



Transport
for NSW

New Intercity Fleet Eveleigh Facility Project

Review of Environmental Factors



New Intercity Fleet Eveleigh Facility Project

REVIEW OF ENVIRONMENTAL FACTORS

Transport for NSW

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ABBREVIATIONS AND DEFINITIONS

AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ASA	Asset Standards Authority
ATP	Australian Technology Park
A-Sets	Otherwise known as the Waratah train type
CBD	Central Business District
CTMP	Construction Traffic Management Plan
dead-running time	When a train operates without carrying or accepting passengers, such as when coming from a stabling yard to begin its first trip of the day.
decant infrastructure	The infrastructure used to empty the effluent tanks of the New Intercity Fleet carriages and fill up the water tanks of the carriages for toilet flushing.
DoEE	(Commonwealth) Department of the Environment and Energy
DVA	Digital Voice Announcement
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
Endeavour	A diesel train fleet operated by NSW TrainLink to provide rail services for passengers on the Blue Mountains, Hunter, South Coast and Southern Highlands lines.
EPA	NSW Environment Protection Authority
EP&A Act	(NSW) <i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	(NSW) <i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	(Commonwealth) <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
GHG	Greenhouse gas
Heritage Act	(NSW) <i>Heritage Act 1977</i>

Heritage train	FRN 2186 Second Class Sitting/Buffer Car otherwise known as the FRN 2186 (Red Rattler) movable heritage train
HV	High voltage
H-Sets	Otherwise known as Oscar (Outer Suburban Cars (a type of train)). H-sets run on the South Coast, Blue Mountains (to Springwood) and Central Coast/Newcastle Lines. These trains were first introduced in 2006.
Infrastructure SEPP	(NSW) <i>State Environmental Planning Policy (Infrastructure) 2007</i>
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
L _{Aeq}	equivalent continuous sound level
LALC	Local Aboriginal Land Council
LEP	local environmental plan
LGA	local government area
Level 1 maintenance	Minor repairs and daily checks, including cleaning and minor repairs.
Level 2 maintenance	Routine 30 day and above general inspections, based on a time based predictive maintenance regime.
Level 3 maintenance	Component change out replacement of major components, typically undertaken every six to eight years.
LNIF	Long New Intercity Fleet which generally comprises 10 cars and has a reference length of 205 metres.
LoS	level of service
Maintenance road	Tracks within the Precinct which are used to travel between the main operational running lines and the various maintenance locations within the Precinct.
Millennium	An electric train fleet operated by Sydney Trains to provide rail services to passengers on the suburban rail network.
NES	(Matters of) National Environmental Significance
New Intercity Fleet	The New Intercity Fleet is a new fleet of trains to replace the existing intercity fleet and is intended to service the Central Coast and Newcastle, the Blue Mountains and the South Coast Lines.
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	(NSW) Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OHW	overhead wiring

Oscars	Outer Suburban Cars (refer to H-sets above)
PAD	potential archaeological deposit
PAH	polycyclic aromatic hydrocarbons
POEO Act	(NSW) <i>Protection of the Environment Operations Act 1997</i>
Eveleigh Rail Precinct (the) Precinct	Comprises the rail infrastructure and buildings that are used by various organisations to support train operations (e.g. stabling, maintenance and commissioning operation). The Precinct is generally bounded by the inner city suburbs of Darlington, Redfern, Alexandria Park, Erskineville and Newtown.
(the) Project	The construction and operation of the Eveleigh Commissioning, Maintenance and Stabling Facility.
REF	Review of Environmental Factors (this document)
Roads Act	(NSW) <i>Roads Act 1993</i>
Roads and Maritime	Roads and Maritime Services
SHR	State Heritage Register
SEPP	State Environmental Planning Policy
Significant impact	Where the impact of an action cannot be mitigated such that the residual effect cannot be reversed or reasonably mitigated to an acceptable level.
SIS	Species Impact Statement
SNIF	Short New Intercity Fleet which generally comprises 8 cars and has a reference length of 164 metres.
SoHI	Statement of Heritage Impact
T-Sets	Tangara passenger train fleet – the T-sets were introduced into service between 1988 and 1995.
TPH	total petroleum hydrocarbons
Track possession	Planned periods when Sydney Trains suspend rail services on a segment of the network to enable track maintenance.
TSC Act	(NSW) <i>Threatened Species Conservation Act 1995</i>
TSP	Total suspended particles
XPLORER	A diesel train fleet operated by NSW TrainLink to provide rail services to Armidale, Moree, Griffith, Broken Hill and Canberra.

EXECUTIVE SUMMARY

Overview of the New Intercity Fleet program

The NSW *Long Term Transport Master Plan* (NSW Government 2012a; 'Transport Master Plan') and its supporting document, *Sydney's Rail Future* (NSW Government 2012b), identifies the need to enhance rail passenger services, in particular for longer distance travel outside of the Sydney suburban network.

In May 2014, the NSW Government announced it is delivering the New Intercity Fleet, to replace trains carrying customers from Sydney to the Central Coast, Newcastle, Blue Mountains and the South Coast. The introduction of the New Intercity Fleet would allow for the replacement of the older electric train fleets currently used to provide intercity services.

The New Intercity Fleet would:

- provide a more consistent and improved level of customer service for intercity passengers
- facilitate the retirement of the two oldest electric train sets currently in operation
- reduce the costs of intercity operations
- increase capacity for intercity passengers.

Eveleigh Rail Precinct

In order to assist the introduction of the New Intercity Fleet, it is proposed to develop a dedicated commissioning, maintenance and stabling facility within the existing Eveleigh Rail Precinct ('the Precinct') approximately two kilometres south west of the Sydney Central Business District.

The Precinct comprises numerous components including the Millennium Shed, the Endeavour/XPLORER Maintenance Centre, the Oscar Maintenance Centre, the Welding Qualifications Centre and the Large Erecting Shop. The location of the Precinct and its major components are shown in Figure 1.1.

Rail related activities have been undertaken at the Precinct since the late 1800s when the site was initially established as a major railway workshop to support the smaller workshops and regional centres across the NSW rail network. Since then, the Precinct has undergone a number of infrastructure modifications to support the increase in passenger train movements and in response to technological and operational changes across the NSW rail network. Currently, Sydney Train's Millennium and Oscar fleets, the Endeavour and XPLORER fleets operated by NSW TrainLink and the steam and diesel engine heritage trains managed and operated by Rail Heritage utilise the Precinct for stabling and maintenance purposes.

To allow for the New Intercity Fleet trains, minor modifications to a number of existing stabling facilities around the network are required. The Eveleigh Commissioning Stabling and Maintenance Facility was selected as one of a number of facilities to undergo modification to support the introduction of the New Intercity Fleet. The Precinct was selected as the primary day stabling location due to its location close to the Sydney New Intercity Fleet terminating station which minimises dead running distance and the minimal upgrade works required to make it suitable for the New Intercity Fleet.

The Project

Transport for NSW (the proponent) is proposing to undertake track, civil, overhead wiring (OHW), signalling and signage modifications at the Precinct to facilitate commissioning, stabling, maintenance and decanting activities for the New Intercity Fleet (the Project). These modification works would allow the New Intercity Fleet to be stabled.

Construction/modification works

Key construction activities associated with the Project would be undertaken at three primary locations within the Precinct and would include:

- extension of **Engineering Roads 1 and 2** which would involve lengthening both tracks at this location to accommodate for the decanting of a NIF train on both tracks. This would involve the relocation of the equipment within the Welding Qualifications Centre to another building/location within the Precinct and demolition of the Welding Qualifications Centre
- extension of the OHW in the **Millennium Shed**
- extension to the **Eastern Siding**
- extension of the existing decant infrastructure
- supporting infrastructure (e.g. signals, walkways, fencing and lighting) to support the above.

The locations of the proposed works are shown in Figure 4.1. A detailed description of the Project is provided in Chapter 4 of this REF.

Commissioning of the New Intercity Fleet

The New Intercity Fleet trains would be shipped to the Port of Newcastle. Following arrival, the new trains would be hauled by diesel locomotive to the Precinct for commissioning. At the Precinct, detailed inspection and operational checks, (i.e. static and dynamic) would be performed to ensure the train's functionality has not been impaired during transit.

Static testing would be undertaken at the Precinct within the Millennium Shed and would involve a number of tests on key train components including compressors, door operation, external and internal speakers, horn, lighting and electrical systems.

Dynamic testing involves validating the operational performance of the train's (e.g. energy consumption/efficiency, traction/acceleration, braking, signal interference, timetable performance, ride performance). This in part involves hauling the New Intercity Fleet trains to a test area on the rail network with a diesel locomotive.

Operation

The introduction of the New Intercity Fleet is not expected to result in any significant change from current operations at the Precinct, as:

- the maintenance activities associated with the New Intercity Fleet are similar to that undertaken on the Millennium fleet which currently uses the Precinct
- all aspects associated with the maintenance, stabling and movements of other train fleets would remain unchanged
- vehicle numbers and access points would be similar to existing operations.

Therefore, as the types of maintenance activities for the New Intercity Fleet would be similar to those currently being undertaken at the Precinct, the use of the facility at Eveleigh for the New Intercity Fleet is not expected to significantly change the nature of the operations at the Precinct. Accordingly, the environmental assessment of the Project has given particular focus to the construction works and commissioning of the trains.

Need for the Project

To allow for the New Intercity Fleet trains, minor modifications to a number of existing stabling facilities around the network are required. Also, the proposed New Intercity Fleet primary maintenance facility at Kangy Angy is not projected to be completed in time for the arrival of the first New Intercity Fleet trains.

As such, a secondary facility is required to serve as a location for the new trains to undergo initial commissioning activities shortly after arriving in Australia, and as a location for routine maintenance activities to be undertaken once the New Intercity Fleet is operational to support the primary maintenance facility at Kangy Angy.

The dominant movement of Intercity trains is driven by large numbers of commuters travelling from regional locations to the city in the morning peak period, before carrying commuters back to their departure location in the evening peak period. This tidal flow requires day stabling capacity of trains close to the city that are supported by overnight stabling facilities at regional locations throughout the network. Therefore, choosing to locate one of the facilities capable of stabling and supporting the New Intercity Fleet near the Sydney termination point at Central Station was considered to be logical. The distance between the Central Station terminus and the Eveleigh Rail Precinct is short, approximately two kilometres, which was considered ideal as it means that day stabling and routine New Intercity Fleet maintenance and inspection activities could be undertaken at the Precinct with minimal dead-running time (train travelling without customers).

Another key consideration in the selection of Eveleigh was the relatively minor extent of modifications required to accommodate the introduction of the New Intercity Fleet. The existing train maintenance facilities at Auburn, Flemington and Mortdale were identified as alternative locations to serve as a commissioning, stabling and maintenance site for the New Intercity Fleet. However, the existing facility at Eveleigh was determined to be the preferred option due to its more central location, the relatively minor extent of modification and capital investment required and the level of construction complexity when compared to the other locations. The Precinct is also currently used as a commissioning, stabling and maintenance facility for other train fleets.

Therefore, the Precinct was identified as a suitable and preferred location for the initial New Intercity Fleet commissioning activities.

Planning approval pathway

The Project comprises an ‘activity’ for the purposes of Part 5 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) by reason of clause 79 of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP). Specifically, Clause 79 of the Infrastructure SEPP outlines that development for the purpose of railways and railway infrastructure facilities, which include ‘maintenance, repair and stabling facilities for rolling stock’, are permissible without the need for development consent under Part 4 of the EP&A Act when undertaken by a public authority (i.e. Transport for NSW).

This Review of Environmental Factors (REF) has been prepared to satisfy the requirements under Part 5 of the EP&A Act. For the purpose of this Project, Transport for NSW is both the proponent and determining authority. As the determining authority, Transport for NSW must:

- examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity, in accordance with Section 111 of the EP&A Act
- determine whether or not the activity is likely to significantly affect the environment or is likely to significantly affect threatened species, populations and ecological communities.

The environmental impacts have been considered in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and the matters of National Environmental Significance (NES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The outcomes of the environmental assessment are outlined below.

Environmental impact assessment

An assessment of all potential environmental benefits and impacts associated with the Project was undertaken to fulfil the requirements under Part 5 of the EP&A Act. The key impacts resulting from the Project are considered to be associated with non-Aboriginal heritage and noise generated during construction and New Intercity Fleet commissioning activities.

The Project is wholly located within the curtilage of the *Eveleigh Railway Workshops*, which is listed on the NSW State Heritage Register. The proposed construction works associated with the Project, with particular reference to the demolition of the Welding Qualifications Centre, have been assessed in a Statement of Heritage Impact (SoHI). The SoHI concluded that the Project would result in an overall minor impact to the heritage significance of the *Eveleigh Railway Workshops*. The SoHI also identified potential for encountering or impacting previously unrecorded non-Aboriginal heritage archaeology during ground disturbance works. An approval, by the Heritage Council (or delegate) under Section 60 of the NSW *Heritage Act 1977* would be required prior to any works proceeding.

A Noise and Vibration Impact Assessment was carried out by WSP | Parsons Brinckerhoff (2016) to understand the level of impact that construction, commissioning and operational activities would have at nearby sensitive receivers with particular focus on surrounding residences. The assessment predicted that elevated noise levels would be experienced from time-to-time during both construction activities and train commissioning works. However, it is expected that such impacts can be managed with the implementation of the mitigation and management measures described in Section 8.2 of this REF.

Other temporary and/or minor potential impacts identified include:

- changes to the visual environment including from:
 - fencing, barricades, construction machinery, stockpiles and construction vehicles during construction
 - the proposed extended Eastern Siding, new ballast, extended OHW and new fencing
 - the relocation of heritage items
- encountering previously unrecorded Aboriginal artefacts during ground disturbance works
- land use impacts associated with the acquisition of land at the Australian Technology Park resulting in the removal of five car spaces from the western end of the Australian Technology Park car park
- congestion and/or logistical impacts affecting other users of the Precinct, including Sydney Trains, NSW TrainLink and Rail Heritage during construction
- a temporary increase in heavy vehicle movements on the surrounding road network during construction
- a temporary increase in dust emissions, erosion and sedimentation during the construction phase due to the excavation and demolition works, stockpiles and vehicle movements which may impact air quality
- potential for encountering contaminated material during the construction works
- an increase in waste generated during construction associated with demolition, excavated material, construction packaging, surplus materials, liquid and general litter
- greenhouse gas emission reductions associated with the New Intercity Fleet trains which typically have lower energy consumption than other train types and the expected increased proportion of people choosing public transport for intercity journeys due to the higher capacity, reliability and level of service of intercity train services.

Further discussion of the potential environmental impacts and proposed management and mitigation measures is provided in Chapter 7 of this REF. Additionally, consideration of the potential impacts has been undertaken with regard to the factors provided in Clause 228 of the EP&A Regulation and the matters of NES under the EPBC Act. With the implementation of the recommended management and mitigation measures in this REF (refer to Section 8.2), the impacts associated with the Project are not anticipated to be significant.

Community and stakeholder consultation

Transport for NSW has developed a communications and consultation strategy for the Project which includes details on key activities to be carried out to inform and engage the local community and key stakeholders throughout the life of the Project. The strategy includes:

- a project overview newsletter to be issued to stakeholders, adjacent property owners, local community organisation and local businesses
- public display of the REF at Surry Hills Library, Redfern Community Centre, Redfern Neighbourhood Service Centre, and Transport for NSW office from 16 March to 6 April 2017
- advertisements in the Inner West Courier and the Daily Telegraph – Central Sydney
- project information telephone line (1800 684 490)
- project information and updates on the [Transport for NSW](http://transport.nsw.gov.au/Projects)¹ website.

The Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Section 6.3 of this REF details the consultation requirements for the Project under the Infrastructure SEPP.

Consultation has been undertaken by Transport for NSW with Sydney Trains and the Heritage Division of the Office of Environment and Heritage during the preparation of the REF. Transport for NSW will continue to meet and discuss the Project with key government agencies and stakeholders throughout the display period (and through to the end of the construction period), as required.

Written submissions are invited on the Project during the public display period of the REF. At the close of the display period, Transport for NSW will review and assess all feedback received regarding the Project. Should Transport for NSW determine to proceed with the Project, interaction with the community would be undertaken in accordance with a Community Liaison Plan to be developed prior to the commencement of construction. This is to ensure the community are kept informed and are given an opportunity for feedback throughout the duration of the construction period.

Further detail regarding the stakeholder and community consultation for the Project is provided in Chapter 6 of this REF. The general planning approval and consultation process, and where this REF fits into the process, is shown in Figure ES.1 below.

¹ transport.nsw.gov.au/Projects

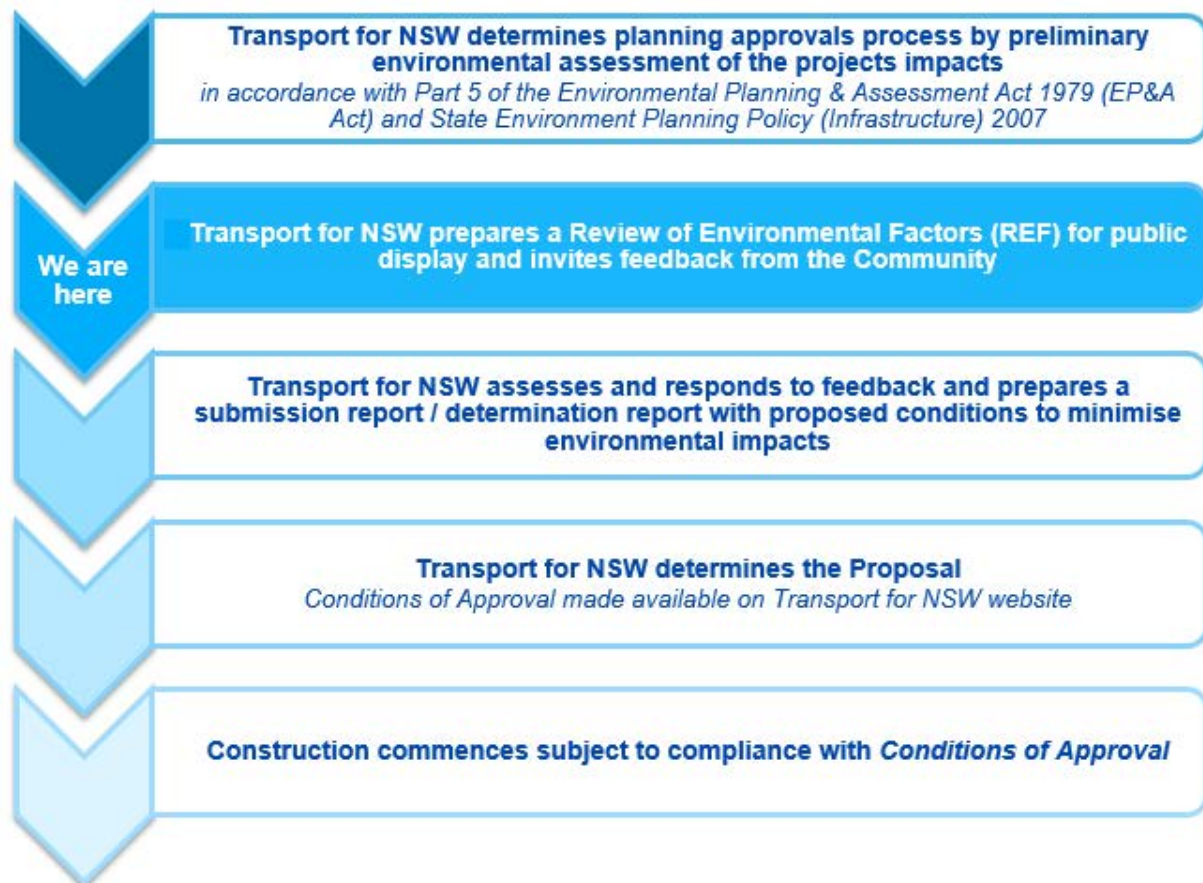


Figure ES.1 Planning approval and consultation process

Conclusion

This REF has assessed the potential impacts associated with the construction and commissioning, stabling and maintenance activities at the Precinct for the New Intercity Fleet. The modifications to the Precinct include the extension of Engineering Roads 1 and 2, extension of the OHW in the Millennium Shed, extension to the Eastern Siding, demolition of the Welding Qualifications Centre, extension of the existing decant infrastructure and establishment of supporting infrastructure. This Project is expected to have both positive and negative environmental and social impacts.

The Project would provide a series of local and broader benefits including:

- maximising the use of the existing rail facilities and infrastructure at Eveleigh
- providing a suitable location for the commissioning of the New Intercity Fleet
- provision of maintenance capacity for the New Intercity Fleet trains in a central location which improves the efficiency of maintenance activities and minimises of dead-running time
- benefits associated with the New Intercity Fleet itself, which relies on the Project to be implemented successfully, including:
 - increased capacity and reliability for intercity train services
 - improved energy efficiency of the New Intercity Fleet compared to the existing older train types
 - improved intercity train services which would contribute to increasing the proportion of people choosing public transport over car travel for intercity journeys, which is a lower greenhouse gas intensive alternative on a per person basis.

The key potential impacts due to the project are associated with:

- non-Aboriginal heritage – due to the demolition of the Welding Qualifications Centre and the location of the Project within the curtilage of the state heritage listed *Eveleigh Railway Workshops*
- noise and vibration – due to the construction activities and train commissioning works
- contamination – including the potential to encounter underlying existing contamination at the site during construction works.

With the implementation of suitable management and mitigation measures (summarised in Section 8.2) the impacts associated with the Project are not anticipated to be significant, and therefore an Environmental Impact Statement is not considered to be required for the Project.

1 INTRODUCTION

This chapter provides an overview of the proposed modification works at the Eveleigh Rail Precinct to service the commissioning, maintenance and stabling facility of the New Intercity Fleet. This chapter also outlines the purpose and structure of the Review of Environmental Factors (REF).

1.1 Background

The *NSW Long Term Transport Master Plan* (NSW Government 2012a; 'Transport Master Plan') and its supporting document, *Sydney's Rail Future* (NSW Government 2012b), identifies the need to enhance rail passenger services, in particular for longer distance travel outside of the Sydney suburban network.

In May 2014, the NSW Government announced it is delivering a New Intercity Fleet to replace trains carrying customers from Sydney to the Central Coast, Newcastle, Blue Mountains and the South Coast. The introduction of the New Intercity Fleet will allow for the replacement of older electric trains fleets currently used to provide intercity services.

These ageing electric train fleets are experiencing a number of adverse operational impacts relating to a decline in their reliability and availability on the network, increasing maintenance costs and lower customer amenity. The New Intercity Fleet would create a more consistent, improved experience for intercity customers, which is comparable to that experienced by commuters on other rail lines, reduce the operating and maintenance costs and provide a more reliable service with increased capacity to support the growing train network (refer to Chapter 3.1 for more detail).

To support the introduction of the New Intercity Fleet trains, minor modifications to a number of existing stabling facilities around the network are required. The Eveleigh Facility was selected as one of the facilities to undergo modification which would make it suitable for the commissioning, stabling and maintenance of New Intercity Fleet trains. It is located within the existing Eveleigh Rail Precinct (herein referred to as 'the Precinct') which is approximately two kilometres south-west of the Sydney Central Business District (CBD).

Rail related activities have been undertaken at the Precinct since the late 1800s when the site was initially established as a major railway workshop to support the smaller workshops and regional centres across the NSW rail network. Since then, the Precinct has undergone a number of infrastructure modifications to support the increase in passenger train movements and in response to technological and operational changes across the NSW rail network.

The Precinct is of exceptional historical and social significance, with its location wholly within the curtilage of the *Eveleigh Railway Workshops*, which is listed on the NSW State Heritage Register (SHR). Currently, Sydney Train's Millennium and Oscar fleets, the Endeavour and XPLOER fleets operated by NSW TrainLink and the steam and diesel engine heritage trains managed and operated by Rail Heritage utilise the Precinct for stabling and maintenance purposes. A more detailed overview of the types of trains stabled and maintained at the Precinct, including the maintenance operations currently undertaken at the Precinct, is detailed in Chapter 2.

The primary maintenance facility for the New Intercity Fleet is the Kangy Angy Maintenance Facility, however it is not projected to be completed prior to the arrival of the first New Intercity Fleet trains. As the Eveleigh Precinct is able to be modified in time for the arrival of the first trains, it was identified as the preferred location for the new trains to undergo initial commissioning activities after arriving in Australia and before entering into service. Once the Kangy Angy Maintenance Facility is operational, it will be used for the remainder of the initial commissioning activities, and will become the primary location for New Intercity Fleet maintenance, as the Precinct will not have capacity to support the entire New Intercity Fleet on its own. Once the New Intercity Fleet is operational, the Eveleigh Precinct, which is close to Central Station where a large proportion of intercity services terminate, will continue to be used as a location for short maintenance and inspection activities to occur (typically level 1 and level 2 maintenance activities as described in Section 2.3) without the trains having to travel to Kangy Angy.

Transport for NSW is proposing to undertake track, civil, overhead wiring (OHW), signalling and signage modifications at the Precinct to facilitate commissioning, stabling, maintenance and decanting activities (referred to as 'the Project'). The modification works would allow the New Intercity Fleet trains to be stabled. The Project requires modifications to the existing infrastructure within the Precinct at three primary locations being Engineering Roads 1 and 2, the Millennium Shed and the Eastern Siding.

A detailed description of the Project, the proposed scope of works and a figure showing the location of the proposed works (refer to Figure 4.1) is provided in Chapter 4.

1.2 Location

The Precinct is located approximately two kilometres south west of the Sydney CBD within the City of Sydney Local Government Area (LGA). It is located immediately south of the existing main rail corridor, approximately 300 metres north-east of Erskineville Station and approximately 250 metres south-west of Redfern Station. The rail corridor encompasses the T1 (North Shore, Northern & Western Line), T2 (Airport, Inner West & South Line), T3 (Bankstown Line) and T4 (Eastern Suburbs & Illawarra Line) lines.

The Precinct is bordered by a mixture of land uses including the residential area of Eveleigh, the Australian Technology Park to the immediate south and east and the existing main rail corridor to the immediate north. The Australian Technology Park is a commercial district, occupied by numerous government and privately owned firms, including the Seven Network.

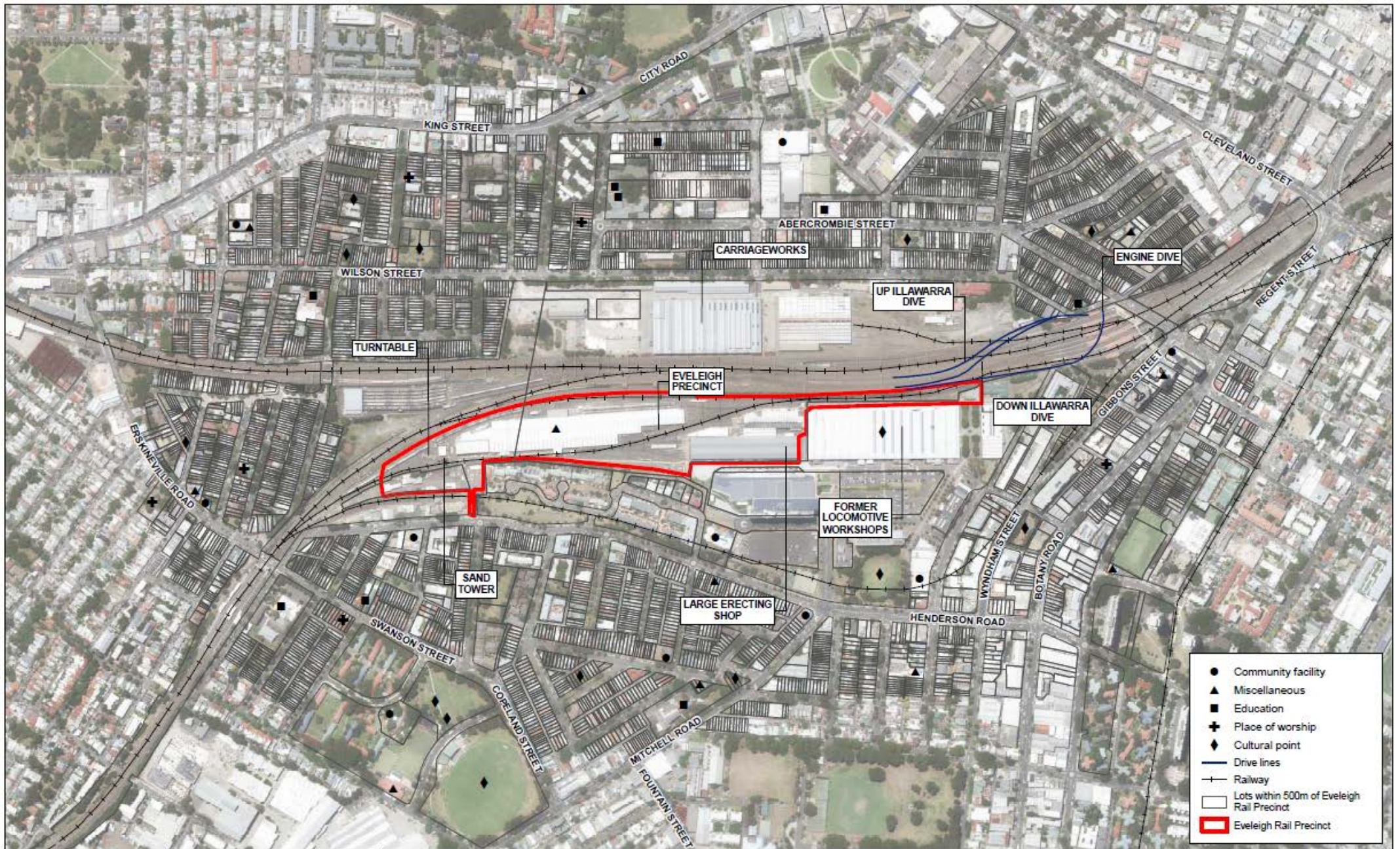
The Precinct has undergone multiple phases of evolution and as a result been highly modified as part of its historical and current use as a train commissioning, stabling and maintenance facility. The site is void of vegetation aside from a thin strip along the northern boundary of the Precinct. Direct vehicle access to the site is provided by an existing access road off Railway Parade, Eveleigh.

The location of the Precinct is shown in Figure 1.1.



1.3 Assessment terminology

For the purposes of this assessment, the following definitions are used:

- The 'Project' refers to:
 - all physical modification works to be undertaken to accommodate the commissioning, stabling and maintenance of the New Intercity Fleet at the Precinct
 - commissioning, stabling and maintenance operations associated with the New Intercity Fleet.
- The 'Precinct' refers to:
 - the boundary of the train stabling and maintenance yard, which incorporates all existing internal tracks and buildings as shown in Figure 1.1.
- The construction works footprint has been divided in to three distinct study areas based on their location within the Precinct. These are described further in Chapter 2 and are referred to as:
 - Subject Site 1 – Engineering Roads 1 and 2
 - Subject Site 2 – Millennium Shed
 - Subject Site 3 – Eastern Siding.



- Community facility
- ▲ Miscellaneous
- Education
- ✦ Place of worship
- ◆ Cultural point
- Drive lines
- Railway
- Lots within 500m of Eveleigh Rail Precinct
- ▭ Eveleigh Rail Precinct

Map: 2202522C_GIS_001_A5	Author: MG	  1:6,000 Scale ratio correct when printed at A3
Date: 9/03/2017	Approved by: IS	
Data source: - © Land and Property Information 2015, NSW Department of Planning & Environment		

New Intercity Fleet Eveleigh
Figure 1.1
 Locality map

1.4 Project objectives

The objectives of the Project are to:

- allow for the New Intercity Fleet to be commissioned in accordance with the New Intercity Fleet program schedule to improve the reliability of intercity services
- improve the operational efficiency and flexibility on the rail network through the provision of stabling and maintenance capabilities for the New Intercity Fleet at a facility located close to the Sydney Terminal (Central Station), where a large proportion of intercity passenger services terminate
- minimise environmental impacts during construction works, commissioning and the ongoing operation and maintenance of the New Intercity Fleet.

1.5 Proponent and delivery

For the purposes of these works, Transport for NSW is the proponent and a determining authority under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The modification works would be undertaken by a contractor(s) engaged by Transport for NSW. During the works, the Precinct would continue to operate as a train stabling and maintenance facility. However, maintenance of the suburban fleet of Millennium trains currently undertaken by Downer EDI would be relocated to another maintenance facility. The relocation of the Millennium fleet maintenance operations is outside the scope of this REF and would be subject to a separate planning approval if required.

Following construction, commissioning and testing of the New Intercity Fleet would be undertaken by the New Intercity Fleet train supplier/maintainer (i.e. RailConnect). Once put into service, ongoing maintenance of the New Intercity Fleet at the Precinct would be undertaken by RailConnect.

1.6 Purpose of this Review of Environmental Factors

This REF has been prepared by WSP | Parsons Brinckerhoff on behalf of Transport for NSW. The purpose of the REF is to:

- describe the proposed modification works at the Precinct
- describe the commissioning, stabling and maintenance procedures associated with the New Intercity Fleet
- document and assess the likely impacts on the environment during:
 - construction/modification works
 - commissioning and maintenance of the New Intercity Fleet within the Precinct
 - ongoing operation and maintenance of the New Intercity Fleet within the Precinct
- detail mitigation measures that would be implemented to manage and minimise likely and potential environmental impacts.

The REF has been prepared in accordance with Part 5 of the EP&A Act. The aim of the REF is to satisfy the requirements established under Section 111 of the EP&A Act and for Transport for NSW to consider and take into account to the fullest extent possible, all potential and likely impacts on the environment during construction and operation. Furthermore, environmental impacts during construction, commissioning and operation have been considered in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

2 EXISTING OPERATIONS WITHIN THE EVELEIGH RAILWAY PRECINCT

2.1 Overview

Rail related activities have been undertaken at the Precinct since the late 1800s. The Precinct was initially established to be the major railway workshop in NSW, supported by smaller workshops at regional centres. At its peak, the Precinct was the primary location for the manufacture of rolling stock such as wagons and passenger carriages as well as the maintenance and repair of locomotives and railway stock. Over time the activities undertaken, and the prominence of the Precinct, has evolved in response to economic cycles, technological developments and operational changes. The Precinct has also historically been used to commission new train fleets including the Oscar and Millennium fleets.

As part of current operations, the Precinct is primarily used to undertake stabling and maintenance activities as follows:

- **Millennium fleet** – The Millennium fleet is an electric fleet operated by Sydney Trains and are maintained under contract by Downer EDI. Maintenance of the Millennium fleet occurs on Maintenance Roads (tracks) 5-9 within the Millennium Shed and Road 10 which runs adjacent to the southern wall of the Millennium Shed. The Millenniums are part of the wider Sydney suburban fleet operated by Sydney Trains which includes T-sets (Tangara), S-sets, A-sets (Waratahs), C-sets and K-sets. Stabling and maintenance of these suburban fleets occurs at other stabling and maintenance facilities located throughout the rail network. Any train type however can utilise the Precinct on an as needs basis.
- **Outer Suburban Rail Car (Oscar) fleet** – The Oscar fleet is an electric fleet operated by NSW TrainLink. Maintenance of the Oscar fleet is carried out by the Sydney Trains Fleet Maintenance Division and occurs on Maintenance Roads 1-4 within the Oscar Maintenance Shed.
- **Endeavour/XPLORER fleet²** – The Endeavour and XPLORER fleets are diesel powered trains operated by NSW TrainLink. Maintenance is carried out by Sydney Trains Fleet Maintenance Division within the Endeavour/XPLORER Maintenance Shed.
- **Heritage train fleet** – The heritage fleet comprises a mixture of diesel and steam engine heritage trains. These trains are operated and maintained by Rail Heritage. The heritage fleet is stabled and maintained within the Large Erecting Shop.

Rail operations at the Precinct are supported by three facilities/administration areas, namely the security gatehouse, the Downer EDI offices and the Sydney Trains administrative facilities and stores area. These areas are used to house all management and logistics facilities which are required to support operations at the Precinct. They generally consist of administration buildings, car parks, storage areas, a drop table (a pit that allows trains to be rolled onto it, avoiding the need for a crane or jacks to lift the vehicle off the rail), train wash, bulk fuel and oil storage and supply facilities, a decant tank and ablution facilities (rooms which contain washing facilities and/or toilets). These facilities and the administration areas will continue to be used to support the current users of the Precinct as well as the proposed New Intercity Fleet.

The location of the individual fleet maintenance areas and supporting facilities/administration areas are shown on Figure 4.1. Currently up to 160 personnel are employed across the Precinct during the daytime and up to 60 personnel during the evening and night-time periods. Equipment and materials are delivered to the Precinct via truck, at a rate of approximately 10 heavy vehicle deliveries per day and three semi-trailer deliveries per week.

Access to the Precinct during routine operations is via the main entrance located off Railway Parade as illustrated in Figure 7.12. The Precinct can also be accessed via Cornwallis Street, which is used to access the rail corridor during track possessions (planned periods when Sydney Trains suspend rail services on a

² [Endeavour/XPLORER fleet](#)

segment of the network to enable track maintenance). It is proposed to use this access point for the construction of the Eastern Siding extension.

2.2 Train access and movements

Train access to the Precinct is via:

- Illawarra Dive
- Engine Dive, which surfaces at the southern end of Platform 10 at Redfern Station and connects to the Western Siding
- down Illawarra Line (train travelling away from Central Station) from Platforms 9 and 10 at Redfern Station. This connects directly to the Western Siding via the existing arrival and departure road located approximately 250 metres west of Redfern Station
- Eveleigh gate road, which connects to the Illawarra Line.

The Precinct operates 24 hours per day, seven days per week with approximately 50 train movements (i.e. in and out) throughout a 24 hour period. Arriving trains are either stabled or directed to the relevant maintenance shed to have scheduled/emergency inspection and/or maintenance activities performed (e.g. cleaning/presentation, replacement of consumable parts etc.) or are directed to Engineering Roads 1 and 2 for decanting.

Train movements within the precinct are manually controlled by a shunter who is in charge of directing and moving the trains, which consists of moving the trains to a siding from the main line or between sidings within the Eveleigh Facility. The shunters also break apart and join the train carriages.

2.3 Train maintenance operations

The maintenance activities performed on the Millennium, Oscar and Endeavour/XPLORER fleets are consistent with the three levels of maintenance activities undertaken for all train fleets by Sydney Trains and NSW Trains. A description of the activities associated with each level of maintenance is provided below:

- **Level 1 maintenance** – This is primarily associated with train presentation activities (i.e. internal train cleaning being the removal of refuse, emptying any receptacles, wiping down dirty surfaces, cleaning toilets and removing graffiti, if possible). Minor repairs, such as rectification of normal wear and tear on interior trim, panels, toilets, signage, window film and exterior washing are also associated with this maintenance level. These activities are carried out on a 24-hour basis.
- **Level 2 maintenance** – This includes planned routine maintenance examinations and/or maintenance of trains that are unfit for service due to graffiti and/or vandalism. Level 2 maintenance also includes other activities such as wheel lathing and replacement of defective major components such as compressors or train carriage couplers. Level 2 maintenance is carried out at intervals in excess of 30 days.
- **Level 3 maintenance** – This generally involves the overhaul or complete replacement of major train components such as bogies, couplers, gangways and compressors. These activities are undertaken less frequently due to the longer service intervals (e.g. typically every six to eight years for heavy component replacements).

