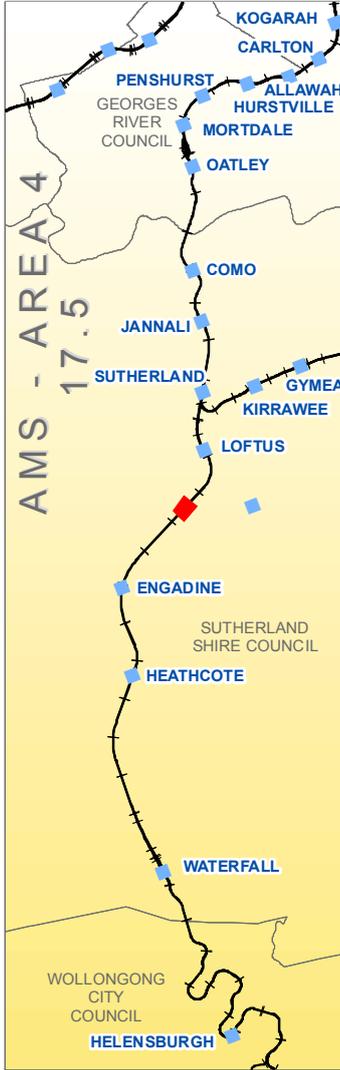


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

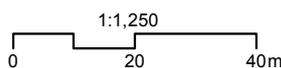
ATP Area 4 Site SD 76



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

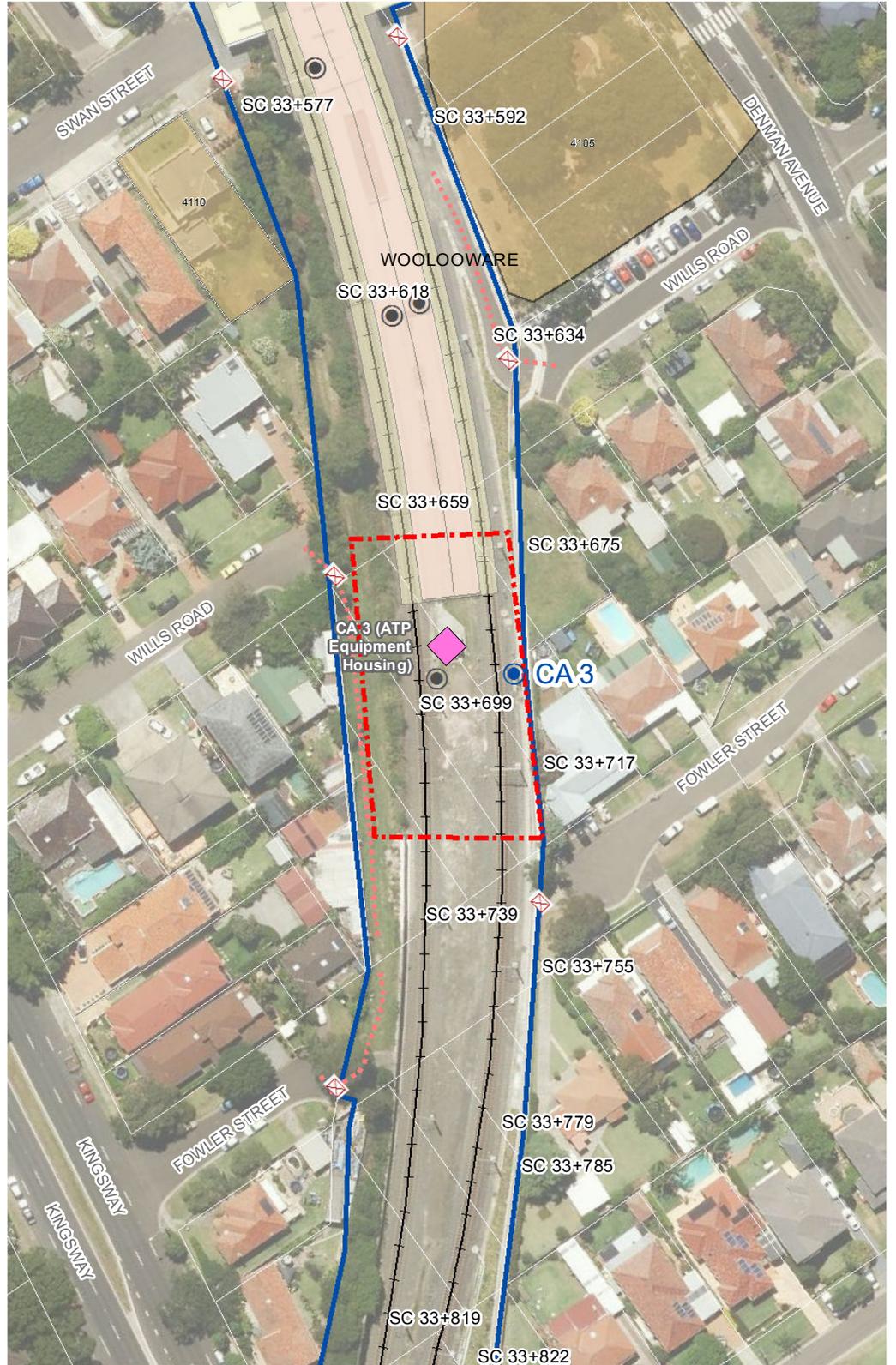
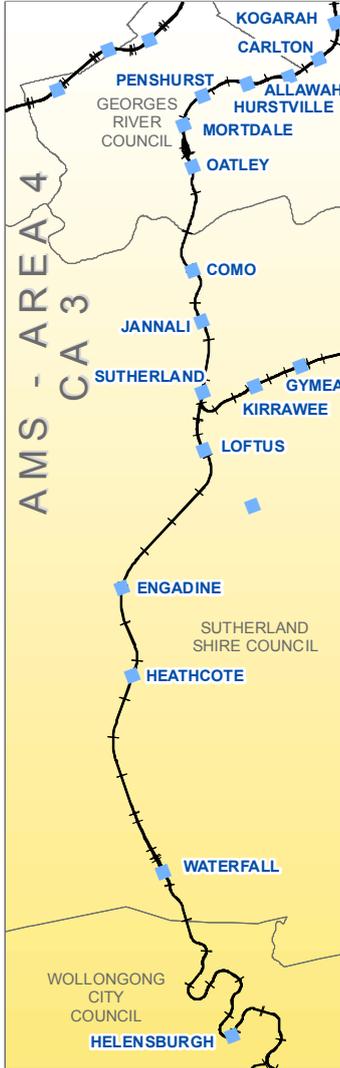