As mentioned above, train maintenance is undertaken at the Precinct 24 hours per day, seven days per week. The maintenance activities are typically undertaken within the respective sheds, however activities which do not require the use of fixed plant or equipment are also undertaken in the yard, as required. Across the Millennium, Oscar and Endeavour/XPLORER fleets, approximately forty trains are maintained within the Precinct over a seven day period.

Decanting of trains is another maintenance activity that is undertaken within the Precinct on Engineering Roads 1 and 2. This involves the removal of sewage waste from storage tanks within the trains. The decanting facility is used across all fleet types. Currently up to twelve decants are performed in a typical 24 hour period.

A drop table is located on Maintenance Road 9 within the Millennium Shed. The drop table is built in a drop pit allowing locomotive or rolling stock to be rolled onto it, avoiding the need for a crane or jacks to lift the vehicle off the rails. It is used during maintenance activities that require the removal of locomotive or rolling stock wheelsets. Although it is located in the Millennium Shed, it is used across all fleet types.

A train wash is located to the west of the Endeavour/XPLORER Maintenance Shed and is used exclusively by the Endeavour/XPLORER fleets.

The layout of the Precinct is shown in Figure 4.1.

3 PROJECT JUSTIFICATION AND NEED

3.1 Strategic justification

Improving transport customer experience is a focus of the NSW Government's transport initiatives. Trains are an important component of the transport system and as such play a critical role in shaping the customer's experience and perception of public transport.

In May 2014, the NSW Government announced it is delivering a New Intercity Fleet to replace trains carrying customers from Sydney to the Central Coast, Newcastle, Blue Mountains and the South Coast. The introduction of the New Intercity Fleet would create a more consistent, improved experience for intercity customers which is comparable to that experienced by commuters on other rail lines, encourage greater public transport use, provide improved transport links between intercity locations and metropolitan Sydney, reduce the operating and maintenance costs and provide a more reliable service and increased capacity to support a growing population.

The Project is consistent with the NSW Government's commitment to deliver an efficient and effective transport system around Sydney and NSW as detailed in *NSW 2021 – A Plan to Make NSW Number One* (NSW Government, 2011).

NSW 2021 is the NSW Government's ten year plan to guide budget and decision making in NSW. NSW 2021 includes the following goals, targets and priority actions relevant to the Project:

- reduce travel times
- minimise public transport waiting times for customers
- improve co-ordination and integration between transport modes
- grow patronage on public transport
- improve public transport reliability
- improve customer experience with transport services.

The Project is also consistent with the *NSW Long Term Transport Master Plan* (NSW Government 2012a; 'Transport Master Plan') and its supporting document, *Sydney's Rail Future* (NSW Government 2012b), which identifies the need to enhance rail passenger services, in particular for longer distance travel outside of the Sydney suburban network.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal. Further details of the application of NSW Government policies and strategies are discussed in Section 3 of this REF.

3.2 New Intercity Fleet program

The introduction of the New Intercity Fleet will allow for the replacement of the existing intercity fleet which are experiencing a number of adverse operational impacts including:

- Declining reliability – higher average peak period breakdown rates in comparison to the rest of the fleet.
- Lower availability – as a result of the declining reliability, the existing intercity fleet are experiencing increases in failures requiring repair and increased routine maintenance levels. This results in a decreased availability of trains on the network.
- Higher maintenance costs – they require maintenance and inspections at 7 day, 15 day, 45 day and 90 day intervals whereas newer fleets generally require only 30 to 60 day inspection cycles. The ageing trains will also require major refurbishment in the future.

- Lower customer amenity – older train fleets do not include modern amenities such as improved customer information features, safety features, accessibility features and internal comfort features for seating, luggage storage and movement.

The benefits of operating the New Intercity Fleet include:

- a more consistent, improved experience for intercity customers which is comparable to that experienced by commuters on other rail lines particularly in terms of reliability and capacity improvements to support the growing train network. This can lead to an increase in the proportion of passengers choosing public transport over car transport for intercity journeys which is a less greenhouse gas (GHG) intensive mode of travel per passenger
- reduced operating and maintenance costs
- increased availability of trains on the network
- generally lower energy consumption (kWh/km) based on contract specifications compared to other train types (it must be noted that the nominated routes and stopping pattern for each contract train type is different which can change the energy consumption values and mean the results aren't directly comparable)
- improved customer experience with CCTV, charging stations for electronic devices, tray tables, luggage racks etc.

The NSW Government's decision to introduce the New Intercity Fleet would result in a number of changes from the existing fleet including an increase of the total length of the train from approximately 165 metres to 205 metres. This would require a number of modifications to stations, stabling yards and tunnels to accommodate and operate the new trains.

3.3 Need for facility

None of the existing maintenance facilities have sufficient spare capacity or capability to accommodate the maintenance requirements of the New Intercity Fleet. A dedicated maintenance facility at Kangy Angy (on the Central Coast) is therefore proposed to be constructed and operated for the New Intercity Fleet (subject to separate planning approval). The Kangy Angy facility would serve as the primary facility at which maintenance of the NIF would be undertaken. This facility would be supported by a number of stabling facilities throughout the network where routine train presentation and minor maintenance tasks would be undertaken.

However, the primary maintenance facility at Kangy Angy would not be operational prior to the arrival of the first New Intercity Fleet trains. As such, another facility is required for commissioning and minor maintenance until the Kangy Angy facility is operational.

The dominant movement of intercity trains is driven by large numbers of commuters travelling from regional locations to the city in the morning peak period, before carrying commuters back to their departure location in the evening peak period. The demand and movement of trains is lower outside the peak periods.

As a result of the peak train movements, a stabling facility is required close to the Sydney CBD to stable the New Intercity Fleet trains for short periods between the morning and afternoon peaks. The facility would also preferably allow routine minor maintenance and inspection checks to be undertaken.

3.4 Selection of sites

GHD was engaged by Transport for NSW to identify existing facilities which could be used to undertake initial commissioning, stabling and maintenance of the New Intercity Fleet. Four facilities were identified being Mortdale, Auburn, Flemington and Eveleigh.

A multi-criteria analysis was carried out that considered factors such as capability of the existing facility, extent of infrastructure upgrades required, cost, available siding capacity, access to the track test sites, proximity to the terminating station (i.e. Central Station), centralised location to allow maintenance and

inspection checks to be easily undertaken, dead-running distances, and proximity to other forms of public transport.

The evaluation of the existing facilities was reviewed at a workshop by representatives from various stakeholder groups within Transport for NSW. The outcomes of the workshop concluded the following:

- The Mortdale facility was considered unsuitable for maintenance because of poor access to the Blue Mountains line and the Central Coast & Newcastle Line.
- The Auburn facility rated poorly because of its layout, and constraints imposed by existing operations.
- The Flemington facility was rejected due to insufficient spare capacity, and access difficulties during the day due to the high frequency of trains operating on the adjacent main line (>20 movements per hour).
- The Eveleigh facility rated strongly across many of the assessment criteria (including the minor extent of infrastructure upgrades required and its proximity to the terminating station (Central Station), and was therefore selected as the preferred option.

The Eveleigh Facility would need to meet the following requirements to ensure it is suitable for the commissioning and stabling of the New Intercity Fleet trains:

- has siding lengths which can accommodate the increased length of the new trains
- provision of safe crew access
- decanting facilities for all carriages (given the longer length)
- provision of day stabling facilities to accommodate trains between the morning and evening peak periods.

Once the Kangy Angy Maintenance Facility is operational, the Eveleigh Facility would function as a secondary maintenance location with maintenance tasks typically being limited to train presentation and minor maintenance activities (i.e. levels 1 and 2 maintenance) as described in Section 2.3.

Undertaking train stabling and minor maintenance activities at a supplementary facility, with major maintenance works undertaken at Kangy Angy, would ensure operational flexibility and the delivery of an effective and efficient maintenance program.

3.5 Assessment of alternatives

Following the identification of the Eveleigh Facility as the preferred site, two options that would achieve the necessary operational requirements for the New Intercity Fleet were considered. A 'do nothing' option was also considered but discounted as it would not meet operational requirements.

3.5.1 Do nothing

Under this option no changes would be made to the existing rail infrastructure within the Eveleigh Yard (i.e. track layout, siding lengths and associated infrastructure). This option was not supported as it:

- introduced operational inefficiencies and complexity associated with train shunting movements (i.e. the increased train lengths would block the movement of trains between some maintenance roads within the precinct)
- introduced unacceptable commissioning and maintenance safety issues due to the train extending outside the section of track which has safety isolation protection devices
- would not meet the stabling requirements, as only a SNIF train could be stabled on maintenance road 6 in the Millennium Shed as the overhead wires do not extend for the full length of the maintenance road
- would not allow for the decanting of all train carriages.

As such, the 'do nothing' option was not considered a feasible option.

3.5.2 Option 1: Alternative Engineering Road track configurations

Option 1 proposed altering the location of the access point to Engineering Roads 1 and 2. This alternative track configuration would increase the length of Engineering Roads 1 and 2 and avoid impacts to the Welding Qualifications Centre. However, given the complexity of the rail network within the Precinct, such an option would trigger additional works to relocate a number of other maintenance roads. This option would significantly increase the scope of works to achieve the required operating objectives and would result in additional operational complexity and disruption to the existing users during construction phase, when compared to Option 2.

3.5.3 Option 2: Extension of existing tracks and overhead wires

Option 2 proposed to extend the Eastern Siding and Engineering Roads 1 and 2 and supporting infrastructure by approximately 26 metres and 49 metres respectively. It would also extend the overhead wiring for the full length of Maintenance Roads 6 and 7 of the Millennium Shed and adjust the associated signalling and safety isolation equipment, and would require the demolition of the Welding Qualifications Centre. This option would maximise the operational efficiency and flexibility for the movement and stabling of trains, allowing for the full length of the train to be decanted on Engineering Roads 1 and 2, and allow unhindered train access from the main line to the Eveleigh Yard should a New Intercity Fleet train be stabled on the Eastern Siding. This option also eliminates the safety risks, would be relatively simple to construct, cost effective and logical. As such, Option 2 was selected as the preferred option.

4 THE PROJECT

4.1 Overview

The New Intercity Fleet comprises 512 cars which would progressively come into service. The first trains are expected to be delivered in 2018, with the remainder of the fleet being delivered through to 2022. Commissioning will commence in late 2018, with the first train entering into service in 2019.

Commissioning, stabling and maintenance of the New Intercity Fleet would be undertaken on Maintenance Roads 5-10 associated with the Millennium Shed. To accommodate the New Intercity Fleet, track, civil, overhead wiring, signalling and signage modifications to the existing infrastructure in the Precinct are required. These modification works would also allow the required configuration of Short New Intercity Fleet (SNIF) and Long New Intercity Fleet (LNIF) trains to be stabled. LNIF trains would operate as 10-car sets which comprise of a six and four car set, with a train length of approximately 205 metres, while the SNIF would operate as 8-car sets, which comprise of two four car sets, with a train length of 164 metres. The modification works would allow stabling and maintenance for 9.5 New Intercity Fleet trains (comprising 4.5 SNIF and 5 LNIF).

The Project involves modifications to three main areas, being:

- **Engineering Roads 1 and 2:** extension of both tracks by approximately 49 metres to accommodate decanting of a LNIF train on both tracks. This would involve the relocation of the equipment within the Welding Qualifications Centre to another building/location within the Precinct and demolition of the Welding Qualifications Centre.
- **Millennium Shed:** extension of the OHW for the full length of Roads 6 and 7 in the Millennium Shed and other works such as aligning safety isolation equipment located at the Sydney end of the Millennium Shed to ensure the full length of the New Intercity Fleet trains can be accommodated under a separate electrical section.
- **Eastern Siding:** extension of the Eastern Siding by approximately 26 metres to allow a LNIF train to be stabled and allow other trains to move throughout the Eveleigh Facility without restriction. This would require the permanent acquisition of approximately 275 square metres of land within the Australian Technology Park.

These modifications require works to a number of supporting and ancillary infrastructure elements in the Precinct. The details of which can be found in Section 4.2 below.

Train movements within the Precinct are currently manually operated under the control of a shunter.

The infrastructure and services required to support the commissioning, stabling and maintenance of the New Intercity Fleet includes, but is not limited to, office, administrative, and amenity facilities and services, workshops, power, water, electricity, telecommunications, access roads, car parks, crew walkways, lighting, security fencing, train radio equipment, stormwater, storage areas and stores.

The Project would continue to utilise the existing supporting infrastructure and services where possible. However, minor modifications to the existing infrastructure as well as new infrastructure will be required to support the Project.

The overall effect of the modification works will be to enable the Precinct to be operated in the same manner as it currently operates with minimal change to Sydney Trains and NSW TrainLink operational and maintenance processes whilst also being suitable for the New Intercity Fleet trains.

4.2 Project boundary and description of works

The Project has been divided into three construction work areas referred to as Subject Site 1, 2 and 3 and are based on the location of the works within the Precinct. For the purpose of this REF, the three subject sites are referred to as the 'Project area'. The location of each subject site is shown in Figure 4.1 with a description of the works at each subject site provided in Table 4.1.

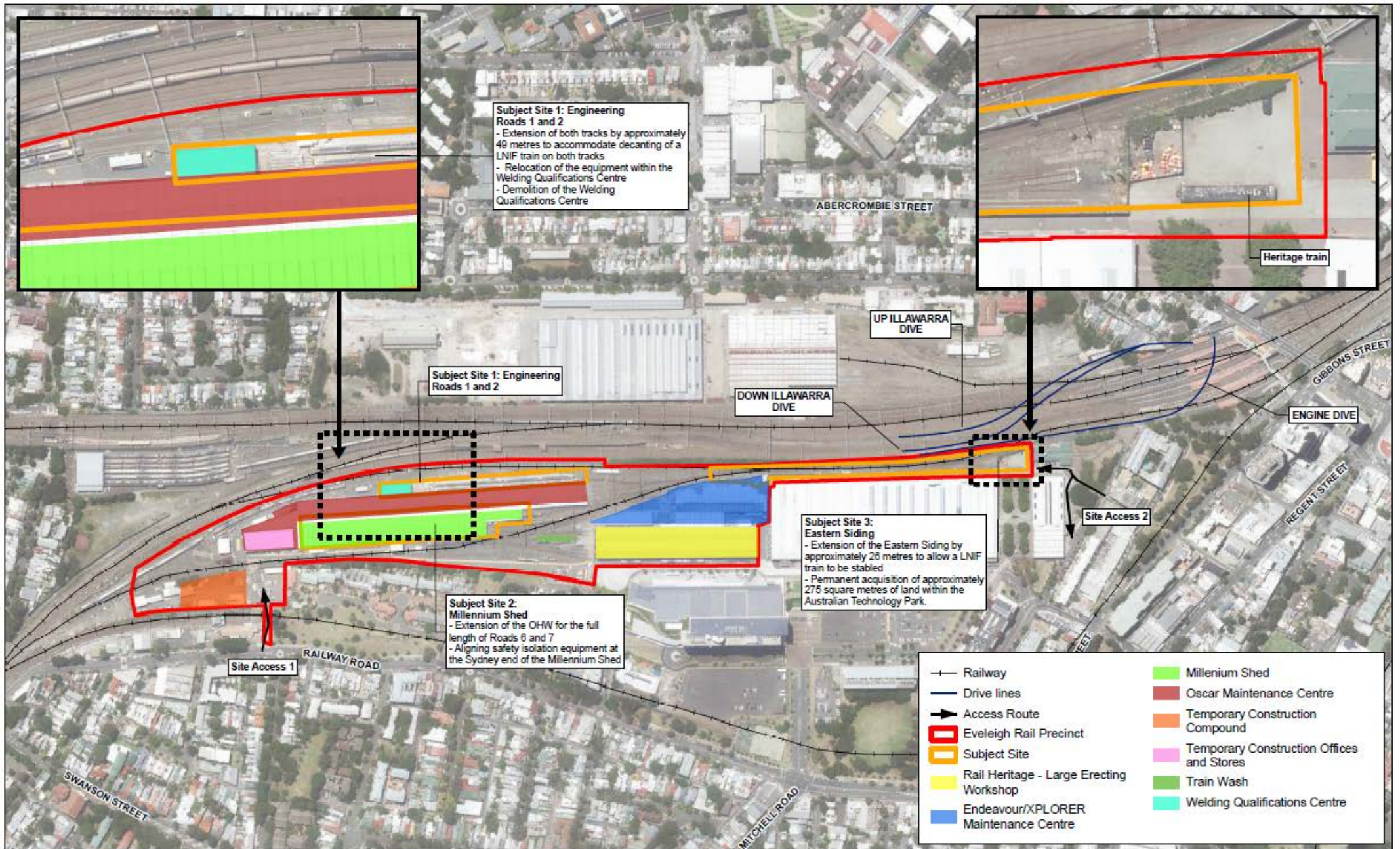
Table 4.1 Description of works

PROJECT AREA	DESCRIPTION OF WORKS
Subject Site 1 – Engineering Roads 1 and 2	Works within Subject Site 1 would involve: <ul style="list-style-type: none"> → relocation of the equipment within the Welding Qualifications Centre to another location within the Precinct → demolition of the Welding Qualifications Centre to accommodate the extension of Engineering Roads 1 and 2 → extension of Engineering Roads 1 and 2 by approximately 49 metres → extension of the OHW to match the track extension → install crew walkways and pathways for the extended length of the Engineering Roads → extension of lighting to cover the new walkways and pathways → extension of the suction and non-potable water supply and the installation of additional decant point associated with the existing decant facility → retain existing fixed buffer stop (a device to prevent railway vehicles from going past the end of a physical section of track) and provide new stop lamp, to the end of the new track on Engineering Road No 1 → provision of a new fixed buffer stop and stop light at the end of the Engineering Siding No. 2 → installation of a new fixed train stop 2.5 metres from buffer stop including location modifications → ancillary works such as bonding modifications, signals, the installation of signage and fixed train stops in accordance with relevant Australian Standards, as required → should ASA not grant a concession to splice onto the end of the existing overhead wire a new section of OHW would be installed which starts from the nearest splice point to the end of the track extension.
Subject Site 2 – Millennium Shed	Works within Subject Site 2 would involve: <ul style="list-style-type: none"> → extension of the OHW over Maintenance Roads 6 and 7 to accommodate access to the shed for the longer New Intercity Fleet trains (i.e. installed to the full length of the roads) → relocation of safety isolation equipment, supporting OHW structures and signals on Maintenance Roads 7, 8 and 9 → new safety isolation equipment to enforce safe interaction between overhead wire isolation on Maintenance Roads 6 and 7, high level platform access, crane operation and retractable overhead wiring operation → extension of walkways and lighting, as appropriate → ancillary works such as bonding modifications, signals, the installation of berth boards, buffer stop lights and fixed train stops in accordance with relevant Australian Standards, as required.

PROJECT AREA	DESCRIPTION OF WORKS
Subject Site 3 – Eastern Siding	<p>Works within Subject Site 3 would involve:</p> <ul style="list-style-type: none"> → extension of the track by approximately 26 metres (to provide a total length of 215 metres clear of the entrance road interlocking) → extension of the OHW to match the track extension → extension of walkways and lighting for the extended track length, as appropriate → extension of the security fencing around the extended section of track → potential alterations to the existing stormwater drainage system at the eastern extent of the new security fence line → relocation of the existing FRN 2186 Second Class Sitting/Buffer Car (referred to as the “heritage train”) to facilitate access to the construction site and for the storage of materials and equipment. The final position of the relocated heritage train would be confirmed during detailed design and in consultation with relevant stakeholders. → installation of a fixed buffer stop and signage → ancillary works including the relocation of the buffer stop and buffer stop lights, signals, bonding modifications the installation of berth boards and fixed train stops in accordance with relevant Australian Standards, as required → should the Asset Standards Authority (ASA) not grant a concession to splice onto the end of the existing overhead wire a new section of OHW would be installed which starts from the nearest splice point to the end of the track extension → electricity will be sourced from the endeavour workshop and will use the existing cable tray.

4.3 Land requirements

To allow for the works at Subject Site 3 – Eastern Siding and the storage of materials and equipment, approximately 550 square metres of land immediately to the east of the Eastern Siding would be acquired. This land is currently used to store rubbish bins and for car parking. Approximately 275 square metres of this area is a permanent acquisition and an adjoining 280 square metres (approximately) is temporarily required for construction purposes. All other construction works at Subject Site 1 and Subject Site 2 would occur within Precinct.



Map: 2202522C_GIS_005_A4

Author: MG

Date: 9/03/2017

Approved by: IS



1:4,000

Coordinate system: GDA 1994 MGA Zone 56

Scale ratio correct when printed at A3

Data source: - © Land and Property Information 2015

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TRANSPORT FOR NSW

New Intercity Fleet Eveleigh
Figure 4.1
Project area

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4.4 General construction approach

4.4.1 Construction program and staging

The construction of the Project is predicted to be completed within around 18 months, commencing in mid 2017. The construction at each Subject Site will overlap during the 18 month period. The estimated duration of construction at each Subject Site is shown in Table 4.2 but is subject to refinement by the contractor, once engaged.

Table 4.2 Indicative construction schedule

SUBJECT SITE	M O N T H S																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Subject Site 3 – Eastern Siding	■	■	■	■	■	■	■											
Subject Site 1 - Engineering Roads 1 and 2:						■	■	■										
Subject Site 2 – Millennium Shed (Millennium Shed is vacated)						■												
Subject Site 2 – Millennium Shed (All other works)							■	■	■	■	■	■	■	■	■	■	■	■

4.4.2 Site establishment and storage areas

The Project is located on disturbed land. To facilitate construction works, equipment and material storage areas would be established at each Subject Site on existing hardstand areas. Some minor trimming of existing planted vegetation adjacent to the Eastern Siding may be required. An additional storage area would also be established at the south western end of the Precinct as shown in Figure 4.1. This storage area would be used as an overflow common user location.

Equipment storage and site establishment works would be as follows:

- **Subject Site 1 - Engineering Roads 1 and 2:** to allow for the storage of materials and equipment and facilitate vehicle access to the work area, an existing removable office to the west of the Welding Qualifications Centre would be relocated to another position within the Precinct (to be determined during detailed design). Mobilisation of construction site administrative and amenity sheds would also be established at this location.
- **Subject Site 2 – Millennium Shed:** the Millennium Shed currently has existing office space, storage and equipment storage areas which would be used once they have been vacated by the existing operator.
- **Subject Site 3 – Eastern Siding:** a heritage train is currently located to the immediate south of the proposed track extension works, within the car park of the Australian Technology Park. The heritage train would either be relocated to another location within the Eveleigh Precinct, or moved off site prior to the commencement of construction to allow access to the work site and for the storage of materials and equipment, installation of site shed and security fencing.
- **Temporary construction offices and stores:** located in the existing Eveleigh Maintenance Centre Office and Amenities. These offices would not be internally altered for the proposed works.
- **Temporary Construction Compound:** located in the car park to the north and west of the Civil and Mains Depot Office. This area would be used for vehicle parking and equipment storage, and the area, nor adjacent buildings, would be physically impacted by the proposed works.
- **Construction workforce:** It is anticipated that less than 50 construction staff would be on-site at any one time.

4.4.3 Construction work hours

The majority of construction works would be carried out during standard construction hours:

- 7am to 6pm – Monday to Friday
- 8am to 1pm – Saturdays
- no work on Sundays or public holidays, with the exception of works undertaken during track possessions (that is, planned periods when Sydney Trains suspend rail services on a segment of the network to enable track maintenance).

Exemptions and approval for works outside of the above standard construction hours may be required during the following circumstances:

- works required by utility service providers or where impacts to services cannot be reasonably managed
- works requiring track possessions and outages
- oversized deliveries/unloading of machinery than can only travel between hours specified by the police or Roads and Maritime Services
- where works can be undertaken so as to be inaudible at the nearest residential receivers.

4.4.4 Track possessions and worksite protection

During construction, network and temporary local track possessions and power outages would be required. Network track possessions are scheduled closures that would occur regardless of the Project and are when part of the rail network is temporarily closed and trains are not operating. Local track possessions would occur at discrete areas within the Precinct as part of full weekend possession works. These would be arranged in consultation with Sydney Trains.

As detailed in Section 4.4.3, track possession and outages may occur during night time hours to minimise any disruption to other users of the Precinct. The local community (including residents and businesses) would be notified in advance of any work outside normal hours that are likely to be audible at adjacent sensitive receivers, including mid-week, night time and weekend rail possessions.

4.4.5 Earthworks

Excavation works would typically be limited to the extension of Engineering Roads 1 and 2 and the Eastern Siding and associated ancillary works such as the relocation of buffer stops, buffer stop signals, installation of berth boards fixed train stops, walkways and underground services.

Based on the total length of track being extended at both the Eastern Siding approximately (26 metre extension) and the Engineering Roads 1 and 2 (approximately 49 metre extension per track), the estimated volume of spoil to be removed is approximately 100 cubic metres. The ground within the excavation area is expected to comprise fill material associated with the initial construction of the railway and the initial levelling of the Precinct.

4.4.6 Construction traffic and construction access

Construction traffic would comprise road vehicles transporting equipment and materials and workers vehicles. Access to the Precinct would be provided by the existing sealed access road off Railway Parade. A secondary access route is via Cornwallis Street and the Australian Technology Park car park. This route would be used to access the works area at Subject Site 3 – Eastern Siding. Both vehicle access routes are shown in Figure 7.12. No upgrades to the existing access roads or the surrounding road network would be required as part of the works. Within the site, the movement of vehicles would be confined to the existing access roads.

The number of light vehicles would typically be limited to the number of workers anticipated on the site. During a typical working day, it is assumed that the majority of the light vehicle movements would approximately occur within an hour period prior to 7am (when employees arrive at work) and after 5pm (when employees depart from work). During track possessions and planned outages, the arrival and departure of construction staff is anticipated to occur late at night/early in the morning. It is anticipated that some construction staff would park within the surrounding streets.

4.4.7 Construction plant and equipment

It is anticipated the following plant and equipment would be used during construction:

- mobile cranes
- trucks including semi-trailers for the delivery of equipment, dump trucks and concrete trucks
- rail saw and rail grinder
- dozer
- compactor
- compressor
- excavator mounted hammer
- backhoe
- loader
- jackhammer
- power tools and hand tools
- tractor or truck rail installer
- hi-rail cherry picker
- overhead wire truck
- vibratory roller
- rail tamper
- ballast tamper.

4.5 Commissioning and maintenance operations

4.5.1 Overview

The introduction of the New Intercity Fleet at the Precinct is not expected to result in any significant change from current operations as:

- the maintenance activities associated with the New Intercity Fleet are similar to that undertaken on the Millennium fleet currently maintained within the Precinct
- all aspects associated with the maintenance, stabling and movement of the Oscar, Endeavour, XPLORER and Heritage fleets, and their frequency, will be unchanged
- vehicle numbers will be generally consistent with current operations
- access points will be unchanged
- the type of maintenance activities associated with the New Intercity Fleet is generally consistent with the Millennium fleet.

However, minor operational changes are expected to be associated with:

- the use of a diesel locomotive to shunt and line haul the New Intercity Fleet trains within the Precinct and on the rail network, during commissioning of the new trains
- component inspection and testing which would be undertaken at a greater frequency during the commissioning phase, when compared with once the New Intercity Fleet is operational
- the overlap of the commissioning and maintenance activities of the New Intercity Fleet, as a result of the four year delivery program
- the nose of the trains will extend outside the Millennium Shed by approximately 20 metres
- minor variations in the arrival and departure times of New Intercity Fleet trains when compared with the existing train timetable, due to the different timetable associated with Intercity trains

- the New Intercity Fleet will improve reliability due to the increased service intervals (i.e. >30 days) and an increase in the period between component inspection and testing activities (i.e. operational maintenance).

The proposed commissioning and operational activities associated with the New Intercity Fleet are consistent with past and existing activities. The Millennium fleet was the most recently commissioned fleet at Eveleigh and is currently stabled and maintained at the Precinct. These minor infrastructure modifications, together with the commissioning and operational activities, are therefore consistent with the ongoing use and operation of the Precinct and are not expected to result in any adverse impacts.

The commissioning and maintenance operations of the New Intercity Fleet are discussed in Section 4.5.2 and Section 4.5.3.

4.5.2 Commissioning

The existing Millennium train maintenance operations undertaken by the operator would be relocated to another railway maintenance facility (to be determined during detailed design) to allow for the use of Maintenance Roads 5 to 10 for the New Intercity Fleet.

Once at the Precinct, detailed inspection and operational checks (i.e. static and dynamic) would be performed to ensure the trains' functionality has not been impaired during transit. The static tests will be undertaken within the Millennium Shed and involve but are not limited to:

- **Compressor/brake testing** – releasing air from the compressed air tanks and pressurising the compressed air tanks. This is expected to occur over a 30 minute period and will result in air compressors running for up to 20 minutes at a time.
- **Door operations** – checking the opening and closing operation of the doors (i.e. one or more doors open/close on the same side of the train, as required).
- **External/internal speaker** – checking it is operating correctly and that recorded announcements are clearly audible.
- **Horn** – testing the operation of the horn system.
- **Lighting** – inspecting the exterior and interior lighting systems.
- **Continuity** – testing the mechanical and electrical systems across the length of the train.
- **Visual inspection** – inspecting the exterior and interior of the train for damage during transit/construction.

Dynamic testing involves validating the operational performance of the trains (e.g. energy consumption/efficiency, traction/acceleration, braking, signal interference, timetable performance, ride performance). This in part involves hauling the New Intercity Fleet train on the rail network with a diesel locomotive.

Due to the four year delivery program, there will be an overlap of the commissioning and maintenance activities. The commissioning will occur over a four year period. Up to five trains will be stabled within the Millennium Shed at any point in time, with commissioning or maintenance activities being undertaken on each train, as relevant.

Commissioning involves both static and dynamic testing. Typically static testing will be undertaken during the daytime. The majority of the dynamic testing will be conducted during night-time on the rail network, but some testing may be conducted during the day, particularly towards the end of the test program and utilise track possessions. After dynamic testing, the train would return to the Precinct to undergo any corrective work or adjustments during the daytime.

4.5.2.1 Assumptions

It should be noted that this REF only assesses potential impacts associated with commissioning works within the Precinct. All haulage and commissioning activities that occur on the network (e.g. associated with dynamic testing and haulage of the New Intercity Fleet on the external rail network from the port of delivery) are covered by existing Environmental Protection Licence (EPL) 12208 held by Sydney Trains. However, there are still a number of uncertainties regarding the New Intercity Fleet commissioning activities as the Project is in the concept design phase. As such, a worst case approach has been adopted as part of the preparation of this REF in order to assess the potential impacts associated with the commissioning works at the Precinct as follows:

- Commissioning and maintenance activities for the New Intercity Fleet trains would overlap, as a result of the four year delivery program.
- The New Intercity Fleet would be delivered as LNIF (i.e. 10 car sets) and hauled to the Precinct along the network via a diesel locomotive (not in REF scope).
- Once at the Precinct, up to two locomotives may be required to move each New Intercity Fleet train into the Millennium Shed:
 - The lead locomotive would haul the New Intercity Fleet train into the Precinct (i.e. clear of the main lines) and will be uncoupled (i.e. disconnected from the New Intercity Fleet train).
 - The lead locomotive would then travel around the network and recouple (reconnect) at the rear of the New Intercity Fleet train and propel the New Intercity Fleet train into the nominated Maintenance Road within the Millennium Shed.
 - Alternatively, a second locomotive may be coupled to the rear of the New Intercity Fleet train (either at the port or in the Precinct) and propel the New Intercity Fleet train into the nominated road within the Millennium Shed, once the lead locomotive is uncoupled.
 - Uncoupling of a locomotive is estimated to take 5 to 15 minutes – at which time the locomotive will be idling.
 - The locomotive would not need to operate at full power either during locomotive hauling or shunting.
- Up to five New Intercity Fleet trains would undergo commissioning at the same time on Roads 5-9 within the Millennium Shed (24 hours per day, seven days per week).
 - If there are more than five New Intercity Fleet trains at the Precinct at any one time, double shunting would be required. This would result in further operational complexity and congestion at the Precinct, however this is expected to occur infrequently.
- Diesel locomotives would be used to haul the New Intercity Fleet train to the section of the network where signal interference testing is to be undertaken (Note: there are 13 signal systems to be tested across the network. The impact of diesel locomotive hauling in the Precinct has been considered by the REF. Once on the network the impacts are outside of the scope of the REF).
- The signal interference testing is estimated to take approximately six weeks to complete and is likely to be undertaken between 8pm and 4am, however, the testing could be undertaken at any time in a 24 hour period depending on commissioning team availability and train path availability.
 - Signal interference testing is undertaken only on the first two New Intercity Fleet trains. Once these trains pass testing no further signal interference testing is undertaken on any of the train sets that are delivered.

4.5.3 Operations

Train maintenance activities associated with the New Intercity Fleet would essentially remain largely unchanged from those currently undertaken on the Millennium fleet (i.e. maintenance of the New Intercity Fleet at the Precinct would continue to involve minor Level 1 and Level 2 maintenance works (refer Section 2.3). Level 3 maintenance works are only typically undertaken every six to eight years and are expected to be undertaken at the proposed primary maintenance facility at Kangy Angy. Notwithstanding

this, Level 3 maintenance operations may be undertaken from time-to-time at the Precinct as required to back up the facility at Kangy Angy.

Maintenance activities are currently undertaken 24 hours per day, seven days per week. This will continue with the introduction with the New Intercity Fleet and will occur in parallel with the commissioning activities.

The New Intercity Fleet trains will be routinely stabled at the Precinct between morning and evening peaks. This reflects the demand for the fleet which brings large volumes of customers into the city each morning and is used more lightly off-peak before carrying the demand back from the city to suburban and regional centres in the evening. This 'tidal' flow means that fewer trains are stabled in Sydney overnight, but significant day stabling is required in the city.

All other operations undertaken at the Precinct would remain unchanged as a result of the Project. The Precinct would continue to operate as a train stabling and maintenance facility for the Oscar, Endeavour and XPLOER fleets operated by NSW TrainLink and the heritage trains managed and operated by Rail Heritage.

5 STATUTORY AND PLANNING CONSIDERATIONS

5.1 Commonwealth legislation

5.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the approval of the Commonwealth Minister for the Environment and Energy for actions that may have a significant effect on matters of National Environmental Significance (NES) or a project which is located on or will affect Commonwealth land and the environment.

The Project would not impact on any matter of NES and is not located on Commonwealth land and therefore a referral to the Commonwealth Department of Environment and Energy is not required (refer to Section 9.4).

5.1.2 *Native Title Act 1993*

Native Title Act 1993 provides the statutory framework for the establishment and dealing of native title claims in Australia with a primary purpose being to provide a national system for the recognition and protection of native title and for its co-existence with the national land management system.

A search of the Register of Native Title Claims was undertaken for the Precinct and did not identify any native title claims or determinations.

5.2 NSW Government legislation and regulations

5.2.1 *Environmental Planning and Assessment Act 1979*

The Project comprises an 'activity' for the purposes of Part 5 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) by reason of clause 79 of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP). Specifically, Clause 79 of the Infrastructure SEPP outlines that development for the purpose of railways and railway infrastructure facilities, which include 'maintenance, repair and stabling facilities for rolling stock', are permissible without the need for development consent under Part 4 of the EP&A Act when undertaken by a public authority. Further details regarding the Infrastructure SEPP are provided in Section 5.3.1.

As the determining authority for the purposes of Part 5 of the Act, Transport for NSW must:

- examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity, in accordance with Section 111 of the EP&A Act
- determine whether or not the activity is likely to significantly affect the environment or is likely to significantly affect threatened species, populations and ecological communities.

Due to the location of the Precinct within an industrial setting, the Project would be unlikely to significantly affect threatened species, populations and ecological communities as assessed in Chapter 7 of this REF.

The remaining impacts associated with the Project are not anticipated to be significant with the implementation of suitable management and mitigation measures, and therefore an Environmental Impact Statement (EIS) is not considered to be required for the Project.

WSP | Parsons Brinckerhoff on behalf of Transport for NSW has prepared this REF, which includes appropriate mitigation measures to manage and minimise impacts on the environment (refer to Chapter 7). The REF will be made publicly available from 16 March 2017 to 6 April 2017. During the display period, the

community would be encouraged to make submissions to Transport for NSW on the Project and information contained in the REF. Following the display period, Transport for NSW will consider issues raised in submissions and respond to community feedback in a Submissions Report. If required, Transport for NSW may also propose changes to the Project and detail these in the Submissions Report. These documents will be available to the public via the [Transport for NSW website](#)³.

If Transport for NSW decides to proceed, the Project would be designed, constructed and operated in accordance with the mitigation measures outlined in this REF, the Submissions Report and any additional Conditions of Approval.

5.2.1.1 Sustainability requirements under the EP&A Act

Schedule 2 of the (NSW) *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and Section 6(2) of the (NSW) *Protection of the Environment Administration Act 1991*, outline the four principles of ecologically sustainable development (ESD). Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ESD, which are:

- *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.

A discussion of how the Project has considered the principles of ESD, including sustainability initiatives incorporated into the Project, is provided in Chapter 9.

5.2.2 Environmental Planning and Assessment Regulation 2000

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* provides a list of factors that must be taken into account when considering the impact of an activity on the environment.

An assessment of the Project with respect of each of the listed factors is provided in Table 9.2 in Section 9.3 of this REF.

5.2.3 Heritage Act 1977

The NSW *Heritage Act 1977* (Heritage Act) provides protection for items of 'environmental heritage' in NSW. 'Environmental heritage' includes places, buildings, works, relics, movable objects or precincts considered significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. Items considered to be significant to the State are listed on the State Heritage Register (SHR) and cannot be demolished, altered, moved or damaged, or their significance altered without approval from the Heritage Council of NSW.

³ transport.nsw.gov.au/Projects

Section 139 of the Heritage Act requires that a person must not:

- a) *disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit*
- b) disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

Section 57(1) of the Heritage Act identifies that:

1. *When an interim heritage order or listing on the State Heritage Register applies to a place, building, work, relic, moveable object, precinct, or land, a person must not do any of the following things except in pursuance of an approval granted by the approval body under Subdivision 1 of Division 3:*
 - a) *demolish the building or work,*
 - b) *damage or despoil the place, precinct or land, or any part of the place, precinct or land,*
 - c) *move, damage or destroy the relic or moveable object,*
 - d) *excavate any land for the purpose of exposing or moving the relic,*
 - e) *carry out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct,*
 - f) *alter the building, work, relic or moveable object,*
 - g) *display any notice or advertisement on the place, building, work, relic, moveable object or land, or in the precinct,*
 - h) *damage or destroy any tree or other vegetation on or remove any tree or other vegetation from the place, precinct or land.*

Where an activity has the potential to impact on any values that are protected under the Act, the Act sets out provisions that require a Statement of Heritage Impact (SoHI) to be prepared. Approval under Section 60 of the Act to disturb the heritage listed item may also be required pending the recommendations of the SoHI.

The Project has the potential to impact the following heritage listed items:

- Eveleigh Railway Workshops – listed on the SHR (Item no. 01140). The Project footprint is located wholly within the curtilage of the heritage listing
- Eveleigh Railway Workshops Machinery (Item no. 01141)
- individual items (including movable items) listed on the RailCorp Section 170 Heritage and Conservation Register.

As the Project has the potential to impact on heritage items listed on the SHR and Section 170 register, a SoHI (Artefact, 2016) has been prepared to support the REF and Section 60 application (refer to Appendix B). A Section 139 excavation permit is not required as detailed above, due to its SHR listing. The SoHI determined the Project would have only a minor impact on the heritage significance of the SHR listed Eveleigh Railway Workshops and a low to moderate potential to impact locally significant archaeological relics associated with former buildings. It is noted that works would not commence until an approval from the Heritage Council (or delegate) under the Heritage Act has been obtained for the Project.

5.2.4 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the control and management of all national parks, historic sites, nature reserves, wetlands and other state reserves. The Project is not within the boundary of a National Park.

The NPW Act also provides for the protection of 'Aboriginal objects' and 'Aboriginal places'. Under the NPW Act, a person must not harm an Aboriginal object or place unless in accordance with an Aboriginal heritage impact permit (AHIP) issued under Section 90 of the NPW Act.

No registered Aboriginal sites are located within or in close proximity to the Precinct. Furthermore, given the highly disturbed nature of the Precinct, encountering previously unrecorded artefacts of Aboriginal heritage is considered to be highly unlikely. Notwithstanding, an assessment of potential impacts on Aboriginal heritage is provided in a Due Diligence Assessment and is summarised in Section 7.4.

5.2.5 *Threatened Species Conservation Act 1995*

The *Threatened Species Conservation Act 1995* (TSC Act) lists threatened species, populations or ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If any of these are to be impacted by the Project, an assessment that addresses the requirements of section 5A of the EP&A Act must be completed to determine the significance of the impact.

The Project would not impact on any threatened species or communities listed under the TSC Act (refer Chapter 7 for more information).

5.2.6 *Protection of the Environment Operations Act 1997*

The (NSW) *Protection of the Environment Operations Act 1997* (POEO Act) requires that environmental protection licences (EPLs) be sought from the NSW Environment Protection Authority (EPA) for specific activities relating to air, water and noise pollution and waste management.

Development activities that require an EPL under the POEO Act are listed in Schedule 1 of the Act. Part 33(1) of Schedule 1 defines railway system activities as:

- a) the installation, on site repair, on-site maintenance or on site upgrading of track, including the construction or significant alteration of any ancillary works, or
- b) the operation of rolling stock on track.

The Project is not considered to be consistent with the definition of 'railway system activity', and is therefore not subject to an EPL (Note: the Precinct (including associated stabling and maintenance activities) does not currently operate under an EPL).

5.2.7 *Roads Act 1993*

Section 138 of the *Roads Act 1993* (Roads Act) requires consent from the relevant roads authority for the erection of a structure, or the carrying out of a work in, on or over a public road, or the digging up or disturbance of the surface of a public road.

Clause 5(1) of Schedule 2 of the Roads Act states that a public authority, such as Transport for NSW, is not required to obtain a road authority's consent in accordance with Section 138 of the Act for works in, on or over an unclassified road. However, consent from Roads and Maritime Services is still required for works in, on or over a classified road. No works would be required on classified roads, therefore a permit under Section 138 would not be required. In addition, no new vehicle access roads or amendments to the existing road network would be required as part of the Project.

5.2.8 *Contaminated Land Management Act 1997*

The *Contaminated Land Management Act 1997* establishes a process for investigating and, where appropriate, remediating land that is considered to pose a significant risk to human health or the environment. Section 60 of the Act requires Transport for NSW to immediately notify the NSW Environment Protection Authority in writing if it is suspected that the work has resulted in ground contamination or encountered existing ground contamination.

Given the historical use of the Precinct, the adjoining land and known contamination reported within and in close proximity to the Precinct, there is potential that contaminated soil may be encountered during excavation works. The implications of this and relevant mitigation and management measures are provided in Section 7.10 of this REF.

5.3 Environmental planning instruments

5.3.1 *State Environmental Planning Policy (Infrastructure) 2007*

The Infrastructure SEPP outlines the permissibility and development controls for infrastructure works and facilities. Specifically, Clause 79 of the Infrastructure SEPP outlines what railway facilities are permissible without the need for development consent under Part 4 of the EP&A Act. Rail infrastructure facilities are defined in Clause 78 of the SEPP, which includes ‘maintenance, repair and stabling facilities for rolling stock’ (part (g) of the definition of ‘rail infrastructure facilities’).

The Project is considered consistent with the definition of development for the purpose of a ‘railway or rail infrastructure facility’ under the Infrastructure SEPP and therefore does not require development consent under Part 4 of the EP&A Act.

5.3.2 *State Environmental Planning Policy (State and Regional Development) 2011*

The Project does not constitute a listed activity in the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) and has not been declared State Significant Infrastructure.

5.3.3 *State Environmental Planning Policy No. 55 — Remediation of Land*

State Environmental Planning Policy No.55 — Remediation of Land (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. As the Project is permissible without consent under Part 4 of the EP&A Act, the provisions of SEPP 55 do not apply. However, the provisions of the SEPP have been considered in the preparation of this REF, and Section 7.10 contains an assessment of the potential contamination impacts of the Project.

5.3.4 *State Environmental Planning Policy (State Significant Precincts) 2005*

Clause 7 of the *State Environmental Planning Policy (State Significant Precincts) 2005* (Precincts SEPP) outlines provisions in relation to the carrying out of development in the precincts listed in Schedule 3 of the SEPP. Part 5 of Schedule 3 lists the Redfern-Waterloo Authority Sites as a State Significant Precinct which may have particular planning provisions. Notwithstanding, pursuant to Clause 24A of Part 5 of Schedule 3 the Project can be carried out without development consent under Part 5 of the EP&A Act.

The land use and development within the Precinct is controlled through the zoning provisions of the *State Environmental Planning Policy (State Significant Precincts) 2005* (State Significant Precinct SEPP). Under the State Significant Precinct SEPP, the Eveleigh Rail Precinct is zoned *G – Special Purpose Zone (infrastructure)*. Pursuant to clause 15(1) of Schedule 3 to the State Significant Precinct SEPP, among other things, a key objective of the zoning is to:

- a) provide for railway infrastructure and related facilities,
- b) to prevent development in the Zone that is not compatible with or may detract from the provision of railway infrastructure and related facilities.

Based on these objectives, the existing use of the Precinct is consistent with the objectives of the zoning.

5.3.5 *Sydney Local Environmental Plan 2012*

The Project is situated within the Sydney LGA. Under the NSW Planning System, State Environmental Planning Policies take precedence over Local Environmental Plans (LEPs) which are adopted by Council. As such, the relevant provisions in the Infrastructure SEPP take precedence over the Sydney LEP 2012. However, during the preparation of the REF, the aims and objectives of the Sydney LEP 2012 (as the current LEP affecting the Precinct) were considered.

5.4 NSW Government policies, strategies and State priorities

5.4.1 State Priorities – *NSW: Making It Happen*

In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen*. 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. *NSW: Making It Happen* focuses on twelve key ‘priorities’ to achieve 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.

One of the twelve priorities identified as part of *NSW: Making It Happen* relates to investment in building infrastructure. The ongoing development and investment in the New Intercity Fleet is identified as one of the series of projects for delivery on as part of the wider building infrastructure priority.

The Project would therefore meet the identified building infrastructure priority by providing a facility to initially commission, maintain and service of the proposed New Intercity Fleet which are designed to replace the current, ageing intercity trains. The New Intercity Fleet would provide an enhanced customer experience for customers travelling from the Central Coast, Newcastle, the Blue Mountains and South Coast. The facility at Eveleigh would assist in maintaining the reliability of these long distance train services.

5.4.2 NSW 2021 – *A Plan to Make NSW Number One*

The NSW Government released *NSW 2021: A plan to make NSW number one* strategic plan in September 2011. One of its key goals, Goal 8, was to ‘grow patronage on public transport by making it a more attractive choice’ including through improving reliability and increasing the share of trips made by public transport. The New Intercity Fleet Project, which requires the Precinct for initial stabling, commissioning and maintenance, would contribute to achieving this goal by improving the capacity and reliability of intercity train services as discussed in Chapter 3.

5.4.3 *NSW Long Term Transport Master Plan*

The *NSW Long Term Transport Master Plan* (NSW Government 2012a; ‘Transport Master Plan’) is a 20-year plan to improve the NSW transport system. The Transport Master Plan considers the future population growth and employment precincts within the State (including Sydney) and outlines the capabilities and limitations of the transport network for all transport modes (including buses, heavy rail, light rail, ferry and private vehicles) to provide clear direction for future transport investigations.

A key element of the Transport Master Plan is the need to create a more reliable intercity service as well as providing new intercity trains which focus specifically on the needs of longer distance customers. As a result, the procurement of a new fleet of intercity trains was identified to support the needs of these longer distance rail customers. As part of the delivery of the New Intercity Fleet, it was identified that existing stabling and maintenance facilities would require modifications to accommodate the maintenance of these new trains. The proposed works at the Precinct is therefore an important component in achieving one of the aims of the Transport Master Plan.

5.4.4 Rebuilding NSW – *State Infrastructure Strategy*

The Rebuilding NSW – State Infrastructure Strategy was released in November 2014. It sets out and commits to the State’s infrastructure delivery and reform priorities with a plan to invest \$20 billion in new productive infrastructure. The State Infrastructure Strategy supports the ongoing aim to provide reliable, frequent and fast passenger trains as an essential part of the economic success of NSW and the amenity of life, particularly in Global Sydney. The investment in the New Intercity Fleet which will carry customers from Sydney to the Central Coast, Newcastle, the Blue Mountains and the South Coast, would assist in improving and maintaining access to the Global Sydney region for those residents who live outside of Sydney (Infrastructure NSW, 2014).

The Project is critical in meeting the requirements to commission, maintain and operate the New Intercity Fleet and therefore is considered to support the overall aims of the State Infrastructure Strategy.

6 STAKEHOLDER AND COMMUNITY CONSULTATION

This chapter summarises the stakeholder consultation carried out to date for the Project. It includes a summary of the planned community and stakeholder consultation activities to be undertaken to support the REF display and construction phases. The REF display will provide the community and stakeholders with the opportunity to provide feedback on the Project.

6.1 Stakeholder consultation during concept design

Transport for NSW developed a communications and consultation strategy for the Project which included details on key activities to be carried out to inform and engage the local community and key stakeholders.

In summary, the consultation approach by Transport for NSW for the Project is to:

- provide accurate, easy to understand, relevant and timely information through a variety of channels, including meetings and briefings with stakeholders
- provide information channels for the community and stakeholders to seek information about the Project
- establish and maintain clear lines of communication and encourage community feedback
- identify opportunities for community engagement at each stage of the Project's lifecycle
- be transparent and accountable, and report back to the community on engagement activities
- provide a mechanism for prompt issues resolution.

Transport for NSW will ensure that community and stakeholders are engaged throughout the life of the Project including:

- post determination of the Project
- throughout construction and operation of the Project.

6.2 Consultation undertaken during the preparation of the REF

In preparing this REF, Transport for NSW has provided briefings to the following stakeholders:

- Sydney Trains – Eveleigh Precinct Manager and Precinct users which include Downer EDI, Sydney Trains Maintenance Division, Rail Heritage, NSW TrainLink and Sydney Trains) on 8 November 2016
- Sydney Trains – Heritage Unit on 4 November 2016
- Office of Environment and Heritage (Heritage Division) on 9 December 2016.

The purpose of the briefings was to inform stakeholders about the scope of the New Intercity Fleet Project, identify any issues of concern or interests to be investigated and addressed and to collect information about the existing activities undertaken at the Eveleigh Facility. No major issues of concerns were raised during these meetings and consultation is ongoing during the environmental assessment and design process.

6.3 Infrastructure SEPP consultation requirements

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15 and 16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 6.1 provides details of consultation requirements under the Infrastructure SEPP for the Project.

Table 6.1 Infrastructure SEPP consultation requirements

CLAUSE	RESPONSE
Clause 13	
1(a) Substantial impact on stormwater management services provided by a council.	<p>The Project would utilise existing stormwater services at the Precinct and would not impose substantial impacts on these service during construction or operation.</p> <p>Formal consultation with City of Sydney Council is therefore not required to be undertaken in accordance with this clause.</p>
1(b) Likely to generate traffic to an extent that would strain the capacity of the road system in a local government area.	<p>The Project would temporarily result in increased traffic during construction. However, in the long-term, the Project is not expected to result in a substantial impact to current and future traffic volumes, therefore not resulting in a strain to the existing capacity of the road system in the LGA.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>
1(c) Involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council.	<p>The Project would utilise the existing sewerage system at the Precinct and would not impose significant impacts on the capacity of the system.</p> <p>Formal consultation with Sydney City Council is not required under this clause.</p>
1(d) Involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council.	<p>The Project would utilise the existing water supply at the Precinct. The volume of water required during construction and operation is not considered substantial in a manner that would trigger the need to consult with council.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>
1(e) Involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential.	<p>The Project would not involve the placement of any temporary structure that would cause disruptions to road users.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>
1(f) Involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the <i>Roads Act 1993</i> (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).	<p>The Project would not involve ground disturbance to the existing road or footpath network.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>

CLAUSE	RESPONSE
Clause 14	
Is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area.	<p>The Project would not involve any substantial impacts to a local heritage item of heritage conservation area. While there would be some impacts to the State heritage listed Eveleigh Railway Workshops (SHR Item No. 01140), it is not listed as a heritage item on the Sydney LEP 2012. This is discussed further in Section 7.2.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>
Clause 15	
Development that is to be carried out on flood liable land that may be carried out without consent and that would change flood patterns other than to a minor extent.	<p>The Project would not involve development in an area that is considered to constitute flood liable land.</p> <p>Formal consultation with City of Sydney Council is not required under this clause.</p>
Clause 16	
<p><i>(a) development adjacent to land reserved under the National Parks and Wildlife Act 1974</i></p> <p>(Office of Environment and Heritage)</p>	<p>The Precinct is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i>.</p> <p>Formal consultation is not required under this clause.</p>
<p><i>(b) development adjacent to a marine park declared under the Marine Parks Act 1997</i></p> <p>(Office of Environment and Heritage)</p>	<p>The Precinct is not located adjacent to a marine park declared under the <i>Marine Parks Act 1997</i>.</p> <p>Formal consultation is not required under this clause.</p>
<p><i>(c) development adjacent to an aquatic reserve declared under the Fisheries Management Act 1994</i></p> <p>(Department of Primary Industries – Fisheries)</p>	<p>The Precinct is not located adjacent to an aquatic reserve declared under the <i>Fisheries Management Act 1994</i>.</p> <p>Formal consultation is not required under this clause.</p>
<p><i>(d) development in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998</i></p> <p>(Sydney Harbour Foreshore Authority)</p>	<p>The Precinct is not located foreshore area within the meaning of the <i>Sydney Harbour Foreshore Authority Act 1998</i>.</p> <p>Formal consultation is not required under this clause.</p>
<p><i>(e) development comprising a fixed or floating structure in or over navigable waters</i></p> <p>(Roads and Maritime Service)</p>	<p>The Project is not development that would comprise a fixed or floating structure in or over navigable waters.</p> <p>Formal consultation is not required under this clause.</p>
<p><i>(f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)</i></p> <p>(NSW Rural Fire Service)</p>	<p>The Project is not development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land.</p> <p>Formal consultation is not required under this clause.</p>

6.4 Public display of REF

The REF will be placed on public display from 16 March 2017 through to 6 April 2017 when written submissions will be invited on the Project. The following tools and activities will be used to provide the community and stakeholders with a range of methods to find out more about the Project and also to comment on the Project.

6.4.1 Project newsletter

A Project overview newsletter will be prepared and issued to the community and stakeholders in the area surrounding the Project. The newsletter would be distributed to stakeholders, adjacent property owners, local community organisations, local businesses, and placed on the Project website.

The newsletter due for distribution as part of the display of the REF will:

- detail the Project and provide an overview of the REF assessment
- include a map showing the location and key features of the Project
- provide details about the locations for accessing the REF documents
- provide information on how to make a submission
- include contact details for further information.

6.4.2 Public display locations

Hard copies of the REF will be made available during the display at the following locations during regular business hours:

- Surry Hills Library, 405 Crown Street, Surry Hills
- Redfern Community Centre, 29-53 Hugo Street, Redfern
- Redfern Neighbourhood Service Centre, 158 Redfern Street, Redfern
- Transport for NSW, Level 5, Tower A, 821 Pacific Highway, Chatswood.

6.4.3 Advertisements

Advertisements will be placed in the Inner West Courier and The Daily Telegraph – Central Sydney to notify the community of the public display of the REF, the display duration and how to obtain further information on the Project.

6.4.4 Project infoline

The Project information telephone line 1800 684 490 is available for project enquiries. The public will be able to make enquiries during the public display period, for those interested in further information and/or to provide feedback on any issues related to the Project. In addition, a 24-hour construction response line (1800 775 465) would be available during construction of the Project, subject to project approval.

6.4.5 Website and email address

All project information, including ongoing updates will be made available through the [Transport for NSW website](http://www.transport.nsw.gov.au/Projects)⁴

⁴ www.transport.nsw.gov.au/Projects

6.4.6 Government and stakeholder consultation

Transport for NSW will continue to meet and discuss the Project with key Government agencies and stakeholders throughout the display period (and through to the end of the construction period), as required.

6.4.7 Written submissions

Written submissions on the REF are encouraged throughout the display period. All submissions should be [emailed](#)⁵ or posted to:

Reference: New Intercity Fleet Eveleigh Facility Project

Principal Manager Environmental Impact Assessment
Transport for New South Wales
Locked Bag 6501
St Leonards NSW 2065

Submissions can also be received through the [Have Your Say website](#)⁶.

6.5 Ongoing consultation

All written submissions received during the public display period would be considered as formal submissions and responded to in the Submissions Report. All written submissions received during the display period will be acknowledged by return letter or email (depending on the contact information provided).

All information in submissions may be published in subsequent assessment documents. If the stakeholder indicates at the time of supply of information that it should be kept confidential, Transport for NSW would attempt to keep it confidential however there may be legislative or legal justification for release of the information, for example under the *Government Information (Public Access) Act 2009* or under subpoena or statutory instrument.

6.6 Response to submissions

Should Transport for NSW determine to proceed with the Project, the Submissions Report would be made available on the [Transport for NSW website](#)⁷.

6.7 Post determination consultation activities

Should Transport for NSW determine to proceed with the Project, the Project team would also keep the community, councils and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Project. The interaction with the community would be undertaken in accordance with a Community Liaison Management Plan to be developed prior to the commencement of construction.

⁵ Projects@transport.nsw.gov.au

⁶ haveyoursay.nsw.gov.au.

⁷ transport.nsw.gov.au/Projects

The consultation activities would ensure that:

- the community and stakeholders have a high level of awareness of all the processes and activities associated with the Project
- accurate and accessible information is made available
- a timely response is given to issues and concerns raised by the community
- feedback from the community is encouraged and opportunities for input to the Project are provided.

Methods used for engaging and providing project information to the community and stakeholders should the Project be determined would include (but not be limited to):

- projects and updates on the [Transport for NSW website](#)⁸
- a 24-hour Construction Response Line: 1800 775 645
- Project Infoline: 1800 684 490
- an enquiry [email](#)⁹ address
- delivering work notifications to nearby residents, businesses and stakeholders
- meetings and briefings for stakeholders, businesses and residents as required
- site signage.

⁸ transport.nsw.gov.au/Projects

⁹ Projects@transport.nsw.gov.au

7 ENVIRONMENTAL IMPACT ASSESSMENT

This chapter describes the key and non-key environmental impacts which have been considered for the construction and operation of the New Intercity Fleet Eveleigh Facility. The assessment described in this chapter is supported by specialist assessments for noise and vibration, heritage and visual impact, with the specialist reports provided in Appendices A to C respectively.

Where inconsistencies between this REF and the specialist studies exist, the main REF is considered to take precedence.

7.1 Noise and vibration

A Noise and Vibration Assessment which assesses the potential construction, commissioning and operational noise and vibration impacts associated with the Project has been undertaken by WSP | Parsons Brinckerhoff (2016). This assessment is attached as Appendix A of this REF. A summary of this assessment is provided in the following sections.

7.1.1 Sensitive receivers

The Precinct is surrounded by a mixture of residential, commercial and industrial receivers with their location shown in Figure 7.1 and described in Table 7.1 below.

Table 7.1 Noise catchment areas

NCA	DESCRIPTION	LAND USAGE	CLOSEST SUBJECT SITE	DISTANCE TO CLOSEST SUBJECT SITE (m)
A	Terraced housing with some limited low rise apartment buildings and commercial properties. Noise Catchment Area (NCA) borders old suburban car workshops and is located over the rail corridor from Subject Site 3.	Primarily residential with some commercial	3	90
B	Residential apartment blocks (3 to 4 storeys) located along Cornwallis Street.	Residential	3	125
C	Australian Technology Park, containing offices and other similar commercial uses. Adjacent to Subject Site 3.	Commercial	1,2 and 3	50, 60, 5
D	Residential development on southern border of the Precinct, consists of townhouses and apartment blocks up to 5 storeys tall.	Residential	2	18
E	Commercial properties on the Precinct's southern border	Commercial	2	45
F	Terraced residential properties on Burren Street. Existing noise barrier located at rear of properties along rail corridor.	Residential	2	150
G	Medium density terraced and free standing houses in addition to apartment block located adjacent to Carriageworks, located over the rail corridor from the Precinct.	Residential	1	70
H	Commercial precinct containing Carriageworks and disused railway workshops and maintenance yard.	Commercial and industrial	1 and 3	55 and 55



New Intercity Fleet Eveleigh
Figure 7.1
 Noise catchment areas and noise monitoring locations

Map: 2202522C_GIS_011_A1	Author: MG		 1:4,000 Scale ratio correct when printed at A3
Date: 9/03/2017	Approved by: IS		
Date source: - Land and Property Information 2015, NSW Department of Planning & Environment			

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7.1.2 Assessment criteria

The assessment has been prepared with reference to the following guidelines, policies and standards:

- *Industrial Noise Policy* (EPA, 2000)
- *Interim Construction Noise Guideline* (DECC, 2009)
- *Construction Noise Strategy* (Transport for NSW, 2013)
- *Road Noise Policy* (EPA, 2011)
- *Assessing Vibration: A Technical Guideline (Vibration Guideline)* (DEC, 2006)
- *DIN Standard 4150-2 Part 3: Structural Vibration in Buildings: Effects on Structures* (DIN Deutsches Institut für Normung, 1999).

7.1.2.1 Noise

CONSTRUCTION NOISE

Noise impacts from construction noise are assessed using the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) and the Transport for NSW *Construction Noise Strategy* (CNS) (Transport for NSW, 2013). The ICNG defines a noise management level for residential and other sensitive land uses. Above this level, feasible and reasonable mitigation should be considered to reduce noise levels.

Table 7.2 defines noise management levels (NML) as specified in the ICNG and how they are applied for residential receivers. NMLs are the level of noise above which receivers are considered to be 'noise affected'. They are based on the measured rating background level (RBL) as defined in the INP plus an additional allowance of 10 decibels (dB) during standard hours and 5 dB outside of standard hours. Where construction noise levels are above 75 dBA at residential receivers during standard hours, they are considered 'highly noise affected' and require additional considerations to mitigate potential impacts.

Table 7.2 Interim Construction Noise Guideline construction noise management levels for residential receivers and working hours

TIME OF DAY	NML $L_{EQ(15MIN)}^{1,2}$ dBA	HOW TO APPLY
Recommended standard hours: Monday–Friday 7am–6pm Saturday 8am– 1pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{eq(15min)}$ dBA is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ul style="list-style-type: none"> → times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) → if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

TIME OF DAY	NML $L_{EQ(15MIN)}^{1,2}$ dBA	HOW TO APPLY
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

- (1) Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.
- (2) The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (INP) (EPA 2000).

Table 7.3 provides a summary of the applicable NMLs based on the background noise monitoring conducted within each noise catchment area (NCA) – for more information on background noise levels refer to Section 7.1.4.1. These noise catchment area locations are shown in Figure 7.1 and are described in Section 7.1.1. In addition, Table 7.4 lists the NMLs that have been adopted for non-residential sensitive receivers as required by the ICNG.

Table 7.3 Construction noise management levels for residential receivers

NOISE CATCHMENT AREA	LAND USE	NML $L_{EQ(15MIN)}$ dBA			
		Day (standard hours)	Day (out of hours)	Evening (out of hours)	Night (out of hours)
A	Primarily residential with some commercial	64	59	48	47
B	Residential	65	60	55	52
D	Residential	57	52	48	41
E	Primarily commercial with some residential	57	52	48	41
F	Residential	53	48	46	43
G	Residential	57	52	47	47

Table 7.4 Noise management levels at sensitive land uses (other than residences)

NOISE CATCHMENT AREA	LAND USE	NML $L_{EQ(15 MIN)}$ dBA (APPLIES WHEN PROPERTIES ARE BEING USED)
C	Commercial	70 (external)
E	Commercial	70 (external)
H	Commercial and industrial	70 (external) commercial 75 (external) industrial

OPERATIONAL NOISE

Operational noise is assessed according to the *Industrial Noise Policy* (INP) (EPA, 2000). The INP is the considered to be the appropriate assessment method for the Project as the *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013) assessment method specifically excludes noise from maintenance and stabling yards. The INP defines two criteria for the assessment of noise; the intrusive and amenity criteria. The more onerous criterion is then adopted as the Project specific noise level (PSNL) which the Project is assessed against.

The intrusive criterion is intended to protect residential receivers against intrusive noise in the short term. The amenity criterion is intended to maintain noise amenity and limit cumulative noise increases for sensitive land uses.

The closest and potentially most affected residential receivers to the operational activities are those located near the southern border of the Precinct and consist of townhouses and apartment blocks up to five storeys. These receivers are considered to be an urban amenity area as the background noise environment is dominated by urban hum during all times of the day, evening and night.

Table 7.5 presents the criteria and Project specific noise levels (PSNL) for the closest residential receivers.

Table 7.5 Operational criteria for closest residential receivers

NOISE MONITORING LOCATION	TIME PERIOD ¹	RBL dBA	INTRUSIVE CRITERIA LEQ(15MIN) dBA	EXISTING INDUSTRIAL NOISE LEVEL LEQ(15MIN) dBA	ACCEPTABLE NOISE LEVEL LEQ(PERIOD) dBA	AMENITY CRITERIA ² LEQ(PERIOD) dBA	PSNL LEQ(15MIN) dBA
NCA A	Day	54	59	<47	60	60	59
	Evening	43	48	45	50	48	48
	Night	42	47	43	45	41	41
NCA B	Day	48	53	48	60	60	53
	Evening ³	46	51	47	50	47	47
	Night	46	51	47	45	37	37
NCA D ²	Day	45	50	<61	60	60	50
	Evening	42	47	<56	50	50	47
	Night	39	44	<51	45	45	44
NCA F	Day	43	48	<41	60	60	48
	Evening	41	46	<42	50	50	46
	Night	38	43	38	45	45	43
NCA G	Day	47	52	<50	60	60	52
	Evening	42	47	42	50	50	47
	Night	42	47	44	45	39	39

- (1) Day is defined as Monday to Saturday 7 am to 6 pm; 8 am to 6 pm Sundays and Public Holidays, Evening is 6 pm to 10 pm and Night is the remaining periods.
- (2) It is considered that the existing industrial noise measured at the logging location is from the existing Eveleigh Precinct. Since the existing industrial noise level used to determine the amenity criteria should exclude that of the premises being assessed, the amenity criteria do not require modification.
- (3) The measured evening RBL was higher than the night. In accordance with the *INP Application Notes*, in this situation the evening RBL should be set no higher than the night RBL.

Table 7.6 presents the Project specific noise level for non-residential receivers as presented in the INP.

Table 7.6 Operational criteria for non-residential receivers

RECEIVER	TIME PERIOD	AMENITY CRITERIA ¹ L _{EQ(PERIOD)} dBA
Industrial (NCA H)	When in use	70
Commercial (NCA C, NCA E and NCA H)	When in use	65

The most stringent assessment criteria have been applied to NCA H.

- (1) The PSNL has been set as a L_{eq(15min)} in order to provide a conservative assessment. Where compliance is achieved over a 15 minute period is therefore implied it will occur over the day, evening or night period.

SLEEP DISTURBANCE

Operational and construction noise during the night have the potential to disturb people's sleep patterns. Guidance in the ICNG and INP Application Notes references further information in the Road Noise Policy (RNP) that discusses criteria for the assessment of sleep disturbance. The RNP and the INP application notes suggest a screening level of L_{1,1min} dBA, equivalent to the RBL+15 dB.

The guidance within the RNP indicates that internal noise levels of 50 to 55 dBA are unlikely to cause sleep awakenings. Therefore at levels above 55 dBA, sleep disturbance would be considered likely. Assuming that receivers may have windows partially open for ventilation, a 10 dB outside to inside correction has been adopted as indicated in the INP. Therefore sleep disturbance screening criteria of RBL+15 dB and L_{max 65} dBA have been adopted for the Project.

OFF-SITE ROAD TRAFFIC

Vehicle movements on the surrounding roads generated by construction and operational activities have the potential to impact sensitive receivers along the access routes.

The RNP has been used to assess both the noise from traffic generated by the Project during either the operational or construction phases of the Project.

Table 7.7 presents the road traffic noise criteria from the RNP for land use developments with a potential to create additional traffic on an existing road. The external noise criteria are applied one metre from the external facades of the affected building and at a height of 1.5 metres from the most affected storey.

Table 7.7 Applicable Road Noise Policy assessment criteria

ROAD CATEGORY	TYPE OF PROJECT/LAND USE	DAY (7 am TO 10 pm)	NIGHT (10 pm TO 7 am)
Collector/sub-arterial/arterial/freeway	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{eq(15hr)} 60 dBA	L _{eq(9hr)} 55 dBA
Local road	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{eq(1hr)} 55 dBA	L _{eq(1hr)} 50 dBA

7.1.2.2 Vibration

Vibration from construction and operation can lead to:

- cosmetic and structural building damage
- loss of amenity due to perceptible vibration, termed human comfort.

Importantly, cosmetic damage is regarded as minor in nature; it is readily repairable and does not affect a building's structural integrity. Damage of this nature is typically described as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks, and separation of partitions or intermediate walls from load bearing walls. If there is no significant risk of cosmetic damage then structural damage is not considered a significant risk and is not further assessed.

COSMETIC BUILDING DAMAGE

There is currently no guidance in NSW specifically addressing cosmetic damage to buildings from vibration. Two international standards are typically referenced for the assessment of cosmetic damage in buildings; British Standard BS 7385-2: 1993 *Evaluation and measurement for vibration in buildings* and German Standard DIN 4150-3: 1999 *Structural Vibration - Part 3: Effects of vibration on structure*

The guidance in the Transport for NSW *Construction Noise Strategy* (CNS) refers to BS 7385 for safe working distances to avoid cosmetic damage of buildings. The standard provides guidance on the 'evaluation and measurement of vibration in buildings' and defines guidance for categorising building damage in terms of 'cosmetic', 'minor' and 'major'; providing limits for each (refer to Table 7.8).

Table 7.8 BS7385 Cosmetic damage criteria, peak component particle velocity, (mm/s)¹

GROUP	TYPE OF STRUCTURE	4–15 Hz	15–40 Hz	40 Hz AND ABOVE
1	Reinforced or framed structures Industrial or heavy commercial buildings		50	
2	Un-reinforced or light framed structures Residential or light commercial buildings	15–20 ²	20–50	50

- (1) Values referred to are at the base of the building, on the side of the building facing the source of vibration (where feasible).
- (2) At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

These peak vibration limits are set so that the risk of 'cosmetic' damage in residential or commercial buildings is minimal. They have been set at the lowest level above which damage has been credibly demonstrated. The limits also assume that the equipment causing the vibration is only used intermittently, however if the equipment is used continuously, then the limits may need to be reduced by up to 50 per cent.

For 'minor' or 'major' vibrational damage to occur, the standard states that vibration need to be two times and four times (respectively for group 1 and group 2) the values shown in Table 7.8.

Guidance in BS 7385 also suggests that unless structurally unsound, heritage items should not be considered to be more sensitive than dwellings for the purposes of assessment.

Vibration limits given in DIN 4150 are more conservative than BS 7385 and specifically address heritage items as being more sensitive. Table 7.9 presents a summary of the vibration limits from DIN 4150.

Table 7.9 Guideline values for short term vibration on structures (DIN 4150-3), guideline values for velocity, (mm/s)

TYPE OF STRUCTURE	1 Hz TO 10 Hz	10 Hz TO 50 Hz	50 Hz TO 100 Hz
Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50
Dwellings and buildings of similar design and/or occupancy.	5	5 to 15	15 to 20
Structures that, because of their particularly sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (for example heritage listed buildings).	3	3 to 8	8 to 10

In this assessment, the DIN 4150 limits have been adopted for heritage items as they represent the more conservative limits.

HUMAN COMFORT (AMENITY)

Table 7.10 presents the limits (vibration dose values) above which there is considered to be a risk that the amenity and comfort of people occupying buildings would be affected by construction work. The limits are taken from *Assessing Vibration: A Technical Guideline* (DEC, 2006).

Table 7.10 Vibration limits (human comfort), Vibration dose value, ($m/s^{1.75}$)

LOCATION	ASSESSMENT PERIOD	PREFERRED VALUES	MAXIMUM VALUES
Critical areas	Day or night time	0.10	0.20
Residences	Daytime	0.20	0.40
Residences	Night time	0.13	0.26
Offices, schools, educational institutions, and places of worship	Day or night time	0.40	0.80
Workshops	Day or night time	0.80	1.60

7.1.3 Methodology

7.1.3.1 Noise monitoring

To establish the baseline noise environment and derive compliance limits as previously discussed, short term attended and long term unattended background noise measurements were taken between 17 and 29 February 2016, and 21 November and 2 December 2016. The noise monitoring was conducted with reference to Australian Standard AS 1055 *Acoustics, Description and Measurement of Environmental Noise*.

Table 7.11 below describes the noise monitoring equipment used onsite, with the monitoring locations shown in Figure 7.1 above.

Table 7.11 Noise measurement equipment

ID	EQUIPMENT DESCRIPTION	ADDRESS	SURVEY DATE	MANUFACTURER & SERIAL NO. TYPE NO.
BG1	Sound Level Meter	157 Little Eveleigh Street, Redfern	21 November 2016, 24 November 2016	Norsonic – Nor140 1406502
BG2		7 Carriageworks Way, Eveleigh	and 2 December 2016	
BG3		43 Burren Street, Erskineville		
BG4		1-5 Rowley Street, Eveleigh		
BG5		32 Rosehill Street, Redfern		
Logger	Environmental Noise Logger	1-5 Rowley Street, Eveleigh	21 November – 2 December 2016	SVAN Sound and Vibration Analyser – SVAN 958 36993

The data were gathered over a period of typical traffic movement and activity in the area (i.e. outside of school holiday periods). Operator attended noise surveys and observations were conducted at the noise monitoring locations on 21 November 2016, 24 November 2016, and 2 December 2016. The primary purpose of the attended monitoring was to measure background noise levels and characterise the existing ambient environment based on a short term noise measurement sample.

7.1.4 Existing environment

7.1.4.1 Noise monitoring results

Table 7.12 summarises the long term unattended noise monitoring results. The data are reported as the average equivalent continuous average sound levels ($L_{eq(15min)}$) and rating background levels (RBL) as defined in the NSW *Industrial Noise Policy* (INP) (EPA, 2000). Table 7.13 presents the results of the short term attended noise monitoring.

Table 7.12 Unattended noise measurement results (dBA)

ID	DAY $L_{eq(15MIN)}$	DAY RBL	EVENING $L_{eq(15MIN)}$	EVENING RBL	NIGHT $L_{eq(15MIN)}$	NIGHT RBL
BG4	61	45	56	42	51	39

The results of the long term monitoring are considered representative of the receivers closest to BG4. Noise monitoring was conducted on the boundary of the Precinct. As a result, noise from activities within the facility would affect the noise monitoring. However, noise from activities are intermittent and did not dominate noise levels measured at the logging location.

Table 7.13 Short term attended noise monitoring results

LOCATION	L _{EQ} (15MIN) dBA	L ₉₀ (15MIN) dBA	COMMENTS
BG1 (NCA A)	Day: 57 Evening: 55 Night: 52	Day: 54 Evening: 43 Night: 42	Precinct related noise not discernible – noise environment was dominated by urban hum comprising primarily of distant traffic noise. During the day, some nearby construction work also contributed to the measured levels. During the evening and night, a nearby generator contributed to the background noise environment with distant traffic noise also a significant contributor.
BG2 (NCA G)	Day: 60 Evening: 55 Night: 51	Day: 47 Evening: 42 Night: 42	Background noise environment was dominated by urban hum with a significant contribution coming from train passbys within the rail corridor. Noise sources from the site were observed to be impulsive noises from horns and impacts within the maintenance sheds.
BG3 (NCA F)	Day: 51 Evening: 52 Night: 46	Day: 43 Evening: 41 Night: 38	Precinct related noise not discernible – noise environment was comprised of urban hum with significant contributions from train passbys on the existing network, however not from train movements within the Precinct.
BG4 (NCA D)	Day: 54 Evening: 50 Night: 50	Day: 47 Evening: 43 Night: 41	The noise environment was made up of intermittent noise from the Precinct in addition to a background of urban hum during the day, evening and night periods.
BG5 (NCA B)	Day: 55 Evening: 50 Night: 49	Day: 48 Evening: 46 Night: 47	Precinct related noise not discernible – noise environment was dominated by general urban hum, nearby mechanical plant and the site was not discernible at this location.

7.1.5 Construction impacts

7.1.5.1 Construction noise assessment

NOISE MODELLING METHODOLOGY AND ASSESSMENT SCENARIOS

To assess the potential noise impacts associated with construction activities, noise modelling was undertaken of multiple construction scenarios at each Subject Site as outlined in Table 7.14. Where works on the OHW are required, a track possession is necessary to maintain the safety of staff and operational assets. Track possessions typically take place during periods of less operational activity such as at weekends and during the night. As the timing of the possessions cannot be confirmed the assessment has taken a conservative approach and therefore it has been assumed that it may take place during the night period in order to minimise potential disruption to operations.