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

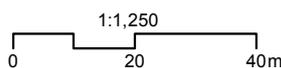
ATP Area 4 Site 17.5



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

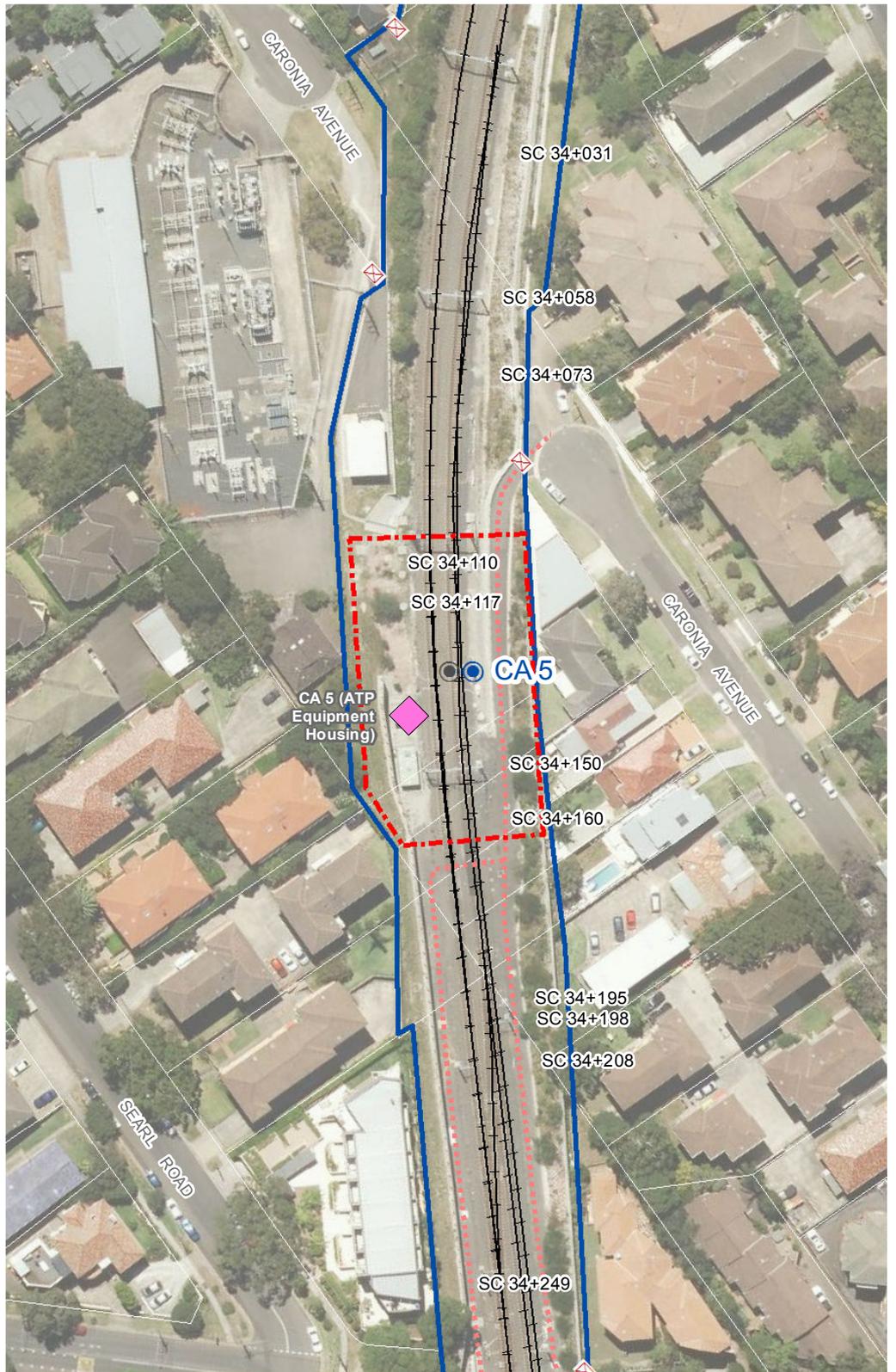
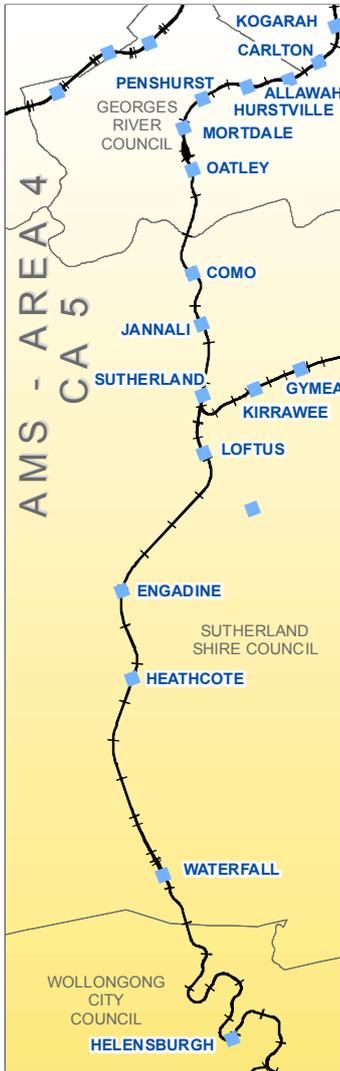


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

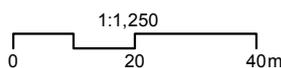
ATP Area 4 Site CA 3



Cablings note: N/A

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- |                          |                     |  |  |
|--------------------------|---------------------|--|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b>                                |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |  |
| Rail line                | Tunnel section      | EEC vegetation                           |  |
|                          | Substation location | Heritage item/heritage conservation area |  |

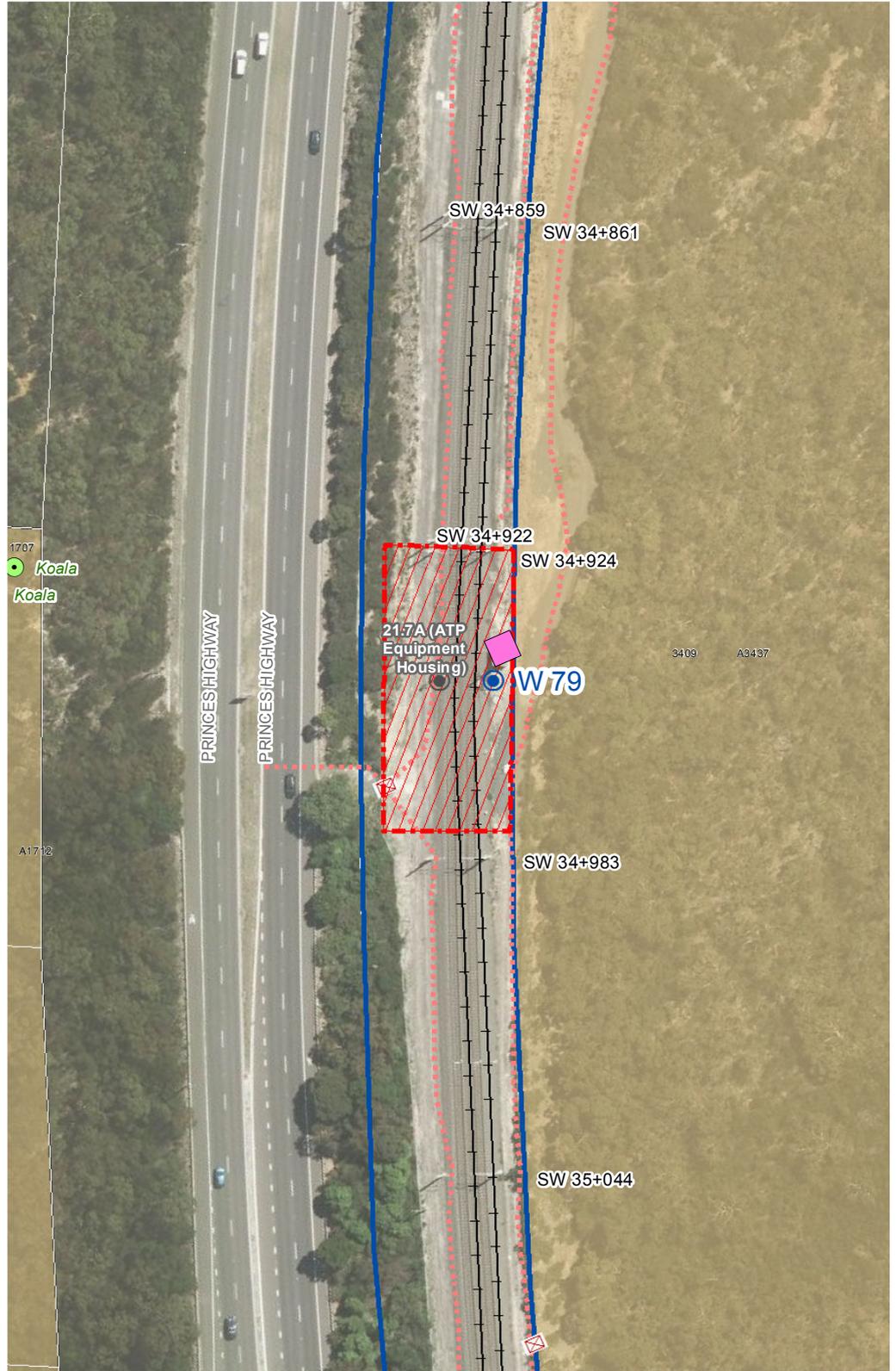
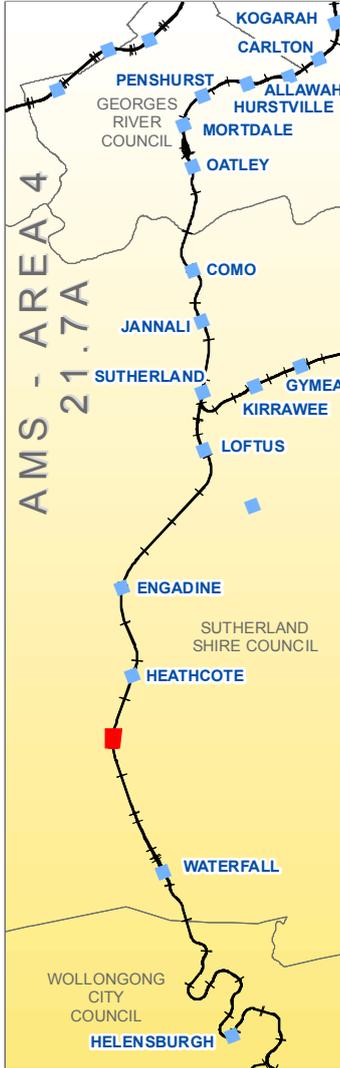