Table 7.14 Construction assessment scenarios

SUBJECT SITE	SCENARIO ID	ACTIVITY	TIME OF DAY ¹
1	1A	Site establishment	Standard hours
	1B	Demolition of existing buildings	Standard hours
	1C	Demolition of existing slabs and rail tracks	Standard hours
	1D	Install new slab footings and tracks	Standard hours and out of hours works
	1E	Extension of decant facility piping	Standard hours
	1F	Installation of new OHW for extended tracks	Standard hours and out of hours works
	1G	Relocation of buffer stops and associated infrastructure.	Standard hours

SUBJECT SITE	SCENARIO ID	ACTIVITY	TIME OF DAY ¹
2	2A	Site establishment	Standard hours and out of hours works
	2B	Installation of new OHW in the Millennium Shed	Standard hours
	2C	Demolish old OHW footings and dispose	Standard hours
3	3A	Relocate heritage train	Standard hours
	3B	Demolish existing slabs / footings and pavement	Standard hours
	3C	Install new footings and tracks	Standard hours
	3D	Install new OHW for extended tracks	Standard hours and out of hours works
	3E	Relocation of buffer stops and associated infrastructure	Standard hours
	3F	Install new OHW for extended tracks	Standard hours and out of hours works

(1) Time periods are those defined by the ICNG (refer to Table 7.2).

The assumed noise levels of the proposed construction equipment are presented in Table 7.2 of the Noise and Vibration Impact Assessment (WSP | Parsons Brinckerhoff, 2016) attached as Appendix A.

PREDICTED NOISE LEVELS

Table 7.15 and Table 7.16 presents the predicted worst case construction noise levels for Subject Site 1 and Subject Site 2 and 3 respectively. Cells have been shaded to indicate exceedance of the NMLs for the applicable time period as follows: orange for day (standard hours), yellow for day (out of hours works), green for evening (out of hours works) and grey for night (out of hours works).

Table 7.15 Predicted noise levels for Subject Site 1 construction activities

NCA	NML				Predicted Noise level $L_{eq(15min)}$ dBA					
	Day	Day	Evening	Night	1A	1B	1C	1D	1E	1F
	SH	OOHW	OOHW	OOHW	SH	SH	SH	SH, OOHW	SH	SH, OOHW
A	64	59	48	47	42	54	58	58	44	46
B	58	53	51	51	38	50	54	54	40	42
C	70	70	70	70	53	65	69	69	55	57
D	55	50	47	44	30	42	46	46	32	34
E	70	70	70	70	25	37	41	41	<30	<30
F	53	48	46	43	35	47	51	51	37	39
G	57	52	47	47	52	64	68	68	54	56
H	70	70	70	70	58	70	74	74	60	62

SH = Recommended standard working hours. OOHW = outside of recommended standard hours work

Table 7.16 Predicted noise levels for Subject Sites 2 and 3 construction activities

NCA	NML				Predicted noise level $L_{eq(15min)}$ dBA									
	Day	Day	Evening	Night	2A	2B	2C	3A	3B	3C	3D	3E	3F	
	SH	OOHW	OOHW	OOHW	SH	SH, OOHW	SH	SH	SH	SH	SH	SH	SH, OOHW	
A	64	59	48	47	<30	<30	<30	51	52	65	69	52	55	
B	58	53	51	51	<30	<30	33	54	55	68	72	55	58	
C	70	70	70	70	53	57	63	82	83	96	100	83	86	
D	55	50	47	44	55	59	65	<30	<30	36	40	<30	<30	
E	70	70	70	70	43	47	53	<30	<30	<30	33	<30	<30	
F	53	48	46	43	<30	31	37	<30	<30	<30	31	<30	<30	
G	57	52	47	47	<30	<30	34	31	32	45	49	32	35	
H	70	70	70	70	33	37	43	45	46	59	63	46	49	

SH = Recommended standard working hours. OOHW = outside of recommended standard hours work

ASSESSMENT OF PREDICTED NOISE LEVELS

Noise levels at Subject site 1 are within acceptable levels during standard hours for residential NCAs except NCA G. Where work occurs outside of standard hours at subject site 1, impacts are predicted NCAs in A, B, D, F and G.

Due to the proximity of the works at subject site 2 to NCA D, the predicted noise levels are higher than other NCAs and impacts are expected for NCA D when works are carried out at any time of the day, evening and night. NCA E is only potentially affected during the night. Exceedances of the noise management levels are not expected at other NCAs for works at subject site 2 carried out at any time of day, evening and night.

The works at subject site 3 are on the border of NCA C and therefore the highest impacts are predicted in this NCA. The closest residential NCAs are NCA A and B where noise levels during the evening and night are predicted to exceed the noise management levels for scenario 3F. Predicted noise levels were all within acceptable levels for all other residential NCAs and scenarios.

Predicted noise levels at receivers were not predicted to be above the highly noise affected level at any subject site and scenario.

SLEEP DISTURBANCE

For the assessment of the potential for sleep disturbance, a +5 dB penalty was added to the predicted $L_{eq(15min)}$ levels predicted in Table 7.15 and Table 7.16 to approximate a maximum noise level emission from the activity.

The assessment of the potential of sleep disturbance consider residential properties affected by work carried out during the night period only. Table 7.17 presents the predicted noise levels during scenarios that occur during the night for residential NCAs. Cells are highlighted grey where the screening criterion is exceeded.

Table 7.17 Sleep disturbance assessment for residential NCAs

NCA	SLEEP DISTURBANCE SCREENING CRITERIA		PREDICTED NOISE LEVEL			L _{MAX(15MIN)} DBA	
	Night	1D	1F	2B	3F		
	OOHW	OOHW	OOHW				
A	65	63	51	<35		60	
B	65	59	47	<35		63	
D	65	51	39	64		<35	
E	65	46	<35	52		<35	
F	65	56	44	36		<35	
G	65	73	61	<35		40	

A review of the predicted noise levels indicates that the sleep disturbance screening criteria were exceeded in NCA G for scenario 1D. The predicted internal noise level, assuming a partially open window is 63 dBA. The latest available guidance on sleep disturbance (contained within the RNP) indicates that one or two events between 65 and 70 dBA would be unlikely to have any notable health or wellbeing effects.

With closed windows, an additional 10 dBA reduction of external noise can be expected. This would mean an internal noise level of 53 dBA could be achieved which is below the level at which sleep disturbance is typically considered likely.

CONSTRUCTION VIBRATION

The significant vibration generating equipment is expected to be as follows:

- excavator mounted hammer
- jackhammers
- vibratory rollers/compactors.

The Transport for NSW CNS includes safe working distances for human comfort and building damage as for the above equipment. Using these safe working distances, the potential for impacts to heritage items was extrapolated.

Site specific safe working distances should be developed on site as the propagation of vibration is highly dependent on local ground conditions and specific equipment being used. Where work is proposed within the safe working distances, mitigation and management measures should be implemented to ensure that vibration can be controlled to appropriate levels.

The condition of the heritage items must be considered when setting vibration limits for construction works. Structures such as heritage industrial buildings which are structurally sound should not necessarily be considered more vibration sensitive than other structures.

Table 7.18 presents the indicative safe working distances for cosmetic damage for standard and heritage structures in addition to human comfort.

Table 7.18 Indicative safe working distances for construction vibration

Plant item	Rating	SAFE WORKING DISTANCES (m)		
		Cosmetic damage (BS 7385)	Cosmetic damage for heritage items ¹ (DIN 4150)	Human comfort
Vibratory roller	<50 kN (1-2 tonnes)	5	15	15-20
	<100 kN (2-4 tonne)	6	20	20
Hydraulic hammer	(300 kg 5-12t excavator)	2	6	7
Jackhammer	Hand held	1	5	Avoid contact with structure

(1) Heritage items should be assessed on a case by case basis and the condition of the items considered when setting vibration limits.

OFF-SITE ROAD TRAFFIC NOISE

During construction, additional vehicles would need to access the site for employees, equipment and material deliveries.

The RNP criteria for traffic generating developments is limited to an increase of 2 dBA or less above the existing traffic noise levels. In order to generate an increase of more than 2 dBA, the traffic volume needs to increase by more than 60 percent. Given the small size and scale of the proposed construction works, an increase of more than 60 percent of the total traffic volumes on any of the Project related roads is not considered likely. Therefore the risk of adverse impacts from construction traffic is considered low.

7.1.6 Commissioning and operational impacts

7.1.6.1 Operational noise assessment

As detailed in Chapter 2 of this REF, the frequency of train movements and the type and frequency of maintenance during the operation of the New Intercity Fleet at the Precinct would remain generally unchanged to the existing conditions. As such, only noise impacts associated with the commissioning of the New Intercity Fleet has been assessed.

NOISE MODELLING METHODOLOGY AND ASSESSMENT SCENARIOS

The assessment has considered seven representative commissioning scenarios to ensure that the range and extent of proposed activities are considered. Table 7.19 provides a summary of the seven assessment scenarios. Noise predictions for each scenario were then generated using the CadnaA 4.2 noise modelling software and then compared to the adopted PSNL to determine compliance.

Table 7.19 New Intercity Fleet train commissioning assessment scenarios

SCENARIO	DESCRIPTION	LOCATION	EQUIPMENT	TIME PERIOD
1	2 locomotives manoeuvre New Intercity Fleet train within the facility	On roads approaching Millennium Shed	2 diesel locomotives equivalent to 81 or 82 class diesel locos	Day, evening or night
2	2 locomotives idle outside	Outside of the Millennium Shed	2 diesel locomotives equivalent to 81 or 82 class diesel locos	Day, evening or night
3	1 locomotives idles outside	Outside of the Millennium Shed	1 diesel locomotive equivalent to 81 or 82 class diesel locomotive	Day, evening or night

SCENARIO	DESCRIPTION	LOCATION	EQUIPMENT	TIME PERIOD
4	5 New Intercity Fleet trains running all services	Inside Millennium Shed	Each New Intercity Fleet train running air compressors, static inverters and air conditioning	Day, evening or night
5	Brake testing (assumed 5 New Intercity Fleet trains tested at the same time)	Inside Millennium Shed	Brake testing including emergency and other brakes	Day, evening or night
6	Digital Voice Announcement testing (assumed 5 New Intercity Fleet trains tested at the same time)	Inside Millennium Shed	DVA on each New Intercity Fleet train	Day, evening or night
7	Horn testing	Inside Millennium Shed	Country horn test	Day, evening or night

Equipment noise source levels for each modelled scenario has been sourced from *Sydney Trains Environmental Management System Document EMS-09-GD-0080 Noise and Vibration from Rail Facilities Chapter 4 - Stabling Yards*, and other published sources where applicable. These are provided in Table 6.2 of the Noise and Vibration Impact Assessment (WSP | Parsons Brinckerhoff, 2016).

ASSESSMENT OF PREDICTED NOISE LEVELS

Noise levels were predicted for the assessment scenarios at the nearest NCAs to the commissioning activities. A summary of the predicted $L_{eq(15min)}$ noise levels is presented in Table 7.20. Cells which have been highlighted indicate an exceedance of the PSNL: orange for day (standard hours), yellow for day (out of hours works), green for evening (out of hours works) and grey for night (out of hours works).

Table 7.20 Predicted noise levels at nearest sensitive receivers

	PSNL $L_{eq(15min)}$ dBA			Scenario noise level $L_{eq(15min)}$ dBA					
	Day	Evening	Night	1	2	3	4	5	6
NCA A	59	48	41	41	32	<30	<30	<30	<30
NCA B	53	47	37	35	<30	<30	<30	<30	<30
NCA C	65	65	65	<30	33	34	<30	37	30
NCA D	50	47	44	46	59	56	52	52	52
NCA F	48	46	43	<30	<30	<30	<30	<30	<30
NCA G	52	47	39	37	36	32	31	33	<30

For the horn testing (Scenario 7), the sleep disturbance screening criteria as described in Section 7.1.2 is the most appropriate criteria. The predicted maximum noise levels at the nearest receivers from testing the horns in the Millennium Shed are as follows:

- country horn: L_{max} 106 dBA
- town horn: L_{max} 97 dBA.

These predicted noise levels are in excess of the 65 dBA sleep disturbance screening criterion for the nearest receivers. Where receivers close their windows at night, this translates to an internal noise level of

86 and 77 dBA for country horns and town horns respectively. These noise levels are in excess of the maximum internal noise levels discussed in Section 7.1.2.

Horns are currently used at the facility with some testing occurring on the network in the vicinity of Redfern station. The proposed commissioning activities are likely to require similar usage of horns within the facility. Whilst the predicted noise levels are above the screening criteria, the use of horns for commissioning activities is not considered to increase the frequency or noise level above that of the existing horns used on the site.

A summary of the potential noise impacts associated with commissioning works is as follows:

- Scenarios 2 to 6 all exceed the day, evening and night PSNLs and scenario 1 exceeds the night PSNLs at NCA D.
- The most substantial noise sources are the diesel locomotives that are used to haul and propel the New Intercity Fleet trains within the Precinct, train horns and simultaneous commissioning activities on five trains occurring within the sheds.
- For activities that occur within the Millennium Shed, the assumptions are based on activities taking place on all five New Intercity Fleet trains at once, which is a worst case assumption. In reality, the commissioning activities in any 15 minute period are unlikely to include the same activity occurring simultaneously on all five trains.
- Commissioning activities (scenarios 4 to 6) that occur within the sheds are operational activities that are expected to occur over the course of four years. Impacts associated with the commissioning activities are expected during the day, evening and night when they occur. Whilst they would not form part of the permanent operations of the facility as the operations would occur over a number of years, they are considered to have similar impacts as a permanent operation.
- The use of diesel locomotives is expected to occur only over the first few months prior to New Intercity Fleet being approved to operate on the network. Therefore the potential impact of diesel trains would be term and would be limited to a few months of locomotives operating in the precinct prior to the type approval and after this only when locomotives delivered trains.
- The nearest residential receivers at NCA D were constructed after the current configuration of the Precinct was established. *AS 2017 Acoustics - Recommended design sound levels and reverberation times for building interiors for sleeping areas (AS 2107)* therefore specifies noise levels in sleeping areas at night should be between $L_{eq(15min)}$ 35 and 40 dBA.
- Due to the fact that the receivers were built adjacent to an industrial facility, receivers would have a ventilation system sufficient to allow windows to be closed at night. Assuming a correction of 20 dBA for a closed façade, the internal $L_{eq(15min)}$ noise levels would all be less than 40 dBA, indicating that an acceptable level of noise can be achieved within the nearest residential buildings.

However, the predicted worst case scenario indicates operational noise levels above the PSNLs would only occur at NCA D. The exceedance is due to the use of locomotives within the facility and the simultaneous commissioning activities which are expected to occur over four years. As a result, mitigation measures should be considered to reduce external noise levels towards the PSNLs where reasonable and feasible.

OFF-SITE ROAD TRAFFIC NOISE

During commissioning and operation of the New Intercity Fleet road traffic generated by the facility is also not expected to significantly increase. The RNP criteria for traffic generating developments is limited to an increase of 2 dBA or less above the existing traffic noise levels. In order to generate an increase of more than 2 dBA, the traffic volume needs to increase by more than 60%. Given the small size and scale of the proposed construction works, an increase of more than 60% of the total traffic volumes on any of the Project related roads is not considered likely. Therefore the risk of adverse impacts from construction traffic is considered low.

OPERATIONAL VIBRATION

Significant operational vibration is not expected to be generated from the proposed activities and no further assessment was undertaken.

7.1.7 Management and mitigation measures

7.1.7.1 During construction

As part of the overall CEMP for the Project, a construction noise and vibration management plan (CNVMP) would be developed, prior to commencement of works. The management plan would include (but is not limited to) the following:

- identified nearby residences and other sensitive land uses
- approved hours of work and what work would be undertaken
- dominant noise and vibration generating activities
- details of noise mitigation and management measures to be applied
- information for worker training to minimise noise impacts
- community consultation protocol(s)
- complaints handling protocol(s)
- construction works should be planned and carried out during standard construction hours wherever possible.

During construction the standard mitigation measures contained within the Transport for NSW *Construction Noise Strategy* (CNS) would be used as the basis for the proposed mitigation measures to be included in the CNVMP. These measures would include:

- All employees, contractors and subcontractors would receive an environmental induction.
- No swearing or unnecessary shouting or loud stereos/radios would be allowed on site.
- No dropping of materials from height, throwing of metal items and slamming of doors would be permitted.
- A noise monitoring program would be carried out for the duration of the works in accordance with the CNVMP and any approval and licence conditions.
- Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
- High noise and vibration generating activities (such as jackhammer use or transportation via diesel locomotive) would only be carried out in continuous blocks, not exceeding three hours each, with a minimum respite period of one hour between each block.
- Quieter and less vibration emitting construction methods would be used where feasible and reasonable.
- The noise levels of plant and equipment would have operating sound power or sound pressure levels that would meet the predicted noise levels.
- Noise emissions would be considered as part of the selection process.
- Simultaneous operation of noisy plant within discernible range of a sensitive receiver would be avoided where possible.
- Plan traffic flow, parking and loading/unloading areas to minimise reversing movements.
- Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out-of-hours work.

- Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.
- Structures to shield residential receivers from noise such as site shed placement, earth bunds, fencing, erection of operational stage noise barriers would be used (where practicable) and consideration of site topography when situating plant would be undertaken.

In addition to the standard mitigation measures identified in the Transport for NSW CNS, the following specific mitigation measures have been developed as a result of the predicted impacts associated with the Project:

- To minimise noise levels, the following work practices would be implemented:
 - Minimise the potential for construction vehicles to access the site prior to 7am, where possible.
- To minimise the risk of vibration impacts, the following would be considered:
 - Ensure that safe working distances are complied with.
 - Where work is required within the distance, site-specific safe working distances are to be established on-site prior to the relevant vibration generating works commencing.
 - The use of less vibration intensive methods of construction or equipment should be considered where possible to reduce the potential for cosmetic damage.
 - All equipment should be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts.
 - If vibration intensive equipment is to be used within the safe working distances, vibration measurements are to be undertaken when work commences.
 - Assess the condition of heritage items to assign the appropriate vibration limits and set safe working distances.
 - Conduct building condition surveys of buildings before and after works where work inside the safe working distances is required.
- To minimise the potential for sleep disturbance, where night works are proposed to be undertaken, the following controls would be implemented where feasible and reasonable:
 - Avoid conducting noise intensive night works for more than two consecutive nights.
 - Schedule noise intensive activities to be undertaken before 10pm.
 - Schedule activities which are likely to cause maximum noise events such as deliveries, moving material or equipment and compacting works to avoid the night time period (10pm to 7am).
 - Avoid dropping tools or materials from height, striking materials, dragging materials or making metal on metal contact.
 - Educate workers on the importance of minimising noise and avoid creating short duration high noise level events.
 - Out of works hours may also be scheduled outside possession periods. Approval from TfNSW would be required for any out of hours work and the affected community would be notified as outlined in TfNSW's *Construction Noise Strategy*.
 - Inform surrounding residents by mail of planned works prior to the works commencing.

7.1.7.2 During commissioning

The following measures would be considered to mitigate noise impacts during commissioning:

- A noise management plan would be developed to manage potential noise impact during commissioning works. The plan should give consideration to the following mitigation measures including those provided in Table 6.5 of the Noise and Vibration Impact Assessment (WSP | Parsons Brinckerhoff, 2016) attached as Appendix A:
 - Scheduling commissioning activities to reduce the number of trains that are conducting noise intensive activities at the same time.
 - Scheduling noise intensive commissioning activities such as brake and Digital Voice Announcement testing during the day and evening time.
 - Scheduling use of diesel locomotives for shunting in the facility to avoid night time period.

- Use locomotives in lowest permissible power/notch setting within the Precinct.
 - Shutting off diesel locomotives when not in use.
 - Utilise existing building/structures (e.g. train wash, Australian Technology Park, other trains) to shield residential receivers from noise from standing locomotives, when it does not significantly impact the operation of the Precinct or as directed by the Eveleigh Precinct Manager. Allocate a place for diesel locomotives to stand and idle, if required in a location that is shielded from the nearest residential receivers.
 - As part of the detailed design, additional noise modelling would be undertaken to confirm potential changes to noise levels from horn testing as a result of the project. If existing horn noise levels are predicted to increase, additional mitigation measures would be considered to minimise horn noise emissions where reasonable and feasible.
- Where intensive night time commissioning activities are planned that may exceed the night PSNLs, it is recommended that the community in NCA D be informed at least 24 hours in advance.

7.2 Non-Aboriginal heritage

A Non-Aboriginal Heritage Assessment in the form of a Statement of Heritage Impact which assesses the potential impact of the Project on the heritage listed items within the Precinct has been undertaken by Artefact Heritage (Artefact, 2016). A summary of this assessment is provided in the following sections.

7.2.1 Methodology

The study area for the assessment of non-Aboriginal heritage was identified as the Precinct boundary, encompassing each of the three Subject Sites and the adjoining land. A search of existing heritage items within the study area was undertaken through a search of the following heritage lists and registers:

- World Heritage List
- National Heritage List
- Commonwealth Heritage List
- State Heritage Register (SHR) and State Heritage Inventory (SHI)
- Sydney Local Environmental Plan 2012
- Section 170 Heritage and Conservation Registers.

A site inspection was undertaken on 25 October 2016. The main aims of the site inspection were to gain an understanding and impression of the proposed construction works at each Subject Site and its potential impact on the heritage listed items at the Precinct.

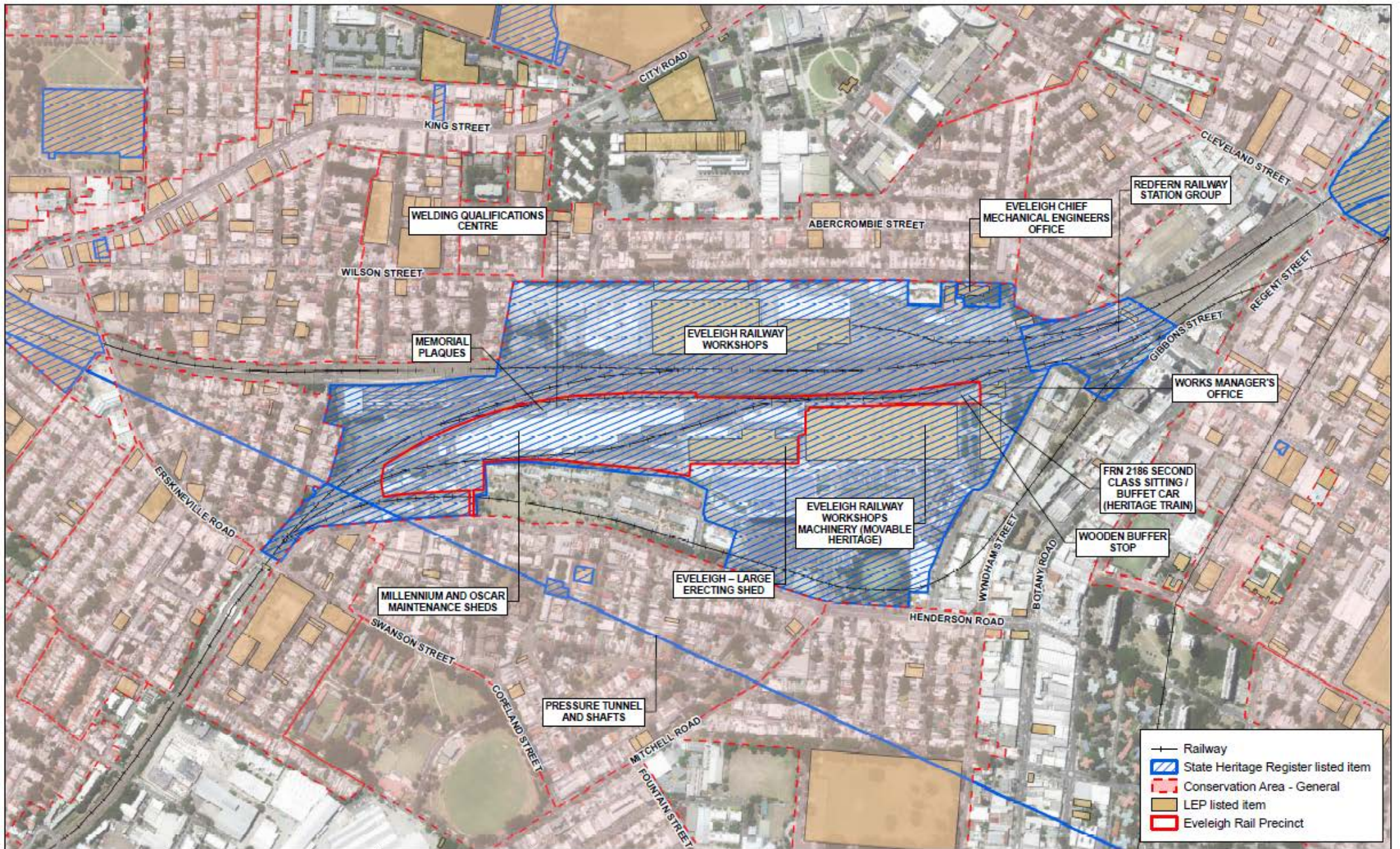
7.2.2 Existing environment

7.2.2.1 Existing heritage listed items



A search of all relevant databases as detailed in Section 7.2.1 identified a total of six listed heritage items as either located within the Precinct or located on adjoining land. Memorial plaques were also located within the Precinct and are a potential non-listed non-Aboriginal heritage item. These heritage items are detailed in Table 7.21 and shown in Figure 7.2.

Table 7.21 Recorded non-Aboriginal heritage items

ITEM	REGISTER LISTING	SIGNIFICANCE	DESCRIPTION
Eveleigh Railway Workshops	→ SHR item no. 01140 → RailCorps170 register, SHI item no. 4801102	State	The listing encompasses an assemblage of some of the finest historic railway engineering workshops in the world. The most significant defining feature of the Precinct is its geographical and local setting. It is a distinctive and aesthetically cohesive area of industrial structures and railways largely set below current road surfaces to the north. <i>The Precinct is located wholly within the curtilage of the Eveleigh Railway Workshops listing.</i>
Eveleigh Railway Workshops Machinery (Movable Heritage)	→ SHR Item no. 01141	State	A collection of mechanical and industrial equipment related to the historical operation of the Eveleigh Railway Workshops. <i>All movable heritage items are now housed in the former locomotive workshops within the Australian Technology Park site. These items will not be affected by the proposed works.</i>
Eveleigh – Large Erecting Shop	→ RailCorps170 register, SHI item no. 4805751	State	Late nineteenth century locomotive maintenance facility, located immediately to the west of the former locomotive workshops. <i>Located within the Precinct, however outside the footprint of each Subject Site.</i>
Redfern Railway Station Group	→ SHR Item no. 01234	State	Late 19th century railway station. <i>Located to the north-east of Precinct and outside the footprint of each Subject Site.</i>
Eveleigh Chief Mechanical Engineers Office	→ SHR Item no. 01139	State	Late 19th century office building, located to the north of the railway corridor on Wilson Street. <i>Located to the north of the Precinct and outside the footprint of each Subject Site.</i>
FRN 2186 Second Class Sitting/ Buffet Car	→ RailCorps170 register, SHI item no. 4807101	Local	Second class carriage car constructed in 1939. Presently residing in the northern portion of the Australian Technology Park partially within the Project impact area. <i>Located immediately adjacent to the works at Subject Site 3 – Eastern Siding. This will form part of the Section 60 Application.</i>
Memorial plaques	→ Not listed	N/A	Two memorial plaques are located at the southern edge of Subject Site 1 – Engineering Roads, to the west of the Welding Qualifications Centre. Small brass plaques on low concrete plinths. One reads “G. A. Long 1920 – 1980 At Rest”, the other “K. M. Dean 1932-1978 At Rest”. These were previously located in a small garden to the north of the Eveleigh Maintenance Centre. <i>Located at the southern edge of Subject Site 1 – Engineering Roads.</i>



Map: 2202522C_GIS_007_A1	Author: MG
Date: 28/02/2017	Approved by: IS

 1:6,000
 Coordinate system: GDA 1994 MGA Zone 56
 Scale ratio correct when printed at A3

Data source: - © Land and Property Information 2015, NSW Department of Planning & Environment

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TRANSPORT FOR NSW

New Intercity Fleet Eveleigh
Figure 7.2
 Heritage listed items

7.2.2.2 Historical archaeological potential

CHISHOLM ESTATE, 1820S – 1880S

Prior to the establishment of the Precinct, the Chisolm Estate occupied the site. This consisted of a 60 acre site which was partially used for farming. A manorial house was also located on the estate. In 1855, the first Sydney railway line was constructed through the centre of the estate, and the land was resumed in the 1880s for the construction of the Eveleigh Railway Workshops. Early site works is expected to have levelled the original landform in the area, with significant excavation across the Precinct. This early landscaping is likely to have removed any archaeological resources associated with the Chisolm Estate.

ORIGINAL EVELEIGH RAILWAY WORKSHOPS, 1880S – 1960

The original Eveleigh Railway Workshops were located within the Precinct from the 1880s through to 1960 which included a number of late nineteenth and early twentieth century railway buildings. The first large structures constructed on the southern side of the railway line included the Locomotive Workshops and the former Engine Running Sheds, which were completed by 1892 (Figure 7.3). A pedestrian footbridge was constructed in 1913 between the northern and southern portions of the Eveleigh workshops, via an access point to Macdonaldtown Station. Plans from the 1930s show that this footbridge connected to a number of smaller ancillary buildings, which have been identified as general stores and office buildings. At Subject Site 3, no substantial structures were constructed. In 1925, the northern bay of the running shed was demolished to make room for more rail tracks and sidings.

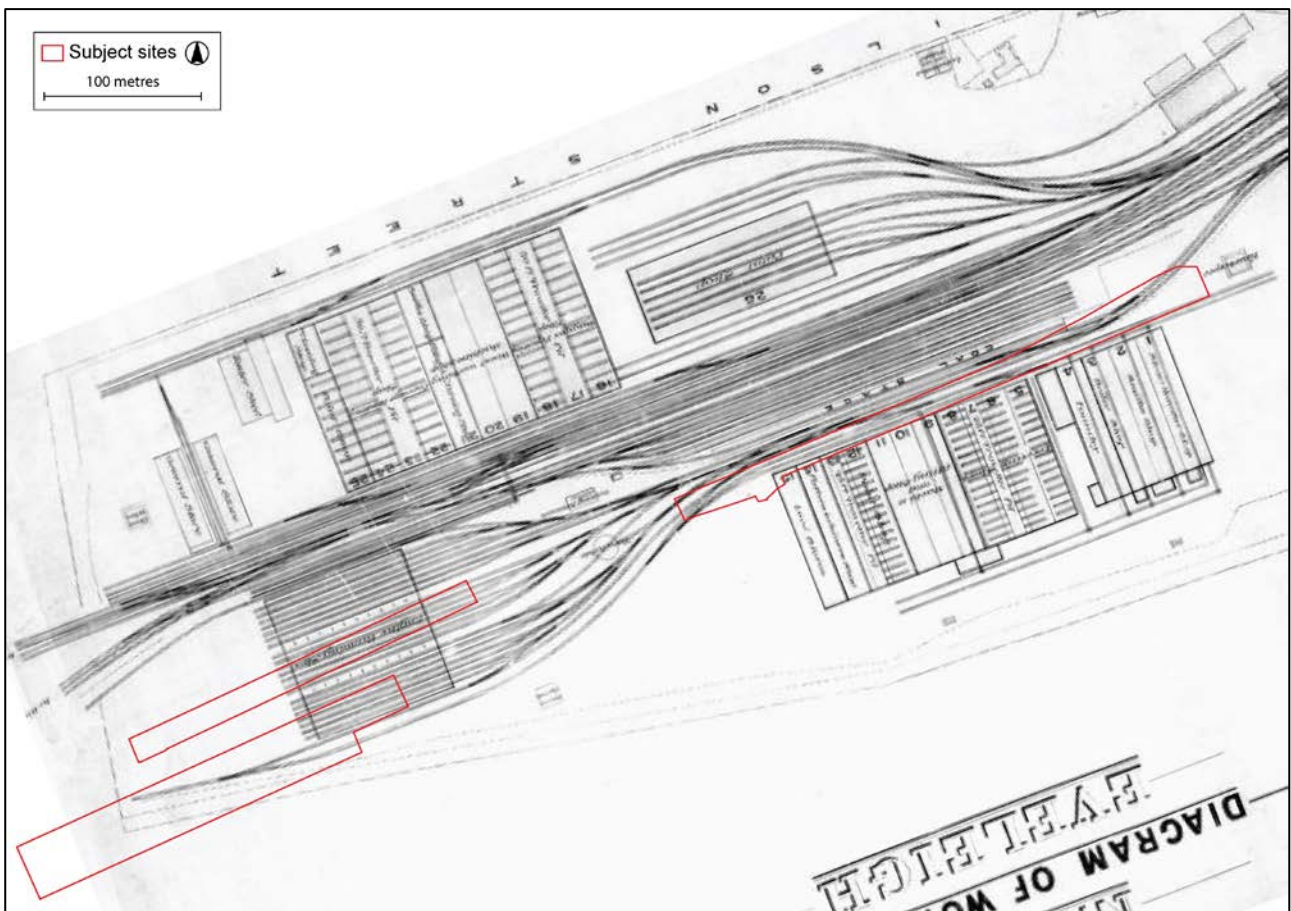


Figure 7.3 1892 Plan of Eveleigh Railway Workshops (Project impact area in red) (Artefact, 2016)

The south-eastern corner of the southern bay of the former running sheds were located within the Subject Site 2 area which is presently occupied by rail sidings. While construction of these tracks would have resulted in sub-surface impacts to any remains associated with the former running sheds, the construction of the running sheds also involved sub-floor structures, particularly train maintenance pits of unknown depth

and extent. Conduits installed to connect to OHW in the area would have caused significant impacts, however former train maintenance pits may have been backfilled and contain artefacts. The potential to recover intact and legible archaeological remains related to the former engine running shed was assessed to be **low to moderate**.

Five smaller store and office buildings were located in the area of Subject Site 1 until the early 1960s. These buildings consisted of general stores and administrative offices. This area has seen significant ground disturbing impacts over part, but not all, of the area. Two store buildings in particular, which used to house and distribute engineering and mechanical supplies to rail workers across the Precinct, would be located in the immediate location of proposed ground disturbing works. The Project impact area is overlaid on the layout of the Eveleigh Railway Workshops in Figure 7.4 below.

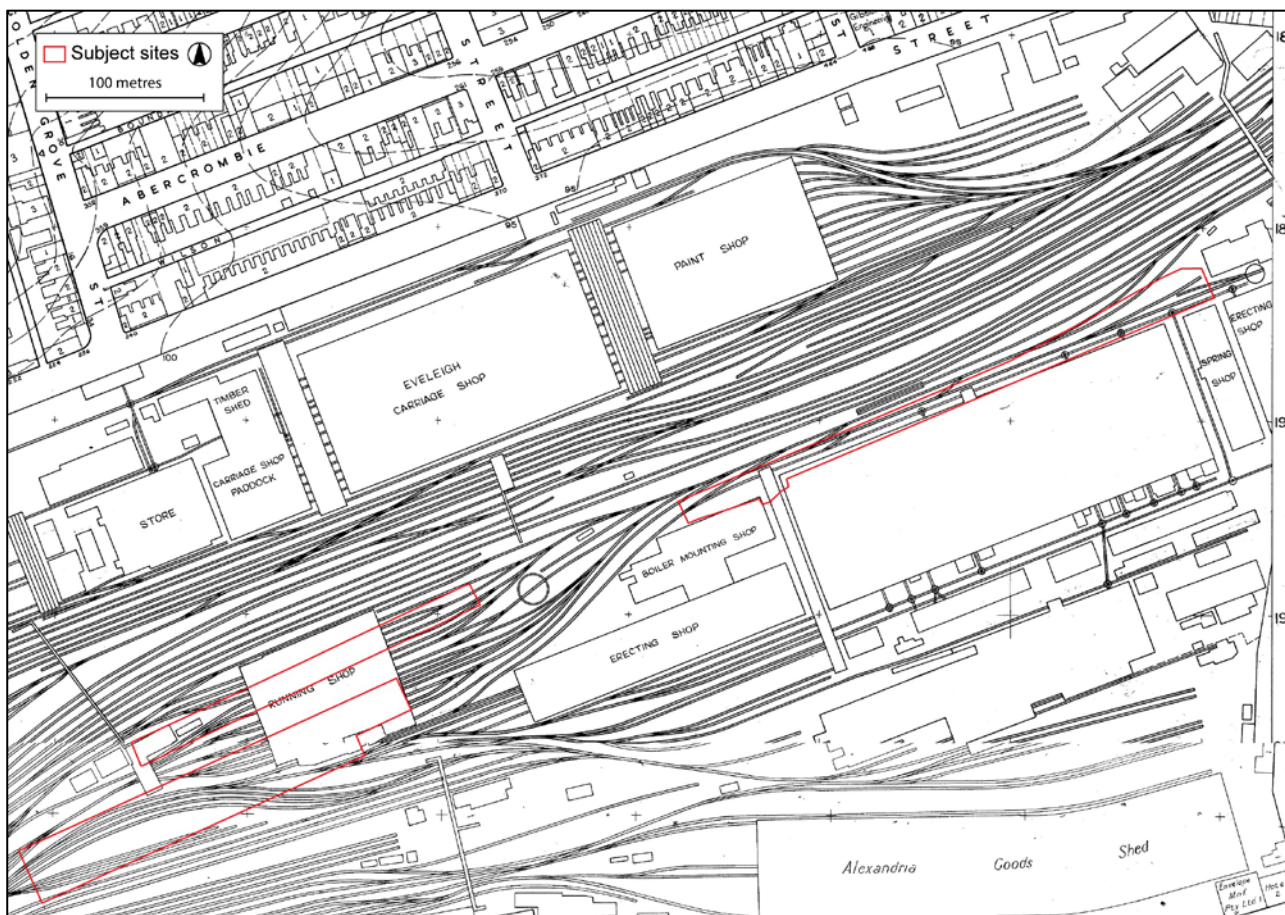


Figure 7.4 1950 civic plan of Sydney, showing Eveleigh Railway Workshops (Project impact area in red) (Artefact, 2016)

The majority of this area is covered in asphalt and hardstand concrete, with utility service corridors located parallel and adjacent to these surfaces. Former and current rail tracks, which are situated at an elevation below ground level, are located within and east of the Welding Qualifications Centre. However, the western portion of this part of the Precinct was known as a small garden up until the early 1990s. It is likely that deeper subsurface remains related to these buildings would remain. The archaeological potential for recovering archaeological resources relating to these buildings was assessed as **low to moderate**.

The archaeological potential in Subject Sites 1 and 2 is shown in Figure 7.5.

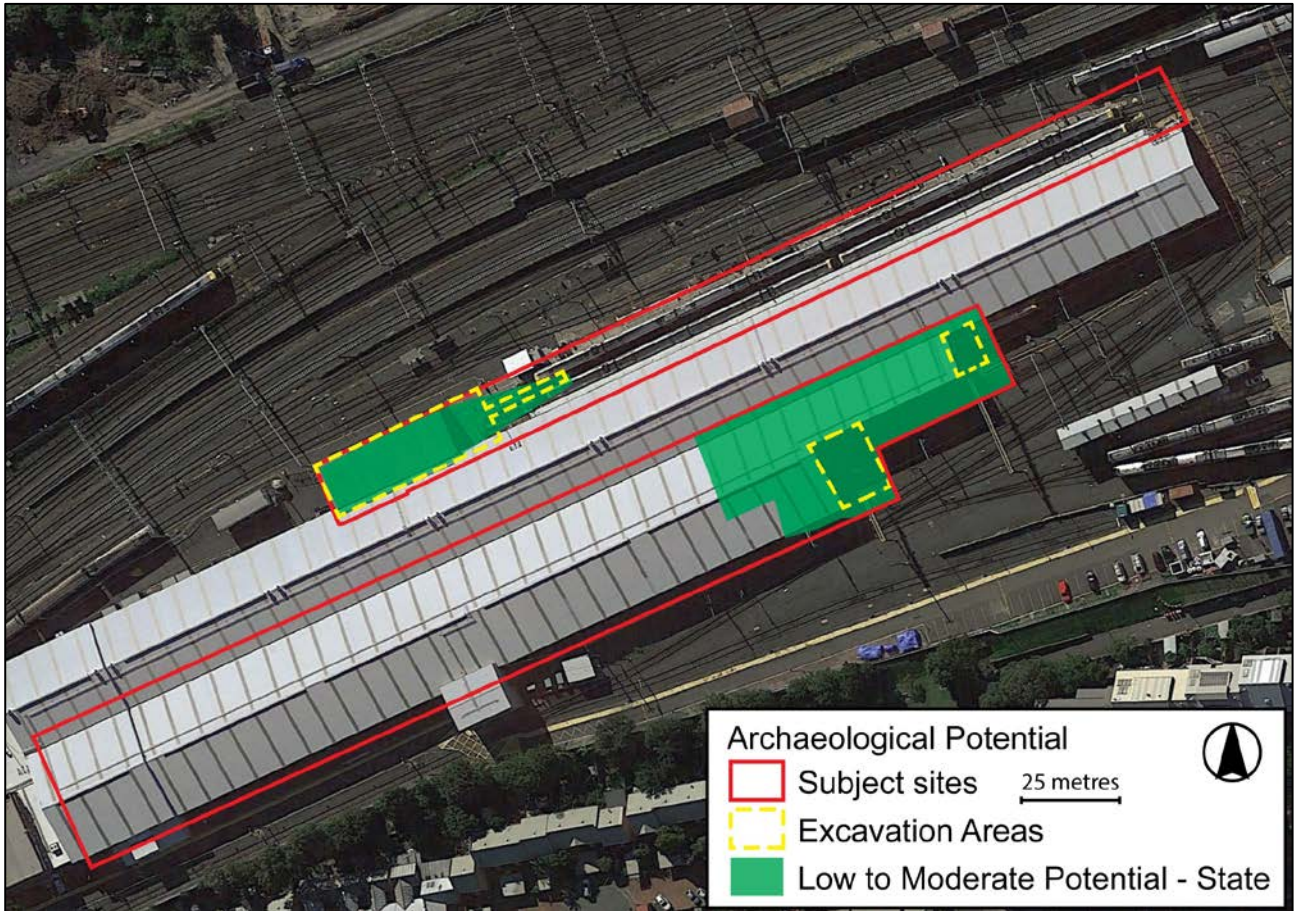


Figure 7.5 Map of archaeological potential in Subject Sites 1 and 2

7.2.3 Construction impacts

The potential impact of the Project on heritage items within the Precinct are outlined below. The assessment has considered the proposed construction works at each Subject Site and its potential impact on the heritage fabric and visual aesthetic from a heritage perspective.

7.2.3.1 Eveleigh Railway Workshops (SHR 01104)

As shown in Figure 7.2, the Precinct is located wholly within the curtilage of the Eveleigh Railway Workshops. As such, all buildings and features within the Precinct are subject to the statutory provisions of the heritage listing and contribute to the overall heritage significance of the listing in some form. An assessment of the proposed construction works at each Subject Site and its assessed impact on the heritage significance of the Eveleigh Railway Workshops is discussed in Table 7.22.

Table 7.22 Eveleigh Rail Workshops (SHR Item no. 01140) – heritage impact assessment

SUBJECT SITE COMPONENT	STATEMENT OF SIGNIFICANCE	HERITAGE IMPACT ASSESSMENT
Subject Site 1 – Engineering Roads Welding Qualifications Centre Significance of the Component to the Eveleigh Railway Workshops: Little	A simple functional building annexed to the Eveleigh Maintenance Centre. It reflects changes in technology that once saw Air-Conditioned Rail Cars as a relative rarity, which required specialised servicing facilities. Such changes in technology are commonly reflected in the built nature of the railway yards. Such simple, functional buildings are also common in the railway yard. As such, the Welding Qualifications Centre does not appear to possess any properties that distinguish it from its surrounds.	Major direct impact on component <ul style="list-style-type: none"> → Demolition of the entire Welding Qualifications Centre would be undertaken. The total demolition of the building cannot be mitigated, and would therefore cause a major impact to the element. → The machinery within the building is modern (post 1990s) so there would be no impact to significant moveable heritage items. This machinery would be moved to another location within the Precinct prior to the demolition of the building. Minor direct impact on SHR item <ul style="list-style-type: none"> → The removal of the structure would not result in a reduction in significant heritage view lines because of its location away from elements of high and exceptional significance in the Precinct. The demolition would therefore not result in indirect (visual) impacts to the heritage significance of the Precinct. → The demolition of the Welding Qualifications Centre would result in only a minor removal of fabric (of little significance) when considered in comparison to the scale of the overall Eveleigh Railway Workshops. Furthermore, the Welding Qualifications Centre was constructed relatively late in the history of the site (1960s) when compared with those elements of the Precinct which are of high and exceptional significance (late 1800s). → The ongoing occupational significance of the rail associated activities that take place in the structure would be relocated elsewhere in the Precinct. This would preserve the continuity of rail training and engineering at the site of the Eveleigh Railway Workshops.
Subject Site 1 – Engineering Roads Decanting facility Significance of the Component to the Eveleigh Railway Workshops: Little	This structure is a modern functionalist shelter with visible design content. It reflects the ongoing changing requirements of train maintenance in the Precinct.	Negligible visual impact on component <ul style="list-style-type: none"> → Demolition of the Welding Qualifications Centre to accommodate the extension of Engineering Roads 1 and 2 would not significantly alter the context or setting of the item. → The number of view lines between this element and other elements within the Precinct would be increased. Negligible indirect and cumulative impact on SHR item <ul style="list-style-type: none"> → The proposed works would expose the item to an increased number of view lines within the Precinct. The element is a modern structure of little heritage significance, located in a localised context of post-war (1960s and later) rail maintenance buildings. → The removal of the nearby Welding Qualifications Centre would not noticeably improve or decrease the prominence of this element of little significance.

SUBJECT SITE COMPONENT	STATEMENT OF SIGNIFICANCE	HERITAGE IMPACT ASSESSMENT
<p>Subject Site 1 – Engineering Roads</p> <p>Significance of the Component to the Eveleigh Railway Workshops: Little</p>	<p>These plaques indicate the close association between railway workers and their place of work. Neither the previous garden, nor the current location is open to members of the public, presumably including family of the memorialised individuals. The choice of plaque location within a specifically work-related setting reinforces the strength of likely ties between these workers, their colleagues, and their trade. The considerable change to the context of their surrounds renders their impact significantly reduced.</p>	<p>Negligible indirect impact on component</p> <p>→ The memorial plaques would not likely suffer noticeable damage from heavy plant in the vicinity. Accidental harm to these elements is possible during construction work although can be effectively mitigated.</p> <p>Negligible indirect and cumulative impact</p> <p>→ The element is of little heritage significance to the Eveleigh Railway Workshops as a whole.</p>
<p>Subject Site 2 – Millennium Shed</p> <p>Significance of the Component to the Eveleigh Railway Workshops: Moderate</p>	<p>The building was originally constructed in the 1960s for the servicing of Air Conditioned Cars. It has since been remodelled extensively, last in 2013, and currently serves for maintenance of Millennium and Oscar trains. It is representative of a large functional mid-twentieth century industrial building.</p>	<p>Negligible direct impact on component</p> <p>→ The modification of the interior of a working train maintenance facility would not substantially alter the interior setting or items of heritage physical fabric of the shed. Internal elements of the Millennium Shed are modern rail maintenance facilities and the Project would cause alterations which would be indistinguishable from present fabric in this context.</p> <p>Negligible direct impact on SHR item</p> <p>→ The Millennium Shed is an element of moderate significance to the Eveleigh Railway Workshops. A negligible impact to this element would result in a negligible impact to the larger item.</p>

SUBJECT SITE COMPONENT	STATEMENT OF SIGNIFICANCE	HERITAGE IMPACT ASSESSMENT
<p>Subject Site 3 – Eastern Siding</p> <p>Works Manager’s Office</p> <p>Significance of the Component to the Eveleigh Railway Workshops: High</p> <p>(This item is also listed on the RailCorp s.170 Register, #4745502)</p>	<p>The Works Manager’s Office is one of the few remaining original components of the Eveleigh Railway Workshops. The building was part of the original construction of the Workshops in the 1880s and served as the location of the Works Manager and the pay office for the site. The building also contained the Timekeeper’s Office and a bell on the top of the building rang the start and end of shift and controlled the actions of workers at the site. The building demonstrates the separation of management from the main workforce and the manner in which control was exercised over the workforce. Although modified, the building retains enough key features to demonstrate its original function within the site.</p>	<p>Moderate visual impact on component</p> <ul style="list-style-type: none"> → The present location of the Works Manager’s Office is surrounded by open pedestrian plazas which provide excellent views of the building from the south and east. The extension of the railway siding into this plaza, with associated protective fencing and access restriction, would reduce available sightlines to the structure. → The existing open space to the west of the Work Managers Office is a continuation of the original gardened approach to the building, and provides prominence to the building from the point of view of the Locomotive Workshops. The isolation of the building from other nearby built elements is integral to the element’s heritage context as a managerial facility overseeing the industrial working of the Precinct. The reduction of this open space to the west of the building would noticeably diminish this particular heritage context of the item. → The extension of the siding would impact the setting and context of the Works Manager’s Office. While the setting and context has been modified since the construction of the building, the existing open space gives it visibility and prominence that would be obstructed by the extension of high security fencing and the intermittent presence of stabled trains. <p>Minor indirect and cumulative impact</p> <ul style="list-style-type: none"> → The extension of the rail sidings into the intervening space between Innovation Plaza (and the public access to the locomotive and new locomotive workshops) and the Work Managers Office would restrict visibility of the element. The visual and spatial relationship between the Work Managers Office and the Locomotive Workshops, while partially obstructed by existing high fencing, would be noticeably impacted by the Project.
<p>Subject Site 3 - Eastern Siding</p> <p>Wooden buffer stop</p> <p>Significance of the Component to the Eveleigh Railway Workshops: Little</p>	<p>This wooden buffer is a functional item that reflects the ongoing changing requirements of train sidings in the Precinct.</p>	<p>Major direct impact on component</p> <ul style="list-style-type: none"> → The wooden buffer would be removed. There is an opportunity for the construction contractor to re-use the wooden buffer at the revised eastern termination of the eastern siding in front of the Works Manager Office. This would be dependent on the wooden buffer meeting current design regulations for railway infrastructure. <p>Negligible indirect and cumulative impacts on SHR item</p> <ul style="list-style-type: none"> → The wooden buffer has been in place in its current location since the late 20th century, whilst previously buffer stops would have been located closer to the Works Manager Office. The removal of the wooden buffer is part of the evolving use of the Precinct as a railway maintenance facility.

SUBJECT SITE	COMPONENT	STATEMENT OF SIGNIFICANCE	HERITAGE IMPACT ASSESSMENT
Subject Site 3 – Eastern Siding	FRN 2186 Second Class Sitting / Buffet Car (heritage train) Significance of the Component to the Eveleigh Railway Workshops: Moderate (This item is listed as an individual RailCorp s170 movable heritage item, (SHI# 4807101) of local significance)	<p>The heritage train has heritage significance for its ability to illustrate the pre-WWII change in carriage construction materials and design, particularly the change to steel fabrication for carriage bodies. The item retains the post-war synthetic timber interior for sitting cars which was superseded over time in favour of simpler layouts and materials. It also demonstrates how these cars were converted to other uses, in this case, construction of a buffet/kitchen and adjacent waiting area. It is a good representative example of a series of vehicles built to this basic design in the late 1930s and modified in the 1960-70s, demonstrating how carriages were adapted in response to demand for improved accommodation. Buffet Car FRN 2186 is also considered to be a good representative example of the materials and methods of construction of railway carriages used in the early twentieth century.</p>	<p>Negligible visual impact on component</p> <p>→ The carriage is located in a position of visual prominence in Innovation Plaza, however this is neither the original location nor heritage appropriate context for the element. The relocation of the carriage would result in negligible visual impacts to the heritage significance of the element.</p> <p>Negligible visual and cumulative impacts on SHR item</p> <p>→ The rail carriage presently partially obscures view lines from the Locomotive Workshops towards the Works Managers Office. The relocation of this element would potentially improve the number of heritage significant view lines. However, security fencing would cause a largely similar degree of visual obstruction in its place.</p>

Based on the assessment of the impact that construction would have on each component within the Precinct, the overall level of impact that construction works would have on the heritage significance of the Eveleigh Railway Workshops as a whole was assessed as **Minor**.

7.2.3.2 Other heritage items

A summary of the level of impact to other heritage listed items within and in proximity to the Precinct is outlined in Table 7.23.

Table 7.23 Impact to other heritage listed items

ITEM	REGISTER LISTING	HERITAGE IMPACT ASSESSMENT
Eveleigh Railway Workshops Machinery (Movable Heritage)	SHR Item no. 01141	Neutral physical and visual impact These items are stored in a building that would not be physically impacted by the Project. As these items are not visible from the outside, there would be no visual impact.
Eveleigh – Large Erecting Shop	RailCorp s170 register, SHI item no. 4805751	Neutral physical and visual impacts This item is located 60 metres to the south-east of Subject Site 2. It would not be physically impacted. Proposed works would not be visible from the point of view of the Large Erecting Shop. Proposed works in the vicinity would not cause significant vibration, and there is no potential for vibrational impacts during construction works.
Redfern Railway Station Group	SHR Item no. 01234	Neutral physical and visual impact This item is located 200 metres to the north-east of the Precinct, and no physical impacts would be caused. The proposed works would not be visible from the Redfern Railway Station Group.
Eveleigh Chief Mechanical Engineers Office	SHR Item no. 01139	Neutral physical and visual impact The item is located to 150 metres to the north of Subject Site 3 and would not be physically impacted. The proposed works would only be partially visible from the item, and those changes that would take place are consistent with the rail and industrial character of the Precinct.

7.2.3.3 Archaeological impacts

The demolition of the Welding Qualifications Centre, and the extension of Engineering Roads 1 and 2 (with associated decanting, services and signalling structures) would cause ground disturbing impacts. These impacts would be up to four metres in depth and may impact archaeological remains associated with the former locomotive stores. Additional works would include the installation of new lighting structures which would involve ground excavation to install pole footings of unknown depth and limited horizontal extent. Proposed pedestrian footpaths would also be constructed, which would involve shallow excavation to lay suitable subgrade before installing the new paving surface. The physical extent of ground disturbing works would exceed an area no larger than 35 metres by 14 metres in extent, predominantly located in and around the footprint of the current Welding Qualifications Centre. As detailed information on constructability for the demolition of the Welding Qualifications Centre and excavation works to build rail, decanting facilities, signalling structures and services is not yet known the entire footprint of the excavation area in Subject Site 1 has conservatively been presumed affected.

Excavation work to replace the overhead wire stanchions immediately to the east of the Millennium Shed would involve excavation to four metres depth and up to one metre by one metre wide. The provision of new service trenching within this area may involve other unspecified ground excavation. These excavations have the potential to impact archaeological remains associated with the former engine running shed.

There is considered to be a **low to moderate** potential impact to State significant archaeological remains associated with the engine running shed and former locomotive stores.

7.2.4 Operational impacts

After the completion of the construction works, the commissioning and ongoing stabling and maintenance operations associated with the New Intercity Fleet at the Precinct, would not impose any impact to the heritage significance of Eveleigh Railway Workshops or the other heritage listed items described in Section 7.2.2.

7.2.5 Management and mitigation measures

The following management and mitigation measures would be implemented to manage impacts on the heritage listed items at the Precinct:

- A Section 60 approval under the NSW *Heritage Act 1977* in relation to the minor assessed impact on the Eveleigh Railway Workshops (SHR Item No. 011040) would be sought prior to construction works commencing.
- Archival recording of all impacted structures and the setting and context of the Precinct, particularly the Welding Qualifications Centre and the FRN 2186 Second Class Sitting / Buffet Car, would be undertaken in accordance with NSW Heritage Council guidelines, prior to construction works commencing.
- The wooden buffer stop in the Eastern Siding should be re-used if feasible and if it meets current operational requirements.
- A schedule of movable heritage objects in the Welding Qualifications Centre should be prepared in consultation with Sydney Trains. The schedule of objects would be prepared prior to commencement of works, and provide guidance in accordance with the Sydney Trains Movable Heritage Strategy on the temporary and long-term curation of these items.
- The construction contractor would consider sympathetic design and materials as part of detailed design, particularly in Subject Site 3 in front of the Works Managers Office.
- The memorial plaques and their plinths currently located to the west of the Welding Qualifications Centre must be protected from damage during demolition and any other local works. This protection may consist of a temporary exclusion zone.
- A program of archaeological monitoring under the supervision of the excavation director would be conducted during the removal of the present ground surfaces in Subject Site 1. Depending on the intactness of archaeological resources identified in this area, testing or open area salvage excavation would be conducted at the discretion of the excavation director. The extent of this program would be refined during detailed design and constructability stages of the Project and would be input into an Archaeological Work Method Statement which would supplement the present Archaeological Research Design. All State significant deposits would be archaeologically excavated, recorded and removed within areas of impact.
- A program of archaeological monitoring under the supervision of the excavation director should be conducted for footing excavation of overhead wiring stanchions located within Subject Site 2 in accordance with the Archaeological Work Method Statement. All State significant deposits would be archaeologically excavated, recorded and removed within areas of impact.
- Minor ground disturbing impacts (such as non-destructive digging service investigation) should be archaeologically monitored in areas of identified archaeological potential in accordance with the Archaeological Work Method Statement.
- The FRN 2186 Second Class Sitting / Buffet Car is situated in a prominent area which suits the heritage character of the carriage. If possible, it should be relocated to an area with similar public visual prominence. The construction contractor will prepare plans for removal, temporary storage and temporary remediation works following removal of the carriage prior to works commencing. The final location of the carriage would be determined in consultation with the owner of the carriage and the property owner.
- In accordance with Policy 3.6 of the Australian Technology Park Conservation Management Plan, the obstruction of the northward view corridor from the pedestrian plaza in the Australian Technology Park Australian Technology Park caused by the extension of the north-eastern railway siding, should be minimised by design. For example barrier height and bulk should be minimised.

- In accordance with Policy 9.2 of the Australian Technology Park Conservation Management Plan, local, heritage and rail history community groups should be informed of the proposed works and their input sought for strategies to preserve the rail heritage of the Australian Technology Park.
- The Transport for NSW *Unexpected Find Procedure* would be adhered to during construction.

7.3 Aboriginal heritage

This section provides an assessment of potential impacts to Aboriginal heritage associated with the Project.

7.3.1 Methodology

A desktop assessment was undertaken with due consideration to the *OEH Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010a) (the 'code of practice').

The desktop assessment aimed to identify the presence of any previously recorded items of Aboriginal heritage significance within the Precinct and understand the level of potential to encounter unrecorded items of Aboriginal heritage during ground disturbance works. This involved a review of the following information and databases pertaining to the Precinct:

- OEH's Aboriginal Heritage Information System (AHIMS) database
- *Australian Technology Park Conservation Management Plan* (GML, 2013)
- *New Intercity Fleet Stabling and Commissioning Site, Eveleigh – Statement of Heritage Impact* (Artefact, 2016)
- *South Eveleigh Heritage Assessment* (Futurepast, 2014).

7.3.2 Existing environment

7.3.2.1 Aboriginal archaeological context and potential

The Precinct is situated on the Botany Sands, which is a young but deep formation of approximately 40 metres of fine sands in undulating dunes. These developed due to fluctuating sea levels and shore lines. They contained numerous wetlands and creeks that would have facilitated Aboriginal habitation (Artefact, 2016).

The original vegetation has been cleared from the Precinct site, however would have consisted of assemblages of dry sclerophyll and apple woodland (GML, 2013). This would have included a mixture of tree species including Smooth-Barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*) and Old Man Banksia (*Banksia aemula*). It is considered that the environment would have been rich in resources to support Aboriginal occupation including the availability of terrestrial resources such as plant and animals for food and medicinal purposes (GML, 2013). This would have been supported by coastal resources available at Sydney Harbour, located approximately 2 kilometres to the north, as well as the Pacific coastline and at Botany Bay.

Whilst the area is considered to have supported some level of Aboriginal occupation as outlined above, the Precinct is now a highly modified site, having been cleared and levelled as part of the initial construction and ongoing modifications of rail infrastructure. This development would have resulted in significant disturbance to Aboriginal archaeology should it have been present.

GML (2013) as part of their preparation of the *Australian Technology Park Conservation Management Plan* indicated that extensive development within the area, including the Eveleigh Railway Workshops and its associated industrial site use such as the foundry and locomotive buildings and laying of rail stock, has resulted in a low potential for intact Aboriginal archaeological sites such as artefact scatters to occur.

7.3.2.2 Registered Aboriginal heritage sites

An extensive search of the AHIMS database was conducted on 8 December 2016 incorporating an approximate 200 metre buffer around the Precinct boundary. The search did not report any previously

recorded Aboriginal heritage items within the search area. A secondary search of the AHIMS database was undertaken incorporating a one square kilometre search area from the centre of the Precinct. The search reported a total of four Aboriginal heritage items within the search area. This included one midden site, one isolate artefact, one potential archaeological deposit (PAD) and one Aboriginal Resource and Gathering site. The isolated artefact, the PAD and the Aboriginal Resource and Gathering site were located on the grounds of Sydney University, located approximately 650 metres north of the Precinct, while the heavily disturbed midden site was recorded in a small park to the east of the Australian Technology Park site.

7.3.3 Construction impacts

The Project would involve excavation works to undertake the modifications as described in Chapter 4. Excavation works would typically be limited to the extension of Engineering Roads 1 and 2 and the Eastern Siding and associated ancillary works such as the relocation of buffer stops, buffer stop signals, installation of berth boards fixed train stops, walkways and underground services. The ground within the excavation area is expected to comprise fill material associated with the initial construction of the railway and the initial levelling of the site. Deeper excavations of up to four metres are expected to be required to install the stanchions to support the OHW above the extended rail track. These excavations may extend beyond the existing fill area into the natural underlying soil.

The due diligence process in accordance with the 'code of practice' was followed to assess the likelihood of potential impact to Aboriginal heritage during excavation works. This process involves a series of steps in a question-answer flow chart format. Responses to each of the relevant questions outlined in this due diligence process is provided in Table 7.24.

Table 7.24 Aboriginal heritage due diligence assessment

STEP	QUESTION	RESPONSE
Step 1	Will the activity disturb the ground surface or any culturally modified trees?	Yes the Project would involve excavation works as part of construction at each Subject Site. Go to Step 2.
Step 2	Are there any: → relevant confirmed site records or other associated landscape feature information on AHIMS? and/or → any other sources of information of which a person is already aware? and/or → landscape features that are likely to indicate presence of Aboriginal objects?	<p>→ As outlined in Section 7.3.2, there are no AHIMS sites located within the Precinct. Only four AHIMS sites are located within a one square kilometre area of the Precinct indicating that extensive disturbance to Aboriginal heritage resulting from industrial and urban development in the surrounding area.</p> <p>→ GML (2013) have assessed the potential presence for Aboriginal archaeology at the Australian Technology Park site, which adjoins the Precinct and has been subject to similar disturbance. This included the presence of former rail related infrastructure and now also including a network of buildings, roadways and car parking areas. GML (2013) there was a low potential to encounter Aboriginal archaeology in all parts of the Australian Technology Park site, which also encompasses Subject Site 3 – Eastern Siding.</p> <p>→ Landscape features as defined in the 'code of practice' include land:</p> <ul style="list-style-type: none"> ▪ within 200 metres of waters, or ▪ located within a sand dune system, or ▪ located on a ridge top, ridge line or headland, or ▪ located within 200 metres below or above a cliff face, or ▪ within 20 metres of or in a cave, rock shelter, or a cave mouth ▪ and is on land that is not disturbed land. <p>Whilst the Precinct is located within the Botany sands physiographic region, which is part of a sand dune network, the site has been highly disturbed as a result of human activity. The Precinct has been subject to considerable disturbance as a result of the construction of rail related infrastructure, including the internal network of rail track, buildings and hardstand areas.</p> <p>Given there are no recorded AHIMS sites within the Precinct, no sources of information indicating the potential presence of archaeologist and no landscape features indicating the presence of Aboriginal objects no further assessment is considered necessary and ground disturbance works can proceed with caution.</p>

In following the due diligence process in accordance with the 'code of practice' there is no evidence to suggest that the ground underlying areas of excavation would contain items of Aboriginal heritage. As such, ground disturbance works can proceed with caution and an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Service Act 1974* would not be required. Notwithstanding, in the unlikely instance that items of potential archaeological significance are encountered during ground disturbance works, the mitigation measures outlined in Section 7.3.5 would be implemented.

7.3.4 Operational impacts

There would not be expected to be any impacts to Aboriginal heritage generated during commissioning, stabling and ongoing maintenance of the New Intercity Fleet during operation. Work at the site would take place within the Precinct would not be expected to disturb other Aboriginal heritage sites.

7.3.5 Mitigation and management measures

The following mitigation measure would be implemented in the unlikely event that a previously unrecorded item of potential Aboriginal heritage is encountered during ground disturbance works:

- Work should cease in the vicinity of the find and the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist, the Office of Environment and Heritage and Local Aboriginal Land Council. If human remains are found, work should cease, the site should be secured and the NSW Police and the Office of Environment and Heritage should be notified.
- Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.

7.4 Biodiversity

7.4.1 Existing environment

The Precinct is a highly modified environment having been cleared for the purpose of establishing the site as a train stabling and maintenance facility since 1888. The site comprises of rail tracks, buildings, access roads and areas of hardstand. It is expected that the underlying topsoil has been progressively replaced with fill material to support the initial and ongoing levelling of the site and to support building and rail infrastructure over time.

The Eveleigh Rail Precinct is void of vegetation aside from a strip of planted trees (approximately 370 metres in length) located on the embankment above the eastern siding on its northern side and separated by an existing fence line. A strip of planted bottlebrush (*Callistemon viminalis*) is also located on the northern edge of Subject Site 3 – Eastern siding.

For completeness, a review of the following databases was undertaken on 8 November 2016 to identify threatened species, populations and communities known or considered to have potential to occur within the Eveleigh Rail Precinct.

- Office of Environment and Heritage's BioNet Atlas of NSW Wildlife
- Commonwealth Department of the *Environment Environmental Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool.

The BioNet search determined that no species listed under the *Threatened Species Conservation Act 1995* (TSC Act) have been previously reported within the Precinct. The nearest reported threatened species was the Powerful Owl (*Ninox strenua*), previously recorded approximately 500 metres to the south of the Precinct boundary.

The EPBC Act Protected Matters Search reported four threatened ecological communities (TEC), 23 threatened species and 13 migratory species as known or likely to occur within the Precinct. However given the highly disturbed and modified nature of each Subject Site, there is limited habitat within the Precinct to

support the identified threatened species, however there is potential that threatened and migratory birds may fly over the area.

7.4.2 Construction impacts

Construction works at Subject Site 3 – Eastern Siding may require the trimming of vegetation.

No vegetation or faunal habitat is present within Subject Site 1 – Engineering Roads and Subject Site 2 – Millennium Shed. As such, no impacts on biodiversity would occur at these locations.

7.4.3 Operational impacts

There is no vegetation or faunal habitat located within the commissioning and operational footprint of the Project, therefore no impact on biodiversity is expected.

7.4.4 Management and mitigation measures

The following mitigation measure would be implemented in relation to works at Subject Site 3 – Eastern Siding.

- No trimming or removal of vegetation (planted Bottle Brush) adjacent to Subject Site 3 – Eastern Siding would be undertaken without prior approval from Transport for NSW.

7.5 Landscape character and visual amenity

A Visual Impact Assessment has been prepared by Clouston Associates (Clouston Associates, 2016) to assess the potential visual impacts associated with the Project. A summary of the key findings of the assessment is provided below, with the full assessment report included in Appendix C.

7.5.1 Methodology

The visual impact assessment (VIA) was carried out based on the structure outlined in the Roads and Maritime Services (Roads and Maritime) *Environmental Impact Assessment Guidance Note EIA-N04 – Guidelines for landscape character and visual impact assessment*. This assessment methodology assesses potential visual impacts of the Project on the surrounding areas. The overall impact rating of the Project on any given receptor is based on factors of magnitude and sensitivity.

Sensitivity: Each visual receptor type has an inherent and varied sensitivity to change in the visual scene based on their personal context in which the view is being experienced. This would have a direct bearing on the perception of visual impact experienced by the receptor and qualifies the quantitative impacts.

Magnitude: The magnitude of the visual effects of the development within the landscape. A series of quantitative assessments are studied, including distance from development, quantum of view, and duration of view and scale of change.

The levels of sensitivity and the ratings assigned to these quantitative assessment are described in Section 4.0 of the VIA (refer to Appendix C). Table 7.25 illustrates the relationship between these two factors and the overall impact rating of the Project at a given location.

Table 7.25 Visual impact ratings

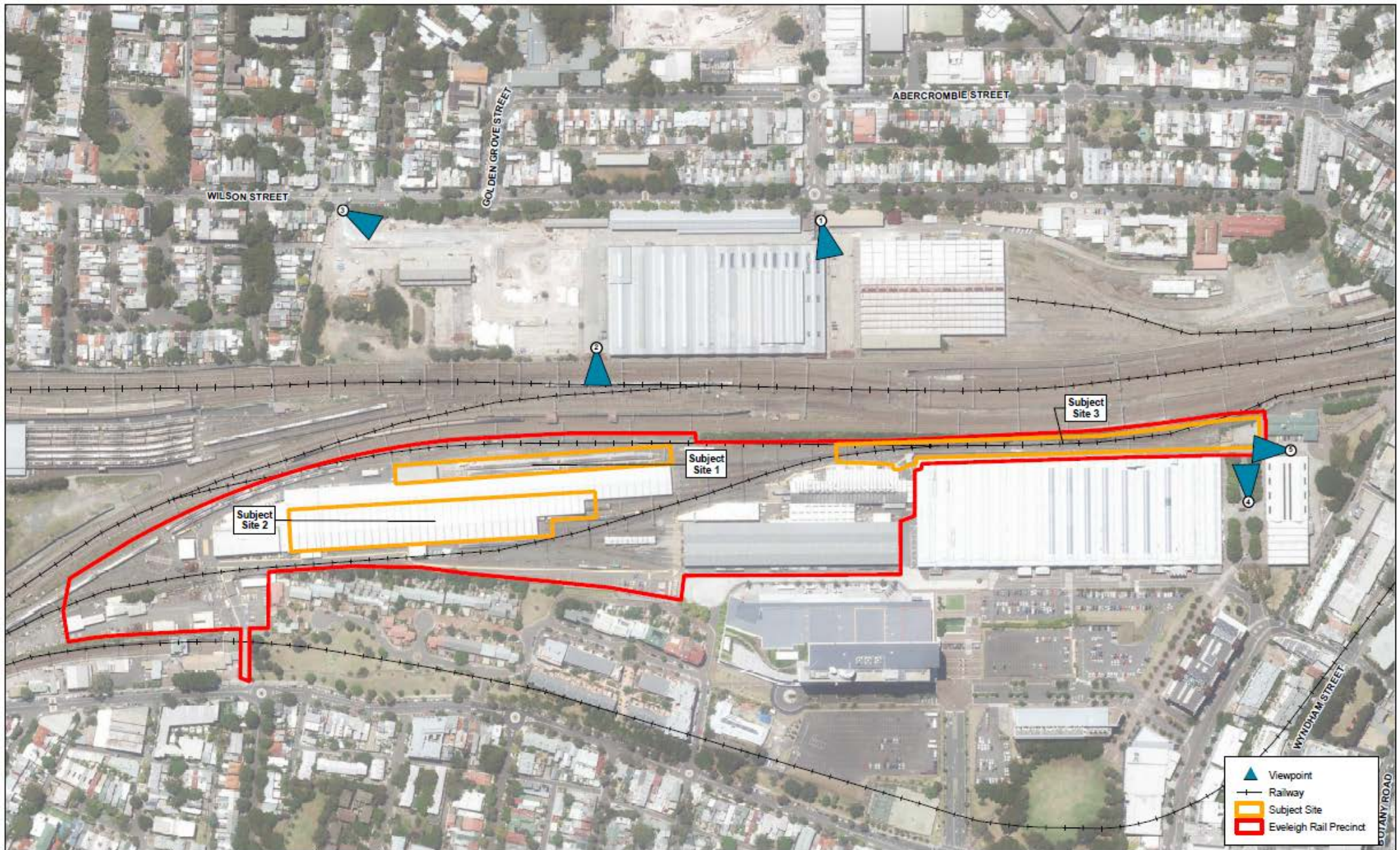
		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High	High/Moderate	Moderate	Negligible
	Moderate	High/Moderate	Moderate	Moderate/Low	Negligible
	Low	Moderate	Moderate/Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

7.5.1.1 Study area


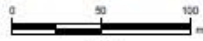
The study area for the visual impact assessment comprises the area of land within and beyond the Precinct boundary that could be potentially visually affected by the Project. Through a desktop assessment and site visit, the study area was defined as a 500 metre area offset from the centre of the Precinct based on topography, vegetation, built form, receptor location and viewing distance.

The visual impact has been assessed with regard to both private and public domain impacts. A number of representative viewpoints were chosen within the visual impact study area to represent the potential receivers who would be sensitive to visual impacts as a result of the Project. These locations are identified as follows and are shown in Figure 7.6:

- **VP1** – Carriageworks entry, Codrington Street, looking south.
- **VP2** – large lot adjacent to the Carriageworks. Site is marked for a future residential apartment block.
- **VP3** – Carriageworks Way/Wilson Street intersection looking south east.
- **VP4** – Innovation Plaza, looking north towards Subject Site 3 – Eastern Siding.
- **VP5** – outside Works Managers' Office, looking west Subject Site 3 – Eastern Siding.



New Intercity Fleet Eveleigh
 Figure 7.6
 Location of viewpoints

Map: 2202522C_GIS_010_A1	Author: MG		 1:3,000 Scale ratio correct when printed at A3
Date: 24/02/2017	Approved by: IS		
Data source: - Land and Property Information 2015, NSW Department of Planning & Environment			Coordinate system: GDA 1994 MGA Zone 58

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7.5.2 Existing environment

7.5.2.1 Urban form

The Precinct is mostly made up of industrial railway buildings, offices and rail related infrastructure. The Precinct is bordered to the north by the main rail corridor and the north Precinct comprising a mixture of residential and commercial dwellings including Carriageworks. Land use to the south and east of the Precinct is comprised of a mixture of a medium density residential area and the Australian Technology Park commercial precinct. As outlined in Section 7.2, the Precinct and adjoining land is comprised of a number of heritage listed items including the State Heritage listed Eveleigh Railway Workshops of which the curtilage covers the entire Precinct.

7.5.2.2 Public open space

Public open space within the study area is limited to a small pocket park along Wilson Street to the north of the Precinct and a tree lined boulevard known as Innovation Plaza within the Australian Technology Park to the immediate east of the Precinct, proximate to Subject Site 3 – Eastern Siding. This space is shaded by large Plane trees and includes several moveable heritage items, interpretative signage and seating opportunities.

7.5.2.3 Sensitive receptors

The sensitive receptors for each of the viewpoints is discussed below.

VIEWPOINT 1



Figure 7.7 View from the Carriageworks entry on Codrington Street

There are elevated views across the Carriageworks that include a car park and outdoor dining area. Glimpses through a gap in the buildings are available to rail infrastructure and the Channel 7 building within the adjoining Australian Technology Park.

VIEWPOINT 2



Figure 7.8 Looking south towards the Precinct from the lot adjacent to the Carriageworks

The existing view looks south from a car park adjacent to Carriageworks over the rail corridor and associated rail infrastructure towards the Eveleigh Precinct. Buildings associated with the Oscar/Millennium Shed are visible behind. The view is representative of the outlook that residents would have from existing and future apartments planned along Carriageworks Way as part of the redevelopment of the 'North Eveleigh' precinct.

VIEWPOINT 3



Figure 7.9 Carriageworks Way/Wilson Street intersection looking south-east

The existing view looks south east from a slightly elevated position. The built form of the Clothing Store and vegetation along the rail corridor obscures the majority of longer distance views towards the Precinct. Glimpses are available to the Precinct and Oscar/Millennium Shed in the distance.

VIEWPOINT 4



Figure 7.10 Looking north from Innovation Plaza towards Subject Site 3 – Eastern Siding

This view is available to users of Innovation Plaza and a commercial building to the south with an elevated view corridor in the same direction. It is framed by heritage buildings associated with the Eveleigh Railway Workshops and an avenue consisting of planted deciduous trees. The historic heritage train carriage can be seen at the far end of the Plaza and is an important feature of the view. This carriage is proposed to be relocated as part of the works at Subject Site 3 – Eastern Siding. Limited rail infrastructure is currently visible from this location.

VIEWPOINT 5



Figure 7.11 Looking west from outside the Works Manager's Building towards Subject Site 3 – Eastern Siding

This view is available to users of the eastern section of Innovation Plaza and public open space further east, adjacent to Cornwallis Street. The existing view includes heritage buildings, the heritage train carriage and the existing Eastern Siding at Subject Site 3. The train carriage is proposed to be relocated as part of the Project.

7.5.3 Construction impacts

As discussed in Chapter 4 of this REF, the construction period is expected to approximately occur over a period of approximately 18 months. During this time, the construction of the Project would be expected to temporarily reduce visual amenity for surrounding residents, adjacent businesses and rail and road users nearby due to elements such as:

- erection of fencing and barricades at Subject Site 3 – Eastern Siding
- the presence of construction machinery and materials storage
- general construction activities within the construction footprint, such as earthworks, stockpiling materials and the parking/use of construction plant and vehicles
- additional construction vehicle movements and minor traffic disruption associated with construction traffic.