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

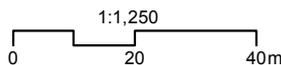
ATP Area 4 Site CA 5



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		

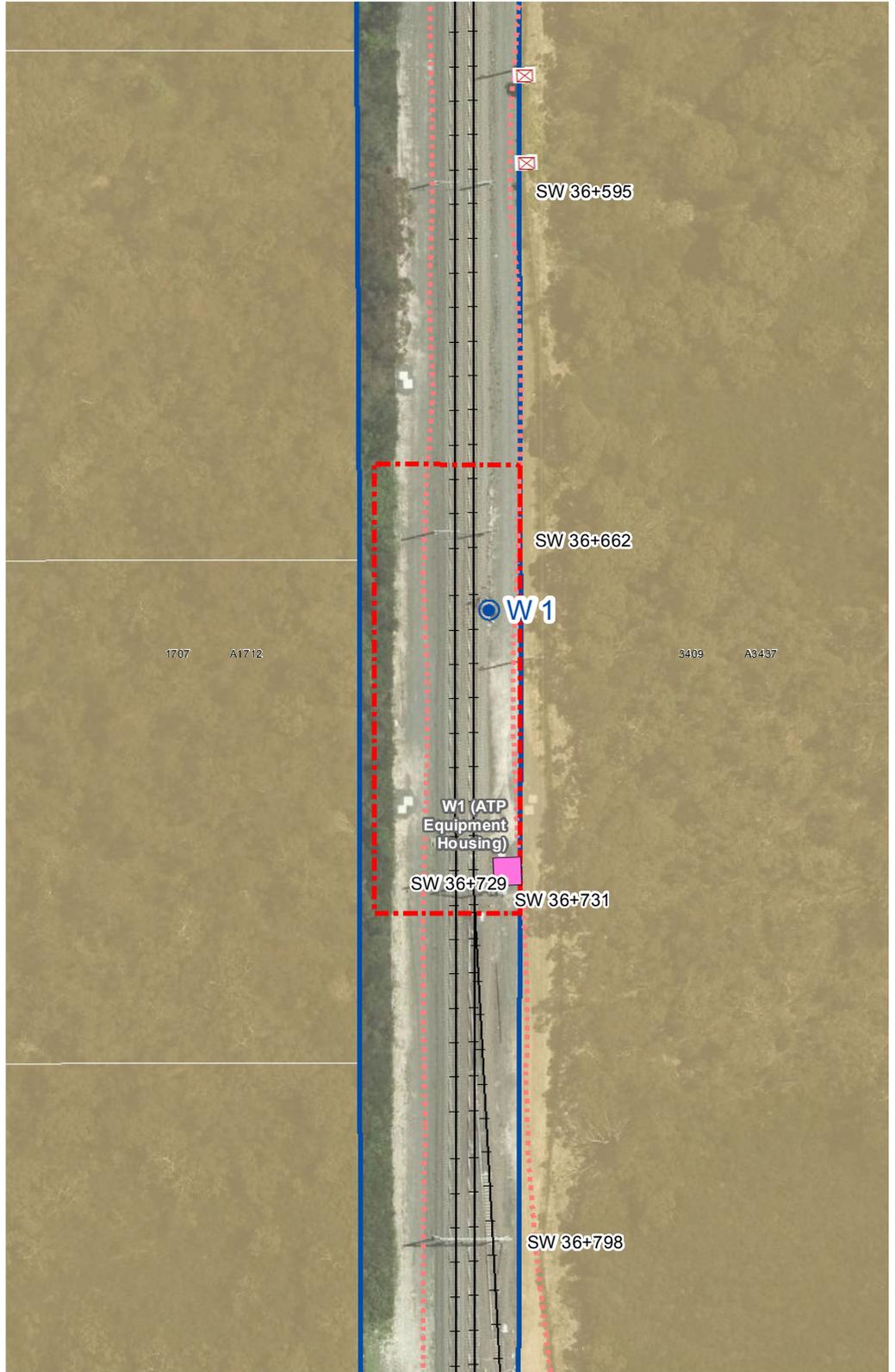
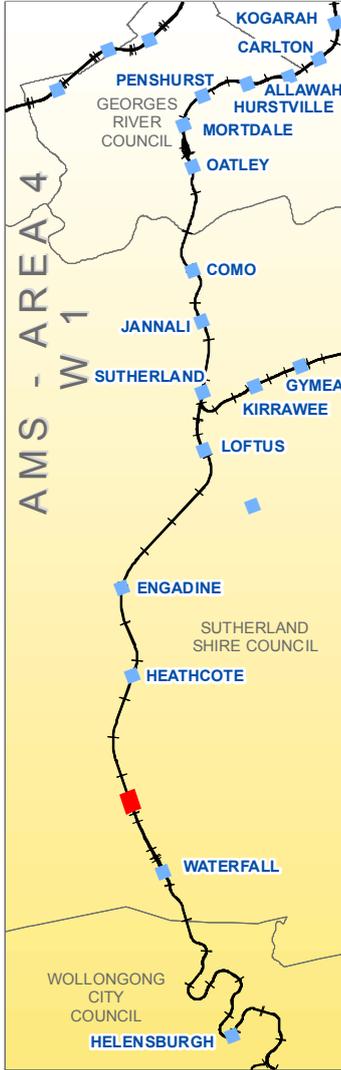


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

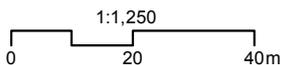
ATP Area 4 Site 21.7A



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		

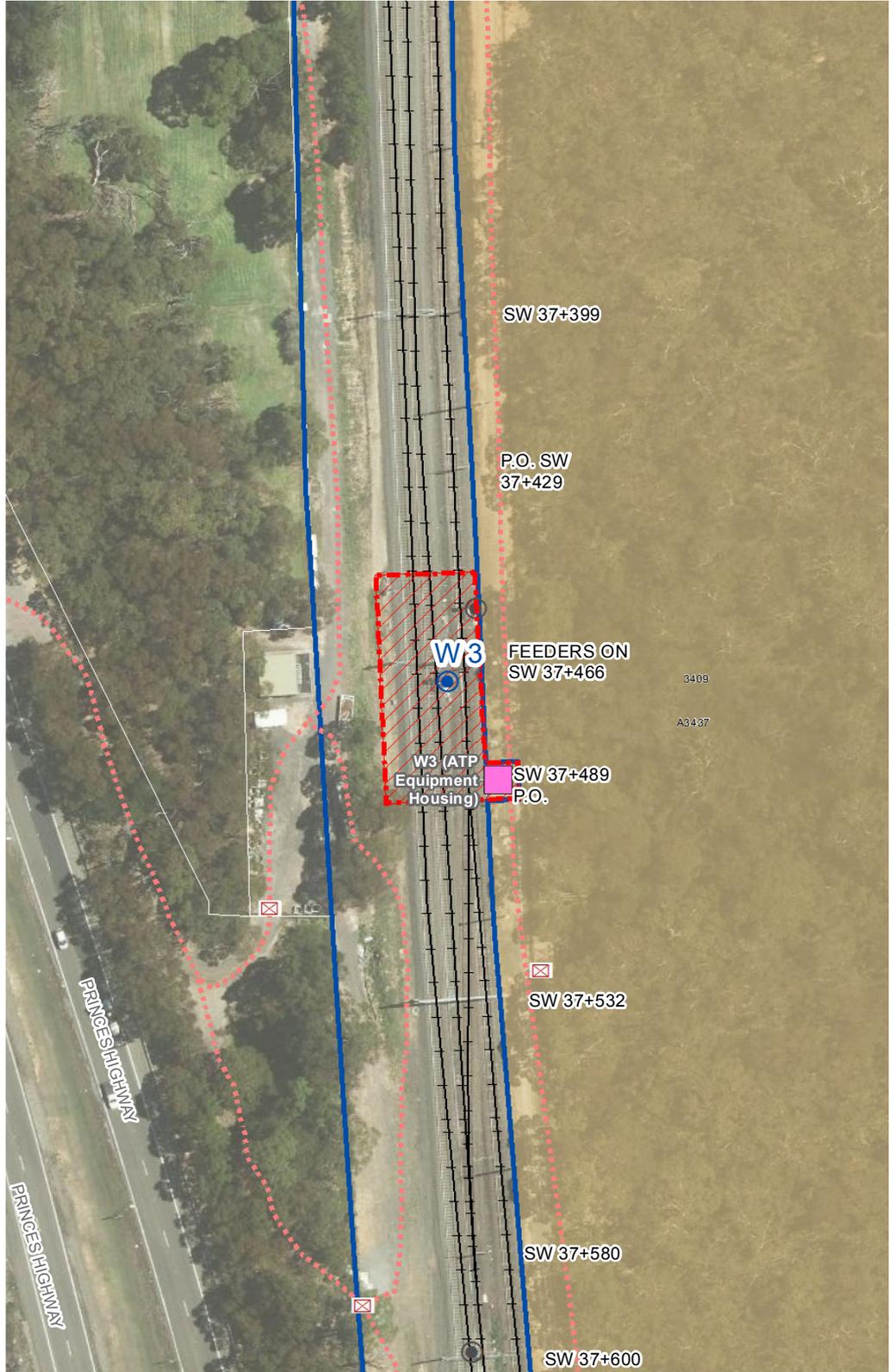
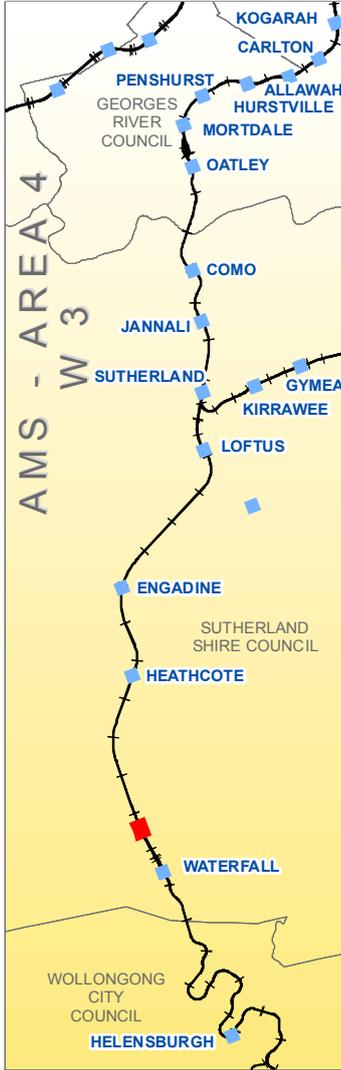