Views of various construction equipment, site compounds, storage areas and increased site traffic (including trucks) on the local road network would lead to a reduction in visual amenity throughout the proposed construction period. These impacts would be the highest for properties in close proximity to the works, particularly at Viewpoint 4 and Viewpoint 5, which would be impacted by the construction works at Subject Site – Eastern Siding. Impact on the visual amenity during construction at these viewpoints is considered to range from moderate to high. Given the construction works would be largely obscured from view at Viewpoints 1-3, due to topography, built form and distance, the impacts on visual amenity as a result of construction works at these locations is expected to range from **negligible to low**.

The permanent visual impact of the Project at each sensitive receptor location is outlined in Section 7.5.4.

7.5.4 Operational impacts

The potential visual impacts are discussed in this section with regard to the permanent change in the built form resulting from the construction modification works to support the commissioning and ongoing stabling and maintenance of the New Intercity Fleet.

The potential visual impacts for each of the viewpoints identified in Figure 7.6 is discussed below in Table 7.26.

Table 7.26 Viewpoint visual impacts

VIEWPOINT	VISUAL IMPACT
Viewpoint 1	This is a well-used and important public space with a varied scheduled of events and activities. Built form obscures all views towards each of the three Subject Sites from this viewpoint. There may be a slight increase in the number of trains visible although this is unlikely to impact visual amenity. The assessed level of impact is Negligible .
Viewpoint 2	The proposed works at Subject Site 2 – Engineering Roads including the extension of Engineering Roads 1 and 2 and demolishing of the Welding Qualifications Centre may result in a change to the visual elements experienced at this location. The elevated nature of the view from existing and future apartments would potentially provide a panoramic view-frame over the Precinct, however the presence of extensive existing rail infrastructure and the limited scale of the construction modification works would reduce the level of impact. The assessed level of impact is Moderate/Low .
Viewpoint 3	While this view is slightly elevated and oriented towards the Precinct, visual accessibility to any Subject Sites are blocked by built form and vegetation. Further development as part of the 'North Eveleigh' precinct is likely to further block views south. The assessed level of impact is Negligible .

VIEWPOINT	VISUAL IMPACT
Viewpoint 4	<p>The construction modification works at Subject Site 3 – Eastern Siding involving the extension of the Eastern Siding and associated works including new ballast, extension of the OHW and new fencing would be visible at this location. To facilitate the works, the heritage train would also require relocation.</p> <p>This viewpoint is considered visually sensitive due to being public open space combined with the presence of numerous heritage items including the Works Manager’s Building and the heritage train.</p> <p>The assessed level of impact is Moderate.</p>
Viewpoint 5	<p>The permanent visual change resulting from the construction modification works at Subject Site 3 – Eastern Siding would be visible from this location.</p> <p>This is an area of sensitive public open space, however the presence of similar existing rail infrastructure within the view somewhat reduces the magnitude of change. The character of the view may alter to one of increased modern rail infrastructure.</p> <p>The assessed level of impact is Moderate.</p>

Given the relatively minor scope in the modification works required at each Subject Site, impacts from light spill at nearby sensitive receptors are expected to be negligible.

A summary of the visual impacts determined by Clouston Associates (2016) at the five viewpoints within the study area is provide in Table 7.27.

Table 7.27 Summary of operational impact ratings at all viewpoints

Receptor location	Receptor identification	Receptor sensitivity	MAGNITUDE					Overall visual impact rating
			Distance	Quantum of View	Period of View	Scale of change	Summary of ratings	
Carriageworks entry, Codrington Street, looking south.	VP1	H	L	N	N	N	N	Negligible
Looking south towards the Precinct from lot adjacent to the Carriageworks.	VP2	M	M	L	M	L	L	Moderate/Low
Carriageworks Way/Wilson Street intersection looking south east	VP3	M	M	L	L	N	N	Negligible
Looking north from innovation Plaza towards Subject Site 3 – Eastern Siding.	VP4	H	H	M	M	M	M	Moderate
Looking west from outside the Works Managers Building towards Subject Site 3 – Eastern Siding	VP5	M	H	M	M	M	M	Moderate

7.5.5 Mitigation and management measures

The following mitigation and management measures would be implemented to reduce visual impacts during construction and operation:

- All construction plant, equipment, storage areas and stockpiles would be contained within the boundaries at each Subject Site and the nominated equipment storage areas and be removed from the Precinct at the completion of construction.
- Where practicable, existing movable heritage items within Innovation Plaza would be relocated to screen Subject Site 3 – Eastern Siding.
- Appropriate and non-intrusive hoarding should be used at Subject Site 3 - Eastern Siding to assist in screening construction works from the surrounding public open space.
- Lighting should be installed to meet relevant Australian Standards and should be designed in a manner to minimise light spill.
- Where possible, the colour of built form elements is to be selected to match the heritage character of the area.
- Any new signage would be consolidated within built form elements rather than freestanding where possible. Dimensions of signs should be kept to a minimum and be complementary to the heritage identity of the Precinct and adjoining area.
- Reflective surfaces on newly constructed elements should be avoided where practicable.

7.6 Traffic, transport and access

7.6.1 Existing environment

7.6.1.1 Vehicle access and surrounding local roads

The Precinct is accessed via a two-way access driveway off Railway Parade, immediately north-west of Park Street. This two-way access driveway provides access to the internal roads, staff and visitor car parking spaces at the Precinct. It is expected that the existing operation of this driveway would be maintained under the proposed future condition and would be the primary driveway to the Precinct during the construction stage at Subject Site 1 – Engineering Roads and Subject Site 2 – Millennium Shed (refer Figure 7.12).

Railway Parade and Henderson Road are collector roads measuring approximately 12.8 metres wide which travel east-west between Botany Road and Swanston Street. Concrete footpaths, on-street parking and bicycle shoulder lanes are available on both sides of Railway Parade to separate the operational space of their respective functions. On-street parking is generally restricted to 2-hour parking between the hours of 8am to 6pm (permit holders excepted) along the kerbside fronting residential developments and are unrestricted along the kerbside fronting commercial and light industrial developments. Railway Parade and Henderson Road consist of a number of traffic calming measures, such as the use of roundabouts and a sign posted speed limit of 50 kilometres per hour with a 3-tonne load limit applicable during 7pm to 6am.

Access to Subject Site 3 – Eastern Siding would be provided via an existing access road off Cornwallis Street, which leads to the car park at the Australian Technology Park. Cornwallis Street is a southbound one-way street with access provided by other surrounding one-way streets including Gibbons Street and Rosehill Street (refer to Figure 7.12). These local streets are considerably narrow (five to seven metres) with on-street parking permitted on both sides along Rosehill Street.

7.6.1.2 Arterial roads

McEvoy Street, Fountain Street, Mitchell Road, Copeland Street, Swanson Street and Erskineville Road to King Street (Princess Highway) forms part of the State road network (*Gazetted Road Number 193*) in the east-west direction. These roads generally consist of one-lane in each direction with on-street parking on either sides.

Botany Road and Wyndham Street are State roads which travel in a north-south direction and are approved B-double routes according to the Roads and Maritime's *NSW Combined Higher Mass Limits and Restricted Access Vehicles*.

7.6.1.3 Internal traffic movements

Vehicle movements within the Precinct are via the internal sealed road network, which is marked and sign posted. Vehicle access is restricted to authorised employees and contractors via a security pass. The majority of the Precinct has a sign-posted speed limit of 10 kilometres per hour.

Deliveries to the varying facilities within the Precinct occur on an infrequent basis with vehicles ranging from small delivery vans to semi-trailers carrying large plant and equipment. Semi-trailers are escorted on the internal road network by employees of the relevant facility (i.e. Downer EDI, Sydney Trains and Rail Heritage).

7.6.1.4 On-site car-parking

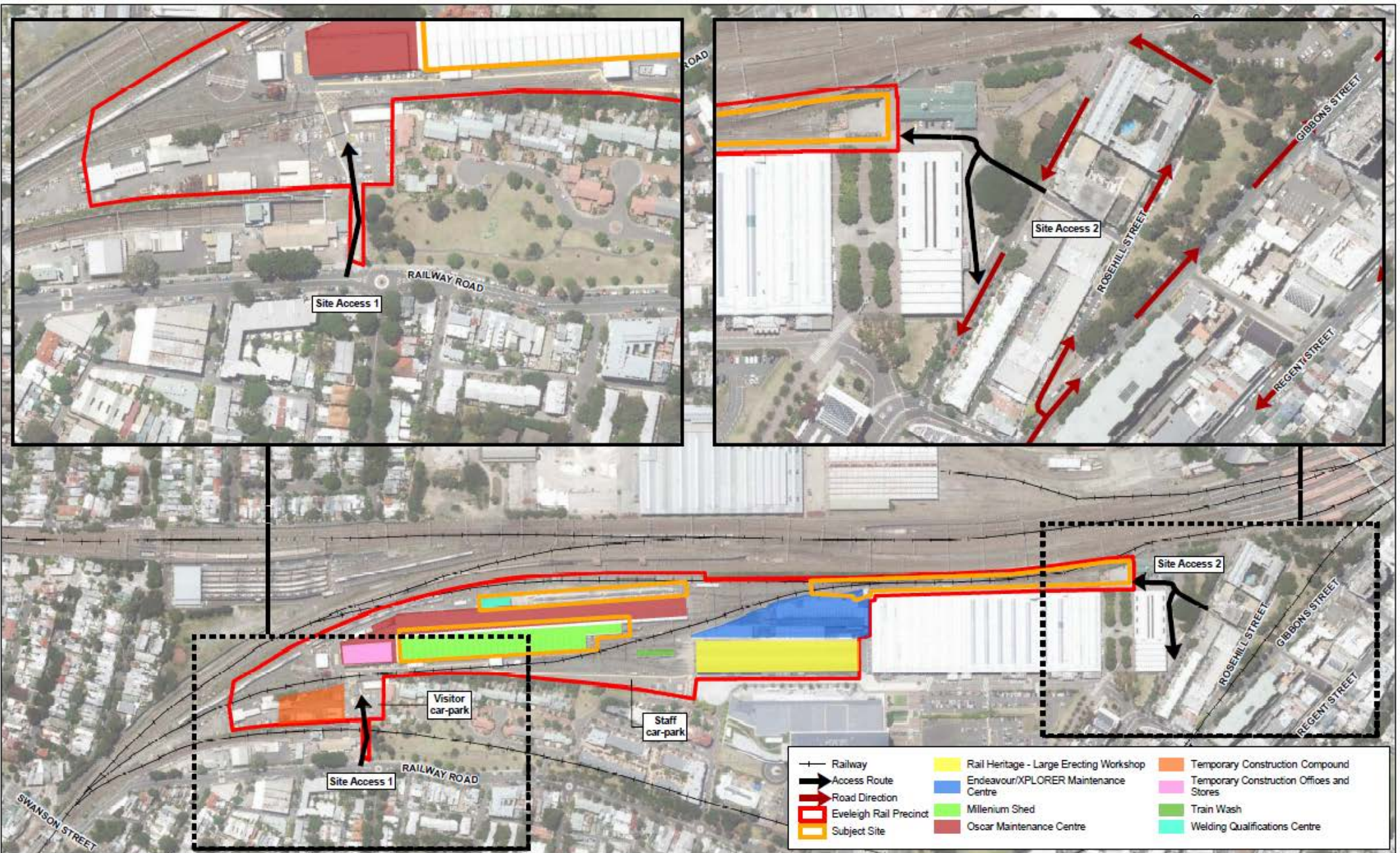
Staff at the Precinct have designated parking areas within the main carpark located to the immediate south of the Millennium Shed, which accommodates approximately 35 marked car-parking bays. This main carpark services employees of Sydney Trains and Downer EDI who work within the Oscar Maintenance Centre and the Millennium Shed. A visitor car-parking area is located to the immediate west of the access driveway to the Precinct and the Main Gate security building and has approximately 40 marked car-parking bays.

Smaller car-parking areas are located beneath the movable office building to the west of the Welding Qualifications Centre and the north western side of the Oscar Maintenance Centre. These smaller car-parks accommodate approximately ten car-parking bays. All parking areas are located on level ground and located away from rail movements. On-site car-parking areas are shown in Figure 7.12.

7.6.1.5 Pedestrian access and movement

The main pedestrian access point to the Precinct is via the main security gate access off Railway Parade. A secondary secured pedestrian access is provided via a turn-style at the far eastern end of the Precinct, near Redfern Station.

Internal pedestrian movements occur within the yellow marked pedestrian walkways, which provide pedestrians with safe passageway and egress throughout the Precinct. A series of yellow marked boardwalks are located across rail tracks areas to provide safe access across the internal rail network. Pedestrian crossings (zebra crossings) are also marked through the internal access road system to define routes where pedestrian have right of way over vehicles.



Map: 2202522C_GIS_008_A1	Author: MG		
Date: 24/02/2017	Approved by: IS		
Data source: © Land and Property Information 2015		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A3	



New Intercity Fleet Eveleigh
Figure 7.12
Vehicle Access

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7.6.2 Construction impacts

7.6.2.1 Vehicle access and surrounding function

Construction vehicle access to Subject Site 1 - Engineering Roads and Subject Site 2 – Millennium Shed would be provided via the existing driveway off Railway Road. This driveway is located immediately north-west of the roundabout at the intersection of Railway Parade and Park Street where the splitter island at the western approach currently extends past the location of the access driveway. This splitter island has been designed with supporting features (pedestrian crossing gap and kerb ramps) to provide a pedestrian crossing facility at the approach to the roundabout.

Due to the size and manoeuvrability of construction vehicles accessing the driveway and the location of the splitter island, there is potential that long construction vehicles such as semi-trailers would mount the splitter island when taking a right turn from Railway Parade. Providing safety measures are implemented during construction vehicle movements, pedestrian safety can be managed effectively.

Construction vehicle access to Subject Site 3 – Eastern Siding would be provided via an existing driveway off Cornwallis Street, which leads to the car park at the Australian Technology Park. Vehicle access to the existing driveway would require drivers to enter via the one-way streets of Gibbons Street and Rosehill Street (refer to Figure 7.12). The width of these local roads are narrow, ranging from five to seven metres in width. In addition, on-street car-parking is permitted on both sides along Rosehill Street. The Project will manage the size of construction vehicles accessing the driveway on Cornwallis Street to avoid property damage and to minimise loss to on-street car-parking spaces (i.e. semi-trailers will not use this access route). Large vehicles such as semi-trailers carrying materials and equipment (ballast, support structures for OHW, sections of rail track etc.) would be required to access Subject Site 3 – Eastern Sidings via the main driveway off Railway Parade. Large equipment and materials would be stored at the equipment storage area prior to its transport to Subject Site 3 – Eastern Siding via the internal road network. It is considered that smaller dump trucks would be able to access Subject Site 3– Eastern Siding via the existing road network.

The surrounding north-south arterial road network and east-west arterial network (refer to Section 7.6.1), which feed the local roads surrounding the Precinct have sufficient capacity to support construction vehicle movements, including longer vehicles such as semi-trailers.

To manage potential impact associated with construction vehicles accessing the Precinct and more specifically, each Subject Site, traffic movements would be undertaken in accordance with the *Eveleigh Precinct Worksite Traffic Management Plan* (Sydney Trains, 2014a). In addition, all measures to protect traffic safety will be outlined in a Project specific Construction Traffic Management Plan (CTMP).

7.6.2.2 Car-parking

An increase in car-parking demand is expected during the construction stage generated by less than 50 construction staff during daylight hours. Currently up to fifteen Downer EDI staff are employed during the daytime period indicating there may be a demand for an extra 35 car-parking spaces for construction personnel. It is anticipated that the main car-parking area to the south of the Millennium Shed would be used for construction personnel with the visitor car-park likely to accommodate the additional demand.

7.6.2.3 Pedestrian safety

There would be no impact on pedestrian safety during the construction stage provided that compliance with all internal and external road signals and signage is maintained.

7.6.3 Operational impacts

Following construction works, commissioning of the New Intercity Fleet would require approximately 30 to 50 staff at any one time. It is envisaged that deliveries of plant and equipment to support commissioning works would be infrequent with the main traffic movements and car-parking demands generated by the commissioning staff.

Given that approximately 30 to 50 staff are required during commissioning works, it is predicted that there will be sufficient existing capacity within the Precinct to accommodate staff car-parking requirements. In addition, the low number of traffic movements expected during commissioning would not impact on the safety and function of the Precincts internal road network or the external road network utilised by commissioning staff.

During operation of the New Intercity Fleet, the number of staff at the Precinct is expected to remain similar to current levels. Furthermore, deliveries and visitor numbers would remain as per current operations. As such, the operation of the New Intercity Fleet is not expected to result in an increased number of trips on the internal and surrounding road network, nor will it demand an increased number of car parking spaces once fully operational.

7.6.4 Management and mitigation measures

The following management and mitigation measures would be implemented to manage potential traffic and access related impacts during construction and operation:

- All traffic movements would be undertaken in accordance with the *Eveleigh Precinct Worksite Traffic Management Plan* (Sydney Trains, 2014a). In addition, a Project specific Construction Traffic Management Plan (CTMP) would be prepared by the construction contractor as to address the access and environmental issues raised in this document.
- The permissible construction hours would be strictly adopted as to ensure compliance with the load-limit restrictions currently applicable on the existing road network. Where construction works are required outside of the permissible hours, the construction contractors must obtain the necessary approval to carry out the construction activities accordingly.
- To ensure the safety of pedestrians using the existing splitter island on Railway Parade's roundabout at Park Street, a no-right-turn restriction should be implemented from Railway Parade into the access driveway for large constitution vehicle such as semi-trailers to avoid vehicles mounting the splitter island of the roundabout.
- Internal turning areas would be made available to ensure all vehicles, including construction vehicles are able to enter and exit in a forward direction to ensure safety and minimise interruption of the access points to the road network.
- The construction contractor is to encourage the use of public transport by workers to minimise the resulting impact of increased parking demand during the construction stage to the surrounding road network.

7.7 Socio-economic

7.7.1 Existing environment

7.7.1.1 Study area

For the purposes of this assessment, the geographical and social statistical areas used for the assessment included the following geographic/statistical areas:

- immediate/local
- regional area.

7.7.1.2 Immediate/local area of impact

The immediate area of impact is typically considered to be any property or neighbouring property that is impacted by the development of the Project. Impacts are considered to be direct if they relate to the acquisition, use of land or placement of site infrastructure on a property. Indirect impacts would be experienced adjacent near neighbours who notice flow on effects such as noise, air quality or visual impacts.

Residential receivers generally surrounding the site to the north and south, with the Australian Technology Park to the south west. The Australian Technology Park occupies the site of the former Eveleigh Railway Yards and consists of new industrial and commercial businesses, technology companies and education organisations.

7.7.1.3 Regional area

The Project is located within the City of Sydney LGA. This area is located within the inner city of Sydney NSW, about three kilometres south of the Sydney CBD. The area is characterised by medium to high density residential housing with several business precincts which is the central hub within Sydney's Global Economic Corridor (Infrastructure NSW, 2012).

7.7.1.4 Community profile

Based on Australian Bureau of Statistics data, the overall population of the suburb of Eveleigh is relatively small with approximately 470 people. Additionally, the suburb is generally characterised by a relatively young population, with 40.6 percent of the people in Eveleigh aged between 20 and 34 compared to the rest of NSW which is only 20.1 percent.

As of June 2015, the estimated residential population of the City of Sydney LGA was 205,339 people, representing around 4.2 percent of Greater Sydney's total population. Between 2005 and 2015, the City's population increased by nearly 30 percent. In contrast, Greater Sydney grew by 16.7 percent while NSW grew by 13.8 percent over the same period. By 2031, the population is projected to increase to more than 269,000.

Based on industry mix and relative occupational wage levels it is estimated that economic activity (GDP) generated in the City of Sydney LGA in 2014/15 was approximately \$110 billion, representing over 7 percent of the total national economy in Australia, over 30 percent of the Sydney metropolitan economy and over 20 percent of the entire GDP for NSW.

There are over 21,500 separate business establishments located within the City of Sydney LGA. A large number of the top 500 companies in Australia are located in the City from the 41 percent that are located in NSW alone. Overall the City of Sydney LGA has a working population that is just under 4 percent of the total workforce in Australia.

7.7.2 Potential impacts

7.7.2.1 Construction impacts and benefits

Construction of the Project has the potential to impact the following aspects which may affect pedestrians, residents, users of the Precinct, motorists and other receivers:

- The immediate local character through changes to visual amenity from the site works and obstruction and/or relocation of heritage items such as the heritage train (refer to Section 7.5 and Appendix C).
- Local environment due to impacted air quality due to dust-generating activities and exhaust emissions from diesel-powered equipment. These impacts are minor and temporary (refer to Section 7.12).
- Local amenity due to increased noise levels from the construction and commissioning during standard construction hours or outside standard construction hours following additional approval for works (refer to Sections 4.4.3 and 7.1). Increased noise has the potential to cause disturbance to local residents. However due to the short-term nature of the construction activities, impacts are predicted to be minor.
- Access and traffic in the local area due to the additional construction traffic, however this impact is expected to be minor (refer to Section 7.6.2).
- Public safety through the use of heavy machinery (e.g. bull-dozers, excavators), however, heavy machinery and equipment would be contained within the construction work site and is not likely to impact or pose a risk to the public under normal circumstances. Overall, the construction of the Project is unlikely to have a negative impact on safety and security.

- Access to users of the Australian Technology Park associated with the land acquisition and removal of car spaces for the Project (refer to Section 7.8.3).

The construction of the Project would directly generate jobs through construction activities. In addition, local businesses, particularly those catering to food and to a lesser extent accommodation could experience flow-on benefits from the increase in the number of workers coming into the locality on a daily basis during construction.

7.7.2.2 Operational impacts and benefits

Operation of the Project has the potential to impact the following aspects which may affect pedestrians, residents, users of the Precinct, motorists and other receivers:

- The visual amenity experienced by sensitive receivers (Australian Technology Park staff) at the Works Manager's office adjacent to Subject Site 3 – Eastern Siding may be moderately affected. However, the visual setting of the Precinct would be similar to its current state and not affect surrounding residential and commercial receivers at a Precinct wide level (refer to Section 7.5).

The benefits associated with operation of the Eveleigh commissioning, stabling and maintenance facility following modification include:

- Helping to maintain a high standard of maintenance and stabling capacity for the New Intercity Fleet trains, which would have a positive impact for train users and help to encourage people to use public transport.

It is predicted that there would be limited changes to local community services as a result of the operation of the Project. In addition, it is predicated that the majority of the operational workforce would come from the wider Sydney region and therefore only a minor number of people are expected to move into the area as a result of the Project. The number of workers who choose to relocate are not considered to be substantial and therefore not enough to alter the demand for services within the area.

Additionally, there is no expected additional impact on local air quality, property value, access and traffic associated with the Project during the operational phase providing that the mitigation measures outlined in Section 8.2 are implemented.

7.7.3 Management and mitigation measures

In addition to the mitigation measures identified in Sections 7.1, 7.5, 7.6 and 7.12, in relation to impacts associated with noise, landscape character and visual amenity, traffic and access and air quality respectively, the following additional measures are proposed:

- Safety and security:
 - All construction areas would be fenced off to restrict access to public. This relates specifically to works at Subject Site 3 – Eastern Siding.
 - High security perimeter fencing and signage would be provided to deter unauthorised access to the Precinct, including suitable vehicle and pedestrian gates at appropriate locations around the perimeter of the Subject Site 3 – Eastern Siding. This would be consistent with the existing security fencing surrounding the Precinct.

7.8 Land use and property

7.8.1 Existing environment

7.8.1.1 Land use

Rail related activities have been undertaken at the Precinct since the late 1880s. Currently, the Precinct is primarily used for the stabling and maintenance of the Millennium Fleet (part of the suburban fleet), Oscar fleet (part of the current intercity fleet), Endeavour/XPLORER fleet (part of the current intercity fleet) and heritage fleet. The rail operations are supported by three facilities/administration areas, namely the security gatehouse, the Downer EDI offices, Sydney Trains administrative facilities and stores area. Welding training specific to rail operations is carried out within the Welding Qualifications Centre.

The land use surrounding the Precinct is comprised of a mixture of medium density residential and commercial to the north and south. The adjoining Australian Technology Park to the immediate east of the Precinct is a key commercial precinct, primarily occupied by technology based firms and new industrial and commercial businesses. Channel 7 studios are also located within the Australian Technology Park. The Precinct is zoned *G – Special Purpose Zone (Infrastructure)* (refer to Section 5.3.4). The land use and zoning in the surrounding area is shown in Figure 7.13 below.

A more detailed overview of the existing operations at the Precinct is provided in Chapter 2.

7.8.2 Construction impacts

7.8.2.1 Interaction with other users of the Precinct

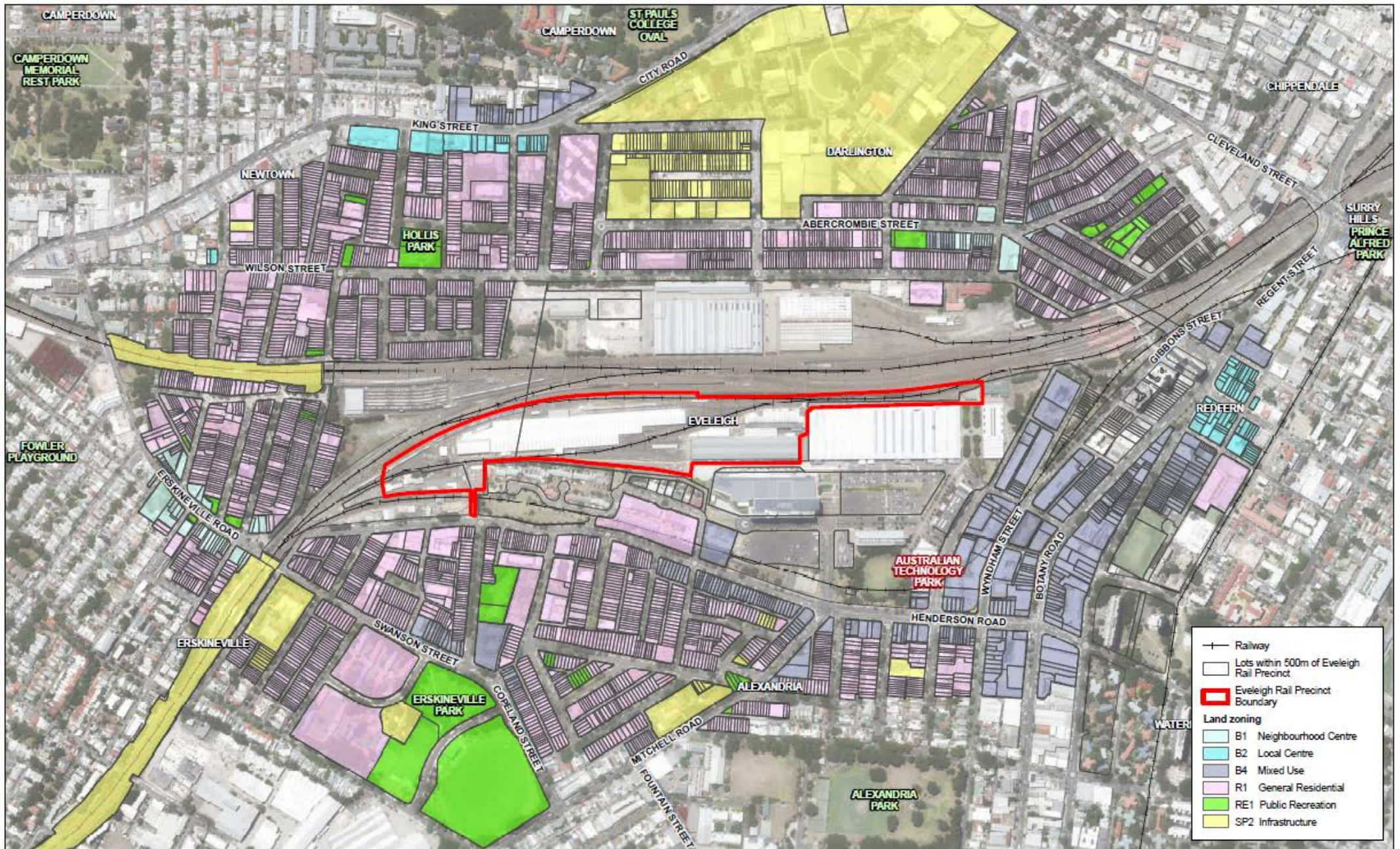
During construction, the Precinct would continue to operate as a train stabling and maintenance facility for the Oscar fleet, Endeavour/XPLORER fleet and the Rail Heritage fleet.

Prior to construction commencing within the Millennium Shed, Downer EDI would cease carrying out maintenance on the Millennium fleet and would vacate their offices and the Millennium Shed to allow for the modification works at Subject Site 2 – Millennium Shed. Other train fleets would continue to use the Precinct for stabling and maintenance purposes on an as needs basis.

Given the Precinct would remain operational during construction, there is potential that construction works would impact on other stakeholders capacity to perform their operations within the Precinct. This would occur as a result of:

- **Track possessions** – These would be required to safely undertake construction works within the Precinct at certain times.
- **Power outages** – It is anticipated that two power outages would be required to safely complete OHW modification works. Each outage is expected to prevent train movements in and out of the Millennium Shed and the Oscar Storage Roads for up to six hours.
- **General construction works** – the general presence of construction works has the potential to impact on other users of the Precinct as a result of:
 - increased vehicle movements on internal roads within the Precinct
 - potential reduction in the availability of car spaces for Precinct staff
 - potential reduction in the availability of the drop table on Roads 9 within the Millennium Shed which is used by other train fleets
 - potential disruptions to decanting operations at the engineering roads.

Whilst the Project would impact on other users of the Precinct from time-to-time, especially during track possessions and planned outages, the impact would be temporary in nature and can be effectively managed with the implementation of the mitigation measures outlined in Section 7.8.4.



Map: 2202522C_GIS_009_A1 Author: MG

Date: 24/02/2017 Approved by: IS



1:6,000

Coordinate system: GDA 1994 MGA Zone 56

Scale ratio correct when printed at A3

Data source: - © Land and Property Information 2015, NSW Department of Planning & Environment

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TRANSPORT FOR NSW

- +— Railway
- Lots within 500m of Eveleigh Rail Precinct
- ▭ Eveleigh Rail Precinct Boundary
- Land zoning**
- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- R1 General Residential
- RE1 Public Recreation
- SP2 Infrastructure

New Intercity Fleet Eveleigh
Figure 7.13
Land use

7.8.2.2 Land acquisition

To facilitate construction at Subject Site 3 – Eastern Siding, approximately 550 square metres of land would be temporarily required within the car park area of the Australian Technology Park. This car park is located to the immediate east of the Eastern Siding and located adjacent to the Australian Technology Park Works Manager’s Office. It is expected that this car park is used by staff occupying the Works Manager’s Office. The land acquisition would likely remove the availability of approximately five car spaces from the western end of the car park. The Project would not impact the remaining use of the eastern section of the car park.

7.8.2.3 Welding Qualifications Centre

The demolition of the Welding Qualifications Centre at Subject Site 1 – Engineering Roads would result in the direct removal of welder’s training operations at the Precinct. This impact is expected to be minor and temporary as the welders training equipment would be relocated to another location within the Precinct. As such, there would be no long term impact on personnel undertaking rail specific welding training.

7.8.2.4 Surrounding land use

Aside from the land acquisition required to facilitate construction works at Subject Site 3 – Eastern Siding, construction works would be located wholly within the existing Precinct boundary. As such, the Project is not expected to result in any alterations to the land use of the surrounding area during construction.

7.8.3 Operational impacts

7.8.3.1 Interaction with other users of the Precinct

As detailed in Chapter 2, the introduction of the New Intercity Fleet is not expected to result in any significant change to the current use of the Precinct for the purpose of train stabling and maintenance activities. This is due to:

- the maintenance activities associated with the New Intercity Fleet are similar to that undertaken on the Millennium fleet at Eveleigh with commissioning and maintenance works primarily occurring within the Millennium Shed, without impacting on other users of Precinct
- all aspects associated with the maintenance, stabling and movement of the Oscar, Endeavour, XPLOER and Heritage fleets and their frequency would be unchanged
- the number of train movements within the Precinct is expected to remain unchanged
- the type of maintenance activities associated with the New Intercity Fleet is consistent with the Millennium fleet.

Based on the above, impacts on other users of the Precinct during commissioning and operation of the New Intercity Fleet are expected to be minor.

7.8.3.2 Land acquisition

To support the operation of the Eastern Siding (i.e. the track extension and the surrounding security fencing) approximately 275 square metres would be permanently acquired following construction. This area is located within the car park adjacent to the Australian Technology Park Works Managers Office. As with construction, the permanent acquisition would result in the direct removal of approximately five car parking bays, however the remainder of the car park would not be affected.

7.8.3.3 Surrounding land use

The residential and commercial use of the areas surrounding the Precinct would not be affected by the commissioning and operation of the New Intercity Fleet.

7.8.4 Management and mitigation measures

The following management and mitigation measures would be implemented to minimise impacts on land use and other property impacts associated with the construction and operation of the Project:

- All track possessions required during construction would be arranged to minimise disruptions where practicable. This would likely occur at times where rail movements within the Precinct are reduced, such as:
 - weekends or during holiday periods
 - during night-time hours.
- Consultation with Australian Technology Park would be undertaken prior to the commencement of construction to establish potential offset locations for displaced car spaces adjacent to the Works Manager's Office resulting from the required land acquisition.

7.9 Hydrology, drainage and flooding

7.9.1 Existing environment

The Precinct is located within the Alexandra Canal Catchment. The total catchment area is approximately 1,141 hectares and includes the suburbs of Alexandria, Rosebery, Erskineville, Beaconsfield, Zetland, Waterloo, Redfern, Newtown, Eveleigh, Surry Hills and Moore Park.

The major sub-catchments are Sheas Creek (775 hectares), Rosebery (207 hectares), Munni Street Erskineville (213.6 hectares) and Alexandra Canal (184.2 hectares). The Munni Street Erskineville sub-catchment covers a majority of the Precinct with Sheas Creek sub-catchment covering a small portion of the Subject Site 3 - Eastern Siding. The Precinct is also not mapped as being located within a flood prone area.

Sheas Creek is the closest waterway, located approximately one kilometre from the Precinct. The creek has been highly modified due to the canal's historical industrial use and location within an industrial precinct. While the nearest creek is not located in close proximity to the Precinct, several stormwater drains occur within the Precinct including immediately adjacent to the Subject site 3 – Eastern Siding. The stormwater drains discharge stormwater directly into the Sydney Water drainage system which ultimately flows into the Alexandra Canal.

The Alexandra Canal Catchment is located on the Botany Sand Beds aquifer. The Botany Sand Beds aquifer is a large volume of underground water present in the sandy ground surrounding Botany Bay. The aquifer is highly vulnerable to contamination due to the permeability of the sands and the generally shallow water table. Any contamination from land use activity that escapes or is spilled onto the ground is likely to accumulate in the earth and leach into the groundwater (NSW DPI Water, 2016). The Phase 1 contamination assessment by GHD in 2016 suggests that contaminated groundwater may be present at the site. The source and nature of the potential contamination is described in greater detail in Section 7.10.2.

Regional groundwater is anticipated to flow in a generally north to south direction towards the Alexandra Canal. The NSW *Natural Resource Atlas* website identified nine registered groundwater bore within 500 metres of the Eveleigh Rail Precinct, as summarised in Table 7.28.

Table 7.28 Groundwater boreholes within 500 metres of the Eveleigh Rail Precinct

BORE ID	DRILLED DEPTH (m)	GEOLOGICAL MATERIAL	USE	STANDING WATER LEVEL	PROXIMITY TO SITE
GW105317	6.5	Fill (0 to 1.1 m) High plasticity silty clay (1.1 to 6.5 m)	Monitoring	1.7	500 m north-northwest
GW105938	–	–	Domestic	–	150 m south east
GW109729	6	Fill (0 to 0.7 m) Clay (0.7 to 6 m)	Monitoring	1.4	425 m west
GW109730	6.5	Clay	Monitoring	1.0	425 m west
GW109731	6	Fill (0 to 1 m) Clay (1 to 6 m)	Monitoring	1.1	425 m west
GW109732	4.3	Clay	Monitoring	1.5	425 m west
GW109733	2.4	Fill (0 to 0.8 m) Clay (0.8 to 2.4 m)	Monitoring	1.4	425 m west
GW110351	60	–	Recreation	25	350 m south
GW110247	210	Clay (0 to 4.5 m) Shale (4.5 to 33 m) Sandstone (33 to 210 m)	Domestic	31	550 m south

The groundwater bore search indicates that groundwater is present as shallow groundwater in residual clay and the groundwater is beneficially used for domestic purposes down-gradient from the Precinct. However, given the presence of reticulated drinking water in and around the Precinct, it is unlikely that the groundwater is used for drinking purposes.

7.9.2 Construction impacts

During construction, potential impacts would likely be focused on erosion and sedimentation as a result of land disturbance, which, if uncontrolled, could potentially result in increased sediment laden run off and potentially enter nearby stormwater drains. The impacts on nearby stormwater drains, particularly at Subject Site 3 – Eastern Siding would be considered further in detailed design and may require relocation as a result of the proximity to the works. However, with the implementation of appropriate erosion and sediment controls as outlined in Section 7.9.4, the potential risk to creeks and surface water quality is not expected from the Project as the Precinct is located over one kilometre from the nearest waterway.

There is potential for groundwater contamination on site. The risk of exposure to contaminated groundwater during excavation works would be heightened, considering the shallow nature of the Botany Sand Beds aquifer. The excavations may need to be dewatered given the shallow aquifer and the potential for rainfall and runoff. Incorrect dewatering can pose risks to nearby waterways and may be in contravention with legislation. Additionally, groundwater assessment may be required to be undertaken for the deeper piling works, however this would be dependent on the extent and nature of soil contamination if it is identified in the area (GHD, 2016). Any potential health and/or environmental risk associated with groundwater contamination and dewatering is expected to be minimised with the implementation of the management and mitigation measures described in Section 7.9.4 below.

7.9.3 Operational impacts

During commissioning and operation, after the work areas have been reinstated and rehabilitated, the potential for sediment laden runoff would be minor. This would reduce the risk of sediment entering nearby

stormwater drains. The risk would be further reduced if nearby stormwater drains are relocated further away from the Precinct.

Operation of the facility at Eveleigh, particularly the maintenance activities, is likely to involve use of materials which contain petroleum hydrocarbons (oil products), heavy metals (copper, zinc and lead) and solvents from degreasing and cleaning. Accidental spills and leakage of fuel, lubricants and oils from vehicles, equipment and the storage of liquids have the potential to contaminate groundwater. This potential for groundwater contamination is considered to be a moderate risk given the shallow nature of the Botany Sand Beds aquifer and the frequent use of potentially contaminating materials. It is anticipated that these potential impacts would be managed through site operational procedures, controls and the management and mitigation measures listed in Section 7.9.4.

The Precinct is not located on flood prone land and would therefore be considered unlikely to alter the flooding regime as a result of the operation of the Project.

7.9.4 Management and mitigation measures

The following management and mitigation measures would be implemented to minimise impacts on drainage, groundwater and water quality associated with the construction and operation of the Project. Additional mitigation measures pertaining to the management and prevention of contamination and erosion and sedimentation are provided in Section 7.10.5.

- During construction, rehabilitation of disturbed areas would be undertaken progressively as activities are completed.
- Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet by implementing erosion and sediment controls outlined in Section 7.11.5.
- Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and *Water Discharge and Reuse Guideline* (Transport for NSW, 2016).

7.10 Soils, geology and contamination

7.10.1 Methodology

The assessment of the Project's potential impact on soils and geology, including issues associated with contamination, was undertaken using a desktop approach involving a review of relevant public databases and available technical reports.

7.10.2 Existing environment

7.10.2.1 Geology and soils

The Sydney 1:100 000 geological map indicates that the Precinct is underlain by Ashfield Shale of the Wianamatta Group. The Ashfield Shale is described as being black to dark-grey with very fine layers and comprises of black mudstones and grey silty shales with frequent clay ironstone bands. The Australian Soil Classification map identifies the soil within the Precinct as Kurosol soils, which are typically highly acidic (pH below 5.5).

The Precinct has been subject to extensive development since its initial establishment in the late 1880s. Geotechnical studies to the immediate north of the Precinct, within the rail corridor, directly east of the Macdonaldtown Railway Station revealed the presence of fill material, varying in depths between 0.2 metres and 2.5 metres (Cultural Resources Management, 2002). This fill material consisted of sand, gravel, ballast and fly ash. In addition, a contamination investigation undertaken by AECOM (2014) in the basement beneath the Oscar Maintenance Centre identified shallow soils comprising clay fill material. Based on the two geotechnical investigations and extensive development across the Precinct, it is anticipated that much of the

shallow underlying soil within the precinct is comprised of fill material used to level the site during the construction of key components including the network of rail track, buildings and other structures.

As a result of extensive levelling across the precinct prior to construction works, the topography is typically flat with elevations ranging between approximately 19 metres in the western portion of the Eveleigh Precinct to approximately 25 metres at the eastern perimeter of the Precinct near Subject Site 3 – Eastern Siding.

A review of the CSIRO's *Australian Soil Resource Information System* (ASRIS) indicated there is no known occurrence of acid sulphate soils within the Precinct.

7.10.2.2 Contamination

The Precinct and the adjoining land at the Australian Technology Park was historically a large complex of rail workshops and yards used to manufacture, stable and maintain steam locomotives and other rolling stock since the 1900s. The industrial use of the site and the adjoining land for the purpose of train commissioning, stabling and maintenance is associated with the historical use and storage of fuel, oil and solvents. There is also potential for the residual presence of heavy metals resulting from the historical use of brass, steel and iron used during train maintenance. In addition asbestos was historically used in train brake liners and building materials.

A Phase 1 Environmental Site Assessment was undertaken for the Project and provided in the concept design report prepared by GHD (2016). In addition, a contamination investigation previously undertaken by AECOM (2014) in the basement beneath the Oscar Maintenance Centre reported concentrations of benzene in the underlying soil above the adopted screening level criteria. Ambient air quality samples collected from the basement also reported concentrations of contaminants of potential concern (CoPC) above the adopted screening level criteria.

The potential soil contamination sources identified included:

- potential use of uncontrolled fill during the historical development stages of the site
- long term use of the site as a rail corridor
- historical use of pesticides/herbicides (for weed and pest control), along the rail corridor
- long term historical industrial/commercial practices in particular along the rail corridor, such as gasworks facilities
- potential hazardous building materials (asbestos containing materials, lead paints etc.) from historical demolition of the former buildings/structures on site.

The identified potential contaminants of concern included heavy metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethyl-benzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), phenols, cyanide and asbestos.

A search of the NSW EPA's *Record of Notices* and *List of NSW Contaminated Sites Notified to the EPA* was undertaken on 1 December 2016 for sites within 500 metres of the Precinct boundary with the results included in Table 7.29.

Table 7.29 Reported contaminated sites within 500 metres of the Eveleigh Rail Precinct

SITE NAME/OWNER/ ADDRESS	DISTANCE FROM EVELEIGH RAIL PRECINCT	NOTICE
Macdonaldtown Triangle (former Eveleigh Gasworks) Off Burren Street, Erskineville, 2043	80 metres west	Two agreed voluntary investigation proposals were issued for the former gasworks sites (investigation of TPH, PAH and lead contamination in soil and groundwater). The notices included: → 19013 (issued May 2002, completed Jan 2008, former status) → 19009 (issued Oct 2001, completed May 2002, former status)
Australian Technology Park Henderson Road, Eveleigh	Adjacent to the Precinct	No notices have been issued to undertake further investigation and/or remediation activities at the site.

Overall, whilst no direct investigation of the underlying soils at each Subject Site was undertaken as part of this REF, based on the desktop searches and contamination reports provided by AECOM and GHD it is reasonable to assume that contamination may be present in the soil at each Subject Site, given the:

- historical use and storage of fuels, oils, solvents and heavy metals in the surrounding rail yards and workshops
- historical use of asbestos in train brake liners and building materials
- known contamination present at Macdonaldtown Triangle (former Eveleigh Gasworks) and the adjoining Australian Technology Park.

7.10.3 Construction impacts

7.10.3.1 Soil and geology

Construction excavation works would expose the underlying soil, increasing the risk of soil to water runoff and erosion. The main risk of erosion and sediment run-off would be associated with excavation and demolition works at Subject Site 1 – Engineering Roads and Subject Site 3 - Eastern Siding as part of the extension of the rail track and the associated OHW.

Ancillary works such as the relocation of buffer stops, buffer stop lights, installation of berth boards and fixed train stops would also require minor excavations. Based on the total length of track being extended at both the Eastern Siding (approximately 26 metre extension) and the Engineering Roads 1 and 2 (49 metre extension per track), the estimate volume of soil to be removed is approximately 100 cubic metres and is expected to comprise of fill material.

Works at Subject Site 2 – Millennium Shed would involve only minimal excavation works associated with relocation of train berth signage, external to the eastern end of the Millennium Shed.

Given the flat topography and relatively minor excavations to support the extension of rail track and ancillary structures, it is anticipated that erosion and sediment risks can be adequately managed through the design and implementation of standard measures as outlined in the Landcom *Managing Urban Stormwater, Soils and Construction Guidelines* (Landcom 2004). Additional, best practice mitigation measures as outlined in Section 7.10.5 would also implemented.

7.10.3.2 Contamination

Given the historical use of the Precinct, the adjoining land and known contamination reported within and in close proximity to the Precinct as detailed in Section 7.10.2, there is potential that contaminated soil may be encountered during excavation works if not managed appropriately.

Similarly, the disturbance of potentially contaminated material could potentially impact on the workers within the site during operation of the rail line and maintenance facility and during construction works, as well as on the current and future occupants of surrounding properties if not managed appropriately (GHD, 2016).

The potential contaminants may include, but not be limited to, petroleum hydrocarbons, heavy metals and asbestos. Asbestos may be potentially fatal if a worker is exposed to the contaminant in high concentrations. Soil investigations may need to be undertaken in areas where excavations are planned, for instance where the rail line extensions and piling of OHW footings are planned, in order to assess the subsurface conditions at the site prior to the works commencing (GHD, 2016). In the event that contaminated material is identified during excavation works, the mitigation measures outlined in Section 7.10.5 would be implemented to ensure that the contaminated material is managed, stored and disposed of appropriately and in a lawful manner.

There is a potential risk of accidental spills or leaks of fuels, oils and other chemicals from plant, equipment and vehicles used during construction works. Any accidental leaks or spills during construction are expected to be minor in nature and can be managed in accordance with the mitigation measures in Section 7.10.5.

7.10.4 Operational impacts

During commissioning and operation of the New Intercity Fleet at the Precinct, accidental spills and leaks from plant and equipment present the primary risk to underlying soils. Any accidental leak/spills are not expected to be significant and would be managed on-site with the implementation of the mitigation measures in Section 7.10.5 and through site specific operational procedures.

7.10.5 Management and mitigation measures

The following management and mitigation measures would be implemented to minimise soil and contamination impacts during construction and operation:

- An erosion and sediment control plan would be prepared for the CEMP. The erosion and sediment control measures would be designed, implemented and maintained in accordance with relevant sections of *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom, 2004) (‘the Blue Book’). This should include adequate mitigation to prevent sediment laden run-off entering the stormwater network.
- All material for off-site disposal is to be tested and classified in accordance with the *Waste Classification Guidelines* (EPA, 2014).
- Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by appropriately registered laboratory (NATA) and managed in accordance with the *Waste Classification Guidelines* (EPA, 2014), the *Guidelines on the Duty to Report Contamination* (EPA, 2015) and the *Contaminated Land Management Act 1997*.
- During construction, rehabilitation of disturbed areas would be undertaken progressively as activities are completed.
- During construction and operation, all fuels, chemicals and hazardous liquids would be stored within an impervious bunded area. The capacity of the bunded area shall be at least 130 percent of the largest chemical volume contained within the bunded area.
- Materials would be stored, used and handled in accordance with the measures and procedures detailed with in the material safety data sheet.
- During construction and operation, environmental spill kits containing spill response materials suitable for the works being undertaken shall be kept on site at all times and be used in the event of a spill.
- Contractors in the vicinity of the Eastern Sidings are to have a HAZMAT Management Plan developed and implemented in accordance with applicable WorkCover and EPA guidelines, prior to the commencement of works, due to the potential hazard of asbestos in the area (GHD, 2016).
- In the event that asbestos containing material is encountered during the construction, works in that location are to cease and a suitably licenced asbestos removal contractor (under the *Work Health and Safety Regulation 2011*) engaged to remove, transport and dispose of the material.

7.11 Waste and resource management

7.11.1 Existing environment

7.11.1.1 Waste sources

The Project may generate various types of waste, some of which would be reused or recycled, while others would require disposal. Construction waste associated with the Project would be managed in accordance with the *Waste Avoidance and Resource Recovery Act 2001*.

Typical waste generated during construction would include:

- approximately 100 cubic metres of excavated material generated during the construction of the extensions to the Engineering Roads and Eastern Siding. Given the known instances of contamination within the Eveleigh Rail Precinct, there is potential that that the excavated material may be contaminated
- building waste (brick material, concrete, glass, steel etc.) from the removal of the Welding Qualifications Centre
- waste from the removal of OHW structures (steel supports and metal cabling)
- construction waste, including packaging, concrete and other surplus materials used during site establishment such as safety fencing and barriers (which may include plastics and metals)
- general litter from site personnel such as food scraps, plastic and glass containers and packages
- liquid waste such as oils and chemicals from equipment maintenance, in addition to sewage from construction site facilities.

7.11.1.2 Materials selection and use

The Project would require a wide range of materials during construction including steel, paints, concrete, ballast, cabling and timber. Opportunities to use recycled and sustainable building materials would be explored where possible throughout the detailed design and procurement.

A majority of the materials used during construction would be considered to be common construction materials and would not be considered to be in short supply or have restricted availability.

The construction of the Project would involve predominantly modular/prefabricated components, which are manufactured off site and transported to the site for installation. The extension to the Eastern Siding and Engineering Roads are not expected to generate significant volumes of waste as the amount of steel, concrete, ballast, wire required to construct each component can be easily quantified. The construction activities are therefore not expected to generate a significant volume of waste material. Any excess/waste concrete and steel would be recycled. Therefore the only construction waste generated by the construction of the Project would be associated with timber formwork, packaging, office / domestic and ablution wastes.

7.11.1.3 Energy and fuel use

Construction works would require the use of energy and fuels to power plant, equipment and transport vehicles. Fuels would include non-renewable sources such as petroleum, diesel, natural gas and liquefied natural gas.

7.11.1.4 Water

Water may be required during construction for dust suppression, compaction, concrete batching, and washing of plant and equipment and for staff facilities. Water would be sourced from existing water mains supply within the Precinct.

7.11.2 Operational impact

7.11.2.1 Waste sources

Typical waste generated during commissioning and operation of the New Intercity Fleet would be generally consistent with waste currently generated at the site. This would include:

- office wastes
- general litter from site personnel
- site sewage and water used by operational staff, however this would be contained and disposed via the existing sewerage system at the Precinct
- ablutions associated with the decanting activities
- other general waste generated during emergency and periodic maintenance of the New Intercity Fleet (which for major maintenance may include substantial amounts of steel or other metals associated with component change out)
- operational wastes generated from maintenance activities such as rags, gloves, general packing material, empty drums, replacement parts, oils, lubricants and chemicals.

7.11.2.2 Resource use

It is not anticipated that maintenance and occasional repair of the infrastructure associated with the Millennium Shed, Eastern Siding, Engineering Roads or the New Intercity Fleet itself would place a considerable demand on resources.

7.11.3 Management and mitigation measures

A waste management plan would be prepared as part of the CEMP. Construction waste would be managed through the waste hierarchy established under the *Waste Avoidance and Recovery Act 2001*, which is as follows:

1. Avoidance of waste – Minimise the amount of waste generated during construction by avoiding unnecessary resource consumption.
2. Resource recovery – Reuse, reprocess and recycle waste products generated during construction to minimise the amount of waste requiring disposal.
3. Disposal – Where resources cannot be recovered, dispose of them appropriately to minimise the potential adverse environmental impacts.

All waste requiring off-site disposal would be classified in accordance with the *Environmental Protection Authority's Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal. The following key waste mitigation and management strategies would be implemented throughout the Project and would be governed by the CEMP:

- Removal and transport of waste off-site is to be undertaken by a suitably licensed contractor with appropriate approvals obtained under the *Protection of the Environment Operations Act 1997* (POEO Act). Disposal of the waste is to occur at a suitably licenced waste facility, which can lawfully accept the waste type in accordance with the POEO Act.
- Construction materials would be purchased in accordance with an established procurement strategy that prioritises the selection of materials that utilise best practice recycled materials and sustainability ratings.
- Where possible, construction wastes would be diverted from landfill and recycled or reused.
- Working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.

- Management of operational wastes would be managed by RailConnect NSW in accordance with relevant legislative and Sydney Trains requirements.

7.12 Air quality

7.12.1 Existing environment

Air quality within the locality and broader Sydney basin is influenced by a range of anthropogenic, biogenic and geogenic sources. Anthropogenic sources such as industrial operations (e.g. EPA licenced premises, oil refineries and power stations), commercial business (e.g. service stations) and motor vehicle emissions play a major role in contributing to Sydney's air quality. Geogenic sources such as bushfires can also significantly affect air quality within the Sydney region, especially during summer months.

Air quality standards and goals refer to pollutant levels that include the contribution from specific projects and existing sources. Particulate Matter (PM) was considered for the purpose of describing the air quality of the Precinct. PM concentrations are expressed as PM₁₀ and PM_{2.5} where:

- PM₁₀ – is particulate matter 10 micrometers or less in diameter
- PM_{2.5} – is particulate matter 2.5 micrometers or less in diameter. PM_{2.5} is generally described as fine particles.

The nearest air quality monitoring stations are located at Rozelle and Randwick, both within five kilometres from the Precinct. Given the proximity of these air quality monitoring stations to the Precinct, the data is considered to be representative of the air quality conditions at Eveleigh. Average air quality levels for these locations are described in Table 7.30.

Table 7.30 Summary of 2015 background 24 hour maximum and annual average PM₁₀ and PM_{2.5} levels for Randwick and Rozelle

POLLUTANT	MONITORING LOCATION	ANNUAL AVERAGE	MAXIMUM DAILY AVERAGE	EPA ASSESSMENT CRITERIA: ANNUAL AVERAGE	EPA ASSESSMENT CRITERIA: MAX 24HR
PM ₁₀	Randwick	18.6	77.4	25 µg/m ³	50 µg/m ³⁺
PM ₁₀	Rozelle	16.7	60.3	25 µg/m ³	50 µg/m ³
PM _{2.5}	Randwick	–	–	8 µg/m ³	25 µg/m ³
PM _{2.5}	Rozelle	7.2	33.4	8 µg/m ³	25 µg/m ³

*Air quality standards as per the National Environment Protection (Ambient Air Quality) Measure + 5 exceedances allowed per year

Source: NSW Air Quality Statement 2015 (OEH, 2015)

As indicated in Table 7.30, the average annual PM₁₀ and PM_{2.5} concentrations were reported below the annual EPA assessment criteria.

7.12.2 Construction impacts

The main air pollution and amenity impacts during construction would include:

- dust deposition (soiling of surfaces) as a result of excavation works at Subject Site 1 – Engineering Roads and Subject Site 3 – Eastern Siding
- elevated PM₁₀ concentrations due to dust-generating activities
- exhaust emissions from diesel-powered construction equipment
- other potential impacts including the release of heavy metals, asbestos fibres or other pollutants during the removal of contaminated soils (if identified as occurring on site).

7.12.2.1 Dust emissions

The Project's maximum dust emissions are likely to occur during the construction phase and are associated with:

- excavation works associated with extending the Engineering Roads and Eastern Siding
- demolition of the Welding Qualifications Centre
- wind erosion of freshly exposed areas and/or stockpiles
- vehicle movements.

Given the small scale of the construction activities and dust emission sources, any potential change in dust emissions are expected to be minor, temporary in duration and be effectively managed through the routine construction mitigation measures described in Section 7.12.4. The construction activities are therefore not predicted to result in any significant change to the current dust levels within the local area.

7.12.3 Operational impacts

The introduction of the New Intercity Fleet within the Precinct would have a negligible to minor impact on air quality and would not result in a significant change to current operations, as:

- **Hardstand areas:** The Project will not result in any substantial change to the total hardstand area. Hardstand areas are likely to be the dominant source of dust emissions during this phase.
- **Consistent with current operations:** The activities and where they are undertaken is similar to Downer EDI's maintenance of the Millennium fleet.
- **Train emissions:** The New Intercity Fleet are electrically powered and are therefore not a source of particulate emissions. This is the same as the Millennium fleet.
- **Vehicle movements:** The introduction of the New Intercity Fleet within the Precinct is not expected to result in a significant increase to the number of vehicle accessing the Precinct. Wheel generated dust emissions are therefore not expected to significantly change as a result of the Project.

7.12.4 Management and mitigation measures

7.12.4.1 Construction

To minimise the generation of dust during construction the following management and mitigation measures would be implemented:

- minimisation of disturbed areas
- implementing dust suppression techniques, such as wet suppression during activities that are predicted to generate high dust emissions (e.g. demolition of the Welding Qualifications Centre)
- stabilising of exposed surfaces post construction
- appropriately cover loads on trucks transporting material to and from the site and securely fix tailgates of road trucks prior to loading and immediately after unloading
- restricting vehicle and machinery movements to designated areas and sealed/compacted surfaces where practicable
- cleaning of material tracked by vehicles from road surfaces, as required.

7.12.4.2 Operations

To minimise the generation of dust during operation the following management and mitigation measures would be implemented:

- restricting vehicle and machinery movements to designated areas and sealed/compacted surfaces where practical
- regular checking and maintenance of plant and equipment, to ensure engine emissions are within air quality standards or comply with the manufacturer's specifications, as relevant
- ancillary service vehicles and maintenance equipment would be operated to minimise dust emissions.

7.13 Climate change and greenhouse gases

7.13.1 Policy context and methodology

The *Greenhouse Gas Protocol* (World Resources Institute/World Business Council Sustainable Development 2004) (the Protocol) provides an internationally accepted approach to greenhouse gas accounting. The Protocol provides guidance on setting reporting boundaries, defining emission sources and dealing with issues such as data quality and materiality.

Under the Protocol the establishment of operational boundaries involves identifying emissions associated with an entity's operations, categorising them as direct or indirect emissions and identifying the scope of accounting and reporting for indirect emissions.

Three "Scopes" of emissions (Scope 1, Scope 2 and Scope 3) are defined for greenhouse gas accounting and reporting purposes. These scopes are briefly outlined in Table 7.31 and the probable sources of emissions.

Table 7.31 Greenhouse gas emission categories

EMISSION SCOPE	DEFINITION	LIKELY SOURCE
Scope 1	Direct emissions generated within the Project boundary. Direct greenhouse gas emissions are defined as those emissions that occur from sources that are owned or controlled by the entity.	<p><i>Construction phase:</i></p> <ul style="list-style-type: none"> → fuel combustion emissions from construction. <p><i>Operational phase:</i></p> <ul style="list-style-type: none"> → commissioning and maintenance activities.
Scope 2	Indirect emissions are produced outside the boundary of the operation, by another organisation but are controlled and directly linked to the operations on site activities (e.g. electricity consumption).	<p><i>Construction phase:</i></p> <ul style="list-style-type: none"> → electricity used to operate site offices (during construction). <p><i>Operational phase:</i></p> <ul style="list-style-type: none"> → electricity to support office and equipment usage.
Scope 3	Indirect emissions outside the boundary of the operation that the operation has no direct control over.	<p><i>Construction phase:</i></p> <ul style="list-style-type: none"> → embodied energy in construction materials → emissions from transport of materials → emissions from landfill and disposed materials. <p><i>Operational phase:</i></p> <ul style="list-style-type: none"> → fuel combustion emissions associated with the shipping of trains to Australia and the diesel used to haul trains during the commissioning phase → embodied energy in maintenance materials → emissions from transport of materials.

7.13.2 Existing environment

7.13.2.1 Existing climate

Average temperatures in NSW have been steadily rising since the 1960s. Eight of Australia's ten warmest years on record have occurred since 2002, and the period 2000–2010 was the state's hottest decade on record. This climate change is predicted to cause an increase in the frequency and intensity of extreme weather events, warmer temperatures as well as increased rainfall in some parts and droughts in others.

The climate of the Sydney region is warm temperate, with rainfall fairly evenly spread throughout the year for an annual average of approximately 950 millimetres. The *NSW Climate Impact Profile* (DECCW, 2010b) suggests that the projected climate change for the Sydney/Central Coast Region is likely to be considerable, including:

- average annual temperatures to increase by up to three degrees Celsius and extreme temperatures to increase substantially by 2050
- changes in seasonal rainfall, including increases in summer rainfall (20-50 percent) and a decrease in winter rainfall (10 to 20 percent) by 2050
- increase in the frequency and intensity of annual extreme rainfall events by up to 20 percent by 2050.

7.13.3 Impact assessment

7.13.3.1 Climate change

Typical climate change impacts on infrastructure and associated assets include the following scenarios:

- higher average temperatures
- more frequent occurrences of extreme temperatures (days over 35°C)
- lower average rainfall
- more intense extreme rainfall events
- increased lightning strikes
- higher sea level and storm surge events
- more frequent extreme (or catastrophic) fire danger days.

Consideration of the above general risks with respect to the Project would indicate that the key risks to the construction works could include the following:

- increased storms and increased flooding frequency posing safety risk to workers, impacting construction deadlines construction costs and potentially damaging equipment and infrastructure
- increased risk of soil shrinkage and building subsidence due to instability from increasing rainfall
- water scarcity during drier months leading to higher demand for water impacting on operational requirements.

7.13.4 Construction impacts

Greenhouse gas emissions may be emitted directly or indirectly. The direct greenhouse gas-generating activities associated with construction include mobile vehicular emissions (Scope 1 emissions). Indirect greenhouse gas emissions as a result of the Project would include emissions associated with the consumption of electricity within site compounds and construction equipment, diesel consumption (Scope 2 emissions) and the emissions embodied in the products used on-site, particularly steel and concrete (Scope 3 emissions).

Typically, the operation of on-site machinery during construction works and general site operations account for the majority of construction-related greenhouse gas emissions. Expected direct sources of greenhouse gas emissions from construction would include:

- combustion of fuel in construction plant, equipment and vehicles which typically accounts for most direct construction related emissions
- expected indirect sources of greenhouse gas emissions from construction would include:
 - electricity generation for use in construction (occurring off-site at the power station)
 - disposal and decomposition of waste generated from construction work and staff
 - embodied emissions in construction material including steel and cement (i.e. the emissions that were required to create the construction material).

The volume of greenhouse gas emissions that would be generated during construction are not expected to be significant and are considered to have minimal potential to significantly contribute to Australia's total annual greenhouse emissions of around 550 Million TCO₂-e (*Department of Climate Change and Energy Efficiency, 2010*). Therefore the construction works are not expected to have a significant effect on climate change.

The modification of the existing facility at Eveleigh would also require less materials and energy than if a new facility were to be constructed. Therefore, the greenhouse gas emissions and climate change impact of the Project would be less than the alternative of a new commissioning, stabling and maintenance facility.

7.13.5 Operational impacts

7.13.5.1 Impacts of climate change

Potential climate change impacts on the operation of the Project have been considered using the typical scenarios identified in Section 7.13.3. The potential climate change impacts during operation of the Project are presented in Table 7.32.

Table 7.32 Potential climate change impacts on the operation of the maintenance facility

CLIMATE RISK	POTENTIAL RISKS TO THE PROJECT
<i>Mean temperature change and extreme heat (days over 35°C)</i>	
Increase in the severity, frequency and duration of extreme temperatures and heatwaves Increase in the severity, frequency and duration of extreme temperatures and heatwaves	<ul style="list-style-type: none"> → risk to health and safety of staff working at the facility → increased air-conditioning and associated power demands → increased frequency and duration of power outages → decreased efficiency and more frequent outages of electrical, signalling and communication systems → accelerated degradation of materials and reduced life of buildings and structures → increased potential for buckling of rail track → increased capital costs due to the need for more frequent repairs and maintenance → maintenance works suspended resulting in program delays.

CLIMATE RISK	POTENTIAL RISKS TO THE PROJECT
<i>Extreme rainfall and flood events</i>	
Increased intensity of extreme rainfall events potentially resulting in flooding	<ul style="list-style-type: none"> → risk to health and safety of staff working at the facility and travelling to/from the facility → inundation of the Precinct causing potential isolation of assets due to flooding → increased frequency and duration of power outages → increased stormwater runoff, with potential damage to surface drainage infrastructure and sewer systems causing localised flooding → malfunctioning of electrical equipment, including communications and associated circuitry → loss of traction of trains moving on tracks through the facility, with potential risk of derailment → increased soil erosion and landslip, resulting in reduced integrity of building foundations and potential structural failure → damage to maintenance facility and trains requiring repair and/or replacement and an increase in capital costs → accelerated degradation of materials and reduced life of buildings and structures requiring repair and/or replacement and an increase in capital costs.
Increased intensity, severity and frequency of storm events exacerbated by extreme rainfall and sea level rise, with increased frequency and severity of extreme wind causing debris (e.g. fallen trees, branches, power lines)	<ul style="list-style-type: none"> → risk to health and safety of staff working at the facility and travelling to/from the facility → damage to maintenance facility and trains, substations, overhead power lines, catenary and signalling/communications infrastructure requiring repair and/or replacement and an increase in capital costs → increased frequency and duration of power outages → accelerated degradation of materials and reduced life of buildings and structures requiring repair and/or replacement and an increase in capital costs.

7.13.5.2 Greenhouse gas impacts

Greenhouse gas emissions would be primarily associated with the following activities during commissioning and operation of the New Intercity Fleet at Eveleigh:

- electricity use for trains, administration buildings and maintenance facilities
- combustion of fuel in site plant, equipment and vehicles when required
- disposal of waste from the facility.

The operation of the New Intercity Fleet would provide benefits over existing operations due to the improved energy efficiency of the New Intercity Fleet due to the generally lower energy consumption (kWh/km) based on contract specifications compared to other train types. Additionally it would contribute to an increased proportion of people travelling on public transport over time due to its role in improving intercity train services, which is a lower greenhouse gas intensive alternative to car travel on a per passenger basis. This is aligned with Transport for NSW's 2012-2017 corporate plan which states that they want "to contribute to the overall response to climate change by supporting sustainable travel options" (TfNSW, 2012).

The central location of the Precinct means that any New Intercity Fleet trains requiring maintenance may not have to travel as far for maintenance. This also contributes to less greenhouse gas emissions compared to the alternative of not having a facility at a central location such as Eveleigh.

These benefits associated with the operation of New Intercity Fleet and use of the facility at Eveleigh are aligned with the NSW Government Resource Efficiency Policy which prioritises the undertaking of energy efficiency projects amongst other goals (Office of Environment and Heritage, 2014).

7.13.6 Management and mitigation measures

7.13.6.1 Climate change

Overall, the risk that climate change poses to the Project, and the contribution of the Project to climate change is not significant and is manageable through consideration of the potential effect of climate change on the Project during the Project detail design stage. This should include considering the potential effect of climate change on drainage requirements and the potential for increased flood frequency.

7.13.6.2 Greenhouse gases

While it would not be possible to completely mitigate the generation of greenhouse gas emissions during construction (due to the need to consume energy and resources), the amount of emissions could be reduced by implementing the following mitigation measures as nominated in the *Sustainable Design Guidelines*:

- Minimise the amount of excavation required (thereby reducing quantities of fuel consumed in the construction process, and fuel consumption associated with the transportation of material).
- Designing to prioritise the use of pre-cast and prefabricated elements. In general there is less waste of materials (with embodied emissions) and energy expended in construction when pre-cast/prefabricated elements are used.
- Using low greenhouse gas-intensive construction materials (where a suitable substitute for a high greenhouse gas-intensive material is available). Options under consideration include:
 - low carbon concrete (where Portland cement is substituted with waste products including granulated blast furnace slag and fly ash)
 - geopolymer concrete for non-load bearing applications such as footpaths
 - recycled glass fines instead of sand
 - recycled ballast
 - recycled steel in reinforcing.
- Procuring construction services and materials locally to minimise the distance travelled and therefore emissions of vehicles accessing the site.
- Implementing energy-efficient work practices, such as switching off construction plant, vehicles and equipment when not in use to minimise idling.
- Equipment and vehicles would be regularly maintained to maximise fuel efficiency.

7.14 Hazard and risk

7.14.1 Existing environment

The Precinct comprises rail tracks, moving trains, rail maintenance buildings, offices, vehicle access roads, equipment and chemical storage sheds and overhead electrical wiring. The existing environment has the potential to result in harm to people working in or visiting the rail yard if not appropriately managed.

7.14.2 Construction hazards

The main hazards associated with the construction works include:

- working in the vicinity of an operating rail corridor and the risk of being hit by a train
- working in the vicinity of live overhead wires and subsurface utilities
- transportation, use and storage of hazardous materials to and on site

- potential for striking of services (either known or unknown during construction works)
- vehicle accidents involving construction plant, equipment and/or construction personnel
- handling of contaminated material.

The above risks would be managed through the mitigation measures described in Section 7.14.4 which would be incorporated into the overall CEMP for the Project.

7.14.3 Operational hazards

The main hazards associated with commissioning and maintenance of the New Intercity Fleet at Eveleigh would include:

- impacts of climate change and natural events such as flooding
- utility failure (power or communication failure)
- train accident (including derailment, collision or impact)
- storage of hazardous materials
- potential spills from trains and other equipment (oil, contaminants, etc.) and materials used for train cleaning.

Operational hazards and risks would be managed through the implementation of Sydney Trains standard measures relating to hazard and risk.

7.14.4 Management and mitigation measures

Management measures that would be implemented to address potential impacts to hazard and risk as a result of the Project are outlined below.

- During construction:
 - Any storage of hazardous materials would be undertaken in clearly marked designated areas that are designed to contain spills and leaks with appropriate bunding.
 - Machinery would be checked daily to ensure there is no leaking oil, fuel or other liquids.
 - A Work Health and Safety Plan would be developed to manage construction safety hazards.
 - Contingency plans would be developed to deal with any spills which might occur during construction.
 - All hazardous material spills and leaks would be reported immediately to site manager and Transport for NSW or Sydney Trains, as required. Actions would be immediately taken to remedy spills and leaks.
 - Chemical spill kits would be readily available and accessible to construction workers. Kits would be kept at site compounds and on specific construction vehicles.
- During operation:
 - All staff would be made aware of incident emergency procedures and the location of emergency spill kits.
 - The modification works at each Subject Site would be designed to comply with Sydney Trains operational safety, signalling and operating procedures. Operational hazards would be managed through Transport for NSW's standard procedures for hazard and risk that are currently in place across the entire rail network.

7.15 Cumulative impacts

7.15.1 Overview

This section discusses the potential cumulative impacts that may arise as a result of the construction and operation of the Project, and the interaction of these impacts with other identified major developments within the local area. The cumulative impacts relate to both the individual environmental impacts of the Project as well as the combined effects of this and other projects in the vicinity of the Precinct.

While this REF focuses on the potential environmental impacts of the associated with the construction, commissioning and ongoing operation of the New Intercity Fleet at the Precinct, it is important these potential impacts are considered in their wider contextual surroundings. Cumulative impacts are those that may not be considered substantial on their own but that may be more substantial when considered in association with other impacts. Cumulative impacts may occur as the result of the interaction of impacts within a single project or due to the combined effects of a number of projects occurring simultaneously in a given area.

7.15.2 Cumulative construction impacts

Potential cumulative construction impacts are considered to include:

- increased construction vehicle traffic on public roads causing congestion and delays, and increased air pollution and noise for local residents and other sensitive receivers/land uses
- cumulative noise impacts associated with multiple construction works, particularly during the night time period
- changes to the overall visual amenity of the area.

The severity of potential cumulative impacts on surrounding receivers would vary between locations and would generally be dependent on the following factors:

- the types of works being undertaken
- the duration of the works
- the distance between the works and their respective proximity to the receiver
- the sensitivity of the receiver.

In general, sensitive receivers that are most likely to be affected by cumulative construction impacts would be those that are located in close proximity to the Precinct and which are also located within close proximity to other construction work sites and/or along common construction access routes.

A more detailed overview of potential cumulative impacts with consideration potential co-occurring developments is provided in Section 7.15.3.

7.15.3 Potential co-occurring and future developments

The consequences that may arise from the effects of incremental or co-occurring development are usually described as 'cumulative environmental impacts'. Cumulative impacts have the potential to arise from the following:

- the interaction of individual elements within the Project and surrounds
- the additive effects of the Project with other external projects.

In accordance with Clause 228(2) of the EP&A Regulation 2000, any cumulative environmental effects of the Project with other existing and likely future activities must be taken into account in assessing potential environmental impacts. These can be viewed as either positive or negative cumulative impacts.

An assessment of cumulative environmental impacts of the Project with other identified potential developments has been undertaken based on the following:

- size of the proposed or existing project which was generally limited to major developments
- type of project or proposal
- location of the proposal or project in relation to the Precinct and specifically, each of the three Subject Sites
- timeframe of the proposal or project with only those projects likely to be constructed concurrently with construction and commissioning works associated with the New Intercity Fleet.

A review of the Department of Planning and Environment's [Major Projects Register](#)¹⁰ (accessed 13 December 2016) and council development applications identified the following proposals or approved projects within close proximity to the Precinct and which may generate potential cumulative environmental impacts:

- proposed, redevelopment of the Australian Technology Park, Eveleigh
- North Eveleigh West Precinct
- South Eveleigh Precinct.

The above mentioned proposals are discussed below along with the potential cumulative environmental impacts when considered to parallel with the Project.

7.15.3.1 Redevelopment of Australian Technology Park

Approval for the redevelopment of the Australian Technology Park is being sought by Mirvac under Part 4, Division 4.1 of the EP&A Act. The consortium lead, by Mirvac acquired the site from the NSW State Government in November 2015. The State Significant Development application (SSD 7317) the NSW Department of Planning and Environment has provided their recommendation to approve the development and is now waiting final consent from the NSW Planning and Assessment Commission (PAC). The development adjoins the southern and eastern boundary of the Precinct and would involve:

- construction of three new mixed use buildings ranging from four to nine stories high. These would include retail, commercial and community and recreational spaces
- site preparation works involving the demolition and clearance of existing car parking areas and excavations
- landscaping, road and establishment of public domain areas throughout the Australian Technology Park site.

An Environmental Impact Statement was prepared by JBA Urban Planning Consultants (JBA) for the proposed development (JBA, 2015), which identified a number of environmental impacts including:

- increase in heavy vehicle movements during construction with a maximum estimated peak of 40 trucks per day
- construction and operational noise impacts at nearby sensitive receivers
- minor heritage impacts on the Eveleigh Railway Workshops, listed on the NSW State Heritage Register and other movable heritage items within the Australian Technology Park precinct.

If approved, construction works would coincide with construction and train commissioning works being undertaken at the Precinct. However, the scale and nature of the proposed construction and commissioning works as part of the New Intercity Fleet project is minor in scale compared to the Australian Technology Park redevelopment. Notwithstanding this, landscaping and public domain improvement works are proposed to be

¹⁰ <http://www.majorprojects.planning.nsw.gov.au/>

undertaken at Innovation Plaza and west of Subject Site 3 – Eastern Siding, near to the secondary site access road off Cornwallis Street. Providing the mitigation measures in Section 7.15.5 are implemented, potential impacts (including elevated noise and traffic and access) generated from the interaction of both projects can be adequately managed.

In summary, the interaction of the Australian Technology Park redevelopment with construction and commissioning works associated with the New Intercity Fleet would be limited to the duration of construction and are not anticipated to be significant.

7.15.3.2 North Eveleigh West Precinct

The North Eveleigh West Precinct is located within the Central to Eveleigh corridor, which encompasses land reserved for the purpose of urban renewal by UrbanGrowth NSW. This development corridor extends westwards from the Sydney CBD following the rail corridor to Eveleigh. The North West Eveleigh Precinct concept plan was approved in 2008 under Part 3A of the EP&A Act (now repealed) and includes the development of residential apartment buildings, landscaped parkland and retention and adaptive reuse of the Clothing Store.

This North Eveleigh West Precinct is located to the north of the Precinct, to the immediate west of Carriageworks. The construction of one affordable housing apartment block was recently completed with further residential apartment developments and other works in accordance with the approved concept plan proposed.

A State Significant Development Application (SSD 7483) has been lodged with the Department of Planning and Environment for site establishment works, construction of roads, landscaping and other ancillary works, however an EIS has yet to be lodged. Given the status of this proposed development, it is unlikely that construction works (if approved) would coincide with construction works associated with the New Intercity Fleet.

Notwithstanding this, should construction occur simultaneously, potential cumulative impacts such as traffic and noise are not expected to be significant. In addition, the construction works at the Precinct, particularly the demolition of the Welding Qualifications Centre is not anticipated to contribute to any cumulative visual impacts associated with future developments within the North Eveleigh West Precinct.

7.15.3.3 South Eveleigh Precinct

Like the North Eveleigh West Precinct, the South Eveleigh Precinct is located within the Central to Eveleigh corridor and adjoins the southern boundary of the Precinct. The southern precinct is likely to be mainly a residential area located around parkland, community facilities and neighbourhood scale shops. A diverse range of apartment buildings is possible with taller residential buildings adjacent to the rail corridor and lower buildings on the precinct edges to provide a transition to the existing neighbourhood.