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

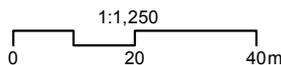
ATP Area 4 Site W 1



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		

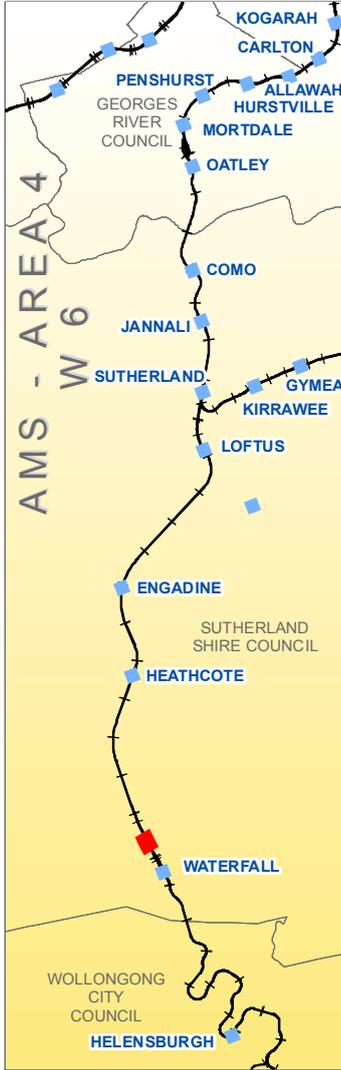


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

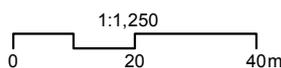
ATP Area 4 Site W 3



Cablings note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	

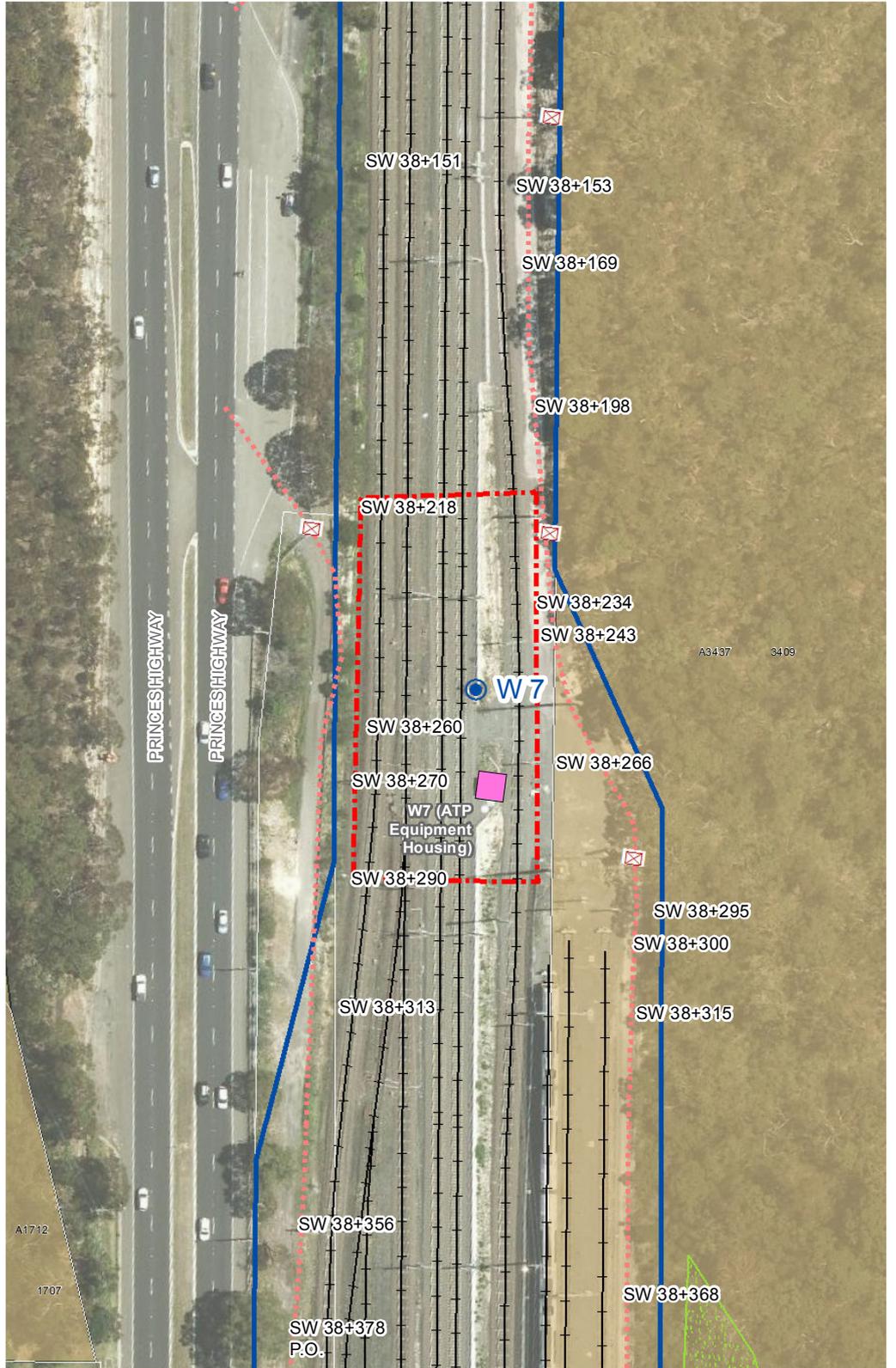
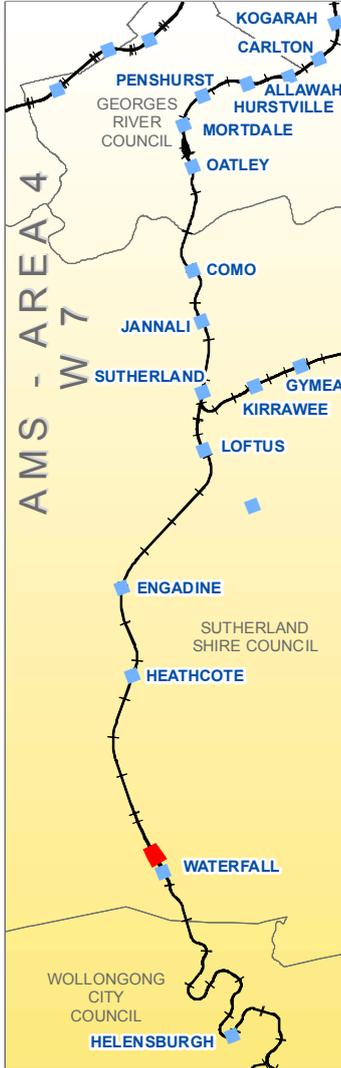


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

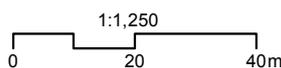
S ATP Area 4 Site W 6



Cablings note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>
ATP equipment housing	Access road	SEPP14 wetlands	High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection	Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna	No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora	
Rail line	Tunnel section	EEC vegetation	
	Substation location	Heritage item/heritage conservation area	



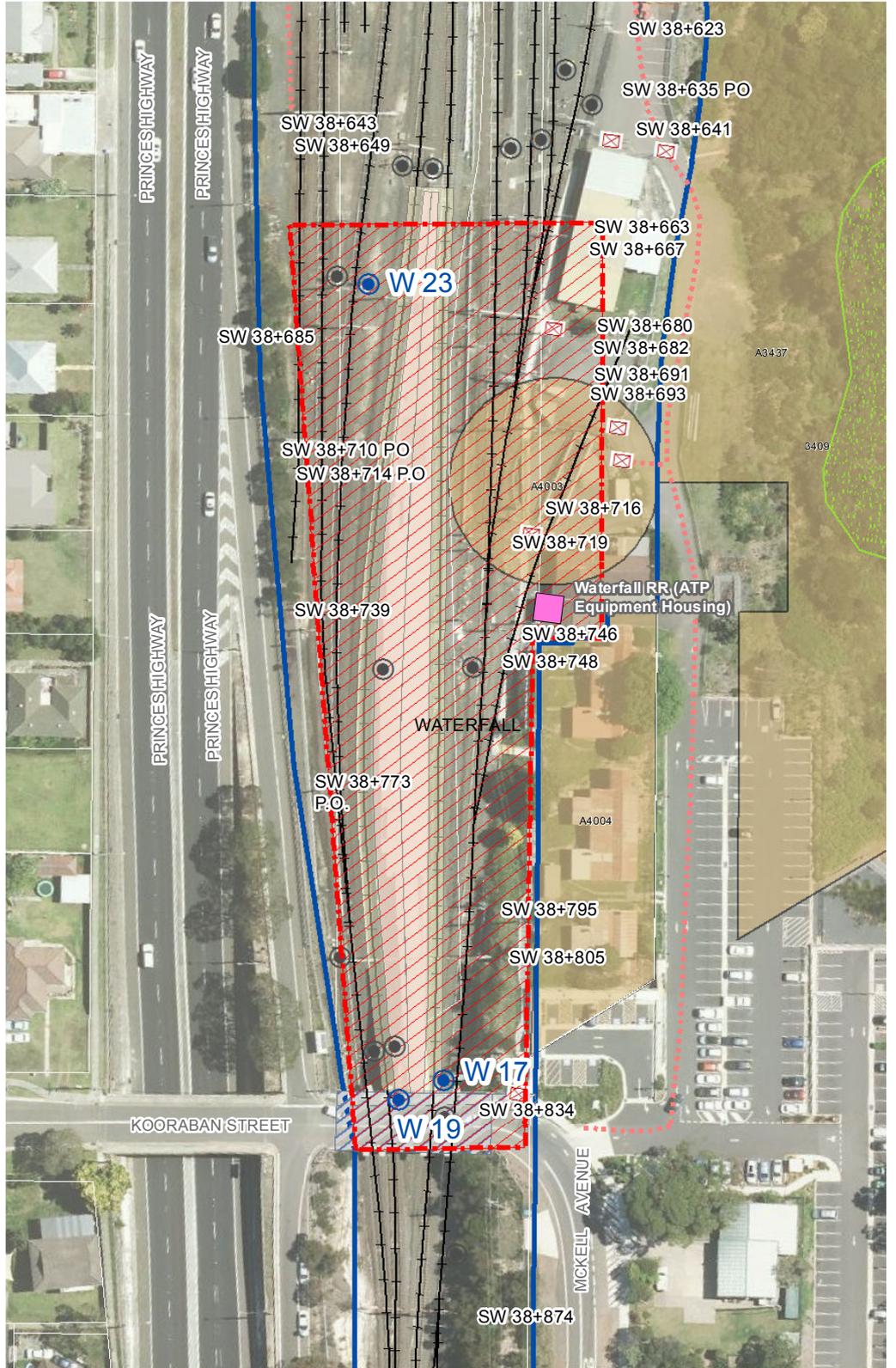
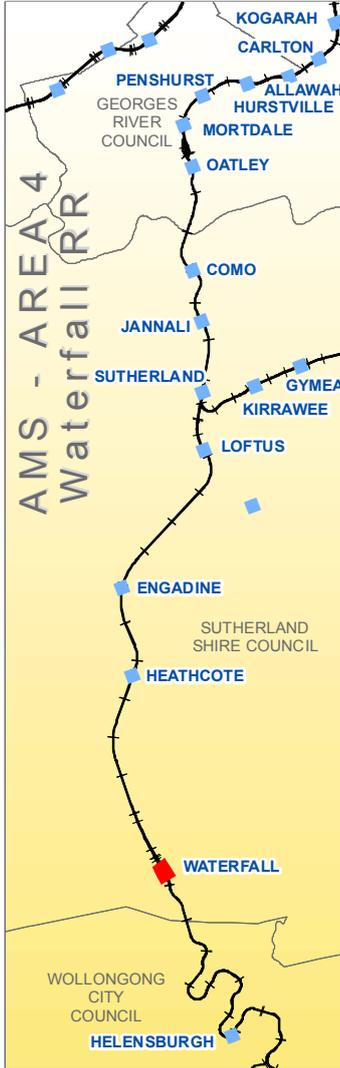
Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

## Automatic Train Protection (ATP) REF

### ATP Area 4 Site W 7

**Note:** This site plan shows the curtilage of the heritage listed Royal National Park Heathcote National Park extending into the rail corridor. This spatial data set has been sourced from the NSW Office of Environment and Heritage and is subject to minor localised boundary anomalies. Local LGA mapping tools have been reviewed to verify the heritage curtilage doesn't extend into the rail corridor.

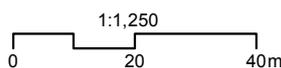


Cabling note: N/A

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- |                          |                     |  |
|--------------------------|---------------------|--|
| Site footprint           | Access gate         | Area of potential contamination          |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          |
| Signal location          | Platform            | SEPP71 coastal protection                |
| Other signal location    | Station             | Threatened fauna                         |
| Indicative rail corridor | Bridge              | Threatened flora                         |
| Rail line                | Tunnel section      | EEC vegetation                           |
|                          | Substation location | Heritage item/heritage conservation area |

- Acid Sulfate Soil Risk**
- High risk of ASS occurring within 4m of natural soil surface
  - Low risk of ASS occurring within 4m of natural soil surface
  - No risk of ASS occurring within 4m of natural soil surface

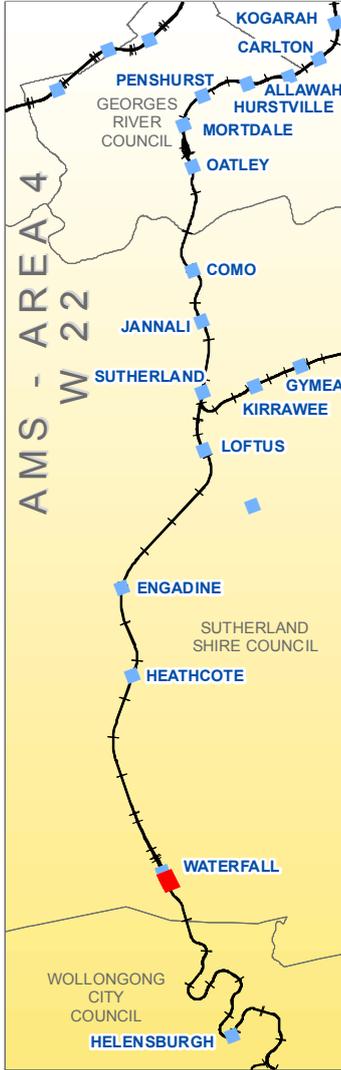


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

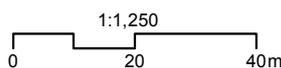
ATP Area 4 Site Waterfall RR



Cabling note: N/A

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- |                          |                     |  |  |
|--------------------------|---------------------|--|--|
| Site footprint           | Access gate         | Area of potential contamination          | <b>Acid Sulfate Soil Risk</b>                                |
| ATP equipment housing    | Access road         | SEPP14 wetlands                          | High risk of ASS occurring within 4m of natural soil surface |
| Signal location          | Platform            | SEPP71 coastal protection                | Low risk of ASS occurring within 4m of natural soil surface  |
| Other signal location    | Station             | Threatened fauna                         | No risk of ASS occurring within 4m of natural soil surface   |
| Indicative rail corridor | Bridge              | Threatened flora                         |  |
| Rail line                | Tunnel section      | EEC vegetation                           |  |
|                          | Substation location | Heritage item/heritage conservation area |  |