No actual development applications or concept plans associated with the South Eveleigh Precinct have been lodged. During operation of the New Intercity Fleet at Eveleigh it is considered that any future developments associated South Eveleigh Precinct would be undertaken in consideration of the ongoing operation of rail activities at the Precinct.

7.15.4 Cumulative operational impacts

Once operational, no cumulative impacts are likely to occur as a result of the Project with any future developments in the local area.

7.15.5 Management and mitigation measures

The following management and mitigation measure would be implemented to minimise cumulative impacts:

- Transport for NSW and the nominated contractor would consult with the proponents of other major projects in the area to avoid any potential cumulative impacts.

8 ENVIRONMENTAL MANAGEMENT

8.1 Overview of environmental management system

8.1.1 Construction environmental management plan

A CEMP would be prepared for the construction phase of the Project. The CEMP would provide a centralised mechanism through which all potential environmental impacts would be managed. The CEMP would document mechanisms for demonstrating compliance with the commitments made in this REF, the Submissions Report (to be prepared following the public display of the REF), and other relevant statutory approvals. The CEMP would outline a framework for the management of environmental impacts during construction of the Project. The plan would include and address (at a minimum) the mitigation and management include in this REF. A summary of these management and mitigation measures is provided in Section 8.2.

It is anticipated that the contractor appointed to deliver the Project would prepare a CEMP for the works which would be reviewed and endorsed by Transport for NSW prior to the commencement of construction. It is also anticipated that Sydney Trains, Rail Heritage and other users of the Precinct would be consulted as part of the preparation of the CEMP.

8.1.2 Operational environmental management plan

Commissioning of the New Intercity Fleet at the Precinct would be managed through an operational environmental management plan (OEMP) (or similar plan) which would be developed prior to commissioning works. The plan would be prepared between Transport for NSW and the nominated maintenance operator under consultation with Transport for NSW and other stakeholders including Sydney trains.

It is anticipated that impacts associated with the stabling and maintenance of the New Intercity Fleet at the Precinct during their operation would be managed in accordance with the existing *Draft Eveleigh Precinct Management Plan* (Sydney Trains, 2014b).

8.2 Management and mitigation measures

The REF has identified a range of environmental impacts that are likely to occur as a result of the Project. Table 8.1 provides a summary of the environmental management measures that Transport for NSW propose to manage the potential environmental impacts associated with the construction and commissioning and operation of the New Intercity Fleet at the Precinct.

The safeguards and management commitments documented in Table 8.1 may be revised in response to submissions raised in response to the public display of this REF and/or design changes made subsequent to the public display of the REF. Transport for NSW would consider the final environmental management commitments when making a determination on the Project. The contractors appointed for the construction of the proposed intercity maintenance facility would be required to undertake all works in accordance with these environmental management measures.

Table 8.1 Summary of environmental management measures

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
General	
A.1	A CEMP would be prepared prior to the commencement of construction and should include all mitigation measures and sub-plans outlined below which are specific to construction activities. The CEMP and all associated sub-plans shall be updated to align with any changes to work procedures.
A.2	All construction workers should be inducted onto the CEMP prior to the commencing their work. Records shall be kept of all inductions and training.
A.3	An OEMP would be prepared to manage potential impacts described and assessed in this REF in relation to commissioning of the new trains. This should include all mitigation measures and sub-plans outlined below which are specific to commissioning works.
A.4	Any modifications to the proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
A.5	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate regular intervals.
Noise and vibration	
B.1	<p>As part of overall CEMP for the Project, a construction noise and vibration management plan (CNVMP) would be developed for the Project, prior to commencement of works. The management plan would include (but is not limited to) the following:</p> <ul style="list-style-type: none"> → identified nearby residences and other sensitive land uses → approved hours of work and what work would be undertaken → dominant noise and vibration generating activities → details of noise mitigation and management measures to be applied → information for worker training to minimise noise impacts → community consultation protocol(s) → complaints handling protocol(s) → construction works should be planned and carried out during standard construction hours wherever possible.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
B.2	<p>During construction the standard mitigation measures contained within the Transport for NSW <i>Construction Noise Strategy</i> (CNS) would be used as the basis for the proposed mitigation measures to be included in the CNVMP. These measures would include:</p> <ul style="list-style-type: none"> → No swearing or unnecessary shouting or loud stereos/radios would be allowed on site. → No dropping of materials from height, throwing of metal items and slamming of doors would be permitted. → A noise monitoring program would be carried out for the duration of the works in accordance with the CNVMP and any approval and licence conditions. → Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods. → High noise and vibration generating activities (such as jackhammer use or transportation via diesel locomotive) would only be carried out in continuous blocks, not exceeding three hours each, with a minimum respite period of one hour between each block. → Quieter and less vibration emitting construction methods would be used where feasible and reasonable. → The noise levels of plant and equipment would have operating sound power or sound pressure levels that would meet the predicted noise levels. → Noise emissions would be considered as part of the selection process. → Simultaneous operation of noisy plant within discernible range of a sensitive receiver would be avoided where possible. → Plan traffic flow, parking and loading/unloading areas to minimise reversing movements. → Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out-of-hours work. → Stationary noise sources would be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. → Structures to shield residential receivers from noise such as site shed placement, earth bunds, fencing, erection of operational stage noise barriers would be used (where practicable) and consideration of site topography when situating plant would be undertaken.
B.3	<p>To minimise noise levels, the following work practices would be implemented:</p> <ul style="list-style-type: none"> → Minimise the potential for construction vehicles to access the site prior to 7 am, where possible.
B.4	<p>To minimise the risk of vibration impacts, the following would be considered:</p> <ul style="list-style-type: none"> → Ensure that safe working distances are complied with. → Where work is required within the distance, site-specific safe working distances are to be established on-site prior to the relevant vibration generating works commencing. → Where possible, the use of less vibration intensive methods of construction or equipment should be considered where possible to reduce the potential for cosmetic damage. → All equipment should be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts. → If vibration intensive equipment is to be used within the safe working distances, vibration measurements are to be undertaken when work commences. → Assess the condition of heritage items to assign the appropriate vibration limits and set safe working distances. → Conduct building condition surveys of buildings before and after works where work inside the safe working distances is required.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
B.5	<p>To minimise the potential for sleep disturbance, where night works are proposed to be undertaken, the following controls would be implemented where feasible and reasonable:</p> <ul style="list-style-type: none"> → Avoid conducting noise intensive night works for more than two consecutive nights. → Schedule noise intensive activities to be undertaken before 10pm. → Schedule activities which are likely to cause maximum noise events such as deliveries, moving material or equipment and compacting works to avoid the night time period (10pm to 7am). → Avoid dropping tools or materials from height, striking materials, dragging materials or making metal on metal contact. → Educate workers on the importance of minimising noise and avoid creating short duration high noise level events. → Out of works hours may also be scheduled outside possession periods. Approval from TfNSW would be required for any out of hours work and the affected community would be notified as outlined in TfNSW's <i>Construction Noise Strategy</i>. → Inform surrounding residents by mail of planned works prior to the works commencing.
B.6	<p>A noise management plan would be developed to manage potential noise impact during commissioning works. The plan should give consideration to the following mitigation measures including those provided in Table 6.5 of the Noise and Vibration Impact Assessment (WSP Parsons Brinckerhoff, 2016) attached as Appendix A:</p> <ul style="list-style-type: none"> → Scheduling commissioning activities to reduce the number of trains that are conducting noise intensive activities at the same time. → Scheduling noise intensive commissioning activities such as brake and Digital Voice Announcement testing during the day and evening time. → Scheduling use of diesel locomotives for shunting in the facility to avoid night time period. → Use locomotives in lowest permissible power/notch setting within the Precinct. → Shutting off diesel locomotives when not in use. → Utilise existing building / structures (e.g. train wash, Australian Technology Park, other trains) to shield residential receivers from noise from standing locomotives, when it does not significantly impact the operation of the Precinct or as directed by the Eveleigh Precinct Manager. Allocate a place for diesel locomotives to stand and idle, if required in a location that is shielded from the nearest residential receivers. → Allocate a place for diesel locomotives to stand and idle, if required in a location that is shielded from the nearest residential receivers. → As part of the detailed design, additional noise modelling would be undertaken to confirm potential changes to noise levels from horn testing as a result of the project. If existing horn noise levels are predicted to increase, additional mitigation measures would be considered to minimise horn noise emissions where reasonable and feasible.
B.7	<p>Where intensive night time commissioning activities are planned that may exceed the night PSNLs, it is recommended that the community in NCA D be informed at least 24 hours in advance.</p>
Non-Aboriginal heritage	
C.1	<p>A Section 60 approval under the NSW <i>Heritage Act 1977</i> in relation to the minor assessed impact on the Eveleigh Railway Workshops (SHR Item No. 011040) would be sought prior to construction works commencing.</p>
C.2	<p>Archival recording of all impacted structures and the setting and context of the Precinct would be undertaken in accordance with NSW Heritage Council guidelines, prior to construction works commencing.</p>
C.3	<p>The wooden buffer stop in the Eastern Siding should be re-used if feasible and if it meets current operational requirements.</p>

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
C.4	A schedule of movable heritage objects in the Welding Qualifications Centre should be prepared in consultation with Sydney Trains. The schedule of objects would be prepared prior to commencement of works, and provide guidance in accordance with the Sydney Trains Movable Heritage Strategy on the temporary and long-term curation of these items.
C.5	The construction contractor would consider sympathetic design and materials as part of detailed design, particularly in Subject Site 3 in front of the Works Managers Office.
C.6	The memorial plaques and their plinths currently located to the west of the Welding Qualifications Centre must be protected from damage during demolition and any other local works. This protection may consist of a temporary exclusion zone.
C.7	A program of archaeological monitoring under the supervision of the excavation director would be conducted during the removal of the present ground surfaces in Subject Site 1. Depending on the intactness of archaeological resources identified in this area, testing or open area salvage excavation would be conducted at the discretion of the excavation director. The extent of this program would be refined during detailed design and constructability stages of the Project and would be input into an Archaeological Work Method Statement which would supplement the present Archaeological Research Design. All State significant deposits would be archaeologically excavated, recorded and removed within areas of impact.
C.8	A program of archaeological monitoring under the supervision of the excavation director should be conducted for footing excavation of overhead wiring stanchions located within Subject Site 2 in accordance with the Archaeological Work Method Statement. All State significant deposits would be archaeologically excavated, recorded and removed within areas of impact.
C.9	Minor ground disturbing impacts (such as non-destructive digging service investigation) should be archaeologically monitored in areas of identified archaeological potential in accordance with the Archaeological Work Method Statement.
C.10	The FRN 2186 Second Class Sitting / Buffet Car is situated in a prominent area which suits the heritage character of the carriage. If possible, it should be relocated to an area with similar public visual prominence. The construction contractor would prepare plans for removal, temporary storage and temporary remediation works following removal of the carriage prior to works commencing. The final location of the carriage would be determined in consultation with the owner of the carriage and the property owner.
C.11	In accordance with Policy 3.6 of the Australian Technology Park Conservation Management Plan, the obstruction of the northward view corridor from the pedestrian plaza in the Australian Technology Park caused by the extension of the north-eastern railway siding, should be minimised by design. For example barrier height and bulk should be minimised.
C.12	In accordance with Policy 9.2 of the Australian Technology Park Construction Management Plan, local, heritage and rail history community groups should be informed of the proposed works and their input sought for strategies to preserve the rail heritage of the Australian Technology Park.
C.13	The Transport for NSW Unexpected Find Procedure would be adhered to during construction.
Aboriginal heritage	
D.1	Work should cease in the vicinity of the find and the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager are to be notified immediately to assist in co-ordinating next steps which are likely to involve consultation with an archaeologist, the OEH and Local Aboriginal Land Council. If human remains are found, work should cease, the site should be secured and the NSW Police and the OEH should be notified.
D.2	Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained before works recommence.
Biodiversity	
E.1	No trimming or removal of vegetation (planted Bottle Brush) adjacent to Subject Site 3 – Eastern Siding would be undertaken without prior approval from Transport for NSW.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
Landscape character and visual amenity	
F.1	All construction plant, equipment, storage areas and stockpiles would be contained within the boundaries at each Subject Site and the nominated equipment storage areas and be removed from the Precinct at the completion of construction.
F.2	Where practicable, existing movable heritage items within Innovation Plaza would be relocated to screen Subject Site 3 – Eastern Siding.
F.3	Appropriate and non-intrusive hoarding should be used at Subject Site 3 - Eastern Siding to assist in screening construction works from the surrounding public open space.
F.4	Lighting should be installed to meet relevant Australian Standards and should be designed in a manner to minimise light spill.
F.5	Where possible, the colour of built form elements is to be selected to match the heritage character of the area.
F.6	Any new signage would be consolidated within built form elements rather than freestanding where possible. Dimensions of signs should be kept to a minimum and be complimentary to the heritage identity of the Precinct and adjoining area.
F.7	Reflective surfaces on newly constructed elements should be avoided where practicable.
Traffic, transport and access	
G.1	All traffic movements would be undertaken in accordance with the <i>Eveleigh Precinct Worksite Traffic Management Plan</i> (Sydney Trains, 2014). In addition, a project specific Construction Traffic Management Plan (CTMP) would be prepared by the construction contractor as to address the access and environmental issues raised in this document.
G.2	The permissible construction hours will strictly adopted as to ensure compliance with the load-limit restrictions currently applicable on the existing road network. Where construction works are required outside of the permissible hours, the construction contractors must obtain the necessary approval to carry out the construction activities accordingly.
G.3	To ensure the safety of pedestrians using the existing splitter island on Railway Parade's roundabout at Park Street, a no-right-turn restriction should be implemented from Railway Parade into the access driveway for large constitution vehicle such as semi-trailers to avoid vehicles mounting the splitter island of the roundabout.
G.4	Internal turning areas would be made available to ensure all vehicles, including construction vehicles are able to enter and exit in a forward direction to ensure safety and minimise interruption of the access points to the road network
G.5	The construction contractor is to encourage the use of public transport by workers to minimise the resulting impact of increased parking demand during the construction stage to the surrounding road network.
Socio-economic	
H.1	All construction areas would be fenced off to restrict access to public. This relates specifically to works at Subject Site 3 – Eastern Siding.
H.2	High security perimeter fencing and signage would be provided to deter unauthorised access to the Precinct, including suitable vehicle and pedestrian gates at appropriate locations around the perimeter of the Subject Site 3 – Eastern Siding. This would be consistent with the existing security fencing surrounding the Precinct.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
Land use and property	
I.1	All track possessions required during construction would be arranged to minimise disruptions where practicable. This would likely occur at times where rail movements within the Precinct are reduced, such as: → weekends or during holiday periods → during night-time hours.
I.2	Consultation with Australian Technology Park would be undertaken prior to the commencement of construction to establish potential offset locations for displaced car spaces adjacent to the Works Managers Office resulting from the required land acquisition.
Hydrology, drainage and flooding	
J.1	During construction, rehabilitation of disturbed areas would be undertaken progressively as activities are completed.
J.2	Sediment would be prevented from moving off-site and sediment laden water prevented from entering any watercourse, drainage line or drainage inlet by implementing erosion and sediment controls outlined in Section 7.11.5.
J.3	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and <i>Water Discharge and Reuse Guideline</i> .
Soils, geology and contamination	
K.1	An erosion and sediment control plan would be prepared for the CEMP. The erosion and sediment control measures would be designed, implemented and maintained in accordance with relevant sections of <i>Managing Urban Stormwater: Soil and Construction Volume 1</i> (Landcom, 2004) (the Blue Book). This should include adequate mitigation to prevent sediment laden run-off entering the stormwater network.
K.2	All material for off-site disposal is to be tested and classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).
K.3	Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by appropriately registered laboratory (NATA) and managed in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014), <i>the Guidelines on the Duty to Report Contamination</i> (EPA, 2015) and the <i>Contaminated Land Management Act 1997</i> .
K.4	During construction, rehabilitation of disturbed areas would be undertaken progressively as activities are completed.
K.5	During construction and operation, all fuels, chemicals and hazardous liquids would be stored within an impervious bunded area. The capacity of the bunded area shall be at least 130% of the largest chemical volume contained within the bunded area.
K.6	Materials would be stored, used and handled in accordance with the measures and procedures detailed with in the material safety data sheet.
K.7	During construction and operation, Environmental spill kits containing spill response materials suitable for the works being undertaken shall be kept on site at all times and be used in the event of a spill.
K.8	Contractors in the vicinity of the Eastern Sidings are to have a HAZMAT Management Plan developed and implemented in accordance with applicable WorkCover and EPA guidelines, prior to the commencement of works, due to the potential hazard of asbestos in the area (GHD, 2016).

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
K.9	In the event that asbestos containing material is encountered during the construction, works in that location are to cease and a suitably licenced asbestos removal contractor (under the <i>Work Health and Safety Regulation 2011</i>) engaged to remove, transport and dispose of the material.
Waste and resource management	
L.1	<p>A waste management plan would be prepared as part of the CEMP. Construction waste would be managed through the waste hierarchy established under the <i>Waste Avoidance and Recovery Act 2001</i>, which is as follows:</p> <ul style="list-style-type: none"> → Avoidance of waste – Minimise the amount of waste generated during construction by avoiding unnecessary resource consumption → Resource recovery – Reuse, reprocess and recycle waste products generated during construction to minimise the amount of waste requiring disposal → Disposal – Where resources cannot be recovered, dispose of them appropriately to minimise the potential adverse environmental impacts.
L.2	All waste requiring off-site disposal would be classified in accordance with the <i>Environmental Protection Authority's Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal. The following key waste mitigation and management strategies would be implemented throughout the Project and would be governed by the CEMP.
L.3	Removal and transport of waste off-site is to be undertaken by a suitably licensed contractor with appropriate approvals obtained under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act). Disposal of the waste is to occur at a suitably licenced waste facility, which can lawfully accept the waste type in accordance with the POEO Act.
L.4	Construction materials would be purchased in accordance with an established procurement strategy that prioritises the selection of materials that utilise best practice recycled materials and sustainability ratings.
L.5	Where possible, construction wastes would be diverted from landfill and recycled or reused.
L.6	Working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.
L.7	Management of operational wastes would be managed by RailConnect NSW in accordance with relevant legislative and Sydney Trains requirements.
Air quality	
M.1	<p>To minimise the generation of dust during construction the following management and mitigation measures would be implemented:</p> <ul style="list-style-type: none"> → Minimisation of disturbed areas. → Implementing dust suppression techniques, such as wet suppression during activities that are predicted to generate high dust emissions (e.g. demolition of the Welding Qualifications Centre). → Stabilising of exposed surfaces post construction. → Appropriately cover loads on trucks transporting material to and from the site and securely fix tailgates of road trucks prior to loading and immediately after unloading. → Restricting vehicle and machinery movements to designated areas and sealed/compacted surfaces where practicable. → Cleaning of material tracked by vehicles from road surfaces, as required.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
M.2	<p>To minimise the generation of dust during operation the following management and mitigation measures would be implemented:</p> <ul style="list-style-type: none"> → Restricting vehicle and machinery movements to designated areas and sealed/compacted surfaces where practical. → Regular checking and maintenance of plant and equipment, to ensure engine emissions are within air quality standards or comply with the manufacturer's specifications, as relevant. → Ancillary service vehicles and maintenance equipment would be operated to minimise dust emissions.
Climate change and greenhouse gases	
N.1	<p>In accordance with the <i>Sustainable Design Guidelines</i> checklist detailed design for the Project would take into consideration the potential effect of climate change on the Project, including drainage requirements and the potential for increased flood frequency.</p>
N.2	<p>Minimise the amount of excavation required (thereby reducing quantities of fuel consumed in the construction process, and fuel consumption associated with the transportation of material).</p>
N.3	<p>Design to prioritise the use of pre-cast and prefabricated elements. In general there is less waste of materials (with embodied emissions) and energy expended in construction when pre-cast / prefabricated elements are used.</p>
N.4	<p>Use low greenhouse gas-intensive construction materials (where a suitable substitute for a high greenhouse gas-intensive material is available). Options under consideration include:</p> <ul style="list-style-type: none"> → low carbon concrete (where Portland cement is substituted with waste products including granulated blast furnace slag and fly ash). → geopolymer concrete for non-load bearing applications such as footpaths. → recycled glass fines instead of sand. → recycled ballast. → recycled steel in reinforcing.
N.5	<p>Procure construction services and materials locally to minimise the distance travelled and therefore emissions of vehicles accessing the site.</p>
N.6	<p>Implement energy-efficient work practices, such as switching off construction plant, vehicles and equipment when not in use to minimise idling.</p>
N.7	<p>Equipment and vehicles would be regularly maintained to maximise fuel efficiency.</p>
Hazard and risk	
O.1	<p>During construction:</p> <ul style="list-style-type: none"> → Any storage of hazardous materials would be undertaken in clearly marked designated areas that are designed to contain spills and leaks with appropriate bunding. → Machinery would be checked daily to ensure there is no leaking oil, fuel or other liquids. → A Work Health and Safety Plan would be developed to manage construction safety hazards. → Contingency plans would be developed to deal with any spills which might occur during construction. → All hazardous material spills and leaks would be reported immediately to site manager and Transport for NSW or Sydney Trains, as required. Actions would be immediately taken to remedy spills and leaks. → Chemical spill kits would be readily available and accessible to construction workers. Kits would be kept at site compounds and on specific construction vehicles.

ID NUMBER	ENVIRONMENTAL MANAGEMENT MEASURES
O.2	<p>During operation:</p> <ul style="list-style-type: none"> → All staff would be made aware of incident emergency procedures and the location of emergency spill kits. → The modification works at each Subject Site would be designed to comply with Sydney Trains operational safety, signalling and operating procedures. Operational hazards would be managed through Transport for NSW's standard procedures for hazard and risk that are currently in place across the entire rail network.
Cumulative impacts	
P.1	Transport for NSW and the nominated contractor would consult with the proponents of other major projects in the area to avoid any potential cumulative impacts.

9 CONCLUSION

9.1 Justification for the Project

The New Intercity Fleet responds to a number of developing issues associated with the existing Sydney Trains and NSW TrainLink fleets, including:

- increasing maintenance costs for ageing trains
- anticipated increases in demand due to urban growth
- lower levels of amenity associated with ageing trains.

In order to allow for the New Intercity Fleet trains, commissioning, maintenance and stabling facilities suitable for the new train type are required around the network. The Eveleigh Facility was selected as one of the facilities.

The key reasons behind the selection of the Eveleigh Facility to support the New Intercity Fleet are as follows:

- The proposed primary maintenance facility for the New Intercity Fleet at Kangy Angy is not projected to be completed in time for the arrival of the first New Intercity Fleet trains. The Precinct at Eveleigh is the preferred location for the initial commissioning of the New Intercity Fleet trains until the facility at Kangy Angy is operational due to:
 - the relatively minor scope of works required to make it suitable for the New Intercity Fleet
 - the lesser capital investment required for the Precinct to be suitable for the New Intercity Fleet compared to other existing train maintenance facilities (such as Mortdale and Flemington) and building a new facility
 - it being a lower risk option as it had already been used for the commissioning, stabling and maintenance of other train fleets.
- The Precinct's direct connection via Engine Dive and Illawarra Dive to the New Intercity Fleet termination point at Central Station, which is only approximately two kilometres away. This is advantageous as:
 - routine and short maintenance activities could be undertaken at the Precinct with minimal dead-running time
 - it is ideal for stabling the New Intercity Fleet trains during the day during the peak periods when trains are not running.
- The benefits of the modifying the Precinct and supporting the implementation of the New Intercity Fleet Program, as discussed in Section 3 of this REF, outweighed the benefits of the 'do nothing' options.

9.2 Sustainable development considerations

Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD). These principles would be incorporated into Transport for NSW's management systems for the Project.

Table 9.1 summarises how the four principles of ESD have been addressed through the Project design and assessment processes.

Table 9.1 Adherence with the principles of ESD

ESD PRINCIPLE	ADHERENCE
Precautionary principle	<p>The assessment of the potential impacts of the Project is considered to be consistent with the precautionary principle. The environmental investigations undertaken for this REF have been consistent with accepted scientific and assessment methodologies (refer to Chapter 7). The detailed investigations undertaken have identified a range of potential impacts associated with the construction and operation of the Project. A worst case approach has also been adopted as part of the preparation of this REF in order to assess the potential impacts associated with the commissioning works at the Precinct as discussed in Section 4.5.2.1.</p> <p>The Project has sought to take a precautionary approach to minimising environmental impacts. This has been applied through the development of a range of environmental management and mitigation measures, as summarised in Chapter 8. These measures would be implemented during construction and operation of the Project.</p> <p>The nominated construction contractor would also be required to prepare a CEMP prior to commencing construction and an OEMP prior to commissioning.</p>
Intergenerational equity	<p>The New Intercity Fleet would benefit future generations by providing an improved set of intercity fleet trains to respond to current passenger demands and crowding levels on current intercity services. The modification works to the Precinct is critical in allowing these new trains to be commissioned on schedule and provide a supplementary location close to the Sydney Terminal for the ongoing stabling and maintenance the new trains.</p> <p>It is acknowledged that the Project may have some adverse impacts on the current generation associated with the minor heritage impacts. However, these are not considered to be of a nature or extent such that they should warrant disadvantage to future generations.</p>
Conservation of biological diversity and ecological integrity	<p>The Project would not impose any impact on biological diversity or ecological integrity.</p>
Improved valuation, pricing and incentive mechanisms	<p>Environmental and social issues were considered in the strategic planning and establishment of the need for the Project and in consideration to the other potential site options at Mortdale and Flemington. The value placed on environmental resources was considered throughout the planning and assessment phase of the Project. The mitigation and management measures in summarised in Chapter 8 are considered suitable in managing and/or reducing the level of impact on the environment and the community.</p> <p>The Project is a continuation of existing operations and therefore maximises use of existing equipment and infrastructure. Continued operation at this Precinct is of significant improved value in comparison to a greenfield site.</p> <p>The Project will use existing, modified rail facilities, thereby improving efficiency of energy consumption and eliminating impacts that would be associated with duplicated facilities.</p>

9.3 Clause 228 considerations

Table 9.2 provides a summary checklist of matters to be considered under clause 228 of the *Environmental Planning and Assessment Regulation 2000*.

Table 9.2 Clause 228 considerations

CLAUSE 228 CONSIDERATIONS		IMPACT
a	<p>Any environmental impact on a community?</p> <p>Some adverse effects on the local community are anticipated during the construction and commissioning of the Project, particularly in relation to construction noise, heavy vehicle movements and visual amenity.</p> <p>After commissioning is complete and the trains enter operation, no additional impacts on the community would be expected as the future operations would be consistent with those currently undertaken at the Precinct.</p> <p>Mitigation measures provided in Chapter 8 are considered appropriate in managing and reducing the level of impact particularly regarding noise.</p>	Short-term negative
b	<p>Any transformation of a locality?</p> <p>As detailed in Section 7.5, the Project would result in adverse changes to the visual setting, particularly at Subject Site 3 – Eastern Siding. However, the overall scale of the change is not considered significant as the Precinct would still remain a prominent industrial feature in the landscape.</p>	Long-term negligible to negative
c	<p>Any environmental impact on the ecosystems of the locality?</p> <p>The Project would not impact on any ecosystems within or near to the Precinct.</p>	No anticipated impacts
d	<p>Any reduction of the aesthetics, recreational, scientific or other environmental quality or value of a locality?</p> <p>The Project would not result in substantial impacts to the recreational or scientific value of the locality. The Project is expected to have some level of impact on the visual amenity to receivers proximate to Subject Site 3 – Eastern Siding as described in section (b) resulting in a reduction in the visual aesthetic and the overall environmental quality at that location.</p>	Long-term negligible to negative
e	<p>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?</p> <p>As described in Section 7.4, the Project would unlikely impact on Aboriginal heritage. A SoHI was prepared by Artefact (2016) to assess the level of impact the Project would have on heritage listed items within and proximate to the Precinct. Whilst the overall level of impact on the State heritage listed Eveleigh Railway Workshops, which the curtilage covers the whole of the Precinct, was assessed as a minor, a permit to proceed with the modification works would be sought under Section 60 of the <i>Heritage Act 1977</i> prior to construction.</p> <p>Overall, the Project is not anticipated to have a substantial effect on the aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance of the locality.</p>	Long-term negative
f	<p>Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Project would not impact on habitat of protected fauna.</p>	No anticipated impact
g	<p>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Project would have no impact on biodiversity.</p>	No anticipated impact

CLAUSE 228 CONSIDERATIONS		IMPACT
h	<p>Any long-term effect on the environment?</p> <p>The Project would cause some long-term visual impacts as discussed in section (b). In addition, the Project is expected to generate some noise impacts at nearby sensitive receivers during construction (18 months) and commissioning works, which are scheduled to be completed at some time in 2022. Following commissioning, noise would be reduced to current levels.</p>	Long-term negative
i	<p>Any degradation of the quality of the environment?</p> <p>There is the potential for contamination of land, surface and groundwater as a result of the construction and commissioning works (refer to Sections 7.10 and 7.11).</p> <p>Amenity related impacts associated with the Project may also detract from the quality of the environment, particularly in respect of project activities resulting in noise and vibration and visual amenity. These impacts are expected to be manageable through the implementation of the safeguards and management measures outlined in this REF.</p>	Long-term negative Short-term negative
j	<p>Any risk to the safety of the environment?</p> <p>Any construction safety hazards would be managed by a Work Health and Safety Plan. Management measures have been proposed to minimise risks associated with encountering contaminated soil and its subsequent disposal. Through implementation of the proposed management and mitigation measures within this REF, it is not anticipated that the Project would result in any substantial risks to the safety of the existing environment.</p>	No impacts anticipated
k	<p>Any reduction in the range of beneficial uses of the environment?</p> <p>The Project would not alter the existing Precinct's use as a train stabling and maintenance facility. Whilst some impacts on other users of the Precinct may be experienced during construction and commissioning works, they would be temporary and short term and can be managed in accordance with the mitigation measures outlined in Section 7.8.4.</p>	Short-term negative
L	<p>Any pollution of the environment?</p> <p>There is the potential for water and soil pollution during the construction of the Project as a result of excavation and other construction works. There would also be some exceedances in noise levels during construction and commissioning works. These impacts are expected to be manageable through the implementation of the safeguards and management measures outlined in this REF.</p>	Short-term negative
m	<p>Any environmental problems associated with the disposal of waste?</p> <p>Waste generated by the Project would be managed through the waste hierarchy established under the <i>Waste Avoidance and Recovery Act 2001</i>. All waste requiring off-site disposal would be classified in accordance with the NSW EPA's <i>Environmental Protection Authority's Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.</p>	Short-term negative
n	<p>Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>There would be no substantial increase in demand on resources that would likely become in short supply as a result of the Project.</p>	Nil
o	<p>Any cumulative environmental effect with other existing or likely future activities?</p> <p>Cumulative environmental effects of the Project with other known developments within the study area have been assessed in Section 7.16. The safeguards and management measures documented in this REF are considered to be adequate in managing the potential cumulative impacts identified.</p>	Short-term negative
p	<p>Any impact on coastal processes and coastal hazards, including those under Projected climate change conditions?</p> <p>The Project would not impact on any coastal processes.</p>	Nil

9.4 Considerations of matters of National Environmental Significance

Table 9.3 provides a summary checklist of matters of national environmental significance to be considered under the Commonwealth EPBC Act.

Table 9.3 Checklist of EPBC Act NES matters

	EPBC ACT NES MATTER	IMPACT
a	Any impact on a World Heritage property? There are no World Heritage properties in the vicinity of the Project.	Nil
b	Any impact on National Heritage Places? There are no National Heritage Places in the vicinity of the Project.	Nil
c	Any impact on wetlands of international importance (declared Ramsar wetlands)? There are no wetlands of international importance in the vicinity of the Project.	Nil
d	Any impact on Commonwealth listed threatened species and ecological communities? The Project would not impact on any EPBC Act listed threatened species or communities.	Nil
e	Any impact on Commonwealth listed migratory species? No impact on migratory species would occur as part of the Project.	Nil
f	Any impact on a Commonwealth marine area? The Project is not located in the vicinity of a Commonwealth marine area.	Nil
g	Any impact on Commonwealth land? The Project would not affect Commonwealth land.	Nil
h	Any impact on the Great Barrier Reef Marine Park? The Project is not located in the vicinity of the Great Barrier Reef Marine Park.	Nil
i	Does any part of the Project involve a nuclear action? No nuclear actions are proposed as part of the Project.	Nil
j	Is the proposed action to be taken by the Commonwealth or a Commonwealth agency? The Project would not be undertaken by the Commonwealth or a Commonwealth agency.	Nil
k	Does the Project involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Project is for a train commissioning, maintenance and stabling facility which is not related to coal seam gas or mining.	Nil

9.5 Significance of environmental impacts

The potential impacts of the Project have been considered in accordance with the requirements of the EP&A Act (Section 111), the EP&A Regulation (Clause 228) and the EPBC Act. Having regard to these provisions, the Project is considered to impose a minor impact on the heritage significance of the Eveleigh Railway Workshops, listed on the NSW State Heritage Register. As such approval under Section 60 of the *NSW Heritage Act 1977* would be sought prior to any construction works commencing.

With respect to the significance of the environmental impacts associated with the Project, Section 112(1C) of the EP&A Act states the following:

An environmental impact statement is not required (despite subsection (1) (a)) in respect of an activity that:

(a) is on land that is, or is part of, critical habitat, or is likely to significantly affect threatened species, populations or ecological communities, or their habitats, and

(b) is not likely to significantly affect the environment except as described in paragraph (a),

if the determining authority has obtained or been furnished with a species impact statement in respect of the activity, prepared in accordance with Division 2 of Part 6 of the Threatened Species Conservation Act 1995.

With the implementation of suitable management and mitigation measures which have been identified as part of this environmental assessment and summarised in Chapter 5, the other impacts associated with the Project are not anticipated to be significant. Therefore an EIS is not considered to be required for the Project.

9.6 Summary

This REF has assessed the potential impacts associated with construction works and the commissioning, stabling and maintenance and operation of the New Intercity Fleet at the Eveleigh Facility. An approval under Section 60 of the *NSW Heritage Act 1977* would be sought prior to any construction works commencing. The key potential impacts associated with the Project (discussed in greater detail in Chapter 7 of this REF) have been identified as comprising:

- noise and vibration – including impacts during construction modification works and commissioning of the new trains
- non-Aboriginal heritage – including impacts to the heritage significance of the *Eveleigh Railway Workshops*, listed on the NSW State Heritage Register.

Through the implementation of suitable management and mitigation measures as identified in this report, the impacts associated with the Project are not anticipated to be significant, and therefore an EIS is not considered to be required.

Using the Eveleigh Facility as a commissioning, stabling and maintenance facility for the New Intercity Fleet would:

- support the initial introduction of the New Intercity Fleet, providing a location for the initial commissioning activities until the primary maintenance facility at Kangy Angy is operational
- provide a location for the day stabling of the New Intercity Fleet between the morning peak and evening peak period
- enable efficient routine maintenance and inspection checks to be undertaken in Sydney and minimise dead-running time.

The New Intercity Fleet would significantly improve the reliability, capacity, operating and maintenance costs and energy consumption of intercity train services. This is aligned with the NSW Government objectives of improving the state's transportation infrastructure.

10 REFERENCES

- AECOM, 2014. *Contamination Investigation – Oscar maintenance Amenities Building Basement Centre*.
- Artefact, 2016. *New Intercity Fleet Eveleigh Facility Project Statement of Heritage Impact*.
- Clouston Associates, 2016. *Eveleigh Maintenance Facility Upgrade – Visual Impact Assessment*.
- Cultural Resources Management, 2002. *Macdonaldtown Triangle REF - European Heritage Issues*.
- Department of Climate Change and Energy Efficiency, 2010, *National Greenhouse Inventory Report 2008*.
- Department of Environment and Climate Change (DECC), 2009. *Interim Construction Noise Guideline*.
- Department of Environment and Conservation, 2006. *Assessing Vibration: A Technical Guideline*.
- Department of Environment Climate Change and Water, 2010a. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*.
- Department of Environment Climate Change and Water, 2010b. *NSW Climate Impact Profile*.
- Department of Environment Climate Change and Water, 2011. *Road Noise Policy*.
- Department of Primary Industries Water (NSW DPI Water), 2016. *Botany Sand Beds aquifer*, accessed 10 February 2017, <<http://www.water.nsw.gov.au/water-management/water-quality/groundwater/Botany-Sand-Beds-aquifer>>.
- Deutsches Institut für Normung, 1999. *DIN Standard 4150-2 Part 3: Structural Vibration in Buildings: Effects on Structures*.
- Environmental Protection Authority, 2000. *Industrial Noise Policy*.
- Environmental Protection Authority, 2011. *Road Noise Policy*.
- Environmental Protection Authority, 2013. *Rail Infrastructure Noise Guideline (RING)*.
- Environmental Protection Authority, 2014 *Waste classification Guidelines – Part 1: Classification of Waste*.
- Environmental Protection Authority, 2015. *Guidelines on the Duty to Report Contamination*.
- Futurepast Heritage Consulting, 2014. *Draft South Eveleigh Heritage Assessment*.
- GHD, 2016. *New Intercity Fleet Enabling Works TA ISD-15-4794 Item F2.1 Concept Design Report Eveleigh Maintenance Facility*.
- GML Heritage Consultants, 2013. *Australian Technology Park Conservation Management Plan*.
- Infrastructure NSW, 2012. *The State Infrastructure Strategy 2012-2031*.
- Infrastructure NSW 2014, *State Infrastructure Strategy Update 2014 – Recommendations to the NSW Government*, November 2014.
- JBA Urban Planning, 2012. *State Significant Development Application SSDA 7317 Environmental Impact Statement Australian Technology Park, Eveleigh*.
- Landcom, 2004. *Managing Urban Stormwater: Soil and Construction Volume 1 (‘the Blue Book)*.
- Landcom, 2004. *Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services*.
- NSW Government, 2011. *NSW 2021 – A Plan to Make NSW Number One*, September 2011.
- NSW Government, 2012a. *NSW Long Term Transport Master Plan*, December 2012.
- NSW Government, 2012b. *Sydney’s Rail Future Modernising Sydney’s Trains*, June 2012.
- Office of Environment and Heritage, 2014. *NSW Government Resource Efficiency Policy*.
- Office of Environment and Heritage 2015, *NSW Air Quality Statement*.

- Sydney Trains, 2014a. *Eveleigh Precinct Worksite Traffic Management Plan*.
- Sydney Trains, 2014b. *Draft Eveleigh Precinct Management Plan*.
- Transport for NSW, 2012. *Connections Transport for NSW's 2012-2017 Corporate Plan*.
- Transport for NSW, 2013. *Construction Noise Strategy*.
- Transport for NSW, 2016. *Water Discharge and Reuse Guideline*.
- World Resources Institute/World Business Council Sustainable Development, 2004. *Greenhouse Gas Protocol*.
- WSP | Parsons Brinckerhoff, 2017. *New Intercity Fleet Eveleigh Commissioning Maintenance and Stabling Facility - Noise and Vibration Assessment*.