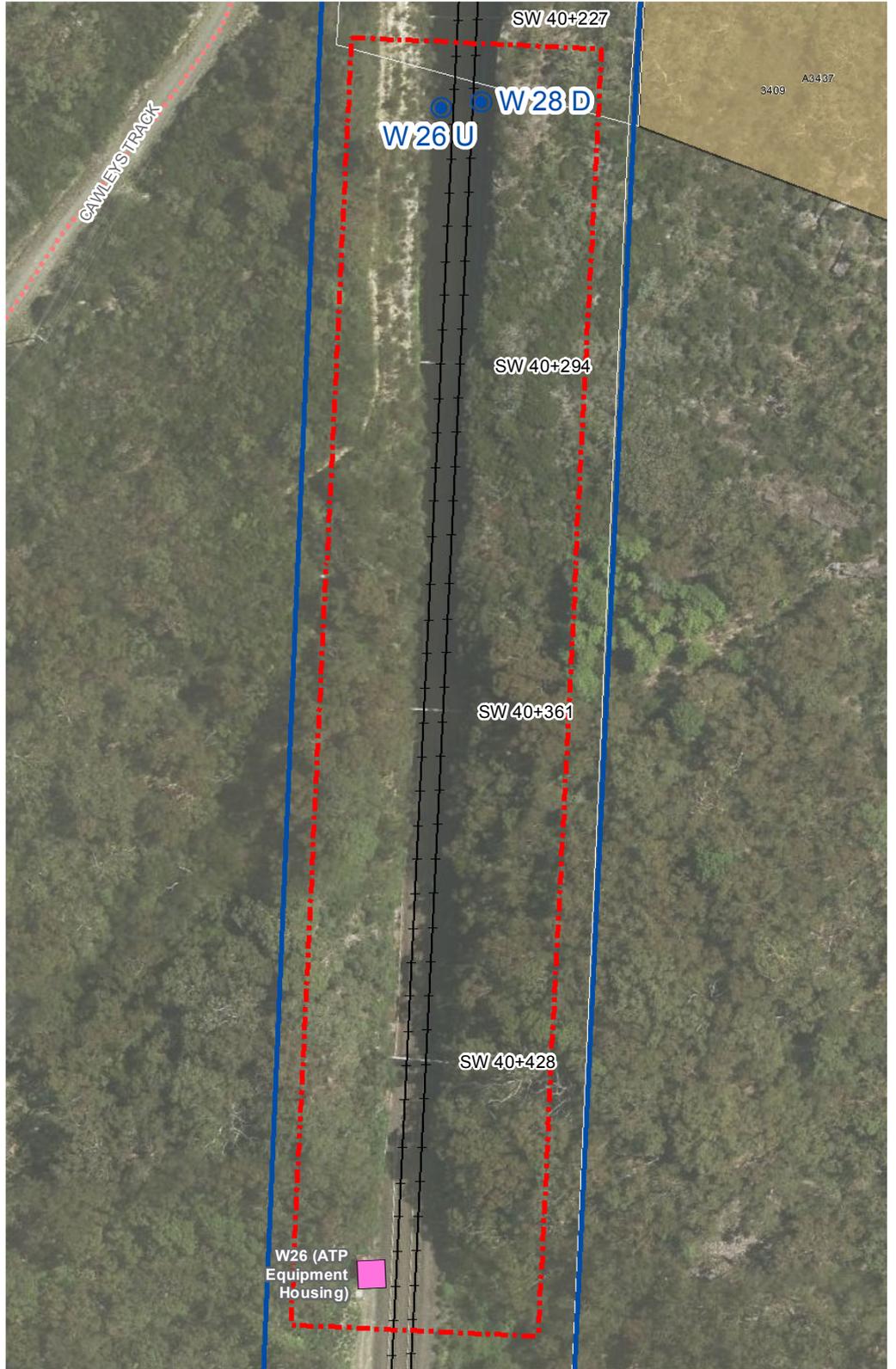
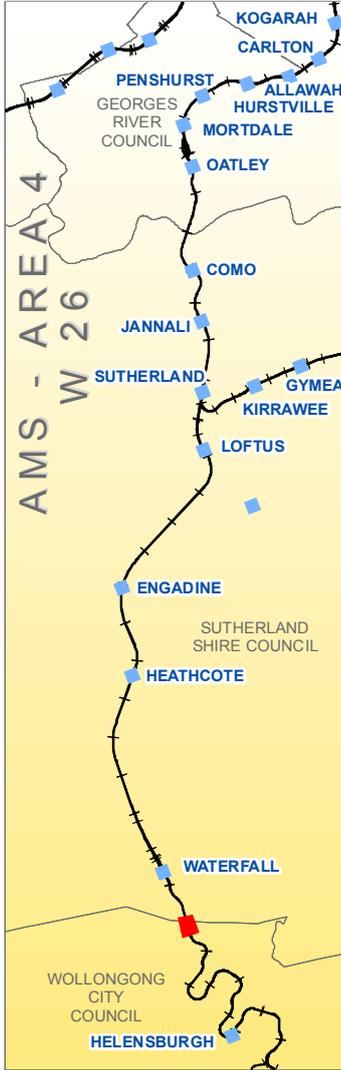


Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

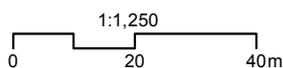
ATP Area 4 Site W 22



Cabling note: N/A

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Site footprint	Access gate	Area of potential contamination	<b>Acid Sulfate Soil Risk</b>	
ATP equipment housing	Access road	SEPP14 wetlands		High risk of ASS occurring within 4m of natural soil surface
Signal location	Platform	SEPP71 coastal protection		Low risk of ASS occurring within 4m of natural soil surface
Other signal location	Station	Threatened fauna		No risk of ASS occurring within 4m of natural soil surface
Indicative rail corridor	Bridge	Threatened flora		
Rail line	Tunnel section	EEC vegetation		
	Substation location	Heritage item/heritage conservation area		



Projection: GDA 1994 MGA Zone 56

Source: Aurecon, OEH, Sydney Trains, LPI

Automatic Train Protection (ATP) REF

ATP Area 4 Site W 26

## Appendix 4 – ATP Preliminary environmental risk assessment criteria

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Water Quality and Hydrology</b>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;25m and ≤150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway ≤25m from works</li> </ul>
	<ul style="list-style-type: none"> <li>Waterway is relatively degraded</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is relatively sensitive</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is highly sensitive and/or specifically protected</li> </ul>
<b>Non-Indigenous Heritage</b>	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of a heritage item/place (including works within the curtilage of items on Section 170, LEP Heritage Schedules)</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of item(s) on the State heritage register</li> </ul>
<b>Indigenous Heritage</b>	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of heritage item/place</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of heritage item/place, or works may affect such a site</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>No vegetation removal required</li> </ul>	<ul style="list-style-type: none"> <li>Tree pruning or lopping required</li> <li>Trees/vegetation within 5m of works</li> <li>Works within a bush regeneration area</li> </ul>	<ul style="list-style-type: none"> <li>Removal of trees/vegetation required</li> <li>Excavations likely to affect tree roots</li> </ul>
	<ul style="list-style-type: none"> <li>No threatened species or ecologically sensitive area(s) affected</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) within 150m of works</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) potentially impacted</li> </ul>
	<ul style="list-style-type: none"> <li>Negligible potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>Potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>High potential to encounter native fauna species</li> </ul>
<b>Potential Contamination</b>	<ul style="list-style-type: none"> <li>No contamination sites identified within vicinity of works (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination in ballast environmental site survey, however no evidence of hazardous building materials, waste materials or contamination of land uses (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination, hazardous building materials and waste within ballast environmental site survey</li> <li>Surrounding land uses indicate potential contamination (EPA search)</li> </ul>
	<ul style="list-style-type: none"> <li>No contamination identified in ballast environmental site survey</li> </ul>		

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Noise</b>	<ul style="list-style-type: none"> <li>Sensitive receptors are identified greater than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located greater than 50m and less than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located equal to or less than 50m of works</li> </ul>
<b>Land Use</b>	<ul style="list-style-type: none"> <li>National park and/or reserve greater than 100m from works</li> </ul>	<ul style="list-style-type: none"> <li>National park and/or reserve within 100m of works</li> </ul>	<ul style="list-style-type: none"> <li>Works bounded by a national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>Works unlikely to extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Works may extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Site access through national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>No disruption to local land uses anticipated</li> </ul>	<ul style="list-style-type: none"> <li>Works could affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>	<ul style="list-style-type: none"> <li>Works outside the rail corridor</li> <li>Works affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>
<b>Potential ASS</b>	<ul style="list-style-type: none"> <li>No risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>Low risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>High risk of ASS occurring within 4m of natural soil surface</li> </ul>
<b>Traffic and access</b>	<ul style="list-style-type: none"> <li>Works are not considered to have an impact on access or parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>Works have the potential to impact on access/parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>The rail corridor access gate is located within close proximity to community places or sensitive receptors, the proposed works are considered likely to have an impact on access/parking for community places or sensitive receptors</li> </ul>

# Appendix 2: Conditions of Approval

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## CONDITIONS OF APPROVAL

### Automatic Train Protection Project Eastern Suburbs & Illawarra Line – Area 4

Note: these conditions of approval must be read in conjunction with the final mitigation measures in the Automatic Train Protection (ATP) Project - Eastern Suburbs & Illawarra Line – Area 4 Review of Environmental Factors.

#### Schedule of acronyms and definitions used:

Acronym	Definition
ATP	Automatic Train Protection
CEMP	Construction Environmental Management Plan
CLP	Community Liaison Plan
CoA	Condition of Approval
ECM	Environmental Controls Map
EIA	Environmental Impact Assessment
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection Licence issued by the Environmental Protection Authority under the Protection of the Environment Operations Act 1997.
ISO	International Standards Organisation
OEH	NSW Office of Environment and Heritage
OOHWP	Out of Hours Works Protocol
ADEM	Associate Director Environment Management, TfNSW (or nominated delegate)
REF	Review of Environmental Factors
TfNSW	Transport for NSW

Term	Definition
<b>Construction</b>	Includes all work in respect of the Project, other than survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys, or other activities determined by the TfNSW ADEM to have minimal environmental impact such as minor access roads, minor adjustments to services/utilities, establishing temporary construction compounds (in accordance with this approval), or minor clearing (except where threatened species, populations or ecological communities would be affected).
Contamination	The presence in, on or under land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.
Emergency Work	Includes works to avoid loss of life, damage to external property, utilities and infrastructure, prevent immediate harm to the environment, contamination of land or damage to a heritage (indigenous or non-indigenous) item.
Environmental Impact Assessment (EIA)	The documents listed in Condition 1 of this approval.
Environmental Management Representative	An independent environmental representative appointed to the Project (or a delegate) nominated by Transport for NSW.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Noise Sensitive Receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios, places of worship/religious facilities (e.g. churches), and other noise sensitive receivers identified in the environmental impact assessment.
(the) Project	The construction and operation of the Automatic Train Protection (ATP) Project as described in the environmental impact assessment.
(the) Proponent	A person or body proposing to carry out an activity under Part 5 of the EP&A Act – in the case of the Project, Transport for NSW.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.

# Conditions of Approval

## Condition

### General

#### 1. Terms of approval

The Project shall be carried out generally in accordance with the environmental impact assessment (EIA) for this Project, which comprises the following documents:

DOCUMENT	AUTHOR	DATE
Automatic Train Protection (ATP) Project - Eastern Suburbs & Illawarra Line – Area 4 Review of Environmental Factors.	Aurecon	July 2017
Automatic Train Protection (ATP) Project - Eastern Suburbs & Illawarra Line – Area 4 Determination Report	TfNSW	August 2017

In the event of an inconsistency between these conditions and the EIA, these conditions will prevail to the extent of the inconsistency.

#### 2. Project modifications

Any modification to the project as approved in the EIA would be subject to further assessment. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised. The assessment shall be subject to approval under delegated authority by TfNSW. The Proponent shall comply with any additional requirements from the assessment of the project modification.

#### 3. Statutory requirements

These conditions do not relieve the Proponent of the obligation to obtain all other licences, permits, approvals and land owner consents from all relevant authorities and land owners as required under any other legislation for the Project. The Proponent shall comply with the terms and conditions of such licences, permits, approvals and permissions.

## Communications

#### 4. Community liaison plan

The Proponent shall develop and implement a community liaison plan (CLP) to engage with government agencies, relevant councils, landowners, community members and other relevant stakeholders (such as utility and service providers, bus companies and businesses) where required. The CLP shall comply with the obligations of these conditions and should include, but not necessarily be limited to:

- details of the protocols and procedures for disseminating information and liaising with the community and other key stakeholders about construction activities (including timing and staging) and any associated impacts during the construction period
- stakeholder and issues identification and analysis
- procedures for dealing with complaints or disputes and response requirements, including advertising the 24 hour construction response line number
- details (including a program) of training for all employees, contractors and sub-contractors on the requirements of the CLP.

Sub-plans to the CLP will be developed as required. These sub-plans will detail site-specific consultation and communication requirements for construction works that impact residents, other stakeholders and businesses. They will also identify further mitigation measures and processes to reduce construction impacts.

The CLP shall be prepared to the satisfaction of the Director Community Engagement prior to the commencement of construction and implemented, reviewed and revised as appropriate during construction of the Project.

## Conditions of Approval

### Condition

#### 5. Community notification and liaison

The local community shall be advised of any activities related to the Project with the potential to impact upon them.

Prior to any site activities commencing and throughout the Project duration, the community is to be notified of works to be undertaken, the estimated hours of construction and details of how further information can be obtained (i.e. contact telephone number/email, website, newsletters etc.) including the 24 hour construction response line number.

Construction-specific impacts including information on traffic changes, access changes, detours, services disruptions, public transport changes, high noise generating work activities and work required outside the nominated working hours shall be advised to the local community at least seven (7) days prior to such works being undertaken or other period as agreed to by the Technical Director Project Communications or as required by Environment Protection Authority (EPA) (where an environment protection licence (EPL) is in effect).

#### 6. Website

The Proponent shall provide electronic information (or details of where hard copies of this information may be accessed by members of the public) related to the Project, on dedicated pages within its existing website, including:

- (a) a list of environmental management reports that are publicly available
- (b) 24 hour contact telephone number for information and complaints.

All documents uploaded to the website must be compliant with the *Web Content Accessibility Guidelines V2.0*.

#### 7. Complaints management

The Proponent shall set up a 24 hour construction response line number.

Details of all complaints received during construction are to be recorded on a complaints register. A verbal response to phone enquiries on what action is proposed to be undertaken is to be provided to the complainant within two (2) hours during all times construction is being undertaken and within 24 hours during non-construction times (unless the complainant agrees otherwise). A verbal response to written complaints (email/letter) should be provided within 48 hours of receipt of the communication. A detailed written response is to be provided to the complainant within seven (7) calendar days for verbal and/or written complaints.

Information on all complaints received during the previous 24 hours shall be forwarded to the environmental management representative (EMR) each working day.

### Environmental management

#### 8. Construction environmental management plan

The Proponent shall prepare a construction environmental management plan (CEMP) prior to commencement of construction which addresses the following matters, as a minimum:

- (a) traffic and pedestrian management (in consultation with the relevant roads authority)
- (b) noise and vibration management
- (c) water and soil management
- (d) air quality management (including dust suppression)
- (e) indigenous and non-indigenous heritage management
- (f) flora and fauna management
- (g) storage and use of hazardous materials
- (h) contaminated land management (including acid sulphate soils)
- (i) weed management

## Conditions of Approval

### Condition

- (j) waste management
- (k) sustainability
- (l) environmental incident reporting and management procedures
- (m) non-compliance and corrective/preventative action procedures

The CEMP shall:

- i. comply with the Conditions of Approval, conditions of any licences, permits or other approvals issued by government authorities for the Project, all relevant legislation and regulations, and accepted best practice management
- ii. comply with the relevant requirements of *Guideline for Preparation of Environmental Management Plans* (Department Infrastructure, Planning and Natural Resources, 2004)
- iii. include an Environmental Policy.

The Proponent shall:

1. consult with government agencies and relevant service/utility providers as part of the preparation of the CEMP
2. submit a copy of the CEMP to the ADEM for approval at least 21 days prior to the commencement of construction (or within such time as otherwise agreed to by the ADEM)
3. review and update the CEMP at regular intervals, and in response to any actions identified as part of Project audits
4. ensure updates to the CEMP are made within seven days of the completion of the review or receipt of actions identified by any audit of the document, and be submitted to the ADEM for approval

The CEMP must be approved by the ADEM prior to the commencement of construction work associated with the Project.

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### 9. Environmental management representative

Not Used

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### 10. Environmental controls map

A site specific environmental controls map(s) (ECM) shall be prepared in accordance with TfNSW's *Guide to Environmental Controls Map* (3TP-SD-015) prior to the commencement of construction for implementation for the duration of construction, and may be prepared in stages as set out in the CEMP.

A copy of the ECMs must be submitted to the ADEM for approval, at least 14 days prior to commencement of construction of the Project (or within such time as otherwise agreed by the ADEM).

The ECM shall be prepared as a map – suitably enlarged (e.g. A3 size or larger) for mounting on the wall of a site office and included in site inductions, supported by relevant written information.

Updates to the ECM shall be made within seven days of the completion of the review or receipt of actions identified by any audit of the document, and submitted to the ADEM for approval.

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## Conditions of Approval

### Condition

#### Hours of work

##### 11. Standard construction hours

Construction activities shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays except for the following works which are permitted outside these standard hours:

- (a) any works which do not cause noise emissions to be more than 5dBA higher than the rating background level at any nearby residential property and/or other noise sensitive receivers
- (b) out of hours work identified and assessed in the EIA or the approved out of hours work protocol (OOHWP)
- (c) the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as agreed by the ADEM
- (d) emergency work to avoid the loss of lives, property and/or to prevent environmental harm
- (e) any other work as agreed by the ADEM (or nominated delegate) and considered essential to the Project, or as approved by EPA (where an EPL is in effect).

##### 12. High noise generating activities

Rock breaking or hammering, jack hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel and any other activities which result in impulsive or tonal noise generation shall not be undertaken for more than 3 hours, without a minimum 1 hour respite period unless otherwise agreed to by the ADEM (or nominated delegate), or as approved by EPA (where relevant to the issuing of an EPL), unless inaudible at nearby residential properties and/or other noise sensitive receivers.

#### Noise and vibration

##### 13. Construction noise and vibration

Construction noise and vibration mitigation measures shall be implemented through the CEMP, in accordance with TfNSW's *Construction Noise Strategy* and the EPA *Interim Construction Noise Guideline* (July 2009). The mitigation measures shall include, but not necessarily be limited to:

- (a) details of construction activities and an indicative schedule for construction works
- (b) identification of construction activities that have the potential to generate noise and/or vibration impacts on surrounding land uses, particularly sensitive noise receivers
- (c) detail what reasonable and feasible actions and measures shall be implemented to minimise noise impacts (including those identified in the environmental impact assessment)
- (d) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints
- (e) an out of hours work protocol (OOHWP) for the assessment, management and approval of works outside the standard construction hours identified in Condition 11 of this approval, including a risk assessment process which deems the out of hours activities to be of low, medium or high environmental risk, is to be developed. All out of hours works are subject to approval by the EMR and/or ADEM (or nominated delegate) or as approved by EPA (where relevant to the issuing of an EPL). The OOHWP should be consistent with the TfNSW *Construction Noise Strategy*
- (f) a description of how the effectiveness of actions and measures shall be monitored during the proposed works, identification of the frequency of monitoring, the locations at which monitoring shall take place, recording and reporting of monitoring results and if any exceedance is detected, the manner in which any non-compliance shall be rectified.

## Conditions of Approval

### Condition

#### 14. Vibration criteria

Vibration (other than from blasting) resulting from construction and received at any structure outside of the Project shall be limited to:

- (a) for structural damage vibration - German Standard DIN 4150:Part 3 – 1999: *Structural Vibration in Buildings: Effects on Structures*
- (b) for human exposure to vibration – the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DEC 2006).

These limits apply unless otherwise approved by the ADEM through the CEMP.

#### 15. Non-tonal reversing beepers

Non-tonal reversing beepers (or an equivalent mechanism) shall be fitted and used on all construction vehicles and mobile plant regularly used on site (i.e. greater than one day) and for any out of hours work.

### Contamination and hazardous materials

#### 16. Unidentified contamination (other than asbestos)

If previously unidentified contamination (excluding asbestos) is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of any contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA guidelines, including the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011).

A copy of any contamination report must be submitted to the ADEM for review for a minimum period of seven days. The ADEM shall determine whether consultation with the relevant council and/or EPA is required prior to continuation of construction works within the affected area.

**Note:** *In circumstances where both previously unidentified asbestos contamination and other contamination are discovered within a common area, nothing in these conditions shall prevent the preparation of a single investigation report to satisfy the requirements of both Condition 16 and Condition 17.*

#### 17. Asbestos management

If previously unidentified asbestos contamination is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of the asbestos contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA and WorkCover guidelines and include the proposed methodology for the remediation of the asbestos contamination. Remediation activities must not take place until receipt of the investigation report.

Works may only recommence upon receipt of a validation report from a suitably qualified contamination specialist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology.

**Note:** *In circumstances where both previously unidentified asbestos contamination and other contamination are discovered within a common area, nothing in these conditions shall prevent the preparation of a single investigation report to satisfy the requirements of both Condition 16 and Condition 17.*

## Conditions of Approval

### Condition

#### 18. Storage and use of hazardous materials

Construction hazard and risk issues associated with the use and storage of hazardous materials shall be addressed through risk management measures, which shall be developed by the construction contractor prior to construction as part of the overall CEMP, in accordance with relevant EPA guidelines, TfNSW *Chemical Storage and Spill Response Guideline* and Australian and ISO standards. These measures shall include:

- (a) the storage of hazardous materials, and refuelling/maintenance of construction plant and equipment to be undertaken in clearly marked designated areas that are designed to contain spills and leaks
- (b) spill kits, appropriate for the type and volume of hazardous materials stored or in use, to be readily available and accessible to construction workers. Kits to be kept at hazardous materials storage locations, in site compounds and on specific construction vehicles. Where a spill to a watercourse is identified as a risk, spill kits to be kept in close proximity to potential discharge points in support of preventative controls
- (c) all hazardous materials spills and leaks to be reported to site managers and actions to be immediately taken to remedy spills and leaks
- (d) training in the use of spill kits to be given to all personnel involved in the storage, distribution or use of hazardous materials.

### Erosion and sediment control

#### 19. Erosion and sediment control

Soil and water management measures shall be prepared as part of the CEMP for the mitigation of water quality impacts during construction of the Project. The management measures shall be prepared in accordance with *Managing Urban Stormwater; Soils and Construction 4<sup>th</sup> Edition* (Landcom, 2004).

### Heritage management

#### 20. Indigenous and non-Indigenous heritage

If previously unidentified Indigenous or non-Indigenous heritage/archaeological items are uncovered during construction works, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (3TP-SD-115) shall be followed, and all works in the vicinity of the find shall cease and appropriate advice shall be sought from a suitably qualified heritage consultant (and in consultation with the OEH Heritage Branch where appropriate). Works in the vicinity of the find shall not re-commence until clearance has been received from the heritage consultant.

### Flora and Fauna

#### 21. Removal of Trees or Vegetation

Separate approval, in accordance with TfNSW's *Removal or Trimming of Vegetation Application (9TP-FT-078)*, is required for the trimming, cutting, pruning or removal of trees or vegetation where the impact has not already been identified in the EIA for the Project. The trimming, cutting, pruning or removal of trees or vegetation shall be undertaken in accordance with the conditions of that approval.

#### 22. Replanting program

All cleared vegetation shall be offset in accordance with TfNSW's *Vegetation Offset Guide (9TP-ST-149)*. All vegetation planted on-site is to consist of locally endemic native species, unless otherwise agreed by the ADEM, following consultation with the relevant council, where relevant, and/or the owner of the land upon which the vegetation is to be planted.

### END OF CONDITIONS

## Appendix 3: Environmental Impact Assessment

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### Automatic Train Protection (ATP) Project - Eastern Suburbs & Illawarra Line – Area 4

#### REVIEW OF ENVIRONMENTAL FACTORS AND DETERMINATION REPORT

##### APPROVAL

I, Ben Groth as delegate of the Secretary, Transport for NSW:

1. Have examined and considered the Proposed Activity in the *Automatic Train Protection (ATP) Project Eastern Suburbs & Illawarra Line – Area 4 Review of Environmental Factors* (July 2017) and *ATP Eastern Suburbs & Illawarra Line – Area 4 Project Determination Report* (August 2017) in accordance with the provisions of section 111 of the *Environmental Planning and Assessment Act 1979*.
2. Determine on behalf of Transport for NSW (the Proponent) that the Proposed Activity may be carried out in accordance with the Conditions of Approval in this Determination Report, consistent with the proposal described in the *ATP Eastern Suburbs & Illawarra Line – Area 4 Review of Environmental Factors* (August 2017) as amended by this Determination Report.



Ben Groth  
Associate Director, Environmental Impact Assessment  
Planning and Environment Services | Integrated Planning  
Infrastructure and Services  
Transport for NSW

Date: 2/8/17



Transport  
for NSW

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**TO:** Ben Groth  
**FROM:** Lisa Montesin  
**DATE:** 2 August 2017  
**CC:** Craig Southward, Peter Jones  
**SUBJECT:** **Recommendation to Determine  
Automatic Train Protection (ATP) Project - Eastern Suburbs &  
Illawarra Line – Area 4**

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**Issue:**

To determine the Automatic Train Protection (ATP) Project for the Eastern Suburbs & Illawarra Line – Area 4 (the Proposed Activity), as assessed in the Review of Environmental Factors (REF) prepared by Aurecon.

**Background:**

Transport for NSW is the proponent for the Proposed Activity. An environmental impact assessment has been carried out for the Project in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000*.

Internal approval to the final reports, the mitigation measures and conditions has been obtained from the relevant directorates.

**Community feedback:**

The works being undertaken as part of the proposal are based on safety and rail system requirements. For this reason, there is limited opportunity for any community feedback into project deliverables. As such, the REF for the ATP Eastern Suburbs & Illawarra Line – Area 4 has not been placed on public display.

**Current Position:**

The Proposed Activity is ready to be approved, subject to mitigation measures contained in the REF (July 2017) and Conditions of Approval (attached)

**Recommendation:**

It is recommended that TfNSW determine to approve the Proposed Activity in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* by signing the Approval in the attached Determination Report.



Lisa Montesin  
**Environment and Planning Manager**



**Transport  
for NSW**

# MEMO

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**TO:** Craig Southward  
**FROM:** Ben Groth  
**DATE:** 2 August 2017  
**CC:** Lisa Montesin, Peter Jones  
**SUBJECT:** **Decision to Proceed**  
**Automatic Train Protection (ATP) Project - Eastern Suburbs & Illawarra Line – Area 4**

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**Issue:**

Decision to proceed with ATP Eastern Suburbs & Illawarra Line – Area 4 (the Proposed Activity), as determined herein and assessed by the Review of Environmental Factors (REF) prepared by Aurecon (July 2017) and the Conditions of Approval prepared by Transport for NSW (July 2017)

**Background:**

The Proposed Activity is now approved, subject to mitigation measures contained in the REF and Conditions of Approval.

**Recommendation:**

It is agreed that the Decision to Proceed with the construction of the Proposed Activity may now be commenced, consistent with the proposal described in the REF and the Conditions of Approval.

A handwritten signature in black ink, appearing to read "B Groth".

Ben Groth  
**Associate Director**  
**Environmental Impact Assessment**

Date:2/8/17

A handwritten signature in blue ink, appearing to read "C Southward".

Craig Southward  
**Project Director**  
**Automatic Train Protection**

Date:3/8/17